

Chapter Fifty-nine
LANDSCAPE DESIGN

BUREAU OF DESIGN AND ENVIRONMENT MANUAL

Chapter Fifty-nine
LANDSCAPE DESIGN

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Chapter Fifty-nine

LANDSCAPE DESIGN

59-1 OBJECTIVES

59-1.01 General

The Illinois Department of Transportation is responsible for transportation facilities that occupy considerable land area throughout the State of Illinois. These facilities are developed to be operationally sensitive and a positive economic asset to the State of Illinois through a balanced blend of environmental, economic, aesthetic, and engineering values. This Chapter provides guidance on the implementation of visual and environmentally based aesthetic components of transportation. It also includes procedures for the establishment of components of the physical landscape.

59-1.02 Effective Design Objectives

All design elements and components must be compatible with each other and with the environment into which they are to be introduced. This objective often necessitates the use of materials native to the surroundings. Give consideration to the wide range vegetation zones in Illinois and to the various vegetation types present in the project area when selecting materials.

The objectives of effective landscape design include the following:

- identify social, economic, aesthetic, and environmental effects early enough to permit analysis and consideration while alternatives are being formulated (see Part III, Environmental Procedures);
- involve other agencies and the public in the planning and design decision process early enough to allow their ideas to influence technical studies and final decisions (see Chapter 19);
- use all practical means to restore and enhance the quality of the environment;
- minimize required maintenance activities after construction (see the *Bureau of Operations Maintenance Policy Manual*); and
- bring together all aspects of the project, including planning, design, construction, and maintenance.

59-2 AUTHORITY BASIS FOR LANDSCAPE DESIGN

59-2.01 Federal Statutes, Regulations, and Policies

Numerous Federal regulations establish the basis for this chapter including:

- 23 USC 319 “Landscaping and Scenic Enhancement,”
- 23 CFR 752 “Landscape and Roadside Development,”
- *National Environmental Policy Act,*
- *1965 Highway Beautification Act,*
- *1973 Policy on Operation Wildflower,* and
- SAFETEA-LU – National Scenic Byways Program.

Use the AASHTO *Guide for Transportation Landscape and Environmental Design* as the general guideline to plan, design, and manage Illinois roadside landscapes.

59-2.02 Illinois Statutes and Directives

A number of Illinois statutes and directives also establish basis including:

- Departmental Policy D&E-18 “Preservation and Replacement of Trees,”
- *Illinois Endangered Species Act,*
- *Illinois Interagency Wetlands Policy Act,*
- *Illinois Exotic Weed Act.*

59-3 LANDSCAPE DESIGN PRINCIPLES

59-3.01 General

The establishment of design principles for environmentally based planning, design, construction, and management of the roadside landscape in Illinois is essential.

59-3.02 Principles

The following controlling principles are based upon the conservation of natural resources; creating a facility that is compatible with its surroundings; minimizing future management efforts and expenditures; and producing a high quality, environmentally responsible finished product:

1. Environmental Impact. Where practical, avoid adverse or disruptive impacts to landscape and environmental features on or adjacent to the right-of-way. Where total avoidance of adverse or disruptive impacts is not practical, undertake all reasonable measures to reduce and minimize impacts to these features. If damage or disruption is unavoidable, undertake all reasonable measures to offset damages through mitigation in the project area or other designated areas. Note that the designer cannot recreate or restore natural systems but can utilize native plant materials to represent some of the appearances and functions of the impacted feature (see Part III, Environmental Procedures).
2. Environmentally Sensitive Areas. Consider environmentally sensitive areas and those harboring endangered species to be a controlling factor in all designs.
3. Use of Indigenous Plants. Emphasize the use of plants native to and grown in Illinois which are appropriate to the site, its planned use, and its future management.
4. Site Compatibility. Design a specific landscape effect that is compatible with the site.
5. Future Management Considerations. Consider the future management plan for the roadside area to be a controlling factor in the planning and design of that area.
6. Sustainable Roadside Environment. Strive to produce a sustainable roadside environment.
7. Visual Quality. Visual appearance and visual unity of the facilities are important components. Recognize that visual quality must be a component in almost all design development and that numerous factors influence the final appearance of the finished project. Durability and appearance are the two items most noticed and commented upon by the traveling public.

59-3.03 Application of Principles

Apply landscape and environmentally based design principles to the full range of highway types, from multi-lane freeways to the rehabilitation and improvement of existing local arterials and rural collector roads. They also apply to all highway components and features including:

- the roadway (i.e., the travel surface itself);
- the roadside (i.e., the remainder of the right of way including any existing natural vegetation and/or plantings);
- ancillary structures (e.g., bridges, culverts, retaining walls); and
- highway appurtenances (e.g., fences, signs, lights, traffic barriers).

The principles also apply to other types of transportation facilities constructed by the Department including public transit, railroad terminals, airports, ferry terminals, and port facilities.

The extent of the application of these principles will depend on the type of project, the environmental resources affected, and the public entities involved.

59-4 LANDSCAPE DESIGN PROCESS

59-4.01 Determine Management Level

Landscape and environmentally based design solutions are initiated in the planning and location phase. It is important, however, that the planned level of management extend into the design, construction, operation, and maintenance of transportation facilities. This is underscored by the likelihood that a large share of future transportation demands will have to be accommodated by upgrading existing facilities while recognizing their management will continue to be limited.

59-4.02 Phase I

During the planning and location phase, apply the landscape and environmentally based design principles to assess environmental effects and identify measures to mitigate adverse impacts. Use the principles to help identify landscape features that can be incorporated into project planning and to influence development of alternatives to the proposed action and any environmental commitment.

59-4.03 Phase II

In the design phase, focus on how each of the principles apply to a particular project, what commitments have been made, and how to incorporate the principles into design plans for such project features as landscaping, environmental impact mitigation measures, support facilities, and associated structures.

59-4.04 Project Construction

The construction phase ensures that mitigation measures committed to in the design and planning phases are carried out and conditions discovered in the field receive consideration.

59-4.05 Operation and Maintenance

Finally, the incorporation of landscape and environmentally based design principles into the operation and maintenance of transportation facilities can help to ensure the continued effectiveness of project mitigation measures.

59-5 RESPONSIBILITY FOR PREPARATION OF DESIGN

59-5.01 General

It is the designer's responsibility to be aware of any aspect of the design which would adversely affect the roadside and to modify such design elements, where necessary, to achieve a harmonious design that meets the criteria for the project. The designer also is responsible for notifying other Bureaus of potential impacts on their respective operations.

59-5.02 District Landscape Architects

The Landscape Architect in the Bureau of Operations provides the required expertise in landscaping aesthetics, material selection, and visual quality. The Landscape Architect advises the designer and reviews design criteria and proposals.

59-5.03 District Environmental Unit

The district Environmental Unit identifies those aspects requiring the input of the Landscape Architect in Phase I of the project including commitments regarding wetland mitigation, erosion control, endangered species habitat protection and restoration, and tree replacement or removal. This Unit also identifies the impact of the visual component of noise mitigation structures and notes critical areas adjacent to the project needing protection.

59-5.04 BDE Environment Section

The Environment Section provides expertise and policy directives in environmentally based landscape matters. The BDE Environment Section also reviews design criteria and proposals to ensure conformance with environmental regulations and commitments.

59-6 DESIGN FACTORS

59-6.01 General

Design factors are intended as a guide for the designer to use in developing a solution for a particular project condition. Determine the appropriateness of the design as it applies to given features of the highway environment. Not all factors will apply to most projects, nor will all project situations be covered by those described in this Section.

59-6.02 Coordination of the Design Process

Use the following guidelines to coordinate the design process:

1. Coordination Within the Department. During the design process, coordination of many disciplines (e.g., engineering, landscape architecture, biology, hydrology) is needed to achieve the proper environmentally based design. This is true not only for large and complex projects but also for small and simple projects. Obtain all available inputs to ensure a coordinated environmentally based design.
2. Coordination with Outside Regulatory Agencies. Where transportation projects involve wetlands, endangered species, Illinois natural areas, nature preserves, historic sites, and culturally sensitive areas or where the planned facility is adjacent to public resources such as streams or forests, the design aspects of the improvement will be coordinated by the Central Office or the district depending upon the project phase.
3. Coordination with Local Jurisdictions and the General Public. Coordination is best accomplished through the environmental review, public involvement process and/or the CSS process. The designer is responsible for coordinating with local jurisdictions and abutting landowners adjacent to or affected by the project. Consider the potential impacts to any local management or long range plans. Ensure that aspects of the project are not adverse to broad public values. Early coordination with local jurisdictions and with the general public may provide valuable input to ensure the success of an acceptable design. Coordination at local level includes municipalities, park and forest preserve districts, counties, chambers of commerce, residential and commercial developments, fire and other special districts. Coordination at the general public level may include garden clubs, beautification agencies, and other general public groups with valuable input.

59-6.03 Protection of Existing Features

Certain existing landscape features, whether manmade or natural, should be protected through a process of identification; enhancement, restoration, or preservation; and avoidance or incorporation into the design of the highway improvement. Consider the following when determining the need for protecting existing features:

1. Review Previous Commitments. Review commitments in environmental documents, tree surveys, wetland reports, public hearing records, project reports, and other project documents for those requiring protection during project development and implementation.
2. Statute Protection. Determine which features of the project area are protected by statute. These may include wetlands, endangered species, nature preserves, natural areas, and cultural sites.
3. Cultural Environment. Determine the project's setting or cultural environment (e.g., rural, urban, or in a transitional area). The design should be influenced by the cultural and physical environment adjacent to it and existing features should be protected where practical.

A variety of techniques may be employed to protect identified resources, including both temporary and permanent measures as appropriate. Consider the following guidelines:

1. Temporary Fencing. Use temporary fencing to protect special waste areas, trees that are not to be disturbed, existing vegetation to remain in critical erosion prone areas (e.g., steep slopes, concentrated flow areas) and areas where it is necessary to prevent stockpiling or construction traffic access. Natural resources (e.g., prairies, woodlands, wetlands) should be protected. Where drainage is flowing from the construction area to these valuable resources, it is usually better to specify perimeter erosion barrier and temporary fencing. The designer should clearly label on the plans the limits of construction and what is to be protected by the temporary fencing.
2. Tree Trunk Protection. Specify tree trunk protection to prevent damage by construction equipment to existing trees located within or along the limits of the construction area.
3. Pruning for Safety and Equipment Clearance. Show pruning of overhanging branches for safety and equipment clearance purposes on the plans.

