

February 11, 2019

Planning Board
8 Newmarket Road
Durham, NH 03824

RE: *18 Main Street - Parking Lot | Tree protection and compromise plan*

Dear Chair Rasmussen and Board members:

At a previous public hearing on this application, Mike Sievert, MJS Engineering, noted that trees on the subject parcel are, of course, owned by the applicant—with the implication that the applicant is free to do with them what he pleases. In addition, the applicant's revised Letter of Intent (February 5, 2019) rebuts points made at the public hearing, including concerns about the impact of the proposed parking lot expansion on mature trees, stating:

"None of the mature trees along the east and west property lines are being removed for the construction of this project."

"Landscape expert Robbi Woodburn [hired by the applicant] testified on January 9, convincingly, that all mature trees will not be adversely impacted by the proposed plan."

The remainder of my letter, below, expands upon the following points:

- (1) Independent horticultural experts argue that unless significant steps—which may be more extensive than is the usual practice in Durham—are taken prior to, during, and after construction, mature trees will indeed suffer damage perhaps leading to their death;
- (2) Actual protection of trees during construction in Durham has been inadequate;
- (3) The Town of Durham has an interest in protecting the mature trees on this site;
- (4) A compromise plan would be more appropriate and might garner support; and
- (5) The Planning Board should deny the application as presented; but if it grants a Conditional Use Permit for the site for this application—or for any amendment thereto, the Board should require specific Conditions of Approval to protect Church Hill's mature trees—both on the site and offsite if their roots extend significantly onto the site—*over and above those stated in the zoning ordinance or site plan regulations.*

Protecting against tree damage: Can it "work," and what has been done in Durham?

It is highly unlikely that mature trees closely bordering a new parking lot would thrive. Below I provide supporting excerpts from the attached publication from Virginia Tech titled "Trees for Parking Lots and Paved Areas":

"At the beginning of parking lot construction, topsoil is generally removed. The subgrade is then compacted, followed by layers of crush and run stone, and asphalt or concrete that are spread and also compacted. If municipal compaction specifications are adhered to, the resulting soil mix under the pavement is generally impenetrable to roots due to mechanical impediment. It also limits root growth due to low available oxygen.

"Trees planted near pavement often suffer due to root damage and soil volume restriction."

/.../

“...Paved surfaces are engineered to quickly shed water, often in directions that either deprive trees of adequate soil moisture or leave their roots submerged in excess water. Heat from parking lots and other pavement is exacerbated by the solar heat sink of the pavement, with adjacent buildings and cars adding to the stress. Limited soil volumes confine roots, restricting root growth, reducing anchorage, and often supplying inadequate moisture and nutrients. The stress of compaction and low soil fertility, coupled with other physical, environmental and human forces acting against trees makes parking lots and paved areas unfriendly to trees. These factors combined make 7–10 years the average life expectancy of most urban trees.”

Second, as some Board members will recall, Durham resident John Parry, an urban forester with the U.S. Forest Service who consults throughout the Northeast, spoke to the Board on March 22, 2017. He gave a presentation on “Best Management Practices for Urban Trees in Durham.” But what happens on a Durham construction site often falls short of those best practices.

Among Mr. Parry’s recommendations:

- Look at how to protect trees during construction
(meeting minutes record John noting that “when the paved path out on Mast Road was constructed, it severed most of the roots on the right side of an old maple tree. He also spoke about how compaction during construction impacted nearby trees.”)
- Design infrastructure to accommodate trees
- Update Durham’s outdated landscaping regulations

Third, I refer the Board to the testimony of Dr. Nina Bassuk, Director of the Urban Horticulture Institute at Cornell University. Dr. Bassuk developed a slideshow presentation titled “Reducing Tree (and Soil!) Damage during Construction.” The presentation was made available through a webinar given in December 2018, the recording of which is available from the home page of the website at <<https://blogs.cornell.edu/urbanhort/>> Text from the presentation include the following observation:

- Three ways to kill a tree in five years or less
 - Soil compaction in the critical root zone
 - Cutting the roots [John Parry would elaborate: “Damage to, or removal of too much of the existing root system”]
 - Backfilling over the roots

