



Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

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**CRITICAL AREA STUDY  
AND  
MITIGATION PLAN  
FOR  
Heathers Ridge South**

*Wetland Resources, Inc.* Project #15023

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**TABLE OF CONTENTS**

|   |    |
|---|----|
| PROJECT LOCATION AND SITE DESCRIPTION               | 1  |
| PROJECT DESCRIPTION                                 | 1  |
| REVIEW OF EXISTING INFORMATION                      | 1  |
| METHODOLOGY   | 2  |
| <u>Vegetation Criteria</u>                          | 2  |
| <u>Soils Criteria</u>                               | 2  |
| <u>Hydrology Criteria</u>                           | 3  |
| BOUNDARY DETERMINATION FINDINGS/RESULTS             | 3  |
| <u>Stream</u>                                       | 3  |
| <u>Upland/Buffer Areas</u>                          | 4  |
| FUNCTIONS AND VALUES ASSESSMENT                     | 4  |
| PROPOSED DEVELOPMENT ACTIVITIES                     | 5  |
| GENERAL MITIGATION STANDARDS                        | 5  |
| BUFFER WIDTH AVERAGING                              | 6  |
| STORMWATER OUTFALL IMPACTS                          | 7  |
| TEMPORARY GRADING IMPACTS                           | 7  |
| BUFFER ENHANCEMENT PLANTING PLAN                    | 7  |
| GOALS, MONITORING, MAINTENANCE, AND CONTINGENCY     | 9  |
| <u>Goals, Objectives, and Performance Standards</u> | 9  |
| <u>Monitoring</u>                                   | 9  |
| <u>Contingency</u>                                  | 10 |
| <u>Maintenance</u>                                  | 10 |
| COST ESTIMATE AND PERFORMANCE BOND                  | 11 |
| USE OF THIS REPORT                                  | 11 |
| REFERENCES  | 12 |

**APPENDICES**

|   |
|---|
| APPENDIX A: FIELD DATA SUMMARY SHEET (OCTOBER 2011) |
| APPENDIX B: CITY OF REDMOND STREAM SUMMARY SHEET    |
| APPENDIX C: SITE PHOTOS                             |
| APPENDIX D: CRITICAL AREAS MAP                      |
| APPENDIX E: MITIGATION PLAN MAP                     |

## PROJECT LOCATION AND SITE DESCRIPTION

Wetland Resources, Inc. (WRI) completed a site investigation on October 20, 2011, August 20, 2013, and May 29, 2015 to evaluate and delineate jurisdictional wetlands and streams on and in the vicinity of King County parcel #0325059100. The subject property is located south of the intersection of 134th Avenue NE and NE 100th Street in the City of Redmond, Washington. The Public Land Survey System (PLSS) locator for the site is Section 03, Township 25N, Range 05E, W.M. The subject property is situated within the Cedar/Sammamish Watershed, or Water Resources Inventory Area (WRIA) 8.

The 1.53-acre subject property is undeveloped and located in a residential setting. The site has a gentle southeast aspect with a shallow ravine along the eastern border. The eastern and southern portions of the site contain forested vegetation, and scattered trees are present in the northwest corner as well. The center portion is dominated by a mix of herbaceous and scrub-shrub vegetation. The subject property is bordered on the north by NE 100th Street. Developed parcels are located to the east, west, and south, along with undeveloped, forested areas.

The site investigations resulted in the identification of one stream along/near the eastern property boundary and extending off-site to the southeast. In addition, steep slopes (approx. 40%) are located in the southeast property corner.

## PROJECT DESCRIPTION

Quadrant Homes (the applicant) is proposing the construction of eight single-family lots and associated infrastructure on the subject property. The project site is located in the R-1 and RIN zones.

## REVIEW OF EXISTING INFORMATION

As part of this project, public resources were reviewed to gather background information on the subject property, the surrounding area, and critical areas in the vicinity. The following information was examined:

- USFWS National Wetlands Inventory: The National Wetland Inventory (NWI) does not indicate any wetland areas on the subject property.
- USDA/NRCS Web Soil Survey: The soil mapped within the project area includes Alderwood gravelly sandy loam, 0 to 6 percent slopes, and Alderwood gravelly sandy loam, 6 to 15 percent slopes. Neither soil is classified as hydric by the Natural Resources Conservation Service (NRCS).
- WDFW SalmonScape Interactive Mapping System: The SalmonScape interactive map illustrates the off-site portion of the stream identified during the October 2011 and August 2013 site investigations. SalmonScape also indicates that fish use (Coho salmon) is present in the easternmost portion of the stream, east of Willows Road NE, approximately two miles away from the subject property.
- StreamNet Interactive Mapper: The StreamNet interactive mapping system illustrates the off-site portion of the identified stream and indicates fish use in the same location as the SalmonScape map.