59-6.04 Grading and Alignment

That portion of the design process concerning alignment and grading offers the best opportunity to fit the highway into the landscape, thereby avoiding unnecessary environmental impacts and yielding a functional and aesthetically pleasing form. The basic guideline for grading and alignment is the *AASHTO Guide for Transportation Landscape and Environmental Design* and Chapter 33. In addition, consider the following guidelines:

1. Environmental Commitments. During Phase I engineering, ensure that all environmental commitments are reviewed to appropriately influence alignment and grading decisions. These commitments also will serve as controls during Phase II plan preparation.
2. Surrounding Landscape. Give consideration to the surrounding landscape. Blend the alignment and grading to fit the existing topography with minimal visual or physical disruption.

3. Clearing and Construction Limits. Carefully plan the establishment of clearing and construction limits. Consider both existing landscape features and critical areas. Clearing and tree removal must be specified in accordance with Departmental Policy D&E-18.
4. Plant Survival. Consider the survival potential of existing plantings to be preserved and proposed plantings at the time that grading decisions are made. This is especially critical in confined areas where landscape features (e.g., screening) are proposed. Plant material to remain within the project limits should be properly cared for so that it is alive and in good condition when the project is complete. Consider the following guidelines:
 - a. Root Pruning. Specify root pruning where trenching or excavation is within the root zone of adjacent trees or shrubs to remain in place to prevent ripping up roots.
 - b. Fertilizer Nutrients. Specify fertilizer nutrients for trees and shrubs that will be disturbed by construction but will remain-in-place.
 - c. Supplemental Watering. Specify supplemental watering for trees and shrubs that will be disturbed by construction but will remain-in-place. Watering should begin immediately after root pruning, top pruning, or other construction disturbance.
 - d. Tree Pruning. Specify tree pruning where an entire tree needs to be pruned, to correct structural problems, or improve the overall appearance.
 - e. Temporary Fencing. Specify temporary fencing where protection of existing trees is necessary. At a minimum, place fencing around the drip line of each tree to be protected. However, if space allows, place fencing 5 ft (1.5 m) out from the drip line of each tree to be protected.
 - f. Tree Trunk Protection. Specify tree trunk protection to prevent damage by construction equipment to existing trees located within or along the construction area.

59-6.05 Erosion Control

See Chapter 41 for information on Department policy and procedures for erosion and sediment control.

59-6.06 Drainage

Design the drainage of the highway system as part of, and not separate from, the natural hydrology of the environment. Consider the following factors during design:

- the environmental impacts of drainage;
- storm water management;
- retention basin design;
- how the drainage way is to be designed or altered from its original pattern;
- the affect that the channel lining will have on values such as wildlife, aquatic life, sediment filtration, and water quality; and
- the impact that water retention and/or soil saturation will have on existing or proposed plant material.

59-6.07 Visual Quality

A project's visual quality is ensured by encouraging a positive visual change that will improve or enhance the surrounding landscape. Define the visual environment by identifying key views, analyzing resources, depicting the project's proposed appearance, and assessing its visual impacts. Manmade features have been integrated successfully into a large portion of Illinois natural landscape. To better provide for visual quality in a project, evaluate the project's relationship with the following:

- natural landscape elements;
- topographical and physical characteristics;
- ecological influences;
- recreational sites;
- residential areas and their character;
- historical features;
- visual values;
- existing land uses (e.g., industrial, junkyards); and
- existing and proposed project profile.

Review these elements to ensure that visual quality is adequately integrated into the project.

59-6.08 Safety

Safety should be the highest functional goal of every design, and all landscape and environmentally based design principles must be compatible with this criteria. During design, consider the following:

- the location, size, and height of plantings in relation to sight distance, drainage, and clear zones;

- traffic-calming designs in urban areas; and
- pedestrian safety in areas such as rest areas, transit stations, and bikeways.

59-6.09 Scenic Byways, Rest Areas, Special Projects, and Settings

Existing scenic conditions, auxiliary facilities, special roadway designations, roadway destinations, and historical values of the project area are examples of special conditions which may be present and which may impact the design of a project. Many of these conditions are held in high regard by the public, and their sensitive treatment is essential to a successful project. Ensure that design decisions are compatible with such special conditions. It may be necessary to provide a higher type of design than is normally required.

59-6.09(a) Scenic Quality Preservation

The project area may be a designated scenic byway or may possess an outstanding scenic quality that must be preserved as part of the project. This may require special limited grading, aesthetic treatments of highway appurtenances, preservation or enhancement of adjacent features, or other actions to preserve unique aspects of the area. These cases normally require special attention and unique designs to improve the quality and safety of the roadway.

59-6.09(b) Auxiliary Facilities

Auxiliary facilities may be required or desirable as a part of the project (e.g., rest areas, scenic overlooks, roadside tables, scenic vistas). The planning and design of these facilities should be an integral part of the roadway design. Give special attention to site amenities, aesthetics, and environmental values as well as safety and future maintenance.

59-6.09(c) Special Designations

A project area may carry a special designation that sets the route apart as a special experience for the traveler. Examples of these are the Great River Road, Historic US 66, the Lake Michigan Circle Tour, and many similar corridors. It is important to become familiar with the meaning and the special features associated with such designations so that any necessary supportive enhancements can be developed (e.g., opening vistas of the Mississippi River along the Great River Road, providing informational signing along Historic US 66).

59-6.09(d) Roadway Destinations

Certain roadway segments may serve primarily as access to a destination (e.g., state park or historic site). Designers of such segments must be aware of the significance of the site and its surroundings and ensure that the project design is compatible with its destination.

59-6.09(e) Historical Influences

Historical influences may affect the project as a nearby destination, as an adjacent feature, or, in some cases, as a part of the roadway or its appurtenances. Pay particular attention to these influences and prepare the project design to be compatible or harmonize with them. Historical markers, structures, districts, and bridges all may influence the design of a project. Required avoidance of or mitigation of impacts to historical resources usually is identified in early project coordination, but the designer should be alert for any unidentified items. Special consideration may need to be given to landscaping within designated National Register Historic Districts.

59-6.09(f) Special Designs

Various elements of the design may need to be modified from the standard treatment or designed to a higher visual quality standard than the ordinary roadway elements to be compatible with the above special circumstances. Give special consideration to the design of features such as bridges, signing, retaining walls, tree protection, colors and textures of appurtenances, and similar items. Design these treatments to be compatible with their surroundings and with the features that make the segment unique. If questions arise regarding a proper design approach, contact in-house specialists (e.g., district Landscape Architect), or outside consultants for ideas and suggestions.

59-7 DESIGN ELEMENTS

59-7.01 Landscape Plantings General Information

Highway landscape plantings are the living component of the highway design and, through the use of native and non-native materials, provide the means to fully integrate the highway with the surrounding environment. Landscape plantings will serve as functional elements (e.g., erosion control, screening, sound abatement, snow control) in the highway environment.

59-7.01(a) Responsibility

The district Roadside Development Unit (Landscape Architect) has the primary responsibility for determining the plant selection on a site-specific basis for a design project. The plants selected generally should be characteristic, native, or indigenous to the specific locality. The district Landscape Architect keeps a current preferred plant list for his/her respective district. Consider the following guidelines:

1. Native Plants. Native plants are effective in perpetuating a self-sustaining roadside landscape. They are adapted to regional environmental conditions and can survive extreme temperatures, wind, and rainfall without additional irrigation or fertilizer.
2. Non-Native Plants. Non-native plants may be selected to achieve special effects (e.g., color, texture, growth habit) for emphasis. For example, non-native plants could be used in urban areas to accentuate an artificial manmade environment. Another example would be to use non-native material to screen the unsightly view of a junkyard. However, ensure that the non-native plant is not a designated noxious weed.
3. Plant Maintenance. Maintenance is a major consideration in landscape plant selection. Strive to choose those plants that require a minimum of maintenance.
4. Ash Trees. Due to recent discoveries of Emerald Ash Borer (EAB) in Illinois, no varieties of ash trees (e.g., *fraxinus* spp.) should be planted as this can contribute to the spread of this species.

59-7.01(b) Hardiness

Select plants for a particular section of roadway based on their climatic and soil requirements. In Illinois, climatic conditions and soil types are favorable to both southern and northern plant groups. Conduct a study of soils, climate, and existing plant growth in the area when planning each planting project. Plant hardiness zones will be as stated in the *Standard Specifications*. Use the USDA Plant Hardiness Zone Map, latest edition, when selecting plant material for any project.

59-7.01(c) Size

The size at which a plant matures will determine the number of plants that will be required in a group planting. The highway speed determines the amount of time a motorist views the planting. Consequently, on higher speed highways, utilize the large group concept of landscaping in lieu of the individual plant concept. Consider the following guidelines:

1. Younger Plants. Younger plants generally establish themselves faster than older plants. As a general practice, specify the smallest size of plants that is consistent with the requirements of the environment.
2. “Balled and Burlapped” Planting. Specify all deciduous trees larger than 1.5 in (40 mm) in diameter or 5 ft (1.5 m) in height as “balled and burlapped” at the time of planting. Also, specify this method of planting for plants that, according to good horticultural practice, require a ball of earth. It is acceptable to specify container-grown material in lieu of “balled or burlapped” plants as an alternative. The relationship of the plant size to the soil ball size or the container size will be as stated in the *Standard Specifications*.
3. Perennial Plants. Perennial plants can be planted as bulbs, tubers, or container plants. Bulbs and tubers should be of a size large enough to produce a healthy plant and to flower the first year. Container plants should be well rooted in the container. A quart (liter) sized container is usually the smallest size that should be planted on highway projects.
4. Prairie Forbs and Grasses. Prairie forbs and prairie grasses can be planted as root plugs or as seed. The minimum size plug should be 1.25 in (30 mm) in diameter by 4.25 in (110 mm) deep.

59-7.01(d) When to Plant

Plantings are placed as follows:

- when required by the Phase I report;
- when planting can fulfill one of the “Functions of Planting” as outlined in this chapter;
- when required by law or Department policy;
- when requested by local residents or communities;
- at any location where the local community will assume plant maintenance; and
- where right-of-way agreements indicate that trees will be planted.

