

# **INTEGRATED PEST MANAGEMENT PLAN**

**FOR**

**Green Cove Park  
2200 Cooper Point Road  
Olympia, WA**

**OWNER**

**Green Cove Park LLC  
Jerry Mahan, Managing Member**

**Completed By**

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**Prepared by**

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## **Introduction**

The project known as Green Cove Park is a 182-lot subdivision located in Olympia, WA. The site is currently an inactive surface mine. Mining ceased in 2005 when the property was obtained by our client, Green Cove Park, LLC.

## **Definitions**

***Integrated Pest Management Plan (IPMP)*** is a plan designed to manage pests and the toxic chemicals used for their control to alleviate pest problems with the least possible hazard to people, property and the environment.

***Pest*** is defined as unwanted animals, diseases, plants, materials, or organisms' intrusion into the development that is desired to be controlled.

## **Background**

With any urban development the potential from contamination to area lakes, streams and groundwater supplies is increased through the construction of homes, streets, and introduction of people.

The majority of Thurston County has been classified as a Critical Aquifer Recharge Area by the County Health Department. Residents of these areas receive their drinking water from these recharge areas. Activities from new construction can impact the water supply.

The project of Green Cove Park is located within one of these areas as identified by County Health. As a requirement for project approval Health requires the development of this Integrated Pest Management Plan (IPMP).

The IPMP will address potential sources of contamination of both surface and groundwater.

The Integrated Pest Management Plan (IPMP) is the coordinated use of pest and environmental information to design and implement pest control methods that are economically, environmentally and socially sound. IPM promotes prevention over remediation. IPM Plan is a plan that establishes a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks.

This IPM plan seeks to:

1. Recognize these possible contaminants.
2. Recognize the critical natural habitats.
3. Recognize pests that may affect the structures designed to control these contaminants.
4. Assist residents and professional landscapers by describing maintenance practices that are the least damaging to the environment.
5. Recognize responsible parties for implementation of these strategies

Pest management strategies may include education, exclusion, sanitation, maintenance, biological and mechanical controls, and site appropriate pesticides.

## **Project Description**

This project will subdivide 4 existing parcels into 182 single family residential lots, with associated wetlands, buffers, roadways, storm facilities and tree preservation tracts. Public utilities will be provided by the City of Olympia (the City). The project has been designed to meet or exceed the requirements of the City.

According to Thurston County Health Department (Health), the project site is within a high Critical Aquifer Recharge Area (CARA). Health determines the risk using soil mapping provided by USGS. Mapped soils are classified as Alderwood series however due to the past usage of the site native soils are no longer present on site and have been replaced with fill in most areas.

This Pest Management Plan is intended to serve both Site Development and future homeowners. The Management Plan will be incorporated within the Home Owners Association's CC&Rs prepared and recorded at final plat.

## **Existing and Proposed Site Features**

### **1) Natural**

- **Ground Water**  
Most of Thurston County is classified as aquifer sensitive area. This means most of the potable water consumed in this area comes from this aquifer.  
Due to the removal of native soils through the past mining history, and according to the Hydrogeological Report prepared by Earth Solutions North West, this site is no longer contributing to the aquifer. However, Low Impact Development (LID) measures have been proposed to introduce water back into the aquifer where possible through the use of amended soils, perforated pipes and dispersion to name a few.
- **Wetlands**  
There are 3 mapped Category III and 2 Category IV wetlands on site. No Construction activities are proposed for the wetlands. Planting of trees and vegetation is proposed within the associated buffers
- **Streams**  
There are no streams within the project site.
- **Lakes**  
There are no lakes within the project site.
- **Natural Habitat**  
The project has no known critical habitat

## 2) Man Made

### A. Mining Operation:

- Onsite Sewage System (OSS)  
One (1) mound drainfield serving an adjacent property (tax parcel 1280914020) is located on site.  
The drainfield serving the site was abandoned on 2020.05.26 in accordance with Health regulations.
- Individual Well  
One domestic well is located on site and is proposed for decommissioning in accordance with Health regulations at site development.

### B. Stormwater System:

A typical Stormwater system is divided into three parts. The first is the conveyance system the second is the treatment and the final is disposal. Maintaining all three are necessary to assure the system is working as designed.

