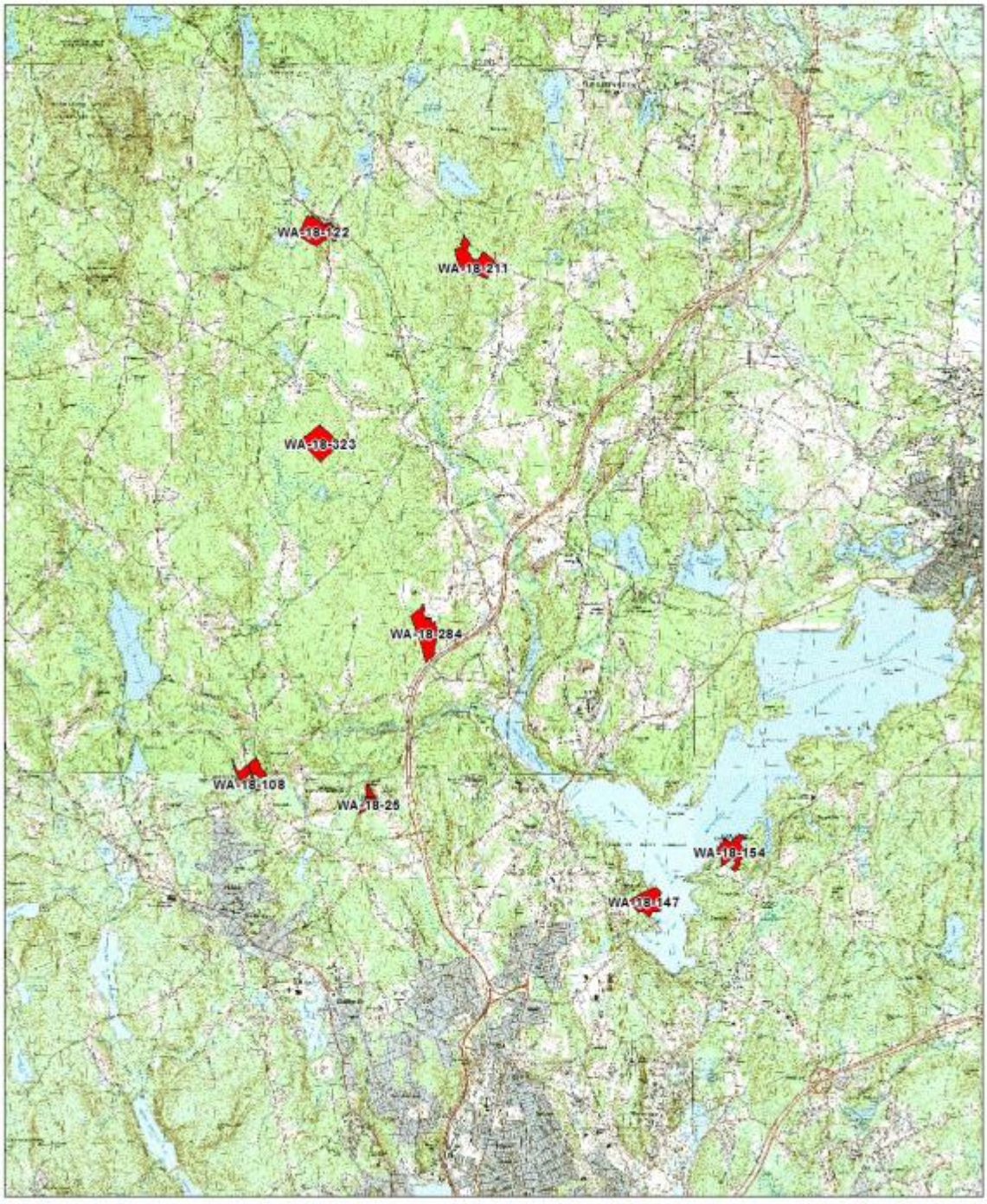
Department of Conservation and Recreation
Division of Water Supply Protection
Office of Watershed Management
Wachusett Reservoir

Proposed Forest Management
Fiscal Year 2018

DCR Wachusett Reservoir

Proposed Timber Sales FY 2018

Locus Map (Scale 1:72,000 - 1 inch=6,000 feet)



Massachusetts Department of Conservation and Recreation

Division of Water Supply Protection, Office of Watershed Management

Forest Management Project Proposal Summary

DWSP Proposal Number: WA-18-25

Site Information

Watershed: Wachusett	**Town(s)**: Holden
Acres: 20.6	**Nearest Road:** Harris Street
Natural Heritage Atlas overlap?: Yes	**Public Drinking Water Supply Watershed?:** Yes
Forest Types: White pine/oak, White pine/hardwood	
Soils: Merrimac and Hinckley	
Wetland Resources: There is only a vernal pool wetland resource in this working unit.	
Vernal Pools: There is one vernal pool located close to Harris Street.	

NARRATIVES

General Description/Forest Composition/History:

The "Paul Street" working unit was part of the original takings and was previously owned by the Linus M. Harris Manufacturing Company. The 1938 hurricane survey showed "scattering damage" on this parcel although no visible evidence was noted. It was first cover typed in 1951 as white pine. Interestingly the northern half of this working unit was mapped by surveyors in 1830 as woodland and thus it has the potential to be a primary woodland. This working unit was cut in 1996 and has resulted in good oak regeneration in the lower elevations and good pine in the higher elevations. This property currently has very good quality white pine throughout the working unit which is not surprising given the excessively drained nature of the soil. Red and black oak is smaller on the hilltops (40'-55') and of much better quality, health and height in the lower elevations of this small working unit. Smaller components of sugar maple, red maple, white oak, and hemlock are interspersed. In the southern section mountain laurel is thick, although the tree saplings are taller than the laurel except for a few small pockets. Gypsy moth and hemlock wooly adelgid were found in this working unit.

Site Selection:

The ideal watershed protection forest is one which best serves the function of the land as a producer of high quality drinking water in both short- and long-term. This forest must be vigorous and diverse in tree species and ages, be actively accumulating biomass and actively regenerating. Such a forest will be ideally suited to be resilient to and quickly recover from small- and large-scale disturbances such as diseases, insect infestations, ice storms and hurricanes.

This particular site has a diverse makeup of regeneration that consists of hemlock, red maple, white pine, white oak, black oak, and red oak among others. This site also has an insufficient component of young forest as 93% of the forest is between 81-100 years old. A harvest would help put this forest closer to the ultimate goal stated above.

Silvicultural Objectives:

Because there is such widespread advance regeneration in this small working unit, openings will be made throughout in order to release the advance regeneration in this working unit. Given that there is already 1.38 acres of young forest, 6 acres of openings will occur. This will create young forest in about 1/3 of the manageable area within this working unit. It will also allow the working unit to further develop into the long term watershed forest management goal of at least three age class.

These openings will average about 1 acre in size and will range in size from about ¼ acre up to 2 acres and will be located where there is plenty of regeneration. At least a few overstory trees will be left standing in most of the openings. These trees provide valuable structural diversity to these openings and it is expected that most of these retained trees will be allowed to grow indefinitely into the future.

Cultural Resources:

This area will be assessed by the DCR Archeologist for both known sites of cultural or archeological importance as well as for potential use by pre-Contact Native Americans.

There are no known or documented significant historic or archeological resources in this area, although the Quinapoxet river is less than 70 feet from the northern section of this working unit.

Wildlife/Rare or Endangered Species:

All DWSP Best Management Practices for wildlife management such as the protection and enhancement of wildlife habitat features will be an integral part of the silviculture and job layout. Diverse hard and soft mast species will be retained and the healthiest trees will be released to improve seed production, which will promote tree seedlings and food for wildlife. Large snags, den trees, logs and nest trees will be retained whenever possible as valuable habitat. No stick nests were observed, but if they are identified in the further steps of this process they will be protected. Where they occur; streams, wetlands, seeps and vernal pools will be protected for water quality and wildlife habitat.

The Natural Heritage and Endangered Species Program have determined that certain state-listed sensitive species or habitats may exist within the lot proposal area. To protect them from unnecessary disturbance, detailed information regarding affected species and their locations is not included in this report. DWSP will coordinate with NHESP and follow recommendations to protect these species during the proposed activity.

There is one vernal pool within this working unit located near Harris Street.

All the vernal pools, whether verified or potential, will be protected using the appropriate Best Management Practices.

