To: Durham Planning Board

Date: 2/3/22

Subject: Questions/Comments on landscape plan for Mill Plaza development

From: John Parry, 5 Denbow Rd., Durham, NH

Urban Forester, U.S. Forest Service (retired)

Dear Planning Board:

Prior to last month's meeting I sent a letter with questions and comments I have on the Mill Plaza landscape plan. Some of these questions have not been answered adequately in the meetings or in the letter on the landscape plan sent previously to Rick Taintor. It was suggested at the last meeting that landscape questions could be put off until after a building permit has been issued by the Town. Some of these issues (especially the first 3 listed below in yellow) relate to, and are impacted by other planning and engineering details, and they should be determined up front by the planning board. It has been my observation with past Durham development projects that if these landscape details are put off to later stages, they are often not well done.

My main comments and questions are listed briefly below – I provide more detail on each of these on page 2.

Thanks for the opportunity to comment.

John Parry

MAIN COMMENTS AND QUESTIONS

1. **Clarify what existing trees will be protected and how**. The details in the plan are not clear. Make sure tree root systems are adequately protected.

2.Improve/clarify design of parking lot islands for tree planting. 5 feet (inside curbs) is not an adequate width for rooting space to grow larger trees.

Recent plan shows use of "engineered soil" (structural soil?) which could be helpful if used appropriately. Define what this "engineered soil" is. Engineered soil under the pavement would be useful in allowing additional rooting space for trees, but I don't see the value of using it around the trees within the islands. Replacing it within the islands with loam or other suitable soil to a depth of 3 feet would be more beneficial to tree health.

Investigate poor drainage and compaction of existing soil underneath the soil added.

3. **A large number of trees will be planted near buildings A & B, many within the sidewalk areas. I don't see any specs. for the design and size of these tree boxes (tree pits)**. The trees suggested for these sites can become larger trees and need adequate rooting space to survive and grow. The design for these sites should be planned up front to ensure they have appropriate soil volume and drainage.

4. The tree planting figure in the Specs. shows the tree **root balls in Islands are planted high (**about ¼ of the root ball is above the soil). I feel this is not appropriate. If soil settling is a concern, trees can be planted

slightly high (1 – 2 inches high) according to the ANSI standard for tree planting (ISA Tree Planting BMPs – Companion Publication to ANSI A 300 Part 6).

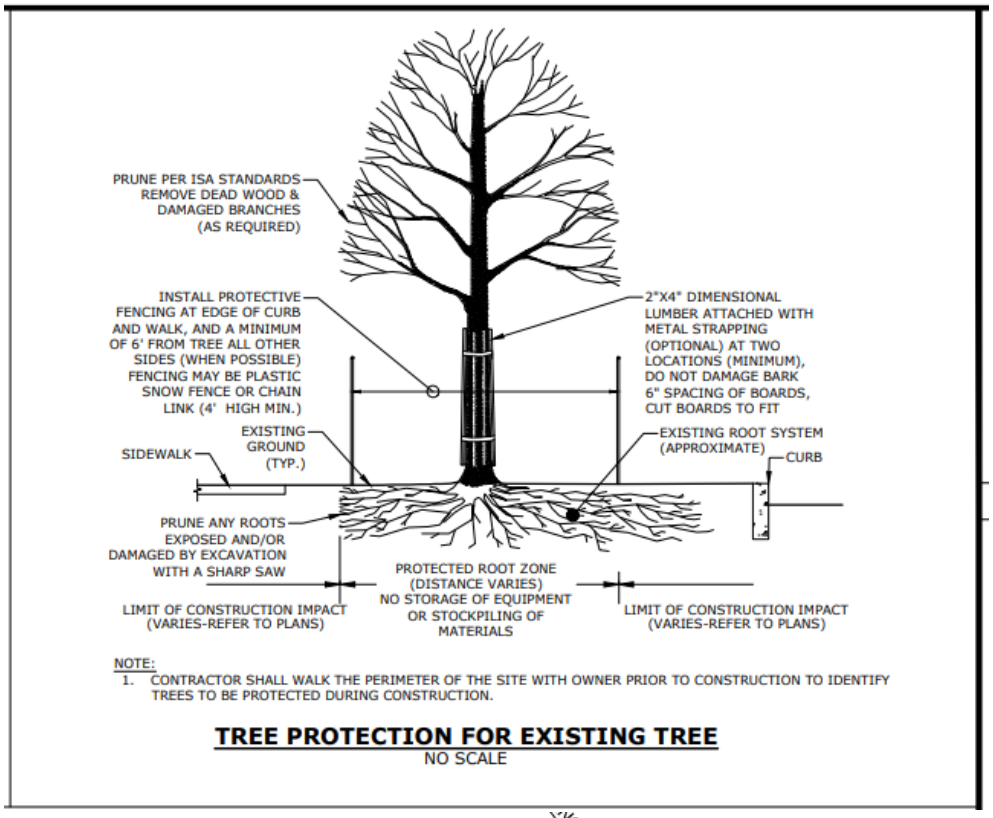
5. A **significant watering* program is critical** to maintain tree health and growth. Parking lots are hotter, dryer sites and engineered soils drains quickly. Will irrigation systems be installed? If not, there should be a sound maintenance plan to water trees permanently during the growing season. Extra attention to watering for first 2 years after planting should be planned to make sure these new trees and shrubs get established.

