

# OR126B & McVAY HWY: MISSISSIPPI AVE – UPRR TRACKS (PHASE 1) Stormwater Management Plan

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PROJECT NUMBER: 656986  
REVISION NO.: 0  
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## Introduction

As part of the Glenwood Refinement Plan, roadway improvements, including increased parking and a multi-use path adjacent to the road, are planned on Franklin Boulevard, also known as Oregon Highway 126 (OR 126) soon to be annexed into Springfield, Oregon. Attachment A shows a map of the project area. Stormwater management facilities are planned to treat runoff from the new and reconstructed impervious surfaces resulting from this project. The proposed stormwater management plan is outlined below.

### A. Project Description

Franklin Blvd is highly industrialized and provides the main transportation link between Eugene and Springfield and the intent of the project is to improve this link for drivers, bicyclists and pedestrians. To do this, improvements to the roadway are planned as well as increased parking, and continuous bicycle and pedestrian facilities. Two roundabouts are to be located along this stretch of road near Oregon-Highway 225, also known as McVay Highway. The two roundabouts are positioned at project locations Eastbound 116+00 and 119+00 (OR 126).

Enhanced stormwater management will accompany the new and redeveloped impervious surface area resulting from the project, using Low Impact Development Approaches (LIDA) stormwater infiltration planters and infiltration rain gardens, in accordance with the guidance in the Glenwood refinement Plan.

### B. Stormwater Quality Design Standards

Stormwater quality design standards for the LIDA alternatives were implemented from the Springfield Engineering Design Standards and Procedures Manual (EDSPM) with reference to the Eugene Stormwater Management Manual (SWMM) for the facility design standards. The project and stormwater facilities will be owned and maintained by the City of Springfield.

Because this project falls within the Glenwood Refinement Plan boundary, each stormwater facility must capture and retain on-site the first one inch of rainfall in a 24-hour period using LIDA. In addition, the water quantity control design goal, using EDSPM guidelines, is to maximize the amount of runoff infiltrated to the greatest extent practicable, taking into account site limitations such as

soil type and lot size and configuration. Treatment will be provided for all impervious area affected by the project.

### C. Stormwater Capacity Design Standards

Stormwater capacity design standards for conveyance followed guidance from the EDSPM. This includes sizing inlets to accept flow from a 10 year storm event. As both McVay Highway and OR 126 are classified as minor arterial streets, inlets are to be located to ensure that the spread shall not run deeper than 4 inches against a curb nor extend more than 2 feet into the travel lane for flows from the 10 year storm event. Pipes are to be 12 inches in diameter and maintain a minimum velocity of 3 feet per second with a Manning's  $n$ -value equal to 0.012. Combination gutter-curb inlets are used where possible, except around the roundabout island where there is a mountable curb and grate inlets will be used.

LIDA facilities have been designed to retain runoff from the 25-year event. The 25-year event will be infiltrated within 24 hours. Runoff in excess of the 25-year event will occupy freeboard volume within the facilities. Once the freeboard volume is exhausted storage of excess runoff will be through surface ponding.

## Setting

### A. Water Resources

Stormwater generated from the modifications and additions of impervious surface is treated and infiltrated into the groundwater.

Projects located in floodplain areas, generally described as the 100-year floodplain, have the potential to raise flood levels and increase floodplain area, posing a risk to adjacent property and habitats, due to project fill material placed within floodplain limits. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) inventory flood zones. The maps covering the project site, located in Attachment B, indicates that the project site is not located in the FEMA 100-year flood plain. The project is not expected to impact the existing FEMA floodplain area.

### B. Affected Area

Proposed roadway improvements will add new and redeveloped impervious surface area. Stormwater runoff, especially from large storm events, will collect roadway contaminants and increase runoff volume and peak flow rate. This can lead to a deterioration of water quality and pose a risk to the aquatic habitat and natural environment. Using Springfield's EDSPM as guidance, runoff from the total project area up to the 25-year event will be controlled and treated prior to infiltration. Because of these measures, no negative impact to receiving waterways is expected.

### C. Climate

The Natural Resource Conservation Service (NRCS) (formerly Soil Conservation Service, SCS) classifies storm rainfall distribution in the project vicinity as Type IA. Total precipitation amounts are available from the Springfield EDSPM. The precipitation amounts are described in Table 1.

**Table 1**

*Total Precipitation for Type 1A 24-Hour Storm Events for  
Springfield, Oregon*

<b>Storm Event</b>	<b>Precipitation (in)</b>
Water Quality *	1.0
2-year	3.3
5-year	3.8
10-year	4.3
25-year	4.8
100-year	5.2

\* Specific to Glenwood Refinement Project

## D. Soils

### NRCS Soil Survey

Soils south and east of the project are primarily composed of gravelly sandy loam or fine sandy loam in hydrologic soil group A, which exhibits high infiltration rates even when thoroughly wet. Soils north of the project are primarily composed of silt loam in hydrologic soil group B with moderate infiltration rates. See Attachment C for the soil maps and soil descriptions, acquired through the NRCS Web Soil Survey (WSS).

### Infiltration Testing

Infiltration rate testing was completed using the *open pit falling head* method, following the procedure laid out in Eugene's SWMM. Three locations were tested. The results are summarized in Table 2 with the Infiltration Test Results Discussion and Illumination Pole Foundation Recommendations Design Memorandum is contained in Attachment D.

**Table 2**

*Infiltration Test Results*

<b>Location</b>	<b>Infiltration Rate (in/hr)</b>
B2	7.2
B7	>1000 gal/hr
B10	0.6

## Stormwater Management

### A. Existing Drainage

The existing Franklin Blvd is crowned and runoff sheet flows into grate inlets or curb inlets along the edge of the roadway where it enters the stormwater sewer main. The gravity main runs along the roadway and generally slopes east to west. The discharge location of the existing storm system is unclear; it may discharge to the Willamette River at some point or it may discharge to drywells.

## **B. Proposed Drainage**

The proposed drainage systems will collect stormwater runoff that sheet flows from the crown of the road and radially from the roundabout shoulder to the center in the project areas. Runoff will be collected and infiltrated in planters and rain gardens. Runoff will enter planters through curb cut inlets. Drainage to rain gardens will be collected by an enclosed stormwater system flowing through a pollution control manhole prior to entering the rain garden. Pervious concrete pavement will be used in the access road on the north side of the project. The two possible treatment facilities are described below.

### **Inlet Placement**

Both McVay Highway and OR 126 are classified as minor arterial streets. Following the EDSPM, most inlets have been located to ensure that the spread shall not run deeper than 4 inches against a curb nor extend more than 2 feet into the travel lane for flows from the 10 year storm event.

Due to the configuration of the road and placement of the planters, there are a few cases where the spread extends more than 2 feet into the travel lane. The proximity of the traveled way to the curb precludes the use of a depressed gutter section at the curb cuts, since it would adversely affect ride quality. Larger spread occur in locations where the first curb cut of a planter collects flow from a large area that cannot be captured elsewhere. While measures have been taken to reduce the flow to the first curb cut of a planter, such as increasing the number of curb cuts in a planter upstream so as to minimize the bypass, in some cases these efforts could not completely mitigate the flow. For example, as shown in Figure 1, PA-8 collects direct runoff from over 2,500 sf of roadway. This flow cannot be reduced as there is a driveway upstream of the planter. Bypass flows from PA-9 and PA-10 have been minimized so as to not exacerbate the spread at PA-8 and similar locations.

The recurrence interval for the design is 10-year for on-grade inlets and 25-year for local sag point inlets as described in the EDSPM. See Attachment E for pipe conveyance and inlet spacing calculations.

### **Pervious Concrete**

Pervious concrete pavement will be used in the access road on the north side of OR126 from WB 210+22 to 214+31, following guidance from the SWMM. Using a pervious surface on the 7,344 sf of access road will allow rainfall to immediately filter into the pavement. The proposed pervious concrete will be 9" thick with a 12" open graded aggregate base for storage before infiltration. This reduces the overall amount of impervious area within the project limits.

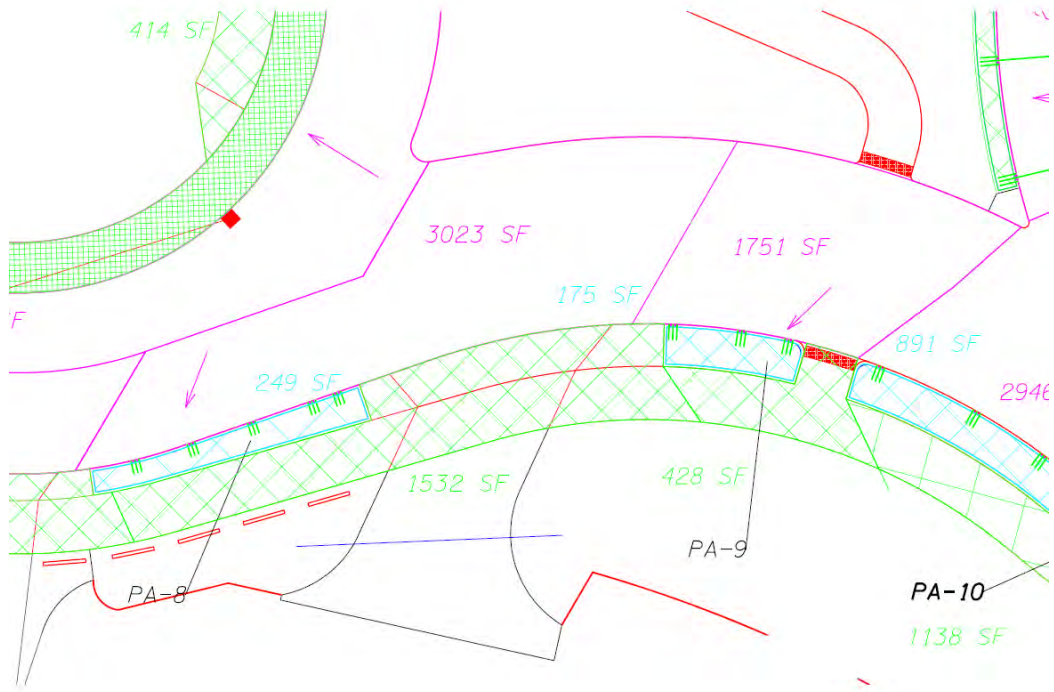


Figure 1 – The first curb cut in Planter PA-8 collects runoff from over 2,500 sf upstream. Bypass flow from Planters PA-10 and PA-9 have been minimized and two curb cuts are placed as far upstream as possible to mitigate the spread into the travel lane.

### C. Water Quality

Water quality has the potential to be impacted by project execution. Construction activities are temporary in nature and can negatively affect water quality. Sedimentation from ground disturbance, such as grading and filling operations and clearing activities, as well as spills of fuel and oil or other chemicals from machinery equipment or construction materials are typical examples of potential construction impacts. Discharges of these pollutants to surface waters from construction activities and accidents (especially when carried by runoff from storm events) are potentially significant impacts. These risks are short-term, and will cease upon completion of the project.

Operation and maintenance activities associated with the new roadway surfaces pose a risk to water quality. Common pollutants from roadway activity and infrastructure consist of suspended solids, polycyclic aromatic hydrocarbons (whether leaked directly or through emissions air deposited), heavy metals (such as zinc, copper, iron), and lubricants (grease and oils). When carried by stormwater runoff to receiving waterways, this negatively impacts water quality and poses risk to the environment and aquatic organisms.

The water quality treatment requirement, as directed by EDSPM guidelines and Glenwood Refinement Plan, is to capture and retain on-site a minimum of 1 inch of rainfall in a 24-hour period using on-site LIDA systems. All facilities are designed in accordance with Eugene's SWMM with a few variances described in a memo sent to and approved by the City of Springfield and summarized in Table 3. The full memo can be found in Attachment F. Where feasible, facilities are designed with a 10% extra capacity. All will allow full infiltration of the 25-year storm event within 24 hours.

Treatment will be provided for nearly all the developed project impervious area by directing runoff to one of a number of planters and rain gardens for full infiltration into the ground. These facilities are identified in Attachment G and described below. Impervious area on the far west end of the project where it ties into the existing OR 126 roadway will be directed to inlets connected to the existing storm sewer. See Attachment G for facility sizing calculations.

**Table 3***Variances From City of Eugene's SWMM*

<b>City of Eugene SWMM Criteria</b>	<b>Proposed Design</b>	<b>Rationale</b>
"Planters located next to public sidewalks or curbs shall have a minimum 12 inch-wide flat area between the planter wall and the sidewalk or curb." (from 2.3.11)	There will be no distinct "flat area" separating planter and sidewalk.	SWMM is not clear on this requirement. No separation is shown in the SWMM standard details for stormwater planters. Additionally, edge protection, as a curb, will be provided adjacent to bike and pedestrian paths. Adjoining sidewalks are also 10-feet wide, which provides additional protection over standard sidewalk widths. The additional treatment area is necessary to provide the requisite storage within the right-of-way.
Infiltration Rain garden "storage depth shall be no more than 12 inches." (2.3.9)	Two rain gardens will have 24" storage depth. One rain garden will have a storage depth of 25"	All rain gardens are designed to fully infiltrate the 25-year storm event. A 12-inch or less depth would require and overflow structure that would require a new stormwater outfall to the river. Increasing their depth also provides for a centralized location to treat the stormwater runoff, thus reducing the number of required rain gardens.
No maximum total depth is explicitly required, however Eugene details imply a maximum of 14-inches. (Appendix B)	Selected rain gardens will be 4-feet deep.	This is necessary to allow areas of the roadway to be piped to the rain gardens, thus again allowing for the centralized treatment of the stormwater runoff. Otherwise the runoff around the truck aprons, for example could not be conveyed to a site for treatment.

### **Infiltration Rain Gardens**

Three rain gardens are planned to collect and treat stormwater before allowing full infiltration into the ground. Prior to entering each rain garden, runoff will pass through a pollution control manhole.