DCR - Wachusett Reservoir
Timber Lot Proposal WA-18-25

Outline of Proposed Area (Working Unit)

DCR property Lines w/wo stone walls

Stone walls

Landing/s

Streams

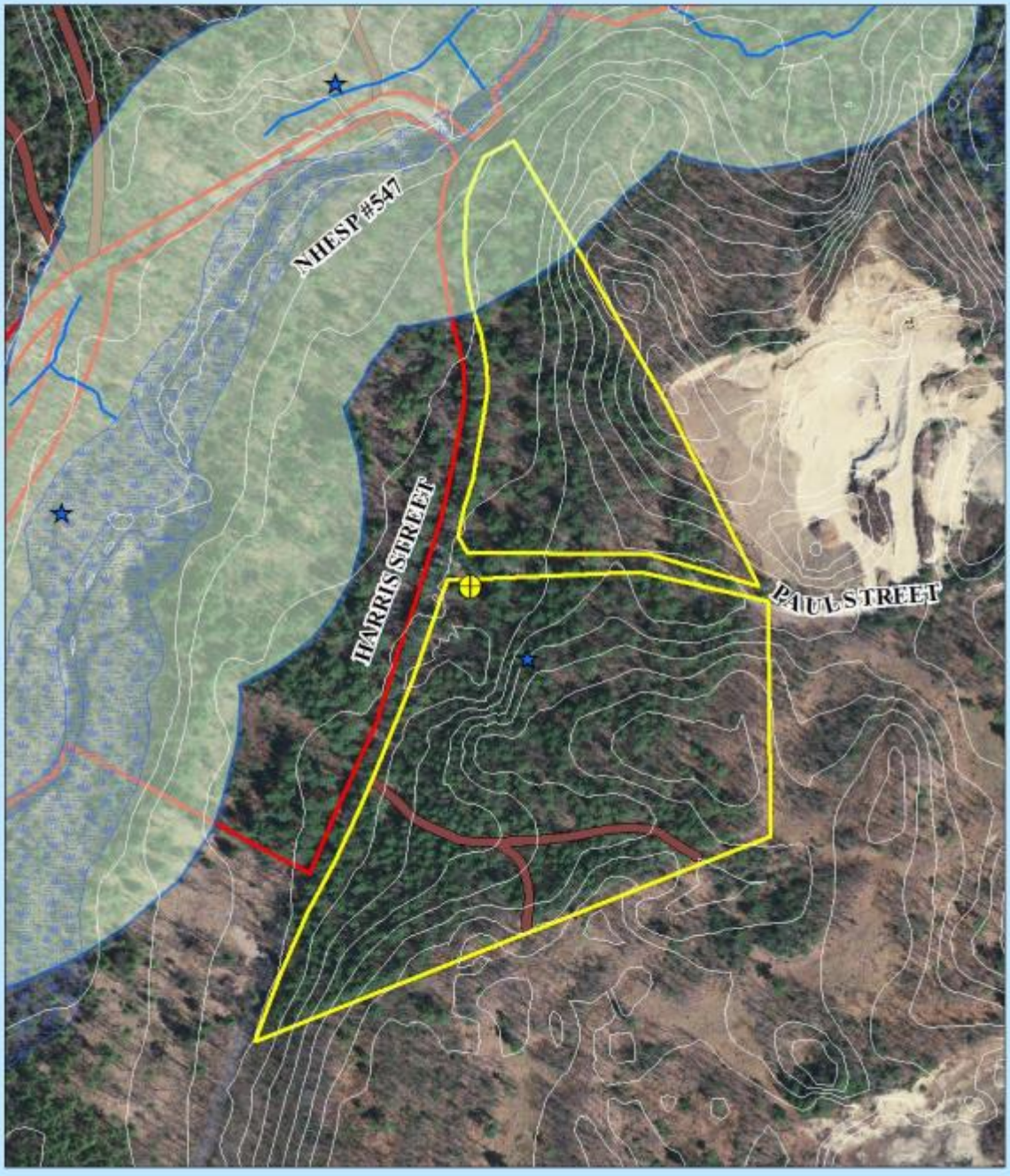
Wetlands

Vernal Pool (NR-Confirmed)

NHESP Priority Habitat

1 inch = 200 feet

0 165 330 660 Feet



Massachusetts Department of Conservation and Recreation

Division of Water Supply Protection, Office of Watershed Management

Forest Management Project Proposal Summary

DWSP Proposal Number: WA-18-108

Site Information

Watershed: Wachusett	**Town(s)**: Holden
Acres:33.3	**Nearest Road:** Mill Street
Natural Heritage Atlas overlap?: Yes	**Public Drinking Water Supply Watershed?:** Yes
Forest Types: Oak/hardwood 13.2 acres. White pine 9.6 acres.	
Soils: The primary soil in this working unit is Hinckley excessively drained soils of outwash origin. Poorly drained Limerick soils are found in the large wetland east of Mill street.	
Wetland Resources: There is a large wetland network east of Mill street. The Quinapoxet river and Asknebumskit river meet in the eastern end of this working unit.	
Vernal Pools: None Known.	

NARRATIVES

General Description/Forest Composition/History:

The west side of Mill Street was taken from Quinapoxet Manufacturing Company in 1928, it had three houses (or offices) where the foundations are still visible on lidar and several out buildings which are not. The east side of Mill Street was taken from Sarah Sweeney and Susie Veitch around the same time. Interestingly, the Susie Veitch parcel was mapped as woodland back in 1830 by surveyors. In 1989 a 2 acre wildlife harvest was made. Again, in 1994 this site was worked in an 8 acre white pine plantation, where harvesting in strips were made. Both of those harvests resulted in a good amount of young saplings coming in. Currently, the forest is dominated by the remnants of a white pine plantation in the flat land close to Mill Street. There is also a mix of red, black and white oak in the hillier areas. The wetlands are dominated by red maple, and throughout the site there are lesser quantities of sugar maple, American hornbeam, American chestnut, pitch pine, hemlock, yellow birch, blue beech, and quaking aspen. Regeneration surveys showed a good amount of saplings made up of white oak, red oak and white pine with smaller quantities of hemlock, pitch pine, red maple, blue beech and sugar maple. Interfering plants such as mountain laurel and witch hazel have a small presence on this lot. The age structure of the forest is as follows: 1%, 0-20 years old, 12%, 21-40 years, 0%, 41-60 years, 22%, 61-80 years, 25% 81-100 years and 40%, >100 years old.

Site Selection:

The ideal watershed protection forest is one which best serves the function of the land as a producer of high quality drinking water in both short- and long-term. This forest must be vigorous and diverse in tree species and ages, be actively accumulating biomass and actively regenerating. Such a forest will be ideally suited to be resilient to and quickly recover from small- and large-scale disturbances such as diseases, insect infestations, ice storms and hurricanes.

Given the small amount of young forest currently free to grow in this woodlot this particular site has a great opportunity, specifically because of the diverse advance regeneration coming up under the white pine stands. There is less white pine coming into the white pine plantation and more hardwoods, which is

appropriate given the quality of the oaks and other hardwoods are good, whereas the white pine quality varies a good deal. This harvest would result in about 9 acres of new age class. The species composition will be similar to what it is now since the advance regeneration is similar to the overstory, although the species proportions will change in some areas.

Silvicultural Objectives:

Given the good advance regeneration present, openings will be made to release this regeneration which will help create a new age class. Given the lot is 33 acres the harvest would result in about 9 acres of new age class. Openings will average about 1 acre in size. After the harvest is complete, the result will be closer to the watersheds ultimate goal of having three distinct age classes within each working unit. This operation will focus on making openings where regeneration is present and will remove low quality multi stemmed white pines in the plantation areas and creating openings where they are suitable to the topography in the oak and white pine/oak stands.

Cultural Resources:

This area will be assessed by the DCR Archeologist for both known sites of cultural or archeological importance as well as for potential use by pre-Contact Native Americans. There is an old dam visible from Mill Street. A map has been provided showing the locations of the old damn and foundations within this working unit.

