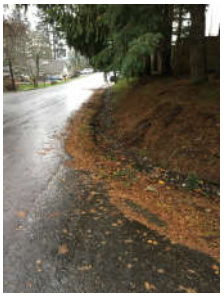
West Linn Surface Water Master Plan

Planning Commission Hearing

October 2| 2019



Presentation Objectives

- Outline changes made in response to Planning Commission review of the Storm Drainage Master Plan (SMP).
- Provide an overview of the City's storm drainage system.
- Review the SMP development process/ timeline
- Summarize capital project, program, and policy recommendations and costs.

Public Outreach Schedule – Storm Drainage Master Plan (SMP)

- SMP presented to the Utility Advisory Board
  - April 9, 2019
  - May 14, 2019
  - July 9, 2019
- Public Review Draft SMP – July 1, 2019
  - Online viewing
- SMP Presented to Planning Commission
  - August 7, 2019
  - September 4, 2019
  - October 2, 2019
- Draft – Final SMP – September 2019
  - Online viewing

Response to Comments – Draft-Final SMP

- Updated document name and references from Surface Water Master Plan to Storm Drainage Master Plan, for consistency with Comprehensive Plan.
- Updated Project Number P-1 name (P-1: Tannler Drive/ Bernert Creek Basin Feasibility Study) and adjusted to high priority.
- Clarified storm system asset information and added reference to stream length (Section 2.5 and Figure 2-5).
- Added Table A-3 to Appendix B, documenting the City's detention pond inventory.
- Utilized consecutive page numbering.

Where Does Stormwater Go?

Where Does Stormwater Go?

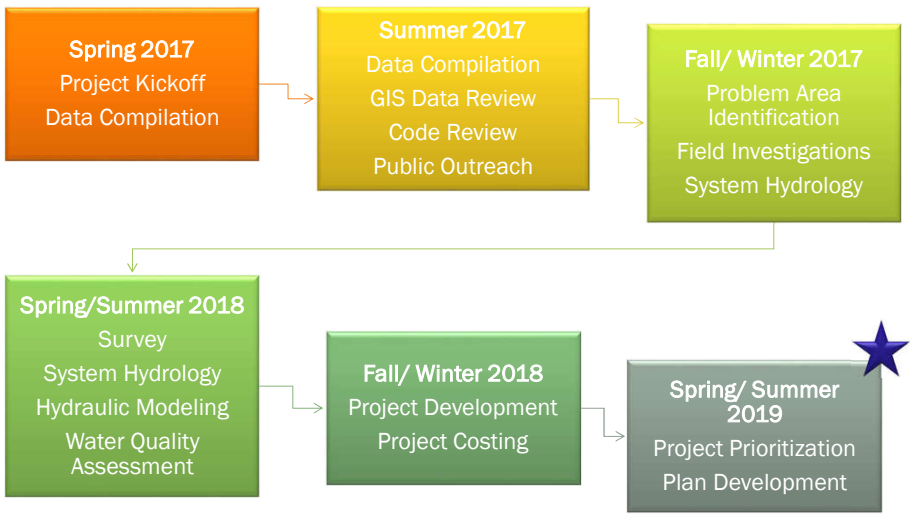
- Surface Water Bodies
  - Storm drainage system (catchbasins, pipes, open channels) collects and conveys stormwater to streams and rivers
- Ground Water
  - Surface infiltration via pervious surfaces, low impact development
  - Underground injection (drywells, UICs)
- Pollutants can be conveyed via stormwater
- No end of pipe treatment system (treatment plant)

6

City's Storm Drainage System

- Collects and conveys stormwater to receiving water bodies.
- Storm drainage system assets are managed by the City and include pipes, open channels (drainage ditches), ponds, water quality facilities, culverts, and structures (manholes, catch basins)
  - 595,000 feet of stormwater pipe
  - 52,000 feet of roadside ditches
  - 4,000+ structures
  - 203 swales (public or private)
  - 53 public ponds and wetlands
- 30 miles of mapped stream corridors discharge stormwater to the Tualatin and Willamette Rivers

Storm Drainage Master Plan - Project Timeline



Storm Drainage Master Plan - Development Process

Project Planning/ Problem Identification
- Data Gathering
- Field Investigations
- Surveys/Interviews
- Public Input
- Hydrologic and Hydraulic Modeling

