Planning
Urban Design
Landscape Architecture

February 21, 2014

Ms. Sharon Dendy
Department of Transportation Urban Forestry Administration
55 M Street, SE
Suite 400
Washington, DC 20003

Dear Sharon:

Following our last meeting with you, Sam Zimbabwe and other members of the DDOT team, I am writing this letter in an effort to better summarize our latest tree preservation measures.

As described at the meeting we have supplemented the tree preservation measures in response to DDOT's concerns and comments. ParkerRodriguez has been working in close collaboration with the Davey Resource Group (highly experienced tree preservation specialists). As we have explained this revised package of mitigation measures has been developed to enhance the survivability and health of the street trees while still allowing for the construction of the circular drive. This proposed set of measures represents the best and latest techniques in tree preservation and impact mitigation.

The following summary list describes in a general manner the various techniques and proposals, supplemented by a series of attachments that elaborate further on those proposed measures:

- Engaged experts on tree preservation.
- Arborist assessment of street trees.
- Installation of tree protection fencing at site.
- Develop a plan that includes efforts at three stages; prior to installation, during installation and post installation with a monitoring and care program (see various exhibits).
- Developed a three zone approach with details for installation of curb cut, sidewalk and paving area at circular drive bolstered to enhance mitigation measures and reduction of impact to root of trees.
    - Zone 1 Driveway Apron
    - Zone 2 Sidewalk
    - Zone 3 New Root Growth Zone
- Proposal of permeable pavement at circular drive.
- Developed mitigation measures throughout.
- Installation of conduit for street lighting will be done by horizontal directional drilling or with supersonic air tools to limit impact to tree roots.
- Applicant has agreed to have arborist at site during installation of circular drive and street lighting.
- Applicant has agreed to extend maintenance for a period of three years along with tree health monitoring and stress reduction program.
- In cases of severe health decline of any of the trees the applicant agrees to their replacement with as large caliper as possible (UFA has mention 8" maximum ever approved). The remaining caliper inches replacement will be installed around the site as feasible.

We really appreciate the collaborative nature in our interactions with UFA and believe that with your suggestions we have now developed a very comprehensive and forward thinking package for tree impact mitigation.

Please feel free to contact me with any comments or if you need additional information.

Regards,

Trini M. Rodriguez

cc: Sam Zimbabwe, DDOT
Whayne Quin, H&K
Dennis Hughes, H&K
Chris McCabe, ECA
Eric Colbert, ECA
Chris Cowles, DRC

## 5333 Connecticut Avenue NW

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# Exhibit-01 Proposed Tree Protection Measures

## Tree Protection Measures

**Pre Construction Activities**
In order to prepare the trees for proposed disturbances the following Stress Reduction Measures and Protection Strategies are recommended prior to construction:
**Stress Reduction Measures-** prescribed for protected trees may begin as season appropriate. Documentation of materials applied, date, and certified pesticide applicators license number are to be submitted. These include the following:

- Decompaction and restoration / amending of soils.
- Mulching as much of the CRZ as possible.
- Supplemental watering during growing season when dry.
- Tree Growth Regulator (begin 3 year cycle)
- Fertilization with low nitrogen liquid, biological inoculants by soil injection such as "PHC for Trees" or equal.
- PHC (Plant Health Care) treatments for appropriate pests/ diseases and season.

**Protection Strategies**
Contract Arborist to assess and document health of trees and begin Site inspections on a monthly basis to document protection measures and coordinate with Construction team as needed.
Pre-construction meeting with Construction team to review construction sequencing and methods, and clarify when arborist needs to be present at site during construction. Additional tree protection will be laid out or revised as needed.

**Construction activities. Apron and Sidewalk Installation with Special Root Friendly Measures-**
The objective for these measures are to retain and protect as much of the root system under the existing and new sidewalk and apron as possible in addition to allowing permeation of air and water into the protected roots below. It is anticipated some shallow surface roots may be removed by this process. Therefore multi-year Stress Reduction Measures are prescribed to maintain tree health.
Only qualified arborists experienced in this work shall be retained for this state of the art work. As trees are biological elements not merely concrete or steel, additional man induced and environmental concerns must be weighed at all steps in order to protect and enhance the biology during and post construction. These are not areas construction personnel are trained at in day to day operations.

1. Install temporary steel tree protection fence to include as much of the CRZ area as possible not just box the trunk. Only take down the fence for select short term work when other protection is provided.
2. Special Demolition Procedures are recommended for demolition of existing sidewalk and curb within CRZs. These measures can vary with the site application. The objective is to protect tree roots under walk and pavement. Such roots may be deep below the base, but some may be directly under the paving layer.
    - Contractor to coordinate with Arborist prior to operation to review procedures and sequence of equipment, staging, stockpile.
    - Walks and pavement may be useful for staging and access. However, once removed there is to be no vehicle access onto prior pavement without special protection.
3. During the following work, temporarily protect soil and roots with root protection matting outside the excavation area all the way to the trunk.
4. Apron excavation with Super Sonic Air Tool (SSAT) within CRZ of protected trees as follows:

- Root diversion/ pruning prior to curb cut for proposed apron behind existing curb.
- Smaller flexible roots exposed with SSAT, bundled with burlap and diverted temporarily, or pruned off if not flexible.
- Excavate behind the line of apron excavation towards trunk to allow side to side diversion of bundled roots.
- Roots to be pruned should be severed at about the excavation line. If some bundled roots cannot be diverted side to side another option is to over cut the depth of subgrade, lower root bundles and loosely pin to bottom, then backfill over to reach appropriate sub-grade.
- SSAT excavate as well hand tools where appropriate to reach appropriate sub-grade and smooth with rake.

5. Install triple-ply, geocomposite drain mat as root aeration matting on to graded but non-compacted sub-grade. This is a soil separator as well allowing roots in soil below to breathe.
6. Install Tensar tri-axial (or equal) geogrid over root aeration matting. This is stiffener for the section as well allowing less compacted stone depth as much as 25-30%.
7. For permeable paving Install appropriate thickness of #57 stone and compact to specifications. As there are no fines in drainage stone the process is principally aligning the stone facets therefor not reducing drainage % or aeration capacity. Four inches is minimum required with Flexi-pave. Some agencies require six inches. However, the thicker the stone section the deeper the excavation- which can disturb more roots.
8. Refer to the pervious pavement specifications/ Detail for total depth of layers. Finish grade stakes are needed to determine the final stone grade. Adjust final stone depth and re-compact to reach bottom of required pervious pavement level.
9. Use similar step by step procedures on sidewalk as needed- based upon finish grade and depth of stone section. SSAT excavation, root bundling/ diversions and pruning, sub-grade preparation, installation of geocomposite and geogrid, and stone base preparation.
10. Install pervious pavement for sidewalk as per civil and manufacturer's specification.
11. Adjust/ re-install temporary tree protection fence just outside perimeter of apron and sidewalk.
12. Coordinate with Arborist for underground utility installation within protected CRZs.
    - Directional boring is recommended for appropriate site applications.
    - SuperSonic Airtool (SSAT) can be used by experienced arborists for excavation for installation of utility conduit or pipe below or through roots.
13. **Stress Reduction Measures-** continue during construction as appropriate be season. These include the following:
    - Supplemental watering during growing season when dry.
    - PHC (Plant Health Care) treatments for appropriate pests/ diseases and season.

