



## DEVELOPMENT REVIEW APPLICATION

**For Office Use Only**

STAFF CONTACT <b>John Floyd &amp; Ben Gardner</b>	PROJECT NO(S). <b>WAP-23-02</b>	PRE-APPLICATION NO. <b>PA-22-21</b>
NON-REFUNDABLE FEE(S) <b>\$2,600</b>	REFUNDABLE DEPOSIT(S)	TOTAL <b>\$2,600</b>

**Type of Review** (Please check all that apply):

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Annexation (ANX)        | <input type="checkbox"/> Historic Review                                  | <input type="checkbox"/> Subdivision (SUB)                                       |
| <input type="checkbox"/> Appeal and Review (AP)  | <input type="checkbox"/> Legislative Plan or Change                       | <input type="checkbox"/> Temporary Uses  |
| <input type="checkbox"/> Code Interpretation     | <input type="checkbox"/> Lot Line Adjustment (LLA)                        | <input type="checkbox"/> Time Extension  |
| <input type="checkbox"/> Conditional Use (CUP)   | <input type="checkbox"/> Minor Partition (MIP) (Preliminary Plat or Plan) | <input type="checkbox"/> Variance (VAR)  |
| <input type="checkbox"/> Design Review (DR)      | <input type="checkbox"/> Modification of Approval                         | <input type="checkbox"/> Water Resource Area Protection/Single Lot (WAP)         |
| <input type="checkbox"/> Tree Easement Vacation  | <input type="checkbox"/> Non-Conforming Lots, Uses & Structures           | <input checked="" type="checkbox"/> Water Resource Area Protection/Wetland (WAP) |
| <input type="checkbox"/> Final Plat or Plan (FP) | <input type="checkbox"/> Planned Unit Development (PUD)                   | <input type="checkbox"/> Willamette & Tualatin River Greenway (WRG)              |
| <input type="checkbox"/> Flood Management Area   | <input type="checkbox"/> Street Vacation                                  | <input type="checkbox"/> Zone Change   |

Pre-Application, Home Occupation, Sidewalk Use, Addressing, and Sign applications require different forms, available on the City website.

**Site Location/Address:**

4060 Kenthorpe Way  
West Linn OR 97068

Assessor's Map No.: T:25R:IE

Tax Lot(s): 402

Total Land Area: 11,601

**Brief Description of Proposal:**

Build a Single Family Home

**Applicant Name:** David & Gabrielle Maher  
(please print) 3290 Summerlinn Dr West Linn OR 97068  
Address:

Phone: 503 516-7240  
Email: exdub@hotmail.com

City State Zip:

**Owner Name** (required): David & Gabrielle Maher  
(please print) 3290 Summerlinn Dr West Linn OR 97068  
Address:

Phone: 503 516-7240  
Email: exdub@hotmail.com

City State Zip:

**Consultant Name:** Steve Greenslate Environmental Management Systems Inc. 4080 SE International Way STE B-112  
(please print) Milwaukie OR 97222  
Address:

Phone: 503 353-9691  
Email: steve@envmgtsys.com

City State Zip:

1. All application fees are non-refundable (excluding deposit). **Any overruns to deposit will result in additional billing.**
2. The owner/applicant or their representative should be present at all public hearings.
3. A decision may be reversed on appeal. The permit approval will not be effective until the appeal period has expired.
4. Submit this form and supporting documents through the [Submit a Land Use Application](https://westlinnoregon.gov/planning/submit-land-use-application) web page:  
<https://westlinnoregon.gov/planning/submit-land-use-application>

The undersigned property owner(s) hereby authorizes the filing of this application, and authorizes on site review by authorized staff. I hereby agree to comply with all code requirements applicable to my application. Acceptance of this application does not infer a complete submittal. All amendments to the Community Development Code and to other regulations adopted after the application is approved shall be enforced where applicable. Approved applications and subsequent development is not vested under the provisions in place at the time of the initial application.

David Maher

2/17/2023

David Maher

2/17/2023

Applicant's signature

Date

Owner's signature (**required**)

Date



ENVIRONMENTAL  
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4080 SE International Way

Suite B-112

Milwaukie, OR 97222



## **4060 Kenthorpe Way Project Narrative**

T:2S R:1E SEC: 24 Taxlot: 402

Prepared For:

**David Maher**

2340 SE Summerlinn Dr.

West Linn OR 97068

Prepared By:

**Environmental Management Systems, Inc.**

4080 SE International Way Ste. B-112

Milwaukie, OR 97222

(503)-353-9691

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## **Proposal**

The proposed development consists of one undeveloped tax lot located at 4060 Kenthorpe Way. The lot is unimproved and undeveloped from the creation of a lot line adjustment and Partition Plat Number 1995-113. The proposed development will include approximately 2,228 square feet of disturbance area within the Water Resource Area (WRA) for the dwelling and 160 square feet of disturbance for the stormwater treatment installation. The Water Resource Area is approximately 5958.8 square feet. The proposed development has a roof area of 2,654 square feet.

## **Site Description**

The site is tax lot 402 in Township 2S, Range 1E, of the Northwest  $\frac{1}{4}$  of Section 24. The site is comprised of one 11,601 square foot lot totaling 0.26 acres. The site is zoned as Single-Family Residential Detached, R-10. The site is a flag lot with an access and public utility easement running along the eastern portion of the site. The site is bounded by a single-family residence to the north (Parcel number 00373241), a single-family residence to the south and east (Parcel number 00373205), and an undeveloped lot to the west (Parcel number 00373250). The site is located approximately .33 miles west of the Willamette River with site elevations ranging from 118 to 134 feet above sea level.

The majority of the site lacks vegetation with less than 15 percent herb cover. Both deciduous and coniferous trees are sparse but provide roughly 60 percent cover. Non-native hedges are planted on the northern portion of the property and along the access road and parcel number 00373241. Trillium creek runs along the western and southwestern corner of the site, covering approximately 600 square feet of the site (at bank full). Slopes on the site range from approximately 3 percent to 20 percent.

**West Linn CDC 11.030 Permitted Uses**

Single-Family detached residential units are permitted uses outright in R 10 Zone.

This application proposes one single-family detached residential unit on the site.

**West Linn CDC 11.070 Dimensional requirements, uses permitted outright and uses permitted under prescribed conditions**

*Minimum lot size: 10,000 sf.*

The proposed lot size is 11,601 sf and satisfies the criteria.

*Minimum lot width at front lot line: 35 ft.*

The proposed front lot width is at least 35 feet and satisfies the criteria.

*Average minimum lot width: 50 ft.*

The average minimum lot width is at least 50 feet and satisfies the criteria.

Under the hardship provisions per CDC 32.110, where development is situated as far as practical from the WRA, front and side setbacks may be reduced up to 50% (per Ch 32.110(F)).

*The minimum yard dimensions or minimum building setbacks:*

*For a front yard, 20 feet; except for steeply sloped lots where the provisions of CDC 41.010 shall apply.*

With 50% reduction per 32.110(F), Front yard setbacks are 10 ft for the lot.

*For an interior side yard, 7.5 feet.*

50% reduction per 32.110(F) notwithstanding, side yards are 3.75 ft for the lot.

*For a side yard abutting a street, 15 feet.*

Side yards do not abut a street for this application.

*For a rear yard, 20 feet.*

Rear yard setbacks are 20 ft for the lot.

*Maximum building height; 35 feet; Except for steeply sloped lots in which case the provisions of Chapter [41](#) CDC shall apply.*

The building height will not exceed 35 feet and satisfies the criteria.

*Maximum lot coverage; 35%; This does not include detached garages, carports, or accessory structures. A developer may deduct up to 200 sf for an attached garage or carport.*

Maximum lot coverage will not exceed 35% of the lot area (11,601 sf x 0.35% = 4061 sf).

*Minimum accessway width to a lot which does not abut a street or a flag lot*

The access and public utility easement vary from 17 to 25 feet in width and satisfies the criteria.

*Maximum floor area ratio; .45*

Maximum floor area will not exceed a ratio of .45.

### **West Linn CDC 32.060 Approval Criteria for the Standard Process**

#### **A. WRA protection/minimizing impacts.**

*1. Development shall be conducted in a manner that will avoid or, if avoidance is not possible,*

*minimize adverse impact on WRAs.*

Under the hardship provisions per CDC 32.110, the minimum required distance from the creek to the house and associated improvements is 15 feet. The new single-family dwelling will be placed as close to the eastern property line (opposite the creek) as practical, with the majority of the structure within the WRA. Front and side setbacks will be reduced up to 50 percent per Chapter 32.110(F). The design has the most impacting functions such as parking and driveways located outside of the WRA.

*2. Mitigation and re-vegetation of disturbed WRAs shall be completed per CDC 32.090 and 32.100, respectively.*

1. All trees, shrubs, and ground cover to be planted are to be native plants selected from the Portland Plant List.

2., 3., & 4. Trees are to be at least one-half inch in caliper, and planted between eight and 12 feet on center, at a rate of 5 trees per every 500 square feet of disturbance area, with a minimum of 2 species. Shrubs are to be in at least a one-gallon container or the equivalent, and planted between four and five feet on center, or clustered in single species groups of no more than four plants. Shrubs are to be planted at a rate of 25 shrubs per 500 square feet of disturbance area, with a minimum of 2 species.

5. Any invasive non-native or noxious vegetation is to be removed within the mitigation area prior to planting.

6. A minimum survival rate of 80 percent of the materials planted is expected after 3 years from the mitigation planting date.

7. Plants that die will be replaced in kind and monitored by the owner.

8. Planting will occur between Dec 1st and April 30th as appropriate for the respective species and will be protected from wildlife damage via use of plant sleeves and/or fencing. Plants are to be mulched a minimum of 3 inches in depth and 18 inches in diameter. Plants are to be irrigated

one inch per week between June 15<sup>th</sup> and October 15<sup>th</sup> for the first three years following mitigation planting. Weeds are to be removed and controlled throughout the vegetation maintenance period.

Any disturbed area other than driveway or accessway will be seeded with the City of Portland Native 50/50 Meadow Mix4 (PT452) at a rate of 1 Lb. per 1000 square feet (2,388 square feet total). Species included in the seed mix are listed below:

- *Bromus carinatus* – California Brome
- *Hordeum brachyantherum* – Meadow Barley
- *Lupinus rivularis* – Streambank Lupine
- *Eschscholzia californica* – California Poppy
- *Clarkia amoena* – Farewell to Spring
- *Prunella vulgaris v. lanceolate* – Lance Self-Heal
- *Nemophila menziesii* – Baby Blue Eyes

***B. Storm water and storm water facilities.***

*1. Proposed developments shall be designed to maintain the existing WRAs and utilize them as the primary method of storm water conveyance through the project site unless:*

*a. The surface water management plan calls for alternate configurations (culverts, piping, etc.); or*

No culvert is proposed. Piping of stormwater from gutters to treatment is being used to manage flow.

*b. Under CDC 32.070, the applicant demonstrates that the relocation of the water resource will not adversely impact the function of the WRA including, but not limited to, circumstances where the WRA is poorly defined or not clearly channelized.*

The WRA is being impacted by the proposed structure as the majority of the property is located within the WRA. The design has minimized the impact the structure has on the WRA.

*c. Re-vegetation, enhancement and/or mitigation of the re-aligned water resource shall be required as applicable.*

The stormwater design satisfies the criteria. See Appendix F.

*2. Public and private storm water detention, storm water treatment facilities and storm water outfall or energy dissipaters (e.g., rip rap) may encroach into the WRA if:*

*a. Accepted engineering practice requires it;*

*b. Encroachment on significant trees shall be avoided when possible, and any tree loss shall be consistent with the City's Tree Technical Manual and mitigated per CDC 32.090;*

- c. There shall be no direct outfall into the water resource, and any resulting outfall shall not have an erosive effect on the WRA or diminish the stability of slopes; and*
- d. There are no reasonable alternatives available.*

*A geotechnical report may be required to make the determination regarding slope stability.*

Stormwater design satisfies the criteria. See Appendix F.

*3. Roadside storm water conveyance swales and ditches may be extended within rights-of-way located in a WRA. When possible, they shall be located along the side of the road furthest from the water resource. If the conveyance facility must be located along the side of the road closest to the water resource, it shall be located as close to the road/sidewalk as possible and include habitat friendly design features (treatment train, rain gardens, etc.).*

The single-family residence development will incorporate a flow through planter to treat runoff from the driveway and structure or other disturbed areas. Associated runoff will not encroach upon significant trees. There will not be any direct outfall into Trillium Creek. The proposed single family residence development within the WRA is not adjacent to or within right-of-way(s). See Appendix F for details.

*4. Storm water detention and/or treatment facilities in the WRA shall be designed without permanent perimeter fencing and shall be landscaped with native vegetation.*

Stormwater flow through planter design will incorporate native plantings appropriate for stormwater infrastructure applications. See the stormwater design in Appendix F.

*5. Access to public storm water detention and/or treatment facilities shall be provided for maintenance purposes. Maintenance driveways shall be constructed to minimum width and use water permeable paving materials. Significant trees, including roots, shall not be disturbed to the degree possible. The encroachment and any tree loss shall be mitigated per CDC 32.090. There shall also be no adverse impacts upon the hydrologic conditions of the site.*

The proposed single family residence development within the WRA is not adjacent to or within right-of-way(s) or public areas. This section does not apply to the development.

*6. Storm detention and treatment and geologic hazards: Per the submittals required by CDC 32.050(F)(3) and 92.010(E), all proposed storm detention and treatment facilities must comply with the standards for the improvement of public and private drainage systems located in the West Linn Public Works Design Standards, there will be no adverse off-site impacts caused by the development (including impacts from increased intensity of runoff downstream or constrictions*



causing ponding upstream), and the applicant must provide sufficient factual data to support the conclusions of the submitted plan.

See the stormwater design in Appendix F.

**C. Repealed by Ord. 1647.**

**D. WRA width.** Except for the exemptions in CDC [32.040](#), applications that are using the alternate review process of CDC [32.070](#), or as authorized by the approval authority consistent with the provisions of this chapter, all development is prohibited in the WRA as established in Table 32-2 below:

Table 32-2. Required Width of WRA

<b>Protected WRA Resource (see Chapter 2 CDC, Definitions)</b>	<b>Slope Adjacent to Protected Water Resource<sup>1, 3</sup></b>	<b>Starting Point for Measurements from Water Resource<sup>1, 3</sup></b>	<b>Width of WRA on Each Side of the Water Resource</b>
A. Water Resource	0% - 25%	OHW or delineated edge of wetland	65 feet
B. Water Resource (Ravine)	over 25% to a distinct top of slope <sup>2</sup>	OHW or delineated edge of wetland	From water resource to top of slope <sup>2</sup> (30-foot minimum), plus an additional 50 feet <sup>4</sup>
C. Water Resource	Over 25% for more than 30 feet, and no distinct top of slope for at least 150 feet	OHW or delineated edge of wetland	200 feet
D. Riparian Corridor	Any	OHW	100 feet
E. Formerly Closed Drainage Channel Reopened	Any	OHW	15 feet
F. Ephemeral Stream	Any	Stream thread or centerline	15 feet with treatment or vegetation (see CDC <a href="#">32.050(G)(1)</a> )

Table 32-2. Required Width of WRA

<b>Protected WRA Resource (see Chapter 2 CDC, Definitions)</b>	<b>Slope Adjacent to Protected Water Resource<sup>1, 3</sup></b>	<b>Starting Point for Measurements from Water Resource<sup>1, 3</sup></b>	<b>Width of WRA on Each Side of the Water Resource</b>
<i>G. Fish Bearing Streams per Oregon Department of Fish and Wildlife (ODFW) or 2003-2004 Survey</i>	<i>Applies to all that stream section where fish were inventoried and upstream to the first known barrier to fish passage.</i>	<i>OHW or delineated edge of wetland</i>	<i>100 feet when no greater than 25% slope. See B or C above for steeper slopes</i>
<i>H. Re-aligned Water Resource</i>	<i>See A, B, C, D, F, or G, above</i>	<i>OHW or delineated edge of wetland</i>	<i>See A, B, C, D, F, or G, above</i>

The WRA width for the Water Resource on the site is 65 feet from the ordinary high water as indicated in Table 32-2 above. The hardship provisions in CDC 32.110 state the minimum required distance from the creek to the disturbance and associated improvements is 15 feet.

See Wetland Determination attached in Appendix A. EMS conducted a wetland determination on the site on July 5<sup>th</sup>, 2022. The field visit concluded no wetland was present on the site.

**E. Potential Hazards.** 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 safe 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 or intensity of land use, which it determines are necessary to mitigate known risks of landslides or property damage.

A topographic survey was conducted in September of 2022 (see Appendix C. Figure 3).

A geotechnical report was prepared in August of 2022 by Mia Mahedy of Rapid Soil Solutions (see Appendix F). The report found the site safe and feasible for development.

Oregon Department of Geology and Mineral Industries (DOGAMI) HazVu mapping identifies the western portion of the site as moderate land sliding possibility (see Appendix C. Figure 4).

**F. Roads, driveways and utilities.**

1. New roads, driveways, or utilities shall avoid WRAs unless the applicant demonstrates that no other practical alternative exists. In that case, road design and construction techniques shall minimize impacts and disturbance to the WRA by the following methods:

a. New roads and utilities crossing riparian habitat areas or streams shall be aligned as close to perpendicular to the channel as possible.

*b. Roads and driveways traversing WRAs shall be of the minimum width possible to comply with applicable road standards and protect public safety. The footprint of grading and site clearing to accommodate the road shall be minimized.*

*c. Road and utility crossings shall avoid, where possible:*

- 1) Salmonid spawning or rearing areas;*
- 2) Stands of mature conifer trees in riparian areas;*
- 3) Highly erodible soils;*
- 4) Landslide prone areas;*
- 5) Damage to, and fragmentation of, habitat; and*
- 6) Wetlands identified on the WRA Map.*

No new road is proposed. A new driveway is proposed and will be located outside of the WRA. No utilities are proposed to cross a riparian habitat or stream.

*2. Crossing of fish bearing streams and riparian corridors shall use bridges or arch-bottomless culverts or the equivalent that provides comparable fish protection, to allow passage of wildlife and fish and to retain the natural stream bed.*

Does not apply to development.

*3. New utilities spanning fish bearing stream sections, riparian corridors, and wetlands shall be located on existing roads/bridges, elevated walkways, conduit, or other existing structures or installed underground via tunneling or boring at a depth that avoids tree roots and does not alter the hydrology sustaining the water resource, unless the applicant demonstrates that it is not physically possible or it is cost prohibitive. Bore pits associated with the crossings shall be restored upon project completion. Dry, intermittent streams may be crossed with open cuts during a time period approved by the City and any agency with jurisdiction.*

Does not apply to development.

*4. No fill or excavation is allowed within the ordinary high water mark of a water resource, unless all necessary permits are obtained from the City, U.S. Army Corps of Engineers and Oregon Department of State Lands (DSL).*

Does not apply to development.

*5. Crossings of fish bearing streams shall be aligned, whenever possible, to serve multiple properties and be designed to accommodate conduit for utility lines. The applicant shall, to the extent legally permissible, work with the City to provide for a street layout and crossing location that will minimize the need for additional stream crossings in the future to serve surrounding properties.*

Does not apply to development.

**G. *Passive recreation.*** *Low impact or passive outdoor recreation facilities for public use including, but not limited to, multi-use paths and trails, not exempted per CDC [32.040\(B\)\(2\)](#), viewing platforms,*

historical or natural interpretive markers, and benches in the WRA, are subject to the following standards:

1. Trails shall be constructed using non-hazardous, water permeable materials with a maximum width of four feet or the recommended width under the applicable American Association of State Highway and Transportation Officials (AASHTO) standards for the expected type and use, whichever is greater.
2. Paved trails are limited to the area within 20 feet of the outer boundary of the WRA, and such trails must comply with the storm water provisions of this chapter.
3. All trails in the WRA shall be set back from the water resource at least 30 feet except at stream crossing points or at points where the topography forces the trail closer to the water resource.
4. Trails shall be designed to minimize disturbance to existing vegetation, work with natural contours, avoid the fall line on slopes where possible, avoid areas with evidence of slope failure and ensure that trail runoff does not create channels in the WRA.
5. Foot bridge crossings shall be kept to a minimum. When the stream bank adjacent to the foot bridge is accessible (e.g., due to limited vegetation or topography), where possible, fences or railings shall be installed from the foot bridge and extend 15 feet beyond the terminus of the foot bridge to discourage trail users and pets from accessing the stream bank, disturbing wildlife and habitat areas, and causing vegetation loss, stream bank erosion and stream turbidity. Bridges shall not be made of continuous impervious materials or be treated with toxic substances that could leach into the WRA.
6. Interpretive facilities (including viewpoints) shall be at least 10 feet from the top of the water resource's bankfull flow/OHW or delineated wetland edge and constructed with a fence between users and the resource. Interpretive signs may be installed on footbridges.

This narrative application for development does not propose any passive recreation. This section does not apply.

#### **H. Daylighting Piped Streams.**

1. As part of any application, covered or piped stream sections shown on the WRA Map are encouraged to be "daylighted" or opened. Once it is daylighted, the WRA will be limited to 15 feet on either side of the stream. Within that WRA, water quality measures are required which may include a storm water treatment system (e.g., vegetated bioswales), continuous vegetative ground cover (e.g., native grasses) at least 15 feet in width that provides year-round efficacy, or a combination thereof.
2. The re-opened stream does not have to align with the original piped route but may take a different route on the subject property so long as it makes the appropriate upstream and downstream connections and meet the standards of subsections (H)(3) and (4) of this section.
3. A re-aligned stream must not create WRAs on adjacent properties not owned by the applicant unless the applicant provides a notarized letter signed by the adjacent property owner(s) stating that the encroachment of the WRA is permitted.

4. *The evaluation of proposed alignment and design of the reopened stream shall consider the following factors:*
  - a. *The ability of the reopened stream to safely carry storm drainage through the area without causing significant erosion.*
  - b. *Continuity with natural contours on adjacent properties, slope on site and drainage patterns.*
  - c. *Continuity of adjacent vegetation and habitat values.*
  - d. *The ability of the existing and proposed vegetation to filter sediment and pollutants and enhance water quality.*
  - e. *Provision of water temperature conducive to fish habitat.*
5. *Any upstream or downstream WRAs or riparian corridors shall not apply to, or overlap, the daylighted stream channel.*
6. *When a stream is daylighted the applicant shall prepare and record a legal document describing the reduced WRA required by subsections (H)(1) and (5) of this section. The document will be signed by a representative of the City and recorded at the applicant's expense to better ensure long term recognition of the reduced WRA and reduced restrictions for the daylighted stream section.*

The site does not contain any daylighted stream elements described above and this narrative proposal does not create any new daylighting for Trillium Creek. This section does not apply.

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

1. *Restore disturbed soils to original or higher level of porosity to regain infiltration and storm water storage capacity.*
2. *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.*
3. *Incorporate storm water management in road rights-of-way.*
4. *Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and groundwater recharge.*
5. *Use multi-functional open drainage systems in lieu of conventional curb-and-gutter systems.*
6. *Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.*
7. *Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.*
8. *Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.*
9. *Use pervious paving materials for driveways, parking lots, sidewalks, patios, and walkways.*

10. *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.*
11. *Use shared driveways.*
12. *Reduce width of residential streets and driveways, especially at WRA crossings.*
13. *Reduce street length, primarily in residential areas, by encouraging clustering.*
14. *Reduce cul-de-sac radii and use pervious and/or vegetated islands in center to minimize impervious surfaces.*
15. *Use previously developed areas (PDAs) when given an option of developing PDA versus non-PDA land.*
16. *Minimize the building, hardscape and disturbance footprint.*
17. *Consider multi-story construction over a bigger footprint. (Ord. [1623](#) § 1, 2014; Ord. [1635](#) § 19, 2014; Ord. [1647](#) § 5, 2016; Ord. [1662](#) § 7, 2017)*

The development on site will utilize the following habitat friendly development practices:

- Minimization of development disturbance
- Smaller footprint development with efficient construction practices, home design, and home location
- Reducing driveway width to the extent possible
- Rain Barrels to capture roof runoff for later use in landscaped areas
- Driveway runoff shedding to landscaped areas
- Revegetation to include native vegetation
- Shared access roadways

### **West Linn CDC 32.110 Hardship Provisions**

*A. The right to obtain a hardship allowance is based on the existence of a lot of record recorded with the County Assessor's Office on, or before, January 1, 2006. The lot of record may have been, subsequent to that date, modified from its original platted configuration but must meet the minimum lot size and dimensional standards of the base zone.*

The partition plat (P.P. 1995-113) for the site was created in 1995 and satisfies the criteria.

