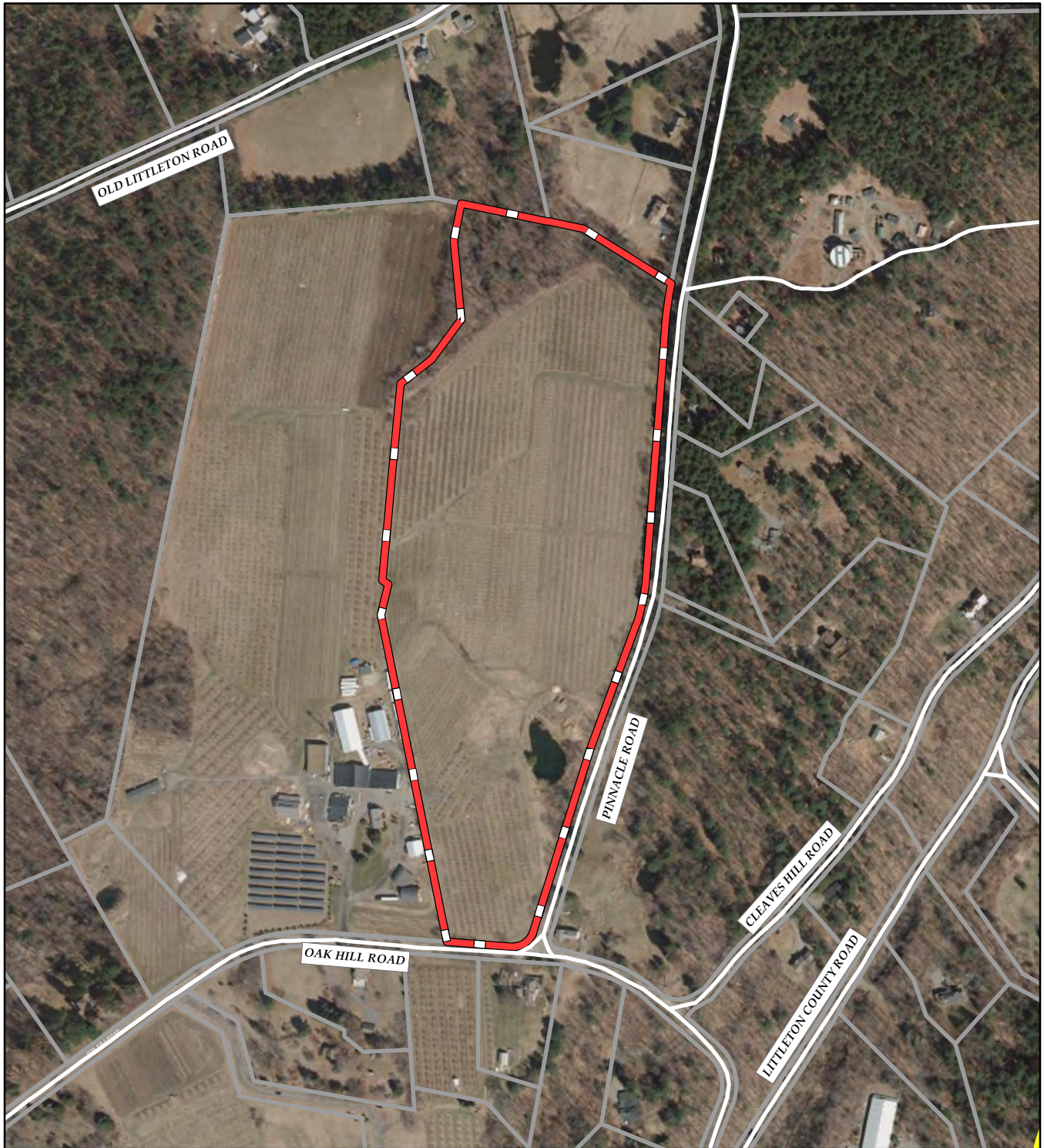


ORSD Examples

November 2021

Carlson Property

Aerial Photo



0 250 500 1,000 Feet

Source: MassGIS: USGS Color Ortho Imagery, 2019
Prepared by William Scanlan and Christopher, Feb. 2021



Carlson Property Base Map



Legend

- 10-Foot Contours
- Wetland
- Pond
- 75' Wetland/Pond Buffer

Land Use

- Orchard
- Woodland

What does this map show?

The property contains 27.1 acres and is currently a productive orchard. It cannot be developed due to the presence of an Agricultural Preservation Restriction (APR). The site is a good candidate to show various development scenarios for how the property could be developed, both conventionally and under the terms of a proposed Open Space Development (OSD) bylaw.

This map shows the existing conditions and environmental constraints. Under the terms of the draft OSD bylaw, constraints include a pond and two small wetland areas. Harvard also prohibits driveways and structures in a 75-foot buffer area around wetlands. These constraints total 1.9 acres.

With gentle grades, the property is very developable. Subtracting these constraints, the net developable area of the site is 25.2 acres.

Notes:

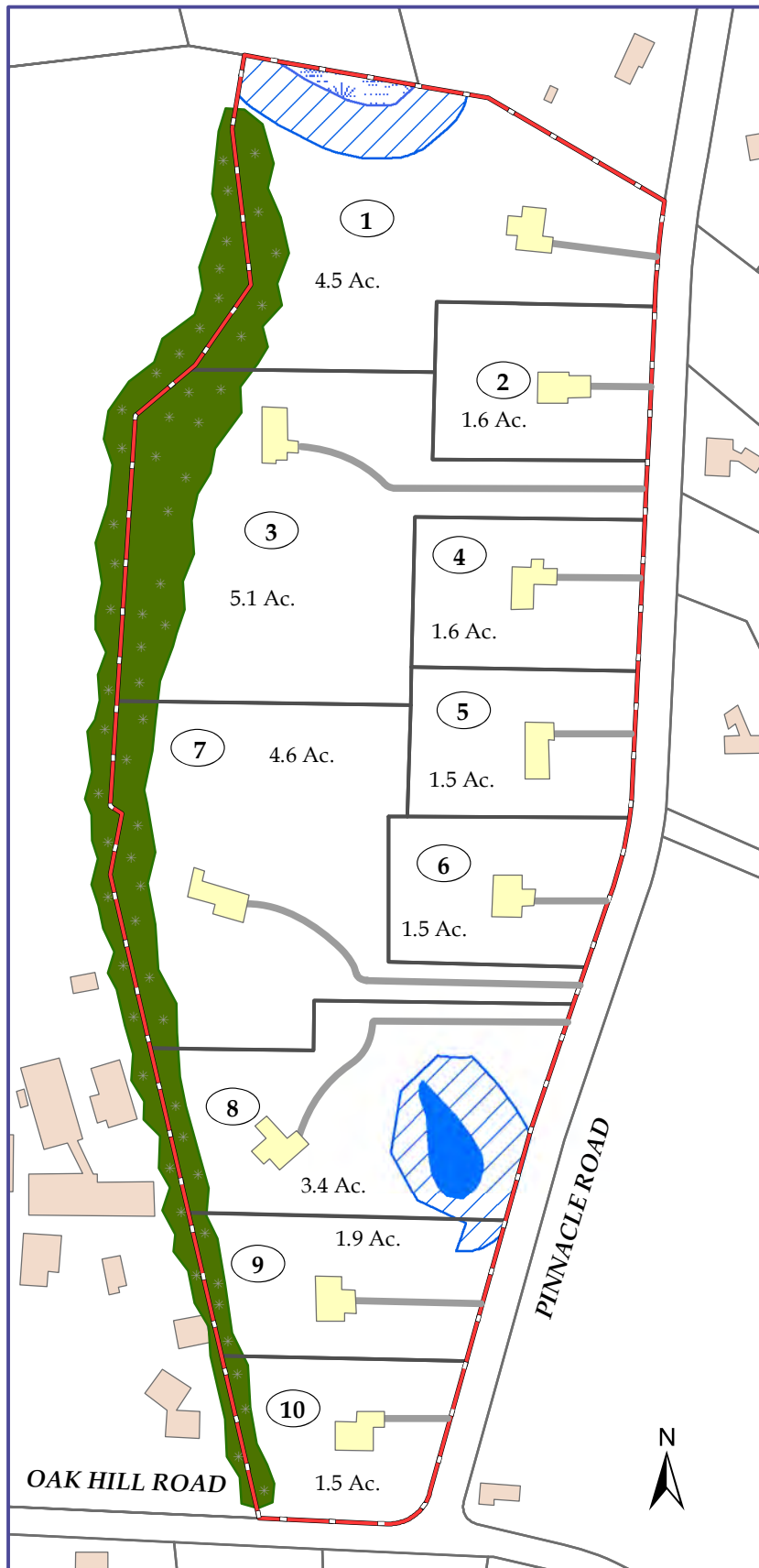
1. Development scenarios are for planning purposes only. The parcel shown is not developable due to an Agricultural Preservation Restriction.
2. 75-foot wetland buffer allows no structures, roads, or driveways.
3. Wetland boundaries are approximate and are derived from MassDEP/MassGIS 1:12,000 wetlands. Actual wetlands may be greater.
4. From other readily available data sources, there are no slopes greater than 15%, flood plains, or rare and endangered species habitat from the Mass. NHESP.

0 125 250 500 Feet

Data Sources: Parcels: Harvard Assessors' Roads: MassDOT;
Environmental Data: MassGIS
Prepared by William Scanlan and Christopher Ryan, February 2021

Carlson Property Conventional ANR Plan

Scenario 1



Legend

- ANR Lots
- Wetland
- Pond
- 75' Wetland/Pond Buffer

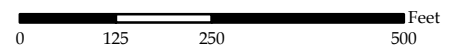
What does this map show?

This map shows the most likely development scenario under current zoning. Because of the large amount of frontage, the site could easily be broken up into frontage lots without the need to build expensive subdivision roads. All of the property would be divided into individual lots that meet the minimum lot size requirements.

This plan shows 10 new lots. No open space would be preserved.