- Stormwater Conveyance System.  
Storms can wash the containments that build up on streets, roofs and lawns into unprotected areas. The free movement of the water is important so a build up of concentration does not occur in areas that are not designed to receive these containments. Keeping ditches, catch basins, and stormwater piping clean will assure a controlled and predictable flow of contaminated water to the correct receiving facility.
- Stormwater Wet Pond.  
The created ponds for a stormwater system, treat, store and dispose of stormwater. The wet pond receives the water first and will remove **many (but not all)** contaminates through a natural process. The water entering the pond should be a steady flow without disruptions. Deadly chemicals can hinder the natural treatment process and need to be avoided. These chemicals should be controlled at the source.
- Stormwater Retention Pond.  
The final pond is used to store water for a slow infiltration back into the ground. It is important that the bottom of the pond remain in a natural state. Compacting or silting can change or stop the rate of infiltration into the ground. Digging or disturbing the soil can create a fast infiltration rate which would not allow enough time

for the final treatment process of the water. The berms at the top of the ponds should be mowed on a regular basis.

### Gravity Sewer System.

The sewage is handled through a gravity pipe flowing into a sewer lift station. This lift station pumps the effluent into the cities sewer system. Placing rags, bottles, or other debris into the system will clog or destroy the collection and/or the pumping system. The city treatment facility is a natural biological degrading process. Dumping harmful chemicals into the system can create foul smells as well as destroy this biological process and force untreated water into sensitive areas.

## **Best Management Practices**

### **General**

This section deals with identifying possible contaminants, their source, the items that may be affected by their misuse, and suggestions on proper prevention of contamination. The house hold has an unlimited amount of possible harmful contaminants, some which are good in some uses, harmful in others, and some are not normally seen as problems. An example of material not normally considered a problem is top soil. Top soil is washed into catch basins by storms or hosing down driveways, which then clogs the system.

Prevention – the best line of defense. Prevention provides the best line of defense against pest problems and is the least costly. Many pest problems in landscaping can be avoided by selecting plants with known pest resistance and avoiding plants that are known to be susceptible to pest problems.

### **Pesticides**

Typical Products and/or Contaminates: Insecticides, Wood preservatives, Moss inhibitors, Fungicides,

These products are specifically designed to kill organisms. The product should be used only in the manner specifically designed.

#### 1) Stormwater Wet Pond:

These chemicals will inhibit the treatment ability of the pond by killing off the natural growth of the wetland.

#### ) Natural Elements

Plants and animals can be killed by small amounts of these products.

#### 2) Sewer System

The sewer system depends on naturally occurring organisms to treat wastewater. These chemicals will destroy this natural process.

Know the pests you are trying to control. Insecticides should only be used when the level of infestation poses a threat to the life of the host plant. Explore cultural means of controlling the insect by modifying the environment that may favor its present.

Read labels carefully; purchase only environmentally sensitive products. Use them in proper quantities and according to the manufacture's recommendations.

Do not dispose of excess products into the sewer system or the stormwater system.

If storing is required, use only original product containers, or containers specifically designed to hold that chemical for long periods of time and are non-breakable.

The individual land owners are responsible for managing the pesticides within their property.

## **Landscaping**

Typical Products and/or Contaminates: Fertilizers, Weed Control Products, Pesticides

Landscaping is the greatest concern of pest control. The "Best Management Practices" portion of this table is further broken down to better manage contaminates in landscaping.

Selecting indigenous plants provide the owner with the best line of defense against pests, since most of these plants are resistant to local pest populations. Information regarding Noxious Weeds is available at <http://www.co.thurston.wa.us/tcweeds/factsheets.htm>

### **1) All Systems**

Landscaping includes all forms of contamination. The method of constructing and maintaining lawns and gardens can create problems in the entire ecosystem.

### **Surveying:**

Homeowners should establish a schedule for systematically surveying their landscape for pests and damage symptoms. This is an important activity and should be performed on a regular basis. By performing regular surveys, potential pest problems are controlled much easier than if the given pest has time to propagate and spread to other locations. This inspection is equally important within the common areas of Green Cove Park, since pest populations can spread long distances, and by a variety of means. Individual homeowners within Green Cove Park should come to a consensus on the responsibility of the common areas. Often, it is in the best interest of the Homeowner's Association to hire a professional to regularly inspect common

areas. Surveys should be more frequent in Spring and Summer months, which are the principle times for pest activity.

