

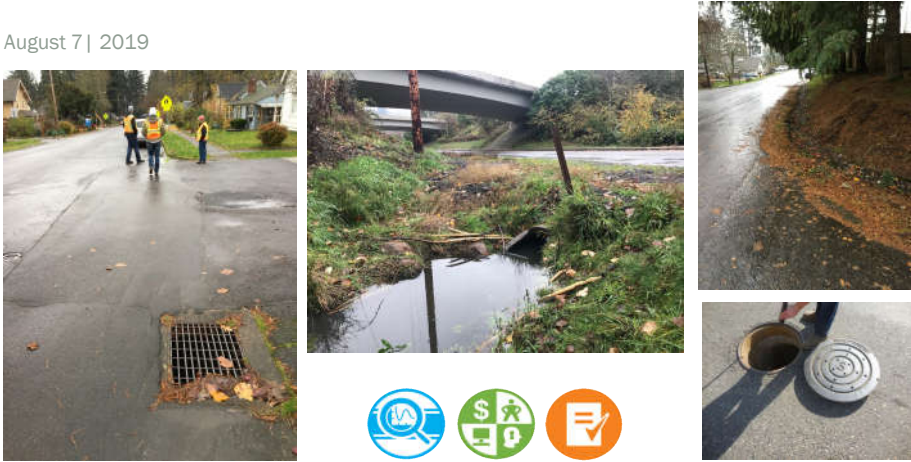


Brown AND Caldwell 

West Linn Surface Water Master Plan

Planning Commission Work Session

August 7 | 2019

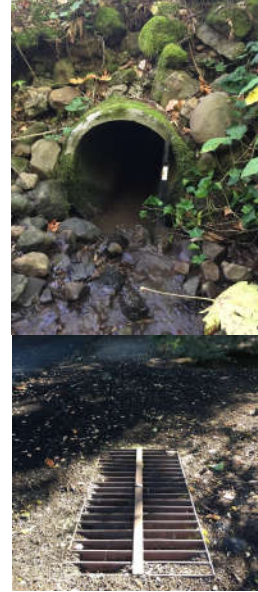


Work Session Goals

- What is stormwater and where does it go?
- Review the Master Plan development process/ timeline
- Review project elements
- Summarize capital project, program, and policy recommendations and costs
- Discuss next steps

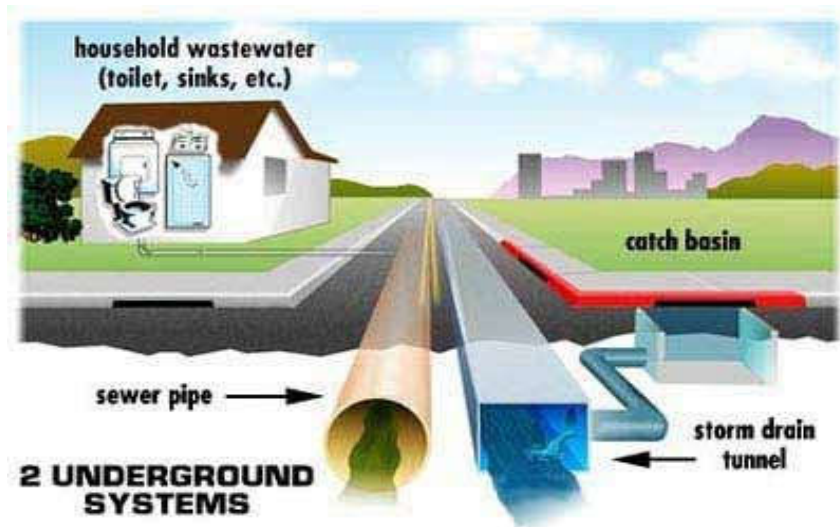
City's Surface Water System

- Collects and conveys stormwater to receiving water bodies.
- Surface water system components includes pipes, open channels (ditches, streams, creeks), ponds, water quality facilities, culverts, and structures (manholes, catch basins)
 - 595,000 feet of stormwater pipe
 - 52,000 feet of roadside ditches
 - 159,000 feet of streams and creeks
 - 4,000+ structures
 - 256 swales or ponds



RR [21]

Where Does Stormwater Go?



