# NATURAL RESOURCE ASSESSMENT

**Miller Property**

19412 View Drive
West Linn, Oregon

**Prepared for:**

**Matthew Miller**
(949) 303-3639

**Issued on:**

April 5, 2022

Project No. 1577-21001-01

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*This*

# Natural Resource Assessment

*Report for:*

19412 View Drive
West Linn, Oregon

*Has been prepared for the sole benefit and use of our Client:*

**Matthew Miller**
(949) 303-3639

*Issued* April 5, 2022 *by:*

EVREN NORTHWEST INC.
environmental natural resource consultants


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*Environmental Scientist*

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# List of Acronyms and Abbreviations

| | |
|---|---|
| bgs | below ground surface |
| CDC | Community Development Code |
| Client | Matthew Miller |
| ENW | EVREN Northwest, Inc. |
| Subject site | 19412 View Drive, West Linn, Oregon 97068 |
| WRA | Water Resource Area |

# 1.0 Introduction

On behalf of Matthew Miller (Client), EVREN Northwest, Inc. (ENW) has prepared this report documenting a Natural Resource Assessment of a riparian corridor and Water Resource Area (WRA) extending through 19412 View Drive, West Linn, Oregon 97068 (subject site; Figures 1, 2 and 3). This will include daylighting a piped stream, restoring a graveled driveway, and reducing the WRA.

The subject site consists of one tax lot located to the northwest of Kantara Way, and southeast of Rydman Court in West Linn, Oregon (Figure 2). The subject site is currently developed with a single-family residence and surrounding vegetated areas. A more detailed description of the site development is presented in Section 2.1.

Since the subject property has a year-round stream (defined as a Water Resource) traversing through it, the city has highlighted a 100-foot riparian corridor buffer (defined as a Water Resource Area), on each side of the corridor, which spans the entire property. Any development within 100 feet of the stream needs further investigation of the site prior to the issuance of a reduction in the Water Resource Area (WRA) boundary by the City of West Linn in accordance with Section 32.070 Alternative Review Process of Chapter 32 Water Resource Area Protection of the Community Development Code (CDC).

## 1.1 Purpose

The purpose of this report is to substantiate a reduction of the WRA (decreased setbacks) to 15'-0" on either side of the stream, per CDC 32.060.H.1, about 16,000 square feet. This proposed WRA boundary reduction will allow for future increases to building square footage and/or density. However, given that the associated stream restoration includes daylighting (culvert removal) and mitigation (removal of invasive species and replacement with native plantings) within 15'-0" on both sides, this reduction is not believed to deteriorate the functions of the current ecosystem. Currently, counting the existing graveled driveway, structures/patio, and former landscaped area along Kantara Way, the approximate (minimum) existing disturbed area is 7,489 SF. If granted under CDC 32.110.B.2, 30 percent of the total area of the WRA would be allowed for future development. This equates to 3,534 SF more, or an MDA of 11,023 SF total. The overall design intent is to provide a continuous stream with improved buildings on one or both sides. This will provide a win-win to the future property owner(s), the adjacent neighbors, and the city. The proposed restoration would daylight the stream and add approximately 148-186 linear feet of stream habitat (depending on the final site plan configuration). It would restore a section of the riparian corridor which is currently lacking due to this piped area.

The proposed WRA boundary reduction will allow for more development and landscaping than the existing WRA boundary, however, with the proposed stream restoration and culvert removal this reduction is not believed to deteriorate the functions of the current ecosystem. Although the WRA reduction will potentially add more square footage of impervious surface in the future, much of the property's vegetation is highly deteriorated by invasive species with minimal native plants. Along with the degraded vegetation, there is a 100-foot span of piped stream that runs under a berm and graveled driveway. This consists of two culverts and three ponded areas. The first culverted area runs under a manmade berm that must be excavated yearly by public works in order to prevent backups and flooding. The culverts and graveled area fragment the resource area creating a barrier for aquatic and terrestrial

life. The proposed restoration would daylight the stream and add 148-186 linear feet of stream habitat and surrounding riparian corridor which is currently lacking due to this piped area.

## 1.2 Proposed Development Activity

The proposed project will comprise a maximum of 11,023 square feet of possible development and landscaping, while reducing the buffer by approximately 16,000 square feet. As the current residence comprises approximately 1,086 square feet of ground floor and covered porch space, along with 2,270 square feet of graveled driveway, and 3,635 square feet of landscaping (per the property owner) this redevelopment will add approximately 3,534 square feet of potential development to the subject site. This area will potentially encroach further towards the WRA than the existing structures or landscaping and is located within the 100-foot boundary around the WRA. However, the area surrounding the WRA on this property and many other residences adjacent to this site have previously impacted the WRA due to past development. The current building and shed on site are approximately 12 to 50 feet from the current stream and therefore were either approved for development in the area or were built before the WRA guidance was enacted.

The WRA between the stream and the residence contains a graveled driveway and large parking lot that re-routes the stream through a culvert. It should also be noted that landscaping was observed along Kantara way, though property owner notes previous landscaping around the house several years prior. Denying the reduction in the WRA would restrict the landowners, while not supporting a higher quality WRA. The WRA reduction is proposed through 32.070 Alternative Review Process and will result in a WRA 15 feet wide on the east and west bank where proposed stream daylighting will occur (See Figure 5 for a detailed diagram). In accordance with 32.080 Approval Criteria, although the proposed WRA will be smaller in size, it will continue to provide better support for a thriving ecosystem post restoration and stream daylighting. Currently, the majority of vegetation within the WRA is invasive, which limits species diversity and functional habitat within the WRA. The two culverted sections of the stream also create a physical barrier for aquatic life to travel the stream freely. See Section 2.2 for further information.

# 2.0 Site Description

The subject property is located at 19412 View Drive, West Linn, Oregon 97068 and is identified as Township 2 South, Range 1 East, Section 23, a portion of the NE 1/4, Tax Lot 100 of the Willamette Meridian. It is zoned as part of Metro's Urban Growth Boundary and contains a steep slope in several areas, ranging in elevation from between approximately 210 to 278 feet above mean sea level and generally sloping to the northeast. The subject site measures approximately 0.85 acres and is currently occupied by a single-family residential structure and accessory structure (shed) near the northeast corner of the site. Remaining areas consist of landscaping and vegetation, including invasive shrub species across the majority of the property.

The site has a large gravel driveway and parking area traversing northwest-southeast to the center of the site leading to the single-family residence located in the central eastern area of the tax lot. There is a fence separating the site from the northern adjacent single-family residence. A year-round stream traverses from the southern property boundary to the northern property boundary, continuing onto the neighboring properties.

