ANALYSIS OF
OPEN SPACE CONSERVATION SUBDIVISIONS

PREPARED FOR THE
NEWTOWN PLANNING AND ZONING COMMISSION

PREPARED BY
HARRALL – MICHALOWSKI ASSOCIATES
HAMDEN, CONNECTICUT

April 2003

TOWN OF

NEWTOWN, CONNECTICUT

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Maps and Photographs Page

I. Introduction and Purpose

The purpose of this analysis is to investigate the reality and desirability of using Open Space Conservation (OSC) subdivisions as a means of protecting significant amounts of open space, to help preserve Newtown's rural community character and to conserve the Town's natural resources.

Why consider the use of OSC subdivisions in Newtown? During the past 20 years, 14,000 acres of vacant land (36% of Newtown's total land area) were developed for residential subdivisions. The community character of areas developed was changed from rural to suburban and the natural landscape and ecosystems of those areas was significantly altered as a result of the grading of 2,700 house lots and the construction of miles of subdivision roads and stormwater drainage facilities.

As a part of this subdivision process, 1,100 acres (2.8% of Newtown's total land area) was set-aside as protected open space. Many of the open space parcels created by the existing subdivision process are too small to make significant contributions to the preservation of Newtown's community character or the conservation of the areas natural environment.

II. What is an Open Space Conservation (OSC) Subdivision?

OSC subdivisions are a means for a town to secure significant amounts of protected open space, at no cost to the town. OSC subdivisions are a tool used by municipalities to manage the subdivision of land for residential development in a manner that results in more effective conservation of the natural environment and the preservation of a town's community character. Newtown's conventional subdivision process secures about 10+% of the land area being subdivided as open space. By contrast, an OSC subdivision typically results in the preservation of at least 50% of the subdivision as protected open space.

OSC subdivisions are designed to function as a municipal land use management tool that will enable the conservation and protection a site's important features, including natural resources, historical and archaeological resources, scenic vistas, greenway connections, community character, etc. At the same time, OSC subdivisions enable a property to be developed for single family detached housing at the same gross density as is permitted under existing municipal zoning.

Under this approach to managing residential development, each new subdivision application is viewed as an opportunity to create a significant amount of protected open space. OSC subdivisions enable the preservation of at least five (5) times as much open space as conventional subdivisions, at no cost to the Town. The amount of land that can be preserved through the application of OSC subdivisions is far more than the Town is likely to have the financial resources to acquire. The number of houses created through the OSC subdivision process is the same as would be created under the Town's current subdivision regulations.

III. Examples of OSC Subdivisions

There are many styles of OSC subdivisions. Several examples of OSC subdivisions located in Connecticut, with on-site sewage disposal are described below:

Great Oak Farm is a recently completed subdivision located in adjacent Monroe, Connecticut. The design of this subdivision managed to conserve and protect 50% of the project area. The open space includes forest land, fields, ponds, trails and greenways that weave their way through the community. (see attached site photos)

The topography of Great Oak Farm is rolling to hilly. This site is served by an on-site community sewerage system that includes several leaching fields serving sub-drainage areas. While the Monroe regulations under which this project was developed are not referred to as OSC, the results are the same and the Town is satisfied with the end product.

Long Hill Farm is an OSC styled subdivision that was developed nearly twenty years ago. Located in Guilford, Connecticut, this residential subdivision contains 62 single family detached homes. This subdivision is served by a community septic system. The design of this OSC subdivision managed to conserve and preserve significant amounts of open space, including woodlands and open fields. The design also buffered the subdivision from view from the local town road (Long Hill Road) and adjacent residential and municipal uses. (see attached site photos)

Guilford OSC subdivisions are currently being developed in the northern portion of the Town, preserving at least 50% of the site as protected open space. The Guilford Conservation Land Trust is actively involved in working with the Town to manage newly created open space. While this area of the Town has four acre zoning, house lots within open space subdivisions

GREAT OAK FARM
MONROE, CT.

GREAT OAK FARM
MONROE, CT.

LONG HILL FARM
GUILFORD, CT.

LONG HILL FARM
GUILFORD, CT.

range in size from 1 acre to 1¾ acres and are supporting the development of very large houses, with on-site septic systems. (see attached site photos)

Open Space Conservation styled subdivisions are also being developed throughout many areas of the U.S. While this type of subdivision is referred to by a variety of terms, they all share the same characteristic of preserving significant amounts of protected open space. (see attached photos of several examples)

IV. Newtown's Existing Subdivision Process

Newtown's zoning code and map establish the allowable density of new residential development, in the form of minimum lot sizes. When a parcel of undeveloped land is subdivided for residential use, the plan for the proposed project moves through a subdivision review process to assess its compliance for a variety of municipal concerns including minimum lot size, minimum lot square requirements, wetlands, flood plains, site drainage, traffic, fire protection, the provision of potable water, the disposal of sewage, 10% open space set-aside, etc.

On most occasions, the goal of the subdivider is to maximize the number of lots that can be developed on the property, while minimizing the developers subdivision infrastructure costs. The goal of the municipal regulatory process is to protect the public's health, safety and general welfare interests of Newtown, as represented in the municipal regulations and codes governing the use of land. The result of this sometimes adversarial process is the approval of subdivisions where building lots essentially cover the property "wall-to-wall," except for a minimal (10+%) open space set-aside and interior roads.

Newtown's current subdivision process does protect the health, safety and general welfare interests of the Town. However, this process does not advance many of the issues, goals and implementation strategies developed by the Planning and Zoning Commission during the update of Newtown's Plan of Conservation and Development. Issues, goals and strategies not addressed by Newtown's current subdivision process include the following:

A. As is evidenced from experiences throughout Newtown, conventional subdivisions do not help to "Maintain the scenic characteristics of Newtown's 'Pastoral and Rural Areas' by siting new houses so as to create a visual buffer from the public realm;"

OPEN SPACE SUBDIVISIONS
GUILFORD, CT.

Ashton, Md.

Ashton, Md.

Terra Maria, Md.

Governor's Run, Md.

Governor's Run, Md.

Governor's Run, Md.

B. Conventional subdivisions practices do not enable the "protection of large undisturbed and contiguous blocks of land to sustain diverse wildlife habitat;"

C. The conventional subdivision process does not "Identify existing wildlife corridors and support actions that preserve wildlife habitat needed for the survival of indigenous wildlife species;"

D. While these issues may be addressed peripherally, conventional subdivisions have not demonstrated that they adequately "Preserve and protect Newtown's steep slopes, ridgelines and scenic views," nor do they incorporate a "view shed" analysis as part of the design and review process;

E. Conventional subdivisions provide limited opportunities to link protected open space and contribute marginally to the creation of an expansive, townwide greenway system;

F. Conventional subdivisions do not provide a "means of promoting orderly development and maintaining Newtown's community character by substantially increasing the amount of protected open space resulting from the land subdivision and development process;"

G. Conventional subdivisions do not achieve the goal that "Residential development should enhance Newtown's present community character."

H. Conventional subdivisions contribute marginally to the strategy to "conserve areas that contribute to the preservation of natural resources and attractive visual qualities;"

I. Conventional subdivisions do not contribute to the strategy that "Residential development fronting on rural roads should be sited with a visual buffer from the public realm- the road and road right of way,"

J. The conventional subdivision process does not enable developers to avoid "plowing down trees" and "leaving the existing landscape" and still achieve the site's development capacity for approvable building lots;"

K. Conventional subdivisions do not allow for residential development and the retention or development of agricultural businesses that are compatible with Newtown's rural character;"

L. Conventional subdivisions do not result in the creation of sufficient amounts of open space that could "support the development of playing fields" that are "closer to neighborhoods;"

Newtown's current subdivision process does protect the health, safety and welfare of the Town and it does result in the creation of attractive, suburban styled subdivisions, but it does not help to achieve the goal of maintaining Newtown's community character. The creation of community character is a process characterized by incremental change- one lot at a time. OSC subdivisions offer the opportunity to preserve and enhance Newtown's community character, even as the Town continues to grow.

V. Implementing the OSC Subdivision

Under the OSC subdivision approach to managing residential development, the planning and design process begins with: a) a description of how the land to be subdivided fits into the context of the surrounding neighborhood; b) progresses to an assessment of the site's physical site conditions and natural features; c) identifies areas recommended for development; and d) identifies areas recommended for conservation. This is followed by the preparation of two sketch plans, one depicting how the site might be developed as a conventional subdivision and a second sketch plan showing the development of the site as an OSC subdivision.

The intent of the sketch planning process is to enable the Town and the developer to assess the desirability of using the OSC subdivision option, without the expenditure of significant monies for the preparation of detailed engineering studies associated with subdivision applications. These studies will still need to be prepared once the Town and the applicant have decided upon the best approach to the development of the property.

The following is a description of the recommended municipal review process for OSC subdivisions. An existing parcel of land (Cider Mill Farm), that has received all subdivision approvals and is under construction, was used as a test case to illustrate the workings of the OSC subdivision design process:

A. <u>Describe Site Context</u>

Assess how the site fits in with the surrounding area and describe any contributions the site makes, in its undeveloped state, to the Town's visual community character. Are there any off-site conditions that might affect the subdivision design for the site?

1. Using available Town and Connecticut Department of Environmental Protection (DEP) resources, map and describe the type of conditions (natural and man made) that currently exist within a 1 mile radius of the subject property.

2. Are there any recommendations in the Town's Plan of Conservation and Development that should be incorporated into the design of the site?

3. Are there any off-site open space, park, greenway or trail facilities or plans that should be addressed for connectivity in the design of the site?

4. Are there any elements of community character in this area of Town that need to be addressed by design of the site?

5. Are there any off-site views of the site that should be addressed in the design of the site?

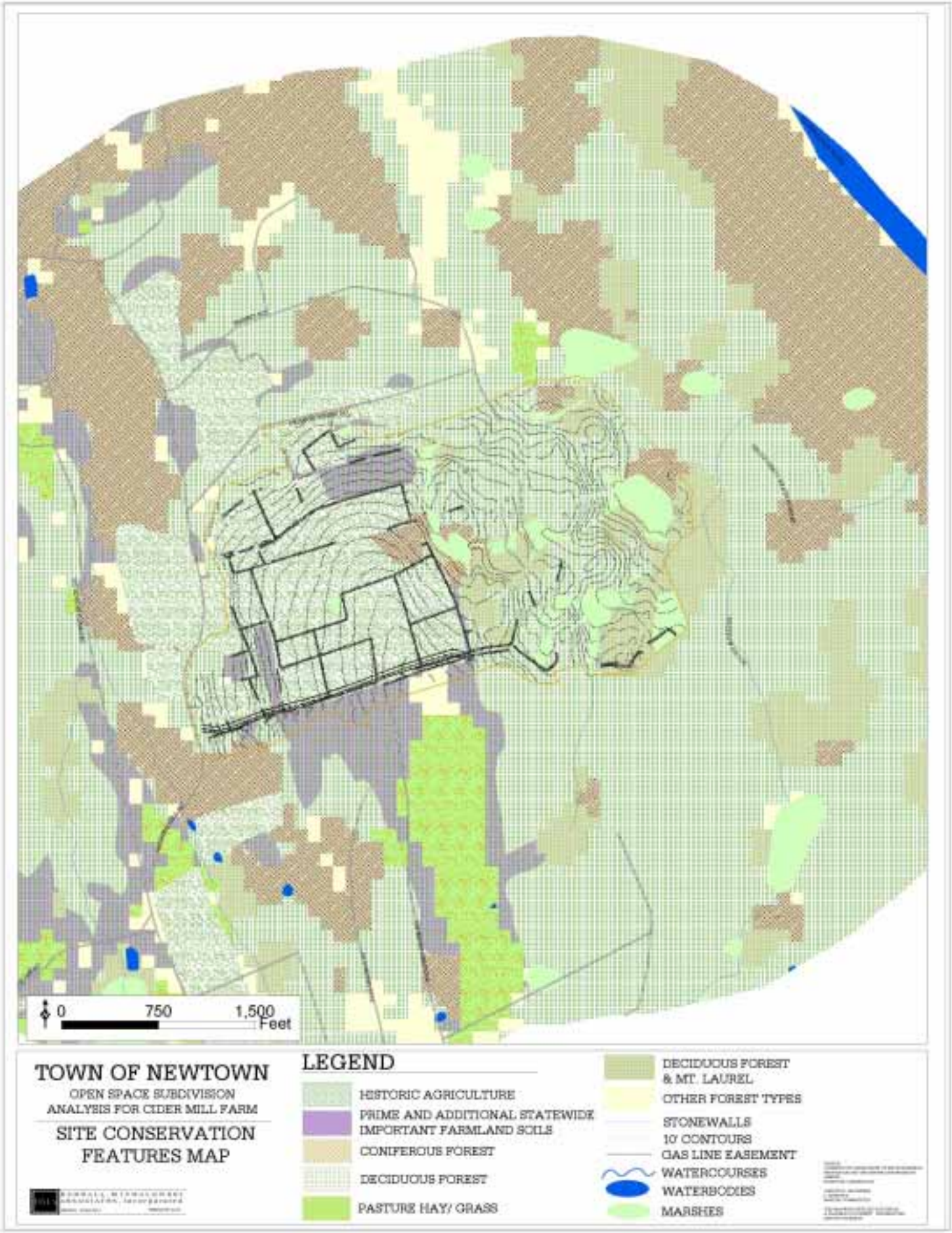
6. Are there off-site historical or archaeological assets that need to be taken into consideration in the design of the site?

