A Design/Build Approach to
Stream Restoration for
Flood Control & Erosion Control
on Willow Creek,
Washington County, Oregon

Presented by:

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Project Team:

CLEAN WATER SERVICES
Tom Lawler - Project Manager
Mike McCallen – Construction Leader

VIGIL-AGRIMIS, INC.
Paul Agrimis, RLA, PE, PWS – Principal-in-Charge
Adam Zucker, PE, CWRE - Project Manager
• Design Objectives

• Design/Construction Process

• Owner Perspective

• Performance to Date

• Conclusion

DESIGN OBJECTIVES:

1. Relocate Three Sections of Willow Creek Away from Properties Prone to Flooding

2. Grade and Plant Sections of the Abandoned Creek Channel to Create Backwater Sloughs

3. Remove Invasive Species and Replant with Native Species.
DESIGN OBJECTIVES:

4. To Increase Flood Storage Capacity by Reclaiming Old Floodplain and Creating New Floodplain to Dissipate Peak Flows with Decreased Erosion Risk

5. Restore Wetlands by Removing Fill Previously Placed in the Floodplain

Eroding Bank Along Residence Fence
Incised Channel With Limited Floodplain Access

Channel With Ready Floodplain Access
Neighbor “Solution” to Bank Erosion

PROJECT IMPLEMENTATION:


2. Construction Based on 90% Plans by Clean Water Service

BASIN and STREAM CHARACTERISTICS and ISSUES:

1. Basin Rapidly Urbanized
2. Cove Soils Dominate in Floodplain
3. Channel Incision And Loss of Floodplain Access
4. Infrastructure and Utility Constraints

DESIGN PROCESS:

1. Address the Acute Concerns:
   - Relocating Three Sections of the Channel
   - Stabilizing Eroding Banks
2. Address the Long Term Systemic Issues
   - Increase Floodplain Storage
   - Improve Channel/Floodplain Connectivity
Willow Creek – Existing Alignment

Addressing the Acute Concerns
Stream Diversion Bioengineering Design

Stream Diversion Bioengineering Construction
Improved Floodplain Access and Shear Stress Reduction

Pre-Construction Model

Proposed Conditions Model

Improved Floodplain / Channel Connectivity
CONSTRUCTION PROCESS AND IMPLEMENTATION:

Need to be FLEXIBLE Implementing the Design

• Survey Discrepancies

• Utility Conflicts

• Address Vulnerable Areas

Site Conditions/Challenges

• Improve Understanding of Site by Clearing/Mowing Prior to Construction

• Find Opportunities to Minimize and Avoid Impact to Large Oaks and Ash

• Take Advantage of the Existing Microtopography
Pre-Construction Cleared Conditions

Constructed Creek Relocation
Peak Event Overflow Channel

- Summer Storm
  - Can Slow Construction
  - Cause Erosion
  - Identify Vulnerable Areas in the Construction

Implementation of Brush Mattress
OWNER PERSPECTIVE:

1. Performance Driven Construction, Not Financially Driven Construction

Pre-Construction Brushy Conditions
OWNER PERSPECTIVE:

2. No Change Orders – Just Adjustments in the Field

Changes in the Field to Fit Opportunities and Needs
Implementation of Brush Mattress as Erosion Control

Rootwad Adjustments Needed
OWNER PERSPECTIVE:

3. Value and Long Term Success
PERFORMANCE TO DATE:

1. Several Peak Events
2. Relocation Has Successfully Relieved Property Impacts
3. Stream Pattern Appears Stable
4. Floodplain Access Not Achieved Universally
High Velocity Reach Below NW 143rd Box Culverts

Extent of November 2006 Highwater
Location of Slope Area Calculation Cross Sections

Cross-Section 1
Cross-Section 2

Cross-Section 3
CONCLUSION:

• Cost Effective Stream Relocation ~ $250/LF

• Many Floodplain Opportunities Realized Despite Some Utility Challenges

• Additional Habitat Creation Facilitated