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Addendum to Forest Management Plan

for

Old Growth Stand

Diamond Cove Home Owners Association

Great Diamond Island

Portland, Maine

Prepared by:

Rene D. Noel, Jr. ACF
Maine Licensed Forester
December 12, 2013

Purpose

I have been engaged to:

1. More accurately locate the bounds of the old growth stand and mark edge of this stand.
2. Assess the impact of the hemlock woolly adelgid (*Adelges tsugae*) on the Hemlocks with the stand.
3. Identify those trees which pose potential hazards to life or property should they fail.
4. Identify those hemlocks in suitable condition so that treatment with an insecticide will extend their lives.
5. Estimate scope of work needed to mitigate fire danger and aesthetic impact of the loss of hemlock from the stands.
6. Address the proposed trash transfer station impact on the old growth stand.

Field Work

Using a handheld GPS receiver (Delorme Earthmate PN-60) data was collected to map the edge of the old growth stand. To do this the stand was perambulated and pink plastic ribbon was hung to mark the edge of the stand. I recommend that boundary be marked permanently. Painting boundary trees, signs or posts and signs are various options. Also gathered was GPS locations of trees that were judged to be potential hazards. These were marked with orange plastic flagging should last a couple of years but they should be marked with paint if they are not to be felled soon. Finally hemlocks that were in locations that were significant to the aesthetics of the area and judged to be in suitable condition that insecticide treatment would allow them to retain vigor were identified. Separate individual stems were located by GPS and marked with blue flagging. Small groves of trees around the tennis courts and along Diamond Avenue are identified solely on the included map.

Report

The forest management plan prepared in 1989 gives an excellent description of the stand, soils, terrain, and other physical features. That work has not been recreated in this report. There has been little change in the forest other than a small amount of wind damage and other natural mortality. The hemlock wooly adelgid infestation and its effect is the primary change in forest conditions.


