

The arboretum of the University of Pennsylvania and the official arboretum of the Commonwealth of Pennsylvania 100 East Northwestern Avenue, Phila., PA 19118

05 February 2022

Robert M. Wallett Interim Vice President Financial Affairs/CFO Chestnut Hill College

RE: Review of Chestnut Hill College's (CHC) Landscaping Plans for the Sugarloaf – Germantown Avenue Entrance

BACKGROUND AND ASSIGNMENT:

On 31 January 2022, you sent me an email and asked if Morris Arboretum's Urban Forestry Consultants would review the current landscaping plan which is currently part of the construction drawings and provide comments or recommendations on the design and documentation. That same day, I received the plan 2021-01-07_CHC Landscape & Lighting_Rev-13.pdf, which has sheets C-701 to C-706, from Bohler. This memo is based on that file. This assignment does not include reviewing any lighting issues except where installing the path/street lighting infrastructure could affect the trees.

PAGE C-701, LANDSCAPE PLAN: RECOMMENDATIONS

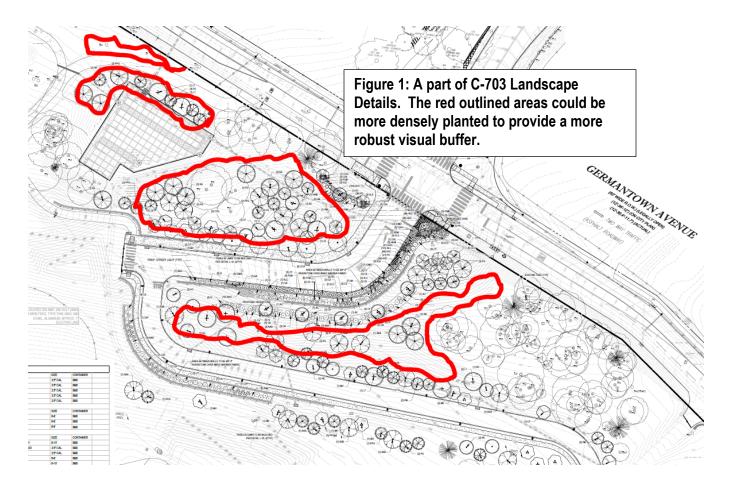
Summary Observations and Recommendations: Planting Density

The proposed planting adjacent to Germantown Avenue seems to be a landscape-type planting design where the proposed trees/shrubs are generally about 20' on center. I feel a "landscape-type" treatment has precedence and is fine for Sugarloaf's interior spaces but assert that the area in the Germantown Avenue viewshed should be treated more as a reforestation project than a designed landscape in this area. This assertion does not include the entrance area which has retaining walls and is heavily planted with perennials. In a sense, my recommendation is to put back a higher density of trees which, before construction, was acting as a visual buffer.

To accomplish this goal, the red outlined areas shown in Figure 1 should be planted with about 50 more large maturing trees. If protected from deer browse and rub (see "Planning for Deer" section), these additional trees can be installed at a smaller size (~1.5" cal).

When planting near existing trees, care should be taken by the contractor, and the bid documents should specify, that no existing roots >1/2" shall be cut to install new plant material and that the new plants should be moved if there is a plant/tree root conflict as to not impact larger tree roots.

It seems like there are other non-planted areas south of the proposed entrance road on higher elevations which may be able to be seen from vehicles on Germantown Avenue. These areas may be candidates for tree planting as well; however, I don't know if these areas were intentionally left unplanted to enhance a view or for some other purpose.



Summary Observations and Recommendations: Planning for Deer Impacts

The deer population around Sugarloaf is significant and will affect the health of trees and landscape plants if left unprotected. Therefore, all new trees should be fenced or otherwise

protected from deer. This protection needs to be robust, long-term, and should remain in place and maintained until the trees have grown large enough (~6-8" diameter) to withstand deer rub and be higher than the browse line (about 5' above grade).