#### ***Rain Garden 1 (RG-1)***

A rain garden is proposed in the center of the Brooklyn Street Roundabout. Runoff from the travel lanes surrounding the roundabout will be directed into inlets and piped to the rain garden. Though the total depth is four feet, the storage depth of the rain garden (potential depth of the water) will be 24". A total of 11,295 sf of runoff will be treated and infiltrated in RG-1. The facility is sized for an additional 6% capacity.

#### ***Rain Garden 2 (RG-2)***

A second rain garden is proposed in the center of the McVay Highway Roundabout. Runoff from the travel lanes surrounding the roundabout will be directed into inlets and piped to the rain garden. Though the total depth is four feet, the storage depth of the rain garden will be 24". A total of 20,933 sf will be treated and infiltrated in RG-2. RG-2 is sized for an additional 10% capacity.

#### ***Rain Garden 3 (RG-3)***

A third rain garden is proposed in southeast of the McVay Highway Roundabout. Runoff from the travel lanes along the southeast side of the roundabout will be directed into inlets and piped to the rain garden. Though the total depth is four feet, the storage depth of the rain garden will be 24". A total of 32,807 sf will be treated and infiltrated in RG-3. RG-3 is sized for an additional 10% capacity.

### **Stormwater Planters**

The remaining impervious area will be treated by one of thirteen total stormwater planters. Eleven will have 12" ponding depth, two will have a 9" ponding depth, and one will have 7" of ponding depth. The two with 9" ponding depth have relatively large amounts of space available for the corresponding impervious area compared to the deeper planters. The planter with 7" ponding depth is composed of three sub-planters that will be hydraulically connected to allow flow to reach hydraulic equilibrium and be fully treated.

#### ***12" Stormwater Planters (PA-X)***

Eleven stormwater planters with a storage depth of 12" are proposed throughout the project. Runoff will flow into these planters via curbcuts. The number of curbcuts has been optimized with as few openings as possible to meet the spread limitations where feasible. A total of 47,801 sf will be treated and infiltrated into 12" planters. Planters are sized for an additional 10% capacity except as noted below and in Table 4.

#### ***PA-3***

Planter PA-3 is designed to treat 8,970 sf of runoff with a storage depth of 12.3" for the 25-year storm event. Additional runoff (via bypass flows) has been minimized however due to the configuration of the roadway and sidewalk, notably the bus stop just east of the planter and its location in a sag, the required storage depth must be greater than 12". This planter does not have additional capacity. Full infiltration is expected to occur within 24 hours.

#### ***PA-7 and PA-8***

Planter PA-8 is designed to treat 2,700 sf of runoff for the 25-year storm event. However, approximately 4,500 sf of runoff is expected to drain to that planter. The additional runoff will drain as bypass flow to PA-7. In addition to bypass runoff from PA-8, PA-7 is sized with an additional 10%



capacity and will treat the full amount with a 12" storage depth. Full infiltration is expected within 24 hours.

***PA-2 and PA-9***

Planters PA-2 and PA-9 are designed with no additional capacity.

***9" Stormwater Planters (PB-X)***

Two stormwater planters with a storage depth of 9" are proposed the project. The planter in the median, west of the left-turn lane onto Brooklyn St. is divided into sub-planters so that the requirements for illumination and tree plantings can also be met. Runoff will flow into these planters via curbcuts. The number of curbcuts has been optimized with as few openings as possible to meet the spread limitations where feasible. A total of 10,527 sf will be treated and infiltrated into 12" planters.

***7" Stormwater Planters (PC-X)***

One stormwater planter with a storage depth of 7" is proposed in the median, east of the left turn lane onto Brooklyn St. The planter will be divided into sub-planters so that the requirements for illumination and tree plantings can also be met. The sub-planters will be of varying depth with respect to the top of curb but the elevation of the treatment media will be consistent at 440.95 ft in all three sub-planters. Runoff will flow into these planters via curbcuts and a V-cut ditch connected to PC-1A. This V-cut will accept runoff from the westbound left turn lane as well as the eastbound roadway and drain it to planter PC-1A. The sub-planters will be hydraulically connected by two 12" pipes, one between PC-1A and PC-1B and one between PC-1B and PC-1C. This will allow the water to freely flow between the sub-planters and allow full infiltration. The number of curbcuts has been optimized with as few openings as possible to meet the spread limitations where feasible. A total of 10,917 sf will be treated and infiltrated into the 7" sub-planters.

**Table 4***Summary of Stormwater Treatment Facilities*

Facility ID	Contributing Surface Area (sf)	Facility Bottom Area* (sf)	Facility Storage Depth (in)
PA-1	1,447	190	12.0
PA-2	3,543	300 <sup>†</sup>	12.0
PA-3	8,970 <sup>†</sup>	741 <sup>†</sup>	12.3
PA-4	5,234	762	12.0
PA-5	3,085	821	12.0
PA-6	951	290	12.0
PA-7	6,293	659	12.0
PA-8	2,700	219 <sup>†</sup>	12.0
PA-9	2,170	175 <sup>†</sup>	12.0
PA-10	6,069	891	12.0
PA-11	6,653	699	12.0
PB-1	10,527	2,027	9.0
PB-2	3,124	316	9.0
PC-1	10,917	1,215	7.0
RG-1	11,295	333 <sup>±</sup>	24.0
RG-2	20,933	1,054	24.0
RG-3	32,807	1,416	24.0

\* Sized for 10% additional capacity except where noted

† Not sized for additional capacity

± Sized for 6% additional capacity

**Filterra®**

There are three locations throughout the project that, due to limited right-of-way, space for stormwater planters is not available. In those locations, runoff will be treated with a Filterra® bioretention treatment system. In this system, runoff drains from the roadway to a curb-inlet and flows through a treatment media contained in a vault-like container. The treated water flows to a drywell where it will infiltrate into the soils below. The locations and treated areas are summarized in Table 5. A total of 19,835 sf will be treated by a Filterra system and infiltrated through a drywell.

**Table 5***Summary of Filterra Bioretention Systems*

<b>Facility ID</b>	<b>Location</b>	<b>Contributing Surface Area (sf)</b>	<b>Facility Size</b>
Filterra 1	WB 209+28.90	4,674	4'x4'
Filterra 2	EB 108+09.86	8,790	8'x4'
Filterra 3	MCV 24+88.35	4,953	4'x12'

#### D. Spill Response

As with any public system operations is required to have a spill response plan. Any potential contaminants released will flow to the planters and rain gardens. This may necessitate removal and replacement of the growing medium depending on the type and quality of the potential contaminant. A Spill Response Form is contained in Attachment H.

## Summary

Proposed roadway improvements will add new and redeveloped impervious surface area to Franklin Blvd. Stormwater generated by the increased new impervious area will produce increased runoff volume and peak flow rate that will all be infiltrated up to the 25-year event. The stormwater will also pick up roadway contaminants and pollutants that will be treated prior to infiltration. Using Springfield's EDSPM and the Eugene Stormwater Management Manual as a guidance documents, the runoff will be controlled, treated and infiltrated meeting all applicable regulations. As a result of the measures described in this memorandum, no negative impact to receiving waterways is expected.

## References

City of Eugene. 2014. *Stormwater Management Manual*.

City of Springfield. 2012. *Engineering Design Standards and Procedures*.

City of Springfield. 2014. *Glenwood Refinement Plan*.

Contech Engineered Solutions. 2016. *Filtterra® Bioretention System Solutions Guide*.

Federal Emergency Management Agency (FEMA). *Flood Map Service Center*. Available online at <https://msc.fema.gov/portal/>. Accessed 08/12/2015.

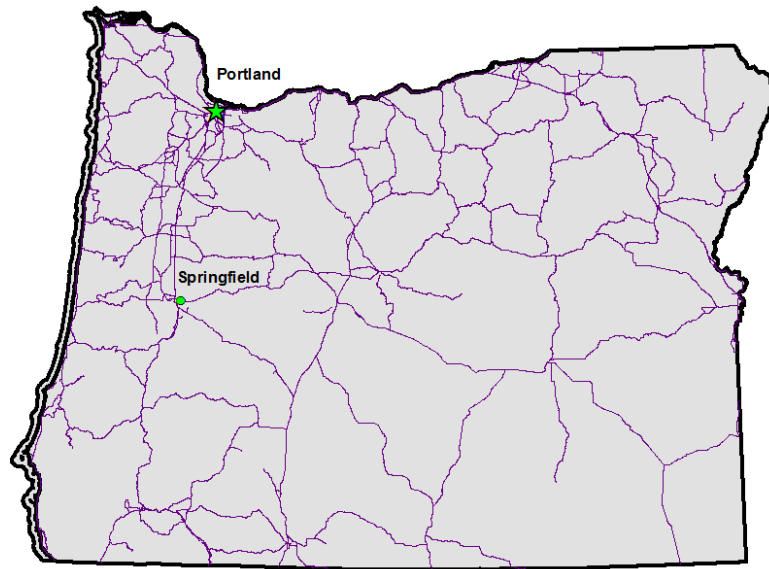
Oregon Department of Transportation (ODOT). 2014. *Hydraulics Manual*.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. *Web Soil Survey*. Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed 08/12/2015.

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## Attachment A

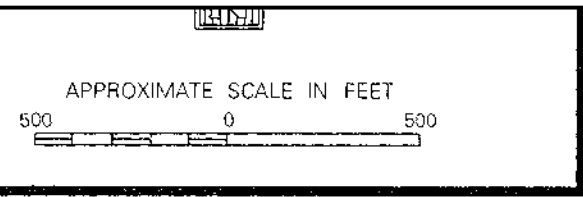
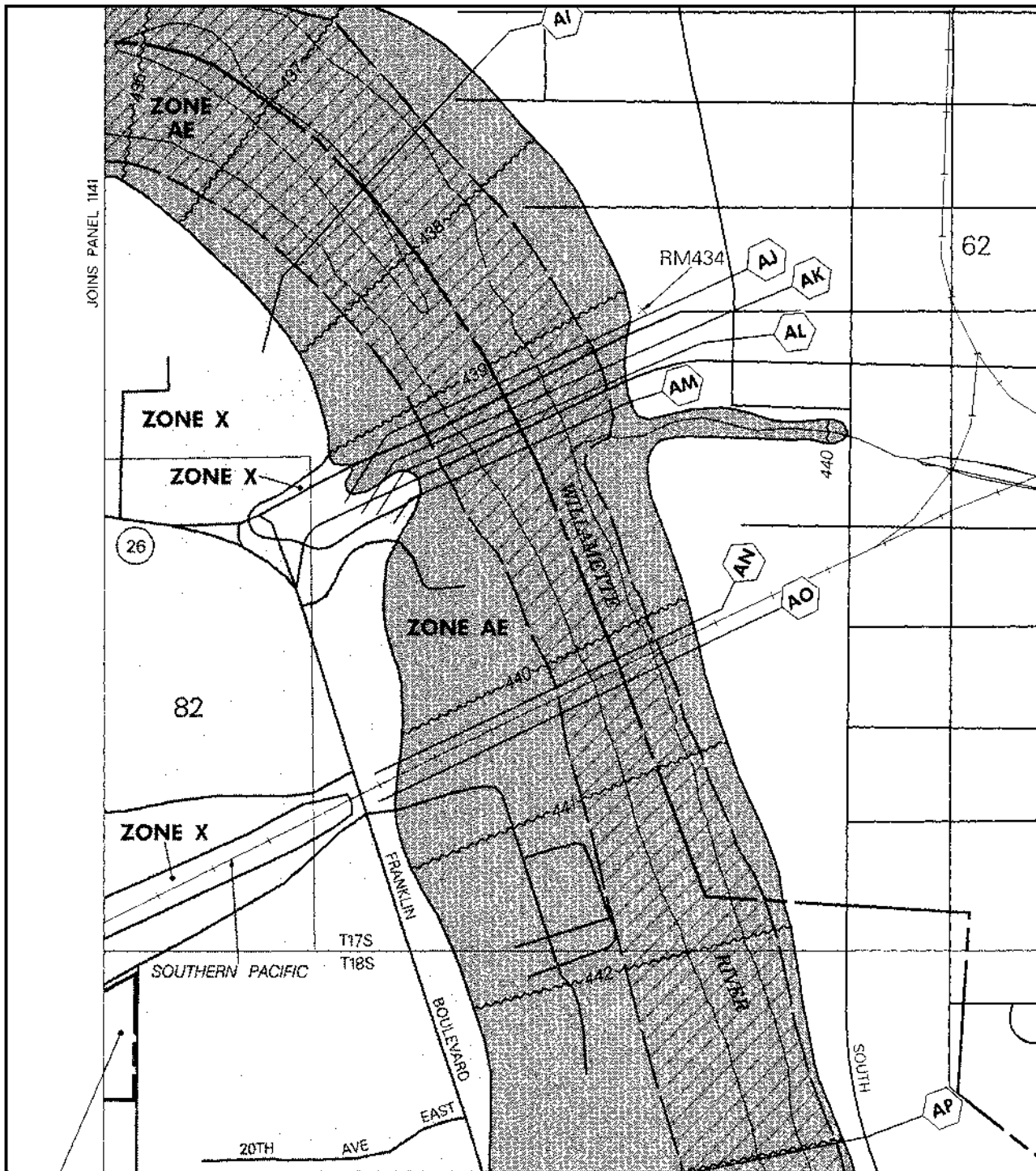
### Project Vicinity Map



## Attachment B

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# FEMA Flood Plain Maps and Profiles



**NATIONAL FLOOD INSURANCE PROGRAM**

**FIRM**  
**FLOOD INSURANCE RATE MAP**

**LANE COUNTY,  
OREGON AND  
INCORPORATED AREAS**

**PANEL 1142 OF 2975**  
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS COMMUNITY	NUMBER	PANEL	SUFFIX
EUGENE CITY OF	410322	1142	F
SPRINGFIELD CITY OF	410592	1142	F
LANE COUNTY UNINCORPORATED AREAS	410599	1142	F