*B. For lots described in subsection A of this section that are located completely or partially inside the WRA, development is permitted, consistent with this section. The maximum disturbed area (MDA) of the WRA shall be determined on a per lot basis. The MDA shall be the greater of:*

1. *Five thousand square feet of the WRA; or*
2. *Thirty percent of the total area of the WRA.*

The maximum disturbed area from the development total 2388 square feet of the WRA and satisfies the criteria.

C. *The MDA shall be located as follows:*

1. *In areas where the development will result in the least square footage encroachment into the WRA.*
2. *The applicant shall demonstrate, through site and building design, that the proposed development is the maximum practical distance from the water resource based on the functional needs of the proposed use.*
3. *The minimum distance from a water resource shall be 15 feet.*
4. *Access driveways shall be the minimum permitted width; select an alignment that is least impactful upon the WRA; and shall share use of the driveway, where possible.*

The development location satisfies the criteria (see Appendix C, Figure 2. Site Plan).

D. *The MDA shall include:*

1. *The footprints of all structures, including accessory structures, decks and paved water impermeable surfaces including sidewalks, driveways, parking pads, paths, patios and parking lots, etc. Only 75 percent of water permeable surfaces at grade shall be included in the MDA.*
2. *All graded, disturbed or modified areas that are not subsequently restored to their original grade and replanted with native ground cover per an approved plan.*

The development location satisfies the criteria (see Appendix C, Figure 2. Site Plan).

E. *The MDA shall not include:*

1. *Temporarily disturbed areas (TDAs) adjacent to an approved structure or development area for the purpose of grading, material storage, construction activity, trenched or buried utilities and other temporary activities so long as these areas are subsequently restored to the original grades and soil permeability, and re-vegetated with native plants per CDC [32.100](#), such that they are at least equal in functional value to the area prior to the initiation of the permitted activity;*
2. *Bay windows and similar cantilevered elements (including decks, etc.) of the principal or secondary structure so long as they do not extend more than five feet towards the WRA from the vertical plane of the house, and have no vertical supports from grade;*
3. *PDA's that are not built upon as part of the development proposal will not count in the MDA (e.g., use of an existing access driveway). (Conversely, PDA's that are built upon as part of the development proposal will count in the MDA.);*
4. *The installation of public streets and public utilities that are specifically required to meet either the transportation system plan or a utility master plan so long as all trenched public utilities are subsequently restored to the original grades and soil permeability, and revegetated with native plants per CDC [32.100](#), such that they are at least equal in functional value to the area prior to the initiation of the permitted activity. All areas displaced by streets shall be mitigated for.*

The development location satisfies the criteria (see Appendix C, Figure 2. Site Plan).

*F. Development allowed under subsection A of this section may use the following provisions:*

*1. Setbacks required by the underlying zoning district may be reduced up to 50 percent where necessary to avoid construction within the WRA, as long as the development would otherwise meet the standards of this chapter. However, front loading garages shall be set back a minimum of 18 feet, while side loading garages shall be set back a minimum of three feet.*

*2. Landscaping and parking requirements may be reduced for hardship properties but only if all or part of the WRA is dedicated pursuant to CDC [32.060\(C\)](#) or if a restrictive deed covenant is established. These reductions shall be permitted outright and, to the extent that the practices are inconsistent with other provisions or standards of the West Linn CDC, this section is given precedence so that no variance is required. The allowable reductions include:*

*a. Elimination of landscaping for the parking lot interior.*

*b. Elimination of the overall landscape requirement (e.g., 20 percent for commercial uses).*

*c. Elimination of landscaping between parking lots and perimeter non-residential properties.*

*d. Landscaping between parking lots and the adjacent right-of-way may be reduced to eight feet. This eight-foot-wide landscaped strip may be used for vegetated storm water detention or treatment.*

*e. A 25 percent reduction in total required parking is permitted to minimize or avoid intrusion into the WRA.*

*f. Adjacent improved street frontage with curb and sidewalk may be counted towards the parking requirement at a rate of one parking space per 20 lineal feet of street frontage adjacent to the property, subject to City Engineer approval based on the street width and classification.*

*g. The current compact and full-sized parking mix may be modified to allow up to 100 percent compact spaces and no full-sized spaces. However, any required ADA compliant spaces shall be provided.*

The development will utilize the 50 % setback reduction to minimize construction within the WRA. No other provisions listed above will apply.

### **32.090 Mitigation Plan**

*A. A mitigation plan shall only be required if development is proposed within a WRA (including development of a PDA). (Exempted activities of CDC [32.040](#) do not require mitigation unless specifically stated. Temporarily disturbed areas, including TDAs associated with exempted activities, do not require mitigation, just grade and soil restoration and re-vegetation.) The mitigation plan shall satisfy all applicable provisions of CDC [32.100](#), Re-Vegetation Plan Requirements.*

*B. Mitigation shall take place in the following locations, according to the following priorities (subsections (B)(1) through (4) of this section):*

*1. On-site mitigation by restoring, creating or enhancing WRAs.*



The project includes the removal of 1 Douglas-Fir tree and invasive Himalayan blackberry and English Ivy in the proposed development area of the property. Native vegetation will be planted within the WRA area of the lot to restore and enhance the WRA.

2. *Off-site mitigation in the same sub-watershed will be allowed, but only if the applicant has demonstrated that:*

a. *It is not practicable to complete mitigation on-site, for example, there is not enough area on-site; and*

b. *The mitigation will provide equal or superior ecological function and value.*

The project includes the removal of 1 Douglas-Fir tree and invasive Himalayan blackberry and English Ivy in the proposed development area of the property. No mitigation is proposed off-site.

3. *Off-site mitigation outside the sub-watershed will be allowed, but only if the applicant has demonstrated that:*

a. *It is not practicable to complete mitigation on-site, for example, there is not enough area on-site; and*

b. *The mitigation will provide equal or superior ecological function and value.*

This project is not proposing any mitigation outside of the WRA. See Appendix A. Mitigation Plan.

4. *Purchasing mitigation credits through DSL or other acceptable mitigation bank.*

C. *Amount of mitigation.*

1. *The amount of mitigation shall be based on the square footage of the permanent disturbance area by the application. For every one square foot of non-PDA disturbed area, on-site mitigation shall require one square foot of WRA to be created, enhanced or restored.*

A total of 2,338 square feet of lot area will have Himalayan blackberries, English ivy, and other invasive vegetation removed and will be replanted with native plants. This consists of the remaining site area within the WRA and an additional area that would be considered an extension of the WRA adjacent to the property development. New trees, shrubs, and herbaceous perennials will be planted based on the size of disturbance area within the WRA, which totals 2338 square feet. Five trees and 25 shrubs shall be planted per 500 square feet of disturbance, which correlates to approximately 24 trees and 120 shrubs. Trees planted shall be 5-gallon (1/2" caliper) trees planted within the WRA. Any disturbed area other than driveway or accessway will be seeded with the City of Portland Native 50/50 Meadow Mix4 (PT452) at a rate of 1 Lb. per 1000 square feet (2,388 square feet total). Species included in the seed mix are listed below:

- *Bromus carinatus* – California Brome

- *Hordeum brachyantherum* – Meadow Barley
- *Lupinus rivularis* – Streambank Lupine
- *Eschscholzia californica* – California Poppy
- *Clarkia amoena* – Farewell to Spring
- *Prunella vulgaris v. lanceolata* – Lance Self-Heal
- *Nemophila menziesii* – Baby Blue Eyes

2. *For every one square foot of PDA that is disturbed, on-site mitigation shall require one half a square foot of WRA vegetation to be created, enhanced or restored.*

This project has no known previously disturbed areas.

3. *For any off-site mitigation, including the use of DSL mitigation credits, the requirement shall be for every one square foot of WRA that is disturbed, two square feet of WRA shall be created, enhanced or restored. The DSL mitigation credits program or mitigation bank shall require a legitimate bid on the cost of on-site mitigation multiplied by two to arrive at the appropriate dollar amount.*

This project does not propose any mitigation off site.

D. *The Planning Director may limit or define the scope of the mitigation plan and submittal requirements commensurate with the scale of the disturbance relative to the resource and pursuant to the authority of Chapter 99 CDC. The Planning Director may determine that a consultant is required to complete all or a part of the mitigation plan requirements.*

E. *A mitigation plan shall contain the following information:*

1. *A list of all responsible parties including, but not limited to, the owner, applicant, contractor, or other persons responsible for work on the development site.*
2. *A map showing where the specific adverse impacts will occur and where the mitigation activities will occur.*
3. *A re-vegetation plan for the area(s) to be mitigated that meets the standards of CDC [32.100](#).*
4. *An implementation schedule, including timeline for construction, mitigation, mitigation maintenance, monitoring, and reporting. All in-stream work in fish bearing streams shall be done in accordance with the Oregon Department of Fish and Wildlife.*
5. *Assurances shall be established to rectify any mitigation actions that are not successful within the first three years. This may include bonding or other surety. (Ord. [1623](#) § 1, 2014).*

See Appendix A. Mitigation Plan.

### **32.100 Re-vegetation Plan Requirements**

A. *In order to achieve the goal of re-establishing forested canopy, native shrub and ground cover and to meet the mitigation requirements of CDC [32.090](#) and vegetative enhancement of CDC [32.080](#), tree and vegetation plantings are required according to the following standards:*

1. *All trees, shrubs and ground cover to be planted must be native plants selected from the Portland Plant List.*
2. *Plant size. Replacement trees must be at least one-half inch in caliper, measured at six inches above the ground level for field grown trees or above the soil line for container grown trees (the one-half inch minimum size may be an average caliper measure, recognizing that trees are not uniformly round), unless they are oak or madrone which may be one gallon size. Shrubs must be in at least a one-gallon container or the equivalent in ball and burlap and must be at least 12 inches in height.*
3. *Plant coverage.*
  - a. *Native trees and shrubs are required to be planted at a rate of five trees and 25 shrubs per every 500 square feet of disturbance area (calculated by dividing the number of square feet of disturbance area by 500, and then multiplying that result times five trees and 25 shrubs, and rounding all fractions to the nearest whole number of trees and shrubs; for example, if there will be 330 square feet of disturbance area, then 330 divided by 500 equals 0.66, and 0.66 times five equals 3.3, so three trees must be planted, and 0.66 times 25 equals 16.5, so 17 shrubs must be planted). Bare ground must be planted or seeded with native grasses or herbs. Non-native sterile wheat grass may also be planted or seeded, in equal or lesser proportion to the native grasses or herbs.*
  - b. *Trees shall be planted between eight and 12 feet on center and shrubs shall be planted between four and five feet on center, or clustered in single species groups of no more than four plants, with each cluster planted between eight and 10 feet on center. When planting near existing trees, the dripline of the existing tree shall be the starting point for plant spacing measurements.*
4. *Plant diversity. Shrubs must consist of at least two different species. If 10 trees or more are planted, then no more than 50 percent of the trees may be of the same genus.*
5. *Invasive vegetation. Invasive non-native or noxious vegetation must be removed within the mitigation area prior to planting.*
6. *Tree and shrub survival. A minimum survival rate of 80 percent of the trees and shrubs planted is expected by the third anniversary of the date that the mitigation planting is completed.*
7. *Monitoring and reporting. Monitoring of the mitigation site is the ongoing responsibility of the property owner. Plants that die must be replaced in kind.*
8. *To enhance survival of tree replacement and plantings, the following practices are required:*
  - a. *Mulching. Mulch new plantings a minimum of three inches in depth and 18 inches in diameter to retain moisture and discourage weed growth.*
  - b. *Irrigation. Water new plantings one inch per week between June 15th to October 15th, for the three years following planting.*
  - c. *Weed control. Remove, or control, non-native or noxious vegetation throughout maintenance period.*
  - d. *Planting season. Plant bare root trees between December 1st and February 28th, and potted plants between October 15th and April 30th.*

*e. Wildlife protection. Use plant sleeves or fencing to protect trees and shrubs against wildlife browsing and resulting damage to plants.*

*B. When weather or other conditions prohibit planting according to schedule, the applicant shall ensure that disturbed areas are correctly protected with erosion control measures and shall provide the City with funds in the amount of 125 percent of a bid from a recognized landscaper or nursery which will cover the cost of the plant materials, installation and any follow up maintenance. Once the planting conditions are favorable the applicant shall proceed with the plantings and receive the funds back from the City upon completion, or the City will complete the plantings using those funds. (Ord. [1623](#) § 1, 2014)*

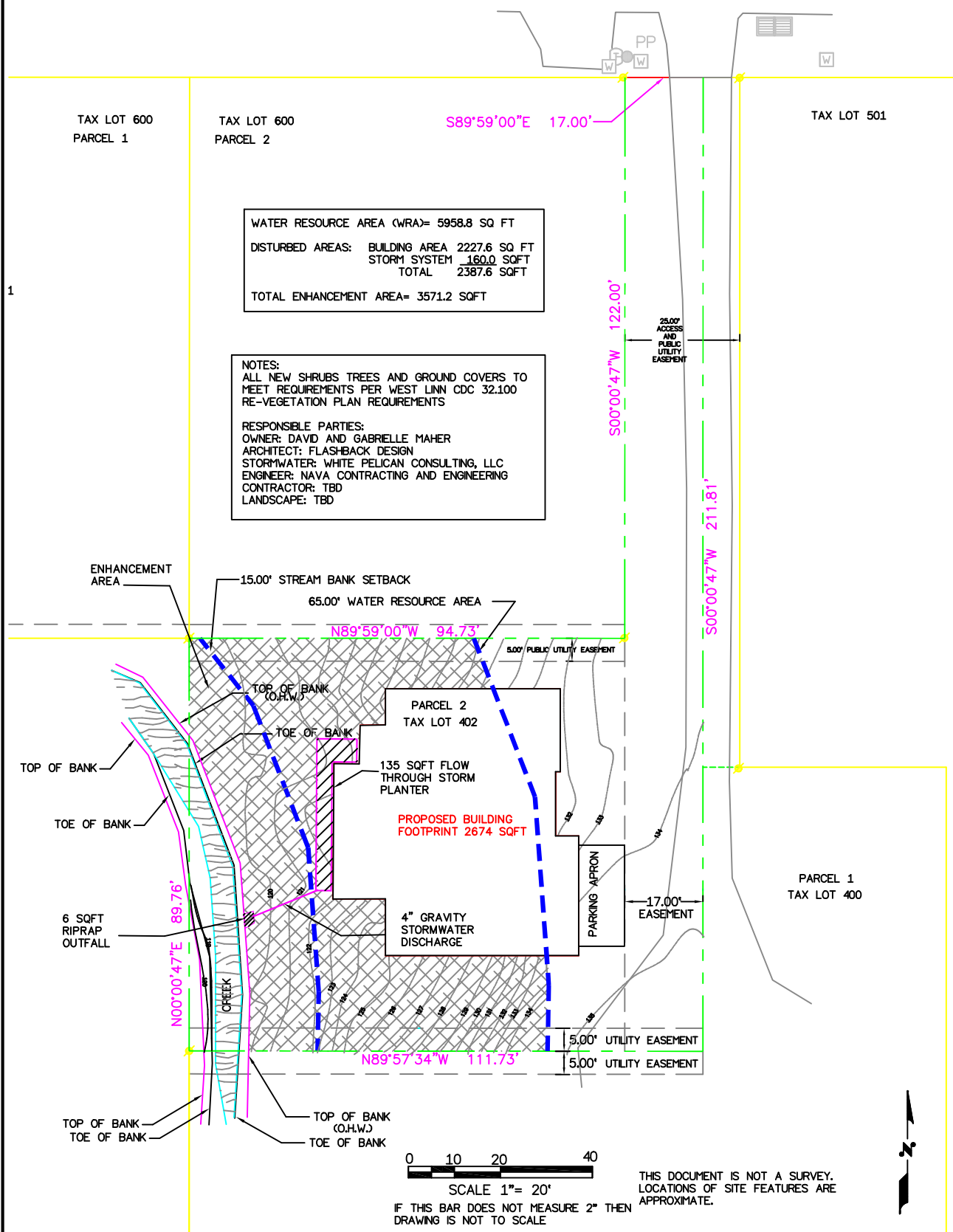
Landscaping and re-vegetation plans submitted for building permit and WRA protection permit shall meet these criteria.

**Appendix A. Mitigation Plan**

**Appendix B. Re-vegetation Plan**

4060 Kenthorpe Way  
West Linn, OR 97068

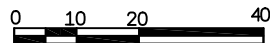
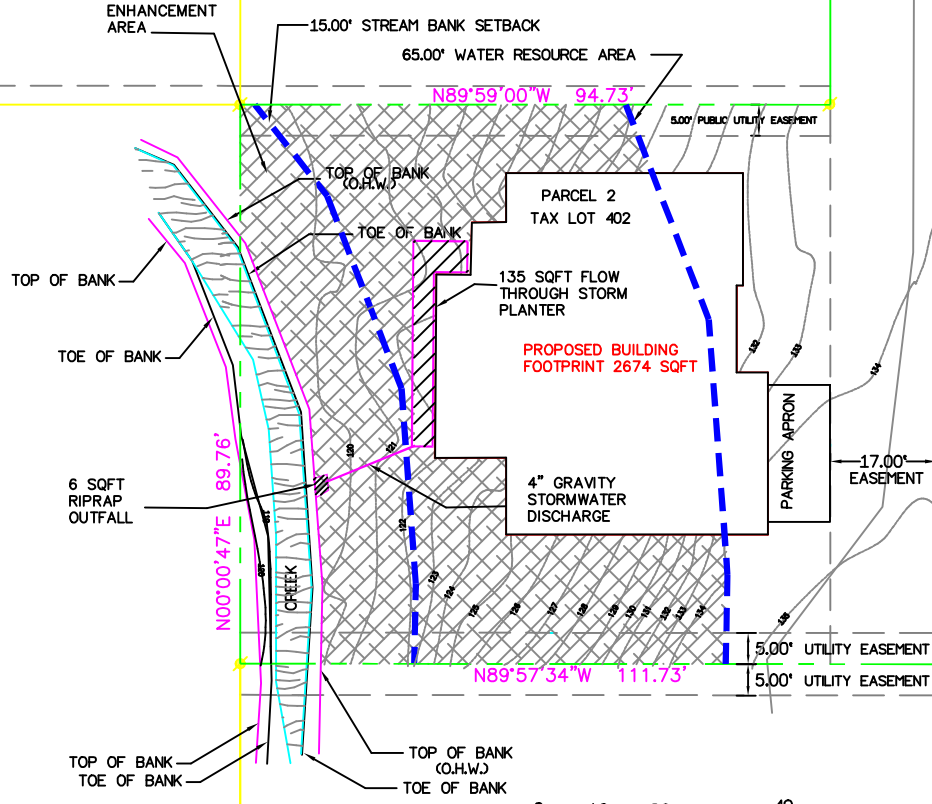
**KENTHORPE WAY**



WATER RESOURCE AREA (WRA)= 5958.8 SQ FT  
 DISTURBED AREAS: BUILDING AREA 2227.6 SQ FT  
 STORM SYSTEM 160.0 SQFT  
 TOTAL 2387.6 SQFT  
 TOTAL ENHANCEMENT AREA= 3571.2 SQFT

NOTES:  
 ALL NEW SHRUBS TREES AND GROUND COVERS TO MEET REQUIREMENTS PER WEST LINN CDC 32.100 RE-VEGETATION PLAN REQUIREMENTS

RESPONSIBLE PARTIES:  
 OWNER: DAVID AND GABRIELLE MAHER  
 ARCHITECT: FLASHBACK DESIGN  
 STORMWATER: WHITE PELICAN CONSULTING, LLC  
 ENGINEER: NAVA CONTRACTING AND ENGINEERING  
 CONTRACTOR: TBD  
 LANDSCAPE: TBD



SCALE 1" = 20'  
 IF THIS BAR DOES NOT MEASURE 2" THEN DRAWING IS NOT TO SCALE

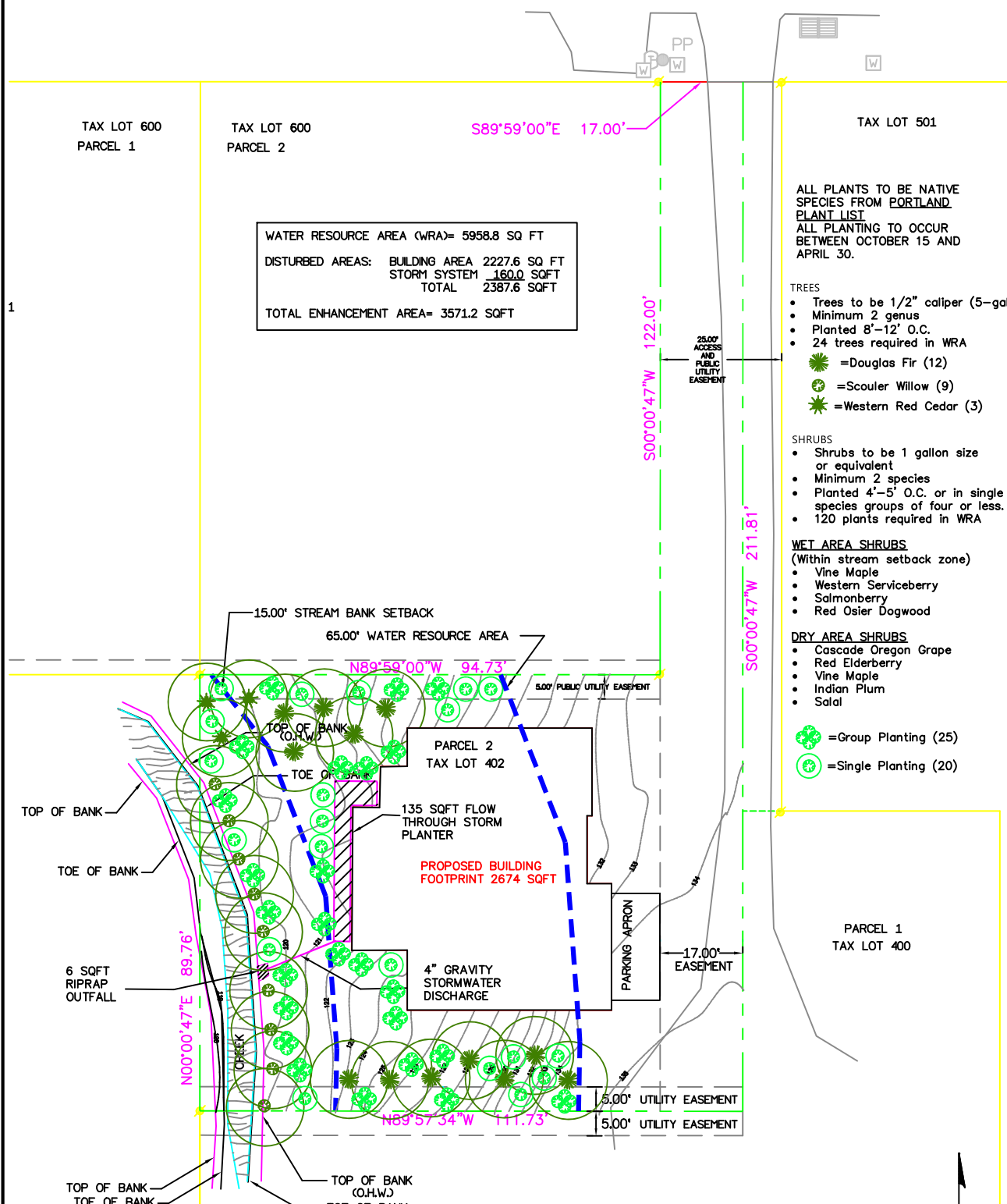
THIS DOCUMENT IS NOT A SURVEY. LOCATIONS OF SITE FEATURES ARE APPROXIMATE.



