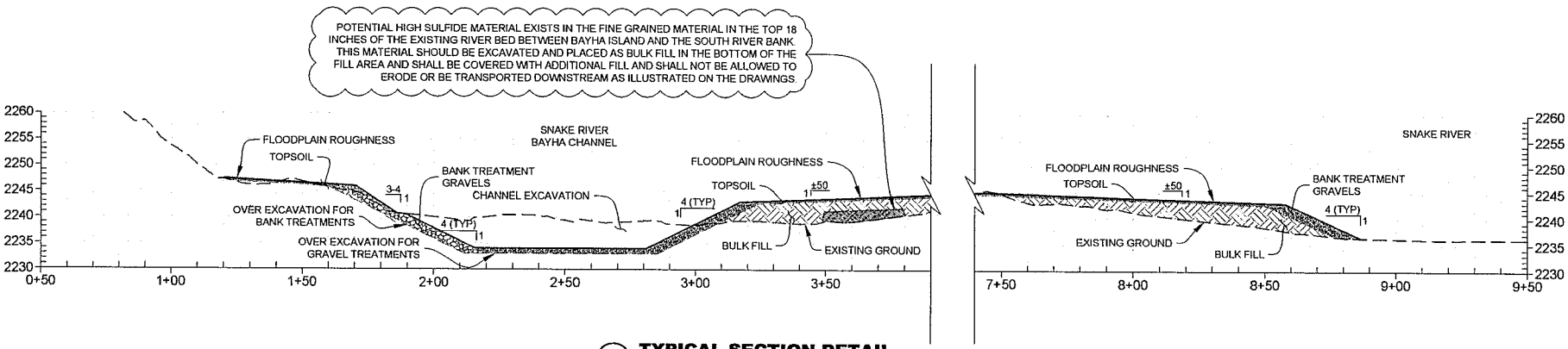
PROJECT MATERIAL	MATERIAL SOURCE	GRADATION / COMPOSITION TECHNICAL SPECIFICATION 05001	PLACEMENT AND COMPACTION TECHNICAL SPECIFICATION 05001
BULK FILL ±47,800 CY (NEAT LINE)	PRODUCED THROUGH CHANNEL EXCAVATIONS ANTICIPATED THAT 90% OF ±51,200 CY CHANNEL EXCAVATION WILL BE USED AS BULK FILL ANTICIPATED THAT 10% OF EXCAVATED MATERIAL WILL BE REMOVED FROM PROJECT AND DISPOSED OF AT APPROVED SITE.	BULK FILL IS PRIMARILY NATURAL ROUND RIVER ROCK AND COBBLES, SAND, AND/OR CRUSHED ROCK, FREE FROM ORGANIC MATERIALS, WOOD, AND DELETERIOUS MATERIALS. BULK FILL COMPRISES A CATEGORY OF FILL THAT DOES NOT MEET SELECT GRADATIONS USED FOR BANK TREATMENTS AND IS DESIGNATED FOR USE IN AREAS WHERE THE MATERIAL COMPOSITION HAS LESS INFLUENCE ON PROJECT FUNCTION.	BULK FILL MIXTURE SHALL BE PLACED BY EQUIPMENT TO THE FILL COURSE THICKNESS IN LIFTS OF LESS THAN 12 INCHES PER TYPICAL SECTION THIS DRAWING AND DETAILED DESIGN SECTIONS DWGS 4.4-4.9.. PLACEMENT TO BEGIN AT EXISTING GROUND SURFACE AND EXTENDS VERTICALLY TO WITHIN 6 INCHES OF FLOODPLAIN FINISHED GROUND ELEVATION. INDIVIDUAL COURSES SHALL BE COMPACTED BY EQUIPMENT TRAVEL PRIOR TO PLACEMENT OF SUBSEQUENT COURSES. PLACEMENT SHALL OCCUR IN A MANNER THAT PREVENTS SORTING AND SEGREGATION OF MATERIALS. EACH LIFT SHALL BE THOROUGHLY TRACKED WITH EQUIPMENT WEIGHING AT LEAST 15 TONS AND TRACKS SHALL TRAVERSE THE ENTIRE SURFACE OF EACH LAYER. MATERIAL DEFORMATION OR RUTTING AFTER TRACKING SHALL BE LESS THAN 2 INCHES BEFORE PLACEMENT OF SUBSEQUENT LIFT.