59-7.01(e) Site Analysis

The design process begins with the site analysis, which includes the following items:

1. Determine final contours and cross sections including:
 - steep slopes,
 - flat areas, and
 - drainage features.
2. Identify adjoining land usage as follows to better blend landscaping with the pre-existing environment:
 - urban,
 - rural,
 - industrial,
 - scenic vistas,
 - agricultural, and
 - natural forested areas.
3. Consult the USDA Hardiness Zone Maps and analyze native plant communities and climate for the area including:
 - local plant types,
 - hardiness zone, and
 - exposure.
4. Analyze landscape position as follows:
 - upland,
 - lowland,
 - wetland, and
 - floodplain.

This is important because plants are site specific to their environment.
5. Analyze soil types and structures including the following factors:
 - soil types,
 - soil textures,
 - available moisture,
 - drainage,
 - fertility, and
 - pH.
6. Ensure plantings are compatible with roadside safety requirements by determining the following:
 - clear zones, and
 - sight distances.

7. Because the planned roadside maintenance often dictates the type of planting, determine future maintenance including the following factors:
 - scope,
 - responsibility,
 - future cost,
 - mowing requirements,
 - burn management requirements,
 - chemical weed control, and
 - fertilization.

8. Identify existing features such as the following:
 - drainage structures,
 - signage and lighting,
 - walls,
 - roadway and shoulders,
 - structures,
 - curbs and medians,
 - interchanges and intersections,
 - alleys,
 - driveways,
 - fire hydrants,
 - utility lines,
 - railroad crossings,
 - buildings,
 - traffic signs and signals, and
 - underground utilities.

This is important because these existing features can influence the final design.

59-7.01(f) Function of Plantings

The functions of plantings are as follows:

1. Aesthetics. Planting is one method used to improve the visual quality of the highway system.
2. Screening. Screening undesirable views seen from and toward the highway can be performed with plants.
3. Delineation. Plants may be used to delineate changes in highway alignment. Plants on the outside of curves, at “T” intersections, and at overpasses may aid in directing the motorist. Plants also may be used to frame or form a background for directional signs.

4. Erosion Control. Plantings may be used to prevent erosion and enhance soil stability.
5. Control of Snow. Living snow fences can reduce maintenance costs, provide increased driver safety, and greatly enhance the appearance of the roadside.
6. Preventing Headlight Glare. Planting can be very effective in screening headlight glare from oncoming vehicles.
7. Environmental Mitigation. Planting may be used for various types of mitigation including various types of buffers, sound barriers, tree replacement requirements, wetland replacement, and providing wildlife habitat.
8. Pollution Control. Planting may be used to attenuate air pollution, dust, and auto emissions.
9. Psychological Considerations. Planting may help to alleviate driver fatigue by changing the driving experience and making it more interesting.
10. Adjacent Landscape Enhancement. Plantings can be used to enhance adjacent landscapes for the better enjoyment of the motorists.

Plant varieties also should be selected for their desirable growth habits, insect and disease resistance, and proven desirable features for highway use.

59-7.01(g) Considerations for Plantings

The functions of plantings are used as the basis for planting shade trees, intermediate trees, shrubs, evergreens, vines, ground covers, and seedlings. Landscape plantings are used to mitigate and replace trees that were removed through highway construction and mitigation for wetland replacement. Installation of landscape plantings are covered in the *Standard Specifications*. Consider the following when designing landscape plans:

1. Roadside Safety. Do not locate woody plants with diameters at maturity greater than 4 in (100 mm) in the clear zone, as defined for new construction. Also, such plants normally should not be planted on the foreslope or in ditches even if outside the clear zone. Curb and gutter is not considered a barrier and clear zone requirements must be applied to these sections of roadway.
2. Sight Distance. When planting in urban areas, consider potential sight distance problems and the potential for obstructing traffic signals, traffic signs, roadway lighting, etc.
3. Impact of Tree Roots. Trees with shallow fibrous systems have the ability to damage nearby sidewalks, storm sewers, and pavement.
4. Fertilizing and Mulching. For survivability and lack of future maintenance, give consideration to fertilizing and mulching all plantings.

5. Existing Soil. Where practical, use the existing soil in the planting operation. In cases where highway construction has made the condition of the existing soil unsuitable, consider the use of soil amendments or new topsoil. Where soil conditions require topsoil placement to ensure adequate growth, specify the following depth of topsoil for the appropriate areas:
 - 8 in (200 mm) where extensive plantings of wood or perennial plants are proposed, and
 - 24 in (600 mm) for plantings in landscaped medians.
6. Impacts of Salt. Due to the adverse effect of salt upon plants, give special consideration to the type and location of plants and their proximity to the roadway in those areas of the State where there is extensive snow and ice control.
7. Agricultural Areas. Do not plant large trees or evergreens on the right-of-way where there is adjacent agricultural land use due to their shading characteristics and their impact on farm machinery mobility.
8. Signage. Do not place plants in a location that will block the view of legally placed advertising signs.
9. Growth Balance. Every large scale planting operation should include a small percentage of relatively fast growing short lived trees that will, in a short period of time, provide the overall landscape with some big trees while the slower growing trees mature. This practice will benefit the current motorist as well as the driver of the future.
10. Blending. Where adjacent land use is wooded, (e.g., parks, forest preserves), use landscape plantings to blend into the existing wooded area and erase the effects of highway construction.
11. Screening. Landscape plantings are used to screen adjacent properties that have undesirable land usage; to reduce highway noise, dust, etc., reaching adjacent properties; and/or to screen the highway from a residential area or park.
12. Snow Drifting. Do not plant dense continuous hedges within 40 ft (12 m) of the edge of pavement where they may cause snow to drift onto the pavement.
13. Permit Planting. All plants placed by permit should be maintained by the person or agency requesting the permit. Removal and/or replacement will be the responsibility of the person requesting the permit.
14. Harmful Plants. Do not plant poisonous or toxic plants in urban areas. Likewise, plants with thorns are suitable only to rural areas.
15. Messy Plants. Do not plant trees or shrubs that drop fruit (e.g., crabapples) immediately adjacent to sidewalks or driveways.

59-7.02 Classification

Consider the following groups for planting:

1. Shade Trees. A single-stem, high-headed, deciduous plant that generally grows to a height in excess of 30 ft (9 m).
2. Intermediate Trees. Generally, a multi-stem, deciduous, low, round-headed plant that matures at 30 ft (9 m) or less in height.
3. Shrubs. Low-growing multiple stemmed plants that are either deciduous or evergreen.
4. Evergreen Trees. Tall-growing evergreen plants.
5. Ground Cover and Vines. A colony forming plant less than 1.5 ft (0.5 m) high that has the ability to spread and root itself.
6. Seedlings. Small shade trees, intermediate trees, shrubs, and evergreens that are usually less than 2 years old.
7. Shelterbelts. Also referred to as “living snow fences,” shelterbelts are multiple rows of trees or shrubs planted to provide protection from wind driven snow. There are many advantages to shelterbelts, as compared to snow fences, including roadside beautification, wildlife benefits, little or no maintenance after establishment, and long service life. A disadvantage of shelterbelts is that they may require 5 to 10 years from the time of planting to become effective depending upon their size at the time of planting. Also, use signage to prevent incidental mowing.

59-7.03 Forestation

Departmental Policy D&E-18 provides direction to guide decision making regarding the management of roadside trees in conjunction with the planning, design, and maintenance of facilities on the State highway system. In areas where highway development must unavoidably remove forest, incorporate replanting with native tree species as part of the project.

59-7.03(a) Objective

In determining where forestation is appropriate, consider whether forestation would:

- enhance the scenic quality of the highway,
- provide additional habitat for wildlife,
- result in financial savings from reduced maintenance,
- enhance air quality,
- serve as a deterrent to soil erosion,
- not hinder a driver’s visibility or otherwise create a traffic hazard,

- allow for natural forest revegetation, and/or
- properly mitigate for environmental impacts.

59-7.03(b) Planning

Consider the following when making decisions on forestation of the project area:

- clear zones,
- blending slope planting with adjacent forested areas,
- revegetating riparian zones around bridges and drainage structures,
- screening undesirable views and objects, and
- framing vistas.

59-7.03(c) Analysis

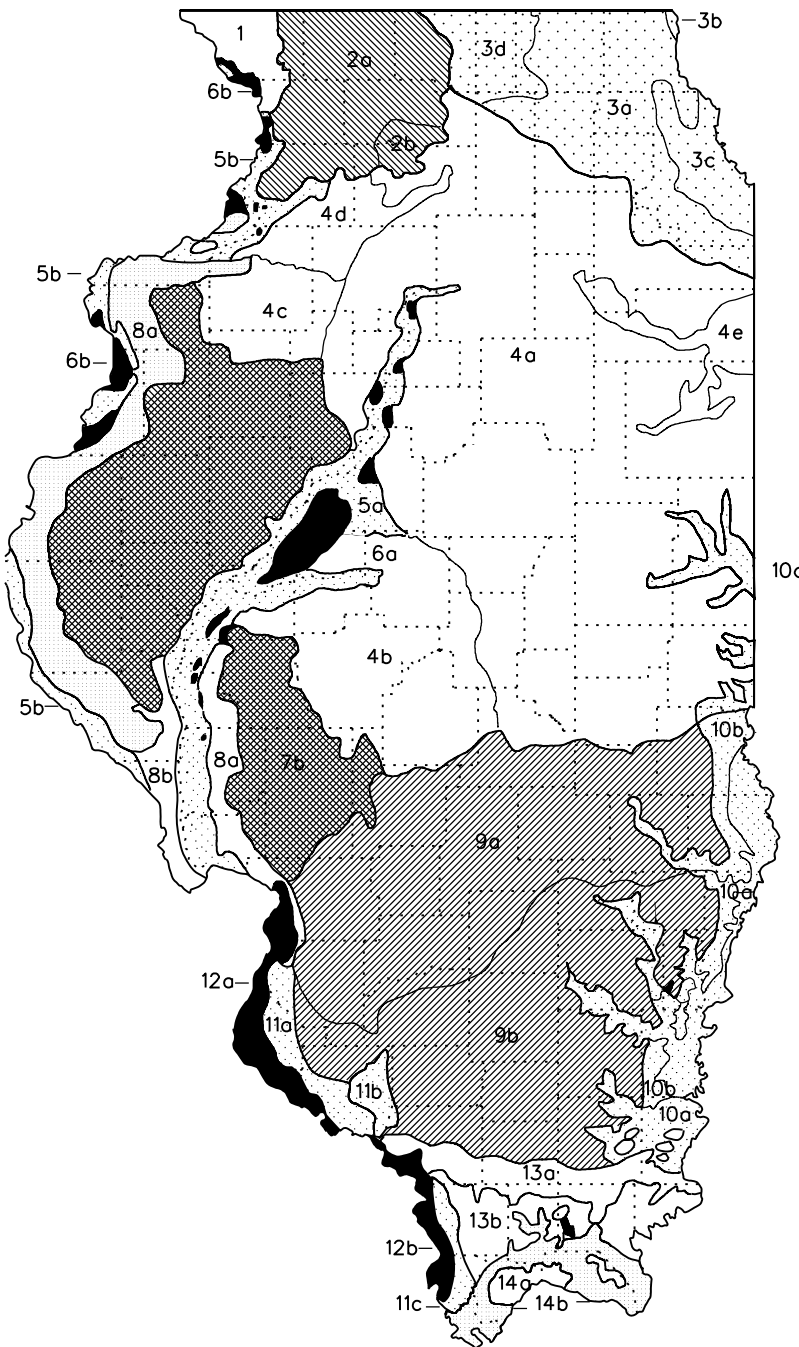
Investigate and determine the proper mixture of plant materials best suited for the project area. Use the following to determine the proper selections:

- native plant communities (see Figure 59-7.A);
- landscape type — upland, lowland, bottomland, wetland;
- soil conditions — texture, available moisture, drainage, fertility, pH; and
- climate — hardiness zone, exposure.