<p>ENVIRONMENTAL MANAGEMENT SYSTEMS, INC.        4080 SE International Way        Suite B112        Milwaukie, OR 97222        503-353-9691        503-353-9695        www.emsinc.com</p>	DESIGNED BY: David Maher (22-0079)	
	DRAWN BY: T.2S, R.1E, Sec 24, T.L. 402	02/09/2023
	Mitigation Plan	Scale: 1" = 20'

4060 Kenthorpe Way  
West Linn, OR 97068

KENTHORPE WAY



WATER RESOURCE AREA (WRA)= 5958.8 SQ FT  
 DISTURBED AREAS: BUILDING AREA 2227.6 SQ FT  
 STORM SYSTEM 160.0 SQFT  
 TOTAL 2387.6 SQFT  
 TOTAL ENHANCEMENT AREA= 3571.2 SQFT

ALL PLANTS TO BE NATIVE SPECIES FROM PORTLAND PLANT LIST  
 ALL PLANTING TO OCCUR BETWEEN OCTOBER 15 AND APRIL 30.

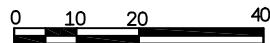
- TREES
- Trees to be 1/2" caliper (5-gal)
  - Minimum 2 genus
  - Planted 8'-12' O.C.
  - 24 trees required in WRA
  - =Douglas Fir (12)
  - =Scouler Willow (9)
  - =Western Red Cedar (3)

- SHRUBS
- Shrubs to be 1 gallon size or equivalent
  - Minimum 2 species
  - Planted 4'-5' O.C. or in single species groups of four or less.
  - 120 plants required in WRA

- WET AREA SHRUBS  
 (Within stream setback zone)
- Vine Maple
  - Western Serviceberry
  - Salmonberry
  - Red Osier Dogwood

- DRY AREA SHRUBS
- Cascade Oregon Grape
  - Red Elderberry
  - Vine Maple
  - Indian Plum
  - Salal

- =Group Planting (25)
- =Single Planting (20)



SCALE 1" = 20'  
 IF THIS BAR DOES NOT MEASURE 2" THEN DRAWING IS NOT TO SCALE

THIS DOCUMENT IS NOT A SURVEY. LOCATIONS OF SITE FEATURES ARE APPROXIMATE.



<p>ENVIRONMENTAL MANAGEMENT SYSTEMS, INC.        4080 SE International Way        Suite B112        Milwaukie, OR 97122        503-353-9691        503-353-9695        www.emsinc.com        © ALL RIGHTS RESERVED</p>	DESIGNED BY: David Maher (22-0079)	02/09/2023  Scale: 1" = 20'
	DRAWN BY: T.2S, R.1E, Sec 24, T.L. 402	
	PROJECT TITLE: Re-Vegetation Plan	

# Appendix C. Figures and Maps

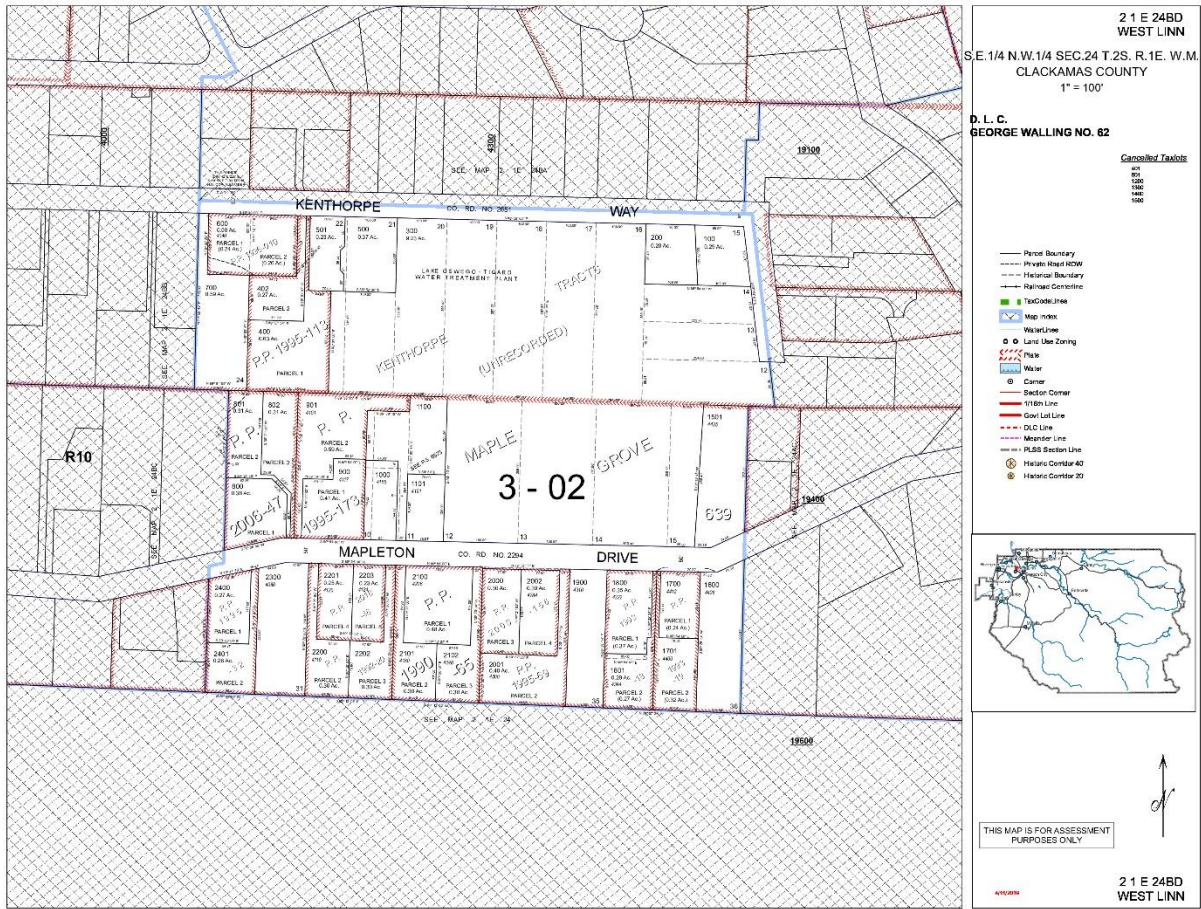


Figure 1. Clackamas County Tax Lot Map.



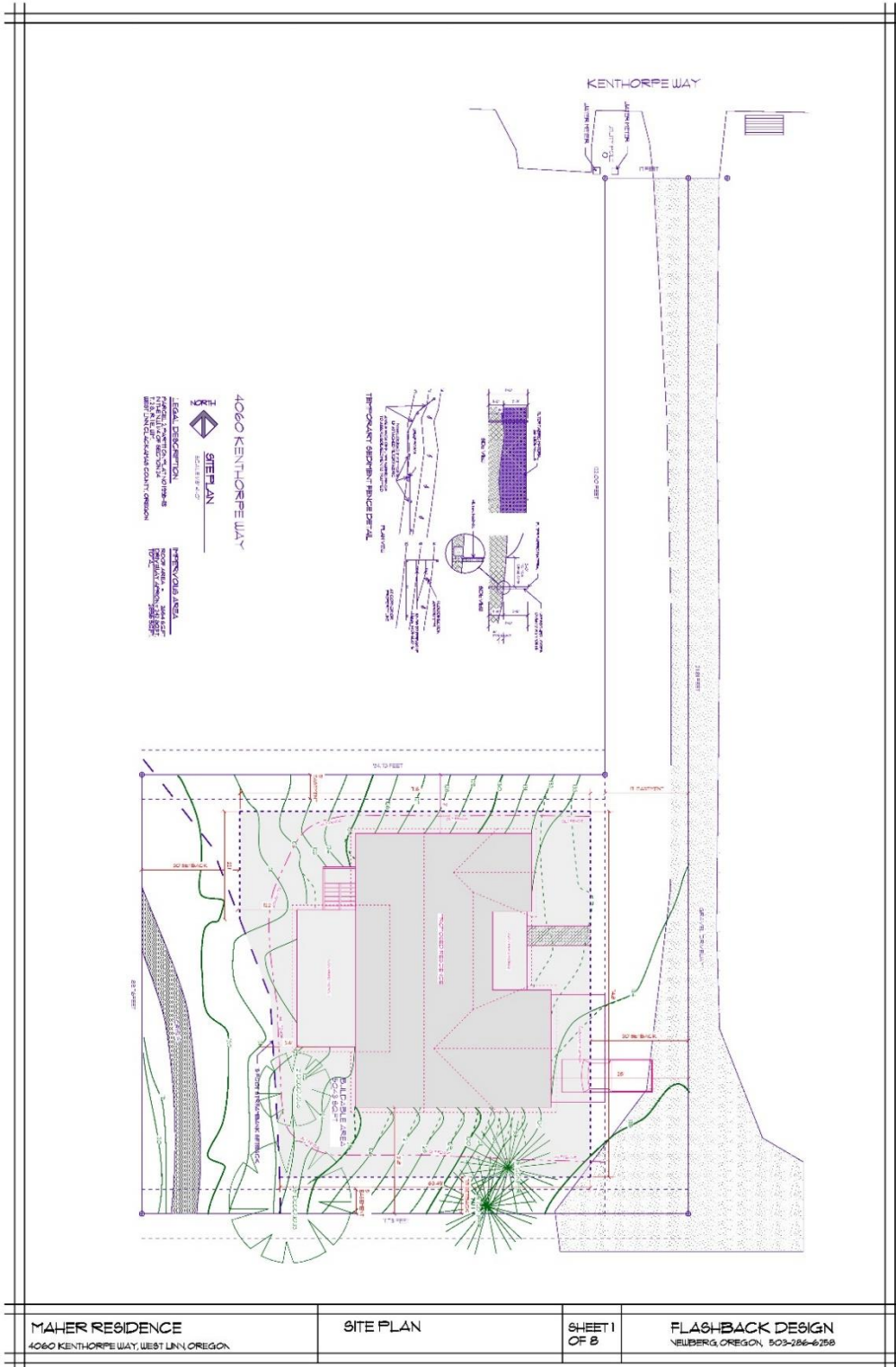


Figure 2. Site Plan.

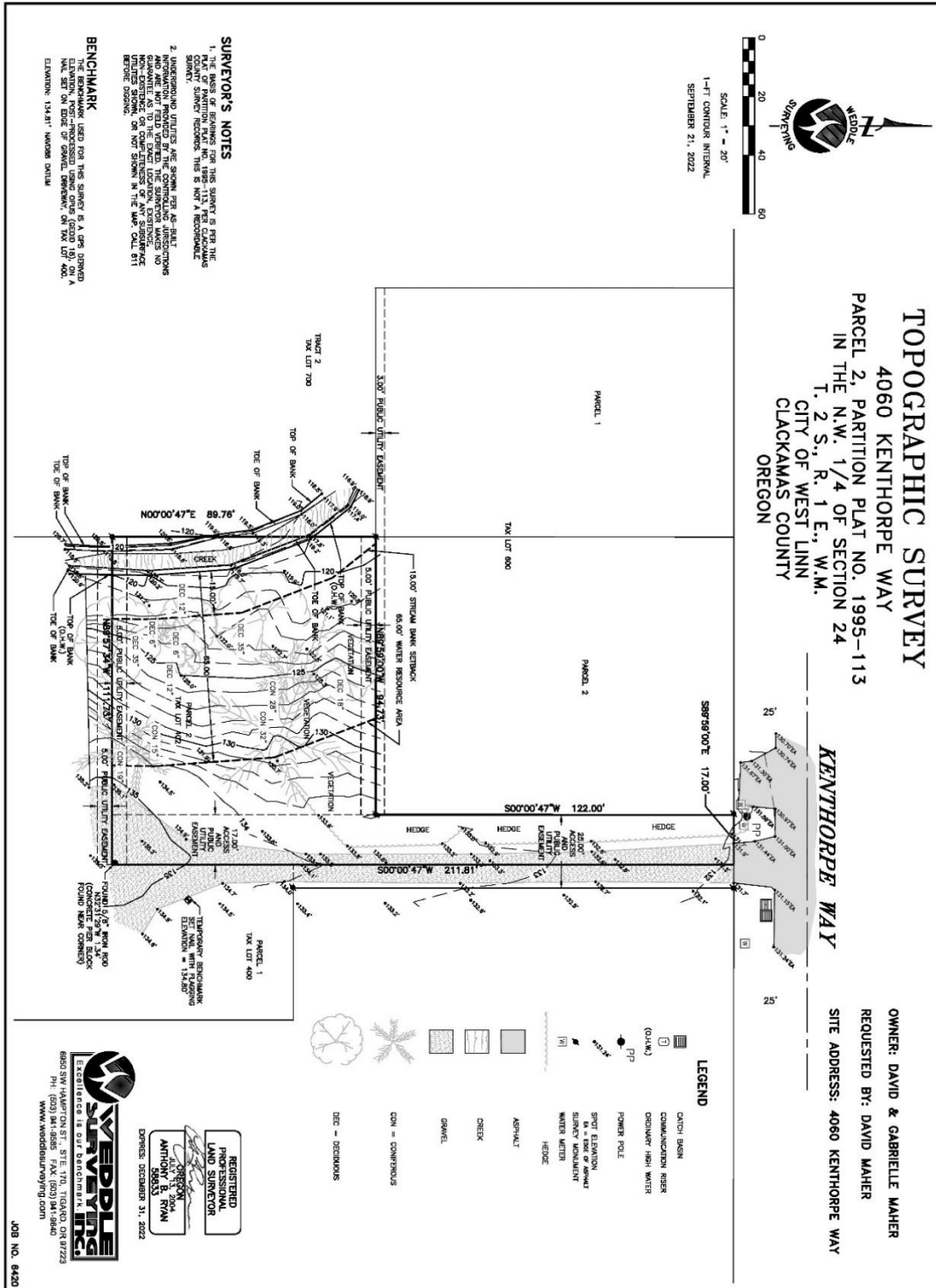


Figure 3. Topographic Survey by Weddle Surveying Inc. 2022.

Kenthorpe Way 22-0080



September 15, 2022

Landslide Hazard

Low - Landsliding Unlikely

Moderate - Landsliding Possible

High - Landsliding Likely

Very High - Existing Landslide

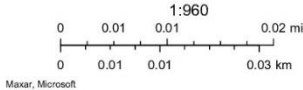


Figure 4. DOGAMI HazVu Map.

## Appendix D. Site Photographs



Site Photograph facing West-Northwest towards Trillium Creek.



Site photograph facing North towards Parcel 00373241.



Site photograph of Trillium Creek facing Northwest.



Site photograph of Trillium Creek facing South.



Site photograph facing East.





Site photograph facing East-Northeast.



Site photograph of Trillium Creek in September of 2022.

## Appendix E. Wetland Determination



ENVIRONMENTAL  
MANAGEMENT  
SYSTEMS, INC.

OR: 503-353-9691  
 FAX: 503-353-9695  
 WA: 360-735-1109  
 www.envmgtsys.com  
 4080 SE International Way  
 Suite B-112  
 Milwaukie, OR 97222

07/06/2022  
 Report # 22-0079

Dave Maher  
 2340 Summerlinn Drive  
 West Linn, OR 97068

REGARDING: Preliminary Site Evaluation/Wetland Determination  
 4060 Kenthorpe Way West Linn, OR 97068

T: 2S, R: 1E, Sec: 24, TL: 402

Dear Mr. Maher:

As requested, Environmental Management Systems Inc. (EMS) has performed the following services and provides this report for your use.

### PROJECT DESCRIPTION:

The purpose of this report is to conduct a preliminary site evaluation to determine the presence of wetlands on the Site.

### RESULTS:

Based upon test pit soil analysis, hydrology indicators, and hydrophytic vegetation indicators, the Site does not contain wetlands. Several test pits were dug to 16-18 inches below grade to conduct a soil analysis. Soil analysis was conducted on two of the test pits: Test Pit 1 located upland from the stream and Test Pit 2 located adjacent to the stream. The soil analysis found no hydric soil indicators. No water table or soil saturation was observed in any of the test pits. The only surface water on Site was the stream running along the southwestern portion of the Site. Wetland hydrology was present for the stream but was not observed anywhere outside of the stream borders.

#### Test Pit 1. Proposed Upland.

Depth (Inches)	Matrix Color (moist)	Matrix Color %	Redox Color (moist)	Redox Color %	Redox Color Type	Redox Color Location	Texture	Remarks
0-16"	10YR 3/3	100 %					SCL	

#### Test Pit 2. Propose Wetland (Adjacent to stream).

Depth (Inches)	Matrix Color (moist)	Matrix Color %	Redox Color (moist)	Redox Color %	Redox Color Type	Redox Color Location	Texture	Remarks
0-14"	7.5YR 3/3	100 %					SCL	
14-16"	7.5YR 3/2	97%	5YR 4/4	3%	Concentrations	Matrix	SCL	Prominent contrast

Vegetation was analyzed and a vegetation analysis was conducted to determine the presence of hydrophytic vegetation. The upland vegetation comprised most of the Site. Upland vegetation consisted of: *Abies grandis* (Grand Fir), *Acer macrophyllum* (Big Leaf Maple), *Hedera helix* (English Ivy), *Lapsana communis* (Common nipplewort), and *Polystichum munitum* (Western Sword Fern).

Wetland vegetation was concentrated in one 10-foot section along the eastern side of the stream. It consisted of *Phalaris arundinacea* (Reed-Canary Grass) and *Glyceria striata* (Fowl-Manna Grass).

A vegetation analysis using the dominance test worksheet and the prevalence index worksheet was conducted and hydrophytic vegetation was found where the wetland vegetation was concentrated adjacent to the stream. The dominance test passed with a value of 2. The prevalence index failed with a value of 1.27. These values are positive indicators for hydrophytic vegetation.

No wetland was mapped on the Local Wetland Inventory (LWI) for West Linn. Trillium Creek runs through the southwest portion of the Site according to the LWI. The U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) Map listed a Riverine Habitat (Classification: R5UBH) on the southwest portion of the Site. No wetland was mapped on the NWI.

#### **CONCLUSIONS:**

1. Hydrophytic vegetation was observed in a section adjacent to the stream.
2. Hydric soil indicators were not observed.
3. Wetland hydrology was observed.
4. A wetland was not observed on the Site as there was no hydric soil indicator.

#### **Recommendations:**

1. Attend a pre application meeting with the City of West Linn to determine any future environmental or site requirements.
2. Clarify the stream setback and if a stream delineation is required.
3. Coordinate with West Linn to determine tree setbacks and tree removal process and requirements.
4. Conduct a formal wetland delineation if required by the City of West Linn.

**LIMITATIONS:** This is a preliminary report only, using hand measurements and observations. More extensive work and investigation will be needed to fully develop the required level of detail for permit and construction approvals.

**DISCLOSURE:** The information and statements in this report are true and accurate to the best of our knowledge. Neither Environmental Management Systems, Inc., nor the undersigned have any economic interests in the project.

To carry out the above listed recommendations, an Agreement for Professional Services is enclosed. Thank you for your business, and we look forward to assisting you to achieve your development objectives. If you have any questions, please contact Gus McKinley or me at 503-353-9691.

Sincerely,

A handwritten signature in black ink, appearing to read "Gus McKinley". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Gus McKinley, BS, Biologist/Wetland Specialist/EHST  
Project Manager  
ENVIRONMENTAL MANAGEMENT SYSTEMS, Inc.

**Appendix F. Stormwater Management Report by White Pelican Consulting, LLC**

# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

February 1<sup>st</sup>, 2022

---

4060 KENTHORPE WAY

WEST LINN, OR 97068

---

Stormwater Management Report (SWMR)

*PREPARED FOR:*

David and Gabrielle Maher  
2390 Summerlinn Dr  
West Linn Or 97068  
503 516-7240

*PREPARED BY:*

White Pelican Consulting, LLC  
Deborah Beck P.E.  
PO BOX #33946  
Portland, OR 97292  
(503) 847-9455

# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

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# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis  
WBE, DBE, ESB Oregon Certified # 12223

## ENGINEERS CERTIFICATION

---

I hereby certify that this Stormwater Management Report for at 4060 Kenthorpe Way West Linn, OR 97068, has been prepared by me or under my supervision and meets minimum standards of City of West Linn and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities designed by me.



EXPIRES: 12/31/2023

White Pelican Consulting, LLC  
Deborah A. Beck, P.E.  
Principle Engineer

# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

## PROJECT SUMMARY

---

This project proposes to manage stormwater resulting from new construction at 4060 Kenthorpe Way West Linn, OR 97068 with a flow-through vegetated planter with an 0.5 inch orifice limiting the rate of the drainage discharging from the planter. The planter will provide pollution reduction and flow control to pre-development levels before releasing the overflow to the creek flowing through the far west portion of the site. The new construction includes a new single-family residence (roof coverage 2,654 sq. ft) and concrete driveway apron (242 sq. ft.).

## SITE LOCATION AND DESCRIPTION

---

4060 Kenthorpe Way West Linn, OR 97068 (site), tax lot ID 21E24BD00402, is entirely located within Clackamas County and is zoned R10. R10 is single-dwelling zone which allows 1 dwelling unit per 10,000 ft<sup>2</sup>. The site is in the Johnson Creek Watershed (source Metro Maps). The site is 0.28 acres (~12,197 sq. ft.) with an existing gravel drive allowing access and no other prior impervious structures.

## SOILS

---

The soils on the site are listed as 1B Aloha silt loam, 3-6 percent slopes, Wetted Drainage Class “Somewhat poorly drained” and are rated Hydrologic soil group C/D (NRCS SoilWeb).

Slopes on the site where the new residence is to be located are generally >20%. Due to the steep slopes combined with nearby access to a creek flowing through the west side of the site, infiltration of collected stormwater is not recommended to reduce landslide concerns.

### *Groundwater*

Rapid Soil Solutions (RSS) prepared a Geotech Report of the site and as part of their analysis took soil borings down to 4 ft. RSS did not encounter groundwater in the soil borings.

## SLOPES

---

Slope on the site varies as shown in West Linn Maps and Metro Maps (Figure 2). The access pole is generally flat but the main portion of the site slopes steeply down from the east to the west before flattening out where the creek flows through the site.

# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

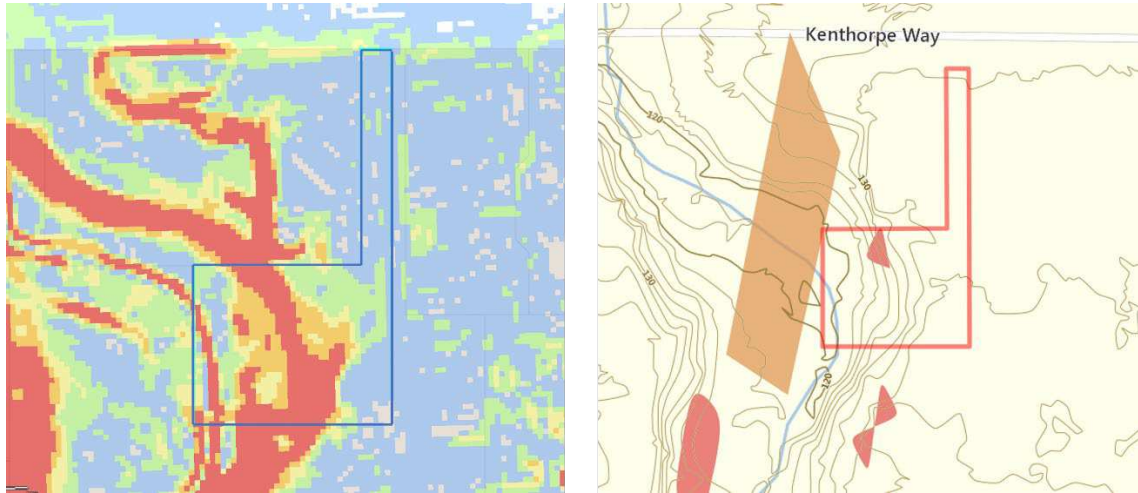


FIGURE 1. LEFT: SLOPES AS SHOWN IN PORTLAND MAPS <5% = BLUE, 5-10% = GREEN, 10-15% = YELLOW, 15-20% = ORANGE, >20% = RED>20%. RIGHT: SLOPES AS SHOWN IN METRO MAPS, LIGHT ORANGE >10%, PINK >25%.

