Tree species and their Tolerance to Construction Stress

A guide for builders, developers, landscapers, urban forestry consultants, urban foresters, and homeowners when determining which trees MAY survive construction stress—if properly protected during construction

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Scientific Name	Common Name	Relative Tolerance	Comments
Acer negundo	Box-elder	Good	Tolerant, but these plants are a poor choice to save.
Acer rubrum	Red maple	Fair	Intolerant of wounding; requires acid to neutral soils.
Acer saccharinum	Silver maple	Good	More tolerant of wounding than red maple; tolerant to additional fill.
Acer saccharum	Sugar maple	Low	Intolerant of fill, of increased light, and of restricted root space.
Aesculus glabra	Ohio-buckeye	Fair	Can adapt to light or shade; sensitive to wounding; will tolerate some fill.
Amelanchier arborea	Downy serviceberry	Good	Adapts to high light, urban situations, and restricted root space.
Amelanchier laevis	Allegheny Juneberry	Good	Adapts to compacted soil, restricted root space, and to increased light.
Betula nigra	River birch	Good	Requires acidic soil, tolerant to urban conditions.
Betula papyrifera	Paper birch	Fair	This plant is sensitive to bronze birch borer, will not tolerate increased heat, and light especially in the root zone; needs to be in its natural range to survive construction activity.
Carpinus caroliniana	Hornbeam	Fair	Short lived due to the presence of hornbeam borer in its natural range; cankers infect stressed trees; can persist as a forest under story plant with low disturbance; tolerates slightly alkaline to acidic soil; needs lots of follow up care after construction activity to ensure survival.
Carya cordiformis	Bitternut hickory	Good	Good stable branching pattern; more so than pecan; will tolerate some fill.
Carya glabra	Pignut hickory	Good	Structurally stable branching pattern; tolerates some fill; withstands winds well.

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Carya illinoensis	Pecan	Good	Co dominant leaders in open grown areas can be a problem making tree structurally unstable; will tolerate some fill.
Carya ovata	Shagbark hickory	Good	Excellent branch structure, tolerates fill; growth and wound closure rates are slow; withstands wind well.
Carya tomentosa	Mockernut hickory	Good	Withstands wind well; tolerates some fill.
Catalpa speciosa	Northern catalpa	Good	Tolerant of wounding; very resistant to decay; tolerates disturbance.
Celtis occidentalis	Hackberry	Good	Tough tree tolerant of urban conditions, including restricted root space, alkaline soils; tolerates some fill.
Cercis canadensis	Redbud	Fair	Adapts to high alkaline soils; will not adapt to high or reflected light as a single plant.
Cladrastis kentukea	Yellow-Wood	Low	Tree has thin bark, which gives it a low tolerance to physical injury and root zone disturbance; sensitive to drought, compaction, canker, and *Verticillium* wilt.
Cornus florida	Flowering dogwood	Low	Forest understory plant that will not do well in sun; intolerant of disturbance.
Crataegus crus-galli	Cockspur- thorn	Good	Adapts to high light; sensitive to wind throw if limbed up; tolerates some disturbance.
Crataegus punctata	Dotted hawthorn	Good	Adapts to high light and urban situations; subject to wind throw; tolerates disturbance.
Diospyros virginiana	Persimmon	Good	Tolerates poor soils and can adapt to low oxygen sites.
Fagus grandifolia	American beech	Low	Maintain a protected root zone (PRZ) about two feet beyond the drip line. Mulch over the root zone following construction may help. Tree is sensitive to increased light; thin bark makes this tree sensitive to wounding and vulnerable to decay.
**Fraxinus* **Fraxinus americana*	**note Threat** White ash	*Emerald Ash Borer* Fair	**Only save if trees are exceptionally healthy, located in a good spot away from proposed construction activity, or have historical or sentimental significance.* Low tolerance to moisture change; Sensitive to drought and confined soil spaces; low tolerance to pests unless in a moist area

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**Fraxinus pennsylvanica*	Green ash	Good	May require protection from borers during reestablishment period; adapts to low oxygen environments; has a good wound response; tolerates some fill and restricted root zone.
**Fraxinus quadrangulata*	Blue ash	Good	Has good wound response.
Ginkgo biloba	Ginkgo	Good	Tolerant of urban conditions; tolerates restricted root space; introduced; not native.
Gleditsia triacanthos	Honey-locust	Good	Will adapt to high light in urban situations; sensitive to wounding when young; somewhat resistant as an older plant; tolerates disturbance; thorns on seedling grown plants an issue.
Gymnocladus dioica	Kentucky coffee-tree	Good	Adapts to high light and urban situations; bark is resistant to mechanical injury; tolerates disturbance.
Juglans nigra	Black walnut	Fair	Requires good soil conditions in order to perform; under poor conditions, this plant is severely stunted; walnuts can be a nuisance; contains juglone, a chemical toxic too many plants.
Juniperus virginiana	Eastern red cedar	Good	Can tolerate poor soils; salt and wound intolerant.
Larix laricina	Tamarack	Fair	Tolerates soil compaction and flooding.
Liquidambar styraciflua	Sweet gum	Good	Adapts to low oxygen, restricted root space, high light, and some fill; reestablishment can be prolonged.
Liriodendron tulipifera	Tulip-tree	Fair	Sensitive to wounding; tolerant of soil compaction; intolerant of sterile soil conditions.
Maclura pomifera	Osage-orange	Good	Tolerant of disturbance, high light, alkaline soil conditions, low oxygen environments, mechanical damage, tolerates some fill.
Magnolia acuminata	Cucumber- tree	Fair	Roots recover slowly from stress and injury; sensitive to drought and poor drainage, and *Verticillium* wilt.
Malus coronaria	Sweet crab	Good	Adapts to high light; disease prone, tolerant of wounding, tolerates some fill.
Malus ioensis	Prairie crab	Good	Disease prone plant, which adapts to high light, tolerant of wounding.
Morus alba	White mulberry	Good	Tolerant of disturbance, tolerates some fill; introduced to IN; not native.
Morus rubra	Red mulberry	Good	Tolerant of disturbance,. of high reflected light, and some fill.