59-7.03(d) Design

Use the following, along with previously gathered information, to develop the final design for forestation:

- plans and special provisions,
- delineating planting locations,
- plant materials,
- soil amendments, and
- plant care.



- 1 Wisconsin Driftless Division
- 2 Rock River Hill Country Division
 - a Freeport Section
 - b Oregon Section
- 3 Northeastern Morainal Division
 - a Morainal Section
 - b Lake Michigan Dunes Section
 - c Chicago Lake Plain Section
 - d Winnebago Section
- 4 Grand Prairie Division
 - a Grand Prairie Section
 - b Springfield Section
 - c Western Section
 - d Green River Lowland Section
 - e Kankakee Sand Area Section
- 5 Upper Mississippi River and Illinois River Bottomlands Division
 - a Illinois River Section
 - b Mississippi River Section
- 6 Illinois River and Mississippi River Sand Areas Division
 - a Illinois River Section
 - b Mississippi River Section
- 7 Western Forest-Prairie Division
 - a Galesburg Section
 - b Carlinville Section
- 8 Middle Mississippi Border Division
 - a Glaciated Section
 - b Driftless Section
- 9 Southern Till Plain Division
 - a Effingham Plain Section
 - b Mt. Vernon Hill Country Section
- 10 Wabash Border Division
 - a Bottomlands Section
 - b Southern Uplands Section
 - c Vermillion River Section
- 11 Ozark Division
 - a Northern Section
 - b Central Section
 - c Southern Section
- 12 Lower Mississippi River Bottomlands Division
 - a Northern Section
 - b Southern Section
- 13 Shawnee Hills Division
 - a Greater Shawnee Hills Section
 - b Lesser Shawnee Hills Section
- 14 Coastal Plain Division
 - a Cretaceous Hills Section
 - b Bottomlands Section

NATURAL DIVISIONS OF ILLINOIS

Figure 59-7.A

59-7.04 Turf Grasses

Non-native grass, grains, legumes, and native grasses form the backbone of highway vegetation cover. The large number of species and varieties of vegetative cover may be used for many applications. Seed mixtures and sodding are covered in the *Standard Specifications*. Consider the following guidelines:

1. Temporary Erosion Control. Use temporary vegetative cover for temporary erosion control at locations where the duration of the turf cover is short term and is expected to prevent loss of soil.
2. Permanent Erosion Control. Permanent vegetative cover is used for permanent erosion control in most highway applications. To achieve a cost-effective permanent cover, select a type of turf grass appropriate to the landscape conditions and planned maintenance.
3. Weed Control. Good turf establishment will minimize weed growth, thereby reducing pesticide requirements.
4. Groomed Appearance. Provide a vegetative cover that can be mowed into a park-like appearance. In urban settings, use a lawn-type mixture to blend in with the urban landscape.
5. Wildlife. Provide a vegetative cover that will enhance and encourage wildlife. This is a component of the Department's Corridors for Tomorrow Program and is often a commitment to resource agencies.
6. Diversity. Provide a diverse vegetative cover that will add color, texture, and form to the highway environment. This is important because not only does diversity provide a visual experience, but also breaks up the monotony of the driving task.
7. Sodding. Seed mixtures are most commonly used; however, some instances may call for the use of sodding to provide for the rapid establishment of turf.
8. Applications. The turf grasses specified in the *Standard Specifications* are used for specific applications as follows:
 - a. Lawn Mixtures. Lawn mixtures are used in urban settings to create a park-like appearance and require a relatively high degree of maintenance.
 - b. Salt Tolerant Mixtures. Salt tolerant mixtures are used along road segments where de-icing salts are heavily used.
 - c. Roadside Mixtures. Roadside mixtures are used in more rural settings where a tougher lower maintenance turf is desired.
 - d. Slope Mixtures. Slope mixtures are used on slopes usually 1V:3H or greater.

- e. Native Grass and Forb (Wildflower) Mixtures. Native grass and forb (wildflower) mixtures can be planted to create specific turf conditions (see Section 59-7.05).
- f. Conservation Mixtures. Conservation mixtures are used for wildlife nesting cover. These are usually planted at the request of resource agencies.
- g. Temporary Erosion Control Mixtures. Temporary erosion control mixtures are seeded to prevent soil from being displaced on a construction project that will be exposing soil. The mixture is spread over all exposed earth to provide a quick cover of the turf that will interrupt the force of rain on the soil and prevent soil from moving. The temporary erosion seed mixture may need to be spread on construction sites numerous times during construction activities. The temporary erosion control mixture also can be combined with a permanent erosion control mixture to provide a nurse crop while the permanent seed is establishing.

59-7.04(a) Site Analysis

When performing the site analysis, give consideration to the project slopes, proximity of seeding type to the highway, surrounding land uses, and current and future maintenance (e.g., mowing, burning, chemical control, fertilization). Also, give consideration to the type of soil and whether or not topsoil will be required. The drainage pattern and how well the soil drains also is important as this can dictate the selection of turf grass mixture.

In addition, consider the ultimate height of the proposed turf. Examine locations where taller grasses or unmowed turf will be established to ensure that sight distance problems at intersections will not be introduced.

59-7.04(b) Seeding

The seeding operation that is conducted in the field actually occurs in a series of steps. The most important aspects of seeding are seed mixture selection, site preparation, and placement of mulch. Consider the following guidelines:

1. Seed Mixture. Select the class of seed mixtures that are appropriate to the specific roadside environment. Consider the following:
 - a. Class 1 (Lawn Mixture). Use Class 1 seeding in an urban setting.
 - b. Class 1A (Salt Tolerant Lawn Mixture). Use Class 1A seeding for:
 - all urban reconstruction not covered in Class 2A, and/or
 - all projects where the entire right-of-way is not torn up and Bluegrass is the primary existing cover.

- c. Class 1B (Low Maintenance Lawn Mixture). Use Class 1B in the southern half of the State for urban projects.
 - d. Class 2 (Roadside Mixture). Class 2 seeding is a hardy roadside turf and should be used where reduced mowing will occur.
 - e. Class 2A (Salt Tolerant Roadside Mixture). Use Class 2A seeding for:
 - new construction or reconstruction projects of limited access routes in locations intended to be mowed by the Department,
 - all rural reconstruction projects where the entire right-of-way is to be seeded or any situation where grasses other than Bluegrass are the primary existing cover, and/or
 - areas adjacent to roads subject to salt spray and/or disposition.
 - f. Class 3 (Northern Illinois Slope Mixture). Use Class 3 seeding in rural areas of Northern Illinois for slopes 3V:1H or steeper.
 - g. Class 3A (Southern Illinois Slope Mixture). Use Class 3A in rural areas of Southern Illinois for slopes of 3V:1H or steeper.
 - h. Class 4, 4A, 4B, 5, 5A, 5B (Native Grass and Forbs Mixture). See Section 59-7.05 for additional discussion.
 - i. Class 6 (Conservation Mixture). Class 6 seeding is used for wildlife cover in the east central part of Illinois. Use caution when considering this class with other seeding classes.
 - j. Class 6A (Salt Tolerant Conservation Mixture). Class 6A seeding is a Class 6 that includes salt tolerant grass.
 - k. Class 7 (Temporary Turf Cover). Class 7 seeding is used as a temporary cover for areas to be regraded more than a year from the time of seeding. Use Class 7 for winter shut down. Provide temporary mulch or erosion control blanket with Class 7 seeding. Use the Temporary Erosion Control Seeding System weekly for shorter-term temporary cover.
2. Site Preparation. Site preparation may consist of:
- tilling or disking the soil to be seeded;
 - spreading of chemical weed control;
 - placement of soil amendments (e.g., fertilizer, lime, compost); and/or
 - placement of topsoil.

Where soil conditions require topsoil placement to ensure adequate growth, specify the following depth of topsoil for the appropriate areas:

- 4 in (100 mm) for use with Seeding Classes 1 and 2 or sodding;
- 12 in (300 mm) in wetland mitigation areas, or what is required by the Corps of Engineers for the specific project; and
- topsoil is not normally required for seeding Classes 4 and 5. Use compost or coarse sand (usually 2 in (50 mm) depth) to amend the existing soil where necessary.

For those seed mixtures requiring complete seedbed preparation, placement of a fertilizer is usually required. A fertilizer is not required for native grass mixtures (Class 4, 5 and 6) and for temporary turf cover (Class 7). Agricultural ground limestone may be specified to adjust soil pH. Turf requires a pH of 7.0 to germinate.

3. Seeding. Once the site preparation has been completed, the seed mixture is applied. The type of seed mixture will dictate the seeding method to be utilized. Seeding methods are described in the *Standard Specifications*.
4. Mulch, Erosion Control Blanket, and Turf Reinforcement Mats. Mulch, erosion control blankets, or turf reinforcement mats are placed once the seed mixture has been applied to the site. The purpose of mulch is to hold the soil moisture level at the ground surface, prevent displacement of seed, and protect seed from predation. For guidance on choosing the proper mulch, erosion control blanket, or turf reinforcement mat, see Chapter 41.