Dr. Bassuk’s presentation also includes the below photograph showing the process of soil compaction that occurs during the preparation prior to laying pavement, e.g., for a parking lot:



The root structure of a mature tree often extends considerably farther than the drip line. In addition, as John Parry told me, most of the feeder roots (up to 80%) are in the top 2 feet of soil; Dr. Bassuk’s slides note that 95% are in the top 3 feet of soil. **Yet preparation for paving—including soil removal and compaction—is likely to occur directly over these roots.**

Parking lot construction near mature trees is thus highly likely to result in damage to them, but not only due to compaction and the concomitant loss of soil structure. Dr. Bassuk’s presentation explains that soil disturbance and compaction during construction also lead to the loss of mycorrhizae—fungal micro-organisms that have a symbiotic relationship with tree roots that help the tree form new root growth, which is, of course, critical after trauma.

Evidence from recent and current Durham construction sites: protection falls short

John Parry sent me the below photograph showing a tree next to Madbury Commons in 2014 while the building was under construction. While this is not the site of parking lot construction, it is reasonable to draw inferences about general practices.

Note the lack of protection for the tree during construction. It is “protected” only by a barely visible thin band of surveyor’s tape, while the portable toilets and other equipment sit on the tree’s roots. One might argue that the tree is “protecting” the construction equipment.

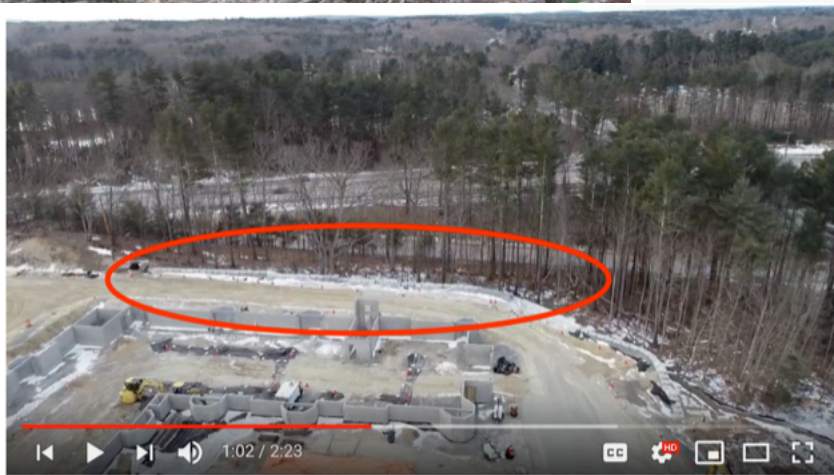
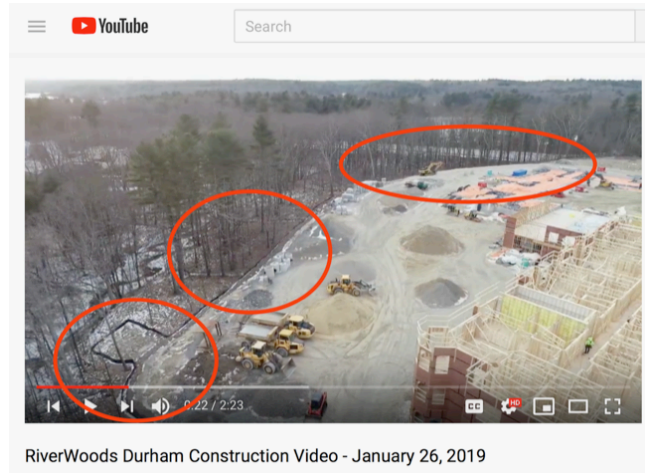


2014: tree unprotected during construction

Four years later that once-healthy tree is in decline. On the same construction site, the roots of a large oak tree near Madbury Road were severed for a utility trench. An alternative approach to install utility lines—directional boring, mentioned in Dr. Bassuk’s presentation—might have better protected the tree.

Another example comes from the construction of RiverWoods, currently underway. On the next page you will see photos taken by John Parry and screenshots excerpted from the video taken by the Town drone later uploaded to YouTube on January 26, 2019.