- WDFW Priority Habitat and Species (PHS) Interactive Map: There are no priority habitats or listed species on the subject property per the PHS Interactive Map. The off-site portion of the identified stream is illustrated, however.
- King County iMap Interactive Mapping Tool: Similar to the other mapping systems, the King County iMap illustrates the off-site portion of the identified stream.
- City of Redmond Maps: The off-site portion of the identified stream is illustrated on the following City of Redmond maps: Critical Areas Map (Map 64.4: Wetlands), Critical Areas Map (Map 64.3: Streams Classification), and Fish and Wildlife Habitat Conservation Areas. The stream is labeled Gun Club Tributary on the City's Streams Classification Map. The stream is also illustrated on the City's Property Viewer Interactive Map.

## **METHODOLOGY**

Wetland boundaries were determined using the routine determination approach described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), or Corps Manual, and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (U.S. Army Corps of Engineers 2010), or the Regional Supplement. Under the routine methodology, the process for making a wetland determination is based on three steps:

- 1.) Examination of the site for hydrophytic vegetation (species present and percent cover);
- 2.) Examination of the site for hydric soils;
- 3.) Determining the presence of wetland hydrology

The following criteria must be met in order to make a positive wetland determination:

### **Vegetation Criteria**

The Corps Manual and 2010 Regional Supplement define hydrophytic vegetation as “the assemblage of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence.” Field indicators are used to determine whether the hydrophytic vegetation criteria have been met. Examples of these indicators include, but are not limited to, the rapid test for hydrophytic vegetation, a dominance test result of greater than 50%, and/or a prevalence index score less than or equal to 3.0.

### **Soils Criteria**

The 2010 Regional Supplement (per the National Technical Committee for Hydric Soils) defines hydric soils as soils “that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.” Field indicators are used to determine whether a given soil meets the definition for hydric soils. Indicators are numerous and include, but are not limited to, presence of a histosol or histic epipedon, a sandy gleyed matrix, depleted matrix, and redoximorphic depressions.

## **Hydrology Criteria**

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on the characteristics of vegetation and soils due to anaerobic and chemically reducing conditions, respectively. The strongest indicators include the presence of surface water, a high water table, and soil saturation within at least 12 inches of the soil surface.

## **BOUNDARY DETERMINATION FINDINGS/RESULTS**

No wetlands were identified on or near the subject property during the site investigations. However, one stream was identified along and near the eastern property boundary. The ordinary high water mark (OHWM) of the stream was identified using the methodology described in the Washington State Department of Ecology document Determining the Ordinary High Water Mark on Streams in Washington State (Second Review Draft) (Olson and Stockdale 2010). The stream was categorized according to Redmond Zoning Code (RZC) section 21.64.020(A)(2)(d) and was classified according to the U.S. Fish and Wildlife Service (USFWS) Classifications of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979), also known as the Cowardin Classification System.

### **Stream**

The identified stream is a perennial feature that meets the criteria for a Class IV stream per RZC 21.64.020(2)(d). It enters the property in the northeast corner via a culvert under NE 100th Street, crosses the northeast property corner, and then flows off-site to the southeast. The stream continues flowing south, roughly paralleling the eastern property boundary. Based on the Cowardin Classification System, the stream is a riverine, lower perennial, unconsolidated bottom, mud and cobble-gravel system (R2UB1/3).

The on-site portion of the stream, as well as a section of the off-site portion, was inspected during the 2011, 2013, and 2015 site investigations. Stream substrate is comprised of small cobbles, gravel, and mud/silt. The channel is shaded by fairly dense riparian vegetation, though the northernmost section, adjacent to NE 100th Street, is dominated by invasive Himalayan blackberry. Small woody debris was observed throughout most of the inspected portion of the stream. A few larger pieces were also observed. An approximate 5-foot drop was observed in the off-site portion of the stream. The stream channel was dry in this location. Upstream of this location, however, as well as on-site, the stream was flowing.

The stream is a tributary to the Sammamish River. It is a non-fish bearing stream in the vicinity of the subject property. Between 2004 and 2005, Washington Trout (now the Wild Fish Conservancy Northwest) conducted the “Redmond, Washington Fish and Fish Habitat Distribution Study.” The study evaluated fish species composition at downstream and upstream road crossings on each of 21 City of Redmond watersheds. The study also conducted formal water typing surveys in 18 of the City of Redmond watersheds. During these studies, Washington Trout crews collected data on riparian characteristics, fish barriers, channel gradients and widths, and qualitative habitat information, along with supporting photographs. Washington Trout assessed the off-site portion of the stream that is located on/near the project

site. Their assessment began approximately 800 to 900 feet downstream (southeast) of the project site. Washington Trout determined that the northern portion of the stream segment they examined to be non-fish bearing. Since the on-site stream conditions are somewhat similar to the stream segment that was inspected during the study, this non-fish bearing status extends upstream for the remainder of the stream course (i.e. up to the culvert located at NE 100th Street). The City of Redmond Streams Classification Map indicates that the on-site portion of the stream is categorized as a Class IV stream (i.e. non-fish bearing).

Per RZC section 21.64.020(B)(3), perennial Class IV streams require 36-foot buffers measured horizontally from the OHWM.

