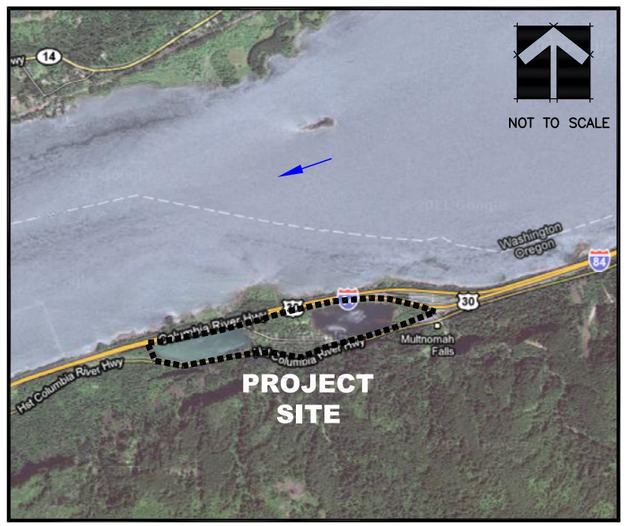
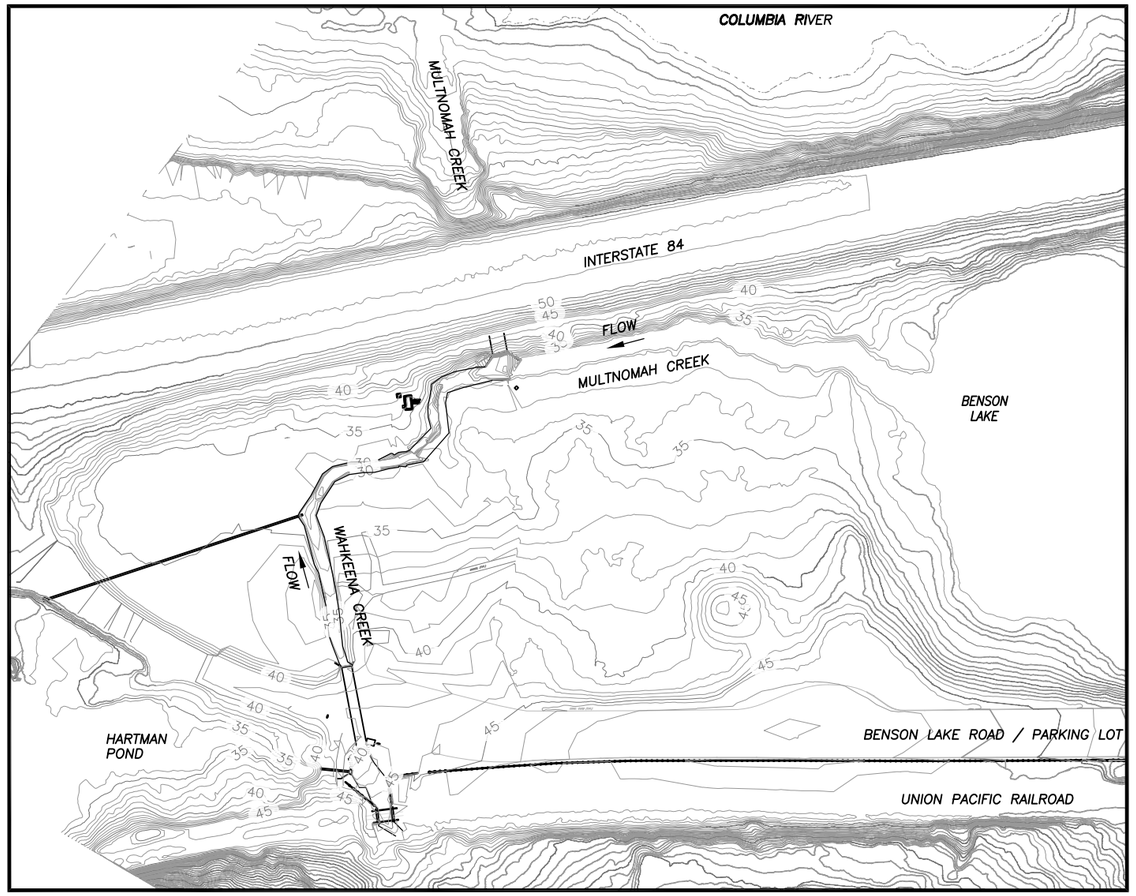
MULTNOMAH AND WAHKEENA CREEK RESTORATION PROJECT

30% DESIGNS

Lower Columbia Estuary Partnership



LOCATION MAP
NO SCALE
PROJECT SITE
xxxxxx"N xxxxxx"W



SHEET	TITLE
G1	COVER SHEET, SITE MAP, & DRAWING INDEX
G2	EXISTING CONDITIONS PLAN
G3	FLOW DIVERSION AND EROSION SEDIMENT AND POLLUTION CONTROL PLAN
WC1	WAHKEENA CREEK PROPOSED PLAN
WC2	WAHKEENA CREEK PROFILE AND SECTION VIEWS
WC3	WAHKEENA CREEK TYPICAL PLAN AND SECTION VIEWS
MC1	MULTNOMAH CREEK PROPOSED PLAN AND TYPICAL SECTION
SW1	PARKING LOT STORMWATER FACILITY
HP1	HARTMAN POND DIVERSION STRUCTURE
HP2	HARTMAN POND OUTLET STRUCTURE
L1	REVEGETATION PLAN

ABBREVIATIONS

DIA.	DIAMETER
DBH	DIAMETER AT BREAST HEIGHT
ELEV	ELEVATION
E.O.G.	EDGE OF GRAVEL
ESPCP FP	EROSION SEDIMENT & POLLUTION CONTROL PLAN FLOODPLAIN
FT	FEET
I.E.	INVERT ELEVATION
IN	INCHES
LF	LINEAL FEET
MAX	MAXIMUM
MIN	MINIMUM
MH	MANHOLE
OC	ON CENTER
ODFW	OREGON DEPT OF FISH AND WILDLIFE
OHW	ORDINARY HIGH WATER
OWNER	CREST
REQ'D	REQUIRED
SD	STORM DRAIN
SS	SANITARY SEWER
STA	STREAM STATION
TYP	TYPICAL
WSE	WATER SURFACE ELEVATION

ALL ELEVATIONS IN FT RELATIVE TO NORTH AMERICA VERTICAL DATUM (NAVD) 88

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APPROVED	DATE	

LOWER COLUMBIA ESTUARY PARTNERSHIP

MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Cover Sheet, Site Map and Drawing Index

30%

PROJECT NO.

SHEET NO. G1 of -

PLAN LEGEND

- PROJECT BOUNDARY
- EXISTING GROUND CONTOUR (1 FT)
- 12+00 ALIGNMENT CENTERLINE
- EXISTING PICNIC BENCH
- W EXISTING WATER SUPPLY
- EXISTING IRRIGATION STRUCTURE
- E EXISTING ELECTRICAL STRUCTURE
- EXISTING SITE FURNISHING

INTERSTATE 84

WAHKEENA CREEK
SHEET WC 1

FLOW

MULTNOMAH CREEK

LOWER MULTNOMAH CREEK
SHEET MC1

BENSON LAKE

HARTMAN POND/WAHKEENA CREEK RETURN FLOW
SHEET HP2

Culvert Inlet 358 ft

WAHKEENA CREEK

FLOW

Work Access

Work Access

PARKING LOT
SHEET SW1

APPROXIMATE PROJECT BOUNDARY

Site Ingress/Egress to I-84

Equipment & Materials Staging Area (Approx.)