There are many different types of tree guards that are aesthetically unobtrusive and effective, from rigid black plastic grids to rolls of wire fencing installed with metal posts. However, whatever type of protection is installed should allow air flow through the guard, be expandable as necessary, be periodically maintained, and installed in such a way as to not harm tree roots.



Figure 2: Deer rubbing a small tree to death.

Instead of protecting each tree/shrub/perennial, a permanent deer fence can be designed and installed around the new plantings if CHC's decision-makers feel that is more functional, aesthetically appropriate, and fits within the project budget. If this is the case, fenced areas should have durable gates for maintenance and access. These gates should have a locking mechanism so that they will not inadvertently swing open. The gates should also be self-closing, either by gravity or mechanical action such as springs.

Some general tree/shrub deer protection recommendations:

- For shrub fencing, use galvanized or coated wire fencing 4' or 6'tall no chicken wire
- Each individual shrub requires at least 3-4 light-duty posts 8' tall, protection can enclose multiple shrubs or trees
- Attach fencing with plastic zip ties
- Posts should be driven in OUTSIDE of the rootball's edge
- Tree/trunk protection should be maintained until tree is at least 6" in diameter at standard height
- Fence maintenance and trunk protection shall include removing vines

Plant Schedule/Trees (deciduous):

In addition to the species listed on sheet C-701, I recommend adding some *Quercus*, such as white oak, swamp white oak, and chestnut oak. These can be long-lived trees and their acorns are used as forage and support wildlife. I recommend severely limiting or not planting oaks from the red oak group such as red, scarlet, pin, or black oaks since these species have been suffering from BLS (Bacterial Leaf Scorch) in our area. This disease is chronic (no known cure).

Plant Schedule /Evergreen Trees:

I do not recommend using Douglas fir and Colorado blue spruce for evergreen trees because they are prone to pest and disease problems in our area and, therefore, usually do not acceptably perform their intended landscape function.

I recommend replacing these species with American holly (*Ilex opaca*, including non-dwarf cultivars) and Eastern red cedar (Juniperus virginiana - single stem). American holly cultivars may have different color seeds/fruits that provide visual winter interest and are a wildlife food source, while the red cedar is used by nesting birds and its seeds are high-quality wildlife food. Choose only high-quality trees; a strong, single central leader and subordinate branches will help the red cedars withstand being negatively affected by ice and snow loading.

Plant Schedule/Ornamental Trees:

I do not recommend planting straight species dogwood (*Cornus florida*) because this species is prone to pest and disease problems in our area, especially anthracnose. Because of these issues, the straight species usually does not acceptably perform their intended landscape function over time and have low expected lifespans.

Therefore, I recommend substituting this species with Rutgers hybrids such as Celestial_®, or Stellar Pink_® or any other crosses with *C. florida* that are highly resistant to the dogwood borer, powdery mildew and dogwood anthracnose.

Other Notes/Observations from Plant Schedule:

White pine is a good screening plant only in the early part of its lifespan. After about 20 or so, the bottom branches start dying back naturally, and the total height of the tree's canopy generally remains about the same as the branches die from the bottom and the new growth flourishes at the top. Consequently, this species loses its screening function over time. Additionally, as these trees mature, they have a tendency for their branches to be periodically broken by ice and snow loading. Despite these somewhat detrimental issues, this species does provide a wealth of benefits to the landscape if these shortfalls are anticipated in placing these trees in the landscape.