The entire subject site was shown to be covered in the riparian corridor as mapped in West Linn's WRA Map (May 2014).

The subject site is situated on a ravine with southeast and northwest-facing slopes and is approximately 4,000 feet west of the Willamette River. The parcel contains a stream that flows through the center of the property, from southwest to northeast. The two closest structures to the resource area are the current house (24-50 feet) and the accessory structure (12 feet). Vegetation on the subject site is characterized as poor forested riparian corridor with invasives seen throughout (See Section 2.2 for more details).

## 2.1 Site Reconnaissance: Survey of On-Site Resources

A site reconnaissance was conducted on August 17, 2021 to document current site conditions. Onsite observations determined that vegetation consists mostly of invasive plants and minimal landscaping, bordering a year-round stream containing three ponded areas with observed standing water up to two and a half feet of water. This gravel driveway fragments the resource area and makes the western portion of the site less accessible to wildlife.

## 2.2 Extent and Condition of On-Site Vegetated Corridor

The slope adjacent to the edge of the stream on site is between 28-40%; therefore, according to Table 32-2 of Chapter 32 of the CDC Water Resource Area Protection the stream has a vegetated corridor extending 100 feet from the mapped edge of the on-site wetland (Figure 4). However, due to the location of the current building and accessory structure, the vegetated corridor presently only extends 12 to 50 feet to the east.

The vegetated corridor of the subject site was observed to have many significant trees, and some scattered native plants. The remainder of the site was observed to be covered in dense invasive vegetation. See Table 2-1 below for the detailed list of observed plants.

**Table 2-1. Plant Inventory for Subject Site**

| Native Plant Species on site | Invasive Plant Species on site |
|---|---|
| Vine Maple (*Acer circinatum*) | Himalayan Blackberry (*Rubus armeniacus*) |
| Bigleaf Maple *(Acer macrophyllum)* | English Ivy (*Hedera helix*) |
| Sword Fern *(Polystichum munitum)* | Japanese Knotweed (*Reynoutria japonica*) |
| Bracken Ferns (*Pteridium aquilinum*) | Holly (*Ilex aquifolium*) |
| Oregon Grape (*Mahonia aquifolium*) | English laurel (*Prunus laurocerasus*) |
| Salal (Gaultheria shallon) | Bindweed (*Calystegia silvatica*) |
| Trillium *(Trillium grandiflorum)* | |
| Hazelnut (*Corylus*) | |
| Red Huckleberry (*Vaccinium parvifolium*) | |
| Cottonwood (*Populus sect. Aigeiros*) | |
| Osoberry (*Oemleria cerasiformis*) | |
| Salmonberry (*Rubus spectabilis*) | |
| Elderberry (*Sambucus*) | |
| Thimbleberry (*Rubus parviflorus*) | |
| Stinging nettle (*Urtica dioica*) | |
| Rowan (*Sourbus acuparia*) | |
| Maidenhair Fern (*Adiantum pedatum*) | |
| English hawthorn (*Crataegus monogyna*) | |
| Flowering quince (*Chaenomeles speciosa*) | |
| Bird cherry (*Prunus avium*) | |

## 2.3 Stream Description

As observed and described by the property owner, the stream was presumably culverted to protect a city water line that was installed across it. Such an engineering method would not be considered today. There are two culverts and three ponds. The higher (1st) pond is smaller; it catches the water from the upland forest's stream and channels it into a short culvert that empties into a larger and deeper (2nd) pond. At this lower (2nd) pond, it then channels the water into the larger culvert which runs under the driveway. After it emerges on the other side of the driveway, the culvert then empties into a 3rd pond; this is at the bottom of a steep slope near the northern property line. No ponds would accumulate if the stream wasn't culverted. The culvert was continued below the driveway so that cars could drive over the stream to access the house from View Drive, as Kantara Way hadn't been built yet.

There is a small dirt clearing to the right of the lower (2nd) pond. This is an overgrown section of the driveway that, as observed by the property owner, is an access point for Public Works' heavy backhoe equipment. The property owner reported that in the past, Public Works noticed that accumulated sediment/debris could fill the 2nd pond and block the driveway's culvert, thereby causing a flood that could affect downstream homes. In response, the City periodically entered the property to dig out the pond to prevent this potential overflow. It is unknown when this last occurred. This left a large "berm" or debris pile of sediment. If the stream was restored, flooding would not be a concern.

# 3.0 On-Site Stream Restoration and Mitigation

## 3.1 Preparation

Stream restoration and WRA mitigation will be conducted on the subject property. No offsite mitigation is proposed. The goal of the stream restoration is to restore between 148-186 linear feet of piped stream while shifting the northern section of the stream to the west approximately 25 feet. The property owner proposes to restore and mitigate anywhere from 148-186 linear feet of the stream. There is a total of 148-186 feet of stream that will have 15 feet of riparian corridor restoration on one or both sides. The following mitigation and restoration calculations will be based on the most conservative measurements (186 feet) but may be changed in the future to encompass less area or a different stream path. Along with the stream restoration there is also a 190 square foot area of upland forest that is part of the graveled driveway that will be restored (See figure 6). The proposed WRA area features a forest overstory dominated by native trees with an understory dominated by invasive species including English ivy (*Hedera helix*), bindweed *(Calystegia silvatica)* and Himalayan blackberry (*Rubus armeniacus*). Other invasives present include Japanese Knotweed (*Reynoutria japonica*), English laurel (*Prunus laurocerasus*), and holly *(Ilex aquifolium).* Weed management will primarily consist of hand-pulling the expanses of sprawling English ivy and bindweed. All other invasives will be cut to the ground and material will be removed offsite. The blackberry and knotweed locations will be flagged and monitored for regrowth. Upon the appearance of regrowth, an acetic acid formulation will be prepared and applied. The preparation will consist of (1) gallon of 10% vinegar, (1) cup of salt and (2) teaspoons of Dawn dish soap. The soap may be substituted with an equal amount of vegetable oil; the soap or oil alternative acts as a surfactant and improves adherence of the preparation to the leaf surfaces. Unlike Glyphosate or other systemic herbicides, the vinegar preparation only affects the leaf surfaces (as opposed to systemic treatments that circulate throughout the plant); for this reason, several applications will be required. This preparation is unlikely to be highly effective on plants that feature waxy leaves such as English ivy. Repeated mechanical reduction of new growth paired with foliar application should be sufficient to kill the plants.

Upon completion of initial noxious weed management, the WRA mitigation area will be prepared for planting. Preparation will consist of flagging planting areas in the field and staging soil amendments and mulch. Planting wells will be hand dug and will receive a 50% amendment of an outdoor potting mix to increase fertility and moisture retention. Planting areas will be identified in maps and locations will be communicated to the landscaping contractor.