HARTMAN POND

BENSON LAKE ROAD / PARKING LOT

UNION PACIFIC RAILROAD

WAHKEENA CREEK/ HARTMAN POND DIVERSION
SHEET HP1

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EXISTING CONDITIONS

0 100
FEET

ACCESS & STAGING

A. CONTRACTOR SHALL USE EXISTING ROAD FOR INGRESS AND EGRESS BETWEEN I-84 AND SITE.

B. STAGING AREA SHALL BE LOCATED ON THE NORTH SIDE OF THE PARKINGLOT, SHALL NOT IMPEDE THE FLOW OF TRAFFIC INTO AND OUT OF THE PARK, AND SHALL KEEP THE WORK AREA CLEAN AND ORDERED.

C. ACCESS TO INSTALL IN-STREAM STRUCTURES SHALL UTILIZE EXISTING ACCESS TO THE UTMOST EXTENT POSSIBLE. ADDITIONAL NECESSARY ACCESS ROAD CONSTRUCTION SHALL MINIMIZE REMOVAL OF TREES, DAMAGE TO VEGETATION, AND DAMAGE TO STREAM BANKS.

D. CONSTRUCTION SEQUENCING AND EROSION CONTROL MEASURES TO BE MODIFIED IN THE FIELD AS NECESSARY WITH APPROVAL OF OWNERS REPRESENTATIVE.

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LOWER COLUMBIA ESTUARY PARTNERSHIP

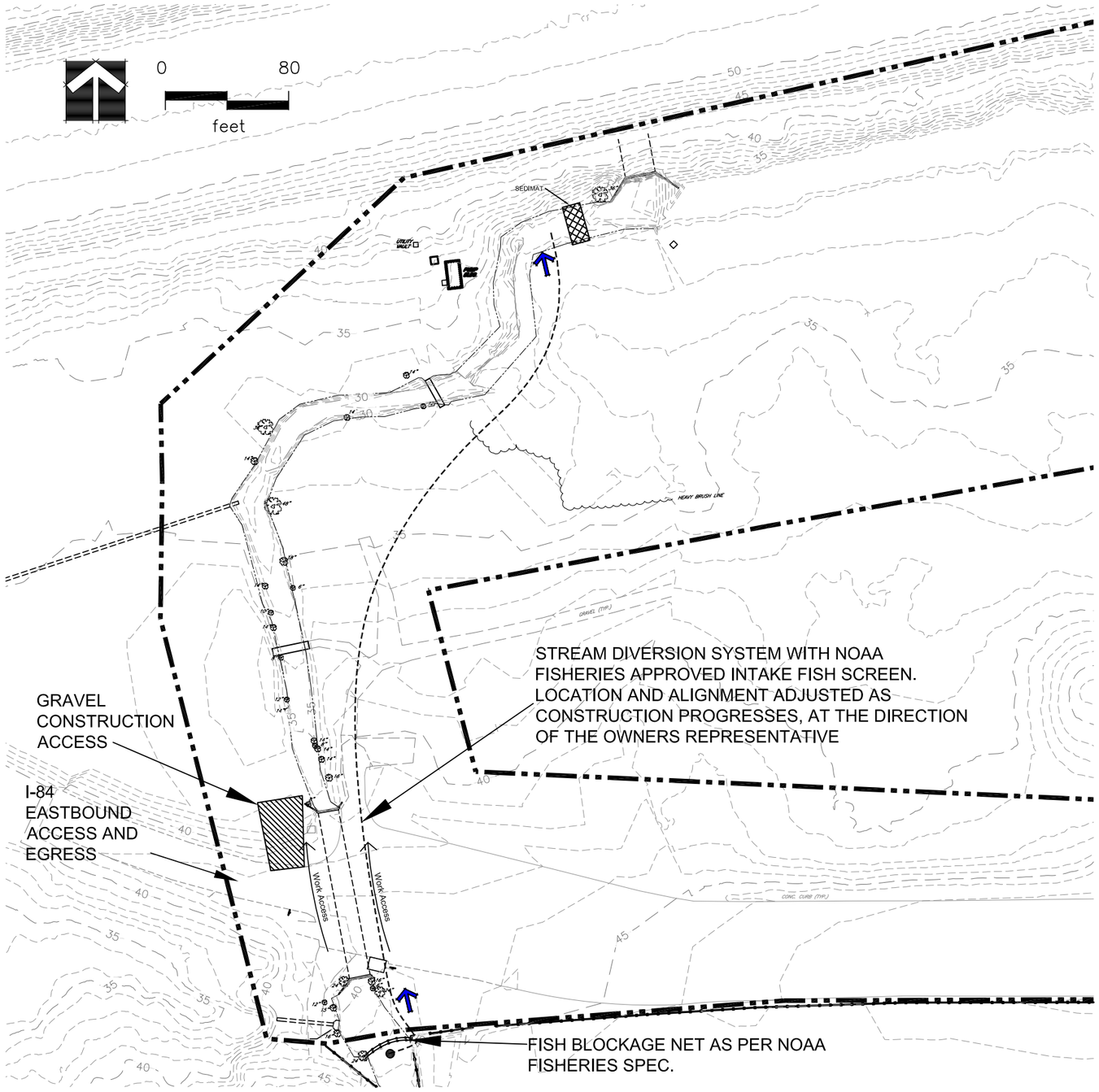
MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

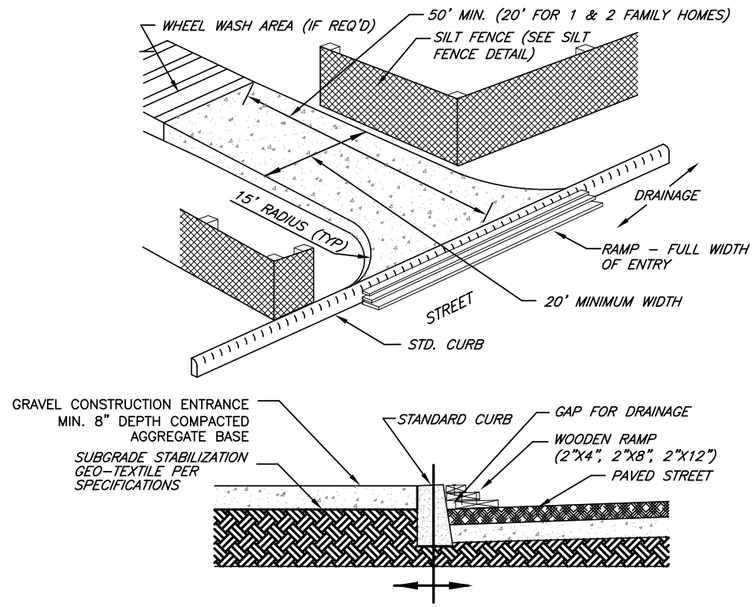
Existing Conditions Plan

30%

PROJECT NO.