Notes:

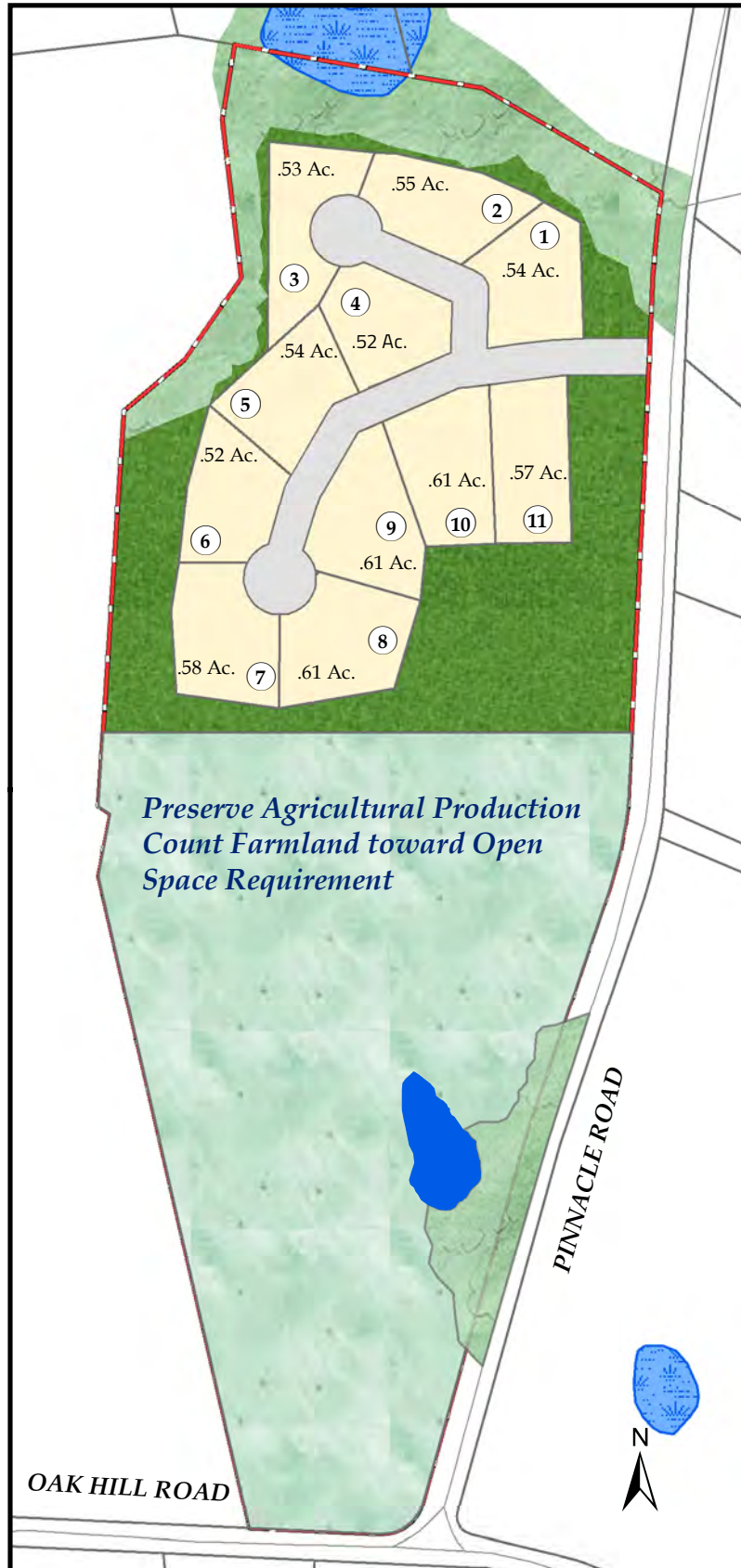
1. Development scenarios are for planning purposes only. The parcel shown is not developable due to an Agricultural Preservation Restriction.
2. 75-foot wetland buffer allows no structures, roads, or driveways.
3. Wetland boundaries are approximate and are derived from MassDEP/MassGIS 1:12,000 wetlands. Actual wetlands may be greater.
4. From other readily available data sources, there are no slopes greater than 15%, flood plains, or rare and endangered species habitat from the Mass. NHESP.



Data Sources: Parcels: Harvard Assessors' Roads: MassDOT;
Environmental Data: MassGIS
Prepared by William Scanlan and Christopher Ryan, Feb. 2021

Scenario 2

Carlson Property Single Family Open Space Design



Legend

- Preserved Farmland
- Woodland
- Single Family Lots
- Open Space/Utilities

What does this map show?

This plan shows an open space development containing 11 lots in two cul-de-sacs on a portion of the property. It results in permanently preserving 74% of the site while allowing reasonable development to occur. The OSD concept allows the owner to maximize the land value in a sale and to continue to use the remaining open space as an orchard. This would preserve the scenic quality of the site and maintain a viable orchard in Harvard.

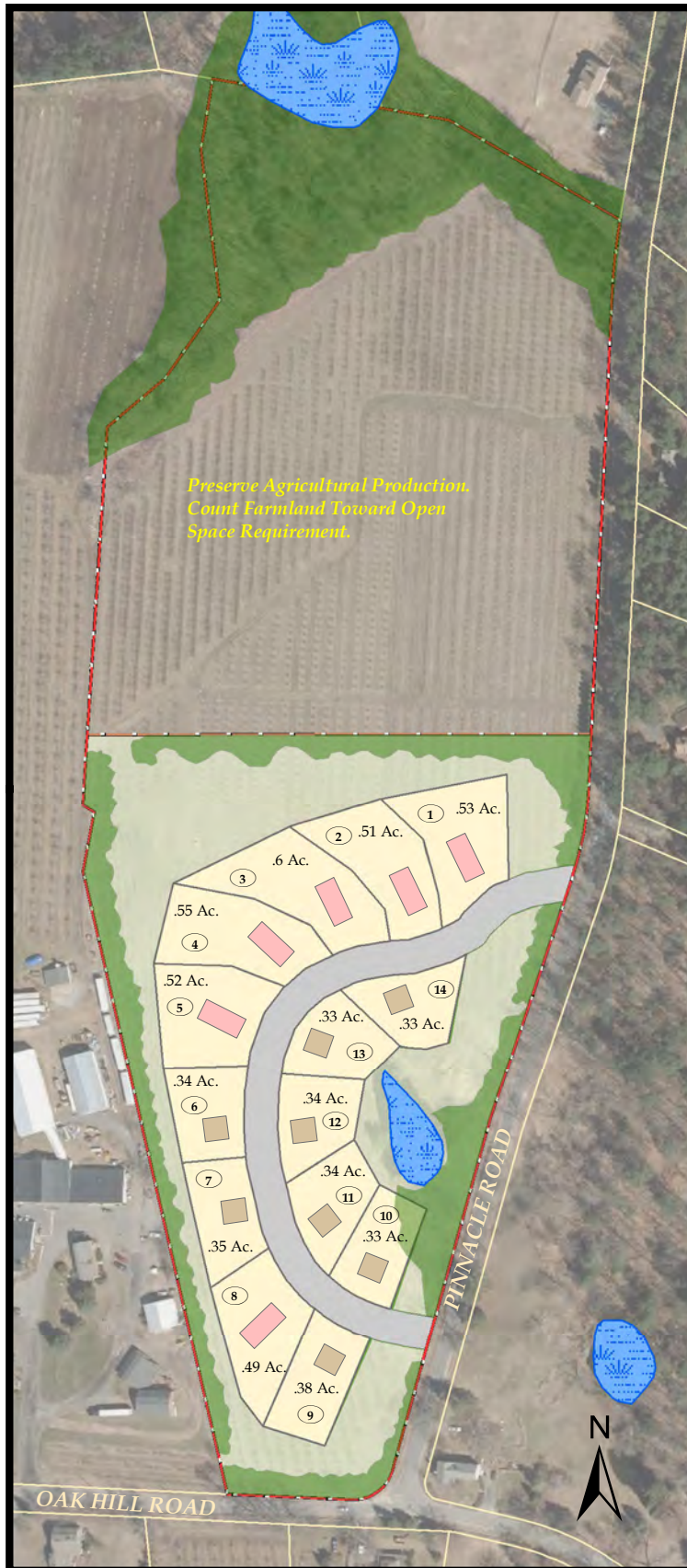
Density is calculated on the basis of .75 bedrooms per net buildable acre. The developer would decide the unit mix based upon market conditions. At this density, the site can accommodate 34 bedrooms. This scenario shows 11, 3-bedroom homes.

Notes:

1. Development scenarios are for planning purposes only. The parcel shown is not developable due to an Agricultural Preservation Restriction.
2. 75-foot wetland buffer allows no structures, roads, or driveways.
3. Wetland boundaries are approximate and are derived from MassDEP/MassGIS 1:12,000 wetlands. Actual wetlands may be greater.
4. From other readily available data sources, there are no slopes greater than 15%, flood plains, or rare and endangered species habitat from the Mass. NHESP.

Carlson Property, Open Space Design Two and Three Bedroom Homes

Scenario 3



Legend

- Single Family Lots
- Preserved Farmland
- Wetlands
- Woodland
- Open Space/Utilities
- Three Bedroom Home
- Two Bedroom Home

What does this map show?

This map shows an OSD scenario with an internal loop road providing frontage for 14 homes. No driveways would exit onto public streets. Density is calculated on the basis of .75 bedrooms per net buildable acre. At this density, the site can accommodate 34 bedrooms. This plan shows 6, 3-bedroom homes and 8, 2-bedroom homes, for a total of 34 bedrooms. This concept helps to meet an important housing goal. Surveys have indicated that many Harvard seniors would like to downsize into smaller homes and remain in Town.

7.2 acres are developed with roads and houses. In total, 73% of the site is preserved as open space. This plan shows about 20 acres remaining in an active orchard use.