Project Development
- Alternatives Analysis
- Project Concept Design
- Programmatic Activities
- Project Prioritization

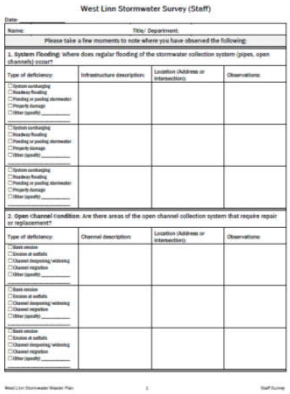
Master Plan Development
- Cost Estimation/ Funding Needs
- Policy Recommendations
- Documentation
- Stakeholder Outreach

Project Planning/ Problem Identification

- Public and Staff Surveys
- Staff discussions/ meetings
- GIS Data Review
- 2006 Surface Water Master Plan CIP Review
- 2015 Hydromodification Assessment Review
- Site Visits

Outcome: 65 "Stormwater Problem Areas"

Project Planning/ Problem Identification
- Data Gathering
- Field Investigations
- Surveys/Interviews
- Public Input
- Hydrologic and Hydraulic Modeling



West Linn Stormwater Survey (Staff)

Date:

Name: Title: Department:

Please take a few moments to note where you have observed the following:

1. System Flooding: Where does regular flooding of the stormwater collection system (pipes, open channels) occur?

Type of deficiency:	Infrastructure description:	Location (Address or intersection):	Observations:
☐ System surcharging ☐ Roadway flooding ☐ Flooding or ponding stormwater ☐ Property damage ☐ Other (specify) _____			
☐ System surcharging ☐ Roadway flooding ☐ Flooding or ponding stormwater ☐ Property damage ☐ Other (specify) _____			
☐ System surcharging ☐ Roadway flooding ☐ Flooding or ponding stormwater ☐ Property damage ☐ Other (specify) _____			

2. Open Channel Condition: Are there areas of the open channel collection system that require repair or replacement?

Type of deficiency:	Channel description:	Location (Address or intersection):	Observations:
☐ Bank erosion ☐ Erosion at outfalls ☐ Channel deepening/ widening ☐ Channel migration ☐ Other (specify) _____			
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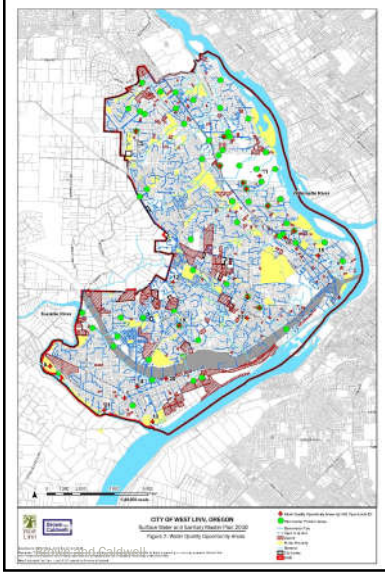
☐ Bank erosion ☐ Erosion at outfalls ☐ Channel deepening/ widening ☐ Channel migration ☐ Other (specify) _____			

Project Planning/ Code Review

- Review of the City's stormwater public works/ stormwater design standards and municipal code.
  - West Linn Municipal Code (WLMC), Chapters 4 (Utilities), 5 (Nuisances), and 8.105 (Erosion Control)
  - Public Works Standards (PWDS), Section 2 (Storm Drain Requirements)
  - PW Construction Specifications, Division 6 (Storm Drain)
  - Community Development Code (CDC), Chapters 55 (Design Review), 56 (Parks and Natural Area), 92 (Required Improvements)
- Goals:
  - Identify basis of design/ design criteria for system evaluation and CIP development
  - Identify gaps or inconsistencies between code and the NPDES MS4 permit requirements
  - Confirm city/ private property responsibilities

