Stantec

Mike Adams
EcoStream 2018

Incorporating Wood
in Urban Systems

Agenda

1. Benefits of Wood
2. Wood in Urban Setting
3. Design Considerations
4. Examples
5. Questions

Benefits of Wood

In-Channel

- **Turbulence**
- **Carbon/nutrient trap**
- **Cover**
- **Toe stability**
- **Wood recruitment**
- **Bedform diversity**
- **Grade Control**

Floodplain

- **Carbon source**
- **Roughness**
- **Trap debris**
- **Habitat**

Wood in an urban setting

Toe wood
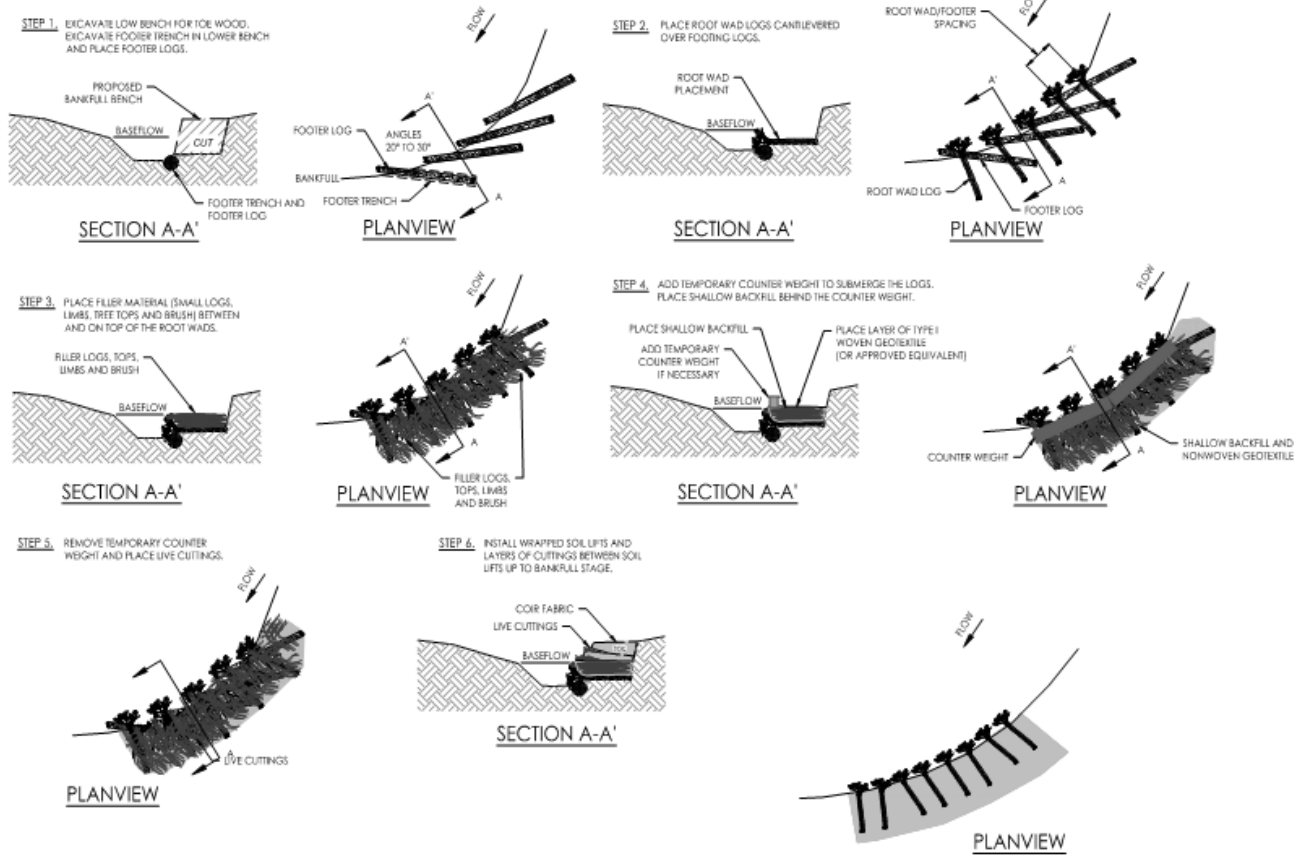
- **Submerged wood**
- **Sod or lifts on top**
- **Stabilizing toe structure**
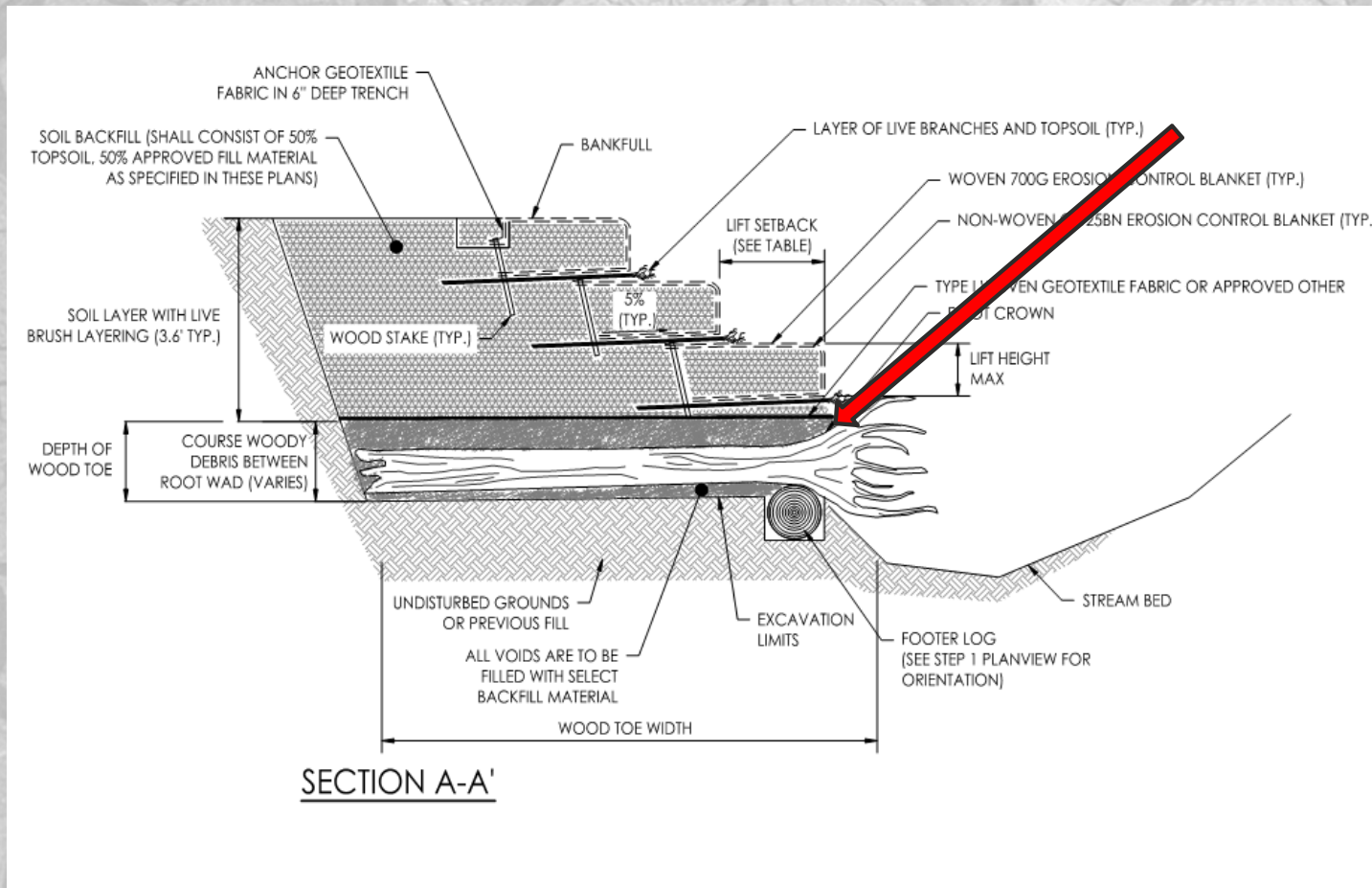- **Undercut bank**