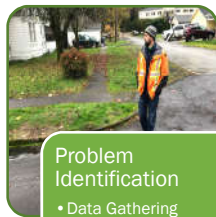
Where Does Stormwater Go?



- Surface Waters
 - Gutters, catchbasins, pipes, outfalls
 - Ditches, open channels
 - Streams and rivers
- Underground
 - Surface infiltration
 - Underground injection (drywells, UICs)
- Pollutants on ground surfaces are conveyed via stormwater and enter streams
- No end of pipe treatment system (treatment plant)

5

Surface Water Master Plan Development Process



Problem Identification

- Data Gathering
- Field Investigations
- Surveys/Interviews
- Public Input
- Hydrologic and Hydraulic Modeling



Project Development

- Alternatives Analysis
- Concept Design
- Programmatic Activities
- Planning Activities
- Cost Estimation

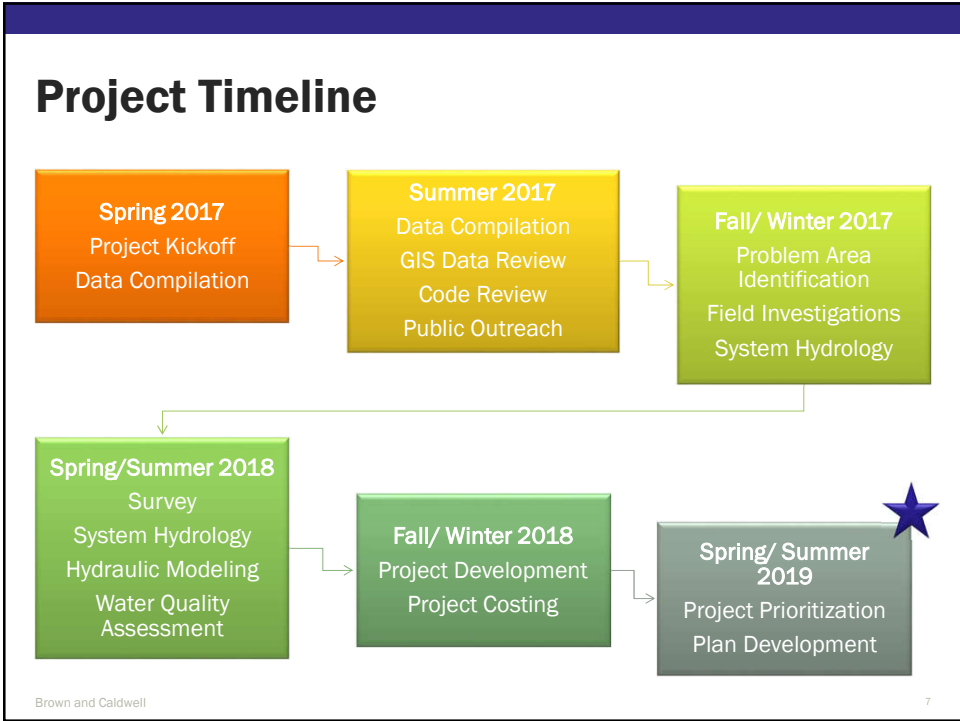


Master Plan Development

- Project Prioritization
- Documentation
- Funding Needs
- Stakeholder Outreach



Brown and Caldwell

6



Master Plan Elements

- Code Review/Policy Recommendations (Section 3)
- Problem Area Identification and Prioritization (Section 4)
- Water Quality Assessment (Section 4)
- Hydrologic/Hydraulic Modeling (Section 5)
- Capital Project Development (Section 6)
- Program Development (Section 6)
- Document Development

