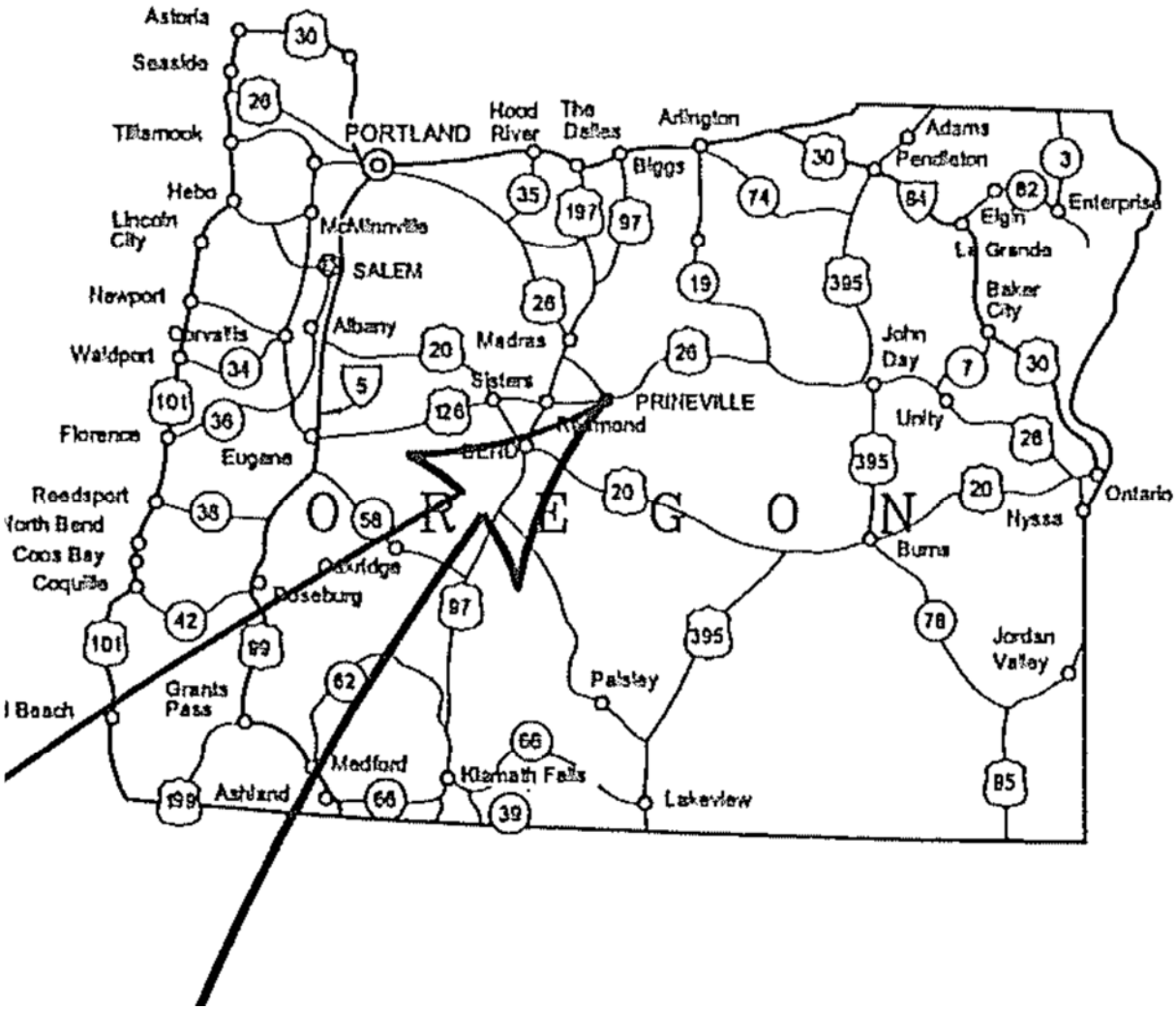
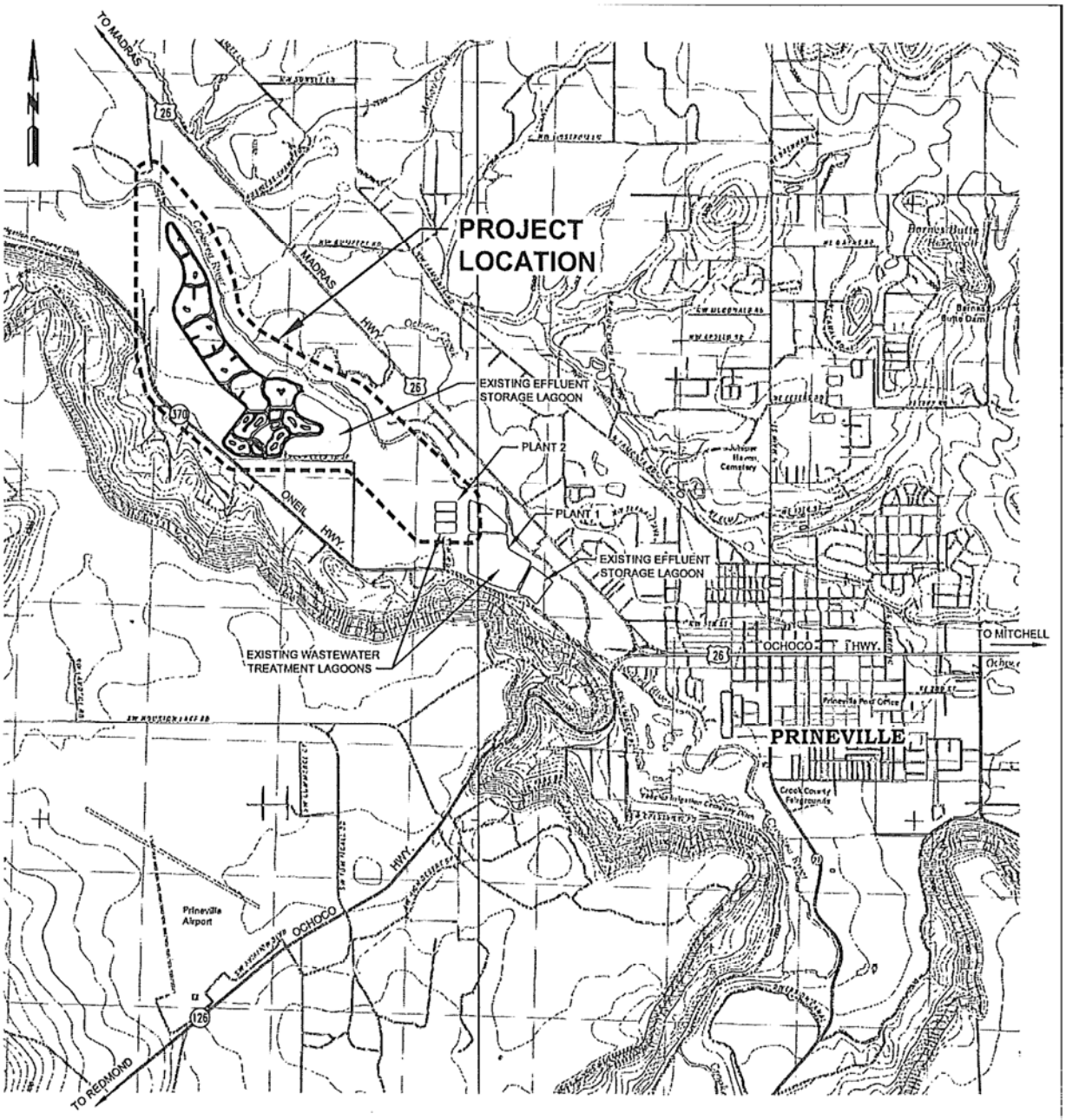
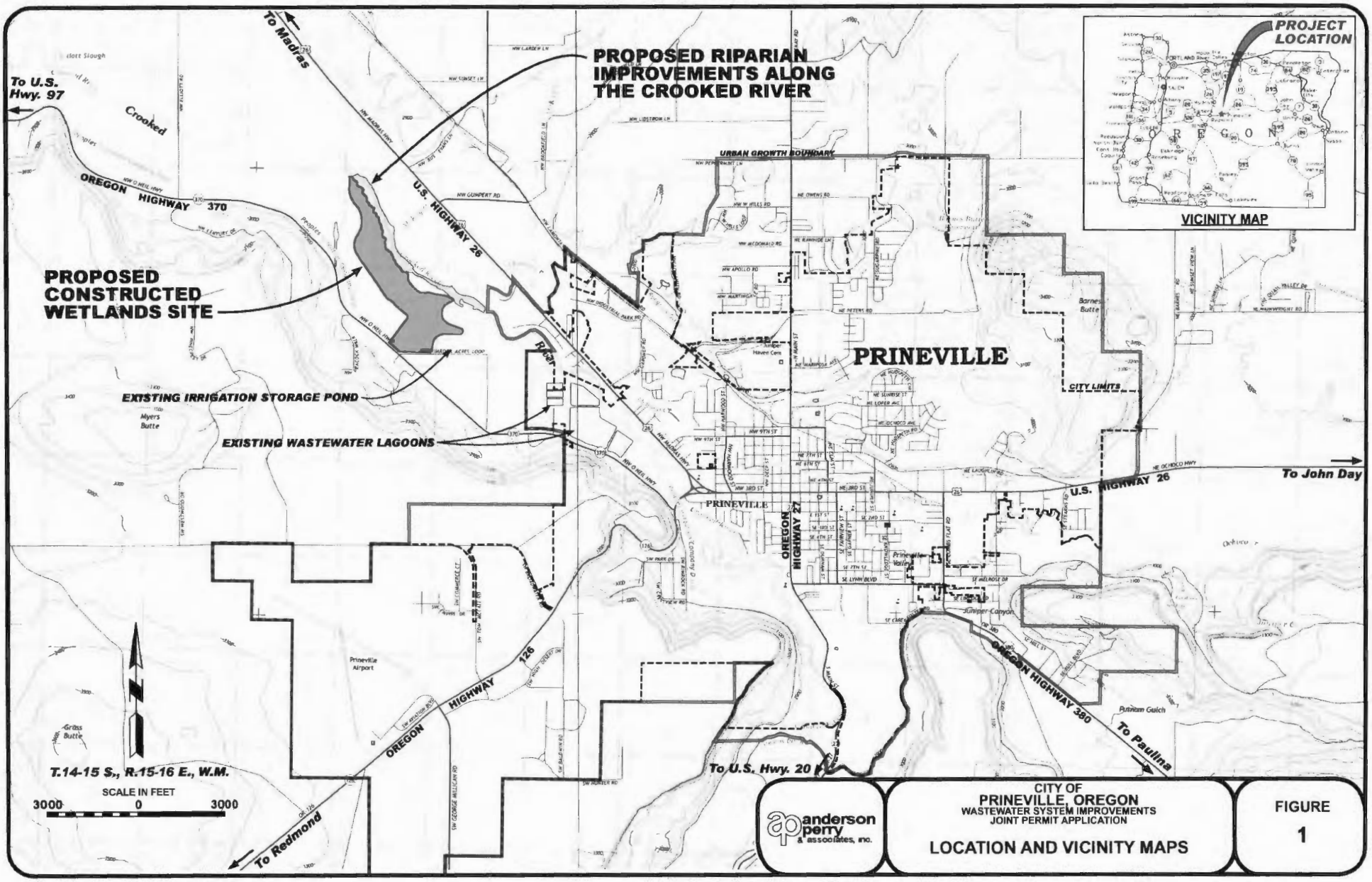
City of Prineville
Crooked River Restoration Project
NWP-2015-535





VICINITY MAP



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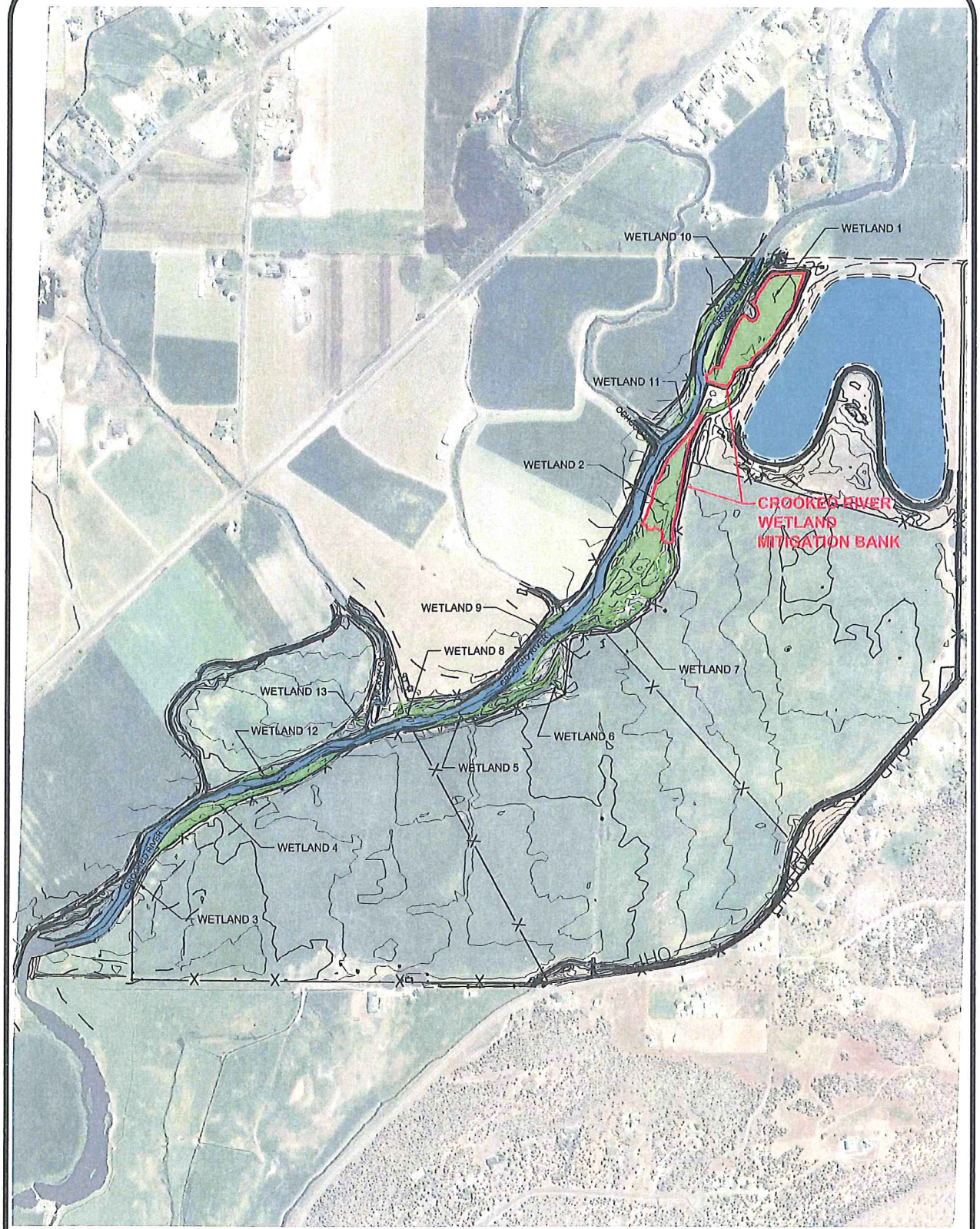
CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
JOINT PERMIT APPLICATION

