PHILADELPHIA WATER
EST. 1801

Addendum to GSI Landscape Design Guidebook

July 2024

This is an addendum to the GSI Landscape Design Guidebook version 4.0, published in April 2020. The addendum was created to rectify three (3) topics which have changed slightly over the past two years. These three topics are concentrated in Chapter 3 of the Guidebook and include:

Low Count Species – Designations of "Use Sparingly" were removed in favor of a new priority designation called "Low Count Species". The Green Stormwater & Stream Design Unit (GSSD) is shifting the focus of tree species selection to encourage the use of species with low representation in the GSI Tree Inventory.

Species Name/Spelling Correction – Species names and spellings were revised to align with PWD database naming conventions, allowing for efficient transfer of information from finalized plans to internal data systems.

Align GSSD Street Tree Designations with PPR (Philadelphia Parks & Recreation) Designations – Tree species labeled "Landscape Only" in the GSI Landscape Design Guidebook are to only be used in off-street parcels. In this addendum, "Landscape Only" designations were removed for species which are present on the PPR Citywide Street Tree Designation list as on-street appropriate species.

The addendum can be found on the following pages.
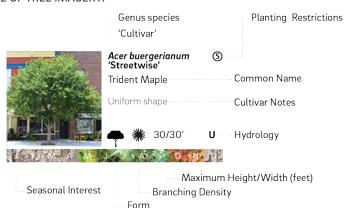
Tree Selection Criteria

Tree selection criteria is primarily based on site conditions and issues most relevant to SMPs. A tree's maximum height and width should be used to determine its appropriateness in a given space.

To increase resiliency against tree pests and diseases, PWD strives to select a diversity of tree species within a project area. However, to achieve visual continuity, block-by-block the designer may plant in groups of 2-4 trees by species or alternate species of similar growth habits such as size, shape, and branching density. Cornell University has an online guide on how to group species for visual similarity.[1] Consideration of textures and colors of foliage and blooms by month may also improve aesthetics at a site.

Planting restrictions for specific species should be followed as described herein. When listed on a design plan, fall dig hazard trees must include substitutes should project planting occur in the fall. Landscape-only trees may be used for rain gardens and other off-street projects, but not in the right-of-way where sight lines must be preserved. *Acer* and *Prunus* trees should be planted sparingly, since they have historically been over planted both within PWD systems and throughout the City. Consideration should also be given to system type and where the tree is being planted within the system (e.g. within the entrance, lower, or upper zones or as a street tree in a tree trench).

Below is an annotated example of tree imagery that can be found on the following pages for each of PWD's recommended trees.

EXAMPLE OF TREE IMAGERY:

SELECTION CRITERIA

1	Classification	Uses
Canopy	Maximum Height > 30 Feet	Where Space Is Available For Growth, Landscapes
Understory	Maximum Height < 30 Feet	Where Growth Is Limited (E.g. Under Wires), Landscapes
2	Form	Uses
	Spreading: Width >/= Height	Wider Sidewalks, Landscapes
	Upright: Width < Height	Narrow Sidewalks, Landscapes
	Columnar: Width Much < Height	Narrowest Spaces
3	Branching Density	Uses
✳	Dense: Greater Than 50% Opaque	Select Similar Density For Visual Similarity On Streets
✳	Open: Less Than 50% Opaque	
4	Size	Uses
N/N'	Maximum Height/Width (Feet)	Height/Width Selected Should Consider Topography In Order To Preserve Sight Lines
5	Hydrology	Uses
U	Upper	Tree Pits, Upper Slopes Of Rain Gardens
L	Lower	Bumpouts, Planters, Swales, Bottom Of Rain Gardens
6	Seasonal Interest	Uses
	See Seasonal Pictures.	Select Color/Textures Of Foliage And Blooms To Increase Interest

PLANTING RESTRICTIONS

1		
Ⓕ	Fall dig hazard	Requires a substitute if planted in fall
2		
Ⓛ	Landscape only	Do not use in the right-of-way
3		
△	Low Count Tree Species	Utilize species when possible
4		
◑	Prefers partial shade	Avoid planting in direct sun
☀	Prefers full sun	Avoid planting in shade

[1] *"Visual Similarity and Biological Diversity: Street Tree Selection and Design" by Nina Bassuk, Peter Trowbridge, and Carol Grohs. <http://www.hort.cornell.edu/uhi/outreach/pdfs/visually_compatible_trees.pdf>*