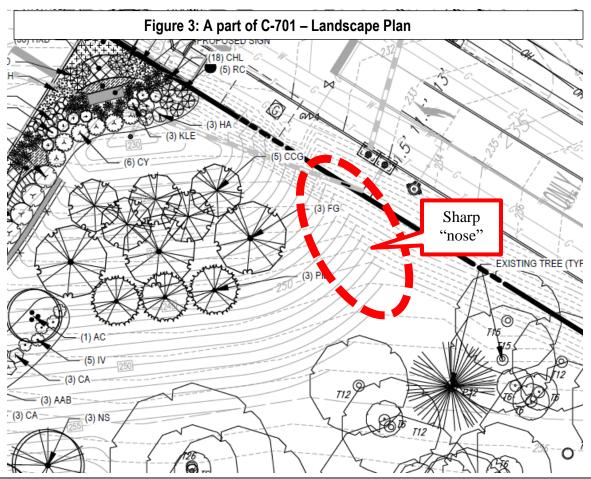
Silverbell (*Halesia carolina*) are listed as a "ornamental tree", but these trees can grow to 75' over time.

Plant Schedule/Shrubs:

I recommend considering planting *Rhododendron maximum* as a screening shrub or shrub mass or understory shrub. This plant is well suited to the Wissahickon Valley's soil pH and it prefers deep, well-drained acid soils high in organic matter.

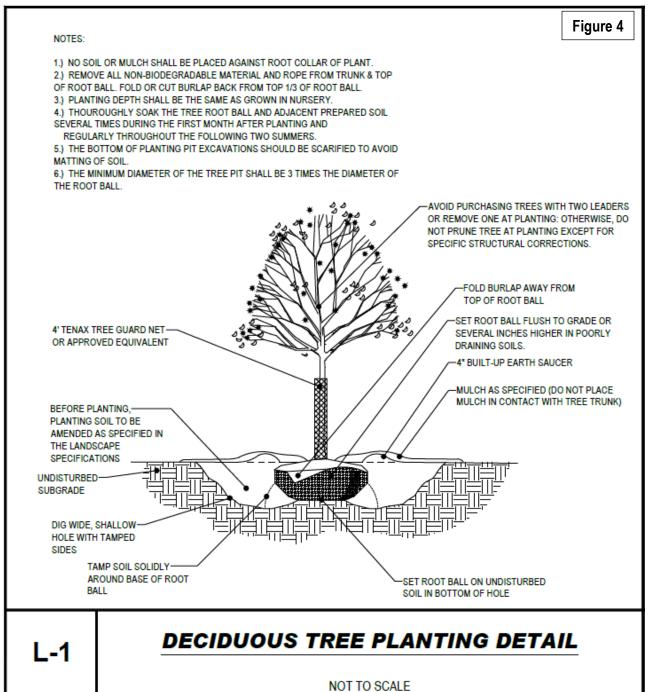
Grading Issues:

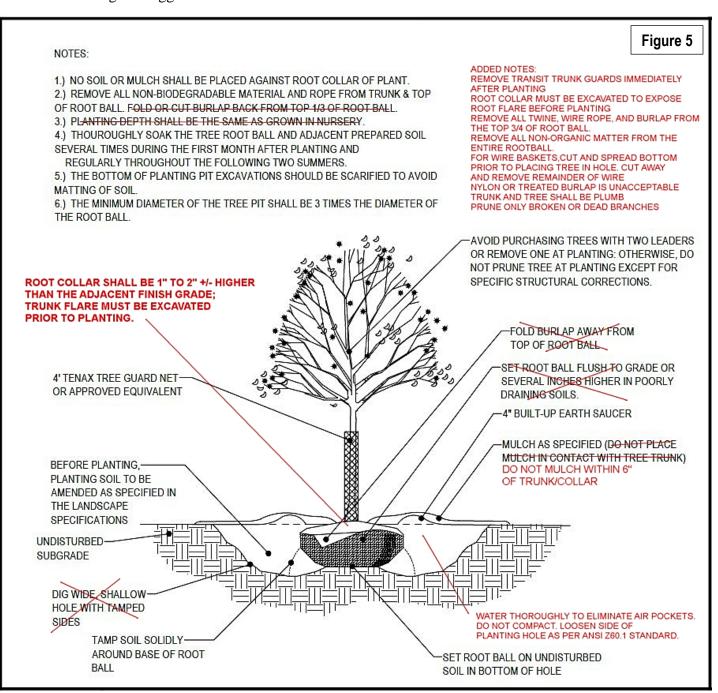
Although I am not a Landscape Architect, Architect, etc., I noticed an area that may need to be regraded. It seems that the highlighted area will have a very sharp corner and slope in the area shown in Figure 3.