### **Identification:**

Proper identification of the pest or symptom affecting a given plant or plants is an essential step before determining the proper control action. Homeowners should take responsibility to familiarize themselves with the common indicators of pest problems, and/or consult with a professional. There are several professional resources within the community to aid in the identification pests. Landscape contractors, nursery professionals and the Master Gardeners at the WSU Cooperative Extension Office are all valuable resources that can identify pests and recommend appropriate control methods based upon their expertise. Often, providing a portion of the plant that displays the symptom to one of these professionals allows them a visual indicator. This results in a more accurate assessment than just a verbal description. Although they should not be relied upon alone, reference books also provide another valuable resource in diagnosing or identifying a potential pest problem. Before applying any control methods, the homeowner or professional must determine whether action is needed or is likely to be effective. Affected plants should be evaluated in terms of their value in the landscape. It is possible that the value of the plant is much less important and could be replaced with less effort than chemical application. It may be too late for a control to be effective, or the problem may be minor. In some situations, no action may be the best alternative. If action is needed, control methods can be used individually or in combination. Priority should always be given to non-chemical methods.

### **Action Thresholds**

Many pests do not actually kill plants but simply make them unsightly. In a residential landscape setting, the individual homeowner makes decisions as to what is unacceptable damage due to pest activity, at which time some form of control seems necessary. This point may be reached sooner for a favorite plant in a conspicuous location. The action threshold will certainly vary from homeowner to homeowner. However, in commons areas within Green Cove Park, this decision is not as easy. What might be acceptable to one homeowner might not be acceptable to others. It is encouraged during monthly meetings that this issue be discussed, and an action threshold be established by group consensus. Professional judgment will be most useful in these discussions. The professional will have the ability to provide an assessment of the existing state of the common areas and recommend management practices for the future. This will dictate the point at which some level of control be taken for the collective good of the development.

### **Evaluating Treatment Strategies**

Determining the success of a given treatment is essential in any modification of the IPMP. Comprehensive records should be kept by the chosen professional for all areas of management. Complete records will be kept for all treatment strategies in order to evaluate both short/long term success.

Information to be recorded will include:

- Identification of the pest;
- Location and size of affected areas;
- Recent weather including rainfall and temperature;

- Previous control methods;
- Control method to be implemented;
- Dates of implementation;
- Observed changes in condition after treatment.

Such detailed record keeping will aid subsequent landscape professionals in fine-tuning treatment strategies.

### **Residential Development Construction**

Adequate site preparation is essential for the successful implementation of the IPMP. Upper layers of topsoil should be removed from foundation and road areas, and stockpiled. This topsoil may then be reapplied to homesites and common areas as needed. In areas with little or no topsoil, soil amendments such as compost or well-aged manure should be added in a layer between 6 and 12 inches thick. This organic material should then be tilled into the soil thoroughly. The added organic material will serve to enrich the nutrient value of the soil, retain moisture, and filter impurities. In areas with existing noxious weed species such as Scots' broom and Himalayan blackberry, plants will be removed to an off-site dump. These plants will be mechanically pulled prior to excavation to remove as much of the below ground root system as possible. Contractors conducting site work should be mindful of cleaning their equipment prior to completing their work. Plant matter from noxious weeds can be spread from site to site on this manner.

### **Irrigation Practices**

- Irrigation systems should be properly adjusted to only watering plants.
- Watering should occur during early morning hours to reduce evaporative losses and minimize fungal problems in turf grasses.
- During extreme drought conditions, watering will be restricted to priority plantings such as trees and shrubs.

Common areas will be subject to the same water restrictions as individual home owners. In both cases, irrigation systems must be well adjusted and apply water only to plants, not pavement.