Canopy Trees

Acer rubrum
Red Maple

🌲 ❋ 70/50' **L U**

J F M A M J J A S O N D

Acer x freemanii
'Celebration'
Freeman Maple

Uniform habit, tolerant of urban conditions

🌲 ❋ 50/35' **L U**

J F M A M J J A S O N D

Betula lenta
Sweet Birch   Ⓕ Ⓛ ☀

△

🌲 ❋ 55/45' **L U**

J F M A M J J A S O N D

Carpinus betulus
'Fastigata'
European Hornbeam

Narrow

🌲 ❋ 40/30' **U**

J F M A M J J A S O N D

Acer rubrum
'Karpick'
Red Maple

Columnar, yellow-orange in fall

🌲 ❋ 50/20' **L U**

J F M A M J J A S O N D

Acer x freemanii
'Marmo'
Freeman Maple

Uniform habit with strong central leader, fruitless

🌲 ❋ 70/40' **L U**

J F M A M J J A S O N D

Betula nigra
River Birch   Ⓕ

🌲 ❋ 70/60' **L U**

J F M A M J J A S O N D

Carpinus betulus
'Frans Fontaine'
European Hornbeam

Narrow

🌲 ❋ 40/20' **U**

J F M A M J J A S O N D

Acer saccharinum   Ⓛ
Silver Maple

△

❋ 80/70' **L U**

J F M A M J J A S O N D

Aesculus flava   Ⓛ
Yellow Buckeye

△

🌲 ❋ 70/50' **L**

J F M A M J J A S O N D

Betula nigra
'DuraHeat'   Ⓕ
River Birch

Tolerant of urban pollution, heat and aphid resistant

🌲 ❋ 40/35' **L U**

J F M A M J J A S O N D

Carya glabra   Ⓛ
Pignut Hickory

△

🌲 ❋ 80/40' **L U**

J F M A M J J A S O N D

Acer saccharum
Sugar Maple

△

🌲 ❋ 80/60' **L U**

J F M A M J J A S O N D

Aesculus hippocastanum
European Horse
Chestnut   △

🌲 ❋ 75/65' **L**

J F M A M J J A S O N D

Betula nigra
'Heritage'   Ⓕ
River Birch

Heat tolerant, large glossy dark green leaves

🌲 ❋ 70/60' **L U**

J F M A M J J A S O N D

Carya ovata   Ⓛ
Shagbark Hickory

△

🌲 ❋ 90/70' **L U**

J F M A M J J A S O N D

Acer saccharum
'Green Mountain'
Sugar Maple

More tolerant of heat, dry conditions, and high pH

🌲 ❋ 60/45' **L U**

J F M A M J J A S O N D

Aesculus x carnea
'Briotii'   Ⓛ
Red Horse Chestnut   △

Larger, dark red flowers

🌲 ❋ 35/35' **L**

J F M A M J J A S O N D

Carpinus betulus
European Hornbeam

🌲 ❋ 60/60' **U**

J F M A M J J A S O N D

Celtis laevigata
'All Seasons'   △
Sugarberry

Adaptable, uniform growth, minimal litter

🌲 ❋ 60/55' **U**

J F M A M J J A S O N D

Canopy Trees

Celtis occidentalis 'Prairie Pride'
Common Hackberry

Less fruit

55/50' U

Cryptomeria japonica 'Yoshino' ☼ Ⓛ
Japanese Cedar

Symmetrical, fast growth, good winter color

40/30' U

Gleditsia triacanthos var. inermis 'Shademaster'
Thornless Honeylocust

Fruitless, deeper shade

70/70' L U

Juniperus virginiana Ⓕ Ⓛ
Eastern Red Cedar ☼

65/25' U

Cercidiphyllum japonicum
Katsura

60/50' L U

Eucommia ulmoides
Hardy Rubber Tree

60/50' U

Gleditsia triacanthos var. inermis 'Skyline'
Thornless Honeylocust

Fruitless, pyramidal, strong central leader

45/35' L U

Juniperus virginiana 'Princeton Sentry' Ⓕ Ⓛ
Eastern Red Cedar ☼

Narrow

30/10' U

Chamaecyparis thyoides Ⓛ
Atlantic White Cedar