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Nyssa sylvatica	Black-gum	Good	Adapts to urban situations, low oxygen; acid soil requiring plant.
Ostrya virginiana	Hop-hornbeam	Fair	Life expectancy could be short due to hornbeam borer, could survive as a forest understory plant with little disturbance and excellent follow-up car.
Oxydendrum arboreum	Sourwood	Fair	Acid soil requiring plant; adapts to low oxygen sites; holds firm in strong winds.
Paulownia tomentosa	Royal paulownia	Good	Adapts to urban situations readily, tolerates disturbance, and spreads rapidly; introduced; not native.
Picea abies	Norway spruce	Good	Susceptible to wind throw, which is increased with canopy raising; intolerant of excessive root loss; introduced; not native.
Picea pungens	Blue spruce	Good	Susceptible to wind throw which is increased with canopy raising; intolerant of excessive root loss; introduced; not native
Pinus banksiana	Jack-pine	Good	Tolerant of poor soil; tolerates some fill in sandy soils.
Pinus echinata	Shortleaf pine	Good	Acid soil requiring pine; tolerant of wounding, and some fill; introduced; not native.
Pinus nigra	Austrian pine	Good	Tolerate some fill and wounding; introduced; not native.
Pinus resinosa	Red pine	Good	Tolerant of wounding; no tolerance of increased heat; introduced; not native
Pinus strobus	Eastern white pine	Fair	Intolerant of changes in soil moisture; requires moist well-drained soils; intolerant of road salts.
Pinus sylvestris	Scotch pine	Good	Intolerant of moisture level fluctuations; introduced; not native.
Pinus virginiana	Virginia-pine	Good	Intolerant of alkaline soils; tolerant of very sterile soil conditions,. wounding., some fill.
Platanus occidentalis	Sycamore	Good	Adapts to low oxygen sites.
Populus deltoides	Cottonwood	Good	Tolerates urban conditions and some fill.
Populus grandidentata	Big-toothed aspen	Low	Tolerant of poor soils.
Prunus serotina	Wild black cherry	Low	Very young plants adaptive to altered environment while older plants often decline over time following any disturbance.
Quercus alba	White oak	Low	Current research indicates that this plant is very intolerant especially if roots are compromised during construction.
Quercus bicolor	Swamp white oak	Good	Alkaline soil tolerant, adapts to low oxygen sites, tolerates some fill.

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Quercus coccinea	Scarlet oak	Fair	Has more trouble adapting to a low oxygen environment than other oaks.
Quercus imbricaria	Shingle-oak	Good	Adapts to acid or neutral soils; shorter lived than the white oak group.
Quercus macrocarpa	Bur-oak	Good	Thick bark provides protection from fire and mechanical damage; tolerant of alkaline soil; to low oxygen sites, and some fill.
Quercus muehlenbergii	Chinquapin- oak	Good	Tolerates alkaline soil, and disturbance; tends to have an excellent branching pattern.
Quercus palustris	Pin-oak	Good	Adaptable to low oxygen; requires acid to neutral soils.
Quercus phellos	Willow oak	Good	Requires acid soils, tolerates some fill.
Quercus rubra	Northern red oak	Fair	Shorter lived and less tolerant of disturbance than the white oak group.
Quercus shumardii	Shumard oak	Good	Tolerant and adapts to poor oxygen sites.
Quercus stellata	Post-oak	Good	Tolerant of poor soils, urban conditions, and mechanical injury.
Quercus velutina	Black-oak	Fair	Not tolerant to soil compaction; shorter lived than oaks in the white oak group.
Rhus typhina	Staghorn- sumac	Good	Readily regenerates from root suckers forming large colonies after a disturbance.
Robinia pseudo-acacia	Black locust	Good	Sensitivity to borer damage; tolerates some fill.
Salix babylonica	Weeping willow	Fair	Cankering, due to disturbance can cause significant injury and/or death. Will tolerate some fill; introduced; not native.
Salix nigra	Black willow	Good	Tolerant of low oxygen levels; poor wound response can result in hollows in the main stem and structural instability; will tolerate some fill.
Sassafras albidum	Sassafras	Good	Root sucker generated plants can be killed with minimal root disturbance due to the root distribution pattern; tolerant of sterile soils.
Taxodium distichum	Bald cypress	Good	Becomes chlorotic above pH 7.5; tolerates wet and compacted soil; can be susceptible to twig blight, canker, and cypress moth when under stress; intolerant to shade.
Thuja occidentalis	Arborvitae	Good	Tolerates excess moisture if given time to adapt, wounding, and some fill. Often found on rock outcrops where root disturbance can be fatal.
Tilia americana	Basswood	Low	Mulching root zone will help to retain, but will decline over time.
Tsuga canadensis	Eastern hemlock	Low	Intolerant of fill ,moisture extremes ,compaction, and increased soil temperatures.

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Ulmus americana	American elm	Good	Sensitive to Dutch elm disease and phloem necrosis both fatal diseases. Will tolerate some fill, restricted root space, low oxygen sites, and mechanical damage.
Viburnum lentago	Nannyberry	Good	More adaptable in low oxygen situations than *Viburnum prunifolium*.
Viburnum prunifolium	Black-haw	Good	A forest understory plant, which will adapt readily to higher light situations.

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