LOCATION AND VICINITY MAPS

FIGURE
1

Job# 1260-11-222 Jul. 1, 2015 lbauer



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CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
USACE JOINT PERMIT APPLICATION NWP-2010-535/1

EXISTING CONDITIONS

FIGURE
2

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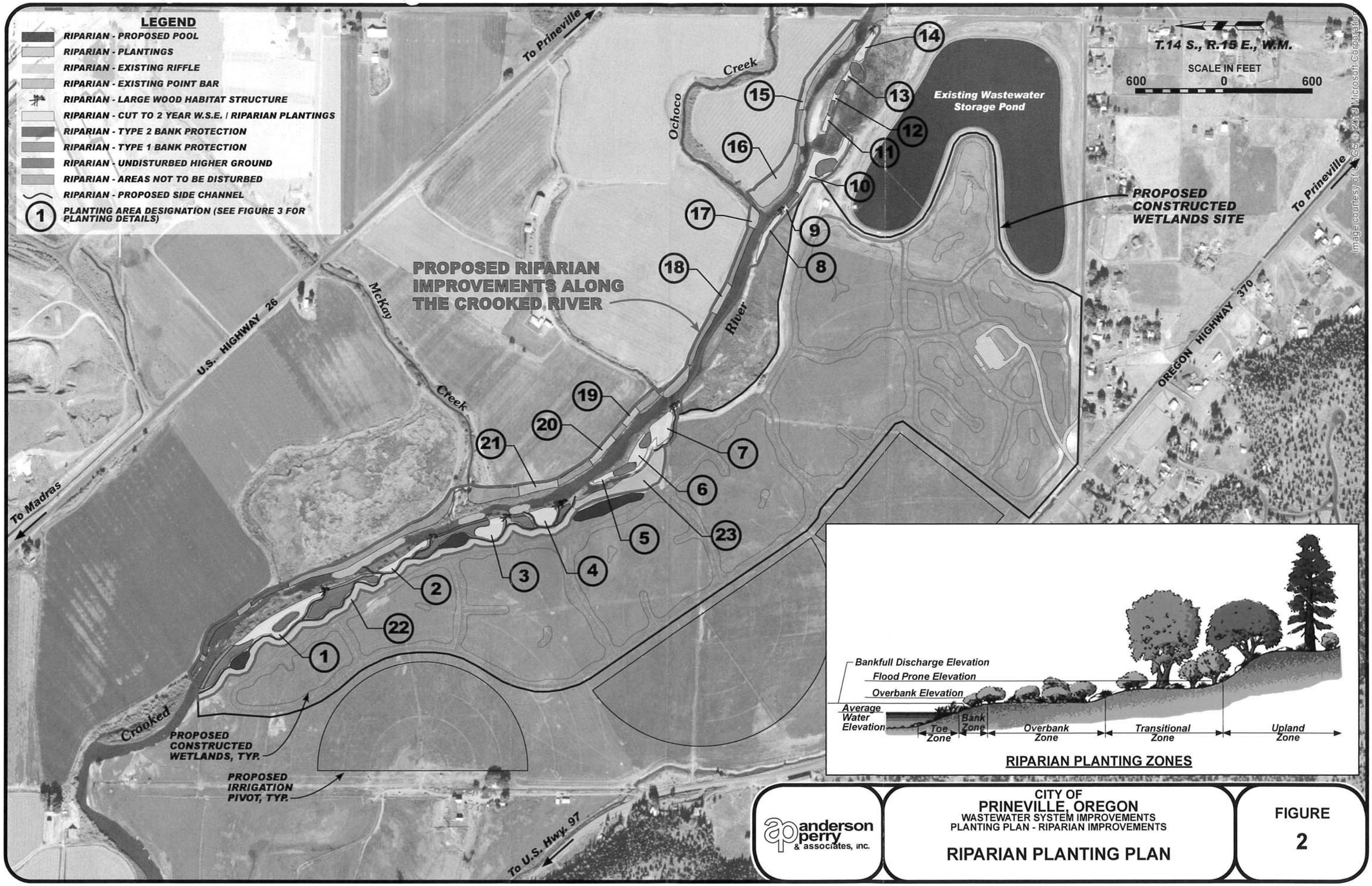

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CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
PLANTING PLAN - RIPARIAN IMPROVEMENTS

RIPARIAN PLANTING PLAN

FIGURE
2

Job# 1260-12-060 Feb. 23, 2016 lbauer

NOTES

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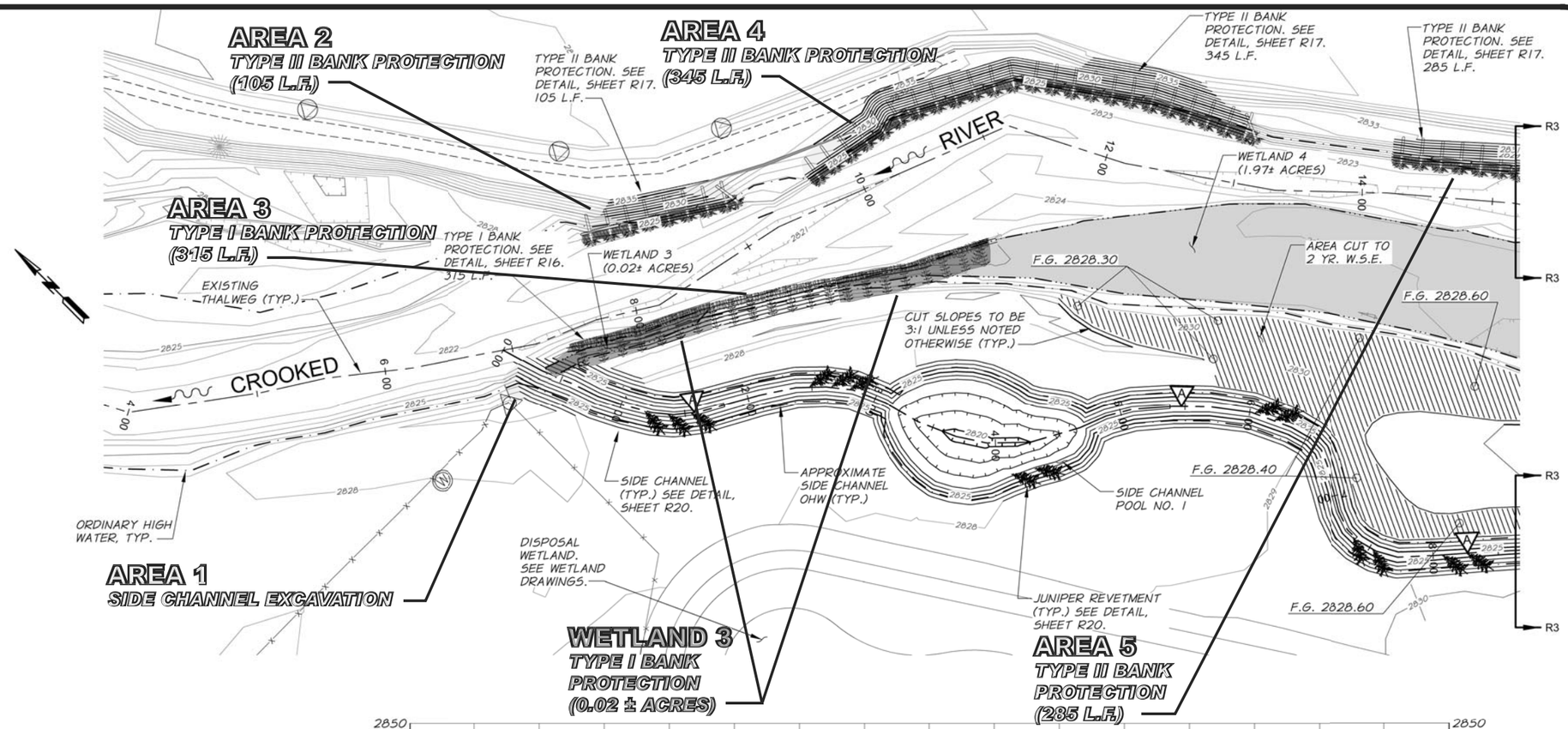

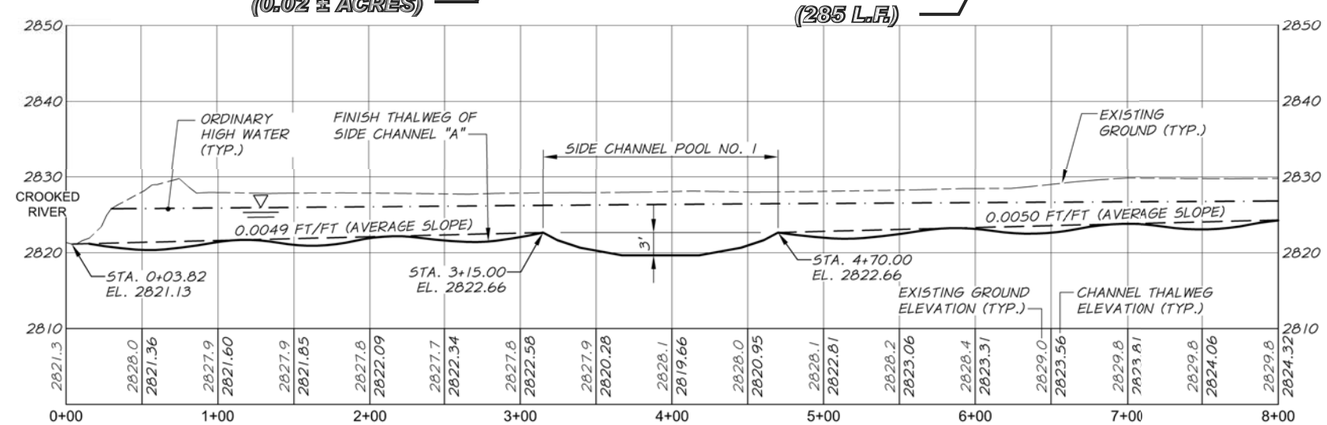

SIDE CHANNEL PROFILE

1"=50' HORZ.
1"=10' VERT.

THIS DRAWING HAS BEEN REDUCED 50%. ADJUST SCALE ACCORDINGLY. BARSCALE SHOWN IS ACCURATE.

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CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
JOINT PERMIT APPLICATION

RIPARIAN IMPROVEMENTS

FIGURE
5A

Job# 1260-11-222 Jul. 7, 2015 lbauer

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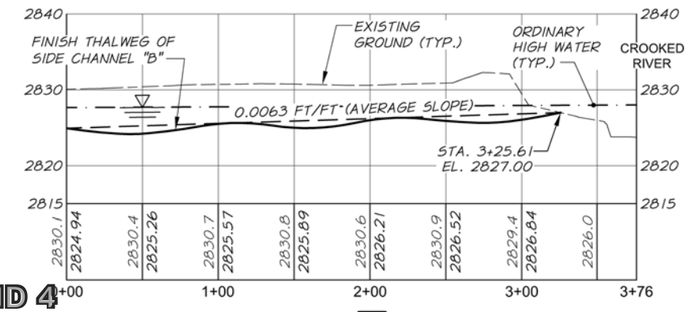
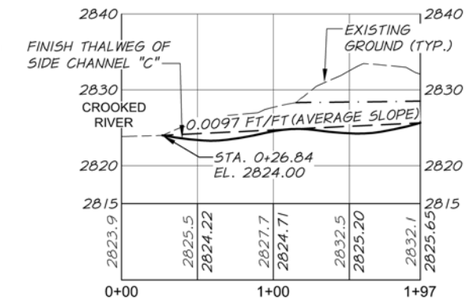


SIDE CHANNEL B PROFILE
1"=50' HORZ.
1"=10' VERT.



SIDE CHANNEL C PROFILE
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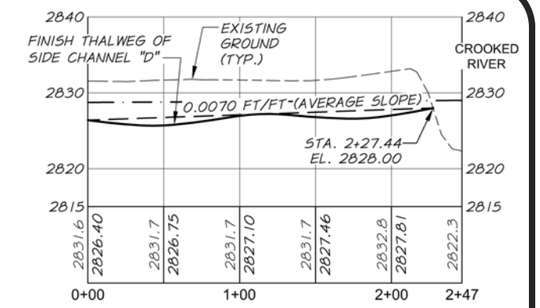
1"=10' VERT.



SIDE CHANNEL D PROFILE
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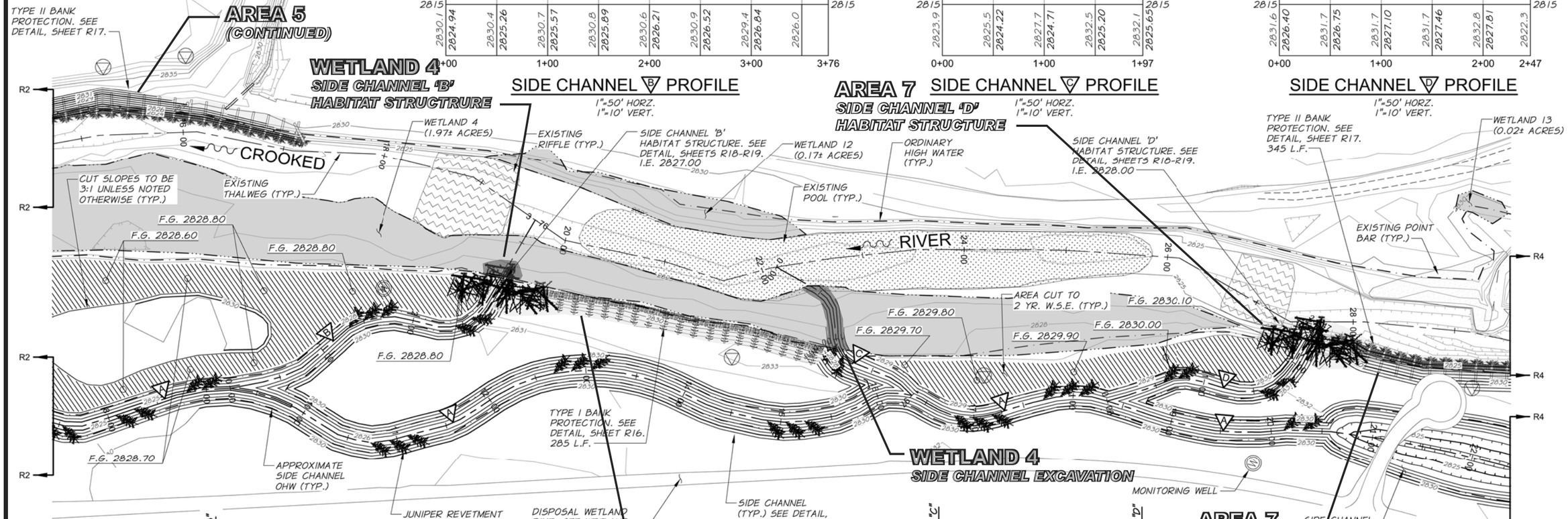
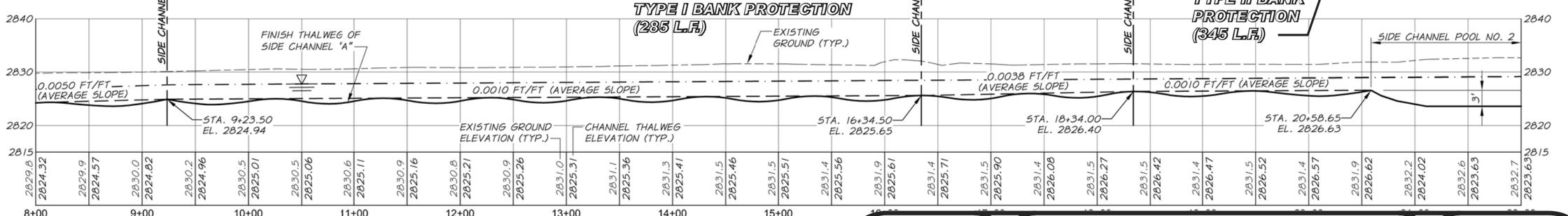
1"=10' VERT.