SHEET NO. G2 of -





1 WC3 GRAVEL CONSTRUCTION ENTRANCE
NTS

EROSION CONTROL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING CLEAN APPROACH TO PARK.
2. PLACE TEMPORARY TREE PROTECTION FENCING FOR APPROVAL PRIOR TO EARTHWORK ACTIVITIES.
3. SEE EROSION CONTROL SPECIFICATIONS FOR DETAILED EROSION CONTROL METHODS.
4. CONTRACTOR SHALL SEED ALL DISTURBED AREAS WITH EROSION CONTROL SEEDING AND APPLY STRAW MULCH. DISTURBED SURFACES TO BE TREATED AS CONSTRUCTION PROGRESSES.
5. CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.

CONSTRUCTION SEQUENCING AND EROSION CONTROL MEASURES TO BE MODIFIED IN THE FIELD AS NECESSARY WITH APPROVAL OF OWNERS REPRESENTATIVE.

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LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Flow Diversion and Erosion Sediment and Pollution Control Plan

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SHEET NO. G3 of -

CONCEPTUAL LWD HABITAT ENHANCEMENT STRUCTURES ARE INTENDED TO VARY WITH SITE CONDITIONS. THE NUMBER OF LOGS AND ROOTWADS, ORIENTATION, FINISHED ELEVATIONS, AND PIN LOG DEPTHS FOR EACH STRUCTURE WILL BE BASED ON SPECIFIC SITE CHARACTERISTICS AND DETERMINED IN THE FIELD BY THE PROJECT DESIGN TEAM.

PLAN LEGEND

- PROJECT BOUNDARY
- EXISTING GROUND CONTOUR (1 FT)
- 13+00 ALIGNMENT CENTERLINE
- OHW ORDINARY HIGH WATER
- LARGE WOODY DEBRIS
- BURIED LARGE WOODY DEBRIS
- POINT BAR
- POOL
- 1/4 SECTION VIEW AND SHEET REFERENCE
- EXISTING PICNIC BENCH
- W EXISTING WATER SUPPLY
- EXISTING IRRIGATION STRUCTURE
- E EXISTING ELECTRICAL STRUCTURE
- EXISTING SITE FURNISHING

LWD MATERIALS SUMMARY

SURFACE LWD W/O ROOT WAD	= X
BURIED LWD (W/O ROOT WAD)	= X
SURFACE LWD W/ ROOT WAD	= X
PIN PILE LOGS	= X
BRUSH	= SALVAGED

LOWER MULTNOMAH CREEK

LWD TO BE PLACED AROUND EXISTING VEGETATION AT THE DIRECTION OF THE OWNERS REPRESENTATIVE

CHANNEL ALIGNMENT SEE PROFILE SHEET WC2

WAHKEENA CREEK

HARTMAN POND OUTLET

PROPOSED CONDITIONS

0 40 FEET

I84

BENSON LAKE ROAD

Work Access

TWIN CHANNEL BOX CULVERT

Work Access

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HENDERSON Environmental Design-Build Professionals	NS DRAWN; NS,BH,MK,MB DESIGNED; BH,MB CHECKED; BH, MK APPROVED; DEC 2012 DATE	LOWER COLUMBIA ESTUARY PARTNERSHIP MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Wahkeena Creek
Proposed Plan

30%

PROJECT NO.

SHEET NO. WC1 of -

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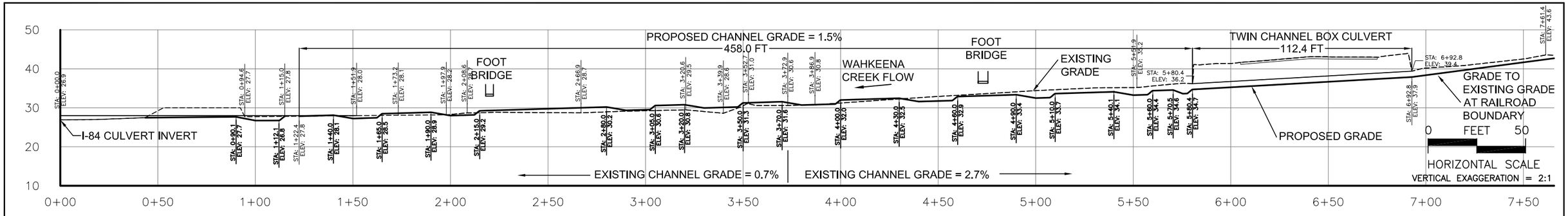
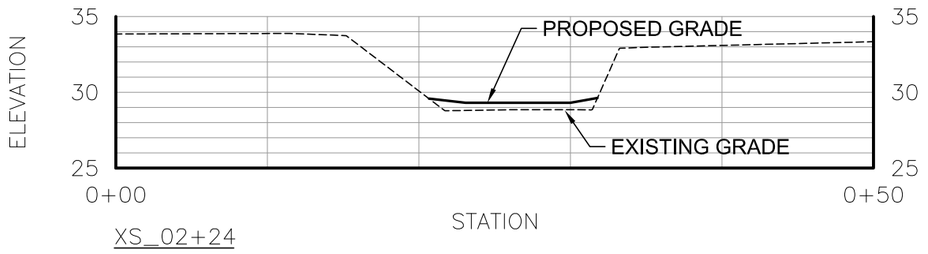
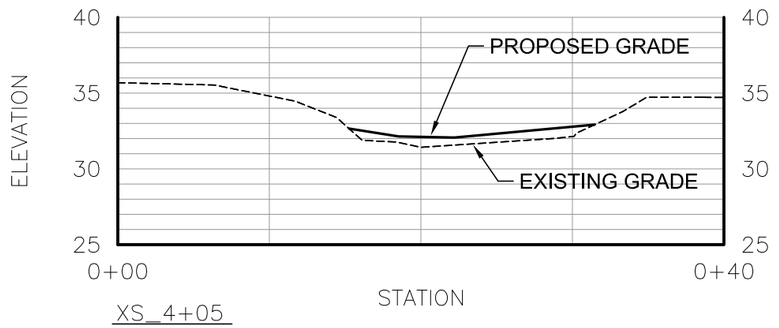
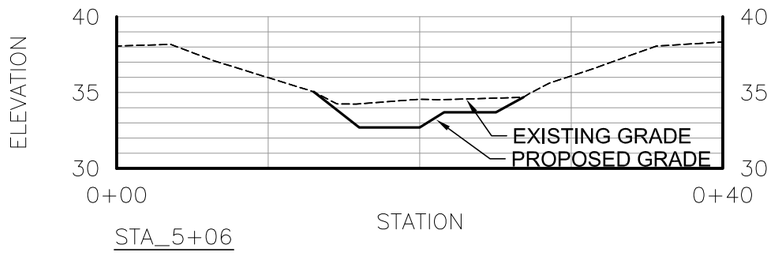