### **Fertilizing Options**

All plants need a supply of nutrients in addition to light, air, and water. Plants require several different nutrients to be present in the soil for proper growth and development. Three main elements are responsible for proper plant development: nitrogen, phosphorus, and potassium. Both organic mulches and commercial fertilizers contain these elements, as well as, several trace elements required by plants in much smaller quantities. As explained previously, excess irrigation and high rainfall is responsible for leaching these nutrients from the soil. A brief description of the three main elements follows:

#### *Nitrogen*

Nitrogen is the element needed in the greatest quantity by plants. All nitrogen used by plants comes from combinations of organic matter, air, and commercial fertilizers

and is responsible for most of the visible growth of plants. Nitrogen is found in forms that are either immediately available to plants (soluble or quick release forms) or not immediately available to plants (insoluble or slow release). Due to the chemical nature of nitrogen, it is leached quickly and readily from the soil.

#### *Phosphorus*

Phosphorus is less mobile in most soils than nitrogen but should be used sparingly to avoid overloading the soils or water with excess nutrient. Phosphorus is associated with root development in plants. The most effective method of applying a fertilizer containing phosphate is to concentrate it within the root zone.

#### *Potassium*

Potassium is an element also commonly referred to as Potash. Potassium aids in the flowering and fruiting of appropriate plants and aids in a plant's ability to withstand stress. Potassium can also be leached from the soil like nitrogen and phosphorus.

### **Organic Mulches**

Organic mulches such as barks and composts provide several advantages when compared to commercial fertilizers. The first advantage is that organic mulches provide a well-rounded nutrient source for most plant material and take the guesswork out of using the "right" combination of synthetic fertilizers. These mulches can be applied in fall and/or spring and release nutrients slowly to plants as they break down. This provides most plants with a year-round nutrient source. As organic mulches decompose, they add structure to soils and provide greater moisture retention and help to regulate temperature extremes within the soil. The other benefit is that organic mulches slow the movement of water through the soil by their ability to absorb and retain water. For these reasons, organic mulches are the most preferable means of increasing nutrient levels within soil.

### **Fertilizers**

Fertilizers should only be applied when it becomes evident that a nutrient deficiency exists. Organic mulches will provide adequate quantities of nutrients to plants in the majority of situations and should be applied before fertilizers are considered. Of the commonly applied fertilizers, applications of excess soluble nitrogen constitute the most serious risk to groundwater supplies and the nearby wetland. Commercial fertilizers come in a variety of formulas and forms. These fertilizers usually come in dry or liquid forms that are applied directly to the surface of the soil. These fertilizers can further be divided into quick and slow release formulas. Quick release fertilizers contain forms of nitrogen, phosphorus, and potassium that are readily available to plants. The advantage of this type of fertilizer is that a known nutrient deficiency can be corrected relatively quickly. However, quick release fertilizers should be used only in situations where a specific plant nutrient deficiency is evident. These types of fertilizers migrate quickly through the soil and provide little or no benefit to the plant if excess water is applied. Groundwater supplies used for drinking water may also be contaminated by readily available periods of active plant growth and only when a nutrient deficiency can be determined. In contrast, slow release fertilizers are also available. Slow release fertilizers are applied as little as once a year, ideally at the end of the rainy season. These fertilizers continuously break

down, providing nutrients to plants year-round. For this reason, it is much more difficult for slow release fertilizers to migrate through soil into the groundwater.

### **Application Guidelines**

- Avoid needless applications of fertilizers. Mulching mowers return cut grass to the lawn and can provide up to 1.3 of the entire nitrogen requirements of the lawn. When fertilizing is appropriate, avoid heavy applications of quick release fertilizers, especially in lawn areas. Rather, consider the use of a natural lawn fertilizer. Natural lawn fertilizers are slow release, require fewer applications and provide more uniform growth.
- In lawn areas, apply lighter rates of fertilizer more often. This practice is much more effective than applying heavy rates less often. As an example, 1 pound of soluble nitrogen per 1,000 square feet applied once a month poses less risk to groundwater than 2 pounds of soluble nitrogen per 1,000 square feet applied every two months. In heavy fertilizer applications, the high infiltration rates of the soils in this area allow excess leaching of fertilizer. The majority of quick release fertilizers move below the root zone of plants so quickly that plants do not benefit.
- To fertilize a lawn properly, it is important to first determine the square footage of the lawn area to be fertilized. Once the square footage of lawn areas has been established, a good rule of thumb is to supply 1 to 4 pounds of nitrogen per 1,000 square feet of lawn a year. Fertilizer labels can be confusing, so be sure to consult with a local nursery professional to help decipher how much actual nitrogen is contained within the specific fertilizer product. As a guideline, no more than 1.2 pound of soluble nitrogen per 1,000 square feet should be applied in any single application.
- It is possible to maintain a healthy lawn by using a natural lawn fertilizer once a year in September. If fertilizing twice a year, an additional application should be made in May.
- Avoid over-watering lawns immediately after applying fertilizer. A preferred alternative is to irrigate the lawn thoroughly a day or two before fertilizing; then water briefly after application – just enough to wash the fertilizer off the leaves and into the soil.
- Do not use “weed and feed” type fertilizers, which contain pre-emergent herbicides on lawn areas.