50/40' L U

Ginkgo biloba 'Autumn Gold' ☼
Maidenhair Tree

Conical, good fall color

50/30' U

Gymnocladus dioicus 'Espresso' ☼
Kentucky Coffeetree

Fruitless, vase-shaped

75/50' U

Koelreuteria paniculata ☼
Golden Rain Tree

40/40' L U

Cladrastis kentukea
Yellowwood

50/55' U

Ginkgo biloba 'Magyar' ☼
Maidenhair Tree

Narrow, upright

60/30' U

Halesia carolina
Carolina Silverbell

40/35' U

Liquidambar styraciflua 'Rotundiloba' ☼ Ⓕ
Sweetgum

Seedless, pyramidal

70/30' L U

Corylus colurna
Turkish Filbert

80/50' U

Ginkgo biloba 'Princeton Sentry' ☼
Maidenhair Tree

Nearly columnar

50/30' U

Juniperus chinensis Ⓛ
Chinese Juniper

50/20' U

Liriodendron tulipifera Ⓛ Ⓕ
Tulip Poplar ☼

90/50' U

CANOPY TREES

Canopy Trees

Liriodendron tulipifera 'Fastigiatum'
Tulip Poplar
L F ☀
Columnar
🌳 ✳ 50/20' U

Parrotia persica
Persian Parrotia
△
🌳 ✳ 40/30' U

Quercus bicolor
Swamp White Oak
F ☀
🌳 ✳ 60/60' L U

Quercus phellos
Willow Oak
F ☀
🌳 ✳ 70/50' L U

Metasequoia glyptostroboides
Dawn Redwood
L ☀
△
🌳 ✳ 100/25' L U

Platanus occidentalis
American Sycamore
L
△
🌳 ✳ 100/100' L U

Quercus imbricaria
Shingle Oak
F ☀
△
🌳 ✳ 60/60' U

Quercus robur
English Oak
F ☀
🌳 ✳ 70/70' U

Nyssa sylvatica
Blackgum
F
🌳 ✳ 50/30' L U

Platanus x acerifolia 'Bloodgood'
London Plane
☀
Some anthracnose resistance
🌳 ✳ 85/70' L U

Quercus lyrata
Overcup Oak
F ☀
△
🌳 ✳ 60/60' L U

Quercus robur 'Fastigiata'
English Oak
F ☀
Narrow
✳ 60/20' U

Nyssa sylvatica 'Tupelo Tower'
Blackgum
F
Narrow
🌳 ✳ 40/15' L U

Platanus x acerifolia 'Exclamation'
London Plane
☀
Upright, anthracnose resistant
🌳 ✳ 60/30' L U

Quercus macrocarpa
Bur Oak
☀
L F
🌳 ✳ 80/80' U

Quercus robur x alba 'Crimschmidt'
Hybrid Oak
F ☀
Narrow
✳ 40/20' U

Ostrya virginiana
American Hop-Hornbeam
F
🌳 ✳ 40/30' U

Quercus alba
White Oak
F ☀
△
🌳 ✳ 80/80' U

Quercus muehlenbergii
Chickapin Oak
F ☀
△
🌳 ✳ 60/70' U

Quercus robur 'Attention'
English Oak
F ☀
△
Narrow
✳ 60/15' U

CANOPY TREES

Canopy Trees

Quercus rubra F ☀
Northern Red Oak
75/75' U

Quercus shumardii F ☀ △
Shumard Oak
60/40' L U

Quercus x warei F ☀ △
'Long Regal Prince'
Ware's Oak
Vigorous, resistant to powdery mildew, narrow
60/25' U

Sorbus aucuparia L ☀ △
'Fastigata'
Mountain Ash
60/25' U

Taxodium distichum △
Bald Cypress
70/45' L U

Tilia americana △
'Redmond'
American Linden
Pyramidal, dense
70/50' L U

Tilia cordata
Littleleaf Linden
70/50' U

Tilia tomentosa
Silver Linden
70/50' U

Tilia tomentosa
'Green Mountain'
Silver Linden
Faster growth, heat/drought tolerant
70/50' U

Tilia tomentosa
'Sterling'
Silver Linden
Heat/drought tolerant; resists Japanese beetle
50/35' U

Ulmus americana △
'Jefferson'
American Elm
Smaller, narrower
50/50' L U

Ulmus americana △
'New Harmony'
American Elm
Vase-shaped, resistant to Dutch Elm disease
70/65' L U