7. Are there any off-site natural resource systems or elements of flora and fauna whose continued good health could be affected by the design of the site? Map and describe "endangered, threatened or species of special concern."

8. Are there any off-site topographic elements that could affect the design of the site?

Prepare a "Site Context" report and map that summarize how the site fits into the community and any conditions or features that should to be considered in the design and development of the site?

- <u>Site Context Map should include</u>: A zoomed-in base map (within a 1 mile radius of the site) that includes roads/names, the site, and major features i.e., streams and water bodies, parks, open space, greenways, trails, viewsheds that include the site, historical/archaeological and cultural features and the presence of any natural resource features that could affect the design of the site. (see attached Cider Mill Farm example)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TOWN OF NEWTOWN
OPEN SPACE SUBDIVISION
ANALYSIS FOR CIDER MILL FARM
SITE CONSERVATION
FEATURES MAP
LEGEND
HISTORIC AGRICULTURE
PRIME AND ADDITIONAL STATEWIDE
IMPORTANT FARMLAND SOILS
CONIFEROUS FOREST
DECIDUOUS FOREST
PASTURE HAY/ GRASS
DECIDUOUS FOREST
& MT. LAUREL
OTHER FOREST TYPES
STONEWALLS
10' CONTOURS
GAS LINE EASEMENT
WATERCOURSES
WATERBODIES
MARSHES

B. Site Assessment Analysis

Prepare an analysis of existing site conditions that should be considered in the design of the proposed OSC subdivision.

1. Prepare a brief summary description of the use/history of the site. Was the site used for farming? (Use DEP contact prints of historical aerial photos as a resource).

2. Map any historic or archaeological features located on the site and prepare a description of such features.

3. Map the site's topography and prepare a slope analysis map that identifies slopes of 25% or greater, consistent with existing Town regulations.

4. Review the "Views of Newtown" for any views from within the property that should be protected by the subdivision plan. Prepare a viewshed analysis to understand how the site will be viewed from off-site.

5. Map wetlands, water courses and flood plains consistent with existing Town regulations and include field observations of any vernal pools. Using the Town's current regulations, map appropriate "buffer areas" around these features.

6. Map on-site sub watershed areas and indicate flow directions.

7. Does the site contain any known aquifers and if so are they protected by a municipal aquifer protection overlay district?

8. Does the site contain any special geologic features?

9. Use information available from the Natural Resource Conservation Service and DEP to map soil types and group by hydric and development suitability categories. Identify any State designated agricultural soils.

10. Map and describe "endangered, threatened or species of special concern" located on the site.

11. Map and describe site vegetation, including mature woodlands, secondary woodlands, meadows and special site features such as stonewalls, laneways, etc.

12. Map and describe any existing known easements (utility, drainage, infrastructure, access, conservation, etc).

Prepare a "Physical Site Assessment" report that summarizes the above information, with conclusions as to how these site features and conditions should to be considered in the design and development of the site. Site Assessment Maps should include:

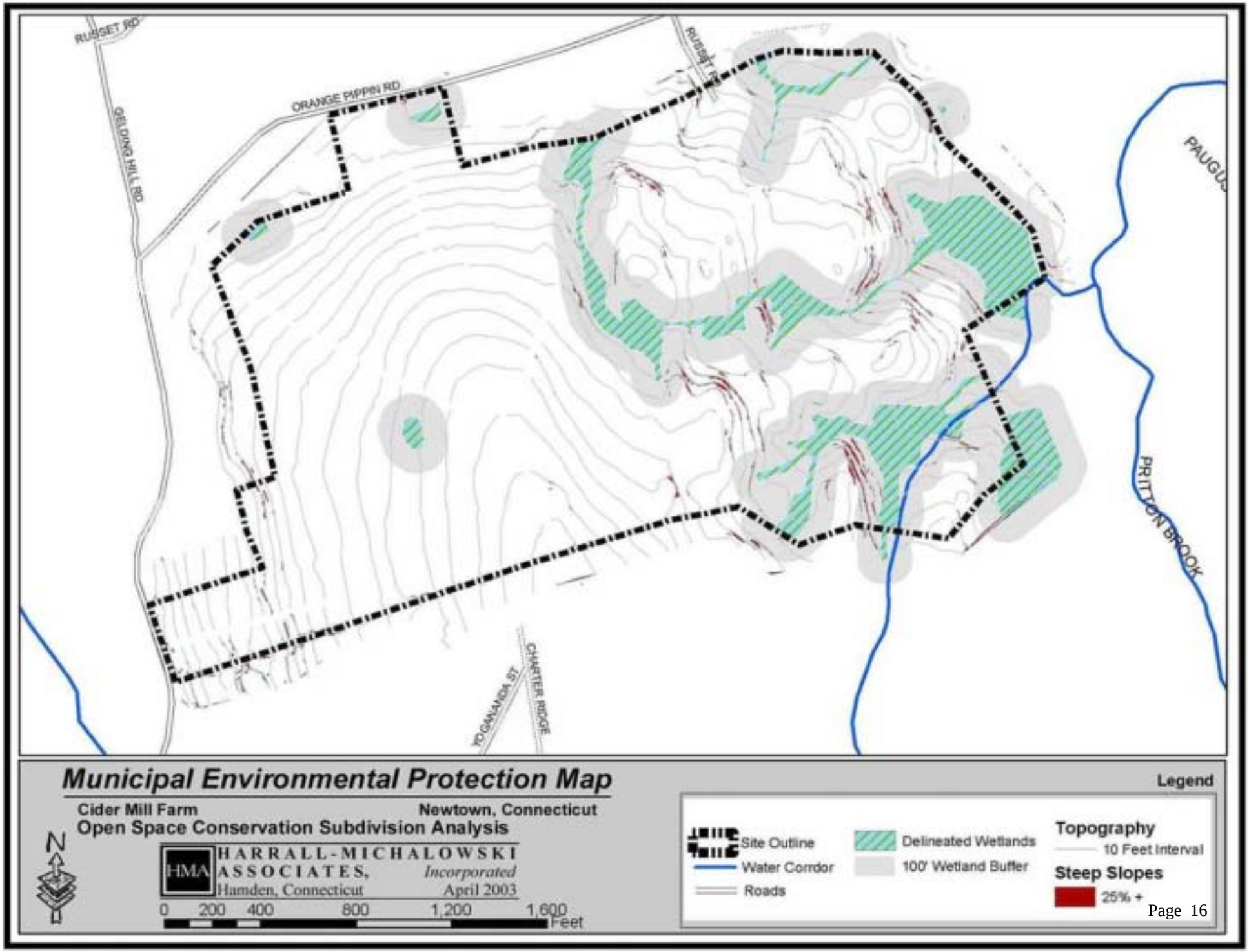
- Municipal Environmental Protection Map: This map highlights those areas of the site that fall under direct municipal and State regulatory protection, including watercourses, wetlands, flood plains, aquifers, protected species and slopes of 25% or greater. Any development proposed within these areas will be subject to municipal regulation as part of the Town's policies to protect important environmental features.

- Site Conservation Features Map: This map features site attributes that should be considered in designing the subdivision, including; site vegetation, State designated farmland soils, non-hydric soils unsuitable for development, stonewalls, rock outcrops, historic or archaeological features, trails, views (from within and from without), neighboring features (houses, parks, State Forests) and easements. This map should have 10' topo lines faded behind the mapped features.

- Areas Suitable for Development Map: This map will include a bold delineation of the areas of the site that are most suitable for development, displayed on the Municipal Environmental Protection map. (see attached Cider Mill Farm examples)

VI. Determination of the Goals for an OSC Subdivision

Based on a review of the findings of the Site Context and Physical Site Assessment analyses, the Planning and Zoning Commission would recommend which site features should be considered for conservation or preservation in designing the lot layout for the proposed subdivision. While some site features will always be considered for preservation, such as wetlands, other site features may be considered for conservation or preservation on a case by case basis. For example, the Commission might consider if the overriding design goal for the OSC subdivision is to:


RUSSET RD
ORANGE PIPPIN RD
GELDING HILL RD
RUSSET RD
PAUGUS
PRITTON BROOK
YOGANANDA ST
CHARTER RIDGE
Municipal Environmental Protection Map
Cider Mill Farm
Newtown, Connecticut
Open Space Conservation Subdivision Analysis
N
HMA
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
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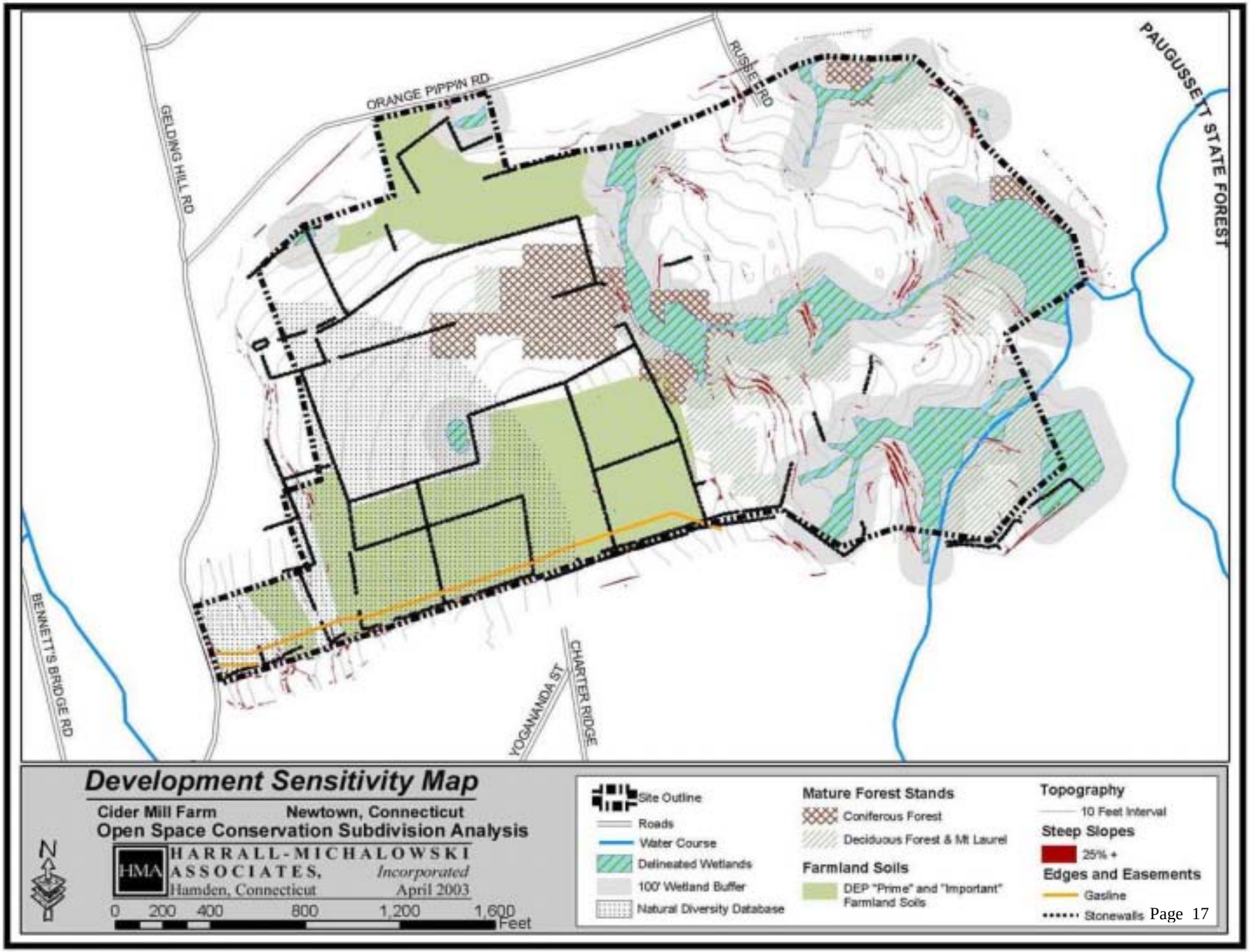
Legend
Site Outline
Water Corridor
Roads
Delineated Wetlands
100' Wetland Buffer
Topography
10 Feet Interval
Steep Slopes
25% +