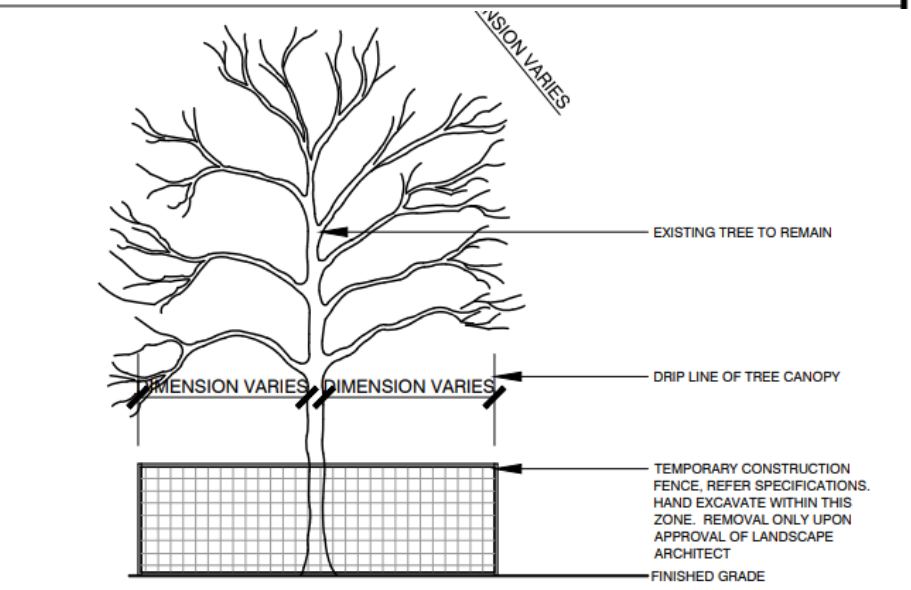
6. An accepted principle in landscape design, is that it is good to **diversify tree and shrub species** in case there is a insect, disease or other problem in the future that affects a specific species in the area. There are a large number (24) of Armstrong maple and Redbud (24) planned. I suggest planting no more than 12 of each of these species and substituting other appropriate species to add diversity.

ADDITION DETAIL

Protecting Existing Trees (see figures below)

- Landscape Note 17. on the plan states; *EXISTING TREES AND SHRUBS SHOWN ON THE PLAN ARE TO REMAIN UNDISTURBED. ALL **EXISTING TREES AND SHRUBS SHOWN TO REMAIN** ARE TO BE PROTECTED WITH A 4-FOOT SNOW FENCE PLACED AT THE DRIP LINE OF THE BRANCHES OR AT 8 FEET MINIMUM FROM THE TREE TRUNK. ANY EXISTING TREE OR SHRUB SHOWN TO REMAIN, WHICH IS REMOVED DURING CONSTRUCTION, SHALL BE REPLACED BY A TREE OF COMPARABLE SIZE AND SPECIES.*
  It is difficult to see on the plan **which trees are identified for protection?** I believe some are along Mill Rd. There could also be some in the College Brook area and along the northeast boundary of the property. Ideally the **Town Tree Warden and LA should identify and flag trees to protect prior to any construction activitiy. ID on the plan which trees will be protected and how.**
- Protecting rooting zone around the tree is very important. Fencing at the drip line is an accepted industry standard* (There are also other accepted methods for determining the rooting area to protect). The plan wording in note 17. above "or at an **8 foot minimum" is contradictory and not adequate** for larger trees over 8" in diameter.
- There are **two different diagrams in the plans** showing different levels of tree protection (see below). The first figure below (from Sheet C508) shows fencing at 6 feet.
- The **protection standards for existing trees are confusing and need to be clarified.**





