

Forrest Keeling Suggested RPM Plants for Vegetative Environmental Buffers

Forrest Keeling's patented RPM containerized stock have superior root mass that will give you unsurpassed survivability and plant growth for your odor abatement VEB. In fact, Forrest Keeling RPM stock is considered by industry professionals to be the standard for plants used in all demanding landscape situations.

Suggested species include:

Evergreen Trees

Eastern Red Cedar, *Juniperus virginiana*
Pitch x Loblolly Hybrid Pine, *Pinus rigida x taeda*
Shortleaf Pine, *Pinus echinata*
White Pine, *Pinus strobus*
Norway Spruce, *Picea abies*

Deciduous Trees

Bald Cypress, *Taxodium distichum*
Hackberry, *Celtis occidentalis*
Pin Oak, *Quercus palustris*
Bur Oak, *Quercus macrocarpa*
Swamp White Oak, *Quercus bicolor*

Shrubs

Buttonbush, *Cephalanthus occidentalis*
Black Chokeberry, *Aronia melanocarpa*
Red Chokeberry, *Aronia arbutifolia*
Gray Dogwood, *Cornus racemosa*
Red-twig Dogwood, *Cornus stolifera*
Rough-leaf Dogwood, *Cornus drummondii*
Silky Dogwood, *Cornus amomum*
Yellow-twig Dogwood, *Cornus stolifera flavinera (sericea)*
Elderberry, *Sambucus canadensis*
Indigo Bush, *Amopha fruticosa*
Ninebark, *Physocarpus opulifolia*
Fragrant Sumac, *Rhus aromatica*
Smooth Sumac, *Rhus glabra*
Arrowwood Viburnum, *Viburnum dentatum*
Blackhaw Viburnum, *Viburnum prunifolium*
Cranberrybush Viburnum, *Viburnum trilobum*
Nannyberry Viburnum, *Viburnum lentago*

Contact your local NRCS agent for additional species and planting recommendations.



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Vegetative Environmental Buffers

Applied Windbreaks for Energy, Conservation and Improved Air Quality

Visual appeal with practical benefits

With fuel costs on the rise, rural properties need ways to improve their energy efficiency. Both warmed and cooled air is lost by conduction through the walls and windows to the outside of a building, while infiltration allows outside air to seep into a building through cracks, doors and other openings. **Vegetative Environmental Buffers (VEB's) are a specialized application of windbreak technology that helps reduce your properties energy cost year round.**

In tests that compare heating costs from homes on protected and unprotected sites, researchers found that **VEBs reduce fuel use by 18 to 25 percent.** These

savings should also be realized when VEB's are correctly positioned around livestock facilities. Additional savings may also be achieved as VEB's reduce fan back pressure normally caused by direct strong winds.

When production and processing facilities or croplands produce odors that are objectionable to surrounding communities, resident complaints and government citations often result. If the company wants to continue its venture and stay in good stead with its neighbors, but cannot reduce the odors with facility modifications, VEB technology may be the answer. **Specific plant materials planted in VEB-style also help neutralize objectionable smells and reduce negative views.**



Planting after several years of growth.

How does a VEB work?

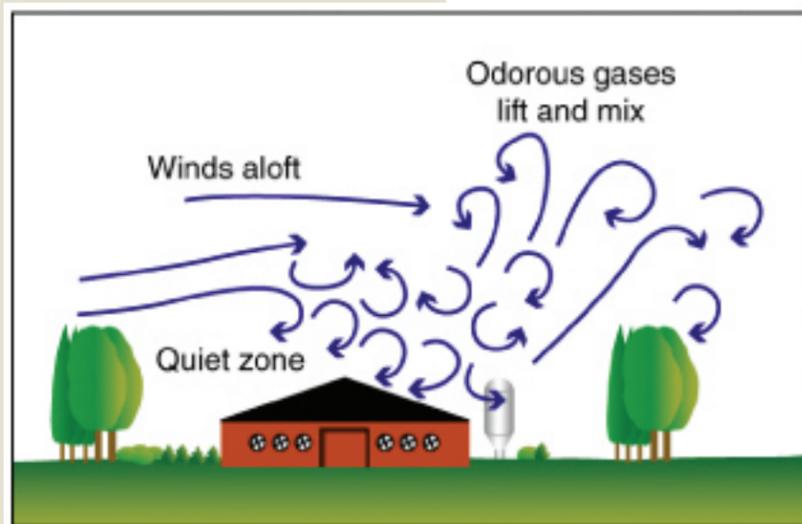
1. **VEB modify airflows**, which protect and insulate buildings and also dilute and disperse odors.
2. **Odorous dusts and aerosols fall** to the windward and leeward sides of VEBs and collect on leaves, needles and branches.
3. **Chemical constituents of odors collect and store** in tree wood.
4. **Odors are physically contained** within the parameters of VEB.
5. **Wind erosion is reduced** on adjacent crop fields.
6. **Screened views improve aesthetic appearances** and show that the facility made positive efforts as a good neighbor.