Floodplain assemblage

- **Roughness element**
- **Variable distance from channel**
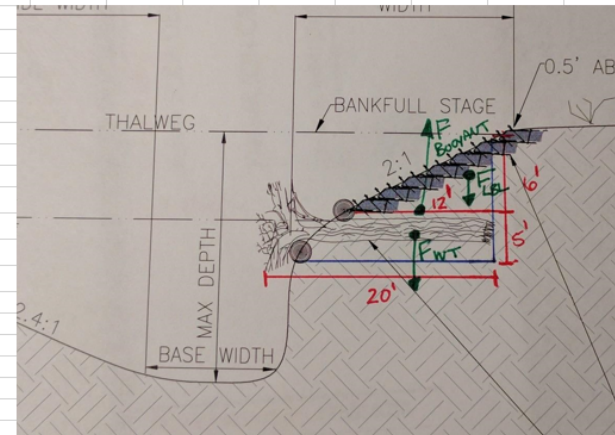- **Requires floodplain**

Design Considerations – Toe Wood

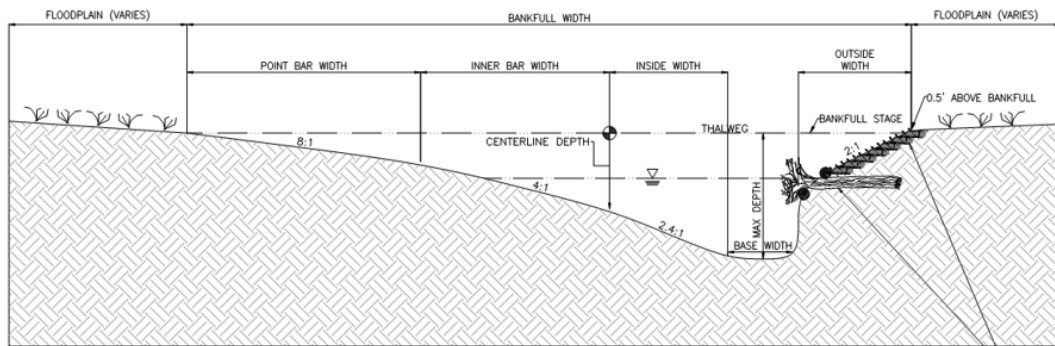WOOD TOE WITH COIR WRAPPED SOIL LIFTS
NOT TO SCALE

Design Considerations – Toe Wood

ANCHOR GEOTEXTILE
FABRIC IN 6" DEEP TRENCH

SOIL BACKFILL (SHALL CONSIST OF 50%
TOPSOIL, 50% APPROVED FILL MATERIAL
AS SPECIFIED IN THESE PLANS)

BANKFULL

LAYER OF LIVE BRANCHES AND TOPSOIL (TYP.)

WOVEN 700G EROSION CONTROL BLANKET (TYP.)

NON-WOVEN 25BN EROSION CONTROL BLANKET (TYP.)

LIFT SETBACK
(SEE TABLE)

TYPE LIVEN GEOTEXTILE FABRIC OR APPROVED OTHER

ROOT CROWN

5%
(TYP.)

SOIL LAYER WITH LIVE
BRUSH LAYERING (3.6' TYP.)

WOOD STAKE (TYP.)

LIFT HEIGHT
MAX

DEPTH OF
WOOD TOE

COURSE WOODY
DEBRIS BETWEEN
ROOT WAD (VARIES)

UNDISTURBED GROUNDS
OR PREVIOUS FILL

ALL VOIDS ARE TO BE
FILLED WITH SELECT
BACKFILL MATERIAL

EXCAVATION
LIMITS

FOOTER LOG
(SEE STEP 1 PLANVIEW FOR
ORIENTATION)

STREAM BED

WOOD TOE WIDTH

SECTION A-A'