## EXISTING STORMWATER CONDITIONS

---

The site is undeveloped with a gravel access drive leading from Kenthorpe Way to the main part of the site. There are no buildings or other impervious surfaces currently on the site.

## PROPOSED CONDITIONS AND STORMWATER FACILITIES

---

Proposed construction includes a new single-family house and driveway apron. The new impervious areas and associated square footages are in Table 1 below. Stormwater runoff from the new impervious areas will be sent to a 135 sq. ft flow-through planter for water quality treatment and flow control, the overflow will then be discharged to the creek running through the west side of the lot.

TABLE 1: NEW IMPERVIOUS AREAS

Area	Sq. Ft.
Roof	2,654
Driveway Apron	242
Total	2,896

## DESIGN HYDROLOGY AND SIZING

---

### *Areas used in Models*

The areas used in the modeling for sizing of the stormwater facilities are listed in Table 2 below.

# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

TABLE 2: AREAS USED FOR SIZING STORMWATER FACILITIES

Area	Sq. Ft.	Stormwater Facility	Sq. Ft. Used in PAC Modeling (No modification required for flow-controlled systems)
Roof	2,654	Flow-through Planter	2,654
Driveway Apron	242		242
<b>Total</b>	<b>2,896</b>		<b>2,896</b>

### *Roof and Concrete Apron Runoff.*

Design hydrology for the water-quality infiltration planter was calculated using City of Portland Presumptive Approach Calculator (PAC) which utilizes the Santa Barbara Urban Hydrograph (SBUH) Method. Per 2.0053 no correction factor for the PAC model was required as the system has flow control criteria.

A flow-through infiltration planter of 135 sq. ft. with an 0.5 inch orifice will treat the runoff water from the new roof and concrete driveway apron for water quality and reduce the flow to pre-development levels before the runoff is discharged to the creek. Figure 2 shows the summary of the PAC modeling results with the PR and Flow Control results of “PASS”. The full PAC Report is in Appendix B.

<b>Pollution Reduction Results</b>	<b>Pollution Reduction Score</b>			
	Pass			
	<b>Overflow Volume</b> 0.00 cf			
<b>Surface Capacity Used</b> 17.49 %				
<b>Flow Control Results</b>	<b>Flow Control Score</b>			
	Pass			
		<b>STORMWATER FACILITY OUTFLOW (CFS)</b>		<b>PRE-DEVELOPMENT RUNOFF (CFS)</b>
	½ the 2 year	0.0054	<=	0.0063
	5 year	0.0083	<=	0.0193
10 year	0.0119	<=	0.0267	
25 year	0.0237	<=	0.0332	

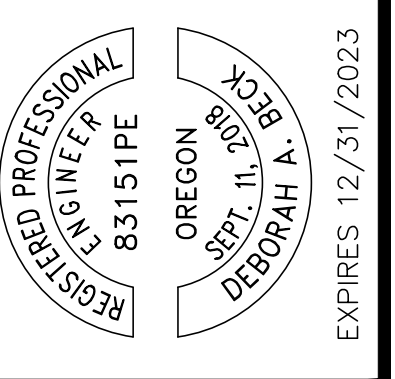
FIGURE 2: PAC RESULTS OF THE 135 SF PLANTER SHOWING PR (WATER QUALITY) AND FLOW CONTROL OF "PASS"



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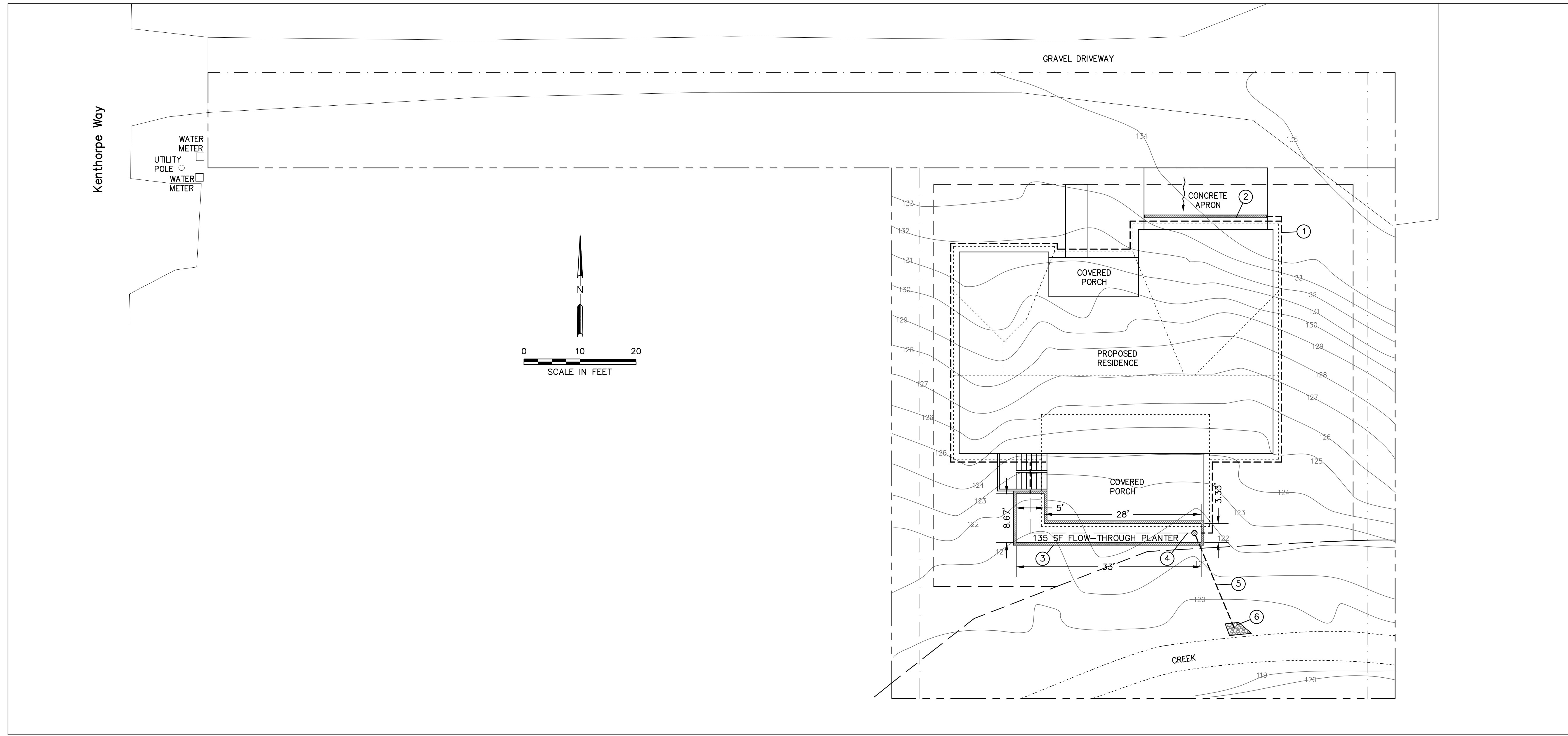
**WHITE PELICAN CONSULTING**  
 PORTLAND, OREGON  
 503-847-9455  
 www.whitepelicanconsulting.com  
 email: dbeck@whitepelicanconsulting.com

**NEW RESIDENCE**  
 4060 KENTHORPE WAY  
 WEST LINN, OREGON 97068  
 STORMWATER MANAGEMENT  
 SITE PLAN



DATE	
2/1/23	
SCALE	PROJ. NO.
1"=10'	
DRAWN BY	CHECKED BY
TRT	DAB

**SW1**



**GENERAL NOTES:**

CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF ALL UTILITIES PRIOR TO CONSTRUCTION AND SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY CONFLICTS WITH THESE PLANS UPON DISCOVERY.

THE CONTRACTOR SHALL PREVENT SEDIMENT LADEN WATER FROM LEAVING THE SITE. ALL ADJACENT DOWNSTREAM STORM DRAIN INLETS SHALL BE PROTECTED FROM SILTATION.

THE CONTRACTOR SHALL NOT ALLOW ANY WASH WATER OR DEBRIS TO ENTER NEW PIPES OR CHANNELS DURING CONSTRUCTION.

THE CONTRACTOR SHALL AT ALL TIMES PROVIDE AND MAINTAIN AMPLE MEANS AND DEVICES TO REMOVE AND DISPOSE OF ALL WATER ENTERING THE TRENCH EXCAVATION DURING THE PROCESS OF LAYING THE PIPE.

INSTALL CONTINUOUS INSULATED COPPER TRACER WIRE OR MAGNETIC TAPE AS REQUIRED BY THE OREGON PLUMBING SPECIALTY CODE.

UNLESS OTHERWISE NOTED, ALL STORM DRAIN PIPES ARE TO HAVE A MINIMUM 1% DOWNSLOPE TO THE NEAREST STORMWATER FACILITY. STORM DRAIN PIPES ARE TO BE PVC SCHEDULE 40, ABS SCHEDULE 40, OR CAST IRON AND FOLLOW OREGON PLUMBING SPECIALTY CODE.

ALL STORM WATER PIPE CONNECTIONS TO CATCH BASINS, MANHOLES, PLANTERS AND OTHER RELATED STRUCTURES SHALL BE WATER TIGHT AS PER OREGON PLUMBING SPECIALTY CODE.

STORMWATER FACILITIES, STRUCTURES, AND PIPING SHOWN ARE INTENDED TO BE FOR SCHEMATIC PURPOSES ONLY. THE CONTRACTOR SHALL ADJUST THE ALIGNMENT AND GRADE OF THE STORMWATER SYSTEM AS NECESSARY TO ACCOMMODATE THE NEW CONSTRUCTION AND TOPOGRAPHY, WHILE MAINTAINING MINIMUM SLOPE REQUIREMENTS.

ALL COMPONENTS OF THE PRIVATE STORMWATER SYSTEM SHALL BE CONSTRUCTED PER OREGON PLUMBING SPECIALTY CODE REQUIREMENTS.

**CONSTRUCTION NOTES:**

1. 4 INCH STORM DRAIN LINE DISCHARGING TO PLANTER. 4 INCH CONVEYANCE PIPE MUST BE CAST IRON, ABS SCHEDULE 40, OR PVC SCHEDULE 40 AND HAVE MINIMUM 1% GRADE AND FOLLOW OREGON PLUMBING SPECIALTY CODE.

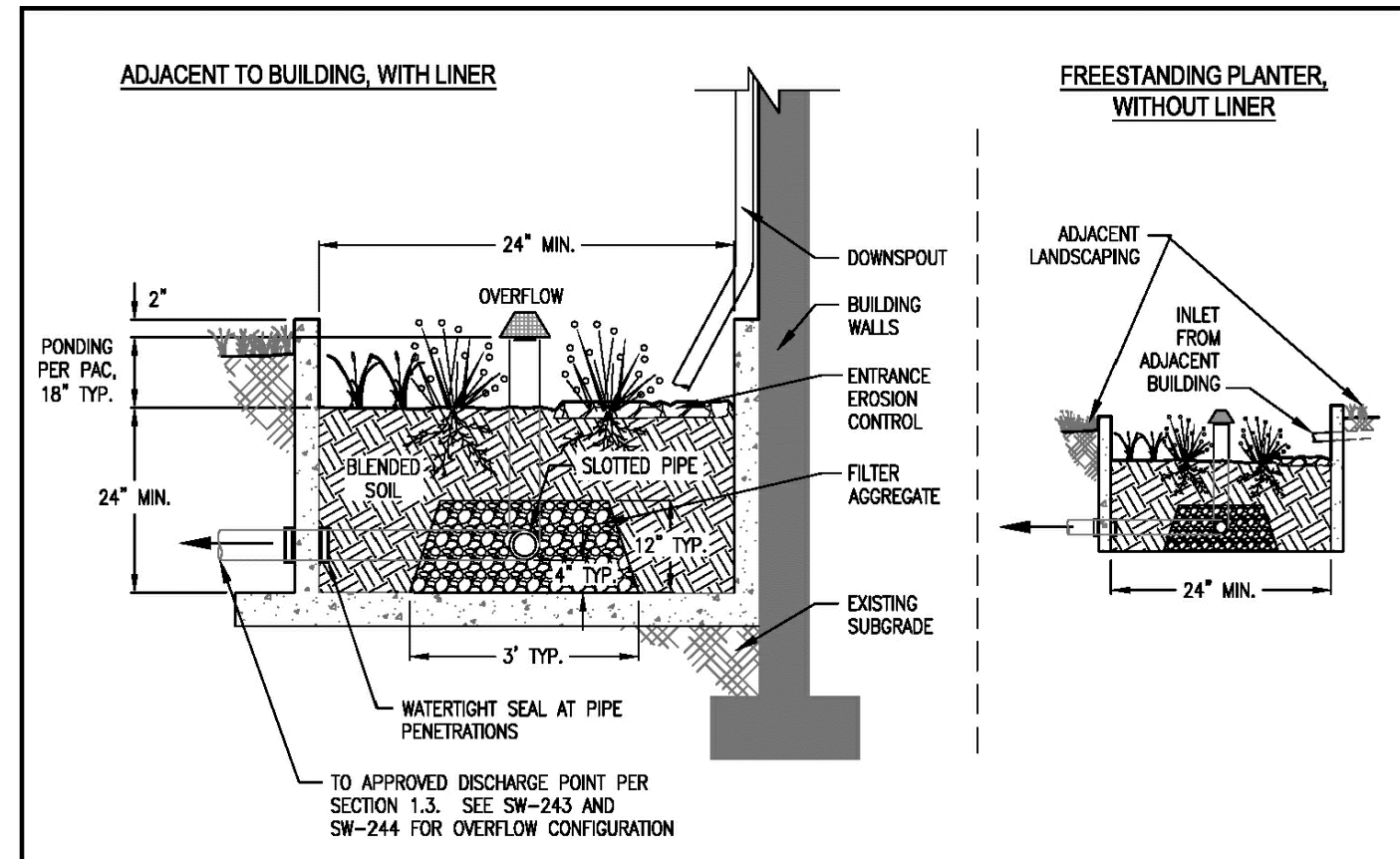
2. DRIVEWAY TRENCH DRAIN DISCHARGING TO 4 INCH STORM DRAIN LINE. TRENCH TO BE FULL WIDTH OF DRIVEWAY, OR DRIVEWAY EDGES TO SLOPE TO TRENCH TO ALLOW TRENCH TO CAPTURE RUNOFF FLOWING DOWN THE DRIVEWAY.

3. LINED FLOW-THROUGH PLANTER. MINIMUM INTERIOR FOOTPRINT OF 135 SQ. FT. TYPICAL 6 INCH WALLS AND BASE. PLACE RIPRAP OR ROCK SPLASH GUARDS AT EACH INFLOW POINT. PLANTER IS DESIGNED TO EVENLY DISTRIBUTE AND FILTER FLOWS. SURFACE LONGITUDINAL SLOPES SHOULD BE LESS THAN 0.5%. INSTALL INLINE GATE VALVE WITH 0.5 ORIFICE BEFORE OVERFLOW PIPE AS NOTED IN SECTION DETAIL. FOLLOW DESIGN DETAILS AND LAYER DEPTHS AS NOTED IN PLANTER SECTION DETAIL. PLANT PER PLANTING TABLE.

4. 4 INCH PERFORATED DRAIN PIPE RUNNING LENGTH OF PLANTER AND CONNECTING TO GATE VALVE. SEE DETAILS.

5. INSTALL 4 INCH DRAIN PIPE AT 1% MINIMUM SLOPE. SEE OUTLET AND OUTFLOW DETAILS. IF THE SLOPE IS GREATER THAN 40%, PIPE MUST BE SET ON GRADE AND ANCHORED AS SHOWN IN THE OUTFALL DETAIL. END OF PIPE TO BE ABOVE THE LOW WATER LEVEL AND AT 30 DEGREE MAXIMUM ANGLE FROM A PERPENDICULAR ALIGNMENT TO THE CREEK. REPLANT AREA DISTURBED FOR PIPE INSTALLATION WITH NATIVE PLANTS.

6. PROVIDE ROCK PROTECTION AT THE OUTFALL. FOLLOW REQUIRED MINIMUM DIMENSIONS AS NOTED IN OUTFALL DETAIL.



- Detail intended as an example. Detail must match PAC assumptions and/or design report.
- Setbacks: No setback is required for lined planters. For infiltration planters the setbacks are 5' from property lines except next to right-of-way, and 10' from building foundations. The planter wall height must be less than 30' above finished grade if within 5' of property line.
- Planter Structure: A single pour, monolithic concrete shell without cold joints is required unless otherwise approved.
- Waterproofing: No additional waterproofing is needed if the structure is a single pour, monolithic concrete shell.
- Blended Soil: Use BES standard soil blend for stormwater facilities (SWMM Section 6.3) unless otherwise approved. Install minimum of 24\"/>

**CONSTRUCTION REQUIREMENTS**  
Do not allow temporary storage of construction waste or materials in the facilities. Do not allow entry of runoff or sediment during construction.

**PLANTER WITH UNDERDRAIN** SW-231

Bureau of Environmental Services

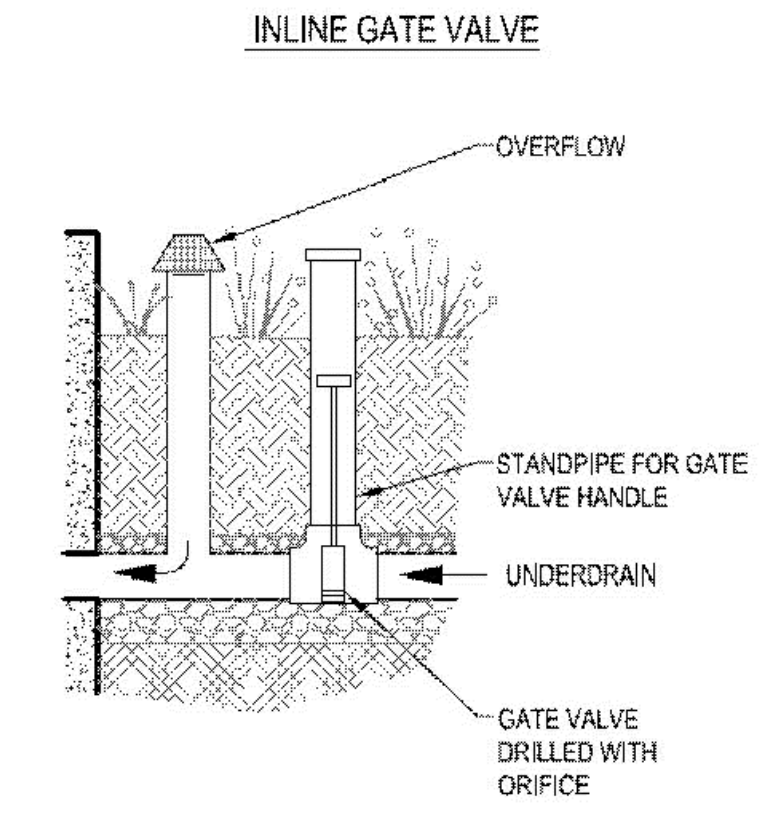
PRESUMPTIVE AND PERFORMANCE DESIGN APPROACH

4060 Kenthorpe Way Planter		
Planter Layer	Depth of Layer in Inches	Width of Layer
Rock	12	3 ft with drain pipe centered inside rock. See Planter with Underdrain SW-231 Detail.
Growing Medium	18" Over rock, 30" Media only areas	Full width of planter
Ponding	18	Full width of planter
Freeboard	2	Full width of planter

PLANTING TABLE  
**DETAIL 2**  
NTS

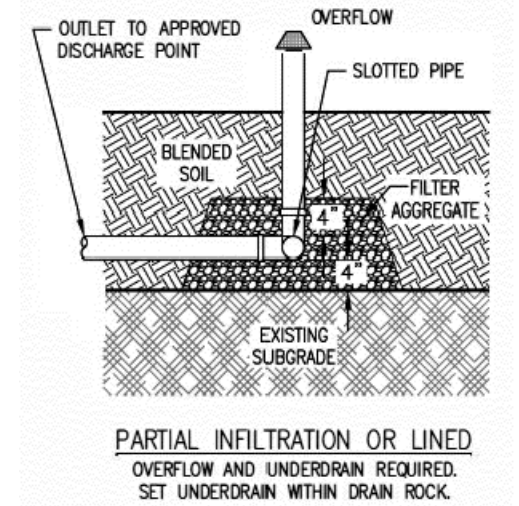
Plant Species	Number of Plants	Vegetation Type	Per Square Foot	Size	Spacing Density (on center)	Required Number of Plants for 135 SF Basin
Choose Plant species from the BES 2020 Private Stormwater Facilities Plant List for Zone A or Zone A/B	80	Herbaceous plants	100	#1 container	1.25'	108
	72	Herbaceous plants	100	#1 container	1.25'	97
	4	Small shrubs	100	#1 container	1'	5

PLANTER LAYER TABLE  
**DETAIL 3**  
NTS



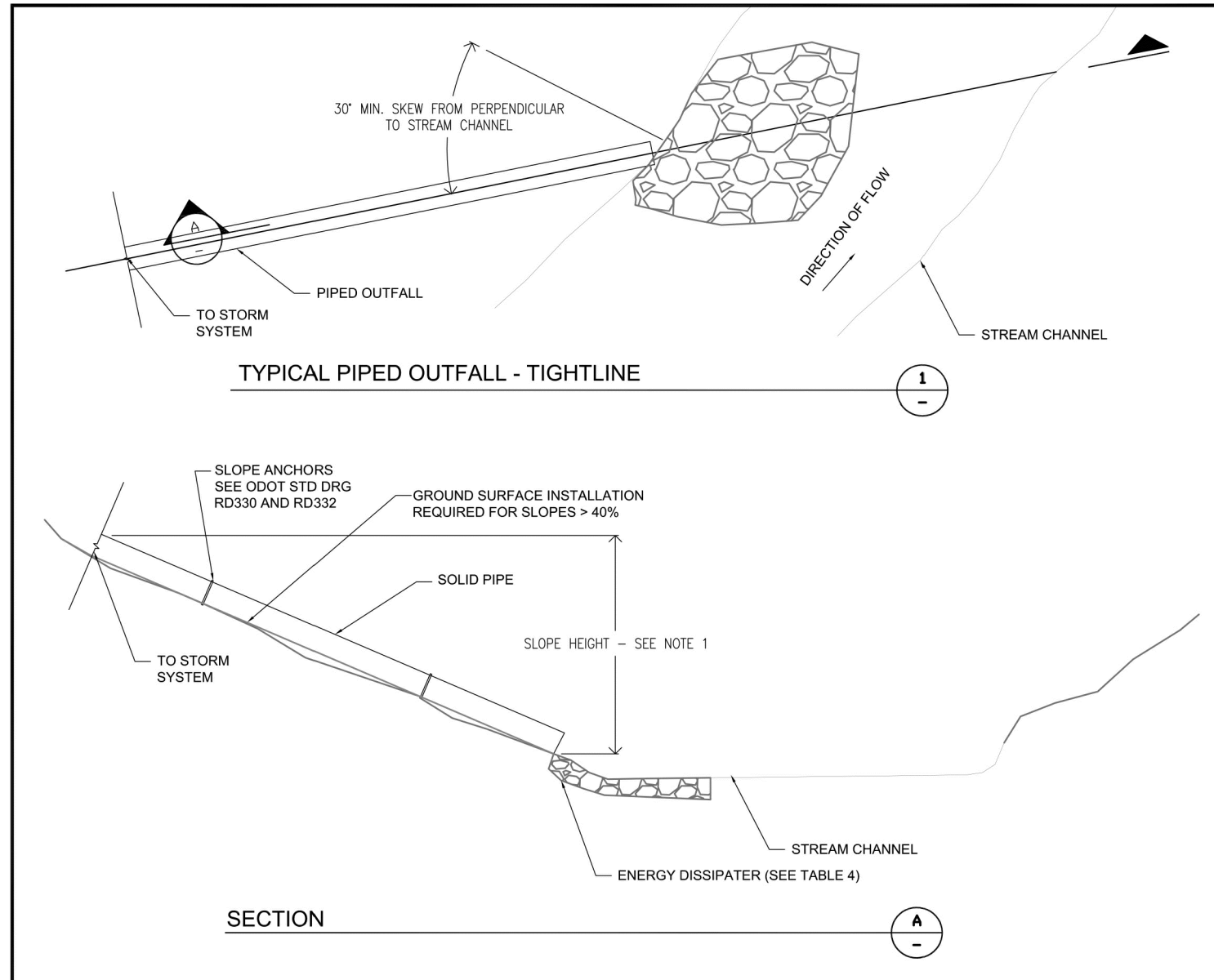
- DRILL 0.5 INCH DIAMETER ORIFICE IN GATE VALVE INSTALLED IN FLOW-THROUGH PLANTER DRAINPIPE.
- MATERIAL: THE ORIFICE PLATE MUST BE A STRONG, THIN MATERIAL SUCH AS STAINLESS STEEL, HDPE, OR PVC. THE THICKNESS OF THE ORIFICE PLATE MUST BE LESS THAN THE ORIFICE DIAMETER.