Project Planning/ Water Quality Assessment

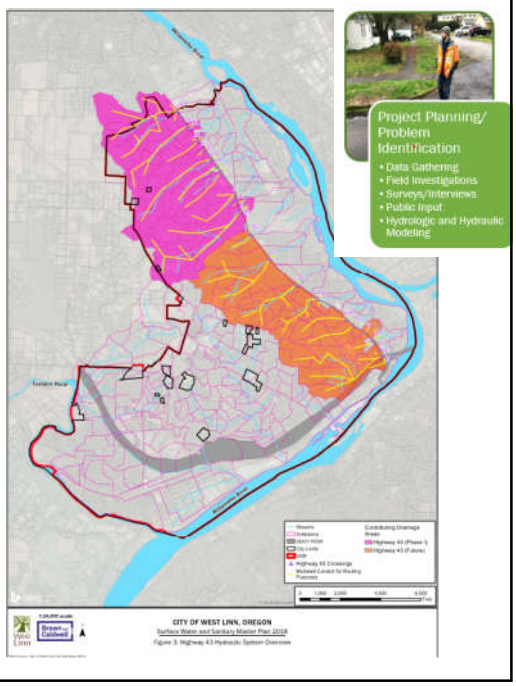


- Water quality retrofits are a priority in the NPDES MS4 permit.
- Four strategies developed to characterize identified water quality projects:
  1. Green infrastructure in public ROW
  2. New facilities on public property
  3. New facilities to directly manage runoff associated with Highway 43
  4. Pond retrofits

Outcome: 5 New Stormwater Quality Opportunities

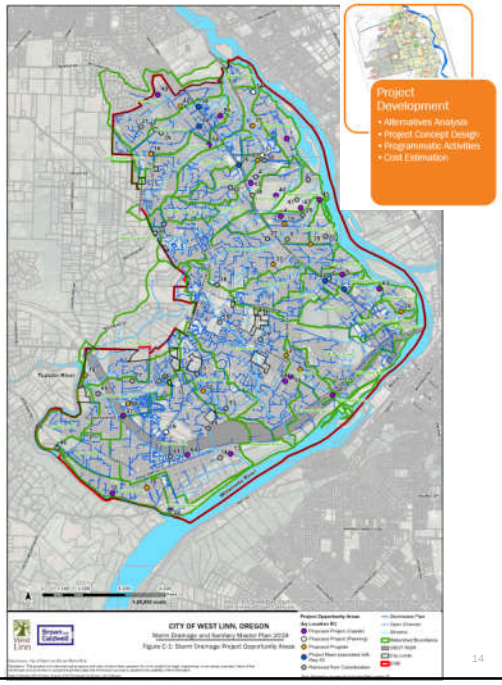
Project Planning/ Modeling Evaluation

- Detailed Modeling Areas:
  - Blankenship Road
  - Fairview Way
- Capacity Modeling Areas:
  - 5th Avenue Culvert
  - Sunset Creek at I-205
  - Kantara Way
  - Maddox Creek at River Street
- Highway 43 Evaluation
  - 24 Crossings
  - Upstream and Downstream Structures and Conveyance Channel



Project Development/ Needs Assessment

- Project Needs Workshop
  - Identified Project Opportunity Areas
  - Defined Project versus Programmatic Activity
- Project/ Program Objectives
  - Increase System Capacity
  - Improve System Configuration
  - Add Infrastructure
  - Improve Water Quality (Retrofits)
  - Prevent Erosion
  - Address Maintenance Need

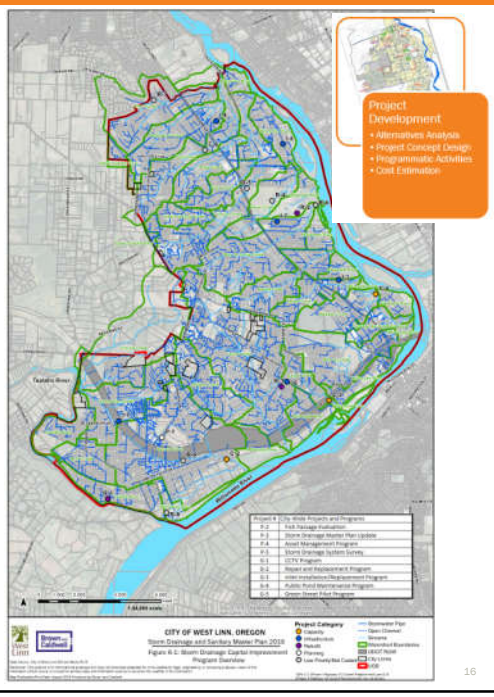


Project Development/ Prioritization and Phasing

- High Priority Needs (2019-2024)
  - Addresses current system flooding
  - Addresses failing infrastructure
  - Project timing in next 5-years
  - 10 projects
- Medium Priority Needs (2025-2029)
  - Addresses local issue
  - Project timing in next 10-years
  - 8 projects
  - 5 annual programs
- Low Priority/ Not Costed (2030-2039)
  - 8 projects

