Utility Serviceability Assessment Report

Utility Service for The Confluence

September 13, 2022

Prepared for:

City of Troutdale

Prepared by:

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Luis Giron

Revision	Description	Author		Quality Check		Independent Review	
1.0	Draft	Luis Giron	LAG	Matt Lewis			
2.0	Final	Luis Giron		Matt Lewis		James Tran	

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Executive Summary

The Confluence at Troutdale (The Confluence) represents a unique opportunity to build an entirely new riverfront district from the ground up at the gateway to the Columbia River Gorge. The property is owned by the City of Troutdale's Urban Renewal Agency and is zoned MU3 – Urban Mixed Use. The Confluence is 15.9 acres with approximately 1,400 lineal feet (lf) of river frontage. An existing 120-ft tall water tower is to be retained and incorporated into the site's design to enhance the character of the proposed development.

This report was prepared to document the site's serviceability by existing utility infrastructure within the site and in the immediate vicinity. Various local utility providers were consulted and they expressed a willingness to expand infrastructure as required to serve The Confluence. The existing condition of public utility infrastructure was documented with information from the City's GIS database and several utility master plans.

This report focuses on two potential development concepts prepared by the City of Troutdale development team. The concepts look to create a vibrant riverfront with community gathering spaces, housing, hospitality, restaurants, lodging and a riverfront park with trail systems allowing visitors to soak in the beauty of the Sandy River.

The site is well positioned with existing public utility service with capacity to serve prospective development. According to findings presented in the City's master plans, the public water line that bisects the site should have sufficient pressure and flow to satisfy the site's fire flow and domestic water demands. The public storm drain and sanitary sewer systems have sufficient capacity to handle full buildout of the site and are not currently experiencing capacity or surcharging issues. Electric, gas, and high-speed internet are also readily available to serve the site. Several utility extensions will likely be required within the site due to its shape, size, and the location of existing utility infrastructure.

Preliminary construction costs for public wet utilities (water, sewer, storm) were determined for budgeting purposes and are anticipated to be in the range of $1.8M to 2.3M for Development Option A and $1.4M to 1.7M for Option B. Though, it is important to note that the engineering analysis for utility service and potential relocation was conducted following preparation of the development concepts. As such, the development concepts could be modified to better accommodate existing utilities to reduce potential relocation costs. Some of the existing utilities are of considerable diameter and minor site plan modifications could result in significant relocation cost reductions.

1.0 ASSESSMENT MAPPING AND UTILITY DOCUMENTATION

The Confluence is 15.9 acres with approximately 1,400 lineal feet (lf) of river frontage. The property is currently owned by the City and is zoned MU3 – Urban Mixed Use. An existing 120-ft tall water tower is to be retained and incorporated into the site's design to enhance the character of the proposed development. Existing utilities available to serve the site include public water, sanitary sewer and storm drain sewer. Various access, water line, storm drain, public utility and sanitary sewer easements exist on-site. The proposed development will need to consider existing utility infrastructure otherwise utility relocation may be required.

Preliminary outreach to private utility companies shows willingness of utility providers to expand services where required to serve the site. There are a few utility poles owned and maintained by Ziply Fiber so high-speed internet may be available on the property to serve the proposed development. Electric service also appears to be available on-site based on the presence of several utility poles owned and maintained by PGE. Overhead utility lines may need to be relocated underground to avoid potential conflicts with proposed buildings. Installation of multiple pad mounted transformers may be required to serve the proposed development. Natural gas service by NW Natural is available along the western property boundary.

1.1 EXISTING UTILITY CONDITIONS

Existing utilities were assessed using the City's public GIS database, 2012, Water Master Plan (WMP), 2013 Sanitary Master Plan (SSMP) and the 2012 Storm Drainage Master Plan (SDMP).

1.1.1 Existing Water Conditions

The Confluence is located within Water Zone 4 and is noted as an area of Urban Renewal in the 2012 City of Troutdale Water Master Plan. Water supply for this zone is pumped from Well #4 with supplemental water coming from Zone 2. Reservoir #1 provides 1MG of storage capacity for Zone 4 for use during peak demand. Well #4 was constructed in 1980, was rehabilitated in 2008 and has an approximate capacity of 600 gpm. Rehabilitation is anticipated to have extended well life expectancy through 2030.

There is an existing public water line that runs through the site beginning at the intersection of Harlow Ave and East Columbia River Highway and continuing beyond the site under Interstate 84. The public water line entering the site along the southern property line is 10-in diameter ductile iron (DI). The public water line steps down to 8-in diameter DI about a third of the way through the site and remains that size beyond Interstate 84. See Technical Appendix: Figure No. 1 – Existing Conditions Map.

1.1.2 Existing Sewer Conditions

There is an existing public sanitary sewer that runs through the site beginning at the intersection of Harlow Ave and East Columbia River Highway and continuing beyond the site under Interstate 84. The public sanitary sewer entering the site along the southern property line is 21-in diameter corrugated steel pipe (CSP). The public sanitary sewer steps up to 30-in diameter polyvinyl chloride (PVC) immediately after entering the site and remains that size beyond

Interstate 84. Existing storm drain sewer depth varies from 9-14-feet BGS. See Technical Appendix: Figure No. 1 – Existing Conditions Map.