DELORME
XMap® 7
Diamond Cove Home Owner Assoc.
Common Area Shown in Red
Portland Parcel Map Shown in Purple
Proposed Transfer Station
drawn by:
Rene D. Noel, Jr. ACF
Maine Licensed Forester # 325
November 20, 2013
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MN (15.5° W)
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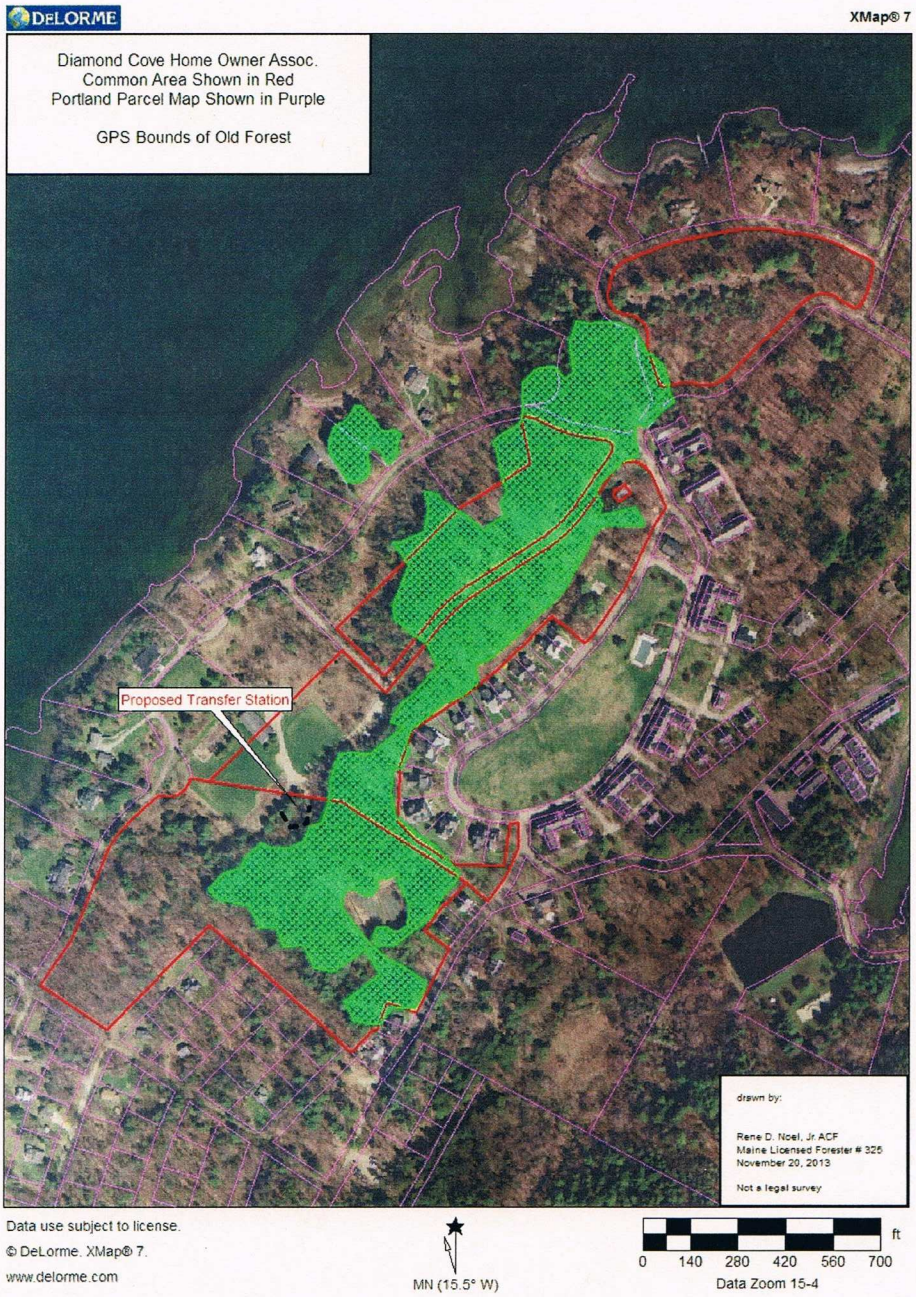
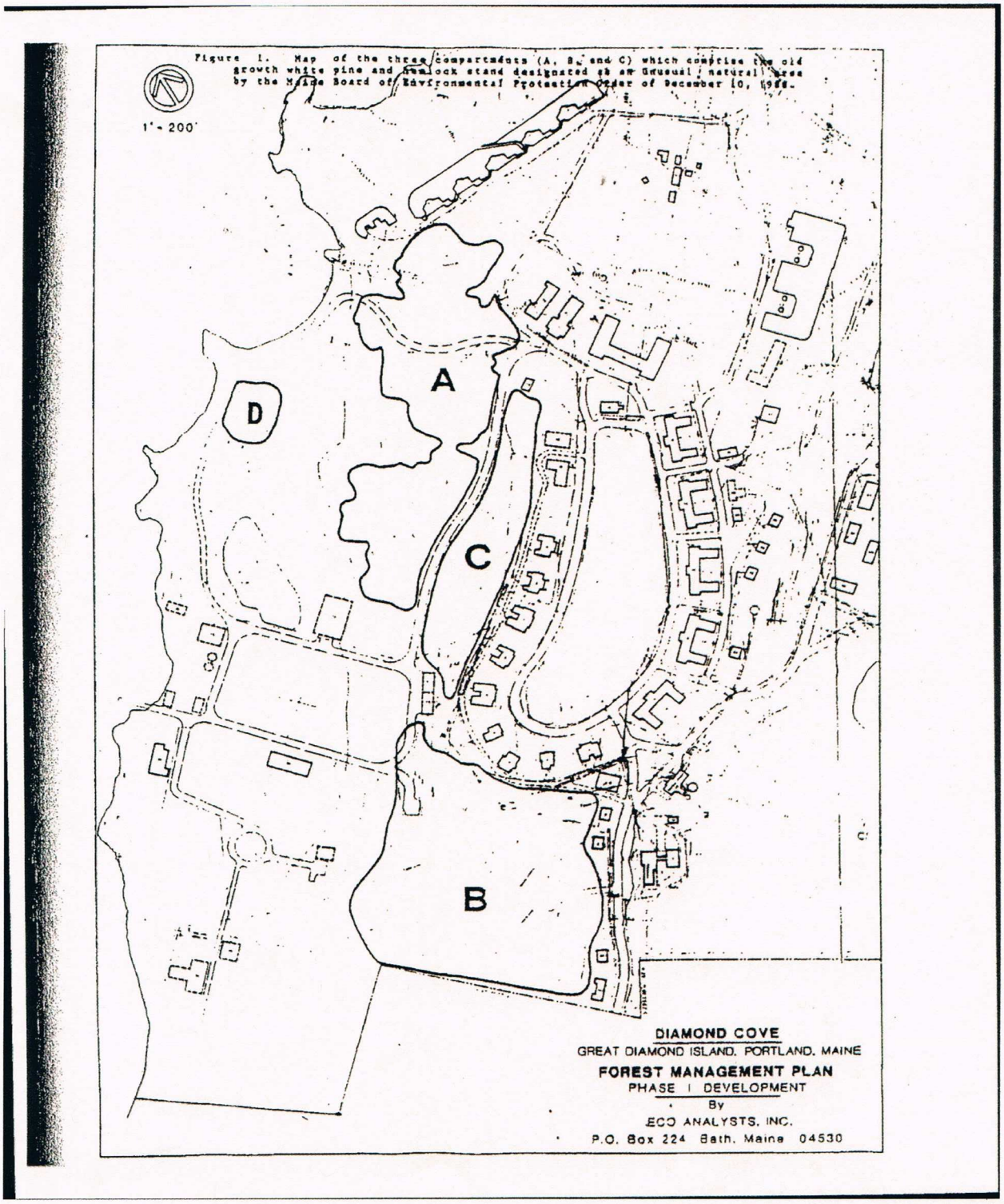
Data Zoom 15-1