Wildlife/Rare or Endangered Species:

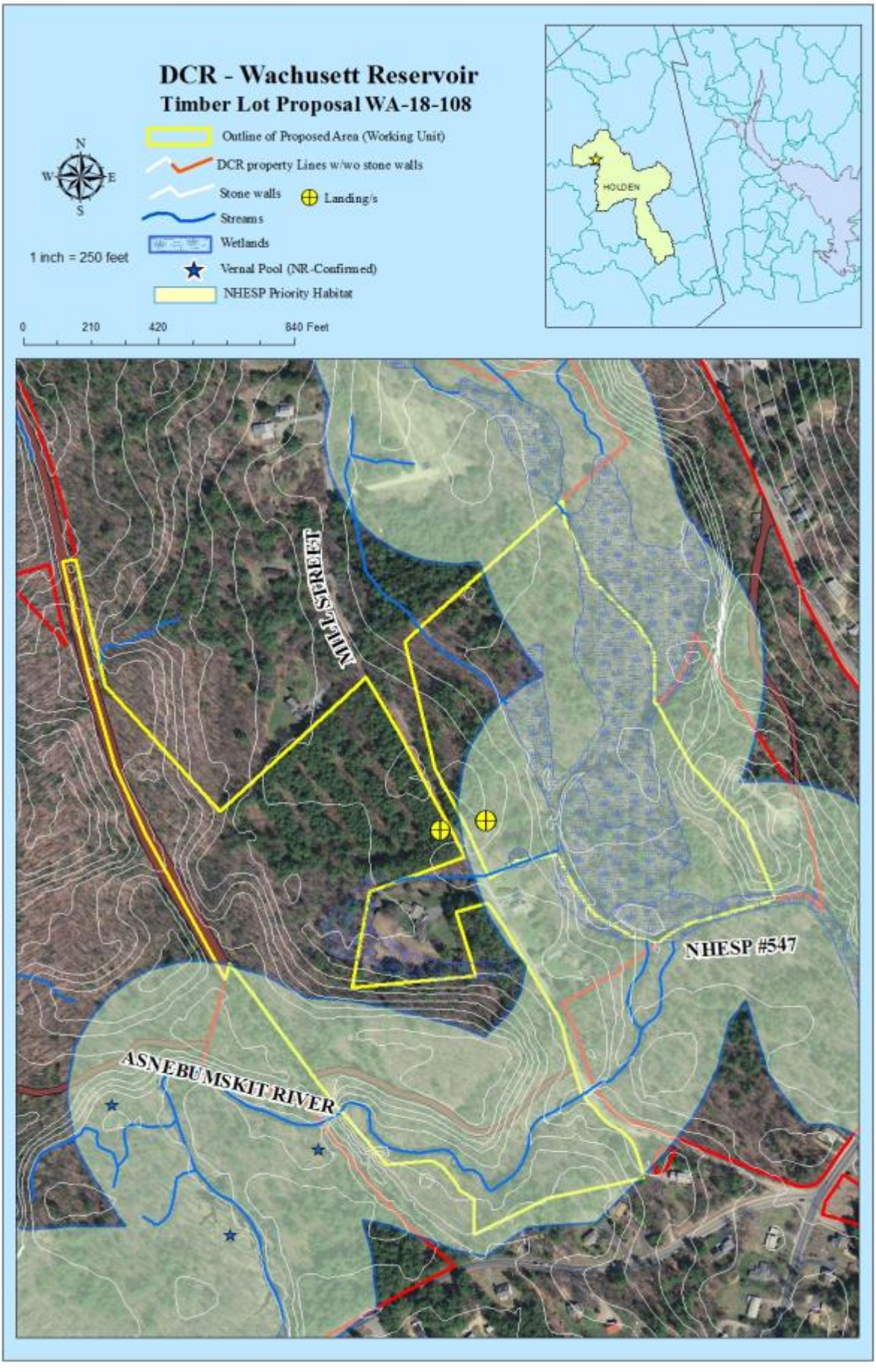
All DWSP Best Management Practices for wildlife management such as the protection and enhancement of wildlife habitat features will be an integral part of the silviculture and job layout. Diverse hard and soft mast species will be retained and the healthiest trees will be released to improve seed production, which will promote tree seedlings and food for wildlife. Large snags, den trees, logs and nest trees will be retained whenever possible as valuable habitat. No stick nests were observed, but if they are identified in the further steps of this process they will be protected. Where they occur; streams, wetlands, seeps and vernal pools will be protected for water quality and wildlife habitat.

The wetland east of Mill Street has a large network of heavily used deer trails.

A Natural Heritage GIS Priority Habitat layer has been identified within this working unit. We will follow the recommendations provided by the Natural Heritage.

All the vernal pools, whether verified or potential, will be protected using the appropriate Best Management Practices.

DCR - Wachusett Reservoir
Timber Lot Proposal WA-18-108



Massachusetts Department of Conservation and Recreation

Division of Water Supply Protection, Office of Watershed Management

Forest Management Project Proposal Summary

DWSP Proposal Number: WA-18-122

Site Information

Watershed: Wachusett	**Town(s)**: Princeton
Acres: 63.6	**Nearest Road:** Gleason Road
Natural Heritage Atlas overlap?: Yes	**Public Drinking Water Supply Watershed?:** Yes
Forest Types: White pine/hardwood 31.8 acres. Oak/hardwood 16.3 acres. White pine 6.4 acres.	
Soils: Montauk-Scituate-Canton association are thick, well drained soils and Charlton-Chatfield-Hollis association which are thin, well drained soils.	
Wetland Resources: Keyes Brook runs along the north edge of this property west of Gleason Road. It flows through the property east of Gleason Road along with its associated bordering vegetated wetlands.	
Vernal Pools: There are no known vernal pools.	

NARRATIVES

General Description/Forest Composition/History:

The piece of land to the east of Gleason Road is primarily an oak/hardwood forest. The overstory is dominated by red oak along with red maple, black birch, beech, white pine and white ash. The portion to the west of Gleason Road is dominated by white pine/hardwood, predominantly comprised of white pine, red maple, white ash, black birch, red oak and white oak. Most of this area, a property that was purchased by DCR in 2002, was heavily logged in about 1988. Where most of the overstory trees were removed, there is now a 29 year old forest on about 11 acres. These are either white pine/hardwood stands comprised of white pine, black birch, red oak, red maple, paper birch and white oak or oak/hardwood stands comprised of red oak, red maple, black birch, white oak, sugar maple and sassafras. Due to the intensity of the logging, there are a lot of large saplings in these stands with a good diversity of species. Another property acquired in 1993 has not been logged but has a very similar species composition as well as good advance regeneration although it is smaller in size due to the lack of adequate sunlight.

A systematic sampling of this area for terrestrial invasive species found invasive species present in just 3 of 113 plots (2.6%). One of these is on the west side of Gleason Road and had just a very small amount of bush honeysuckle. The other two on the east side of Gleason Road have more honeysuckle present.

Site Selection:

The ideal watershed protection forest is one which best serves the function of the land as a producer of high quality drinking water in both short- and long-term. This forest must be vigorous and diverse in tree species and ages, be actively accumulating biomass and actively regenerating. Such a forest will be ideally suited to be resilient to and quickly recover from small- and large-scale disturbances such as diseases, insect infestations, ice storms and hurricanes.

This area was selected for management because of the lack of age diversity both in these 63.6 acres as well as in the 741 DCR-owned acres from which water flows into Keyes Brook and ultimately into the Wachusett Reservoir. The ideal protection forest would have at least 3 age classes of trees distributed throughout this sale area. This area is unusual in having 2 distinct age classes of trees. Most of the forest

originated prior to 1950 with most of this in the 1920s. There are just a few acres of sugar maple and hemlock stands on the east side of Gleason Road that originated just after 1900 making them about 110 years old. The logging in 1988 resulted in a second age class which is now 29 years old on 18% of the area. This operation is an opportunity to create a third distinct age class in this forest.

Silvicultural Objectives:

A systematic sampling of tree regeneration found at least adequate numbers and diversity of young trees in 60% of the plots. Another 20% of the plots had what was determined to be marginally adequate regeneration. These plots are well distributed throughout the area. The species composition of these young trees is very diverse with black birch, red maple, red oak, white pine, black oak, white oak, yellow birch, white ash, sugar maple, paper birch, black cherry and eastern hophornbeam. With this excellent regeneration in place, the goal will be to create openings in the overstory of the older portion of this forest releasing these younger trees from the inhibiting shade. The openings will average about 1 acre in size, will range from about ¼ acre up to 2 acres and will total no more than 21 acres. Large trees will be retained in most of these openings that are larger than ½ acre both singly and in small clusters. These trees provide valuable structural diversity to these openings and it is expected that most of these retained trees will be allowed to grow indefinitely into the future. No cutting between the openings is planned given that the logging in 1988 already reduced the stocking to a significant degree.

No logging will occur on the east side of Gleason Road due the small acreage, the extreme rockiness of the site and the remains of the mill.