Project Development/ Results

- Capacity Projects – Replace existing infrastructure
  - 6 total, 4 are high priority
- Infrastructure Projects – Construct new infrastructure
  - 6 total, all are high/medium priority
- Retrofit Projects – Modify infrastructure to enhance water quality functionality
  - 9 total, 3 are high/medium priority
- Planning Projects
  - 5 total, all are high/ medium priority
- General/ Annual Maintenance Programs
  - 5 total, all are medium priority



Master Plan Development/ Cost Summary

Master Plan Development
- Cost Estimation/ Funding Needs
- Policy Recommendations
- Documentation
- Stakeholder Outreach

Improvement Category	Capital Improvement Cost Total (One Time)	SDC Eligibility
Capacity Projects	$2,559,000	$146,000
Infrastructure Projects	$6,301,000	$265,000
Retrofit Projects	$2,338,000	$1,000
Planning Projects	$790,000	----
TOTAL	$11,988,000	$412,000
	Capital Improvement Cost Total (Annual)	SDC Eligibility
Maintenance Programs	$1,269,000	---

Master Plan Development/ Programmatic Needs

Master Plan Development
- Cost Estimation/ Funding Needs
- Policy Recommendations
- Documentation
- Stakeholder Outreach

- General/ Maintenance Programs (5 total)
  - G-1: CCTV Program
  - G-2: Repair and Replacement Program
  - G-3: Inlet Installation and Replacement Program
  - G-4: Public Pond Maintenance Program
  - G-5: Green Street Pilot Program

Master Plan Development/ Documentation

- Study Area Characteristics (Section 2)
- Code Evaluation (Section 3)
- Project Planning Process (Section 4)
  - Problem Area Identification
  - Project Needs Assessment
  - Water Quality Assessment
- Modeling/ Capacity Evaluation (Section 5)
- Capital Improvement Program (Section 6)
  - Project Summaries
  - Program Summaries
  - Cost Estimates
  - Policy Recommendations

Next Steps

- Draft-Final Master Plan currently available for public review/ comment
- City Council Presentation(s)
- Master Plan Finalization

Brown AND Caldwell

Additional Reference Slides

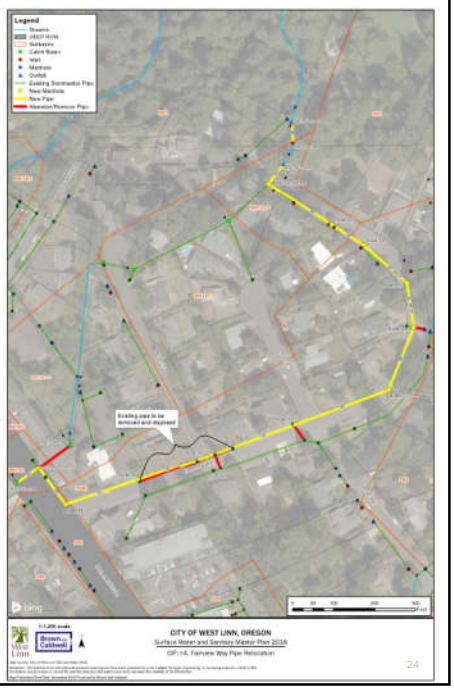
Brown AND Caldwell

Proposed Projects (* high priority projects)

- Capacity Projects (6 total)
  - *C-1: Phase I Highway 43 Culvert Improvements
  - *C-2: 5th Avenue Culvert Replacement
  - *C-3: Sunset Creek Culvert Replacement
  - *C-4: Maddox Creek Culvert Replacement
  - C-5: Phase II Highway 43 Culvert Improvements
  - C-6: Kantara Way Capacity Deficiency
- Retrofit Projects (9 total)
  - *R-1: Public Pond 22 Retrofit
  - R-2: Mary S Young Parking
  - R-3: Public Works Planters
  - R-4: Mary S Young Erosion Control
  - R-5: Trillium Creek Restoration
  - R-6: Mary S Young Fish Restoration
  - R-7: Arbor Creek Culvert
  - R-8: Willamette Park Parking
  - R-9: Public Pond 18 Retrofit