ORANGE PIPPIN RD
GELDING HILL RD
RUSSE RD
PAUGUSSETT STATE FOREST
BENNETT'S BRIDGE RD
YOGANANDA ST
CHARTER RIDGE
Development Sensitivity Map
Cider Mill Farm
Newtown, Connecticut
Open Space Conservation Subdivision Analysis
HMA
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
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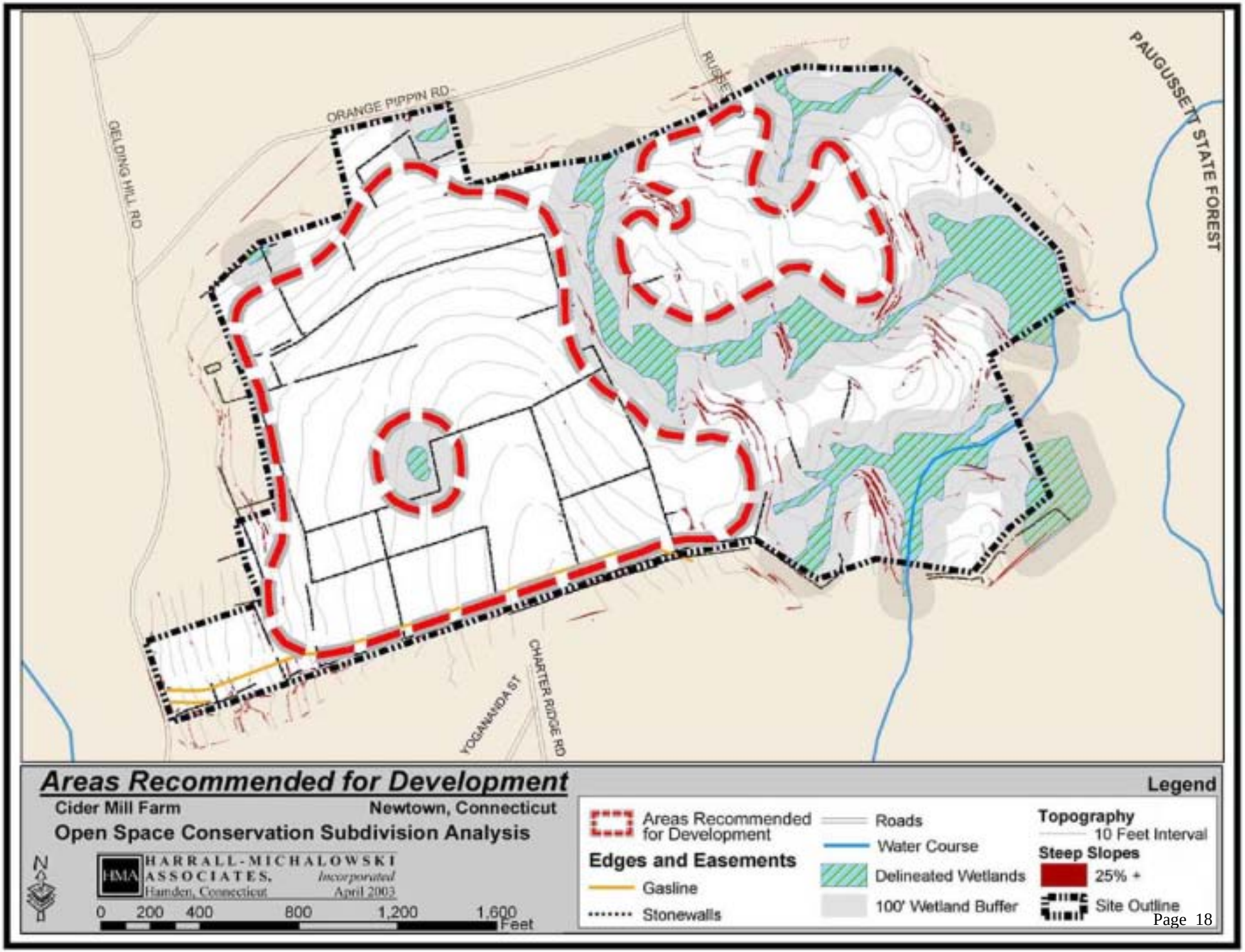
Site Outline
Roads
Water Course
Delineated Wetlands
100' Wetland Buffer
Natural Diversity Database
Mature Forest Stands
Coniferous Forest
Deciduous Forest & Mt Laurel
Farmland Soils
DEP "Prime" and "Important" Farmland Soils
Topography
10 Feet Interval
Steep Slopes
25% +
Edges and Easements
Gasline
Stonewalls


ORANGE PIPPIN RD
GELDING HILL RD
RUGGE
PAUGUSSETT STATE FOREST
YOGANANDA ST
CHARTER RIDGE RD
Areas Recommended for Development
Cider Mill Farm
Newtown, Connecticut
Open Space Conservation Subdivision Analysis
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
0 200 400 800 1,200 1,600 Feet
Legend
Areas Recommended for Development
Edges and Easements
Gasline
Stonewalls
Roads
Water Course
Delineated Wetlands
100' Wetland Buffer
Topography
10 Feet Interval
Steep Slopes
25% +
Site Outline

A. Protect a site's existing agricultural lands or prime agricultural soils: If the Planning and Zoning Commission desires to protect a site's agricultural lands or prime agricultural soils for existing or future agricultural use, the design approach would be to site houses in the woodland areas and on soils which are marginal for agricultural purposes, preserving open agricultural land and prime agricultural soils; or

B. Preserve the elements of community character embodied in the existing conditions of the undeveloped land: If the Commission desires to protect the views of the property that contribute to elements of the Town's rural or agrarian community character, site development should be visually buffered from existing Town roads; or

C. Protect the site's other natural resource features: If the Commission desires to protect the site's other natural resource features, such as woodland areas and the site's wildlife habitat associated with woodlands, the design approach would avoid the woodlands and site houses in open meadow areas; or

D. Maximize the value of adjacent open space: The Commission may recommend that a large, undisturbed portion of the subject property adjacent to existing open space be preserved as protected open space so as to maximize the benefits of the existing open space.

Conservation and preservation considerations of this nature should be made on a case by case basis, taking into consideration the context of the of the property within the Town; its contributions to the Town's visual community character, the site's natural resource features and the influences the site's physical characteristics may have on the design of a residential subdivision.

VII. Assessment of Conventional Subdivision Development Potential

The next step in the OSC subdivision design process is the preparation of a sketch plan of a conventional subdivision layout applied to the site to determine the maximum number of house lots that could be developed on the subject property.

The sketch plan is a planning tool and not an engineered drawing. It will be drawn over the two foot contour base map of the site and respond to applicable Town and State regulations regarding watercourses, wetlands, flood plains, aquifers, protected species, slopes of 25% or greater within the minimum lot square and include the mandatory 10%

open space set-aside, etc. The sketch plan would evolve from a rough sketch that approximates the location of streets, individual lots and the open space set-aside, to a more formalized sketch that shows the location of roads, lot lines and the open space parcel(s). The sketch plan would not be drawn to a survey map level of accuracy, but rather as a planning tool for discussion purposes.

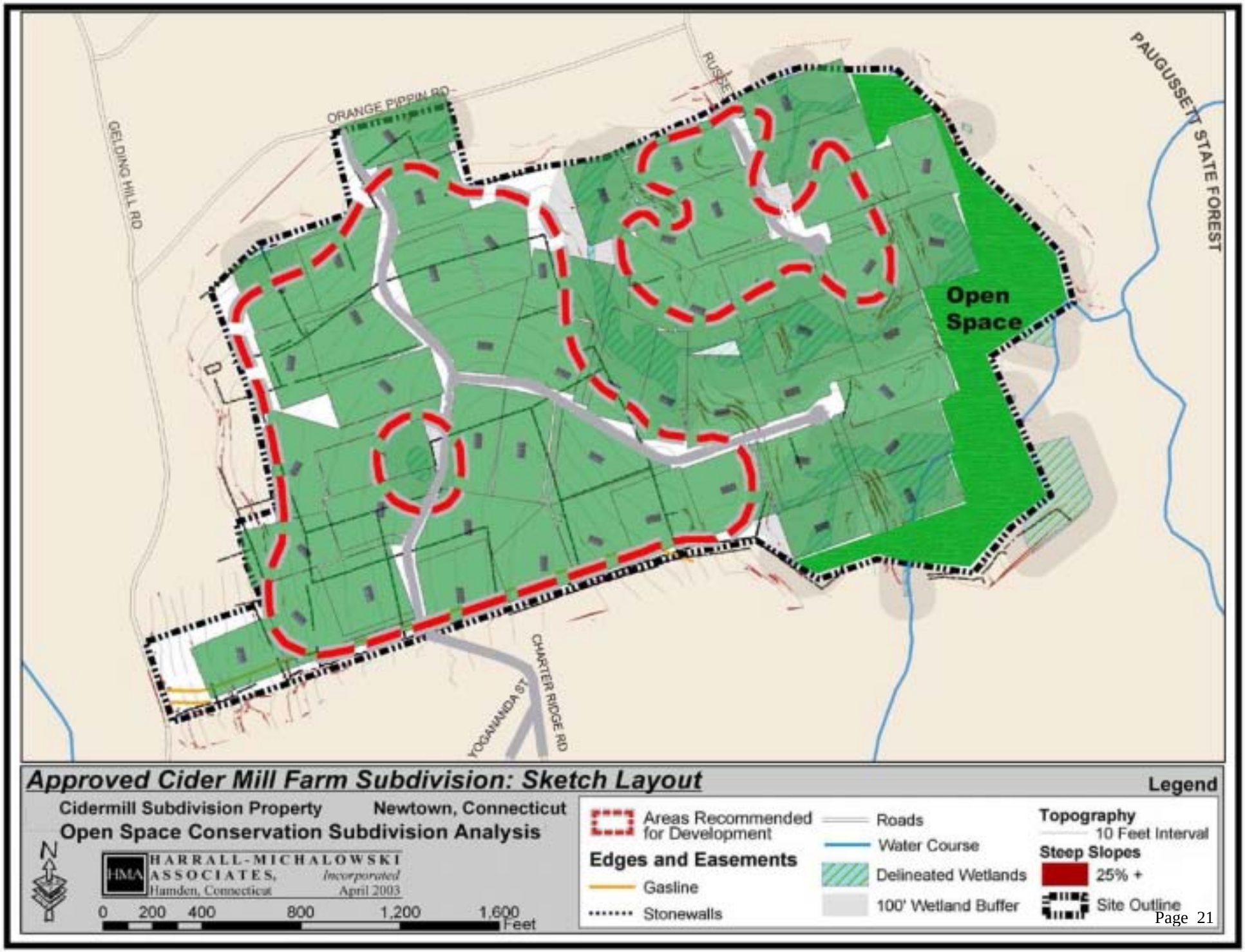
The sketch plan analysis would also provide an assessment of the potential of the conventional subdivision layout to respond to and conserve the site's important features and natural resource assets, as identified by the Planning and Zoning Commission following the Site Context and Physical Site Assessment analyses. The intent of this sketch planning process is to establish the maximum number of house lots that could be built on the site, as a conventional subdivision.

