

**Keanland Park PRRD
Integrated Pest Management Plan (IPMP)**

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1.0 INTRODUCTION

1.1 Purpose of Plan

This development lies within the Deschutes River Watershed and within Category II and Category III Aquifer Recharge Areas as defined by the local jurisdiction overseeing the natural resources of the region. Also, Sheehan Lake, the Deschutes River, Ayer Creek, and a large Critical Area Preserve are in the immediate vicinity of the subdivision. The quality of these local water resources, associated wetlands and groundwater can be protected and maintained by you, the property owner, by exercising wise use and practices around your home and property. These practices (called Integrated Pest Management (IPM)) are designed to reduce water use, reduce the amount of pollutants you use or reduce their chance of entering nearby natural water and/or habitat features.

Recommended Best Management Practices (BMPs) discussed herein include the following topics: landscape management around your home including the proper use of herbicides, pesticides, and fertilizers; the storage, disposal and handling of pesticides and other household products used; and maintenance of the community property within the development. Since this plan has been recorded as an attachment to the neighborhoods' covenants, conditions, and restrictions, you should have received a copy with your title documents. Property owners are responsible for following this plan within their own property and for the care and maintenance of community property on the site. A copy of this plan should be provided to landscape professionals who may be hired to work on private or community property.

1.2 Landscape Management

You can grow attractive, healthy lawns using less water, pesticides and fertilizers. Every time you plant, water, fertilize or control pests in your lawn and garden, you can choose methods that protect your health and the health of our shared environment and aid in the improvement of the quality of the local water resources. Lawn and garden chemicals include some of the most hazardous products in the home. By switching to less-hazardous products as well as practicing conscientious management of your landscape, you help reduce the potentially harmful impact to the groundwater and natural resources of the immediate area and/or region.

There are a number of measures a homeowner can exercise to aid in the prevention of pest and disease problems. In regard to your soil and plants, some typical measures are: knowledgeable use of herbicides, pesticides, and fertilizer; proper landscape design; proper choice and location of plants; knowing your soil through soil testing and then building it to a healthy state; utilizing organic compost to encourage and maintain soil and plant health; aeration of lawn to provide good air circulation and soil drainage; good mowing practices; and proper pruning of plants. Further, it is wise to make regular observations of the health of your lawn and landscaping so that any problems can be spotted and identified. Verify your identified problems before choosing an action to control the pest or disease problem. Contact your local nursery for help with identification (see list of resources below). You must also become aware of that threshold when action by you must be taken to prevent unacceptable damage by the pest or disease. The action to control the pest or disease should be the least toxic, yet effective, measures available to homeowners.

You are encouraged to contact a local nursery or the Washington State University Cooperative Extension if you have specific questions or if you need to gain more information than is listed herein. The Washington State University Cooperative Extension can be contacted at (360) 786-5445, extension 7908. Local nurseries include: Sound Native Plants (360) 352-4122, Lacey; and The Barn at 9440 Old Highway 99 SE, Olympia.

1.3 Hazardous Household Products

Pesticides, insecticides and fungicides are toxic and should be handled with care. Carefully read the label of the product and follow the instructions thereon. Wear protective clothing when working with these materials. It is important to always store chemicals in a dry place inaccessible to children and pets. The containers should be well marked and kept tightly closed. When you have left-over hazardous household wastes, use Thurston County's HazoHouse to safely dispose of unwanted left-over wastes. The HazoHouse is located at the Hawk's Prairie Landfill. A brochure entitled "It All Begins at Home" is available to the public and gives further suggestions and guidelines in the proper storage, disposal and handling of hazardous household products. For additional recommendations regarding this subject matter refer to Section 3.1.

1.4 Maintaining Community Tracts

This development has several community stormwater tracts and stormwater systems within the road rights-of-way that need to be properly maintained and monitored to ensure the quality of groundwater and local water resources. This Integrated Pest Management Plan (IPMP) contains a maintenance checklist for stormwater tracts and components (Chapter 4.0). The information provided was taken from the Stormwater Management Manual for Western Washington, Volume IV, August 2001, and Source Control BMPs, prepared by Washington State Department of Ecology. A full copy of this manual is available by contacting the Washington State Department of Ecology's printing department at 360-753-6820 or download it at www.ecy.wa.gov/pubs/9914.pdf.

1.5 Summary

By following the IPM principles outlined herein and guidelines published through various agencies, you as a homeowner have many control options that are environmentally-friendly, relatively safe around children and pets and very cost-effective. In exercising your responsibility to ensure the quality of local surface and groundwater supplies, you will minimize adverse effects on these vital components of the environment.

2.0 ENVIRONMENTALLY FRIENDLY LANDSCAPE CARE

The goal of environmentally-friendly landscape care is to minimize the potential for water quality impacts from yard and garden activities. The recommendations described here follow the Thurston County Pest and Vegetation Management Policy. They reflect proper land stewardship practices that should be followed by all property owners. There are recommendations for protection of groundwater, plant selection, landscape design and maintenance, and low impact approaches to pest and disease control.

2.1 Groundwater

Groundwater is an important source of drinking water for communities and individuals. From 1950 to 1980, the use of groundwater in the United States for human consumption increased from approximately 35 billion gallons per day to approximately 87 billion gallons per day. Today, more than half of all Americans get their drinking water from underground sources. In Washington State, groundwater provides 25-49 percent of the drinking water to communities and individuals. Groundwater is our sole water supply in Thurston County.

Until the 1970s, it was believed that groundwater was naturally protected from contamination by layers of soil, rock, and sand between the surface of the ground and groundwater. These layers of soil, rock, and sand were believed to filter out pollutants before they could reach the groundwater. However, this is not the case and contaminants can move through these layers and enter the groundwater.

Because groundwater is not immediately visible and easy to monitor, groundwater contamination can go undetected until the problem has become extensive. In turn, cleaning up contamination of groundwater is complicated, costly, and sometimes impossible. Therefore, preventing contamination of groundwater is the best way to guarantee continued supply. Throughout this document are recommendations and information that either directly or indirectly pertain to the conservation and protection of the public's ground and surface water supplies.

2.2 Appropriate Plant Selection

A wise first step when choosing grass or landscaping plants is to select plants that are native or well adapted to the soils and climate of our area. Native plant species have adapted over time to their specific region. If a plant is adapted to regional conditions, it is less likely to need extra fertilizing and watering and less likely to be attacked by pests. An excellent reference for more information on native plants is the book by Arthur Kruckeberg, "Gardening with Native Plants of the Pacific Northwest".

Table 2-1 displays grass strains are recommended for use in our area. A mix containing a variety of these strains could be used to optimize best characteristics of each strain. The easiest way to get the best variety is to choose a mix that is "Blended for the Pacific Northwest".

Table 2-1 Recommended Strains of Grass

Grass Type	Strains
Fescue (finest leaf)	Palmer, Manhattan 11, and Repeil
Perennial Rye grass ¹	Reliant, Scaldis, and Enjoy

2.2.1 Resource Use Parcel

Positioned along the western edge of the development in which you live are wetland buffers, an integral part of the neighboring Resource Use Parcel. The Resource Use Parcel consists of two designated uses (1) Agriculture and (2) Critical Area Preservation. In general, the Critical Area Preservation contains the Ayer Creek Floodplain, delineated wetlands and wetland buffers, and Elwanger Creek. The wetland/ Critical Area Preservation buffers are an important natural feature of the area in which you live. They protect wetland and stream functions, help maintain surface and groundwater quality, provide area wildlife with important life stage requirements, contribute to the country-like setting, and enhance the overall quality of life. Each residential lot owner, particularly those that border the Resource Use Parcel, can enhance and/or maintain these areas by incorporating the following guidance recommendations into their initial landscape plan, normal yard maintenance schedule, and daily activities.