Notes:

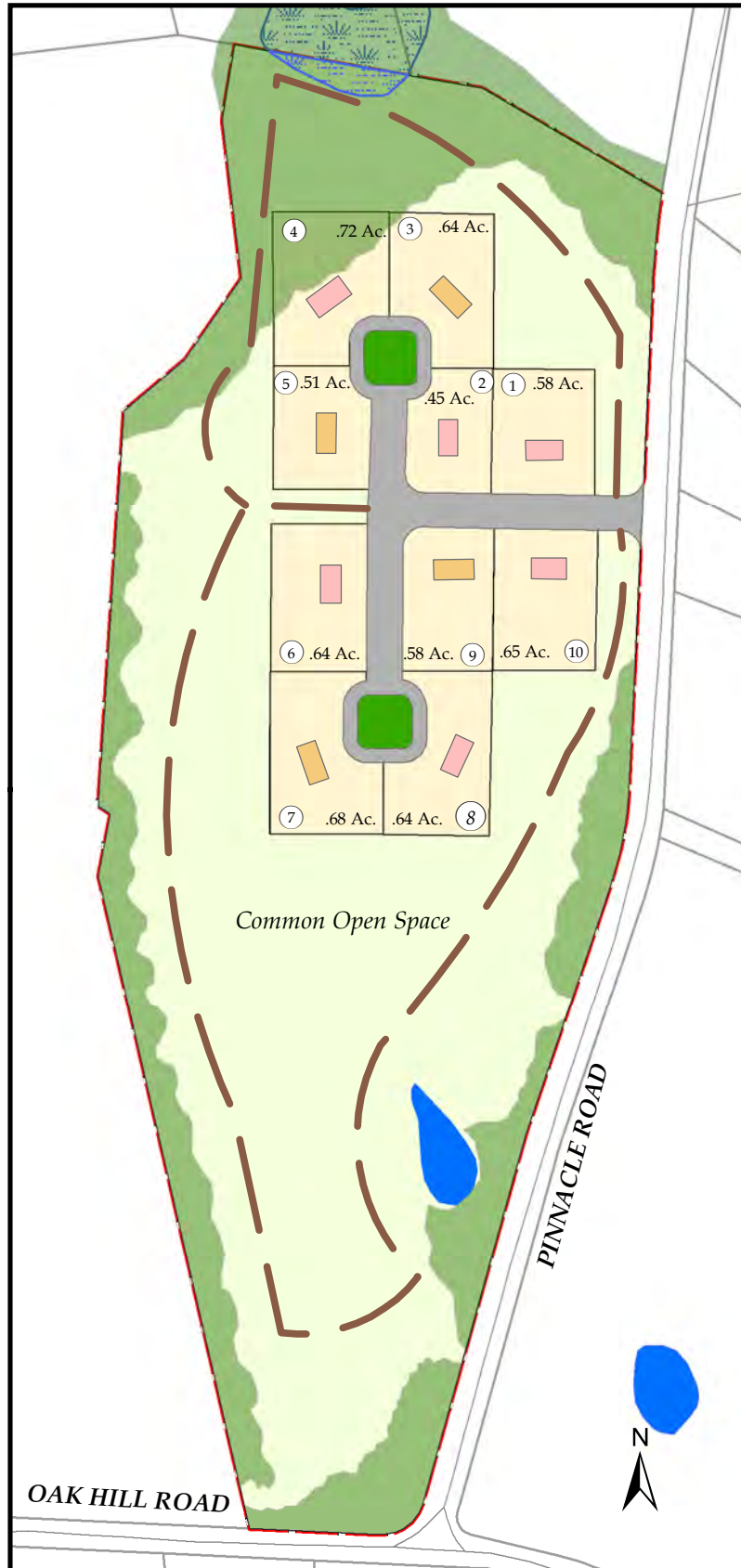
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2. 75-foot wetland buffer allows no structures, roads, or driveways.
3. Wetland boundaries are approximate and are derived from MassDEP/MassGIS 1:12,000 wetlands. Actual wetlands may be greater.
4. From other readily available data sources, there are no slopes greater than 15%, flood plains, or rare and endangered species habitat from the Mass. NHESP.

0 125 250 500 Feet

Prepared by William Scanlan and Christopher Ryan, Feb. 2021

Carlson Property, Open Space Design Three and Four Bedroom Homes

Scenario 4



Legend

- Trails
- Wetland
- Pond
- Proposed Lots
- Preserved Open Space
- Three Bedroom Home
- Four Bedroom Home

What does this map show?

This map shows an alternative OSD design. A new subdivision road leads from Pinnacle Road and splits into 2 cul-de-sacs.

Based on a density of .75 acres of net developable land per bedroom, the site can accommodate 34 bedrooms. This plan shows 6, 3-bedroom homes and 4, 4-bedroom homes, for a total of 34 bedrooms. The developer can decide the mix of units depending upon market conditions.

7.8 acres are developed with roads and houses; 19.9 acres remain undeveloped. In total, 73% of the site is preserved as open space to help retain Harvard's scenic landscapes. This open space could be reserved for the enjoyment of the residents; for example, the plan depicts possible walking trails for exercise by the residents.

Notes:

1. Development scenarios are for planning purposes only. The parcel shown is not developable due to an Agricultural Preservation Restriction.
2. 75-foot wetland buffer allows no structures, roads, or driveways.
3. Wetland boundaries are approximate and are derived from MassDEP/MassGIS 1:12,000 wetlands. Actual wetlands may be greater.
4. From other readily available data sources, there are no slopes greater than 15%, flood plains, or rare and endangered species habitat from the Mass. NHESP.

0 125 250 500 Feet

Prepared by William Scanlan and Christopher Ryan, Feb. 2021

Carlson Property Open Space Design Scenarios

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
w	Conventional ANR	OSD-Single Family	OSD-2&3 Bed. Homes	OSD-3&4 Bed. Homes
Road Type	Existing Frontage	Cul-de-sacs	Loop Road	T-Shape Road
Lot Size	27.1 Ac.	27.1 Ac.	27.1 Ac.	27.1 Ac.
Development Constraints	1.9 Ac.	1.9 Ac.	1.9 Ac.	1.9 Ac.
Net Developable Area	NA	25.2 Ac.	25.2 Ac.	25.2 Ac.
Density	Allowed by Zoning	.75 Ac./Bedroom	.75 Ac./Bedroom	.75 Ac./Bedroom
Number of Lots	Basic Lots: 7 Hammerhead Lots: 3	11, 3-Bed. Homes	8, 2-Bed. Homes 6, 3-Bed. Homes	6, 3-Bed. Homes 4, 4-Bed. Homes
Bedrooms	40-50	33	34	34
Area in Lots	27.1 Ac.	6.1 Ac.	5.9 Ac.	6.1 Ac.
Average Lot Size	2.7 Ac.	0.56 Ac.	0.42 Ac.	0.61 Ac.
Open Space	0 Ac.	19.6 Ac.	19.9 Ac.	19.6
Open Space %	0%	72%	73%	72%

Open Space Design Project Fruitlands Property

Aerial Photo



0 500 1,000 2,000 Feet

Data Sources: Parcels: Harvard Assessors; Roads: MassDOT; Environmental Data: MassGIS
Prepared by William Scanlan and Christopher Ryan, March 2020




Base Map

Open Space Design Project Fruitlands Property

Legend

-  Fruitlands Parcel
-  Wetlands
-  Steep Slopes

Land Cover

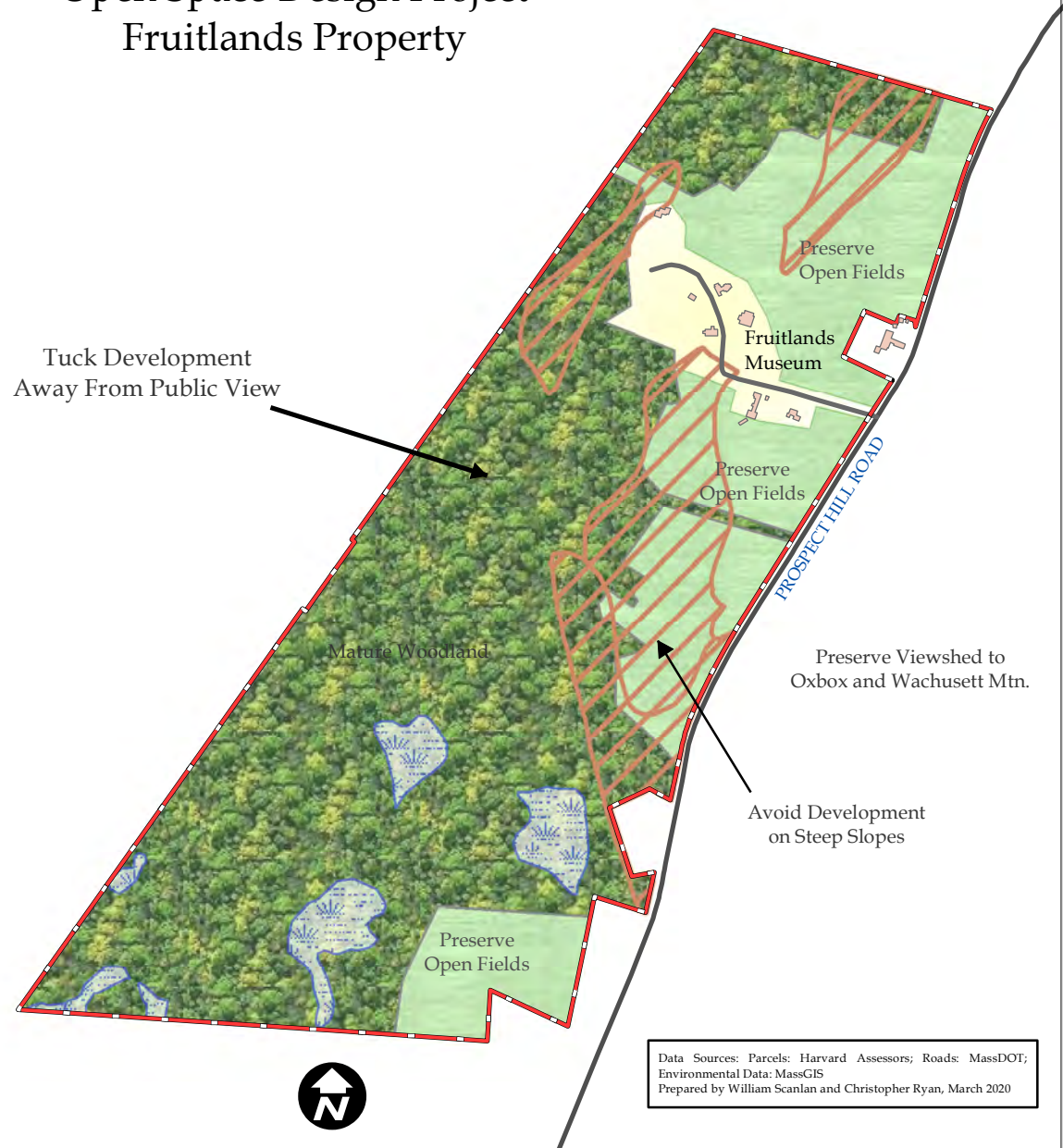
-  Field
-  Forest
-  Museum Grounds

What does this map show?