BANK TREATMENT GRAVELS ±22,100 CY (NEAT LINE)	BANK TREATMENT ZONE 1: PRODUCED AT GRAVEL SOURCE SITE 3 BANK TREATMENT ZONE 2: PRODUCED AT GRAVEL SOURCE SITES 1-2 BANK TREATMENT ZONE 3: PRODUCED AT GRAVEL SOURCE SITES 1-2	BANK TREATMENT ZONE FILL IS A COBBLE AND GRAVEL MIXTURE WITH A MINIMUM OF FINES. THIS MATERIAL IS INTENDED TO BE AN ENVELOPE PLACED OVER EXPOSED BULK FILL SLOPED SURFACES AND ALONG THE EXCAVATED STREAMBED. GRADATION TO CONFORM TO BANK TREATMENT ZONE GRADATION TABLES PRESENTED ON BANK TREATMENT ZONES DRAWING 4.2.	BANK TREATMENT ZONE GRAVELS SHALL BE PLACED BY EQUIPMENT TO THE FULL COURSE THICKNESS IN LIFTS OF 12 INCHES OR LESS PER BANK TREATMENT ZONES DWG 4.2, 4.3 AND DETAILED DESIGN SECTIONS DWGS 4.4-4.9. WHEN PLACED, BANK TREATMENT ZONE GRAVELS SHALL BE "CLAST SUPPORTED" SUCH THAT GRAVEL AND COBBLE ELEMENTS OF THE FILL ARE IN CONTACT WITH GRAVEL AND COBBLE ELEMENTS AFTER PLACEMENT, THEY ARE NOT SEPARATED BY LAYERS OF FINE SOIL. CLAST SUPPORT MUST BE ASSURED EITHER BY MATERIAL COMPOSITION OR BY PLACEMENT METHOD, OR A COMBINATION THEREOF. EACH LIFT SHALL BE THOROUGHLY TRACKED WITH EQUIPMENT WEIGHING AT LEAST 15 TONS AND TRACKS SHALL TRAVERSE THE ENTIRE SURFACE OF EACH LAYER.
TOPSOIL ±6,300 CY (NEAT LINE)	IMPORTED TO SITE	TOPSOIL IS PRIMARILY A LOAM OR SANDY LOAM MATERIAL DESIGNATED FOR THE GROUND SURFACE ON THE TOP OF CONSTRUCTED FEATURES AND FLOODPLAINS SUITABLE FOR GROWING PLANTS. TOPSOIL SHALL NOT INCLUDE CLAY, SAND, ROCK OR DEBRIS. AS WELL MATERIAL MUST BE FREE OF WEEDS AND AMENDABLE TO SPECIES REQUIREMENTS BY PLANTING ZONE.	TOPSOIL SHALL BE PLACED BY EQUIPMENT TO THE FULL THICKNESS IN LIFTS OF 6 INCHES OR LESS TO FLOODPLAIN FINISHED GRADE PER TYPICAL SECTION THIS DRAWING AND DETAILED SECTIONS DWGS 4.4-4.9. INDIVIDUAL LIFTS SHALL BE CONSOLIDATED BY EQUIPMENT TRAVEL PRIOR TO PLACEMENT OF SUBSEQUENT LIFTS. FINAL TREATMENT THICKNESS TO BE ±6 INCHES.