**Post Construction Activities. Maintenance Plan Post Installation-**

At the end of construction of this phase of work, the project arborist will review all previous site tree reports and assess the current condition of the trees to determine the appropriate remediation and maintenance program for the coming 3 years.
Remediation measures may include but are not limited to the following:

- Decompaction and restoration / amending of soils.
- Pruning of broken or storm damaged branches

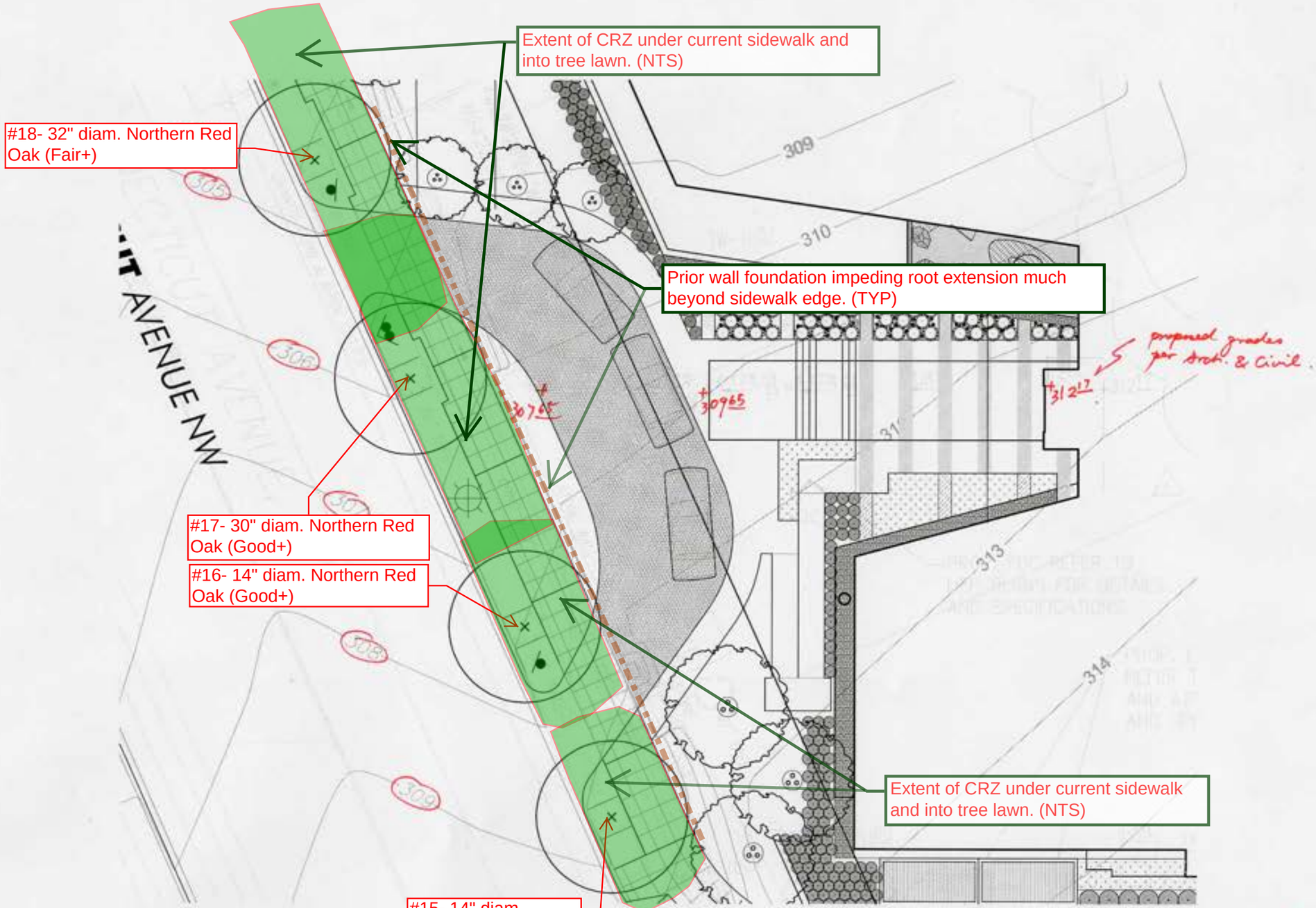
Annual maintenance measures to be applied as determined by season and need:

- Supplemental Mulching to be coordinated with the landscape plan.
- Supplemental Watering will occur during weeks of high temperature and low rainfall (<3/4") Recommend 50-200 gallons per tree per watering.
- Tree Growth Regulator (after third year from start)
- Fertilization with low nitrogen liquid, biological inoculants by soil injection such as "PHC for Trees" or equal.
- PHC (Plant Health Care) treatments for appropriate pests/ diseases and season.

Chris Cowles, *Senior Urban Forestry Consultant*
MD LP Forester, ISA Certified Arborist, MD Tree Expert, WSA Master Watershed Steward, BS Forestry UF

**The Davey Resource Group**
A Division of the Davey Tree Expert Company

**Exhibit-02** **Existing Tree & CRZ Condition Assessment**




EXISTING TREE & CRZ CONDITION ASSESSMENT
5333 Connecticut Ave NW, Washington DC
DECEMBER 2013
DRG- Natural Resource Consulting

