City of West Linn
Planning & Development • 22500 Salamo Rd #1000 • West Linn, Oregon 97068
Telephone 503.656-3535 • westlinnoregon.gov

DEVELOPMENT REVIEW APPLICATION

For Office Use Only			
STAFF CONTACT	PROJECT NO(S). ELD-25-04		PRE-APPLICATION NO.
NON-REFUNDABLE FEE(S) $4,900	REFUNDABLE DEPOSIT(S)	TOTAL $4,900	

Type of Review (Please check all that apply):

- ☐ Annexation (ANX)
- ☐ Appeal (AP)
- ☐ CDC Amendment (CDC)
- ☐ Code Interpretation (MISC)
- ☐ Conditional Use (CUP)
- ☐ Design Review (DR
- ☐ Tree Easement Vacation (MISC)
- ☑ Expediated Land Division (ELD)
- ☐ Extension of Approval (EXT)
- ☐ Final Plat (FP) Related File#_____
- ☐ Flood Management Area (FMA)
- ☐ Historic Review (HDR)
- ☐ Lot Line Adjustment (LLA)
- ☐ Minor Partition (MIP)
- ☐ Modification of Approval (MOD)
- ☐ Non-Conforming Lots, Uses & Structures
- ☐ Planned Unit Development (PUD)
- ☐ Street Vacation
- ☐ Subdivision (SUB)
- ☐ Temporary Uses (MISC)
- ☐ Time Extension (EXT)
- ☐ Right of Way Vacation (VAC)
- ☐ Variance (VAR)
- ☐ Water Resource Area Protection/Single Lot (WAP)
- ☐ Water Resource Area Protection/Wetland (WAP)
- ☐ Willamette & Tualatin River Greenway (WRG)
- ☐ Zone Change (ZC)

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

Site Location/Address: 2785 Arbor Dr

Assessor's Map No.: 21E14DB
Tax Lot(s): 21E14DB00105
Total Land Area: 0.6 acre

Brief Description of Proposal:

The application proposes two-lot expedited land division for development of middle housing in the form of detached duplexes.

Applicant Name*: Chi Kin Mung
Address: 2785 Arbor Dr
City State Zip: West Linn, OR 97068
Phone: 503-720-8235
Email: becken.mung@gmail.com

Owner Name (required):
Address: Same as applicant
City State Zip:
Phone:
Email:

Consultant Name: Akiko Arai - sora design
Address:
City State Zip:
Phone: 414-369-0861
Email: akiko@sora-design.info

1. Application fees are non-refundable (excluding deposit). Applications with deposits will be billed monthly for time and materials above the initial deposit. ***The applicant is financially responsible for all application costs**.
2. All information provided with the application is considered a public record and subject to disclosure.
3. The owner/applicant or their representative should attend all public hearings related to the application.
4. A decision may be reversed on appeal. The decision will become effective once the appeal period has expired.
5. Submit this form, application narrative, and all supporting documents as a single PDF through the web page: https://westlinnoregon.gov/planning/submit-land-use-application

The undersigned property owner authorizes the application and grants city staff the **right of entry** onto the property to review the application. The applicant and owner affirm that the information provided in this application is true and correct. Applications with deposits will be billed monthly for time and materials incurred above the initial deposit. The applicant agrees to pay additional billable charges.

Applicant's signature — April 25, 2025 — Date

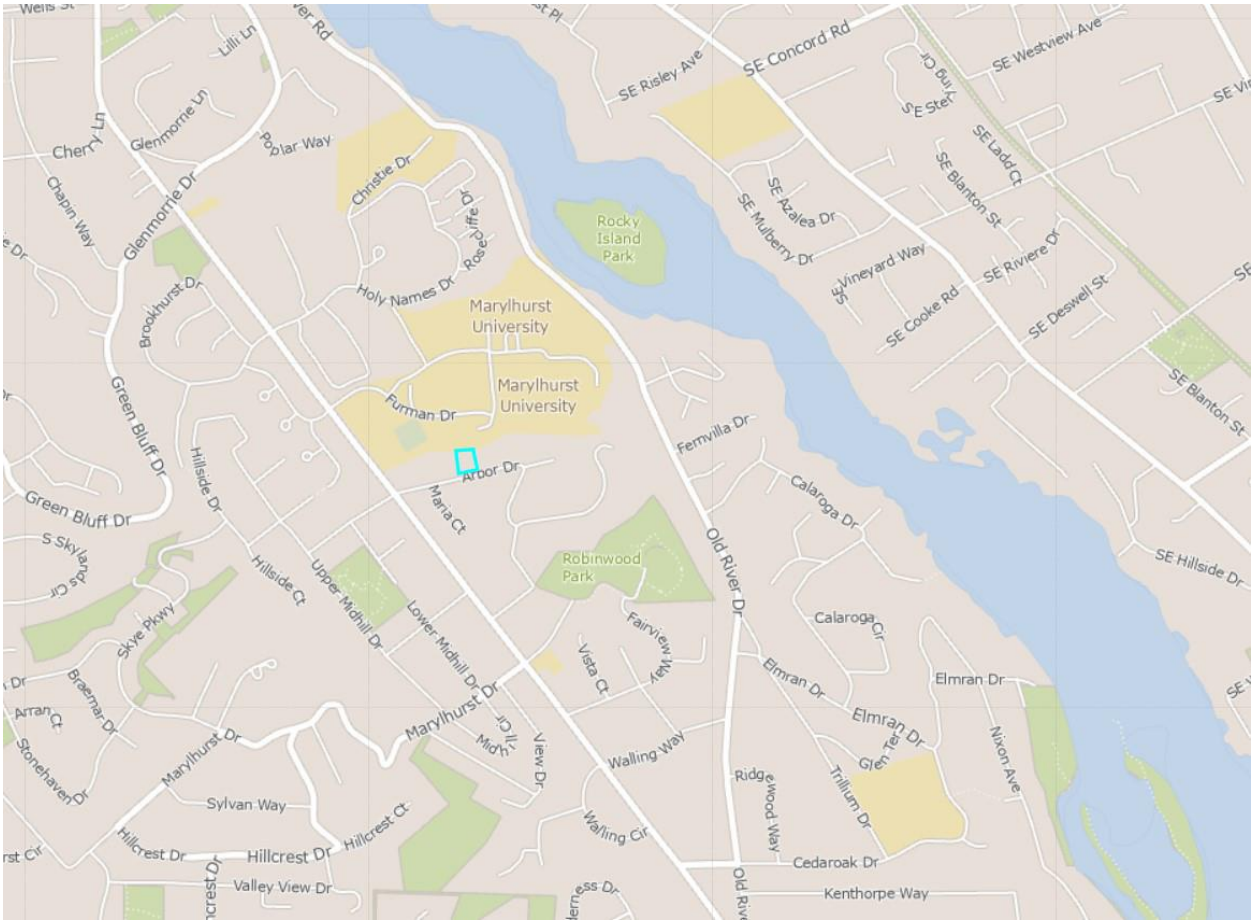
Owner's signature ***(required)*** — April 25, 2025 — Date

Middle Housing Expedited Land Division Narrative

Tax Lot 21E14DB00105, 2785 Arbor Dr, West Linn, OR 97068

Prepared by Owner – Chi Kin Mung

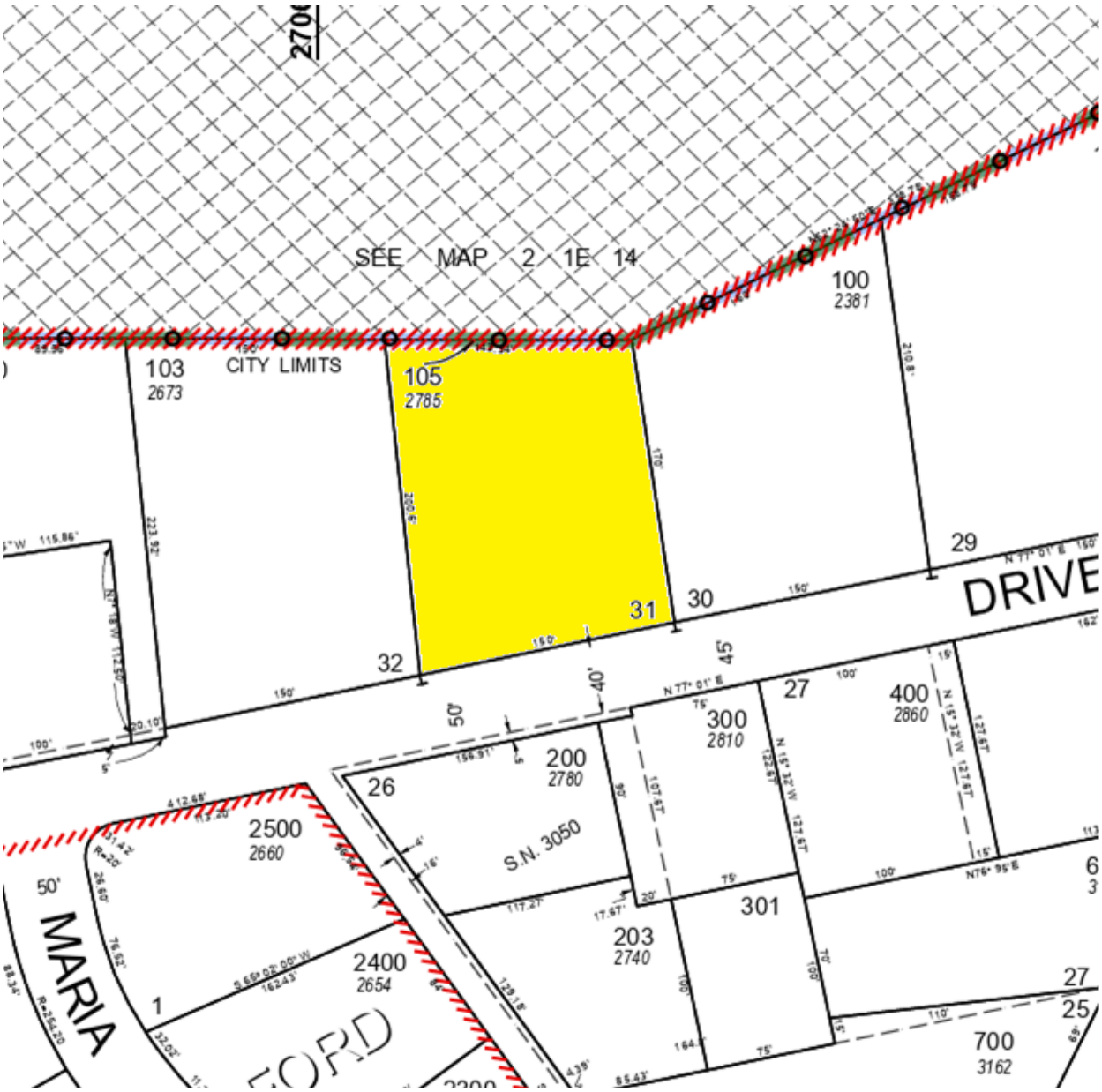
Proposal: This application requests approval of a Middle Housing Expedited Land Division (ELD) for an existing lot described as Tax Lot 21E14DB00105. The property is located at 2785 Arbor Dr, West Linn, OR 97068



Vicinity Map

The property is developed with an existing single-family home that County records indicate was built in 1978. This house is proposed to be retained. A new parcel would be created to the east of the existing home and a new home will be constructed there. Together, the two homes will be middle housing detached duplexes. The subject property is zoned R-10 which allows duplex residential units as an outright permitted use per CDC 11.030.1.a. The proposed site plan is depicted on the map below.

Site Plan



Crop from Assessor's Map
21E14DB

Existing Conditions

The subject property is shown outlined in red on the aerial photograph below. There are mostly coniferous trees in the site but the site development does not require any of the trees to be removed. There is a stream (Arbor Creek) and riparian corridor mapped by the West Linn Planning Department in the "Significant Riparian Corridors West Linn Goal 5 Inventory, January 2007" in a Water Resource Area but the new home on proposed parcel 2 will not be built in the Water Resource Area.

Aerial Photograph of Conditions before construction started

Public Facilities

City of West Linn sanitary sewer and water lines are located in Arbor Dr to serve the proposed project. A stormwater management report prepared by Emerio Design, LLC is included in our application package.

Compliance with Approval Criteria:

Consistent with the provisions of ORS 92.031, this proposed middle housing land division application will make use of the Expedited Land Division procedures set forth in ORS 197.360. The approval criteria relevant to this application are found in ORS 92.031.
(1) As used in this section, "middle housing land division" means a partition or subdivision of a lot or parcel on which the development of middle housing is allowed under ORS 197A.420 (2) or (3).

Comment: This application involves detached duplex units, one of which will be located on each parcel. Duplex units are middle housing pursuant to the definitions in ORS 197A.420(1). The subject lots are zoned R-10 and this zone allows for the development of middle housing under standards adopted by the City of West Linn.

ORS 197.360(1)(a)(C)(i) requires that ELD proposals *"Does not provide for dwellings or accessory buildings to be located on land that is specifically mapped and designated in the comprehensive plan and land use regulations for full or partial protection of natural features under the statewide planning goals that protect:*
(i)Open spaces, scenic and historic areas and natural resources
(ii)The Willamette River Greenway;
(iii)Estuarine resources;
(iv)Coastal shorelands; and
(v)Beaches and dunes."

Comment: The subject property does not contain any resource lands described under subsections (i) through (v).

(2) A city or county shall approve a tentative plan for a middle housing land division if the application includes:

(a) A proposal for development of middle housing in compliance with the Oregon residential specialty code and land use regulations applicable to the original lot or parcel allowed under ORS 197A.420(5);

Comment: The proposed parcels will be developed with detached duplex units, as shown on the attached "Site Plan". Application for building permits will be submitted separately and they will demonstrate compliance with the Oregon residential specialty code.

ORS 197A.420(5) states:
"Local governments may regulate siting and design of middle housing required to be permitted under this section, provided that the regulations do not, individually or cumulatively, discourage the development of all middle housing types permitted in the area through unreasonable costs or delay. Local governments may regulate middle housing to comply with protective measures adopted pursuant to statewide land use planning goals."