Cultural Resources:

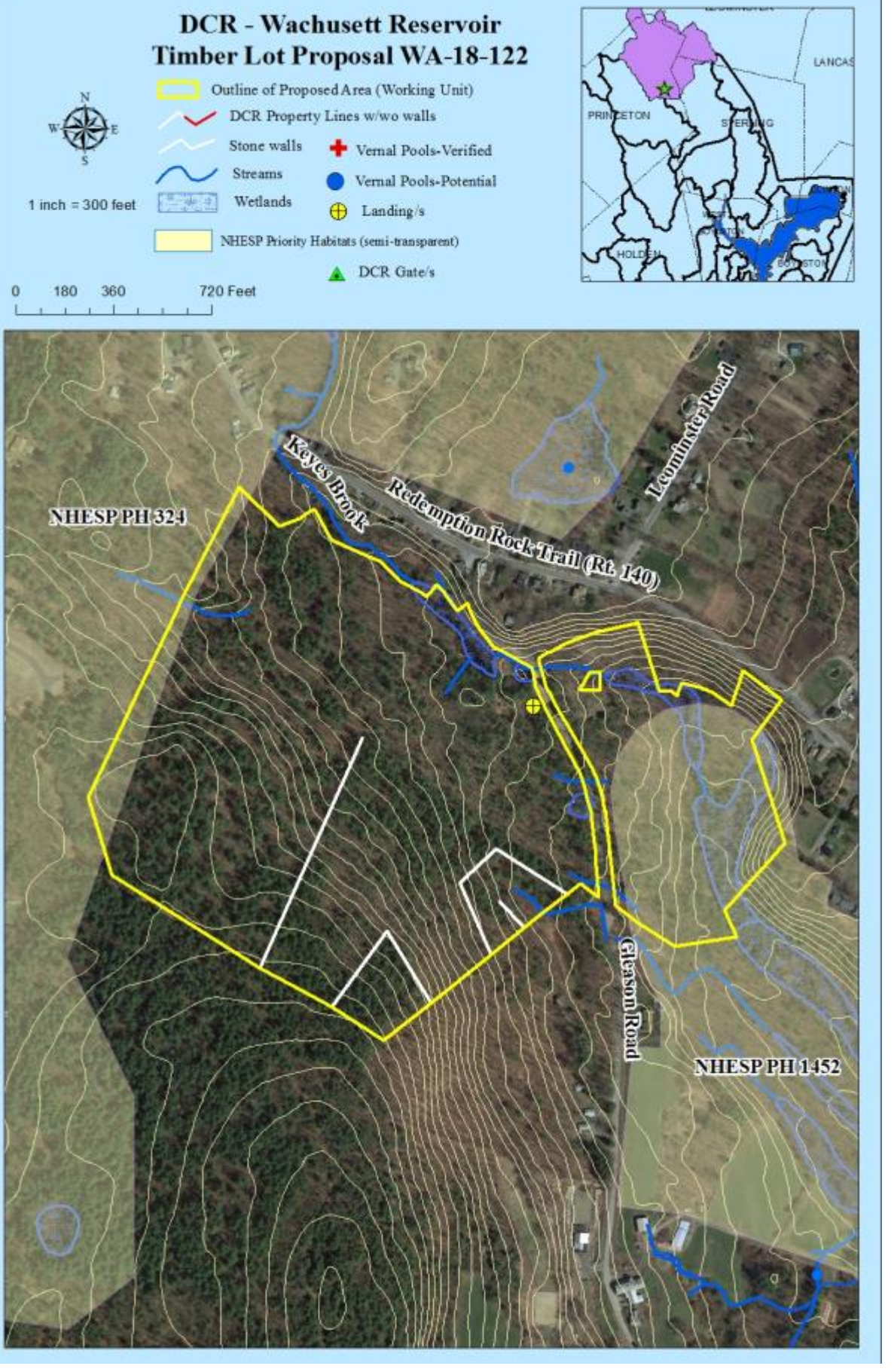
This area will be assessed by the DCR Archeologist for both known sites of cultural or archeological importance as well as for potential use by pre-Contact Native Americans.

The remains of the Temple-Stuart Chair Company mill are on this property on both sides of Gleason Road. This mill was operated from 1841 until it burned in 1910 when the company moved its operation to Baldwinville.

Wildlife/Rare or Endangered Species:

The Natural Heritage and Endangered Species Program has determined that certain state-listed sensitive species or habitats may exist within the lot proposal area. To protect them from unnecessary disturbance, detailed information regarding affected species and their locations is not included in this report. DWSP will coordinate with NHESP and follow recommendations to protect these species during the proposed activity.

DCR - Wachusett Reservoir
Timber Lot Proposal WA-18-122



Massachusetts Department of Conservation and Recreation

Division of Water Supply Protection, Office of Watershed Management

Forest Management Project Proposal Summary

DWSP Proposal Number: WA-18-147

Site Information

Watershed: Wachusett	**Town(s)**: West Boylston and Boylston
Acres: 45.7	**Nearest Road:** Temple Street (Rt. 140)
Natural Heritage Atlas overlap?: Yes	**Public Drinking Water Supply Watershed?:** Yes
Forest Types: White pine/oak	
Soils: The Hinckley sandy loam which is an excessively drained soil of outwash origin.	
Wetland Resources: There are no wetlands.	
Vernal Pools: There are no vernal pools .	

NARRATIVES

General Description/Forest Composition/History:

At the time of the construction of the Wachusett Reservoir, this area was described as "Scrub growth with few desirable trees". The area south of the Gate 22A woods road that divides this area in half was planted with 4 year old white pine in 1930. The area north of the road was planted with 4 year old white pines and 3 year old Austrian pines in 1933. A small area near the parking lot was planted with 4 year old red pines in 1933 as well and this was presumably when red pines were planted along the central road, although no map shows the planting of these trees.

Today, this white pine/oak stand is predominantly white pine with red, black and white oak with far less red maple and a few poplar. Some of the red pine and very few Austrian pines have survived as well. Most of the surviving red pine is along the Gate 22A woods road and in the woods south of this road. Given how dry this site is due to the excessively drained nature of the sandy soil, it is not surprising that the white pine is generally of far better quality and vigor than the hardwoods, and in particular, the oaks.

Two previous forest management operations have taken place in this area. The first, in 1983 on a 17 acre portion: the second, in 2000, on this same 45.7 acre area. Both of these operations had the same objective, to encourage the establishment and development of white pine regeneration while removing the hardwoods of the poorest quality. The result of these two operations is the presence of an excellent understory of white pine seedlings and saplings of a wide variety of sizes. Oak, red maple, American chestnut and beech saplings are present as well. Huckleberry and lowbush blueberry are the predominant shrubs.

This winter, an Asian longhorned beetle full host removal operation took place in 14 acres of this area. In 2013, a few infested red maples were found here and promptly removed. Unfortunately, a few more infested trees were found in 2016 in the same locale. In these full host removal operations, all trees that the Asian longhorned beetle uses during its life cycle are removed whether the tree is infested or not. Host species include all of the maples, birches, ash, elms and others. Fortunately, host species comprise a very small component of this forest. Most of them were understory red maples so the impact of the host removal operation was minimal.

A systematic sampling of this area found no presence of terrestrial invasive species. This is not surprising given the very dry character of this site. Invasive species are far more likely to be present on moister and more fertile sites.

Site Selection:

The ideal watershed protection forest is one which best serves the function of the land as a producer of high quality drinking water in both short- and long-term. This forest must be vigorous and diverse in tree species and ages, be actively accumulating biomass and actively regenerating. Such a forest will be ideally suited to be resilient to and quickly recover from small- and large-scale disturbances such as diseases, insect infestations, ice storms and hurricanes.

This area was selected for management because of the lack of age diversity both in these 45.7 acres as well as in the 481 DCR-owned acres from which water flows into this part of the Wachusett Reservoir. Unfortunately, there is no young forest in this area. All of this forest originated with the plantings that took place in the 1930's. The ideal protection forest would have at least 3 age classes of trees distributed throughout this sale area.

Silvicultural Objectives:

A systematic sampling of the tree regeneration found at least adequate numbers and diversity of seedlings and saplings in 91% of the plots taken. This regeneration is comprised primarily of white pine and red oak along with red maple, white oak and black oak. Given this excellent advance regeneration, openings will be made in the older forest to release these young trees from the inhibiting shade. As the goal of the watershed forest management program is to have at least 3 distinct age classes well distributed throughout each area of management, these openings will total about 15.2 acres which is 1/3rd of 45.7 acres. These openings will average about 1 acre in size and will range in size from about ¼ acre up to 2 acres and will be located where there is plenty of regeneration. At least a few overstory trees will be left standing in most of the openings. These trees provide valuable structural diversity to these openings and it is expected that most of these retained trees will be allowed to grow indefinitely into the future. A limited amount of cutting will occur between these openings on perhaps as much as 15 acres. The goal will be the removal of the trees of poorest health while continuing to encourage the presence of the white pine.

Cultural Resources:

This area will be assessed by the DCR Archeologist for both known sites of cultural or archeological importance as well as for potential use by pre-Contact Native Americans.