SIDE CHANNEL A PROFILE
1"=50' HORZ.
1"=10' VERT.

THIS DRAWING HAS BEEN REDUCED 50%. ADJUST SCALE ACCORDINGLY. BARSCALE SHOWN IS ACCURATE.

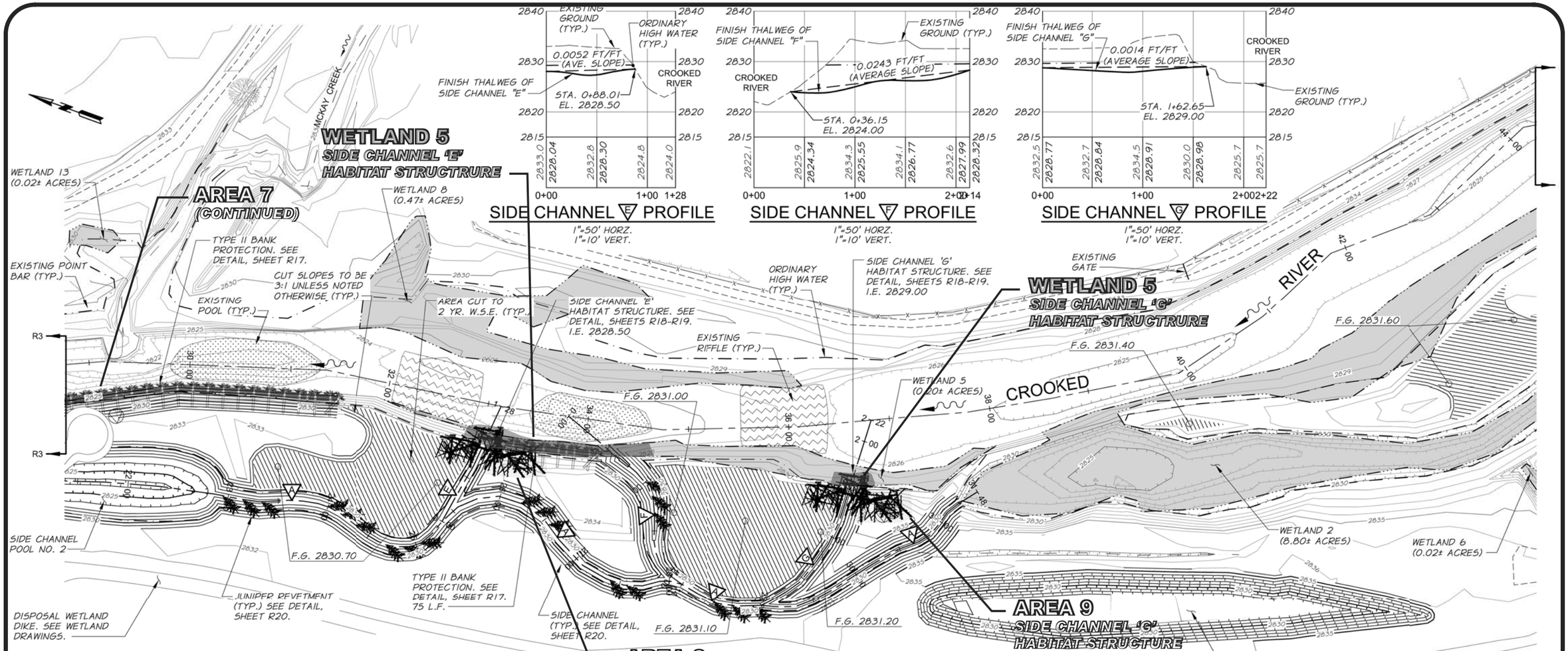
anderson perry & associates, inc.

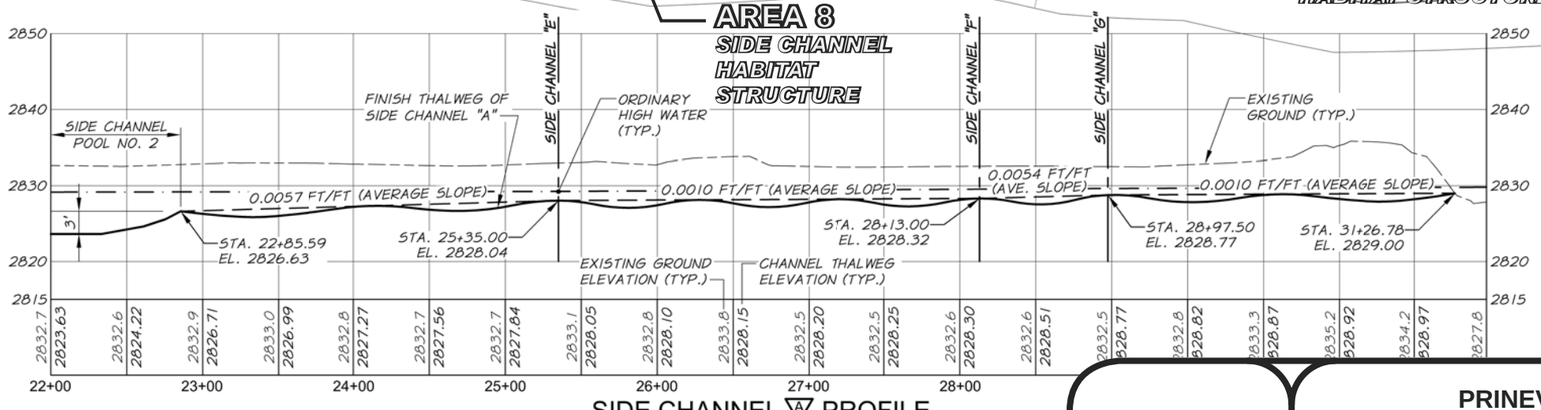
CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
JOINT PERMIT APPLICATION

RIPARIAN IMPROVEMENTS

FIGURE
5B

Job# 1260-11-222 Jul. 2, 2015 lbauer





SIDE CHANNEL A PROFILE

1"=50' HORZ. 1"=10' VERT.

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NOTES

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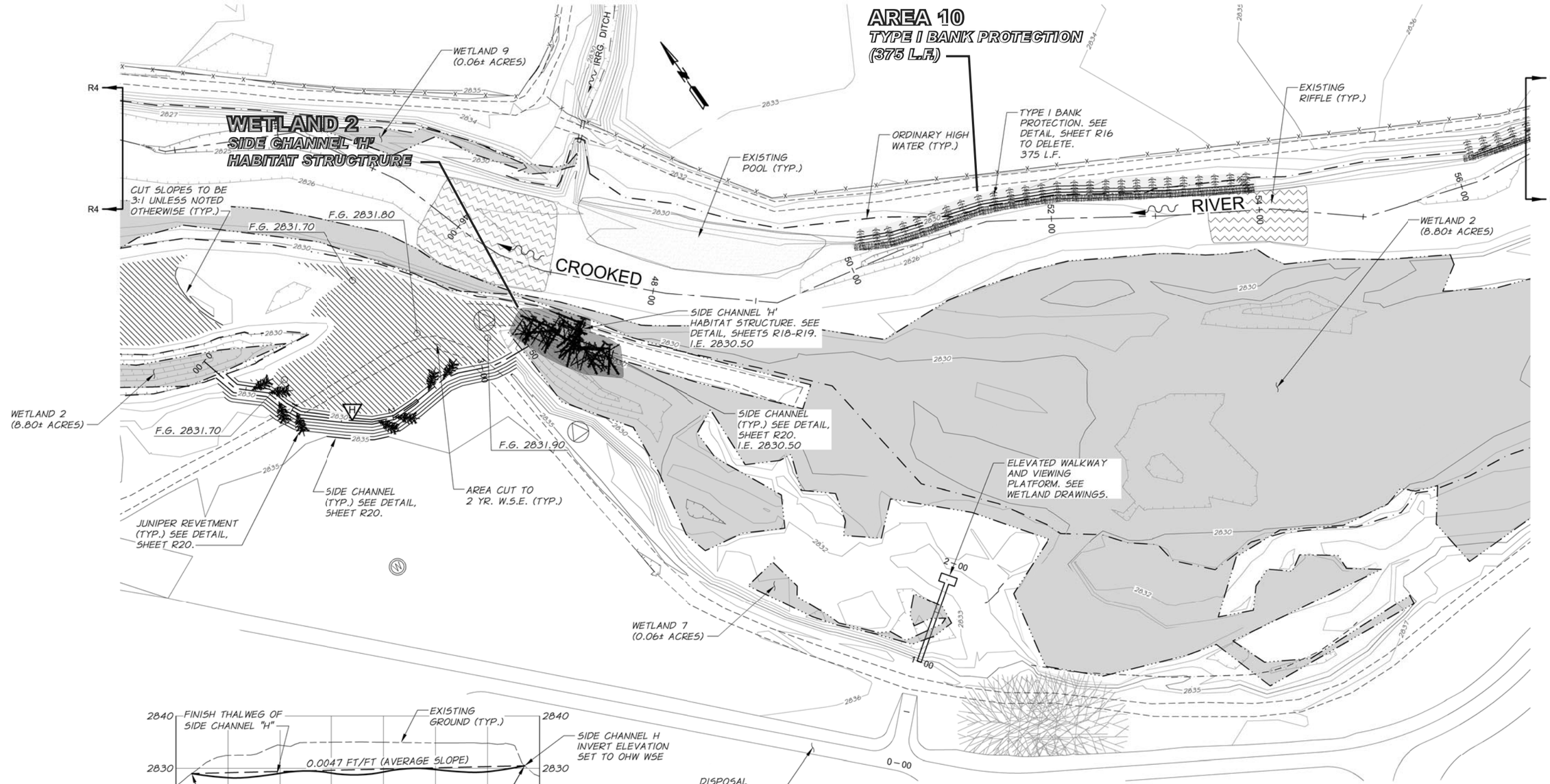
CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
JOINT PERMIT APPLICATION

RIPARIAN IMPROVEMENTS

FIGURE
5C

Job# 1260-11-222 Jul. 7, 2015 lbauer



SIDE CHANNEL H PROFILE

1"=50' HORZ.
1"=10' VERT.

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2. THE CONTRACTOR SHALL MAINTAIN AN AVERAGE

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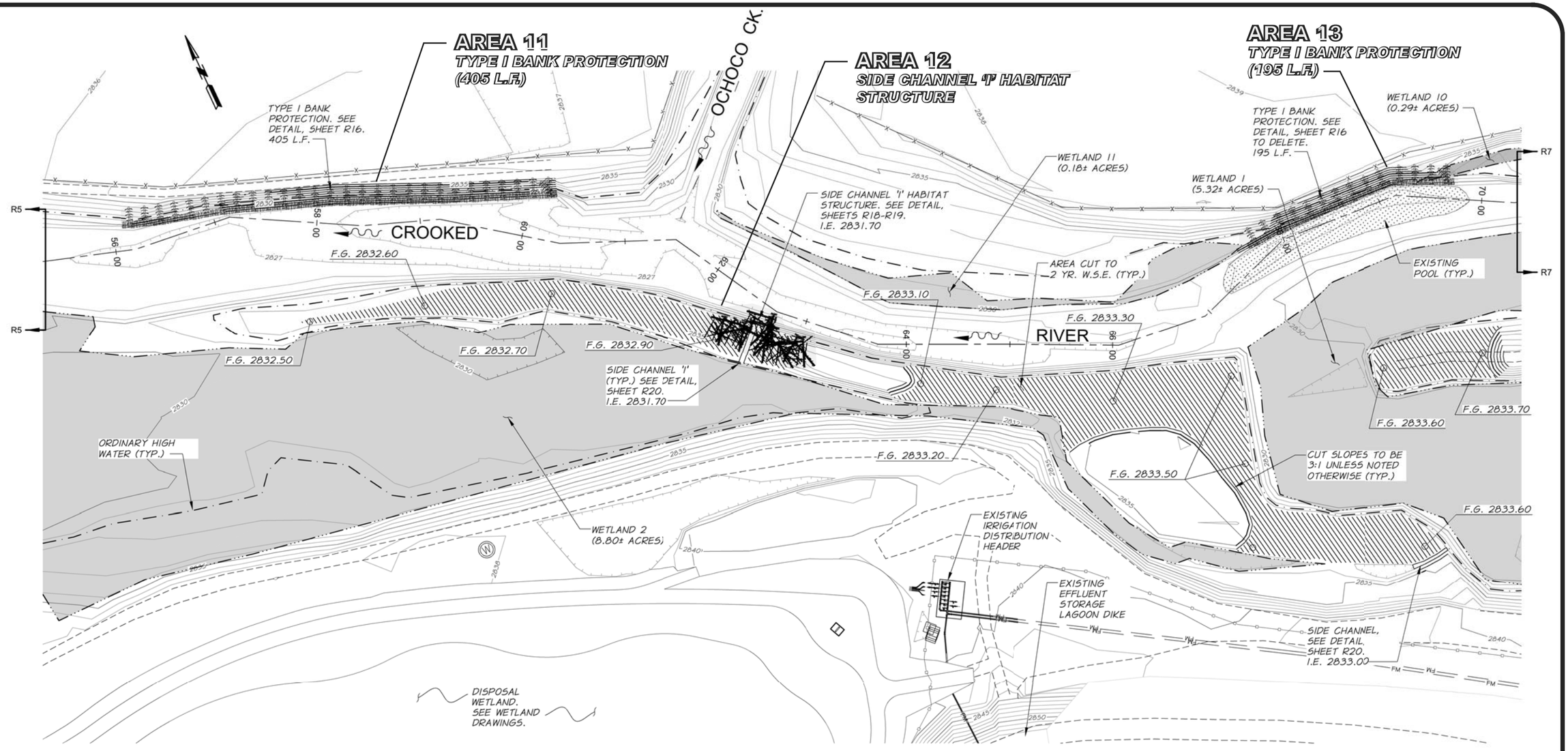
CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
JOINT PERMIT APPLICATION

RIPARIAN IMPROVEMENTS

FIGURE
5D

Job# 1260-11-222 Jul. 2, 2015 lbauer



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CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
JOINT PERMIT APPLICATION