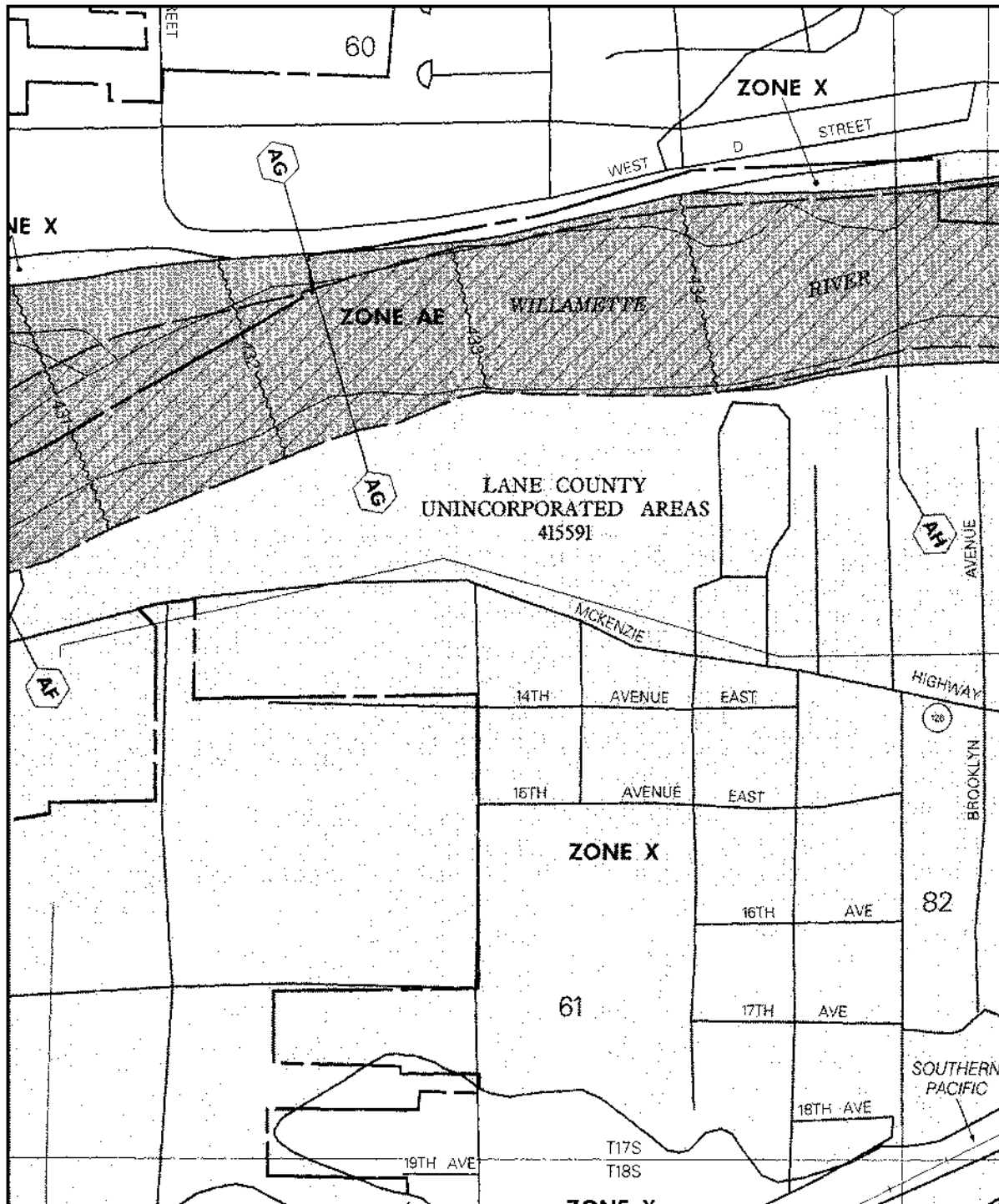
**MAP NUMBER  
41039C1142 F**


**EFFECTIVE DATE:  
JUNE 2, 1999**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)







APPROXIMATE SCALE IN FEET

500 0 500

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**NATIONAL FLOOD INSURANCE PROGRAM**

**FIRM**

**FLOOD INSURANCE RATE MAP**

**LANE COUNTY, OREGON AND INCORPORATED AREAS**

**PANEL 1141 OF 2975**

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:


COMMUNITY	NUMBER	PANEL	SHEET
CLATSOP CITY OF	41072	1141	F
SPRINGFIELD CITY OF	41592	1141	F
LANE COUNTY UNINCORPORATED AREAS	415591	1141	F

**MAP NUMBER**

**41039C1141 F**

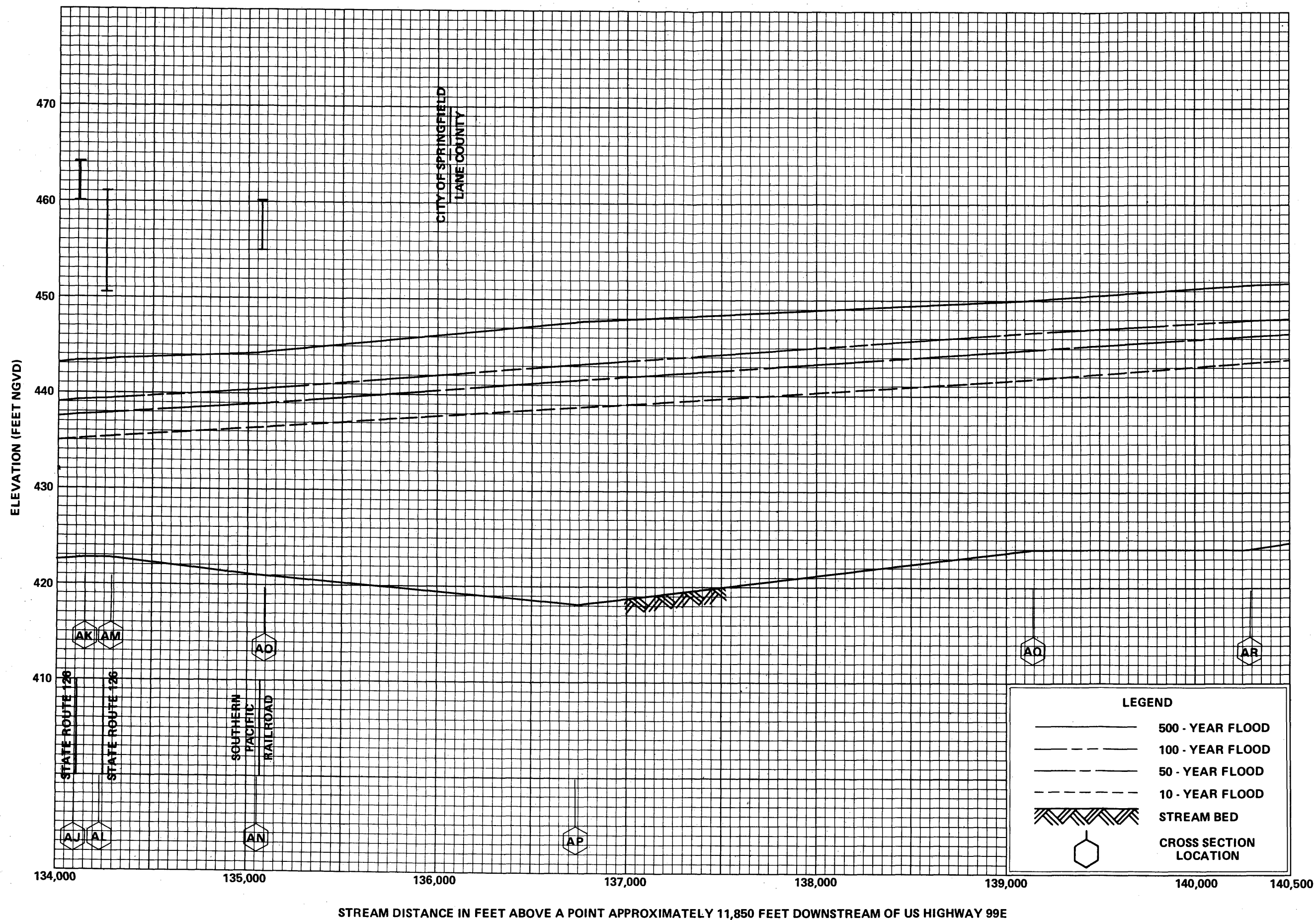
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# FLOOD PROFILES

WILLAMETTE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

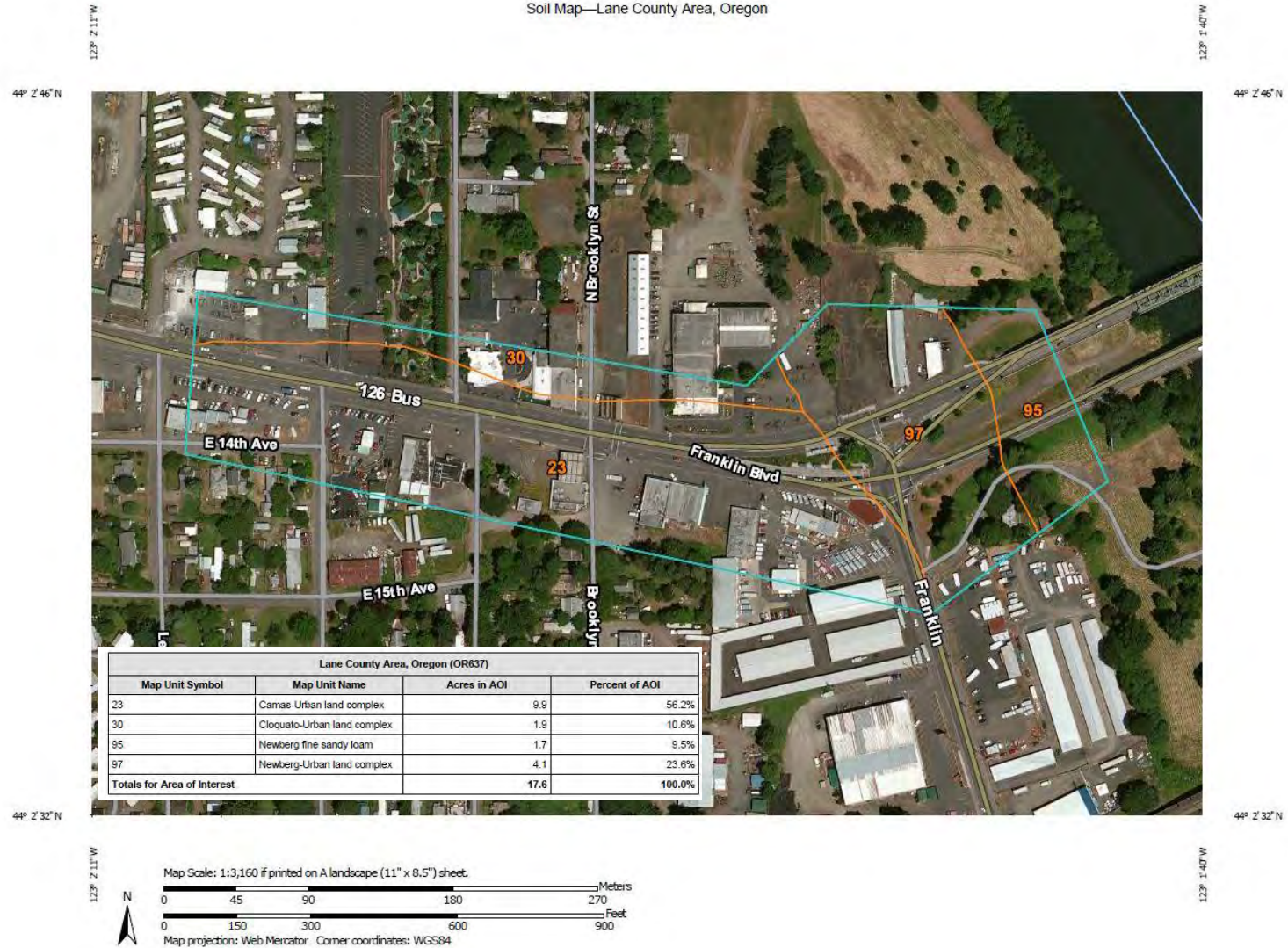
LANE COUNTY, OR  
AND INCORPORATED AREAS

193P

## Attachment C

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# NRCS Web Soil Survey Map and Soil Type Descriptions



**Attachment C**  
NRCS Soil Survey Map



## Lane County Area, Oregon

### 23—Camas-Urban land complex

#### Map Unit Setting

*National map unit symbol:* 235y

*Elevation:* 400 to 1,200 feet

*Mean annual precipitation:* 40 to 60 inches

*Mean annual air temperature:* 52 to 54 degrees F

*Frost-free period:* 165 to 210 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Camas and similar soils:* 50 percent

*Urban land:* 40 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Camas

##### Setting

*Landform:* Flood plains

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Sandy and gravelly alluvium

##### Typical profile

*H1 - 0 to 14 inches:* gravelly sandy loam

*H2 - 14 to 60 inches:* very gravelly sand

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* 9 to 17 inches to strongly contrasting textural stratification

*Natural drainage class:* Excessively drained

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* Rare

*Frequency of ponding:* None

*Available water storage in profile:* Very low (about 1.1 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 4w

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* A

*Other vegetative classification:* Well drained < 15% Slopes  
(G002XY002OR)

### **Description of Urban Land**

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8

### **Data Source Information**

Soil Survey Area: Lane County Area, Oregon

Survey Area Data: Version 11, Sep 15, 2014



## Lane County Area, Oregon

### 30—Cloquato-Urban land complex

#### Map Unit Setting

*National map unit symbol:* 2367

*Elevation:* 300 to 800 feet

*Mean annual precipitation:* 40 to 60 inches

*Mean annual air temperature:* 52 to 54 degrees F

*Frost-free period:* 165 to 210 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Cloquato and similar soils:* 45 percent

*Urban land:* 40 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Cloquato

##### Setting

*Landform:* Flood plains

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Alluvium from mixed sources

##### Typical profile

*H1 - 0 to 14 inches:* silt loam

*H2 - 14 to 50 inches:* silt loam

*H3 - 50 to 60 inches:* stratified sand to silt loam

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):*

Moderately high to high (0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* Occasional