Resource Use Parcel - Buffer Maintenance

The Resource Use Parcel boundary is designated by the presence of a fence with signage. Activities within the Resource Use Parcel such as dumping yard waste, extending yard parameters, removing or pruning vegetation, constructing trails, using all-terrain vehicles (ATV), and allowing domestic pet incursions are not encouraged. Such activities, if practiced over the life of the development, would ultimately degrade Resource Use Parcel buffers and negatively affect the Critical Area Preservation components listed above. In addition, wise use of herbicides and pesticides within each private parcel and as specified elsewhere in this IPMP is strongly recommended to protect the long term health and viability of the Resource Use Parcel i.e., leaving a 10-foot "No Application" zone bordering the Resource Use Parcel buffers and Community stormwater facilities.

Resource Use Parcel - Buffer Augmentation

Augmentation of the existing Resource Use Parcel buffers from within the bordering residential lots is highly recommended as an option to ensure and improve Resource Use Parcel health and buffer viability into the future. Lot owners bordering the Resource Use Parcel would greatly improve buffer functions by electing to use native plant species listed in Table 2-2 and create a three-tiered forested buffer-extension (herb, shrub, and tree) abutting the Resource Use Parcel (lot side of the Resource Use Parcel fence line). A minimum 25-foot extension is recommended which, ideally, would be lineally solid.

¹ New perennial rye grasses have been bred with increased endophyte - a fungus which makes the grass resistant to Argentine Stem Weevil, Cherry Aphid, Armyworm, Bug larva, Cutworm, and Sod webworm.

Table 2-2 Recommended Native Plant Species for Buffer Augmentation²

Common Name	Scientific Name	Stratum
Douglas Fir	<i>Pseudotsuga menziesii</i>	Tree
Western Hemlock	<i>Tsuga heterophylla</i>	Tree
Big-leaf Maple	<i>Acer macrophyllum</i>	Tree
Red Alder	<i>Alnus rubra</i>	Tree
Bitter Cherry	<i>Prunus emarginata</i>	Tree
Vine Maple	<i>Acer circinatum</i>	Shrub
Beaked Hazelnut	<i>Corylus cornuta</i>	Shrub
Western Serviceberry	<i>Amelanchier alnifolia</i>	Shrub
Salal	<i>Gaultheria shallon</i>	Shrub
Holly	<i>Ilex aquifolium</i>	Shrub
Oregon Grape	<i>Mahonia nervosa</i>	Shrub
Grass Species	See Table 2-1, above	Herb

2.3 Landscape Maintenance

2.3.1 Mulching

Use organic mulches to reduce water loss through evaporation, to reduce soil loss due to exposure to wind and runoff, to suppress weeds, and to provide a more uniform soil temperature.

Basic Practice Guidelines

1. Heavily mulch planting beds with partially composted organic material in a layer three-to-four inches deep to reduce weeds, keep roots cool, keep soil moist and reduce the frequency of required watering. Also mulch tree and shrub bases as appropriate for each species.
2. Apply mulch to the soil surface, not against the plant stem or high against the base of tree trunks to minimize disease.
3. Organic mulch material includes bark, wood chips, chopped leaves and pine needles. Potentially appropriate inorganic mulch material includes gravel, pebbles and woven ground cloth. Fabric material can be placed underneath the mulch to reduce weeds. Some plants are better suited to inorganic mulches due to propensity to root rot, so check with nursery professionals regarding suitable mulches for specific plants.
4. Apply mulch to areas of disturbed soil to prevent erosion and sediment transport to drainageways. In areas prone to significant runoff, inorganic mulches that are less easily washed away than bark should be used.
5. Check mulched areas on a routine basis, at least monthly, and replace mulch as needed.

² This is only a partial list of native plants that you could use. For additional information on native plant use and to receive "how to" guidance, contact Sound Native Plants (360/352-4122) or visit their web site (www.soundnativeplants.com).

2.3.2 Fertilizer Application

According to the National Academy of Science, on the average 5 to 10 pounds of fertilizer are applied annually for every acre of lawn in the United States. Often this occurs whether the lawn needs it or not.

There are two types of fertilizers, natural and synthetic. Natural fertilizers such as: bone meals (Ca, P and some N) blood meals (N), fish meals (N and P), kelp meals (K and trace elements), seed meals (N and some P/K) and rock phosphates (P) are often recommended for both lawns and landscaping plants. These are preferred over synthetic fertilizers for a number of reasons. The various meals listed above are slow releasing and tend to be neutral in pH and are relatively water insoluble. This means that they tend to stay in the soil longer and are not as quickly leached out as their synthetic alternatives. Natural fertilizers often contain many naturally occurring micronutrients that are typically unavailable in synthetic fertilizers. Synthetic fertilizers can also contain inert ingredients (compounds added during manufacturing that are not listed as part of the active ingredients) that can be harmful to the environment. However, for both natural and synthetic fertilizers improper management and over application can cause serious impacts. When applying fertilizers, the application rate and timing is dependent upon the type of fertilizer used and soil needs. Properly apply fertilizers based on the specific needs of plants, particularly as identified by appropriate soil or plant tissue tests. Simple soil test kits are available at most gardening centers.

Ca = Calcium
K = Potassium
N = Nitrogen
P = Phosphorous

Established native plants should require little in the way of fertilizing other than annual mulching. Although periodic fertilization will promote bloom of more traditional garden plants, you can still reduce fertilizer use through mulching and use natural fertilizers instead of synthetic types. As always, the garden soil should be tested first to determine nutrient needs.

Basic Practice Guidelines

1. Apply fertilizer when needed to achieve a clearly defined objective such as increasing shoot growth, root growth, flowering or fruiting; establishing newly planted trees and shrubs; enhancing foliage color and plant appearance; or correcting or preventing nutrient deficiencies.
2. Because manufactured fertilizers can be relatively high in nutrient content, it is critical to follow the manufacturer's directions, using the minimum amount recommended. Over-application "burns" leaves, may lead to water pollution, thatch buildup and excessive mowing.
3. Only apply nutrients the plants can use. Fertilizer labels identify product contents in terms of ratios that indicate percentage of ingredients by product weight.
4. When practical and appropriate, base fertilizer application on soil analysis. Be aware that at many new home sites, "basement" topsoil may make obtaining representative soil samples challenging. (Basement topsoil consists of soils excavated during home foundation construction.)
5. Prior to fertilizing, modify soil as needed to improve nutrient uptake. Contact your Thurston Conservation District for guidance (360-754-3588).

6. Utilize split applications of slow-release (controlled-release) fertilizer forms such as IBDU, sulfur-coated urea and natural organic-based fertilizer (not to be confused with raw manure) to minimize the risk of nutrients leaching into groundwater or running off in surface water. When properly applied, other forms of fertilizer can also be safely used, provided that over-watering and over-fertilization do not occur.

