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**Subject:** RE: Tree Protection at Middle School - Follow Up

Hi Mr. Morse.

I wanted to reply to your previous email but I have been away for most of the last month and just catching up.

This past March, a few weeks before demolition, Rob Sullivan contacted me to get some input on saving trees on the ORMS property. I worked with the U.S. Forest Service here in Durham - I think Mr. Richard requested that Rob contact me since I had worked with ORMS in the past on tree issues.

I did a short report in March (attached ) for Rob with some recommendations on protecting the larger trees along Coe Dr. and possibly moving two small trees near the entrance to the building. I think in the end, all of these trees were removed, except for two. At this point, I want to pass on a few final suggestions for the remaining trees.

#### **Suggestions for the two trees remaining along Coe Dr.**

Tree B in attached pictures - The large sugar maple tree that was saved (the second tree east of Coe/Dennison intersection) has some defects but is in fair condition. Unfortunately, some of the critical root system on this tree was damaged during the demo. I had suggested erecting fence to protect roots 30 feet out from the tree (the tree likely had roots extending well past the width of the crown). In some spots, the soil excavation that occurred came to within 15 feet or less of the trunk and did some damage to roots. In the attached picture you can see this. Summer is the worst time for this to occur since the tree is growing and relies on the root system to provide moisture and nutrients. I think the tree will likely survive this, but there will be some decline over the next few years. This will be visible in die back of some of the small branches in the crown. This is a nice tree and it would be worth putting some effort into helping it recover. I recommend the steps below;

1. Establish a tree protection zone (TPZ) 30' out from the tree (or as far as possible). The intent is to nurture existing roots and generate new growth from severed/damaged roots. Keep equipment/activity off of the rooting system in the TPZ. Ideally use fence, signs or some other means to do this.
2. Applying a layer of bark mulch 3 inches deep, over the root system in the TPZ.
3. Set up a watering system (could use a simple hose and lawn sprinkler) to water in the TPZ. A significant watering should be done once per week through September (unless significant rainfall occurs during the week). This is especially important now during a drought period.

4. I had originally recommended that any larger severed roots be pruned right after damage. Since significant time has passed, I am not sure this is still useful, but you might want to try it. Use a sharp tool (shovel, ax,, etc.) to make a clean cut on severed/damaged roots at a spot where the cut end will be under ground. If the root tissue is still alive, it may resprout if under the soil and moist.

Tree A in attached pictures - I feel the Norway maple nearest the corner of Coe/Dennison should be considered for removal. It is in poor condition, has decay, weak branch unions, dead wood and wounds from utility pruning. The root system was also impacted to some degree by the demolition activity & grading. The tree's condition will continue to decline and risk for failure will increase. You might want to get a second opinion on this from Rich Reinne, the Durham DPW supervisor who is also a Certified Arborist.

If removed, it might be worth looking into saving and utilizing some of the wood from this tree. The tree saw a lot of history at ORMS, and that history is preserved in the wood. If there is enough sound wood, it might be possible to produce some objects that could be saved in the new school.

### **Suggestions for Future Tree Protection in ORCSD**

I was contacted just a short time before demolition and I was not very aware of the long-term planning for this project before that, so excuse me if the following comment is incorrect. My impression is that protection of existing trees was not a significant consideration in early project planning for the building demolition or construction of the new middle school.

Trees are easily damaged during construction activities. The trunk and crown may have physical damage, but the more concerning damage occurs to the tree rooting system, since it is out of sight. Roots can extend as far as the tree height and most roots are in the top 2 – 3 feet of soil, so they can be easily damaged. Excavating or adding soil, heavy equipment use, driving across or parking in the area, change of drainage can all cause damage to the roots, soil and tree decline. Trees can tolerate some damage to roots, but protection of a substantial part of the root system is critical. When roots are severely damaged trees will decline over years and can gradually become a high risk for failure and a threat to public safety.

Trees in the landscape can have a high monetary and environmental value. If building sustainability is an important goal, saving existing trees should be a high priority as they provide many environmental services, including reducing energy consumption in buildings by providing shade and windbreaks. Landscaping is expensive and it takes a long time to grow trees to a substantial height, so it makes good economic sense to protect existing trees that are desirable species, in good condition and in good locations.

Ideally, in future ORCSD projects, protection of trees should be included when the planning first starts. If desirable trees (and their critical root area) are identified early, it may be possible to make adjustments in project design to protect an adequate amount of the root system. If a landscape architect is on the planning team they could provide this expertise, or a forester or certified arborist could be brought in.