1 **TYPICAL SECTION DETAIL**

*SECTION IS ORIENTED IN THE DOWNSTREAM DIRECTION

HORZ 1" = 40'
VERT 1" = 20'

PROPOSAL DRAWINGS
NOT FOR CONSTRUCTION

RIVER DESIGN GROUP, INC
The Freshwater Trust

TYPICAL SECTION DETAIL

BAYHA ISLAND ENHANCEMENT RESEARCH PROJECT
SNAKE RIVER NEAR WALTERS FERRY, IDAHO

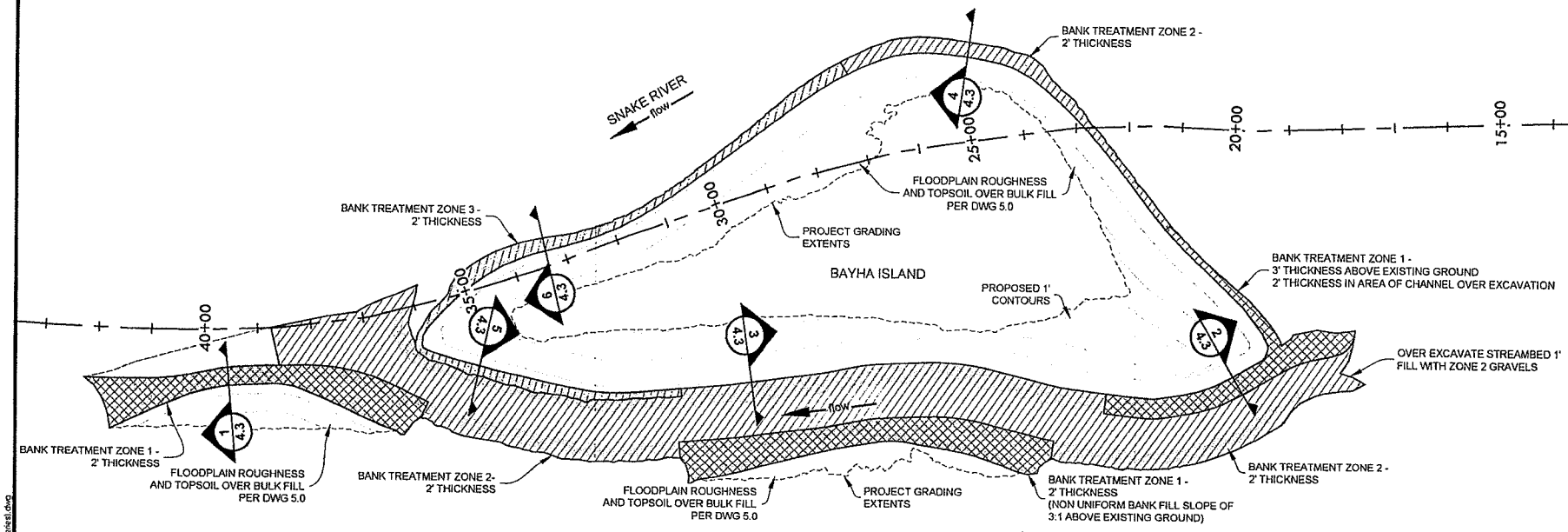
NO.	DATE	BY	DESCRIPTION	CHK
*	11/10/15	RB	PROPOSALS	SIV

PROJECT NUMBER
RDG-14-010

DRAWING NUMBER
4.1

Drawing 15 of 27

M:\client-data\2014\rdg-14-010 fit pc snake site 3\CAD\30% Bayha Island (Grading 40 series) .dwg



1 BANK TREATMENT LAYOUT

1" = 200'

ZONE 1 GRAVEL ROCK GRADATION

PERCENT PASSING	MIN (INCH)	MAX (INCH)
100	8	12
85	4	8
50	3	4
30	2	3
15	1	2
ESTIMATE TOTAL VOLUME = 7,700 CY		

NEAT LINE

ZONE 2 GRAVEL ROCK GRADATION

PERCENT PASSING	MIN (INCH)	MAX (INCH)
100	4	6
85	3	4
50	2	3
30	1	2
5	0.5	1
ESTIMATE TOTAL VOLUME = 12,200 CY		

NEAT LINE

ZONE 3 GRAVEL ROCK GRADATION

PERCENT PASSING	MIN (INCH)	MAX (INCH)
100	2	3
85	1	2
50	1	2
30	1	1
15	0	1
ESTIMATE TOTAL VOLUME = 2,200 CY		

NEAT LINE

HATCH LEGEND

ZONE 1

ZONE 2

ZONE 3

PROPOSAL DRAWINGS
NOT FOR CONSTRUCTION

RIVER DESIGN GROUP, INC.
The Freshwater Trust

BANK TREATMENT ZONES

BAYHA ISLAND ENHANCEMENT RESEARCH PROJECT
SNAKE RIVER NEAR WALTERS FERRY, IDAHO

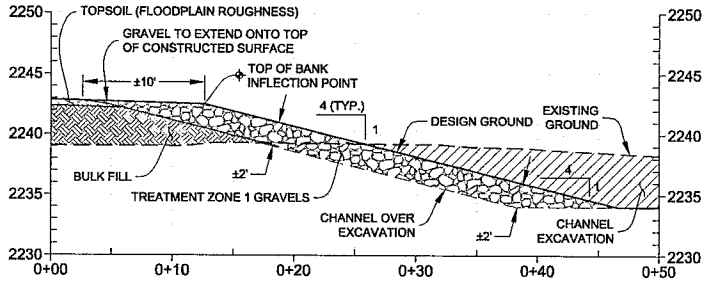
NO.	DATE	BY	DESCRIPTION	CHK
*	11/10/15	RB	PROPOSALS	SW

