

# 629 Woodland Apartments

Lacey, Washington

Project #: 10182300068

## PRELIMINARY DRAINAGE REPORT

**September 29, 2023**

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**ENGINEER OF RECORD CERTIFICATION**

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*I hereby state that this Drainage Control Plan for **MJR 7th Avenue. Apartments** has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the **City of Lacey** does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.*



9-29-2023

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- Appendix D – Existing Conditions
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# 1 Project Overview

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## 1.1 Site Information

Site Address:	629 Woodland Square Loop SE, Lacey, WA 98503
Parcel Number:	84990001400
Property Owner:	DM Park Ventures LLC
Total Parcel Area:	1.08 AC
Parcel Zoning:	Woodland District
Current Use Code:	65
Abbreviated Legal:	Section 17 Township 18 Range 1W Plat Woodland Square BLA-6144 TR A Document 005/682

## 1.2 Project Description

MJR Development proposes to redevelop the site on parcel 84990001400. The site consists of a 4-story vacant office building and associated paved parking. The project will convert the existing building into a 50-unit apartment building. Unit mix will consist of studios, 1-bedroom, and 2-bedroom. The site redevelopment proposes keeping the existing parking lot in its current configuration. Site improvements include areas of replaced pavement, concrete sidewalks, concrete patios, bike parking, ADA improvements, and landscaping. Utility improvements include an 8" water main looping through the site, fire hydrants, and lining of the existing sewer lateral.

## 1.3 Proposed Stormwater Drainage Design

There is an existing stormwater conveyance system on-site that ties into the stormwater system on the adjacent parcel to the west (parcel 84990001500). The runoff from the site is captured through catch basins and routed to the west where it ties into a series of Bayfilters on the adjacent parcel. These Bayfilters are connected by 10-inch diameter perforated storm drains to allow stormwater to infiltrate on-site. The last Bayfilter in the series has an overflow connection to the City stormwater system along Woodland Square Loop.

The project proposes to maintain the existing stormwater system in its current condition. All stormwater will be routed to the existing catch basin on the site.

## 1.4 Subarea Data Tabulation

Table 1 and 2 summarize the existing and proposed on-site areas for this project, respectively. Table 3 summarizes the proposed off-site areas (includes improvements in the right-of-way and adjacent parcels). The total proposed project areas (on-site plus off-site) are as follows:

- Total New Hard Surface: 3,900 square feet
- Total Replaced Hard Surface: 4,300 square feet
- Total Disturbed Area: 17,190 square feet

Table 1: Existing Site Areas

Surface	Surface Type	Area (sf)	Area (ac)
Pavement	Impervious	24,470	0.56
Sidewalk	Impervious	4,390	0.10
Roof	Impervious	8,390	0.19
Landscaping	Pervious	9,632	0.22
<b>Total</b>		<b>46,882</b>	<b>1.08</b>

Table 2: Proposed Site Areas

Surface	Surface Type	Pollution Generating?	Area (sf)	Area (ac)
New Sidewalk	Impervious	No	3,000	0.07
New Pavement	Impervious	Yes	145	0.003
<b>Total New Impervious Surface</b>			<b>3,145</b>	<b>0.07</b>
Replaced Pavement	Impervious	Yes	4,140	0.10
<b>Total Replaced Impervious Surface</b>			<b>4,140</b>	<b>0.17</b>
Landscape	Pervious	Yes	8,355	0.19
<b>Total Disturbed Area</b>			<b>15,640</b>	<b>0.36</b>
Ex Roof	Impervious	No	8,390	0.19
Ex Asphalt	Impervious	No	19,810	0.46
Ex Landscape	Pervious	Yes	3,042	0.07
<b>Total Site Area</b>			<b>46,882</b>	<b>1.08</b>

Table 3: Proposed Off-Site Areas

Surface	Surface Type	Pollution Generating?	Area (sf)	Area (ac)
Replaced Pavement	Impervious	Yes	160	0.00
New Concrete	Impervious	No	755	0.02
Landscape	Pervious	Yes	635	0.02

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## **2 Development Conditions and Requirements**

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### **2.1 Project Vesting**

This project complies with the requirements and regulations set by the City of Lacey 2022 Storm Drainage Manual (SDM).