To ensure that the site would support the number of lots identified on the sketch plan by the subdivider, the Town would have the option to request the developer to conduct standard septic system perk tests for up to 10% of the lots shown on the sketch plan. This would provide the Town with the information it requires to establish whether or not the most questionable lots proposed in the sketch plan layout are in fact developable and at the same time, the developer avoids the expense of having to do perk tests for every lot on the sketch plan.

Although the Cider Mill Farm property has already received municipal approvals for 52 house lots, two sketch plans of the site (sketch layout and assessment of subdivision impacts) were prepared to demonstrate the process and to describe the level of detail that would be expected from an applicant in establishing the maximum development potential of this property. (see attached Cider Mill Farm Sketch Layout and Subdivision maps)

VIII. Preparation of OSC Subdivision Layouts

After the sketch plan of a conventional subdivision layout has been prepared and the Town and the developer have reached an agreement as to the maximum number of lots that could likely be created under this scenario, one or more OSC subdivision sketch plans would be prepared by the subdivider. The purpose of this process is to create a subdivision layout that better addresses the conservation of the site's landscape and natural resources and the open space protection desires of the Town. The OSC subdivision design layouts would be


ORANGE PIPPIN RD
GELDING HILL RD
RUSSE
PAUGUSSETT STATE FOREST
Open Space
YOGANANDA ST
CHARTER RIDGE RD
Approved Cider Mill Farm Subdivision: Sketch Layout
Cidermill Subdivision Property
Newtown, Connecticut
Open Space Conservation Subdivision Analysis
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
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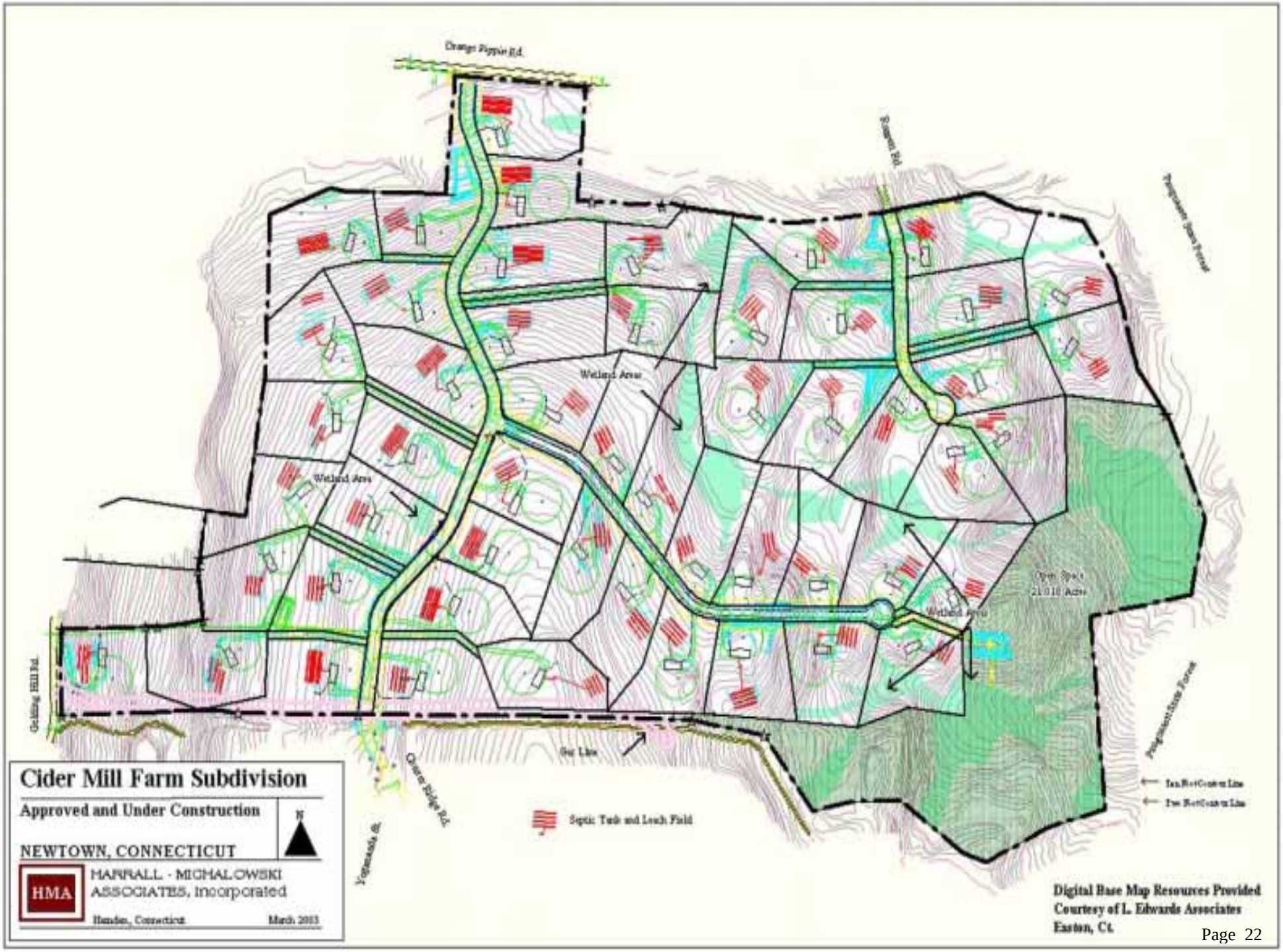
Areas Recommended for Development
Edges and Easements
Gasline
Stonewalls
Roads
Water Course
Delineated Wetlands
100' Wetland Buffer
Topography
10 Feet Interval
Steep Slopes
25% +
Site Outline


Orange Pippin Rd.
Wetland Area
Wetland Area
Wetland Area
Open Space
21.018 Acres
Gelding Hill Rd.
Gas Line
Septic Tank and Leach Field
Cider Mill Farm Subdivision
Approved and Under Construction
NEWTOWN, CONNECTICUT
HMA
HARRALL - MICHALOWSKI
ASSOCIATES, Incorporated
Hamden, Connecticut
March 2003
Digital Base Map Resources Provided
Courtesy of L. Edwards Associates
Easton, Ct.

limited to no more house lots than can be achieved under the conventional subdivision layout and should preserve at least 50% of the site as protected open space. (see attached Open Space Conservation Subdivision: Suburban Sketch).

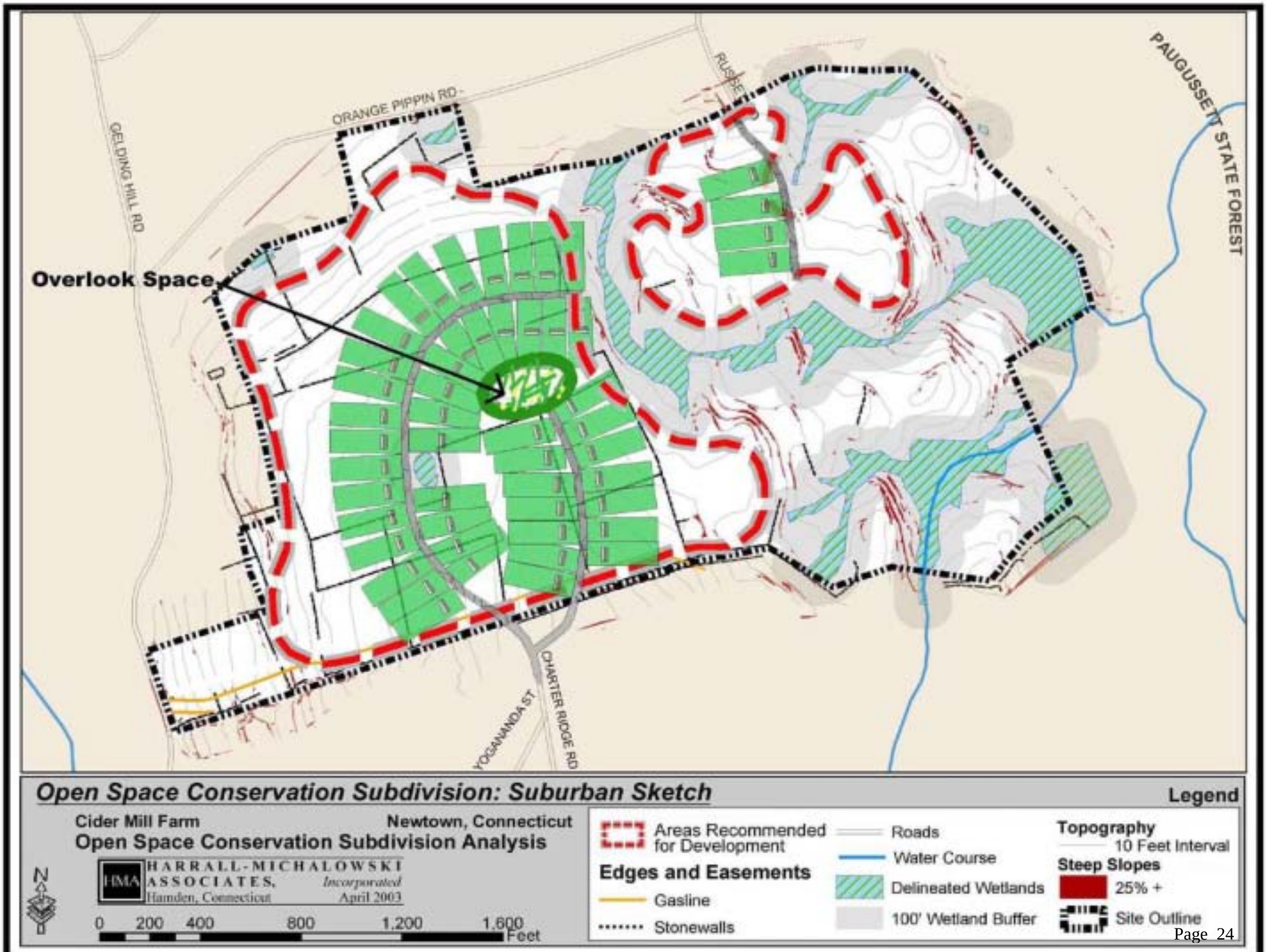
As noted above, the OSC sketch plan would be drawn over the two foot contour base map of the site and respond to applicable Town and State regulations regarding watercourses, wetlands, flood plains, aquifers, protected species, slopes of 25% or greater, etc. The sketch plan would evolve from a rough sketch that approximates the location of streets, individual lots and open space areas, to a more formalized sketch that shows the location of roads, lot lines and protected open space. The sketch plan analysis would provide an assessment of the ability of the OSC layout to conserve the site's natural resource features and to protect open space. (see attached Open Space Conservation Subdivision: Suburban Layout)

The developer would be encouraged to explore one or more alternative sketch plan design styles that might have application for the site. The most common subdivision layout features houses fronting on curvilinear streets. This approach produces a subdivision with suburban characteristics. An alternative approach that may be used to preserve a site's rural characteristics is a design that results in the creation of a small rural residential hamlet. Both of these styles are represented in the accompanying drawings. (see attached Open Space Conservation Subdivision: Hamlet Layout)

Along with the submission of the OSC subdivision sketch plans, the subdivider would also be required to submit a general description of the approach to provide sewer and water services. This is not expected to be an engineering report. The requirements for site survey and engineering reports would apply once the Town has accepted, in principle, a subdivider's proposal to develop an OSC subdivision.