Ulmus americana △
'Valley Forge'
American Elm
Broad, dense
70/60' L U

Ulmus parvifolia
Chinese Elm
50/40' U

Zelkova serrata
'Halka'
Japanese Zelkova
Looser habit
50/30' U

Zelkova serrata
'Mushashino'
Japanese Zelkova
Narrow
45/20' U

Zelkova serrata
'Village Green'
Japanese Zelkova
Fast growing, upright, vigorous
60/50' U

Zelkova serrata
'Green Vase'
Japanese Zelkova
Upright
70/40' U

Understory Trees

Acer buergerianum 'Streetwise'
Trident Maple

Uniform shape

30/30'   U

J F M A M J J A S O N D

Acer campestre
Hedge Maple

35/35'   U

J F M A M J J A S O N D

Acer tataricum
Tatarian Maple

20/20'   U

J F M A M J J A S O N D

Acer tataricum subsp. ginnala
Amur Maple

20/20'   L U

J F M A M J J A S O N D

Acer truncatum
Shantung Maple

25/20'   U

J F M A M J J A S O N D

Acer truncatum x platanoides 'Keithsform'
Hybrid Maple

Heat tolerant

35/20'   L U

J F M A M J J A S O N D

Acer truncatum x platanoides 'Warrenred'
Hybrid Maple

Heat tolerant, fast growing

30/25'   L U

J F M A M J J A S O N D

Amelanchier arborea
Downy Serviceberry

25/25'   L U

J F M A M J J A S O N D

Amelanchier canadensis
Shadblow Serviceberry

30/20'   L U

J F M A M J J A S O N D

Amelanchier laevis
Allegheny Serviceberry

15/35'   L U

J F M A M J J A S O N D

Amelanchier laevis 'Cumulus'
Allegheny Serviceberry

Upright, yellow-orange in fall

30/20'   L U

J F M A M J J A S O N D

Amelanchier lamarckii ⓛ
Juneberry

25/25'   L U

J F M A M J J A S O N D

Amelanchier x grandiflora 'Autumn Brilliance'
Apple Serviceberry

Red in fall

25/25'   L U

J F M A M J J A S O N D

Amelanchier x grandiflora 'Princess Diana'
Apple Serviceberry

Wide-spreading branches, red in fall

25/20'   L U

J F M A M J J A S O N D

Amelanchier x grandiflora 'Robin Hill'
Apple Serviceberry

Upright, red-yellow in fall

25/15'   L U

J F M A M J J A S O N D

Carpinus caroliniana ◑
American Hornbeam

35/35'   L U

J F M A M J J A S O N D

Cercis canadensis Ⓕ
Eastern Redbud

30/35'   U

J F M A M J J A S O N D

Cercis canadensis 'Appalachian Red' Ⓕ
Eastern Redbud

Tiny fuchsia-pink to red flowers

25/25'   U

J F M A M J J A S O N D

Cercis canadensis 'Merlot' Ⓕ
Eastern Redbud

Purple foliage, drought & heat resistant

15/15'   U

J F M A M J J A S O N D

Cercis canadensis f. alba 'Royal White' Ⓕ
Eastern Redbud

Larger white flowers, early blooming

25/25'   U

J F M A M J J A S O N D

UNDERSTORY TREES

Understory Trees

Chionanthus retusus
Chinese Fringtree
20/20' L U
J F M A M J J A S O N D

Cornus florida F
'Cherokee Chief'
Flowering Dogwood
Red-pink, new foliage tinged with red
25/25' U
J F M A M J J A S O N D

Cornus officinalis F L
Japanese Cornel Dogwood
25/25' L U
J F M A M J J A S O N D

Crataegus laevigata F
'Superba'
English Hawthorn
Disease resistant
20/20' U
J F M A M J J A S O N D

Chionanthus virginicus
Fringetree
20/20' L U
J F M A M J J A S O N D

Cornus florida F
'Cherokee Princess'
Flowering Dogwood
Large, reliable blooms
30/30' U
J F M A M J J A S O N D

Cornus x rutgersensis F
'Aurora'
Hybrid Flowering Dogwood
18/24' U
J F M A M J J A S O N D

Crataegus x lavalleei F
Lavalle Hawthorn
25/18' U
J F M A M J J A S O N D

Cornus florida F
Flowering Dogwood
30/30' U
J F M A M J J A S O N D

Cornus florida var. rubra F
Flowering Dogwood
Red-pink
30/30' U
J F M A M J J A S O N D

Cotinus obovatus
American Smoke Tree
30/30' U
J F M A M J J A S O N D

Crataegus phaenopyrum F
Washington Hawthorn
30/30' U
J F M A M J J A S O N D

Cornus florida F
'Appalachian Snow'
Flowering Dogwood
Vigorous, white flower
20/20' U
J F M A M J J A S O N D