Proposed Projects
(* high priority projects)

- Infrastructure Projects (6 total)
  - *I-1: Blankenship
  - *I-2: 5th Avenue Culvert Replacement
  - *I-3: Buck Street
  - I-4: Fairview Pipe Relocation
  - I-5: Nixon Pipe Relocation
  - I-6: Sunset Ave. Improvements



Proposed Projects
(* priority projects)

- Planning Projects (5 total)
  - *P-1: Tannler Open Ditch Feasibility Study
  - P-2: Fish Passage Evaluation
  - P-3: Surface Water Master Plan Update
  - P-4: Asset Management Program
  - *P-5: Stormwater System Survey

Proposed City-wide Programs

- General/ Maintenance Programs (5 total)
  - G-1: CCTV Program
  - G-2: Repair and Replacement Program
  - G-3: Inlet Installation and Replacement Program
  - G-4: Public Pond Maintenance Program
  - G-5: Green Street Pilot Program

Site Visits

Problem Area Identification

- Public and Staff Surveys
- Staff discussions/ meetings
- GIS Data Review
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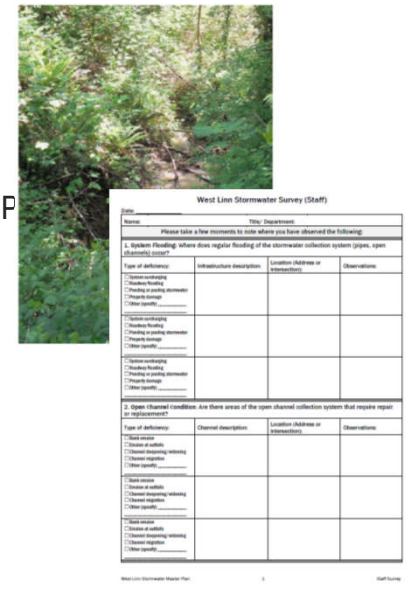
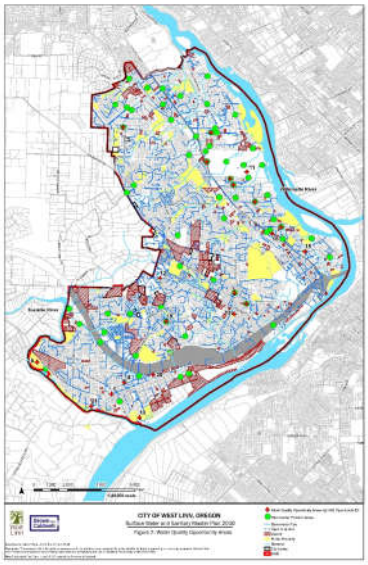
- 2015 Hydromodification Assessment Review
- Site Visits


West Linn Stormwater Survey (Staff)

65 Stormwater “Problem Areas”

Water Quality Assessment



Brown and Caldwell

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- Four strategies developed to characterize identified water quality projects:
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  2. New facilities on public property
  3. New facilities to directly manage runoff associated with Highway 43 (public property or property acquisition)
  4. Pond retrofits

5 New Stormwater Quality Opportunities

Projects will use AACE Class 5 Capital Estimates and will be in 2018 ENR dollars

	Primary Characteristic	Secondary Characteristic			
ESTIMATE CLASS	LEVEL OF PROJECT DEFINITION Expressed as % of complete definition	END USAGE Typical purpose of estimate	METHODOLOGY Typical estimating method	EXPECTED ACCURACY RANGE Typical variation in low and high ranges [a]	PREPARATION EFFORT Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/ Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Notes: [a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.
[b] If the range index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

Figure 1. – Cost Estimate Classification Matrix for Process Industries

Code Review Outcomes

- Recommendations
  - Technical Standards and Policy
  - Clarity and Implementation
- PWDS Update, effective October 15, 2018
  - Technical Standards and Policy
    - Updated impervious area thresholds
    - Provided guidelines for sizing facilities
  - Clarity and Implementation Changes
    - Standards apply to public and private projects
    - Correct references and version inconsistencies