Comment: The West Linn City Council adopted Ordinance 1736 to amend the West Linn Community Development Code to promote the development of Middle Housing options in compliance with Oregon House Bill 2001. The City of West Linn adopted Ordinance 1736 to provide for compliance with state requirements for middle housing. The adopted standards allow for middle housing in all residential districts, including the R-10 district applicable to the subject property. The only limitations provided in the updated standards are dimensional requirements that do not discourage development of middle housing. The applicable dimensional standards for the R-10 zone are found in CDC 11.070 and are shown in the table below:

STANDARD	REQUIREMENT	ADDITIONAL NOTES	COMMENT
Minimum lot size	*10,000 sf*	*For a single-family attached or detached unit*	Not applicable to detached duplexes, but both parcels exceed 10,000 sq. ft.
Average minimum lot or parcel size for a townhouse project	*1,500 sf*		Not applicable to detached duplexes.
Minimum lot width at front lot line	*35 ft*	*Does not apply to townhouses or cottage clusters*	The lot widths at the front lot line are: Proposed Parcel 1 is 79.25 feet, Proposed Parcel 2 is 70.7 feet.
Average minimum lot width	*50 ft*	*Does not apply to townhouses or cottage clusters*	Proposed Parcel 1 is 57.6 feet. Proposed Parcel 2 is 83.3 feet.
Minimum yard dimensions or minimum building setbacks		*Except as specified in CDC 25.070(C)(1) through (4) for the*	Not applicable to the proposed project as it does not include a Cottage Cluster.

		Willamette Historic District. *Front, rear, and side yard setbacks in a cottage cluster project are 10 ft. There are no additional setbacks for individual structures on individual lots, but minimum distance between structures shall follow applicable building code requirements.*	
Front yard	*20 ft*	*Except for steeply sloped lots where the provisions of CDC 41.010 shall apply*	The proposed minimum front yard setback is 20 feet.
Interior side yard	*7.5 ft*	*Townhouse common walls that are attached may have a 0-ft side setback.*	This standard is not applicable to duplex units along their common line. A minimum of 10.8 feet. setback is proposed on the common lot line.
Street side yard	*15 ft*		Not applicable. No street side yards exist in this proposal.
Rear yard	*20 ft*		The minimum rear yards proposed exceed 20 feet.
Maximum building height	*35 ft*	*Except for steeply sloped lots in which case the provisions of*	Proposed building on Parcel 2's height from front finish grade: 28'4",

		Chapter 41 CDC shall apply.	average on sloped side: 32'.
Maximum lot coverage	*35%*	*Maximum lot coverage does not apply to cottage clusters. However, the maximum building footprint for a cottage cluster is less than 900 sf per dwelling unit.* • *This does not include detached garages, carports, or accessory structures.* • *A developer may deduct up to 200 sf for an attached garage or carport.*	Proposed lot area of Parcel 1: 11,087 sq. ft., lot coverage 22.0% (2,435 sq. ft.) Proposed lot area of Parcel 2: 14,780 sq. ft., lot coverage: 12.8% (1,890 sq. ft.)
Minimum accessway width to a lot which does not abut a street or a flag lot	*15 ft*		Not applicable. Both parcels have direct frontage onto public streets.
Maximum floor area ratio	*0.45*	*Maximum FAR does not apply to cottage clusters.*	Not applicable. The proposed project is for detached duplexes.
Duplex, triplex, and quadplex	*0.6*	*Type I and II lands shall not be counted toward lot area when determining allowable floor area ratio, except that a minimum floor area ratio of 0.30 shall be allowed regardless of the classification of lands within the property. That 30 percent shall be*	The home on proposed Parcel 1 has a floor area of 2,564 sq ft. The proposed lot area is 11,087 sq. ft., which yields a FAR of 0.23. The home to be built on proposed Parcel 2 has a floor area of 4,138 sq. ft. The proposed lot area

		based upon the entire property, including Type I and II lands. Existing residences in excess of this standard may be replaced to their prior dimensions when damaged without the requirement that the homeowner obtain a non-conforming structures permit under Chapter 66 CDC.	will be 14,780 sq. ft., which yields a FAR of 0.29.

(b) Separate utilities for each dwelling unit;
Comment: Each unit of the detached duplex will have separate utilities.

(c) Proposed easements necessary for each dwelling unit on the plan for:
(A) Locating, accessing, replacing and servicing all utilities;
Comment: Each unit is on a separate lot and all utilities serving the homes are either on the proposed lots or the street right-of-way fronting the lots. No Public Utility Easements other than the standard PUE along the street right-of-way are proposed.

(B) Pedestrian access from each dwelling unit to a private or public road;
Comment: Both lots front directly onto abutting street.

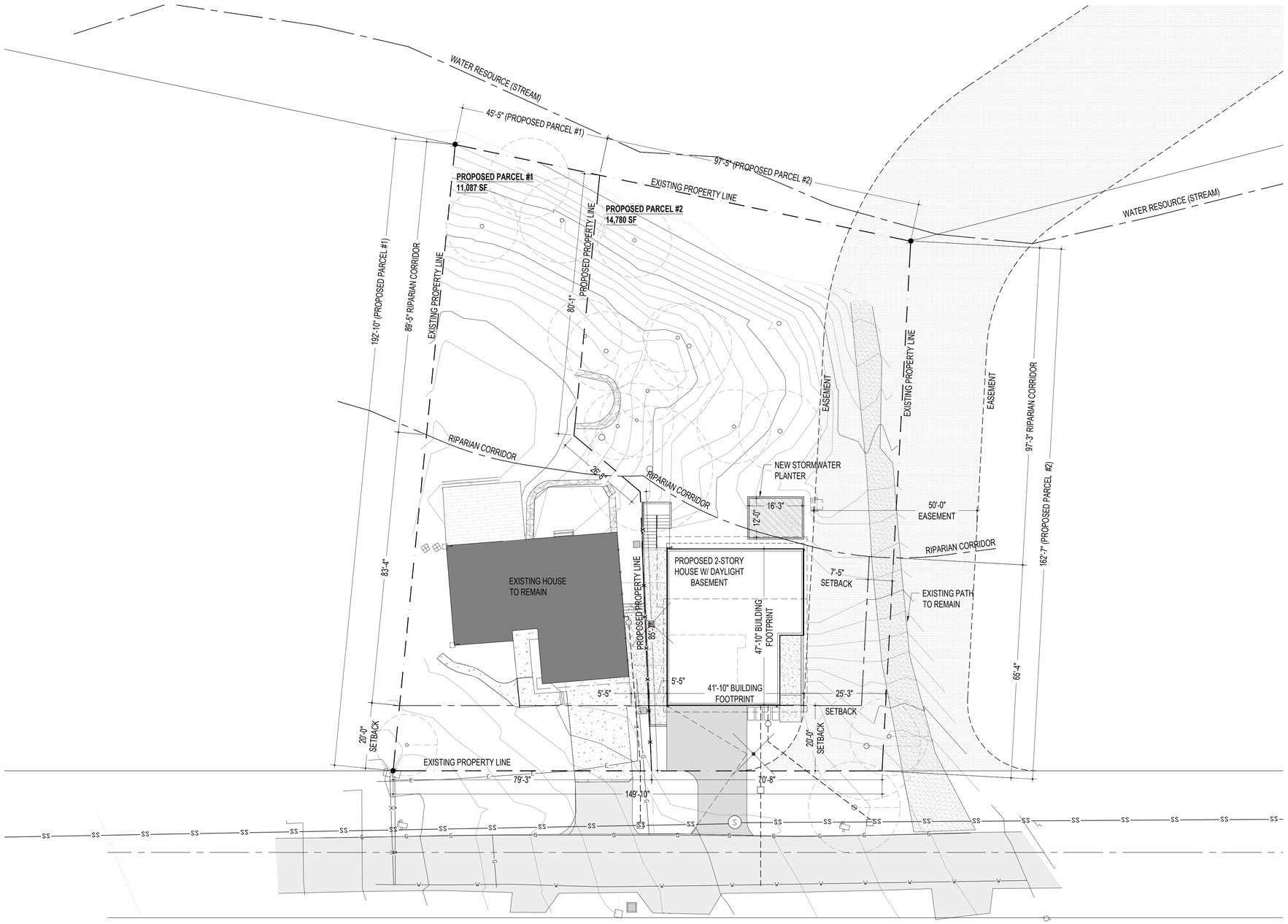
(C) Any common use areas or shared building elements;
Comment: Not applicable. There will be no common use areas or shared building elements.

(D) Any dedicated driveways or parking; and
Comment: Each parcel will have a driveway providing for parking for a minimum of two vehicles plus an attached garage providing parking for an additional two vehicles.

(E) Any dedicated common area;
Comment: No dedicated common areas are proposed.

(d) Exactly one dwelling unit on each resulting lot or parcel, except for lots, parcels or tracts used as common areas; and
Comment: Each lot will be developed with exactly one dwelling unit.

(e)Evidence demonstrating how buildings or structures on a resulting lot or parcel will comply with applicable building codes provisions relating to new property lines and, notwithstanding the creation of new lots or parcels, how structures or buildings located on the newly created lots or parcels will comply with the Oregon residential specialty code.
Comment: The plans and other materials required to demonstrate compliance with this requirement will be provided with the building permit applications.



1 PROPOSED PLOT PLAN

SCALE: 1/16"=1'-0"

N

PROPERTY ID NUMBER:	84612
SITE ADDRESS :	2785 ARBOR DR, WEST LINN OR
LEGAL DESCRIPTION:	LOT 31, ROBINWOOD PLAT
JURISDICTION :	WEST LINN
MAP NUMBER:	21E14DB
TAX LOT NUMBER:	21E14DB00105
PARCEL NUMBER:	00304539

ORIGINAL LOT SIZE(ESTIMATED):	.6 ACRES (26,000 SF)
PROPOSED WEST LOT SIZE:	**11,087 SF**
PROPOSED EAST LOT SIZE:	**14,780 SF**
EAST LOT COVERAGE:	**12.8%** (1,890 SF)
BUILDING SIZE (GSF):	
BASEMENT:	1084 SF (DAYLIT, PARTIALLY FINISHED)
FIRST FL:	1821 SF (INCL. GARAGE)
SECOND FL:	1,233 SF
TOTAL:	4138 SF
BUILDING HEIGHT FROM:	
FRONT FINISH GRADE:	28'-4"
AVERAGE ON SLOPED SIDE:	32'-0"
FLOOR AREA RATIO:	
4,275 SF (NEW LOT SIZE) / 14, 780 SF (GSF) = 0.29	
COVERED ENTRY:	139 SF
DRIVEWAY (ASPHALT):	797 SF
UNCOVERED PAVEMENT:	344 SF

ARCHITECT

sora design

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KATSUYA ARAI
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P: 917-790-9268

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2785 ARBOR DR
WEST LINN, OR
97086

SEAL

REGISTERED ARCHITECT
AKIKO ARAI
PORTLAND, OR
12809
STATE OF OREGON

ISSUED DATE

NO	DATE	DESCR
1	2025.04.18	LAND DIVISION SUBMISSION

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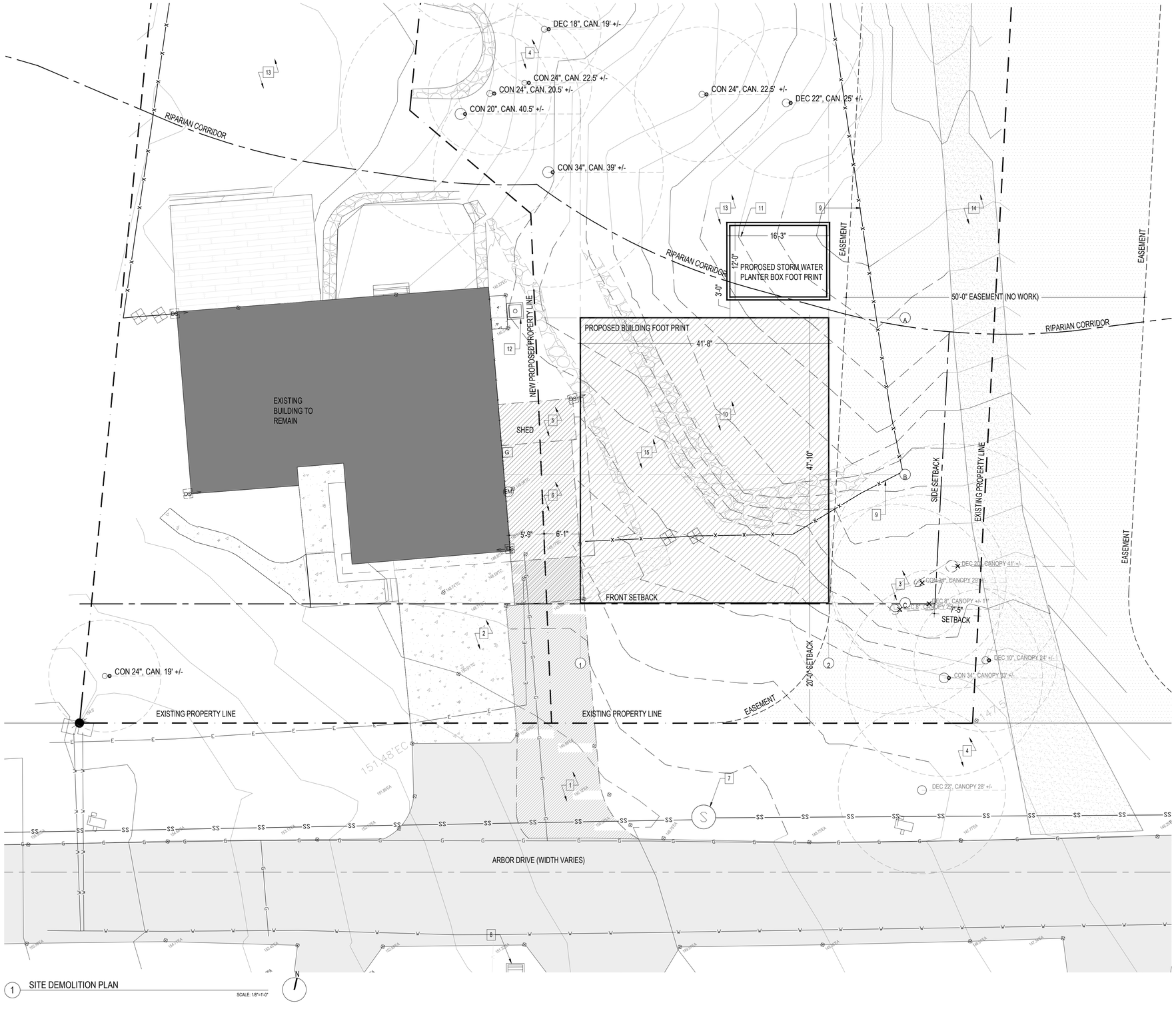
NO	DATE	DESCR

DWG. NAME

PROPOSED PLOT PLAN

DWG NO.