This area totals 15.58 acres and is a mapping of my judgement of the old growth stands boundary to the drip edge of the crowns of the trees identifying the edge of the stand. This is the accepted definintion of a stand boundary. The old growth was determined by me based on size, branching, stem and bark characteristics which indicate old age for the various species. It contains some area in gravel roads which is consistant with the 1989 map. The acreage stated in 1989 was 17.43 acres and this includes a 35 foot buffer where the old growth is bordered by younger forest.

Compartment Map from 1989 Plan




DeLORME
XMap® 7
Diamond Cove Home Owner Assoc.
Old Growth Compartments
Yellow line approximate 1989 mapping
Green line 2013 GPS mapping
A
B
C
D
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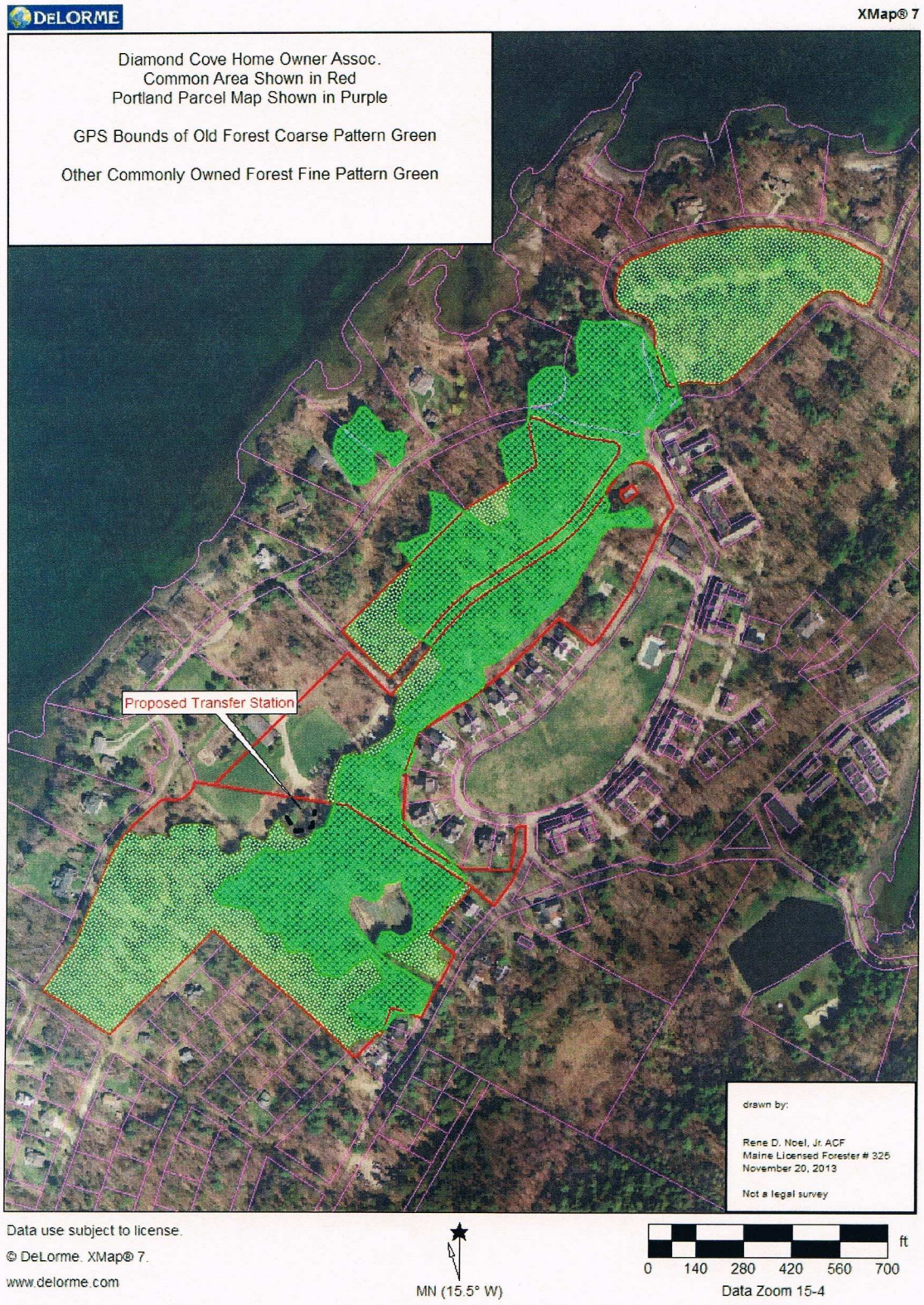
DeLORME
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Common Area Shown in Red
Portland Parcel Map Shown in Purple
GPS Bounds of Old Forest Coarse Pattern Green
Other Commonly Owned Forest Fine Pattern Green
Proposed Transfer Station
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Damage by Hemlock Wooly Adelgid