Design Considerations – Toe Wood

Design Considerations – Floodplain Assemblage
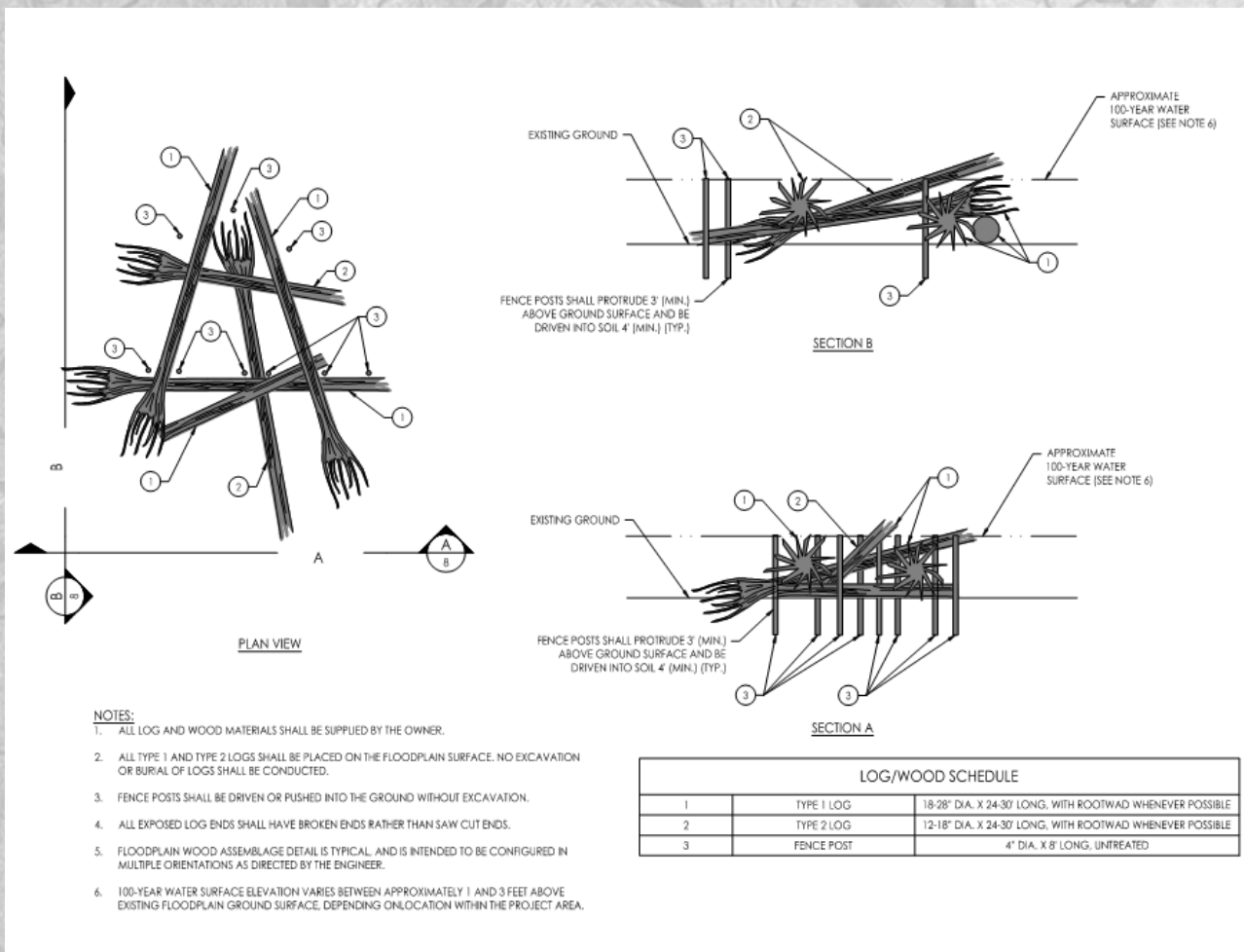
Crawford Reach

Durham, OR (Outside Portland)

Setting

- **Landscaping company**
- **Extensive adjacent wetlands**

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Goals

- **Stabilize banks in place**
- **Beaver resiliency**

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Goals

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Construction

- Doug firs
- Pump around with screen

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- Beaver resiliency

Construction

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- Pump around with screen

Results

- Erosion - Deposition

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- Landscaping company
- Extensive adjacent wetlands

Goals

- Stabilize banks in place
- Beaver resiliency

Construction

- Doug firs
- Pump around with screen

Results

- Flood resilience
- Recruitment

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- **Extensive adjacent wetlands**