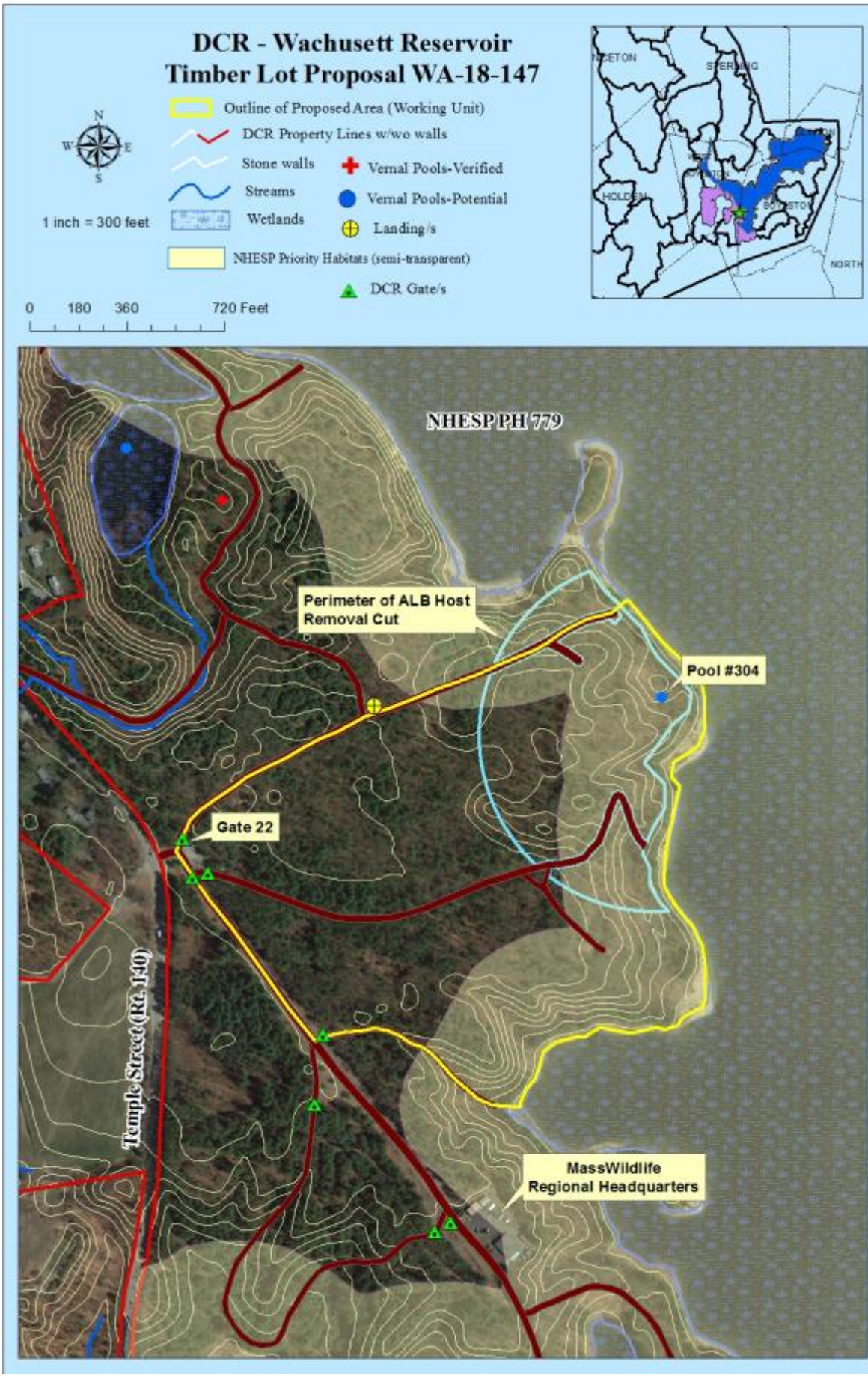
The remnants of a Cold War-era military communications facility are still present. Built in 1955 by the Army Corps of Engineers, concrete footings, cable anchors and chain link fence are all that's left in the woods. The MassWildlife Region 3 office building was the headquarters for this facility that was operated by the 1917th Airborne Air Control Squadron, based out of Westover Air Force Base, until about 1963 when it was turned back over to the MDC.

Wildlife/Rare or Endangered Species:

The Natural Heritage and Endangered Species Program has determined that certain state-listed sensitive species or habitats may exist within the lot proposal area. Both the bald eagle and common loon are known to nest at the Wachusett Reservoir. DWSP will coordinate with NHESP and follow recommendations to protect these and any other species during the proposed activity.

All DWSP Best Management Practices for wildlife management such as the maintenance and encouragement of mast-producing species snag and den trees will be followed.

DCR - Wachusett Reservoir
Timber Lot Proposal WA-18-147



Massachusetts Department of Conservation and Recreation

Division of Water Supply Protection, Office of Watershed Management

Forest Management Project Proposal Summary

DWSP Proposal Number: WA-18-154

Site Information

Watershed: Wachusett	**Town(s)**: Boylston
Acres: 35.5	**Nearest Road:** Kendall Place
Natural Heritage Atlas overlap?: Yes	**Public Drinking Water Supply Watershed?:** Yes
Forest Types: Mixed oak 21.5 acres. White pine/hardwood 11.6 acres. Northern red oak 7.4 acres.	
Soils: Hinckley sandy loam, an excessively drained soil of outwash origin.	
Wetland Resources: The Wachusett Reservoir forms the north and west sides of this sale area and there is a small wetland associated with a vernal pool at the bottom of the very large kettle hole adjacent to the Boylston town well. A very small intermittent stream forms the eastern boundary of this proposed sale area.	
Vernal Pools: There are 3 vernal pools at the bottom of the kettle holes.	

NARRATIVES

General Description/Forest Composition/History:

The far southeastern corner of this area was acquired in 1996. The rest of the area is old Metropolitan Water Works property taken prior to the construction of the reservoir at which time it was described as "Sproutland chestnut oak". About half of the area was then planted in 1904 to white pines at 10'x10' spacing on the cut-over sproutland and 5'x7' spacing on open portions. Today, much of the planted areas are white pine-oak stands and the unplanted sproutlands are either mixed oak stands on the flatter, drier sections or red oak stands on the steep slopes.

About half of this area has received treatment in the past. A small piece in the far southwestern corner was cut in 2000 and another operation took place in 1994 that cut in various parts of this area. The goal of these operations was to begin the establishment of young trees and, where feasible, begin the releasing of existing young trees on the very limited areas where they were already established.

Regeneration sampling shows that 66% of the plots have adequate numbers and diversity of young trees and another 22% have marginal regeneration. The regeneration is comprised of an appropriate mix of white pine, oaks, red maple and hemlock. 3% of plots had an interfering level of mountain laurel. The mountain laurel is especially thick on the steep slopes around the various kettle holes.

The hemlock in this area is being severely impacted by hemlock wooly adelgid with many dead and dying trees.

Systematic sampling of terrestrial invasive species found just one plot out of 106 with invasive species present. Norway maple is present in the far southeastern corner of the sale area near the intermittent stream.

Site Selection:

The ideal watershed protection forest is one which best serves the function of the land as a producer of high quality drinking water in both short- and long-term. This forest must be vigorous and diverse in tree species and ages, be actively accumulating biomass and actively regenerating. Such a forest will be ideally suited to be resilient to and quickly recover from small- and large-scale disturbances such as diseases, insect infestations, ice storms and hurricanes.

This area was selected for management because of the lack of age diversity both in these 35.5 acres as well as in the 1,139 DCR-owned acres from which water flows into the Wachusett Reservoir. The ideal protection forest would have at least 3 age classes of trees distributed throughout this sale area. This area has no component of the forest that is less than 20 years old. 86% of the forest is more than 100 years old, dating to the plantings during reservoir construction in 1904.

Silvicultural Objectives:

Given the excellent numbers and diversity of young trees present throughout this area, openings will be made in the older portion of the forest, releasing these trees from the inhibiting shade. Given the noticeably superior quality of the white pine compared to the oaks, which is common on these dry soils, white pine regeneration will be the focus of these openings although, of course, other species will be released along with the pine. Care will be taken to avoid unnecessary release or encouragement of the beech that is scattered throughout this area due to the presence of beech bark disease. Openings will average about 1 acre in size, range from about ¼ acre to 2 acres and total up to 12 acres.

Between the openings, partial cutting will take place designed to continue and enhance the presence and dominance of white pine over the oaks while removing trees of the poorest health regardless of species.

Cultural Resources:

This area will be assessed by the DCR Archeologist for both known sites of cultural or archeological importance as well as for potential use by pre-Contact Native Americans.

Wildlife/Rare or Endangered Species:

All DWSP Best Management Practices for wildlife management such as the protection and enhancement of wildlife habitat features will be an integral part of the silviculture and job layout. Diverse hard and soft mast species will be retained and the healthiest trees will be released to improve seed production, which will promote tree seedlings and food for wildlife. Large snags, den trees, logs and nest trees will be retained whenever possible as valuable habitat. No stick nests were observed, but if they are identified in the further steps of this process they will be protected. Where they occur; streams, wetlands, seeps and vernal pools will be protected for water quality and wildlife habitat.

The Natural Heritage and Endangered Species Program has determined that certain state-listed sensitive species or habitats may exist within the lot proposal area. Both the bald eagle and common loon are known to nest at the Wachusett Reservoir. DWSP will coordinate with NHESP and follow recommendations to protect these and any other species during the proposed activity.