The tree care industry has a good reference on this topic that I recommend; Best Management Practices - Managing Trees During Construction, produced by the International Society of Arborists.

Go to; <https://www.isa-arbor.com/store/product/139/>

They also have BMPs on other tree planting and tree care issues. This collection would be good references for your staff to have.

Thanks for the opportunity to provide input. I would be glad to provide information or assistance in the future if that is helpful.

John Parry

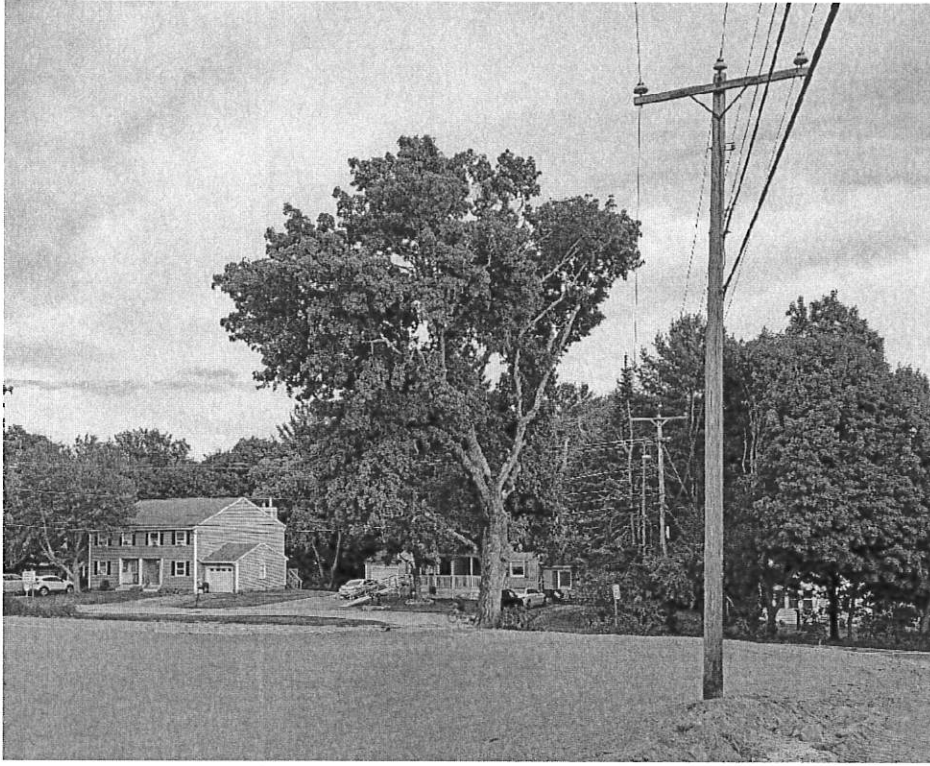
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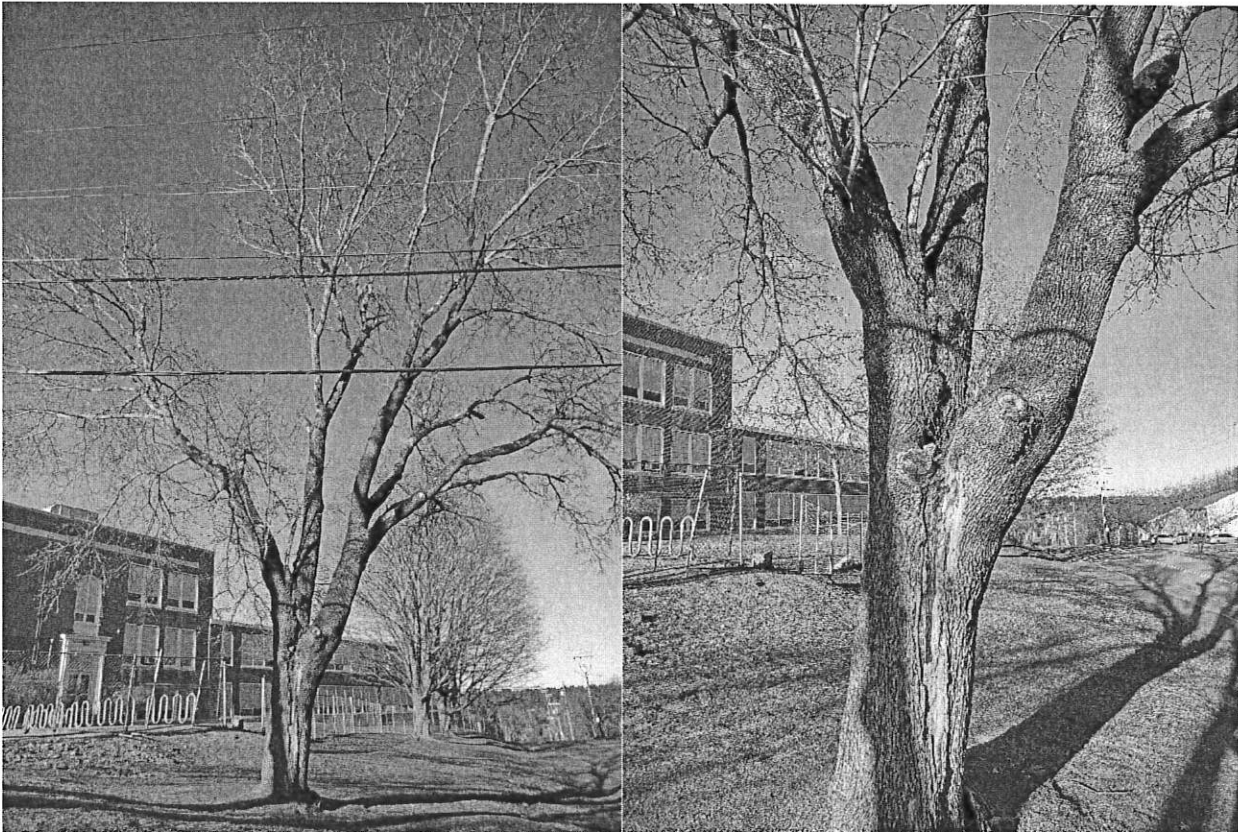
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Oyster River Middle School Trees, Durham NH