This map shows existing conditions on a 200+ acre parcel that is the site of the Fruitlands Museum. Fruitlands is owned by the Trustees of Reservations, which manages the site for educational and conservation purposes. It is not developable. It was selected for an Open Space Residential Development case study to demonstrate how the technique could preserve significant cultural and natural resources while allowing development to occur on a limited portion of the property.

This map shows the location of museum buildings, open fields, forests and presence of panoramic vistas from Prospect Hill Road. Portions of the site contain environmental constraints where development should be avoided, including wetlands, a 75-foot no-build zone surrounding the wetlands, and steep slopes. These constraints total 58.5 acres, leaving a net developable area of 151.8 acres.

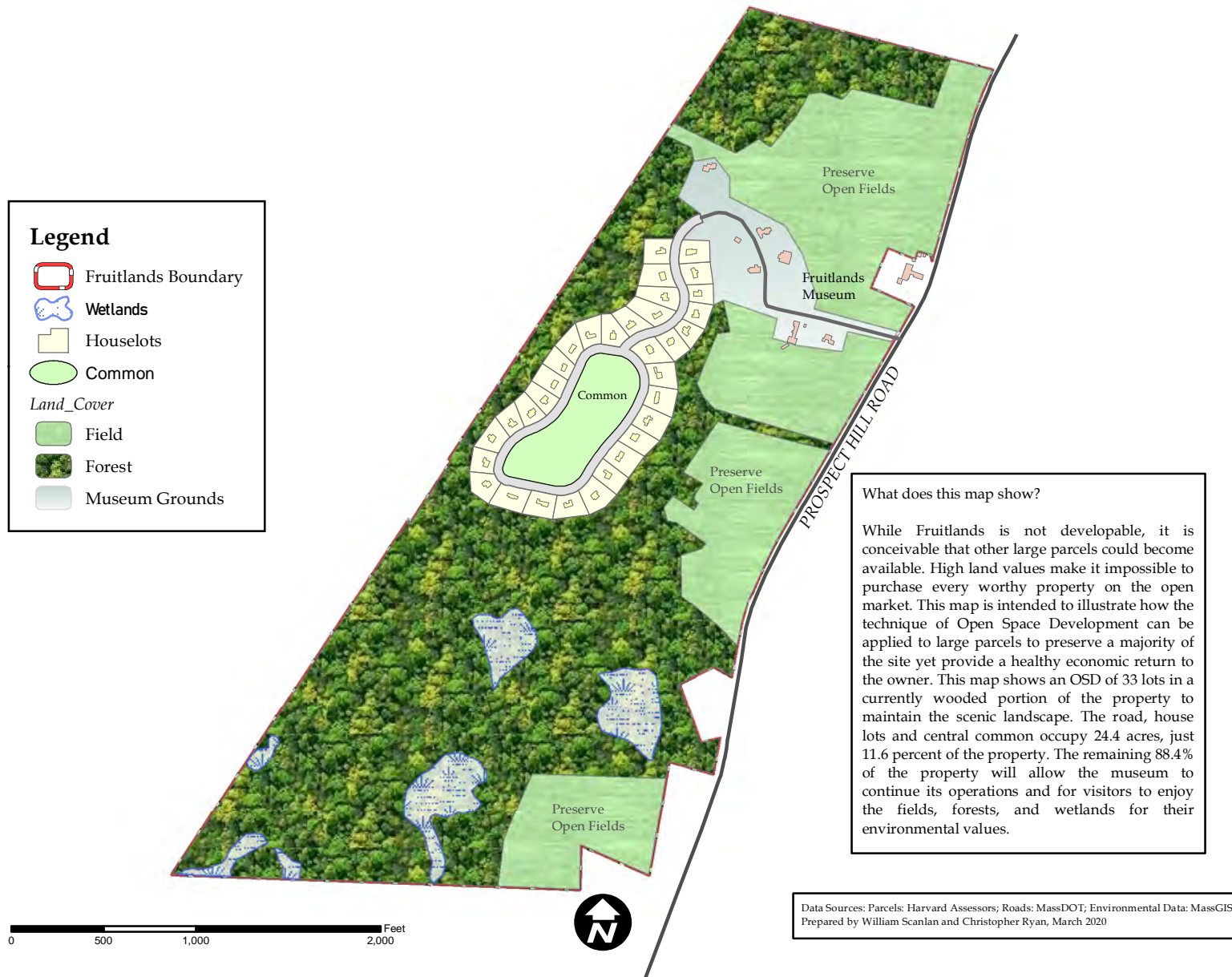
0 500 1,000 2,000 Feet



Data Sources: Parcels: Harvard Assessors; Roads: MassDOT;
Environmental Data: MassGIS
Prepared by William Scanlan and Christopher Ryan, March 2020

Open Space Design Scenario

Open Space Design Project Fruitlands Property



Fruitlands Property Open Space Design Scenario

	Open Space Development
Road Type	Minor Road with Central Common
Road Length	3,350'
Lot Size	210.2 Ac.
Development Constraints	58.5 Ac.
Net Developable Area	151.8 Ac.
Number of Lots	33
Density	1 lot per 4.6 net developable acres
Bedrooms	132 - 165
Area in Lots	14.6 Ac.
Average Lot Size	.44 Ac.
Open Space and Museum	185.8 Ac.
% Preserved	88.4%

Aerial Photo

Open Space Design Poor Farm Property



Legend

- Poor Farm, 2017
- ANR Lots, 2018
- Parcels, 2021

0 125 250 500
Feet

Data Sources: Parcels: Harvard Assessors; Roads: MassDOT; Environmental Data: MassGIS
Prepared by William Scanlan and Christopher Ryan, March 2021

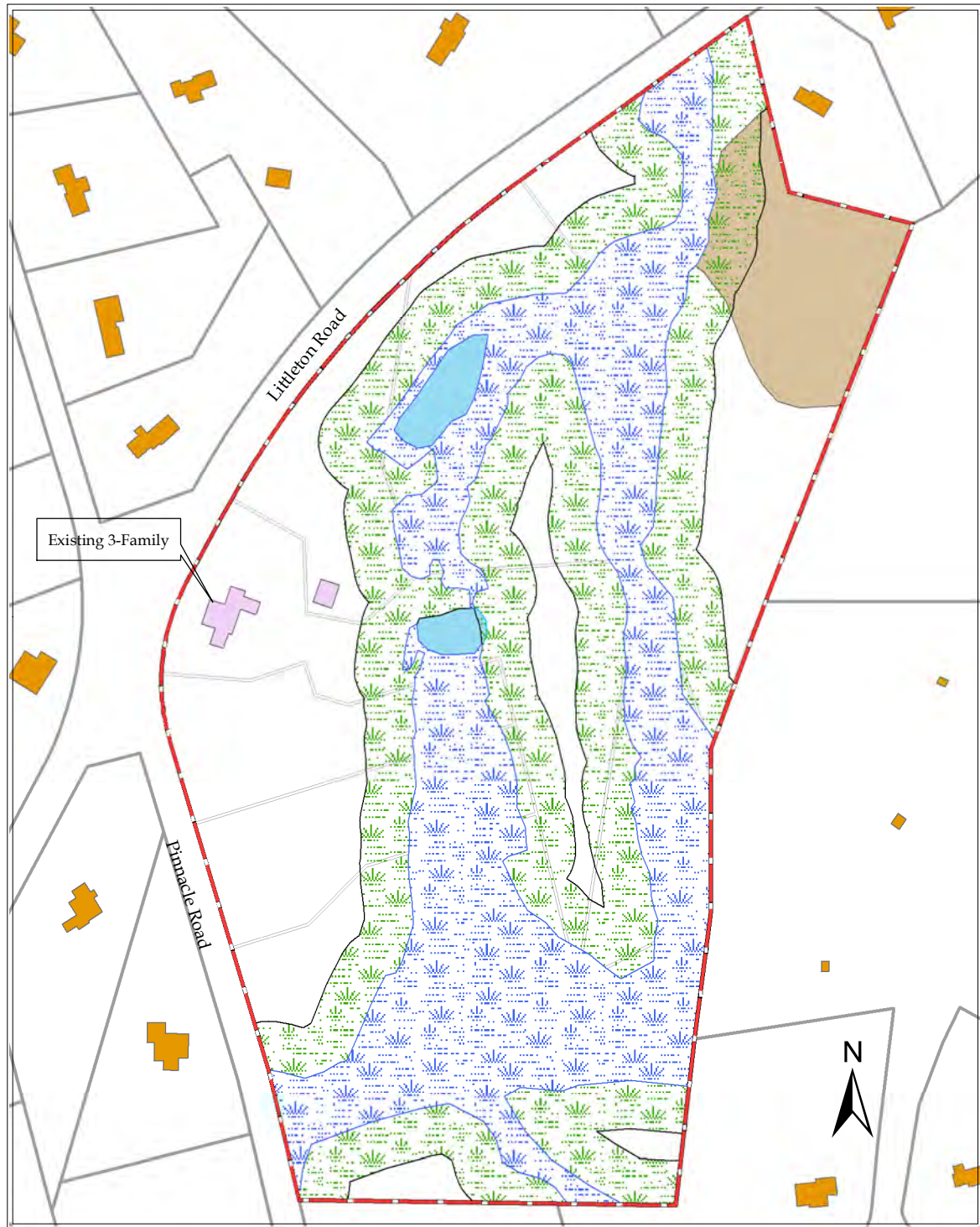
What does this map show?