**Exhibit-03** **Perimeter Tree Planting Plan**


## 5333 CONNECTICUT AVENUE NW

### Plant Schedule - BUILDING ENTRANCE AND PERIMETER

| QTY | KEY | BOTANICAL NAME | COMMON NAME | SIZE | COND. | COMMENTS |
|---|---|---|---|---|---|---|
| **Canopy Trees** | | | | | | |
| 2 | AS | *Acer saccharum* | Sugar Maple | 3 1/2"-4" cal. | B&B | single leader; full branching |
| 21 | BN | *Betula nigra* | River Birch | 14'-16' ht. | B&B | multistem - 3 stems minimum; full branching |
| 1 | QP | *Quercus phellos* | Willow Oak | 3 1/2"-4" cal. | B&B | single leader; full branching |
| **Ornamental Trees** | | | | | | |
| 7 | MV | *Magnolia virginiana* | Sweetbay Magnolia | 8'-10' ht. | B&B | multistem - 3 stems minimum; full branching |
| 1 | MG | *Magnolia grandiflora* | Southern Magnolia | 14'-16' ht. | B&B | single leader; full branching |
| **Evergreen Trees** | | | | | | |
| 14 | IF | *Ilex x attenuata 'Fosteri'* | Foster Holly | 8'-10' ht. | B&B | single leader; full branching |
| **Evergreen Shrubs** | | | | | | |
| 29 | IC | *Ilex crenata'Steeds'* | Steeds Japanese Holly | 4-6' ht. | Cont. | full branching to ground |
| 79 | RD | *Rhododendron 'Delaware Valley White'* | White Azalea | 24-30" ht. | Cont. | full branching |
| **Grasses** | | | | | | |
| 150 | CAK | *Calamogrostis acutiflora 'Karl Foerster'* | Feather Reed Grass | 2 gal. | Cont. | 24" o.c. |
| 294 | PAH | *Pennisetum alopecuroides 'Hameln'* | Hameln Fountain Grass | 2 gal. | Cont. | 30" o.c. |
| **Bulbs** | | | | | | |
| 154 | AAM | *Allium Ambassador* | Purple Large-Headed Allium | | Bulbs | accent |
| **Groundcovers** | | | | | | |
| 2427 | LMB | *Liriope muscari 'Big Blue'* | Big Blue Liriope | 1 gal. | Cont. | 12" o.c. |
| 119 | LMV | *Liriope muscari 'Variegata'* | Variegated Liriope | 1 gal. | Cont. | 12" o.c. |
| 10669 | PTE | *Pachysandra terminalis* | Japansese Spurge | 2 1/4" | PP | 8" o.c. |
| **Vines** | | | | | | |
| 39 | PAQ | *Parthenocissus quinquefolia* | Virginia Creeper | 1 gal. | Cont. | 12" o.c. |
| **Lawns** | | | | | | |
| | | *Sodded Lawn (per sq. yd.)* | | | | |
| | | *Seeded Lawn (per sq. yd.)* | | | | |

Existing street trees to remain

Proposed shade tree

Proposed ornamental tree

Proposed evergreen tree

Pole light

Property line

BN - RIVER BIRCH
install: 14' - 16'
mature: 40' - 60'

AS - SUGAR MAPLE
install: 3½" - 4" CAL.
mature: 70'

MG - SOUTHERN MAGNOLIA
install: 14' - 16'
mature: 60' - 80'

QP - WILLOW OAK
install: 3½" - 4" CAL.
mature: 40' - 60'

MV - SWEETBAY MAGNOLIA
install: 8' - 10'
mature: 10' - 20'

IF - FOSTER HOLLY
install: 8 - 10'
mature: 20'

RD - DELAWARE VALLEY WHITE AZALEA
install: 24" - 30"
mature: 48"

IC - JAPANESE HOLLY
install: 4' - 6'
mature: 8'

Sidewalk note:
All existing concrete sidewalks will be removed and replaced. Proposed sidewalks should be per DC concrete sidewalk standard, and at the same location as the existing sidewalks.

# 5333 Connecticut Ave NW

## Perimeter Tree Planting Plan

N

SCALE: 1" = 20'-0" 12.09.13

Parker Rodriguez, Inc.

**Exhibit-04** **Circular Drive Plan**


Sidewalk note:
Existing concrete sidewalk will be removed and replaced. Proposed sidewalk should be per DC concrete sidewalk standard, and at the same location as the existing sidewalk.

## TREE PROTECTION MEASURES:

A. **Install 4' Welded Wire Tree Protection Fencing on Metal T-Posts**, 8-10' on Center: Fencing shall be installed to include all areas within each tree's dripline; excluding active roadways, and those areas within the limits-of-disturbance. Tree Protection Signage shall be installed on the fencing in 25' intervals.

B. **Install 3-4" of Shredded Hardwood Mulch in a Minimum Band Extending 5' from Trunk:** Mulch shall be installed in Tree Protection Zones within each tree's dripline, excluding active roadways, and those areas within the limits-of-disturbance.

C. **Hand Demo Curb in Area of Planned Drive thru Turf Median**: In the two expanses where the drive will pass thru the driplines of the existing trees, hand demolition procedures shall be used to remove the existing curb, to insure minimal impact to root systems. Demolition shall be under the supervision of an ISA Certified Arborist; who will hand cut any exposed roots greater than 1" that must be removed.

D. **Excavate by Hand or Supersonic Air Tool (SSAT) in Area of Planned Drive thru Turf Median:** In the two expanses where the drive will pass thru the driplines of the existing trees, hand or supersonic air tool (SSAT) procedures shall be used to remove the soil down to base grade for the drive profile. Excavation shall be under the supervision of an ISA Certified Arborist; who will hand cut any exposed roots greater than 1" that must be removed.

E. **Lay Root Protection Matting as the Initial Base in Area of Planned Drive thru Turf Median:** In the two expanses where the drive will pass thru the driplines of the existing trees, the drive shall be constructed with a base of Syntec Roaddrain Trip-Planer Geotextile, followed by a geogrid, crushed stone, and built to engineers specification. The Roaddrain product (or comparable) shall be employed to reduce overall depth of the profile, as well as spread weight and provide porespace to sustain remaining root systems.

F. **Under Sidewalk Areas, along Connecticut Avenue, Hand Demo and Hand Excavate:** In areas where roots are present under sidewalks, demo and excavation shall be done by hand or supersonic air tool (SSAT). Excavation shall be under the supervision of an ISA Certified Arborist; who will hand cut any exposed roots greater than 1" that must be removed. (See detailed program attached).

G. **Fall application of Plant Growth Regulator (*Paclobutrazol*):** Products shall be applied to impacted trees to regulate plant growth in such a way as to restrict canopy growth and free stored or produced energy for other uses in the tree. For highly impacted trees, this means more energy may be made available for fibrous root growth (to combat root loss), thicker darker leaves (allowing for increased photosynthesis, and increased drought tolerance), and pest suppression (often an issue with construction stressed trees); among countless other potential benefits.

H. **Spring and Fall 2014 Application of Soils Treatments:** Based upon soils reports to be taken by the Contract Arborist, a soil treatment regime shall be devised to improve available nutrients, improve soil structure and biology, and encourage root growth.