Tree A



Tree A Defects



Tree B



Tree B showing roots exposed by grading, some within 15 feet of trunk



# Tree Protection Suggestions for Oyster River Middle School

March 29, 2022

Building demolition and construction of new sports fields is occurring at the middle school starting in March and there is interest in saving/protecting some of the trees nearby. We looked at 5 trees on the south side of the school for possible protection, and two trees on the west side for possible transplanting. These are briefly described in the table and map on pages 3 & 4.

## Recommended Basic Steps for Protection and Maintenance

There are many techniques that can be used to protect trees during construction, depending on the time and resources available. I recommend six simple, low-cost activities below. More detailed information can be provided if desired.

## Tree Protection

**Trees 1, 3, 4, and 5 should be saved and protected** during demolition and construction of new fields. **Tree 2 is in poor condition. It could be saved but it may be most practical to consider removal of this tree** since it's condition will continue to decline and risk for failure will increase.

Trees are often damaged during construction activities. The trunk and crown can have physical damage, but most often damaged occurs to the tree rooting system, since it is out of sight. Roots can extend as far as the tree height. Most roots are in the top 2 – 3 feet of soil, so they can be easily damaged. Excavating or adding soil, heavy equipment use, driving across or parking in the area, change of drainage can all cause damage to the roots, soil and tree decline. Trees can tolerate some damage to roots, but protection of a substantial part of the root system is critical.

A standard formula can be used for estimating the amount of critical rooting that should be protected ( tree protection zone - TPZ). Protect a circle around the tree with a radius of 1 foot for each 1 inch of tree diameter. For example, a tree with a 20" diameter should have a circular TPZ with a radius of 20'. Some tree species are more tolerant of root disturbance, and generally healthy and younger trees are more tolerant, so the size of the TPZ can be adjusted up or down based on those factors.

- 1. Erect additional fencing to create a tree protection zone (\*TPZ) that will keep all activities and equipment at least 30' from the trees.** In this case the 4 trees are all in a limited turf area bounded by roads/sidewalks and the school building. This is a triangular shaped area, with the widest distance at 65' and the narrowest distance 40'. The trees have grown in that area for decades so current roots systems will be limited to that space. **It seems most practical to erect fencing around the perimeter of this turf area, rather than fencing around each individual tree (see red line on map below).** Fencing could be inexpensive plastic construction fence 4' in height.

There is currently some chain link fence erected just outside of the building that delineates the area where demolition will take place. The trees are outside of this fence, but can still be accessed from spots on the east and west ends and from Coe Dr. It is my experience that subcontractors are often not aware of tree protection efforts, and they will use any accessible areas for parking, equipment and supply storage, etc. Fencing should be erected around the entire perimeter of the triangular turf area to totally protect this space.

2. **Post simple signage on 4 sides to identify this area as a tree protection zone.** This increases awareness of workers and the public.