The property, known locally as the Poor Farm, was acquired by the Municipal Affordable Housing Trust in 2013 to meet a need for subsidized housing. Due to neighborhood opposition, the MAHT abandoned the project and sold the property. In 2018, the buyer received endorsement of an Approval Not Required (ANR) Plan. The Plan divided the property into six buildable lots and three non-buildable parcels. Due to environmental constraints, six is considered the maximum number of lots that could be built by-right on the property.









Open Space Design Poor Farm Property

Base Map



Legend

-  Former Poor Farm
-  Wetlands
-  75' Wetland Buffer
-  Pond
-  Slopes > 15%
-  Unconstrained Land

0 125 250 500 Feet

What does this map show?

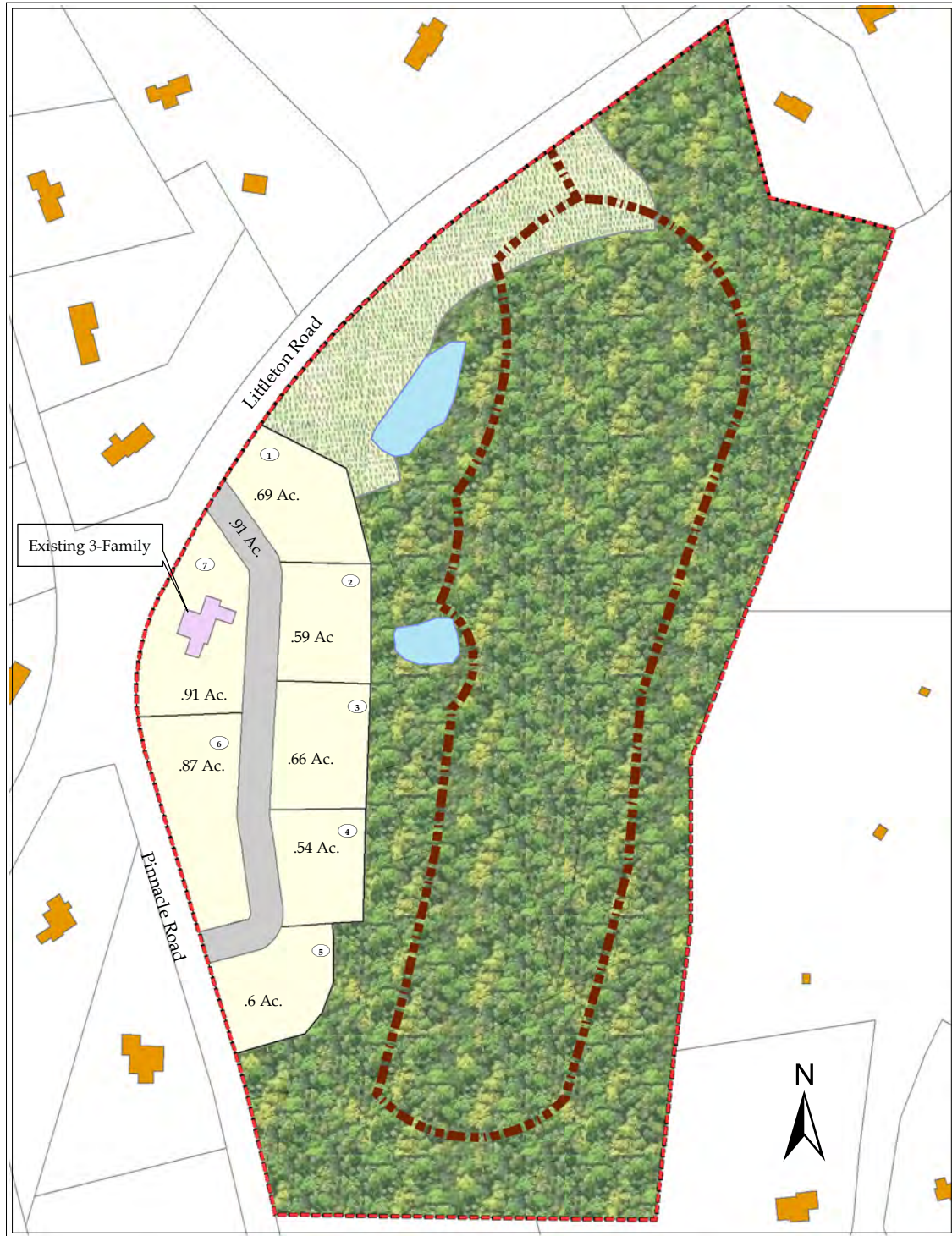
This map shows environmental constraints of the property prior to its division into multiple frontage lots. It depicts how environmental features limit development options for the property. Wetlands are the primary constraint, and the associated 75-foot no-build buffer zone further constrains use of the property. Of the original 29.5-acre site, 21.4 acres have environmental limitations, leaving a net buildable area of 8.1 acres.

Notes:

1. 75-foot wetland buffer allows no structures, roads, or driveways.
 2. Wetland boundaries are approximate. Sources include MassGIS wetlands and partial delineation from David E. Ross Associates. Actual wetlands may be greater.
 3. Slope greater than 15% is from the USDA Soil Survey, slope 'D'.
- Prepared by William Scanlan and Christopher Ryan, March 2021

Open Space Design Poor Farm Property

Scenario 1



Legend

- Trail
- New Lots
- Land Cover*
- Field
- Forest
- Pond

What does this map show?

This map shows an open space design development of 7 lots whose frontages are on a loop road between Littleton Road and Pinnacle Road. The lots combined occupy just 4.9 acres of the larger parcel. The advantages of this plan over the ANR Plan include less visual impact of houses strung out along the road, fewer driveways entering public ways, leaving untouched a large portion (80%) of the site, not fragmenting the wetland system among different owners, and offering opportunities for public access on commonly-owned land.

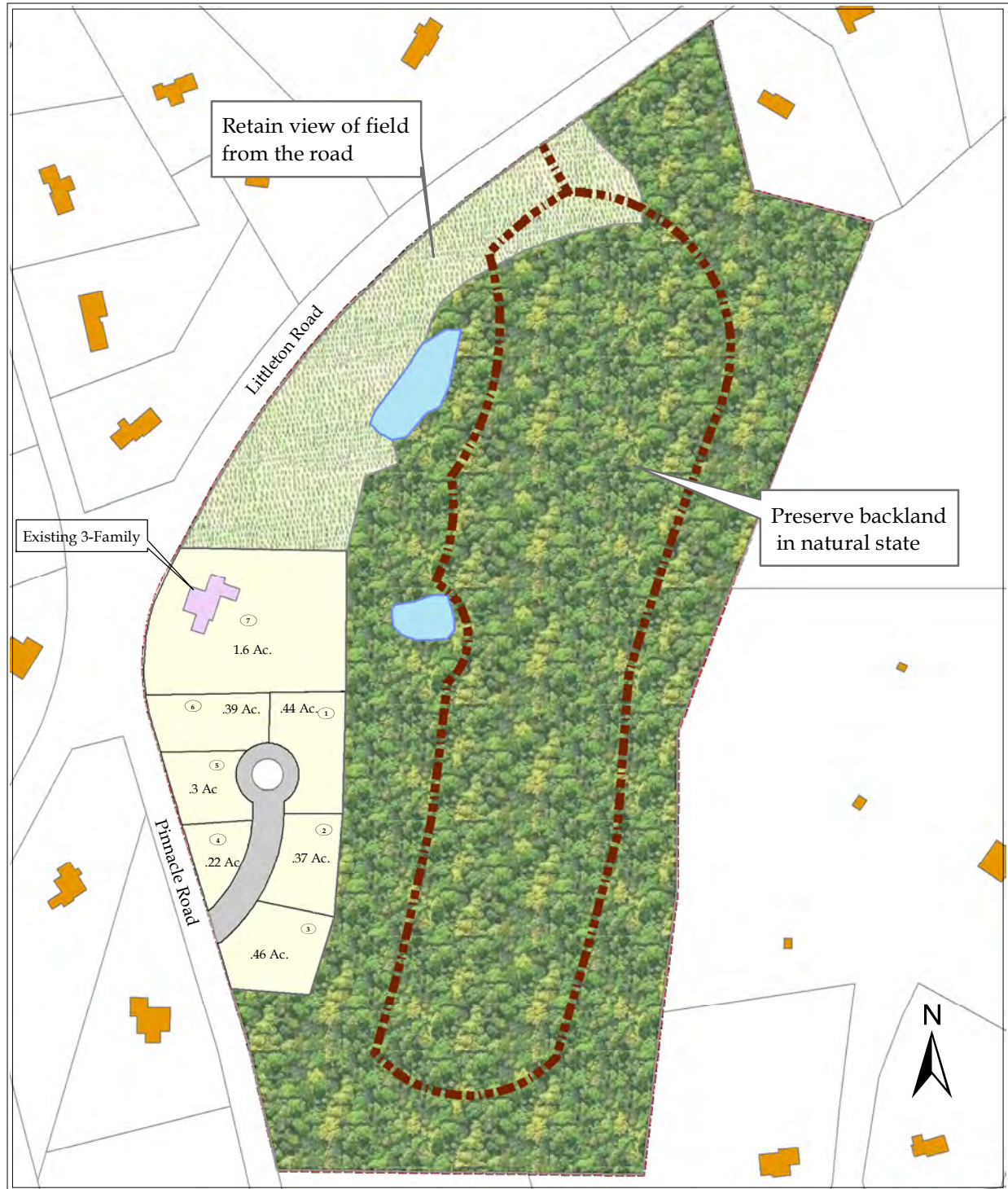
Notes:

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 2. Wetland boundaries are approximate. Sources include MassGIS wetlands and partial delineation from David E. Ross Associates. Actual wetlands may be greater.
 3. Slope greater than 15% is from the USDA Soil Survey, slope 'D'.
- Prepared by William Scanlan and Christopher Ryan, March 2021

0 125 250 500
Feet

Open Space Design Poor Farm Property

Scenario 2



Legend

- Trail
- Cover
 - Field
 - Forest
 - Pond
 - New Lots

What does this map show?

This map shows an open space design development of 6 new lots with access off a short cul-de-sac, plus the existing three family home is on a separate lot. The lots are concentrated on a small portion of the larger parcel and are brought close to the road due to the large area of wetlands and associated buffer zone. This allows for the natural resources to be unharmed by the development. Given the maximum of six lots from the conventional ANR Plan, this open space development plan has a single access point on Pinnacle Road, results in less disturbance of the site, keeps the natural systems intact, and allows for a recreational trail and nature study.