A-100.00



1 SITE DEMOLITION PLAN

SCALE: 1/8"=1'-0"

KEY NOTES - DEMO SITE PLAN

1. EXISTING ASPHALT DRIVEWAY TO BE REMOVED
2. EXISTING CONCRETE TO REMAIN
3. EXISTING TREES TO BE REMOVED
4. EXISTING TREES TO REMAIN
5. EXISTING SHED TO BE REMOVED. EXISTING DOWNSPOUT TO BE REDIRECTED TO REAR. HOUSE TO BE PATCHED AND REPAIRED AS REQUIRED
6. EXISTING PAVERS TO BE REMOVED
7. EXISTING SANITARY SEWER MANHOLE, RIM = 149.38', IE 8" CIPP IN (W) = 144.50', IE 8" CIPP OUT (E) = 144.43'
8. EXISTING CATCH BASIN, RIM = 151.47', IE 8" CONC IN (W) = 150.16', IE 8" CONC OUT (E) = 149.26'
9. EXISTING FENCE TO BE REMOVED WITHIN PROPOSED PARCEL #2
10. PROPOSED BUILDING FOOTPRINT. EXISTING LANDSCAPE / ROCK TO BE REMOVED AND PREPARED FOR CONSTRUCTION
11. EXISTING IE 2" ABS 127.43' TO BE RELOCATED.
12. EXISTING AC UNIT TO BE RELOCATED
13. EXISTING RIPARIAN CORRIDOR. SEE CHAPTER 32, WATER RESOURCE PROTECTION
14. EXISTING PATH TO BE KEPT CLEAR DURING DEMOLITION / CONSTRUCTION
15. EXISTING BOULDERS TO BE RELOCATED ON SITE. TBC W/ OWNER DURING EXCAVATION

GENERAL NOTES

1. SETBACKS:
   - FRONT SETBACK: 20'-0"
   - REAR SETBACK: 20'-0" N/A, RIPARIAN CORRIDOR
   - INTERIOR SIDE SETBACK: N/A PER ORS 92.031
   - STREET SETBACK: N/A
2. MIDDLE HOUSING LAND DIVISION ORS 92.031
3. RIPARIAN CORRIDOR: SEE CHAPTER 32, WATER RESOURCE PROTECTION

KEY

- DEMO TOPOGRAPHY
- FENCE
- GAS
- SANITARY SEWER
- STORM DRAIN
- UNDERGROUND COMMUNICATION
- UNDERGROUND ELECTRIC
- VEGETATION
- WATER
- CONCRETE
- GRAVEL
- PAVEMENT
- STRIPING
- AC UNIT
- CATCH BASIN
- DOWNSPOUT
- NG NATURAL GROUND
- SANITARY SEWER MANHOLE
- SPOT ELEVATION
  - EC : EDGE OF CONCRETE
  - EA: EDGE OF ASPHALT
  - TC: TOP OF CONCRETE
- MAIL BOX
- GATE POST
- W WATER METER
- EM ELECTRIC METER
- G GAS METER

TO REMAIN / TO BE REMOVED

CON : CONIFEROUS
DEC: DECIDUOUS
TRUNK DIAMETER

DEC 8", CAN. 22' +/-

CANOPY DIAMETER

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SITE DEMOLITION PLAN

DWG NO.

A-101.00

1 PROPOSED SITE PLAN

SCALE: 1/8"=1'-0"

KEY NOTES - SITE PLAN

1. ASPHALT DRIVEWAY: 3 IN. OF ASPHALTIC CONCRETE, CONSISTING OF ONE 3 IN. LIFT OF LEVEL 2, 1/2 INCH ACP WITH 6 INCHES OF AGGREGATE BASE ON COMPACTED SUBGRADE. SEE DRIVEWAY DIAGRAM BELOW FOR SLOPE AND DETAIL SECTION
2. EXISTING DRIVEWAY ASPHALT TO REMAIN
3. EXISTING CONCRETE TO REMAIN
4. MAN HOLE TO BE RESET IN NEW ASPHALT DRIVEWAY
5. PAVERS W/ GRAVEL
6. CAST IN PLACE CONCRETE W/ 1/4":1'-0" SLOPE
7. CAST IN PLACE CONCRETE STEP W/ 1/4":1'-0" SLOPE
8. DRAIN TO CONNECT TO STORMWATER SYSTEM. SEE KEY NOTE 20
9. EXISTING PATH TO REMAIN
10. NEW EXTERIOR GRADE WOOD STAIRS
11. NEW FENCE OVER 6" RETAINING WALL ON NEW PROPOSED PROPERTY LINE
12. NEW DOWNSPOUTS TO CONNECT TO STORM WATER SYSTEM. SEE STORM WATER DRAWINGS
13. NEW CONCRETE STEPS
14. NEW SEWER LINE TO EXISTING HOUSE: 4" DIAM ETER PVC AT EXTERIOR. EXISTING WASTE LINE TO BE REUSED INSIDE.
15. AREA DRAIN, SET 15' FROM HOUSE TO CENTER. SEE STORMWATER DESIGN. TO BE INSTALLED AFTER REMOVAL OF CONCRETE WASHOUT IF REQUIRED
16. CONCRETE WASHOUT, SET 15' FROM HOUSE TO CENTER. SEE STORMWATER DRAWINGS
17. 6" RETAINING WALL
18. STOCKPILES. SEE STORMWATER DESIGN
19. OUTLET PROTECTION RIPRAP. SEE STORMWATER DRAWINGS
20. STORMWATER DRAIN. 4" ABS. SEE STORMWATER DRAWINGS
21. NEW STORM DRAIN. UNDERGROUND PIPES TO EXIT AT REAR YARD OF EXISTING HOUSE
22. SEWER LINE: 4" DIAM ETER PVC AT EXTERIOR, 4" DIAMETER ABS INSIDE HOUSE. RE PURPOSE AND EXTEND EXISTING SEWER LINE FOR NEW HOUSE. NEW SEWER EXTENSION ENTERING HOUSE.

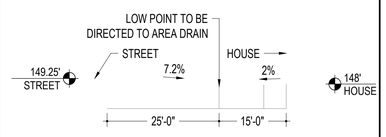
GENERAL NOTES

1. SETBACKS:
   - FRONT SETBACK: 20'-0"
   - REAR SETBACK: 20'-0" N/A, RIPARIAN CORRIDOR
   - INTERIOR SIDE SETBACK: N/A PER ORS 92.031 BETWEEN EXISTING AND NEW PROPOSED HOUSE 7'-6" AT NORTH SIDE
   - STREET SETBACK: N/A
2. MIDDLE HOUSING LAND DIVISION ORS 92.031
3. RIPARIAN CORRIDOR: SEE CHAPTER 32, WATER RESOURCE PROTECTION
4. SEE FOUNDATION PLAN FOR FINISH GRADE ELEVATION MARKERS
5. SEE STORMWATER DRAWINGS FOR PLANTER BOX DESIGN

KEY

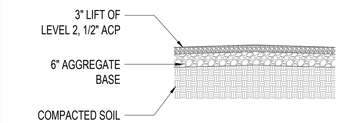
- WM — WATER METER: **1" DIAM PEX PIPE** FOR SERVICE TO WATER METER. 1 1/4" PEX PIPE TO CONNECT FROM WATER METER TO HOME
- S — NEW SEWER TAP. SEE KEYNOTE 14 FOR SIZING AND MATERIAL. EXISTING WHERE NOTED
- CO — CLEANOUT. CLEANOUT TO CLEAR PAVERS
- SD — STORM DRAIN LINE. 4" ABS

A DRIVEWAY SLOPE DIAGRAM



B DRIVEWAY CROSS SECTION

NOTE: 3.5% CROSS SLOPE TO LOWEST POINT



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PROPOSED SITE PLAN

DWG NO.

A-102.00

Stormwater Management Report
Mung Residence
Single-Family Home at
2785 Arbor Drive
West Linn, Oregon

Emerio Project Number:	2349-001
City of West Linn Permit Numbers:	TBD
Date:	09/18/2024

Prepared For:
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Table of Contents:

Project Overview and Description:

Size and location of project site (vicinity map): The current site is located on the north side of Arbor Drive, approximately 370 feet east of the intersection with Maria Court. One lot will be divided into 2 lots. The existing house will remain, and a new house and driveway will be constructed on the east portion of the lot. Reference the vicinity map provided in Appendix A(1).

Property Zoning: The property is zoned R7 (Residential 7,000 SF lots).

Type of Development/Proposed Improvements: The proposed development will consist of a new house, attached garage, walkways, and a new driveway.

Existing vs. post-construction conditions: The current (existing) site condition consists of an under-developed forested lot with one house, attached garage, and associated driveway.

Watershed Description: The site drainage area presently sheet flows northeast toward adjacent lots and into Arbor Creek. In the post-developed condition, the site impervious flows will be treated onsite and discharge into the existing depression/drainage path location. Drainage basin areas are shown in Appendix D(1).

Soil Classification:

The NRCS soil survey of Clackamas County, Oregon classifies the onsite soils as Cascade-urban land complex soil. The associated hydrologic group of this soil is C/D, see Appendix B(1). A curve number of 80 is used for pre-developed pervious surfaces and 98 and 89 are used for impervious and pervious surfaces.

Methodology:

To satisfy stormwater requirements, a flow-through planter box per city of Portland BES detail SW-231 (Appendix D(2)) is proposed to provide water quality treatment and detention effects before discharging onsite. The layer of growing medium (soil) within the planter box will act as an orifice, limiting the flow of water as it infiltrates through this amended soil layer at a rate of 2.0 in/hr before collecting in a 4" underdrain within a 12" rock layer. HydroCAD V.10 was used to model the design storms and size the facility area.

<u>Planter Box:</u>

Total Impervious Area:	3,183 SF
Planter Box Min. Surface Area Required:	195 SF
Bottom Width Min.:	2 Feet
Freeboard:	2 Inch Minimum
Storage Depth:	12 Inch
Topsoil Media Depth:	12-24 Inch
Drain Rock Layer Thickness:	12 Inch
Amended Soil Infiltration Rate:	2.0 Inches/Hour
Drain Rock Void Ratio:	30%

Output Data:

24-Hour Design Storm	Pre-Developed Flow Rate (CFS)	Post-Developed Site Discharge Rate (CFS)
2-Year	0.013	0.009
5-Year	0.019	0.009
10-Year	0.025	0.014
25-Year	0.033	0.030

The pre-developed to post-developed peak runoff rates for the 2-year, 5-year, 10-year, and 25-year 24-hr design storms will be met to the maximum extent practicable. As shown above, the planter is sized to meet detention requirements for the required design storm events. See Appendix C(1) for plots of the HydroCAD model.

Water Quality:

The water quality design storm has a lower rainfall depth than the 2-year design storm. As shown in the HydroCAD output, the peak water surface elevation during the 2-year design storm for the planters is below the overflow/bypass orifice; therefore, the volume of runoff during the water quality design storm will also be below the overflow orifice and the whole volume of water quality stormwater runoff will route through the soil to be treated.

Stormwater Conveyance:

Onsite conveyance will be by means of 4" stormwater pipe routing to the stormwater planter, and then discharging from the planter in 4" pipe to the outfall location just upstream of an existing culvert. All proposed onsite pipes were shown to have sufficient capacity for conveyance.

Analysis:

The following design assumptions were utilized in this design.

Design Storm: Water quality storm = **0.83" in 24 hours**
2-year 24-hour storm **= 2.5" in 24 hours**
5-year 24-hour storm **= 3.0" in 24 hours**
10-year 24-hour storm **= 3.4" in 24 hours**
25-year 24-hour storm **= 3.9" in 24 hours**

Computation methods and software utilized in the design were from HydroCAD V-10.