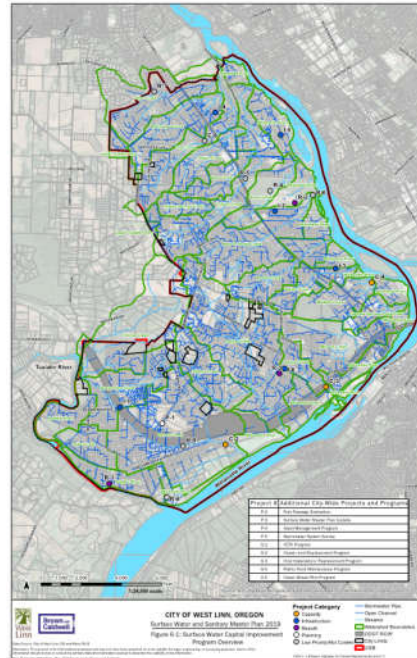



Code Review/ Basis of Planning

- 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

Capital Project and Program Objectives

- Increase System Capacity
- Improve System Configuration
- Add Infrastructure
- Improve Water Quality (Retrofits)
- Prevent Erosion
- Address Maintenance Need



Brown and Caldwell

Capital Improvement Program Priorities and Phasing

- High Priority Needs (2019-2024)
 - Addresses current system flooding
 - Addresses failing infrastructure
 - Project timing in next 5-years
 - 8 projects
- Medium Priority Needs (2025-2029)
 - Addresses local issue
 - Project timing in next 5-10 years
 - 9 projects
 - 5 annual programs
- Low Priority/ Unfunded Needs (2030-2039)
 - 8 projects

Brown and Caldwell

11

Proposed Projects and Programs

- 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

Brown and Caldwell

12

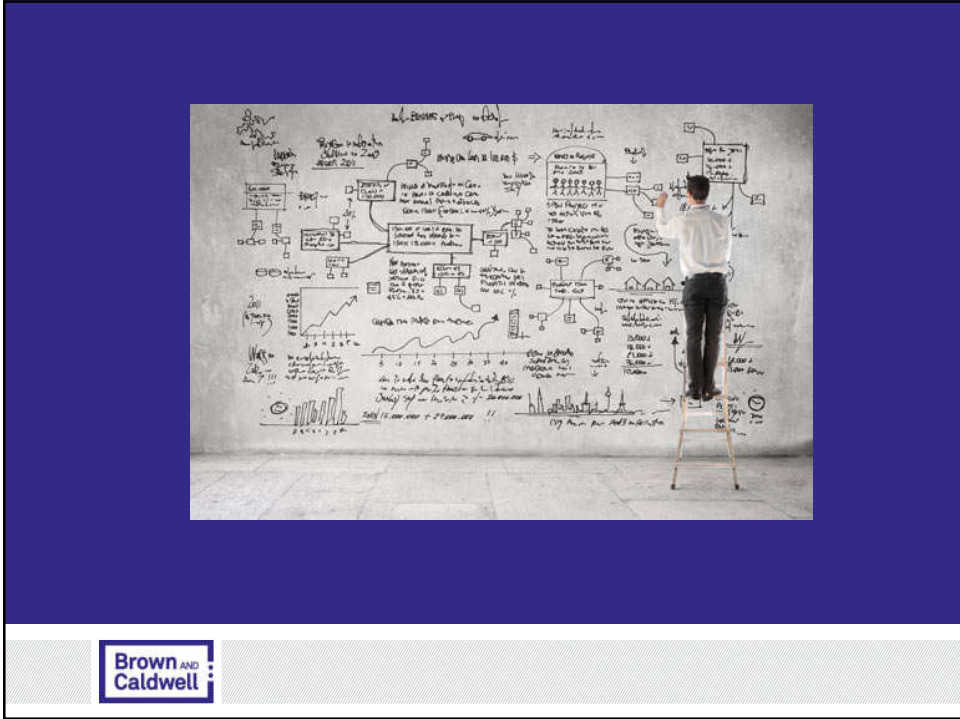
Cost Summary

| 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 |
| Improvement Category | Capital Improvement Cost Total (Annual) | SDC Eligibility |
| Maintenance Programs | \$1,269,000 | — |