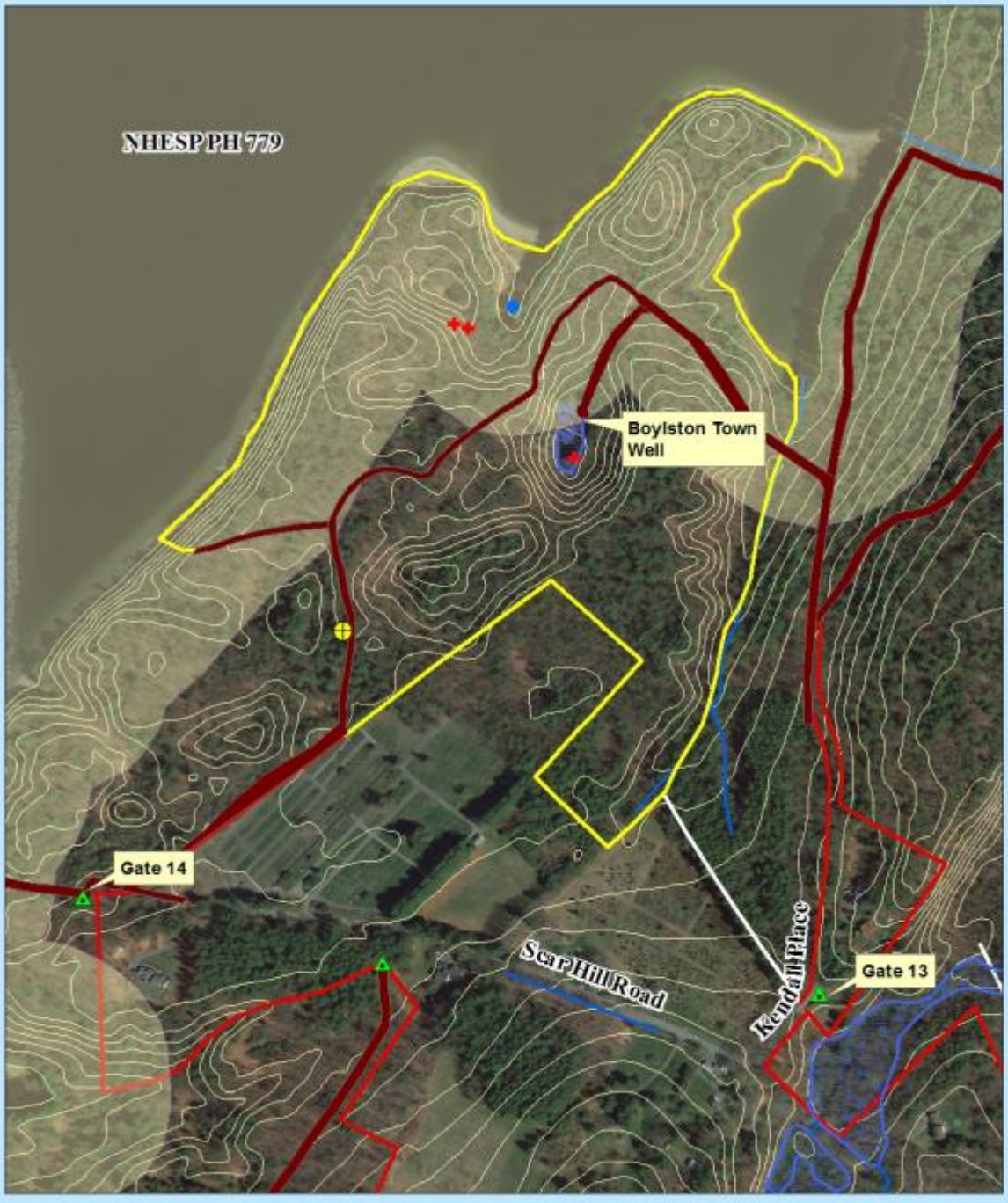
All the vernal pools, whether verified or potential, will be protected using the appropriate Best Management Practices.

DCR - Wachusett Reservoir
Timber Lot Proposal WA-18-154

1 inch = 300 feet

- Outline of Proposed Area (Working Unit)
- DCR Property Lines w/wo walls
- Stone walls
- Streams
- Wetlands
- Vernal Pools-Verified
- Vernal Pools-Potential
- Landing/s
- NHESP Priority Habitats (semi-transparent)
- DCR Gate/s

0 180 360 720 Feet



Massachusetts Department of Conservation and Recreation

Division of Water Supply Protection, Office of Watershed Management

Forest Management Project Proposal Summary

DWSP Proposal Number: WA-18-211

Site Information

Watershed: Wachusett	**Town(s)**: Sterling
Acres: 65	**Nearest Road:** Justice Hill Road
Natural Heritage Atlas overlap?:	**Public Drinking Water Supply Watershed?:** Yes
Forest Types: Mixed Hardwood – Northern Red Oak – White pine/oak	
Soils: Woodbridge fine sandy loam, extremely stony	
Wetland Resources: Rocky Brook with its associated bordering vegetated wetland flows southerly through this area. An intermittent stream that crosses Justice Hill Road flows southerly and joins Rocky Brook in the southeast corner of the sale area.	
Vernal Pools: There are two potential vernal pools awaiting verification.	

NARRATIVES

General Description/Forest Composition/History:

This area is part of two acquisitions by the Metropolitan District Commission (the predecessor of the DCR), one in 1995 (formerly Blanchard) and the other in 1996 (formerly Lanciani). The formerly Blanchard parcel is dominated by a mixed hardwood stand and a red oak stand. The mixed hardwood stand is located primarily in the low area adjacent to Rocky Brook which bisects this area. The forest here is comprised primarily of red maple, yellow birch, red oak and hickory. Portions of this stand were cut pretty heavily in the early 1990s prior to state acquisition. It appears that removing the better quality red oaks was the focus of that operation. The result of that harvest is the presence of a diverse hardwood understory comprised of varying levels of yellow birch, black birch, red maple, paper birch, red oak. Witch-hazel is the dominant shrub. Grape and ferns (cinnamon and interrupted) are also common.

The red oak stand on the east-facing slope has white oak, white pine and hickory present in the overstory. The nearly 90 year old red oaks are of very good quality. The understory is comprised of black birch, hickory, red maple, red oak, white oak and black cherry. Maple-leaved viburnum and hay-scented fern are the most common non-tree species in the understory. Maple-leaved viburnum is a favored food item of white-tailed deer. Having a good component of maple-leaved viburnum is a good indication that the deer population is not so high in this area and so regenerating the forest should not be a problem.

Most of the white pine/oak stands are on the former Lanciani parcel in the east end of this area. Along with white pine, the most common species are red oak, red maple, black birch, and white ash. The understory has very little white pine and is instead dominated by black birch, red oak, paper birch, red maple and white oak. Witch-hazel, mountain laurel and blueberry (both highbush and lowbush) are the dominant shrubs.

Site Selection:

The ideal watershed protection forest is one which best serves the function of the land as a producer of high quality drinking water in both short- and long-term. This forest must be vigorous and diverse in tree species and ages, be actively accumulating biomass and actively regenerating. Such a forest will be ideally suited to be resilient to and quickly recover from small- and large-scale disturbances such as diseases, insect infestations, ice storms and hurricanes.

This area was selected for management because of the lack of age diversity both in these 65 acres as well as in the 2,062 DCR-owned acres from which water flows into the Stillwater River and ultimately into the Wachusett Reservoir. The ideal protection forest would have at least 3 age classes of trees distributed throughout this sale area. There is no young forest and no forest less than 60 years old while 65% of the forest is between 81 and 100 years old. This harvest will contribute as much as 22 acres or 33% of young forest towards the ideal protection forest which would have at least 3 distinct age classes of trees distributed throughout this sale area.

Silvicultural Objectives:

Systematic sampling of the forest understory found there is adequate numbers and diversity of young trees in 54% of the plots taken with marginal regeneration on another 20%. Oak was present in 51% of the plots.

Given the excellent numbers and diversity of young trees present, portions of the overstory will removed to release this regeneration resulting in a new component of young forest. The openings will average about 1 acre in size, will range from about ¼ acre up to 2 acres in size and will total not more than 22 acres. Large trees will be retained in most of these openings that are larger than ½ acre both singly and in small clusters. The species composition of this young forest should be more diverse than the present older forest particularly in the case of the red oak stand which is presently 80-90% red oak. Openings in this stand will be a far more diverse mix of black birch, hickory, red oak, red maple, white oak and black cherry. Partial cutting will occur on up to 22 acres with the goal of continuing the overall improvement of the vigor and quality of the overstory by removing trees of poor form and vigor.

Cultural Resources:

This area will be assessed by the DCR Archeologist for both known sites of cultural or archeological importance as well as for potential use by pre-Contact Native Americans.