RIPARIAN IMPROVEMENTS

FIGURE
5E

Job# 1260-11-222 Jul. 2, 2015 lbauer

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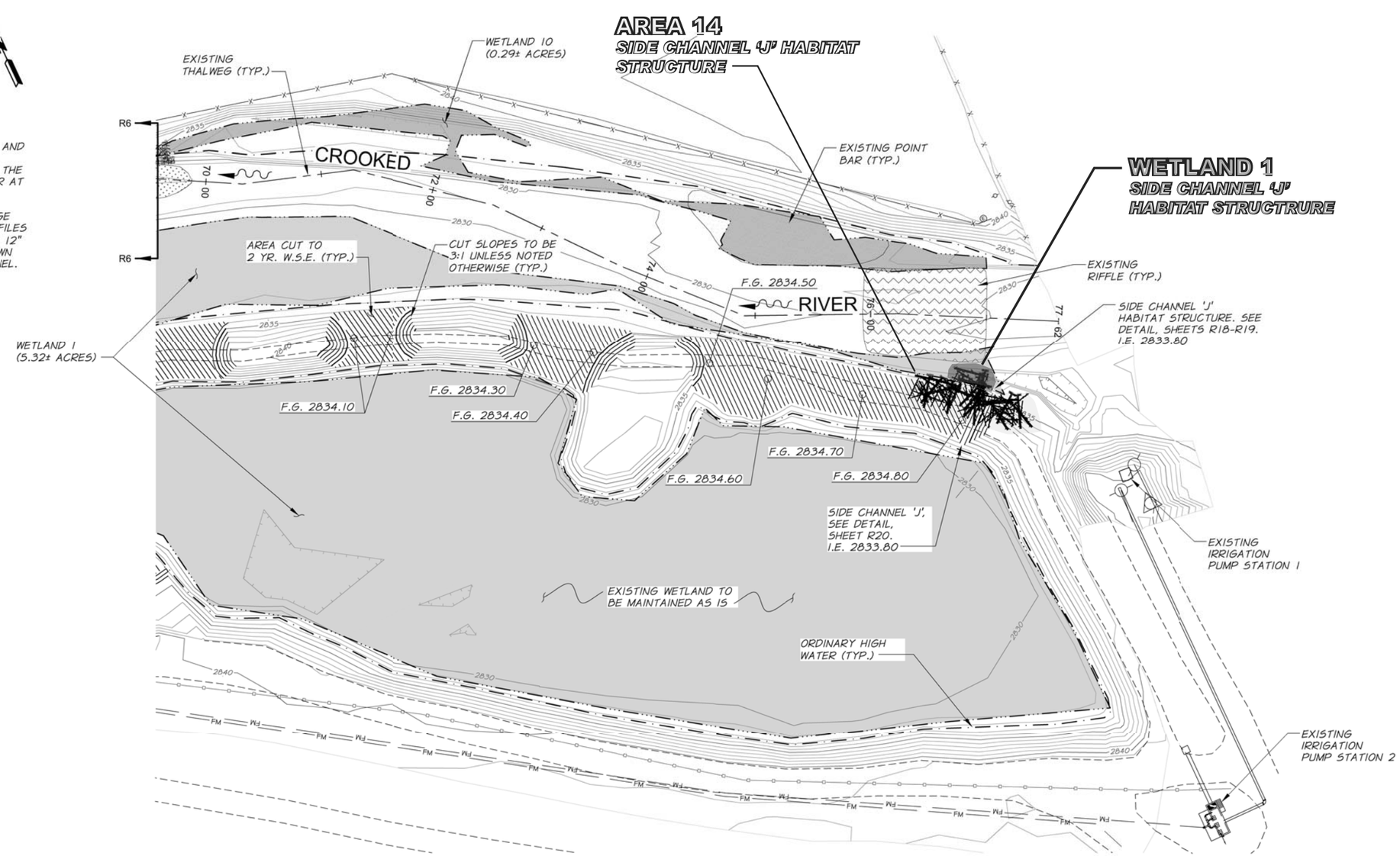

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CITY OF
PRINEVILLE, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
JOINT PERMIT APPLICATION

RIPARIAN IMPROVEMENTS

FIGURE
5F

Job# 1260-11-222 Jul. 7, 2015 lbauer

RIPARIAN LEGEND

(SEE LEGEND, SHEET G1, FOR OTHER BASEMAP SYMBOLOGY)

EXISTING THALWEG

ORDINARY HIGH WATER (OHW)

EXISTING RIFFLE

EXISTING POOL

EXISTING POINT BAR

WOOD HABITAT STRUCTURE AND TYPE DESIGNATION

NEW FLOODPLAIN

EXISTING WETLAND

NOTES

1. THE CONTRACTOR SHALL ABIDE BY ALL CONDITIONS OF THE DEPARTMENT OF STATE LANDS AND U.S. ARMY CORPS OF ENGINEERS PERMITS. SEE APPENDIX OF THE TECHNICAL SPECIFICATIONS FOR THE JOINT PERMIT APPLICATION AND SAMPLE DEPARTMENT OF STATE LANDS PERMIT CONDITIONS AND SAMPLE U.S. ARMY CORPS OF ENGINEERS NATIONWIDE REGIONAL PERMIT CONDITIONS.
2. QUANTITIES SHOWN ARE NEAT LINE ESTIMATES AND ARE SHOWN FOR INFORMATION ONLY. CONTRACTOR SHALL NOT USE THESE ESTIMATES FOR BIDDING PURPOSES AND IS RESPONSIBLE FOR CALCULATING HIS OWN QUANTITIES.
3. ALL EXCESS EXCAVATED MATERIAL FROM THE RIPARIAN IMPROVEMENTS SHALL BE UTILIZED IN THE DIKE CONSTRUCTION IN THE UPLAND AREA.
4. THE LOCATION OF THE ALIGNMENT SHOWN IS APPROXIMATE. THE ACTUAL LOCATION SHALL BE STAKED IN THE FIELD BY THE ENGINEER.
5. CONTRACTOR SHALL PRESERVE AND PROTECT ALL EXISTING VEGETATION TO THE FULLEST EXTENT POSSIBLE.

DESIGN CRITERIA

DESCRIPTION	CROOKED RIVER UPSTREAM OF OCHOCO CREEK	CROOKED RIVER DOWNSTREAM OF OCHOCO CREEK
1.4 YEAR FLOW (OHW)	872 CFS	1,026 CFS
2 YEAR FLOW	1,473 CFS	1,713 CFS
5 YEAR FLOW	2,656 CFS	3,125 CFS
10 YEAR FLOW	3,010 CFS	3,500 CFS
50 YEAR FLOW	3,490 CFS	4,000 CFS
100 YEAR FLOW	3,580 CFS	4,100 CFS

PROJECT OBJECTIVES

TO NATURALIZE THE RIPARIAN AREA AND STREAMBANK BETWEEN THE CONSTRUCTED WETLANDS AND THE CROOKED RIVER, INCREASE FLOODPLAIN CONNECTIVITY, REDUCE EROSION RATES PARTICULARLY ALONG PRIVATELY OWNED PROPERTY, MAINTAIN PRESENT STREAM FORM AND MORPHOLOGY, MAINTAIN AND ENHANCE ODOT WETLANDS, ENHANCE FISH AND WILDLIFE HABITAT AND FUNCTION WITH AN ECOSYSTEM PROCESS BASED APPROACH, AND ENHANCE AESTHETIC APPEAL AND RECREATIONAL POTENTIAL OF CITY-OWNED PROPERTY.

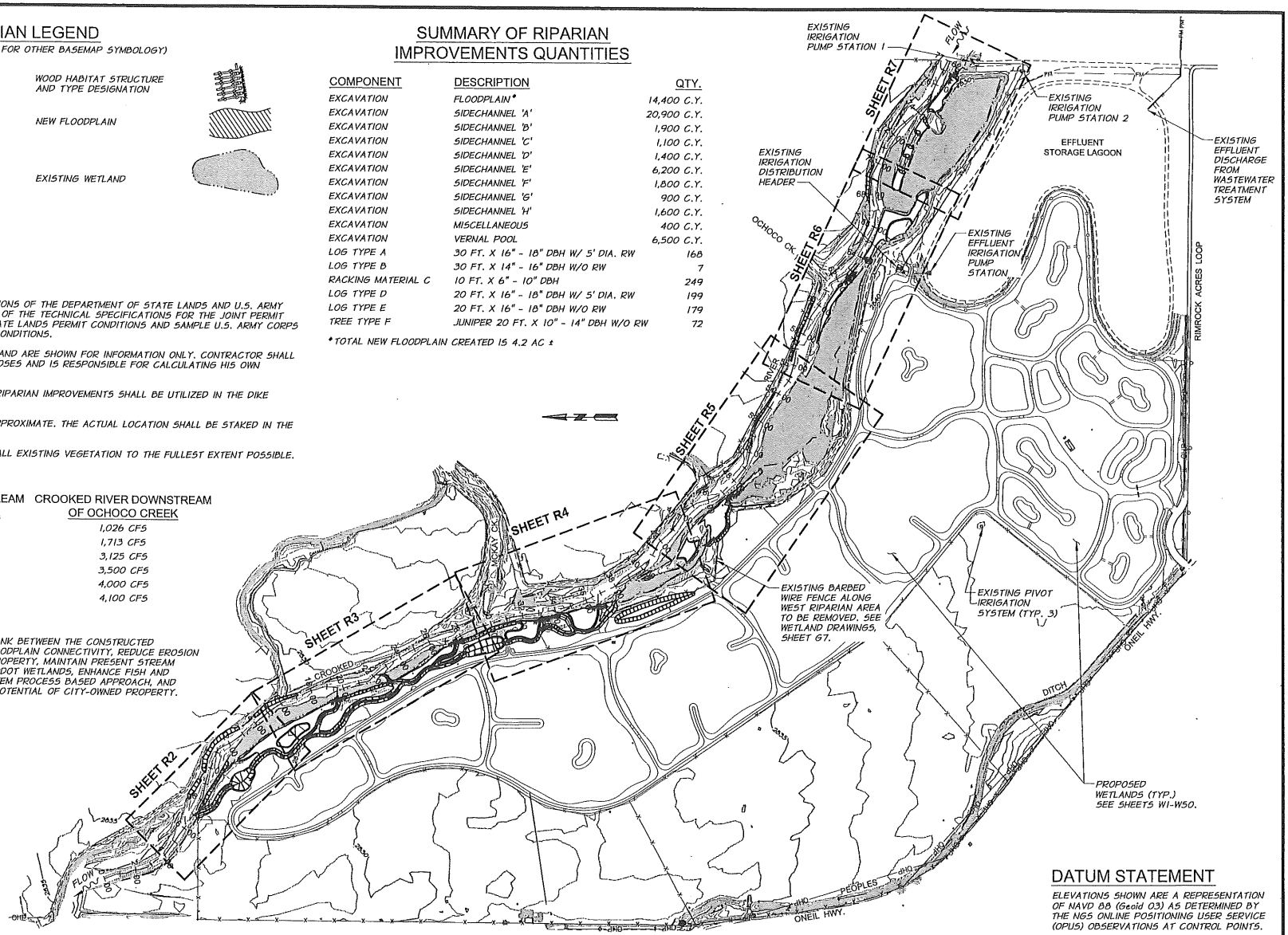
CROOKED RIVER CHANNEL CHARACTERISTICS

CHANNEL LENGTH	7,760 FT
SLOPE	0.001 FT/FT
SINUOSITY	1.09

SUMMARY OF RIPARIAN IMPROVEMENTS QUANTITIES

COMPONENT	DESCRIPTION	QTY.
EXCAVATION	FLOODPLAIN*	14,400 C.Y.
EXCAVATION	SIDECHANNEL 'A'	20,900 C.Y.
EXCAVATION	SIDECHANNEL 'B'	1,900 C.Y.
EXCAVATION	SIDECHANNEL 'C'	1,100 C.Y.
EXCAVATION	SIDECHANNEL 'D'	1,400 C.Y.
EXCAVATION	SIDECHANNEL 'E'	6,200 C.Y.
EXCAVATION	SIDECHANNEL 'F'	1,800 C.Y.
EXCAVATION	SIDECHANNEL 'G'	900 C.Y.
EXCAVATION	SIDECHANNEL 'H'	1,600 C.Y.
EXCAVATION	MISCELLANEOUS	400 C.Y.
EXCAVATION	VERNAL POOL	6,500 C.Y.
LOG TYPE A	30 FT. X 16" - 18" DBH W/ 5' DIA. RW	168
LOG TYPE B	30 FT. X 14" - 16" DBH W/O RW	7
RACKING MATERIAL C	10 FT. X 6" - 10" DBH	249
LOG TYPE D	20 FT. X 16" - 18" DBH W/ 5' DIA. RW	199
LOG TYPE E	20 FT. X 16" - 18" DBH W/O RW	179
TREE TYPE F	JUNIPER 20 FT. X 10" - 14" DBH W/O RW	72

*TOTAL NEW FLOODPLAIN CREATED IS 4.2 AC ±



DATUM STATEMENT

ELEVATIONS SHOWN ARE A REPRESENTATION OF NAVD 88 (Geoid 03) AS DETERMINED BY THE NGS ONLINE POSITIONING USER SERVICE (OPUS) OBSERVATIONS AT CONTROL POINTS.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg

300 0 300 600 900 SCALE IN FEET

HORZ. SCALE 1"=300' VERT. SCALE
JOB NUMBER 1260-10 DATE 2015
ACAD FILE RiverPlansProfs.dwg

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CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
SITE PLAN AND SHEET INDEX

SHEET R1

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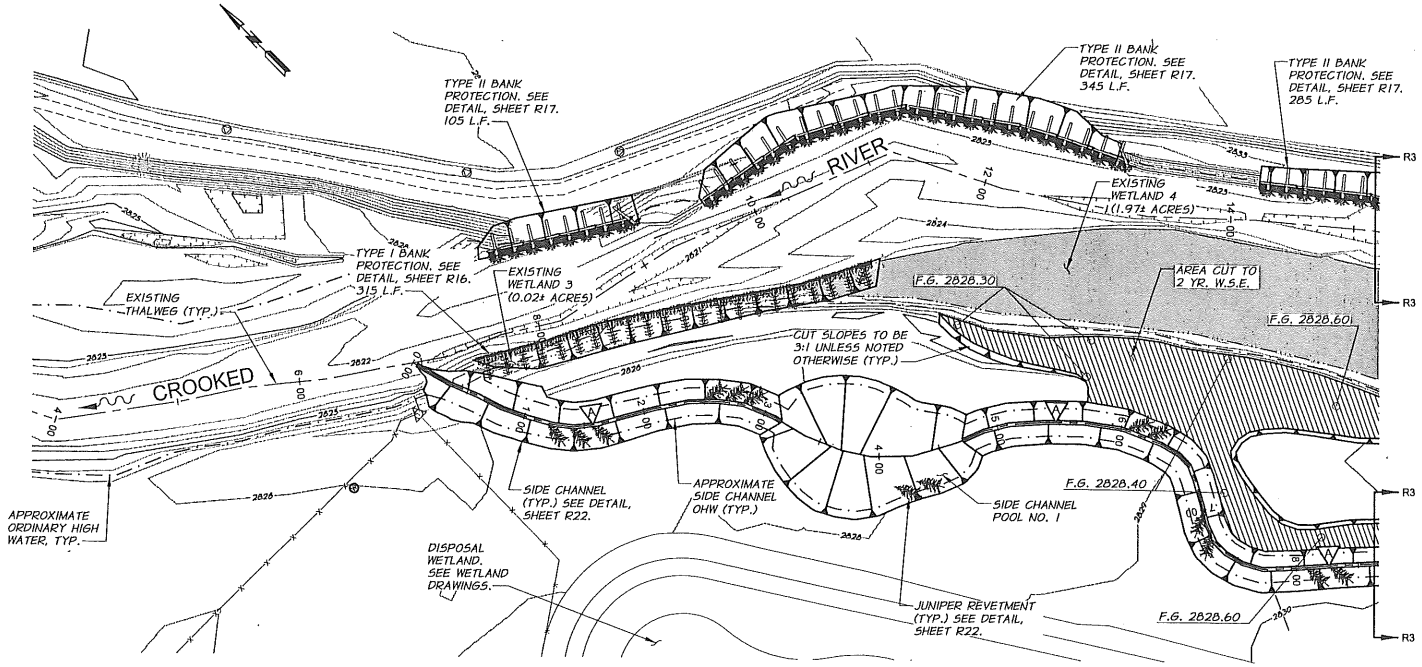