A total of 5,390 square feet of the subject property will be mitigated/restored in the highly degraded WRA, which encompasses two areas. The riparian corridor restoration will border the stream on either side by 15 feet where the graveled area and proposed stream locations are shown in figure 6, covering 5,200 square feet. Additionally, the remainder of the graveled area on the west bank (190 square feet) will be part of the mitigation for the reduction of the WRA. Restoring the graveled area helps to maximize the amount of habitat that will become one connected resource area with no terrestrial or aquatic barriers.

Responsible parties for onsite mitigation work and proposed development include, but are not limited to, property owner and applicant.

## 3.2 Planting Plan

The planting scheme is based upon West Linn Community Development Code 32.100, which informs the type, quantity as well as the timing of plant installation. The planting scheme for the proposed WRA includes 4 trees and 9 shrubs, all containerized and of native origin found on the Portland Plant List. The selection of plants is based upon native species present in the vicinity and those species well-adapted to local conditions. Trees and shrubs selected are intended to provide structural cover as well as nectar for pollinators and fruit for small wildlife. Planting will be conducted between October 15th and April 30th. If animal damage is expected (i.e., area of high deer use), plantings will be protected by sleeves. Once the trees and shrubs are installed, the plantings will be surrounded by a conifer-based bark mulch (preferably hemlock); trees will receive a ring of mulch extending two feet from the stem, while shrubs will receive a ring of mulch extending one foot from the stem. The mulch will be applied three inches deep surrounding the plantings. After the mulch application, a quarter pounds of a native woodland seed mix will be broadcast to the balance of the WRA not covered by the mulch. The seed mix will consist exclusively of species native to the vicinity and include grasses and wildflowers. The WRA planting plan is included in Tables 3-1 and 3-2. The WRA will be irrigated from June 15th to October 15th at a rate of one inch per week to reduced drought-related mortality. Periodic deep watering is recommended to achieve the weekly rate, as opposed to regular light watering. Deep watering encourages deep rooting and will reduce irrigation needs long-term for the WRA. Summer irrigation will continue for the three years following the planting.

Beyond irrigation, maintenance of the WRA includes non-native plant control, reapplication of mulch and replacement of dead plants. Noxious weeds along the wetland/WRA margin will be controlled by spot application of the vinegar preparation or by hand-pulling. Blackberry and knotweed will require close monitoring to control regrowth. Mulch surrounding tree and shrub plantings will be reapplied as needed to maintain the three-inch material depth. Monitoring of the mitigation site is the ongoing responsibility of the property owner. All dead trees will be replaced in-kind. Minimum shrub density is assumed to be 80% of the minimum requirement for the proposed WRA. Shrubs will be replaced in-kind as needed to maintain 80% survival (n=340).

There are many significant trees on the property including Vine Maple (Acer circinatum), Bigleaf Maple (Acer macrophyllum), Cottonwood, hazelnut, rowan (Sourbus acuparia), bird cherry (Prunus avium), English hawthorn (Crataegus monogyna), Douglas fir, and others noted per a 2007 survey by Landesign Group (see Figure 4). These, along with other native plants, will be worked around and will remain unharmed throughout the mitigation process. This will allow for the least impact on the soil, species, and habitat while also increasing plant diversity and ecosystem functions in the WRA.

Mitigation will occur to the density standards outlined in CDC 32.100. Mitigation will take place in the WRA and the resource area (riparian corridor) A total of 5,390 square feet of the subject property will be mitigated in the highly degraded WRA area. See below for upland planting details within the mitigation area.

**Table 3-1. Upland Planting Details for WRA Mitigation (190 Sq Ft)**

| Species | Zone | Type | Spacing | Size Class | Quantity |
|---|---|---|---|---|---|
| **Grand fir (*Abies grandis*)** | Upland | Tree | 10' | 2 gallons | 1 |
| **Big-leaf maple (*Acer macrophyllum*)** | Upland | Tree | 10' | 2 gallons | 1 |
| **Western red-cedar (*Thuja plicata*)** | Upland | Tree | 10' | 2 gallons | 1 |
| **Western hemlock (*Tsuga heterophylla*)** | Upland | Tree | 10' | 2 gallons | 1 |
| **Western burning bush (*Euonymus occidentalis*)** | Upland | Shrub | 4' | 1 gallon | 1 |
| **Salal (*Gaultheria shallon*)** | Upland | Shrub | 4' | 1 gallon | 2 |
| **Dull Oregon-grape (*Mahonia nervosa*)** | Upland | Shrub | 4' | 1 gallon | 2 |
| **Thimbleberry (*Rubus parviflorus*)** | Upland | Shrub | 4' | 1 gallon | 2 |
| **Snowberry (*Symphoricarpos albus*)** | Upland | Shrub | 4' | 1 gallon | 2 |
| **Silver Falls Seed Company Northwest Woodland Economy Mix*** | Upland | Seed | Broadcast | n/a | 1/4 pound |

*Contents of seed mix: https://silverfallsseed.com/product/northwest-woodland-economy-mix/

**Table 3-2. Riparian Planting Details for Resource Area Restoration (5,200 Sq Ft)**

| Species | Zone | Type | Spacing | Size Class | Quantity |
|---|---|---|---|---|---|
| **Slough sedge (*Carex obnupta*)** | Lower Riparian | Herb | 3' | 1 gallon | 481 |
| **Western red-cedar (*Thuja plicata*)** | Riparian | Tree | 10' | 2 gallon or larger | 24 |
| **Red osier dogwood (*Cornus stolonifera*)** | Riparian | Shrub | 4' | 1 gallon | 120 |
| **Salmonberry (*Rubus spectabilis*)** | Riparian | Shrub | 4' | 1 gallon | 120 |
| **Sitka brome (*Bromus sitchensis*)** | Riparian | Seed | Broadcast | n/a | 5 pounds |

*Slough sedge will be planted along the wetted width of the created stream channel (lower riparian), with the balance of species planted just upslope but within the area of riparian influence.

## 3.3 Storm Water Discharge

Currently stormwater runs along this site following topographic contours into the WRA and stream, while the roof runoff flows to the gravel surface via a gutter.

# 4.0 Narrative Responses

**CDC Chapter 30.080 Approval Criteria (Alternative Review Process)**

**A. The proposed WRA shall be, at minimum, qualitatively equal, in terms of maintaining the level of functions allowed by the WRA standards of CDC 32.060(D):**

The slope adjacent to the edge of the riparian corridor varies between 28-40%; therefore, according to Table 32-2 of Chapter 32 of the CDC Water Resource Area Protection the riparian corridor has a vegetated corridor extending 100 feet from the mapped edge of the on-site Ordinary High-Water Level (Figure 4). However, due to the location of the current building and accessory structure, the vegetated corridor presently only extends 12 to 50 feet from the current stream location.