Wildlife/Rare or Endangered Species:

All DWSP Best Management Practices for wildlife management such as the protection and enhancement of wildlife habitat features will be an integral part of the silviculture and job layout. Diverse hard and soft mast species will be retained and the healthiest trees will be released to improve seed production, which will promote tree seedlings and food for wildlife. Large snags, den trees, logs and nest trees will be retained whenever possible as valuable habitat. Any stick nests observed will be protected. Where they occur; streams, wetlands, seeps and vernal pools will be protected for water quality and wildlife habitat.

All the vernal pools, whether verified or potential, will be protected using the appropriate Best Management Practices.

DCR - Wachusett Reservoir
Timber Lot Proposal WA-18-211

1 inch = 300 feet

Outline of Proposed Area (Working Unit)

DCR Property Lines w/wo walls

Stone walls

Streams

Wetlands

Vernal Pools-Verified

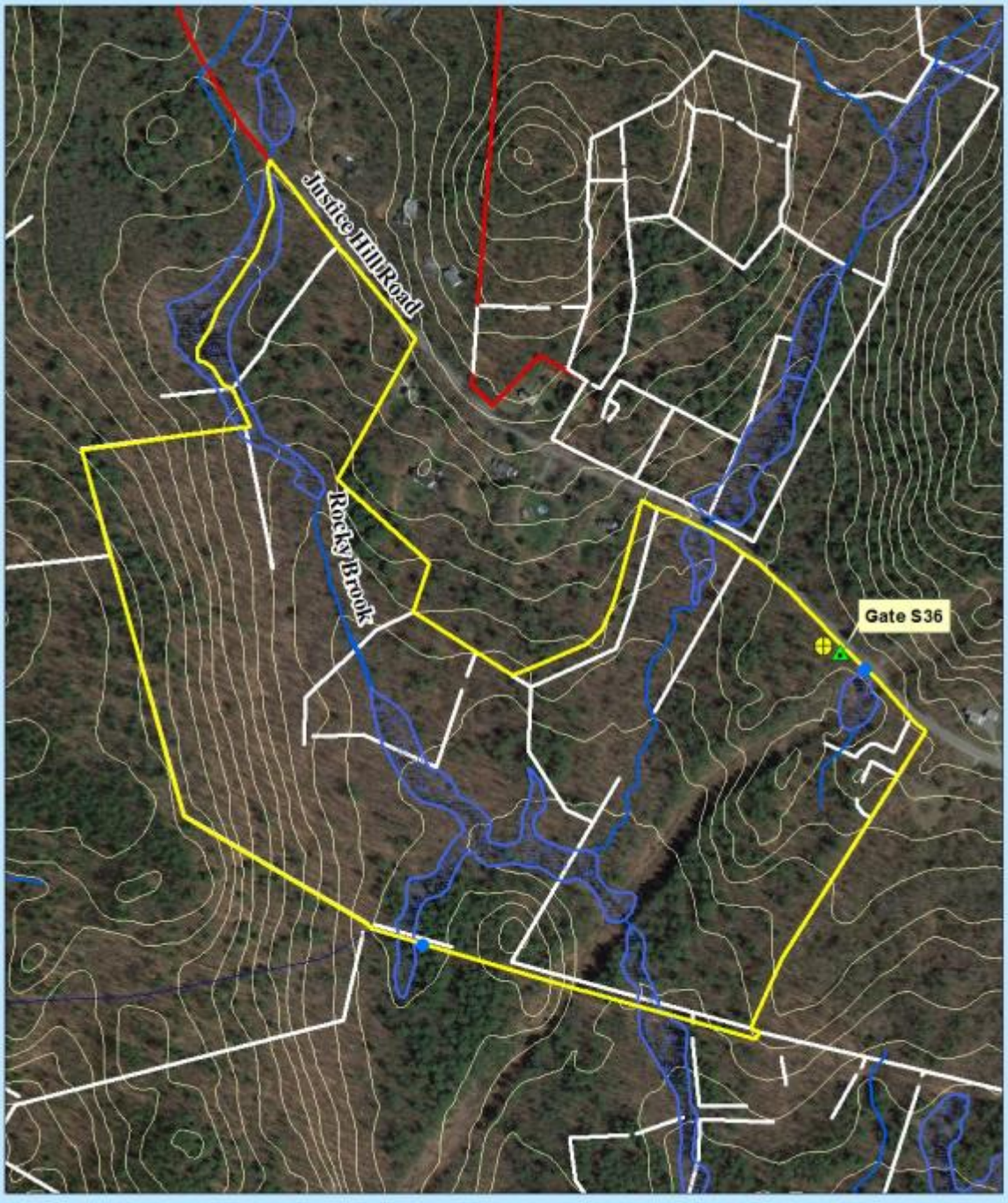
Vernal Pools-Potential

Landing/s

NHESP Priority Habitats (semi-transparent)

DCR Gate/s

0 180 360 720 Feet



Massachusetts Department of Conservation and Recreation

Division of Water Supply Protection, Office of Watershed Management

Forest Management Project Proposal Summary

DWSP Proposal Number: WA-18-284

Site Information

Watershed: Wachusett	**Town(s)**: West Boylston
Acres: 65.2	**Nearest Road:** Raymond Huntington Highway
Natural Heritage Atlas overlap?: No	**Public Drinking Water Supply Watershed?:** Yes
Forest Types: Mixed oak 21 acres. Northern red oak 17.9 acres. Mixed Hardwoods 15.6 acres.	
Soils: Paxton fine sandy loam is a well-drained thick soil. The Whitman loam is a poorly drained soil associated with the stream in the northern section of this area.	
Wetland Resources: Hog Brook bisects the northern part of this area before it flows into the large wetland that forms the eastern boundary of this area.	
Vernal Pools: There are no vernal pools.	

NARRATIVES

General Description/Forest Composition/History:

This property was purchased by the Metropolitan District Commission (the predecessor of the DCR) in 1994 (the northern half) and 1998 (the southern half). The northern half is bisected by Hog Brook. To the west of the brook is a 90 year old red oak stand. The understory is dominated by mountain laurel with widely scattered black birch, sassafras and white pine saplings. East of the stream, there is a similar 90 year old oak-hardwood stand that has a little more black birch and red maple in the overstory. There is also a 35 year old mixed hardwood stand comprised of black birch, paper birch, red maple, yellow birch, sassafras, black cherry and pin cherry.

The southern part is a 100 year old forest dominated by a mixed oak stand along with an oak-hardwood stand (more black birch and red maple), red oak stand (nearly pure red oak) and a white pine-oak stand. The understory is overwhelmingly dominated by mountain laurel. Only in the far southern end near Raymond Huntington Highway is there a small section where there is good advance regeneration.

Regeneration sampling found that adequate numbers and diversity of young trees was present in just 7% of the plots taken. 59% of the plots had interferring levels of mountain laurel.

Site Selection:

The ideal watershed protection forest is one which best serves the function of the land as a producer of high quality drinking water in both short- and long-term. This forest must be vigorous and diverse in tree species and ages, be actively accumulating biomass and actively regenerating. Such a forest will be ideally suited to be resilient to and quickly recover from small- and large-scale disturbances such as diseases, insect infestations, ice storms and hurricanes.

This area was selected for management because of the lack of age diversity both in these 65.2 acres as well as in the 2,423 DCR-owned acres from which water flows into the Quinapoxet River and ultimately into the Wachusett Reservoir. While this management area does have 15.7 acres (24%) of forest that is 21-40 years old, it is not well distributed and there is no young forest. The ideal protection would have at least 3 age classes of trees distributed throughout this sale area.

Silvicultural Objectives:

Given the lack of young forest in this area and the lack of seedlings and saplings in the understory of the older forest, the primary goal of this operation will be to begin the establishment of regeneration that can one day be released. This will be accomplished by removing about half of the trees from about 31 acres. These 31 acres will be spread throughout the area in discrete 2-6 acres blocks. This will accomplish several things; the dense, interfering mountain laurel will be seriously damaged by the activity, the leaf litter on the forest floor will be roughen up which helps seedlings to germinate, more light will reach the forest floor which is also necessary for seedlings to germinate as well as develop and the best trees will be kept to provide the seeds from which the next forest will develop.

A very limited amount of regeneration openings will be made in the very far southern end of the area where the advance regeneration is adequate. These are expected to cover no more than a couple of acres. Given the character of this site, hardwoods, and specifically red oak, will be the desired species. No doubt other hardwoods and white pine (which is of good quality) will become established as well. This is desirable, given the advantages that species diversity provides.