*Frequency of ponding:* None

*Available water storage in profile:* High (about 11.0 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2w

*Hydrologic Soil Group:* B

*Other vegetative classification:* Well drained < 15% Slopes  
(G002XY002OR)

### **Description of Urban Land**

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8

### **Data Source Information**

Soil Survey Area: Lane County Area, Oregon

Survey Area Data: Version 11, Sep 15, 2014



## Lane County Area, Oregon

### 97—Newberg-Urban land complex

#### Map Unit Setting

*National map unit symbol:* 239x

*Elevation:* 300 to 850 feet

*Mean annual precipitation:* 40 to 60 inches

*Mean annual air temperature:* 52 to 54 degrees F

*Frost-free period:* 165 to 210 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Newberg and similar soils:* 50 percent

*Urban land:* 35 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Newberg

##### Setting

*Landform:* Flood plains

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Recent silty alluvium

##### Typical profile

*H1 - 0 to 14 inches:* fine sandy loam

*H2 - 14 to 65 inches:* fine sandy loam

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* Occasional

*Frequency of ponding:* None

*Available water storage in profile:* Moderate (about 8.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 2w

*Land capability classification (nonirrigated):* 2w

*Hydrologic Soil Group:* A

#### Description of Urban Land

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated): 8*

## **Data Source Information**

Soil Survey Area: Lane County Area, Oregon  
Survey Area Data: Version 11, Sep 15, 2014

## Lane County Area, Oregon

### 95—Newberg fine sandy loam

#### Map Unit Setting

*National map unit symbol:* 239v

*Elevation:* 290 to 850 feet

*Mean annual precipitation:* 40 to 60 inches

*Mean annual air temperature:* 52 to 54 degrees F

*Frost-free period:* 165 to 210 days

*Farmland classification:* Prime farmland if irrigated

#### Map Unit Composition

*Newberg and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Newberg

##### Setting

*Landform:* Flood plains

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Recent silty alluvium

##### Typical profile

*H1 - 0 to 14 inches:* fine sandy loam

*H2 - 14 to 65 inches:* fine sandy loam

##### Properties and qualities

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* Occasional

*Frequency of ponding:* None

*Available water storage in profile:* Moderate (about 8.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 2w

*Land capability classification (nonirrigated):* 2w

*Hydrologic Soil Group:* A

## Data Source Information

Soil Survey Area: Lane County Area, Oregon

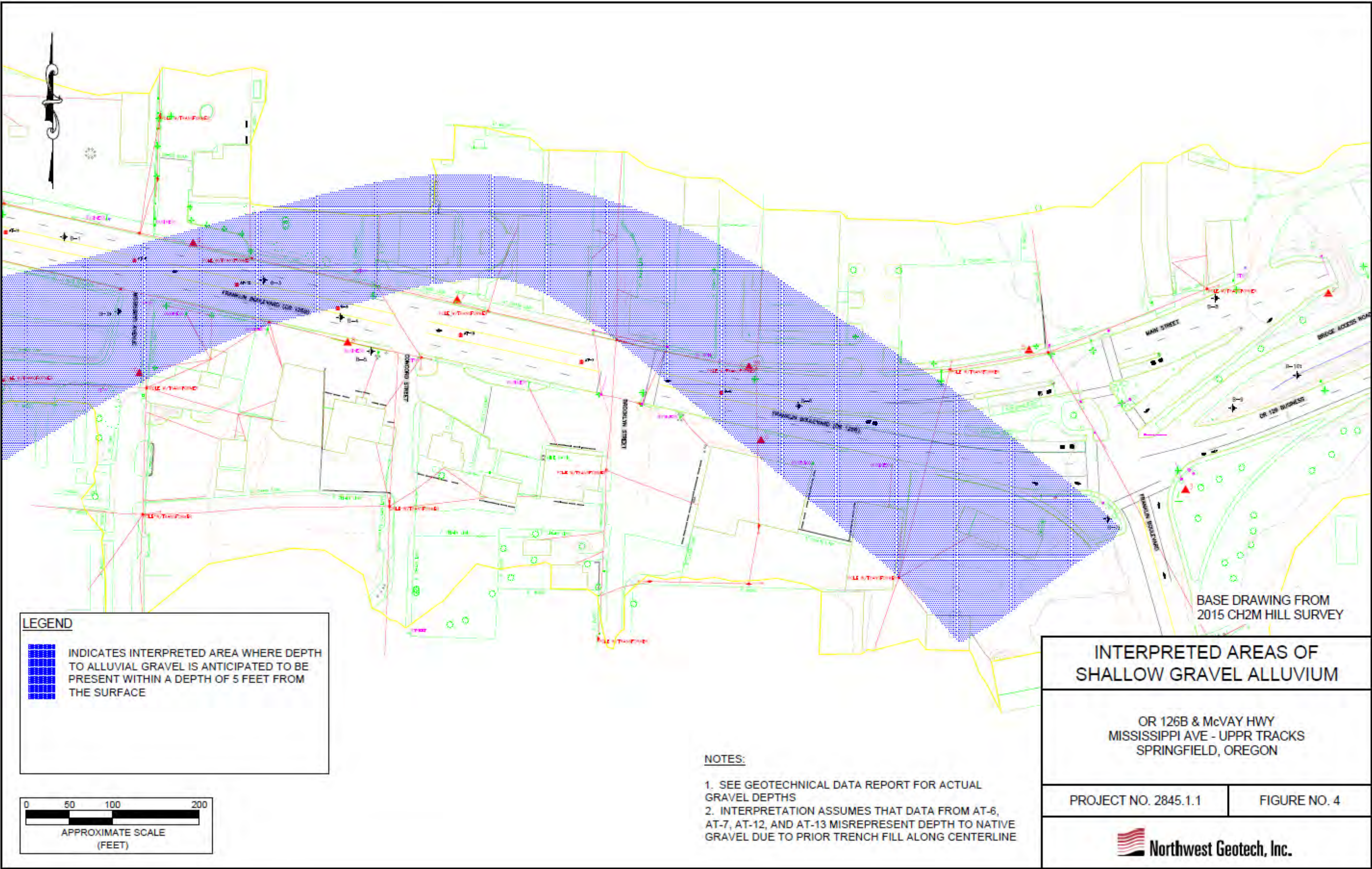
Survey Area Data: Version 11, Sep 15, 2014

## Attachment D

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# Geotechnical Draft Design Memorandum







## Attachment E

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# Inlet and Conveyance Calculations

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OR126 Inlet Calcs

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OR126 Inlet Calcs



STORMWATER DRAINAGE DESIGN  
INLET/SPREAD CALCULATIONS- OR126 and McVay Highway

Project:		Franklin Blvd																																						
Project Number:		656986																																						
Location	Side	Inlet No.	From STA	To STA	Section Width (ft)	Section Length (ft)	Area (ft <sup>2</sup> )	Area (ac)	C	CA	Tc to CO (min)	Intensity I (in/hr)	Flow Q (cfs)	Slope Pavement	Pavement	S'w ft/ft	Equiv. Cross Se	Pavement Manning's n	Prev. Bypass Qb (cfs)	Total Gutter Qg (cfs)	Depth D (ft)	Opening Length L (ft)	L <sub>T</sub> (ft)	Spread Calc'd T (ft)	Max T <sub>MAX</sub> (ft)	Check	W/T	Inlet Type	Gutter Width W (ft)	Gutter Velocity Vg (ft/sec)	Eo	Efficiency E	Rf	Rs	Intercept Flow Qi (cfs)	Bypass Flow (cfs)	Bypass %	Bypass Check	Remarks	
														Long. SL (ft/ft)	Cross Sx (ft/ft)			0.016																						
16+60	Rt	3-3	16+72.00	16+50.00	1.0	0	0	0.030	0.90	0.03	5.00	2.45	0.07	0.000	0.020	0.000	0.02	0.02	0.11	0.18	0.12	1.50	2.30	5.85	3.42	Wide Spread	0.24	Curb	1.43		1.00				0.18	N/A		Spread Calculated using Flowmater- Attached; Sag located at EB2 16+60		
PA-1 to PA-2 STA WB2 14+75 to 16+25																																								
15+37.00	Rt	2-1	16+05.00	15+37.00	1.0	0	0	0.029	0.90	0.03	5.00	2.10	0.05	0.004	0.015	0.000	0.0150	0.016	0.00	0.05	0.05	1.50	4.87	3.54	3.42	Wide Spread	0.40	Curb	1.43	0.58	0.75	0.48	0.95	0.40	0.03	0.03	52%	Check Inlet Type		
14+76.00	Rt	2-2	15+37.00	14+76.00	1.0	0	0	0.022	0.90	0.02	5.00	2.10	0.04	0.004	0.020	0.000	0.0200	0.016	0.03	0.07	0.06	1.50	4.53	3.23	3.42	OK	0.44	Curb	1.43	0.66	0.79	0.51	0.94	0.41	0.04	0.03	49%	Check Inlet Type		
Sag in PA-1																																								
14+40.00	Rt	1-1	14+76.00	14+20.00	1.0	0	0	0.018	0.90	0.02	5.00	2.45	0.04	0.000	0.020	0.000	0.02	0.02	0.03	0.07	0.06	1.50	1.58	3.12	3.42	OK	0.46	Curb	1.43		1.00				0.07	N/A		Spread Calculated using Flowmater- Attached; Sag located at WB2 14+40		
PB-1 STA EB																																								
111+18.00	Lt	B-3	111+10.00	111+18.00	1.0	0	0	0.004	0.90	0.00	5.00	2.10	0.01	0.005	0.020	0.000	0.0200	0.016	0.00	0.01	0.03	1.50	1.99	1.31	3.42	OK	1.09	Curb	1.43	0.44	1.00	0.92	0.96	0.60	0.01	0.00	8%	OK		
111+34.00	Lt	C-1	111+18.00	111+34.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.005	0.020	0.000	0.0200	0.016	0.00	0.02	0.03	1.50	2.71	1.73	3.42	OK	0.83	Curb	1.43	0.52	0.99	0.77	0.95	0.52	0.01	0.00	23%	Check Inlet Type		
111+47.00	Lt	C-2	111+34.00	111+47.00	1.0	0	0	0.007	0.90	0.01	5.00	2.10	0.01	0.005	0.020	0.000	0.0200	0.016	0.00	0.02	0.04	1.50	2.79	1.77	3.42	OK	0.81	Curb	1.43	0.53	0.99	0.75	0.95	0.51	0.01	0.00	25%	Check Inlet Type		
111+60.00	Lt	C-3	111+47.00	111+60.00	1.0	0	0	0.007	0.90	0.01	5.00	2.10	0.01	0.005	0.020	0.000	0.0200	0.016	0.00	0.02	0.04	1.50	2.83	1.79	3.42	OK	0.80	Curb	1.43	0.54	0.99	0.74	0.95	0.51	0.01	0.00	26%	Check Inlet Type		
111+77.00	Lt	D-1	111+60.00	111+77.00	1.0	0	0	0.009	0.90	0.01	5.00	2.10	0.02	0.005	0.020	0.000	0.0200	0.016	0.00	0.02	0.04	1.50	3.09	1.94	3.42	OK	0.74	Curb	1.43	0.57	0.97	0.70	0.95	0.48	0.02	0.01	30%	Check Inlet Type		
111+92.00	Lt	D-2	111+77.00	111+92.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.005	0.020	0.000	0.0200	0.016	0.01	0.02	0.04	1.50	3.09	1.94	3.42	OK	0.74	Curb	1.43	0.57	0.97	0.70	0.95	0.48	0.02	0.01	30%	Check Inlet Type		
112+07.00	Lt	D-3	111+92.00	112+07.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.005	0.020	0.000	0.0200	0.016	0.01	0.02	0.04	1.50	3.10	1.95	3.42	OK	0.73	Curb	1.43	0.57	0.97	0.70	0.95	0.48	0.02	0.01	30%	Check Inlet Type		
112+16.00	Lt	E-1	112+07.00	112+16.00	1.0	0	0	0.005	0.90	0.00	5.00	2.10	0.01	0.005	0.020	0.000	0.0200	0.016	0.01	0.02	0.03	1.50	2.73	1.74	3.42	OK	0.82	Curb	1.43	0.53	0.99	0.76	0.95	0.52	0.01	0.00	24%	Check Inlet Type		
112+32.00	Lt	E-2	112+16.00	112+32.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.005	0.020	0.000	0.0200	0.016	0.00	0.02	0.04	1.50	2.86	1.88	3.42	OK	0.76	Curb	1.43	0.53	0.98	0.74	0.95	0.51	0.01	0.00	26%	Check Inlet Type		
112+47.00	Lt	E-3	112+32.00	112+47.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.005	0.020	0.000	0.0200	0.016	0.00	0.02	0.04	1.50	2.93	1.92	3.42	OK	0.74	Curb	1.43	0.54	0.97	0.73	0.95	0.51	0.01	0.01	27%	Check Inlet Type		
112+65.00	Lt	F-1	112+47.00	112+65.00	1.0	0	0	0.010	0.90	0.01	5.00	2.10	0.02	0.005	0.020	0.000	0.0200	0.016	0.01	0.02	0.04	1.50	3.18	2.07	3.42	OK	0.69	Curb	1.43	0.57	0.96	0.68	0.95	0.48	0.02	0.01	32%	Check Inlet Type		
112+79.00	Lt	F-2	112+65.00	112+79.00	1.0	0	0	0.007	0.90	0.01	5.00	2.10	0.01	0.005	0.020	0.000	0.0200	0.016	0.01	0.02	0.04	1.50	2.98	1.95	3.42	OK	0.73	Curb	1.43	0.55	0.97	0.72	0.95	0.50	0.02	0.01	28%	Check Inlet Type		
PC-1 STA EB																																								
113+75.00	Lt	A-3	114+05.00	113+75.00	1.0	0	0	0.007	0.90	0.01	5.00	2.10	0.01	0.006	0.005	0.000	0.0050	0.016	0.00	0.01	0.02	1.50	5.88	3.81	3.42	REVISE	0.38	Curb	1.43	0.36	0.71	0.41	0.97	0.34	0.01	0.01	59%	Check Inlet Type		
113+61.00	Lt	A-2	113+75.00	113+61.00	1.0	0	0	0.010	0.90	0.01	5.00	2.10	0.02	0.006	0.008	0.000	0.0080	0.016	0.01	0.03	0.03	1.50	5.96	3.70	3.42	REVISE	0.39	Curb	1.43	0.49	0.73	0.41	0.96	0.33	0.01	0.02	59%	Check Inlet Type		
113+52.00	Lt	A-1	0+00.00	113+52.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.006	0.011	0.000	0.0110	0.016	0.02	0.03	0.04	1.50	5.24	3.20	3.42	OK	0.45	Curb	1.43	0.55	0.79	0.46	0.95	0.36	0.01	0.02	54%	Check Inlet Type		
113+47.00	Lt	PD-4	0+00.00	113+47.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.006	0.014	0.000	0.0140	0.016	0.02	0.03	0.04	1.50	4.59	2.79	3.42	OK	0.51	Curb	1.43	0.59	0.85	0.51	0.95	0.38	0.02	0.02	49%	Check Inlet Type		
113+42.00	Lt	PD-3	0+00.00	113+42.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.006	0.017	0.000	0.0170	0.016	0.02	0.03	0.04	1.50	4.03	2.43	3.42	OK	0.59	Curb	1.43	0.61	0.91	0.57	0.95	0.41	0.02	0.01	43%	Check Inlet Type		
113+37.00	Lt	PD-2	113+75.00	113+37.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.006	0.020	0.000	0.0200	0.016	0.01	0.03	0.04	1.50	3.53	2.13	3.42	OK	0.67	Curb	1.43	0.62	0.95	0.63	0.94	0.44	0.02	0.01	37%	Check Inlet Type		
Sag in EB V-cut (PD)																																								
113+30.00	Lt	PD-1	112+79.00	113+37.00	1.0	0	0	0.090	0.90	0.08	5.00	2.45	0.20	0.000	0.020	0.000	0.02	0.02	0.01	0.21	0.13	1.50	2.45	6.48	3.42	Wide Spread	0.22	Curb	1.43		1.00				0.21	N/A		Spread Calculated using Flowmater- Attached; Curb Cut Sag located in PD-1		
PB-1 STA EB - drains west																																								
111+02.00	Rt	B-2	111+10.00	111+02.00	1.0	0	0	0.004	0.90	0.00	5.00	2.10	0.01	0.005	0.020	0.000	0.0200	0.016	0.00	0.01	0.03	1.50	1.99	1.31	3.42	OK	1.09	Curb	1.43	0.44	1.00	0.92	0.96	0.60	0.01	0.00	8%	OK		
110+86.00	Rt	B-1	111+02.00	110+86.00	1.0	0	0	0.008	0.90	0.01	5.00	2.10	0.02	0.005	0.020	0.000	0.0200	0.016	0.00	0.02	0.03	1.50	2.71	1.73	3.42	OK	0.83	Curb	1.43	0.52	0.99	0.77	0.95	0.52	0.01	0.00	23%	Check Inlet Type		
110+78.00	Rt	A-2	110+86.00	110+78.00	1.0	0	0	0.004	0.90	0.00	5.00	2.10	0.01	0.005	0.015	0.000	0.0150	0.016	0.00	0.01	0.03	1.50	2.79	1.82	3.42	OK	0.79	Curb	1.43	0.45	0.98	0.75	0.96	0.52	0.01	0.00	25%	Check Inlet Type		
110+65.00	Rt	A-1	110+78.00	110+65.00	1.0	0	0	0.007	0.90	0.01</																														