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- **Stabilize banks in place**
- **Beaver resiliency**

Construction

- **Doug firs**
- **Pump around with screen**

Results

- **Near-bank velocity reduction**

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Setting

- Landscaping company
- Extensive adjacent wetlands

Goals

- Stabilize banks in place
- Beaver resiliency

Construction

- Doug firs
- Pump around with screen

Results

- Revegetation of banks

Wolftrap Creek

Vienna, VA (Outside Washington, DC)

Setting

- **Urban Park**

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Goals

- **Stabilize banks in place**
- **Minimize tree take**
- **Preserve / mimic what's working**

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Goals

- **Stabilize banks in place**
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- **Preserve / mimic what's working**

Construction

- **On-site materials**
- **Dry / pump around**

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Construction

- **On-site materials**
- **Dry / pump around**

Results

- **Fish habitat / benthics**
- **Redds**

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- **Urban Park**

Goals

- **Stabilize banks in place**
- **Minimize tree take**
- **Preserve / mimic what's working**

Construction

- **On-site materials**
- **Dry / pump around**

Results

- **Fish habitat / benthics**

Wolftrap Creek

Vienna, VA (Outside Washington, DC)
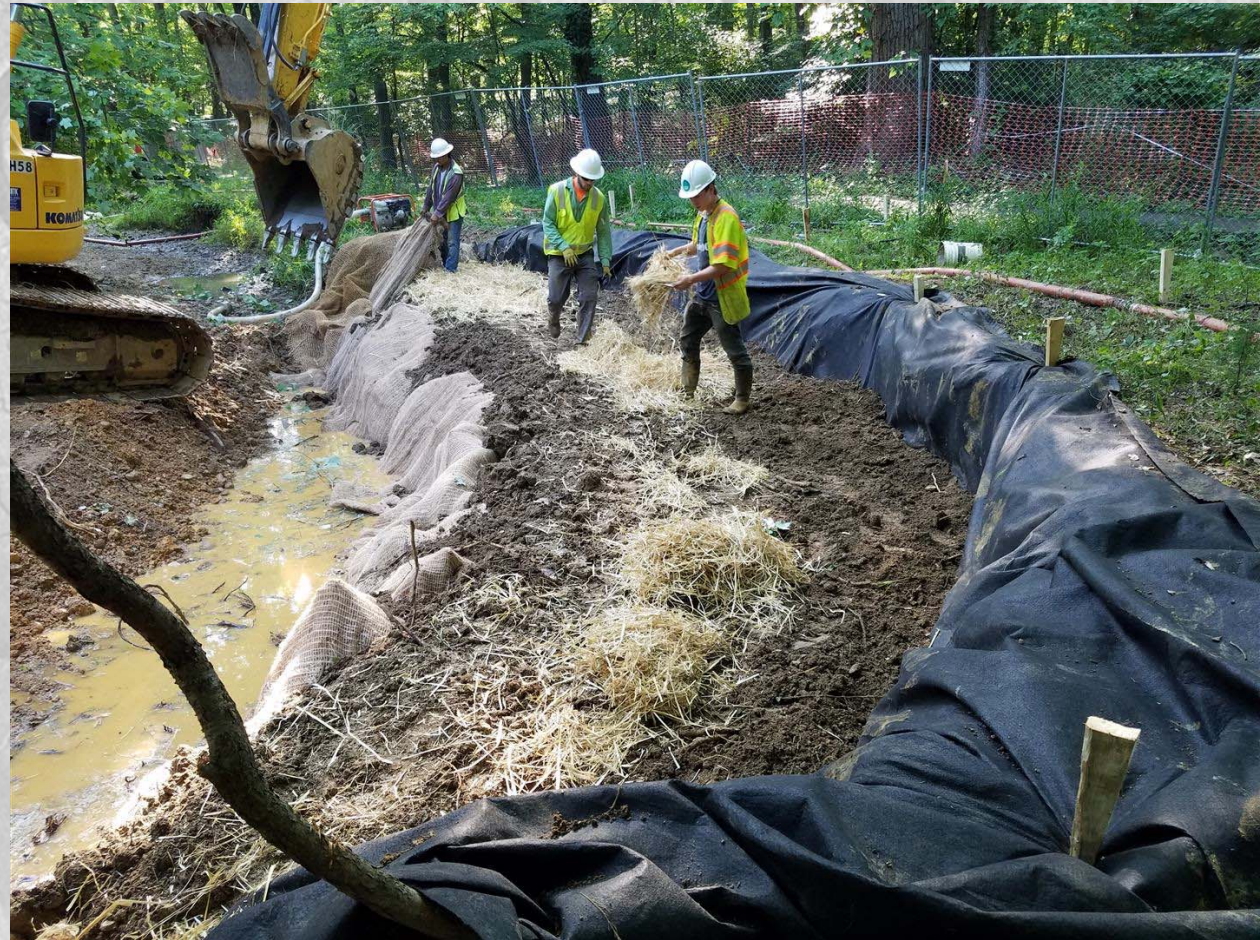
Setting
- **Urban Park**