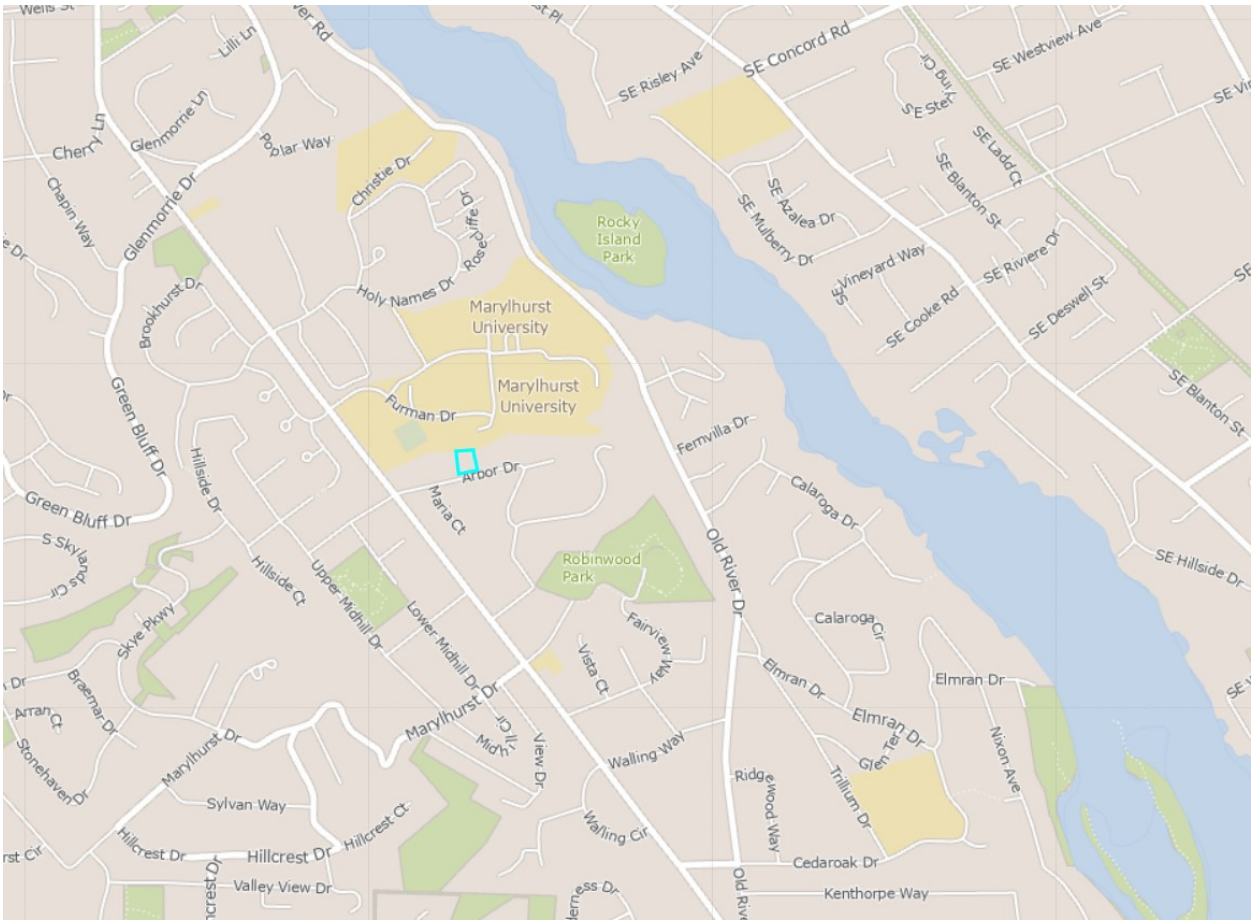
Curve numbers utilized in the design were 98 for impervious areas, 89 for pervious areas, and 80 for predeveloped pervious areas.

Engineering Conclusions:

The design of the proposed stormwater management facilities satisfies the pollution reduction, conveyance and detention standards required by the 2010 City of West Linn Public Works Design Standards.

Appendix A:

Appendix A(1)
Vicinity Map



Appendix B:

Tables — Hydrologic Soil Group — Summary By Map Unit

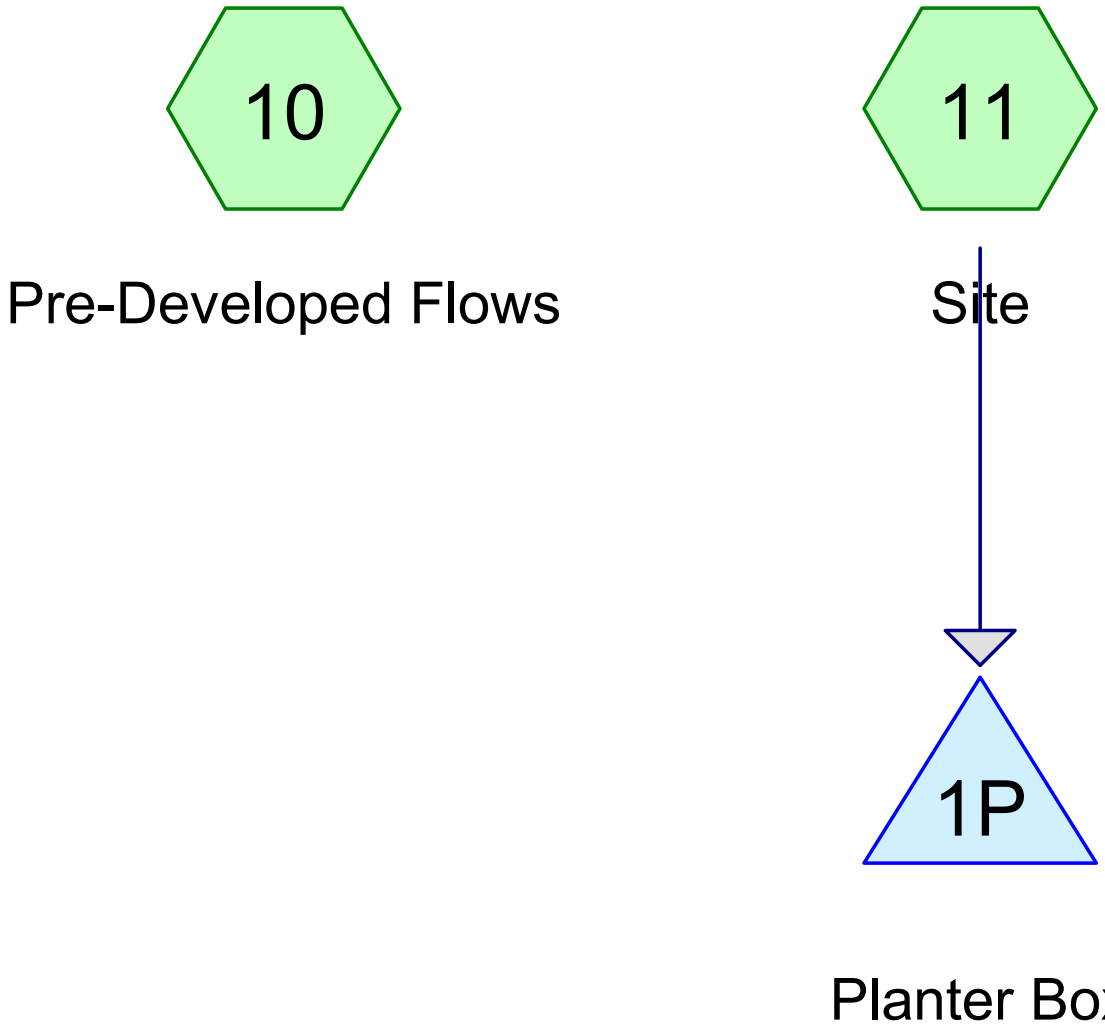
Summary by Map Unit — Clackamas County Area, Oregon (OR610)

Summary by Map Unit — Clackamas County Area, Oregon (OR610)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1B	Aloha silt loam, 3 to 6 percent slopes	C/D	0.6	100.0%
Totals for Area of Interest			**0.6**	**100.0%**

SITE

Appendix C:



Subcat Reach Pond Link

Routing Diagram for 2349-001 2785 Arbor Dr HydroCAD
Prepared by {enter your company name here}, Printed 9/17/2024

Summary for Subcatchment 10: Pre-Developed Flows

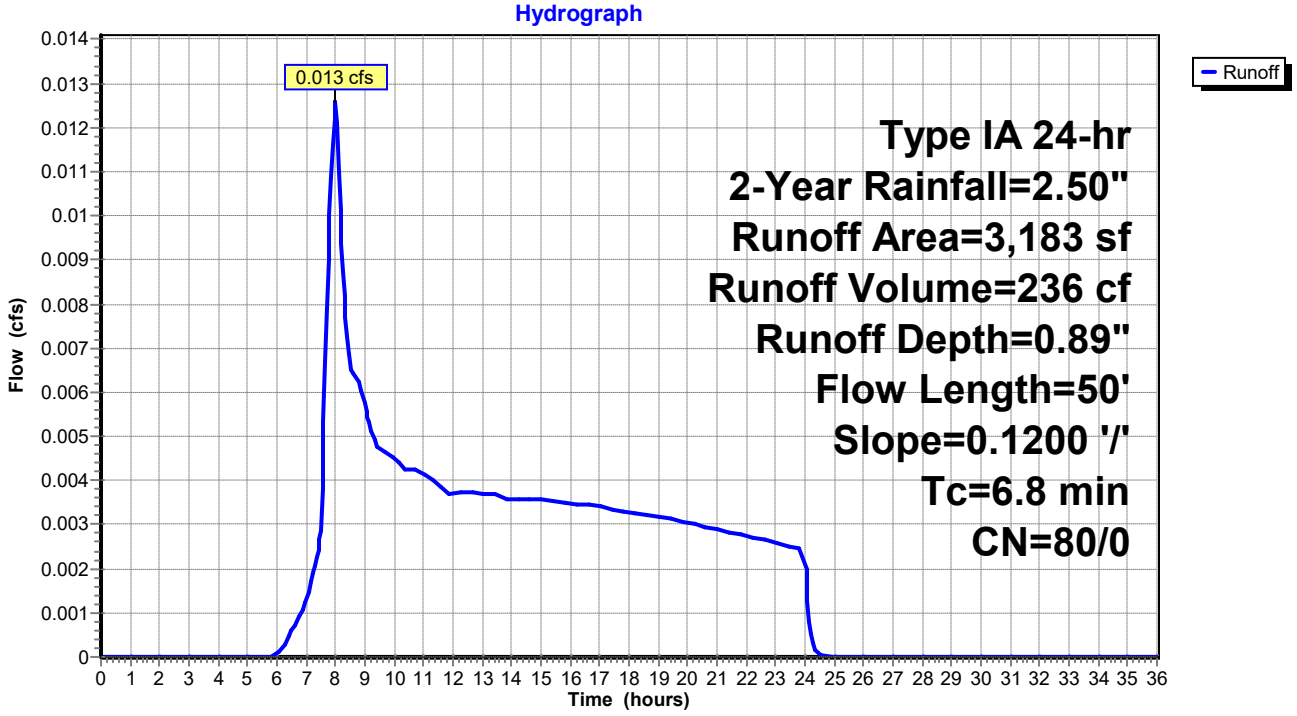
Runoff = 0.013 cfs @ 8.00 hrs, Volume= 236 cf, Depth= 0.89"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	3,183	80	roofs
	3,183	80	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.1200	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"

Subcatchment 10: Pre-Developed Flows



Summary for Subcatchment 11: Site

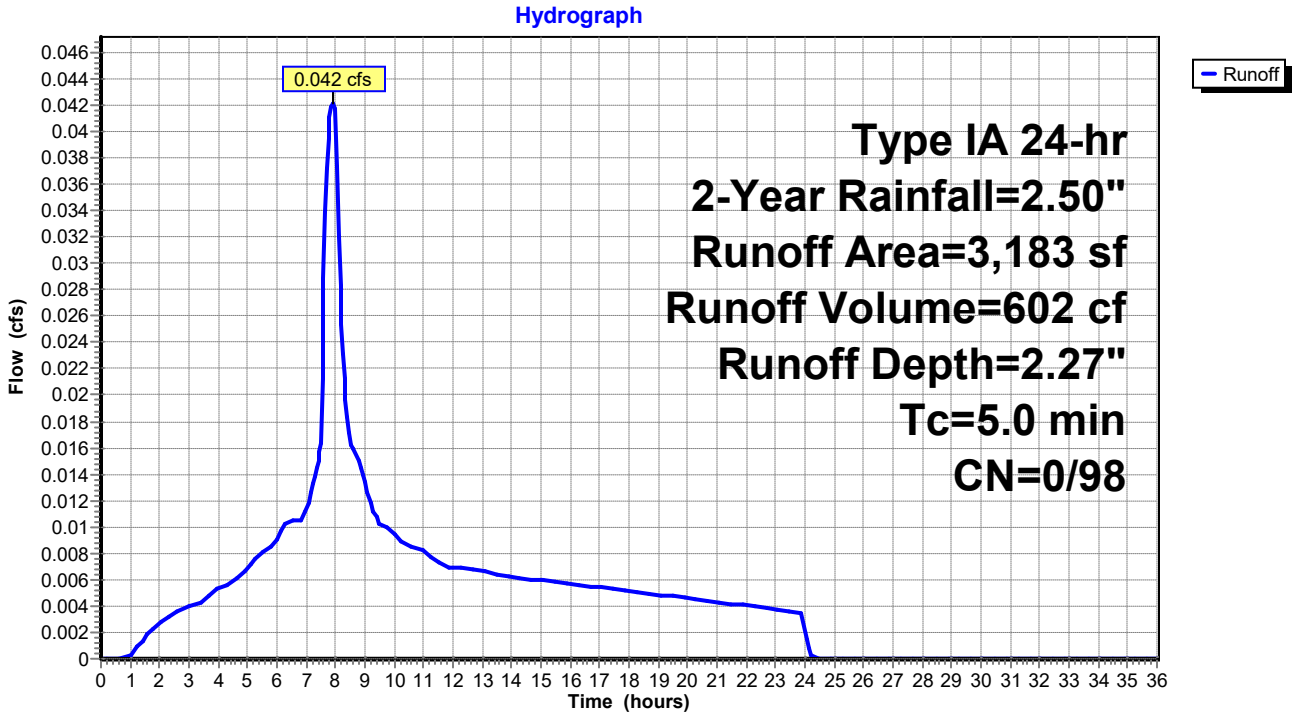
Runoff = 0.042 cfs @ 7.90 hrs, Volume= 602 cf, Depth= 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-Year Rainfall=2.50"

	Area (sf)	CN	Description
*	2,408	98	roof
*	442	98	driveway
*	333	98	walkway
	3,183	98	Weighted Average
	3,183	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11: Site



Summary for Pond 1P: Planter Box

Inflow Area = 3,183 sf,100.00% Impervious, Inflow Depth = 2.27" for 2-Year event
Inflow = 0.042 cfs @ 7.90 hrs, Volume= 602 cf
Outflow = 0.009 cfs @ 6.10 hrs, Volume= 602 cf, Atten= 79%, Lag= 0.0 min
Primary = 0.009 cfs @ 6.10 hrs, Volume= 602 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 138.56' @ 10.17 hrs Surf.Area= 195 sf Storage= 109 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 91.5 min (765.3 - 673.8)