I. **Supplemental Watering thru Growing Season of 2014:** Action shall be taken for impacted trees of during the growing season. Supplemental watering by watering truck shall occur weekly from May thru September, except in weeks where the contract arborist determines and documents that adequate natural rainfall has occurred.

J. **Study the use of Flexible Pavement, Ronacrete, or equivalent product** at the drive apron to allow for water and air to reach tree roots and encourage new root growth in this area.

**Monitor and Treat Tree Health thru 2014-2015 Growing Seasons:** Periodic inspections and treatments for pertinent insects, disease, soil moisture levels, weather, and health changes on all impacted trees. Inspection periods shall be monthly in Spring and Fall, and Bi-Weekly during the three Summer months. Inspections shall be performed by an ISA Certified Arborist, who will provide reports following each visit. The owner shall comply with recommendations pertaining to tree health or tree risk issues.

# 5333 Connecticut Ave NW

## Circular Drive Plan

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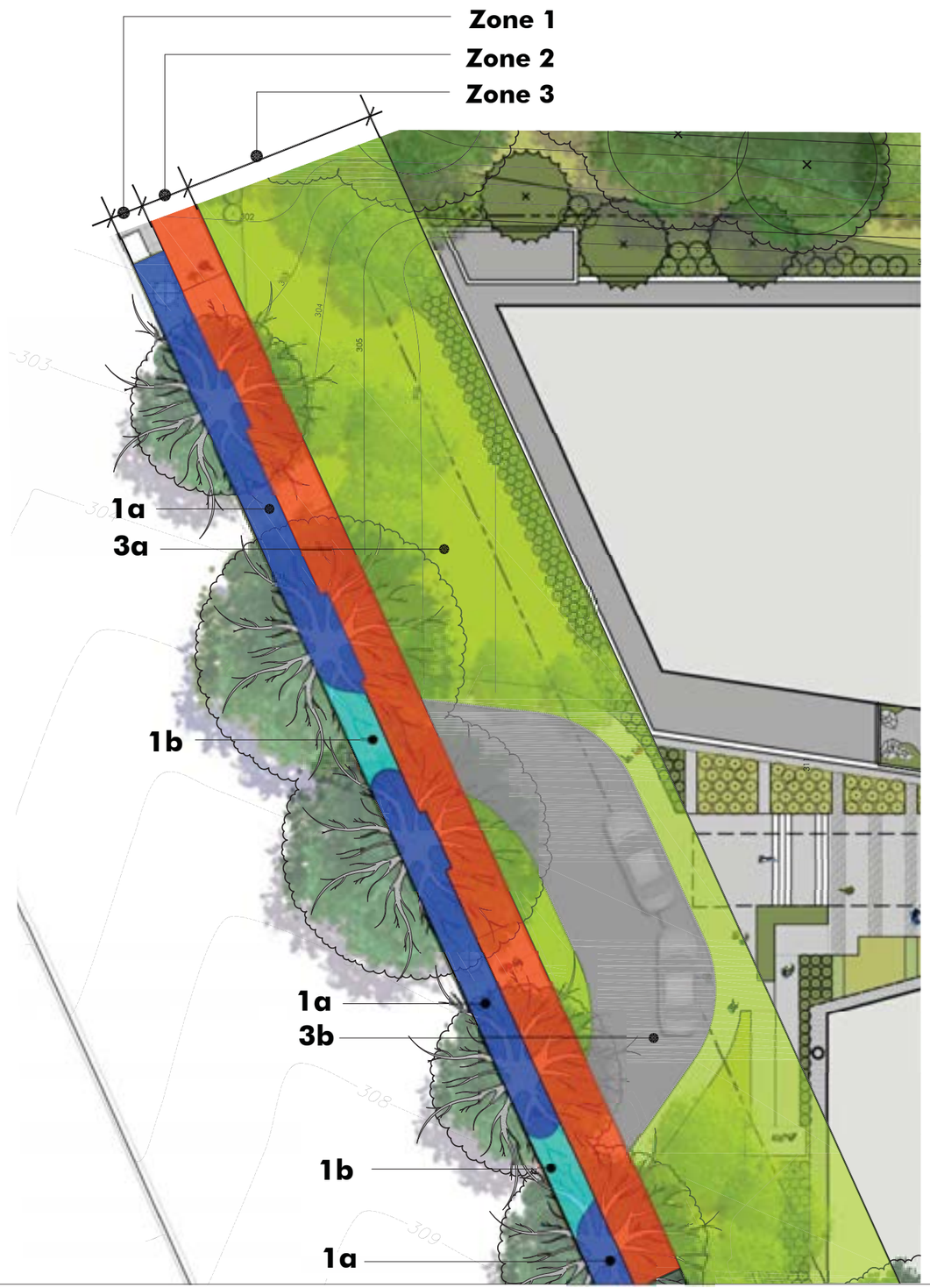
SCALE: 1" = 10'-0" 01.16.14 Parker Rodriguez, Inc.

# Areas for Implementation of Tree Protection Measures




**Zone 1 - Planting Strip:**

1a - Undisturbed tree pit; soil enhanced for root growth
1b - Apron Driveway

1. Root diversion/ pruning prior to curb cut for proposed apron behind existing curb.
2. Smaller flexible roots exposed with SSAT, bundled with burlap and diverted temporarily, or pruned off if not flexible.
3. Excavate behind the line of apron excavation towards trunk to allow side to side diversion of bundled roots.

**Zone 2 - Sidewalk:**

1. SSAT excavate as well hand tools where appropriate to reach appropriate sub-grade and smooth with rake.
2. Install triple geocomposite drain mat as root aeration matting on to graded but non-compacted sub-grade. This is a soil separator as well as allowing roots in soil below to breathe.
3. Install Tensar tri-axial (or equal) geogrid over root aeration matting. This is stiffener for the section as well allowing less compacted stone depth as much as 25-30%.

**Zone 3 - Green Strip:**

3a - New Green Area
3b - Permeable Paving

1. Install appropriate thickness of #57 stone and compact to specifications. As there is no fines the process is principally aligning the stone facets therefor not reducing drainage % or aeration capacity.
2. Enhance root health by increased underground water and air circulation.
3. Minimize soil compaction.