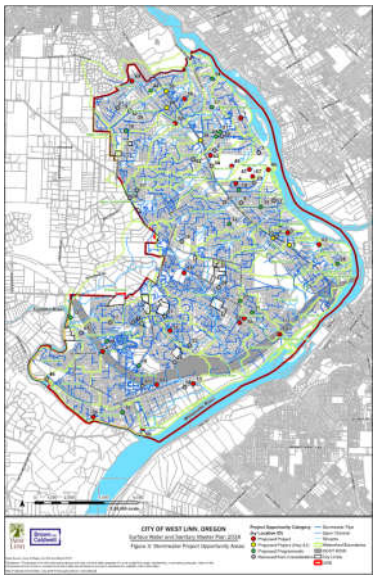
Code Review Outcomes

- Outstanding Recommendations
  - Technical Standards and Policy
    - CDC/ WLMC. Move floodplain management regulations to the WLMC from CDC. Update to reflect current floodplain standards for the NFIP Program for Oregon.
    - PWDS, Section 2.0013. Specify design storms.
    - PWDS, Section 2.0040/2.0050. Specific facility selection hierarchy to prioritize green infrastructure and impervious area reduction techniques.
  - Clarity and Implementation Changes
    - PWDS. Specify Portland SWMM references and applicable technical guidelines
    - Additional clarification edits

Project Needs Assessment

- Projects
  - Capacity Improvement
  - Improve System Configuration
  - Add Infrastructure (with and without water quality)
  - Water Quality
  - System Repair
  - Erosion
- Planning Efforts
- Programs

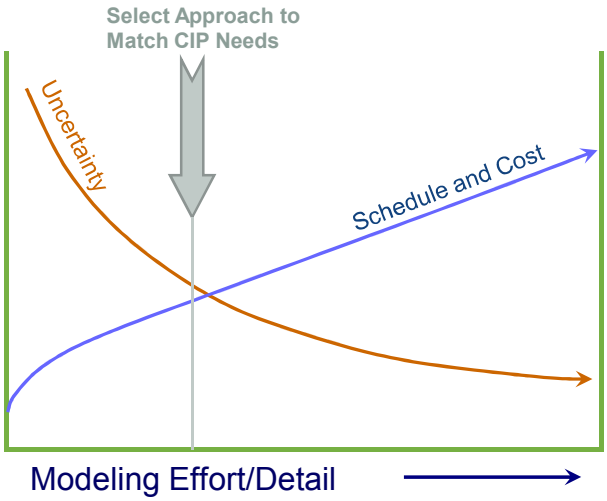
44 Stormwater Opportunity Areas



Modeling Needs Identification

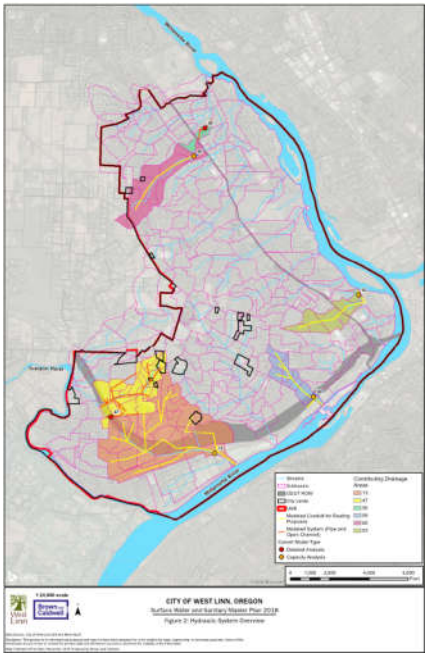
- Project needs were reviewed to determine if modeling would help inform project solutions.
  - Category 1: Detailed hydraulic modeling to inform sources and solutions
  - Category 2: Hydrology modeling only to inform system sizing
  - Category 3: Limited hydraulic modeling to evaluate capacity
  - Category 4: No modeling required
- Survey conducted by City staff in Summer 2018