### **Upland/Buffer Areas**

Vegetation throughout the upland and buffer areas consists of trees in the northwest corner and along the eastern property boundary. The center of the property is relatively open and appears to be abandoned pasture that is currently dominated by Himalayan blackberry (*Rubus armeniacus*) and creeping buttercup (*Ranunculus repens*). The southern portion of the subject property is forested and part of a forested corridor that extends off-site to the south. Typical vegetation in the forested portions of the site is represented by big leaf maple (*Acer macrophyllum*), Indian plum (*Oemleria cerasiformis*), Himalayan blackberry (*Rubus armeniacus*), creeping buttercup (*Ranunculus repens*), and sword fern (*Polystichum munitum*). Vegetation in the abandoned pasture area is comprised of scattered big-leaf maple saplings, with Himalayan blackberry, creeping buttercup, colonial bentgrass (*Agrostis tenuis*), orchard grass (*Dactylis glomerata*), and small patches of reed canarygrass (*Phalaris arundinacea*). Soils across the site have matrix colors ranging from very dark grayish brown to dark yellowish brown with textures of gravelly sandy loam from 0 to 18 inches below the surface. Soils were moist to dry during the October 2011 and August 2013 site investigation.

It should be noted that as of May 2015, the majority of the subject property has been cleared of vegetation in preparation for construction. The exception to this is the stream buffer, which has not been cleared or altered.

### **FUNCTIONS AND VALUES ASSESSMENT**

The methodology for this functions and values assessment is based on professional opinion developed through past field analyses and interpretations. This assessment pertains specifically to the on-site stream system, but is typical for assessments of similar systems throughout western Washington.

Streams and their associated floodplains in western Washington perform a variety of ecosystem functions including the movement of water and sediment, recharge of groundwater, treatment of pollutants, dynamic stability, and habitat diversity. Assessments of these functions for the project site are provided below.

The on-site stream serves to collect stormwater from the surrounding areas and convey it to downstream systems. The vegetation and micro topography in the adjacent upland buffer serves to filter and trap sediments and pollutants in small, overbank areas bordering to the stream and to naturally purify in-stream flows. The stream and associated buffer comprise part of a larger, natural area (extending off-site to the south/southeast) that provides some wildlife habitat as well

as a protected movement corridor. Forested and scrub-shrub vegetation in the stream buffer provides shade and allochthonous material to the stream and downstream systems and generally improves the stream's functions and values.

Along with the preceding functions and values, stream buffers often provide additional functions in western Washington such as physical protection to the stream and aesthetic value.

### **PROPOSED DEVELOPMENT ACTIVITIES**

The project applicant is proposing the development of an 8-lot subdivision and associated infrastructure. In order to accomplish this project, portions of the stream buffer must be reduced. To compensate for these reductions, buffer width averaging and buffer enhancement is being proposed. The resulting stream buffer will be slightly larger in area than the standard buffer area prior to averaging and will be planted with native upland vegetation. In addition, two stormwater outfall pipes will extend into the stream buffer and rip-rap dispersion pads will be located at the pipe outlets. The outfall pipes – which will be placed below ground – represent temporary impacts; the areas will be returned to their pre-existing conditions following installation. The rip-rap pads will be planted with willow whips to compensate for the small impact area and to assist with stormwater dispersion. Furthermore, temporary buffer impacts (220 SF) will occur in the northern portion of the stream buffer, east of Lot 2. Grading activities will occur in this area in order to avoid the installation/construction of additional rockery walls. The temporary impact area will be restored with native vegetation as part of the overall buffer enhancement actions.

### **GENERAL MITIGATION STANDARDS**

Per section 21.64.010(I) of the RZC, all adverse impacts to critical areas must be mitigated. The following sequence of mitigation actions must be applied by the project applicant:

- Avoiding the impact altogether by not taking a certain action or parts of actions;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;
- Rectifying the impact to the critical area by repairing, rehabilitating, or restoring the affected environment to the conditions existing at the time of the initiation of the project;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
- Compensating for the impact by replacing or providing substitute resources or environments; and/or
- Monitoring the hazard or other required mitigation and taking remedial action when necessary.

Complete avoidance of stream buffer impacts is not feasible for this project. The proposed lot sizes are the smallest practicable while still allowing for some usable yard/lawn areas. Per the RZC, the minimum average lot area for this zone is 4,000 square feet (SF); the proposed yard areas are required to meet the lot sizes. In addition, the RZC requires that 10% of the project

site area be provided by lot-by-lot open space. For the proposed Heathers Ridge South project, the required lot-by-lot open space is 6,648 SF; the project applicant is proposing 6,757 SF.

Stream buffer impacts have been minimized to the maximum extent practicable. The buffer will be reduced only where necessary to allow for lot development, and nowhere will the buffer be reduced to less than 25 percent of the standard buffer width. There are several areas where the buffer could have been further reduced, thereby utilizing the full, allowable reduction, yet this was avoided in order to minimize impacts.

The affected environment, i.e. the reduced buffer areas, cannot be repaired, rehabilitated, or restored to previously existing conditions since buffer reduction is a permanent action. Similarly, reducing or eliminating the impacts over time is not feasible due to their permanent nature. However, averaging and enhancement of the remaining buffer will replace the lost square footage and improve buffer functions and stream protection.