PROJECT NUMBER RDG-14-010

DRAWING NUMBER 4.2

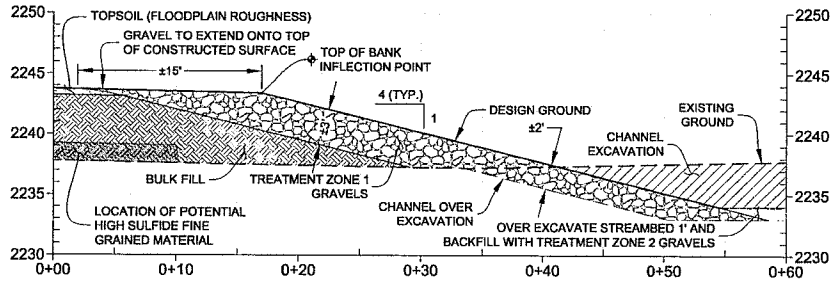
Drawing 16 of 27

M:\client-data\2014\rdg-14-010 tft ipc snake site 3\CAD\30% Bayha Island (Grading 40 series).dwg



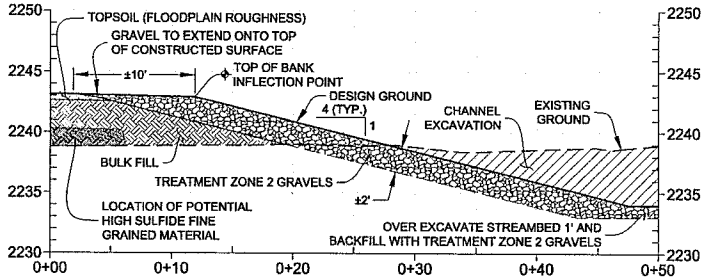
1 BANK TREATMENT ZONE 1 - A

HORZ 1" = 10'
VERT 1" = 10'



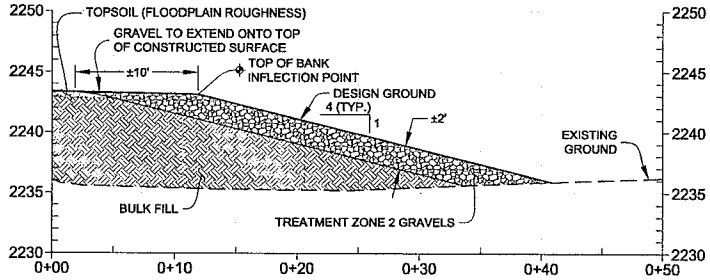
2 BANK TREATMENT ZONE 1 - B

HORZ 1" = 10'
VERT 1" = 10'



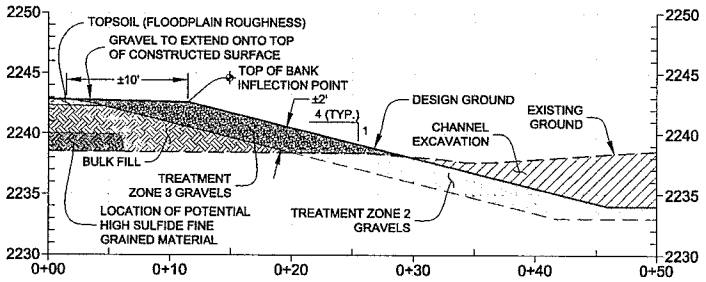
3 BANK TREATMENT ZONE 2 - A

HORZ 1" = 10'
VERT 1" = 10'



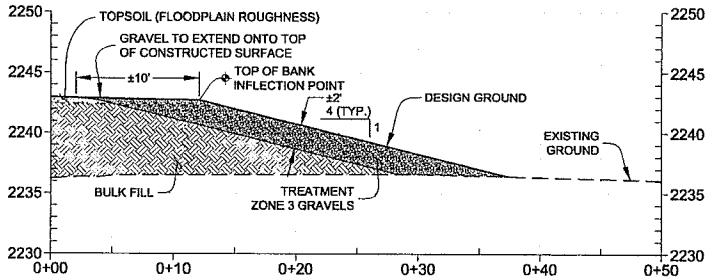
4 BANK TREATMENT ZONE 2 - B

HORZ 1" = 10'
VERT 1" = 10'