### **Weed Control**

Mechanical and cultural control methods are the preferred means of weed control within Green Cove Park. These methods include combinations hand pulling, tilling, installation of weed barriers, and application of organic mulch. These control methods are preferred to using herbicides, since herbicides may harm desirable plants and contaminate groundwater supplies. The wetland and its buffer should be monitored for in the invasion of noxious vegetation. If noxious weeds are found,

they should be hand-pulled or cut to prevent the loss of desired species from competition. Irrigation and fertilization techniques confined to the needs of desirable plants help keep weed growth from becoming too invasive. Chemical weed control is only appropriate for homesites, and only in situations where mechanical and cultural means of control have been proven ineffective. If chemical weed control becomes appropriate, the following guidelines should be followed:

- Individual homesites should use Roundup brand herbicide. This product is one of few herbicides without lasting residues.
- Applications should be timed to provide for best results. Always follow product label directions.
- Applications should be made during windless periods at least 4 hours before probable rainfall, and early in the morning before the day heats up.
- Do not use “weed and feed” type fertilizers, which contain pre-emergent herbicides on lawn areas.
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Use of any other herbicides should be recommended and applied by a licensed professional, especially in common areas

The individual land owners are responsible for managing the landscaping items within their property

### **Stormwater Ponds**

Fertilizers, Weed Control Products, Pesticides

Maintaining the stormwater facilities should be completed by professionals who are knowledgeable in these types of facilities and how they work.

#### 1) Stormwater System

Excessive growth, silted in bottoms, clogs, should be maintained on a regular basis.

Hire a professional landscaper to maintain the facility

Home Owners Association

### **Soil and Vegetation Plan**

The follow pages are from the Soil and Vegetation Plan prepared for the project

## 5.2 Tree Density

Tree units were calculated in **Appendix C** for each stand and the results are summarized in **Table 4**.

**Table 4. Summary of Results**

Area	Existing Acreage	Existing Tree Units	Forested Acreage Proposed to be Removed	Acreage to be Preserved	Remaining Tree Units
Area 1	2.97	1,812	0.25	2.72	1,658
Area 2	2.52	1,580	0.53	1.99	1,248
Area 3	0.45	140	0.08	0.37	106
Area 4	1.75	492	0.48	1.27	361
Area 5	6.89	5,928	1.93	4.96	4,265
Area 6	0.66	470	0.36	0.3	217
<b>Total</b>	15.24	10,422	3.63	11.61	7,855

Existing tree units onsite were calculated at ten thousand four hundred twenty-two (10,422) (**Appendix C, Sheet 4**). A total of 3.63 acres of forested area will be cleared and graded according to the clearing and grading plan. The total acreage of forested area to be preserved is 11.61 acres, totaling seven thousand eight hundred fifty-five (7,855) tree units (**Sheet 4**). The minimum required tree units for the subject property per OCC Table 16.60.080A is nine thousand four hundred three (9,403) tree units. Planting of one thousand twelve (1,012) trees is required to satisfy minimum tree unit requirements (**Sheet 4**).

## 6.0 PLANTING PLAN AND MITIGATION

### 6.1 Mitigation Specifications

#### 6.1.1 Mitigation Sequencing

The preservation and protection of existing, mature trees in good condition is given priority to meet minimum tree density requirements onsite. Preservation and protection of existing trees was not sufficient to achieve minimum tree density requirements onsite; therefore, one thousand twelve (1,012) replacement trees will be planted in designated tree preservation areas (**Sheet 4**). A tree preservation fence will be installed around the tree preservation areas.