The vegetated corridor of the subject site was observed to have many significant trees, and some scattered native plants, noted in Table 2-1. The remainder of the site was observed to be covered in dense invasive vegetation, including Himalayan Blackberry (Rubus armeniacus), English Ivy (Hedera helix), Japanese Knotweed (Reynoutria japonica), English laurel (Prunus laurocerasus), Bindweed (Calystegia silvatica) and English Holly (*Ilex aquifolium*).

The current conditions of the WRA of the subject site is significantly degraded due to the dense invasive vegetation, and graveled area that culverts the stream. A reduced vegetated buffer is proposed, in exchange for stream restoration and mitigation measures which will enhance the WRA with native plant species and removal of invasive species such as English Ivy and Bindweed along the stream. In addition, the graveled area will be restored, and the stream will be daylighted, adding 148-186 linear feet of stream habitat and reducing fragmentation. See Section 3.2 for further information on planting plans.

**B. If a WRA is already significantly degraded (e.g., native forest and ground cover have been removed or the site dominated by invasive plants, debris, or development), the approval authority may allow a reduced WRA in exchange for mitigation, if:**

a. **The proposed reduction in WRA width, coupled with the proposed mitigation, would result in better performance of functions than the standard WRA without such mitigation. The approval authority shall make this determination based on the applicant's proposed mitigation plan and a comparative analysis of ecological functions under existing and enhanced conditions**.

The proposed WRA reduction and conjugate mitigation/restoration will result in better performance and function of the WRA due to the removal of invasive species along the corridor boundary and planting of native species. The mitigation and restoration will cover a total of 5,390 square feet and take place in two areas. The riparian corridor restoration will be 5,200 square feet which will border the stream on one or both sides by 15 feet. This restoration will occur where the graveled area currently occupies, and the proposed stream path is located (See figure 6). Additionally, the remainder of the graveled area on the west bank (190 square feet) will be part of the upland forest mitigation for the reduction of the WRA to approximately 15 feet on the east and west banks where stream restoration will occur.

b. **The mitigation project shall include all of the following components as applicable. It may also include other forms of enhancement (mitigation) deemed appropriate by the approval authority.**

i. **Removal of invasive vegetation.**

The proposed WRA area features a forest overstory dominated by native trees with an understory dominated by invasive species including English ivy (*Hedera helix*), bindweed *(Calystegia silvatica)* and Himalayan blackberry (*Rubus armeniacus*). Other invasives present include Japanese Knotweed (*Reynoutria japonica*), English laurel (*Prunus laurocerasus*), and holly *(Ilex aquifolium).* Weed management will primarily consist of hand-pulling the expanses of sprawling English ivy and bindweed. All other invasives will be cut to the ground and

material will be removed offsite. The blackberry and knotweed locations will be flagged and monitored for regrowth. Upon the appearance of regrowth, a spot application of the vinegar preparation will be applied along with mechanical reduction. Several applications may be required to kill the knotweed.

ii. **Planting native, non-invasive plants (at minimum, consistent with CDC 32.100) that provide improved filtration of sediment, excess nutrients and pollutants. The amount of enhancement (mitigation) shall meet or exceed the standards of CDC 32.090(C).**

The planting plan for the proposed restoration and mitigation includes all native species including 28 trees, 249 shrubs, 481 herbs, and 5.25 pounds of seeds. See Section 3.2 and Tables 3-1 and 3-2 for further information on planting details.

iii. **Providing permanent improvements to the site hydrology that would improve water resource functions.**

Stormwater on site currently infiltrates the ground surface and flows along topographic contours of the property, releasing into the WRA and stream.

iv. **Substantial improvements to the aquatic and/or terrestrial habitat of the WRA.**

Mitigation on the subject site is expected to substantially enhance the habitat of the WRA by planting native plant species which will improve erosion and pollution along with habitats for native wildlife. Additionally, removing the culverts and daylighting the stream will create 100 linear feet of new habitat for aquatic and terrestrial life. This restoration will stop fragmentation and allow better access to the resource area for any terrestrial or aquatic wildlife.

**C. Identify and discuss site design and methods of development as they relate to WRA functions.**

Mitigation and restoration will occur to the density standards and requirements outlined in CDC 32.1000. A total of 5,390 square feet of the subject property will be mitigated/restored in the highly degraded WRA area, which encompasses two separate areas. The riparian corridor restoration will border the proposed stream location on either side by 15 feet, covering 5,200 square feet. Additionally, the remainder of the graveled area to the west of the stream (190 square feet) will be part of the mitigation for the reduction of the WRA See Tables 3-1 and 3-2 for planting plan details. The methods of development include the creation of an upland buffer with a plant community dominated by native plants. Trees and shrubs will be planted in accordance with on-center spacing recommendations along with the inclusion of an outdoor potting mix. See Section 3.0 for further details of mitigation and restoration design and methods.

**D. Address the approval criteria of CDC 32.060, with the exception of CDC 32.060(D).** ***No application for development on property containing a WRA shall be approved unless the approval authority find that the proposed development is consistent with the following approval criteria, or can satisfy the criteria by conditions of approval:***

**a. WRA protection/minimizing impacts:**

Current conditions of the WRA consist of densely vegetated invasives, with scattered natives, and two sections of piped steam that travel under a large, graveled driveway and parking area, thus the WRA has already endured impacts which has resulted in a significantly degraded condition. The proposed WRA reduction will include mitigation of part of the graveled area along with restoration and daylighting the culverted stream. This will add 148-186 linear feet and 5,390 square feet of riparian habitat to the WRA, that would not happen with mitigation alone.

**b. Storm water and storm water facilities:**

Stormwater on site currently infiltrates the ground surface and flows along topographic contours of the property, releasing into the WRA and stream. No current proposed development will impact the storm water flow to the water resource area. With the increase in vegetation where the graveled area is currently located the WRA is expected to better retain runoff than pre-restoration.

No roadways, rights-of-ways, or storm water detention and/or treatment facilities are proposed or currently located within the WRA of the proposed development.