An example of a well-balanced organic fertilizer mixture for lawn grass suggested by the Territorial Seed Company consists of 4 parts seed meal or fish meal (N); 1 part agricultural lime or dolomite (Ca); 1 part rock phosphate or 2 parts bone meal (P); and 2 parts kelp meal (K) (all measurements by volume). This mixture would need to be adjusted based on results of site soil testing and nutrient content of the meals used. For more information on fertilizers refer to "Grow Smart, Grow Safe", a consumer's guide to lawn and garden products" found at growsmartgrowsafe.org.

- Avoid over-watering lawns immediately after applying fertilizer. It is better to water the lawn thoroughly a day or two before fertilizing, and then water briefly after the application to wash the fertilizer off the leaves and into the soil.
 - Reduce the need for fertilizers by returning grass clippings to lawns. (In Western Washington, 4 pounds of nitrogen per 1,000 square feet per year is usually a maximum application rate, 1 pound is often sufficient. Grass cycling (leaving the cut grass on the lawn) can supply at least a quarter of what is needed by your lawn.
 - Test soils before applying fertilizers. In this region soils are naturally high in phosphate. Adding more through fertilizing is not only a waste of money, it can also result in excess pollution of nearby waters. There are now phosphate-free lawn fertilizers available commercially that can provide a nitrogen and micronutrient source without contributing to excess phosphates in our environment.
7. When applying fertilizer, broadcast it uniformly over the targeted area of the landscape.
 8. Post application of fertilizer care should be taken to avoid excessive irrigation that would result in fertilizer being washed away. Similarly, avoid application of fertilizer immediately prior to heavy rain fall.
 9. Fall is the best time of year to fertilize lawns to promote a healthier turf before winter, a healthier root system, and turf that greens up earlier in the spring without excessive top growth. Fertilize with nitrogen sometime during late September to early November or prior to the first hard frost.
 10. Over-application of nitrogen fertilizer in the spring may cause grass to grow too fast before roots can support the growth, resulting in less heat tolerance.
 11. Recommendations for fertilizer application vary among industry professionals. The Thurston Conservation District's (TCD) recommendations for established Western Washington lawns are available by calling 306-754-3588. TCD staff may also be helpful when considering site-specific conditions.

12. Keep fertilizer off of streets, sidewalks and driveways to prevent water pollution. Fertilizer that inadvertently falls on impervious surfaces should be swept back onto the lawn or area being fertilized.
13. Maintain a buffer zone around wells, stormwater facilities and/or surface water bodies and their buffers where fertilizers are not applied to minimize pollution and inadvertent degradation of natural areas. Consult the fertilizer product label, local regulations and landscape ordinances for appropriate distances; under most circumstances, 8- to 12- feet would be a sufficient distance.

2.3.3 Watering

Properly design, install and maintain irrigation systems to ensure uniform and efficient distribution of water, thereby conserving water and protecting water resources.

Basic Practice Guidelines

1. **Do not over water** --- most established vegetation does not require more than one inch per week depending on the season and rainfall. Plants will develop deeper roots and ultimately require less watering when not over watered.
 - When watering, keep an eye on the watered area to ensure that the flow rate of the sprinklers doesn't exceed the infiltration rate of the soil, which can vary greatly based on surface management. Over watering can result in the proliferation of some unwanted insect pests.
 - During extreme drought conditions, watering should be restricted to priority plantings, such as newly established trees and shrubs.
 - Consider not supplying extra water to your lawn in summer, to let the grass go through a normal dormant stage. Think of this as a natural seasonal event like the trees changing color in the fall.
2. Never water if the soil is still wet.
3. Irrigate according to the requirements of the plants, not on a fixed schedule. The duration of irrigation is typically what needs to be modified based on evapotranspiration.
4. Apply only enough water to replace water loss by evapotranspiration. Match irrigation application to soil type and root depth. Avoid applying more water than can be contained in the root zone. Daily observation is optimal to determine the appropriate changes to make to the irrigation system. If impractical, weekly observation should be conducted at a minimum.
5. Water all plants deeply but infrequently to encourage deeper, healthier rooting. Prolonged intervals between watering (short of drought damage) provide maximum encouragement of plant growth.
 - The key to a healthy lawn and plants is to encourage the roots to grow as deep into the soil as possible. That will make them more drought resistant later in the season. Infrequent, long irrigation, (i.e., wetting the soil to about 10 inches), is recommended to encourage deep roots. Frequent short watering cycles

encourage shallow roots since they adapt to that condition by concentrating their roots in the upper layers of the soil.

6. Until plants have developed deep roots, they may need more frequent watering than older established plants.
7. When determining the watering needs of planted areas, dig down about 4 to 6 inches to determine the moisture content of the soil. Do not worry about the dryness of the top inch of soil. If the soil is too dry to form a ball when squeezed in the hand, it needs water.
8. Water early in the morning or between the hours of 6 p.m. and 10 a.m. when temperatures and winds are at their lowest levels to reduce water loss. Sprinklers are typically more efficient during these times due to better water pressure.

Watering during early morning will reduce loss by evaporation and minimize development of mold and fungal problems on lawn and plants. (Note: Many garden plants, notably roses, garden phlox, peonies, and others, are susceptible to disease that can be **discouraged** through early morning watering.)

9. Excessive irrigation after fertilization may cause leaching or surface runoff that pollutes water bodies, while lack of irrigation may result in inefficient utilization of the fertilizer.
10. Water lawns and shrubs/perennial beds separately. These should be in different irrigation zones as they require being watered differently. Water trees and shrubs, which have deeper root systems, longer and less frequently than shallow-rooted plants.
11. When watering plants on slopes, compacted soils, and/or sandy soils, a series of several light applications instead of one continuous application is typically appropriate to account for the lower intake rates of these soils. Consider installing low-angle nozzles on tops of slopes to improve efficiency. Irrigation systems should also apply more water at the top of the slope and less at the base to prevent excess runoff.
12. Irrigation efficiency is equally dependent upon a good design, correct installation and proper maintenance. Use only qualified (e.g., licensed, certified as needed) irrigation professionals for system installation and irrigation advice.

2.3.4 Monitoring Noxious Weeds

The Thurston County Noxious Weed control program keeps a list of invasive plant species that are creating problems in our area. Left unmanaged, these plants can quickly populate an area and displace native vegetation. The displacement of native vegetation over time is a threat to plant diversity and wildlife habitat.

An integrated vegetation management approach is recommended for control of these species. This approach involves early identification, use of appropriate control measures, and proper timing of their application. Use of these methods will reduce the need for herbicide use. It is recommended that you visually check your site for these species in early spring and late summer. Early spring is when the over-wintered seeds are germinating. Identification of the plants when they are still young is critical. Generally, it is recommended that plants be hand pulled and disposed of at the Hawk's Prairie Landfill. In late summer and early fall, the recommended method for eradication for the following year is to remove the seed heads on the

plant and collect any that are at the soil surface. However there are a number of problem plants for which this method will not be effective. Because the best control technique varies for each plant listed, it is recommended Thurston County Noxious Weed control be contacted directly at 360-786-5576 for plant specific information i.e., plant identification and recommended control techniques.

Chapter 17.10RCW (Noxious Weeds - Control Boards)

The purpose of this chapter is to limit economic loss and adverse effects to Washington's agricultural, natural, and human resources due to the presence and spread of noxious weeds on all terrestrial and aquatic areas in the state. The intent of the legislature is that this chapter be liberally construed, and that the jurisdiction, powers, and duties granted to the county noxious weed control boards by this chapter are limited only by specific provisions of this chapter or other state and federal law.