## 6.1.2 Preservation and Protection Measures

Several tree preservation areas have been designated onsite and tree protection measures will be implemented before construction activities begin onsite. Tree protection measures will be in compliance with City of Olympia's Forestry Manual. No materials or construction activity will occur in the tree preservation areas.

### 6.1.2.1 Protective Barrier

Prior to development, land clearing, filling or any land alteration begin, the applicant:

- A. Shall erect and maintain readily visible protective tree fencing along the outer edge and completely surrounding the protected area of all protected trees or groups of trees. Fences shall be constructed of chain link and at least four (4) feet high, unless other type of fencing is authorized by the City Urban Forester.
- B. May be required to cover with mulch to a depth of at least six (6) inches or with plywood or similar material the areas adjoining the critical root zone of a tree in order to protect roots from damage caused by heavy equipment
- C. Shall prohibit excavation or compaction of earth or other potentially damaging activities within the barriers
- D. May be required to minimize root damage by excavating a two (2) foot deep trench to cleanly sever the roots of trees to be retained
- E. Shall maintain the protective barriers in place until the City Urban Forester authorizes their removal or a final Certificate of Occupancy is issued, whichever occurs first
- F. Shall ensure that any landscaping done in the protected zone subsequent to the removal of the barriers shall be accomplished with light machinery or hand labor

### 6.1.2.2 Grade

- A. The grade shall not be elevated or reduced within the critical root zone of trees to be preserved without the City Urban Forester's authorization. The City Urban Forester may allow coverage of up to one-half (1/2) of the area of the Tree's critical root zone with light soils (no clay) to the minimum depth necessary to carry out grading or landscaping plans, if it will not imperil the survival of the tree. Aeration devices may be required to ensure the tree's survival
- B. If the grade adjacent to a preserved tree is raised such that it could slough or erode the Tree's critical root zone, it shall be permanently stabilized to prevent suffocation of the roots
- C. The applicant shall not install an impervious surface within the critical root zone of any tree to be retained without the authorization of the City Urban Forester. The City Urban Forester may require specific construction methods and/or use of aeration devices to ensure the tree's survival and to minimize the potential for root induced damage to the impervious surface
- D. To the greatest extent practical, utility trenches shall be located outside of the critical root zone of trees to be retained. The City Urban Forester may require that utilities be tunneled under the roots of trees to be retained if the City Urban Forester determines that trenching would significantly reduce the chances of the trees' survival

- E. Trees and other vegetation to be retained shall be protected from erosion and sedimentation

### 6.1.2.3 Directional Felling

Directional felling of trees shall be used to avoid damage to trees designated for retention.

### 6.1.2.4 Additional Requirements

The City Urban Forester may require additional tree protection measures which are consistent with accepted urban forestry practices.

## 6.2 Replacement Tree Planting Specifications

### 6.2.1 Planting Plan

The planting plan will designate tree preservation areas including wetlands and the associated buffers.

### 6.2.2 Planting Specifications

The planting plan calls for installing native tree species in the planting areas totaling two hundred eighty-nine thousand twelve (289,012) sf (**Table 5**). Planting native, drought tolerant conifer species were given priority in the following order:

- A. In non-forested wetland buffer (to improve habitat function and create protective barrier)
- B. Adjacent to Cooper Point RD NW (to create sound and visual buffer between development, critical areas, and development)
- C. In areas cleared and graded (to prevent erosion and to shade out opportunistic invasive species)

**Table 5. Planting Plan**

Replacement Tree Planting Plan						
Tree species	Scientific Name	Number	Container	Cost/plant	Cost	
Douglas Fir	<i>Pseudotsuga menziesii</i>	337	3' cuttings	\$10.00	\$3,370.00	
Western Red Cedar	<i>Thuja plicata</i>	337	3' cuttings	\$10.00	\$3,370.00	
Sitka Spruce	<i>Picea sitchensis</i>	338	3' cuttings	\$10.00	\$3,380.00	
Total		1012			\$10,120.00	
Plant Types	Feet on center	Area (sf)	Plants/Acre	Plants/sf	# Plants	
Trees	15	289,012	152	0.0035	1012	
	Est. cost per plant		# Plants	Total Cost		
Trees	\$10.00		1012	\$10,120.00		
		Total	1012			
Total Cost of Plants		\$10,120.00				

Plants proposed for installation are three (3) foot conifers. The cost for plant stock covering planting in the tree preservation areas is estimated at **\$10,120** (\$10 per sapling) per average nursery cost for bulk purchasing of saplings. The planting plan for the replacement trees consists of native plant species.