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OR126 Inlet Calcs

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## Worksheet for RG1: Sag Located at CI2 5+25

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### Project Description

Solve For Spread

### Input Data

Discharge		0.110	ft <sup>3</sup> /s
Gutter Width		0.00	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Grate Width		2.25	ft
Grate Length		2.67	ft
Local Depression		0.00	in
Local Depression Width		0.00	ft
Grate Type	P-50 mm (P-1-7/8")		
Clogging		50.00	%

### Results

Spread	3.60	ft
Depth	0.07	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft
Open Grate Area	2.70	ft <sup>2</sup>
Active Grate Weir Length	4.92	ft

---

## Worksheet for RG3: Sag Located at MCV 20+98.81

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### Project Description

Solve For                      Spread

### Input Data

Discharge		0.250	ft <sup>3</sup> /s
Gutter Width		0.00	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Curb Opening Length		4.00	ft
Opening Height		0.70	ft
Curb Throat Type	Horizontal		
Local Depression		1.50	in
Local Depression Width		4.60	ft
Throat Incline Angle		90.00	degrees

### Results

Spread	3.56	ft
Depth	0.04	ft
Gutter Depression	0.00	ft
Total Depression	0.13	ft

## Project Description

## Input Data

## Results

Spread	3.67	ft
Depth	0.05	ft
Gutter Depression	0.00	ft
Total Depression	0.13	ft

---

## Worksheet for PA-4: Curb Cut Sag Located at EB2 10+30

---

### Project Description

Solve For Spread

### Input Data

Discharge		0.260	ft <sup>3</sup> /s
Gutter Width		0.00	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Curb Opening Length		1.50	ft
Opening Height		0.50	ft
Curb Throat Type	Vertical		
Local Depression		0.00	in
Local Depression Width		0.00	ft
Throat Incline Angle		0.00	degrees

### Results

Spread	7.47	ft
Depth	0.15	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft

## Project Description

## Input Data

## Results

## Project Description

## Input Data

## Results



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## Worksheet for PD-1: Curb Cut Sag Located EB

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### Project Description

Solve For Spread

### Input Data

Discharge		0.210	ft <sup>3</sup> /s
Gutter Width		0.00	ft
Gutter Cross Slope		0.02	ft/ft
Road Cross Slope		0.02	ft/ft
Curb Opening Length		1.50	ft
Opening Height		0.50	ft
Curb Throat Type	Vertical		
Local Depression		0.00	in
Local Depression Width		0.00	ft
Throat Incline Angle		0.00	degrees

### Results

Spread	6.48	ft
Depth	0.13	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft

## Project Description

## Input Data

## Results

Spread	2.49	ft
Depth	0.05	ft
Gutter Depression	0.00	ft
Total Depression	0.00	ft

Conveyance   Project: Franklin Blvd Project Number: 656986 Date: 3/7/2016																				
Location		Hydrology										Sewer Design								
Approx. Inlet Location (Upstream End of Pipe)	Inlet No.	Area (ft <sup>2</sup> )	Area (ac)	C 0.90	CA	CA Sum	Tc Upstrm (min)	Tc Pipe (min)	Tc Total (min)	Intensity I (in/hr)	Flow Q (cfs)	Diameter D (in)	Length L (ft)	Slope S (ft/ft)	Manning's n 0.012	Capacity Qf (cfs)	Velocity V (fps)	Q/Qf	Check	
RG-1 - North Network - Path 1																				
Sta WB 216+64.96 Rt	2	479	0.011	0.90	0.01	0.01	5.00	0.41	5.41	2.10	0.02	12	50	0.68%	0.012	3.18	4.05	0.01	OK	
Sta WB 216+06.94 Rt	3	1437	0.033	0.90	0.03	0.04	5.41	0.40	5.81	2.10	0.08	12	52	0.77%	0.012	3.39	4.31	0.02	OK	
Sta WB 215+54.77 Rt	4	1786	0.041	0.90	0.04	0.08	5.81	0.10	5.92	2.10	0.16	12	11	0.53%	0.012	2.81	3.58	0.06	OK	
RG-1 - South Network - Path 2																				
Sta EB 117+09.63 Lt	6	2831	0.065	0.90	0.06	0.06	5.00	0.44	5.44	2.10	0.12	12	50	0.60%	0.012	2.99	3.81	0.04	OK	
Sta EB 116+52.84 Lt	7	1525	0.035	0.90	0.03	0.09	5.44	0.49	5.93	2.10	0.19	12	50	0.48%	0.012	2.67	3.41	0.07	OK	
Sta EB 115+92.81 Lt	8	1612	0.037	0.90	0.03	0.12	5.93	0.33	6.26	1.95	0.24	12	52	1.13%	0.012	4.10	5.23	0.06	OK	
Sta CI2 5+38.29 Rt	5	1873	0.043	0.90	0.04	0.24	6.26	0.28	6.54	1.95	0.47	12	31	0.55%	0.012	2.86	3.65	0.16	OK	
RG-2 - NE Network - Path 6																				
Sta WB 220+80.00 Lt	14	1612	0.037	0.90	0.03	0.03	5.00	0.34	5.34	2.10	0.07	12	84	2.88%	0.012	6.55	8.34	0.01	OK	
Sta WB 219+84.07 Lt	15	3920	0.09	0.90	0.08	0.11	5.34	0.19	5.53	2.10	0.24	12	35	1.51%	0.012	4.74	6.04	0.05	OK	
Sta CI3 01+25.00 Rt	16	2265	0.052	0.90	0.05	0.16	5.53	0.17	5.70	2.10	0.34	12	56	5.20%	0.012	8.80	11.21	0.04	OK	
RG-2 - South Network - Path 7																				
Sta CI3 05+50.37 Lt	35	3267	0.075	0.90	0.07	0.07	5.00	0.38	5.38	2.10	0.14	12	78	1.90%	0.012	5.32	6.78	0.03	OK	
Sta CI3 04+71.21 Lt	36	1830	0.042	0.90	0.04	0.11	5.38	0.38	5.76	2.10	0.22	12	68	1.47%	0.012	4.68	5.96	0.05	OK	
Sta CI3 04+00.96 Lt	37	1699	0.039	0.90	0.04	0.14	5.76	0.52	6.28	1.95	0.27	12	83	1.18%	0.012	4.19	5.34	0.07	OK	
RG-2 - NW Network - Path 3 and 4																				
Sta CI3 02+10.12 Lt	11	3180	0.073	0.90	0.07	0.07	5.00	0.36	5.36	2.10	0.14	12	51	0.90%	0.012	3.66	4.66	0.04	OK	
Sta CI3 02+36.60 Lt	12	1263	0.029	0.90	0.03	0.09	5.36	0.58	5.95	2.10	0.19	12	57	0.44%	0.012	2.56	3.26	0.08	OK	
Sta WB 218+63.13 Rt	13	1394	0.032	0.90	0.03	0.12	5.95	0.29	6.23	1.95	0.24	12	28	0.44%	0.012	2.56	3.26	0.09	OK	
RG-3 - North Network Path 8																				
Sta EB 123+27.97 Lt	18	828	0.019	0.90	0.02	0.02	5.00	0.37	5.37	2.10	0.04	12	36	0.44%	0.012	2.56	3.26	0.01	OK	
Sta EB 122+28.05 Lt	31	1394	0.032	0.90	0.03	0.03	5.00	0.44	5.44	2.10	0.06	12	43	0.44%	0.012	2.56	3.26	0.02	OK	
Sta EB 121+14.93 Lt	32	2396	0.055	0.90	0.05	0.05	5.00	0.08	5.08	2.10	0.10	12	22	3.27%	0.012	6.98	8.89	0.01	OK	
Sta EB 120+51.36 Lt	33	1917	0.044	0.90	0.04	0.04	5.00	0.23	5.23	2.10	0.08	12	35	1.05%	0.012	3.95	5.04	0.02	OK	
Sta EB 119+95.37 Lt	34	1525	0.035	0.90	0.03	0.03	5.00	0.18	5.18	2.10	0.07	12	44	2.65%	0.012	6.28	8.00	0.01	OK	
Sta MCV 21+11.22 Rt	25	2614	0.06	0.90	0.05	0.05	5.00	0.08	5.08	2.10	0.11	12	8	0.44%	0.012	2.56	3.26	0.04	OK	
Sta EB 119+61.73 Rt	39	2439	0.056	0.90	0.05	0.10	5.08	0.70	5.78	2.10	0.22	12	68	0.44%	0.012	2.56	3.26	0.09	OK	

Sta MCV	20+80.70 Rt	26	1786	0.041	0.90	0.04	0.09	5.00	0.11	5.11	2.10	0.19	12	26	2.80%	0.012	6.46	8.23	0.03	OK
Sta MCV	22+09.76 Rt	29	2526	0.058	0.90	0.05	0.05	5.00	0.44	5.44	2.10	0.11	12	43	0.44%	0.012	2.56	3.26	0.04	OK
Sta MCV	21+12.59 Lt	30	1786	0.041	0.90	0.04	0.09	5.44	0.76	6.20	1.95	0.17	12	95	0.71%	0.012	3.25	4.14	0.05	OK
Sta MCV-R	01+54.93 Lt	38	4269	0.098	0.90	0.09	0.28	6.20	0.08	6.29	1.95	0.55	12	8	0.44%	0.012	2.56	3.26	0.21	OK
Sta MCV-R	01+63.10 Lt	27	436	0.01	0.90	0.01	0.38	6.29	0.10	6.39	1.95	0.74	12	10	0.44%	0.012	2.56	3.26	0.29	OK
Sta MCV-R	01+73.37 Lt	28	218	0.005	0.90	0.00	0.48	6.39	0.11	6.49	1.95	0.93	12	16	1.05%	0.012	3.95	5.04	0.24	OK
Sta MCV-R	05+36.15 Rt	19	1220	0.028	0.90	0.03	0.04	5.00	0.36	5.36	2.10	0.09	12	100	3.52%	0.012	7.24	9.22	0.01	OK
Sta MCV-R	04+36.26 Rt	20	2919	0.067	0.90	0.06	0.13	5.36	0.45	5.81	2.10	0.28	12	107	2.62%	0.012	6.25	7.96	0.04	OK
Sta MCV-R	03+29.21 Lt	21	3223	0.074	0.90	0.07	0.25	5.81	0.28	6.09	1.95	0.48	12	52	1.63%	0.012	4.93	6.28	0.10	OK
Sta MCV-R	02+78.26 Lt	22	1002	0.023	0.90	0.02	0.31	6.09	0.18	6.27	1.95	0.60	12	51	3.57%	0.012	7.29	9.29	0.08	OK
Sta MCV-R	02+27.08 Lt	23	1002	0.023	0.90	0.02	0.36	6.27	0.16	6.43	1.95	0.70	12	37	2.52%	0.012	6.12	7.80	0.11	OK
Sta MCV-R	20+73.56 Lt	24	0	0	0.90	0.00	0.84	6.43	0.34	6.76	1.95	1.63	12	33	0.44%	0.012	2.56	3.26	0.64	OK
Filterra 4x4																				
Sta WB	209+28.9 Lt	F4x4	4792	0.11	0.90	0.10	0.10	5.00	0.18	5.18	2.10	0.21	6	11	0.44%	0.012	0.40	2.05	0.52	OK
Filterra 8x4																				
Sta EB	123+27.97 Lt	F8x4	10019	0.23	0.90	0.21	0.21	5.00	0.29	5.29	2.10	0.43	8	22	0.44%	0.012	0.87	2.49	0.50	OK
Filterra 4x12																				
Sta EB	123+27.97 Lt	F4x12	4792	0.11	0.90	0.10	0.10	5.00	0.37	5.37	2.10	0.21	12	36	0.44%	0.012	2.56	3.26	0.08	OK