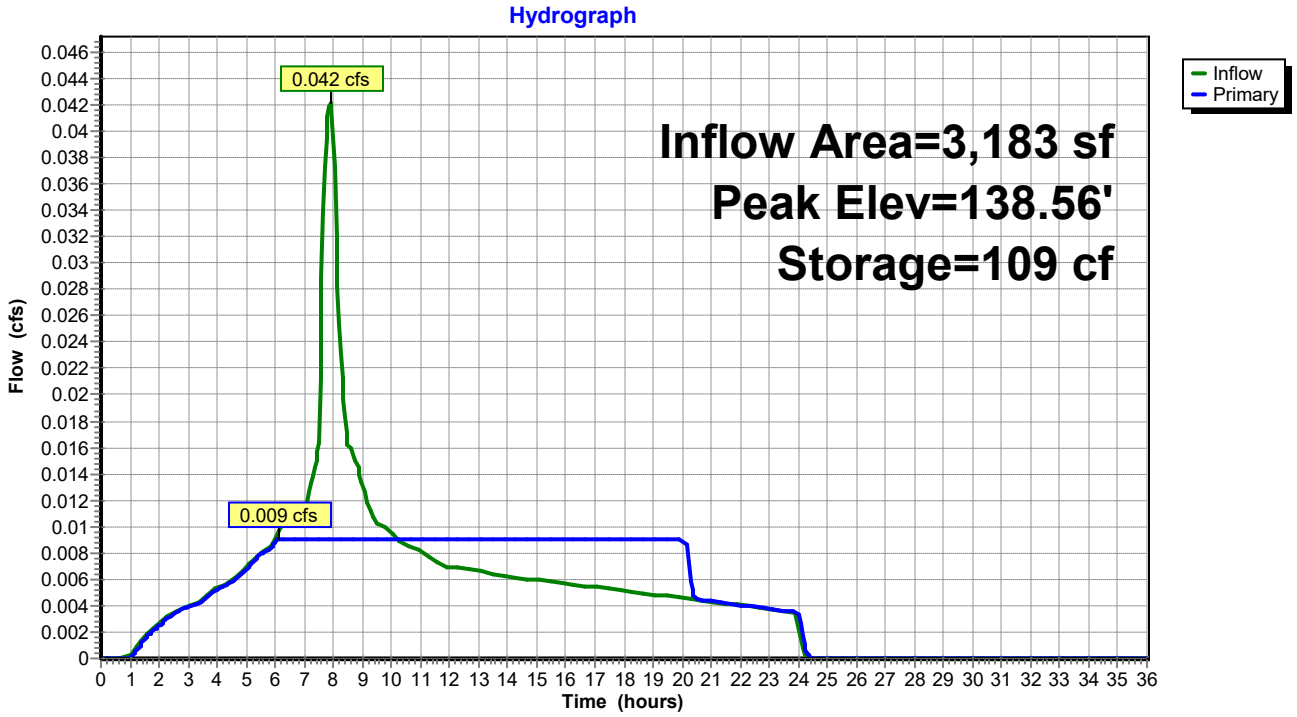
Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	214 cf	**planters (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.00	195	0	0
139.10	195	214	214

Device	Routing	Invert	Outlet Devices
#1	Primary	136.33'	**4.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.33' / 134.40' S= 0.1930 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 1	138.00'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	139.00'	**6.0" Horiz. Orifice/Grate** C= 0.620 Limited to weir flow at low heads

Primary OutFlow Max=0.009 cfs @ 6.10 hrs HW=138.01' (Free Discharge)
└─**1=Culvert** (Passes 0.009 cfs of 0.517 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.009 cfs)
  └─**3=Orifice/Grate** (Controls 0.000 cfs)

Pond 1P: Planter Box



Summary for Subcatchment 10: Pre-Developed Flows

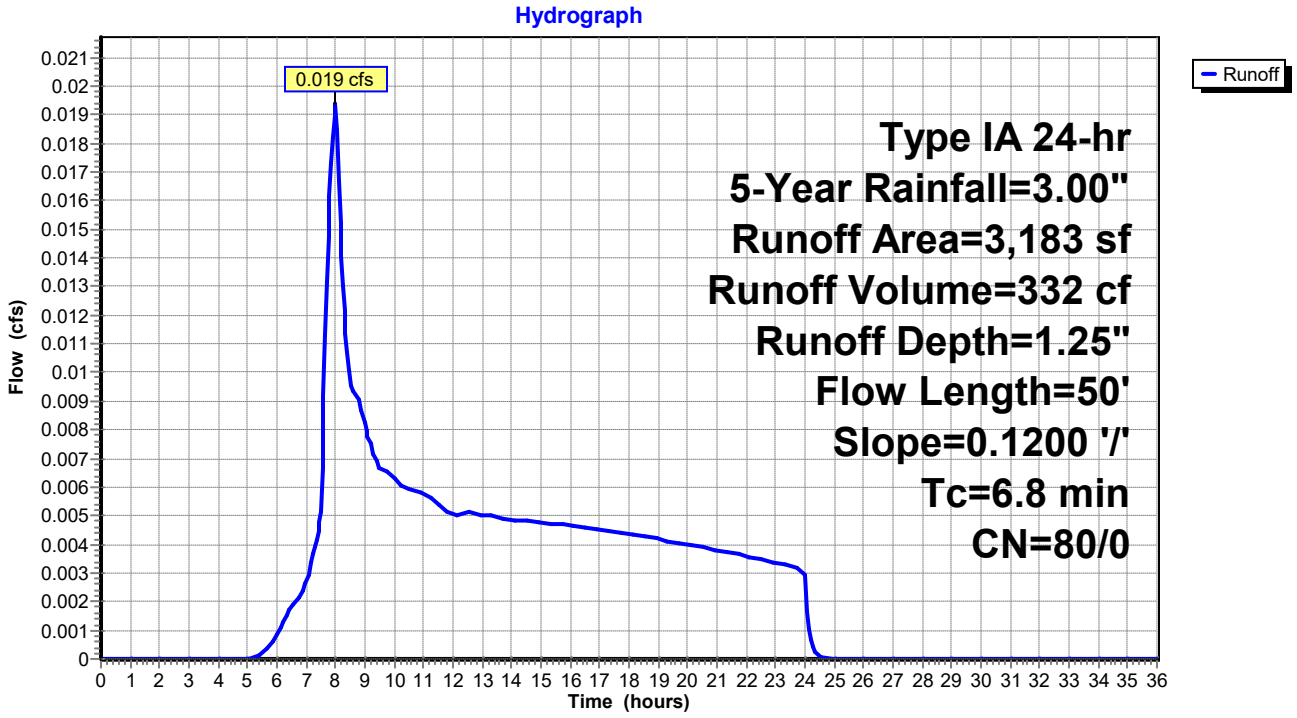
Runoff = 0.019 cfs @ 7.99 hrs, Volume= 332 cf, Depth= 1.25"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	3,183	80	roofs
	3,183	80	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.1200	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"

Subcatchment 10: Pre-Developed Flows



Summary for Subcatchment 11: Site

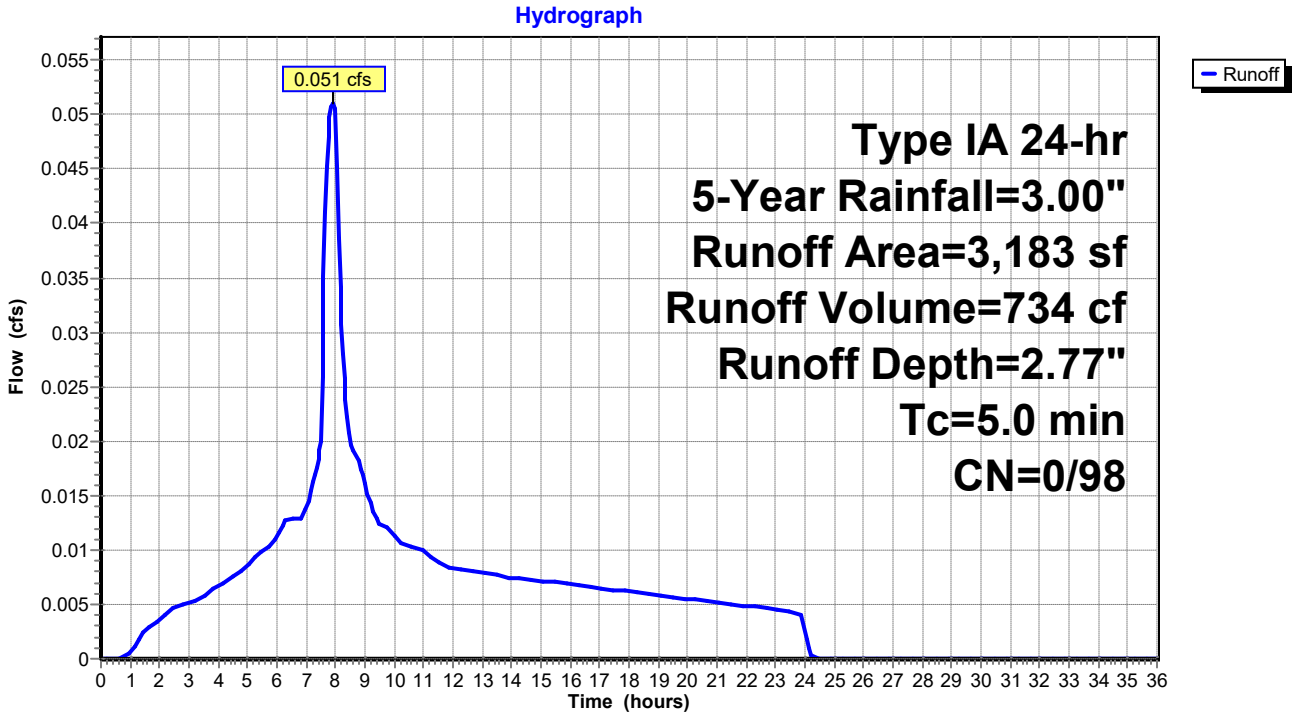
Runoff = 0.051 cfs @ 7.90 hrs, Volume= 734 cf, Depth= 2.77"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-Year Rainfall=3.00"

	Area (sf)	CN	Description
*	2,408	98	roof
*	442	98	driveway
*	333	98	walkway
	3,183	98	Weighted Average
	3,183	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11: Site



Summary for Pond 1P: Planter Box

Inflow Area = 3,183 sf,100.00% Impervious, Inflow Depth = 2.77" for 5-Year event
Inflow = 0.051 cfs @ 7.90 hrs, Volume= 734 cf
Outflow = 0.009 cfs @ 5.25 hrs, Volume= 734 cf, Atten= 82%, Lag= 0.0 min
Primary = 0.009 cfs @ 5.25 hrs, Volume= 734 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 138.86' @ 11.45 hrs Surf.Area= 195 sf Storage= 168 cf

Plug-Flow detention time= 175.8 min calculated for 733 cf (100% of inflow)
Center-of-Mass det. time= 175.7 min (844.0 - 668.2)

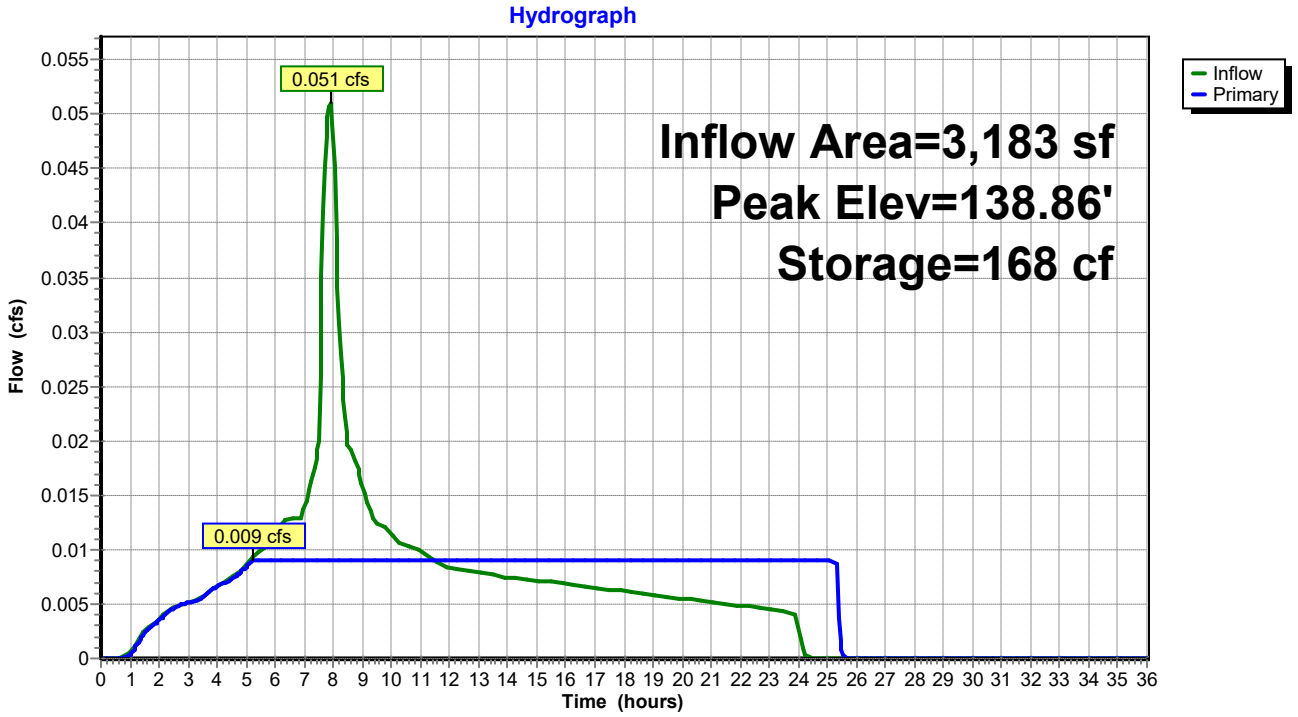
Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	214 cf	**planters (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.00	195	0	0
139.10	195	214	214

Device	Routing	Invert	Outlet Devices
#1	Primary	136.33'	**4.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.33' / 134.40' S= 0.1930 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 1	138.00'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	139.00'	**6.0" Horiz. Orifice/Grate** C= 0.620 Limited to weir flow at low heads