### **2.2 Permits Required**

This drainage report has been prepared for the use of Land Use Approval. The following permits are anticipated to be required for this project:

- City of Lacey – Civil Engineering Permit
- City of Lacey – Grading Permit
- City of Lacey – Building Permit

### **2.3 Project Type and Size**

This project is a redevelopment project that proposes a total (on-site and off-site) 3,900 square feet (0.09 acres) of new hard surface, 4,300 square feet (0.10 acres) of replaced hard surfaces, and 17,910 square feet (0.41 acres) of disturbed area. Also, the proposed site improvements do not exceed 50% of the assessed value of the existing project site. Therefore, the project is required to comply with Core Requirements #1 through #5 of the City of Lacey's 2022 Stormwater Design Manual (SDM) for all new and replaced hard surfaces and land disturbed. See the flow chart for determining requirements for redevelopment located in Appendix B.

### **2.4 Critical Areas**

The site has been assessed for critical area impacts based on review of the critical area maps available on the Thurston County GeoData website and the latest FEMA flood plain maps.

#### ***Streams***

There are no streams within the parcel boundary.

#### ***Flood Zone***

No portion of this parcel is within FEMA Flood Zone, Floodway, or area of high groundwater flood.

#### ***Wetlands***

There are no wetlands present on this parcel.

#### ***Critical Aquifer Recharge Area***

The entire parcel is within a Type 1 Critical Aquifer Recharge Area.

#### ***Watershed Protection Areas***

The parcel is within the Henderson Watershed Protection Area.

#### ***High Ground Water***

There are no high groundwater areas mapped on the project parcel.



### ***Wells and Septic Systems***

There are no known existing wells or septic systems located on the parcel. No wells or septic systems are proposed for this project. The project parcel is also outside of wellhead protection areas.

### ***Fuel Tanks***

There are no known underground fuel tanks on the project parcel.

### ***Landfills***

There are no closed or active landfills, or contaminated sites on the project parcel or within 100-ft of the project area.

## **2.5 Core Requirements**

The project is a redevelopment project with less than 5,000 sf. of new hard surfaces. Therefore, the project will comply with Core Requirements #1 through #5 of the City of Lacey's 2022 SDM.

The requirements for each core requirement will be met as follows:

### ***Core Requirement #1: Preparation of Stormwater Site Plans***

Stormwater Site Plan has been prepared in accordance with Chapter 3 of the SDM and has been included with this the submittal package.

### ***Core Requirement #2: Construction Stormwater Pollution Prevention***

A Construction Stormwater Pollution Prevention Plan (C-SWPPP) document will be prepared and included in the final review submittal.

### ***Core Requirement #3: Source Control of Pollution***

Source control BMPs have been identified and are included in Section 8 of this report. A Maintenance and Source Control Manual will be developed and submitted for final approval.

### ***Core Requirement #4: Preservation of Natural Drainage Systems and Outfalls***

The existing site is developed and contains a vacant office building and an associated paved parking lot. An existing stormwater system conveys on-site stormwater runoff to the west where it connects to the adjacent parcels storm system. The stormwater runs through perforated pipes that allows for infiltration; an existing overflow route is provided that routes water to the city storm system in Woodland Square Loop. The system ultimately discharges to the City's regional stormwater facility located within the Saint Martin's University Campus.

### ***Core Requirement #5: On-site Stormwater Management***

Per section 2.2.5 of the City of Lacey SDM, the project triggers Core Requirements #1 - #5, therefore, the project will implement List #1 BMPs to the extent feasible for stormwater management of the project. Each surface type has been evaluated in Section 5 of this report.

All areas of disturbance not proposed as hardscape will implement BMP T5.13 – Post-Construction Soil Quality and Depth and will meet the requirements of Section 7.4.1 of the SDM.

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### **3 Site and Vicinity Description**

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#### **3.1 Existing Physiography**

The current project site is currently developed with a vacant 4-story office building and an associated paved parking lot. The ground cover consists of concrete walkways, paved parking lots, and landscaped areas. The site is generally flat. There is no known off-site drainage to the property. All generated run-off from the site is currently collected and conveyed through storm drains and infiltrated on the adjacent parcel to the west. See existing conditions in Appendix D.

#### **3.2 Existing Improvements**

The site is fully developed with an office building and an associated paved parking lot. The building is to remain and be converted to a 50-unit apartment building. The building is currently served by City of Lacey water and sewer. These service connections will remain/ be modified by the proposed development. The existing storm system will remain.