Compensation for the reduced buffer areas will be in the form of buffer width averaging and buffer enhancement. The total area (square footage) of the new/averaged buffer areas will be slightly larger than those areas that are being reduced. Furthermore, native trees and shrubs will be planted throughout the remaining buffer area. This will improve the existing buffer functions and will avoid any future impacts. Currently, the stream buffer contains only scattered, mature trees, a sparse shrub layer, and a fairly dense herbaceous layer. The northernmost portion of the buffer is dominated by a dense layer of Himalayan blackberry, which will be removed as part of the buffer enhancement plan.

### **BUFFER WIDTH AVERAGING**

The proposed project will require averaging the width of the stream buffer in order to allow for lot development and to avoid greater impacts. Per section 21.64.020(B)(6) of the RZC, stream buffer width averaging may be approved by the Administrator if the following criteria are met:

- The width reductions will not reduce stream or habitat functions, including those of non-fish habitat;
- The width reduction will not degrade the habitat, including habitat for salmonid fisheries;
- The proposal will provide additional habitat protection;
- The total area contained in the stream buffer area after averaging is no less than that which would be contained within the standard stream buffer area; and
- The buffer width is not reduced to less than 25 percent of the standard stream buffer width, or 25 feet, whichever is greater.

The Class IV stream will not be impacted by the buffer reductions due to the small size/quantity of the areas being reduced. The replaced/additional buffer areas will adequately replace those areas being reduced. They are similar in nature and vegetative composition. Furthermore, the stream buffer (following averaging) will be enhanced with native trees and shrubs, which will improve buffer functions and stream protection. A total of 8,925 SF of stream buffer will be enhanced.

The amount of stream buffer being reduced/removed is 1,215 SF. The replacement buffer totals 1,303 SF.

The size of the buffer area following averaging will be no less than the size of the standard buffer area, and the width of the buffer shall not be reduced more than 25 percent of the standard buffer width (i.e. no less than 27 feet).

Permanent signage and fencing shall be installed along the perimeter of the critical area boundary per RZC 21.64.010(R). In addition, a Native Growth Protection Area (NGPA) tract will be established for the on-site stream and buffer area to provide permanent protection for these resources (Tract C on the project site plans and critical areas study map).

### **STORMWATER OUTFALL IMPACTS**

Two stormwater outfall pipes will be constructed within the project site. One will be placed within a portion of the southern stream buffer. This pipe will originate south of Lot 6 and extend east into the buffer. The second outfall pipe will be located adjacent/parallel to the northern property boundary and will extend east into the stream buffer. Rip-rap dispersion pads will be located at both pipe outlets. These pipes represent temporary impacts; they will be placed below ground and the areas will be returned to their previously existing conditions following installation. The dispersion pads will be planted with willow whips (*Salix* sp.) to aid in stormwater dispersion and help reduce the velocity of stormwater as it exits the pipe. The northern rip-rap pad (64 SF) will be planted with 16 willow whips while the southern pad (25 SF) will be planted with 7 willow whips. Whips will be planted two feet on-center (OC).

### **TEMPORARY GRADING IMPACTS**

Approximately 220 SF of stream buffer will be temporarily impacted by grading activities. The impact area will be located in the northern portion of the stream buffer, just east of Lot 2. Grading this area will avoid the need for additional rockery walls and, therefore, permanent impacts. This area will be restored as part of the overall buffer enhancement plan (see below).

### **BUFFER ENHANCEMENT PLANTING PLAN**

In order to compensate for buffer width averaging and provide additional habitat protection, approximately 8,925 SF of stream buffer will be enhanced with native trees and shrubs. Currently, the stream buffer contains only scattered, mature trees, a sparse shrub layer, and a fairly dense herbaceous layer. The northernmost portion of the buffer is dominated by a dense layer of Himalayan blackberry, which will be removed as part of the enhancement plan. The enhancement plan includes the additional buffer areas being designated as part of buffer width averaging (1,303 SF).

Table 1, below, lists the species that will be planted throughout the buffer enhancement area.

**Table 1: Species List for Stream Buffer Enhancement Area (8,925 SF)**

| Species         | Scientific Name              | Size     | Spacing            | Quantity |
|-----------------|------------------------------|----------|--------------------|----------|
| Douglas fir     | <i>Pseudotsuga menziesii</i> | 1 gallon | 10' on-center (OC) | 45       |
| Big-leaf maple  | <i>Acer macrophyllum</i>     | 1 gallon | 10' OC             | 45       |
| Vine maple      | <i>Acer circinatum</i>       | 1 gallon | 5' OC              | 66       |
| Thimbleberry    | <i>Rubus parviflorus</i>     | 1 gallon | 5' OC              | 66       |
| Indian plum     | <i>Oemleria cerasiformis</i> | 1 gallon | 5' OC              | 66       |
| Snowberry       | <i>Symphoricarpos albus</i>  | 1 gallon | 5' OC              | 66       |
| Pacific willow* | <i>Salix lasiandra</i>       | Whips    | 2' OC              | 23       |

\*For rip-rap dispersion pads only. The northern rip-rap pad shall be planted with 16 whips; the southern pad shall be planted with 7 whips.

Throughout the planting area, trees will be planted at 10 feet on-center (OC) and shrubs at 5 feet OC.