1.1.3 Existing Storm Conditions

Two existing public storm drains enter The Confluence and converge in a storm drain manhole located near the middle of the site. The first storm drain line enters the SW corner of the site and consists of 54-in CSP and it increases to 60-in CSP before converging with the second public storm drain line. The public storm drain line remains 60-inch CSP until it outfalls to the Sandy River. The second storm drain line enters the NW corner of the site near NW 257th Way and consists of 12-in CSP. It increases to 18-in CSP before turning 90-degrees towards the Sandy River. The segment between the 90-degree turn and the storm drain manhole connecting both public storm drains consists of 30-in CSP. The existing storm drain sewer depth varies from 8-10-feet BGS. New outfalls to the Sandy River are unlikely to be readily permitted so all drainage from the proposed development should be connected upstream of the existing storm drain outfall. See Technical Appendix: Figure No. 1 – Existing Conditions Map.

1.2 PLAN DEVELOPMENT AND UTILITY SERVICEABILITY

Potential utility alignments were prepared for both development concept. Each concept looks to create a vibrant riverfront with community gathering spaces, housing, hospitality, restaurants, lodging and a riverfront park with trail systems allowing visitors to soak in the beauty of the Sandy River. Proposed utility locations are approximate and may be subject to change with revisions to the concepts. The City provides utility location guidance for various utilities in relation to each other and public/private streets. See Technical Appendix: City Standard Drawing No. II-21.

And it is important to note that the engineering analysis for utility service and potential relocation was conducted following preparation of the development concepts. As such, the development concepts could be modified to better accommodate existing utilities to reduce potential relocation costs. Some of the existing utilities are of considerable diameter and minor site plan modifications could result in significant relocation cost reductions.

1.2.1 Proposed Water System

A portion of the existing public water line may need to be realigned depending on the final location of proposed buildings.

Concept A:
Water line realignment may require the replacement of approximately 780 lf of water line with replacement costs projected to be about $270-335k for budgetary purposes. Approximately 1,520 lf of new water line will be required to provide water service throughout the site. Construction costs for new water lines are anticipated to be approximately $460-570k. See Technical Appendix: Figure No. 2 – Development Concept A for location of new utilities.

Concept B:
Water line realignment may require the replacement of approximately 980 lf of water line with replacement costs projected to be about $340-425k for budgetary purposes. Approximately 420 lf of new water line will be required to

provide water service throughout the site. Construction costs for new water lines are anticipated to be approximately $130-160k. See Technical Appendix: Figure No. 3 – Development Concept B for location of new utilities

The Confluence can be expected to generate a demand of approximately 13,000 gallons per day (gpd), assuming commercial use and a design unit rate demand of 800 gallons per acre per day (gpad). The unit rate was determined using the City's WMP. Figure 5-9 of the WMP shows an available maximum hour pressure of 80 psi and Figure 5-12 shows an available maximum day fire flow of 3,500 gpm within The Confluence so the existing public water system infrastructure should have sufficient capacity to serve proposed development. There are currently four public fire hydrants located on-site, however, additional hydrants may be required to provide adequate building coverage per the Oregon Fire Code.

Historic unit rates presented in the WMP were developed for the underlying land use classification by determining the gallons per acre per day (gpad) using historic metered sales. Design Unit Rates where increased by 25% to account for the full buildout condition. See Table 1 for unit rates for multiple land use classifications.

Table 1 Design Unit Rate Based on Metered Sales

Land Use Classification	Historical Unit Rate (gpad)	Design Unit Rate (gpad)
Commercial	625	800
Industrial	115	150
Mixed Use	1,057	1,400
Residential	876	1,100

1.2.2 Proposed Sewer System

The existing sanitary sewer line runs along the western property line and is already in a location conducive to maximizing the developable area on-site and realignment is unlikely to be necessary. The public sanitary sewer drains via gravity to the City's Water Pollution Control Facility located north of Interstate 84. The City's SSMP shows sufficient capacity downstream of the site for the full buildout condition so the existing infrastructure should be sufficient to serve the proposed development. Concept A:

Concept A:
Approximately 1,560 lf of sanitary sewer lines will be required to serve the proposed development with replacement costs projected to be about $390-490k for budgetary purposes.

Concept B:
Approximately 1,040 lf of sanitary sewer lines will be required to serve the proposed development with replacement costs projected to be about $260-325k for budgetary purposes.

The Confluence can be expected to generate a sanitary base flow of approximately 16,000 gpd, assuming commercial use and a design unit base flow of 1,000 gpad. The design unit base flow was taken from Section 3.6 of the City's SSMP. See Table 2 for design unit base flow for multiple land use classifications. An average of 3 people per residential unit can be assumed for calculating sanitary base flow from residential land use.

Table 2 Design Unit Base Flows

Land Use Classification	Units	Design Unit Base Flow
Commercial	gpad	1,000
Industrial	gpad	5,000
Residential	gpcd	70

1.2.3 Proposed Stormwater Management

1.2.3.1 Stormwater Conveyance System

A majority of the existing public storm drain line runs along the western property line and is already in a location conducive to maximizing the developable area on-site. The portion running west to east consists of large diameter pipe and realignment should be avoided if possible due to potential impacts to the City's upstream stormwater drainage basins.

Concept A:
Design Concept A shows a proposed building over a segment of the 60-in storm drain line which would require realignment of approximately 560 lf or pipe. Construction costs for this work are likely to be about $355-440k. 1,800 lf of additional storm drain lines will need to be constructed to convey runoff from the remainder of the property. Additional storm drain line construction work is anticipated to be approximately $360-450k. The City's SDMP shows sufficient capacity downstream of the site for the full buildout condition so the existing infrastructure should be sufficient to serve the proposed development.