All of the hemlock are showing signs of damage from adelgid feeding. I would estimate that on the average, the hemlock have about 50% of normal foliage density. Hemlock is a significant component of Compartment A, (39.9%), Compartment B, (75.3%) and Compartment C, (23.4%) Compartment D (0%). There are also some understory sapling and small pole size hemlock that were not inventoried and are not included in these numbers.

With out insecticide treatment it can be anticipated that mortality of the hemlock will approach 100%. Based on 1989 inventory and my observations there would be about 300 tons of biomass contained in these trees. That would be about 10 tractor trailer loads of material. About a third or 100 tons would be in fine to medium size fuel which is of concern in a wildfire situation.

There is the option of harvesting all the hemlock and removing them from the island.

Hemlock is not particularly valuable as timber. Considering the cost of utilizing this material by shipping it to the mainland and the impact of heavy equipment needed to remove it I do not recommend this option.

The second option is to fell the stems as they die and treat the fine and medium size fuel to make it less flamable. Within 100 feet of any structure I recommend chipping branches and tops with a portable chipper. In areas over 100 feet from buildings branches and tops should be cut up so they lie within a foot or two of the ground. This treatment will hasten their decay and the close proximaty to the ground will keep the moisture content up in the fuel making it less flamable.

Current Hazards

Fourteen stems, 3 hardwoods and 13 hemlock were judge as currently being hazardous and located where they could damage people or property should they fail. They are marked with orange flagging. I did not get an estimate from arborists on the cost of dropping and treating these stems.

The three hardwoods are the most difficult to remove. A white birch, a red maple and a large sugar maple located at the eastern edge of Compartment C are all fairly close to residential buildings and are not easy to remove. The large sugar maple is located between two buildings and contains a considerable amount of rot. It will be somewhat of a challenge to remove. The weight of the large limbs indicate they are likely to fall towards the building to the trees north.

The hemlocks are located that they can likely be felled away from improvements.

I did not get estimates from arborists on the cost of removing these stems but I would estimate a mainland cost in the $5,000 to $10,000 range. My experience with transporting men and equipment is it adds significantly to the cost.