Notes:

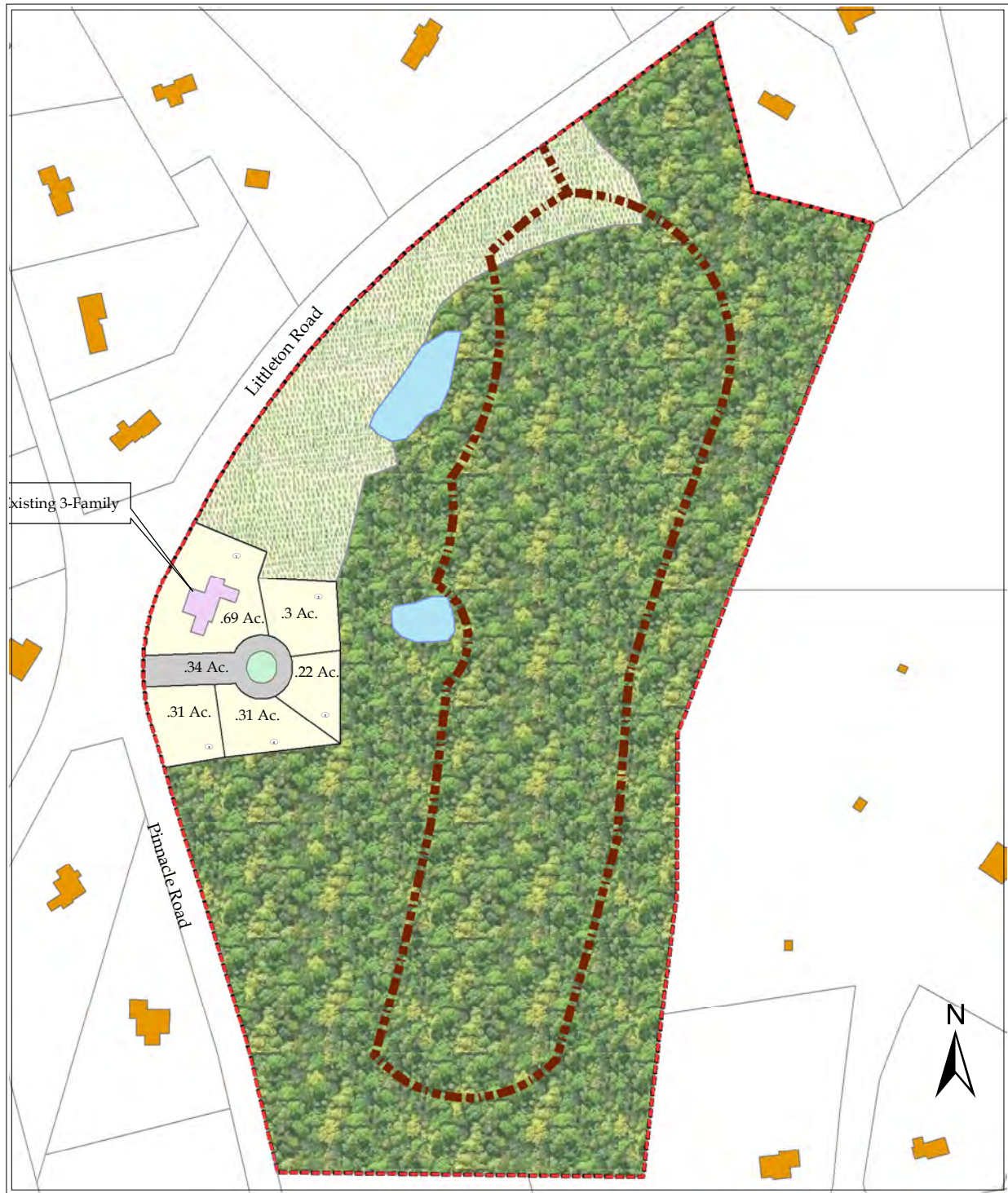
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2. Wetland boundaries are approximate. Sources include MassGIS wetlands and partial delineation from David E. Ross Associates. Actual wetlands may be greater.
3. Slope greater than 15% is from the USDA Soil Survey, slope 'D'.

Prepared by William Scanlan and Christopher Ryan, March 2021

0 125 250 500 Feet

Scenario 3

Open Space Design Poor Farm Property



Legend

- New Lots
- Trail
- Field
- Forest
- Pond

What does this map show?

This map shows an open space design development of 5 new lots with access off a short cul-de-sac; road costs per lot are low compared to a conventional subdivision. The average lot size is .4 acres, which provides a manageable amount of private space for homeowners to maintain, affords play areas for children, and offers room for a small garden and privacy landscaping. Roads and lots occupy 2.2 acres, leaving 27.3 acres as open space, or 93% of the total parcel. On a site with a large amount of environmental constraints, an open space design approach provides a way to achieve a reasonable economic return for the landowner while leaving the natural systems largely unaffected by the development.

Notes:

1. 75-foot wetland buffer allows no structures, roads, or driveways.
2. Wetland boundaries are approximate. Sources include MassGIS wetlands and partial delineation from David E. Ross Associates. Actual wetlands may be greater.
3. Slope greater than 15% is from the USDA Soil Survey, slope 'D'. Prepared by William Scanlan and Christopher Ryan, March 2021

0 125 250 500 Feet

Poor Farm Property Open Space Design Scenarios

	ANR Plan	Scenario 1	Scenario 2	Scenario 3
Road Type	NA - Frontage Lots	Minor Street Through Road	Minor Street Cul-de-sac	Minor Street Cul-de-sac
Road Length	NA	800	325'	240'
Lot Size	29.5 Ac.	29.5	29.5	29.5
Development Constraints	21.4 Ac.	21.4 Ac.	21.4 Ac.	21.4 Ac.
Net Developable Area	8.1 Ac.	8.1 Ac.	8.1 Ac.	8.1 Ac.
Density (Units per Ac.)	0.27	0.31	0.31	0.24
Number of Lots	6 Basic Lots (1.5 Ac. Minimum Lot Size) 3 Other Parcels	7 Lots	7 Lots	5 Lots
Bedrooms	24-30	28-35	28-35	20-25
Area in Lots/Parcels	29.5 Ac.	4.9 Ac.	3.8 Ac.	1.8 Ac.
Average Lot Size	3.2 Ac.	0.69 Ac	.54 Ac.	0.4 Ac
Open Space Set-Aside	0 Ac.	23.7 Ac.	25.3 Ac.	27.3
Open Space %	0%	80%	86%	93%

Open Space Design Project Crook Property

Aerial Photo



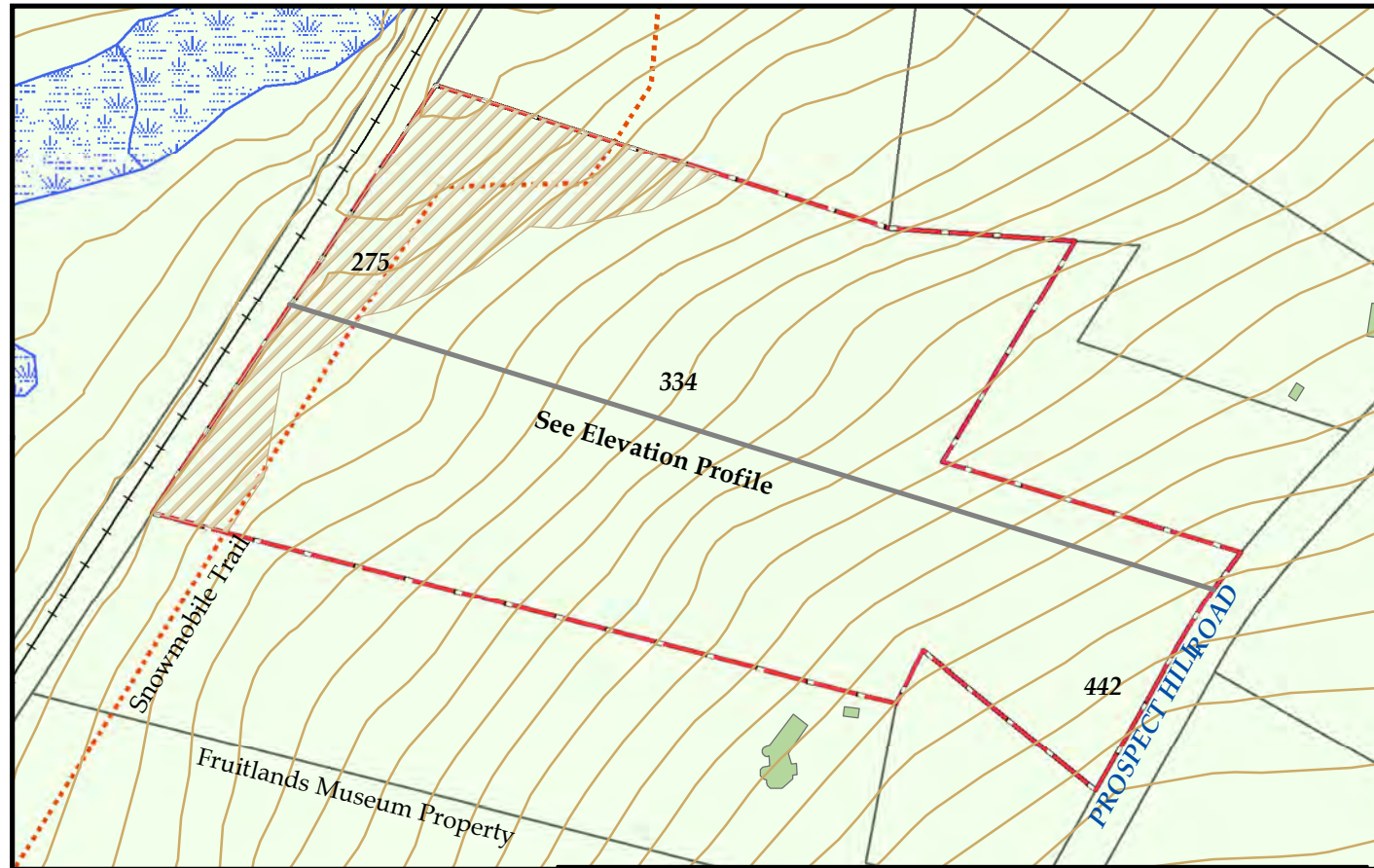
0 150 300 600 Feet



Data Sources: Parcels: Harvard Assessors; Roads: MassDOT; Environmental Data: MassGIS
Prepared by William Scanlan and Christopher Ryan, March, 2021

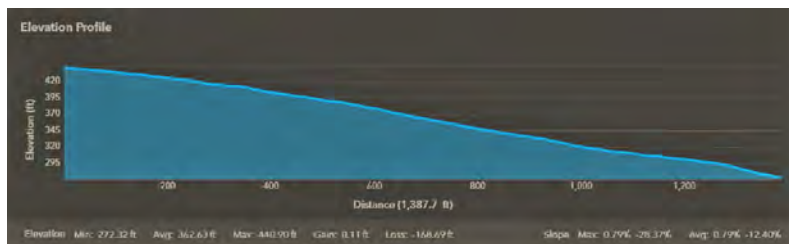
Open Space Design Project Crook Property

Base Map



Legend

- 10 Foot Contours
- Priority Habitat
- Wetlands
- Snowmobile Trail
- Parcels



0 150 300 600 Feet

What does this map show?