"Noxious weed" means a plant that when established is highly destructive, competitive, or difficult to control by cultural or chemical practices. The "State noxious weed list" is a list of noxious weeds adopted by the state noxious weed control board. The list is divided into the following classes:

- Class A consists of those noxious weeds not native to the state that are of limited distribution or are unrecorded in the state and that pose a serious threat to the state;
- Class B consists of those noxious weeds not native to the state that are of limited distribution or are unrecorded in a region of the state and that pose a serious threat to that region;
- Class C consists of any other noxious weeds.

Property owners have a duty to control the spread of noxious weeds (RCW 17.10.140). Every owner shall perform or cause to be performed those acts as may be necessary to:

- Eradicate all class A noxious weeds;
- Control and prevent the spread of all class B noxious weeds designated for control in that region within and from the owner's property; and
- Control and prevent the spread of all class B and class C noxious weeds listed on the county weed list as locally mandated control priorities within and from the owner's property.

Noxious weeds threaten public health, the environment, wildlife habitat, native plants, agriculture areas, and recreational areas. Thurston County has operated a weed program since the County's Noxious Weed Board was originally activated in 1972. Prior to the current County Weed Board there were Weed Districts as well as Extermination areas in the County. Thurston County Noxious Weed Control is responsible for identifying and controlling noxious weeds in Thurston County. Currently, 35 species of noxious weeds (Table 2-3) are targeted for control out of a list of 75 designated by Washington State. All species of noxious weeds are non-native or introduced.

Table 2-3 Noxious Weeds List for Thurston County - 2004

Common Name	Scientific Name
Blueweed	<i>Echium vulgare</i>
Broom, Spanish	<i>Spartium junceum</i>
Bugloss, common	<i>Anchusa officinalis</i>
Butterfly bush	<i>Buddleia davidii</i>
Chervil, wild ³	<i>Anthriscus sylvestris</i>
Gorse	<i>Ulex europæus</i>
Hawkweed, mouse ear ⁴	<i>Hieracium pilosella</i>
Hawkweed, orange	<i>Hieracium aurantiacum</i>
Hawkweed, yellow devil	<i>Hieracium floribundum</i>
Helmet, policeman's ⁵	<i>Impatiens glandulifera</i>
Hemlock, poison	<i>Conium maculatum</i>
Hogweed, giant	<i>Heracleum mantegazzianum</i>
Knapweed, bighead	<i>Centaurea macrocephala</i>
Knapweed, black	<i>Centaurea nigra</i>
Knapweed, brown	<i>Centaurea diffusa</i>
Knapweed, diffuse	<i>Centaurea diffusa</i>
Knapweed, meadow ⁶	<i>Centaurea jacea x nigra</i>
Knapweed, spotted	<i>Centaurea biebersteinii</i>
Loosestrife, garden	<i>Lysimachia vulgaris</i>
Loosestrife, purple	<i>Lythrum salicaria</i>
Loosestrife, wand	<i>Lythrum virgatum</i>
Parrot feather	<i>Myriophyllum aquaticum</i>
Nutsedge, yellow	<i>Cyperus esculentus</i>
Ragwort, tansy ⁷	<i>Senecio jacobaea</i>
Reed, common, nonnative genotypes	<i>Phragmites australis</i>
Skeletonweed, rush	<i>Chondrilla juncea</i>
Sowthistle, perennial ⁸	<i>Sonchus arvensis ssp. arvensis</i>
Spruce, leafy	<i>Euphorbia esula</i>
Starthistle, yellow	<i>Centaurea solstitialis</i>
Thistle, Italian	<i>Carduus pycnocephalus</i>
Thistle, milk	<i>Silybum marianum</i>
Thistle, Scotch	<i>Onopordum acanthium</i>
Thistle, slenderflower	<i>Carduus tenuiflorus</i>
Toadflax, Dalmatian	<i>Linaria dalmatica ssp. dalmatica</i>

³ Except those portions within T15, 16 17N, R2, 3, 4W.

⁴ Only in those portions of the County lying within T17N R1W 831; T16N R2W 830 WJ 1z; T16N R3W 825 SE; T16N R32 836 NY; T16 R2W 831 NWK

⁵ For policeman's helmet, control is required on land within the following areas and a 200-foot buffer outside of these areas: surface waters including lakes, ponds, both perennial and intermittent streams, stormwater ditches, swales, and retention/detention ponds.

⁶ Except the area below the ordinary high water mark of the Nisqually River downstream from Alder Dam to Puget Sound.

⁷ Tansy ragwort control is required in any area where livestock are present, and other areas identified as lying within 1000-feet of property used for the production of feed or forage, rights-of-way and open forest roads, and within forest designations. If any portion of a parcel falls within this definition, the tansy ragwort shall be controlled on the entire parcel and the entire parcel is subject to enforcement and shall be acted upon.

⁸ Except sections 30, 31 and 32 of township 19 north, range 1 east

In addition to the species listed on the County noxious weed list, other problem weeds are found in Thurston County which are also a problem because of their invasive nature i.e., Brazilian elodea (*Egeria densa*), Canada thistle (*Cirsium arvense*), Scotch broom (*Cytisus scoparius*), English Ivy, Hibernica (*Hedera hibernica*), Baltica (*Hedera helix*), Pittsburg (*Hedera helix*), Star (*Hedera cuspidatum*), and Giant knotweed (*Polygonum sachalinense*).

2.3.5 Pesticide and Herbicide Application

Apply pesticides and herbicides at minimal levels in accordance with the label and targeted to specific disease and weed problems.

General Guidelines

1. **Apply pesticides and herbicides according to the label ... it's the law!**
2. Apply pesticides and herbicides only when needed and use in a manner to minimize off-target effects.
3. Individuals and companies hired to apply pesticides must be licensed in the appropriate categories by the Washington Department of Agriculture (WDA).
4. Know characteristics of the application site, including soil type and depth to groundwater. Be aware of any drinking water wells or natural resources i.e., streams, wetlands and their buffers down gradient of the operation.
5. Select pesticides and herbicides best suited to the characteristics of the target site and the particular pest or weed. Half-life, solubility and adsorption should be compared to site characteristics to determine the safest chemical. Choose least toxic and less persistent sprays whenever possible based on comparison of labels and associated material safety data sheets.
6. Employ application techniques that increase efficiency and allow the lowest effective application rate. Carefully calibrate application equipment and follow all label instructions.
7. Recognize that no landscape should be completely pest-free or weed-free.
8. Accurately diagnose the pest; disease and insect symptoms can mimic each other in many plants. A fungicide will not control an insect, and an insecticide will not control a disease.

Integrated Pest Management / Plant Health Care

1. Use an Integrated Pest Management (IPM) /Plant Health Care (PHC) approach, integrating a variety of management tools (e.g., scouting, monitoring, cultural practices, targeted pesticide application). The pros and cons of various tools should be weighed and used in an integrated manner to achieve pest control objectives in a safe, effective and cost-effective manner.
2. Consider spot treatments of pests rather than treating the entire area.
3. Consider pest occurrence and history when developing pest management strategies.