These images show how close the construction is to the tree line—and how surveyors' tape is all but ignored. The placement of the erosion-management physical barrier SiltSoxx is within the critical root zone for all these adjacent trees.



RiverWoods Durham Construction Video - January 26, 2019

Given the proximity of the mature trees to the area of construction, the risk of tree damage and perhaps eventual death must be acknowledged. The arboreal buffer to Route 4 may well suffer—perhaps not visibly when RiverWoods opens its doors but likely within a few years.

So, even on high-profile, prominently visible construction projects, we have not seen the most basic protection of mature trees one might reasonably expect, given today's knowledge and techniques—let alone the state-of-the-art protection that experts advise.

Why should we then assume a different outcome on future Durham construction projects? So I urge the Board to consider this on-the-ground reality when considering the application before you.

The Town of Durham has an interest in protecting the trees at 18 Main Street

Here's the fundamental question:

Should the Town of Durham have any say in the protection of privately-owned mature trees that benefit (1) adjacent properties and/or (2) the community as a whole?

The **Master Plan** suggests that the Town does have such a say. The "Vision and Community Character" chapter adopted on November 18, 2015 includes the following definition:

Community Cornerstones: A community cornerstone is an entity that is generally considered by the members of a community to be an important or defining element. It may be a building, structure, place, neighborhood, park, natural feature, institution, historical event, program, or even a person (alive or deceased). ... (VCC-4)

Many of us probably consider—consciously or not—Church Hill, with the two iconic churches, the Red Tower, and many historic homes, to be such a "community cornerstone" The natural features include the arboreal framing of the historic structures. (Just imagine what it would look like if we lost the mature trees. Those of us who lived through the loss to Dutch Elm Disease of the majestic elm trees that had lined Mill Road and Main Street can perhaps better imagine this than residents who arrived more recently.)

Given the observation about tree life expectancy provided in the Virginia Tech publication, Durham is fortunate to have *any* large mature trees in our downtown. Members of the Durham Historical Association might be able to date the trees on Church Hill, but, since I remember them from childhood, they are at least fifty years old.

Church Hill's trees remind us—just as much as do its 1800s houses—that our town has a long history and that for all our sophisticated technology and urgency to conduct business, we are only occupying a moment in time. Why, then, shouldn't we want to protect these trees?

In fact, our **zoning ordinance** explicitly affirms that the Town has an interest in protecting these trees. We know that impacts of construction may not be seen in the immediate future. The zoning ordinance recognizes this in the following definition (under Landscaping):

Damage – Includes any intentional or negligent act which will cause vegetation to decline and die within a period of five (5) years, including but not limited to such damage inflicted upon the root system by the operation of heavy machinery, the change of the natural grade above the root system or around the trunk of a tree and damages from injury or from fire inflicted on vegetation which results in or permits infection or pest infestation.

Unfortunately, history shows that Town follow-up enforcement of violations resulting in tree damage simply does not occur. An expert should evaluate the amount of tree growth following completion of construction as part of the determination whether "damage" has occurred, yet I don't believe we have ever conducted such an evaluation.

So protection must take precedence over enforcement.

Apart from helping to manage stormwater, mature trees and other vegetation improve air quality, contribute carbon sequestration, provide passive cooling (including through urban heat island mitigation)—all increasingly valuable as our planet warms. They provide grace by framing and softening the edges of our built environment and add visual interest, which encourages people to be pedestrians rather than drivers and to linger rather than rush through the area.

In recognition of these benefits, towns and cities across the country—including Portsmouth—are taking steps to plant *more* trees. In contrast, as former Town Councilor Doug Clark noted about a decade ago, an aerial view of our downtown reveals an astonishing high amount of asphalt, and we are apparently now considering adding more.

The argument that we already have enough trees downtown can be challenged: The future growth of many of those trees is compromised by constraints to their root growth such as undersized tree boxes. We may need more downtown parking, but the proposed parking lot expansion will be a drop in a bucket to put out that “fire.” We will always need more parking, but we cannot just plant 50-or 100-year-old trees.