Planting VEBs around the entire facility perimeter is ideal. VEBs upwind of the facility move the airflow up and over odor sources and mix odor sources with fresh air to help dilute and filter those downwind of the odor source filter air and trap odors and dust. VEBs must be at least 75 to 100 feet from access roads and driveways to prevent snowdrift accumulation.

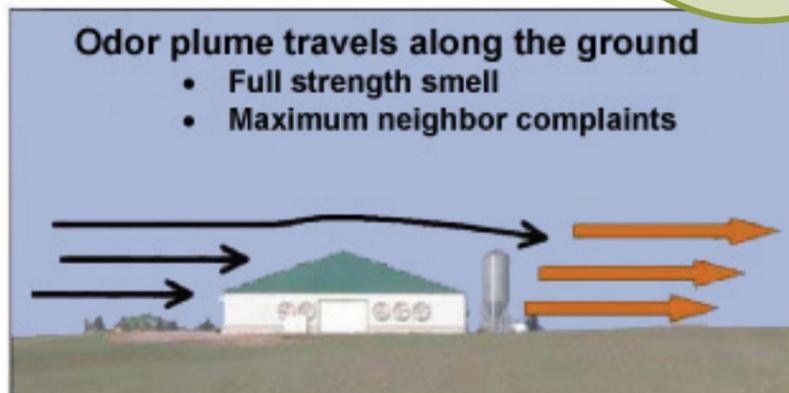
Watering Newly Planted Landscape

- Daily for 7 to 10 days
- Then every other day for the next 2 weeks
- Once per week when rainfall is less than 3/4 to 1 inch

With VEB system



Without VEB system



Getting started

Sounds complicated, but getting started is as simple as meeting with your local Natural Resources Conservation Service (NRCS) agent. The agent will either visit the site in person or look at it from aerial photos.

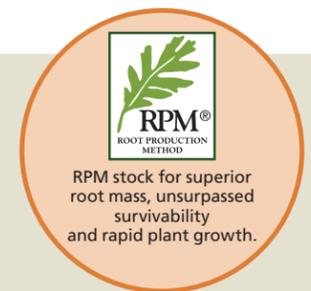
The location and size of your property can help the agent determine the project scope and cost and if any cost share opportunities are appropriate for your project, for example, through the NRCS. Drip irrigation for your VEB is cost-shared by NRCS and is sometimes required. Continuous weed mat or mulching is also recommended and cost-shared. Additional cost share programs are included in the Environmental Quality Incentives Program (EQIP), which was reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill).

The final approvals on these cost-share benefits rest with NRCS. You can find your local NRCS office on the Internet at www.nrcs.gov, or by calling Forrest Keeling Nursery 800-356-2401.

Plant spacing and number of plants needed

Trees should be planted 10–15 feet apart on-center, with an average 20 feet between tree and shrub rows. Shrubs should be planted 6-8' apart. The number of plants required for a working VEB will vary from site to site. As an example, a three-row, four-sided VEB with two, 2,000' sides and two, 1,500' sides (a total perimeter of 5,000 linear feet) will need:

830 shrubs or small trees, *plus* 500 evergreen trees, *plus* 500 deciduous trees



What Species to choose

Your Forrest Keeling representative or NRCS agent can guide your final selection of plant materials. Points to consider include:

1. **Facility location:** Plant zone, available sunlight and moisture, and soil type are important in understanding the project's maintenance and long-term success and which species will survive best.
2. **Site characteristics:** Overhead power lines, fences, roadway visibility, facility layout and function and the mature height and spread of the species chosen should be compatible.
3. **Soil conditions.** Your NRCS agent can assist you with a soil test to determine your soil's health and quality, and if amendments are required.

Planting in rows by facility.