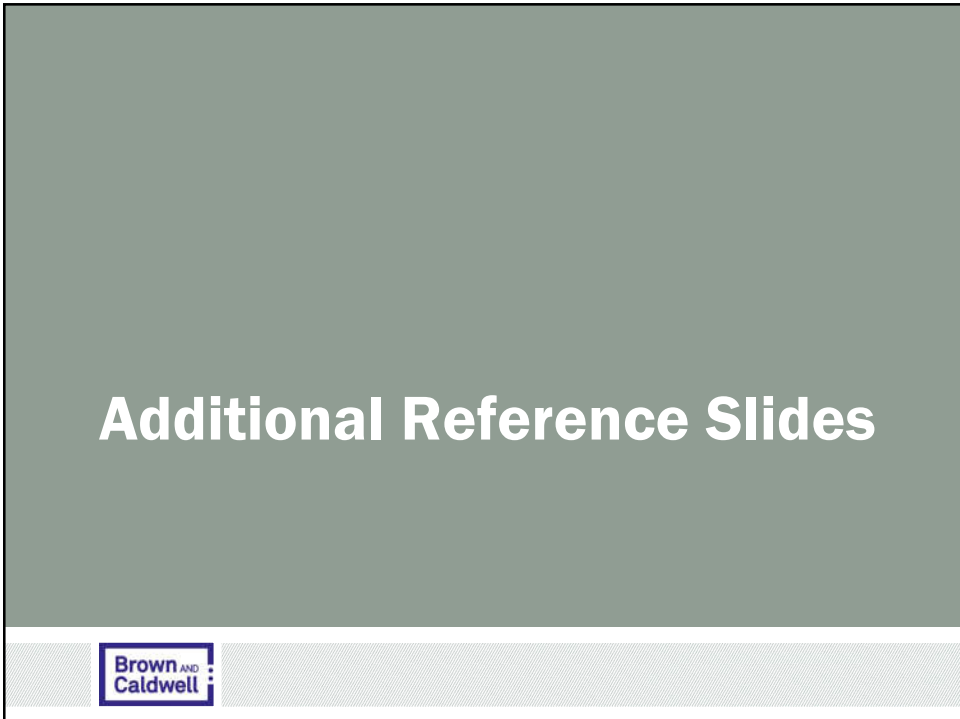
Next Steps

- Draft Master Plan currently available for public review/comment
- Public Hearing before Planning Commission Meeting
- City Council Presentation(s)
- Master Plan Finalization





Brown AND Caldwell



Brown AND Caldwell

Proposed Projects (* 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

Brown and Caldwell

17

Proposed Projects (* 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



Brown and Caldwell

18

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



Brown and Caldwell

19

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

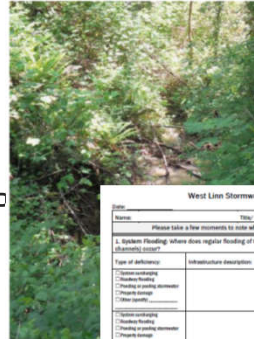


Brown and Caldwell

20

Problem Area Identification

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



West Line Stormwater Survey (Staff)

Name: _____ Title: _____

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 problem | Infrastructure description | Location (Address or intersection) | Observations |
|--|----------------------------|------------------------------------|--------------|
| <input type="checkbox"/> Stormwater pipe <input type="checkbox"/> Stormwater manhole <input type="checkbox"/> Flooding at public structure <input type="checkbox"/> Private property <input type="checkbox"/> Other specify: _____ | | | |
| <input type="checkbox"/> Stormwater pipe <input type="checkbox"/> Stormwater manhole <input type="checkbox"/> Flooding at public structure <input type="checkbox"/> Private property <input type="checkbox"/> Other specify: _____ | | | |
| <input type="checkbox"/> Stormwater pipe <input type="checkbox"/> Stormwater manhole <input type="checkbox"/> Flooding at public structure <input type="checkbox"/> Private property <input type="checkbox"/> Other specify: _____ | | | |