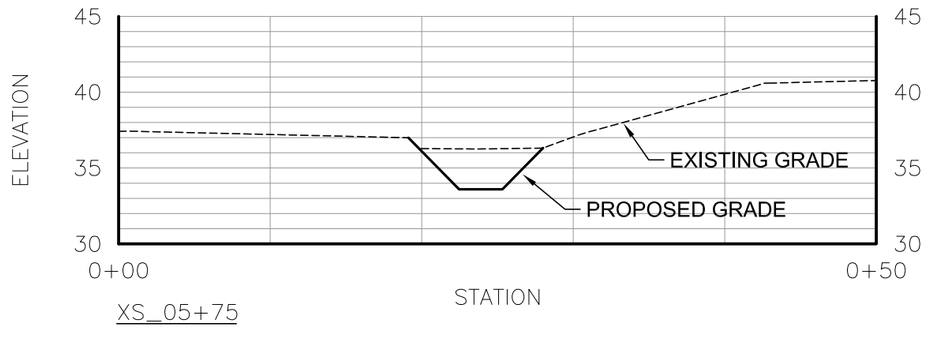
1 WC2 *WAHKEENA CREEK LONG PROFILE*

HORIZONTAL SCALE
NO VERTICAL EXAGGERATION
0 FEET 10









2 WC2 *WAHKEENA CREEK CHANNEL CROSS SECTIONS*

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LOWER COLUMBIA ESTUARY PARTNERSHIP

MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Wahkeena Creek Profile and Section Views

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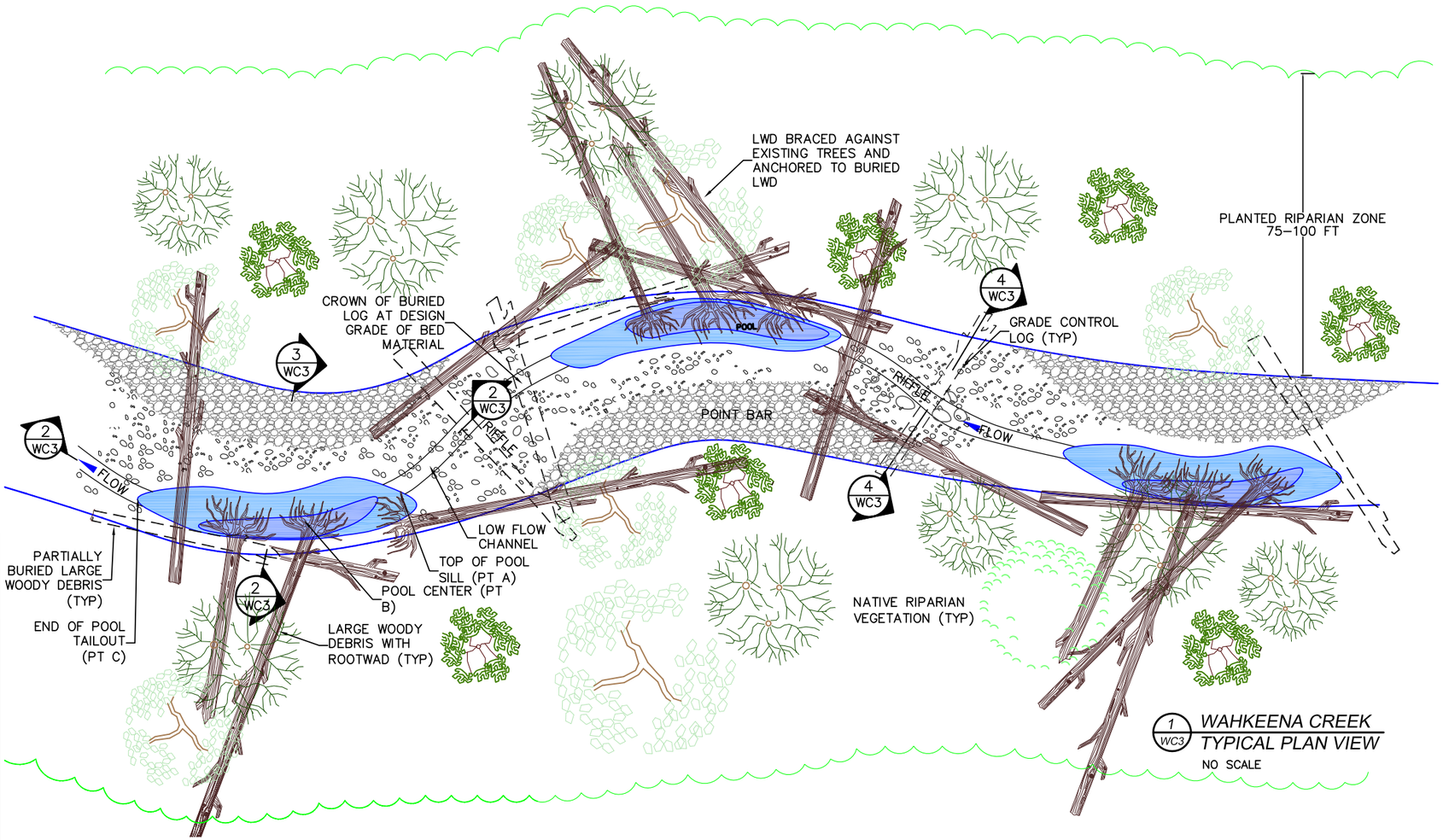
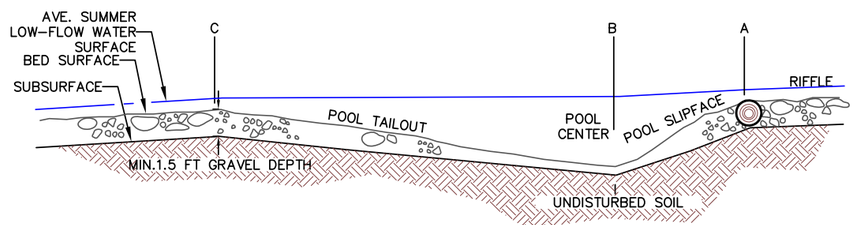
PROJECT NO.