4. Time pesticide application to minimize host plant damage and maximize pest control.
5. Rotate annual garden plants to reduce the buildup of soil-borne pests.
6. Clean up plant litter and remove weeds before they go to seed.
7. Remove infested plant residue from the garden in the fall so that pests do not overwinter there.
8. Implement cultural controls such as proper plant selection, planting time and planting method to reduce susceptibility to insects, pests and diseases, thereby reducing pesticide usage.
9. Implement mechanical and physical controls where practical as an alternative to chemical application. Examples include a wide variety of practices such as "collars" around seedlings, mulching, solar heating, syringing, handpicking, mowing, hoeing and traps.
10. Use biological controls where appropriate to reduce pesticide usage. For example, introduce natural enemies of pests such as lady beetles, green lacewings. (Note: pesticides may kill these natural enemies.)
11. Consider applying environmentally-friendly chemical alternatives such as insecticidal soaps, horticultural oils and other such measures when practical and effective.

Application Practices

1. Do not apply pesticides or herbicides during high temperatures or windy conditions or immediately prior to heavy rainfall or yard irrigation/watering.
2. Treat for and control noxious weeds prior to installing the landscape using an herbicide targeted to the weeds that are present and applied in accordance with the product label.
3. Be aware that some pesticide formulations are not compatible with other pesticides and combining them may result in increased potency and phytotoxicity.
4. Maintain a buffer zone around wells or surface water where pesticides are not applied. Consult local regulations and landscape ordinances, as well as the product label, for distances, which may vary depending on the type of chemical and the sensitivity of the water body. The purpose of this practice is to keep pesticides and herbicides out of surface water bodies i.e., streams, rivers, and wetlands and their buffers.

2.4 Controlling Pests and Disease

Effective pest control can be achieved by avoidance of circumstances that encourage pest growth and periodic monitoring. Ultimately the types of insect pests that will occur will be based on the type of landscaping plants and grasses used and how well they are maintained. Many insect pests can be avoided by selecting appropriate plants, and by following recommendations on proper care.

The cornerstone of pest management is doing periodic visual checks of your landscaping. This way a new disease or infestation will be spotted before it becomes out of hand. When pest management becomes necessary, an IPM approach should be followed.

IPM is a holistic approach to pest and invasive plant control that consists of: monitoring the problem at hand; determining the injury and action level; correct timing of the solution; and selecting optimal strategies (as defined below) to carry out the solution. The first step is correct identification of the problem pest. Once this has been done, strategies to reduce or eliminate the specific pest can be applied.

IPM practices take into consideration that insects are a natural part of the environment. Therefore it is necessary to determine at what level of infestation they become a problem. Action usually occurs when there is an extensive unacceptable aesthetic change in the vegetation, and in some cases, when the health of an entire landscaped area is in jeopardy.

Optimal strategies are defined as:

- Least damaging to the natural environment and humans.
- Greatest probability of permanent reduction of the intended pest.
- Least disruptive to the natural pest controls at hand.

Pest control can be divided into three types: physical controls (traps, barriers, and hand removal), biological controls (beneficial insects or bacteria), and chemical. Detailed information on specific control techniques are described in the following tables. These levels of controls are ordered from least to most disruptive to the natural system. All of these controls have advantages and disadvantages that must be taken into consideration prior to use.

2.4.1 Early Infestation

Early infestations are defined as small areas of coverage and/or new, less dense populations of the pest (e.g. a few plants in a small area). The goal is to catch the problem pest at this stage before it leads to an advanced infestation. It is recommended that these early infestations be dealt with by using physical controls. Physical controls are the least invasive of all the insect control methodologies. If physical controls alone prove to be ineffective, then appropriate biological controls should be utilized. Biological controls include predatory insects and bacteria. The effectiveness of these less invasive controls has been proven over the last thirty years. Chemical controls are generally not recommended for infestations of this level.

2.4.2 Advanced Infestation

Advanced infestations are defined as large areas of unacceptable aesthetic changes to vegetation due to insects or diseases. When dealing with advanced infestations, it is recommended that biological controls be utilized first. If these methods fail, then it is recommended that botanical and mineral (organic or synthesized) insecticide / fungicide controls (i.e. chemical controls) be implemented. These controls should be applied properly at levels intended to bring the target problem back to a level that can subsequently be managed with the physical and biological controls. Unwise use could lead to an upset in the natural ecological balance of the system and result in wetland and water quality impacts.

Once a decision has appropriately been made to utilize a pesticide, insecticide or fungicide, it should be selected carefully. A number of pesticides that have unrestricted use (that is they are easily available for purchase and use by homeowners and do not require a professional applicators license to apply), have a high potential for leaching into groundwater and thus constitute a risk to nearby ground and surface waters.

Preferred fungicides and pesticides can be found at <http://growsmartgrowsafe.org/>. Pesticides and fungicides are listed as "preferred" if they are less persistent in the environment and break down quickly into non-toxic components following application.

2.4.3 Potential Insect Pests and Their Control

Table 2-5 below describes some of the common insect pests, the type of damage they create and possible methods for their control. Correct identification of the pest is the first step to selecting an appropriate control strategy. The local WSU Cooperative Extension office should be contacted to help with accurate identification of insect pests (360-786-5445). Table 2-6, following, provides a description of the different types of available control techniques i.e., physical, biological, and chemical.

Table 2-5 Common Insect Pests

Host	Description	Damage	Remedy
<p>Aphids (<i>Acyrtosiphon pisum</i>)</p> <p>Many plant species, particularly new plantings.</p>	<p>Soft bodied, pear shaped less than 1/10 inch long, purple, red, light green; to dark green, winged or wingless with a pair of tubes at the end of their abdomen (spray a fluid as a defense mechanism), eggs laid in the fall and hatch the following spring, immediately the nymphs begin feeding by piercing plant tissue to get sap.</p>	<p>Attack new plant growth, particularly succulent herbaceous plant species. Reduce plant vigor, subsequently allowing other pests / diseases proliferate. Attract ants (aphids attract more plant sap than needed as and ants enjoy the plant sap, and in return protect the aphids from various predators).</p>	<p>Physical barriers (sticky traps and Teflon tape). Dusting of diatomaceous earth kills soft bodied adults. Natural predators include lacewings, ladybugs, and trichogramma wasps (purchased or attracted naturally by planting species in the Umbelliferae family (Queen Anne's lace, dill, fennel, and carrot)). Large colonies can be removed by applying insecticidal soap (low toxicity preparations are available in ready-mixed form in plant nurseries).</p>
<p>Cutworm (<i>Noctuidae</i>)</p> <p>Turfgrass, tender plant species.</p>	<p>1 to 2 inches long; grayish or brown larval stage of the moth. Adult moth is gray or brownish with paler hind wings (1-1.5 inches long). Eggs usually laid in the soil, pupae or young larval stage during the winter.</p>	<p>Feed on plant shoots at the soil level, cutting stems at or below ground level.</p>	<p>At dusk, simple bait or equal parts hardwood sawdust, wheat bran, and enough molasses for goeey texture (traps insects so they are unable to burrow back into the ground and become easy prey to predators (trichogramma wasps and predatory nematode species – can be purchased and have no negative effects on humans)). Planting resistant perennial rye grasses is helpful in reducing populations. When all else fails, an application of <i>Bacillus thuringiensis</i> (BT) is very effective (caution must be used with BT because it will attack any larvae form in the soil, even non-target species)</p>
<p>Sod Webworm / Fall Webworm</p> <p>Turfgrass, Lonicern, Malus, Prunus, Salix, Viburnum Spp and other hardwoods.</p>	<p>(<i>Hyphantria cunea</i>)</p> <p>1-inch long, pale green or yellow covered with long silky hairs attached to small humps. Adult is white with brown spots with a 2-inch wingspan. Hair covered eggs are laid in masses on the underside of leaves.</p>	<p>Make nests on the ends of branches and feed on the leaves.</p>	<p>The best long-term cure, in lawn grasses, is to plant resistant grass species. Insect predators such as trichogramma wasps are also helpful. Finally, if no other option is available, an application of BT to the troubled area is effective, but as stated above affects non-target species.</p>
<p>White Grubs (<i>The grubs of Scarab</i>)</p> <p>Turfgrass</p>	<p><i>Beetles, June Bugs, Rose and other Chafers, and Asiatic and Oriental beetles</i></p> <p>C-shaped bodies measure from ¼ to ¾ of an inch long; are blunt-ended and creamy white, with hard yellow or brown heads.</p>	<p>Grubs feed in grass clumps, making lawn appear spongy, brown and easy to pull out. To determine infestation, tear up a square foot of sod, and if more than five grubs per square foot, take action.</p>	<p>Diatomaceous earth is effective in controlling surface feeding grubs. Predatory nematodes are also helpful in attaching and killing grubs</p>