Comments on L-1 Deciduous & L-2 Evergreen tree planting details

The following L-1 is the planting detail taken from the drawing set:





Deep planting is the #1 malady of newly planted trees. Therefore, the top of the root ball must be untied and the trunk flare¹ must be excavated before the tree is planted to determine the tree's planting height in the pit.

Another recommendation is to remove all man-made material from the top 3/4 of the root ball. The method of doing this is to backfill from the bottom, in 4-6" lifts, and rolling the next 4-6" of burlap and wire up the root ball and repeating this process until all the material can be removed. This methodology is illustrated in Appendix A.

¹ transition zone from trunk to roots where the trunk expands into the buttress or structural roots. (root flare)

Landscape Specifications – 2. Materials Part F. Plant Material

This sections states "All plants shall in all cases conform to the requirements of the American standard for nursery stock (ANSI Z60.1), latest edition..."

ANSI Z60.1 is NOT a quality standard. In fact, the standard states on the first page: "This standard does not provide buyers with any assurance of the health or quality of the nursery stock being specified or sold." That means specifications about tree quality must be in the project package ensure quality trees are purchased. An exemplary example of a nursery quality standard is the *Florida Grades and Standards for Nursery Plants* which can be found online by typing "Florida nursery quality standards" in any search engine.

To assure high-quality trees are tagged and planted, CHC should hire a practitioner who knows how to choose high-quality trees in the nursery. CHC should also hire contractors who know how to properly plant trees or have other knowledgeable consultants oversee tree planting to make sure it is done properly and agrees with bid specifications/planting details as offed in this report.

Landscape Specifications – 5. Tree Protection

Part A of this sections states "A Tree Protection Zone (TPZ) shall be established at the drip line or 15 feet from the trunk or at the limit of construction disturbance, whichever is greater..."

Cut and fill activities within a tree's rooting area (not drip line) has the potential to severely affect the tree's longevity and structural/biological

health. Construction activities around trees can damage and compact the soil, which can have short and long-term negative impacts on tree growth and biological heath. Therefore, where preserving existing trees during construction is desired, the affects from grading and construction activities must be understood and planned for if tree preservation to be successful.

To quantify how construction activities could potentially impact trees, it is useful to understand about tree roots. Tree roots have two primary functions: 1) absorption and transport of water and minerals, and 2) anchorage. Therefore, the Morris Urban Forestry Consultants use two models to quantify construction impacts.

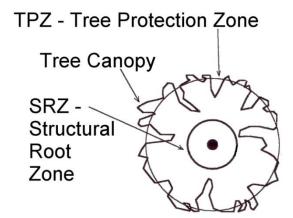


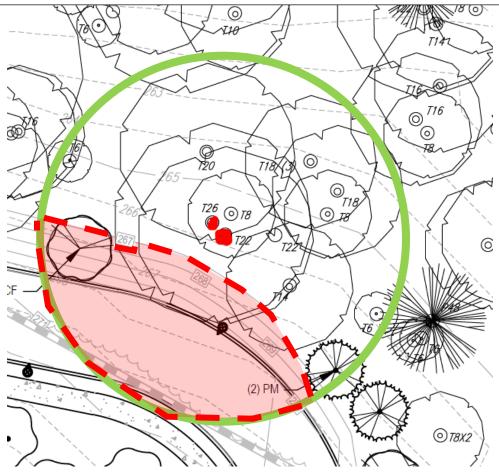
Figure 6: Tree protection and structural root zones

The first calculates the critical tree protection zone, or TPZ. This zone is the circular area around the tree required to assure 100% tree survival by preserving enough biological roots that absorb and transport water and minerals. There is a direct relationship between incursions into the TPZ and increased likelihood of tree mortality. If the incursion into the TPZ is not too great, the likelihood of tree mortality may be decreased by post disturbance care treatments such as supplemental irrigation, root treatments, growth hormones, mulching, and monitoring.