59-7.04(c) Selective Mowing Stakes

Consider the following guidelines when specifying selective mowing stakes:

1. Application. Use selective mowing stakes to delineate areas that are not to be mowed (e.g., areas that contain plants or natural features that need to be protected from mower damage, areas of existing vegetation, areas seeded or planted with trees, shrubs, wildflowers, or prairie plants). Another use of staking would be to delineate selecting mowing lines to create an aesthetic or visual effect.
2. Placement. Place selective mowing stakes in a manner as to delineate the mowing boundaries of the feature to be protected or created. Spacing of the stakes will depend upon the size and shape of the area. Use a minimum spacing of 200 ft (60 m) for long and fairly straight runs and a minimum spacing of 25 ft (7.5 m) for tight curves (e.g., ramps). Signs should be specified at the beginning of each run of mowing stakes to further mark the area. These signs are available from the district Landscape Architect.

59-7.04(d) Sodding

Appropriate uses of sodding are as follows:

- urban areas with residential or commercial development (e.g., in front of homes, businesses, parks, adjacent to paved shoulders or edges of paved ditches);
- rest areas;
- in front of maintained parks and cemeteries;
- erosion control in ditch bottoms and around culverts; and
- special areas (e.g., channelized medians, around inlets in grassed areas). Small areas which would normally be seeded should be sodded where a large majority of the remainder of the project ($\pm 90\%$) is to be sodded.

Consider the following guidelines when specifying sodding:

1. Salt Tolerant Sod. Specify salt tolerant sod in those areas where large quantities of deicing salt are used by maintenance forces (e.g., highly urbanized areas).
2. Topsoil. Topsoil is usually required.
3. Fertilizer. Fertilizer should be included and incorporated prior to sod installation. Fertilizer requirements are indicated in the *Standard Specifications*.
4. Watering. Specify the number of supplemental waterings. Field adjustments can be made according to season and time of application. Watering rates and requirements are indicated in the *Standard Specifications*.
5. Staking. Specify staking on all slopes of 1V:2H or steeper. Staking requirements are indicated in the *Standard Specifications*.
6. Lime. Consider lime application after a soil pH analysis is taken.

Design considerations for placing sod in ditches are as follows:

1. In urban areas, except expressways, place sodding in ditches with grades of 0.75% to 2.5%.
2. Place sodding in ditches 50 ft (15 m) upstream and downstream from the ends of culverts, unless grades or volume of water flow require a paved ditch, aggregate ditch, or riprap.
3. Place sodding on moderately steep slopes and ditch flow lines where appearances dictate except in continuously flowing ditches or wet ditches.

59-7.05 Native Grasses and Forbs (Wildflowers)

Consider the following guidelines for applications involving native grasses and forbs (wildflowers):

1. Native Grasses. There are numerous species of native Illinois grasses. These grasses are commonly referred to as prairie grasses.
2. Forbs (Wildflowers). Forbs, commonly referred to as wildflowers, can be native and or non-native flowering plants. They are used for either visual effect or to mitigate environmental impact.

Non-native wildflowers are used to add a splash of color to the roadside and are often mixed with native wildflowers to provide blooming while the native wildflowers are being established. Some non-native species commonly planted are:

- Ox-Eyed Daisy,
 - Cosmos,
 - Poppy, and
 - Indian Blanket.
3. Growth Rate. The native grass and native wildflowers are mostly warm season plants that do not begin their growth until warm weather arrives. Most roadside plantings of native grasses and native wildflowers take 3 to 5 years to show results. The native species spend their initial growth establishing an extensive root system once the seeds germinate, thereby resulting in a longer time frame to show results.
 4. Applications. Grasses and wildflowers can be used separately or in combination to provide a specific effect or restore a native Illinois landscape. Native roadside plantings offer many benefits to highway managers, motorists, and wildlife. Their thick deep roots anchor the soil and prevent erosion. Native species tolerate a wide range of soil types, climatic conditions, and hydrology making them suitable for most highway conditions. They offer a motorist a rich, aesthetic landscape full of texture and color enhanced by seasonal change. Native-planted roadsides provide habitat for wildlife. The following class of seed mixtures for native grasses and native wildflowers are covered in the *Standard Specifications*:
 - Class 4 (Native Grass);
 - Class 4A (Low-Profile Native Grass);
 - Class 4B (Wetland Grass);
 - Class 5 (Forbs with Annuals);
 - Class 5A (Large Flower Native Forbs (i.e., tall)); and
 - Class 5B (Wetland Forbs).

Where it is desirable to eliminate most future mowing, native grasses and forbs may be suitable for the following applications:

- inaccessible areas (e.g., when a creek or similar barrier separates an area from the roadway);
- in wide right-of-way areas;

- interchanges;
- bordering slope walls and retaining walls;
- between the back of guardrail and top of retaining walls in narrow areas; and
- outside access control fencing on rural freeways, (except those immediately adjacent to agricultural land, residential areas, or frontage roads).

Discuss the selection and application of native grasses and forbs with the district Landscape Architect.

5. Planting Methods. The method of planting these species ranges from complete seed bed preparation to inter-seeding existing turf. Usually, seed mixtures are selected for planting grasses and forbs; however, plant plugs may be used to achieve faster results. If plugs are selected (also known as perennial plants), consult the *Standard Specifications* for planting times.

59-7.05(a) Planning

Because of the splashes of color added to the highway landscape by wildflowers, place these plantings in areas of high visual impact (e.g., interchanges). Wildflower plantings, although colorful, often have the appearance of unkempt vegetation. Wildflowers, whether native or non-native, require some maintenance, usually in the form of selective mowing or roadside burning to prevent establishment or undesirable vegetation. Consider future maintenance requirements of the roadside when planning the appropriate planting mixtures.

Wildflower plantings can be placed in stand-alone groupings or combined in a plant community with native grasses to restore part of the native landscape. The advantage of using native species is that they are adapted to the Illinois environment and, therefore, do not require fertilizer nutrients or topsoil.

If native grasses are to be mixed with forb plantings, consult the district Landscape Architect for the appropriate mix, because grasses can out-compete forbs. Select grass species that are compatible with forbs. Prairie grasses also may be added to other turf grass mixtures to enhance diversity, erosion control, and aesthetics in the turf area. Consider prairie grasses for use on all new and highway reconstruction projects. These grasses especially can be effective on steep slopes 1V:3H or greater, and where maintenance is limited (e.g., slopes 10 ft (3.0 m) or more in height and 100 ft (30 m) or more in length), due to their deep rooting ability that holds the soil in place. Native grass and forb mixtures should only be considered in residential areas if a right-of-way fence is present.

Select a location that will maximize the visual impact to the motorist. Examine the highway alignment to determine where to maximize the visual experience with any flowerbeds or grass plantings.

59-7.05(b) Analysis

Consider the following guidelines during the analysis:

1. Visual Analysis. Consider the sight line of the motorist when planning any wildflower or native grass establishment. These areas include interchange locations, outsides of curves, gore areas, and back slopes. In urban areas, the view from the surrounding neighborhood as well as the motorist's view must be compatible with existing neighborhood landscapes and coordinated with local municipalities.
2. Landscape Position, Upland, Lowland, Bottomland, and Wetland. Some native grasses and wildflowers are adapted to dry or mesic conditions (prairie) while others require wet or saturated conditions. Consult the district Landscape Architect to determine which species are appropriate for a given set of roadside conditions.
3. Soil Conditions. Determine the type of soil and identify the soil's characteristics. Consult soil maps prepared by the Natural Resource Conservation Service for information regarding project soils. Although native species are adapted to Illinois soil conditions, determining the soil type can dictate the use of a specific species for planting.

59-7.05(c) Design Plans and Specifications

The design plans and specifications should contain the following information:

- type of seed bed preparation,
- delineation of planting locations including selective mowing stakes and signs,
- plant materials required sizes and rates,
- fertilizer requirements (usually only for non-native species),
- mulch requirements and method,
- planting dates, and
- plant care requirements if plugs are used.

59-7.06 Perennial Plants

Perennial plants are hardy flowering bulbs, tubers, and herbaceous plants. Perennial non-native flowering plants are often used in the highest visual impact areas, usually in urban areas. Perennial native species often are used more in rural areas. Only specify perennial plants for use when:

- required by commitments in the Phase I report to resource and regulatory agencies and to comply with Federal requirements for wildflower planting,

- requested by local residents or communities, and /or
- needed on any highway to blend the right-of-way into adjacent land uses.

Planting beds containing non-native perennial plants are designed to give the impression of a highly maintained park-like atmosphere. These can be more expensive to establish than other plantings and require intense maintenance. High maintenance ornamental flower beds should only be planted when a local community agrees to accept maintenance of the flower bed. Consider the following for planting perennial plants:

1. Non-Native. Non-native perennial plants require:

- complete bed preparation,
- fertilizer,
- permanent mulch,
- watering, and
- a period of establishment.

2. Native. Native perennial plants require:

- bed preparation or planting in existing turf;
- mulch, unless planted in existing turf;
- watering; and
- a period of establishment.

59-7.07 Wetlands

Use the *Illinois Wetland Restoration and Creation Guide* to assist in the design of wetland mitigation sites and the guidance in the following Sections.

59-7.07(a) **Planning**

Use the following guidelines when planning wetlands:

1. Project Goals and Objectives. Establish project goals and objectives for wetland compensation in the planning phase of highway development. For compensation that will be provided via wetland restoration or creation, the primary goal is to establish jurisdictional wetlands as defined by current Federal and State criteria. The secondary goal is to restore or create a specific amount (acres (hectares)) and type (emergent, forested) of wetland.

The amount and type of wetland to be replaced is determined by the agency with jurisdiction over the impacts. Compensation ratios to wetlands where a Section 404 permit has been required will be determined by the US Army Corps of Engineers (US ACOE). Some US ACOE district offices allow for compensation ratios as defined in the

IDOT Wetland Action Plan (see Section 26-8). Currently, wetlands that are considered isolated fall under the jurisdiction of the IDNR and compensation ratios are defined in the Wetland Action Plan.

For the Federal and State goal of no net loss of wetlands, the minimum replacement is 1:1 and the greatest is 5.5:1, replacement to loss. Usually, replacement should be in-kind, but out-of-kind may be justified.

2. Site Selection. Select sites that have a majority of poorly drained soils and that are designated as prior converted by the Natural Resources Conservation Service (NRCS). The NRCS field offices and published soil survey reports can provide information to assist in identifying sites that meet these criteria. If either component of the criteria is not met, there are a number of obstacles that may arise that could block approval of the proposed wetland compensation site. If both criteria are satisfied, planning, design, construction, and maintenance of the planned wetland is much simplified.