Attachment F

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## SWMM Variance Memorandum

# Franklin Blvd: Stormwater Drainage Design Variances

PREPARED FOR: Kristi Krueger/City of Springfield

PREPARED BY: Theresa Ring/CH2M  
Richard Attanasio/CH2M

DATE: ~~December 1, 2015~~ March 1<sup>st</sup>, 2016

PROJECT NUMBER: 656986

As part of the Franklin Blvd project, the City of Springfield code references the guidelines laid out by the City of Eugene's Stormwater Management Manual (SWMM) for LID drainage design. The Glenwood Refinement Plan calls for management of stormwater using LID principles. This project is therefore incorporating stormwater planters and infiltration raingardens as described in the Eugene SWMM with a couple of modifications on the required design criteria. These modifications are necessary to meet the project requirements within the given right-of-way and to construct the drainage system without providing a new stormwater outfall to the river. These variances to the Eugene SWMM are described below.

## Variances

Table 1, below, provides the requirements out of the Eugene SWMM, changes in the proposed design and explains the reasoning behind the proposed changes:

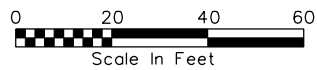
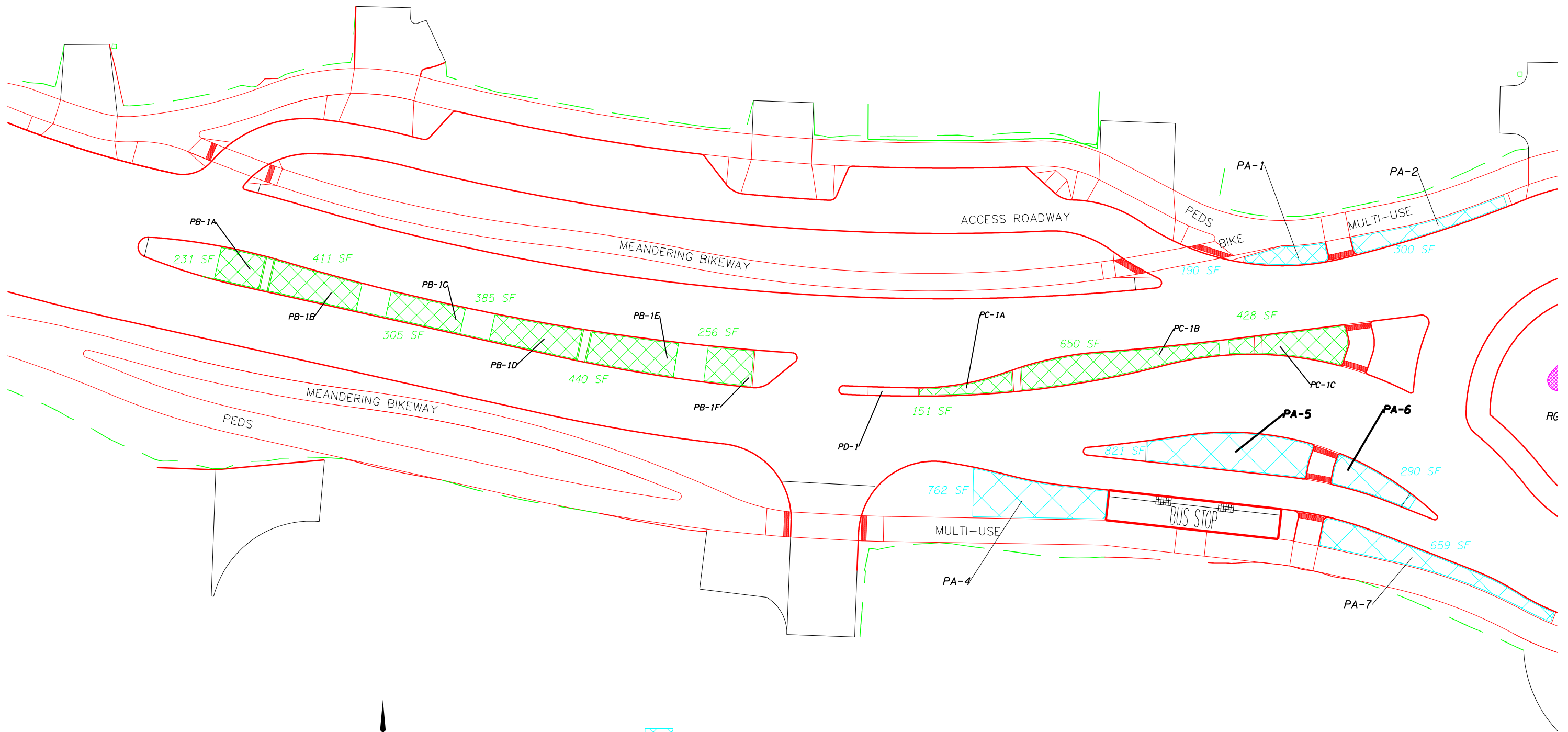
Table 1

City of Eugene SWMM Criteria	Proposed Design	Rationale
"Planters located next to public sidewalks or curbs shall have a minimum 12 inch-wide flat area between the planter wall and the sidewalk or curb." (2.3.11)	There will be no distinct "flat area" separating the planter wall from the sidewalk.	SWMM is not clear on this requirement. No separation is shown in the SWMM standard details for stormwater planters. Additionally, edge protection, as a curb, will be provided adjacent to bike and pedestrian paths. Adjoining sidewalks are also 10-foot wide, which provides additional protection over standard sidewalk widths. The additional treatment area is necessary to provide the requisite storage within the right-of-way.

Table 1

City of Eugene SWMM Criteria	Proposed Design	Rationale
Infiltration Raingarden “storage depth shall be no more than 12 inches.” (2.3.9)	Selected raingardens will have 24-inches of storage depth.	All raingardens are designed to fully infiltrate the 25-year storm event. A 12-inch or less depth would require an overflow structure that would require a new stormwater outfall to the river. Increasing their depth also provided for a centralized location to treat the stormwater runoff, thus reducing the number of required raingardens.
No maximum total depth is explicitly required, however Eugene details imply a maximum of 14-inches. (Appendix B)	Selected raingardens will be 4-feet deep.	This is necessary to allow areas of the roadway to be piped to the raingardens, thus again allowing for the centralized treatment of the stormwater runoff. Otherwise the runoff around the truck aprons, for example, could not be conveyed to a site for treatment.

The proposed variances to the Eugene SWMM are necessary to meet the drainage requirements, within the constrained envelope along the highly anticipated urbanized corridor of Franklin Blvd.



Stormwater Planters (Depth=14\", Ponding Depth=10\")

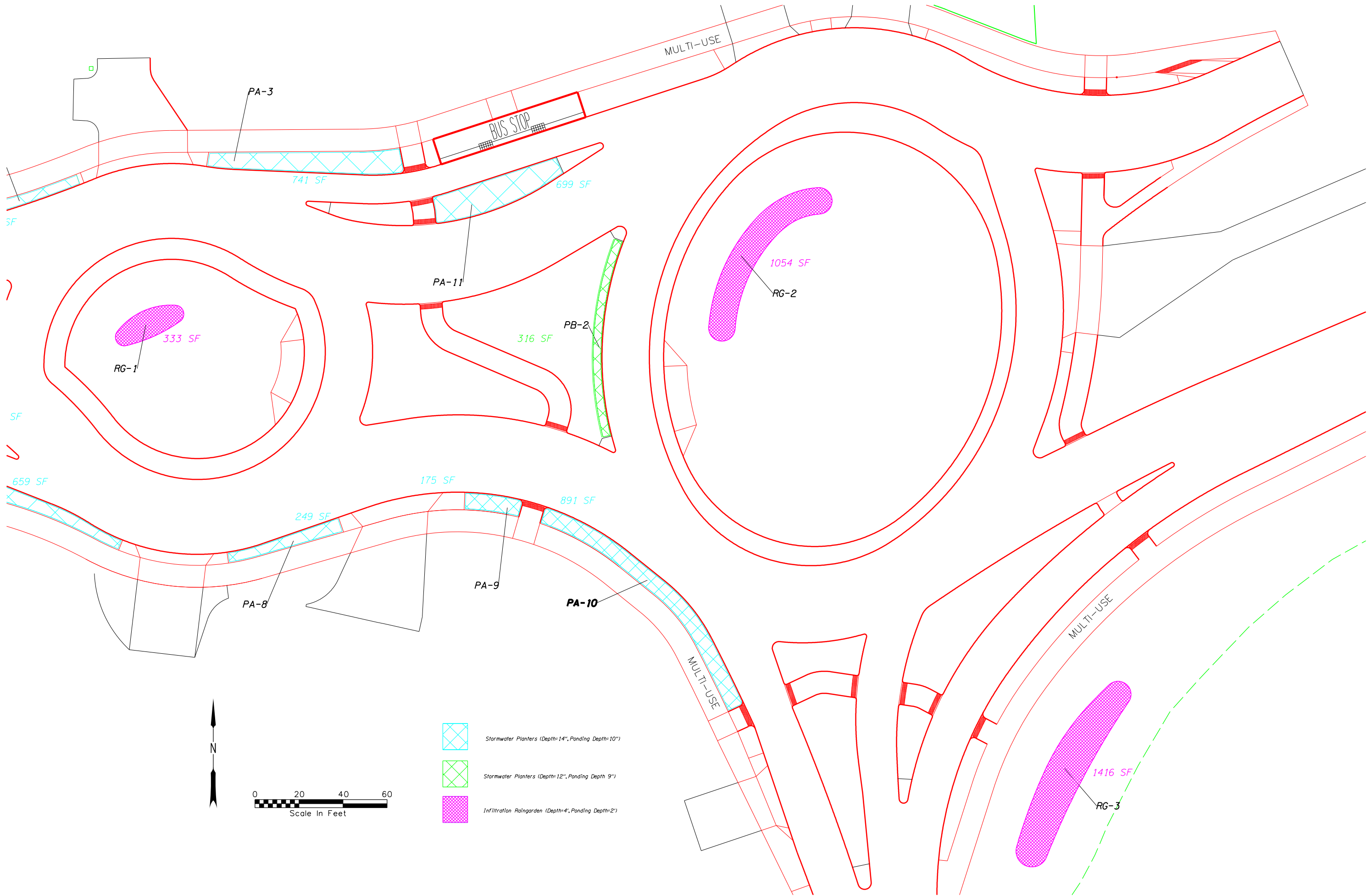


Stormwater Planters (Depth=12\", Ponding Depth=9\")



Infiltration Raingarden (Depth=4\", Ponding Depth=2\")





## Attachment G

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# Stormwater Facility Sizing Calculators



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name: Franklin Blvd Date: 6/7/2016  
Project Address: Franklin Blvd Permit Number:   
Springfield, OR Catchment ID: PA-1  
Designer: Theresa Ring  
Company: CH2M

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR) Yes  
Flow Control (FC) Yes  
Destination (DT) Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area= 1591.7 sqft Total Square Footage Pervious Area= 0 sqft  
Impervious Area CN= 98 Pervious Area CN= 85  
Total Square Footage of Drainage Area= 1592 sft Time of Concentration Post Development= 5 min  
Weighted Average CN= 98

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN= 85 Time of Concentration Pre-Development= 10 min

#### Soil Data

Tested Soil Infiltration Rate= 7.2 in/hr (See Note 4) Destination Design= 2.5 in/hr  
Design Soil Infiltration Rate= 2.5 in/hr Soil Infiltration Rate

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type= Infiltration Stormwater Planter Facility Surface Area= 188.5 sqft  
Surface Width= 6.5 ft Facility Surface Perimeter= 71 ft  
Surface Length= 29 ft Facility Bottom Area= 189 sqft  
Facility Side Slopes= 0 to 1 Facility Bottom Perimeter= 71 ft  
Max. Ponding Depth in Stormwater Facility= 12 in Basin Volume= 188.5 cf  
Depth of Growing Medium (Soil)= 12 in Ratio of Facility Area to Impervious Area= 0.118

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.008 cfs  
Total Runoff Volume to Stormwater Facility = 105 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.034 cfs  
Total Runoff Volume to Stormwater Facility = 446 cf  
Max. Depth of Stormwater in Facility = 2.5 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.019 cfs  
Total Runoff Volume = 279 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.046 cfs  
Total Runoff Volume to Stormwater Facility = 604 cf  
Max. Depth of Stormwater in Facility = 4.9 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name: Franklin Blvd Date: 6/3/2016  
Project Address: Franklin Blvd Permit Number:   
Springfield, OR Catchment ID: PA-2  
Designer: Theresa Ring  
Company: CH2M