The second model calculates the structural root zone, or SRZ. Structural roots anchor the tree. If these roots are severed, it can destabilize the tree. Furthermore, cutting major woody roots can promote decay and fungal infections that can have both immediate and long-term impacts on tree health and stability. The SRZ is always smaller than the TPZ.

The TPZ is not the tree's drip line, but should be calculated for each tree considering the tree's age, diameter, and the species ability to tolerate construction impacts such as cut/fill grading, soil compaction, etc. The SRZ is calculated using the tree's trunk diameter. These root zone models aid in decision-making.

Figure 7: The tree protection zone (green circle for this example) for trees T22 and T26 may be severely compromised by the road installation and grading (red shaded area). Without anticipating this impact, this tree may have a significantly shortened safe and useful lifespan and my need to be removed five or ten years after construction is completed.



Other construction activities that can affect a trees health include but are not limited to trenching for utilities, installing sprinkler systems, dumping concrete wash near a tree, soil compaction, and hydrological changes. All these issues should be considered so the trees you want preserved during construction can have healthy and long lives.

Given the method specified (drip line or at least 15' from trunk) for identifying the tree protection zones in the specifications, I recommend that the Urban Forestry Consultant's calculate the TPZ for all retained trees that could be impacted by construction, place these zones on a CAD plan, and if necessary, calculate the amount and severity of incursion into the TPZ. A findings/recommendations report should be submitted to the project team to determine the best course of action and tree protection for these trees.

Landscape Specifications – 5. Tree Protection (Fencing Material)

Part B of this sections states "a forty-eight inch (48") high wooden snow fence or orange colored high-density 'visi-fence', or approved equal, mounted on steel posts shall be placed along the boundary of the tree protection zone.

Once the TPZ is determined and agreed upon, the tree should be protected by installing a chain-link fence around the tree or trees (not orange snow fencing). This fence should be installed so that it cannot be easily moved by contractors. The Morris Consultants have been involved with tree preservation in construction projects for over two decades and have experienced numerous times contractors moving unsecured tree protection fencing without permission. Therefore, we recommend using at least a 6' high chain link fence secured to the ground.

Landscape Specifications – 6. Soil Modification

The subsoil in the much of new landscape areas will be severely compacted by grading activities and vehicles. Then, as specified, 6" of topsoil will be spread onto this compacted subsoil and organic matter or fertilizers may be tilled into the topsoil. Then, the landscape plants are installed.

The compacted subsoil can result in a host of tree-related maladies including surface rooting, and girdling roots because the tree roots cannot penetrate into the compacted subsoil beyond their planting hole. Also, the compacted subsoil may result in poor tree anchorage and decreased biological tree heath, anerobic soil conditions, perched water tables, and other issues.

Therefore, I highly recommend that, before any of the tree/shrub landscape is installed or topsoil spread on the area, that the compacted subsoil first be decompacted to at least an 18" depth. This can be accomplished by using tractors with decompacting soil blades, or large rototillers. This decompaction process should be done in such a way as to limit vehicle access to decompacted areas as much as feasible. One this is done; lighter vehicles can spread the topsoil over the decompacted subsoil.

Landscape Specifications – 9. Planting, part H

I do not recommend using peat moss as specified since harvesting this finite resource is causing environmental damage and good substitutions do exist. I would substitute composted organic matter and change the mixture so that the organic matter is about 5% of total backfilled soil by volume. Soil that is high in organic matter will subside over time causing problems and offers little added benefit to the tree whose roots will soon grow beyond the planting pit.

SUMMARY RECOMMENDATIONS

The following recommendations have been extracted from the body of this report.