Primary OutFlow Max=0.009 cfs @ 5.25 hrs HW=138.01' (Free Discharge)
└─**1=Culvert** (Passes 0.009 cfs of 0.517 cfs potential flow)
  ├─**2=Exfiltration** (Exfiltration Controls 0.009 cfs)
  └─**3=Orifice/Grate** (Controls 0.000 cfs)

Pond 1P: Planter Box



Summary for Subcatchment 10: Pre-Developed Flows

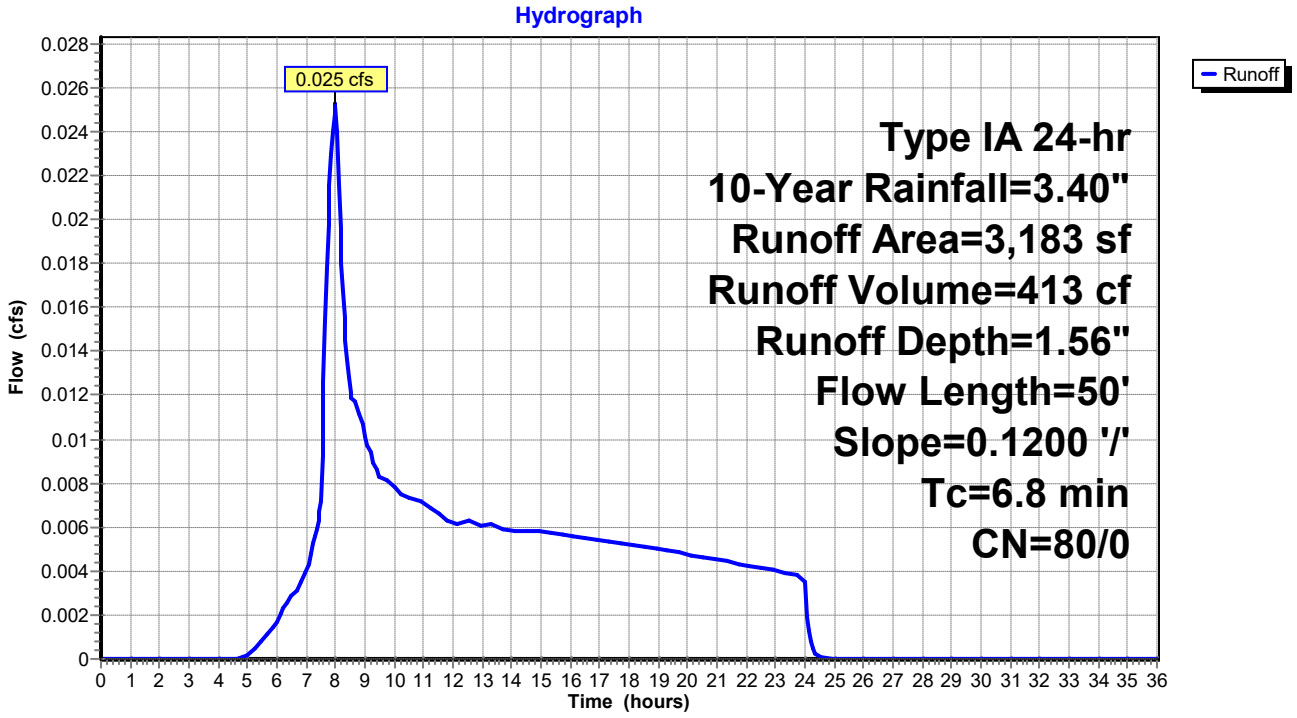
Runoff = 0.025 cfs @ 7.99 hrs, Volume= 413 cf, Depth= 1.56"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	3,183	80	roofs
	3,183	80	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.1200	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"

Subcatchment 10: Pre-Developed Flows



Summary for Subcatchment 11: Site

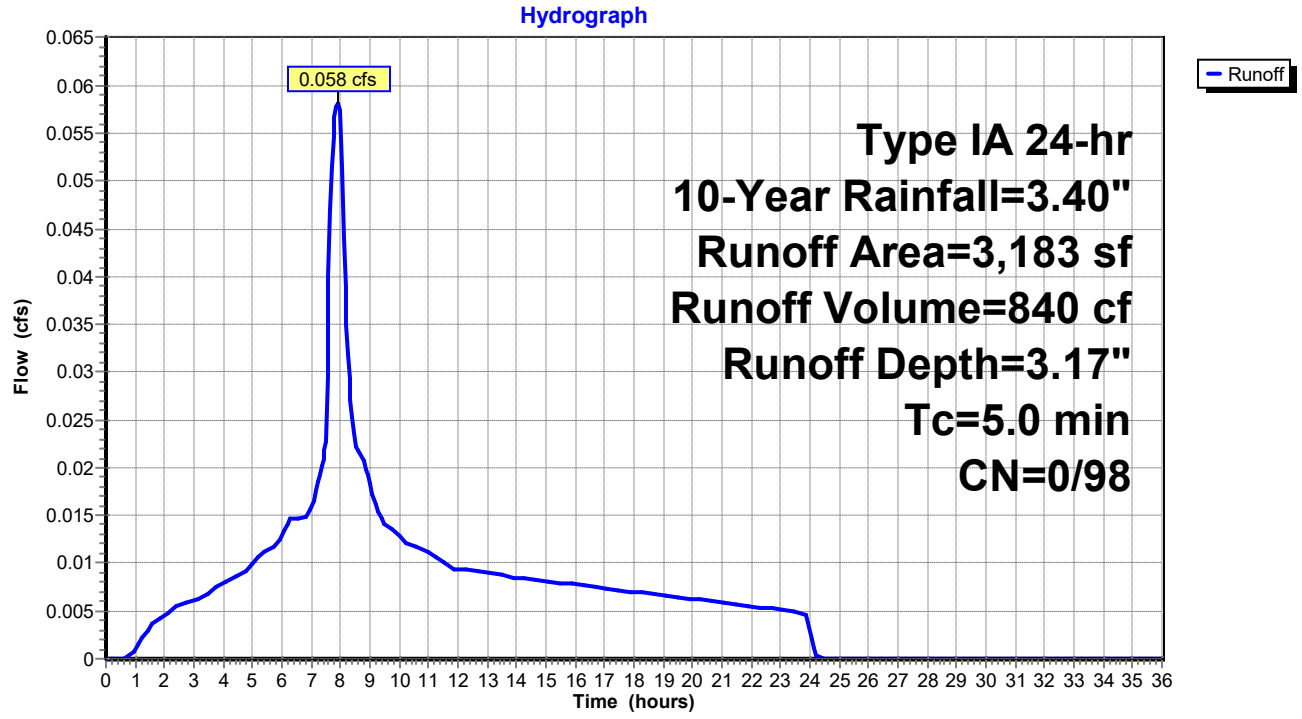
Runoff = 0.058 cfs @ 7.90 hrs, Volume= 840 cf, Depth= 3.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	2,408	98	roof
*	442	98	driveway
*	333	98	walkway
	3,183	98	Weighted Average
	3,183	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11: Site



Summary for Pond 1P: Planter Box

Inflow Area = 3,183 sf,100.00% Impervious, Inflow Depth = 3.17" for 10-Year event
Inflow = 0.058 cfs @ 7.90 hrs, Volume= 840 cf
Outflow = 0.014 cfs @ 9.57 hrs, Volume= 840 cf, Atten= 76%, Lag= 100.1 min
Primary = 0.014 cfs @ 9.57 hrs, Volume= 840 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 139.01' @ 9.57 hrs Surf.Area= 195 sf Storage= 197 cf

Plug-Flow detention time= 216.9 min calculated for 839 cf (100% of inflow)
Center-of-Mass det. time= 216.9 min (881.7 - 664.8)

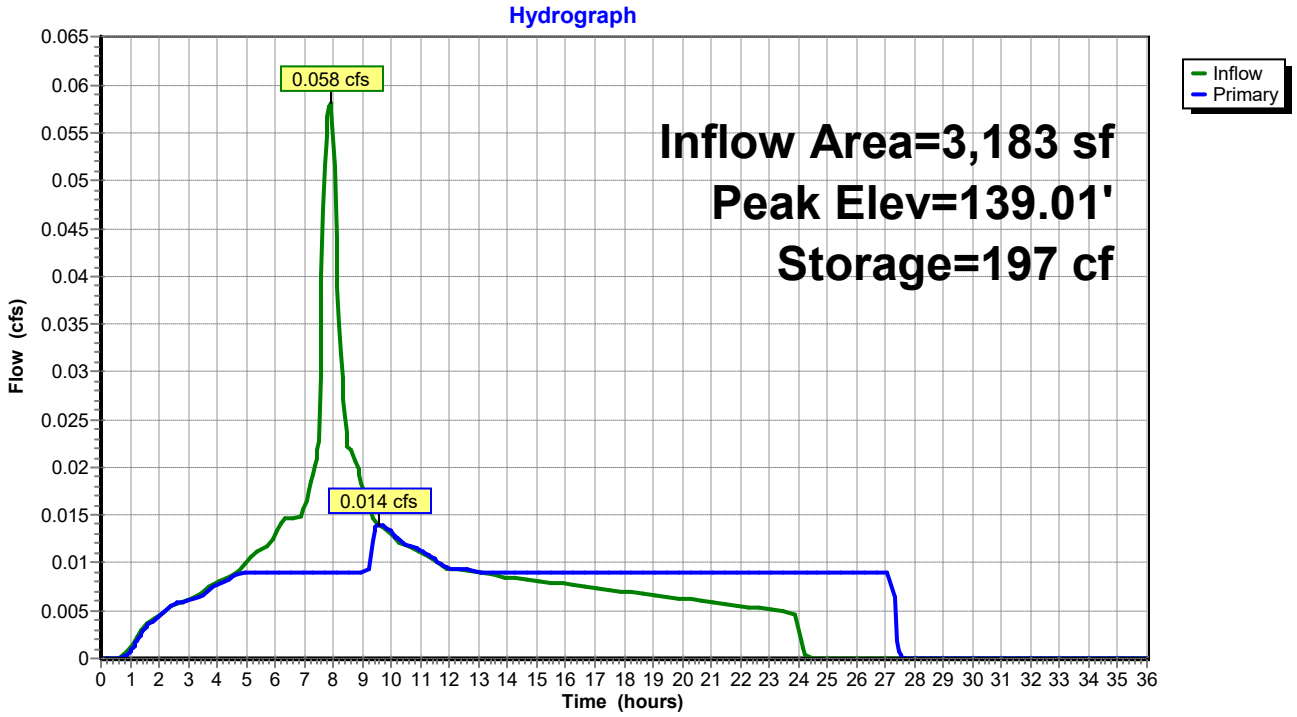
Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	214 cf	**planters (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.00	195	0	0
139.10	195	214	214

Device	Routing	Invert	Outlet Devices
#1	Primary	136.33'	**4.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.33' / 134.40' S= 0.1930 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 1	138.00'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	139.00'	**6.0" Horiz. Orifice/Grate** C= 0.620 Limited to weir flow at low heads

Primary OutFlow Max=0.013 cfs @ 9.57 hrs HW=139.01' (Free Discharge)
└**1=Culvert** (Passes 0.013 cfs of 0.666 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.009 cfs)
  └**3=Orifice/Grate** (Weir Controls 0.004 cfs @ 0.31 fps)

Pond 1P: Planter Box



Summary for Subcatchment 10: Pre-Developed Flows

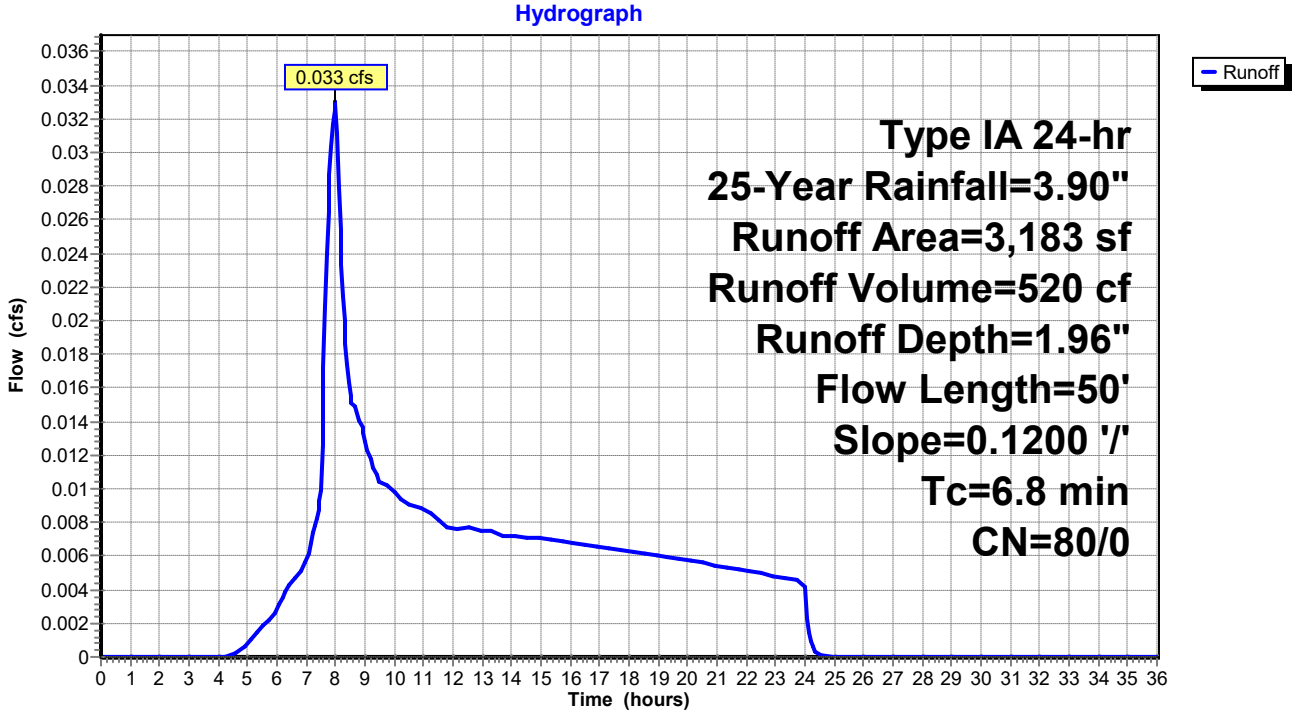
Runoff = 0.033 cfs @ 7.98 hrs, Volume= 520 cf, Depth= 1.96"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	3,183	80	roofs
	3,183	80	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.1200	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"