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR) Yes  
Flow Control (FC) Yes  
Destination (DT) Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area= 3543 sqft Total Square Footage Pervious Area= 0 sqft  
Impervious Area CN= 98 Pervious Area CN= 85  
Total Square Footage of Drainage Area= 3543 sft Time of Concentration Post Development= 5 min  
Weighted Average CN= 98

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN= 85 Time of Concentration Pre-Development= 10 min

#### Soil Data

Tested Soil Infiltration Rate= 7.2 in/hr (See Note 4) Destination Design= 2.5 in/hr  
Design Soil Infiltration Rate= 2.5 in/hr Soil Infiltration Rate

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type= Infiltration Stormwater Planter Facility Surface Area= 300 sqft  
Surface Width= 10 ft Facility Surface Perimeter= 80 ft  
Surface Length= 30 ft Facility Bottom Area= 300 sqft  
Facility Side Slopes= 0 to 1 Facility Bottom Perimeter= 80 ft  
Max. Ponding Depth in Stormwater Facility= 12 in Basin Volume= 300.0 cf  
Depth of Growing Medium (Soil)= 12 in Ratio of Facility Area to Impervious Area= 0.085

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.019 cfs  
Total Runoff Volume to Stormwater Facility = 233 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.077 cfs  
Total Runoff Volume to Stormwater Facility = 992 cf  
Max. Depth of Stormwater in Facility = 5.3 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.042 cfs  
Total Runoff Volume = 621 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.103 cfs  
Total Runoff Volume to Stormwater Facility = 1345 cf  
Max. Depth of Stormwater in Facility = 10.7 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name:	Franklin Blvd	Date:	6/3/2016
Project Address:	Franklin Blvd	Permit Number:	
	Springfield, OR	Catchment ID:	PA-3
Designer:	Theresa Ring		
Company:	CH2M		

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes	*An infiltration facility must be chosen as the facility type to meet destination requirements
Flow Control (FC)	Yes	
Destination (DT)	Yes	

#### Site Data-Post Development

Total Square Footage Impervious Area=	8970	sqft	Total Square Footage Pervious Area=	0	sqft
Impervious Area CN=	98		Pervious Area CN=	85	
Total Square Footage of Drainage Area=	8970	sft	Time of Concentration Post Development=	5	min
Weighted Average CN=	98				

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85	Time of Concentration Pre-Development=	10	min
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#### Soil Data

Tested Soil Infiltration Rate=	7.2	in/hr (See Note 4)	Destination Design=	2.5	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	Soil Infiltration Rate		

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type=	Infiltration Stormwater Planter	Facility Surface Area=	741	sqft
Surface Width=	13	ft	Facility Surface Perimeter=	140
Surface Length=	57	ft	Facility Bottom Area=	741
Facility Side Slopes=	0	to 1	Facility Bottom Perimeter=	140
Max. Ponding Depth in Stormwater Facility=	12.0	in	Basin Volume=	741.0
Depth of Growing Medium (Soil)=	12	in	Ratio of Facility Area to Impervious Area=	0.083

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.047 cfs  
Total Runoff Volume to Stormwater Facility = 590 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.194 cfs  
Total Runoff Volume to Stormwater Facility = 2511 cf  
Max. Depth of Stormwater in Facility = 5.6 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.107 cfs  
Total Runoff Volume = 1573 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.260 cfs  
Total Runoff Volume to Stormwater Facility = 3404 cf  
Max. Depth of Stormwater in Facility = 11.3 in  
Drawdown Time = 0.3 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?





# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name: Franklin Blvd Date: 6/3/2016  
Project Address: Franklin Blvd Permit Number:   
Springfield, OR Catchment ID: PA-4  
Designer: Theresa Ring  
Company: CH2M

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR) Yes  
Flow Control (FC) Yes  
Destination (DT) Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area= 5757.4 sqft Total Square Footage Pervious Area= 0 sqft  
Impervious Area CN= 98 Pervious Area CN= 85  
Total Square Footage of Drainage Area= 5757 sft Time of Concentration Post Development= 5 min  
Weighted Average CN= 98

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN= 85 Time of Concentration Pre-Development= 10 min

#### Soil Data

Tested Soil Infiltration Rate= 7.2 in/hr (See Note 4) Destination Design= 2.5 in/hr  
Design Soil Infiltration Rate= 2.5 in/hr Soil Infiltration Rate

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type= Infiltration Stormwater Planter Facility Surface Area= 473 sqft  
Surface Width= 11 ft Facility Surface Perimeter= 108 ft  
Surface Length= 43 ft Facility Bottom Area= 473 sqft  
Facility Side Slopes= 0 to 1 Facility Bottom Perimeter= 108 ft  
Max. Ponding Depth in Stormwater Facility= 12 in Basin Volume= 473.0 cf  
Depth of Growing Medium (Soil)= 12 in Ratio of Facility Area to Impervious Area= 0.082

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.030 cfs  
Total Runoff Volume to Stormwater Facility = 379 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.124 cfs  
Total Runoff Volume to Stormwater Facility = 1612 cf  
Max. Depth of Stormwater in Facility = 5.6 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.069 cfs  
Total Runoff Volume = 1009 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.167 cfs  
Total Runoff Volume to Stormwater Facility = 2185 cf  
Max. Depth of Stormwater in Facility = 11.5 in  
Drawdown Time = 0.5 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name:	Franklin Blvd	Date:	6/3/2016
Project Address:	Franklin Blvd	Permit Number:	
	Springfield, OR	Catchment ID:	PA-5
Designer:	Theresa Ring		
Company:	CH2M		

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area=	3394 sqft	Total Square Footage Pervious Area=	0 sqft
Impervious Area CN=	98	Pervious Area CN=	85
Total Square Footage of Drainage Area=	3394 sft	Time of Concentration Post Development=	5 min
Weighted Average CN=	98		

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85	Time of Concentration Pre-Development=	10 min
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#### Soil Data

Tested Soil Infiltration Rate=	7.2 in/hr (See Note 4)	Destination Design=	2.5 in/hr
Design Soil Infiltration Rate=	2.5 in/hr	Soil Infiltration Rate	

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type=	Infiltration Stormwater Planter	Facility Surface Area=	280 sqft
Surface Width=	8 ft	Facility Surface Perimeter=	86 ft
Surface Length=	35 ft	Facility Bottom Area=	280 sqft
Facility Side Slopes=	0 to 1	Facility Bottom Perimeter=	86 ft
Max. Ponding Depth in Stormwater Facility=	12 in	Basin Volume=	280.0 cf
Depth of Growing Medium (Soil)=	12 in	Ratio of Facility Area to Impervious Area=	0.083

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.018 cfs  
Total Runoff Volume to Stormwater Facility = 223 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.073 cfs  
Total Runoff Volume to Stormwater Facility = 950 cf  
Max. Depth of Stormwater in Facility = 5.6 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.041 cfs  
Total Runoff Volume = 595 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.098 cfs  
Total Runoff Volume to Stormwater Facility = 1288 cf  
Max. Depth of Stormwater in Facility = 11.4 in  
Drawdown Time = 0.3 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name: Franklin Blvd Date: 6/3/2016  
Project Address: Franklin Blvd Permit Number:   
Springfield, OR Catchment ID: PA-6  
Designer: Theresa Ring  
Company: CH2M

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR) Yes  
Flow Control (FC) Yes  
Destination (DT) Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area= 1046 sqft Total Square Footage Pervious Area= 0 sqft  
Impervious Area CN= 98 Pervious Area CN= 85  
Total Square Footage of Drainage Area= 1046 sft Time of Concentration Post Development= 5 min  
Weighted Average CN= 98

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN= 85 Time of Concentration Pre-Development= 10 min

#### Soil Data

Tested Soil Infiltration Rate= 7.2 in/hr (See Note 4) Destination Design= 2.5 in/hr  
Design Soil Infiltration Rate= 2.5 in/hr Soil Infiltration Rate

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type= Infiltration Stormwater Planter Facility Surface Area= 88 sqft  
Surface Width= 8 ft Facility Surface Perimeter= 38 ft  
Surface Length= 11 ft Facility Bottom Area= 88 sqft  
Facility Side Slopes= 0 to 1 Facility Bottom Perimeter= 38 ft  
Max. Ponding Depth in Stormwater Facility= 12 in Basin Volume= 88.0 cf  
Depth of Growing Medium (Soil)= 12 in Ratio of Facility Area to Impervious Area= 0.084

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.005 cfs  
Total Runoff Volume to Stormwater Facility = 69 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.023 cfs  
Total Runoff Volume to Stormwater Facility = 293 cf  
Max. Depth of Stormwater in Facility = 5.4 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.013 cfs  
Total Runoff Volume = 183 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.030 cfs  
Total Runoff Volume to Stormwater Facility = 397 cf  
Max. Depth of Stormwater in Facility = 10.8 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name:	Franklin Blvd	Date:	6/24/2016
Project Address:	Franklin Blvd	Permit Number:	
	Springfield, OR	Catchment ID:	PA-7
Designer:	Theresa Ring		
Company:	CH2M		

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area=	6922.3	sqft	Total Square Footage Pervious Area=	0	sqft
Impervious Area CN=	98		Pervious Area CN=	85	
Total Square Footage of Drainage Area=	6922	sft	Time of Concentration Post Development=	5	min
Weighted Average CN=	98				

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85	Time of Concentration Pre-Development=	10	min
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#### Soil Data

Tested Soil Infiltration Rate=	7.2	in/hr (See Note 4)	Destination Design=	2.5	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	Soil Infiltration Rate		

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type=	Infiltration Stormwater Planter	Facility Surface Area=	610	sqft	
Surface Width=	10	ft	Facility Surface Perimeter=	142	ft
Surface Length=	61	ft	Facility Bottom Area=	610	sqft
Facility Side Slopes=	0 to 1		Facility Bottom Perimeter=	142	ft
Max. Ponding Depth in Stormwater Facility=	12	in	Basin Volume=	610.0	cf
Depth of Growing Medium (Soil)=	12	in	Ratio of Facility Area to Impervious Area=	0.088	

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.036 cfs  
Total Runoff Volume to Stormwater Facility = 455 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.149 cfs  
Total Runoff Volume to Stormwater Facility = 1938 cf  
Max. Depth of Stormwater in Facility = 4.9 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.083 cfs  
Total Runoff Volume = 1214 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.201 cfs  
Total Runoff Volume to Stormwater Facility = 2627 cf  
Max. Depth of Stormwater in Facility = 9.7 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?





# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name:	Franklin Blvd	Date:	6/29/2016
Project Address:	Franklin Blvd	Permit Number:	
	Springfield, OR	Catchment ID:	PA-8
Designer:	Theresa Ring		
Company:	CH2M		

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area=	2700	sqft	Total Square Footage Pervious Area=	0	sqft
Impervious Area CN=	98		Pervious Area CN=	85	
Total Square Footage of Drainage Area=	2700	sft	Time of Concentration Post Development=	5	min
Weighted Average CN=	98				

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85	Time of Concentration Pre-Development=	10	min
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#### Soil Data

Tested Soil Infiltration Rate=	7.2	in/hr (See Note 4)	Destination Design=	2.5	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	Soil Infiltration Rate		

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type=	Infiltration Stormwater Planter	Facility Surface Area=	218.75	sqft
Surface Width=	7	ft	Facility Surface Perimeter=	76.5
Surface Length=	31.25	ft	Facility Bottom Area=	219
Facility Side Slopes=	0	to 1	Facility Bottom Perimeter=	77
Max. Ponding Depth				
in Stormwater Facility=	12	in	Basin Volume=	218.8
Depth of Growing Medium (Soil)=	12	in	Ratio of Facility Area to Impervious Area=	0.081

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.014 cfs  
Total Runoff Volume to Stormwater Facility = 178 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.058 cfs  
Total Runoff Volume to Stormwater Facility = 756 cf  
Max. Depth of Stormwater in Facility = 5.8 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.032 cfs  
Total Runoff Volume = 473 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.078 cfs  
Total Runoff Volume to Stormwater Facility = 1025 cf  
Max. Depth of Stormwater in Facility = 11.9 in  
Drawdown Time = 0.7 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet 24 Hour Storm, NRCS Type 1A Rainfall Distribution City of Eugene

Version 2.1

## Project Information

Project Name:	Franklin Blvd	Date:	6/3/2016
Project Address:	Franklin Blvd Springfield, OR	Permit Number:	
Designer:	Theresa Ring	Catchment ID:	PA-9
Company:	CH2M		

## Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

## Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

## Site Data-Post Development

Total Square Footage Impervious Area=	2170	sqft	Total Square Footage Pervious Area=	0	sqft
Impervious Area CN=	98		Pervious Area CN=	85	
Total Square Footage of Drainage Area=	2170	sft	Time of Concentration Post Development=	5	min
Weighted Average CN=	98				

## Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85	Time of Concentration Pre-Development=	10	min
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## Soil Data

Tested Soil Infiltration Rate=	7.2	in/hr (See Note 4)	Destination Design=	2.5	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	Soil Infiltration Rate		

## Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

## Facility Data

Facility Type=	Infiltration Stormwater Planter	Facility Surface Area=	176	sqft	
Surface Width=	8	ft	Facility Surface Perimeter=	60	ft
Surface Length=	22	ft	Facility Bottom Area=	176	sqft
Facility Side Slopes=	0	to 1	Facility Bottom Perimeter=	60	ft
Max. Ponding Depth in Stormwater Facility=	12	in	Basin Volume=	176.0	cf
Depth of Growing Medium (Soil)=	12	in	Ratio of Facility Area to Impervious Area=	0.081	

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.011 cfs  
Total Runoff Volume to Stormwater Facility = 143 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.047 cfs  
Total Runoff Volume to Stormwater Facility = 607 cf  
Max. Depth of Stormwater in Facility = 5.8 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.026 cfs  
Total Runoff Volume = 380 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.063 cfs  
Total Runoff Volume to Stormwater Facility = 823 cf  
Max. Depth of Stormwater in Facility = 11.9 in  
Drawdown Time = 0.7 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name: Franklin Blvd Date: 3/7/2016  
Project Address: Franklin Blvd Permit Number:   
Springfield, OR Catchment ID: PA-10  
Designer: Theresa Ring  
Company: CH2M