The application for a Conditional Use Permit should be denied

This application is subject to Conditional Use. 175-23 (C) Criteria Required for Consideration of a Conditional Use Permit includes (emphasis added):

5. Preservation of natural, cultural, historic, and scenic resources: The proposed use of the site, including all related development activities, shall preserve identified **natural**, cultural, historic, and scenic resources on the site and **shall not degrade such identified resources on abutting properties**. This shall include, but not be limited to, identified wetlands, floodplains, significant wildlife habitat, stonewalls, **mature tree lines**, cemeteries, graveyards, designated historic buildings or sites, scenic views, and viewsheds.

Expansion of the existing parking lot, as proposed, would violate this criterion. Stone walls and rows of trees delineating roads and boundaries both act to frame historic structures and tie them to their place in time. While the applicant notes that mature trees along the property’s boundaries would not be removed, they **would be at risk**—as in death, if not immediately, within five years—as a result of the proposed construction. If roots from trees on abutting properties are damaged during the construction, then those trees would also be at risk.

The application also flies in the face of criteria number 3 (Character of the site development): It proposes a commercial use within a neighborhood. The parking lot at the abutting St. George’s Church is for the use of parishioners while they are attending services or using the church for other purposes. The proposed parking lot expansion is designed to support an offsite business enterprise.

Alternative, compromise plan possible?

Most of us recognize that the applicant has a right to benefit from his property. A commercial parking lot within a residential neighborhood and abutting an iconic church is inappropriate. Likewise, **a modest expansion of the parking lot, for example, by 10 spaces**, would probably be perceived by most of us as reasonable, provided the design better protects the mature trees.

It would therefore seem advantageous to the applicant to work with the Planning Board to achieve this more modest goal—particularly since, if this specific application is denied, the zoning ordinance would preclude reconsideration of a similar application for a year:

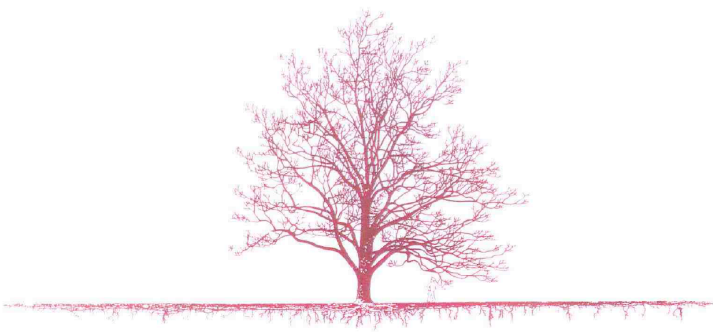
If a permit is granted, include Conditions of Approval

Some measures to protect trees during construction help mitigate or avoid negative impacts. The Planning Board should require, as part of a Conditional Use Permit, Conditions of Approval that include the types of construction procedures and protections advised by Dr. Bassuk and John Parry, below. These steps would add time and cost to the applicant but would likely enhance the survival prospect of affected mature trees.

Approaches to tree protection during construction included in Dr. Bassuk's presentation include (put simplistically; refer to the presentation for specifics):

- advance preparation of a “tree protection plan” (specifying, among other things, physical protections such as rigid fencing and mulching)
- communication of goals with—and commitment to by—all construction participants
- directional boring under tree roots rather than trenching
- avoiding compaction over tree roots
- no backfilling soil over the roots after construction
- site remediation and tree treatment

Additional excerpts from Dr. Bassuk's slideshow emphasize points mentioned earlier:



- Critical Root Zone (CRZ)
 - Typically, 1 foot radius protected for every 1 inch dbh [diameter at breast height]
- No Cut Zone (Structural CRZ)
 - Typically within 6'–10' of a mature (24" dbh) tree
 - Cutting within this radius can destabilize the tree
 - Design so there will be no root severance within 6-10' of a mature tree
- Mitigating Work Inside a CRZ
 - Avoid impacting more than 30% of the CRZ total area and NONE of the No Cut Zone

In conclusion, according to independent horticultural experts, the very preparation of parking lots is likely to lead to the damage and/or death of adjacent trees. I urge the Planning Board to take these observations and recommendations under advisement when considering the application before you tonight and others that will be presented in the future.

Regards,

Robin Mower