Goals
- **Stabilize banks in place**
- **Minimize tree take**
- **Preserve / mimic what's working**

Construction
- **On-site materials**
- **Dry / pump around**

Results
- **Woody material recruitment**

Wolftrap Creek

Vienna, VA (Outside Washington, DC)

Setting

- **Urban Park**

Goals

- **Stabilize banks in place**
- **Minimize tree take**
- **Preserve / mimic what's working**

Construction

- **On-site materials**
- **Dry / pump around**

Results

- **Stabilized bank**

Wolftrap Creek

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Setting

- **Urban Park**

Goals

- **Stabilize banks in place**
- **Minimize tree take**
- **Preserve / mimic what's working**

Construction

- **On-site materials**
- **Dry / pump around**

Results

- **Increased floodplain roughness**
- **Wood recruitment**

Wolftrap Creek

Vienna, VA (Outside Washington, DC)

Setting

- **Urban Park**

Goals

- **Stabilize banks in place**
- **Minimize tree take**
- **Preserve / mimic what's working**

Construction

- **On-site materials**
- **Dry / pump around**

Results

- **Micro habitat**
- **Roughness**

Wolftrap Creek

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Setting

- **Urban Park**

Goals

- **Stabilize banks in place**
- **Minimize tree take**
- **Preserve / mimic what's working**

Construction

- **On-site materials**
- **Dry / pump around**

Results

- **Floodplain roughness**

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- **Urban Park**

Goals

- **Stabilize banks in place**
- **Minimize tree take**
- **Preserve / mimic what's working**

Construction

- **On-site materials**
- **Dry / pump around**

Results

- **Floodplain roughness**

Dewey Creek

Dumfries, VA (Outside Washington, DC)

Setting

- **Urban corridor**

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Setting

- **Urban corridor**

Goals

- **Sediment transport**
- **Cover (fish)**
- **Floodplain reconnection**

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Setting

- **Urban corridor**

Goals

- **Sediment transport**
- **Cover (fish)**
- **Floodplain reconnection**

Dewey Creek

Dumfries, VA (Outside Washington, DC)

Setting

- Urban corridor

Goals

- Sediment transport
- Cover (fish)
- Floodplain reconnection

Construction

- On-site / imported materials
- Dry / pump around

Dewey Creek

Dumfries, VA (Outside Washington, DC)

Setting

- **Urban corridor**

Goals

- **Sediment transport**
- **Cover (fish)**
- **Floodplain reconnection**

Construction

- **On-site / imported materials**
- **Dry / pump around**

Results

- **Sub-surface habitat**

Dewey Creek

Dumfries, VA (Outside Washington, DC)

Setting

- **Urban corridor**

Goals

- **Sediment transport**
- **Cover (fish)**
- **Floodplain reconnection**

Construction

- **On-site / imported materials**
- **Dry / pump around**

Results

- **Pool holding**
- **Support of point-bar deposition**

Bonita Reach

Tigard, OR (Outside Portland)