Concept B:
Design Concept A shows a proposed building over a segment of the 60-in storm drain line which would require realignment of approximately 860 lf or pipe. Construction costs for this work are likely to be about $565-695k. 540 lf of additional storm drain lines will need to be constructed to convey runoff from the remainder of the property. Additional storm drain line construction work is anticipated to be approximately $110-135k. The City's SDMP shows sufficient capacity downstream of the site for the full buildout condition so the existing infrastructure should be sufficient to serve the proposed development.

1.2.3.2 Stormwater Detention and Water Quality

The City of Troutdale follows guidance outlined in the City of Portland's Stormwater Management Manual for sizing and design of water quality and stormwater detention facilities. It is anticipated that The Confluence will treat stormwater runoff using stormwater planters or basins. See Technical Appendix: SW-231 and SW-241 for a typical storm facility sections. Water quality treatment using proprietary mechanical treatment is also an option but it will require replacement of filter cartridges/media at an interval recommended by the manufacturer.

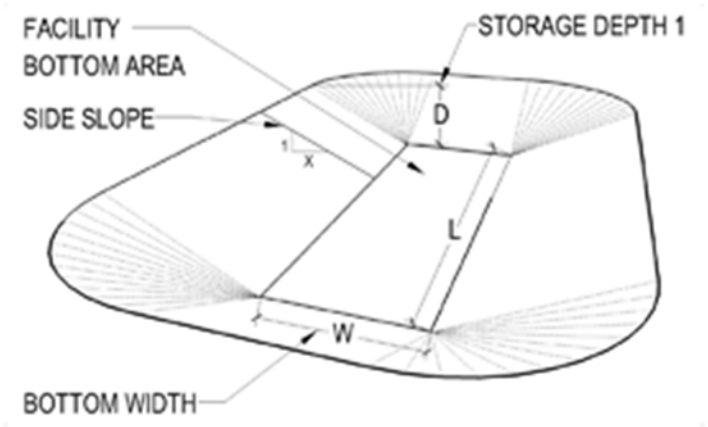
Stormwater detention can be provided above ground with a detention pond. Detention ponds tend to be less expensive compared to underground storage, but they often take up valuable real estate. Typical pond geometry consists of a 5-ft maximum depth including 1-ft freeboard and 3H:1V side slopes. Ponds generally need to be three

times as long as they are wide to mitigate potential short circuiting of stormwater runoff. See Figure 1 below. Approximately 4 acre-ft (ac-ft) of storage will likely need to be provided on-site to provide the necessary levels of flow control. A pond with a top area of 51,000 sf would be required assuming a storage depth of 4-ft and freeboard of 1-ft.

Underground stormwater detention becomes a viable option when large swaths of vehicle parking are proposed since the stormwater detention facility can often be placed directly under parking lots. Underground storage with an internal area of approximately 35,000 sf would be necessary to provide 4 ac-ft of storage assuming a usable storage depth of 5-ft, 6-in of dead storage, and 6-in of freeboard.

Preliminary review of the Oregon Water Resources Department (OWRD) Water Well Report Database shows that shallow or perched groundwater is unlikely to be present on-site. Historic boring logs within the site vicinity were pulled from the OWRD Water Well Report Database and it appears as though ground water depth ranges from 10-ft to 24 ft BGS with many reports stating no groundwater detected. A detailed geotechnical investigation will be required to confirm findings as subsurface hydrology can be highly variable.

Figure 1 Typical Pond Geometry



2.0 REFERENCES

- Black & Veatch, Water Master Plan for City of Troutdale, prepared July 2012.
- Brown and Caldwell, Sanitary Sewer Master Plan for the City of Troutdale, Oregon, prepared May 2013.
- Brown and Caldwell, South Troutdale Storm Drainage Master Plan for the City of Troutdale, Oregon, prepared February 2012.
- City of Portland 2020 Stormwater Management Manual, prepared December 2022.
- OWRD Water Resources Water Well Report Database, accessed August 2022.