5 BANK TREATMENT ZONE 3 - A

HORZ 1" = 10'
VERT 1" = 10'



6 BANK TREATMENT ZONE 3 - B

HORZ 1" = 10'
VERT 1" = 10'

PROPOSAL DRAWINGS
NOT FOR CONSTRUCTION

RIVER DESIGN GROUP, INC
The Nature Conservancy Freshwater Trust

BANK TREATMENT DETAILS

BAYHA ISLAND ENHANCEMENT RESEARCH PROJECT
SNAKE RIVER NEAR WALTERS FERRY, IDAHO

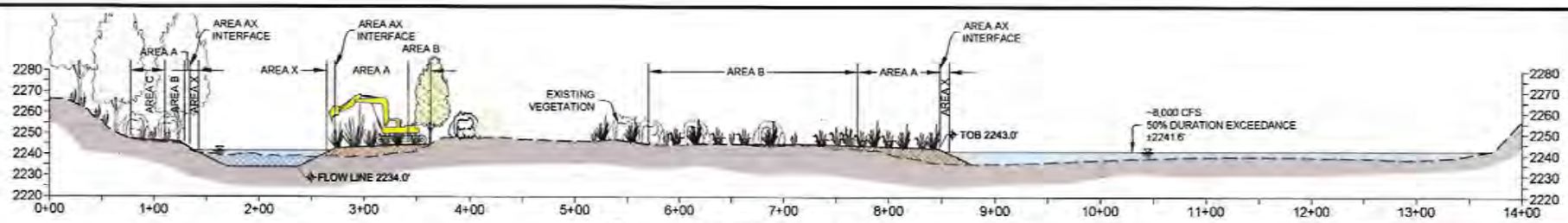
NO.	DATE	BY	DESCRIPTION	CHK
*	11/10/15	RB	PROPOSALS	SIV

PROJECT NUMBER
RDG-14-010

DRAWING NUMBER
4.3

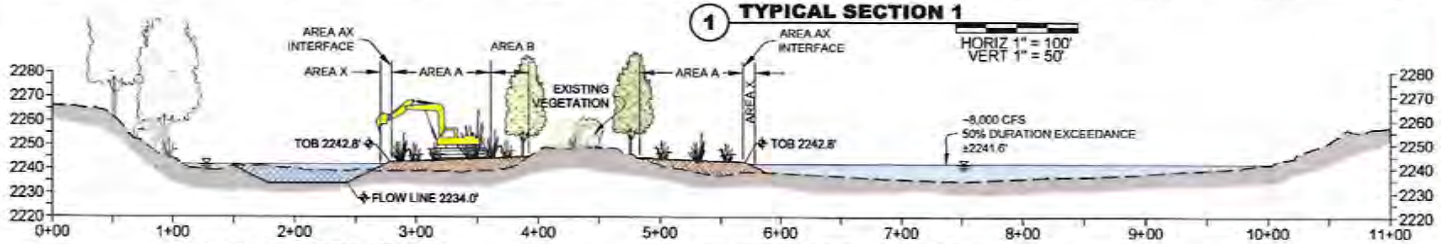
Drawing 17 of 27

M:\client-data\2014\rdg-14-010 tft jpc snake site 3\CAD\30% Bayha island (Grading 40 series).dwg



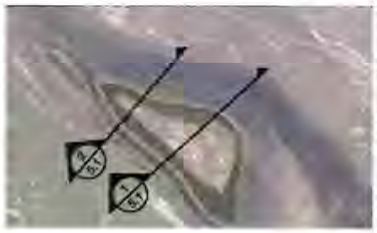
1 TYPICAL SECTION 1

HORIZ 1" = 100'
VERT 1" = 50'



2 TYPICAL SECTION 2

HORIZ 1" = 100'
VERT 1" = 50'



PROPOSAL DRAWINGS

NOT FOR CONSTRUCTION

REVEGETATION NOTES

GENERAL NOTES

PRIME CONTRACTOR FOR EARTHWORK IS NOT CHARGED WITH INSTALLATION OF REVEGETATION PLAN PLANTINGS. EARTHWORK CONTRACTOR RESPONSIBLE FOR PLACEMENT OF PLANTING MEDIUM (TOPSOIL) PER DRAWINGS 4.0-4.9. REVEGETATION TO OCCUR ONLY ON CONSTRUCTED FLOODPLAIN SURFACES.