Prior to planting, invasive trees and shrubs (particularly Himalayan Blackberry) shall be removed from the enhancement area, with the focus being on the northern portion of the stream buffer/enhancement area (see attached mitigation plan map). Plant installation should take place in late fall or early spring (prior to the start of the growing season), if possible. Plants shall be obtained from a reputable nursery familiar with native vegetation and that is capable of providing local genetic stock. Limited species substitution may be allowed; however, City of Redmond personnel and/or the project ecologist must approve the substitution.

The plants shall be arranged with the appropriate numbers, sizes, species, and distribution to achieve the required vegetation coverage. The actual placement of individual plants shall mimic natural, asymmetric vegetation patterns found on similar undisturbed sites in the area. A mulch containing wood chips and some green/vegetative material shall be applied in a 2-foot radius around the base of each installed plant to a depth of 3 inches. Mulch will provide nutrients to the new trees and shrubs and will help suppress establishment of weedy species. In order to avoid stem decomposition/rot, the mulch shall not be allowed to touch the plant trunks/stems.

Lath staking, brightly colored flagging, or another form of marking shall be placed on or near each installed plant to assist in locating the plants during maintenance and monitoring activities.

Irrigation shall be provided during the first two years of the monitoring period and will occur during the summer/dry season (e.g. May through October), any extensive dry periods, and/or as determined by the project ecologist. Water shall be applied to the new plants at a rate of one (1) inch per week. Irrigation can occur via hand watering or an installed irrigation system.

The project ecologist shall be on-site to inspect plant materials for proper size and quality, inspect the layout and planting locations, and to complete a final walk-through before accepting the buffer enhancement installation.

## **GOALS, MONITORING, MAINTENANCE, AND CONTINGENCY**

### **Goals, Objectives, and Performance Standards**

Project goals identify what the mitigation plan is attempting to accomplish. Objectives identify specific actions that are taken or components that are initiated in order to meet the project goals. Finally, performance standards provide measurable criteria for determining if the goals and objectives are being achieved (WA State Department of Ecology et al., 2006).

The goals of this mitigation plan include the following:

- Replacement of approximately 1,215 SF of stream buffer removed as part of the proposed development
- Enhancement of approximately 8,925 SF of stream buffer
- Permanent protection of on-site critical areas and buffers

These goals will be met by performing the following actions (i.e. objectives):

- Employing buffer width averaging per RZC 21.64.020(B)(6) and providing 1,303 SF of new buffer
- Installation of 90 native trees and 264 native shrubs throughout the buffer enhancement area
- Installation of permanent signage and fencing shall be along the perimeter of the stream buffer boundary per RZC 21.64.010(R). In addition, a Native Growth Protection Area (NGPA) tract will be established for the on-site stream and buffer area to provide permanent protection for these resources

The performance standards for all of the planted areas include the following:

- Per RZC 21.61.010(P)(3)(c), success of the buffer enhancement plantings shall equal 80 percent per year survival of planted trees and 80 percent cover of shrubs, groundcover, and emergent species, and less than 20 percent cover of invasive species
- All dead plants shall be replaced following the first year of monitoring.
- Desirable native volunteer species, such as red alder and black cottonwood, may contribute up to 20% cover. If volunteer species exceed 20% cover, control measures shall be initiated in an effort to maintain species diversity.

### **Monitoring**

A five-year monitoring plan will begin with the preparation of an as-built report 30 days after the installation of the enhancement trees and shrubs. This report will outline what occurred on the project site during construction and identify if any changes were made to the approved mitigation plan. Following submittal of the as-built plan, monitoring visits will occur. Two monitoring visits will occur during the second year (i.e. a year after plants have been installed), followed by annual visits for the remainder of the monitoring period.

Monitoring techniques will include general visual observations to assess tree and shrub survivability and coverage. In addition, transects and/or quadrats may be established to assess plant survivability. The sizes and locations of the transects and/or quadrats will be discussed in the first monitoring report. Monitoring shall include general appearance, health, mortality, colonization rates, percent cover, percent survival, volunteer plant species, invasive weeds, and/or other components, as necessary.

Monitoring reports will be prepared and submitted to the City of Redmond. The first monitoring report will be submitted early in the growing season of the second year (i.e. a year after plants have been installed) and the second report will be submitted at the end of the growing season of the second year. After the second year of monitoring, reports will be submitted annually until the end of the monitoring period. The reports will summarize the overall conditions of the mitigation areas and discuss whether the performance standards are being met. Photos of the mitigation areas will be provided. On year 5, the final monitoring report will be prepared and will determine if the mitigation plan has been successful per the established goals, objectives, and performance standards. If the mitigation plan is deemed unsuccessful, contingency actions will be utilized and/or the monitoring period may be extended.

### **Contingency**

If, during any of the monitoring visits, 20% of the plants within any restoration area, or in any particular stratum within a restoration area, are severely stressed, or it appears that 20% may not survive, additional plants will be added to the mitigation areas. If invasive and non-native species exceed 20% aerial coverage within any of the restoration areas at any time, control measures will be initiated. Additional contingency actions may include, but will not be limited to, more aggressive weed control, additional mulching, species substitution, soil amendments, additional irrigation, and/or repair of damages caused by erosion, settling, or other geomorphological processes.