IN LINE GATE VALVE  
**DETAIL 4**  
NTS



OVERFLOW  
**DETAIL 5**  
NTS

PLANTER WITH UNDERDRAIN  
**DETAIL 1**  
NTS



- Notes:**
- For design guidelines for buried pipes, including materials, minimum cover, and bedding requirements, see Chapter 4 of the Portland Sewer and Drainage Facilities Design Manual 2006.
  - See Part 0400 of the City of Portland Standard Specifications for additional requirements on bedding, backfill and pipe materials.
  - Solid pipe required for slopes higher than 20' with gradient of 15% or greater.
  - Solid pipe may be installed in shallow trench if outfall pipe gradient is between 15 and 40% ground installation (as shown) recommended for slopes greater than 40%.
  - All disturbed areas to be replanted with native vegetation. See section 8.5.6 of the Portland Sewer and Drainage Facilities Design Manual 2006 and Appendix A.5 of the Stormwater Management Manual.
  - For more information and details see Appendix A.5 of the Stormwater Management Manual.

**STORMWATER MANAGEMENT MANUAL SUPPLEMENTAL DETAILS**

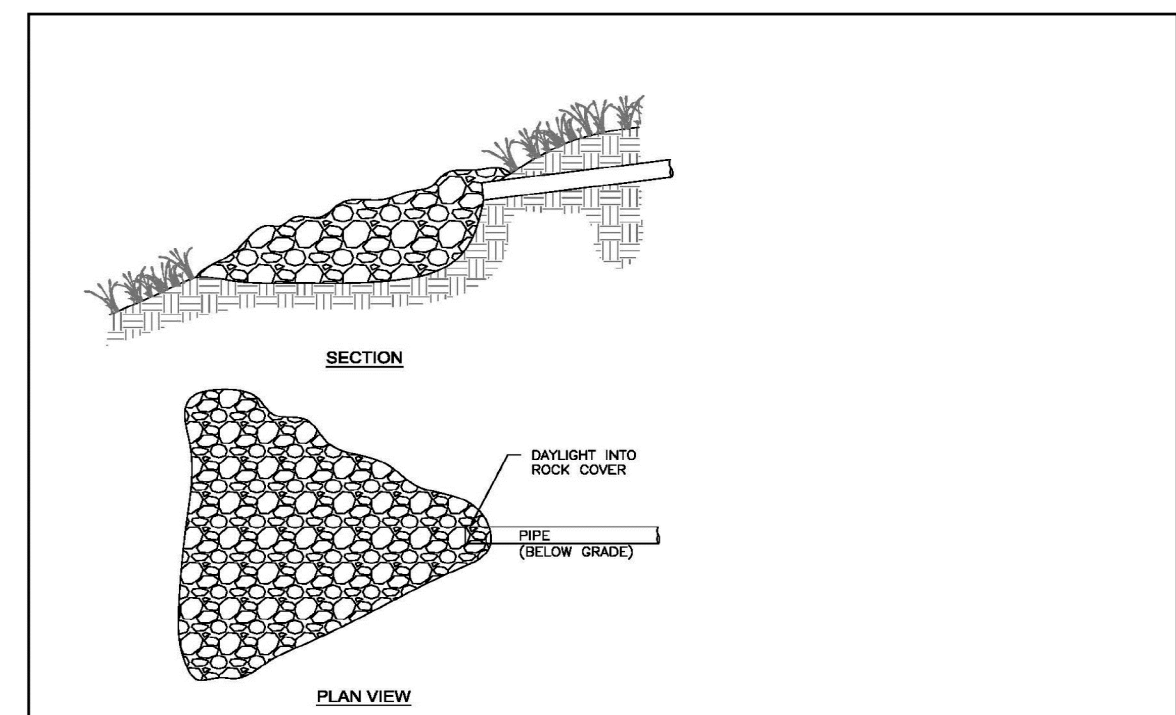
- Supplemental Details -

Outfall Piped Outfall

NUMBER: SW-522

Bureau of Environmental Services

OUTFALL  
**DETAIL 6**  
NTS

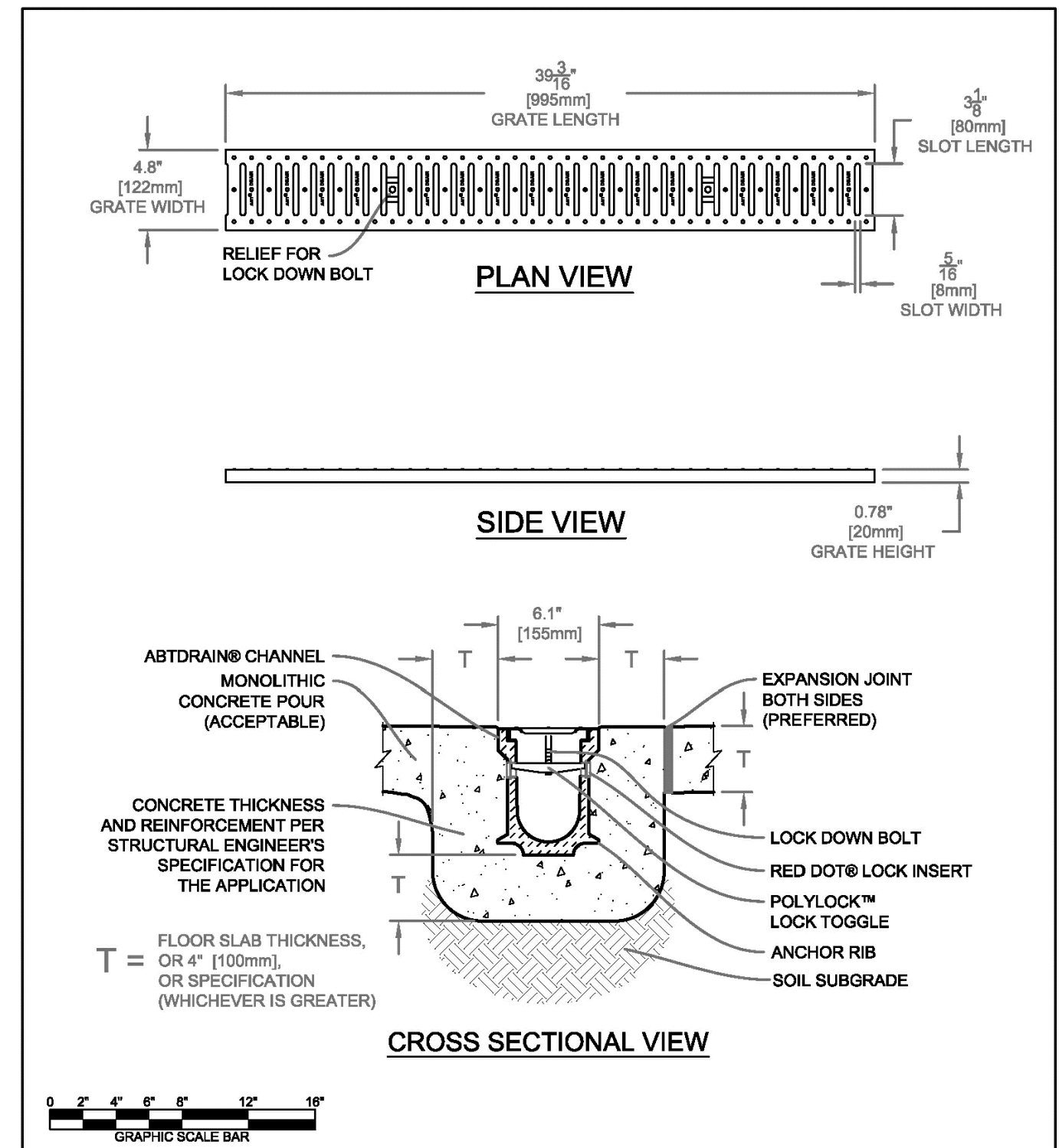


**Rock Protection at Outfalls**

Outfall Diameter	Discharge Velocity at Design Flow	Average Stone Size	Depth	Width	Length	Height
2 inch		1 inch	2 inch	12 inch	24 inch	
4 inch		2 inch	4 inch	24 inch	36 inch	
6 inch		4 inch	6 inch	36 inch	48 inch	
>6 inch	0-5 feet per second	Riprap	2 x max stone size	Diameter + 6 feet	As calculated	Crown + 1 foot
	6-10 feet per second	Riprap	2 x max stone size	Greater of (diameter + 6 feet) or (3x diameter)	As calculated	Crown + 1 foot

- Riprap size shall be calculated as  $d_s = 0.25 \cdot (V/g)$  (6 inches minimum), where  $d_s$  = rip rap size,  $V$  = average velocity (ft/s) and  $g=32.2$  ft/s<sup>2</sup>.
- All rock protection areas should be interplanted with willow stakes or other appropriate riparian vegetation to increase slope stability, reduce erosion, provide shading and other habitat functions, and improve aesthetics.

OUTFALL PROTECTION  
**DETAIL 7**  
NTS



**ABT Inc.**  
P.O. BOX 807, 288 MARSHOCK ROAD  
TROUTMAN, NC 28166  
(704) 528-8808

SPECIFICATION DRAWING © 2005 ABT, Inc.  
**INLAY GRATE SLOTTED STAINLESS STEEL**

FILE: S-2440-00 PART: 2440

DATE: 1/31/23

SCALE: NTS

DRAWN BY: TRT CHECKED BY: DAB

REGISTERED PROFESSIONAL ENGINEER  
83151PE  
OREGON  
EXPIRES: 12/31/2023

TRENCH DRAIN  
**DETAIL 8**  
NTS

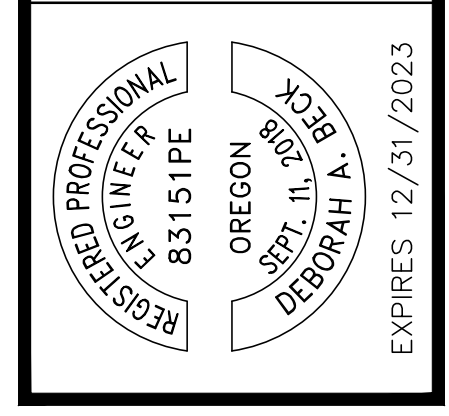


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**WHITE PELICAN CONSULTING**  
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503-847-9455  
www.whitepelicanconsulting.com  
email: dbeck@whitepelicanconsulting.com

NEW RESIDENCE  
4060 KENTHORPE WAY  
WEST LINN, OREGON 97008  
STORMWATER MANAGEMENT  
DETAILS



DATE	1/31/23
SCALE	NTS
DRAWN BY	TRT
CHECKED BY	DAB

**SW2**

# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

## OPERATIONS AND MAINTENANCE (O&M)

### PLANTER O&M

Structural components must be operated and maintained in accordance with the design specifications.		
	MAINTENANCE INDICATOR	CORRECTIVE ACTION
	Clogged inlets or outlets	Remove sediment and debris from catch basins, trench drains, curb inlets, and pipes; maintain at least 50% conveyance at all times.
	Broken inlets or outlets	Repair/replace broken downspouts, curb cuts, standpipes, and screens.
	Damaged liners and walls	Extend and secure liner to planter walls above the high-water mark. The facility must be watertight to protect abutting foundations from moisture damage.
	Cracked or exposed drain pipes	Repair or seal cracks. Replace when repair is insufficient. Cover with 6 inches of growing medium to prevent freeze/thaw and UV damage
Vegetation must cover at least 90% of the facility at maturity.		
	MAINTENANCE INDICATOR	CORRECTIVE ACTION
	Dead or stressed vegetation	Replant per original planting plan, or substitute from the plant list in Section 3.8. Irrigate and mulch as needed; prune tall, dry grasses and remove clippings.
	Tall grass and vegetation	Maintain grass height at 6"-9". Trim to allow sight lines and foot traffic, also to ensure inlets and outlets freely convey stormwater into and/or out of facility.
	Weeds	Manually remove weeds.
Growing medium must sustain healthy plant cover and drain within 48 hours.		
	MAINTENANCE INDICATOR	CORRECTIVE ACTION
	Gullies, erosion, exposed soils, sediment accumulations	Fill in and lightly compact areas of erosion with City-approved soil mix (SWMM section 3.2.2.1) and replant according to planting plan or substitute from the plant list in SWMM section 3.8. Sediment more than 4 inches deep must be removed.
	Scouring at the inlet(s)	Ensure splash blocks or inlet gravel/rock are placed correctly to prevent erosion.
	Ponding	Rake, till, or amend soil surface with City-approved soil mix to restore infiltration rate. Remove and replace sediment at entrances.

#### Annual Maintenance Schedule

Summer	Make structural repairs; clean gutters and downspouts; remove any build-up of weeds or organic debris.
Fall	Replant exposed soil and replace dead plants. Remove sediment and plant debris.
Winter	Clear gutters and downspouts.
Spring	Remove sediment and plant debris. Replant exposed soil and replace dead plants.
All seasons	Weed as necessary.

**Maintenance Records:** All facility operators are required to keep an inspection and maintenance log. Record date, description, and contractor (if applicable) for all repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the City inspector.

**Fertilizers:** Their use is strongly discouraged because of the potential for negative environmental impacts. Never apply fertilizer before testing the fertility of the growing medium to determine whether fertilizer is needed and

# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

appropriate application rates. Use only organic, slow-release fertilizers. See SWMM Section 3.2.2.1 for more information.

**Pesticides/Herbicides:** Their use is prohibited.

**Pollution Prevention:** All sites must implement Best Management Practices to prevent the introduction of pollutants to stormwater and/or facility discharge points. In the event of a spill, call 503-823-7180 to report it immediately and document the circumstances and the corrective action taken; include the date/time, weather and site conditions. Never wash spills into a stormwater facility.

**Infiltration/Flow Control:** Facilities must drain within 48 hours. Document time/date and weather if extended ponding occurs.

**Vectors (Mosquitoes and Rats):** Stormwater facilities must not harbor mosquito larvae or rodents that pose a threat to public health or that undermine facility structures. Record the time/date, weather, and site conditions when vector activity observed. Record when vector abatement started and ended.

**Access:** Maintain ingress/egress per design standards, maintaining access to the entirety of the facility for inspection & maintenance.

2020 City of Portland Stormwater Management Manual  
STANDARD O&M PLAN—**PLANTERS**

3-119



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## ENGINEERING CONCLUSIONS

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Stormwater runoff from the post-development impervious areas will be directed to a flow-through vegetated planter with an 0.5 inch orifice limiting the rate of drainage from the planter to pre-development levels. This stormwater facility will meet both pollution reduction and flow control requirements as specified by the City of West Linn.

The proposed installation of the flow-through planter as described in this report is expected to meet the site's needs for stormwater management of impervious areas on the site.

# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

## APPENDIX A: GEOTECH REPORT

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# Geotechnical Report

4060 Kenthorpe Way  
West Linn, Oregon

Prepared for:  
David Maher

11 August 2022



## **PROJECT AND SITE DESCRIPTIONS**

### **Introduction**

Rapid Soil Solutions Inc (RSS) has prepared this geotechnical report, as requested, for the proposed new single-family residential dwelling to be constructed on the Clackamas County tax parcel currently assigned the street address of 4060 Kenthorpe Way (West Linn, OR 97068). The property is a flag lot, where the main body of the site is roughly 122 feet south of Kenthorpe Way with west-descending slopes that accommodate a 14-foot grade change. RSS understands that the proposed structure will contain a west-facing daylight basement and will occupy the majority of the main body of the site.

### *Site Location*

The subject site occupies a single Clackamas County tax parcel, currently assigned the state tax lot identification number of 21E24BD00402. It is located along the southern side of Kenthorpe Way, in a flag lot with a 17' wide and 122' long 'flag pole'. The access and public utility easement extends along the entirety of the eastern property margin, for the benefit of the subject site and the south adjacent tax parcel. The site is currently assigned the street address of 4060 Kenthorpe Way. The driveway departs the southern side of Kenthorpe Way roughly 1,320 feet east of Old River Road and 1,200 feet west of the roadway's eastern terminus. The driveway accessing the subject site is shared with the south-adjacent tax parcel (4068 Kenthorpe Way). The driveway is tucked between the residential dwellings assigned the street addresses of 4040 and 4100 Kenthorpe Way. The west-adjacent property is currently vacant and assigned the street address of 4020 Kenthorpe Way. The site is roughly 0.29 miles southwest of the Willamette River (at Cedar Island), 0.24 miles northeast of Willamette Drive, and 2 miles northwest of Interstate 205 at exit 8.

The site can be found in the southeast quarter of the northwest quarter of Section 24, Township 2-South, Range 1-East (W.M.) in Clackamas County and can be distinguished by the lot number 402. A partition plat (P.P. 1995-113) appears to have created the modern property from a section of lots 22 and 23 in the "Knethorpe Tracts" Subdivision. The site is assigned the Clackamas County parcel number of 01660429. The latitude and longitude of the site are 45.386039 and -122.634420 (45°23'09.7"N, 122°38'03.9"W). The site can be found in the southeast quarter of the Lake Oswego 7.5-minute quadrangle.

## **SITE CONDITIONS**

### **Surface Conditions**

The subject site is situated within a suburban neighborhood tucked between OR-43 (Pacific Highway) and the Willamette River. The site is in the Robinwood neighborhood of West Linn. The north-flowing Trillium Creek passes through the western margin of the subject property. The stream flows into the Willamette River roughly 0.8 miles beyond the northern edge of the subject property. At the time of the site visit, the stream contained flowing water within the small stream channel. East of the subject site the slopes extends across a low-relief surface to the western flank of the Willamette River. The upper slope break of the western valley wall is roughly 0.21 miles east-northeast of the subject site while the banks of the river are 0.29 miles northeast and at least 120 feet lower in elevation. West of the subject site, and west of the small valley containing Trillium Creek, the slopes ascend gradually to the west-southwest. The majority of the low, low-relief slopes, are occupied by single-family

residential dwellings. These dwellings are typically shaded by large clusters of mature trees. The water treatment plant for the City of West Linn is also located within the local geomorphologic bench, east of the subject site.

The subject site is surrounded by residential properties ranging in size from 0.23 acres to 0.64 acres, with the exception of the water treatment plant east of the subject property. The vast majority of the residential lots are developed with single-family residential dwellings. Original construction dates, as recorded by the county, range from 1930 to 2017. The local slopes are all zoned for single-family residential applications with a minimum lot size of 10,000 feet (R-10).

The site is generally situated on slopes above the western flank of the Willamette River. The regional morphology is primarily controlled by the structural deformation of the igneous bedrock. The local bench is bound the west by the Bolton Fault and to the east by the Willamette River. The site morphology is primarily controlled by the fine-grained sedimentary materials deposited by catastrophic flooding of the Portland Basin at the end of the last glacial maximum and the modern fluvial environment. Trillium Creek has cut a 12- to 14-foot-deep valley into the local sedimentary deposits, creating the slopes that dominate the main body of the parcel.

The street in front of the subject site is a relatively narrow residential street, surface with asphalt concrete. There are no curbs or sidewalks. The existing driveway accessing the subject site is gravel.

#### *General Site Conditions*

The subject site is an undeveloped lot in the Robinwood neighborhood of West Linn. It is currently undeveloped.

The site is connected to Kenthorpe Way by a 17' wide flagpole, the access easement is 25' wide, of which the eastern 8' is part of the south-adjacent flag lot. The western half of the flagpole portion of this property is occupied by a large, mature, laurel hedge. The eastern half of the flagpole contains the western half of the gravel driveway used to access the site. This driveway extends southwards to the detached three-car garage and attached garages of the south-adjacent dwelling. A widening of the gravel driveway creates a small parking area in the southeastern corner of the subject site.

The main body of the subject site contains west-descending slopes above Trillium Creek. The creek contains flowing water over a bed of gravels. The channel banks contain 0.5- to 1.5-foot-tall vertical relief where fine grained materials have been eroded by the flowing waters. The subject site is situated along the cut bank of the small stream. The slopes directly above the stream bank are low and expose clays with mud cracks. This low slope area forms a roughly crescent shaped bench that appears to extend below the proposed building envelope.

The slopes on site follow the curvature of the local stream, opening slightly to the north. The slopes display a slight concavity to the west, increasing in severity at the southern end of the property. The slopes overlooking the stream south of the subject site are relatively steep, raising abruptly to the upper slope break. The surface of the site appears to have been recently cleared of invasive species; the upper slopes contain a layer of bark chips. The lower slopes contain little to no understory vegetation. The northern end of the site extends into the landscaped yard of the north-adjacent parcel.



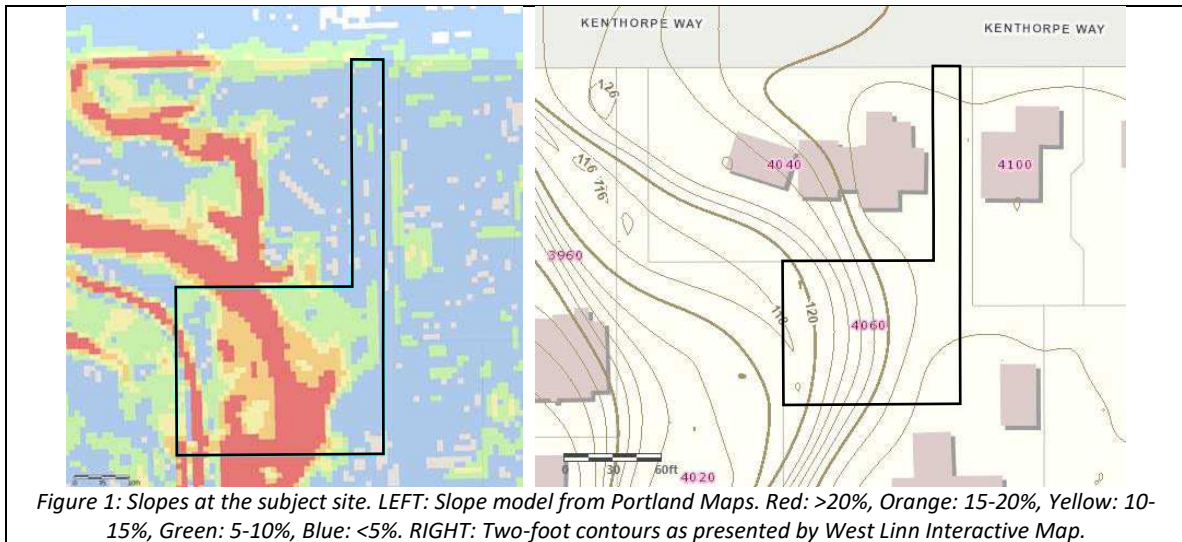
### *Slopes*

The subject site is situated within an uplifted band of bedrock extending south from the Tualatin Mountains (also known as the Portland Hills). The site is generally situated on a northwest-sloping bench between the Bolton Fault and the Willamette River. The low slopes are blanketed in fine grained deposits and interrupted by incised drainages. The north-flowing Trillium Creek passes through the western end of the property. The main body of the site is dominated by west-descending slope along the eastern flank of the stream. Beyond the area directly influenced by this drainage, the slopes are broad and low.