### **Tree Repair/Maintenance**

Trees that are impacted by construction will undergo some degree of stress. Providing some basic maintenance to keep trees healthy is important, especially if there are any impacts within the tree protection zone.

3. **Root prune any large (>1 ") roots that are ripped up and exposed by construction equipment.** If the root is torn it is better to cut it cleanly using a saw or ax. Prune and cover exposed roots with soil as soon as possible after disturbance. The wound will heal and resprout more easily from a clean cut once it is reburied. If it is known that a number of roots will be torn up within the TPZ in a specific spot, it is possible to prune roots beforehand by using a cutting tool such as a root pruner or rock saw across the area.
4. **Prune and remove any damaged or dead branches after construction.** \*\*
5. **Mulch the TPZ if feasible or at least as much as reasonable (15 feet or more out from the tree trunks?).** This area is somewhat compacted by decades of foot traffic, and in some of the area there is little or no turf. There is a slight slope here and erosion has occurred in some spots. Some tree roots are exposed. A layer of mulch will help to retain moisture in the soil, moderate temperatures and improve the soil as it decays. If there is any activity expected within the TPZ, a thicker layer of mulch will help protect exposed tree roots and reduce soil compaction. Mulching can be done as a temporary step to help the trees during/after construction, or it could be done permanently in some areas if it compliments landscape plans.

If done temporarily, woodchips 3 – 4 inches deep could be used to keep costs low. If mulch will be used long-term for landscaping, a good quality landscape mulch should be used\*\*.

6. **Irrigate root systems as needed.\*\*** As mentioned, trees that are impacted by construction will undergo some degree of stress. Lack of water will add to this stress, especially if construction occurs during the growing season (spring – summer). Make plans to be able to water in the TPZ during dry/droughty periods April - September. A simple sprinkler system or soaker hoses could be used to accomplish this.

Ideally steps suggested above should be continued for a reasonable time after the construction project ends, such as through the next growing season.

\*\* For more information on proper pruning and other tree care techniques see *The Tree Owners Manual* : [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5368392.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5368392.pdf)

### **Transplanting Trees**

It is possible to save trees by transplanting them to appropriate locations outside of the construction zone. This is more commonly done with smaller trees since it gets more difficult and more costly as

trees get bigger. The root ball can get very heavy and is difficult to move. It is critical to get enough of the tree root system to make sure the tree gets re-establish. Typically the size of the rootball needed is based on tree diameter.

We looked at two trees (# 6 cherry & 7 red maple?) as possible trees to transplant. These were planted by the school near the entrance about 10 or so years ago. Transplanting these is possible, but they would require heavy equipment to dig and move enough of the root system. Rootball size would need to be about 5-6 feet or more wide and 2 ½ - 3 feet deep. Transplanting is best done in early spring so would need to be done soon. Water trees before digging and continue to water periodically as needed for at least two years after transplanting.

There are companies that do this kind of work using specially made tree spades. Five trees of about this size were moved at the U.S., Forest Service building in Durham about 10 years ago and all survived, however moving trees of this size is often not successful.

Another alternative would be to use existing equipment on the construction site. This is a much more iffy proposition and may not be successful but might be worth the effort if the trees were to be cut down anyways. More detail can be provided if desired.

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## TREE DETAILS

Tree	Species	Estimated Diameter	Condition	*Rooting Distance	Remarks/ Defects	Recommendation
1	Norway Maple?	17 inches, 14	Fair - Poor	55 feet	Two stems. Largest stem is 17". Some dead branches. Some small decay cavities.	Save & protect. Minor maintenance needed.
2	Norway Maple?	30	Poor - Fair	40 feet	Some deadwood. Several lg. wounds from pruning cuts. Weak limb attachments. Some decay.	Remove tree. Condition is poor.
3	Norway Maple?	11	Fair	65 feet	Some small wounds from pruning cuts.	Save & protect. Minor maintenance needed.
4	Sugar Maple	32	Fair	65 feet	Some weak branch unions.	Save & protect. Minor maintenance needed.
5	Sugar Maple	38	Fair	50 feet	Some weak branch unions.	Save & protect. Minor maintenance needed.
6	Cherry, Ornamental?	7	Good	NA	Planted by school about 2010. This is a flowering ornamental. Will stay small (<20').	Consider transplanting to another location.
7	Red Maple?	6	Good	NA	Planted about ?. Will be a large tree at maturity (>50'). Good fall color. Transplants well.	Consider transplanting to another location.

\* Rooting Distance = Turf area rooting space for each tree, between Coe Dr. sidewalk on south side and school wall/parking area on north side.

# TREE LOCATIONS