- Any **setbacks or otherwise protected areas should be protected from all construction activities**. In many past projects, building was not allowed on wetland and shoreland setback areas, but developers were allowed to store supplies, park vehicles, pile soil, etc. in those areas, and this "temporary use" did significant damage/compaction in those areas. Also, **sites where new tree planting will occur should be protected from soil compaction**.

- Some **deer protection may be needed around new trees planted in/near natural areas by College Brook**.

Design for Tree Planting in Parking Lot Islands (see figures below)

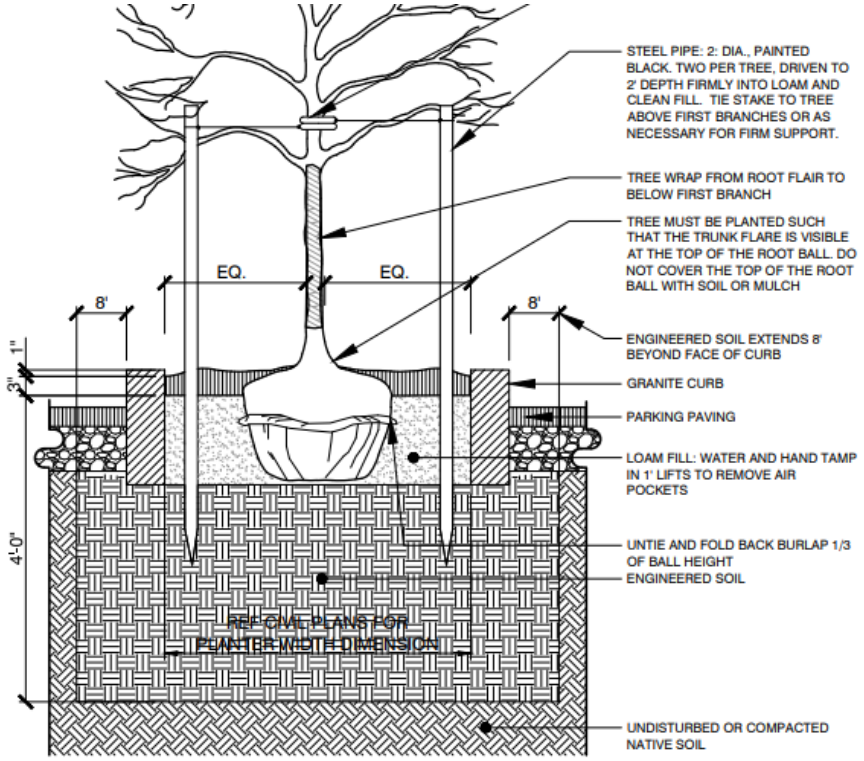
- The islands are 6 feet wide. My understanding is that measurement is to the outside of the curb, so the curbs will take up about 12+ inches of the island space. That **leaves just 5 feet or less of soil width for tree rooting** within the islands. Most tree roots naturally grow horizontally from the root ball. The species selected can grow to a larger size at maturity if adequate rooting space is available. Trees in the existing lot, and on main street are examples of what happens long term without adequate rooting space – they grow slowly, stay small, have poor health, are short lived and must be replaced regularly. I am glad to see species were selected that will have a larger size at maturity, but I feel the **width of the Islands should have been increased (to 8 feet or more) to allow adequate rooting space**. As an example, the picture below shows a parking median at Targets in Greenfield, with a 10 foot width and healthy trees growing at a good rate. Wider islands might also allow planting one or two additional trees in each island.
- The crown spread of some of these trees at maturity shows as up to 30' plus. Plan n**eeds to plan adequate spacing in the parking lot islands to avoid branch conflicts with pedestrians, vehicles, delivery trucks, snowplows**, etc. Branches can be pruned up over time*, but trees must be allowed to gain height before too much lower branch pruning can be done. Good species selection can help. Also, when ordering trees from nursery, contract wording can specify the height to which trees should be free of branching.
- Landscape Note 14. on the plan states; PARKING AREA PLANTED ISLANDS TO HAVE MINIMUM OF 1'-0" TOPSOIL PLACED TO WITHIN 3 INCHES OF THE TOP OF CURB ELEVATION. REMOVE ALL CONSTRUCTION DEBRIS BEFORE PLACING.
  Ideally loam should be as deep as the tree root balls (2 – 3 feet). Should also consider replacing the engineered soil under the trees with loam soil (see comment below under engineered soil).
- A concern I have is that **any existing, compacted undersoil (underneath the islands) will impede water drainage from the islands**, especially if the old, compacted soil from previous construction is still present. If water drainage is a concern, it would be helpful to break up or till compacted soil, to a depth of 4 feet or more for the whole length of the islands. Engineered soil under the trees may help with drainage, especially if the engineered soil (or an appropriate soil mix) ran the full length of the islands to a depth of 3 - 4 feet. **Another option is to install drainage tile the length of the islands, especially if an outlet can be provided. This could be a cheaper alternative to other remedies.**