5333 Connecticut Ave NW

Circular Drive Diagram

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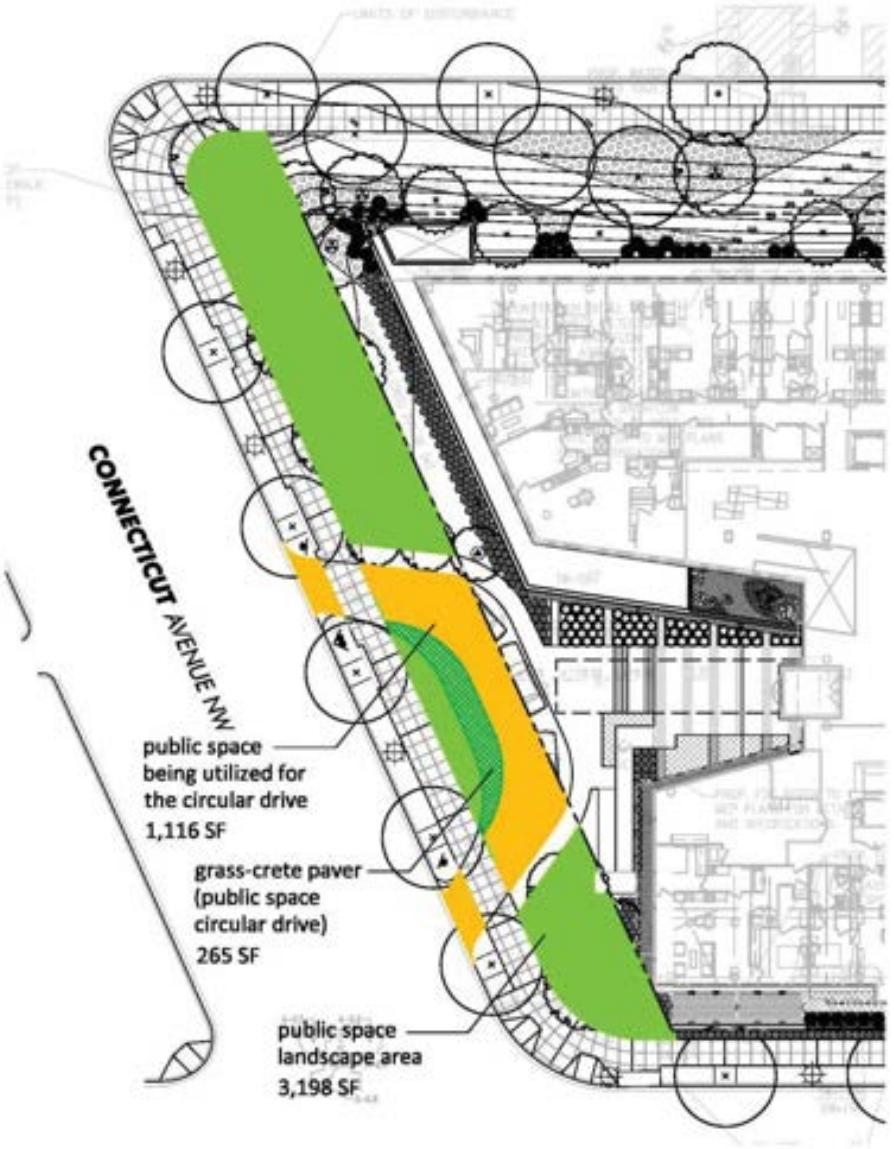
SCALE: 1" = 10'-0" 01.31.14

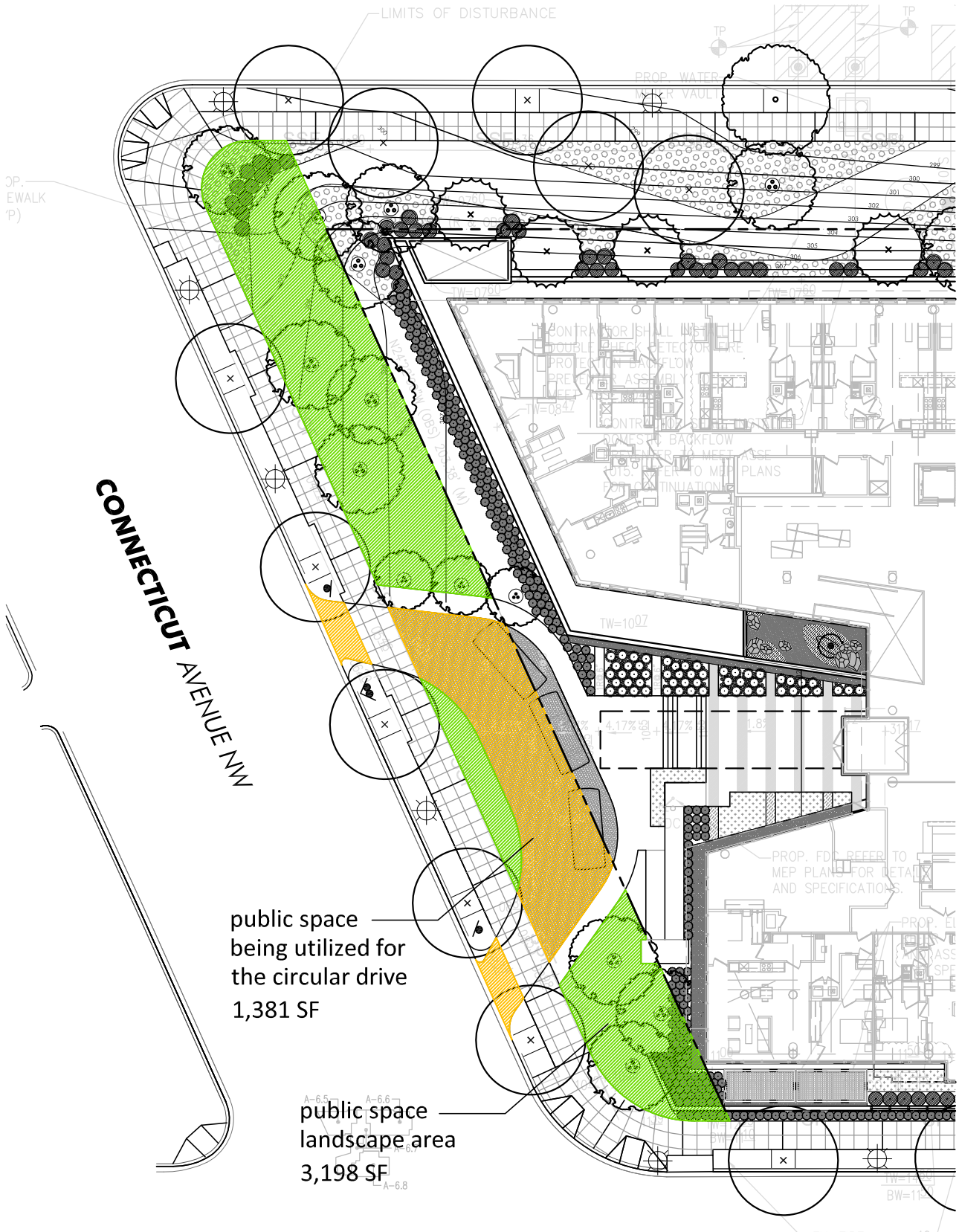
Parker Rodriguez, Inc.