Setting

- Urban industrial park
- Sewer / parking lot / apartments

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Construction

- Doug firs
- Pump around with screen

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Construction

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Bonita Reach

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Setting

- **Urban industrial park**
- **Sewer / parking lot / apartments**

Goals

- **Stabilize banks in place**
- **Beaver resiliency**

Construction

- **Doug firs**
- **Pump around with screen**

Bonita Reach

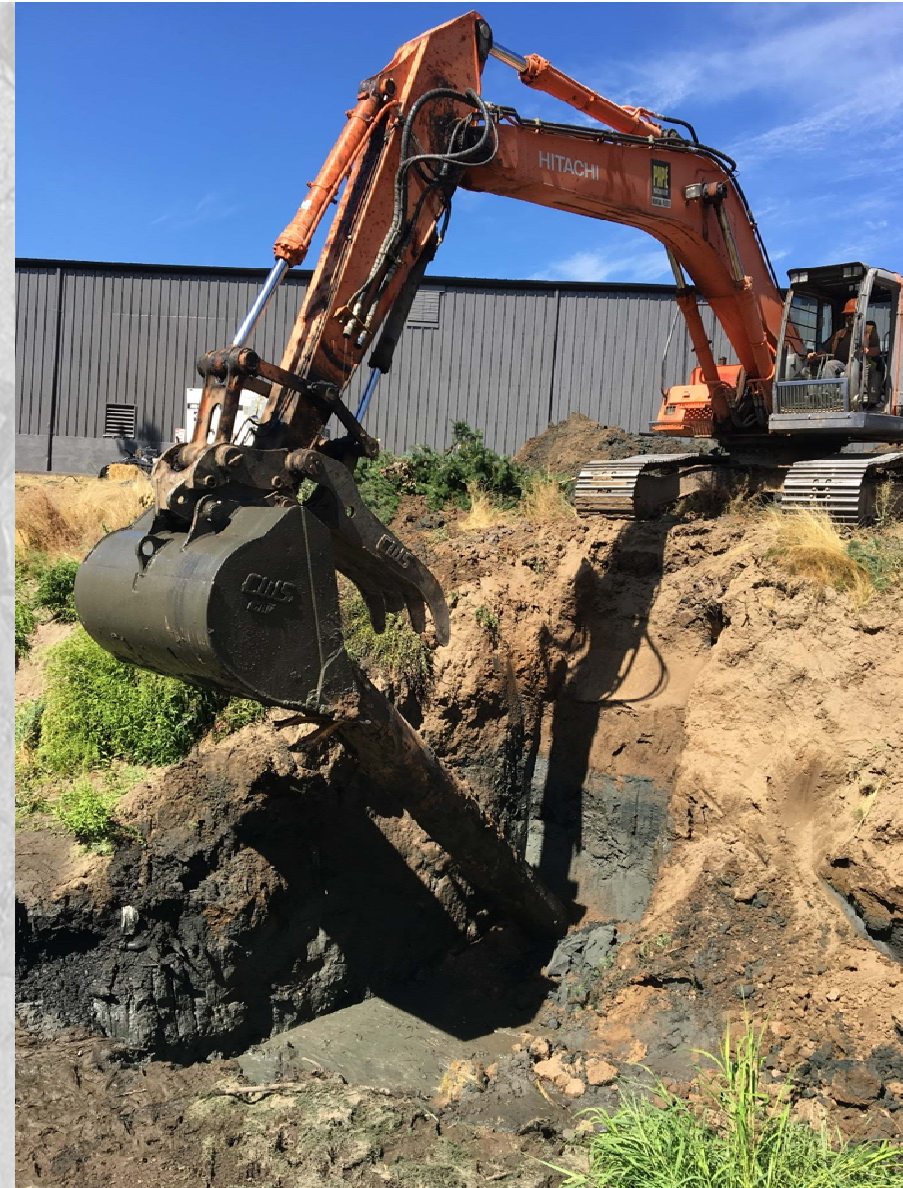**Tigard, OR (Outside Portland)**

Setting

- Urban industrial park
- Sewer / parking lot / apartments

Goals

- Stabilize banks in place
- Beaver resiliency

Construction

- Doug firs
- Pump around with screen

Bonita Reach

Tigard, OR (Outside Portland)

Setting

- Urban industrial park
- Sewer / parking lot / apartments

Goals

- Stabilize banks in place
- Beaver resiliency

Construction

- Doug firs
- Pump around with screen

Results

- 1:1 bank slope

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- Urban industrial park
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Goals