Engineered Soils (ES): I don't have much direct experience in using engineered soils, but questions/comments I have are;

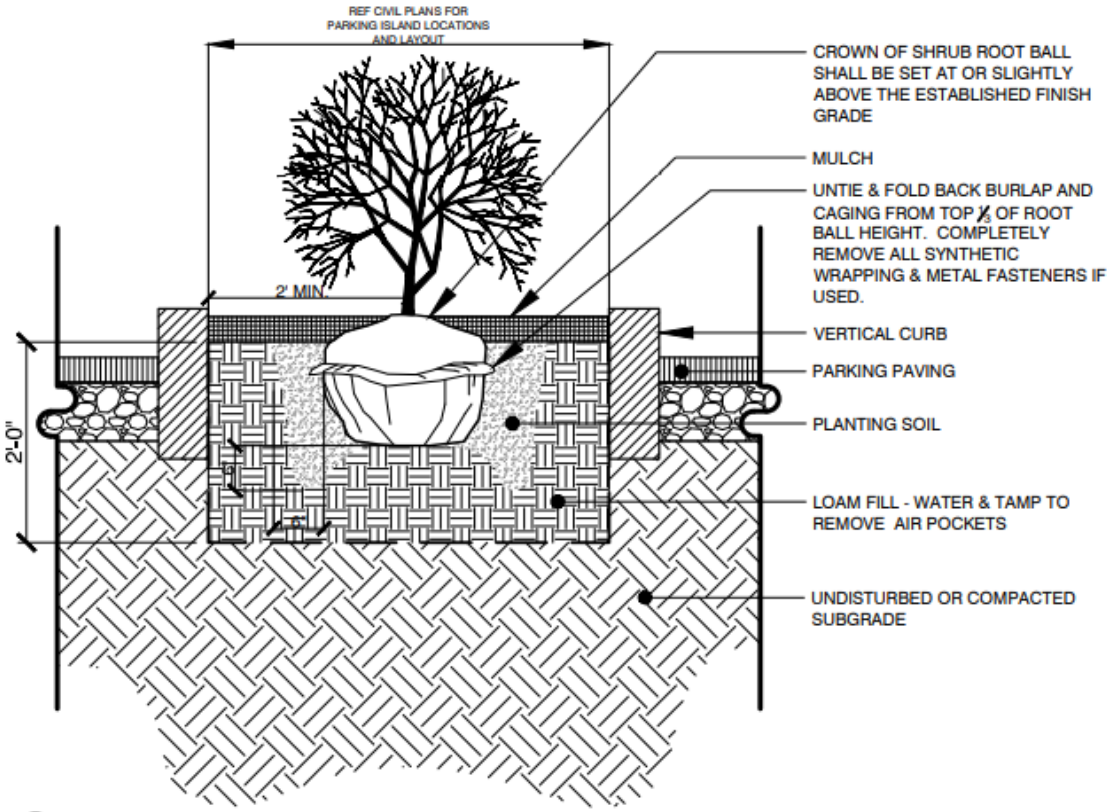
- The newest plans show that an "engineered" soil (ES) will be used and extends 8 feet beyond the curb, underneath the pavement. I assume this is similar to a structural soil which will allow tree root growth, and also support pavement or concrete above? **This ES should be defined or described in the plans.**
- Glad you are considering using ES, since this can help increase rooting space for trees when used correctly. It should be noted that because of the large volume of stone in **ES, it is less productive**

for tree growth than a good loam or topsoil (some estimates suggest that you need 4 or more cubic feet of engineered soil to replace 1 cubic foot of good soil).