TECHNICAL APPENDIX

Appendix A

A.1 UTILITY MAPS

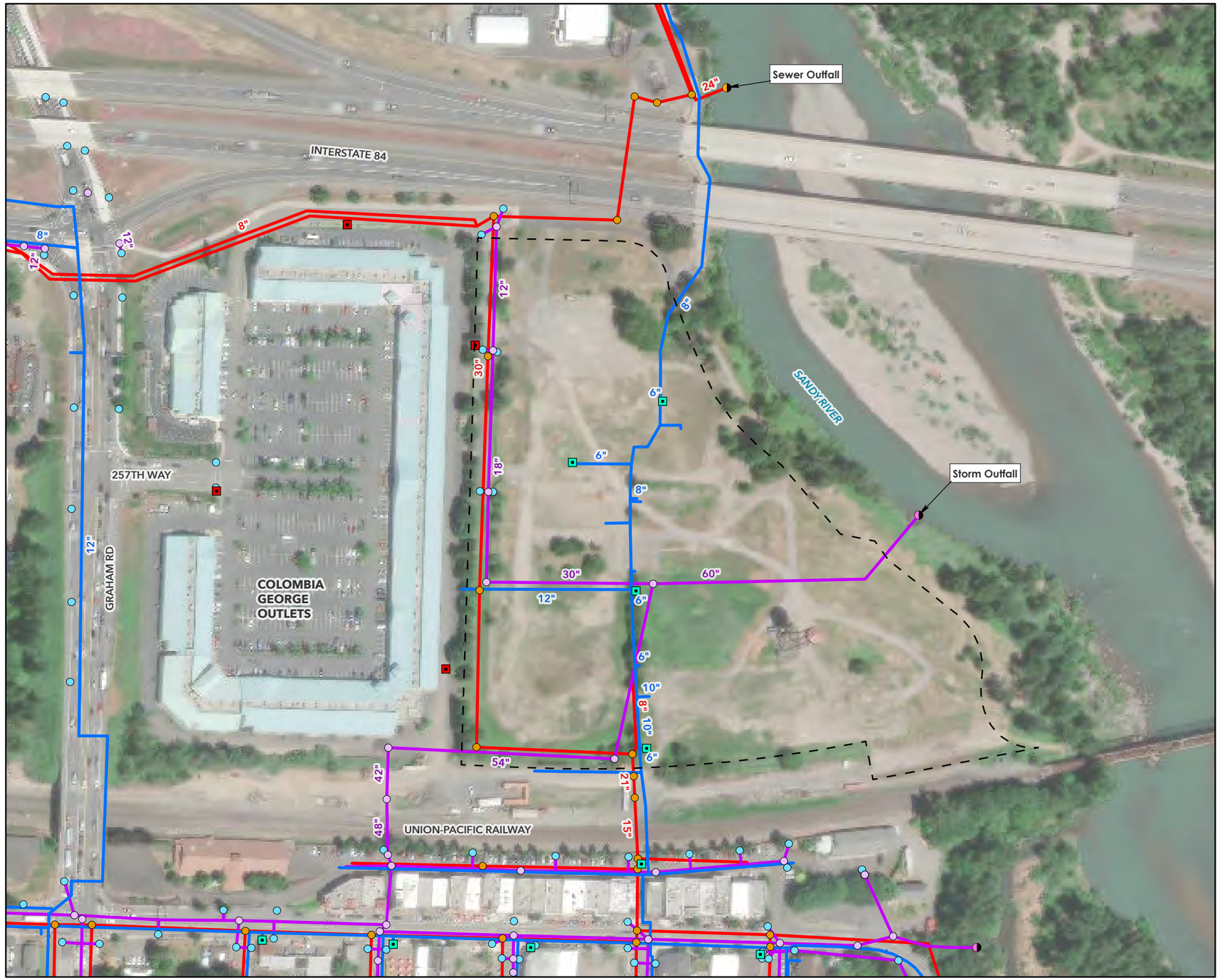


Figure No.
1

Title
Existing Conditions Map

Client/Project 238201769
Troutdale Utility
Feasibility Study

Project Location
Troutdale, Oregon

- City Fire Hydrant
- Private Fire Hydrant
- Storm Manholes
- Storm Catch Basins
- Sewer Manholes
- Water Pipes
- Storm Pipes
- Sewer Pipes
- Property Boundary

0 150 300 Feet
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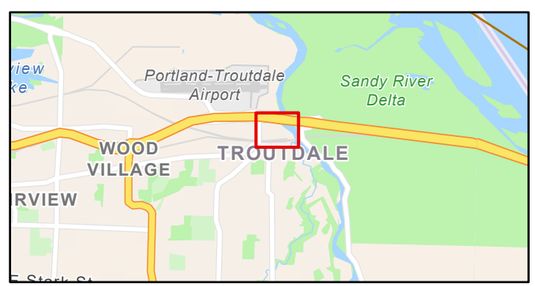
1:2,500



Notes
1. Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
2. Background Source: County of Clark, WA, Oregon Metro, State of Oregon GEO, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, Maxar, Microsoft

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Revised: 9/2/2022 By: leonard.luz

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Figure No.
2

Title
Development Concept A - Public Utility Considerations

Client/Project 238201769
Troutdale Utility
Feasibility Study

Project Location
Troutdale, Oregon

- City Fire Hydrant
- Private Fire Hydrant
- Sewer Manholes
- Water Pipes
- Storm Pipes
- Sewer Pipes
- Property Boundary

Proposed Alignment

- Proposed Sewer Pipe
- Proposed Storm Pipe
- Proposed Water Pipe
- Relocated Utility

0 150 300 Feet
(At original document size of 11x17)
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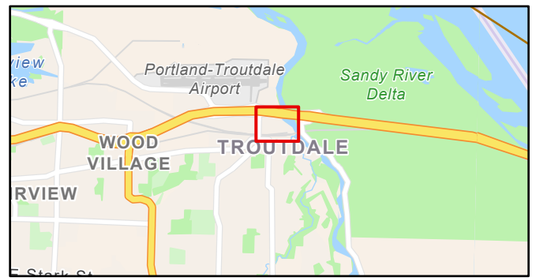

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2. Background Source: County of Clark, WA, Oregon Metro, State of Oregon GEO, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, Maxar, Microsoft