- Stabilize banks in place
- Beaver resiliency

Construction

- Doug firs
- Pump around with screen

Results

- Toe stability
- Wood recruitment

Bonita Reach

Tigard, OR (Outside Portland)

Setting

- Urban industrial park
- Sewer / parking lot / apartments

Goals

- Stabilize banks in place
- Beaver resiliency

Construction

- Doug firs
- Pump around with screen

Results

- Lamprey / benthics

Bonita Reach

Tigard, OR (Outside Portland)

Setting

- **Urban industrial park**
- **Sewer / parking lot / apartments**

Goals

- **Stabilize banks in place**
- **Beaver resiliency**

Construction

- **Doug firs**
- **Pump around with screen**

Results

- **Habitat infrastructure**

Bonita Reach

Tigard, OR (Outside Portland)

Setting

- Urban industrial park
- Sewer / parking lot / apartments

Goals

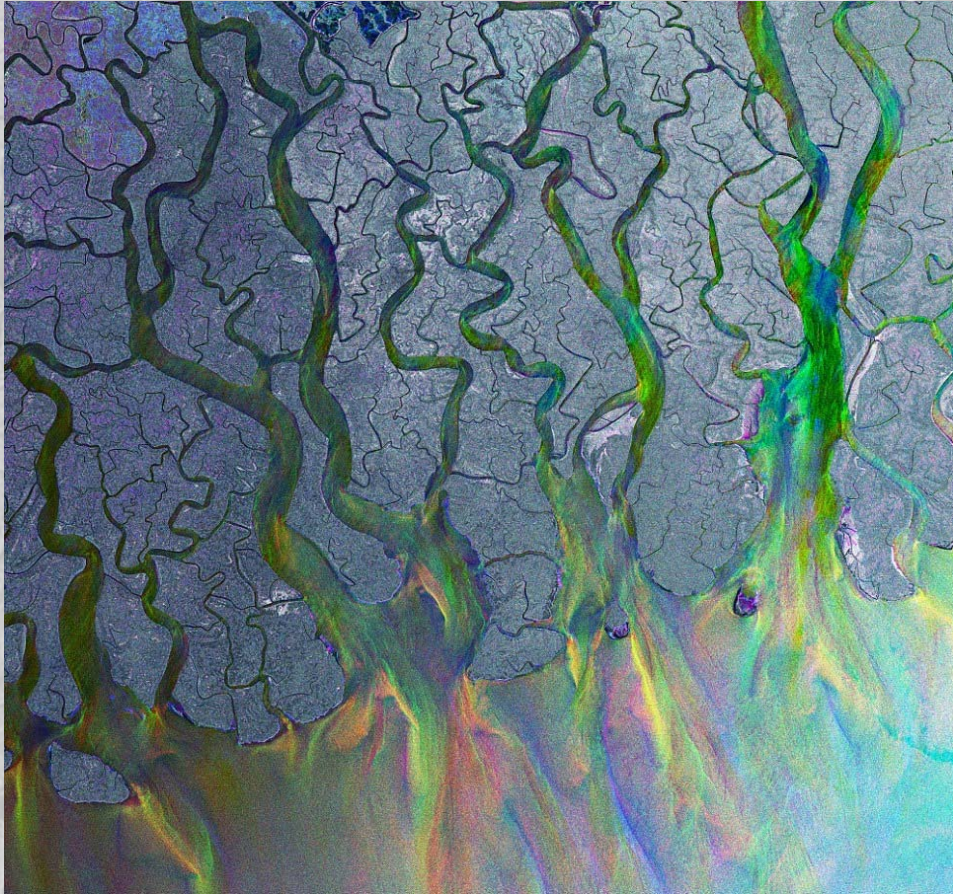- Stabilize banks in place
- Beaver resiliency

Construction

- Doug firs
- Pump around with screen

Results

- Off-channel habitat

Acknowledgements

- **Clean Water Services (OR)**
- **Town of Vienna (VA)**
- **Prince William County (VA)**
- **EQR**
- **RES**
- **Endicott Woods Enterprises**
- **Biohabitats**