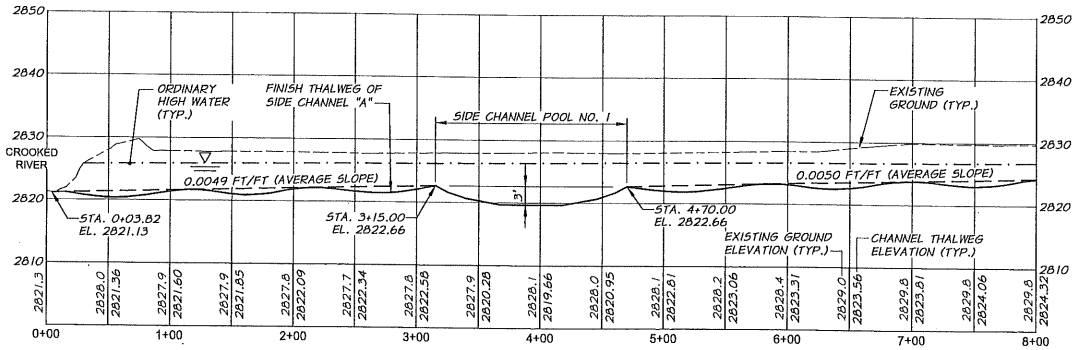

SIDE CHANNEL ▽ PROFILE

1"=50' HORZ.
1"=10' VERT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)

HORZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE: RiverPlansProfs.dwg

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CITY OF PRINEVILLE

WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
RIVER STA. 5+00 TO STA. 15+00

SHEET R2

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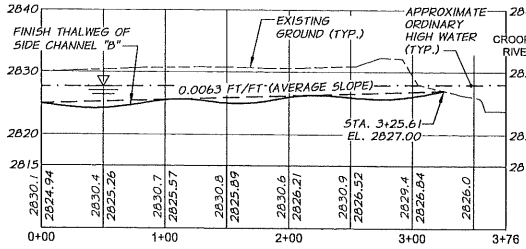

SIDE CHANNEL "B" PROFILE

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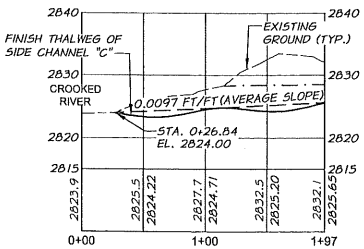
1"=10' VERT.



SIDE CHANNEL "C" PROFILE

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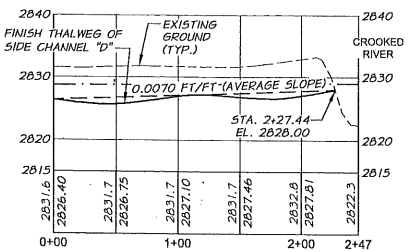
1"=10' VERT.



SIDE CHANNEL "D" PROFILE

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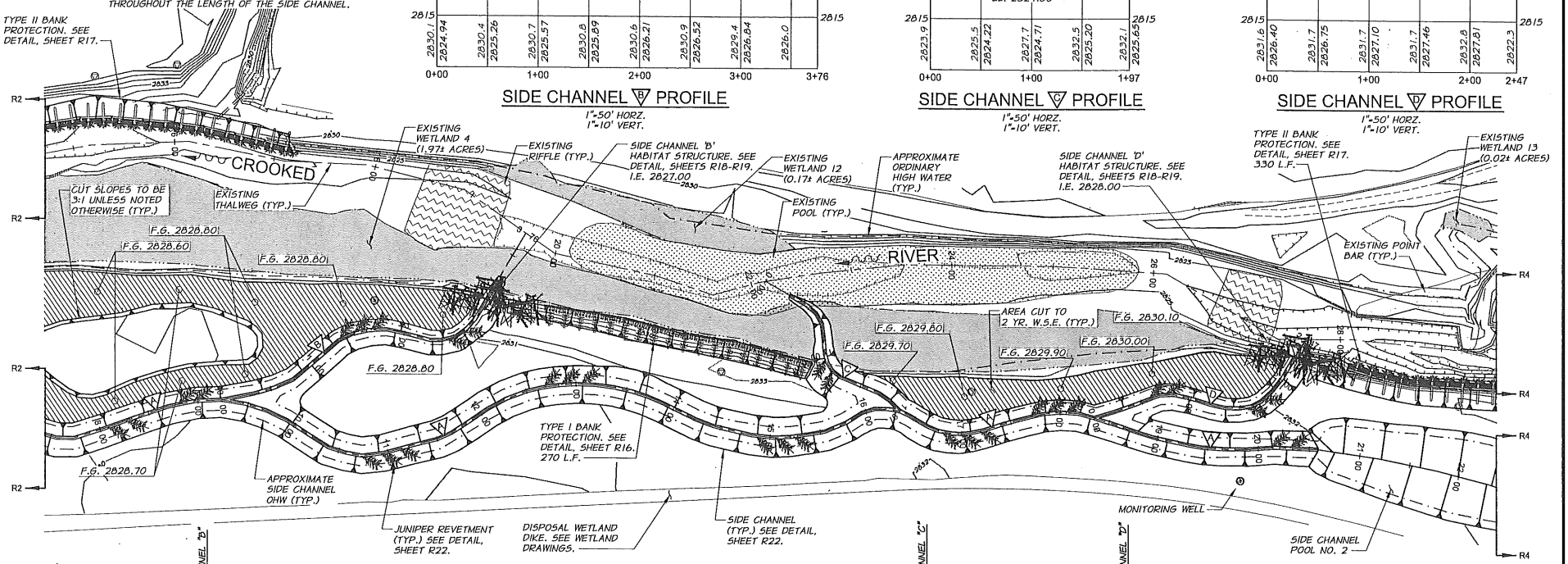
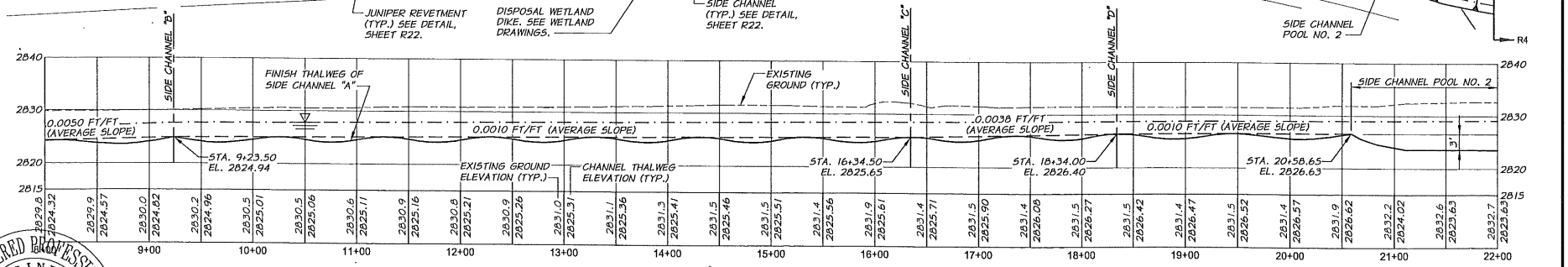
1"=10' VERT.





SIDE CHANNEL "A" PROFILE

1"=50' HORZ.
1"=10' VERT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)

HORZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE: RiverPlansProfs.dwg

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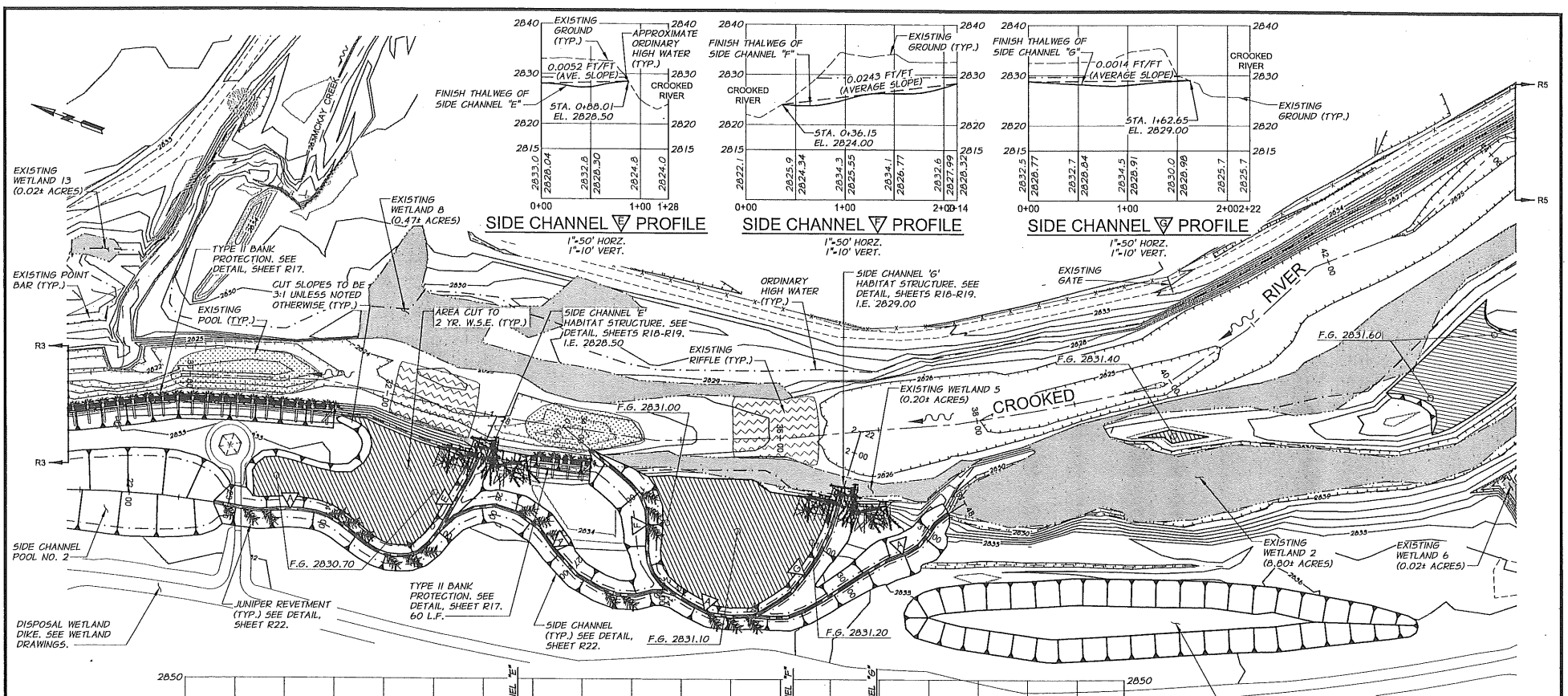
CITY OF PRINEVILLE

WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
RIVER STA. 15+00 TO STA. 29+00

SHEET R3

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverPlansProfs.dwg, Plan II, 10/21/2015 4:00:46 PM, \\Jpprint64\HP 700M, DMC



NOTES

1. LOCATION OF WOODY MATERIAL, REVETMENTS, AND BANK PROTECTION SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS SHALL BE DETERMINED IN THE FIELD UNDER THE DIRECTION OF THE ENGINEER AT TIME OF CONSTRUCTION.
2. THE CONTRACTOR SHALL MAINTAIN AN AVERAGE SLOPE AS SHOWN ON THE SIDE CHANNEL PROFILES AND SHALL UNDULATE THE CHANNEL THALWEG 12" BELOW THE AVERAGE SLOPE PROFILE AS SHOWN THROUGHOUT THE LENGTH OF THE SIDE CHANNEL.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS
RENEWS 06-30-17
SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)
HORZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE: RiverPlansProfs.dwg

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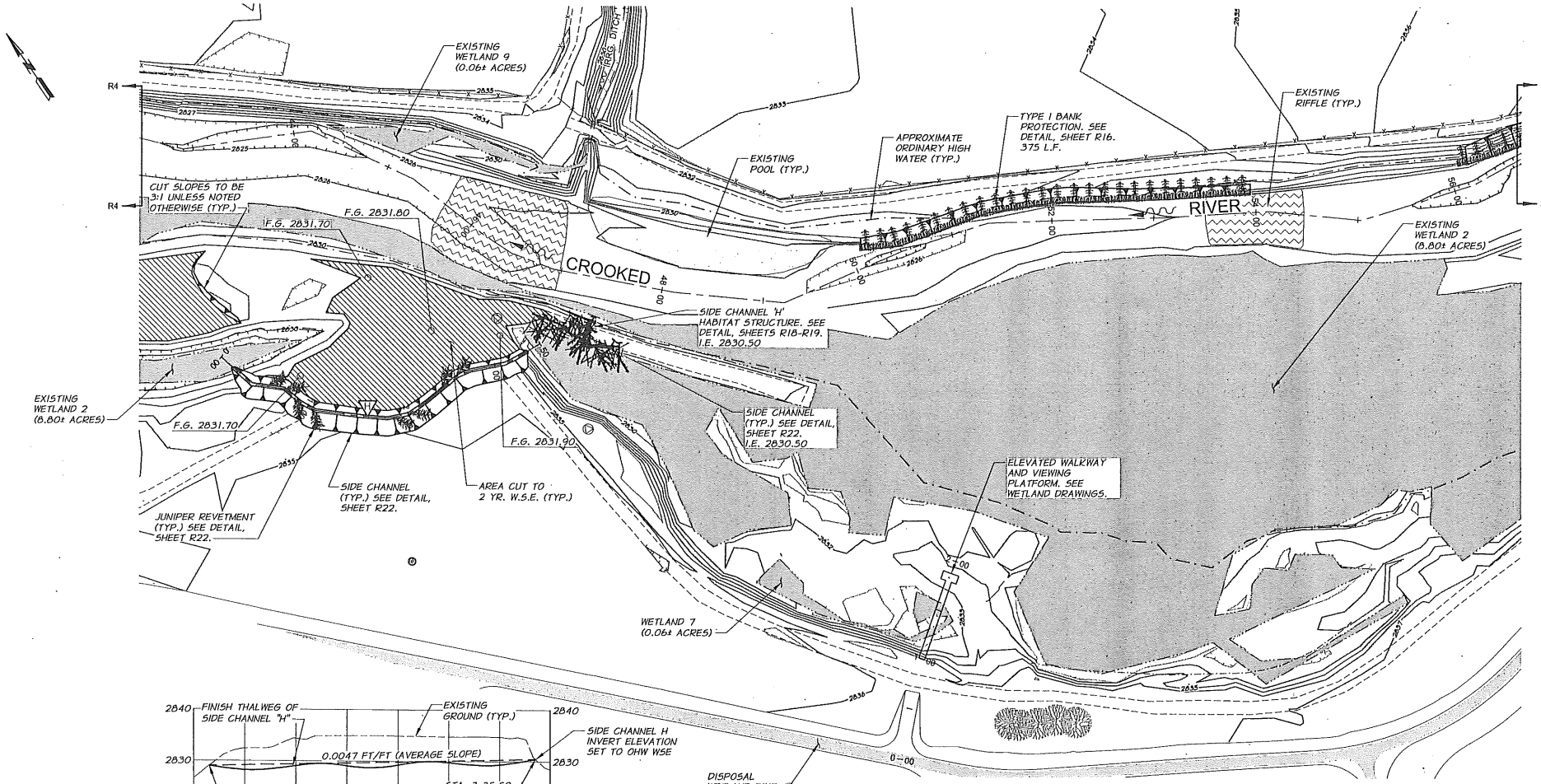
CITY OF PRINEVILLE

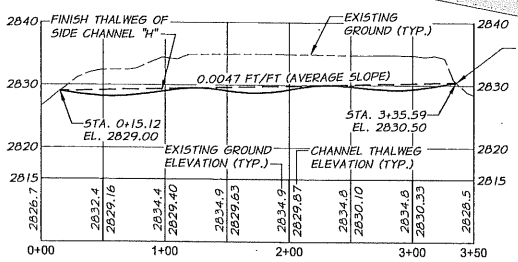
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
RIVER STA. 29+00 TO STA. 43+00

SHEET R4

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverPlansProfs.dwg, Plan III, 10/21/2015 4:01:18 PM, \\Jplprint64\HP 700M, DMC





SIDE CHANNEL H PROFILE

1"=50' HORZ.
1"=10' VERT.