### **Maintenance**

Maintenance will be performed within the restoration areas as necessary. Maintenance actions may include, but are not limited to, replacement of dead vegetation (during the first year following plant installation), removal of invasive and non-native vegetation, trash cleanup, and repair of damaged signs and fencing. Maintenance needs will be discussed in the annual monitoring reports.

**COST ESTIMATE AND PERFORMANCE BOND**

The following is a cost estimate for plant materials, labor, monitoring, and maintenance. This does not represent an actual bid (please note: plant prices include labor and installation):

|                                |                   |
|--------------------------------|-------------------|
| Plants – \$9.50/plant:         | \$3,363.00        |
| Estimated cost of monitoring:  | \$5,000.00        |
| Estimated cost of maintenance: | \$1,500.00        |
| <b>Total:</b>                  | <b>\$9,863.00</b> |

A performance and maintenance bond is required to ensure the applicant's compliance with the terms of the mitigation agreement. Per RZC 21.76.090(F)(4), the cost of the performance bond must be 125 percent of the cost of mitigation (i.e. installation, monitoring, and maintenance). The bond for the Heathers Ridge South project shall be **\$12,328.75**.

**USE OF THIS REPORT**

This Critical Area Study and Mitigation Plan is supplied Quadrant Homes as a means of determining and protecting on-site critical area conditions as required by the City of Redmond. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to critical areas are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

This delineation and report conforms to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.



Jim Rothwell  
Senior Ecologist, PWS

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**Appendix A**

Field Data Summary Sheet (October 2011)

**Field Data Sheet**  
**Ellsworth 134th Ave - WRI # 11122**  
**Investigation Date: 10.20.2011**

| Pit                        | Depth | Texture             | Color    | Moisture | Species                      | %  | Status | Strata     |
|----------------------------|-------|---------------------|----------|----------|------------------------------|----|--------|------------|
| <b>S1</b><br><b>Upland</b> | 0-18" | Gravelly Sandy Loam | 10YR 3/2 | moist    | <i>Acer macrophyllum</i>     | 80 | FacU   | tree       |
|                            |       |                     |          |          | <i>Oemleria cerasiformis</i> | 30 | FacU   | Shrub      |
|                            |       |                     |          |          | <i>Polystichum munitum</i>   | 20 | FacU   | Herb       |
|                            |       |                     |          |          | <i>Tolmiea menziesii</i>     | 50 | Fac    | Herb       |
|                            |       |                     |          |          | <i>Erodium cicutarium</i>    | 20 | FacU   | Herb       |
|                            |       |                     |          |          | <i>Rubus ursinus</i>         | 10 | FacU   | Woody Vine |
|                            |       |                     |          |          | <i>Urtica dioica</i>         | 10 | Fac+   | Herb       |

Conclusion: Upland - Parameters for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.

|                            |       |                     |          |     |                              |    |      |       |
|----------------------------|-------|---------------------|----------|-----|------------------------------|----|------|-------|
| <b>S2</b><br><b>Upland</b> | 0-18" | Gravelly Sandy Loam | 10YR 4/4 | dry | <i>Acer macrophyllum</i>     | 80 | FacU | Tree  |
|                            |       |                     |          |     | <i>Oemleria cerasiformis</i> | 20 | FacU | Shrub |
|                            |       |                     |          |     | <i>Rubus ameniacus</i>       | 10 | FacU | Shrub |
|                            |       |                     |          |     | <i>Ranunculus repens</i>     | 30 | FacW | Herb  |
|                            |       |                     |          |     | <i>Erodium cicutarium</i>    | 20 | FacU | Herb  |
|                            |       |                     |          |     | <i>Polystichum munitum</i>   | 10 | FacU | Herb  |

Conclusion: Upland - Parameters for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.

|   |       |                     |                      |       |                                  |    |      |       |
|---|-------|---------------------|----------------------|-------|----------------------------------|----|------|-------|
| <b>S3</b><br><b>Upland</b>  | 0-5"  | Silt Loam           | 10YR 3/2             | moist | sapling <i>Acer macrophyllum</i> | 30 | FacU | Tree  |
|   | 5-18" | Gravelly Sandy Loam | 10YR 3/2 (4/4 mixed) | dry   | <i>Rubus ameniacus</i>           | 20 | FacU | Shrub |
| Area appears recently cleared or abandoned pasture - soils somewhat disturbed |       |                     |                      |       | <i>Ranunculus repens</i>         | 50 | FacW | Herb  |
|   |       |                     |                      |       | <i>Agrostis tenuis</i>           | 30 | Fac  | Herb  |
|   |       |                     |                      |       | <i>Dactylis glomerata</i>        | 10 | FacU | Herb  |
|   |       |                     |                      |       | <i>Phalaris arundinacea</i>      | 10 | FacW | Herb  |

Conclusion: Upland - Parameters for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.

|                            |       |                     |                          |     |                             |    |      |       |
|----------------------------|-------|---------------------|--------------------------|-----|-----------------------------|----|------|-------|
| <b>S4</b><br><b>Upland</b> | 0-18" | Gravelly Sandy Loam | 10YR 3/2                 | dry | <i>Rubus ameniacus</i>      | 60 | FacU | Shrub |
|                            |       |                     | 10YR 4/4                 |     | <i>Ranunculus repens</i>    | 70 | FacW | Herb  |
|                            |       |                     | mixed<br>disturbed soils |     | <i>Phalaris arundinacea</i> | 20 | FacW | Herb  |

Conclusion: Upland - Parameters for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.