### **6.2.3 Replacement Tree Quality**

Replacement trees shall be the American Standard for Nursery Stock Grade Number 1 or better and will be approved by the Urban Forester prior to planting.

### **6.2.4 Replacement Trees – Species and Spacing**

The species selection and spacing of trees to be planted shall be such that it provides for the eventual mature size of the trees. Soil type, soil conditions and other site constraints shall be considered when selecting species for planting. Douglas fir (*Pseudotsuga menziesii*) and Western red cedars will be planted fifteen (15) feet off-center.

### **6.2.5 Soil Amendments**

As a result of pre-existing gravel extraction, disturbed soils occur on the majority of the subject property (**Sheet 6**). Some areas proposed for planting contain soils that were minimally disturbed some time in the past (**Sheet 7**). These soils are largely intact and are vegetated by shrubs or grasses.

No major soil amendments are necessary in planting areas because these areas contain minimal soil disturbance and existing shrubs and herbaceous vegetation. Soil amendments would unnecessarily disturb soils and remove native plant species.

A large planting hole, at least twice as wide as the root ball, will be excavated to encourage rapid root growth and plant establishment. The planting hole will be excavated as deep as the root ball. Organic amendments will be added to the planting hole in areas of disturbed soils if necessary.

### **6.2.6 Required Cultural Practices**

Trees shall be watered as necessary to ensure establishment, survival and growth, during the first three (3) growing seasons after planting. They shall be mulched with four (4) inches deep of composted mulch. Staking and fertilizer shall, only be required where deemed necessary by the Urban Forester.

### **6.2.7 Required Pruning (Conifer Trees)**

Pruning shall be performed on newly planted deciduous trees pursuant to the following schedule and standards.

Year 1 – Only dead, broken and/or double. Leaders shall be pruned when the tree is planted.

Year 2 – Depending on species, the tree shall be pruned/sheared to encourage one (1) central leader. Lower branches shall be pruned as needed to provide clearance.

Year 3 – Depending on species, the tree shall be pruned/sheared to encourage one (1) central leader. Lower branches shall be pruned as needed to provide clearance.

### 6.2.8 Additional Maintenance Invasive Plant Control and Removal

Invasive species to be addressed include Himalayan blackberry (*Rubus armeniacus*), scotch broom (*Cytisus scoparius*), English laurel (*Prunus laurocerasus*), English ivy (*Hedera helix*), and all listed noxious weeds. Invasive plant species, specifically Himalayan blackberry, are well-established within portions of the site that will not be cleared and/or will be planted for tree replacement. An effective control strategy is recommended in all native vegetation areas. Invasive plants within the remaining areas should be pretreated with a root-killing herbicide a minimum of two (2) weeks prior to being cleared and grubbed. The pre-treatment with herbicide should occur prior to all planned replanting actions, and spot treatment of surviving invasive vegetation should be repeated until effectively controlled.

### 6.2.9 Implementation Schedule

Planting actions will begin after the completion of all clearing, grading, and construction.

#### Cost Estimate

Item	Estimate cost
Plant Stock	\$10,120
Planting crew	\$2000
Monitoring	\$3000
Contingency	\$800
Total	\$15,920

## 7.0 CONCLUSION AND SUMMARY

A Tree Inventory Report was prepared to summarize tree density on the subject property and satisfy with the City of OCC 16.60.050. Stands with even and uniform forest character were divided and labeled Areas 1-6.

Trees were inventoried using standard forest mensuration techniques to satisfy the City of Olympia Urban Forestry Manual's requirements. Two (2) methodologies were used to determine tree units on the site, fixed plot quadrats and one hundred percent (100%) sampling.

Four (4) fixed plot quadrats were surveyed in four (4) stands to determine basal area per acre for each stand. Basal area per acre was expanded to calculate tree units in each stand. Two (2) stands were one hundred percent (100%) inventoried due to lack of small trees and open understory.