Table 2-5 Common Insect Pests

Host	Description	Damage	Remedy
Root Weevils Rhododendrons and other woody landscape plants	Most distinguishing feature is the presence of an elongated snout with an antennae in the middle. The mouth parts are at the end of the snout. Weevils tend to be small, hard shelled and black. Root weevil larvae are legless, whitish grubs.	The adults are a plant pest, however, it is the larvae stage that feeds on the plant and causes the most damage.	Determine level of infestation, (place tarp under infested tree, shake, adults will drop to the ground. Weevils are nocturnal, best done at night. Unacceptable plant damage will be visible). Physical deterrents (sticky barriers and Teflon tape) applied to the base of the plants. If the population gets out of hand, dust diatomaceous earth on foliage.
Tent Caterpillar (<i>malacosoma dissina</i>) Acer, Alnus, Coryluse, Crataegus, Fraxinus, Malus, Prunus, Ribes, Rosa, Salix and other hardwood species.	Larva stage tends to be about two inches long, pale blue to black with diamond shaped white marks down the middle of its back; with a blue head. Adults are light yellow to brown moths with a one inch wingspan. Eggs are laid in bands around twigs.	Young caterpillars build a web in the branch fork of trees and feed on leaves. Severe infestation can defoliate trees and in some rare cases lead to the tree's death.	Larvae and their "tents" should be physically removed while the larvae are still inside. In the case of severe infestations, BT is very effective, but as stated above affects non-target species.
Scale Insects (Homoptera) Many plant species, particularly fruit trees (apple, cherry, peach, pecan, quince)	Two distinct families (soft and armored scales). Both attach to plant tissues and suck sap, initially appearing as bumps. Soft scales - covered in waxy/cottony substance they secrete. Females wingless; flat and long. Males have single pair of translucent wings or none at all. Eggs appear as cottony sacks. Young nymphs have legs and antennae. Armored - very similar to soft scales, but they possess a much stronger waxy/cottony coating.	In large numbers, these insects tend to weaken the plant host by depleting the nutrient rich sap. When the plant becomes weakened, it is more susceptible to attack by borers and other insect pests/diseases. Limbs of trees that are severely infected with the scales may die.	Physically remove scales with brush and alcohol then hose down to remove crawlers and secretions. Parasitic wasps will feed on the scales and/or lay eggs within host scales, which develop and destroy the host. Some predatory beetles also feed on scales. As a last resort, spray infested areas with horticulture oil or Fastar 2 (these chemical controls only work on mobile stages of scale development).

Table 2-6 Physical, Biological and Chemical Control Techniques

Control Name	Description	Mode of Action	Use	Advantages	Disadvantages	Pest
Physical Controls						
Diatomaceous earth	Skeletal remains of diatoms with tiny barbs	Tiny barbs shred soft-bodied insects.	Dust foliage	Natural pest control, effective	Can be an irritant to human lungs	Aphids, grubs, mealybugs, mites, white flies, and slugs
Sticky barrier (Tanglefoot Tangle Trap)	A band of non-toxic sticky material	Insects permanently stick to material	Wrap trunks with tape	Non-toxic, easy to use	Also traps beneficial insects, use in conjunction with other controls	Root weevils and ants
Sticky Traps (Biolume, Yellow Sticky Traps, Safer's Flying Insect Traps)	Hanging traps with sticky material	Insects permanently stick to material	Place near problem areas	Non-toxic, easy to use	Numerous traps need to cover a large area, unaesthetic, also traps beneficial insects	Aphids and white flies
Teflon Tape (Surefire Teflon Insect Barrier Tape)	White Teflon tape	Tape causes insects to slide off stems as they try to walk	Applied to rhododendrons and other woody species	Non-toxic, highly effective	Unattractive if visible	Root weevils and ants
Biological Controls						
Bacillus thuringiensis (BT), Dipel, Thionicide, Safer's Caterpillar Killer	BT is a bacterium. Different strains are effective against different pests or groups of pests	Larvae eat dusted plant material, the bacteria penetrates their stomach lining causing paralysis	Sprayed/dusted onto problem area, timing critical, apply when larvae are young and feeding	BT strains are selective in their pest target, relatively non-toxic to humans and beneficial insects	Possible allergic reaction or skin irritation from contact	Moth, butterfly, mosquito, and other pest larvae
Trichogramma wasps	Typically adult wasps are brown to black with four clear veined wings. Body size ranges from smaller than a pinhead to two inches long.	Eggs are laid on the unsuspecting host eggs. As the larvae grow, they feed on the host eggs	Release of wasps is recommended in cool evenings or early mornings	Effective natural control	Insects may not remain in the area	Aphids, cutworms, fall webworms / sod webworms, cotton leafworm, bollworm, codling moth, sugarcane borer and others
Beneficial Nematodes (Biosafe, Scanmask, Biovector, Nemesis)	Simple colorless, unsegmented roundworms	Penetrate host body and release symbiotic bacterium then feed on host	Apply from spring to late fall when larvae pests are present and soil is warm	Effective for soil dwelling pests, non-toxic to humans and beneficial insects	Expensive, less effective than chemical controls	Soil dwelling pests, crane fly, flea, root weevil and larvae
Ladybugs	Ladybug species vary from bright reddish yellow bodies with black spots to black bodies	Adult ladybugs and their larvae eat eggs and young	Wet the ground in the evening or early morning and place insects	Non-toxic, natural pest control	Insects may not remain on site	Aphids, scales, and other soft bodied insects
Green lacewings	Pale green with slender bodies and 1/2 to 3/4 inch wings. Larvae are yellowish gray with brown marks, tufts or hair and long jaws	Adults and larvae feed on other insects	Space release intervals between seven days apart	Effective all-purpose predator	Non-native, will not survive a freeze, may not remain on site	Aphids, immature scale insects, spider mites, and various larvae / eggs of other insects