Cultural Resources:

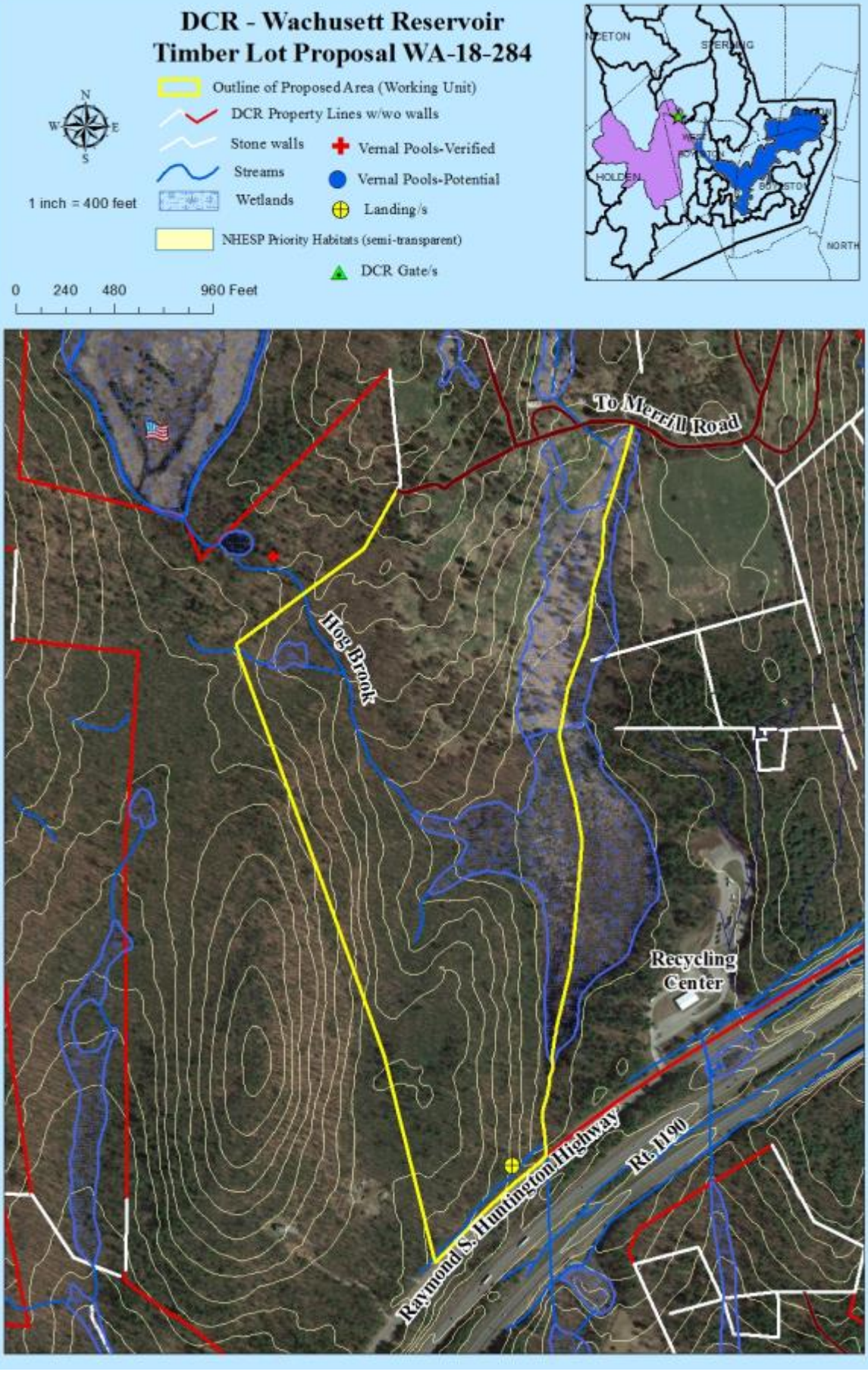
This area will be assessed by the DCR Archeologist for both known sites of cultural or archeological importance as well as for potential use by pre-Contact Native Americans.

There is evidence of quarrying activity on a rocky knoll in the middle of the southern parcel.

Wildlife/Rare or Endangered Species:

All DWSP Best Management Practices for wildlife management such as the protection and enhancement of wildlife habitat features will be an integral part of the silviculture and job layout. Diverse hard and soft mast species will be retained and the healthiest trees will be released to improve seed production, which will promote tree seedlings and food for wildlife. Large snags, den trees, logs and nest trees will be retained whenever possible as valuable habitat. No stick nests were observed, but if they are identified in the further steps of this process they will be protected. Where they occur; streams, wetlands, seeps and vernal pools will be protected for water quality and wildlife habitat.

DCR - Wachusett Reservoir
Timber Lot Proposal WA-18-284



Massachusetts Department of Conservation and Recreation

Division of Water Supply Protection, Office of Watershed Management

Forest Management Project Proposal Summary

DWSP Proposal Number: WA-18-323

Site Information

Watershed: Wachusett	**Town(s)**: Princeton
Acres: 65.4	**Nearest Road:** Mason Road
Natural Heritage Atlas overlap?: No	**Public Drinking Water Supply Watershed?:** Yes
Forest Types: White pine/hardwood 38 acres. White pine/oak 18 acres. White pine 9 acres.	
Soils: Woodbridge-Paxton soils are moderately well and well drained soils	
Wetland Resources: There is a wetland under the power line that forms a stream that bisects the unit straight down the middle where it meets another wetland at the southern end of the working unit. There is also an isolated vernal pool in the eastern section of the unit.	
Vernal Pools: There is one known vernal pool in the eastern end of the lot.	

NARRATIVES

General Description/Forest Composition/History:

This working unit is dominated by white pine and red oak. In smaller quantities red maple, black birch, black oak, sassafras, American chestnut and white oak exist. The "Israel" parcel was acquired in 2010 and was previously cut around 2000. The past cutting practices created very small openings and thinned areas which now have interfering levels of mountain laurel that make it a challenge to walk on the western half. In the eastern half regeneration surveys showed a decent amount of diversity in saplings made up of white pine, red oak, white oak, sassafras, red maple, black birch, American chestnut and black oak. There is an old defunct campsite in the eastern half of the working unit. Deer and Moose frequent the area. The entire forest has been aged between 81 and 100 years old.

Site Selection:

The ideal watershed protection forest is one which best serves the function of the land as a producer of high quality drinking water in both short- and long-term. This forest must be vigorous and diverse in tree species and ages, be actively accumulating biomass and actively regenerating. Such a forest will be ideally suited to be resilient to and quickly recover from small- and large-scale disturbances such as diseases, insect infestations, ice storms and hurricanes.

This area was selected for management because of the lack of age diversity in these 65.4 acres. The ideal protection forest would have at least 3 age classes of trees distributed throughout this working unit. This unit has one age class of trees. The forest originated in the 1920s. There are just a few acres of power lines that get mowed every several years. The logging in 2000 resulted in half the working unit with mountain laurel and the other in a diversity of tree saplings with an overall reduction in mature trees throughout. This operation is an opportunity to create a second distinct age class in this forest.

Silvicultural Objectives:

The working unit can be divided in half when it comes to advance regeneration. The eastern half has a good amount of tree saplings spread throughout, including oak in a decent (19%) amount of the plots. The western half of the working unit is mostly covered in interfering levels of mountain laurel. Both areas are

the result of past cutting practices, which for the most part have left less mature trees spread throughout. Even though the western half has interfering mountain laurel, the amount of mature trees is low enough at this point where defined openings should be made with the goal of damaging mountain laurel as much as possible to encourage tree regeneration. The eastern half will have openings made that target the good advance regeneration that is present releasing these younger trees from the inhibiting shade. Here, openings will range from ¼ acre to 2 acres in size averaging about 1 acre and total no more than about 21 acres.

Cultural Resources:

This area will be assessed by the DCR Archeologist for both known sites of cultural or archeological importance as well as for potential use by pre-Contact Native Americans.

Wildlife/Rare or Endangered Species:

All DWSP Best Management Practices for wildlife management such as the protection and enhancement of wildlife habitat features will be an integral part of the silviculture and job layout. Diverse hard and soft mast species will be retained and the healthiest trees will be released to improve seed production, which will promote tree seedlings and food for wildlife. Large snags, den trees, logs and nest trees will be retained whenever possible as valuable habitat. No stick nests were observed, but if they are identified in the further steps of this process they will be protected. Where they occur; streams, wetlands, seeps and vernal pools will be protected for water quality and wildlife habitat.

There are no critical habitats or known rare or endangered plants or wildlife.

There is one known vernal pool located at the eastern edge of the working unit.
All the vernal pools, whether verified or potential, will be protected using the appropriate Best Management Practices.

DCR - Wachusett Reservoir
Timber Lot Proposal WA-18-323

Outline of Proposed Area (Working Unit)

DCR property Lines w/wo stone walls

Stone walls

Landing/s

Streams

Wetlands

Vernal Pool (NR-Confirmed)

NHESP Priority Habitat

1 inch = 300 feet

0 250 500 1,000 Feet