REFERENCE CONDITIONS AND SPECIES SELECTION

PLANTING DESIGN WAS INFORMED BY REFERENCE DATA ILLUSTRATING CONDITIONS SUCH AS NATIVE PLANT SPECIES COMPOSITION AND DENSITY. BASED ON THESE DATA, PLANTINGS WILL INITIATE A RIPARIAN FOREST DOMINATED BY PEACHLEAF WILLOW (*SALIX AMYGDALOIDES*), WITH AN UNDERSTORY OF COYOTE WILLOW (*SALIX EXIGUA*), OTHER NATIVE WILLOWS AND NATIVE SHRUB AND NATIVE GRASS SPECIES.

PLANT MATERIALS

PLANT MATERIALS WILL CONFORM TO THE FRESHWATER TRUST'S PLANT MATERIALS STANDARDS. CUTTINGS, BARE ROOT AND SEED MATERIALS WILL BE SOURCED FROM EPA LEVEL III SNAKE RIVER PLAIN ECOREGION. ONE GALLON POLE TUBES WILL BE PRODUCED FROM 3'-6' POLE CUTTINGS HARVESTED SPRING 2016, 3'-10' POLE CUTTINGS (DIAMETER 3/4" TO 6") WILL BE HARVESTED WITHIN 1-7 DAYS OF PLANTING SOAKED IN WATER (FALL 2016), AND 5-8" TO 18"-36" BARE ROOT STOCK WILL BE PRODUCED FROM SEED AND CUTTINGS COLLECTED SUMMER 2014 OR BEFORE. PLANT MATERIAL COLLECTION, PROCUREMENT, GROW-OUT, STORAGE, HANDLING AND INSTALLATION WILL FOLLOW THE PROCEDURES OUTLINED IN THE "RIPARIAN PLANING DESIGN" DOCUMENT.

SITE PREPARATION

SITE PREPARATION WILL CONSIST OF NOXIOUS WEED SPECIES TREATMENT ON EXISTING ISLAND SURFACE OF TAMARISK (*TAMARIX* SP.), PERENNIAL PEPPERWEED (*LEPIDIUM LATIFOLIUM*), CANADA THISTLE (*CIRSIUM ARVENSE*) AND OTHER NOXIOUS SPECIES. INSTALLATION OF PLANTING MEDIUM (TOPSOIL) WILL OCCUR DURING ISLAND CONSTRUCTION, AND WILL CONSIST OF APPROVED MATERIAL AND AMENDABLE TO SPECIES REQUIREMENTS BY PLANTING ZONE. ALONG STEEP, EROSION PRONE AREAS WHERE EXTENSIVE GRADING IS NOT PRACTICAL, PRE-VEGETATED COIR LOGS WILL BE USED TO PROVIDE IMMEDIATE EROSION CONTROL ALONG WITH THE USE OF NATIVE SEDGE, RUSH, AND WILLOW SPECIES.

PLANTING DESIGN

VEGETATION SCHEDULE IS OUTLINED IN THE "RIPARIAN PLANING DESIGN" DOCUMENT. CUTTINGS IN AREA A AND B WILL BE PLANTED AT SUFFICIENT DEPTH SO THAT 6"-8" OF THE CUTTING STAYS IN THE WATER TABLE THROUGHOUT THE YEAR. APPROXIMATELY 3' OF CUTTING WILL REMAIN ABOVE GROUND TO OUTCOMPETE HERBACEOUS SUMMER GROWTH. BIG SAGEBRUSH ESTABLISHMENT WILL BE MAXIMIZED BY GROWING NURSERY SEEDLINGS IN TOPSOIL WITH MYCORRHIZAL FUNGI. FOR AREAS B AND C, A MIX OF ECOLOGICALLY APPROPRIATE, NATIVE GRASS SPECIES WILL BE SEEDED ACCORDING TO RESTORATION PROFESSIONAL SPECIFICATIONS.