Landscape Plan:

- Plant more canopy trees (about 50) in the area outlined in Figure 1
 - o These additional trees can be installed at a smaller size (~1.5" cal)
- If applicable, consider planting trees on higher elevations if these areas are in the Germantown Avenue viewshed
- Plan for, install, and maintain deer protection around new landscape plants
- Add some trees from the white oak group to the tree planting mix
- Remove Douglas fir and Colorado blue spruce from the plant list
- Consider substituting American holly (*Ilex opaca*, including non-dwarf cultivars) and Eastern red cedar for the Douglas fir and Colorado blue spruce
- Remove straight species dogwood (*Cornus florida*) from the planting list and substitute with Rutgers hybrids such as Celestial®, or Stellar Pink® or any other crosses with *C. florida* that are highly resistant to the dogwood borer, powdery mildew and dogwood anthracnose
- Considering planting *Rhododendron maximum* as a screening shrub or shrub mass
- Check the grading plan for awkward or unworkable grade changes
- Have the Morris Arboretum's Urban Forestry Consultants calculate the Tree Protection Zones for selected trees to remain that are adjacent to the proposed grade changes. These zones should be put on a plan to guide tree protection fence locations and more fully understand the potential impact the construction project may have to preserved trees.
- The LOD (limit of disturbance) line or TPZ line should be shown on plans especially around existing trees to be preserved
- No new utility trenches should impact existing trees to be preserved (this recommendation is not discussed in the report)

Landscape Details

- Change the L-1 and L-2 planting details as offered in this report's body
- New trees' trunk flare shall be carefully excavated in the rootball before planting, and the trunk flare should be slightly higher than the surrounding grade after the tree is planted
- Use the tree planting methodology as shown in Appendix A
- Only tag, purchase and use high quality trees. These trees should be free of defects and should demonstrate optimal form and structure
- When trees are delivered, have a knowledgeable practitioner reject trees that do not meet specification or that have been damaged by shipping
- Decompact the subsoil before adding the topsoil in applicable areas
- Do not use peat moss for backfill soil. Backfill soil should have an organic matter content of about 5%
- All tree guys and anchoring should be removed after one full growing season and after the warrantee period (this recommendation is not discussed in the report)

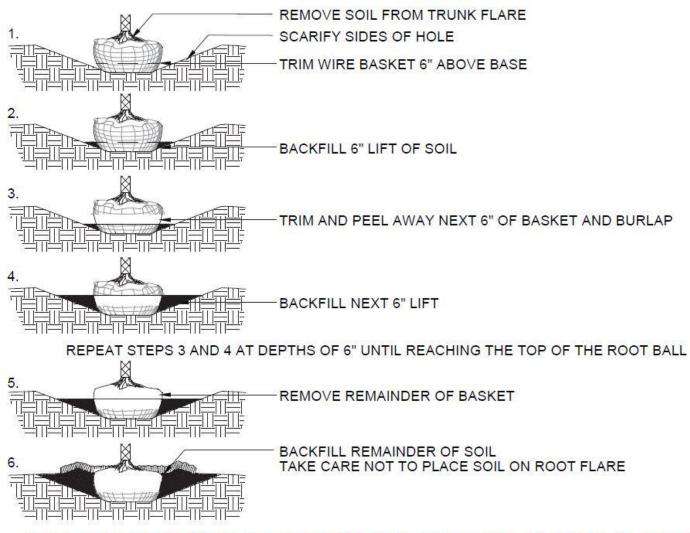
CERTIFICATION

I certify that I am a member in good standing of the International Society of Arboriculture and am a Board Certified Master Arborist Tree Risk Assessment qualified, and that I am a member in good standing of American Society of Consulting Arborists (ASCA). I further certify that I represent the Morris Arboretum of the University of Pennsylvania and that this is my work product based on my professional judgment and current industry standards and understanding.

Respectfully Submitted:
Jason Lubar, ISA BCMA

05 February 2022 Date

page 11 of 12



BALL AND BURLAP PREPARATION AND REMOVAL DURING PLANTING

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