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Revised: 9/2/2022 By: leonard.luz
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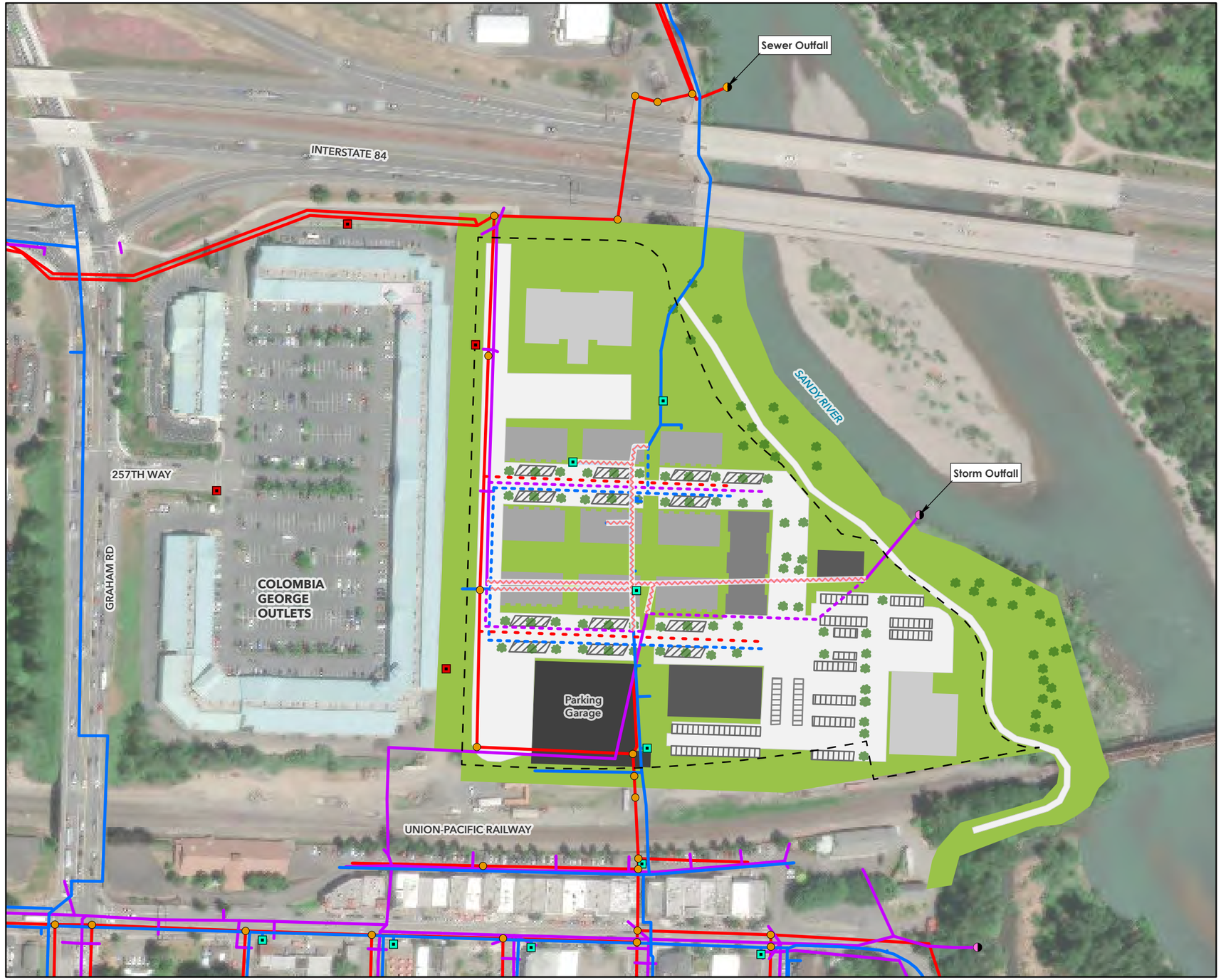

Figure No.
3

Title
Development Concept B - Public Utility Considerations

Client/Project 238201769
Troutdale Utility
Feasibility Study

Project Location
Troutdale, Oregon

- City Fire Hydrant
- Private Fire Hydrant
- Sewer Manholes
- Water Pipes
- Storm Pipes
- Sewer Pipes
- Property Boundary

Proposed Alignment

- Proposed Sewer Pipe
- Proposed Storm Pipe
- Proposed Water Pipe
- Relocated Utility

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Feet
(At original document size of 11x17)
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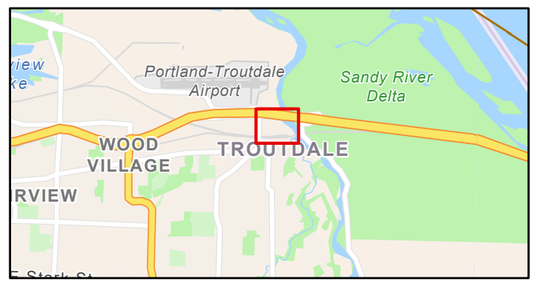

Notes
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Revised: 9/2/2022 By: leonard.luz

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A.2 PHOTOS

4

The Confluence - Site Photo Key Map

238201769

Troutdale Utility
Feasibility Study

Troutdale, Oregon

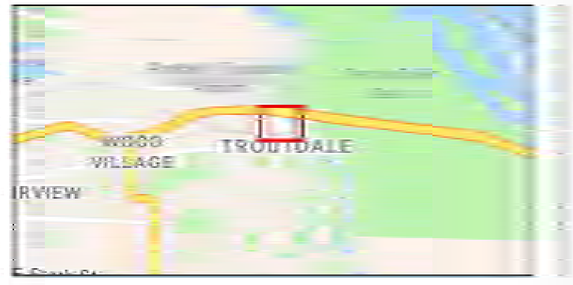
1 Looking West Towards Outlet Mall (Figure 5)

2 Looking South View of downtown Troutdale (Figure 6)

3 Looking North Towards Interstate 84 (Figure 7)

4 View of Water Tower and The Troutdale House (Figure 8)

Not to Scale



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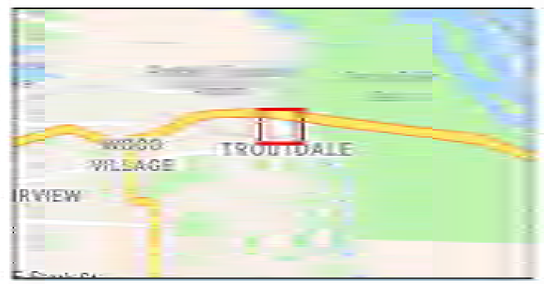
Looking West Towards Outlet Mall (Figure 5)