Subcatchment 10: Pre-Developed Flows



Summary for Subcatchment 11: Site

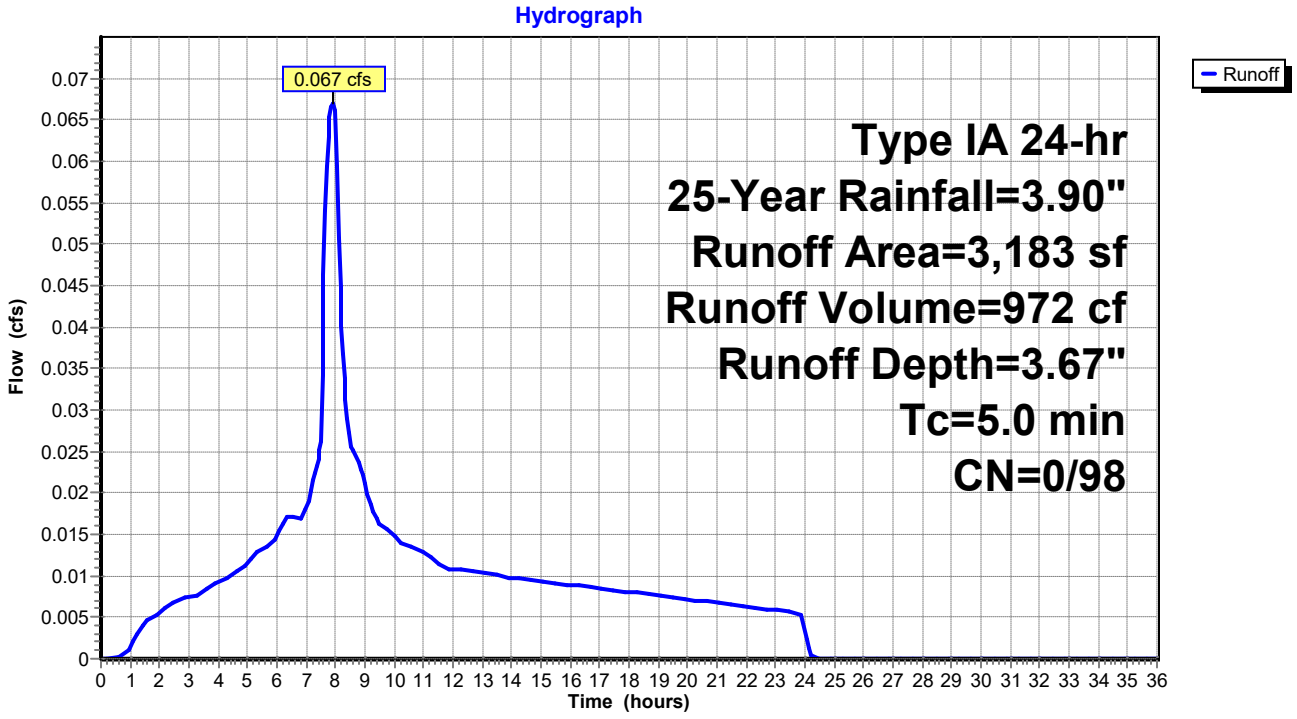
Runoff = 0.067 cfs @ 7.90 hrs, Volume= 972 cf, Depth= 3.67"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Year Rainfall=3.90"

	Area (sf)	CN	Description
*	2,408	98	roof
*	442	98	driveway
*	333	98	walkway
	3,183	98	Weighted Average
	3,183	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 11: Site



Summary for Pond 1P: Planter Box

Inflow Area = 3,183 sf,100.00% Impervious, Inflow Depth = 3.67" for 25-Year event
Inflow = 0.067 cfs @ 7.90 hrs, Volume= 972 cf
Outflow = 0.030 cfs @ 8.40 hrs, Volume= 972 cf, Atten= 56%, Lag= 30.3 min
Primary = 0.030 cfs @ 8.40 hrs, Volume= 972 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 139.03' @ 8.40 hrs Surf.Area= 195 sf Storage= 200 cf

Plug-Flow detention time= 212.1 min calculated for 971 cf (100% of inflow)
Center-of-Mass det. time= 212.2 min (873.5 - 661.3)

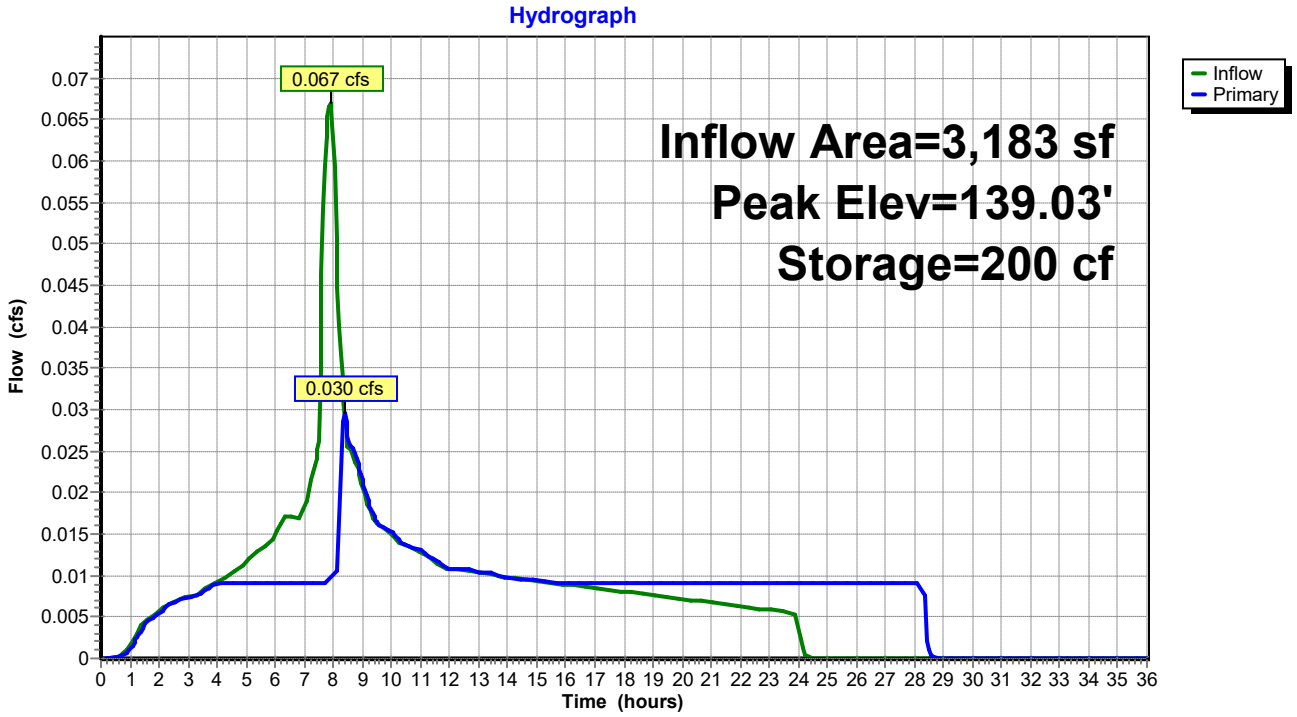
Volume	Invert	Avail.Storage	Storage Description
#1	138.00'	214 cf	**planters (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
138.00	195	0	0
139.10	195	214	214

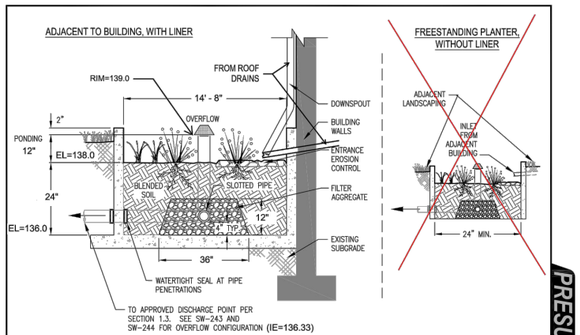
Device	Routing	Invert	Outlet Devices
#1	Primary	136.33'	**4.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.33' / 134.40' S= 0.1930 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 1	138.00'	**2.000 in/hr Exfiltration over Surface area**
#3	Device 1	139.00'	**6.0" Horiz. Orifice/Grate** C= 0.620 Limited to weir flow at low heads

Primary OutFlow Max=0.029 cfs @ 8.40 hrs HW=139.03' (Free Discharge)
└**1=Culvert** (Passes 0.029 cfs of 0.668 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.009 cfs)
  └**3=Orifice/Grate** (Weir Controls 0.020 cfs @ 0.52 fps)

Pond 1P: Planter Box



Appendix D:



1. Detail provided to match design intended for this project site within the city of West Linn jurisdiction.
2. 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.
3. Planter Structure: A single pour, monolithic concrete shell without cold joints is required unless otherwise approved.
4. Waterproofing: Waterproof liner to be added and installed covering bottom and sides of interior concrete up to the height of the overflow outlet.
5. Blended Soil: Use BES standard soil blend for stormwater facilities (SWMM Section 6.3) unless otherwise approved. Install minimum of 24" of blended soil.
6. Underdrain System: The underdrain must be 4" slotted schedule 40 PVC well casing pipe manufactured with .050" slots, 6 slots per row. Embed the underdrain in ¾" No.10 washed angular aggregate. See SW-243 for longitudinal section and SW-244 for orifice examples. Conform with Oregon Plumbing Specialty Code (OPSC) requirements. Alternative configurations and materials such as cellular storage systems, drainage mats, and non-standard aggregates may be used under the Performance Approach, with BES approval.
7. Overflow: Overflow elevation must allow for 2" of freeboard, minimum. Protect from debris and sediment with strainer or grate.
8. Vegetation: Refer to plant list in SWMM Section 3.5. Minimum container size is 1 gal. Number of plantings per 100sf of facility area: 80 herbaceous plants OR 72 herbaceous plants and 4 small shrubs.
9. Entrance Erosion Control: Install river rock, flagstone, or similar to dissipate the energy of incoming water at entrances and ends of downspout extensions.

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.

– DRAWING NOT TO SCALE –

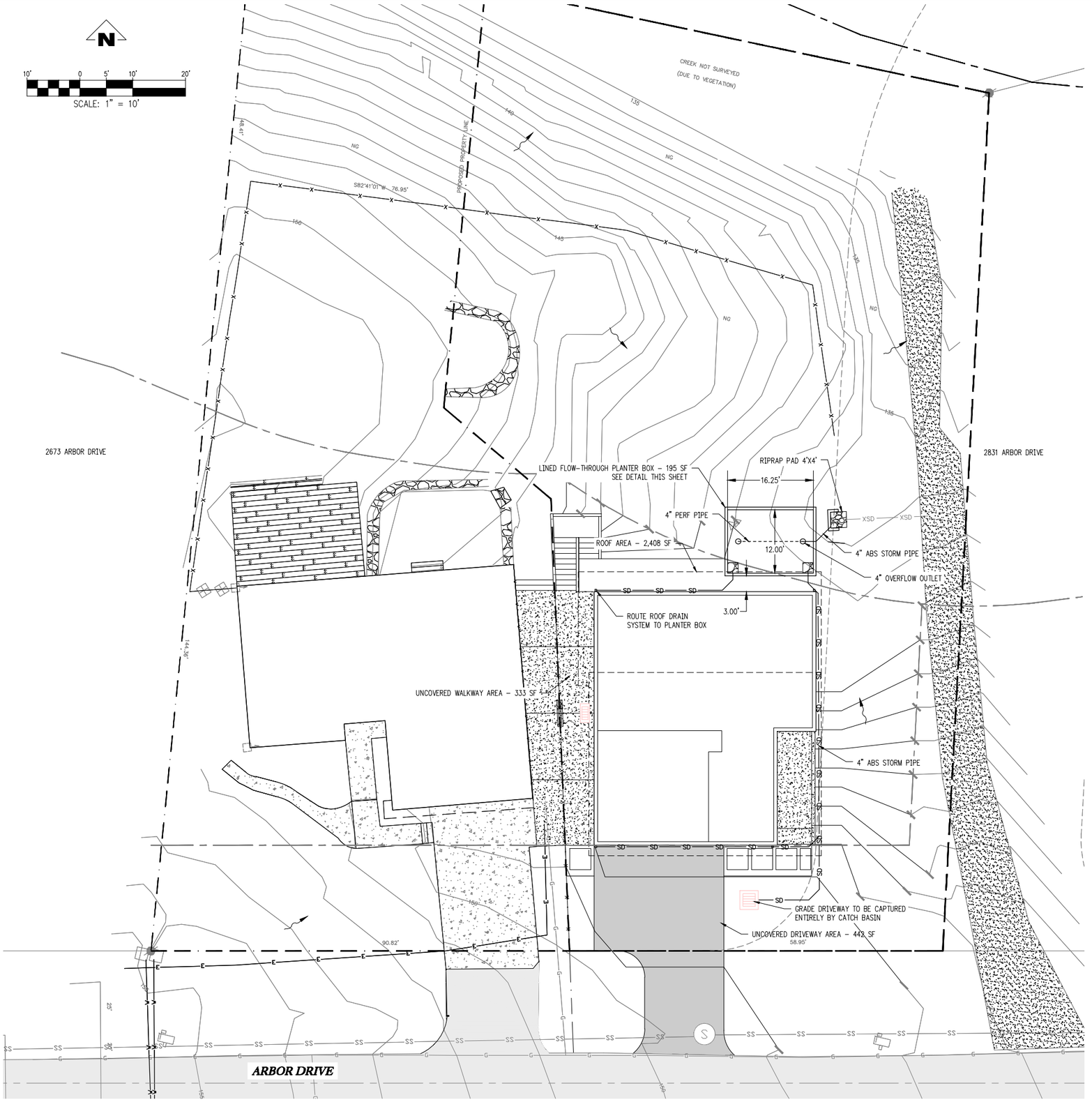
PRESUMPTIVE AND PERFORMANCE DESIGN APPROACH