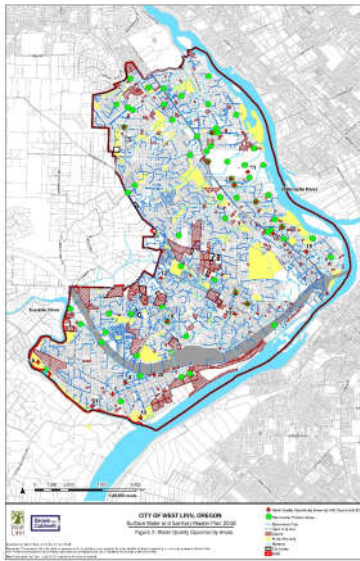
2. Open Channel Condition: Are there areas of the open channel collection system that require repair or replacement?

| Type of problem | Channel description | Location (Address or intersection) | Observations |
|--|---------------------|------------------------------------|--------------|
| <input type="checkbox"/> Road curbs <input type="checkbox"/> Stormwater pipe <input type="checkbox"/> Channel eroding, settling <input type="checkbox"/> Channel sagging <input type="checkbox"/> Other specify: _____ | | | |
| <input type="checkbox"/> Road curbs <input type="checkbox"/> Stormwater pipe <input type="checkbox"/> Channel eroding, settling <input type="checkbox"/> Channel sagging <input type="checkbox"/> Other specify: _____ | | | |
| <input type="checkbox"/> Road curbs <input type="checkbox"/> Stormwater pipe <input type="checkbox"/> Channel eroding, settling <input type="checkbox"/> Channel sagging <input type="checkbox"/> Other specify: _____ | | | |

West Line Stormwater Master Plan 5 Staff Survey

65 Stormwater "Problem Areas"

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 (public property or property acquisition)
 4. Pond retrofits

5 New Stormwater Quality Opportunities

Brown and Caldwell

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

| ESTIMATE CLASS | Primary Characteristic | Secondary Characteristic | | | |
|----------------|--|--|--|---|--|
| | 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 0.002% 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