IRRIGATION

A STANDARD IRRIGATION SYSTEM USING A HAND LINE AND IRRIGATION PIPES WILL BE USED TO WATER THE PLANTS, AT MINIMUM, DURING THE FIRST GROWING SEASON. AN IRRIGATION MANAGEMENT SYSTEM WILL OUTLINE SPECIFIC VOLUME, DURATION AND FREQUENCY OF WATERINGS BASED ON WATER HOLDING CAPACITY OF THE SUBSTRATE AND PERCOLATION RATES. GENERALLY, IRRIGATION WILL OCCUR AT A HIGH FREQUENCY AND LOW DURATION WHEN THE PLANTS ARE INITIALLY INSTALLED, AND SHIFT TO LOW FREQUENCY AND LONG DURATION ONCE ROOTS HAVE ESTABLISHED. APPROXIMATE WATERING RATES ARE 36 ACRE FEET PER SEASON.

PLANTING ZONE	LATIN SPECIES NAME	COMMON NAME	STOCK TYPE	STOCK SIZE	QUANTITY (PLANTS PER ACRE)	SPACING (FT ON CENTER)
Area X Adjacent to river (-1' - 1' above 50% duration exceedance flow), frequent inundation, saturated soils (±1.1 acres)	*Carex lanuginosa*	wooly sedge	wetland sod mats 3.3' wide		TBD	
	Carex nebrascensis	Nebraska sedge				
	Carex utriculata	beaked sedge				
	Eleocharis palustris	common spikerush				
	Juncus articulatus	jointleaf rush				
	Schoenoplectus acutus	hardstem bulrush				
	Scirpus microcarpus	panicled bulrush				
Area AX Interface The interface between areas A and X.	*Carex lanuginosa*	wooly sedge	seed and plugs		43,560	1' on center
	Carex nebrascensis	Nebraska sedge				
	Carex utriculata	beaked sedge				
	Carex vulpinoidea	fox sedge				
	Eleocharis palustris	common spikerush				
	Juncus articulatus	jointleaf rush				
	Juncus arcticus	Arctic rush				
	Scirpus microcarpus	panicled bulrush				
Area A Adjacent to river (1'-2.2' ft above 50% duration exceedance flow), freq. inundation, saturated soils (±5.8 acres)	*Cornus sericea sericea*	dogwood	1 gallon pole tubes, pole cuttings	3-10'	400	3-4' on center
	Ribes aureum	golden currant	Plug	25"	100	
	Salix exigua	coyote/sandbar willow	1 gallon pole tubes, pole cuttings	3-10'	2350	
	Salix lasiolepis	arroyo willow	1 gallon pole tube, pole cuttings	3-10'	600	
	Salix lucinda caudata	greenleaf willow	1 gallon pole tube, pole cuttings	3-10'	150	
	Salix lutea	yellow willow	1 gallon pole tube, pole cuttings	3-10'	250	
Area B Inland of Area A (2.6'-4.6' above 50% duration exceedance flow), infreq. high water events, sediment deposition, eventual soil layering (±2.9 acres)	*Philadelphus lewisii*	mock orange	Plug	25"	250	5' on center
	Populus trichocarpa	black cottonwood	1 gallon pole tubes	5-15'	100	
	Ribes aureum	golden currant	Plug	25"	750	
	Rosa woodsii	wood rose	Plug	25"	250	
	Salix amygdaloides	peachleaf willow	1 gallon pole tubes, pole cuttings	5-15'	400	
Area C Inland of Area B, (>4.6 ft above 50% duration exceedance flow), very infreq. high water events, suitable for drought tolerant species (±0.2 acres)	*Artemisia tridentata tridentata*	big sagebrush	Plug	25"	600	4-5' on center
	Atriplex canescens	fourwing saltbush	Plug	25"	350	
	Ericameria nauseosa	grey rabbitbrush	Plug	25"	350	
	Sarcobatus vermiculatus	greasewood	Plug	25"	650	