238201769

Troutdale Utility
Feasibility Study

Troutdale, Oregon

Not to Scale



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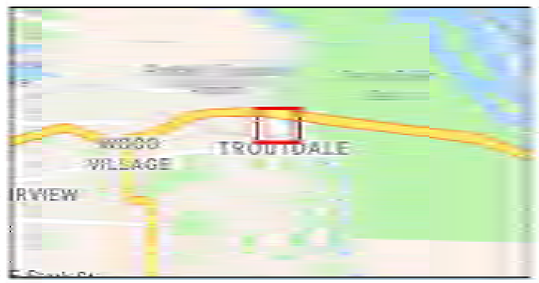
Looking South View of downtown Troutdale

238201769

Troutdale Utility
Feasibility Study

Troutdale, Oregon

Not to Scale



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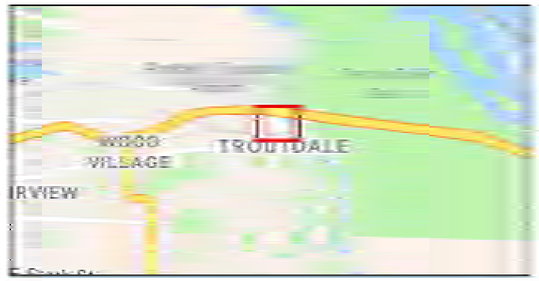
Looking North Towards Interstate 84

238201769

Troutdale Utility
Feasibility Study

Troutdale, Oregon

Not to Scale



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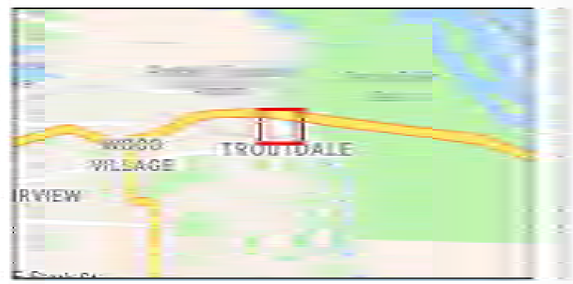
View of Water Tower and The Troutdale House

238201769

Troutdale Utility
Feasibility Study

Troutdale, Oregon

Not to Scale



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A.3 STANDARD DETAILS

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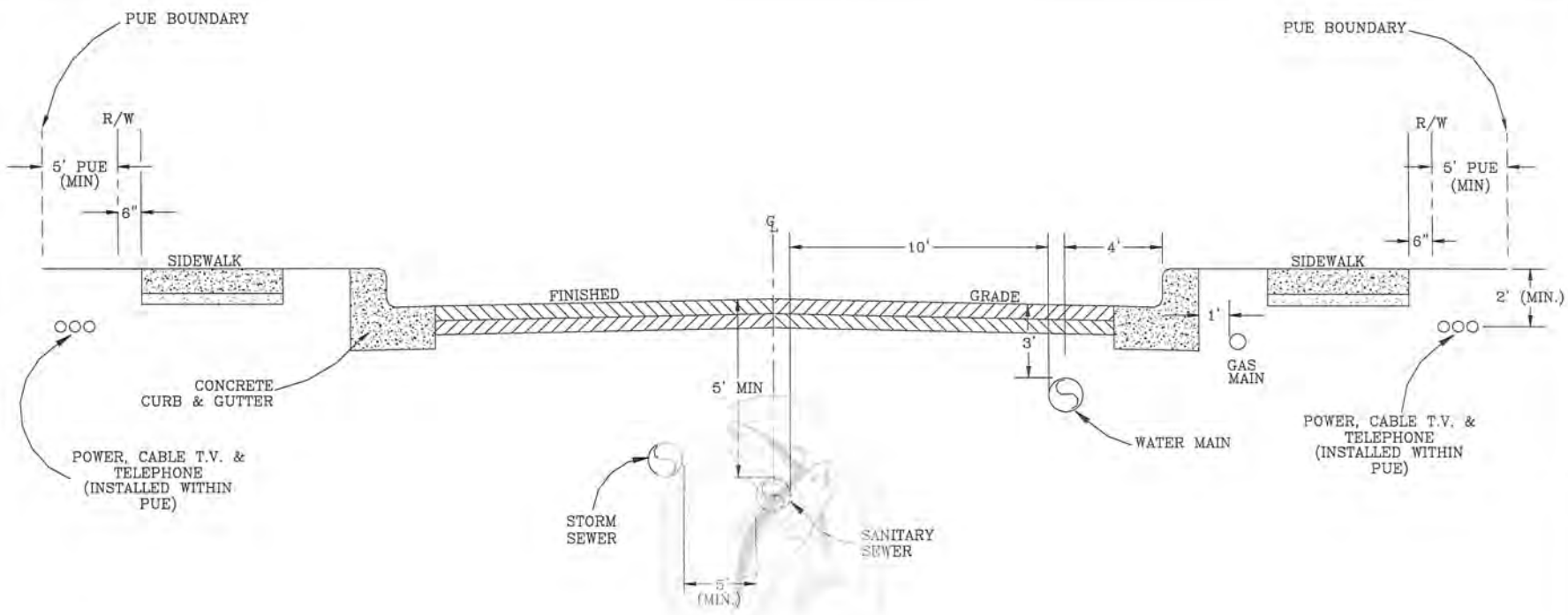


GENERAL NOTES:

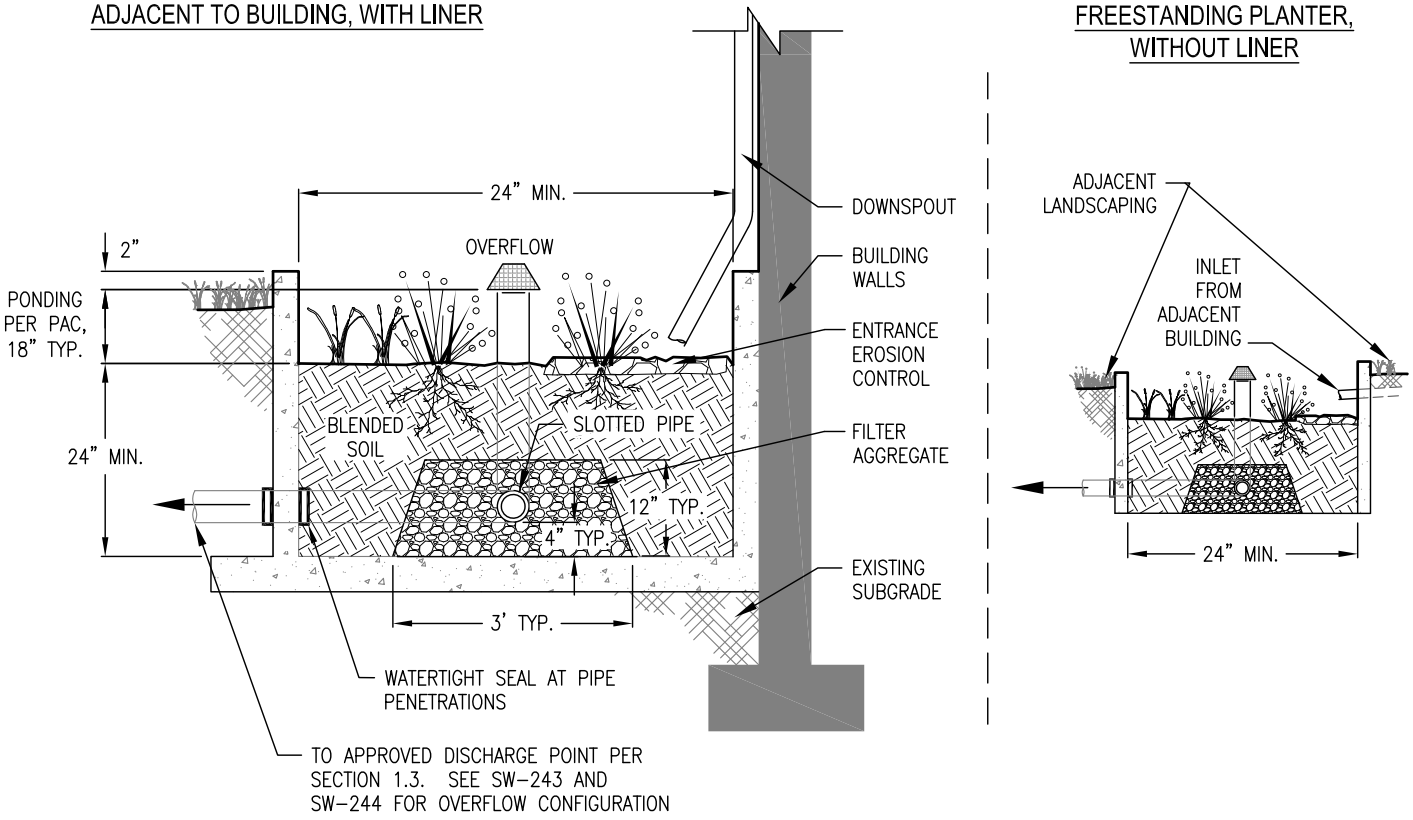
1. VERTICAL AND HORIZONTAL SEPARATION DISTANCES BETWEEN THE WATER, SANITARY AND STORM SEWERS ARE GOVERNED BY THE CITY, THE DEPARTMENT OF ENVIROMENTAL QUALITY, AND STATE HEALTH DIVISION.
2. PUE: PRIVATE UTILITY EASEMENT
3. WATER MAINS SHALL BE LOCATED ON THE SOUTH & EAST SIDE OF THE STREETS WHERE POSSIBLE.
4. STORM SEWER MAINS SHALL BE LOCATED ON THE NORTH & WEST SIDE OF THE STREETS WHERE POSSIBLE.
5. SANITARY SEWER MAINS SHALL BE LOCATED ALONG THE CENTER LINE OF THE STREETS, WHEREVER POSSIBLE. AT POINTS OF STREET INTERSECTIONS, CURVATURES AND TANGENTS, THE SANITARY SEWER MANHOLES CAN BE PLACED SLIGHTLY OFF STREET CENTER LINES WHEN & IF SURVEY CONTROL POINTS ARE REQUIRED.

CITY OF TROUTDALE

PUBLIC/PRIVATE UTILITY LOCATIONS

DATE: UPDATED 1997

DRAWING NO. II – 21



1. Detail intended as an example. Detail must match PAC assumptions and/or design report.
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: No additional waterproofing is needed if the structure is a single pour, monolithic concrete shell.
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: Sizing is per the PAC. 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.
9. Entrance Erosion Control: Install river rock, flagstone, or similar to dissipate the energy of incoming water at entrances and ends of downspout extensions.
10. Check Dams: Spacing per the PAC. Check dam length must equal the full width of the planter.
11. Inspections: Call BDS IVR Inspection Line, (503) 823-7000, request 487. 3 inspections required.