Future Mortality

Based on the inventory in the 1989 plan it appears there are 250 large hemlock in the three compartments. I have identified approximately 99 that can be treated and their lives extended for as long as the association is willing to continue treatment. These were either marked with blue flagging (individual stems) or are located in small groves shown on included map. That leaves approximately 150 trees that are likely to die in the next 5 to 10 years if adelgid feeding damage remains at current levels. Or in other words there will be about 20 trees per year that will need to be dropped, limbed and limbs cut up or chipped.

Trees that are not near buildings or other improvements can be dropped by a proffessional logger limbed and slash treated less expensively than by a licensed arborist. I would estimate the cost for this sort of work to be about $100 per tree plus transport cost.

Trees near buildings and improvements should be taken down by a licensed arborist who is skilled and insured for in this work. A two man arborist crew with truck and chipper is being billed in the $300 per hour range. I would estimate they can fell and chip branches from two to four trees per day.

I recommend the Association budget an amount annually to do a certain amount of this work. Arborists' slow season is usually winter and this is the most suitable time to do this sort of work in this community. It may be possible to negotiate some discount from regular fees with a long term contract.

Replanting

Where the hemlock is in decline more light is reaching the forest floor. Seedlings and saplings are already responding to this increase light. In many areas this natural reseeding will replace the forest. In those areas that this does not occur or where it is destroyed during felling and fuel reduction activities of dying hemlock I recommend planting white pine and red oak. Both are native to the island, grow well in that environment and are trees that are well rooted and wind firm in windy conditions. There are numerous young stems, seedlings and saplings already established. Where and how many replacement trees will be needed will depend on how many are destroyed in the felling process. Where sizable areas (600 sq. ft or more of open ground is my recommendation) of regeneration are destroyed I recommend planting at the spacing described. There is no ratio between trees cut and trees planted.

I recommend seedlings be planted spaced about twelve feet apart. The oak should be protected with a five or six foot tree shelter to assure they grow above a height that will be browsed by deer. Large seedlings or transplants are recommended as these will more quickly grow out of reach of deer. Four or five year old pine transplants and oak seedlings a minimum of 24" tall are recommended. Depending on quantity, this size stock is available for $3.00 to $10.00 per seedling.

Invasive Plants

The plant community on the island includes a large number of invasive species. Honysuckle, bittersweet, barberry and Japanese knotweed are those noted which are likely invade disturbed forested areas. These species are very aggressive and have the potential to dominate a site preventing native vegetation from reestablishing itself. Controlling these species is difficult. It is possible to control small infestations by uprooting the plants. However, such mechanical control is labor intensive and needs to be repeated annually to remove sprouts from broken roots and new seedlings. Herbicides are much more efficient. Glyphosate the active chemical in Roundup brand yard products will control all of these. The woody species can be controlled with either a foliar application later in the growing season or by treating the surface of cut stumps within a day or two of the stems being cut. Japanese knotweed is easiest to treat with a foliar application. Ideally this should be done at the time of flowering. Stems are hollow and stems can be cut and treated by pouring herbicide into the hollow stem but this is very time consuming on all but smallest infestations.