NOTES

1. LOCATION OF WOODY MATERIAL, REVETMENTS, AND BANK PROTECTION SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS SHALL BE DETERMINED IN THE FIELD UNDER THE DIRECTION OF THE ENGINEER AT TIME OF CONSTRUCTION.
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REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS
RENEWS 06-30-17
SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET: 50 0 50 100 150
VERT. SCALE IN FEET: 10 0 10 20 30
HORZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE: RiverPlansProfs.dwg

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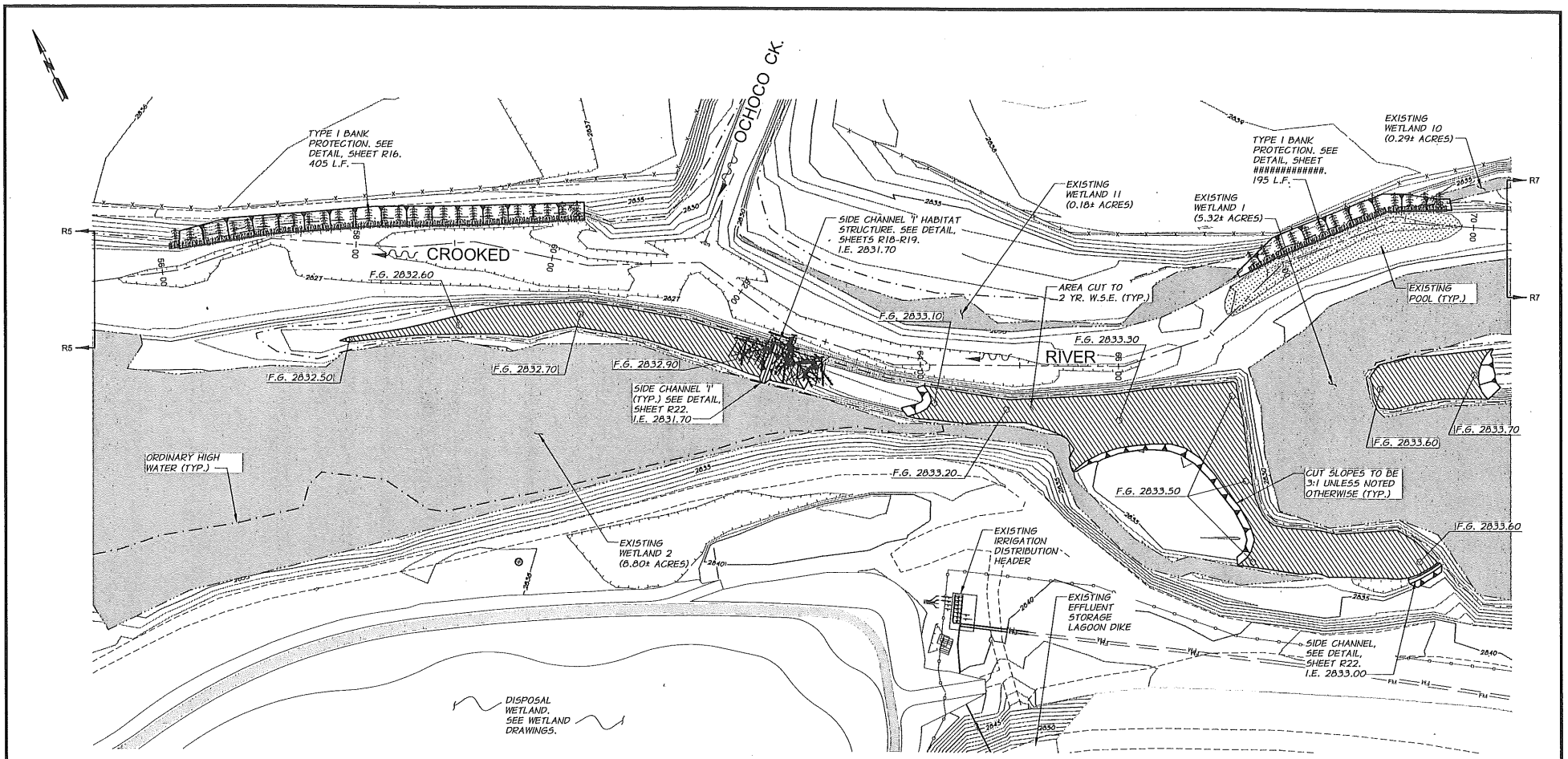
CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS
RIPARIAN IMPROVEMENTS
RIVER STA. 43+00 TO STA. 56+00

SHEET R5
63 OF 83

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverPlansProfs.dwg, Plan IV, 10/21/2015 4:01:41 PM, \\lgprint64\HP 700M, DMC



NOTES

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REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS
RENEWS 06-30-17
SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg

SCALE IN FEET: 50 0 50 100 150
HORIZ. SCALE 1"=50' VERT. SCALE
JOB NUMBER 1260-10 DATE 2015
ACAD FILE RiverPlansProfs.dwg

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CITY OF PRINEVILLE

WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
RIVER STA. 56+00 TO STA. 70+00

SHEET
R6

R:\PRINEV\LLE\1260-10_WW-WETLANDS\dwg\RiverPlansProfs.dwg, Plan V, 10/21/2015 4:01:57 PM, \\lgprint64\HP 700M, DMC

NOTES

1. LOCATION OF WOODY MATERIAL, REVETMENTS, AND BANK PROTECTION SHOWN ARE APPROXIMATE. ACTUAL LOCATIONS SHALL BE DETERMINED IN THE FIELD UNDER THE DIRECTION OF THE ENGINEER AT TIME OF CONSTRUCTION.

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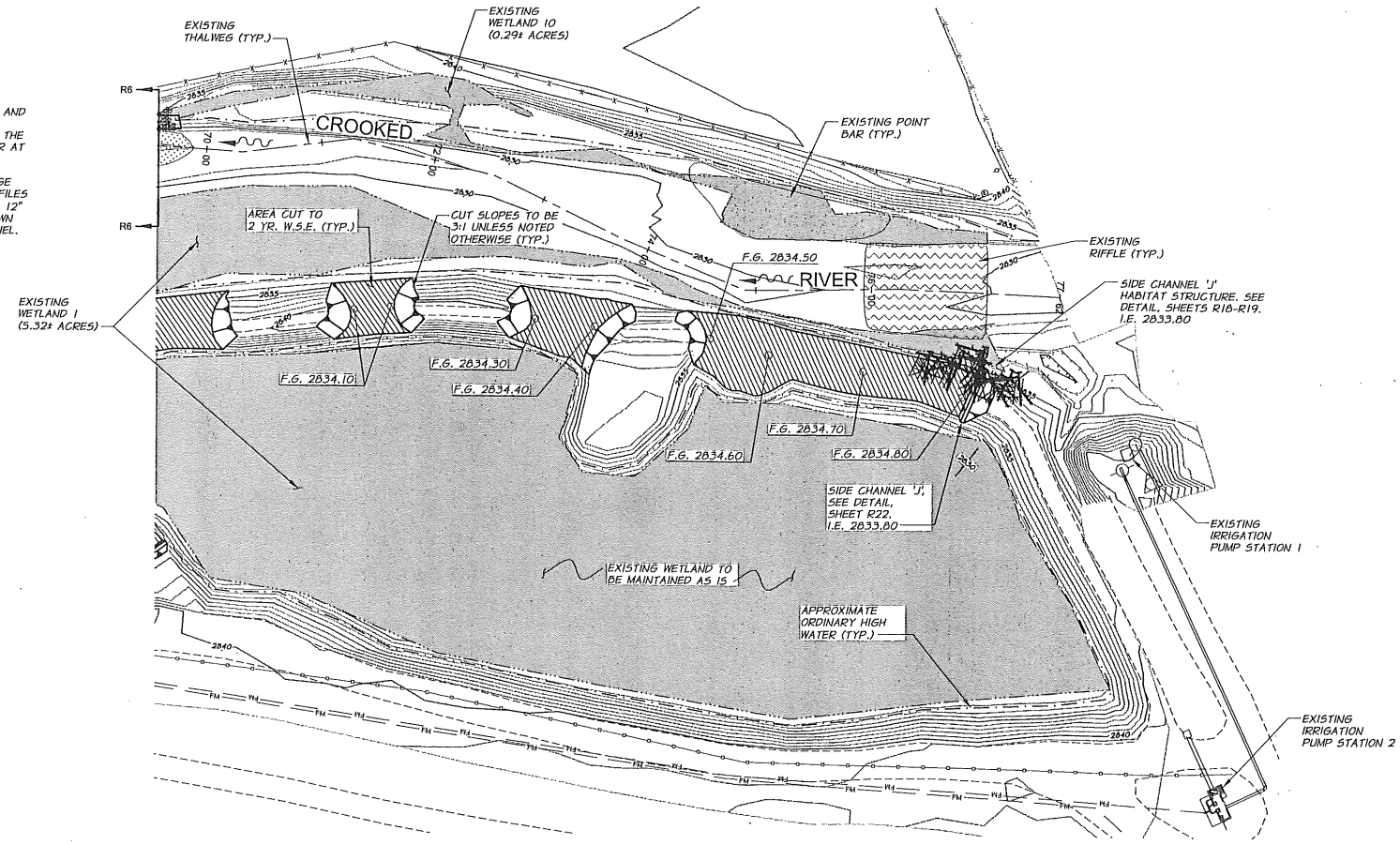

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

50 0 50 100 150
SCALE IN FEET

HORIZ. SCALE 1"=50' VERT. SCALE
JOB NUMBER 1260-10 DATE 2015
ACAD FILE: RiverPlansProfs.dwg

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CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
RIVER STA. 70+00 TO STA. 77+62

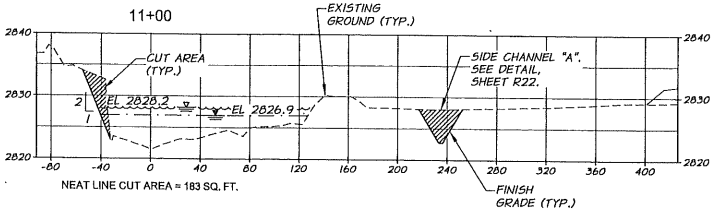
SHEET
R7
65 OF 83

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverPlansProfs.dwg, Plan VI, 10/21/2015 4:02:12 PM, \\lgprint64\HP 700M, DMC

NOTES

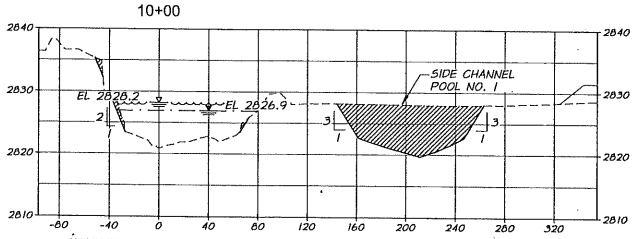
1. SEE SIDE CHANNEL PROFILES FOR SIDE CHANNEL THALWEG ELEVATIONS.
2. ALL CUT MATERIAL TO REMAIN ON SITE AND SHALL BE UTILIZED AS FILL IN THE CONSTRUCTION OF THE WETLANDS. SEE WETLAND DRAWINGS.
3. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
4. CROSS SECTION STATIONING REFERS TO CROOKED RIVER STATIONING SHOWN ON SHEETS R2-R7.
5. CROSS SECTIONS ARE CUT PERPENDICULAR TO THALWEG AT STATION INDICATED.

11+00



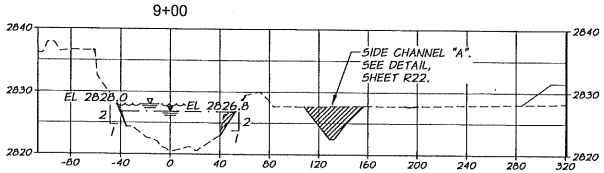
NEAT LINE CUT AREA = 183 SQ. FT.

10+00



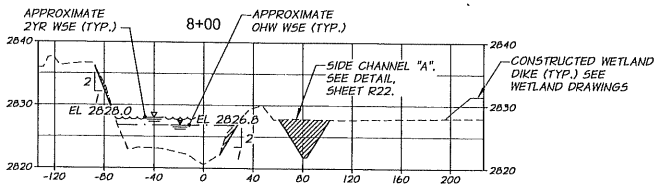
NEAT LINE CUT AREA = 710 SQ. FT.

9+00



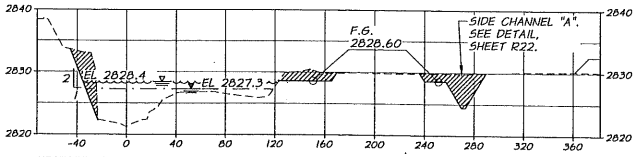
NEAT LINE CUT AREA = 156 SQ. FT.

8+00



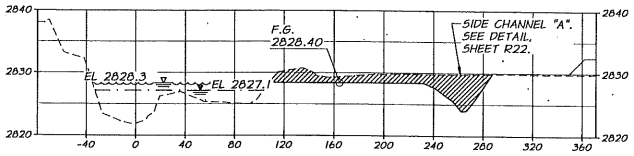
NEAT LINE CUT AREA = 158 SQ. FT.