**Exhibit-06** **Circular Drive Plan Close-Up with Dimensions**

**Exhibit-07 Potential Alternative Treatment at Circular Drive**



# Exhibit-08 Permeable Paved Areas vs. Green Space in Public Space




5333 Connecticut Ave NW

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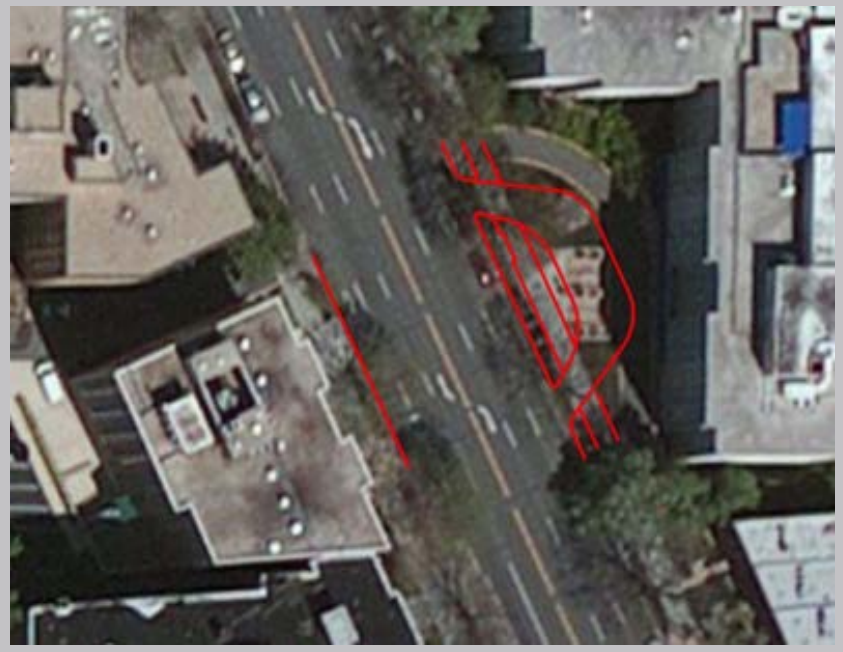
SCALE: 1" = 30'-0"

02.11.14

Parker Rodriguez, Inc.

**Exhibit-09 Comparisons of some Existing Circular Drives along Connecticut**



near Legation St

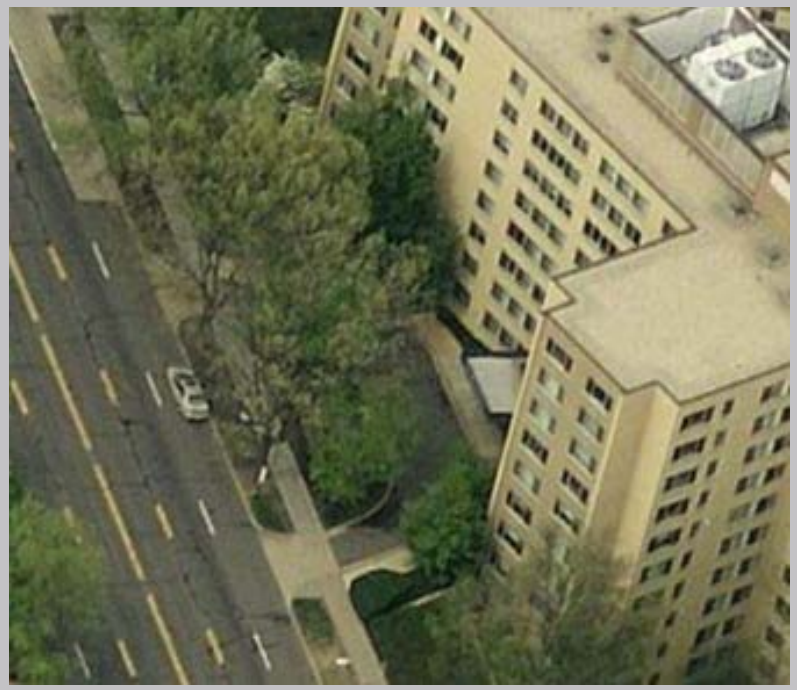

near Ingomar St

near Huntington St

near Chevy Chase Pkwy

near Ellicott St

near Cumberland St



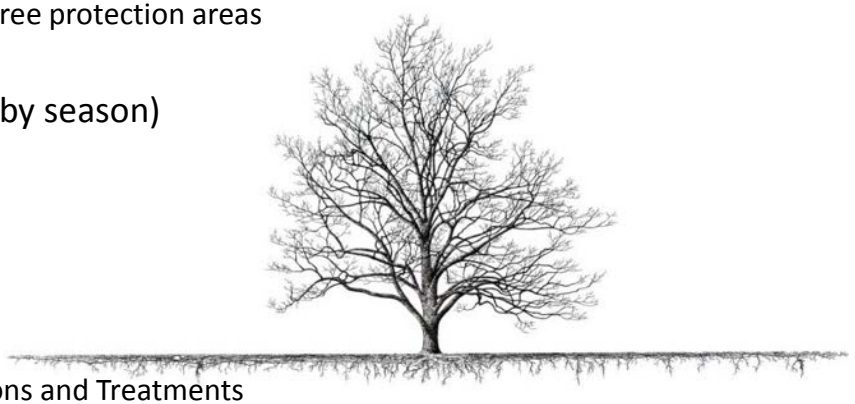
near Brandywine St

near Windom Pl

# 5333 Connecticut Avenue NW – Tree Preservation Program

This report represents a comprehensive three part program for the protection and treatment of high value trees on construction sites. The three parts include pre-construction, during construction, and post construction measures. Final construction documents will include plan drawings, sequence notes, details, specifications, and tree by tree matrix of recommended protection and stress reduction measures as depicted in this pictorial document.