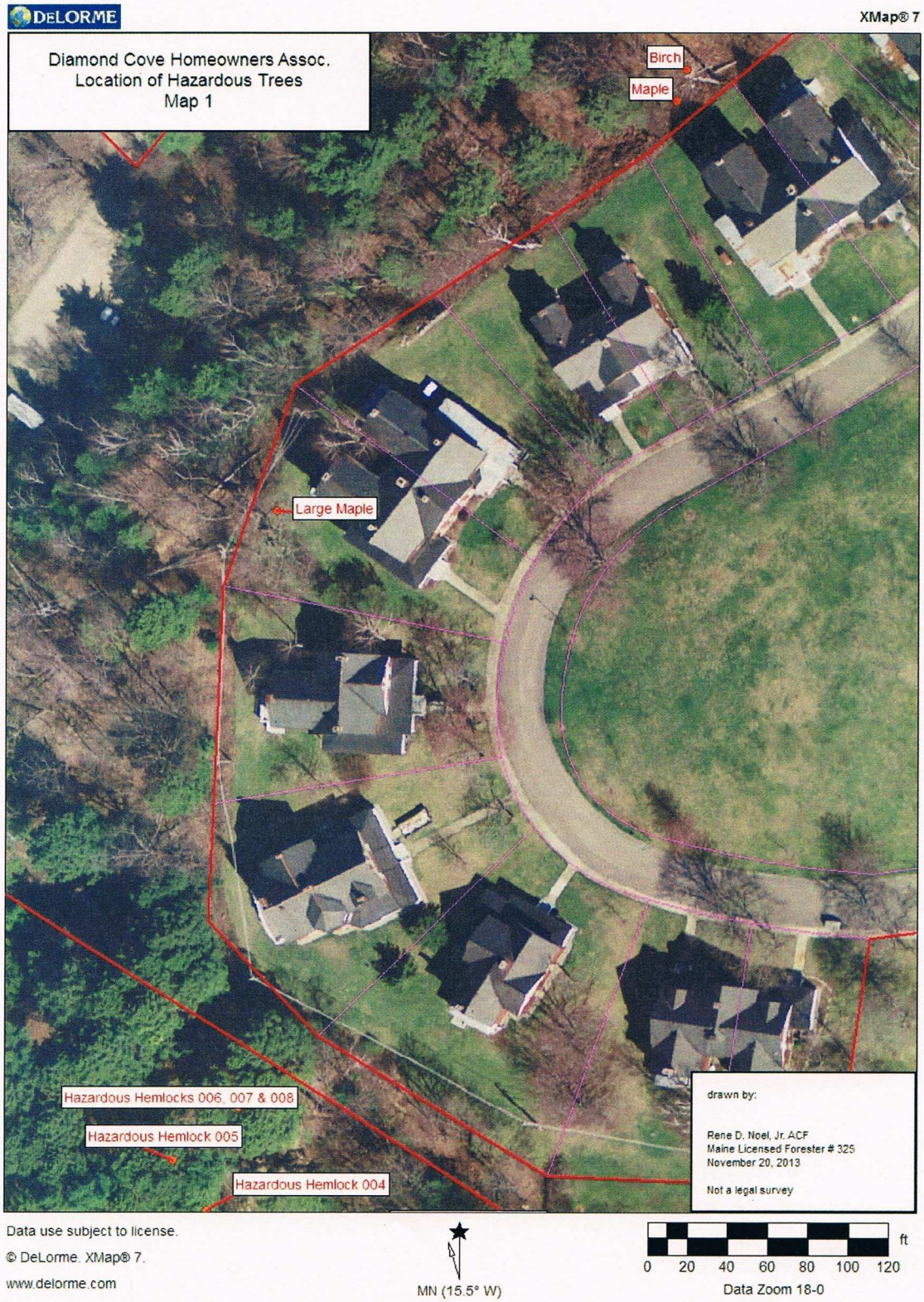
Managing Fire Risk

Risk of wild fire is best controlled by controlling fuel. To begin any flamable materials that collect around buildings should be removed. Porches, decks and other attached objects as well as gutters, roof valleys and other places were debris collects should have leaves and other fine fuels removed. Ideally the areas where this material collects should be screened to prevent these build ups.

Away from the building concentric rings of treatment should be applied. Nearest the building should have plant material and landscaping which is fire resistant such as green lawn, gravel or pavement. Shrubs should not be planted so they contact the building and species which are less likely to burn (hardwoods species in general) should be considered. Continuous stands of vegetation that could carry a fire should be avoided. This ring is typically the area immediately around the house lawn and other landscaped features. The next ring is more natural vegetation but in which fine fuel is not allowed to accumulate. Nor should dense stands of young stems be allowed to grow. Park like comes to mind with well space trees and understory plants and little brush or other fine flamable fuels. Typically 75 feet is recommended for this ring. The outer ring is the natural forest. Large trees do not easily burn. It takes a ladder of fuel from the ground to the crowns of large trees to ignite them. Controlling fire danger means controlling this fuel. The litter and duff layer of organic material is flamable but being on the ground maintains a fairly high moisture content and slower burning. Dead limbs and branches and small seedlings and saplings particularly softwoods are the most common fast fuels in a forest. Chipping or lopping dead material so it lays within a foot or so of the ground will hasten its decay and place it so it maintains a high moisture content. Seedlings and saplings should be spaced so there is not a continuous stand. Individual stems and small groups seperated from each other are ideal. As these grow lower limbs can be pruned until the stem is free of limbs for 6 or 8 feet.