The lowest elevation on the subject site is positioned within the stream bed. At the subject site the stream bed is between 116 and 118 feet above mean sea level. The highest elevation within the subject property can be found in the southeastern corner, at 134 feet above mean sea level. The slopes that dominate the subject site accommodate the grade change between 120 feet above mean sea level and 132 feet above mean sea level. The entirety of the driveway is above the elevation of 132 feet.

Portland Maps includes a lidar-derived slope model of the subject site. This slope model indicates that the slopes within the proposed disturbance are generally greater than 20%, with slopes of 15-20% and 10-15% present along the slope breaks. The driveway area contains slopes of less than 5%.

Lidar imagery of the subject site was referenced on the DOGAMI Lidar Viewer. Slopes presented by the bare-earth hill shade are consistent with other models describing the local slopes.



### *Historical Site Conditions*

Historical aerial imagery dating back to 1952 was reviewed as part of this investigation. Early images of the site depict a narrow residential street (Kenthorpe Way) extending across a predominantly wooded slope. Small residential clearings are visible across the low slope bench, but the majority of the area is undeveloped and wooded. The dwelling south of the subject site was constructed prior to 1952. Imagery suggests the site was cleared of trees between 1952 and 1955, as part of a small clearing created around the south-adjacent dwelling. By 1960, the north-adjacent parcel was developed. Observations derived from the referenced areal imagery do not suggest major changes after the site was cleared between 1952 and 1955. The tree cover across the site appears to gradually increase over time.

### **Geology**

Current geologic literature classifies the slopes underlying the proposed development area as fine-grained Missoula Floods deposits draped over Columbia River Basalt Group flows. This blanket of Catastrophic Floods deposits is draped across much of the local lowlands including both the Portland and Tualatin basins. It forms a relatively thick and often low-relief surface of unconsolidated materials obstructing older bedrock and basin-fill units. The local deposits were emplaced along the flank of a major floodway during the Missoula Floods, where the floodwaters followed the course of the Willamette River both north and southwards.

### *Geologic History*

The subject site is situated generally along the western flank of the Willamette River, south of the Oswego Gap, and along the eastern flank of the uplands extends southeastward from the Tualatin Mountains (locally called the Portland Hills). The ridge was created as a result of margin-parallel shortening. The structurally uplifted ridge exposes bedrock deposits of the Columbia River basalt Group. This unit is comprised of a thick accumulation of flood

basalts, produced by dozens of fissure eruptions in eastern Oregon and Washington in the Middle Miocene. These volcanic eruptions are among the largest observed anywhere on earth. The floods of hot, fluid lava flowed across much of the eastern half of both Oregon and Washington, eventually reaching the Pacific Ocean. Some flows extended as far as 400 miles from their vents with individual flows covering as much as 10,000 square miles. In the Portland area, these dark grey to black basalts can be divided into 8-10 distinct Columbia River Basalt flow types, comprised of as many as two dozen individual flows. The physical properties of these flows are very similar, often making it difficult to distinguish between individual flows. They have built up as much as 10,000 feet of lava in eastern Washington, and 850 feet in the Portland area.

Between about 21,000 to 12,000 years ago, dozens of gigantic floods periodically burst through the ice dam that retained Glacial Lake Missoula, bringing sediment-laden floodwaters into the Portland Basin. These floodwaters emerged from the Gorge at Grown Point Gap at velocities up to 60 miles per hour and plunged down into the broad lowlands. During each flooding event, the wall of water 400-500 feet high descended on the basin, scouring many areas down to bedrock and burying others beneath a thick layer of gravels, sand and silt. As the floodwaters hit the hydraulically restrictive Kalama Gap along the Columbia North of Portland, only two thirds of the floodwaters escaped the basin, the rest of the waters ponded in the Portland basin as well as the Tualatin and Willamette basins. The ponded waters dropped a large amount of fine-grained sediments across all of these basins. Dramatic scour features and giant bars can be seen within and around the Portland Basin, demonstrating the great influence the floodwaters had on shaping the Quaternary geomorphology of the region. Lidar imagery of the area surrounding Oswego Lake clearly displays scour patterns produced by the rushing floodwaters both as they inundated the region and later retreated. Locally the site is draped in fine grained deposits, settling out of the floodwaters as the flow velocities decreased.

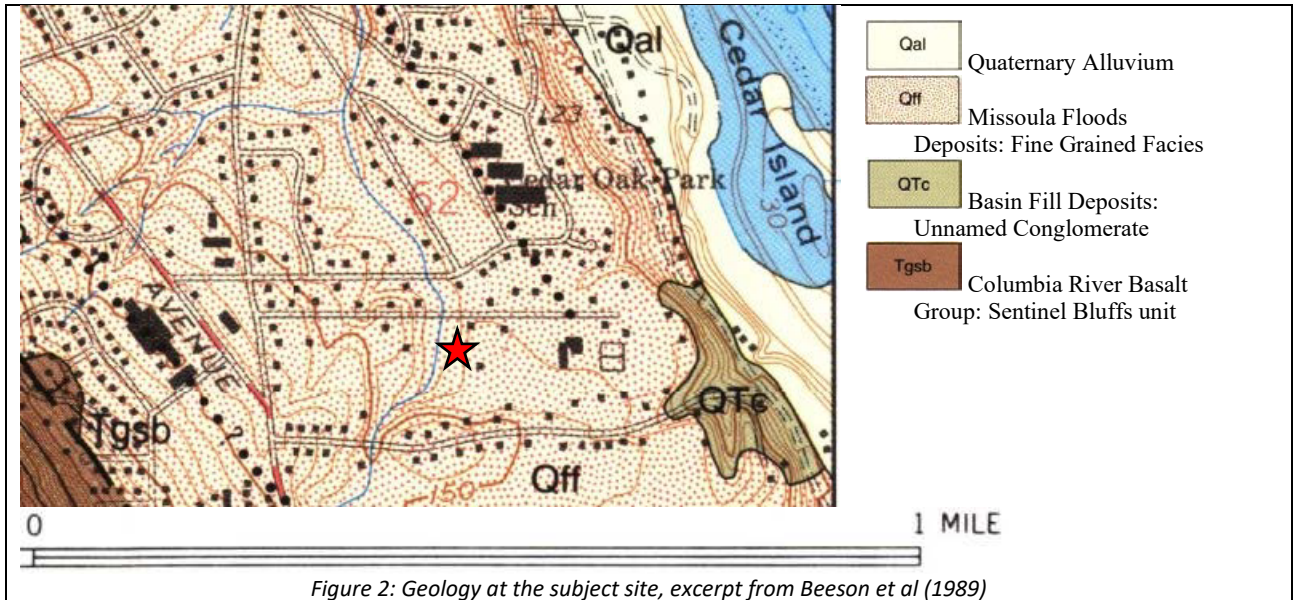
### *Site Geology*

The sediments brought into the valley by the floodwaters were generally deposited when the waters slowed down, blanketing older deposits with a swath of fine-grained, rhythmic, silt-dominated sediments. Various studies have divided the Missoula Floods deposits into distinct facies defined by grain size. The deposits at the subject site are classified as falling within the fine-grained fraction of the Missoula Floods deposits. This unit is described as an unconsolidated light-brown to light-gray silt, clay and fine to medium sand. The sediments are deposited in a series of distinct layers, a few inches to a few feet thick, each of which represents a single flood. The finer sediments are predominantly quartz and feldspar and also contain white mica. The coarser sediments can be comprised of Columbia River Basalt fragments. Poorly defined beds of 1- to 3-foot thickness are observed in outcrops, and complex layering has been recorded in boreholes. This bedding and layering can be observed as a faint color change between the finer and coarser layers of the formation. Soil development commonly introduces significant clay and iron oxides into the upper 6-10 feet of the deposit.

RSS referenced local well logs using the map search on available through the Oregon Water Resources Department Water Report Query. RSS identified numerous logs along Mapleton Drive and Kenthorpe Drive, including 29 logs associated with the water treatment plant directly east of the subject property. The well logs referenced along Mapleton Drive



contained fine grained materials overlaying interbedded gravels and silt/clay. The deepest boring extended to 172, and identified a few horizons of cemented materials with thicknesses of around 8-10'. Most borings described clays and silts with horizons of gravelly clay or gravelly silt, to their final depths (15-30 feet). The borings conducted at the adjacent water treatment facility generally found sands (SM), gravels (GM), and silt (ML). The deeper borings generally found gravels at depths exceeding 50 feet. Where logs describe clays, they are present in the upper reaches of the boring. Two of the 29 logs note clay at depths of 61 feet, underlying 12-foot-thick bed of sandy cemented gravel.



### Geohazard Review

The Oregon HazVu: Statewide Geohazard Viewer and Metro Map were reviewed 1<sup>st</sup> August 2022 to investigate mapped geological hazards.

This review indicates that the subject site is outside the 100-year floodplain, as mapped by FEMA.

The expected earthquake-shaking hazard is classified as 'severe', with no mapped earthquake liquefaction hazard classification. The DOGAMI SLIDO interactive map doesn't indicate the presence of slide within ¼ mile NE of the on the subject site near the Willamette River.

### Field Exploration and subsurface conditions

#### Surface Explorations

RSS conducted field explorations at the subject site on August 1<sup>st</sup>, 2022. RSS viewed the slope across the entirety of the subject site. RSS observed adjacent slopes from the subject site and adjacent roadway. RSS visited the site unaccompanied. RSS found conditions on site to be consistent with the mapped conditions. Detailed site description can be found in the 'site conditions' sections of this report.

### *Subsurface Exploration*

A total of two shallow hand auger borings were completed on the subject site. Both borings were conducted to a depth of 4 feet. Both borings found fine grained silts and clays, with a higher clay content observed in the lower elevation boring.

The locations of the borings are shown in the Appendix. A Geologist in Training (GIT) observed the borings and logged the subsurface materials. The soil logs were reviewed by a professional engineer (PE, GE). The logs were created using the Unified Soil Classification and Visual Manual Procedure (ASTM-D 2488). Samples were transported in sealed plastic bags. Moisture content ranged from 16.7% to 29.5%.

### **Foundation Design**

The building foundations can be installed into the medium stiff to stiff CLAY. This depth may be locally variable and should be confirmed by a geotechnical engineer or their representative at the time of construction, on average at 1ft below existing grade. ***Please allow up to 48hours by phone to call for foundation excavation inspections.***

Continuous wall and isolated spread footings should be at least 16 and 24 inches wide, respectively. The bottom of exterior footings should be at least 16 inches below the lowest adjacent exterior grade. The bottom of interior footings should be at least 12 inches below the base of the floor slab.

Footings placed into the CLAY shall be designed for an allowable bearing capacity of 1,500 *pounds per square foot (psf)*. The recommended allowable bearing pressure can be increased by 1/3 for short-term loads such as those resulting from wind or seismic forces.

### **Structural Fills**

Fills shall be placed on level benches in thin lifts and compacted to a dry density of at least 92% of its Maximum Dry Density (MDD) as determined by the Modified Proctor Test (ASTM D-1557). Compaction testing shall take place every 18in. A minimum of three days prior to the placement of any fill, please supply Engineer with a 30-pound sample (approximately a full 5-gallon bucket) of any soil or base rock to be used as fill (including native and import materials) for testing and approval.

### **Retaining Walls and Embedded Walls**

Default lateral soil load for the design of basement and retaining walls supporting level backfill shall be 40 psf/ft for laterally unrestrained retaining walls and 60 psf/ft for laterally restrained retaining walls.

For embedded building walls, a superimposed seismic lateral force should be calculated based on a dynamic force of  $5H^2$  pounds per lineal foot of wall, where H is the height of the wall in feet and applied at 1/3 H from the base of the wall. The wall footings should be designed in accordance with the guidelines provided in the "Foundation Design" section of

this report. These design parameters have been provided assuming that back-of-wall drains will be installed to prevent buildup of hydrostatic pressures behind all walls.

The backfill material placed behind the walls and extending a horizontal distance equal to at least half of the height of the retaining wall should consist of granular retaining wall backfill as specified in the “Structural Fill” section of this report. The wall backfill should be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D698. However, backfill located within a horizontal distance of 3 feet from the retaining walls should only be compacted to approximately 92 percent of the maximum dry density, as determined by ASTM D698. Backfill placed within 3 feet of the wall should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (e.g., jumping jack or vibratory plate compactors). If flat work (e.g., sidewalks or pavements) will be placed atop the wall backfill, we recommend that the upper 2 feet of material be compacted to 95 percent of the maximum dry density, as determined by ASTM D698.

A minimum 12-inch-wide zone of drain rock, extending from the base of the wall to within 6 inches of finished grade, should be placed against the back of all retaining walls. Perforated collector pipes should be embedded at the base of the drain rock. The drain rock should meet the requirements provided in the “Structural Fill” section of this report. The perforated collector pipes should discharge at an appropriate location away from the base of the wall. The discharge pipe(s) should not be tied directly into storm water drain systems, unless measures are taken to prevent backflow into the wall’s drainage system. Settlements of up to 1 percent of the wall height commonly occur immediately adjacent to the wall as the wall rotates and develops active lateral earth pressures.

Engineering values summary

Bearing capacity - soil	1,500psf
Coefficient of friction - soil	0.28
Active pressure	40pcf
Passive pressure	300pcf

**Seismic Design Criteria**

The seismic design criteria for this project found herein is based on the Oregon Structural Specialty Code *OSSC 2011*, Section 1615, and from the USGS Earthquake Hazards Program. A summary of seismic design criterion below using Lat 45.386039 and Long of -122.634420, site class D, where null= see section 11.4.8

	<b>Short Period</b>	<b>1 Second</b>
Maximum Credible Earthquake Spectral Acceleration	Ss = 0.856g	S1 = 0.382 g
Adjusted Spectral Acceleration	Sms = 1.027	Sm1 = null
Design Spectral Response Acceleration Perimeters	Sds = 0.685	Sd1= null

### **Driveway cross section**

In order to meet current fire department loading the roadway shall consist of 6" of 1 ½" minus with 2" of ¾" minus on top. RSS will need to proof rolls the excavated roadway with a loaded dump truck to ensure the driveway is hard and non-yielding. Please give 24hours notice when proof rolling. If driveway is constructed during the dry season April to October, geo-textile fabric will not be required.

### **Drainage**

The Contractor should be made responsible for temporary drainage of surface water and groundwater as necessary to prevent standing water and/or erosion at the working surface.

The ground surface around the structure should be sloped to create a minimum gradient of 2% away from the building foundations for a distance of at least 5 feet. Surface water should be directed away from all buildings into drainage swales or into a storm drainage system. "Trapped" planting areas should not be created next to any buildings without providing means for drainage. Foundation house drains are required.

RSS recommends foundation drains surrounding the new house.

### **Settlement**

Based on our knowledge of the project scope, and for footings designed as described in the preceding paragraphs, maximum settlement should not exceed 0.5 inches due to rock. Differential settlement should be on the order of 50 to 75% of the maximum settlement over 50 feet. Our settlement estimate assumes that no disturbance to the foundation soils would be permitted during excavation and construction, and that footings are prepared as described in the preceding paragraphs.

### **Limitations**

This report has been prepared for the exclusive use of the addressee, and their architects and engineers for aiding in the design and construction of the proposed development. It is the addressee's responsibility to provide this report to the appropriate design professionals, building officials, and contractors to ensure correct implementation of the recommendations. The opinions, comments and conclusions presented in this report were based upon information derived from our literature review, field investigation, and laboratory testing. Conditions between, or beyond, our exploratory borings may vary from those encountered. Unanticipated soil conditions and seasonal soil moisture variations are commonly encountered and cannot be fully determined by merely taking soil samples or soil borings. Such variations may result in changes to our recommendations and may require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

If there is more than 2years time between the submission of this report and the start of work at the site; if conditions have changed due to natural causes or construction operations at, or adjacent to, the site; or, if the basic project scheme is significantly modified from that assumed, it is recommended this report be reviewed to determine the applicability of the

conclusions and recommendations.

The work has been conducted in general conformance with the standard of care in the field of geotechnical engineering currently in practice in the Pacific Northwest for projects of this nature and magnitude. No warranty, express or implied, exists on the information presented in this report. By utilizing the design recommendations within this report, the addressee acknowledges and accepts the risks and limitations of development at the site, as outlined within the report.

## References

- Metro Map <https://gis.oregonmetro.gov/metromap/>  
Portland Maps <https://www.portlandmaps.com/>  
LO Maps <http://gis.ci.oswego.or.us/pub/>  
Google Maps <https://www.google.com/maps>  
Google Earth 2022  
Clackamas County Maps online <http://cmap.clackamas.us/maps/cmap>  
DOGAMI Oregon State Wide Geohazard Viewer (HazVu)  
<https://gis.dogami.oregon.gov/maps/hazvu/>  
DOGAMI Lidar Viewer <https://gis.dogami.oregon.gov/maps/lidarviewer/>  
DOGMAI Statewide Landslide Information Layer for Oregon  
<https://gis.dogami.oregon.gov/maps/slido/>  
United States Department of Agriculture Natural Resources Conservation Service, Web Soil Survey. <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>  
DOGAMI Geology Map <http://www.oregongeology.org/geologicmap/>  
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Ma, L., Madin, I.P., Duplantis, S., and Williams, K.J., 2012, Lidar-based surficial geologic map and database of the greater Portland, Oregon, area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries, Open-File Report 0-2012-02, scale 1:8,000.  
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Wells, R.E., Haugerud, R.A., Niem, A.R., Niem, W.A., Ma, Lina, Evarts, R.C., O'Connor, J.E., Madin, I.P., Sherrod, D.R., Beeson, M.H., Tolan, T.L., Wheeler, K.L., Hanson, W.B., and Sawlan, M.G., 2020, Geologic map of the greater Portland metropolitan area and surrounding region, Oregon and Washington: U.S. Geological Survey, Scientific Investigations Map SIM-3443, scale 1:63,360.  
Trimble, D.E., 1957, Geology of the Portland quadrangle, Oregon-Washington: U.S. Geological Survey, Geologic Quadrangle Map GQ-104, scale 1:62,500.  
Trimble, D.E., 1963, Geology of Portland, Oregon and adjacent areas: U.S. Geological Survey, Bulletin 1119, scale 1:62,500.  
Treasher, R.C., 1942, Geologic map of the Portland area: Oregon Department of Geology and Mineral Industries, Quadrangle Map 9, scale 1:96,000.

- Phillips, W.M., 1987, Geologic map of the Vancouver quadrangle, Washington: Washington Division of Geology and Earth Resources, Open File Report 87-10, scale 1:100,000.
- Wong, I., Silva, W., Bott, J., Wright, D., Thomas, P., Gregor, N., Li, S., Mabey, M., Sojourner, A., and Wang, Y., (2000), Earthquake scenario ground shaking map for the Portland, Oregon, metropolitan area: Portland Hills Fault M 6.8 earthquake, Peak horizontal acceleration (g) at the ground surface: DOGAMI, IMS-15. Scale 1:62,500
- Burns, W.J., and Coe, D.E., 2011, Missoula floods - inundation extent and primary flood features in the Portland metropolitan area, Clark, Cowlitz, and Skamania Counties, Washington, and Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map Series 36

## **APPENDIX**

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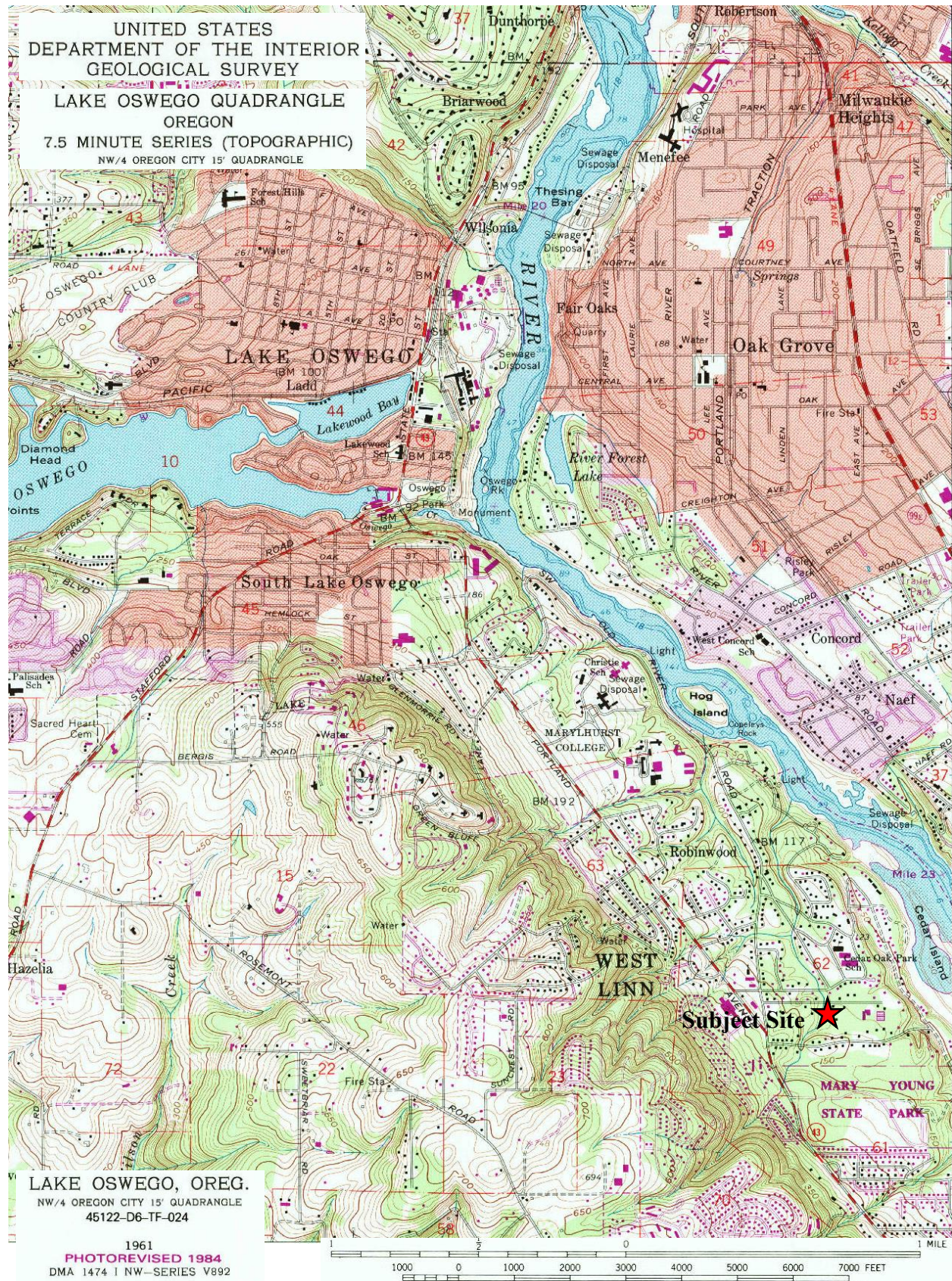


Figure 1: Subject site location in the SE quarter of the Lake Oswego Topographic Quadrangle