IX. Assessing the Consequences of Conventional versus OSC Subdivisions: The Cider Mill Farm Example

The Cider Mill Farm subdivision was examined to illustrate the on-the-ground differences resulting from development managed by conventional subdivision regulations and development managed by the OSC subdivision approach. The areas of examination included the amount and quality of open space protected by each approach and the conservation of the site's natural resources and important site features.


Overlook Space
ORANGE PIPPIN RD
GELDING HILL RD
RUSSE
PAUGUSSETT STATE FOREST
YOGANANDA ST
CHARTER RIDGE RD
Open Space Conservation Subdivision: Suburban Sketch
Cider Mill Farm
Newtown, Connecticut
Open Space Conservation Subdivision Analysis
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
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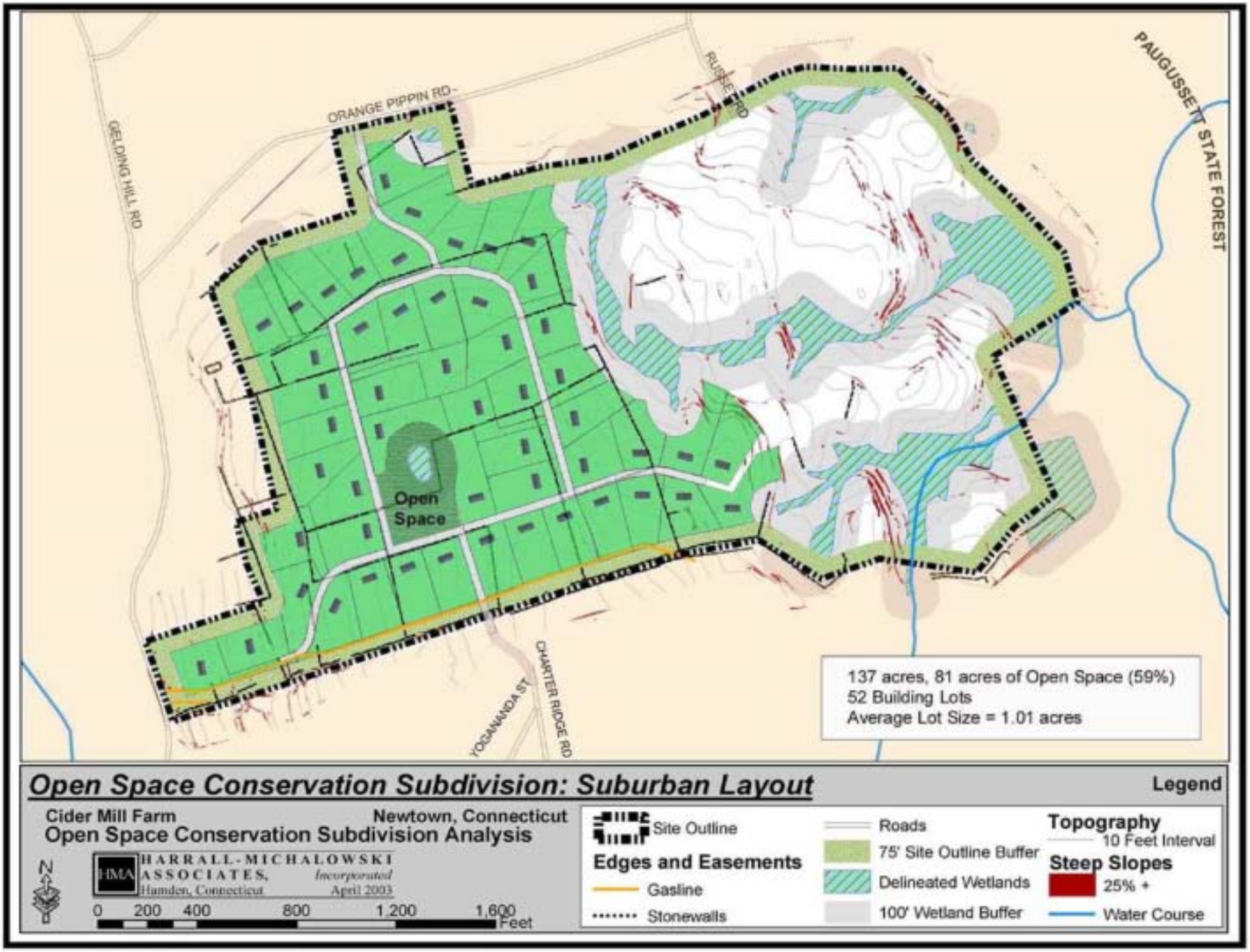
Legend
Areas Recommended for Development
Edges and Easements
Gasline
Stonewalls
Roads
Water Course
Delineated Wetlands
100' Wetland Buffer
Topography
10 Feet Interval
Steep Slopes
25% +
Site Outline


ORANGE PIPPIN RD
GELDING HILL RD
RUSSE RD
PAUGUSSETT STATE FOREST
Open Space
YOGANANDA ST
CHARTER RIDGE RD
137 acres, 81 acres of Open Space (59%)
52 Building Lots
Average Lot Size = 1.01 acres
Open Space Conservation Subdivision: Suburban Layout
Cider Mill Farm
Newtown, Connecticut
Open Space Conservation Subdivision Analysis
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
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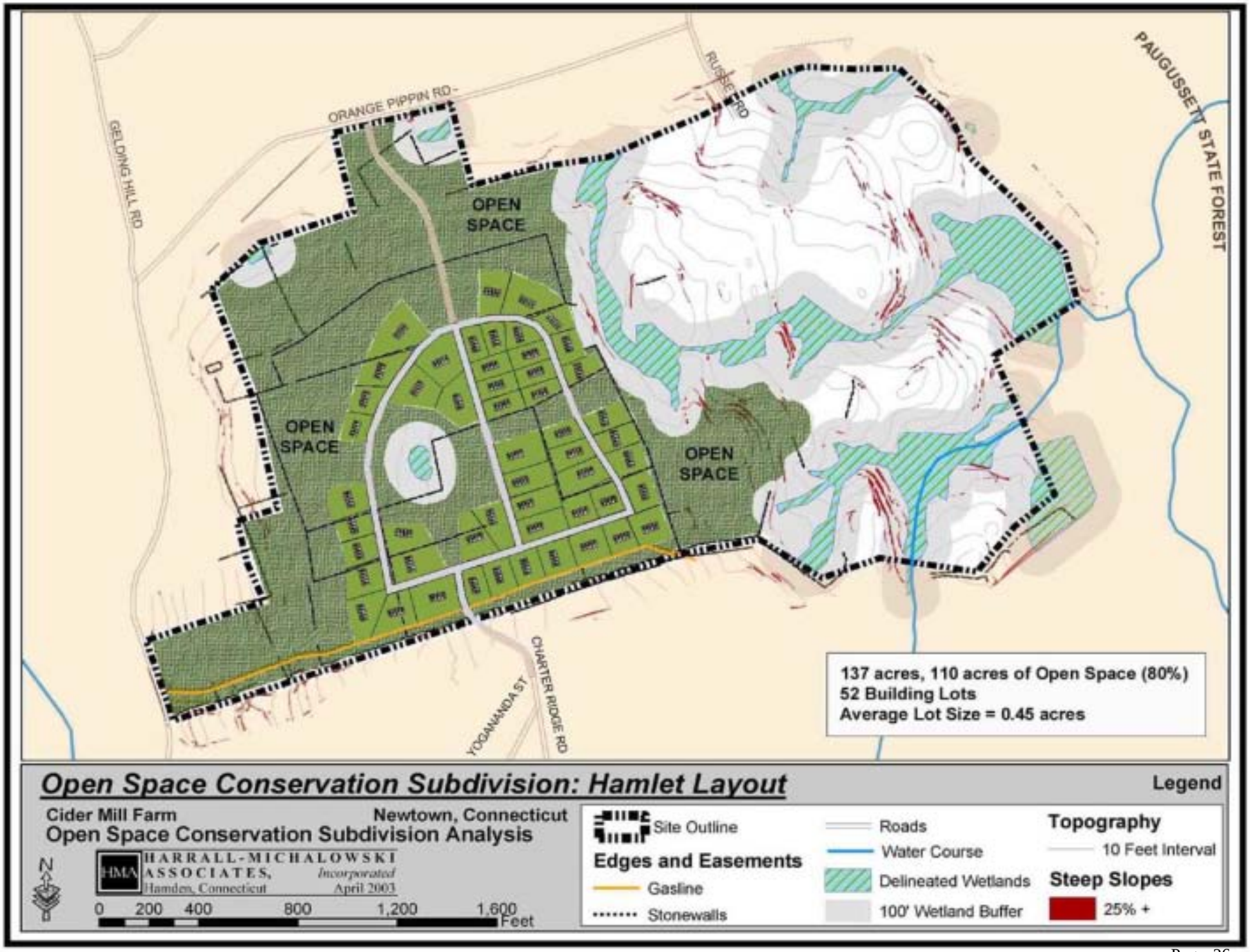
Site Outline
Edges and Easements
Gasline
Stonewalls
Roads
75' Site Outline Buffer
Delineated Wetlands
100' Wetland Buffer
Topography
10 Feet Interval
Steep Slopes
25% +
Water Course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OPEN SPACE
OPEN SPACE
OPEN SPACE
YOGANANDA ST
CHARTER RIDGE RD
137 acres, 110 acres of Open Space (80%)
52 Building Lots
Average Lot Size = 0.45 acres
Open Space Conservation Subdivision: Hamlet Layout
Cider Mill Farm
Newtown, Connecticut
Open Space Conservation Subdivision Analysis
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
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Site Outline
Edges and Easements
Gasline
Stonewalls
Roads
Water Course
Delineated Wetlands
100' Wetland Buffer
Topography
10 Feet Interval
Steep Slopes
25% +

A. Evaluation of Open Space Preservation

1. Conventional Subdivision: The amount of open space created by the subdivision of the 137 acre Cider Mill Farm was 21 acres or approximately 15% of the site area, exceeding the Town's mandatory open space set-aside of 10%. This open space is adjacent to the Lower Paugussett State Forest, enhancing the linkage of protected open space. Linear conservation easements incorporated into the subdivision approval facilitate the connectivity of nearby trail resources.

   A closer look at the Cider Mill Farm open space reveals that much of this area is unbuildable due to the combination of difficult topography and the presence of wetlands. While only 9% of the overall Cider Mill Farm property possesses wetlands, 31% of the open space area is classified as wetlands.

   Cider Mill Farm's open space is contiguous to the Paugussett State Forest, however access to this open space from the subdivision will be limited to a gravel drive that serves a major stormwater retention basin, at the end of a long cul-de-sac.

2. OSC Subdivision: The amount of open space that could have been created by an OSC subdivision on the Cider Mill Farm property is estimated at 80 to 110 acres, depending on the style of OSC design. Protected open space includes the eastern half of the site, which is adjacent to the Lower Paugussett State Forest. In addition, the developed portion of the OSC subdivision is surrounded by open space, buffering the new development from area roads and neighbors. All of the open space areas created by the OSC subdivision can be readily accessed from numerous points within the subdivision and the size and location of the open space is sufficient to become part of a larger Town-wide system of greenways.

B. Conservation of Natural Resources and Special Site Features

1. Conventional Subdivision: To assess the effectiveness of the current subdivision process to conserve and protect the natural resources and special features of the Cider Mill Farm property, the information prepared as part of the site analysis process was examined relative to the approved subdivision (Development Sensitivity Map) and the assessment of Areas Recommended for Development. The information displayed on the Development Sensitivity Map was overlain onto a map of the approved Cider Mill Farm's subdivision to assess the impact of site development. The resulting map, Assessment of Subdivision Impacts helps to describe how the

current subdivision process affects natural resources and site features. (see attached Approved Cider Mill Subdivision: Assessment of Subdivision Impacts)

The 52 lot Cider Mill Farm subdivision is a recent example of the application of Newtown's current subdivision process. The Cider Mill Farm subdivision design is a creative solution to owner/developer goals of maximizing the number of building lots, while satisfying municipal regulations. In order for the subdivider to realize the maximum number of building lots permitted by municipal regulations, all of the site was covered with building lots, plus an open space set-aside was made and no wetlands were crossed.