My fire training occurred in a much drier climate than Maine but I believe the guidelines would be applicable to an island situation. In that climate it was recommended that a fire resistant forest be maintain out at least two tree lengths out from any structures or improvements. In this case that means about 150 feet back from anything that should be protected from fire.

Following these recommendations does not remove all fire danger. It should, however, slow the advance of a wildfire giving time for the arrival of men and equipment that will suppress the fire.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Location of Hazardous Trees
Map 1
Birch
Maple
Large Maple
Hazardous Hemlocks 006, 007 & 008
Hazardous Hemlock 005
Hazardous Hemlock 004
drawn by:
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MN (15.5° W)
0 20 40 60 80 100 120
ft
Data Zoom 18-0


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Location of Hazardous Trees
Map 2
Hazardous Hemlocks 006, 007, 008
Hazardous Hemlock 005
Hazardous Hemlock 004
Hazardous Hemlock 001, 002
Hazardous Hemlock 009
Hazardous Hemlock 010
Hazardous Hemlock 003
Hazardous Hemlock 011
Hazardous Hemlock 013
Hazardous Hemlock 012
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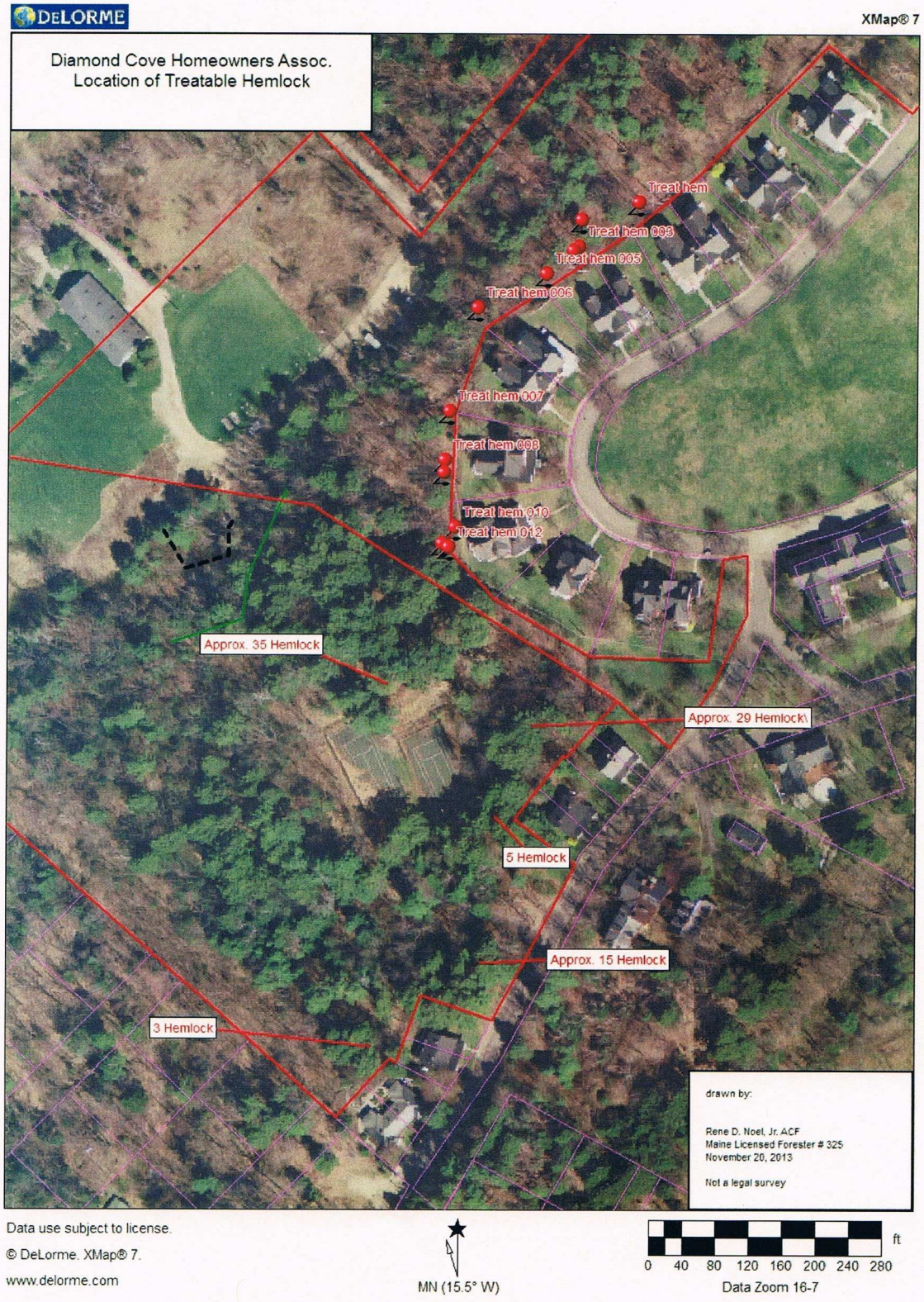
Insecticide Treatment