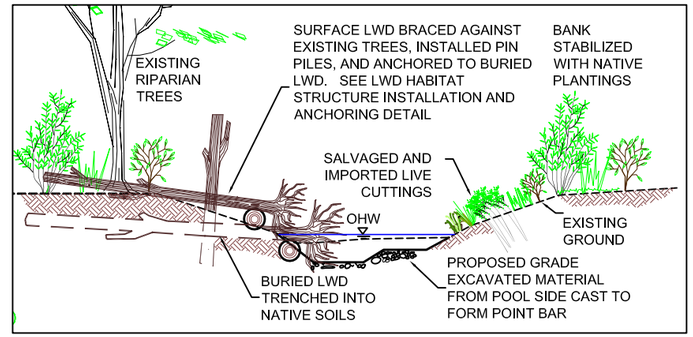
SHEET NO. *WC2* of -



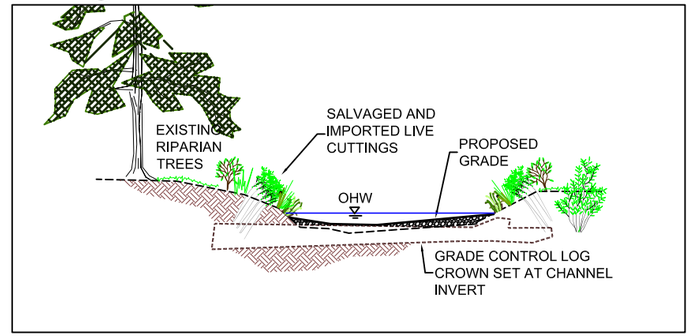
1 WC3 WAHKEENA CREEK
TYPICAL PLAN VIEW
NO SCALE



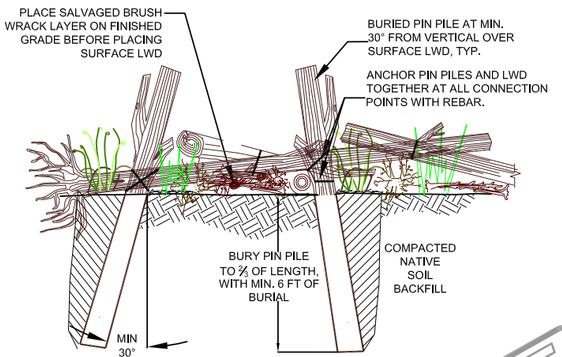
2 WC3 WAHKEENA CREEK
TYPICAL POOL RIFFLE PROFILE VIEW



3 WC3 TYPICAL SECTION VIEW
POOL



4 WC3 TYPICAL SECTION VIEW
RIFFLE



5 WC3 LWD HABITAT STRUCTURE
INSTALLATION AND ANCHORING DETAIL

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LOWER COLUMBIA ESTUARY PARTNERSHIP
MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Wahkeena Creek Typical Plan and Section Views

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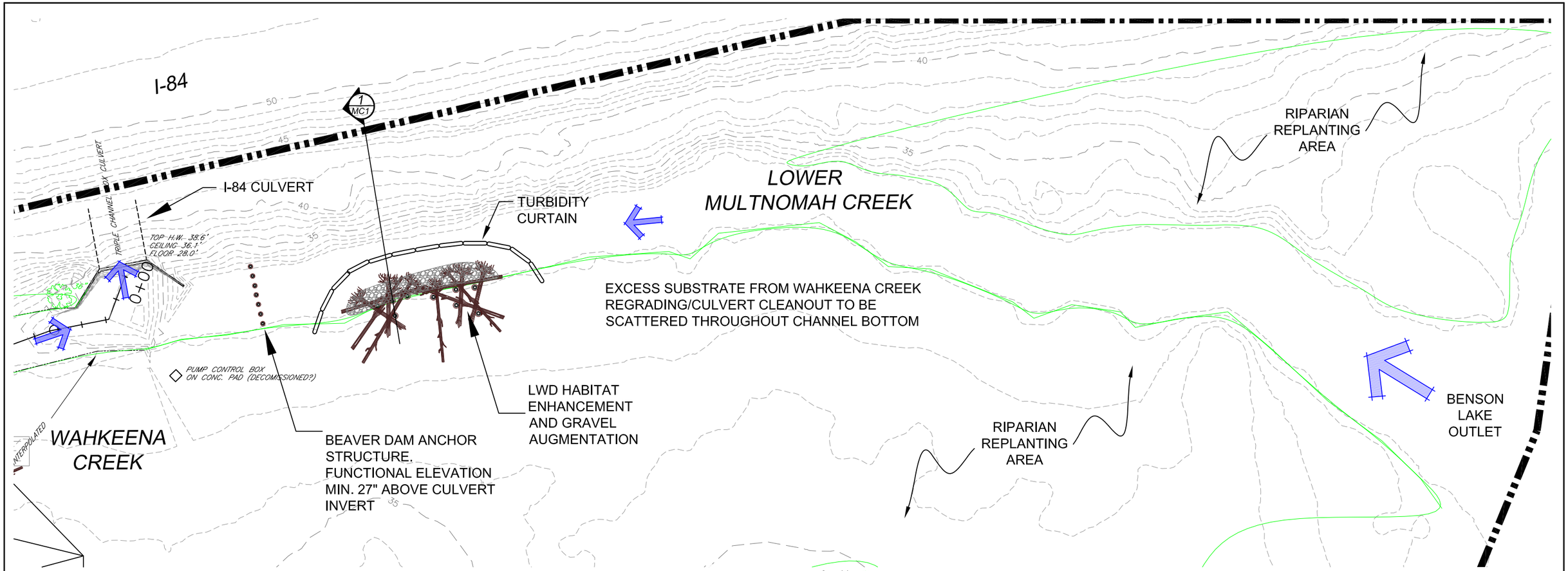
PROJECT NO.

SHEET NO. WC3 of -

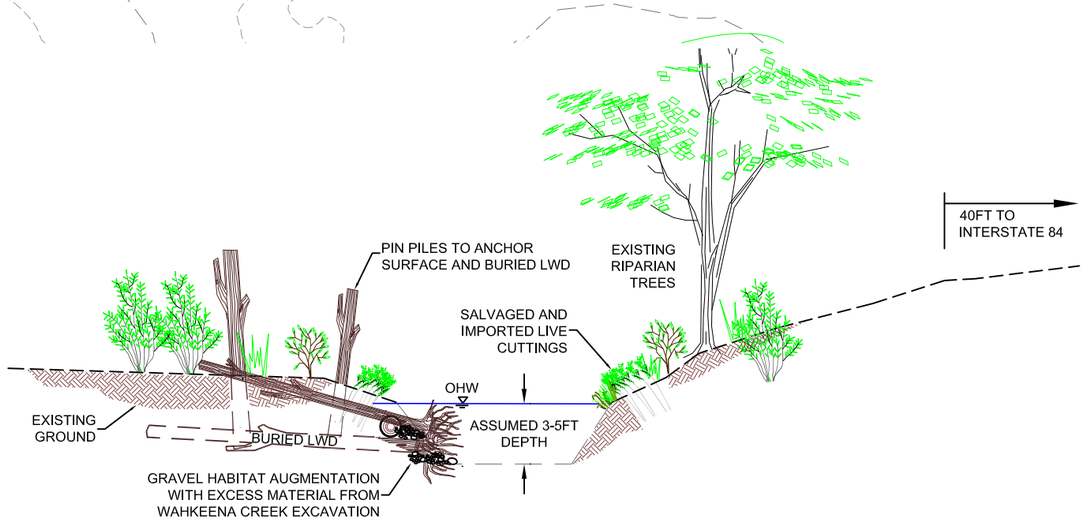


PLAN LEGEND

- PROJECT BOUNDARY
- EXISTING GROUND CONTOUR (1 FT)
- LIMITS OF GRADING
- 13+00 ALIGNMENT CENTERLINE

LWD MATERIALS SUMMARY

SURFACE LWD W/O ROOT WAD	= X
BURIED LWD (W/O ROOT WAD)	= X
SURFACE LWD W/ ROOT WAD	= X
PIN PILE LOGS	= X
BRUSH	= SALVAGED



1 MC1 *TYPICAL SECTION VIEW LOWER MULTNOMAH CREEK*

PROPOSED CONDITIONS

0 40 FEET

CONCEPTUAL LWD HABITAT ENHANCEMENT STRUCTURES ARE INTENDED TO VARY WITH SITE CONDITIONS. THE NUMBER OF LOGS AND ROOTWADS, ORIENTATION, FINISHED ELEVATIONS, AND PIN LOG DEPTHS FOR EACH STRUCTURE WILL BE BASED ON SPECIFIC SITE CHARACTERISTICS AND DETERMINED IN THE FIELD BY THE PROJECT DESIGN TEAM.