Site selection also should include sufficient ground to buffer planned wetlands from adjacent land uses that are not compatible with the establishment of native plant communities. There exist no guidelines, regulatory or scientific, for determining the appropriate amount of buffer to provide. The minimal buffer consists of a 10 ft to 20 ft (3 m to 6 m) belt of upland that is planted with native grasses and forbs. Embankments planted to prairie may be sufficient.

3. Site Assessment. Assess every proposed wetland compensation site both off- and on-site for its possibilities and limitations. Evaluate the site using topographic maps, aerial photography, published soil survey reports, and other existing geographic information. Survey the site for existing vegetation cover types and jurisdictional wetlands. Field-check county soil survey mapping and delineate any hydric soils. Field-check the site's geology and hydrology for confining layers (aquicludes) and sources of surface water. Note the presence of drain tile blowouts and outlets.

59-7.07(b) Design

Keep designs for planned wetlands simple. Reliance on sophisticated design features to provide hydrology or other attributes will likely increase the margin for failure. Design for low maintenance and utilization of natural systems. Consider the following additional guidelines:

1. Grading. Even the best sites will require some earthwork (e.g., a shallow 1 ft to 2 ft (300 mm to 600 mm) berm may have to be constructed at property boundaries to contain surface water, or earth may have to be moved to enlarge an existing wetland). Excavation for creation of wetlands should extend no deeper than 1 ft to 2 ft (300 mm to 600 mm). Any deeper and side slopes become too steep and erosion and siltation become a problem. The shape or configuration of a wetland should be curvilinear like an oxbow and not geometric.

Although sometimes recommended by regulatory agencies, stockpiling and backfilling topsoil generally is unnecessary for creation of wetlands. Because most substrates can be used as a medium for plant growth, it usually is unnecessary to specify their removal and backfilling with topsoil in the plans and specifications. This practice may be warranted only where soils are very shallow or clayey. In Illinois, most if not all, soils are very deep. Salvaged topsoil may contain a bank of weed seed that should not be used in the planned wetland.

2. Emergent Wetlands. Natural revegetation may be proposed for some exceptional sites. This approach to restoration may be acceptable to the regulatory agencies if it can be demonstrated that a viable seed bank exists in the soils or that there is an adequate source of propagules. A cover crop should be planted in areas proposed for natural revegetation. The cover crop stabilizes the soil and helps control weeds. A recommended crop mix consists of red top at 5.0 lb/acre (5.6 kg/ha). Virginia wild rye at 10 lbs/acre (11.2 kg/ha) may be added to the red top. Never specify agricultural grain or perennial rye as a cover crop. They can alter soil characteristics and impair the growth of desirable wetland plants.

At other sites, the revegetation may have to be accelerated. One to five percent of the surface area of the planned wetland should be planted and the rest seeded to a temporary cover. Tubers, corms, rootstock, etc., are usually set on 1 ft (300 mm) centers; however, the faster a species rate of spreading, the more distance there can be between transplants. Planting areas should be protected from predators. Low netting supported 1 ft to 2 ft (300 to 600 mm) above the mature height of the plants works well.

The use of wetland seed mixes is discouraged. This type of planting requires a great deal of care and maintenance. Success has been poor with planting seed and there is extremely little information in the literature regarding which plant species can be successfully seeded.

3. Forested Wetlands. Forested wetlands usually are planted with hardmast producing species as favored by the Federal regulatory agencies. The species of choice include swamp white oak (*Quercus bicolor*), pin oak (*Q. palustris*), pecan (*Carya illinoensis*), and shellbark hickory (*C. laciniosa*). These four species grow naturally throughout Illinois and are commercially available. A cover crop of red top at the rate of 5 lb/acre to 10 lb/acre (5.6 kg/ha to 11.2 kg/ha) should be planted with the trees. Virginia wild rye at the rate of 5 lbs/acres to 10 lb/acres (5.6 kg/ha to 11.2 kg/ha) may be added to the mix. These plants are hydrophytic.

Various methods of tree installation may be used. If bare root seedlings are specified, install a minimum of 560 trees/acre (225 trees/ha). If 3-gallon (11 L) potted material is specified, install a minimum of 70 trees/acre (28 trees/ha). If 1.75 in (45 mm) balled and burlapped material is specified, install a minimum of 30 trees/acre (12 trees/ha). These numbers are consistent with previous practices, but may have to be increased at the request of the Federal regulatory agencies. A goal of 80% survival of all planted trees is usually required as a project goal for forested wetlands. Vegetation between rows

should be mowed out completely during the first two growing seasons and then reduced to one mowing pass in a single direction (i.e., north to south or east to west) between rows for the next three growing seasons.

Seeds or acorns may also be proposed for establishment of forested wetlands. A common specification is to plant three seeds or acorns per hole 2 in to 4 in (50 mm to 100 mm) deep. Plant one seed or acorn deeper than the other two to deter predation by animals (e.g., squirrels). Each hole is 3 ft (900 mm) on center and rows are 10 ft (3 m) apart.

4. Plants. Use the following guidelines for plants:

- a. Selection. The best guideline for plant selection is to observe what is growing in similar wetlands near the planned wetland. Select the dominant or common plants in the model wetland for use in the planned one. Select natural associates and group plants by community type.
- b. Nativity. Plants native to the region always should be specified for use in wetland replacement projects. It is considered counterproductive to specify the use of local native plants. Few, if any, nurseries can guarantee that their plant materials are local native to the wetland replacement site. Where feasible, buy plants from nurseries located within 100 miles (160 km) north or south and 200 miles (320 km) east or west of the compensation site.
- c. Availability. Take care to specify only those species that are commercially available. Keep plant lists short and simple. Select the more common wetland plants and let nature fill-in with the uncommon species.
- d. Adaptability. Many of our wetland plants, especially the woody ones, are propagated in uplands. Often these plants die in our planned wetlands because they are not adapted to wet conditions. Vegetation must be grown in conditions similar to those in which they will be planted. If this option is not available at the supplying nursery, dormant stock should be planted during the dormant season so that when the plants break dormancy they will develop the necessary structures for survival.

Young woody plant material should be specified because it is not use to growth under ideal conditions and is better able to adapt to wetlands. The survival rate for transplanted containerized plants and seedling plugs is higher than for seed, bare root, and balled and burlapped material.

5. Planting. Consider the following guidelines when planting:

- a. Deconsolidation. Where heavy machinery is used to move earth and create wetland conditions, compacted surface material should be deconsolidated. This is especially true with fine textured (clay) materials or substrates. Site construction plans and specification always should state that before planting, the

substrates will be deconsolidated by plowing, discing, rototilling, or ripping. The depth of deconsolidation should be 4 in to 6 in (100 mm to 150 mm) for herbaceous material and 12 in to 18 in (300 mm to 450 mm) for woody plants.

- b. Planting “In-The-Dry”. Wherever practical, plant “in the dry” with most of the water drained from the site. Water may have to be drained from a site mechanically (e.g., through pumping) so that planting “in the dry” may be accomplished and so that planting schedules may be met. Do not plant in standing water. Plantings are more likely to be done properly, and costs will be reduced by as much as a factor of 10.
- c. Bowls. Do not build bowls around planting holes with excess soils. Bowls divert water from the plants during overland flow.
- d. Mulch. Do not mulch plants because mulch will wash or float away.
- e. Stakes and Anchors. Trees and shrubs more than 4 ft (1.2 m) in height should be staked using standard landscape specifications. Where surface water may freeze, trees and shrubs should be wired to anchors. The anchors should be sufficiently deep to prevent plant material from being lifted by ice.

59-7.08 Wildlife Habitat

Wildlife has four basic needs for habitat — food, water, shelter, and space. These needs can be provided through both vegetative and structural components in the landscape design. Consider the following guidelines:

1. Vegetative Cover. Vegetative components of wildlife habitat include:
 - a. Conifers. Conifers provide escape cover, winter shelter, and summer nesting sites. Also, the sap, needles, twigs, buds, and seeds are eaten by wildlife.
 - b. Grasses and Legumes. Grasses and legumes provide habitat for ground nesting birds; forage for deer, rabbits, woodchucks, meadow voles, and others; hunting areas for foxes, hawks, kestrels, owls, coyotes, weasels, and skunks; winter cover for pheasants and deer; and winter food for seed-eating winter birds.
 - c. Nectar Plants. Nectar plants typically are provided for hummingbirds, orioles, bees, moths, and butterflies.
 - d. Other. Other vegetative cover include:
 - summer fruit, berry, and cover plants;
 - fall fruit, grains, and cover plants;
 - winter fruits and cover plants; and
 - mast (i.e., plants that produce nuts and acorns).