15+00



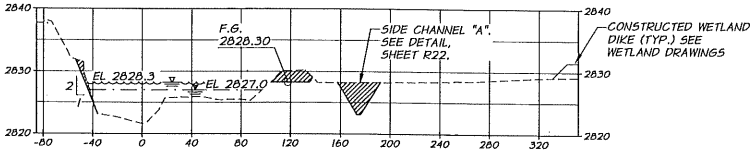
NEAT LINE CUT AREA = 288 SQ. FT.

14+00



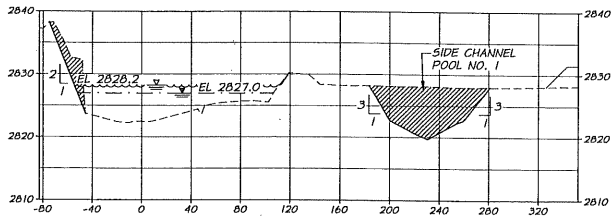
NEAT LINE CUT AREA = 358 SQ. FT.

13+00



NEAT LINE CUT AREA = 163 SQ. FT.

12+00



NEAT LINE CUT AREA = 605 SQ. FT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)

HORZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE RiverXsects.dwg

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CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
CROSS SECTIONS - STA. 8+00 TO STA. 15+00

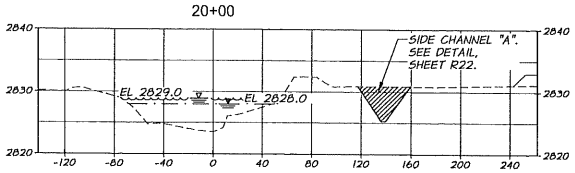
SHEET R8

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverXsects.dwg, XSECT 1, 10/21/2015 4:29:01 PM, \\lgprint64\HP 700M, DMC

NOTES

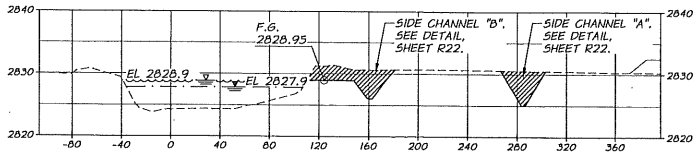
1. SEE SIDE CHANNEL PROFILES FOR SIDE CHANNEL THALWEG ELEVATIONS.
2. ALL CUT MATERIAL TO REMAIN ON SITE AND SHALL BE UTILIZED AS FILL IN THE CONSTRUCTION OF THE WETLANDS. SEE WETLAND DRAWINGS.
3. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
4. CROSS SECTION STATIONING REFERS TO CROOKED RIVER STATIONING SHOWN ON SHEETS R2-R7.
5. CROSS SECTIONS ARE CUT PERPENDICULAR TO THALWEG AT STATION INDICATED.

20+00



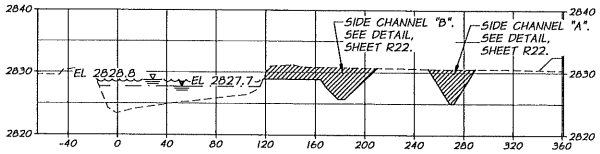
NEAT LINE CUT AREA = 128 SQ. FT.

19+00



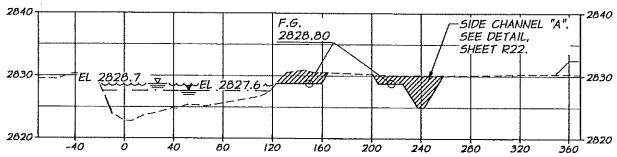
NEAT LINE CUT AREA = 275 SQ. FT.

18+00



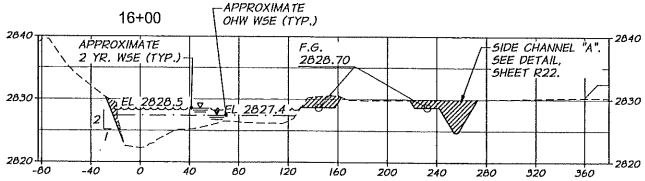
NEAT LINE CUT AREA = 352 SQ. FT.

17+00



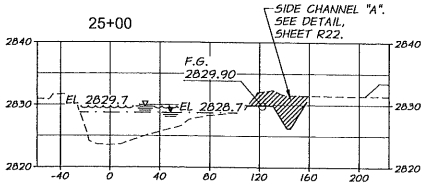
NEAT LINE CUT AREA = 201 SQ. FT.

16+00



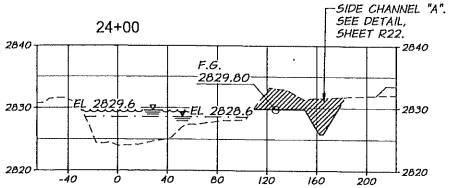
NEAT LINE CUT AREA = 189 SQ. FT.

25+00



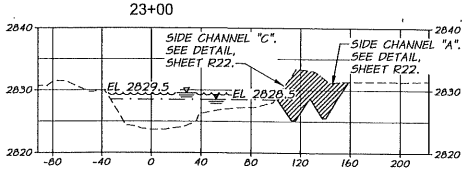
NEAT LINE CUT AREA = 139 SQ. FT.

24+00



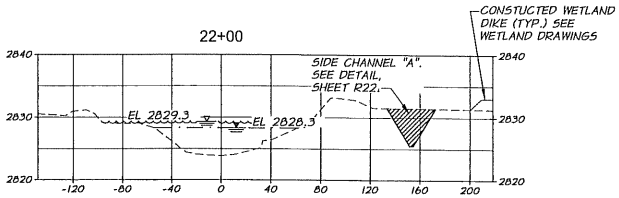
NEAT LINE CUT AREA = 214 SQ. FT.

23+00



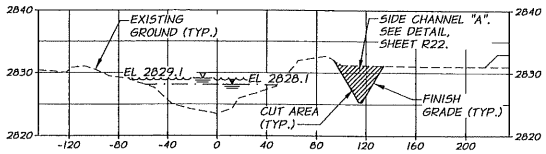
NEAT LINE CUT AREA = 267 SQ. FT.

22+00



NEAT LINE CUT AREA = 124 SQ. FT.

21+00



NEAT LINE CUT AREA = 119 SQ. FT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)

HORZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE RiverXsects.dwg

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CITY OF PRINEVILLE

WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
CROSS SECTIONS - STA. 16+00 TO STA. 25+00

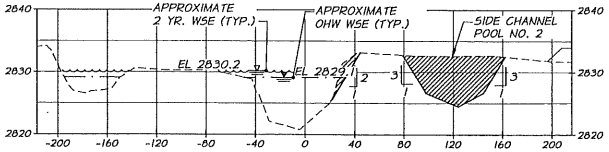
SHEET R9

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverXsects.dwg, XSECT II, 10/21/2015 4:29:08 PM, \\lgprint64\HP 700M, DMC

NOTES

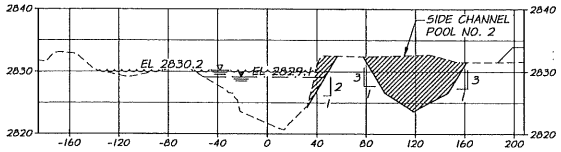
1. SEE SIDE CHANNEL PROFILES FOR SIDE CHANNEL THALWEG ELEVATIONS.
2. ALL CUT MATERIAL TO REMAIN ON SITE AND SHALL BE UTILIZED AS FILL IN THE CONSTRUCTION OF THE WETLANDS. SEE WETLAND DRAWINGS.
3. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
4. CROSS SECTION STATIONING REFERS TO CROOKED RIVER STATIONING SHOWN ON SHEETS R2-R7.
5. CROSS SECTIONS ARE CUT PERPENDICULAR TO THALWEG AT STATION INDICATED.

30+00



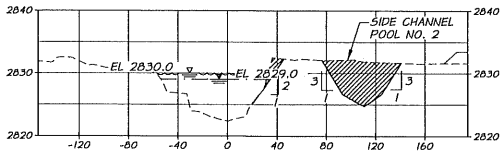
NEAT LINE CUT AREA = 477 SQ. FT.

29+00



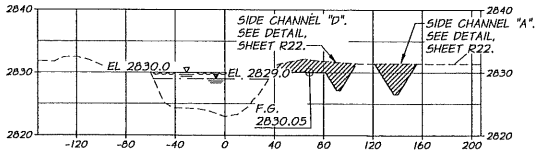
NEAT LINE CUT AREA = 528 SQ. FT.

28+00



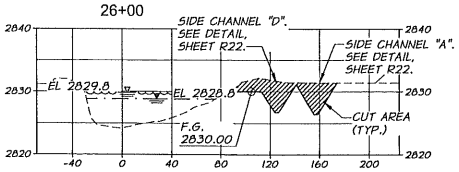
NEAT LINE CUT AREA = 309 SQ. FT.

27+00



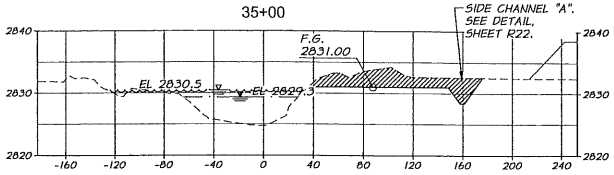
NEAT LINE CUT AREA = 238 SQ. FT.

26+00



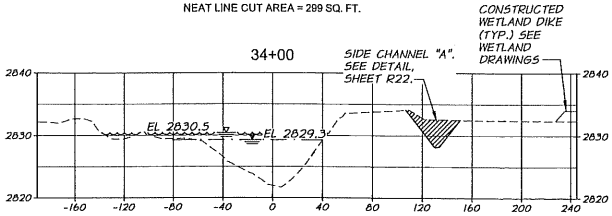
NEAT LINE CUT AREA = 218 SQ. FT.

35+00



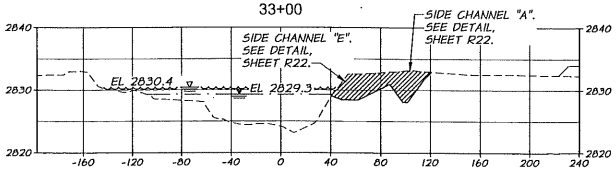
NEAT LINE CUT AREA = 299 SQ. FT.

34+00



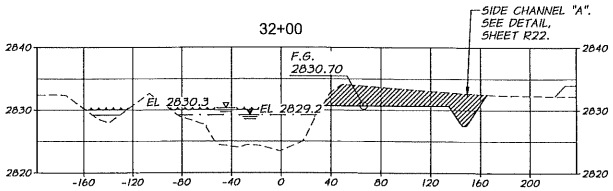
NEAT LINE CUT AREA = 101 SQ. FT.

33+00



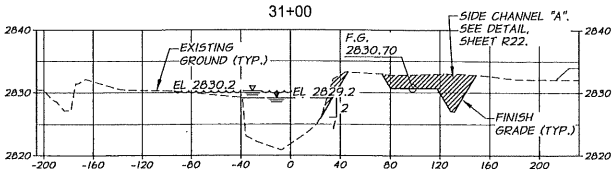
NEAT LINE CUT AREA = 242 SQ. FT.

32+00



NEAT LINE CUT AREA = 371 SQ. FT.

31+00



NEAT LINE CUT AREA = 234 SQ. FT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)

HORIZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE: RiverXsects.dwg

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CITY OF PRINEVILLE

WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
CROSS SECTIONS - STA. 26+00 TO STA. 35+00

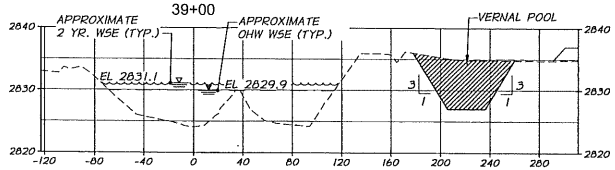
SHEET R10

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverXsects.dwg, XSECT III, 10/21/2015 4:29:14 PM, \\lgprint64\HP 700M, DMC

NOTES

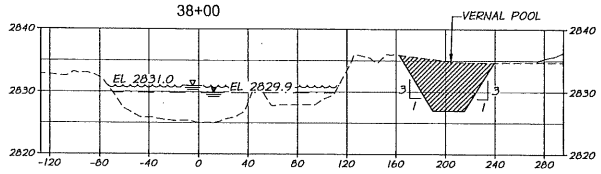
1. SEE SIDE CHANNEL PROFILES FOR SIDE CHANNEL THALWEG ELEVATIONS.
2. ALL CUT MATERIAL TO REMAIN ON SITE AND SHALL BE UTILIZED AS FILL IN THE CONSTRUCTION OF THE WETLANDS. SEE WETLAND DRAWINGS.
3. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
4. CROSS SECTION STATIONING REFERS TO CROOKED RIVER STATIONING SHOWN ON SHEETS R2-R7.
5. CROSS SECTIONS ARE CUT PERPENDICULAR TO THALWEG AT STATION INDICATED.

39+00



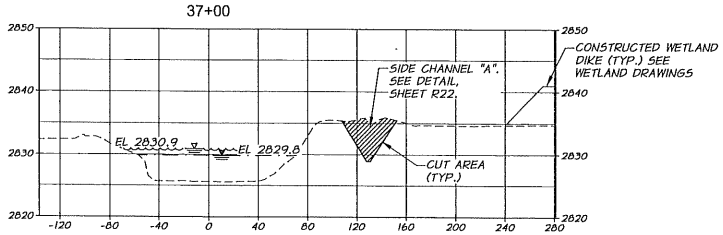
NEAT LINE CUT AREA = 446 SQ. FT.

38+00



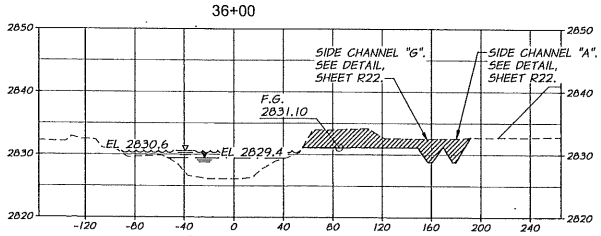
NEAT LINE CUT AREA = 407 SQ. FT.

37+00



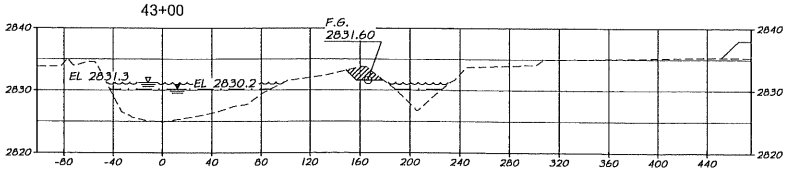
NEAT LINE CUT AREA = 158 SQ. FT.

36+00



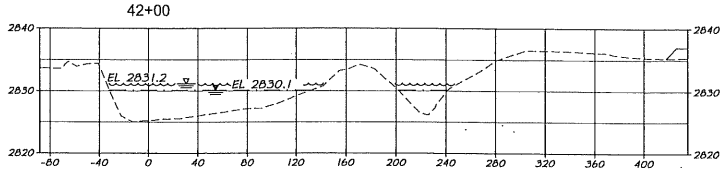
NEAT LINE CUT AREA = 321 SQ. FT.