#### **3.3 Drainage Patterns**

The runoff from the site is currently captured through catch basins and routed to the west where it ties into a series of Bayfilters on the adjacent parcel. These Bayfilters are connected by 10-inch diameter perforated storm drains to allow stormwater to infiltrate on-site. The last Bayfilter in the series has an overflow connection to the city stormwater system along Woodland Square Loop. The site is located within the drainage basin identified by the City of Lacey as the Woodland Basin which discharges to the Henderson Inlet.

The project proposes to keep the existing stormwater system. There are currently no known drainage issues on the project parcel or adjacent parcels.

#### **3.4 Qualitative Analysis**

The overflow route from the existing storm drainage system on the adjacent parcel is connected to the City of Lacey's storm system in Woodland Square Loop and eventually discharged into the City's regional stormwater facility as shown in Figure 1.

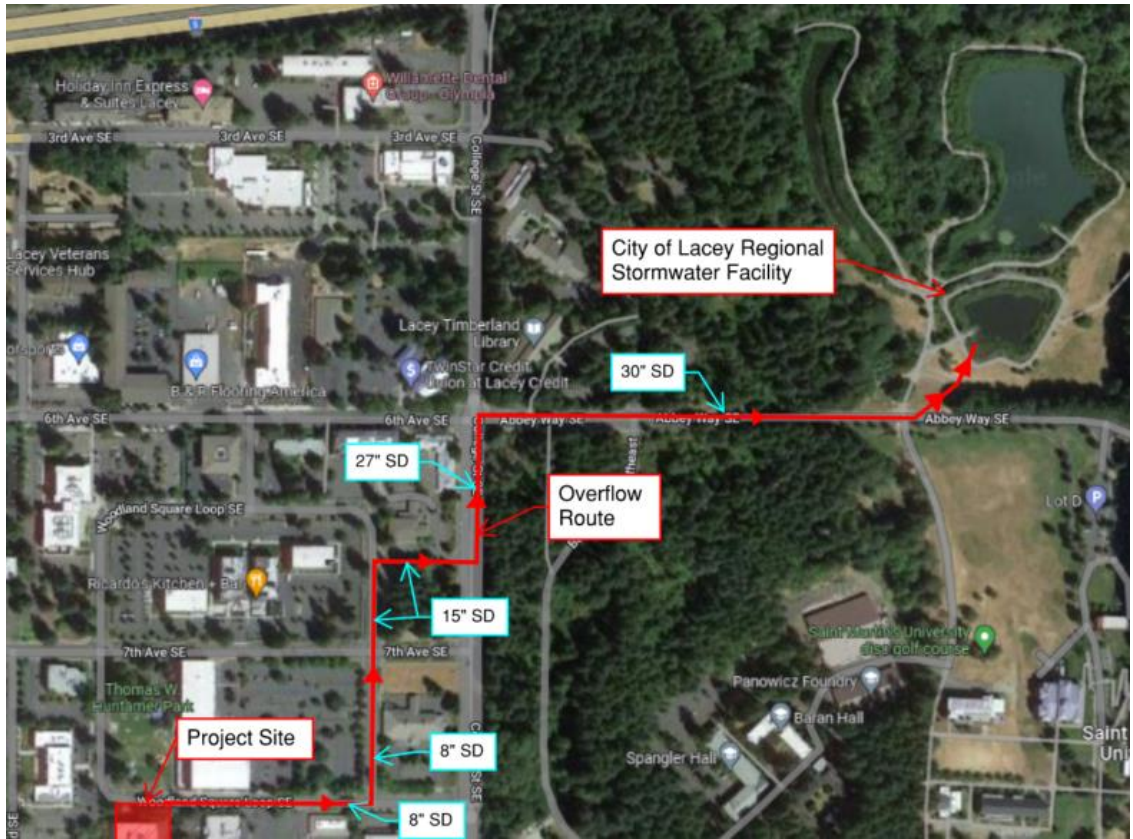


Figure 1: Downstream Overflow Route

### 3.5 Quantitative Analysis

It is not anticipated that a quantitative analysis is required for this project. A quantitative analysis will be performed if required by the city.

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## 4 Soils and Infiltration Analysis

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### 4.1 Summary of Soils and Geotechnical Data

A NRCS Soil Survey is included in Appendix C. Site soils are Indianola loamy sand and classified Hydrologic soil group A. These soils are anticipated to have a relatively high infiltration property.

### 4.2 Subsurface Factors

Geotechnical testing and subsurface explorations were not performed.