**c. Repealed by Ord. 1647.**

**d. Approval of criterion of CDC 32.060(D) is exempted under CDC 30.080 Approval Criteria.**

**e. Per the submittals required by CDC 32.050(F)(4), the applicant must demonstrate that the proposed methods of rendering known or potential hazard sites for development, including proposed geotechnical remediation, are feasible and adequate to prevent landslides or other damage to property and safety. The review authority may impose conditions, including limits on type of intensity of land use, which it determines are necessary to mitigate known risks of landslides or property damage.**

The project site has a ravine that follows the flow of the river and the bank slopes range from 28-40%. Development hazards relating to risk of landslides or property damage are not expected to occur under the proposed WRA reduction as no new development is currently proposed within the ravine.

**f. Roads, driveways and utilities:**

No new roads, driveways or utilities are included in the proposed WRA reduction. No crossing of fish bearing streams or utilities spanning fish bearing streams is included in the proposed development. No fill is proposed within the ordinary high-water mark of the riparian corridor. If excavation is needed for the restoration of the riparian corridor within the ordinary high-water mark, then permits will be obtained from the city, U.S Army Corps of Engineers and Oregon Department of State Lands (DSL).

**g. Passive recreation:**

No paved or unpaved trails, footbridges or interpretive facilities are included in the proposed development.

**h. Daylight piped streams:**

There are currently two sections of piped stream on the property, one of which travels under a graveled driveway. Both sections will be daylighted and restored to riparian habitat. This will add a total of 148-186 linear feet of stream habitat and 5,390 square feet of riparian corridor to the WRA. The proposed re-aligned stream will directly connect to the current southern section and the northern section will be shifted approximately 25 feet west as shown in figure 5 and 6. Per CDC 32.060H.2 the northern section of the stream will still leave the site in the same location, connecting with the adjacent property. Connecting the stream in this way allows for the property owner to have more flexibility on the eastern portion of the property while added approximately 48-86 linear feet of stream habitat. The restored area will have more vegetation which will better infiltrate runoff and is therefore not expected to cause significant erosion.

**i. The following habitat friendly development practices shall be incorporated into the design of any improvements or projects in the WRA to the degree possible:**

- **i. Restore disturbed soils to original or higher level of porosity to regain infiltration and storm water storage capacity.**
- **ii. Apply a treatment train or series of storm water treatment measures to provide multiple opportunities for storm water treatment and reduce the possibility of system failure.**
- **iii. Incorporate storm water management in road rights-of-way.**
- **iv. Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and ground water recharge.**
- **v. Use multi-functional open drainage systems in lieu of conventional curb-and-gutter systems.**
- **vi. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.**
- **vii. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.**
- **viii. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain garden.**
- **ix. Use pervious paving materials for driveways, parking lots, sidewalks, patios and walkways.**
- **x. Reduce sidewalk width to a minimum four feet. Grade the sidewalk so it drains to the front yard of a residential lot or retention area instead of towards the street.**
- **xi. Use shared driveways.**
- **xii. Reduce width of residential streets and driveways, especially at WRA crossings.**
- **xiii. Reduce street length, primarily in residential areas, by encouraging clustering.**
- **xiv. Reduce cul-de-sac radii and use pervious and/or vegetated islands in center to minimize impervious surfaces.**

**xv. Use previously developed areas (PDAs) when given an option of developing PDA versus non-PDA land.**

**xvi. Consider multi-story construction over a bigger footprint.**

There is currently no proposed new development on site, only a reduction in the WRA and restoration of the culverted stream. Mitigation/restoration will result in 5,200 square feet of restoration to the WRA which will include planting native species to assist with soil porosity and infiltration, along with daylighting 146-186 feet of piped stream. No streets or sidewalks are present in the WRA project area. The only graveled driveway onsite, will be restored to riparian and upland habitat within the proposed WRA area. See Section 3.0 for further information.

**CDC Chapter 30.090 Mitigation Plan**

See Section 3.0 which details the preparation and planning of the onsite mitigation of the WRA. Additionally, refer to Figure 6 for location of planned mitigation areas.

**CDC Chapter 30.100 Re-Vegetation Plan Requirements**

See Sections 3.1 and 3.2 which detail the re-vegetation preparation and planting plan of native species within the WRA. Additionally, refer to Tables 3-1 and 3-2 which detail the species to be planted for mitigation, along with the species' zone, type, space, size class and quantity.

**CDC Chapter 30.110 Hardship Provisions**

**The purpose of this section is to ensure that compliance with this chapter does not deprive an owner of reasonable use of land. To avoid such instances, the requirements of this chapter may be reduced. The decision-making authority may impose such conditions as are deemed necessary to limit any adverse impacts that may result from granting relief. The burden shall be on the applicant to demonstrate that the standards of this chapter, including Table 32-2, Required Width of WRA, will deny the applicant "reasonable use" of his/her property.**

Clackamas County Assessor's Office identified the construction date of the residence on the subject property as 1957. The total amount of impervious surfaces on the subject site consists of 1,086 square feet which includes the ground floor square footage of the residence and existing porch, and laundry space. While there is no proposed development at this time, the reduction in the WRA will cover a total 16,000 square feet, due to the restoration and reduction to a 15 foot buffer, instead of a 100 foot buffer for the WRA. The vegetated corridor extends 100 feet from the mapped edge of the onsite stream. However, due to the location of the current building, porch and shed, the vegetated corridor presently only extends 12 to 50 feet in some sections. While CDC 32.090 C states a 1:1 mitigation ratio for development is required, it should be noted that with the steep slopes and the amount of water usage for irrigating 11,023 square feet of possible development, meeting this requirement would be extremely difficult, and is not recommended. If mitigation can be substituted for restoration and daylighting the stream, then this will have a profound impact on the habitat upstream and downstream, while also preventing any further annual upkeep by the city or unwanted erosion during mitigation.