This map shows existing conditions on a 15.9-acre privately owned parcel of land on Prospect Hill Road. The contour lines indicate a moderately sloping hill falling from the high point along the road to the railroad below. The average slope along the transect line is about 13%. This will present some difficulty for developing the entire property. An Open Space Design would be preferable to a conventional subdivision since it would result in less land disturbance. An area of Priority Habitat of Rare Species is found at the western end of the property containing about 2.4 acres. This habitat should be preserved to protect state-listed rare species.

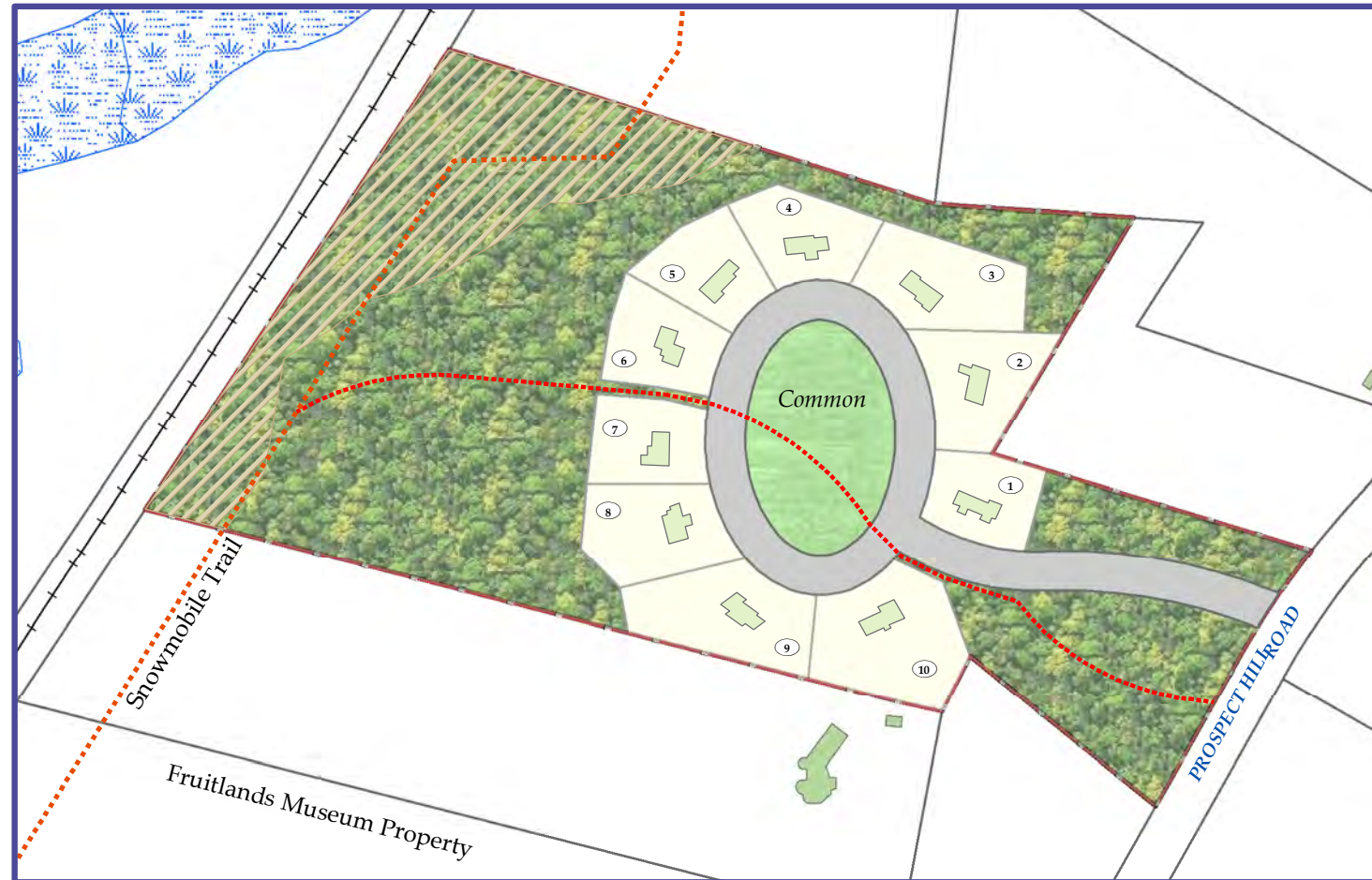
Data Sources: Parcels: Harvard Assessors; Roads: MassDOT; Environmental Data: MassGIS
Prepared by William Scanlan and Christopher Ryan, March 2021

Open Space Design Project Crook Property

OSD Scenario

Legend

-  Trail
-  Priority Habitat
-  House Lot
-  Open Space
-  Common
-  Structures
-  Wetlands



0 150 300 600 Feet

Data Sources: Parcels: Harvard Assessors; Roads: MassDOT; Environmental Data: MassGIS
Prepared by William Scanlan and Christopher Ryan, March 2021

What does this map show?

This map shows an Open Space Design of single family homes on the 15.9-acre property. The plan shifts the development into the middle portion of the property in order to minimize its visual impact. The first house is about 400 feet off the road. Ten lots yield a density of one lot per 1.6 acres, which is close to the 1.5-acre minimum lot size in Harvard. The road and lots take up 5.9 acres, or 37% of the site. Nine acres are preserved as natural open space, and a Common provides an acre of recreational space for the residents. Development is kept well away from the endangered species habitat. A trail could be provided from the road to the snowmobile trail at the base of the hill, which then leads to more trails on the Fruitlands property to the south.

Crook Property Open Space Design Scenario

	Open Space Development
Road Type	Minor Road with Central Common
Road Length	1,400'
Lot Size	15.9 Ac.
Development Constraints	2.4Ac.
Net Developable Area	13.5 Ac.
Number of Lots	10
Density	1 lot per 1.35 net developable acres
Bedrooms	40-50
Area in Lots	4.3 Ac.
Average Lot Size	.43Ac.
Open Space & Common	10.0 Ac.
% Preserved	62.9%

Open Space Design Project Westward Property

Aerial Photo



0 125 250 500 Feet



Open Space Design Project Westward Property

Base Map



Legend

 90 Oak Hill Road

 Slopes > 15%

Land Use

 Agriculture

 Farm Buildings

 Forest

What does this map show?

The property for this case study is owned by Westward Orchards and contains 35.4 acres. It is under an Agricultural Preservation Restriction (APR) and is therefore not developable. The property is intensively used as an orchard and has few developmental constraints. The only environmental constraint is slope greater than 15% on about .5 ac., but it has little effect on the development suitability of the lot.

Notes:

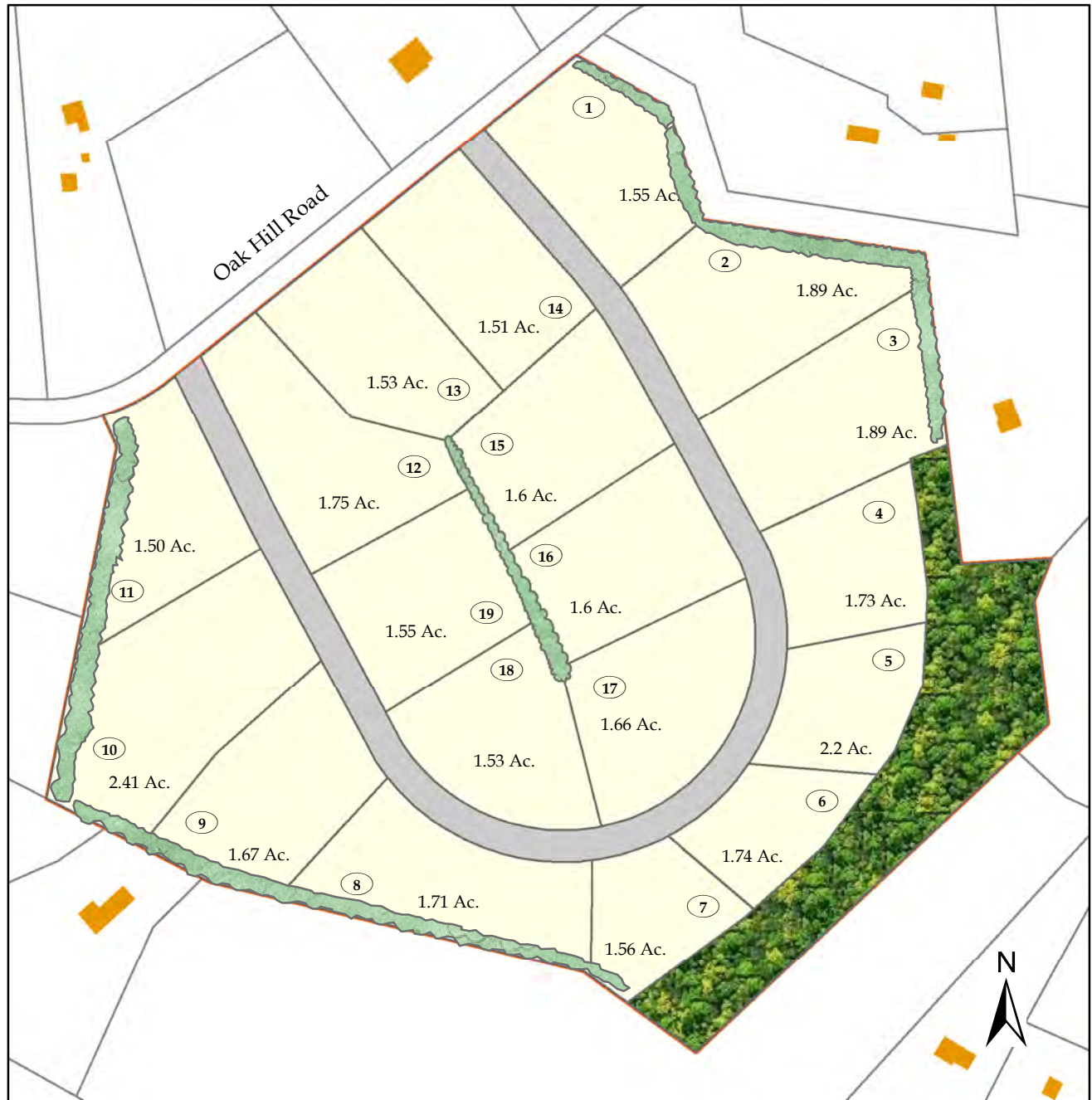
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2. From other readily available data sources, there are no wetlands, flood plains, or rare and endangered species habitat from the Mass. NHESP.