### 4.3 Infiltration Rates

Infiltration testing was not performed.

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## 5 On-Site Stormwater Management and Low Impact Development

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### 5.1 LID Site Design

This project does not propose many changes to the existing site or drainage system. Low impact design (LID) considerations will be implemented to the project to the extent feasible.

### 5.2 Methodology

The project will implement List #1 BMPs to the extent feasible for stormwater management of the project. BMPs from List #1 have been evaluated below:

#### Lawn and Landscaped Areas

All areas of disturbance not proposed as hardscape will implement BMP T5.13 – Post-Construction Soil Quality and Depth and will meet the requirements of Section 7.4.1 of the SDM.

#### Roofs

No new or replaced roof area is proposed. Runoff from the existing roof will continue to flow into the on-site drainage system.

#### Other Hard Surfaces

The following BMPs were evaluated and determined infeasible for the proposed project:

- Full Dispersion
  - The project site is fully developed with no area remaining to allow for dispersion of stormwater runoff.
- Permeable Pavements / Rain Gardens / Bioretention
  - Permeable Pavement is infeasible because infiltrating water might compromise adjacent impervious pavements.

- Rain gardens and bioretention are infeasible because they are not compatible with the existing on-site drainage system. The project drains to an existing collection system whose elevations and location don't allow for a connection to rain gardens or bioretention on-site. Available landscape areas are high points on the site. The site runoff drains to the center of the drive aisles where existing catch basins are located.
- Sheet Flow Dispersion / Concentrated Flow Dispersion
  - The project site is fully developed with no area remaining to allow for dispersion of stormwater runoff.

### **5.3 LID Practices**

The following LID BMPs will be implemented for this project:

- BMP T5.13 – Post-construction Soil Quality and Depth

### **5.4 Post-Construction Soil Quality and Depth**

Post construction soil quality and depth will be implemented by importing soil.

### **5.5 Retained Trees and Aesthetics**

Most existing trees within the demolition limits are proposed to be removed with the exception of 34" Fir and 48" Maple. All other trees throughout on-site shall remain. Refer to the landscape/ architectural plans. A tree report has been prepared and included in this submittal.

All existing and proposed stormwater facilities are located underground and will not affect the aesthetics of the proposed project.

## **6 Source Control**

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### **6.1 Potential Sources of Pollutants**

Potential pollutant sources that may occur on the proposed site are as follows:

- Cars
- Landscaping (fertilizer)

### **6.2 Source Control BMPs**

The following Pollution Source Control BMPs will be incorporated:

1. BMP S410: Correcting Illicit Discharges to Storm Drains
2. BMP S411: Landscaping/Lawn Vegetation Maintenance
3. BMP S417: Maintenance of Stormwater Drainage and Treatment Systems
4. BMP S443: Fertilizer Application
5. BMP S453: Formation of a Pollution Prevention Team
6. BMP S454: Preventative Maintenance/Good Housekeeping
7. BMP S455: Spill Prevention and Cleanup

8. BMP S456: Employee Training
9. BMP S457: Inspections
10. BMP S458: Record Keeping

A Maintenance and Source Control Manual will be developed and submitted for final approval.

### **6.3 Source Control Checklist and Worksheet**

A source control checklist per Chapter 9, Appendix 9A of the SDM will be completed and included in the final review submittal.

## **7 Covenants, Dedications, Easements, Agreements, and Guarantees**

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### **7.1 Covenants, Dedications, and Easements**

Appendix Q (Maintenance Agreement) of the 2017 City of Lacey Development Guidelines will be implemented for the project. Maintenance and Source Control Manual will be developed for final review.

### **7.2 Agreements and Guarantees**

All necessary agreements and financial guarantees will be provided to ensure the construction and functionality of the drainage facilities in accordance with Section 3.090 of Chapter 3 of the City of Lacey's Development Guidelines and Public Works Standards.