Modeling Approach



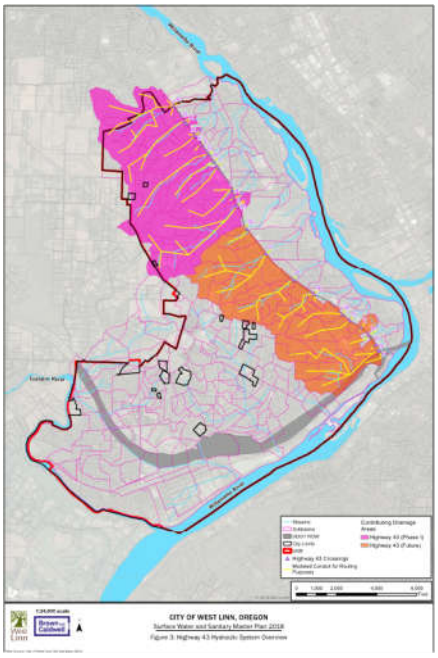
Modeling Overview

- Detailed Modeling Areas:
  - Blankenship Road
  - Fairview Way
- Capacity Modeling Areas:
  - 5th Avenue Culvert
  - Sunset Creek at I-205
  - Kantara Way
  - Maddox Creek at River Street



Modeling Overview

- Highway 43
  - 24 Crossings
    - Phase 1: Arbor to Hidden Springs
    - Phase 2: Hidden Springs to I-205
  - Upstream and Downstream Structures and Conveyance Channel
  - Water Quality is not considered.



Highway 43 System Evaluation Assumptions

- Stemming from the 2016 Highway 43 Concept Plan
- Phase I of the Highway 43 Improvements (Arbor to Hidden Springs)
  - Design: 2018 (Conducted by ODOT), Construction: ~2020
  - Capacity deficient culverts to be sized and costed as a CIP.
  - Water quality improvements not included in CIP concepts.
- Phase II of the Highway 43 Improvements (Hidden Springs to I-205)
- Guidelines:
  - Cooperative Maintenance Agreement (February 2018)
  - City charter amendment (Chapter 11, Section 46) - stormwater management associated with OR43 is an authorized use. Water quality mitigation for Highway 43 may be permitted in parks.

Analysis Criteria Used to Identify "Deficiencies"

- Water Quality Facility Design
  - Portland SWMM
  - 1"/ 24 hour design storm
- Structure Spacing
  - Max 500' between structures
- Pipe Design
  - 10-year design storm, surcharge is acceptable
  - 12" min pipe size in public ROW
- Culverts
  - 25-year design storm, such that headwater does not exceed 1.5 times culvert diameter.

Modeling Results

- Blankenship Road
  - 2-yr and 10-yr deficiencies
  - Upsizing and realignment
- Fairview Way
  - 10-yr deficiencies
  - Upsizing and relocation

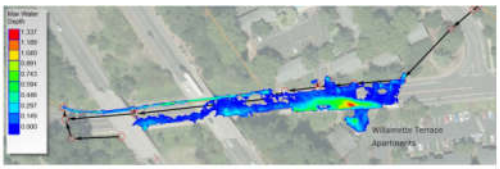


Figure 1. Existing system analysis showing 2-D flooding for the 2-year 24-hour event

Modeling Results

- 2-yr deficiency at all evaluated culverts
- Kantara Way
  - Limited potential for safety impacts
  - No project development

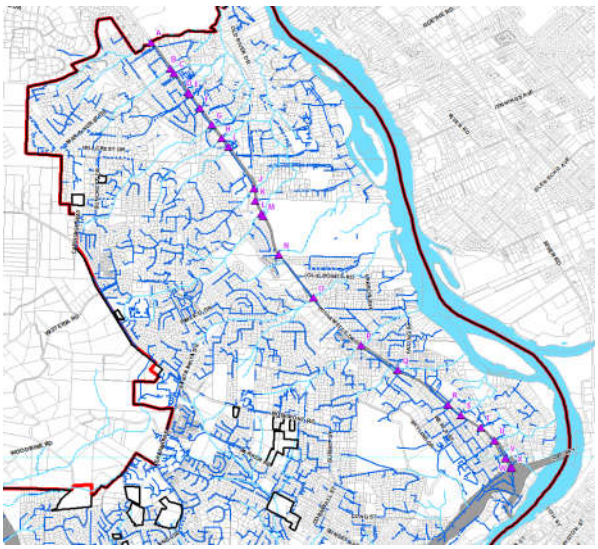
Location #13: 5th Avenue Culvert

Location #60: Kantara Way

Location #63: Maddox Creek

Modeling Results - Highway 43

- 24 culverts evaluated
- 13 deficient
  - Flooding
  - Surcharging
- Upsize/ realignment in conjunction with Highway 43 improvements



Planning Efforts

- One-time effort to evaluate feasibility and need for a project opportunity
- Planning efforts are all considered Medium Priority and a preliminary cost developed.