1. **Assess tree current health and condition as a basis for prescriptive care**
2. **Review all design elements with tree CRZs, modify design to meet standards while balancing tree care.**
3. **Develop strategy of construction access, staging, sequence, and stockpile for trees**
4. **Develop Tree Preservation Plan, Details, and Specifications encompassing prior steps #1-3.**
5. **Construction Management for Trees:**
   a. Construction Oversight for Trees by Qualified Arborist
   b. Protection Measures Installed: Root Prune / Diversion; Protection Fence; Root Protection Matting & Root Aeration Matting under sidewalk.
   c. Special curb & walkway demolition measures within tree protection areas
   d. Special underground utility installation within CRZs.
6. **Stress Reduction Measures** (Sequence determined by season)
   a. Mulching
   b. Decompaction
   c. Soil Amendments
   d. Tree Growth Regulator
   e. Supplemental Watering
   f. Plant Health Care (PHC for Insect & Disease) Inspections and Treatments



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# Construction Strategy

"Develop a Strategy of Construction to fit the Forest /Tree Environment"

Construction personnel and managers are not accustomed to dealing with tree physiology on a regular basis. Having detailed Construction Documents is a start but not enough. The Arborist asks the question "*How are you going to build it?*" Each step or operation is reviewed with the construction managers for possible tree disturbance and recommended protection strategy or work around.

23rd Street Renovation, Arlington, VA
Developer- C.E. Smith

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# Tree Protection Measures- Steel Protection Fence for Protection of CRZs

High strength steel fence with signage is specified for installation by the site arborist to protect critical root zones, define equipment access, staging and stockpile, and control "creep" into designated tree protection area.
Should the fence come down or special access is needed, coordination with the Arborist will help to make sure proper protection is allocated.

PA State Capitol Historic South Park Renovations
Client- Capitol Preservation Commission
Architect- Hord Coplan Macht
GC- L.R. Costanzo

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# Construction Tree Protection- Root Protection Matting within CRZs


Careful coordination with site arborist allows short term equipment access into tree protection areas. Various grades of Root Protection Matting are prescribed by experienced tree preservation specialists to fit the type and duration of construction.



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# **Construction Protection**- Temporary Root Protection Matting

Single Family Residence
Potomac, MD
Landscape Arch- Mark Willard & Assoc.
Civil- Morris Ritchie Assoc.
Builder- O.C. Builders

Undisclosed golf course renovation anywhere in the country.

Temporary parking or staging within trees CRZ can occur with minimal disturbance to protected tree roots. Stone is placed over geocomposite sometimes with geogrid layer to provide an “all-weather working surface”.

Erosion & Sediment Control Methods can sever major lateral roots of mature trees just outside the LOD where people assume they are “safe”.

Approved by several review agencies or by field inspectors this “non- invasive” SSF was developed over several years of projects.

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# Special Demolition Procedures- within protected CRZs

**Special Demolition Procedures** are recommended for demolition of existing sidewalk and curb within CRZs. These measures can vary with the site application. The objective is to protect tree roots under walk and pavement. Such roots may be deep below the base, but some, as in above, may be directly under the paving layer.

Contractor to coordinate with Arborist prior to operation to review procedures and sequence of equipment, staging, stockpile.

Walks and pavement may be useful for staging and access. However, once removed there is to be no vehicle access onto prior pavement without special protection.

**Fairfax County Tree Preservation Award- 2012**
Safeway Store #24 Renovation
Fairfax, VA
Civil- Bohler Engineering

DAVEY RESOURCE GROUP
*A Division of The Davey Tree Expert Company*

# Apron Excavation- Selective Root Diversion with SSAT



**Apron excavation with SuperSonic Air-tool (SSAT) within CRZ of protected trees as follows:**

- Selective Root diversion/ pruning prior to curb cut for proposed apron behind existing curb.
- Smaller flexible roots are exposed with SSAT, bundled with burlap and diverted temporarily. Larger, non-flexible roots are pruned off with hand tools providing a much cleaner cut than excavation equipment.
- Excavate behind the line of apron excavation towards trunk to allow side to side diversion of bundled roots.
- Roots to be pruned should be severed at about the excavation line. If some bundled roots cannot be diverted side to side another option is to over cut the depth of subgrade, lower root bundles and loosely pin to bottom, then backfill over to reach appropriate sub-grade.
- SSAT excavate as well hand tools where appropriate to reach appropriate sub-grade and smooth with rake.
- This work to be done with experienced arborist crew only.

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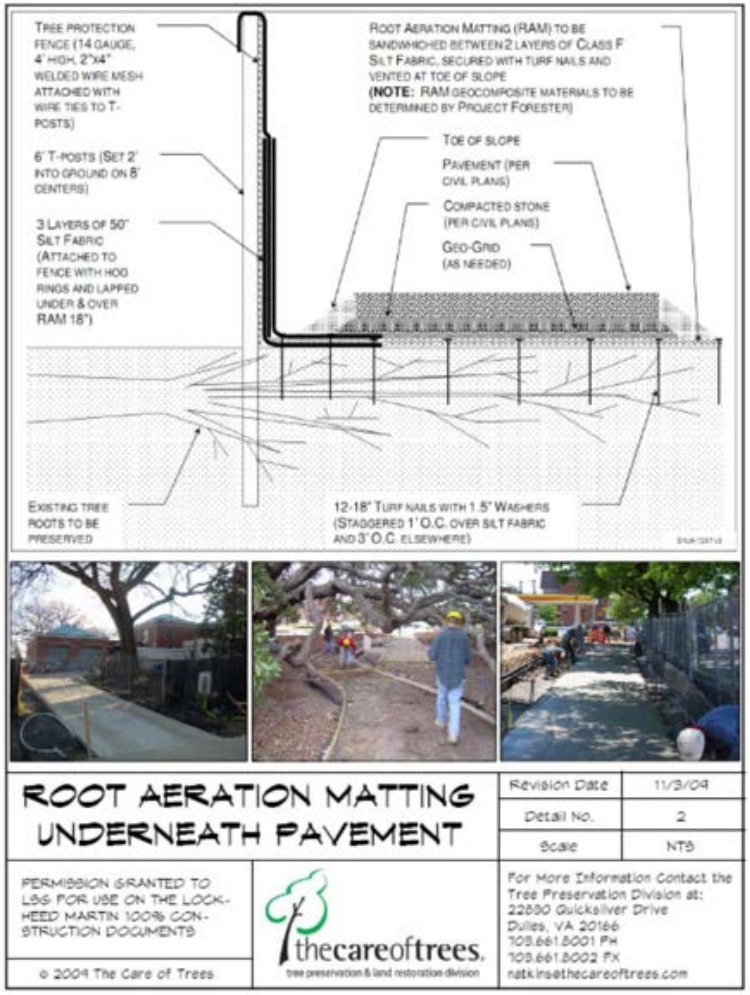
# Root Friendly Sidewalk- Apron & Sidewalk Pavement Section within CRZs




**Custom Apron & Sidewalk Section with Root Aeration Matting:**

Finish grade should allow the entire walk section to be placed above root level.

Install triple-ply, geocomposite drain mat as root aeration matting onto graded but non-compacted sub-grade. This is a soil separator as well allowing roots in soil below to breathe.