To accomplish this however, 25 of the 52 approved building lots include portions of wetlands, even though only 9% of the site contains wetlands. The future management of these wetland resources will now be entrusted to the 25 individual home owners who will inhabit those lots. (Will grass clippings and leaves eventually be deposited beyond rear yards in the wetlands? Will runoff from fertilized lawns end up in the wetlands?)

The Cider Mill subdivision will make it possible to protect a large (21 acres), undisturbed block of land of land that is contiguous to open space and will help to sustain diverse wildlife habitat in this area. However, by siting approximately 20 houses within or in close proximity to the 100 foot wetland buffer, the subdivision does little to protect the existing wildlife corridors that likely exist within the existing system of interconnected wetlands leading to the Paugussett State Forest. These corridors are important to the survival of Newtown's indigenous wildlife species. Additionally, the site grading required for subdivision roads and the wall-to-wall layout of house lots will result in the fragmentation of the forests that exist on the eastern portion of this property. Current municipal regulations essentially mandate this type of an outcome to the subdivision of land.

2. <u>OSC Subdivision</u>: The OSC subdivision designs for Cider Mill Farm contain 80 to 110 acres of open space. Approximately 60% to 80% of the site would be protected open space. Created open space includes all of the eastern half of the site, resulting in a large, undisturbed block of protected land adjacent to the Paugussett State Forest. All of the major wetlands and their buffer systems are protected without the intrusion of house lots. This means that the wildlife corridors within the wetland


ORANGE PIPPIN RD
GELDING HILL RD
RUSSE
PAUGUSSETT STATE FOREST
OPEN SPACE
YOGANANDA ST
CHARTER RIDGE RD
Approved Cider Mill Farm Subdivision
Assessment of Subdivision Impacts Newtown, Connecticut
Open Space Conservation Subdivision Analysis
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
0 200 400 800 1,200 1,600 Feet
Legend
Areas Recommended for Development
Edges and Easements
Gasline
Stonewalls
Roads
Water Course
Delineated Wetlands
100' Wetland Buffer
Topography
10 Feet Interval
Steep Slopes
25% +
Site Outline

areas would also be protected and the forests on the eastern half of the property would not be fragmented by site grading for roads, house site's, driveways and lawns.

Newtown's municipally managed subdivision approval process would continue to ensure that protected open space furthers the creation of a town-wide system of interconnected open space and greenways, better preserving the Town's natural and scenic resources, providing additional passive recreational opportunities and contributing to the maintenance of the Town's visual character and enhancing the quality of life afforded by these resources.

X. Sewer Service

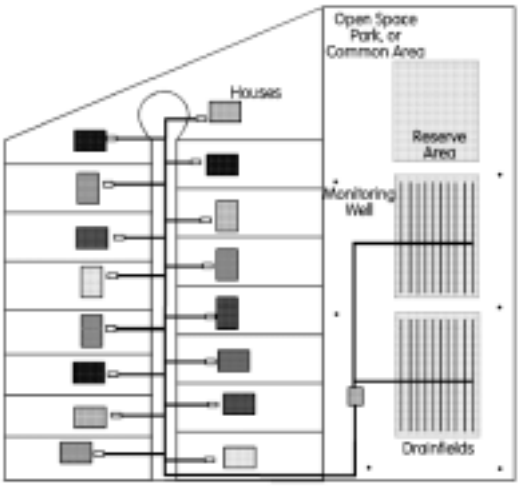
A. Approved Cider Mill Farm Subdivision: The approved 52 lot Cider Mill Farm subdivision is served by 52 on-site wells and septic systems. Each septic system has been engineered to meet municipal health code requirements. A review of the approved subdivision indicates that many of these septic systems are on slopes that require grading and filling to accommodate the leaching field requirements. The operation of each system is the responsibility of the homeowner.

B. OSC Subdivisions: There are a variety of techniques to address the interconnected issues of sewer and water service for OSC subdivisions.

1. Acre Lots: When house lots are at least one acre in size and soils will permit, it is possible to provide on-site septic systems and wells, if the design of the subdivision permits the proper separation distance between wells and septic systems. If proper separation between wells and septic systems cannot be achieved, a possible solution is the construction of a community water system.

2. Lots of Less than One Acre: The smaller lots typically found in a hamlet style of OSC subdivision do not permit the construction of on-lot septic systems. In this instance, there are several proven solutions:

   a. If open space with suitable soils is located near proposed house lots, it may be possible to develop a hamlet layout that enables the placement of individual septic system leaching fields in protected open space.



b. If the project layout, topography or soils do not make it possible to construct individual septic systems for each home, a possible solution is the construction of a community septic system where each home has its own septic tank that discharges into a community leaching field. (see accompanying diagram)

c. If the design of the subdivision does not make it possible to develop a system of individual septic tanks connected to a community leaching field, another option is the development of a community sewerage system where sewage from individual homes is piped to a community septic tank(s) and discharged into a community leaching field(s).

Under this development scenario, a portion of the protected open space is set-aside to accommodate an engineered community septic system that includes septic tanks and leaching fields that have been designed and engineered to meet the needs of the OSC subdivision and reviewed and approved by the Connecticut Department of Environmental Protection's Water Management Division. This type of system has been successfully developed in several Connecticut communities, including Newtown. The Riverview, a residential community with 49 homes in southern Newtown, is served by a community sewerage system. In this instance, the area for the community leaching field is also used for recreational purposes by Riverview residents.

Riverview- Green Space is the Community Leaching Field

XI. Conclusions and Recommendations

Conclusions

1. The Open Space Conservation (OSC) subdivision is a municipal land use management tool that enables the more effective conservation of the Town's natural resources. The additional amounts of open space created by means of OSC subdivisions can result in larger blocks of undisturbed land being set-aside to protect Newtown's natural environment.

2. OSC subdivisions provide a municipality with additional capabilities to preserve the Town's community character. Portions of the additional open space created by an OSC subdivision can be used to visually buffer development from existing Town roads.

3. The additional open space created by OSC subdivisions provide greater flexibility toward the achievement of the POCD goal of a town-wide, interconnected greenway system.

4. OSC subdivisions enable greater design flexibility to address the protection of a site's important features, including historical and archaeological resources and scenic vistas.

5. The conventional subdivision process results in the open space protection of 10%-15% of the land area being subdivided. By contrast, an OSC subdivision typically results in the preservation of at least 50% of the subdivision as protected open space.

6. OSC subdivisions enable a Town to secure significant amounts of protected open space, at no cost to the town. The amount of land that can be preserved through OSC subdivisions is far more than the Town is likely to have the financial resources to acquire.

7. The number of houses created through the OSC subdivision process is the same as would be created under the Town's current municipal regulations.

Recommendations

1. Prepare municipal regulations that will result in the creation of Open Space Conservation subdivisions in Newtown.

2. Develop a municipal strategy for the ownership and stewardship of the open space lands that will be created by OSC subdivisions.

APPENDIX I

SEWERAGE TREATMENT OPTIONS

1. Current Regulatory Practices

The disposal of sewage is one of the key concerns for the application of Open Space Conservation (OSC) subdivisions. A review of how communities with OSC subdivisions have treated this issue reveals a variety of approaches. In some communities with extensive public sewer system coverage, the use of OSC subdivisions may be only be utilized when public sewers are available. In one Connecticut community with an extensive public sewer system, all new subdivisions are mandated to be in the form of an OSC subdivision design. In other communities where public sewer systems are not available, OSC subdivisions have utilized a variety of solutions to sewerage disposal including individual on-site systems, community systems and hybrid systems that combine elements of on-site and community systems to collect and treat sewage.

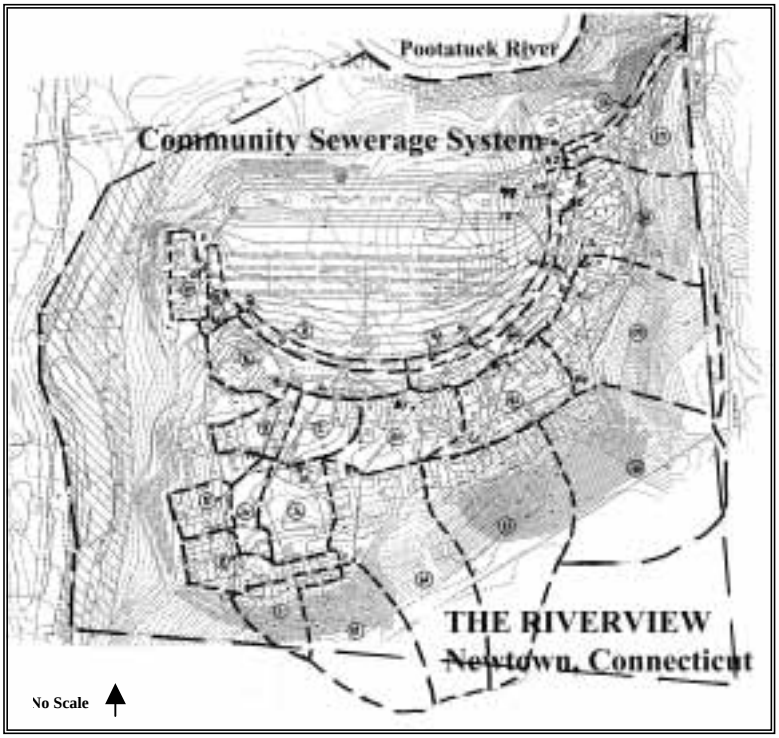
In Connecticut, the public responsibility for the approval of sewerage systems serving residential subdivisions rests with three public entities, depending upon the amount of sewage being treated. Sewer systems discharging less than 2,000 gallons per day come under the regulation of the local health department. The calculation of sewage discharge volumes is based upon the number of bedrooms contained in a house, at the rate of 150 gallons per bedroom. Most of the homes in subdivisions approved in Newtown are sized to have four bedrooms, equating to a discharge of 600 gallons per house. The municipal review and approval process for septic systems takes into consideration such factors as soils, topography, distance to wells, etc. Although the 52 houses in the Cider Mill Farm subdivision will generate a combined discharge of 31,200 gallons of sewage per day, each house septic system is reviewed and approved as a separate 600 gallon entity.

Under current State regulations, a residential development having a discharge of 2,000 to 5,000 gallons per day comes under the combined review of the local health department and the Connecticut Department of Health and a project having a discharge in excess of 5,000 gallons per day comes under the review of the Connecticut Department of Environmental Protection (DEP).

If the proposed OSC subdivision has house lots large enough to accommodate on-site septic disposal (approximately 1 acre in size), reviews for on-site septic systems would be handled locally. OSC subdivisions containing smaller lots and discharging more that 5,000 gallons into an on-site community septic system would be reviewed by the Water Management Division of DEP.

2. The Riverview in Newtown

The Riverview is a residential development in southern Newtown, constructed in the late 1990's. The Riverview has forty-nine two bedroom housing units, with a combined sewage discharge of 14,700 gallons per day. This project was reviewed and approved by DEP for a community sewerage system that includes a collection system, a community septic tank, distribution box and a community leaching field. (see plan)



Prior to issuing a permit for a community sewerage system, the DEP requires the local WPCA to signify that the Town is satisfied with the management structure, maintenance schedules and financial reserves established to manage, maintain and repair the system. Financial reserves are sized to enable the replacement of the system, if it were to fail. Under State law, if a community sewerage system were to fail and the responsible home owners association (HOA) did not remediate the problems, the Town would become responsible for the cost of system repairs.

Riverview- Green Space is the Community Leaching Field

The Riverview HOA has an agreement with the Newtown WPCA that governs the maintenance of the community sewerage system, as well as the reserve fund that was established to enable ongoing maintenance, repairs and system replacement, if required. This agreement identifies the maintenance schedules for the community sewerage system, ongoing reporting requirements and the manner in which the reserve fund is to be maintained.