**Appendix B**

City of Redmond Stream Summary Sheet



## STREAM SUMMARY SHEET

| Stream Summary     |                   |                          | Buffer Summary        |                       |                        | Riparian Corridor Summary   |                          |                              |
|--------------------|-------------------|--------------------------|-----------------------|-----------------------|------------------------|-----------------------------|--------------------------|------------------------------|
| Label <sup>1</sup> | Type <sup>2</sup> | Linear Feet <sup>3</sup> | Required <sup>4</sup> | Proposed <sup>5</sup> | Averaging <sup>6</sup> | Disturbed Area <sup>7</sup> | Filled Area <sup>8</sup> | Mitigation Area <sup>9</sup> |
| A                  | IV                | 124.2'                   | 36'                   | 27'                   | Prior: 10,414 SF       | 89 SF (rip-rap)             | 1,215 SF                 | 8,925 SF                     |
|                    |                   |                          |                       |                       | After: 10,508 SF       | 220 SF (grading)            |                          | (throughout buffer)          |
|                    |                   |                          |                       |                       |                        |                             |                          |                              |
|                    |                   |                          |                       |                       |                        |                             |                          |                              |
|                    |                   |                          |                       |                       |                        |                             |                          |                              |

<sup>1</sup> Stream A, B, C, etc.

<sup>2</sup> Stream type per City stream classification system.

<sup>3</sup> Length of stream on the property.

<sup>4</sup> Required buffer width in feet per RCDG.

<sup>5</sup> Proposed buffer width in feet.

<sup>6</sup> Note if buffer averaging is used. If so, identify minimum and maximum buffer widths in feet as well as area in square feet contained within the buffer prior to and after averaging.

<sup>7</sup> Area of buffer that is disturbed in square feet.

<sup>8</sup> Area of buffer to be filled in square feet, such as for a road crossing.

<sup>9</sup> Location and size in square feet of riparian corridor mitigation.

**Appendix C**

Site Photos



**Stream A flowing through blackberry near northern property boundary**



**Upstream view of Stream A along eastern property boundary**



**View south of existing stream buffer**



**View north of existing stream buffer**

**Appendix D**

Critical Areas Map and Site Plan

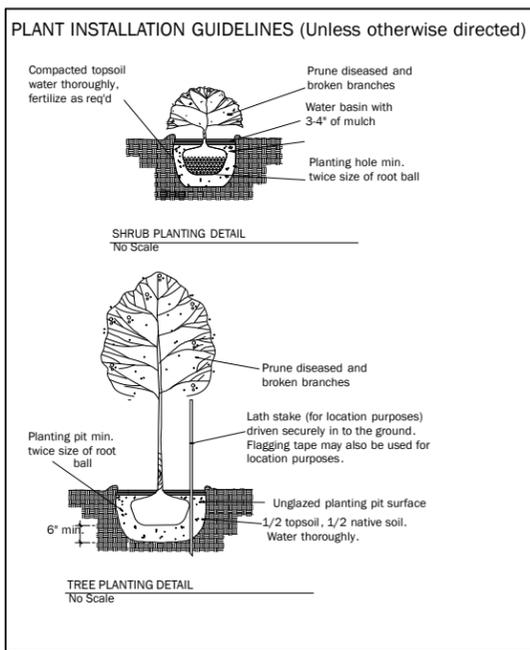
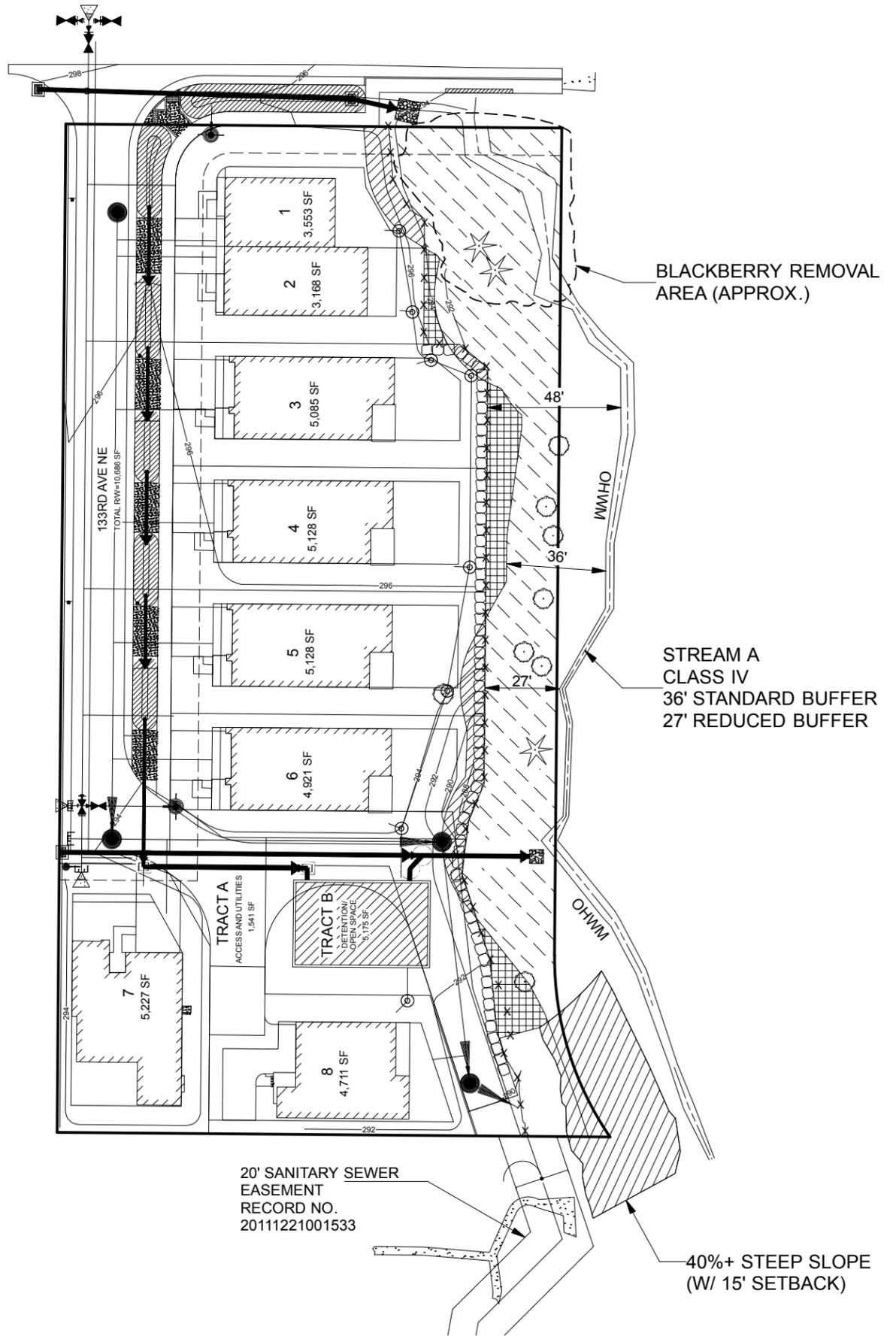