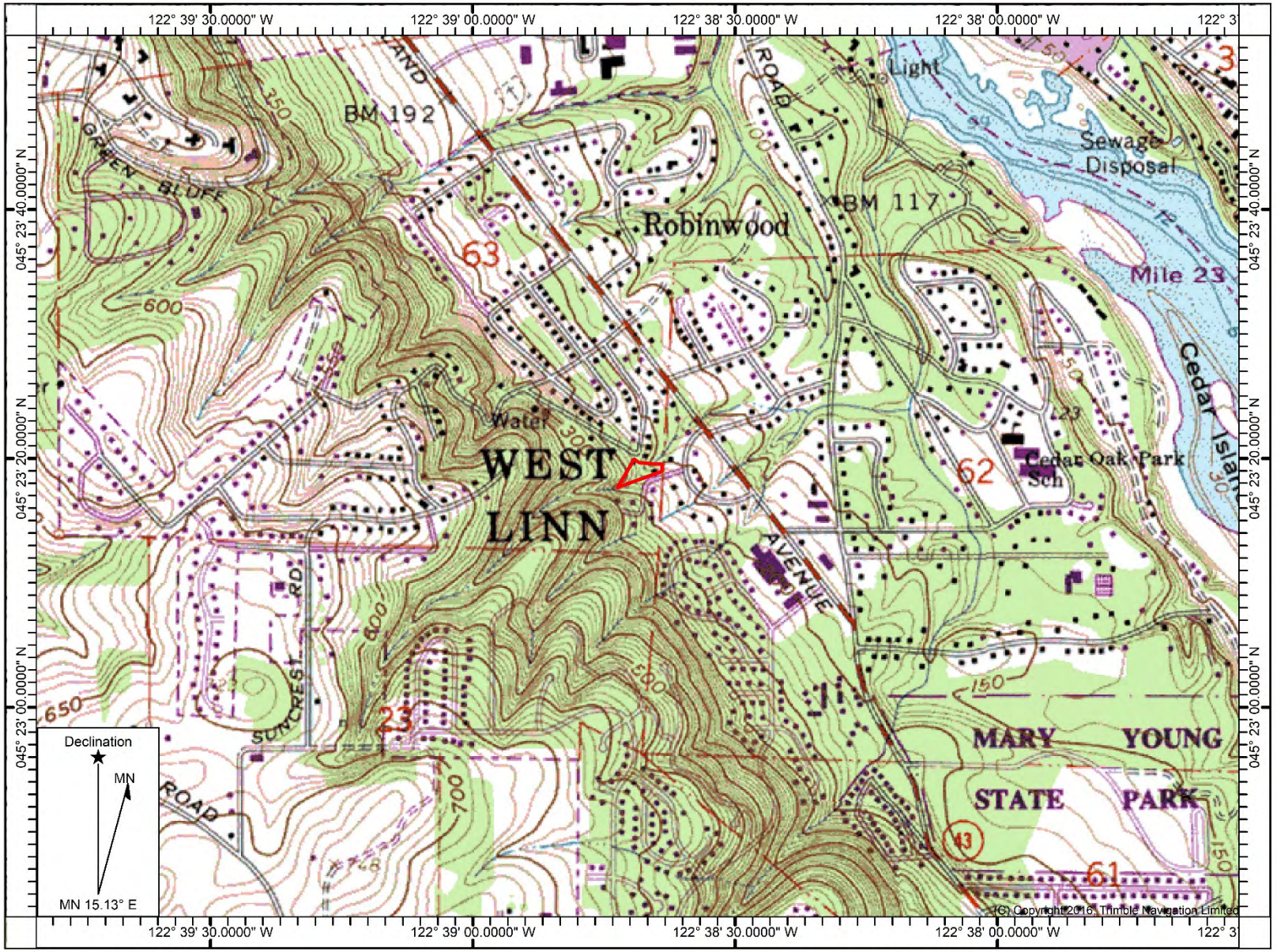
The proposed WRA reduction will encroach further to the WRA than the existing structures. However, the area surrounding the WRA on this property and many other residences adjacent to this site have previously impacted the WRA due to past development. The current building and shed on site are approximately 12 to 50 feet from the stream and therefore were either approved for development in the area or built before the WRA guidance was enacted. The proposed WRA reduction will be 15 feet from the stream on the east side, and the west side, where stream restoration will occur. Although the proposed WRA will be smaller in size, it will continue to provide the same, if not better, support for a thriving ecosystem post mitigation and restoration. Currently, the majority of vegetation within the WRA is invasive which limits species diversity and functional habitat within the WRA. See Figure 4 for existing conditions at the subject site.

## 5.0 Limitations

The scope of this report is limited to observations made during on-site work; interviews with knowledgeable sources; and review of readily available published and unpublished reports and literature. As a result, these conclusions are based on information supplied by others as well as interpretations by qualified parties.

We have performed our services for this project in accordance with our agreement and understanding with the Client. This document and the information contained herein have been prepared solely for the use of the Client.

# *Figures*

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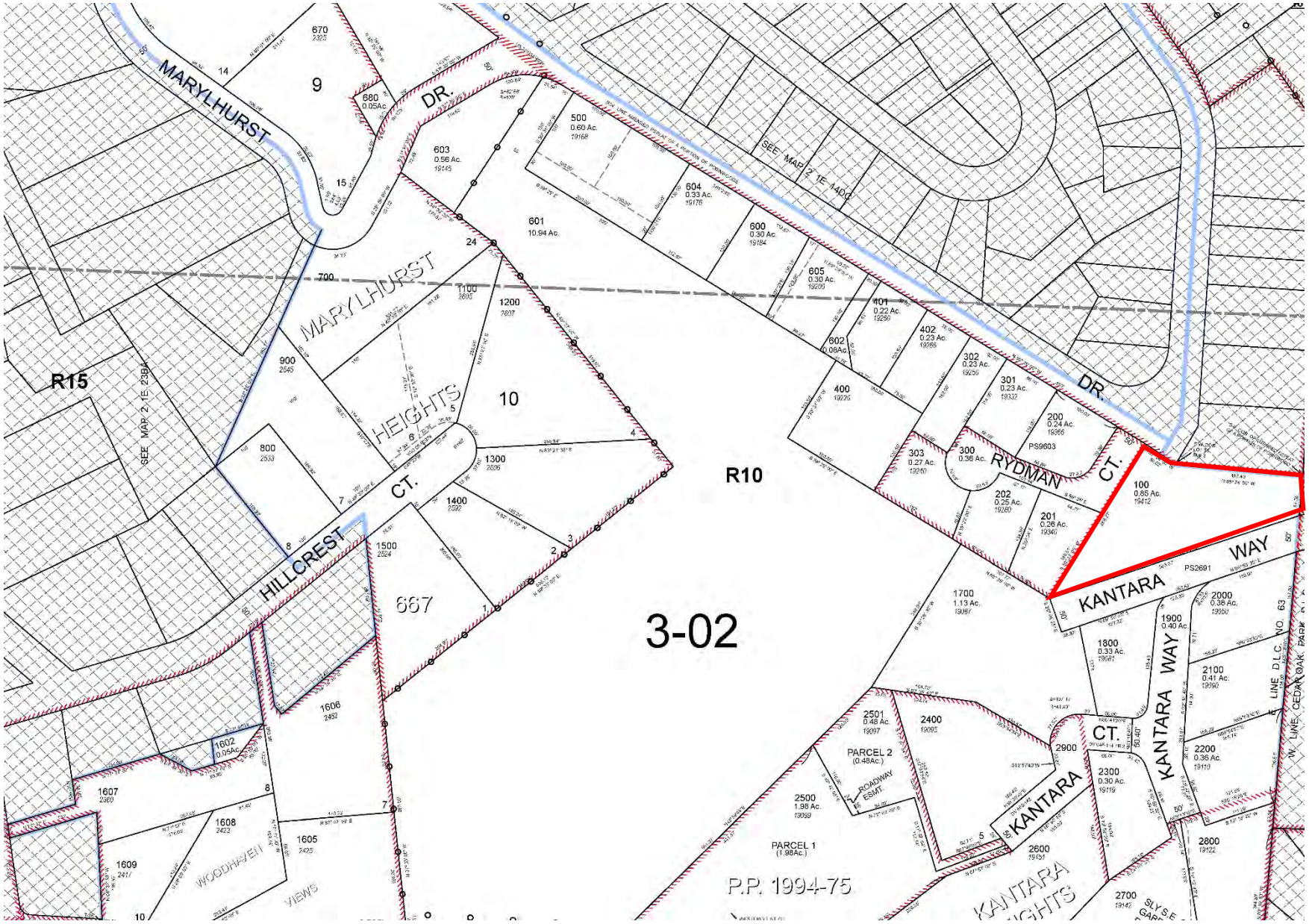
|---|---|---|---|---|
| EVREN NORTHWEST | Date Drawn: 9/1/2021<br>CAD File Name: 1577-21001-01_fig1sv_map<br>Drawn By: CLR<br>Approved By: LDG | Residential Property<br>19412 View Drive<br>West Linn, Oregon | **General Location and Topography** | Project No. 1577-21001<br>Figure No. **1** |