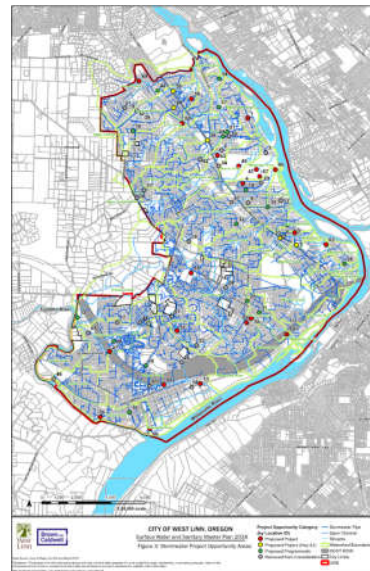


Code Review Outcomes

- 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

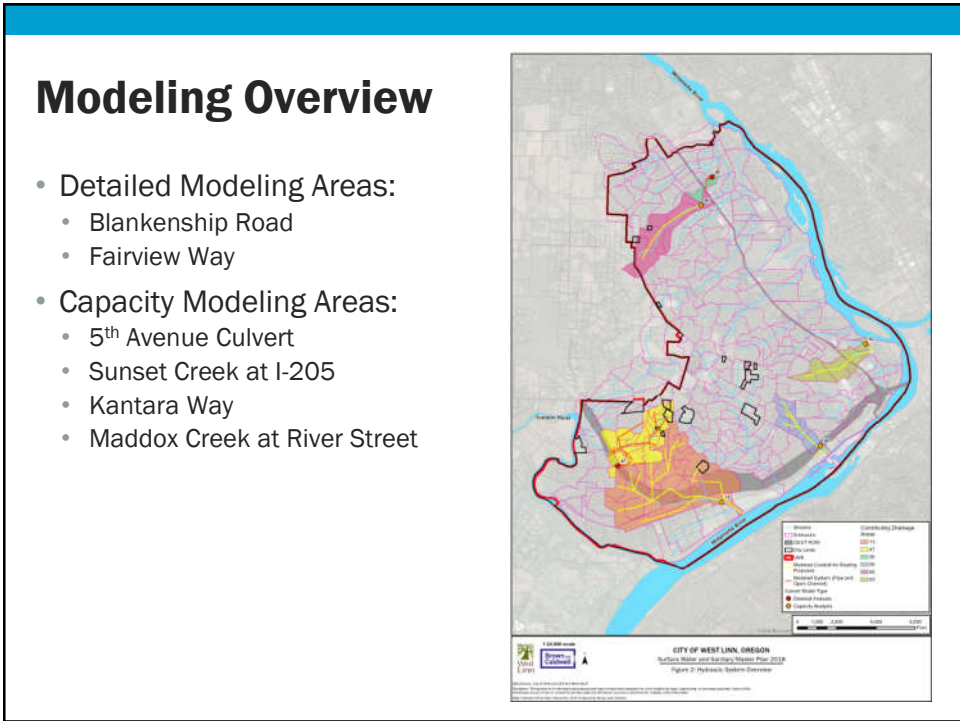
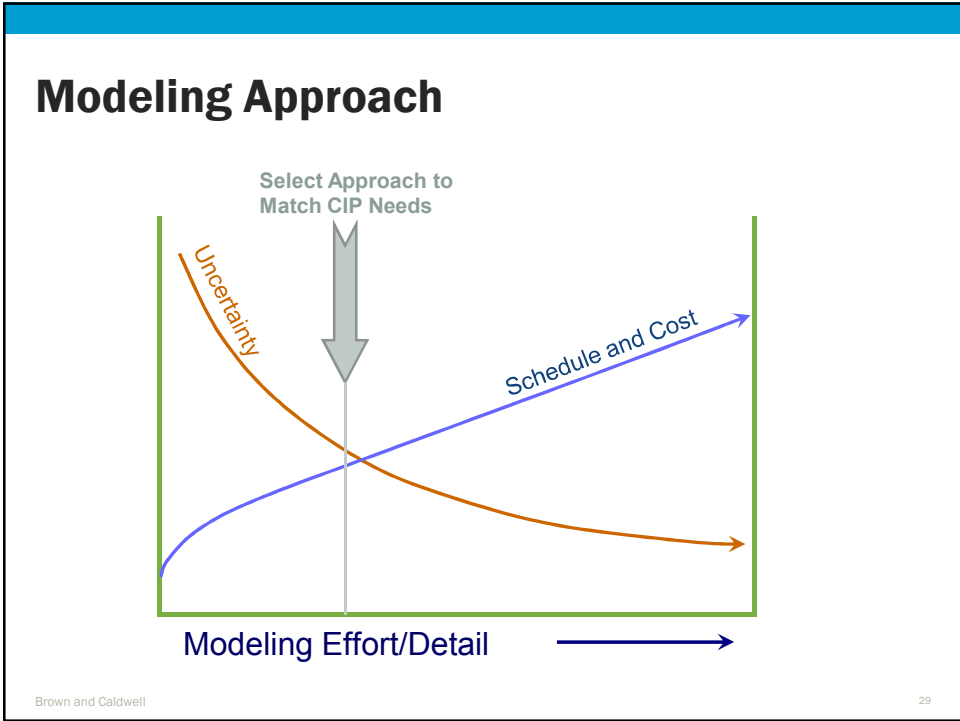
- Projects
 - Capacity Improvement
 - Improve System Configuration
 - Add Infrastructure (with and without water quality)
 - Water Quality
 - System Repair
 - Erosion
- Planning Efforts
- Programs