The forest between McKinley Court and West Side Drive and west of Diamond Avenue and around the tennis court have 99 hemlocks that contribute greatly to the forest of that residential area. Systemic insecticides containing the active ingrediant imidacloprid are effective in controlling the insect for a number of years following application. Some research has shown treatments every three or four years may be effective. Other products are in development/label phases and current product recommendations should be checked when treatments are planned.

This sort of treatment is fairly low tech. Backpack sprayers are used to either apply the chemicals to the ground or stem or granules are spread on the ground. It is necessary for the tree to absorb the chemical and translocate it to the needles. I estimate it would take a two man crew a full day to do the treatment. Depending on the cost of chemical at the time I estimate the cost of treatment to be in the $2,000 range.


DeLORME
XMap® 7
Diamond Cove Homeowners Assoc.
Location of Treatable Hemlock
Treat hem
Treat hem 003
Treat hem 005
Treat hem 006
Treat hem 007
Treat hem 008
Treat hem 010
Treat hem 012
Approx. 35 Hemlock
Approx. 29 Hemlock\
5 Hemlock
Approx. 15 Hemlock
3 Hemlock
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MN (15.5° W)
0 40 80 120 160 200 240 280 ft
Data Zoom 16-7

Trash Transfer Station

Most of the proposed site is in an area which appears to have not been forested 24-27 years ago when the original work for the forest management plan was undertaken. However, one corner will encroach on the old growth stand and will require the removal of one large hemlock tree. This tree is not in good condition because of adelgid feeding. As I envision the propose construction work less than 500 square feet within the old growth stand will need to be disturbed. The effect on the stand will not be noticeable. I suggest as a mitigation that buffer area to the west be expanded by a similar area. There are some large hardwood stems in this area that are 40 or 50 years younger than the oldest trees. With the anticipated loss of the hemlock due to adelgid damage these will be a natural expansion of a stand with old growth characteristics.

Summary of Recommendations/Findings:

- Use of new technology (GPS mapping) has enabled a more precise delineation of the Old Growth Forests first identified in 1989 plan (page 2)
- trees identified and marked- establish tree drip line as the exact edge on all Old Growth trees along the border of each compartment (page 4)
- Woolly adelgid damage to Old Growth hemlocks evaluated
    - Certain trees that pose a hazard to life or property marked for removal (page 8)
    - Certain trees with enough vitality remaining to benefit from insecticide application marked (page 14)
- Recommendation for DCHA to create an ongoing yearly budget to deal with the eventual death and removal of infected hemlocks (page 9)
- Replanting recommendations made for certain areas of the Old Growth stand using native species (page 9)
- Recommendations made for the proper cutting/removal/chipping of damaged/dead trees within the stand to mitigate forest fire risk (pages 8-9)
- Recommendation on limb trimming and removal of small saplings as part of good management practices (page 10)
- Recommendations on insecticide application to save viable hemlocks (page 14)
- Minimal impact to Old Growth Stand (Compartment B) due to proposed construction of trash transfer station
    - 1 infested hemlock should be removed (page 16)
    - Add 500 square feet of area to the west of Compartment B to offset any disturbance and harmonize existing Old Growth area with large hardwoods within this new area (page 16)