**APPENDIX A**

**Vicinity Map**



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## VICINITY MAP



**APPENDIX B**

**Requirements Flow Chart**

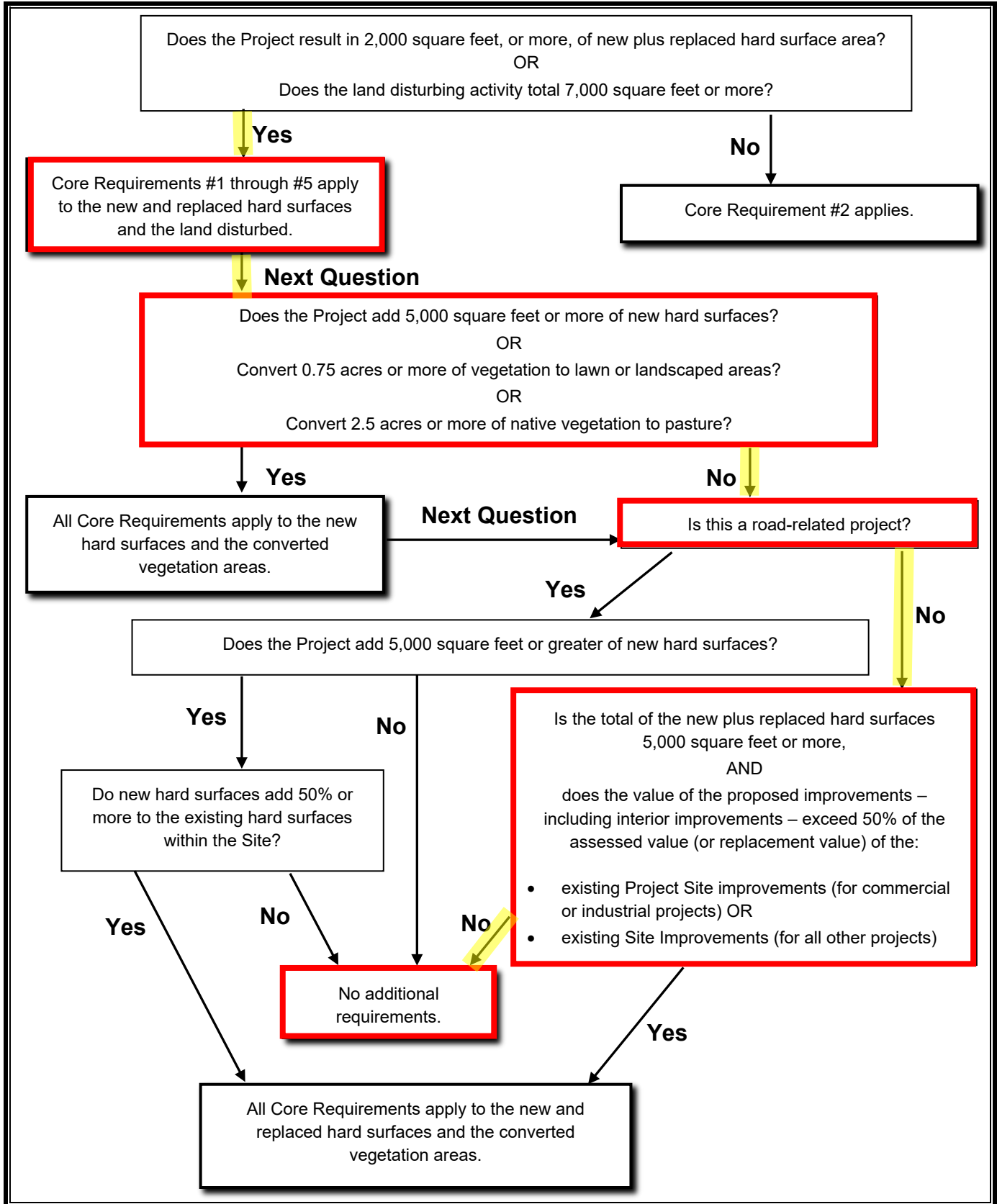


Figure 2.2. Flow Chart for Determining Requirements for Redevelopment.

The bottom of the page features a decorative graphic consisting of two overlapping blue shapes. On the left, a dark blue triangle points downwards. On the right, a lighter blue triangle points upwards, overlapping the dark blue one.

**APPENDIX C**

**NRCS Soil Report**



United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for Thurston County Area, Washington