44 Stormwater Opportunity Areas

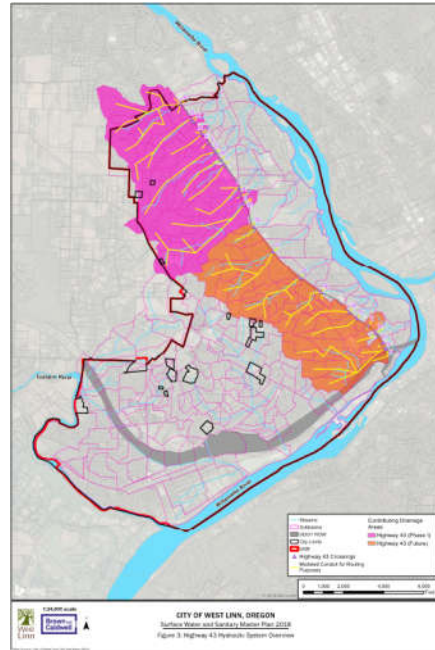
Brown and Caldwell

27



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.



Modeling Results

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

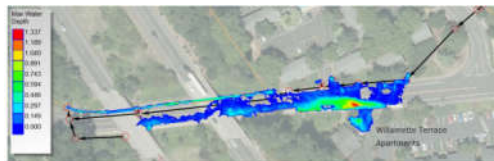
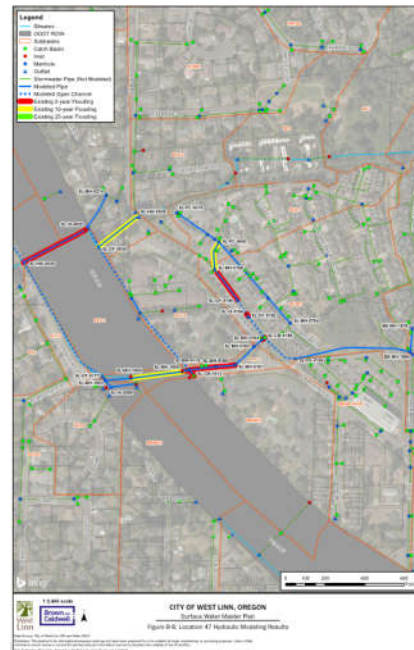


Figure 1. Existing system analysis showing 2-D flooding for the 2-year 24-hour event



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 #63: Maddox Creek



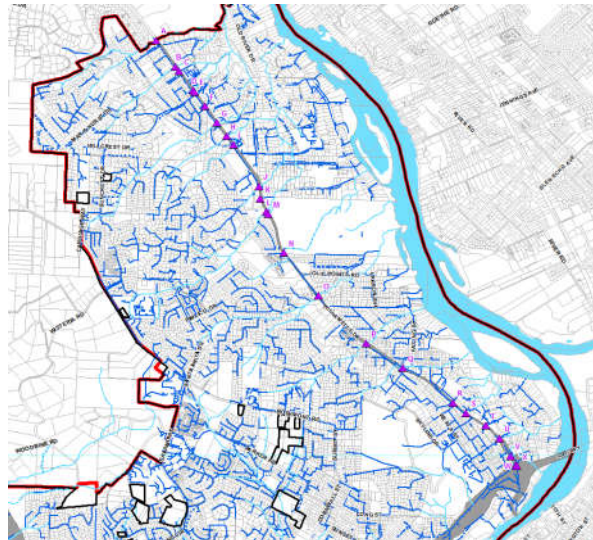
Location #60: Kantara Way

Brown and Caldwell

35

Modeling Results - Highway 43

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



Brown and Caldwell

36

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.