Install Tensar tri-axial (or equal) geogrid over root aeration matting. This is stiffener for the section as well allowing less compacted stone depth as much as 25-30%.

Backfill raised edges of walk as applies.

Custom details have been developed from Design/ Build Experience by tree preservation specialists with over 30 years experience working in the field and with regulatory agencies.

Innovative state of the art- installed by trained ISA Certified Arborists.

DAVEY RESOURCE GROUP
*A Division of The Davey Tree Expert Company*

# Root Friendly Sidewalk- Permeable Sidewalk Pavement Section within CRZs

CAPITOL FLEXI-PAVE

KBI FLEXI™-PAVE

## Root Friendly Sidewalk- Permeable Options

Installation of flexible, permeable sidewalk such as Flexi-Pave. Comprised of 50-50 mix of stone aggregate + recycled tire shreds + elastomeric polyurethane binder.

*From upper left to right*: Mirafi 140 fabric, geogrid, #57 drainage stone then compacted, seamless pour of 2” nominal Flexi-Pave.

**Eisenhower Blvd- Arlington National Cemetery**
Arlington, VA

# Construction Tree Protection- Options for Underground Utilities within CRZs

**Directional Boring-**

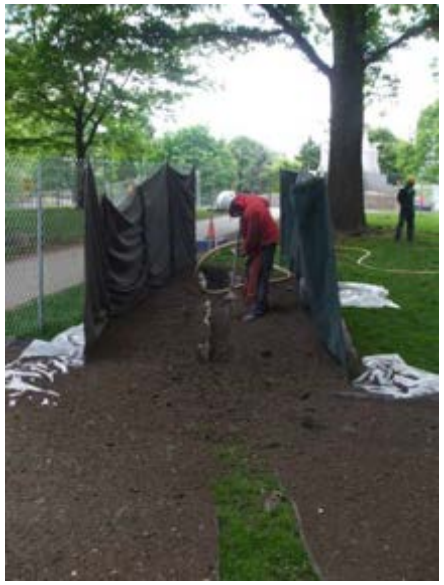
Directional boring is often the best option for the tree.

Roots are principally in the upper three feet of soil.

Consult with Arborist for species and soil variations.

Coordinate with Arborist for determining depth and location of Vertical Access Pitts.

# Construction Tree Protection- Options for Underground Utilities within CRZs



Arborists experienced in high profile construction sites coordinates with the electrician to begin Supersonic Airtool (SSAT) excavation to specified depth for conduits and light pole bases. Note the temporary heavy duty geocomposite matting for root protection during these operations.

PA State Capitol Historic South Park Renovations,
Harrisburg, PA
LA: Hord, Coplan, Macht

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# Construction Tree Protection- Options for Underground Utilities within CRZs


**Custom Utility Installation for high profile site-**
Electrical duct bank on steep slope below roots of major mature trees.
Vacuum Truck with 300’ hose to remove loosened soil from trench.
Neoprene pipe insulation used to protect roots during construction.
Temporary Root Protection Matting to minimize compaction.

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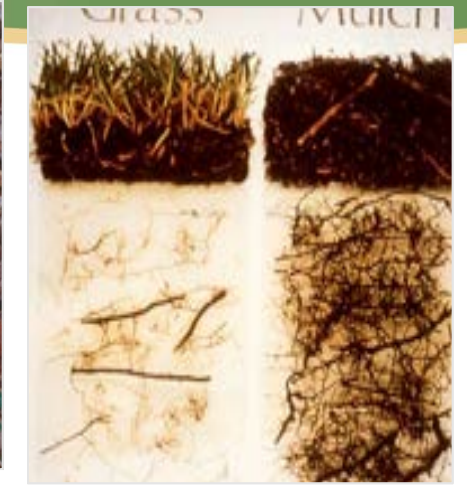
# Construction Protection plus Stress Reduction Measure- Mulching



**Mulching with whole tree aged wood chips**- Temporary for construction protection such as foot traffic and prevention of decontamination.
As well can serve as long term stress reduction by moderating soil temperatures and moisture as well providing organic matter for beneficial soil organisms.

Johns Hopkins University OSI I Project
Baltimore, MD
Design Team: ASG, MVLA, MRA, RKK

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# Stress Reduction Measures- Soil Decompaction


- Native healthy topsoil = 80% compaction;
- Urban sites easily 90% - 98%.
- How can you “decompact” soils without root damage?
- SuperSonic Airtool (SSAT)

Decompaction of Soils with SSAT

Can be timed before, during, or post construction.
Problem: Sustaining Healthy Trees on a campus or urban site with poor soils or pedestrian compaction over time. Little organic matter due to leaf removal Radial Mulching with SSAT to “De-compact” Soils

- Backfill with 50% Organic Compost
- Excellent time for soil amending such as Compost Teas / Humate
- Uncover subsurface girdling roots and prune off.

# Stress Reduction Measures- Supplemental Watering



**Supplemental Watering-** during growing season for designated trees with moderate to high root disturbance.
Many delivery options for watering trees.
Methods need to consider that mature trees need 100-500 gallons per watering during summers.
One option is the above- “Tree IV” with portable tank and timer.

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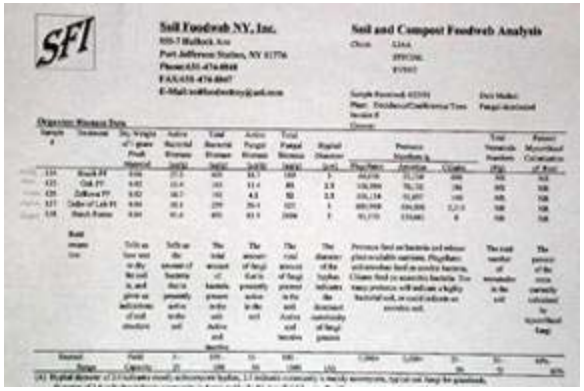
# Stress Reduction Measures-

## Healthy Soil Biology is Key for Urban Trees




Multi- applications of beneficial fungi strains in compost tea, with fish hydrolisate, dried kelp, and humate restore a balance to the soil biology.

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# Stress Reduction Measures- Tree Growth Regulator


Cambistat reduces growth 40% - 60% over 3 years with one treatment. Oak treated in fall 2000, picture taken fall 2003.
***Photo: Rainbow Treecare Scientific Advancements***

**Tree Growth Regulator-**

Applied by a licensed pesticide applicator based upon species specific guidelines.

Reduction in shoot elongation producing thicker, more resistant, darker foliage.

Results normally last for 3 years.

Basal application

Increases close in fibrous root growth

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