**629 Woodland**



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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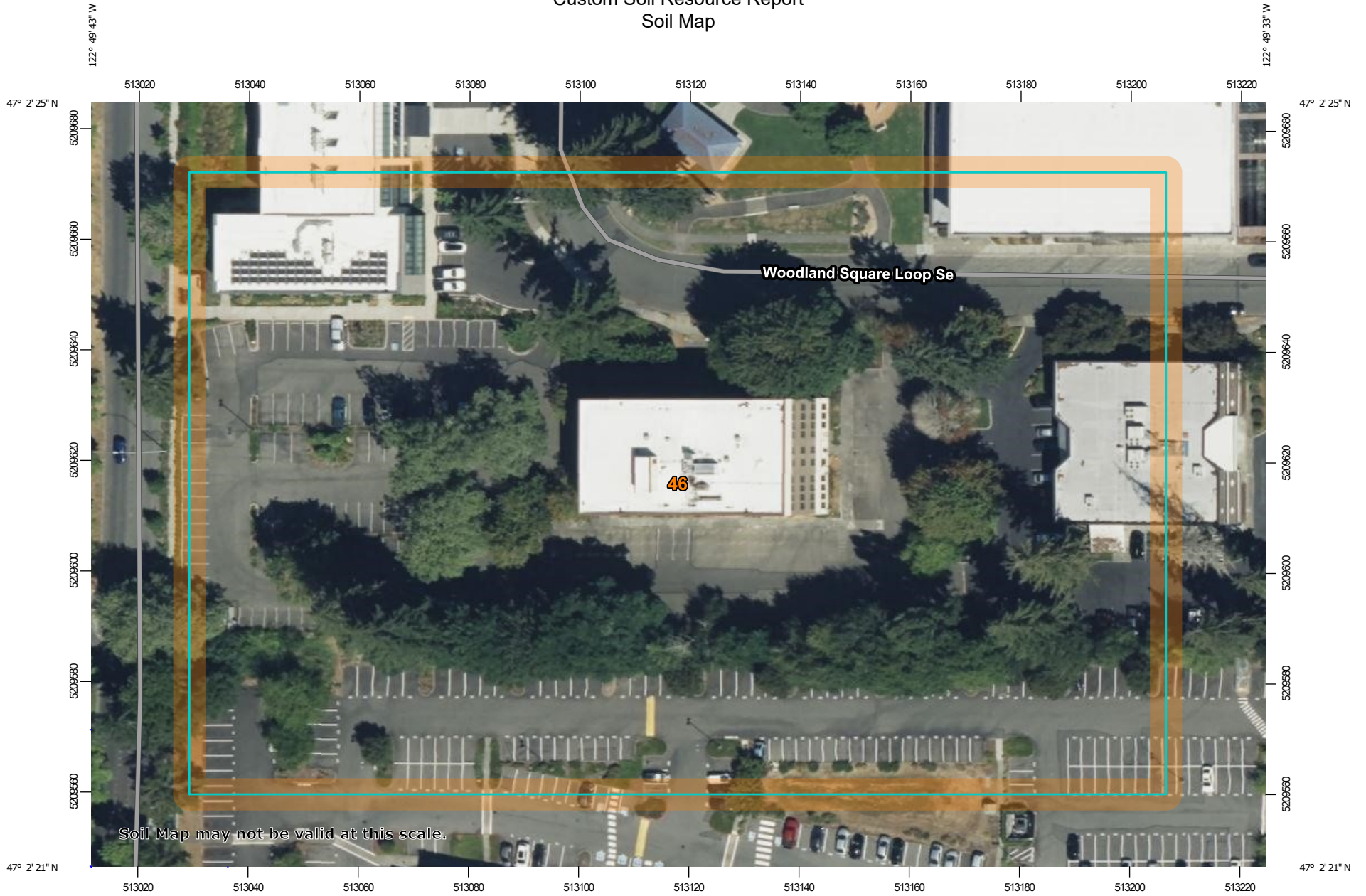
# Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



# Custom Soil Resource Report Soil Map



Map Scale: 1:974 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84




### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)




















**Soils**







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Thurston County Area, Washington  
 Survey Area Data: Version 16, Sep 8, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 31, 2022—Aug 8, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
46	Indianola loamy sand, 0 to 5 percent slopes	5.0	100.0%
<b>Totals for Area of Interest</b>		<b>5.0</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

## Custom Soil Resource Report

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Thurston County Area, Washington

### 46—Indianola loamy sand, 0 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2t62k  
*Elevation:* 0 to 980 feet  
*Mean annual precipitation:* 30 to 81 inches  
*Mean annual air temperature:* 48 to 50 degrees F  
*Frost-free period:* 170 to 210 days  
*Farmland classification:* Prime farmland if irrigated

#### Map Unit Composition

*Indianola and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Indianola

##### Setting

*Landform:* Kames, terraces, eskers  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Sandy glacial outwash