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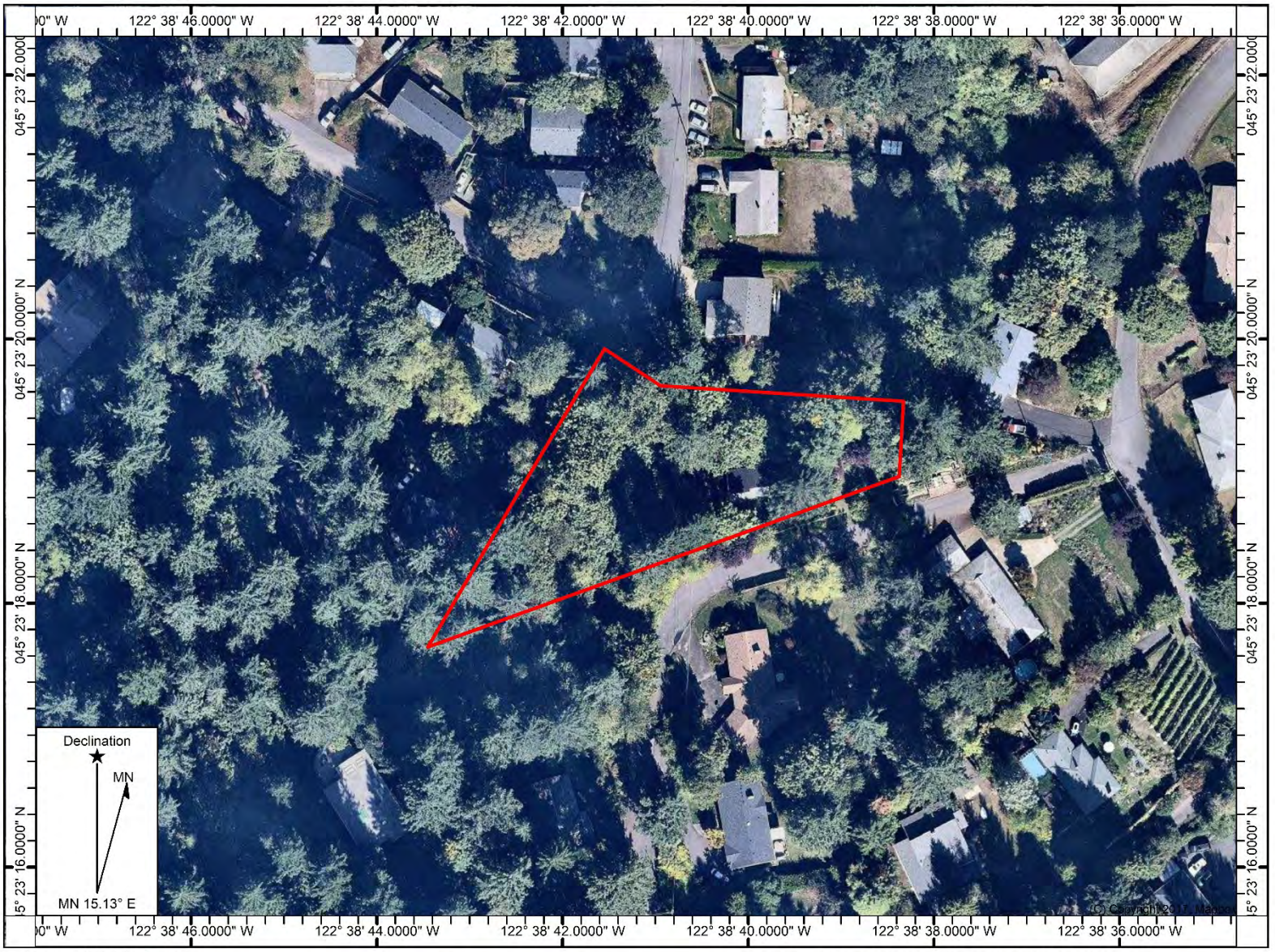
|---|---|---|---|---|
| EVREN NORTHWEST INC. environmental natural resource consultants | Date Drawn: 9/1/2021<br>CAD File Name: 1577-21001-01_fig2taxlot map<br>Drawn By: CLR<br>Approved By: LDG | Residential Property<br>19412 View Drive<br>West Linn, Oregon | **Tax Lot Map** | Project No. 1577-21001<br>Figure No. **2** |




Name: Satellite Image
Date: 08/16/21

0 100 200
Feet

Location: 045° 23' 18.9627" N, 122° 38' 41.2096" W

| | | | | |
|---|---|---|---|---|
| EVREN NORTHWEST | Date Drawn: 9/1/2021<br>CAD File Name: 1577-21001-01_fig3aerial<br>Drawn By: CLR<br>Approved By: LDG | Residential Property<br>19412 View Drive<br>West Linn, Oregon | **Aerial Map** | Project No.<br>1577-21001<br>Figure No.<br>**3** |

| DRAWN BY | CHECKED BY | APPROVED BY | DRAWING NUMBER |
|---|---|---|---|
| C. ROSEBROOK 09/01/2021 | P. TRONE 08/18/2021 | L. GREEN 08/18/2021 | 1577-21001(v01) |