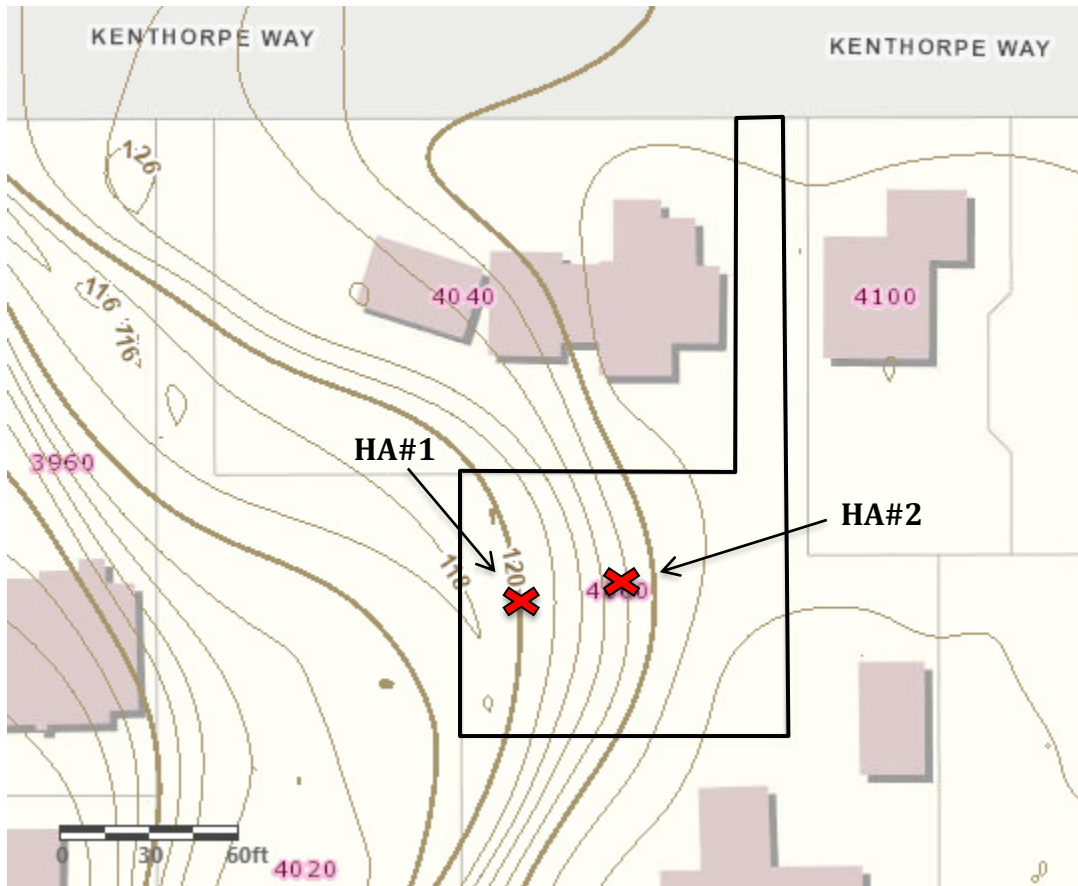


Figure 2: Subject site and approximate boring locations with 2' contours from West Linn interactive maps

Moisture

Sample number	HA#1-A	HA#1-B	HA#2-A	HA#2-B
1 Date and time in oven	8/1/22 3:00 PM	8/1/22 3:00 PM	8/1/22 3:00 PM	8/1/22 3:00 PM
2 Date and time out of oven	8/2/22 11:30 AM	8/2/22 11:30 AM	8/2/22 11:30 AM	8/2/22 11:30 AM
3 Depth (ft)	2	4	2	4
4 Tare No.	1	2	3	4
5 Tare Mass	234	234	235	231
6 Tare plus sample moist	976	901	1011	1101
7 Tare plus sample dry	812	759	900	903
8 Mass of water (g)	164	142	111	198
9 Mass of soil (g)	578	525	665	672
10 Water Content (%)	28.4	27.0	16.7	29.5

Atterberg Limit Test

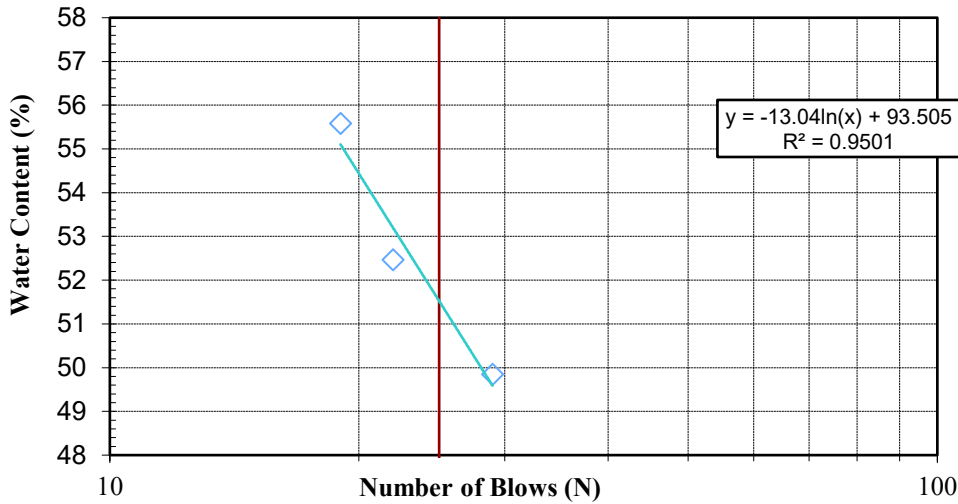
Sample Number: HA#1-A

Depth: 2'

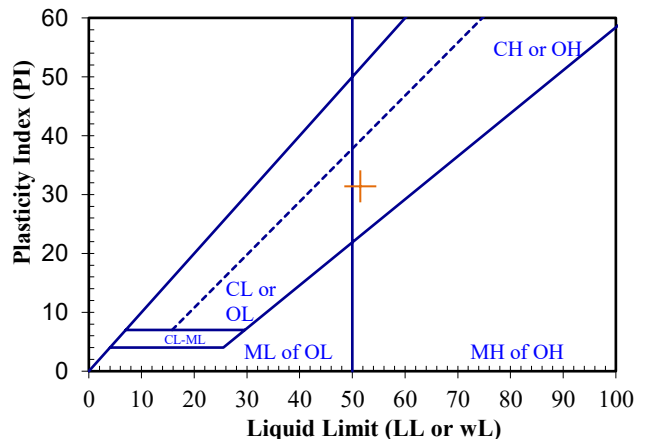
Liquid Limit

Plastic Limit

	D#1.1	D#1.2	D#1.3	R#1.1	R#1.2
1 Tare No.					
2 Tare Mass (g)	39.88	40.11	40.77	39.44	40.23
3 Tare Plus Wet Soil (g)	63.57	61.02	62.13	52.11	52.12
4 Tare Plus Dry Soil (g)	55.69	53.55	54.78	50.00	50.12
5 Mass of Water (g)	7.88	7.47	7.35	2.11	2.00
6 Mass of Soil (g)	15.81	13.44	14.01	10.56	9.89
7 Water Content (%)	49.84	55.58	52.46	19.98	20.22
8 No. Blows	29	19	22		



Liquid Limit (%) 51.5  
 Plastic Limit (%) 20.1  
 Plasticity Index (%) 31.4  
 USCS Classification of fines: CH



# HA#1

**Surface Elevation: 120**  
**Boring Date: 01 August 2022**  
**Boring Location: West Linn, OR**  
**Drilling Method: Hand Auger**

Date: 8/5/2022  
 File: C:\Users\Owner\Documents\In Progress Reports\4060 Kenthorpe Way Geotech 01Aug22\Kenthorpe Logs.log  
 SuperLog CivilTech Software, USA www.civiltech.com

Depth	Remarks	Moisture (%)	Dry Density	Blow Counts	Sample Type	Water Table
0					CL	Dry, medium stiff, light brown, silty CLAY with organics.
					FL-CG	Dry, medium dense, medium brown, clayey gravel. FILL - imported angular gravels.
1					CL	Damp-dry, stiff, medium brown, silty CLAY.
					CH	Damp-dry, stiff, medium brown with redoximorphic discoloration (rust and grey mottling), fine grained, silty CLAY to CLAY.
2	LL=52, PI=31	28.4				
3					CH	Damp, stiff, dull grey to greenish grey with subtle rust-hued mottling, fine grained, silty CLAY.
					CH	Damp, very stiff, dull grey to greenish grey, fine grained, silty CLAY.
4		27.0				Boring completed at depth of 4 feet.
5						
6						
7						

## LOG OF BORING



# White Pelican Consulting, LLC

Environmental Engineering & Data Analysis

WBE, DBE, ESB Oregon Certified # 12223

## APPENDIX B: PAC MODELING OUTPUT

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# PAC Report

## Project Details

Project Name	Permit No	Created
4060 Kenthrope Way		1/26/2023 3:02:59 AM
Project Address	Designer	Last Modified
4060 Kenthrope Way	Deborah Beck	1/26/2023 8:33:44 PM
	Company	Report Generated
	White Pelican Consulting LLC	2/1/2023 3:21:52 PM

## Project Summary

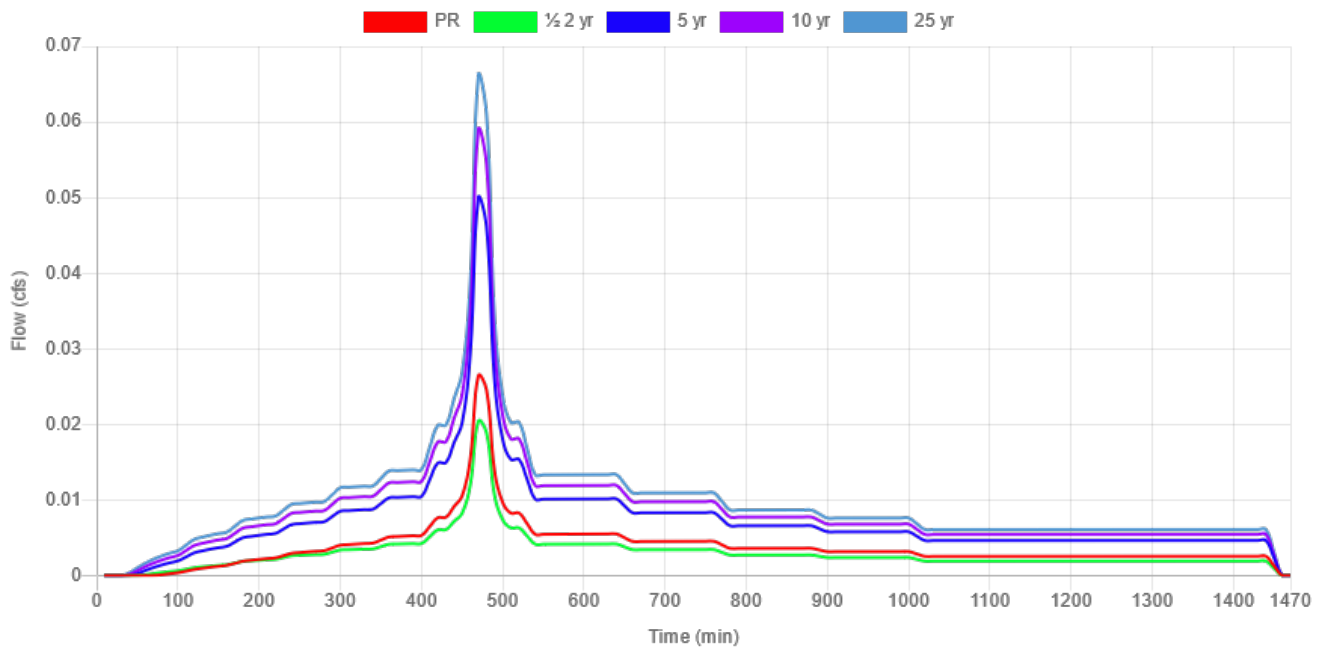
Catchment Name	Imper-vious Area (sq ft)	Native Soil Design Infiltration Rate (in/hr)	Level	Category	Config	Facility Area (excl. free board) (sq ft)	Facility Sizing Ratio (%)	PR Results	Infiltration Results	Flow Control Results
Flow-through Planter 2	2896	0	2B	FlatPlanter	D	135.00	4.66	Pass	NA	Pass

## Flow-through Planter 2

<b>Site Soils &amp; Infiltration Testing</b>	<p>Infiltration Testing Procedure NA</p> <p>Tested Native Soil Infiltration Rate 0 in/hr</p>
<b>Correction Factor</b>	<p>CF<sub>test</sub> 2</p>
<b>Design Infiltration Rates</b>	<p>Native Soil 0 in/hr</p> <p>Imported Blended Soil 6 in/hr</p>
<b>Catchment Information</b>	<p>Hierarchy Level 2B</p> <p>Hierarchy Description Discharge to an overland storm drainage system, including streams, drainageways, and ditches, or to a storm-only pipe system that discharges to an overland storm drainage system.</p> <p>Pollution Reduction Requirement Filter the post-development stormwater runoff from the water quality storm event through the blended soil.</p> <p>Infiltration Requirement N/A</p> <p>Flow Control Requirement Limit the ½ the 2-yr, the 5-yr, and the 10-yr post-development peak flows to their respective pre-development peak flows. Unless the facility is a public facility (i.e., in the public right-of-way), also limit the 25-yr post-development peak flow to the 25-year pre-development peak flow.</p> <p>Impervious Area 2896 sq ft 0.066 acre</p> <p>Pre-Development Time of Concentration (T<sub>C pre</sub>) 5 min</p> <p>Post-Development Time of Concentration (T<sub>C post</sub>) 5 min</p> <p>Pre-Development Curve Number (CN<sub>pre</sub>) 81</p> <p>Post-Development Curve Number (CN<sub>post</sub>) 98</p>

# SBUH Results

## Post-Development Runoff



	Pre - Development Rate and Volume		Post - Development Rate and Volume	
	Peak Rate (cfs)	Total Volume (cf)	Peak Rate (cfs)	Total Volume (cf)
<b>PR</b>	0.0036	90.1	0.0265	335.1
<b>1/2 2-Year</b>	0.0063	105.2	0.0204	262
<b>5-Year</b>	0.0193	298.6	0.0499	644
<b>10-Year</b>	0.0267	392.9	0.0589	764.3
<b>25-Year</b>	0.0332	471.7	0.0661	860.5

	Overflow		Underdrain Outflow		Infiltration	
	Peak Rate (cfs)	Total Volume (cf)	Peak Rate (cfs)	Total Volume (cf)	Peak Rate (cfs)	Total Volume (cf)
<b>PR</b>	0	0	0.005	329.1	0	0
<b>1/2 2-Year</b>	0	0	0.005	256	0	0
<b>5-Year</b>	0.003	15	0.005	623	0	0
<b>10-Year</b>	0.007	109	0.005	649.3	0	0
<b>25-Year</b>	0.018	200.6	0.005	653.9	0	0

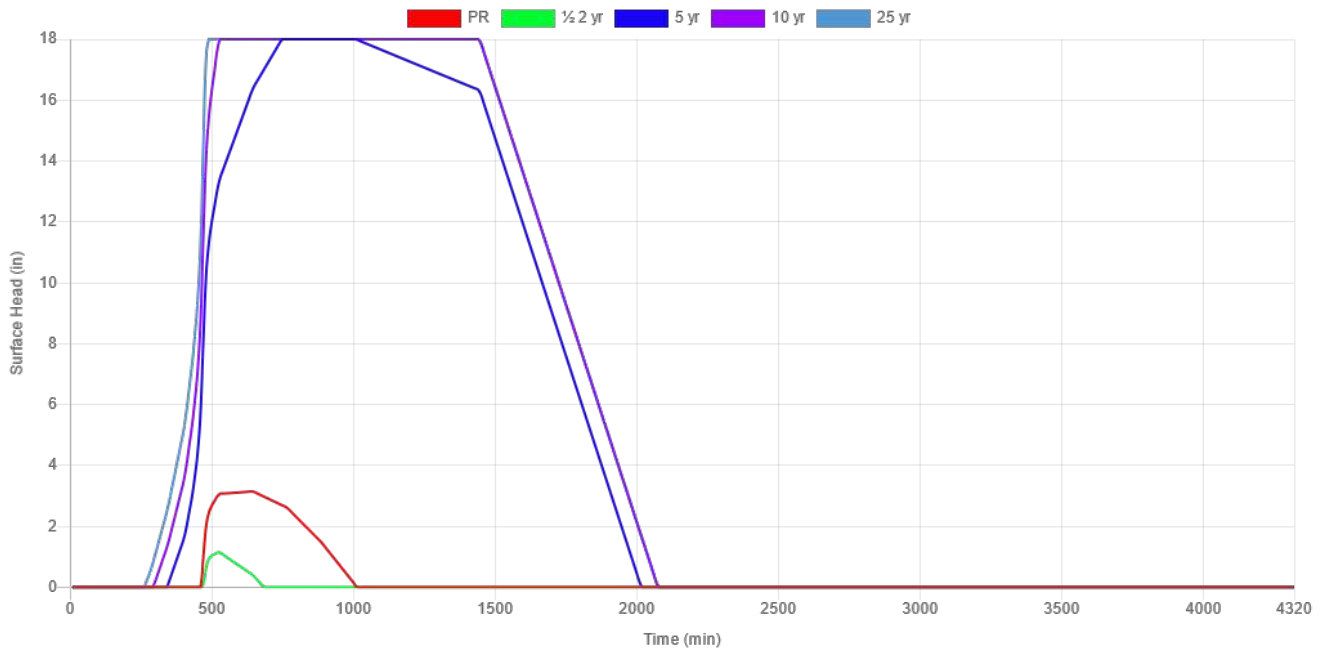


# Flat Planter

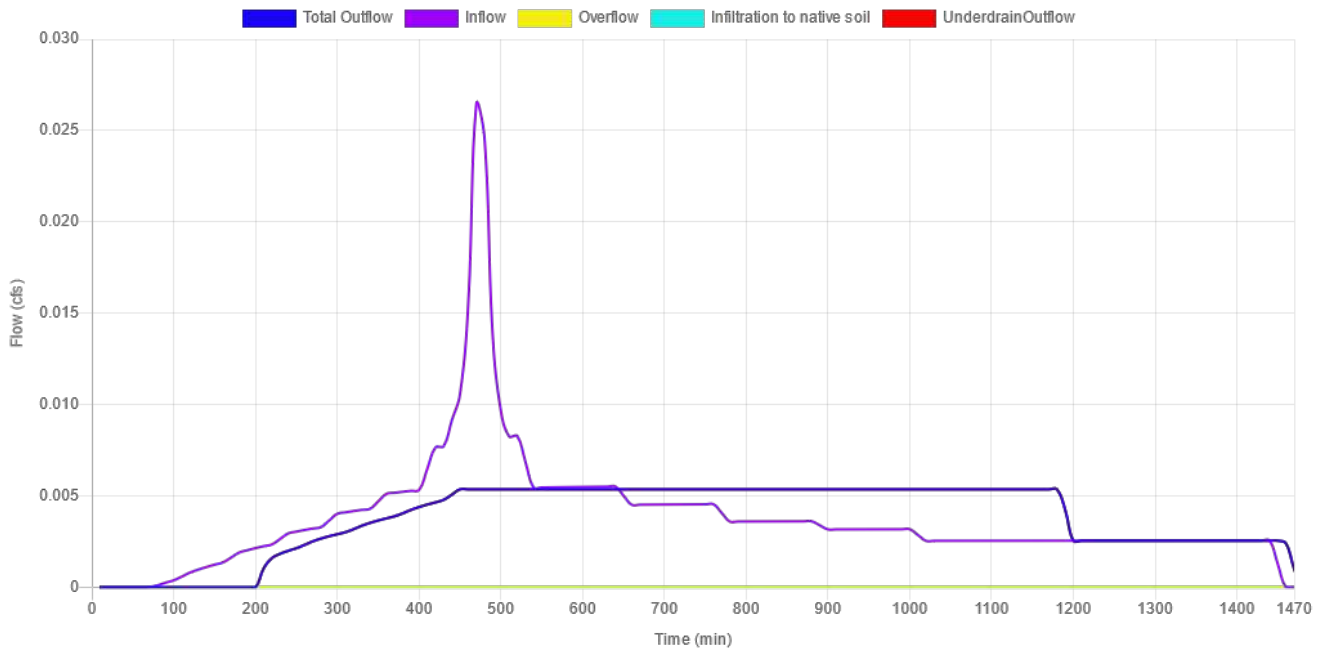
<b>Site Soils &amp; Infiltration Testing</b>	<b>Category</b>
	Flat Planter
	<b>Shape</b>
	Null
	<b>Location</b>
	Parcel
	<b>Configuration</b>
	D: Lined Facility with RS and Ud
	<b>Above Grade Storage Data</b>
	<b>Bottom Area</b>
	135 sq ft
	<b>Bottom Width</b>
	3.60 ft
	<b>Overflow Height</b>
	18.0 in
	<b>Total Depth of Blended Soil plus Rock</b>
	30 in
	<b>Surface Storage Capacity at Overflow</b>
	202.5 cu ft
	<b>Design Infiltration Rate to Soil Underlying the Facility</b>
0.000 cfs	
<b>Design Infiltration Rate for Imported Blended Soil in the Facility</b>	
0.019 cfs	
<b>Below Grade Storage Data</b>	
<b>Catchment is too small for flow control?</b>	
No	
<b>Rock Area</b>	
22.50 sq ft	
<b>Rock Width</b>	
3.00 ft	
<b>Rock Storage Depth</b>	
12.0 in	
<b>Rock Porosity</b>	
0.3	
<b>Underdrain Height</b>	

	<p>4 in</p> <p>Percent of Facility Base that Allows Infiltration</p> <p>0 %</p> <p>Orifice (Y/N)?</p> <p>Yes</p> <p>Orifice Diameter</p> <p>0.500 in</p>																				
<b>Facility Facts</b>	<p>Total Facility Area (excluding freeboard)</p> <p>135.00 sq ft</p> <p>Sizing Ratio</p> <p>4.66 %</p>																				
<b>Pollution Reduction Results</b>	<p>Pollution Reduction Score</p> <p>Pass</p> <p>Overflow Volume</p> <p>0.00 cf</p> <p>Surface Capacity Used</p> <p>17.49 %</p>																				
<b>Flow Control Results</b>	<p>Flow Control Score</p> <p>Pass</p> <table border="1"> <thead> <tr> <th></th> <th>STORMWATER FACILITY OUTFLOW (CFS)</th> <th></th> <th>PRE-DEVELOPMENT RUNOFF (CFS)</th> </tr> </thead> <tbody> <tr> <td>½ the 2 year</td> <td>0.0054</td> <td>&lt;=</td> <td>0.0063</td> </tr> <tr> <td>5 year</td> <td>0.0083</td> <td>&lt;=</td> <td>0.0193</td> </tr> <tr> <td>10 year</td> <td>0.0119</td> <td>&lt;=</td> <td>0.0267</td> </tr> <tr> <td>25 year</td> <td>0.0237</td> <td>&lt;=</td> <td>0.0332</td> </tr> </tbody> </table>		STORMWATER FACILITY OUTFLOW (CFS)		PRE-DEVELOPMENT RUNOFF (CFS)	½ the 2 year	0.0054	<=	0.0063	5 year	0.0083	<=	0.0193	10 year	0.0119	<=	0.0267	25 year	0.0237	<=	0.0332
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10 year	0.0119	<=	0.0267																		
25 year	0.0237	<=	0.0332																		