##### Typical profile

*Oi - 0 to 1 inches:* slightly decomposed plant material  
*A - 1 to 6 inches:* loamy sand  
*Bw1 - 6 to 17 inches:* loamy sand  
*Bw2 - 17 to 27 inches:* sand  
*BC - 27 to 37 inches:* sand  
*C - 37 to 60 inches:* sand

##### Properties and qualities

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 99.90 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 3.9 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 4s  
*Land capability classification (nonirrigated):* 4s  
*Hydrologic Soil Group:* A  
*Ecological site:* F002XA004WA - Puget Lowlands Forest  
*Forage suitability group:* Droughty Soils (G002XV402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)

## Custom Soil Resource Report

*Other vegetative classification:* Droughty Soils (G002XV402WA), Droughty Soils (G002XF403WA), Droughty Soils (G002XS401WA), Droughty Soils (G002XN402WA)

*Hydric soil rating:* No

### Minor Components

#### **Alderwood**

*Percent of map unit:* 5 percent

*Landform:* Ridges, hills

*Landform position (two-dimensional):* Summit

*Landform position (three-dimensional):* Crest, talf

*Down-slope shape:* Linear, convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### **Everett**

*Percent of map unit:* 5 percent

*Landform:* Eskers, moraines, kames

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Interfluve, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### **Norma**

*Percent of map unit:* 5 percent

*Landform:* Depressions, drainageways

*Landform position (three-dimensional):* Dip

*Down-slope shape:* Concave, linear

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

The bottom of the page features a decorative graphic consisting of two overlapping triangular shapes. The left shape is a dark blue triangle pointing downwards, and the right shape is a lighter blue triangle pointing upwards, creating a central white space.