2. Structural Components. Structural components of wildlife habitat include:

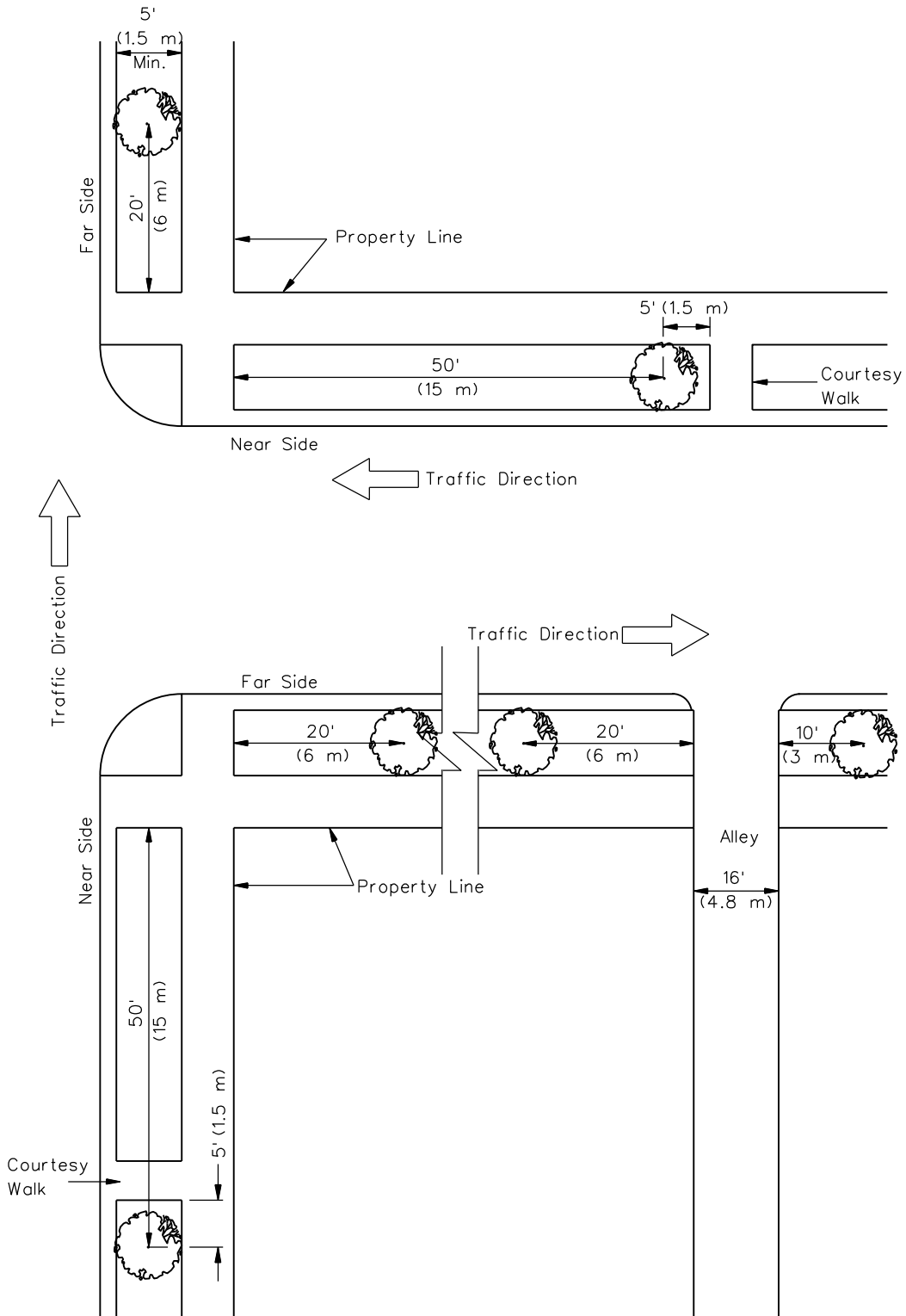
- nest boxes;
- dead trees, fallen trees, and perches;
- brush piles and rock piles;
- cut banks, cliffs, and caves;
- dust and grit;
- salt; and
- water.

The type of vegetative and structural components of wildlife habitat restoration will be dictated by the species involved, degree of impact, and availability of plant material. A number of published guides exist that list habitat requirements for wildlife species. Consult the district Environmental Coordinator and Landscape Architect prior to initiating design.

59-7.09 Planting in Urbanized Areas

Use the following criteria for planting in urbanized areas:

1. Minimum Distance from Intersections, Alleys, and Driveways. The following criteria relates to distances as measured from the property line and along the property lines:
 - a. Intersections. Do not locate trees within 50 ft (15 m) on the near side and 20 ft (6 m) on the far side of the intersection; see Figure 59-7.B. Trees on medians should be located a minimum of 50 ft (15 m) from intersections.
 - b. Alleys. Do not locate trees within 20 ft (6 m) on the near side and 10 ft (3 m) on the far side.
 - c. Commercial Driveways. Do not locate trees within 20 ft (6 m) on the near side and 10 ft (3 m) on the far side.
 - d. Residential Driveways. Do not locate trees within 10 ft (3 m).
2. Minimum Distances from Walks, Curbs, Utilities, and Structures. The following criteria applies from face of curb or center of utility to edge of tree, as measured horizontally:
 - sidewalks and carriage walks — 3 ft (900 mm);
 - access of courtesy walks — 5 ft (1.5 m);
 - face of curb — 4 ft (1.2 m);
 - manholes and catchbasins — 10 ft (3 m);
 - fire hydrants — 10 ft (3 m);



MINIMUM PLANTING DISTANCES FROM INTERSECTIONS

Figure 59-7.B

- underground utility mains and services — 5 ft (1.5 m);
- street lights — see Item 3;
- existing trees — see spacing criteria below;
- overhead wires — no ascending shade trees will be planted under overhead wires;
- railroad crossings — 100 ft (30 m), written approval from railroad is required to plant within 100 ft (30 m); and
- other structures — 30 ft (9 m) or as directed.

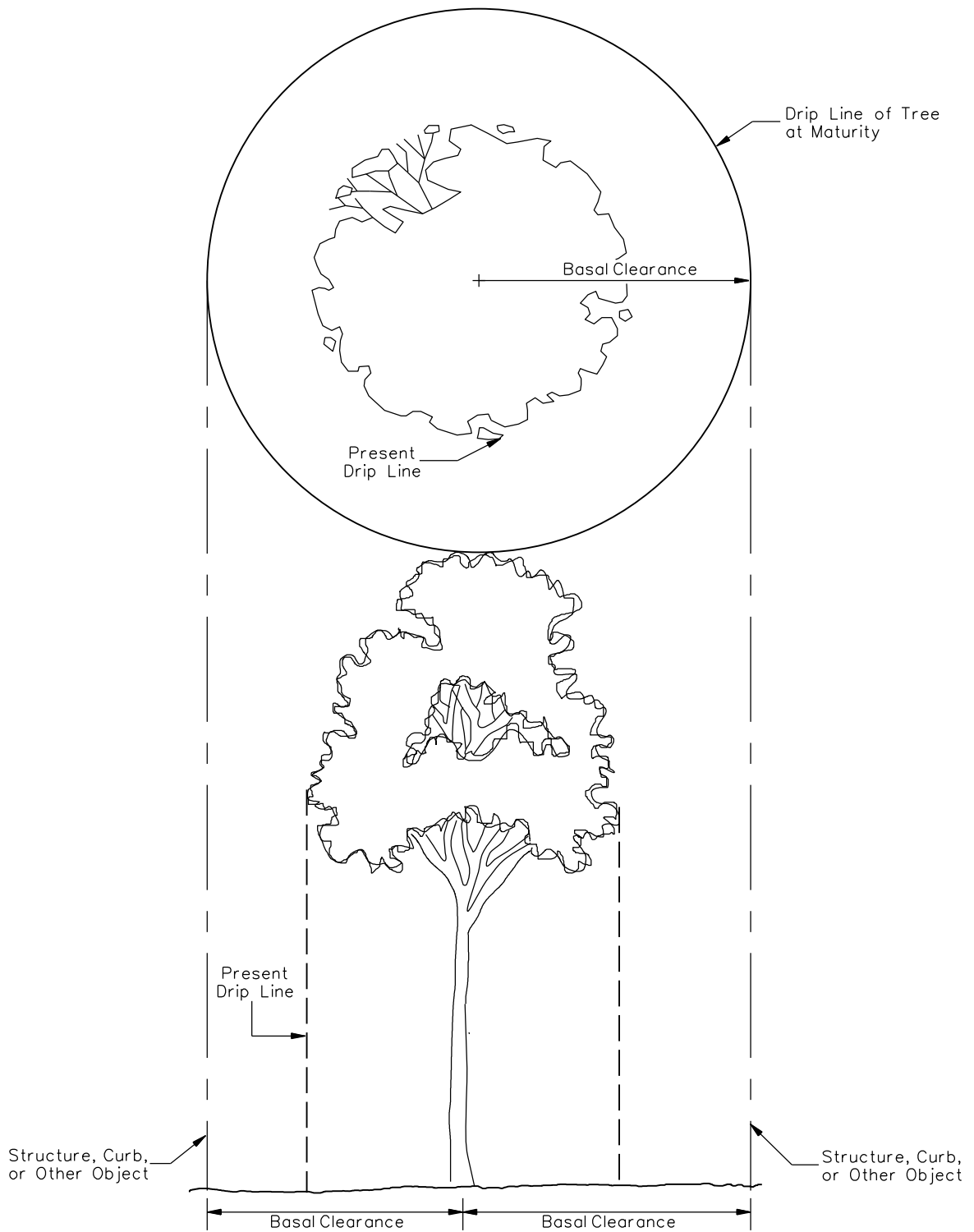
These requirements are for reduced speed urbanized areas and must be adjusted for higher speeds so that clear zone and sight distance requirements are met.

3. Minimum Basal Clearance Between Trees and Structures. Basal clearance is defined as the distance from the center of the tree to the structure or object involved. See Figure 59-7.C. Minimum basal clearance between trees and between trees and structures located on parkways, medians, or other areas of the right-of-way are as follows:

- Trees with spreading crowns must have a minimum basal clearance of 15 ft (4.5 m).
- Trees with global or pyramidal crowns must have a minimum basal clearance of 12 ft (3.6 m).
- Trees with fastigiate or columnar crowns must have a minimum basal clearance of 10 ft (3 m).
- Do not plant trees in areas where basal clearance is less than 10 ft (3 m) without written permission from the district Landscape Architect.
- The Department will determine the form classification of a given tree or species of tree; see Figure 59-7.D.
- Select tree species from the approved tree list of the district Landscape Architect or from a municipal tree list if it is applicable to the project site.

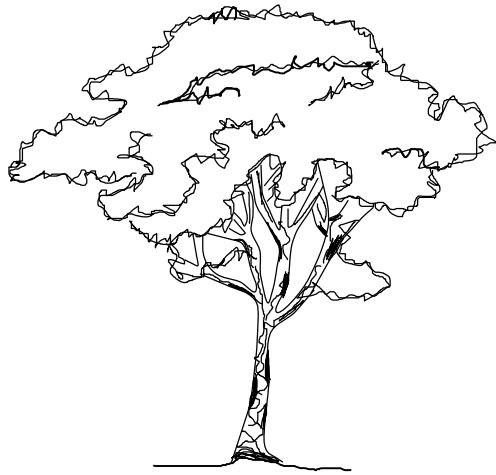
4. Spacing of Trees Within Parkway. Use the following criteria for spacing of trees within parkways:

- Space trees with spreading crowns at a minimum of 30 ft (9 m).
- Space trees with global or pyramidal crowns at a minimum of 25 ft (7.5 m).