VIEW DRIVE

RYDMAN COURT

KANTARA WAY

FORESTED

MAPLE
MAPLE
DEC
FIR
FIR
DEC
CHERRY
COTTON
PINE
MAPLE
CHERRY
CEDAR
CEDAR
MAPLE
FIR
MAPLE
MAPLE
MAPLE
MAPLE
MAPLE
COTTON
CEDAR
DEC
DEC
DEC
FIR
FIR
DEC
DEC
DEC
DEC
FIR
CHERRY
CHERRY
C
C
C
C

LEGEND:

- SUBJECT BUILDINGS
- SUBJECT PROPERTY BOUNDARIES
- TREE
- GRAVELED AREA
- CURRENT STREAM LOCATION
- PONDED AREA
- EXISTING VEGETAED BUFFER (WATER RESOURCE AREA)
- CULVERT (C)

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2021 AND ENW FIELD NOTES.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT. SHAPE, SIZE, OR ORIENTATION

APPROXIMATE SCALE

0 30 60 FEET

N

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FIGURE 4

EXISTING CONDITIONS

RESIDENTIAL PROPERTY
19412 VIEW DRIVE
WEST LINN, OREGON

| DRAWN BY | CHECKED BY | APPROVED BY | DRAWING NUMBER |
|---|---|---|---|
| C. ROSEBROOK 03/23/2022 | P. TRONE 03/23/2022 | L. GREEN 03/23/2022 | 1577-21001(v01) |

VIEW DRIVE

RYDMAN COURT

KANTARA WAY

FORESTED

MAPLE
MAPLE
DEC
FIR
FIR
FIR
DEC
CHERRY
COTTON
PINE
MAPLE
CHERRY
CEDAR
CEDAR
MAPLE
MAPLE
MAPLE
MAPLE
FIR
MAPLE
COTTON
CEDAR
DEC
DEC
DEC
FIR
FIR
DEC
FIR
DEC
DEC
FIR
CHERRY
CHERRY

LEGEND:

- SUBJECT BUILDINGS
- SUBJECT PROPERTY BOUNDARIES
- TREE
- RESTORED STREAM LOCATION
- PROPOSED VEGETATED BUFFER (WATER RESOURCE AREA)

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2021 AND ENW FIELD NOTES.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT. SHAPE, SIZE, OR ORIENTATION

APPROXIMATE SCALE

0 30 60 FEET

N

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# FIGURE 5
## REQUIRED AND PROPOSED WATER RESOURCE AREAS

RESIDENTIAL PROPERTY
19412 VIEW DRIVE
WEST LINN, OREGON

| DRAWN BY | CHECKED BY | APPROVED BY | DRAWING NUMBER |
|---|---|---|---|
| C. ROSEBROOK 03/23/2022 | P. TRONE 03/23/2022 | L. GREEN 03/23/2022 | 1577-21001(v01) |

VIEW DRIVE

RYDMAN COURT

KANTARA WAY

FORESTED

MAPLE
MAPLE
DEC
FIR
FIR
FIR
DEC
CHERRY
COTTON
PINE
MAPLE
CHERRY
CEDAR
CEDAR
MAPLE
MAPLE
MAPLE
MAPLE
FIR
MAPLE
MAPLE
COTTON
CEDAR
DEC
DEC
DEC
FIR
FIR
DEC
FIR
DEC
DEC
DEC
FIR
CHERRY
CHERRY

LEGEND:

- SUBJECT BUILDINGS
- SUBJECT PROPERTY BOUNDARIES
- PROPOSED VEGETATED BUFFER (WATER RESOURCE AREA)
- APPROXIMATE UPLAND MITIGATION AREA
- PROPOSED RIPARIAN CORRIDOR RESTORATION
- RESTORED STREAM LOCATION
- TREE

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2021 AND ENW FIELD NOTES.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT. SHAPE, SIZE, OR ORIENTATION

APPROXIMATE SCALE

0 30 60 FEET

N

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# FIGURE 6
## PROPOSED WATER RESOURCE AREA MITIGATION PLANTING PLAN

RESIDENTIAL PROPERTY
19412 VIEW DRIVE
WEST LINN, OREGON

# *Appendix A*

## Site Photographs

View facing southwest at Pond 1, showing central vegetated area near stream and berm that runs west to east.

View facing southwest from top of berm.

View facing east towards house from the gravel driveway.

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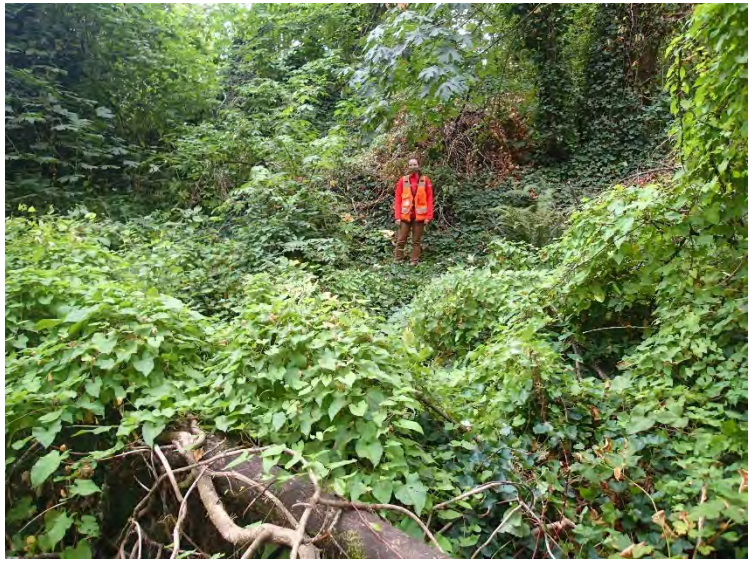
View on the east exterior of the house facing north.

| | | | |
|---|---|---|---|
| EVREN NORTHWEST INC. environmental natural resource consultants | Residential Property<br>19412 View Drive<br>West Linn, Oregon | **Site Photographs** | Project No.<br>1577-21001-01<br>Appendix<br>**A** |

Western bank furthest from house and south of the southernmost ponded area.

View of invasive Japanese Knotweed (*Reynoutria japonica*) on the subject site.



View of vegetated area in the southwestern most part of the site noted with bindweed and English Ivy.

Span of invasive English Ivy (*Hedera helix*) which was found in large sections throughout the entire property.

| | | | |
|---|---|---|---|
| EVREN NORTHWEST INC. environmental natural resource consultants | Residential Property<br>19412 View Drive<br>West Linn, Oregon | **Site Photographs** | Project No.<br>1577-21001-01<br>Appendix<br>**A** |