**Appendix E**

Mitigation Plan Map

# MITIGATION PLAN MAP HEATHERS RIDGE SOUTH

PORTION OF SECTION 03, TOWNSHIP 25N, RANGE 05E, W.M.

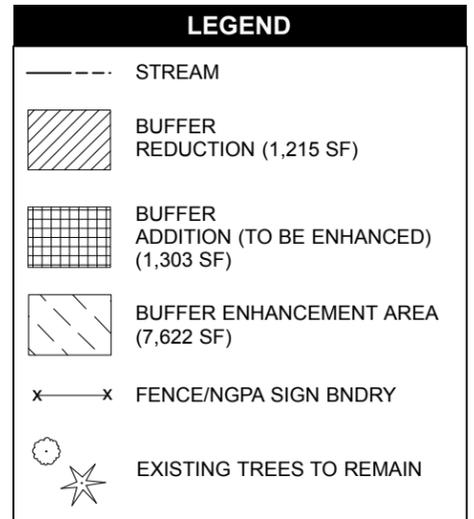


**BUFFER ENHANCEMENT AREA PLANT LIST\***

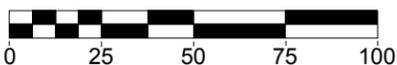
| Species          | Scientific Name              | Size     | Spacing            | Quantity |
|------------------|------------------------------|----------|--------------------|----------|
| Douglas fir      | <i>Pseudotsuga menziesii</i> | 1 gallon | 10' on-center (OC) | 45       |
| Big-leaf maple   | <i>Acer macrophyllum</i>     | 1 gallon | 10' OC             | 45       |
| Vine maple       | <i>Acer circinatum</i>       | 1 gallon | 5' OC              | 66       |
| Thimbleberry     | <i>Rubus parviflorus</i>     | 1 gallon | 5' OC              | 66       |
| Indian plum      | <i>Oemleria cerasiformis</i> | 1 gallon | 5' OC              | 66       |
| Snowberry        | <i>Symphoricarpos albus</i>  | 1 gallon | 5' OC              | 66       |
| Pacific willow** | <i>Salix lasiandra</i>       | Whips    | 2' OC              | 23       |

\*Refer to the Critical Areas Study and Mitigation Plan (WRI 2015) for plan details.

\*\*For rip-rap dispersion pads only. The northern rip-rap pad shall be planted with 16 whips; the southern pad shall be planted with 7 whips



Scale 1" = 50'



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**MITIGATION PLAN MAP  
HEATHERS RIDGE SOUTH**

The Quadrant Corp.  
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 Bellevue, WA 98006

Sheet 1/1  
 WRI Job #15023  
 Drawn by: JR  
 Date: 6/29/2015