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BH, MK APPROVED | DEC 2012 DATE

LOWER COLUMBIA ESTUARY PARTNERSHIP

MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Lower Multnomah Creek Proposed Plan and Typical Section

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4000 SQFT X 3FT DEEP WETLAND/STORMWATER TREATMENT FACILITY (LOCATION BLENDED INTO NATURAL TOPOGRAPHY OF SITE AND MINIMIZES TREE LOSS)

24IN CORRUGATED PLASTIC PIPE

6IN WIDE TRENCH GRATE

18IN CORRUGATED PLASTIC PIPE

STORM GRATE AND PRECAST CONCRETE BOX (TYP)

12IN CORRUGATED PLASTIC PIPE

6IN WIDE TRENCH GRATE

12IN CORRUGATED PLASTIC PIPE OR PRECAST CONCRETE PIPE

APPROXIMATE PROJECT BOUNDARY

HEAVY BRUSH LINE

GRAVEL (TYP.)

CONC. CURB (TYP.)

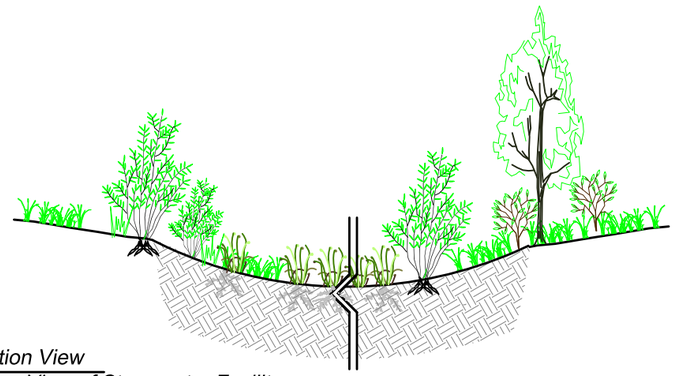
0 50 FEET

EXISTING PARKING LOT

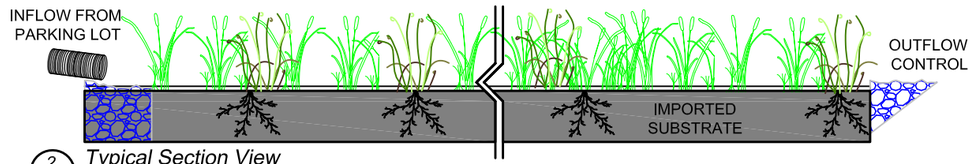
1 SW1 PARKING LOT PLAN VIEW

PROPOSED MATERIALS

12" Corrugated Plastic or Concrete Pipe	- 120 Linear ft
18" Corrugated Plastic Pipe	- 80 Linear ft
24" Corrugated Plastic Pipe	- 300 Linear ft
Precast Concrete Stormwater Grate and Box	- 3
6" W Metal Storm grate	- 215 Linear ft
6" minus Armoring/Salvaged Stream Rock	- 20 cubic yds
Native Vegetation Wetland Plants	- Cover 150 sq yds



3 SW1 *Typical Section View*
Cross Section View of Stormwater Facility



2 SW1 *Typical Section View*
Longitudinal View of Stormwater Facility

PLAN LEGEND

- PROJECT BOUNDARY
- EXISTING GROUND CONTOUR (1 FT)
- 13+00 ALIGNMENT CENTERLINE
- LIMITS OF DISTURBANCE
- EXISTING PICNIC BENCH
- W EXISTING WATER SUPPLY
- EXISTING IRRIGATION STRUCTURE
- E EXISTING ELECTRICAL STRUCTURE
- EXISTING SITE FURNISHING

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LOWER COLUMBIA ESTUARY PARTNERSHIP

MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Parking Lot Stormwater Facility Proposed Plan

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PROJECT NO.