Cornus kousa F L
Kousa Dogwood
30/30' U
J F M A M J J A S O N D

Crataegus crus-galli var. F
inermis
Thornless Cockspur Hawthorn
30/30' U
J F M A M J J A S O N D

Crataegus punctata F
'Ohio Pioneer'
Dotted Hawthorn
Essentially spineless
30/30' U
J F M A M J J A S O N D

Cornus florida F
'Cherokee Brave'
Flowering Dogwood
Vigorous, red flower
25/25' U
J F M A M J J A S O N D

Cornus mas F
Cornelian Cherry Dogwood
25/20' U
J F M A M J J A S O N D

Crataegus flava F
Yellowleaf Hawthorn
30/30' U
J F M A M J J A S O N D

Crataegus viridis F
'Winter King'
Green Hawthorn
Profuse bloom
35/35' U
J F M A M J J A S O N D

UNDERSTORY TREES

Understory Trees

Maackia amurensis
Amur Maackia

☀ 30/30'   U

Magnolia grandiflora Ⓛ
'Bracken's Brown Beauty'
Southern Magnolia

Hardy

☀ 30/25'   L U

Magnolia virginiana Ⓛ
Sweetbay Magnolia

☀ 35/35'   L U

Magnolia virginiana
'Green Mile'
Sweetbay Magnolia

Narrow, reliably evergreen

☀ 25/20'   L U

Magnolia virginiana
'Moonglow'
Sweetbay Magnolia

Upright, reliably evergreen,
slightly larger flowers

☀ 35/20'   L U

Malus
'Golden Raindrops'
Crabapple

Yellow fruit, fine-textured

☀ 20/15'   U

Malus
'Harvest Gold'
Crabapple

Yellow fruit, fine-textured

☀ 25/15'   U

Malus
'Prairie Fire'
Crabapple

Pink flowers, dense, round,
disease resistant

☀ 20/20'   U

Malus
'Robinson'
Crabapple

Pink flowers, wide

☀ 25/25'   U

Malus
'Royal Raindrops'
Crabapple

Purple foliage

☀ 20/16'   U

Malus
'Snowdrift'
Crabapple

White flowers, resistant to
fireblight and scab

☀ 20/20'   U

Malus
'Spring Snow'
Crabapple

White flowers, upright,
dense, fruitless

☀ 25/20'   U

Malus
'Sugartyme'
Crabapple

White flowers, red fruits

☀ 18/15'   U

Prunus maackii
Amur Chokecherry △

☀ 30/25'   U

Prunus sargentii
'Columnaris'
Sargent Cherry

Narrow, vase-shaped

☀ 30/20'   U

Prunus serrulata
'Kwanzan'
Japanese Flowering Cherry

Double pink flowers

☀ 30/30'   U

Prunus subhirtella
'Autumnalis'
Higan Cherry

Blooms again in fall

☀ 35/30'   U

Prunus x hillieri
'Spire'
Flowering Cherry

Narrow

☀ 30/20'   U

Prunus x incam
'Okame'
Okame Cherry

Upright, early bloom

☀ 25/20'   U

Prunus x yedoensis
Yoshino Cherry

☀ 40/40'   U

UNDERSTORY TREES

Understory Trees

Prunus virginiana
'Canada Red'

Chokecherry

Green leaves turning to
purple foliage

🌳 ✳ 25/20'   U

J F M A M J J A S O N D

Syringa reticulata
'Regent'

Japanese Tree Lilac

Narrow

🌳 ✳ 30/20'   U

J F M A M J J A S O N D

Stewartia koreana
Korean Stewartia   △

🌳 ✳ 25/15'   U

J F M A M J J A S O N D

Syringa reticulata
'Summer Snow'

Japanese Tree Lilac

Compact

🌳 ✳ 30/25'   U

J F M A M J J A S O N D

Stewartia monadelpha
Tall Stewartia

🌳 ✳ 25/25'   U

J F M A M J J A S O N D

Styrax japonicus
Japanese Snowbell   △

🌳 ✳ 30/30'   U

J F M A M J J A S O N D

Syringa reticulata
'Ivory Silk'

Japanese Tree Lilac

Upright, compact

🌳 ✳ 25/20'   U

J F M A M J J A S O N D

UNDERSTORY TREES