The importance of the presence of this community sewerage system in Newtown is the expression of confidence that DEP has in the long term performance of such systems. The Riverview's community sewerage system is located directly over the Pootatuck Aquifer (within the Aquifer Protection District), just upstream from the two United Water Connecticut wells that provide drinking water to 1,153 Newtown households.

3. CT DEP's Regulation of Community Sewerage Systems

When an OSC subdivision is proposed to use a community sewerage system, it is important for the developer to contact DEP early in the planning process to assess the technical feasibility of such a system and to understand how such a system will affect the design of the subdivision. It may be possible to layout an OSC subdivision that is served by one community leaching field or a solution may entail the development of two or more community leaching fields.

The DEP will be interested in the hydraulics of the proposed system, the treatment of nitrogen and pathogens and the mixing of treated wastewater into the area's ground water system. The location of the proposed system's leaching fields, affected soils, the supporting ground water system and adjacent uses are factors that will influence the design and feasibility of a community sewerage system. In instances where soils and the ground water system are not supportive of a community sewerage system with a standard septic tank/leaching field operation, it may be possible to develop an approach that pre-treats effluents prior to discharging into a constructed leaching field. It will require six to nine months for a community sewerage system to receive DEP approvals. Approvals will not be granted until the local Water Pollution Control Authority indicates its support for the system. Early communications with DEP and the local WPCA by a developer proposing a community sewerage system will probably result in time/money savings.

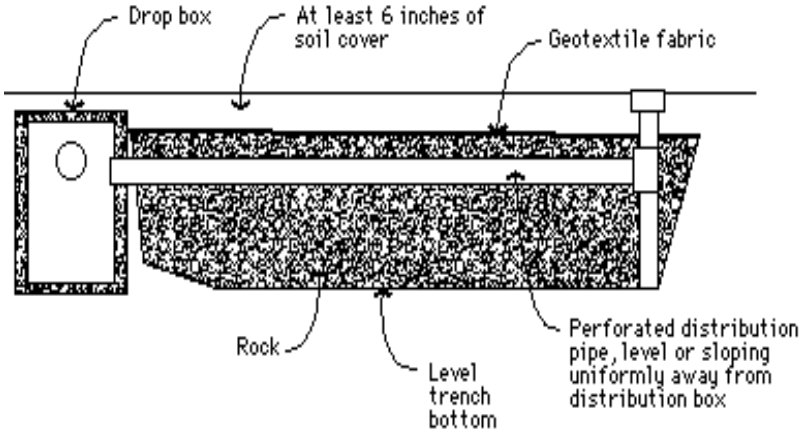
4. Innovative Sewerage Treatment Systems

A review of the types of technologies used to implement community sewerage systems reveals a wide variety of approaches. Several states have undertaken or are in the process of

GREAT OAK FARM
MONROE, CT.

Community Leaching Field

Community Leaching Field



examining existing and innovative technologies available to support the on-site treatment of sewage. The State of Rhode Island is completing such an analysis and the State of Maine will be initiating an analysis later this year. The following information on the technologies available for sewage treatment was excerpted from a report prepared by the University of Minnesota Extension Service (Residential Cluster Development- Alternative Waste Water Treatment Systems, by J. L. Anderson, et. al., University of Minnesota). This report provides a good overview of both subsurface and above surface treatment systems.

A. Sub-surface Systems

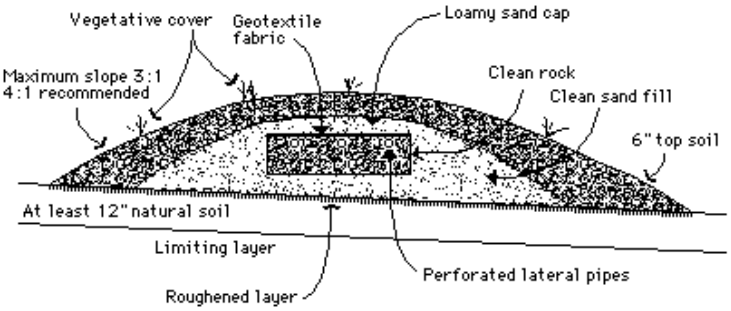
Community Drainfields

For individual sewage treatment systems not limited by soil conditions, the most commonly used unit is trenches. A drainfield trench is constructed by making a level excavation 18-36 inches deep. Clean rock is placed in the bottom of the excavation to a depth of 12-24 inches; then, a four-inch diameter distribution pipe, using one pipe per trench, is placed on the rock and covered with soil. Pipe or chamber systems without gravel can be used as substitutes for the rock. Treatment occurs in the natural soil through interrelated physical, chemical, and biological processes. Special siting considerations for trench systems include:

- trenches need to be installed on a site's contour with the excavation depth limited by saturated soil or bedrock;
- a minimum of 10 feet on center must be maintained between trenches;
- the site must be large enough to accommodate a series of trenches laid along the natural slope.

Soil Treatment Mounds

In areas where limiting soil conditions do not allow the installation of sewage treatment trenches, mounds are an option. They are constructed with a layer of clean sand and leveled with a foot-deep rock



LONG HILL FARM
GUILFORD, CT.

Community Leaching Field

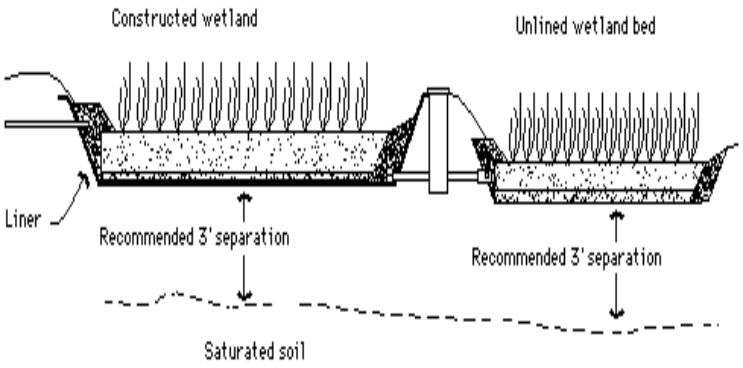
Community Leaching Field

layer before being covered by soil. Special siting and construction considerations for cluster mound systems are:

- the configuration needs to be a long, narrow rectangle;
- mounds need to be installed on a site's contour with the special consideration that they don't act as dams for surface or subsurface flow across the site;
- if more than one mound is required (which is usually the case), there must be adequate distance between them to allow for construction and to assure they do not interfere with one another hydraulically.

Constructed Wetland Systems

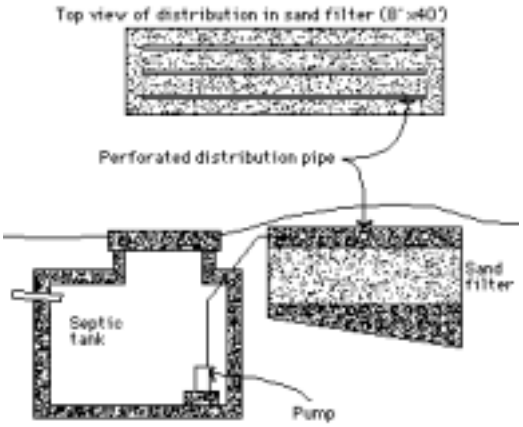
Constructed wetlands treat wastewater by bacterial decomposition, settling, and filtering. As in tank designs, bacteria break down organic matter in the wastewater, both aerobically and anaerobically. Oxygen for aerobic decomposition is supplied by the plants growing in the wetland. Solids are filtered and finally settle out of the wastewater within the wetland. After about two weeks in the wetland, effluent is usually discharged by gravity to an unlined wetland bed.



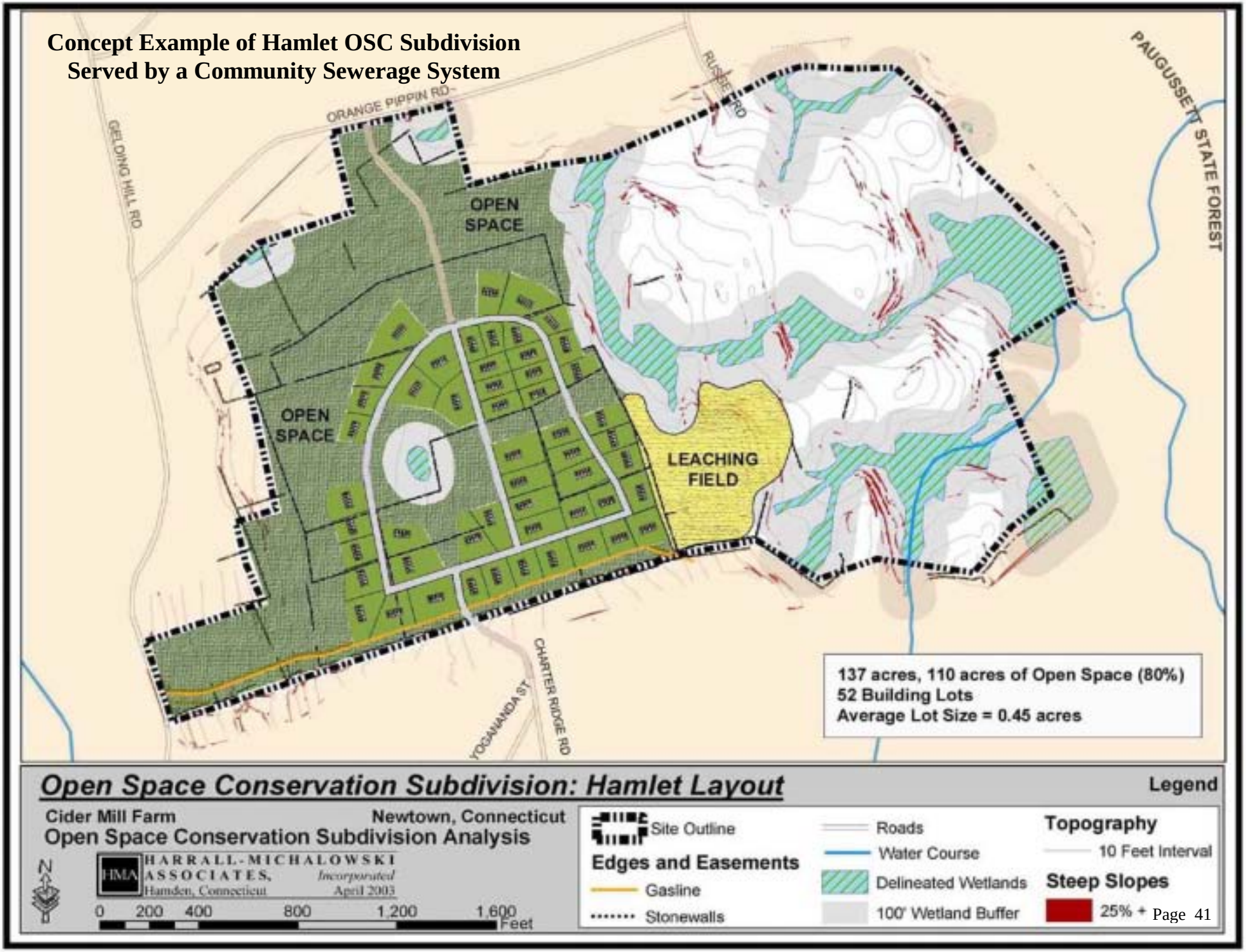
In theory, any wetland design could incorporate a soil treatment system for final effluent treatment, but since the wetland itself takes up a lot of space, communities are unlikely to construct a soil treatment system in addition to the wetland.

Sand Filter Systems

The sand filter uses sand, like a mound in a box, as a medium for treating wastewater. This system has been used with great success for over 100 years and there is a large amount of information available about design and applications.