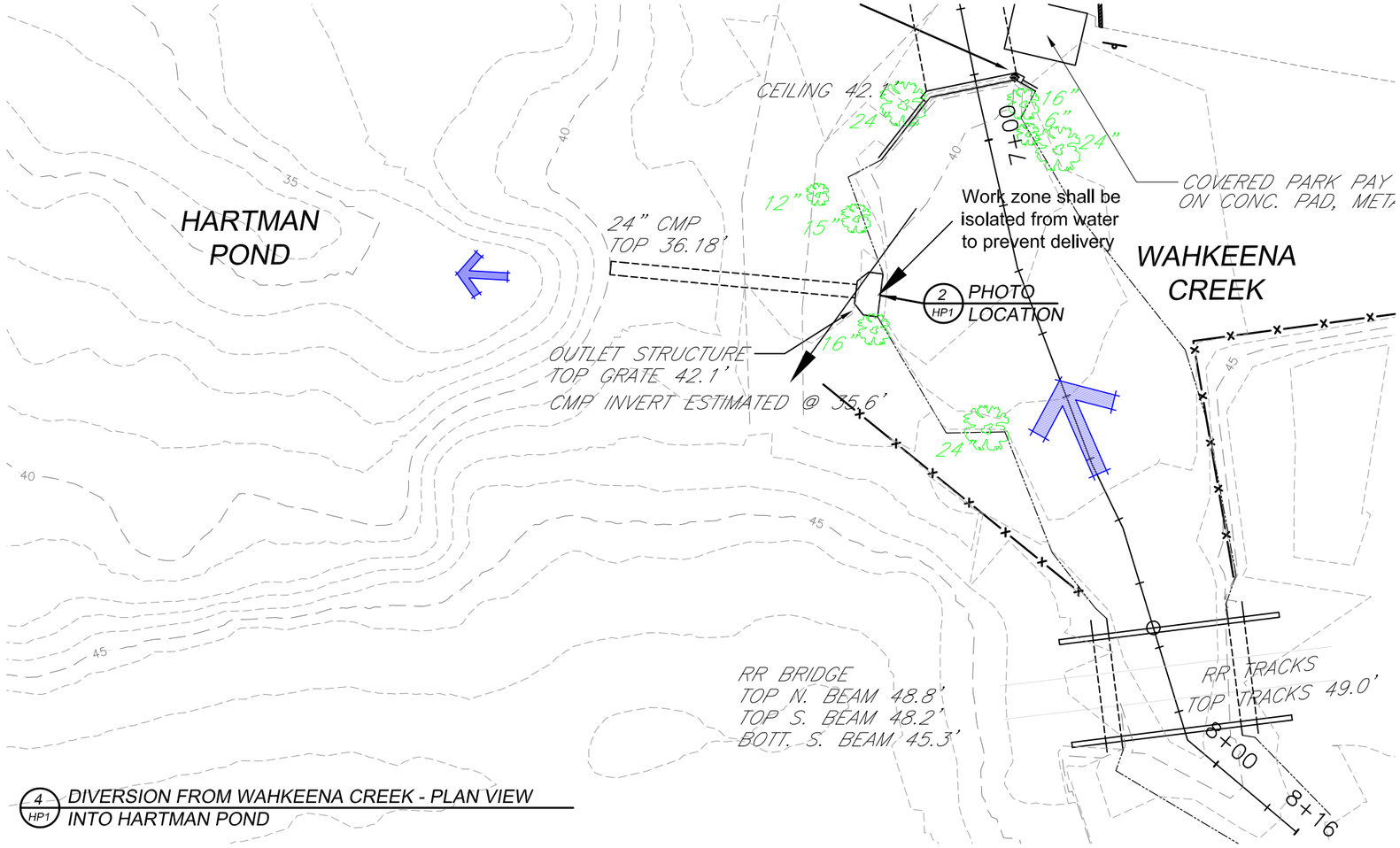
SHEET NO. *SW1* of -

PLAN LEGEND

- PROJECT BOUNDARY
- EXISTING GROUND CONTOUR (1 FT)
- PROPOSED CONTOUR (1 FT)
- LIMITS OF GRADING
- 13+00 ALIGNMENT CENTERLINE
- LIMITS OF DISTURBANCE

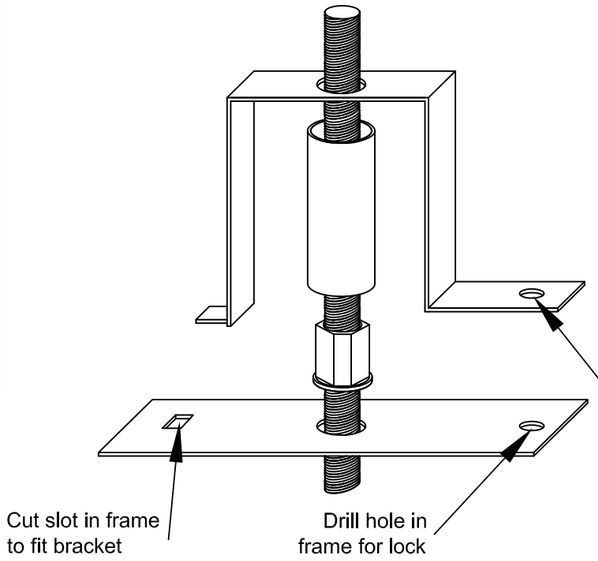
0 20
FEET

PROPOSED CONDITIONS



4 HP1 *DIVERSION FROM WAHKEENA CREEK - PLAN VIEW INTO HARTMAN POND*

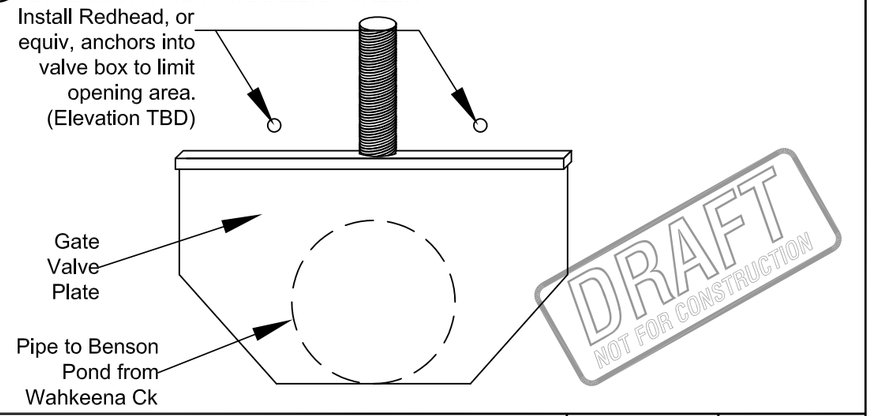
Socket fits over nut to prevent turning of nut without removal of bracket and socket.



1 HP1 *PROTOTYPE FOR VALVE LOCKOUT - ELEVATION VIEW DIVERSION FROM WAHKEENA CREEK*

2 HP1 *PHOTO - EXISTING VALVE OPERATION MECHANISM DIVERSION FROM WAHKEENA CREEK*

3 HP1 *EXISTING LOWER VALVE ASSEMBLY - ELEVATION VIEW DIVERSION FROM WAHKEENA CREEK*



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LOWER COLUMBIA ESTUARY PARTNERSHIP

MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Wahkeena Creek/ Hartman Pond Diversion Structure Proposed Plan

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PROJECT NO.

SHEET NO. *HP1* of -

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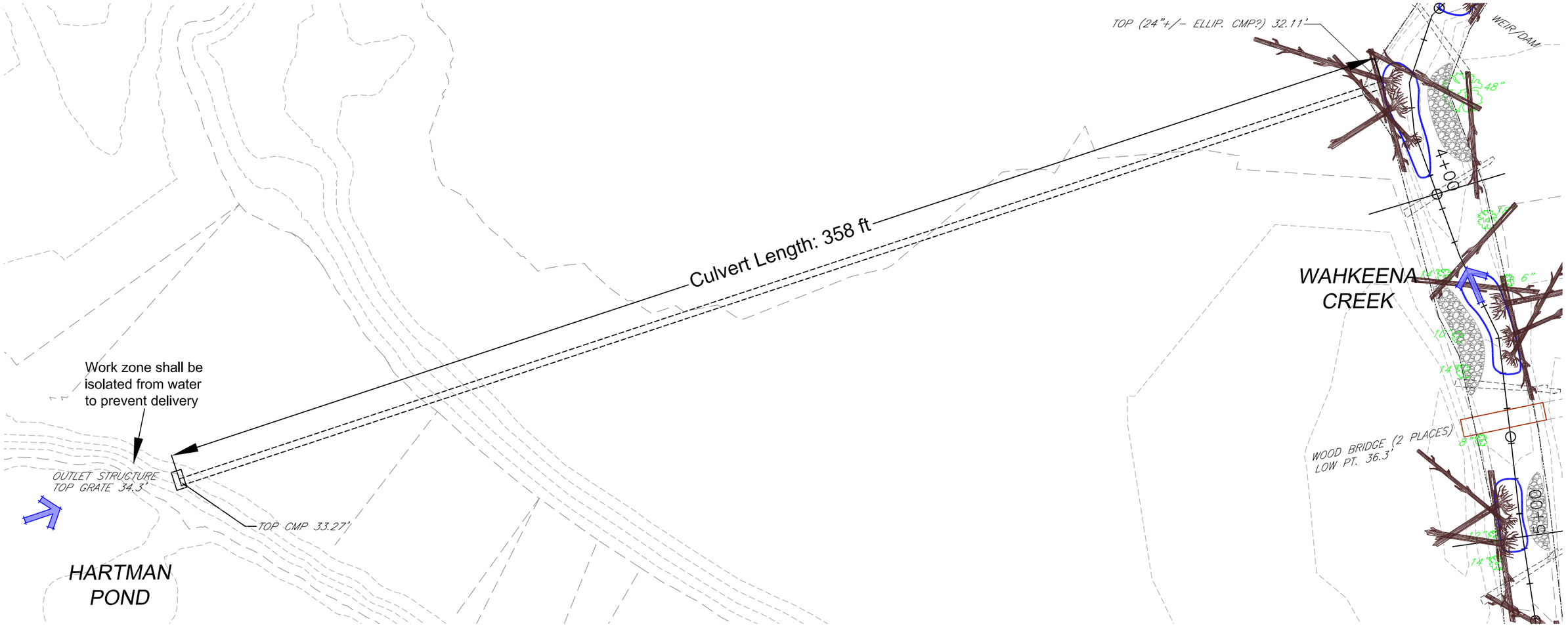