RIVER DESIGN GROUP, INC.
The Freshwater Trust

PROJECT REVEGETATION PLAN

BAYHA ISLAND ENHANCEMENT RESEARCH PROJECT
SNAKE RIVER NEAR WALTERS FERRY, IDAHO

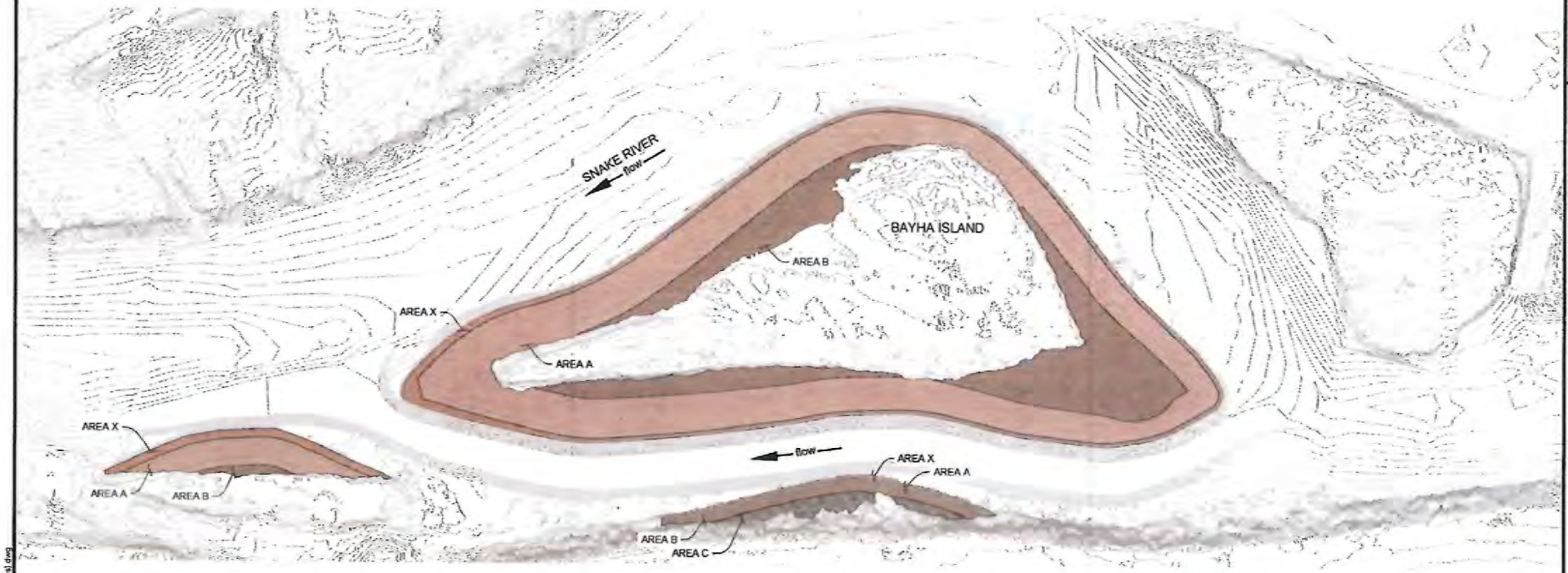
NO.	DATE	BY	DESCRIPTION	CHK
*	11/10/15	RB	PROPOSALS	SW

PROJECT NUMBER RDG-14-010

DRAWING NUMBER 5.1

Drawing 25 of 27

M:\client-data\2014\rdg\14-010\fl\ipo snake sh\?CAD\3?\5 (bayha island (Details 50 series).dwg



1 **REVEGETATION LAYOUT**

1" = 200'

HATCH LEGEND

- AREA X PLANTING (UPSTREAM ELEV. 2241.2'-2243.2') (DOWNSTREAM ELEV. 2240.0'-2242.0')
- AREA A PLANTING (UPSTREAM ELEV. 2243.2'-2244.8') (DOWNSTREAM ELEV. 2242.0'-2243.6')
- AREA B PLANTING (UPSTREAM ELEV. 2244.8'-2246.8') (DOWNSTREAM ELEV. 2243.6'-2245.6')
- AREA C PLANTING (UPSTREAM ELEV. +2246.8') (DOWNSTREAM ELEV. ±2245.6')

NOTE:
UPSTREAM 50% DURATION EXCEEDANCE ELEV. 2242.2'
DOWNSTREAM 50% DURATION EXCEEDANCE ELEV. 2241.0'

PROPOSAL DRAWINGS
NOT FOR CONSTRUCTION

RIVER DESIGN GROUP INC
The Freshwater Trust

PROJECT REVEGETATION LAYOUT

BAYHA ISLAND ENHANCEMENT RESEARCH PROJECT
SNAKE RIVER NEAR WALTERS FERRY, IDAHO

NO.	DATE	BY	DESCRIPTION	CHK
-	11/10/15	RB	PROPOSALS	SW

PROJECT NUMBER RDG-14-010

DRAWING NUMBER 5.2

Drawing 26 of 27

M:\client-data\2014\rdg-14-010\fl\roc snake site 3\CAD\30% Bayha Island (Details 50 series).dwg