Table 2-6 Physical, Biological and Chemical Control Techniques

Botanical and Mineral Insecticide / Fungicide Controls						
Control Name	Description	Mode of Action	Use	Advantages	Disadvantages	Pest
Insecticidal Soap Ringers	Liquid Spray	Washes away protective coating on insect surface, disrupts normal membrane function	Spray directly onto insect, must be sufficiently wet, can damage foliage	Biodegradable, relatively non-toxic, high effectiveness	Toxic to fish and other aquatic species, can damage foliage, may require numerous treatments	Soft bodied insects such as aphids, mealybugs, white flies, and mites
Horticultural Oil / Dormant Oil Sprays (Scotch Dextol)	Liquid oily spray. Do not use Bordeaux mixtures of dormant oils as they contain copper or arsenate of lead and are highly toxic	Smothers insects and impairs respiration	Apply spray carefully in late winter or very early spring, when no foliage is present	Low toxicity to humans, tends to be biodegradable	Toxic to fish, flammable, kills all insects, damages foliage	Aphids, red spiders, thrips, mealybugs, white fly, pear psylla, scale insects and mites
Sulfur (Safer's)	Premixed spray on liquid	Forms sulfide and inhibits enzymes	Apply to leaf surface, top and bottom	Naturally derived. Less toxic than most fungicides	Can cause eye irritation. Action only preventable in nature	Powdery mildew, black spot, rust, scab, and damping off virus

3.0 HAZARDOUS HOUSEHOLD SUBSTANCES

Pesticides, insecticides and fungicides are toxic and should be handled with care. Carefully read the label of the product and follow the instructions.

Pesticides, herbicides, fertilizers, fuel and other maintenance chemicals must be properly applied, stored, handled and disposed of to prevent contamination of surface water and groundwater. Misuse of pesticides and herbicides can adverse impacts to aquatic life, result in even at low concentrations. Misuse of fertilizer can result in algae overgrowth in water bodies due to excessive phosphorus and nitrogen loading. Table 3-1 and Table 3-2 below represent lists of household products and compounds that have the potential to be harmful and therefore should be used, applied and stored wisely.

Table 3-1 Common Household Products With Potentially Harmful Components

Antifreeze (gasoline or coolant systems)	Metal polishes
Automatic transmission fluid	Laundry soil and stain remover
Battery Acid (electrolyte)	Spot removers and dry cleaning fluid
Degreasers for driveways and garages	Other solvents
Degreasers for engines and metal	Rock salt (Halite)
Engine and radiator flushes	Refrigerants
Hydraulic fluid (brake fluid)	Bug and tar removers
Motor oils and waste oils	Household cleansers oven cleaners
Gasoline and jet fuel	Drain cleaners
Diesel fuel, kerosene, #2 heating oil	Toilet cleaners
Grease, lubes	Disinfectants
Rustproofers	Pesticides (all types)
Car wash detergents	Photochemicals
Car waxes and polishes	Printing ink
Asphalt and roofing tar	Wood preservatives (creosote)
Paints, varnishes, stains, dyes	Swimming pool chlorine
Paint and lacquer thinner	Lye or caustic soda
Paint and varnish removers, deglossers	Jewelry cleaners
Paint brush cleaners	

The risk of groundwater contamination is higher with the use of some pesticides than others. Soil type and the chemical's ability to travel through the soil and remain there without breaking down are factors that affect the contamination risk. The pesticides listed in Table 3-2 are known to leach in Thurston County soils. Use of these compounds should be avoided. Product labels should be consulted before purchasing to check for these compounds.

Table 3-2 Pesticides with a High Leaching Risk

Chemical Name	Example
Herbicides	
2,4 D	Weed 'n' Feed
Acifluorfen	Kleenup
Dicamba	Weedmaster
Dichlobenil	Casoron
Diquat	Knockout
Trifluralin	Preen
Triclopyr	Crossbow
Insecticides	
Diazinon	
Fungicides	
Thiram	Bulb Dust

3.1 Pesticide, Fertilizer and Other Chemical Storage, Handling and Disposal

3.1.1 General Guidelines

1. Apply fertilizers, pesticides and other chemicals according to manufacturer's directions. The label is the law for pesticide usage.
2. Keep pesticide and fertilizer equipment properly calibrated according to the manufacturer's instructions and in good repair.
3. All mixing and loading operations must occur on an impervious surface.
4. Do not apply pesticides during high temperatures or windy conditions.
5. Avoid application of any pesticide, herbicide or fertilizer immediately prior to forecasted or inclement heavy rainfall that may result in runoff of the chemicals.
6. Reduce your use of hazardous materials (fertilizers and pesticides paints, solvents, or other chemicals) and substitute with non-hazardous products whenever possible. The pamphlet "Turning the Tide on Toxins in the Home" lists alternatives to ordinary household products that are less toxic. This pamphlet can be obtained free of charge from the Department of Ecology.

3.1.2 Storage

1. Storage areas should be secure and covered, preventing exposure to rain and unauthorized access. Basic safety equipment such as fire extinguishers, warning signs, adequate light and ventilation and spill clean-up materials should be present. Floors and shelves should be non-porous (e.g., metal, concrete) to prevent sorption of

⁹ Source: Thurston County Public Health and Social Services Department.

chemicals. If possible, temperature control should be provided to avoid excessive heat or cold. Storage areas should be kept clear of combustible material and debris.

2. Store nitrate-based and other oxidizing fertilizers separately from solvents, fuels and pesticides to reduce fire risk. **Follow the general principle of storing like chemicals together.**
3. Store chemicals in their original containers, tightly closed, with labels intact. Also inspect them regularly for leaks.
4. Dry chemicals should be stored above liquids and off the floor to ensure that they do not get wet.
5. Locate chemical storage and maintenance areas, as well as vehicle refueling and maintenance areas, away from wells, surface water bodies and stormwater facilities i.e., catch basins, ditches and/or detention ponds in accordance with local regulations, typically at least 50 to 100 feet away.
6. Do not store pesticides for long periods of time. **Adopt the "first in-first out" principle**, using the oldest products first to ensure that the shelf life does not expire. Buy small or use specific quantities of pesticides and fertilizers, thereby reducing storage issues.

3.1.3 Spills and Disposal

1. Wear protective gear and keep emergency phone numbers available when handling chemicals and their containers.
2. Properly manage chemical spills by cleaning them up as soon as possible, controlling actively spilling or leaking materials, containing the spilled material (e.g., with absorbents, sand), collecting the spilled material, storing or disposing of the spilled material at a licensed disposal site. **"Washing down" a spill with water is not an appropriate cleanup approach.**
3. Never pour lawn and garden chemicals or rinse water down storm drains (or sanitary drains) and keep chemicals off of impervious surfaces (e.g., streets, gutters) during application. Use local recycling centers to dispose of chemicals. When you have left-over hazardous household wastes, use Thurston County's HazoHouse to safely dispose of unwanted left-over wastes. The HazoHouse is located at the Hawk's Prairie Landfill. A brochure entitled "It All Begins at Home" is available to the public and gives further suggestions and guidelines in the proper storage, disposal and handling of hazardous household products.
4. Follow label directions for disposal. This typically involves triple-rinsing empty containers, puncturing and crushing. All visible chemicals should be cleaned from the container prior to disposal.