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR) Yes  
Flow Control (FC) Yes  
Destination (DT) Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area= 6675.9 sqft Total Square Footage Pervious Area= 0 sqft  
Impervious Area CN= 98 Pervious Area CN= 85  
Total Square Footage of Drainage Area= 6676 sft Time of Concentration Post Development= 5 min  
Weighted Average CN= 98

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN= 85 Time of Concentration Pre-Development= 10 min

#### Soil Data

Tested Soil Infiltration Rate= 7.2 in/hr (See Note 4) Destination Design= 2.5 in/hr  
Design Soil Infiltration Rate= 2.5 in/hr Soil Infiltration Rate

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type= Infiltration Stormwater Planter Facility Surface Area= 550 sqft  
Surface Width= 10 ft Facility Surface Perimeter= 130 ft  
Surface Length= 55 ft Facility Bottom Area= 550 sqft  
Facility Side Slopes= 0 to 1 Facility Bottom Perimeter= 130 ft  
Max. Ponding Depth in Stormwater Facility= 12 in Basin Volume= 550.0 cf  
Depth of Growing Medium (Soil)= 12 in Ratio of Facility Area to Impervious Area= 0.082

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.035 cfs  
Total Runoff Volume to Stormwater Facility = 439 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.144 cfs  
Total Runoff Volume to Stormwater Facility = 1869 cf  
Max. Depth of Stormwater in Facility = 5.6 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.080 cfs  
Total Runoff Volume = 1170 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.194 cfs  
Total Runoff Volume to Stormwater Facility = 2533 cf  
Max. Depth of Stormwater in Facility = 11.4 in  
Drawdown Time = 0.3 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name: Franklin Blvd Date: 3/7/2016  
Project Address: Franklin Blvd Permit Number:   
Springfield, OR Catchment ID: PA-10  
Designer: Theresa Ring  
Company: CH2M

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR) Yes  
Flow Control (FC) Yes  
Destination (DT) Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area= 7318.3 sqft Total Square Footage Pervious Area= 0 sqft  
Impervious Area CN= 98 Pervious Area CN= 85  
Total Square Footage of Drainage Area= 7318 sft Time of Concentration Post Development= 5 min  
Weighted Average CN= 98

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN= 85 Time of Concentration Pre-Development= 10 min

#### Soil Data

Tested Soil Infiltration Rate= 7.2 in/hr (See Note 4) Destination Design= 2.5 in/hr  
Design Soil Infiltration Rate= 2.5 in/hr Soil Infiltration Rate

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type= Infiltration Stormwater Planter Facility Surface Area= 600 sqft  
Surface Width= 10 ft Facility Surface Perimeter= 140 ft  
Surface Length= 60 ft Facility Bottom Area= 600 sqft  
Facility Side Slopes= 0 to 1 Facility Bottom Perimeter= 140 ft  
Max. Ponding Depth in Stormwater Facility= 12 in Basin Volume= 600.0 cf  
Depth of Growing Medium (Soil)= 12 in Ratio of Facility Area to Impervious Area= 0.082

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.038 cfs  
Total Runoff Volume to Stormwater Facility = 481 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.158 cfs  
Total Runoff Volume to Stormwater Facility = 2049 cf  
Max. Depth of Stormwater in Facility = 5.7 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.087 cfs  
Total Runoff Volume = 1283 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.212 cfs  
Total Runoff Volume to Stormwater Facility = 2777 cf  
Max. Depth of Stormwater in Facility = 11.6 in  
Drawdown Time = 0.5 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?





# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name:	Franklin Blvd	Date:	6/7/2016
Project Address:	Franklin Blvd	Permit Number:	
	Springfield, OR	Catchment ID:	PB-1
Designer:	Theresa Ring		
Company:	CH2M		

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area=	11579.7 sqft	Total Square Footage Pervious Area=	0 sqft
Impervious Area CN=	98	Pervious Area CN=	85
Total Square Footage of Drainage Area=	11580 sft	Time of Concentration Post Development=	5 min
Weighted Average CN=	98		

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85	Time of Concentration Pre-Development=	10 min
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#### Soil Data

Tested Soil Infiltration Rate=	7.2 in/hr (See Note 4)	Destination Design=	2.5 in/hr
Design Soil Infiltration Rate=	2.5 in/hr	Soil Infiltration Rate	

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type=	Infiltration Stormwater Planter	Facility Surface Area=	1980 sqft
Surface Width=	11 ft	Facility Surface Perimeter=	382 ft
Surface Length=	180 ft	Facility Bottom Area=	1980 sqft
Facility Side Slopes=	0 to 1	Facility Bottom Perimeter=	382 ft
Max. Ponding Depth in Stormwater Facility=	9 in	Basin Volume=	1485.0 cf
Depth of Growing Medium (Soil)=	12 in	Ratio of Facility Area to Impervious Area=	0.171

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.061 cfs  
Total Runoff Volume to Stormwater Facility = 761 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.250 cfs  
Total Runoff Volume to Stormwater Facility = 3241 cf  
Max. Depth of Stormwater in Facility = 1.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.138 cfs  
Total Runoff Volume = 2030 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.336 cfs  
Total Runoff Volume to Stormwater Facility = 4394 cf  
Max. Depth of Stormwater in Facility = 2.1 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name:	Franklin Blvd	Date:	3/5/2016
Project Address:	Franklin Blvd	Permit Number:	
	Springfield, OR	Catchment ID:	PB-2
Designer:	Theresa Ring		
Company:	CH2M		

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR)	Yes
Flow Control (FC)	Yes
Destination (DT)	Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area=	3436.4	sqft	Total Square Footage Pervious Area=	0	sqft
Impervious Area CN=	98		Pervious Area CN=	85	
Total Square Footage of Drainage Area=	3436	sft	Time of Concentration Post Development=	5	min
Weighted Average CN=	98				

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN=	85	Time of Concentration Pre-Development=	10	min
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#### Soil Data

Tested Soil Infiltration Rate=	7.2	in/hr (See Note 4)	Destination Design=	2.5	in/hr
Design Soil Infiltration Rate=	2.5	in/hr	Soil Infiltration Rate		

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type=	Infiltration Stormwater Planter	Facility Surface Area=	316	sqft	
Surface Width=	3.16	ft	Facility Surface Perimeter=	206.32	ft
Surface Length=	100	ft	Facility Bottom Area=	316	sqft
Facility Side Slopes=	0 to 1		Facility Bottom Perimeter=	206	ft
Max. Ponding Depth in Stormwater Facility=	9	in	Basin Volume=	237.0	cf
Depth of Growing Medium (Soil)=	12	in	Ratio of Facility Area to Impervious Area=	0.092	

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.018 cfs  
Total Runoff Volume to Stormwater Facility = 226 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.074 cfs  
Total Runoff Volume to Stormwater Facility = 962 cf  
Max. Depth of Stormwater in Facility = 4.5 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.041 cfs  
Total Runoff Volume = 602 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.100 cfs  
Total Runoff Volume to Stormwater Facility = 1304 cf  
Max. Depth of Stormwater in Facility = 8.7 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?



# Stormwater Surface Filtration/Infiltration Facility Sizing Spreadsheet

## 24 Hour Storm, NRCS Type 1A Rainfall Distribution

### City of Eugene

Version 2.1

#### Project Information

Project Name: Franklin Blvd Date: 6/7/2016  
Project Address: Franklin Blvd Permit Number:   
Springfield, OR Catchment ID: PC-1  
Designer: Theresa Ring  
Company: CH2M

#### Instructions:

1. Complete this form for each drainage catchment in the project site that is to be sized per the Presumptive Approach.
2. Provide a distinctive Catchment ID for each facility coordinated with the site basin map to correlate the appropriate calculations with the facility.
3. The maximum drainage catchment to be modeled per the Presumptive Approach is 1 acre (43,560 SF)
4. For infiltration facilities in Class A or B soils where no infiltration testing has been performed use an infiltration rate of 0.5 in/hr. For all facilities use a maximum soil infiltration rate of 2.5 in/hr for topsoil/growing medium.

#### Design Requirements:

Choose "Yes" from the dropdown boxes below next to the design standards requirements for this facility.

Pollution Reduction (PR) Yes  
Flow Control (FC) Yes  
Destination (DT) Yes

\*An infiltration facility must be chosen as the facility type to meet destination requirements

#### Site Data-Post Development

Total Square Footage Impervious Area= 12008.7 sqft Total Square Footage Pervious Area= 0 sqft  
Impervious Area CN= 98 Pervious Area CN= 85  
Total Square Footage of Drainage Area= 12009 sft Time of Concentration Post Development= 5 min  
Weighted Average CN= 98

#### Site Data-Pre Development (Data in this section is only used if Flow Control is required)

Pre-Development CN= 85 Time of Concentration Pre-Development= 10 min

#### Soil Data

Tested Soil Infiltration Rate= 7.2 in/hr (See Note 4) Destination Design= 2.5 in/hr  
Design Soil Infiltration Rate= 2.5 in/hr Soil Infiltration Rate

#### Design Storms Used For Calculations

Requirement	24-hour	Design Storm
Pollution Reduction	1.0 inches	Water Quality
Flow Control	3.6 inches	Flow Control
Destination	4.8 inches	Flood Control

#### Facility Data

Facility Type= Infiltration Stormwater Planter Facility Surface Area= 1210 sqft  
Surface Width= 10 ft Facility Surface Perimeter= 262 ft  
Surface Length= 121 ft Facility Bottom Area= 1210 sqft  
Facility Side Slopes= 0 to 1 Facility Bottom Perimeter= 262 ft  
Max. Ponding Depth in Stormwater Facility= 7 in Basin Volume= 705.8 cf  
Depth of Growing Medium (Soil)= 12 in Ratio of Facility Area to Impervious Area= 0.101

**Pollution Reduction-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.063 cfs  
Total Runoff Volume to Stormwater Facility = 790 cf  
Max. Depth of Stormwater in Facility = 0.0 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Pollution Reduction Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Flow Control-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.259 cfs  
Total Runoff Volume to Stormwater Facility = 3361 cf  
Max. Depth of Stormwater in Facility = 3.6 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf  
Peak Off-Site Flow Rate  
Filtration Facility Underdrain = N/A cfs

**Pre-Development Runoff Data**

Peak Flow Rate = 0.144 cfs  
Total Runoff Volume = 2105 cf

**Yes** Facility Sizing Meets Flow Control Standards?

**YES** Meets Requirement for Post Development offsite flow less or equal to Pre-Development Flow?

**YES** Meets Requirement for Maximum of 18 Hour Drawdown Time?

**Destination-Calculation Results**

Peak Flow Rate to Stormwater Facility = 0.348 cfs  
Total Runoff Volume to Stormwater Facility = 4557 cf  
Max. Depth of Stormwater in Facility = 6.8 in  
Drawdown Time = 0.2 hours

Peak Facility Overflow Rate = 0.000 cfs  
Total Overflow Volume = 0 cf

**Yes** Facility Sizing Meets Destination Standards?

**YES** Meets Requirement of No Facility Flooding?

**YES** Meets Requirement for Maximum of 30 hour Drawdown Time?

Attachment H

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Spill Response Form

## SPILL RESPONSE FORM

Location

Date

Address

Phone

### Release Information

<b>Date of spill</b>	<b>Person who discovered the spill</b>
<b>Time spill started</b>	<b>Time spill was stopped</b>
<b>Material spilled</b> <i>Attach a copy of the SDS (safety data sheet), if available.</i> <i>Mark the location of the spill and the direction of flow on a site drawing</i>	<b>Estimated amount released</b>
<b>Was there a threat to public safety?</b>	<input type="checkbox"/> No <input type="checkbox"/> Yes
<b>Is there a potential for future release?</b>	<input type="checkbox"/> No <input type="checkbox"/> Yes
<b>Did anyone come in direct contact with the spill?</b> If yes, describe	<input type="checkbox"/> No <input type="checkbox"/> Yes
<b>Describe how the release occurred.</b> Include details such as the source of the release, the cause, contributing factors, weather, activities occurring prior to or during the release, and the dates and time of the activities	
<b>The release impacted</b> (check all that apply) <input type="checkbox"/> Surface water <input type="checkbox"/> Groundwater <input type="checkbox"/> Soil <input type="checkbox"/> Air Describe any impacts from the release (such as fish kill, evacuation, etc.)	

### Response Action

<b>Who was notified and when did the notification occur.</b>
<b>Describe actions taken in response to the release.</b> Include details such as actions taken to contain the release, actions taken by the first responders, and other immediate actions to protect people or the environment.



Yard

Date

## Recovery Action

### Who performed the site cleanup

If City or ODOT did not perform the cleanup, list the cleanup company's

Name

Address

Phone

Project manager

**Describe cleanup activities.** Include what actions were taken and when the actions were taken.

### Were soil or water samples collected?

☐ No ☐ Yes

If yes, who collected the samples?

*Mark the sample collection and locations on a copy of the site map. Attach copies of the sample results.*

### How much contaminated soil was removed from the site (estimate volume)?

☐ No ☐ Yes

Has all the contamination been removed from site?

Estimated volume of contaminated soil remaining, if any

### Was a hazardous waste determination made?

☐ No ☐ Yes

List hazardous substances

### Were contaminated materials taken off-site for disposal?

☐ No ☐ Yes

*If yes, attach copies of receipts and/or documentation for disposal.*

List the name and address of the disposal location

Facility phone

Facility contact

**These answers are True and Complete to the best of my ability.**

Name

Date

Position

Signature

## Keep this form and all related documentation on file at the yard

Accompanying documentation

- ☐ A copy of the SDS for the spilled product
- ☐ A site map that shows the location of spill and the flow direction
- ☐ A site map that shows the location of samples
- ☐ Receipts for disposal of hazardous material
- ☐ Receipts and/or documentation for disposal of contaminated material (such as soil)