Wastewater is introduced by pressure distribution. The goal is to load the system as evenly as possible over the filter surface. This is best accomplished by using a pump to put

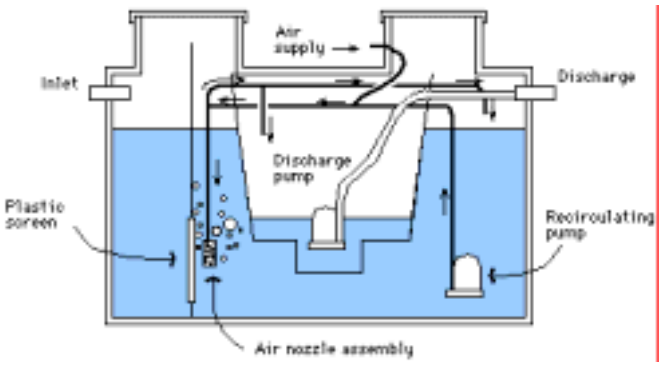

Concept Example of Hamlet OSC Subdivision
Served by a Community Sewerage System
ORANGE PIPPIN RD
GELDING HILL RD
RUSSELL RD
PAUGUSSETT STATE FOREST
OPEN SPACE
OPEN SPACE
LEACHING FIELD
YOGANANDA ST
CHARTER RIDGE RD
137 acres, 110 acres of Open Space (80%)
52 Building Lots
Average Lot Size = 0.45 acres
Open Space Conservation Subdivision: Hamlet Layout
Cider Mill Farm
Newtown, Connecticut
Open Space Conservation Subdivision Analysis
HARRALL-MICHALOWSKI ASSOCIATES, Incorporated
Hamden, Connecticut
April 2003
0 200 400 800 1,200 1,600 Feet
Legend
Site Outline
Edges and Easements
Gasline
Stonewalls
Roads
Water Course
Delineated Wetlands
100' Wetland Buffer
Topography
10 Feet Interval
Steep Slopes
25% +

the wastewater under pressure inside the pipe. This allows the waste to move through the filter at a rate that maximizes treatment. This system's treatment mechanisms are physical filtering and ion exchange. A properly operating sand filter should produce high quality wastewater.

B. Above-Surface Systems

Aerobic Tanks and Package Plants

Aerobic tanks treat wastewater far better than conventional septic tanks. This is due to the oxygen that is added to the liquid in the tank. Aerobic tanks are, however, considerably more complicated to design, construct and maintain than septic tanks.



Aerobic tanks are available in residential or small-community sizes. In either case, these tanks require more maintenance than conventional septic tanks. If problems arise with the supply of air to the bacteria, an aerobic tank loses all its effectiveness. If there are problems with settling (more likely in these designs than with conventional tanks), there will be problems in the soil treatment system. It's critical that aerobic tanks be monitored regularly and repaired as needed.

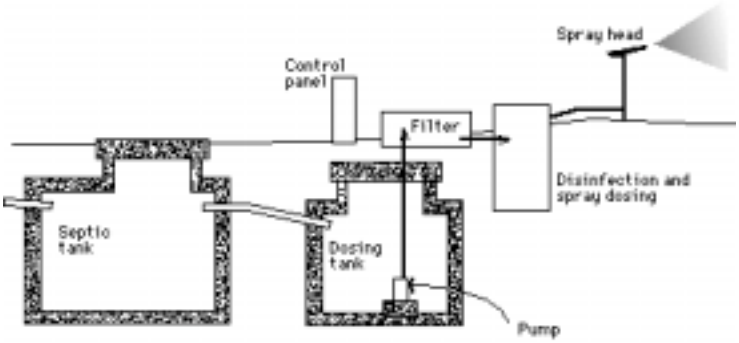
For community aerobic tanks, there is a single location that needs checking and maintenance. Individual aerobic tanks provide multiple opportunities for problems and each one must be inspected as frequently as larger tanks. The aerobic tanks serving individual residences contain both the aeration and settling areas within the same tank. Since the discharge is to the soil there is no disinfection.

Package plants for small communities usually consist of an aeration tank followed by a settling tank and some type of disinfection or chlorination unit that treats the water before discharge.

Spray Irrigation

Spray irrigation uses both biological and chemical processes to treat wastewater. The pretreated and often disinfected wastewater is applied at low rates to agricultural or wooded areas.

A spray irrigation system often consists of a septic tank (that provides a highly pretreated effluent), a sand filter and a disinfection unit within a spray application site. The final product is applied to the spray field through a conventional sprinkler system.



Site suitability is determined by soil permeability, the depth to saturated soil or bedrock, the availability of a buffer zone, and land slope. For proper treatment of wastewater, the soil must remain unsaturated, just as it does in subsurface systems.

Compared to other wastewater treatment alternatives, spray irrigation systems require more land. That's why they may be best suited for recreational areas (such as golf courses) and agricultural land.

APPENDIX II

OPEN SPACE OPTIONS

1. Types of Open Space

The types of open space that may be created by an OSC subdivision can vary considerably from project to project, depending on the circumstances of the land being subdivided, the neighboring area and the conservation desires of the Town. The OSC subdivision process provides the Town with several options to conserve and preserve open space.

a. Farmland Preservation: If a parcel of land proposed for OSC subdivision contains an active farming component or very high quality farmland soils that the Town desires to preserve for an existing or future farming operation, the subdivision could be designed around such site features, buffering the residential areas from farming operations.

b. Woodland Preservation: If the land being subdivided contains exceptional woodlands that the Town desires to preserve as open space or conserve as a park, the subdivision could be designed around such prime woodland features to achieve the desired conservation or preservation benefits.

c. Natural Resource Conservation: It is possible that the subdivision of a parcel of land will involve a site identified in DEP's Connecticut Natural Diversity Data Base. The design process of an OSC subdivision allows considerable flexibility that may make it possible to layout a subdivision in a manner that protects the habitat of "endangered, threatened or special concern" mammals, birds, reptiles, amphibians, fish, invertebrates, and plants.

d. Greenway Development: Newtown's updated Plan of Conservation and Development will include the goal of developing an extensive, interconnected town-wide greenway system. The OSC subdivision design process enables the conservation and protection of significant amounts of open space that could contribute to the attainment of this goal.

2. Ownership of Open Space

Who will own and manage the open space created by OSC subdivisions? In researching the utilization of OSC subdivisions it has become clear that there are many successful approaches to the manner in which open space is owned and managed, including municipal ownership,

non-profit ownership (land trust type organizations), home owners association (HOA), State ownership or State use (forests and parks), private ownership (use governed by conservation easement), or a combination of the above.

The underlying assumption is that the Planning and Zoning Commission would decide how this land would be used during the OSC subdivision design process, taking into consideration the needs of the subdivision's home owners and the Town's needs, including: protection of the site's natural resources and special features (views, historic sites, etc.); protection of the area's community character; the creation of greenways and trails; the need for municipal facility sites (parks, playing fields, schools, etc.), farmland protection, etc. The future use of open space created by an OSC subdivision would be defined by the Commission during the design process described above, taking into consideration the natural resource and physical characteristics of the land, the surrounding neighborhood context, proximity to adjacent open space/greenways/ trails, POCD recommendations and the facility needs of the Town.

a. Town Ownership: In many instances the Planning and Zoning Commission may decide that most, if not all, of the open space created by an OSC subdivision should be deeded to the Town. When this decision is made, there should also be a determination as to how the land is to be used and who in Town government will have responsibility for managing the use, conservation or preservation of this municipal resource.

b. Non-Profit Organization: The Town has established relationships with land trust organizations, especially the Newtown Forest Association, for the protection of open space. During the OSC subdivision design process, the Town will gain an appreciation for the characteristics of the land, proximity to open space, greenway and trail linkages, etc. and be in a position to decide how the open space land should be used and how it should be managed. In the past, the Town has occasionally concluded that created open space should be conveyed to a land trust organization, such as the Newtown Forest Association, for their stewardship, pursuant to the stipulations of use imposed by the Commission at the time title to the open space is transferred.

c. Home Owners Association: In some OSC subdivisions, the HOA retains title to those lands that are in close proximity to homes. This land is often landscaped to a high standard to function as a visual amenity for the residential community. Some OSC subdivisions may also include special recreational amenities, for use by the homeowners who paid for

the facilities. The use and maintenance of open space areas and facilities owned by a HOA are stipulated by the Commission at the time of OSC subdivision approval.

d. State Ownership or Use: In some instances, the open space created by an OSC subdivision may lie adjacent to State owned open space, such as the Paugussett State Forest, one of the State Parks, the Kazan property, etc. In this instance the Town might conclude that the long term use and management of the created open space might be best achieved under the ownership or stewardship of the State, either by transfer of title or by a conservation easement. It is assumed that the transfer of title or the granting of a conservation easement would be subject to the use and maintenance protections desired by the Commission, with a reversion clause if the State were to renege on the agreement.

e. Private Ownership: In a few limited cases, it is possible that the Town might consider the private ownership of open space created by an OSC subdivision, subject to use restrictions required by the Town. Examples include the use of open space for farming purposes, the use of the open space for a golf course or the use of open space for a private conservation organization that features activities compatible with the subdivision and the surrounding neighborhood. Such an agreement would be subject to the use and maintenance protections required by the Town, with a clause that the open space land would become Town land if the terms of the agreement were not met.

Recommendation- The Need for Flexibility: The variety of successful approaches to the use and management of open space created by the OSC subdivision process points-up the need for a flexible policy toward the ownership of these open space resources. During the design of an OSC subdivision, the Commission will learn a great deal about the characteristics of the property. It is during this process that the Commission can determine which land should be designated as open space and how that land will be used and protected. Once those decisions have been made, the Commission can choose the ownership scenario that will best satisfy those desires.

As recommended in Newtown's updated Plan of Conservation and Development, a natural resource inventory and land management plan should be prepared to address the issues of ownership, use and long term management for the open space created by the OSC subdivision process.

APPENDIX III

STORM WATER MANAGEMENT

1. Storm Water Management in Conventional Subdivisions

Storm water management in residential subdivisions is typically focused on the prevention of on-site and downstream flooding, the removal of storm water from roads (and sidewalks if present) and the prevention of polluting substances including sediments (soil erosion), chemicals and nutrients (lawn fertilizers, grass clippings, leaves) and heavy metals (washed off of paved surfaces) from being carried into watercourses and waterbodies. Conventional detention ponds remove most of these substances, which become suspended in water and are carried downstream, to "settle-out" in a retention basin or pond.

All subdivisions introduce impervious surfaces from roofs, driveways and roads. Conventional subdivisions contain large lots with substantial frontage requirements necessitating a large amount of impervious street pavement as well as front yard set-backs requiring more impervious driveway pavement. Most of the impervious pavement is connected, providing little opportunity for storm water run-off to infiltrate into the ground. Because these impervious surfaces must by nature be smooth, they accelerate the speed of the run-off when compared to a natural surface. The storm water runoff from impervious surfaces is collected and channelized by a system of gutters, curbs, and storm sewers and directed to storm water retention ponds to remove suspended pollutants and reduce peak flows. While conventional storm water management systems are very efficient at quickly moving large quantities of water, the consequence of conventional storm water management is that it alters the flow of water over the landscape, reducing the natural on-site absorption of water generated by rain and snowfall and creating a water body (retention pond) that requires on-going Town maintenance to remove sediment accumulations. In addition, the reduction of on-site infiltration leads to the lowering of the water table in the affected area.

2. Storm Water Management in Cluster Developments

The fact that OSC subdivisions result in the creation of substantial amounts of open space provides the Town and the developer with additional opportunities to manage storm water run-off.

OSC subdivisions can result in a reduction in the amount of impervious surface due to shorter roads and driveways. The OSC subdivision design process enables a lot layout that is more sensitive to the natural features of the site, preserves steep slopes, rock outcrops and important natural resources so that storm water runoff from impervious surfaces can flow more slowly and be directed to flow over pervious surfaces covered by natural vegetation, as well as constructed swales. By enabling natural infiltration, water, soaking into and moving through the underlying soil is filtered of some pollutants and ground water resources are recharged.

OSC subdivisions are more effective in managing storm water runoff because they have less impervious surface generating less runoff, and their open space design can facilitate more on-site infiltration than conventional subdivisions.