4.0 COMMUNITY TRACTS

This development has several community stormwater tracts consisting of stormwater systems with amenities (components) within the road rights-of-way that must be properly maintained and monitored to ensure the quality of area ground and surface water resources. Maintenance and conservation of these common tracts will be the responsibility of each individual lot owner via membership, maintenance dues, and participation in the Keeneland Park Homeowners Association.

This Chapter of the IPMP contains information pertaining to the proper maintenance of these common stormwater tracts and systems. The information herein is in the form of individual maintenance checklists that are applicable to the stormwater systems and components that were designed and built specifically for the Keeneland Park Housing Development (both housing clusters). If, upon home construction, individual lot owners are required to implement stormwater controls that are not covered within this IPMP Chapter, additional system or component maintenance guidance may be ascertained by contacting the Thurston County Public Works Department (360-754-3355), or the Department of Ecology's Stormwater Division (360-407-6000).

Any or all of the recommendations presented in Chapters 1.0, 2.0, and 3.0 of this IPMP are also relevant and applicable to the maintenance and care of Community Property. By following this guidance, the Homeowners Association will be able to successfully manage the long-term functionality and viability of these systems.

The following maintenance recommendations were taken from Thurston County's *Drainage Design and Erosion Control Manual for Thurston County*, 1994 Edition.

5.1 HELPFUL CONTACTS AND REFERENCES

Table 5-1 Helpful Contacts

Agency	Phone	Address / Website	Expertise
Sound Native Plants	360-352-4122	PO Box 7505 Olympia WA, 98507 www.soundnativeplants.com	Native plants
Territorial Seed Company	800-626-0866 (for orders)	PO Box 158 Cottage Grove, OR 97424 territorial-seed.com	Native Grass Seed Mixes
The Barn Nursery	360-943-2826	9510 Old Highway 99 SE Olympia, WA 98501 www.thebarnnurseryolympia.com	Native plants
Thurston Conservation District	360-754-3588	921 Lakeridge Way SW, Suite 101 Olympia, WA 98502 www.thurstoncd.com	General Information and Advice

Table 5-1 Helpful Contacts

Agency	Phone	Address / Website	Expertise
Thurston County Development Services	360-786-5490	Thurston County Courthouse Building 1, Second Floor 2000 Lakeridge Drive SW Olympia, WA 98502 www.co.thurston.wa.us/permitting/	Stormwater System Maintenance and BMPs
Thurston County HazoHouse	360-867-2912	2418 Hogum Bay Road NE Lacey, WA 98503	Advice on Storage, Handling, and Disposal of Toxic Substances
Thurston County Noxious Weed Control Agency	360-786-5576	9605 Tilley Road SW Olympia, WA 98512 www.co.thurston.wa.us/lcweeds/index.htm	Plant Identification and Control Measures
Washington State Dept. of Ecology - Water Quality Division/ Stormwater Management	1-800-633-6193 or 360-407-6000 (Reception)	Southwest Region 300 Desmond Drive Lacey, WA 98503 www.ecy.wa.gov/ta.htm	Ecology's <i>Stormwater Manual for Western Washington</i> and Technical Services
Washington State University Cooperative Extension - Thurston County	360-786-5445 ext. 7908	720 Sleater Kinney Road SE, Suite Y Lacey, WA 98503 thurston.wsu.edu	General Information and Advice

Thurston County Public Health and Social Services Department. *It All Begins at Home*. Brochure.

Kruckeberg, Arthur. 1997. *Gardening with Native Plants of the Pacific Northwest*. University of Washington Press; 2nd Rev edition (January 1997). 282 pages.

Dickey, Philip. 1998. *Grow Smart, Grow Safe - A Consumers Guide to Lawn and Garden Products*. Local Hazardous Waste Management Program in King County. 42 pages.

Thurston County Public Health & Social Services Department. Common Sense Gardening Home Page. <http://www.co.thurston.wa.us/health/ehcsg/index.html>. Site visited January 2007.

Thurston County Public Health & Social Services Department. Keeping Your Well, Well Fact Sheets. *Preventing Pesticide Contamination*. October 2003.

Washington State Department of Ecology. *Turning the Tide on Toxins in the Home, a Guide To Safer Alternatives and Proper Disposal of Household Products*. Pamphlet.

Thurston County. Thurston County's Drainage Design and Erosion Control Manual, 1994 Edition.

Washington State Department of Ecology. *Stormwater Management Manual for Western Washington, Volume II*. February 2005. Publication No. 05-10-30.

Thurston County Development Services. Integrated Pest Management. History of the County's Pest and Vegetation Management Policy. <http://www.co.thurston.wa.us/permitting/integrated-pest-management/index.htm>. Site visited January 2007.

INSTRUCTIONS

The following pages contain maintenance needs for most of the components that are part of your drainage system, as well as for some components that you may not have. Let us know if there are any components that are missing from these pages. Ignore the requirements that do not apply to your system. You should plan to complete a checklist for all system components on the following schedule:

- (1) Monthly from November through April.
- (2) Once in late summer (preferably September).
- (3) After any major storm (use 1-inch in 24 hours as a guideline), items marked "S" only.

Using photocopies of these pages, check off the problems you looked for each time you did an inspection. Add comments on problems found and actions taken. Keep these "checked" sheets in your files, as they will be used to write your annual report (due in May). Some items do not need to be looked at every time an inspection is done. Use the suggested frequency at the left of each item as a guideline for your inspection.

You may call the jurisdiction for technical assistance. Please do not hesitate to call, especially if you are unsure whether a situation you have discovered may be a problem.

ATTACHMENT "A": MAINTENANCE PROGRAM

COVER SHEET

Inspection Period _____

Number of Sheets Attached _____

Date Inspected: _____

Name of Inspector: _____

Inspector's Signature _____

ATTACHMENT "A": MAINTENANCE PROGRAM

Maintenance Checklist for Closed Detention Systems (Pipes/Tanks)

Frequency	Drainage Systems Feature	✓	Problem	Conditions to Check For	Conditions That Shall Exist
M	Storage area (pipe tank)		Plugged air vents (small pipe that connects catch basin to storage pipe)	One-half of the end area of a vent is blocked at any point with debris and sediment. Plugged vent can cause storage area to collapse.	Vents free of debris and sediment.
M			Debris and sediment	Accumulated sediment depth exceeds 15% pf diameter. Example: 72-inch storage tank would require cleaning when sediment reaches depth of 10 inches.	All sediment and debris removed from storage area. Contact City Public Works for guidance on sediment removal and disposal.
A			Joints between tank/pipe section	Any crack allowing material to leak into facility.	All joints between tank /pipe sections are sealed.
A			Tank/pipe bent out of shape	Any part of tank/pipe is noticeably bent out of shape	Tank/pipe repaired or replaced to design. Contact a professional engineer for evaluation.
M, S	Manhole		Cover not in place	Cover is missing or only partially in place. Any open manhole requires maintenance	Manhole is closed.
A			Locking mechanism not working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than ½ of thread (may not apply to self-locking lids)	Mechanism opens with proper tools.
A			Cover difficult to remove	One maintenance person cannot remove lid after applying 80 pounds of lift. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
A			Ladder rungs unsafe	Maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks.	Ladder meets design standards and allows maintenance persons safe access.

If you are unsure whether a problem exists, please contact the Jurisdiction and ask for technical assistance.

Comments:

Key:

A – Annual (March or April preferred)

M=Monthly (see schedule)

S= After major storms