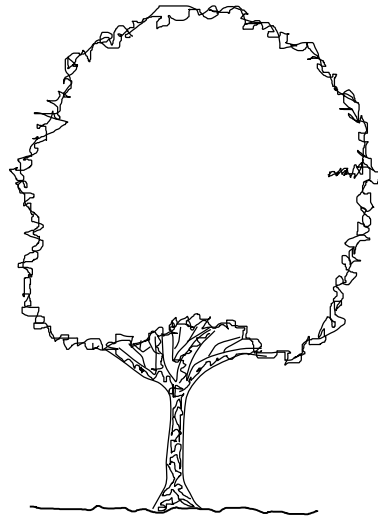


BASAL CLEARANCE

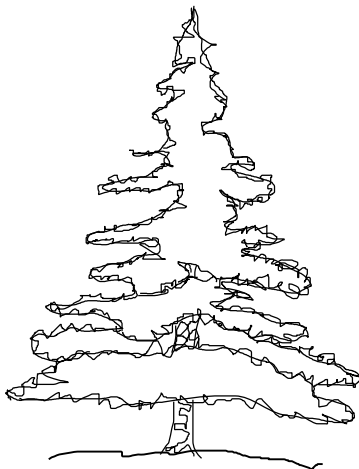
Figure 59-7.C



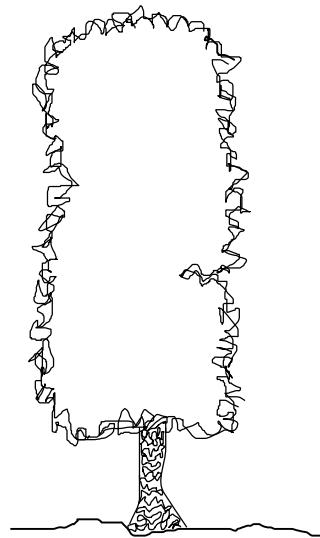
Spreading



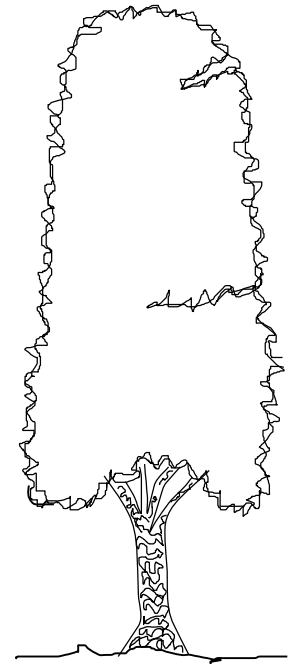
Globe



Pyramidal



Fastigate



Columnar

REPRESENTATIVE FORM CLASSES

Figure 59-7.D

- Space trees with fastigate or columnar crowns at a minimum distance of 20 ft (6 m).
5. Spacing Between Trees Within Median or Other Right-of-Way Areas. Spacing will follow the same criteria given for spacing between trees within parkways with the following exception: if the median is concrete paving or other hard surface material, obtain written approval for the specific tree planting proposal. Spacing of trees located on other right-of-way must be approved by the district Landscape Architect.
6. Width of Parkway, Medians, and Other Public Ways. Landscape designs must be so arranged to provide a sufficiently wide, clear, and safe pedestrian walkway. The required width will in no case be less than 6 ft (1.8 m) wide, measured from a line 1 ft (300 mm) within the right-of-way. Use the following criteria:
- a. Minimum Width of Parkways. Use the following criteria for minimum width of parkways:
 - Do not plant trees on any parkway that is less than 6 ft (1.8 m) in width except when specific permission is granted by the district Landscape Architect.
 - Do not plant trees on any commercial or industrial sidewalk or cut-out in a sidewalk that is less than 16 ft (4.8 m) in width, except when specific permission is granted by the district Landscape Architect.
 - b. Minimum Width of Medians. Do not plant any trees or shrubs in a median unless a local community agrees to the maintenance of the median. Do not plant trees on any median that is less than 10 ft (3 m) in width, except when specific permission is granted by the district Landscape Architect.
 - c. Minimum Width of Other Right-of-Way. Do not plant trees on any right-of-way that is less than 26 ft (7.8 m) in width except when specific permission is granted by the district Landscape Architect.
7. Lateral Location of Trees Within Parkways, Medians, and Right-of-Way Areas. Use the following lateral location criteria:
- The lateral location of trees being planted should reflect the ultimate pavement width of arterial streets.
 - Where practical, trees planted in parkways will be planted in the lateral center of the parkway, or as close to it as practicable, unless specifically approved otherwise.
 - Space and locate trees planted according to their crown form, basal clearance, and the recommendations of the district Landscape Architect.

- Do not plant trees that will branch lower than 10 ft (3 m) immediately adjacent to sidewalks.
- Do not plant trees that will branch lower than 14 ft (4 m) immediately adjacent to driveways.

In urbanized areas, a maintenance agreement with the local agency is usually required.

59-7.10 Visual Quality

Visual quality is a functional goal that is achieved by conserving existing visual resources and enhancing the built environment through landscape and environmental design. Consider the following factors during design:

- the view from the road and of the road;
- outstanding scenic qualities;
- the color choices for roadside features;
- the location of utilities;
- clear zones, sight lines, and profiles;
- bridge and structure designs;
- number, type, and location of signage; and
- noise mitigation structures.

59-7.11 Erosion Control

See Chapter 41 for information on erosion and sediment control.

59-7.12 Architectural Design Elements

There are a number of architectural design elements that can be incorporated into highway design to make the project compatible with its environment including:

- retaining walls constructed with special finishes, modular block, or stone;
- noise barrier walls;
- sight-screen fences and walls to screen unsightly areas such as junkyards;
- sculptures, graphics, and other special art work;
- guardrails and concrete barriers;
- highway appurtenances including signs, delineators, traffic signals, and control boxes;
- access control fencing;

- bridge designs;
- light poles, historical lighting fixtures, and lighting of tunnels, bridges, and pedestrian sidewalks and trails;
- enhanced light quality and special aesthetic enhancement light for structures, sculptures, flag poles, and other artwork;
- planter boxes;
- bicycle racks;
- bollards and barriers; and
- decorative surface areas including stone surfaces, patterned and/or colored concrete, and precast concrete pavers and natural stone pavers.

59-7.13 Plan Preparation

Provide a copy of the construction plan sheets and cross sections to the district Landscape Architect for plant placement/replacement input.

Include the following in the plans:

1. plant key sheet, including the following information:
 - code numbers with heading of trees, intermediate shrubs, evergreens, seedlings, and wildflowers;
 - scientific name;
 - common name;
 - measured size (include balled and burlapped, container grown, and bare root);
 - key number (optional);
 - each or units;
 - quantity;
 - sheet locations; and
 - general notes, if any;
2. sheets showing actual location of items on project with key number; and
3. any standard sheet (e.g., details of hole size, bracing, mulch).

See Chapter 63 for further details.

59-7.14 Highway Related Areas

The transportation system contains supplemental areas and facilities (e.g., bikeways, information centers, weigh stations, rest areas) that are specifically designed for uses other than driving. It is important to understand that these areas and facilities are integral, not separate, features of the highway. Detailed treatment is required to ensure that these areas and facilities provide maximum benefit to the user and blend into or complement the surrounding landscape.

The need for supplemental highway related areas and facilities are evaluated at the inception of the design process. Rest areas, scenic overlooks, information centers, and truck weigh stations usually are planned in conjunction with the entire highway system. Other facilities are designed to take advantage of the environment through which the highway passes. Urban streetscape and scenic highways can be either carefully planned and managed or evolve unplanned.

Separate bikeways can exist within the right-of-way. Park-and-ride lots are becoming increasingly important aspects of the highway and must be addressed in evaluating the total highway environment.

As highways and bridges are being reconstructed in response to age, deterioration, and changes in use, similar attention must be paid to the various highway related areas that have been constructed to support the highway system. Consult the AASHTO publication *A Guide For Transportation Landscape and Environmental Design* for considerations involving highway related areas. See Chapter 16 for information on rest areas and weigh stations.

59-7.15 Roadside Seeding in Areas Disturbed By Construction

Since the early 1980's, the Department's decisions on type of cover and plant material for roadside areas have been largely influenced by consideration of the level of maintenance/management anticipated for the areas involved. This practice has helped the Department to achieve a better fit between available funding and manpower resources and the amount of roadside maintenance needed. Experience during this period has shown that where a low level of maintenance/management is desired, native Illinois grasses and other native selections often are the best choice for planting. Furthermore, FHWA has issued guidance that encourages the use of plants native to the project locale where practical. The guidance in this topic clarifies requirements on developing plan specifications for roadside seeding/cover and is intended to maximize the benefits of using native plants.

Use the following procedures in developing seeding/cover specifications for 3R, reconstruction, and new construction projects:

1. Mowing Widths. Consult with the district Bureau of Operations to determine applicable mowing widths for all projects in accordance with current mowing policies of the Bureau of Operations.

2. Seeding For Mowed Areas. In all areas that Operations' policy stipulates must be mowed, specify the appropriate seeding selections from Classes 1 or 2, depending upon the site conditions and geographical location of the project. The designer should consult the district Landscape Architect on the specific seeding selections.
3. Seeding For Areas That Will Not Be Mowed. In those areas that Operations policy stipulates are not to be mowed regularly, specify appropriate seeding selections from Class 4 or, for steep inaccessible slopes, from Class 3. As with specifications for mowed areas, the designer should consult with the district Landscape Architect on the selections within these classes for specific circumstances. Do not use Class 4 seeding in ditch bottoms or drainage ways where it would impede the flow of water. In areas that are not to be mowed, plantings within 10 ft (3 m) of the shoulder break/face-of-curb should not exceed a height of 3 ft (1 m) at maturity and should not interfere with sight distances.
4. Seeding for Areas Involving Special Environmental Commitments. For project goals or commitments involving wildflower planting, environmental mitigation, aesthetics, or habitat enhancement the designer should consult with the district Landscape Architect on the use of Class 5 or Class 6 seeding.
5. Overseeding/Interseeding on 3R or Reconstruction Projects. On 3R or reconstruction projects, existing turf in unmowed areas and all damaged turf should be overseeded or interseeded in accordance with the specifications using an appropriate class as determined by the district Landscape Architect to establish turf that will require little or no regular maintenance.
6. Turf Establishment on New Construction Projects. On new construction projects, turf should be established by conventional methods appropriate to the seeding class used.
7. Use of Other Grasses and Forbs. Grasses and forbs other than those in seeding Classes 1 through 6 may be specified for use at the discretion of the district Landscape Architect. Any such plants must be appropriate to the location and intended management of the project and, generally, should be species native to the project locale.