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 –

Bureau of Environmental Services

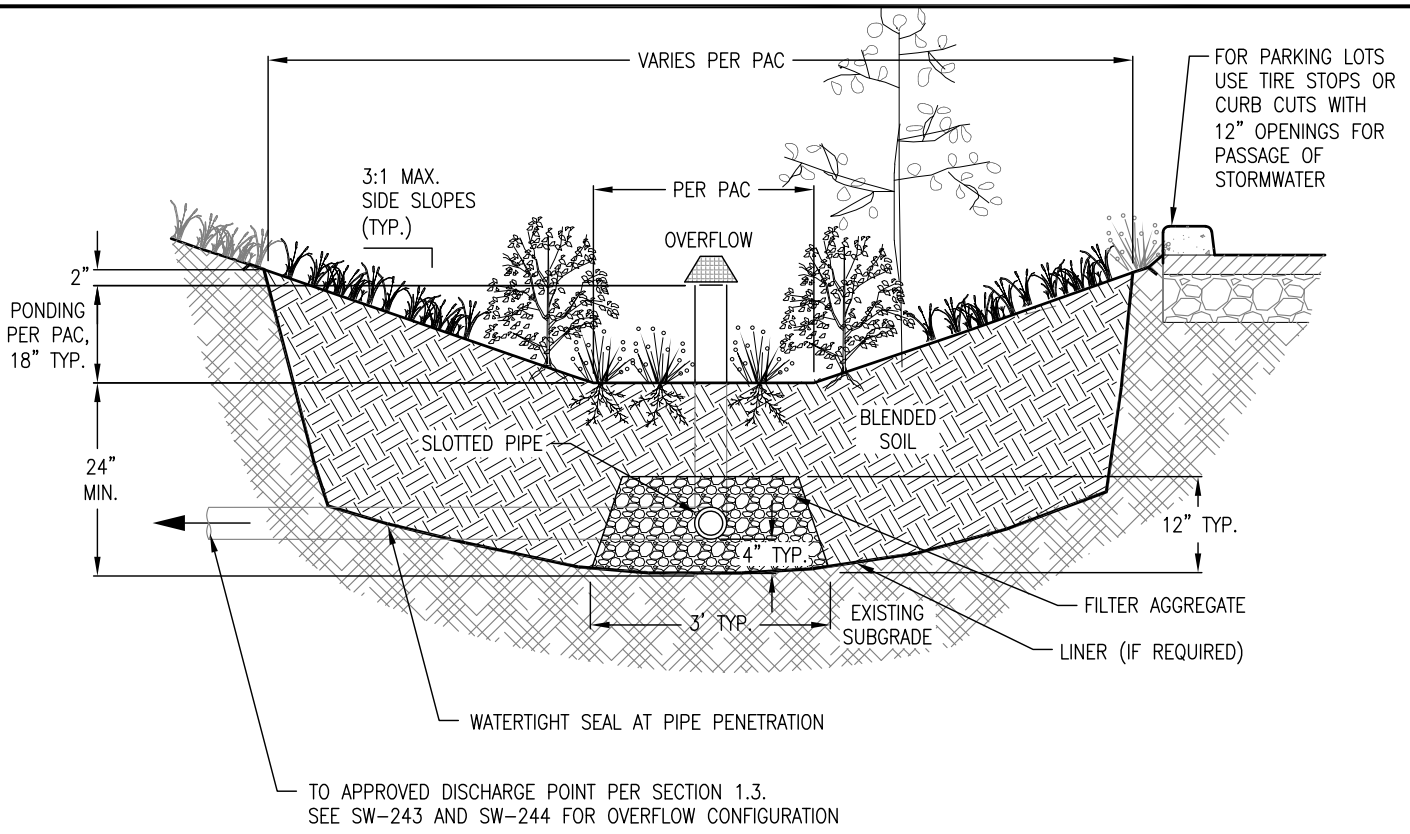
STORMWATER MANAGEMENT TYPICAL DETAILS FOR PRIVATE PROPERTY

PLANTER WITH UNDERDRAIN

SW–231

9–8–20

PRESUMPTIVE AND PERFORMANCE DESIGN APPROACH



1. Detail intended as an example. Detail must match PAC assumptions and/or design report.
2. Setbacks: None required.
3. Overflow: Overflow elevation must allow for 2" of freeboard, minimum. Protect from debris and sediment with strainer or grate.
4. Underdrain System: Sizing is per the PAC. The underdrain must be 4" slotted schedule 40 PVC well casing pipe manufactured with .050" slots, 6 slots per row. 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.
5. Vegetation: Refer to plant list in SWMM Section 3.5. Minimum container size is 1 gal. Number of plantings per 100sf of facility area:
   - Zone A (wet): 80 herbaceous plants OR 72 herbaceous plants and 4 small shrubs.
   - Zone B (moderate to dry): 7 large or small shrubs AND 70 groundcover plants.

   The delineation between Zone A and B shall be either at the outlet elevation or the check dam elevation, whichever is lowest. If project area is over 200sf consider adding a tree.
6. Blended Soil: Use BES standard soil blend for stormwater facilities (SWMM Section 6.3) unless otherwise approved. Install minimum of 24" of blended soil. Waterproof Liner: 30 mil EPDM, HDPE or approved equivalent.
7. Entrance Erosion Control: Install river rock, flagstone, or similar to dissipate the energy of incoming water at entrances and ends of downspout extensions.
8. Check Dams: Spacing per the PAC. Check dam ends must be keyed into the native soil a minimum of 12".
9. Inspections: Call BDS IVR Inspection Line, (503) 823-7000, request 487. 3 inspections required.

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

BASIN WITH UNDERDRAIN

SW-241

9-8-20