- The main benefit of using a structural soil or ES is that it supports concrete or pavement above, while also allowing root growth. The plan shows using ES directly under the trees (and 1' of loam) from a 1' depth down to 4'. **Since there is no pavement or concrete to support in the islands, just use a good soil** (at least 3 feet deep) in the islands instead. Tree growth will be much better. I spoke with one of the developers of structural soil at Cornell Uni. And she agreed with the above.
- There is **no engineered soil shown under the planned shrubs in the island, so that implies that the engineered soil does not run the full length of the island** and is only near the trees? **It would be useful to know how far the engineered soil extends in all directions.**
- It will be helpful that the roots can run down the length of the islands**. However, in calculating the usable soil volume for rooting,** it should be considered that this may be a diminishing return. There will be less root growth as you get farther from the tree, and there will be some competition for water and nutrients from shrubs and other plant material in those areas. Also, it appears the engineered soil does not run the full length of the islands, so in between the trees the rooting depth is more limited (2' deep) and the soil below the loam there may be compacted.



4 DECIDIOUS TREE PLANTING: CENTER PARKING ISLAND
Scale: Not To Scale



3 SHRUB PLANTING: PARKING ISLAND
Scale: Not To Scale

General Tree Planting Specs

- The tree planting figure above shows the root ball planted high, about ¼ of the root ball is above the soil. **I feel this is inappropriate. Trees should be planted so that the root flare is established at or near ground level.** If soil settling is a concern, trees can be planted slightly high (no more than 1 – 2 inches high). The **ANSI standard for tree planting** (ISA Tree Planting BMPs – Companion Publication to ANSI A 300 Part 6) states that "B&B root balls should have the trunk flare correctly located at the surface – the planting hole can be 1 -2 inches shallower than the root ball depth in anticipation of minor settling and flattening of the root ball"*.
- Will there be no **new trees planted along Mill Rd.?** This seems like a good site for planting and a good buffer should be provided here.
- The plan indicates **tree boxes (tree pits) near the buildings** (such as in the sidewalk in front of building A and around B)? I did not see detail in the plans on the design for these tree boxes. **What is the size and how is underground rooting space designed for these tree boxes**? Armstrong maple are planned for most of these sites and it is not a small tree. Needs adequate rooting space.

Tree Species Selected

- It is good **to diversify species** in case there is an insect, disease or other problem in the future that affects trees in the area.
- There are a large number (24) of Armstrong maple (Acer x fremanii) planned. **I suggest planting no more than 12 Armstrong and substitute 12 other appropriate species.**
- There are a large number (25) of redbud (cercis canadensis) planned. These are not a bad choice, but are close to their northern range and do better with some shade. **I suggest planting no more than 12 Redbud and substitute 12 other appropriate species.**

Watering

- Landscape Note 16. on the plan states; *ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY, OR MORE OFTEN, IF NECESSARY, DURING THE FIRST GROWING SEASON. LANDSCAPE CONTRACTOR SHALL COORDINATE WATERING SCHEDULE WITH OWNER DURING THE ONE (1) YEAR Guarantee period.* Landscape Note 19. on the plan states; *UPON EXPIRATION OF THE CONTRACTOR'S ONE YEAR GUARANTEE PERIOD, THE OWNER SHALL BE RESPONSIBLE FOR LANDSCAPE MAINTENANCE INCLUDING WATERING DURING PERIODS of drought.*
  A significant watering* program for at least 2 years after planting is critical and should be planned. It takes that long for new trees to become established. Also, if engineered soil is used, it may need regular irrigation on a long-term basis.

*There are ANSI Standards developed for many tree planting, care and protection issues. The International Society of Arboriculture (ISA) have developed Best Management Practice booklets developed as companion publications to each ANSI Standard and these provide a very good summary of recommended industry standards. Tree topics related to new development, and of interest to the PB and other Town Committees and Depts. are ; Tree Planting, Tree Protection During Construction, Soil & Root Management, Tree Pruning, Utility Pruning of Trees and Integrated Vegetation Management.

The Planning Board should acquire a set of these ANSI Standards and BMP Booklets for future reference. These can be purchased at the website below. https://www.isa-arbor.com/store/category/117/

Photo Caption: Parking lot at Greenland Target store with 10 foot islands.