Insert new flashboards below screen to close gap to prevent debris entering overflow culvert

Remove non-functioning flashboards and debris and clear or recontour earth

Insert flashboards in front of screen to make standpipe primary lake outlet

Insert flashboard below screen to close gap to prevent debris entering overflow culvert

Remove earth and woody debris to ensure unimpeded flow

0 120
FEET

PROPOSED CONDITIONS

PLAN LEGEND

- PROJECT BOUNDARY
- EXISTING GROUND CONTOUR (1 FT)
- PROPOSED CONTOUR (1 FT)
- LIMITS OF GRADING
- 13+00 ALIGNMENT CENTERLINE
- LIMITS OF DISTURBANCE

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LOWER COLUMBIA ESTUARY PARTNERSHIP

MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Hartman Pond Outlet Proposed Plan

30%

PROJECT NO.

SHEET NO. HP2 of -

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PLAN LEGEND

PROJECT BOUNDARY

EXISTING GROUND CONTOUR (1 FT)

PLANTING AREA

0 100

FEET

Multnomah/Wahkeena Creek Restoration Project

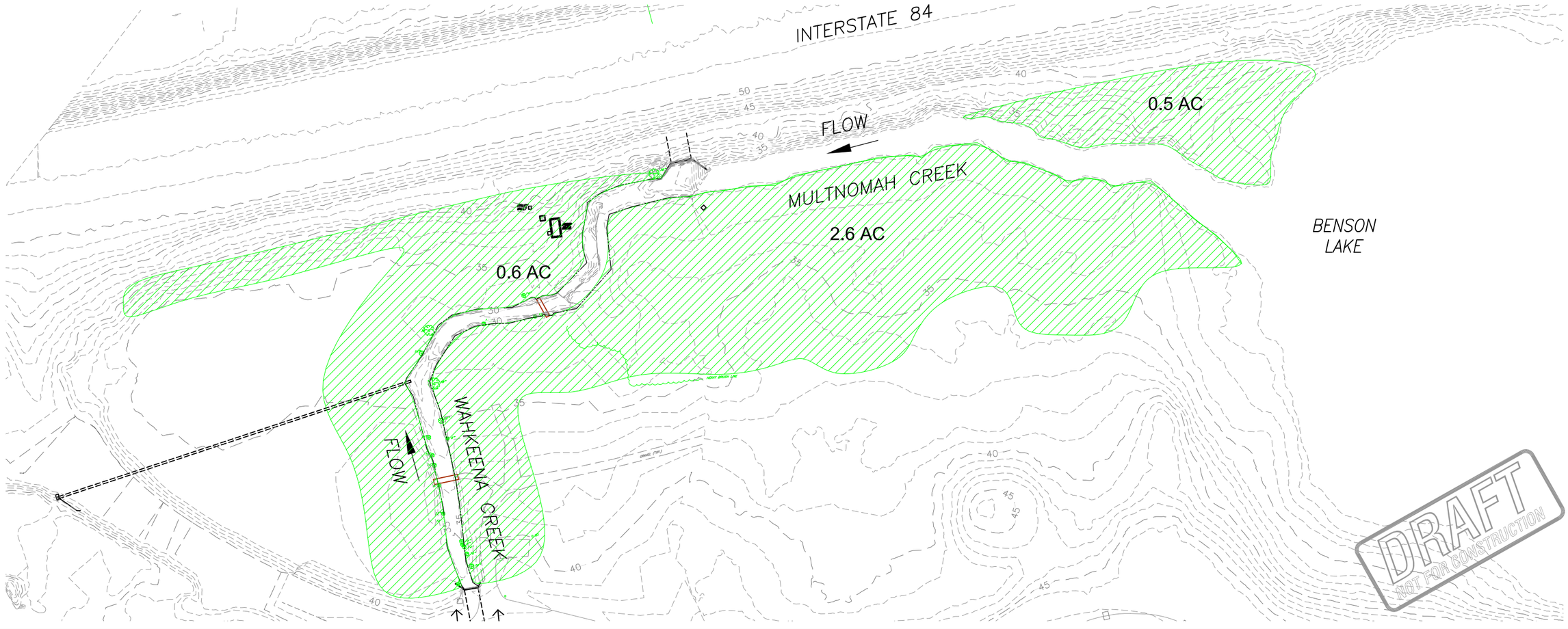
Phase I - planting plant

1,800 plants per acre; bare root or live stakes as appropriate

Common Name	Scientific Name	Relative abundance
Redstem dogwood	*Cornus sericea*	25%
Pacific ninebark	*Physocarpus capitatus*	15%
Snowberry	*Symphoricarpos albus*	15%
Western red cedar	*Thuja plicata*	10%
Pacific willow	*Salix lasiandra*	10%
Red alder	*Alnus rubra*	5%
Red elderberry	*Sambucus racemosa*	5%
Oregon ash	*Fraxinus latifolia*	5%
Black cottonwood	*Populus balsamifera*	5%
Salmon berry	*Rubus spectabilis*	5%

NOTES:
1. PLANT PLACEMENT WILL BE CONSISTENT WITH NATURALLY OCCURRING PLANT COMMUNITIES. TREES OR SHRUBS SHALL BE PLACED IN SINGLES OR CLUSTERS OF THE SAME SPECIES TO PROVIDE A NATURAL PLANTING SCHEME.

2. PATHWAYS AND ACCESS WILL BE MAINTAINED OR CREATED THROUGH VEGETATION TO MAINTAIN ACCESS TO EXISTING INFRASTRUCTURE.



HENDERSON
Environmental Design-Build Professionals

NS	NS,BH,MK,MB	BH,MB
DRAWN	DESIGNED	CHECKED
BH, MK	DEC 2012	
APPROVED	DATE	

LOWER COLUMBIA ESTUARY PARTNERSHIP

MULTNOMAH AND WAHKEENA CREEKS RESTORATION DESIGN

Revegetation Plan

30%

PROJECT NO.

SHEET NO. *L1* of -

Plotted: Dec 07, 2012, S:\HLS Active 'S'\LCEP 12-1\Benson_30_Percent\DWGS\Sheet_Plan Set.dwg