Bureau of Environmental Services

STORMWATER MANAGEMENT TYPICAL DETAILS FOR PRIVATE PROPERTY

PLANTER WITH UNDERDRAIN SW-231

9-8-20



2785 ARBOR DRIVE
2 - LOT PARTITION
TAX MAP SEC. 14 T2S R1E W.M.
TAX LOT 105
WEST LINN, OREGON

2349-001

STORMWATER EXHIBIT

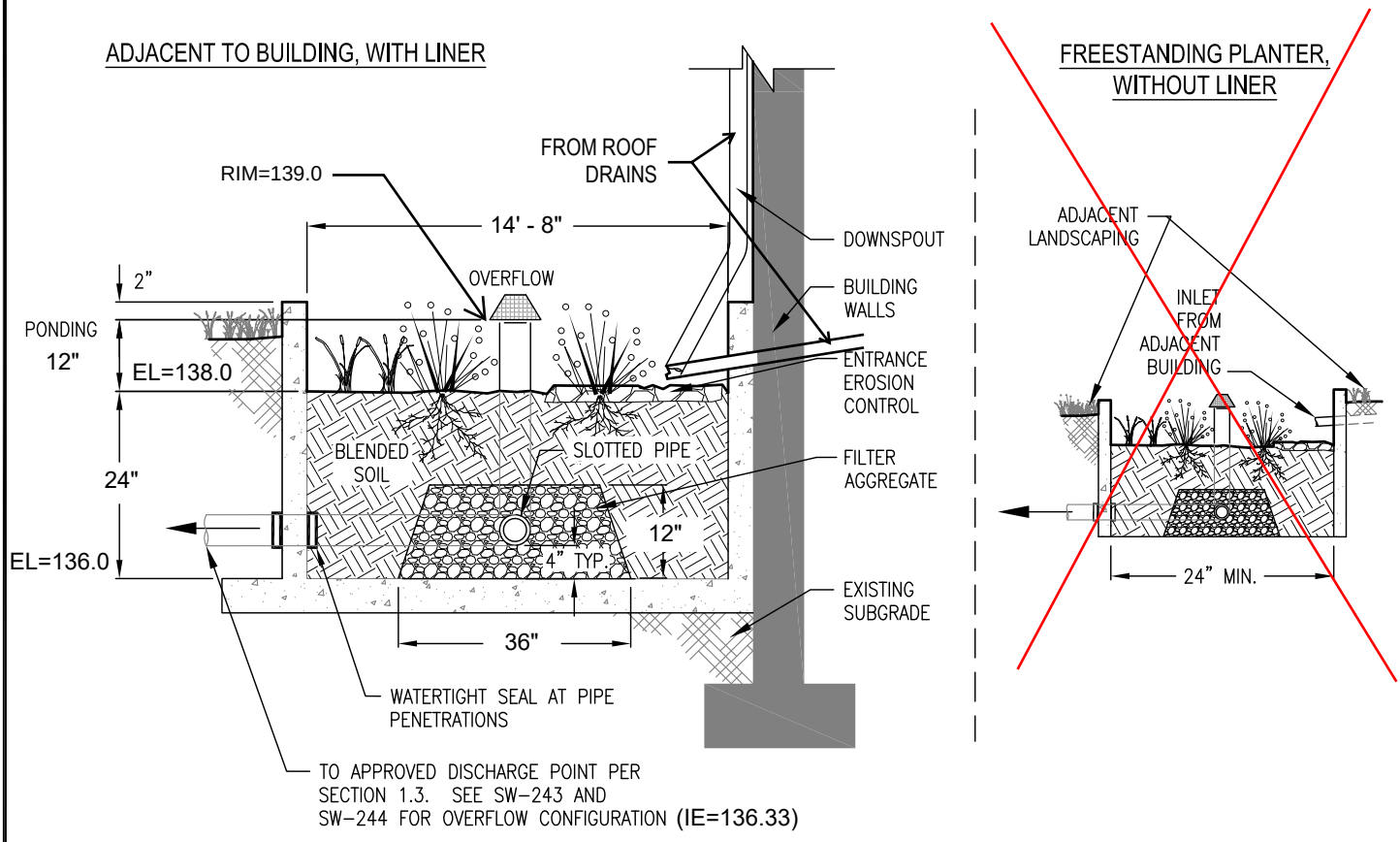
REVISIONS

NO.	DATE	DESCRIPTION

EMERIO
ENGINEERING • SURVEYING • DESIGN
6445 SW FALLBROOK PLACE, SUITE 100
BEAVERTON, OREGON 97008
TEL: (503) 646-0912
FAX: (503) 598-8592
www.emeriodesign.com

SHEET 1 OF 1

FILE:P:\2349-001 2785 Arbor Dr\docs\civil\storm\CAD\2349-00Site, Layout: Layout1, Plot Date: 9/18/2024 12:57 PM, by: Josh Meyer



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4. Waterproofing: Waterproof liner to be added and installed covering bottom and sides of interior concrete up to the height of the overflow outlet.
5. Blended Soil: Use BES standard soil blend for stormwater facilities (SWMM Section 6.3) unless otherwise approved. Install minimum of 24" of blended soil.
6. Underdrain System: The underdrain must be 4" slotted schedule 40 PVC well casing pipe manufactured with .050" slots, 6 slots per row. Embed the underdrain in $\frac{1}{4}$" No.10 washed angular aggregate. See SW-243 for longitudinal section and SW-244 for orifice examples. Conform with Oregon Plumbing Specialty Code (OPSC) requirements. Alternative configurations and materials such as cellular storage systems, drainage mats, and non-standard aggregates may be used under the Performance Approach, with BES approval.
7. Overflow: Overflow elevation must allow for 2" of freeboard, minimum. Protect from debris and sediment with strainer or grate.
8. Vegetation: Refer to plant list in SWMM Section 3.5. Minimum container size is 1 gal. Number of plantings per 100sf of facility area: 80 herbaceous plants OR 72 herbaceous plants and 4 small shrubs.
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– DRAWING NOT TO SCALE –

PRESUMPTIVE AND PERFORMANCE DESIGN APPROACH

Bureau of Environmental Services

STORMWATER MANAGEMENT TYPICAL DETAILS FOR PRIVATE PROPERTY

PLANTER WITH UNDERDRAIN

SW-231

9-8-20

FIRE CODE / LAND USE / BUILDING REVIEW APPLICATION

Tualatin Valley Fire & Rescue

North Operating Center
11945 SW 70th Avenue
Tigard, OR 97223
Phone: 503-649-8577

South Operating Center
8445 SW Elligsen Rd
Wilsonville, OR 97070
Phone: 503-649-8577

REV 6-30-20

Project Information

Applicant Name: Chi Kin Mung

Address: 2785 Arbor Dr, West Linn, OR 97068

Phone: 503-720-8235

Email: becken.mung@gmail.com

Site Address: 2785 Arbor Dr

City: West Linn

Map & Tax Lot #: 21E14DB, 21E14DB00105

Business Name: N/A

Land Use/Building Jurisdiction: West Linn

Land Use/ Building Permit # Not applied for yet

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

The project is a two-lot middle housing Expedited Land Division (partition). A new home will be built on the property.

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)
  - * Exception: Underground Storage Tanks (UST) are deferred to DEQ for regulation.
- ☐ 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 # 2025-0062

Permit Type: SPP- West Linn

Submittal Date: 4-18-25

Assigned To: DFM Avs

Due Date: N/A

Fees Due: Ø

Fees Paid: Ø

Approval/Inspection Conditions

(For Fire Marshal's Office Use Only)

This section is for application approval only

Fire Marshal or Designee 0430 Date 4-24-25

Conditions: See approved fire service plan.

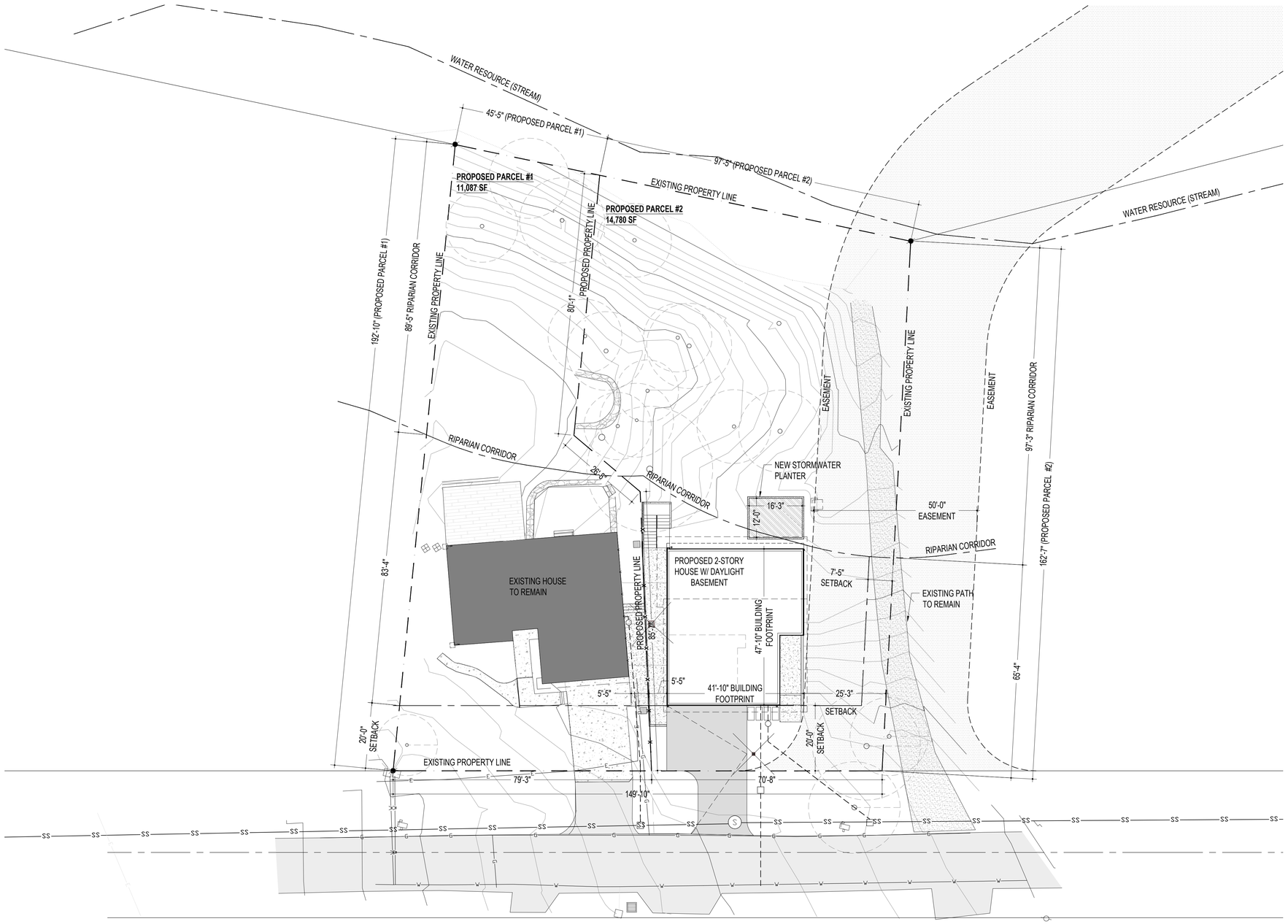
See Attached Conditions: ☐ Yes ☑ No

Site Inspection Required: ☐ Yes ☑ No

This section used when site inspection is required

Inspection Comments:

Final TVFR Approval Signature & Emp ID Date



1 PROPOSED PLOT PLAN

SCALE: 1/16"=1'-0"

N

TVF&R
Tualatin Valley Fire & Rescue

APPROVED PLANS

APPROVAL OF PLANS IS NOT AN APPROVAL OF OMISSIONS OR OVERSIGHTS

Deputy Fire Marshal II

TVF&R Permit# 2025-0062

PROPERTY ID NUMBER:	84612
SITE ADDRESS :	2785 ARBOR DR, WEST LINN OR
LEGAL DESCRIPTION:	LOT 31, ROBINWOOD PLAT
JURISDICTION :	WEST LINN
MAP NUMBER:	21E14DB
TAX LOT NUMBER:	21E14DB00105
PARCEL NUMBER:	00304539

ORIGINAL LOT SIZE(ESTIMATED):	.6 ACRES (26,000 SF)
PROPOSED WEST LOT SIZE:	**11,087 SF**
PROPOSED EAST LOT SIZE:	**14,780 SF**
EAST LOT COVERAGE:	**12.8%** (1,890 SF)
BUILDING SIZE (GSF):	
BASEMENT:	1084 SF (DAYLIT, PARTIALLY FINISHED)
FIRST FL:	1821 SF (INCL. GARAGE)
SECOND FL:	1,233 SF
TOTAL:	4138 SF
BUILDING HEIGHT FROM:	
FRONT FINISH GRADE:	28'-4"
AVERAGE ON SLOPED SIDE:	32'-0"
FLOOR AREA RATIO:	
4,275 SF (NEW LOT SIZE) / 14, 780 SF (GSF) = 0.29	
COVERED ENTRY:	139 SF
DRIVEWAY (ASPHALT):	797 SF
UNCOVERED PAVEMENT:	344 SF

ARCHITECT

sora design

CONTACT:
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KATSUYA ARAI
E: katsuya@sora-design.info
P: 917-790-9268

MUNG RESIDENCE
2785 ARBOR DR
WEST LINN, OR
97086

SEAL

REGISTERED ARCHITECT
AKIKO ARAI
PORTLAND, OR
12809
STATE OF OREGON

ISSUED DATE

NO	DATE	DESCR
1	2025.04.18	LAND DIVISION SUBMISSION

REVISIONS

NO	DATE	DESCR

DWG. NAME

PROPOSED PLOT PLAN

DWG NO.

A-100.00