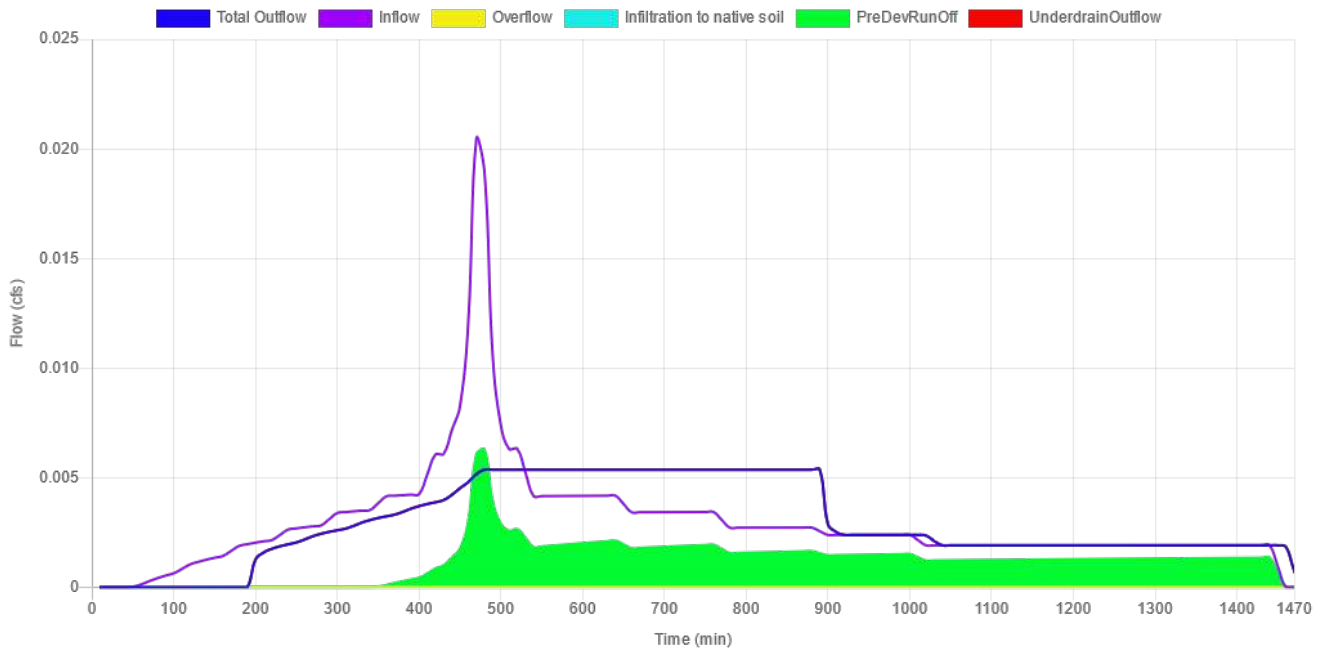
## Surface Head



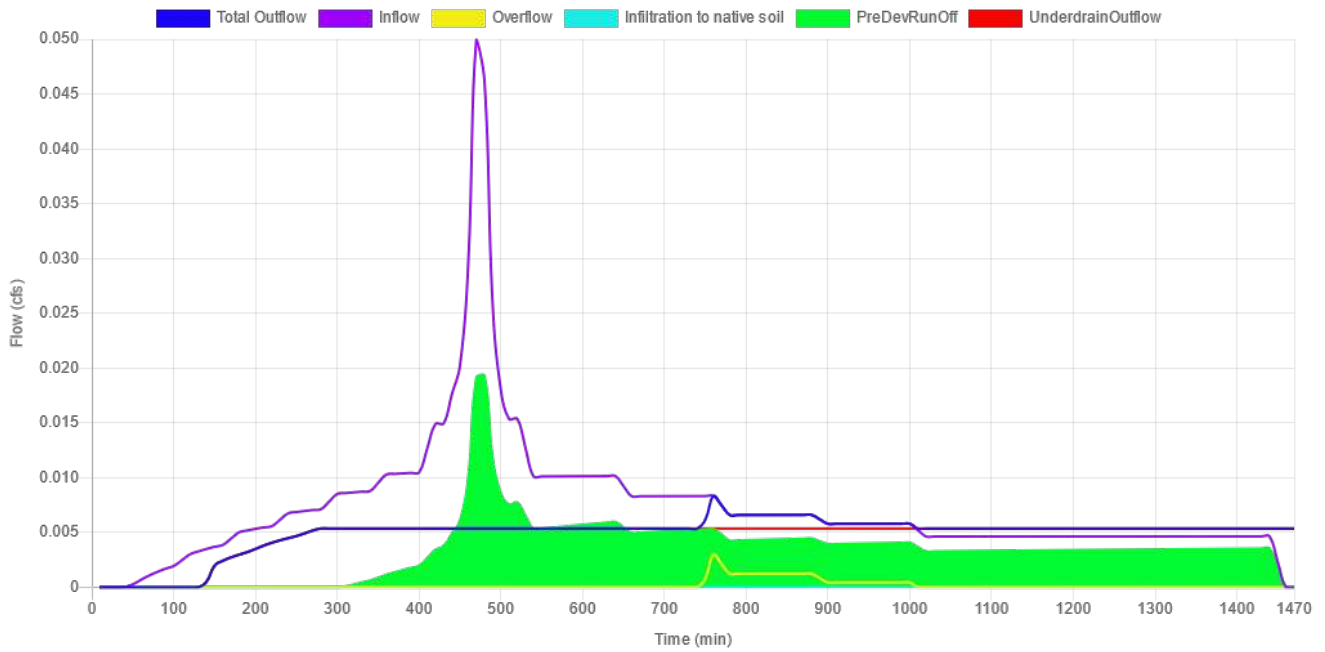
## Water Quality



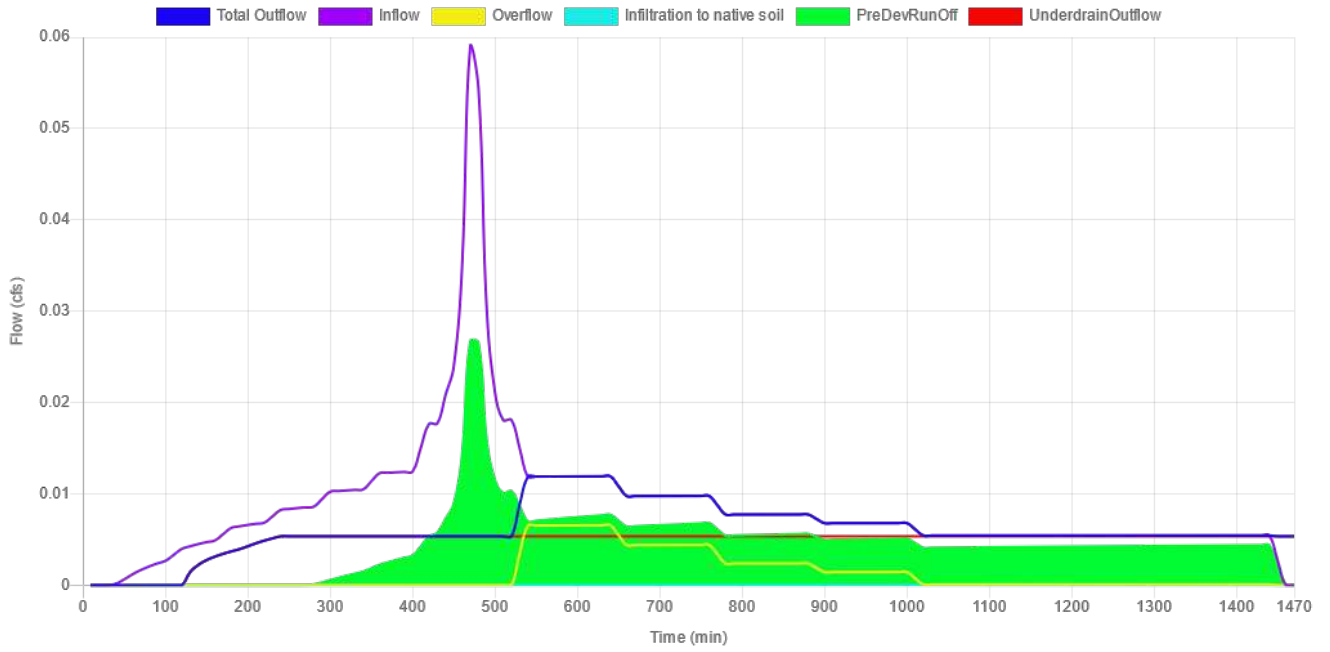
## 1/2 2-Year



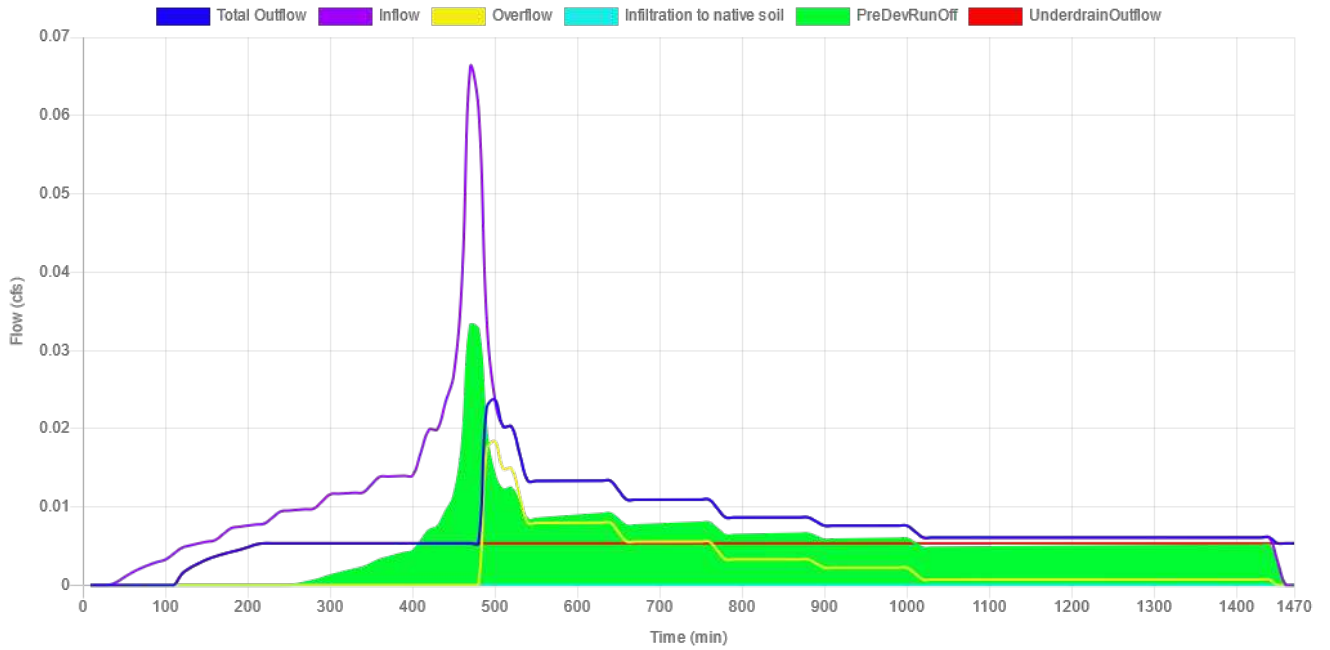
## 5-Year



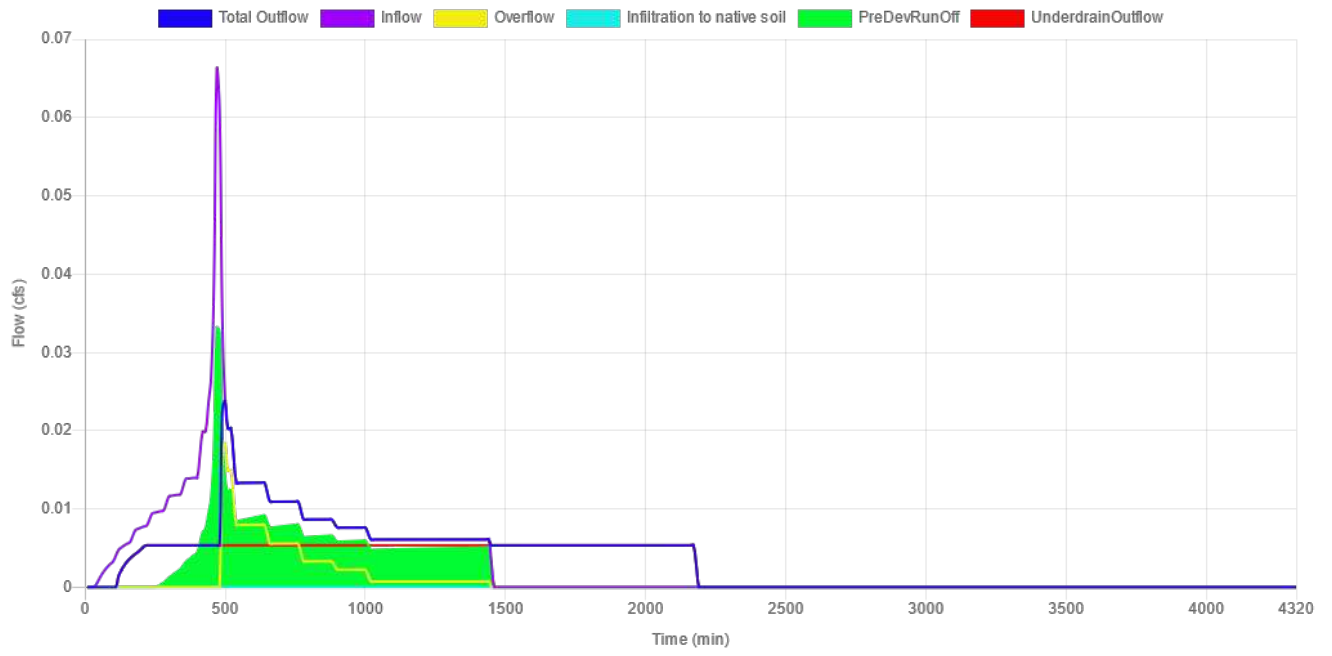
## 10-Year



## 25-Year



# 25-Year



**FIRE CODE / LAND USE / BUILDING REVIEW  
APPLICATION**



**North Operating Center**  
11945 SW 70<sup>th</sup> Avenue  
Tigard, OR 97223  
Phone: 503-649-8577

**South Operating Center**  
8445 SW Elligsen Rd  
Wilsonville, OR 97070  
Phone: 503-259-1500

REV 12-12-2019

**Project Information**

Applicant Name: David Maher  
 Address: 4060 Kenthorpe Way, West Linn  
 Phone: 503-516-7240  
 Email: exdub@hotmail.com  
 Site Address: 4060 Kenthorpe Way  
 City: West Linn  
 Map & Tax Lot #: 21E24BD00402  
 Business Name: NA  
 Land Use/Building Jurisdiction: West Linn  
 Land Use/ Building Permit # \_\_\_\_\_

Choose from: Beaverton, Tigard, Newberg, Tualatin, North Plains, West Linn, Wilsonville, Sherwood, Rivergrove, Durham, King City, Washington County, Clackamas County, Multnomah County, Yamhill County

**Project Description**

New Single Family


**Permit/Review Type (check one):**

Land Use / Building Review - Service Provider Permit  
 Emergency Radio Responder Coverage Install/Test  
 LPG Tank (Greater than 2,000 gallons)  
 Flammable or Combustible Liquid Tank Installation (Greater than 1,000 gallons)  
 Explosives Blasting (Blasting plan is required)  
 Exterior Toxic, Pyrophoric or Corrosive Gas Installation (in excess of 810 cu.ft.)  
 Tents or Temporary Membrane Structures (in excess of 10,000 square feet)  
 Temporary Haunted House or similar  
 OLCC Cannabis Extraction License Review  
 Ceremonial Fire or Bonfire (For gathering, ceremony or other assembly)

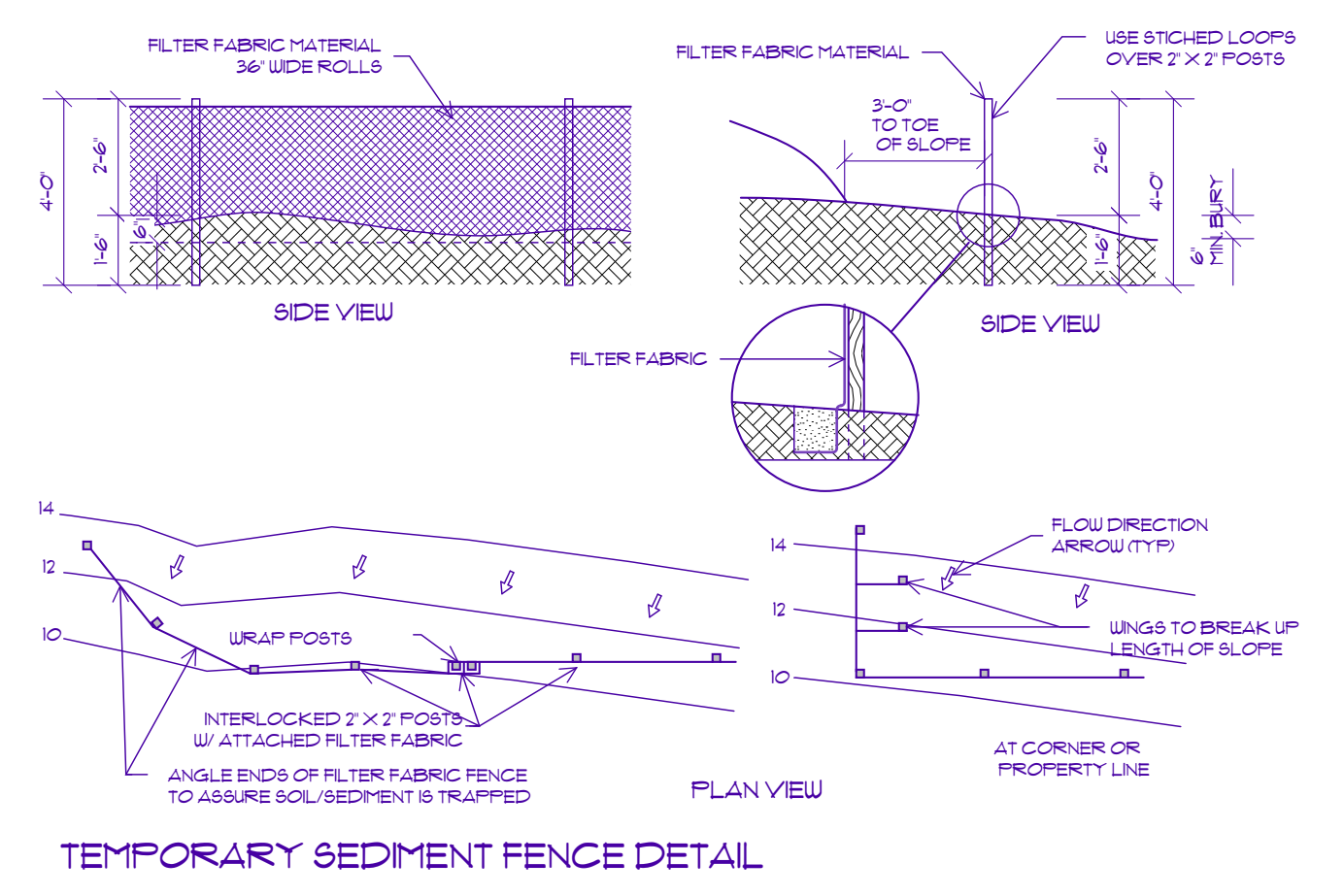
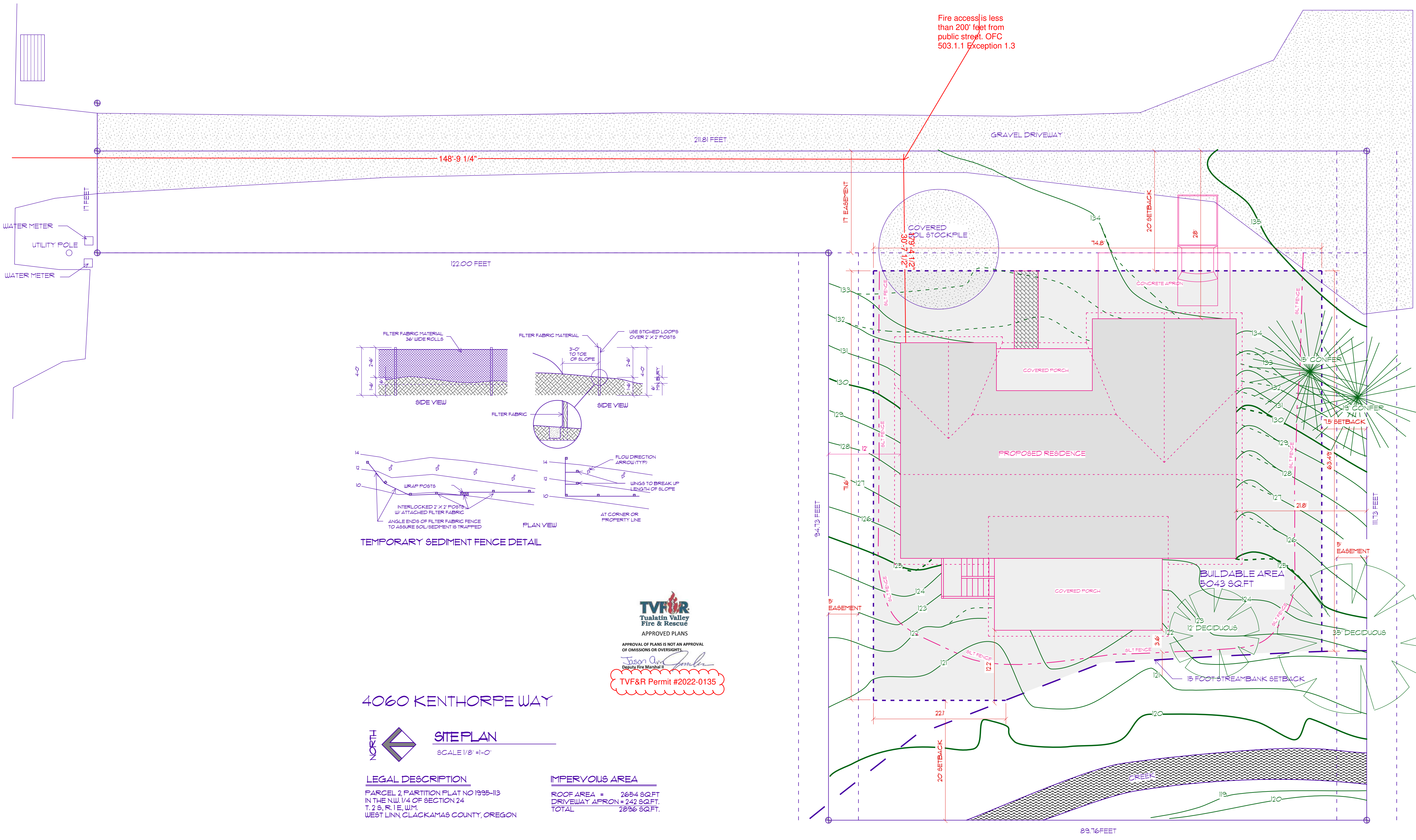
**For Fire Marshal's Office Use Only**

TVFR Permit # 2022-0135  
 Permit Type: SPP-COWL  
 Submittal Date: 11/10/22  
 Assigned To: DFM Arn  
 Due Date: NA  
 Fees Due: \$0  
 Fees Paid: \$

**Approval/Inspection Conditions**  
(For Fire Marshal's Office Use Only)

<p><b>This section is for application approval only</b></p> <p> <u>11/16/22</u>                  Fire Marshal or Designee _____ Date _____</p> <p>Conditions:</p> <p><u>See approved fire service plan.</u></p> <p>See Attached Conditions: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Site Inspection Required: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p><b>This section used when site inspection is required</b></p> <p>Inspection Comments:</p>     <p>Final TVFR Approval Signature &amp; Emp ID _____ Date _____</p>
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KENTHORPE WAY



TEMPORARY SEDIMENT FENCE DETAIL

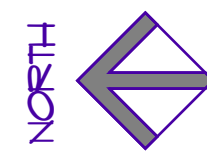
**TVF&R**  
Tualatin Valley  
Fire & Rescue  
APPROVED PLANS

APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS.

*Jason O'Connell*  
Tualatin Valley Fire Marshal

TVF&R Permit #2022-0135

4060 KENTHORPE WAY



SITE PLAN  
SCALE 1/8" = 1'-0"

**LEGAL DESCRIPTION**  
PARCEL 2, PARTITION PLAT NO 1995-113  
IN THE NW1/4 OF SECTION 24  
T. 2 S., R. 1 E., W.M.  
WEST LINN, CLACKAMAS COUNTY, OREGON

**IMPERVIOUS AREA**  
ROOF AREA = 2654 SQ.FT.  
DRIVEWAY APRON = 242 SQ.FT.  
TOTAL = 2896 SQ.FT.