**APPENDIX D**

**Existing Conditions**



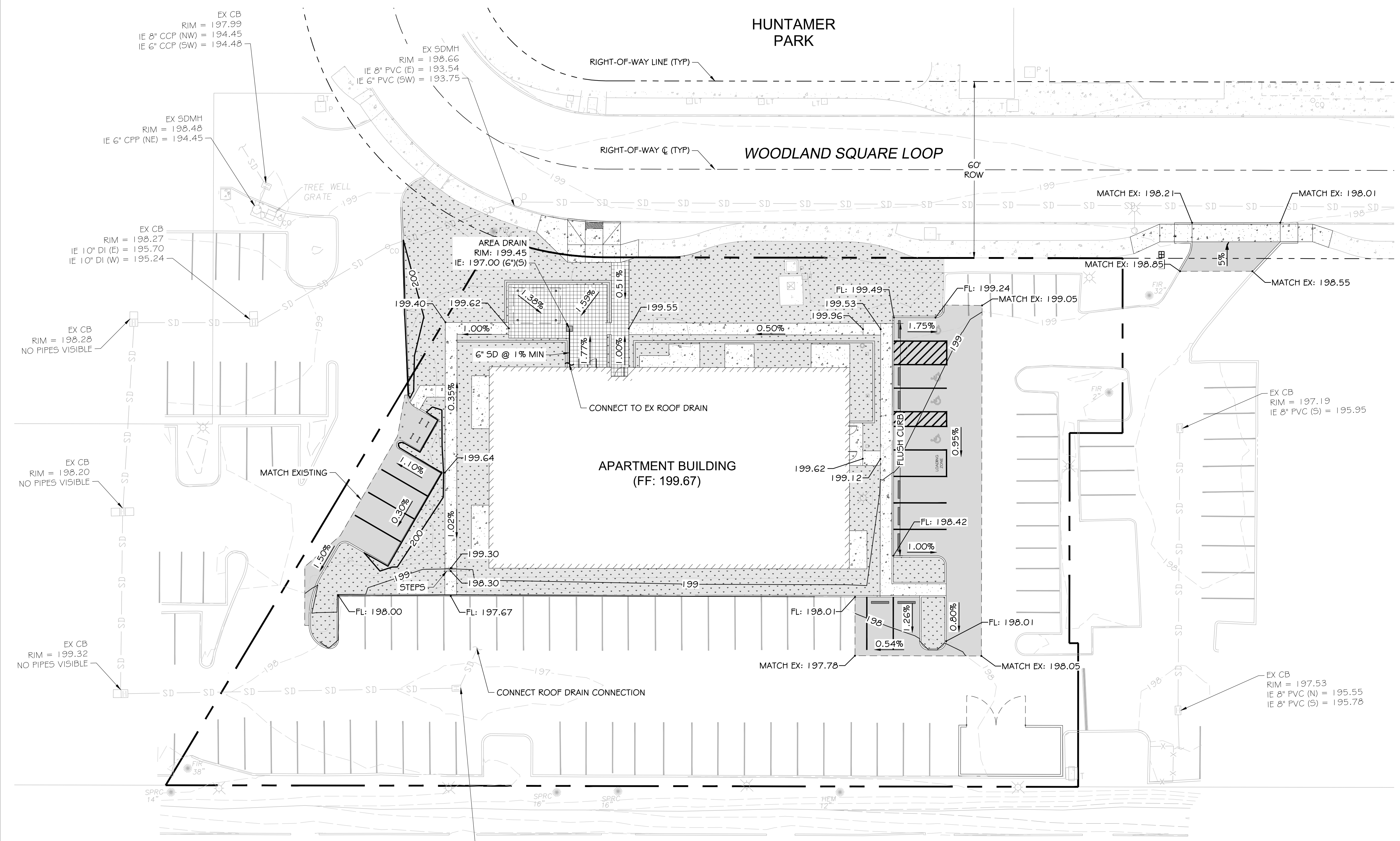


**APPENDIX E**

**Drainage Plan**

SECTION 17, TOWNSHIP 18 NORTH, RANGE 1 WEST, W.M.  
THURSTON COUNTY, WASHINGTON

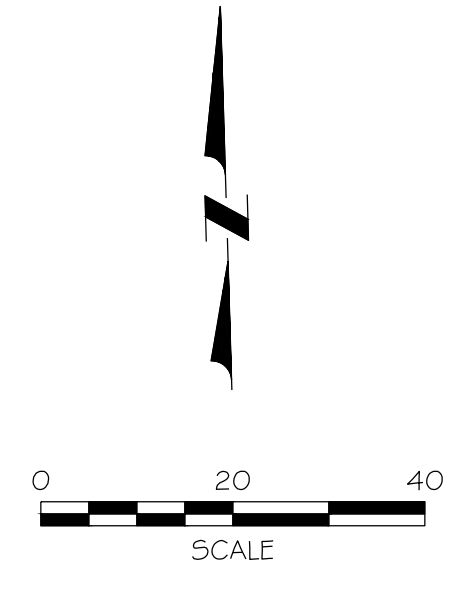
FILE: I:\2023\1018220068 - 629 Woodland Square Loop\DWG\GRADING & DRAINAGE  
 PLOTTED: Sep 28, 2023 - 13:29:59 PLOTTED BY: jrs/eric



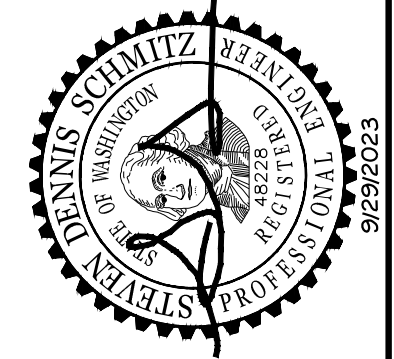
**LEGEND**

EX MAJOR CONTOUR	---
EX MINOR CONTOUR	---
PROP MAJOR CONTOUR	---
PROP MINOR CONTOUR	---
SLOPE ARROW	X%
SPOT ELEVATION	DESC: XXX.XX
AREA DRAIN	■
6" STORM DRAIN	SD

- GRADING NOTES:**
1. ALL TOP OF CURB ELEVATIONS SHALL BE 0.5' ABOVE FLOW LINE ELEVATIONS. UNLESS OTHERWISE NOTED.
  2. ADA PARKING SHALL NOT EXCEED 2% IN ANY DIRECTION
  3. ALL SIDEWALKS SHALL NOT EXCEED 2% CROSS SLOPE AND 5% RUNNING SLOPE



NO	DATE	BY	CHKD	APPR	REVISION



**kpff**  
 629 Woodland Square Loop,  
 Lacey, WA 98503  
 360.292.7730  
 www.kpff.com

CALL  
UNDERGROUND  
LOCATE TWO (2)  
WORKING DAYS  
BEFORE YOU  
DIG  
811

DESIGNED BY	JM	DATE	9-29-2023
DRAWN BY	JM	JOB NO	10182200068
CHECKED BY	SDS		

**629 WOODLAND APARTMENTS**  
 LACEY, WASHINGTON

**GRADING & DRAINAGE PLAN**