0 125 250 500 Feet




Prepared by William Scanlan and Christopher Ryan, March 2021

Scenario 1
Conventional Subdivision

Open Space Design Project Westward Property



Legend

-  New Plantings
-  Forest
-  Conventional Lots

What does this map show?

Scenario 1 displays a conventional subdivision that maximizes the build-out of the property. It contains 19 lots with at least 1.5 ac. and 180' of frontage. The orchard is lost and the Town loses a scenic resource and community asset. Whether or not all of these lots could accommodate a private well and septic system is an open question, but this layout is similar to other subdivisions in Harvard dating from the 1970's and '80's. No land is set aside as open space since none is required.

Notes:

1. Development scenarios are for planning purposes only. The parcel shown is not developable due to an Agricultural Preservation Restriction.
- 2.. From other readily available data sources, there are no wetlands, flood plains, or rare and endangered species habitat from the Mass. NHESP.

0 125 250 500 Feet

Prepared by William Scanlan and Christopher Ryan, March 2021

Open Space Design Project Westward Property

Scenario 2
OSD - 3-Bedroom Homes



Legend

-  Forest
-  OSD Lots
-  Common
-  Orchard

What does this map show?

Scenario 2 shows an OSD plan of all 3-bedroom homes, with a yield of 15 lots, or 4 lots less than the conventional plan; however, the OSD plan requires about 1,000 linear feet less of roadway. The cost of constructing the longer road may offset the profit from the additional lot sales.

The OSD bylaw does not specify minimum lot sizes and frontages, but it does require that open space comprise at least 50% of the site; this plan has an 80% open space set-aside. The owner could reap a significant profit from the lot sales and still keep about 18 acres in orchard. The forest in the rear remains undisturbed as well. Last, fewer bedrooms likely mean fewer school children and a lower impact on the tax rate for educational expenses.

Notes:

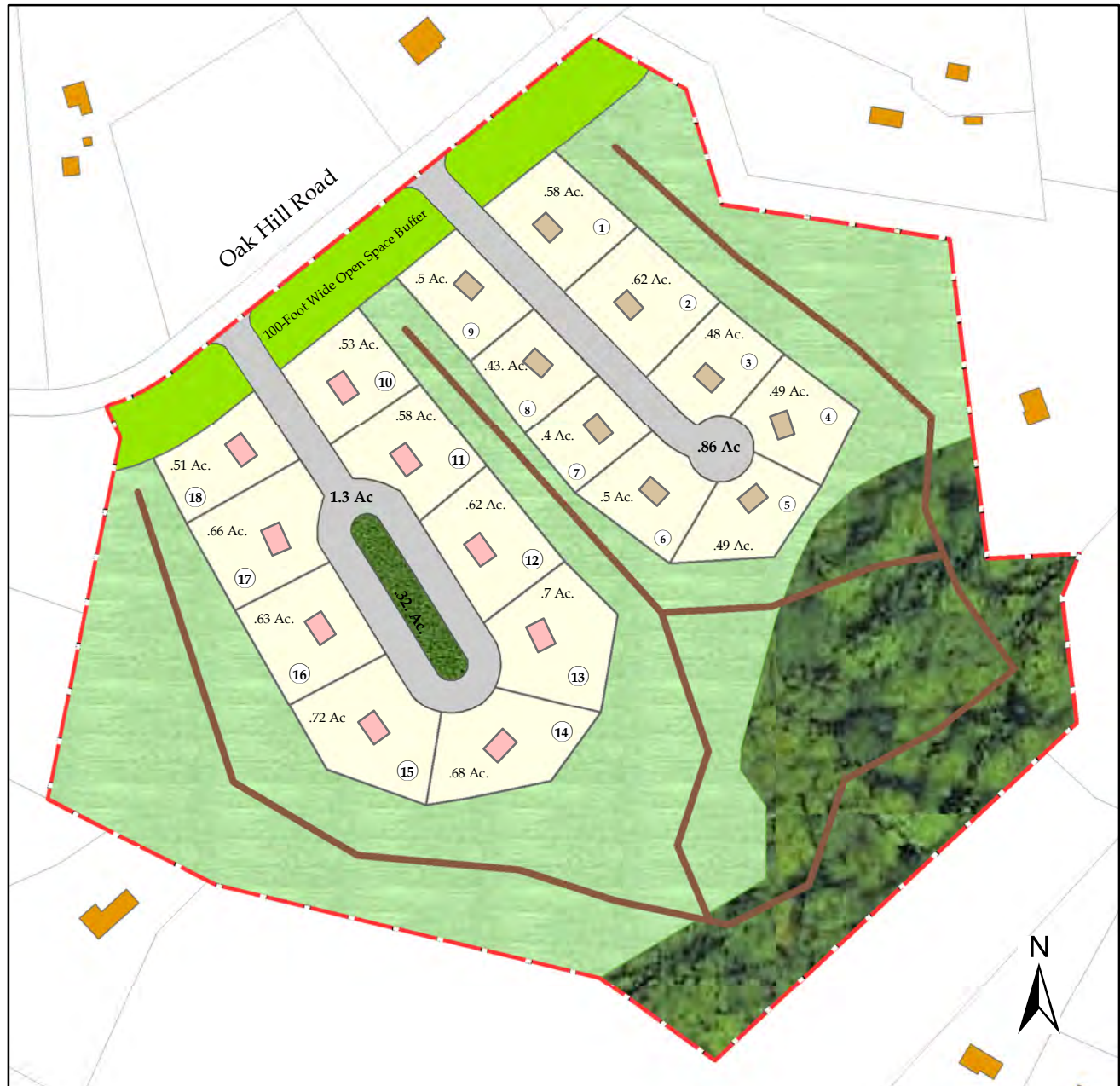
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2. From other readily available data sources, there are no wetlands, flood plains, or rare and endangered species habitat from the Mass. NHESP.

0 125 250 500 Feet







Prepared by William Scanlan and Christopher Ryan, March, 2021

Open Space Design Project Westward Property

Scenario 3
OSD - 2 and 3-Bedroom Homes



Legend

-  OSD Lots
-  Trails
-  Forest
-  Field/CSA
-  Three Bedroom Home
-  Two Bedroom Home

What does this map show?

Scenario 3 contains a mix of two and three bedroom homes in two separate clusters. This plan yields 18 lots, including 9, 3-bedroom homes and 9, 2-bedroom homes, for a total of 45 bedrooms. These units might appeal to seniors looking to downsize from a large home. Lot sizes range from about .4 - .7 acres, which makes for a compact, walkable neighborhood and provides the owners with a private yard for outdoor activities. Roads and lots comprise 12 ac., leaving 23 ac. (65%) of the parcel as open space. If not reserved for agriculture, the homeowners could establish trails, install a ballfield, or create a community garden. Last, with about half the number of bedrooms as a conventional plan, much less land is needed for a common leach field, significantly lowering the cost for septic treatment.

Notes:

1. Development scenarios are for planning purposes only. The parcel shown is not developable due to an Agricultural Preservation Restriction.
2. From other readily available data sources, there are no wetlands, flood plains, or rare and endangered species habitat from the Mass. NHESP.

0 125 250 500 Feet

Prepared by William Scanlan and Christopher Ryan, March 2021

Westward Property Open Space Design Scenarios

	Scenario 1	Scenario 2	Scenario 3
	Conventional Subdivision	OSD-3 Bedroom Homes	OSD-2&3 Bed. Homes
Road Type	Loop Road	Minor Road With Central Common	Two Dead-End Roads
Road Length	2,450'	1,415'	1,750'
Lot Size	35.4 Ac.	35.4 Ac.	35.4 Ac.
Development Constraints	0.5 Ac.	0.5 Ac.	0.5 Ac.
Net Developable Area	34.9 Ac.	34.9 Ac.	34.9 Ac.
Density	Required by Zoning	.75 Ac./Bedroom	.75 Ac./Bedroom
Number of Lots	19 Basic Lots (1.5 Ac. Minimum Lot Size)	15, 3-Bed. Homes	9, 2-Bed. Homes 9, 3-Bed. Homes
Bedrooms	76-95	45	45
Area in Lots	32.6 Ac.	5.5 Ac.	10.1 Ac.
Average Lot Size	1.7 Ac.	0.37 Ac.	0.56 Ac.
Open Space	0 Ac.	28.4 Ac.	23.1 Ac.
Open Space %	0%	80%	65%