43+00



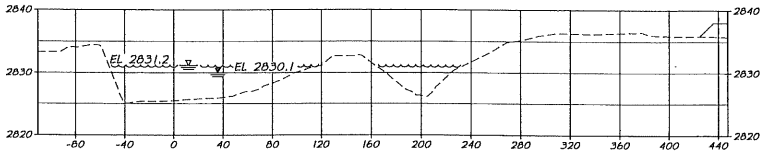
NEAT LINE CUT AREA = 40 SQ. FT.

42+00



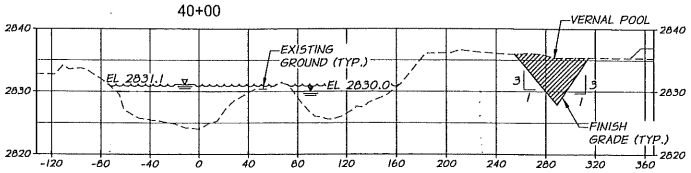
NEAT LINE CUT AREA = 0 SQ. FT.

41+00



NEAT LINE CUT AREA = 0 SQ. FT.

40+00



NEAT LINE CUT AREA = 231 SQ. FT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)
HORZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE: RiverXsects.dwg

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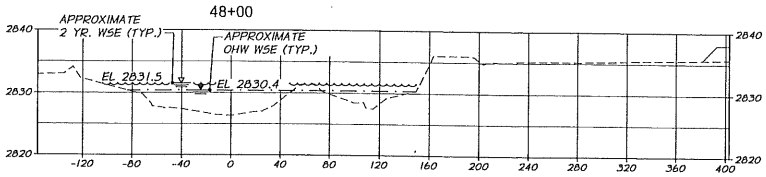
LA GRANDE, OR. WALLA WALLA, WA. PRINEVILLE, OR.

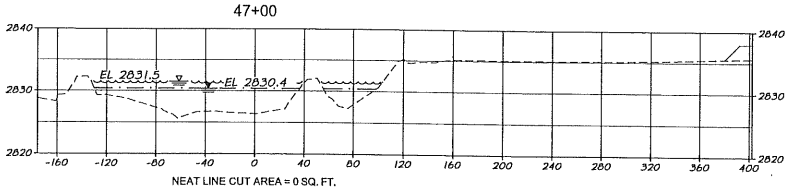
CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

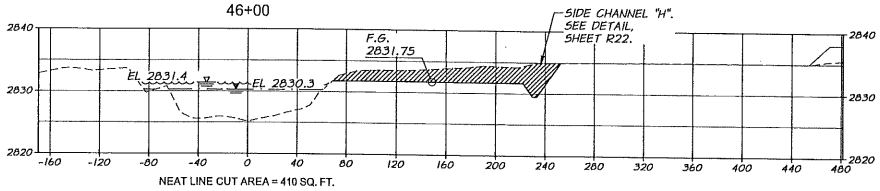
RIPARIAN IMPROVEMENTS
CROSS SECTIONS - STA. 36+00 TO STA. 43+00

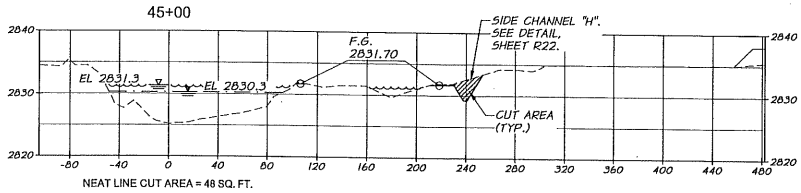
SHEET R11

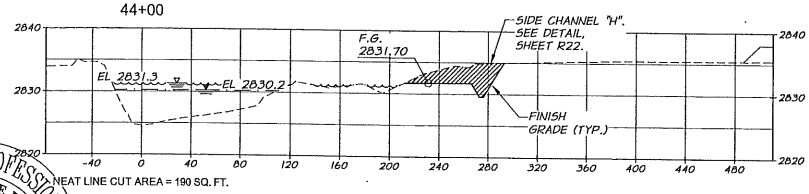
R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverXsects.dwg, XSECT IV, 10/21/2015 4:29:21 PM, \\lgprint64\HP 700M, DMC





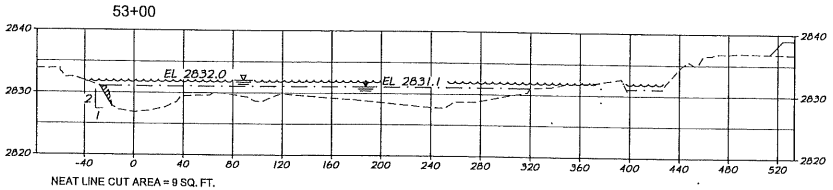


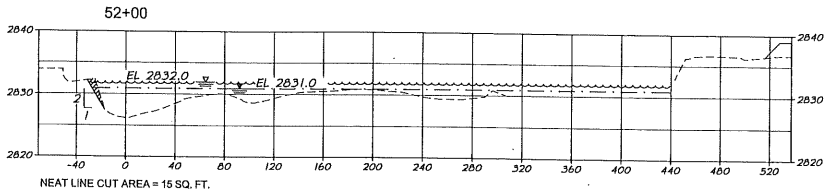


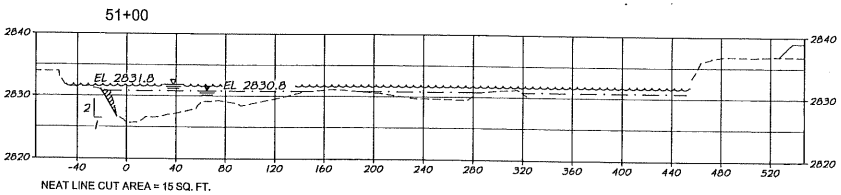


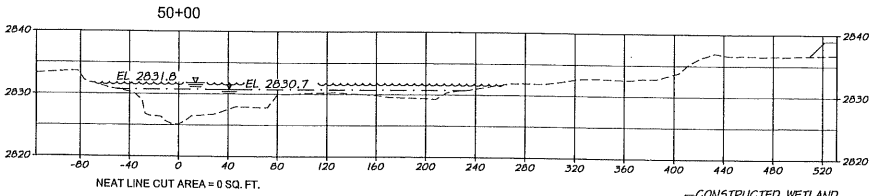
NOTES

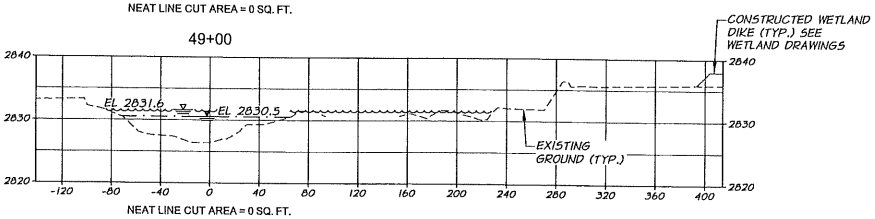
1. SEE SIDE CHANNEL PROFILES FOR SIDE CHANNEL THALWEG ELEVATIONS.
2. ALL CUT MATERIAL TO REMAIN ON SITE AND SHALL BE UTILIZED AS FILL IN THE CONSTRUCTION OF THE WETLANDS. SEE WETLAND DRAWINGS.
3. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
4. CROSS SECTION STATIONING REFERS TO CROOKED RIVER STATIONING SHOWN ON SHEETS R2-R7.
5. CROSS SECTIONS ARE CUT PERPENDICULAR TO THALWEG AT STATION INDICATED.











REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)

HORZ. SCALE 1"=50' VERT. SCALE 1"=10'
JOB NUMBER 1260-10 DATE 2015
ACAD FILE: RiverXsects.dwg

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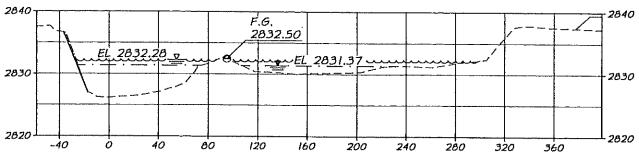
CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
CROSS SECTIONS - STA. 44+00 TO STA. 53+00

SHEET R12

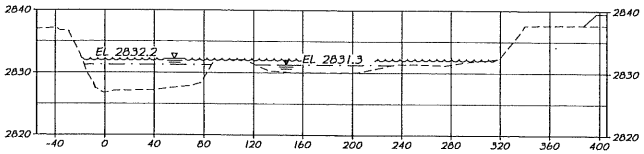
R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverXsects.dwg, XSECT V, 10/21/2015 4:29:28 PM, \\lgprint64\HP 700M, DMC

58+00



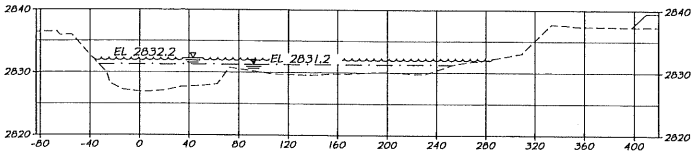
NEAT LINE CUT AREA = 10 SQ. FT.

57+00



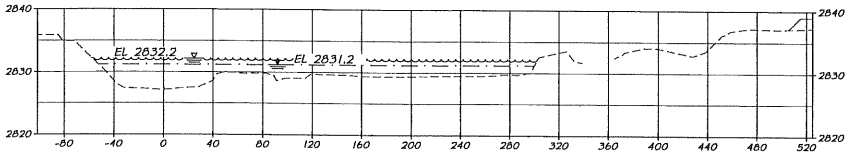
NEAT LINE CUT AREA = 0 SQ. FT.

56+00



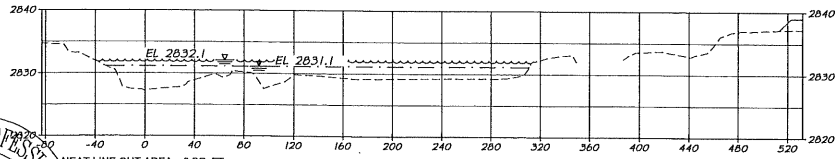
NEAT LINE CUT AREA = 0 SQ. FT.

55+00



NEAT LINE CUT AREA = 0 SQ. FT.

54+00

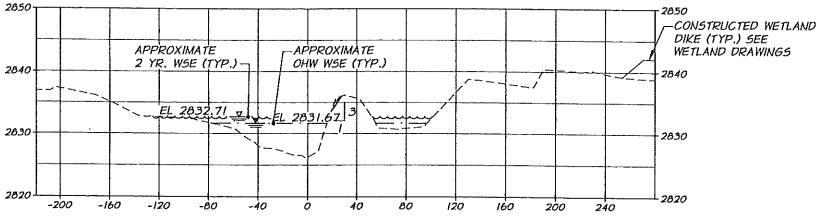


NEAT LINE CUT AREA = 0 SQ. FT.

NOTES

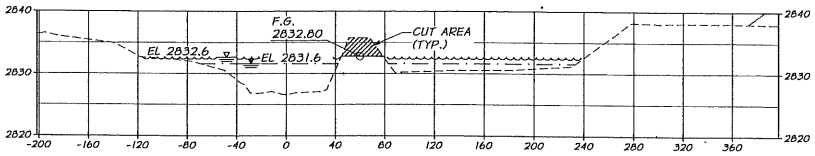
1. SEE SIDE CHANNEL PROFILES FOR SIDE CHANNEL THALWEG ELEVATIONS.
2. ALL CUT MATERIAL TO REMAIN ON SITE AND SHALL BE UTILIZED AS FILL IN THE CONSTRUCTION OF THE WETLANDS. SEE WETLAND DRAWINGS.
3. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
4. CROSS SECTION STATIONING REFERS TO CROOKED RIVER STATIONING SHOWN ON SHEETS R2-R7.
5. CROSS SECTIONS ARE CUT PERPENDICULAR TO THALWEG AT STATION INDICATED.

63+00



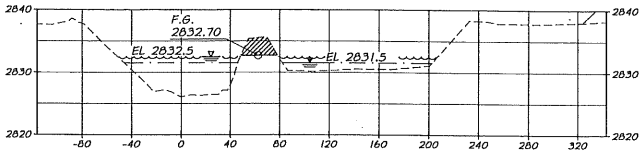
NEAT LINE CUT AREA = 5 SQ. FT.

62+00



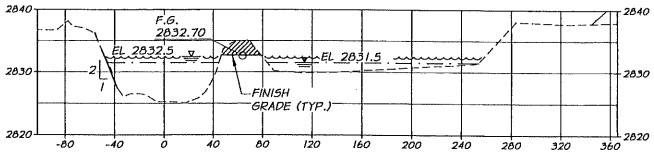
NEAT LINE CUT AREA = 75 SQ. FT.

61+00



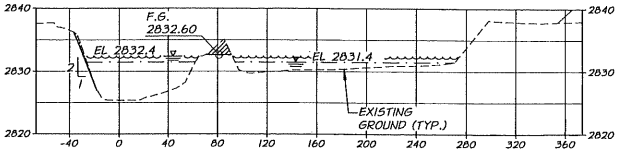
NEAT LINE CUT AREA = 62 SQ. FT.

60+00



NEAT LINE CUT AREA = 53 SQ. FT.

59+00



NEAT LINE CUT AREA = 34 SQ. FT.

REGISTERED PROFESSIONAL ENGINEER
83517PE
OREGON
NOV. 10, 2009
CHAS B. HUTCHINS
RENEWS 06-30-17
SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg

HORZ. SCALE 1"=50'
VERT. SCALE 1"=10'
JOB NUMBER 1260-10
DATE 2015
ACAD FILE RiverXsects.dwg

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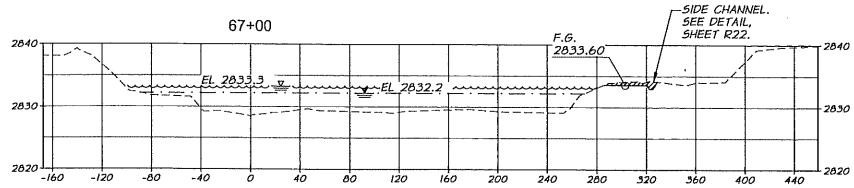
CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

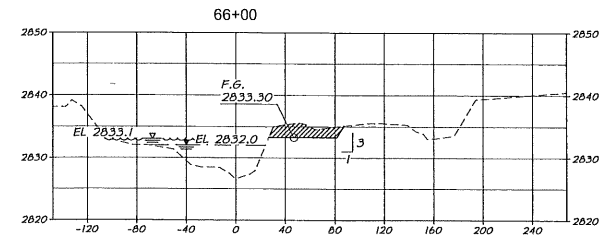
RIPARIAN IMPROVEMENTS
CROSS SECTIONS - STA. 54+00 TO STA. 63+00

SHEET
R13
71 OF 83

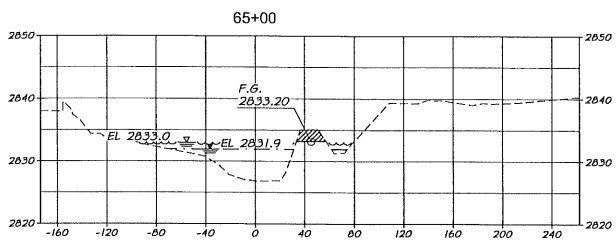
R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverXsects.dwg, XSECT V1, 10/21/2015 4:29:36 PM, \\lgprint64\HP 700M, DMC



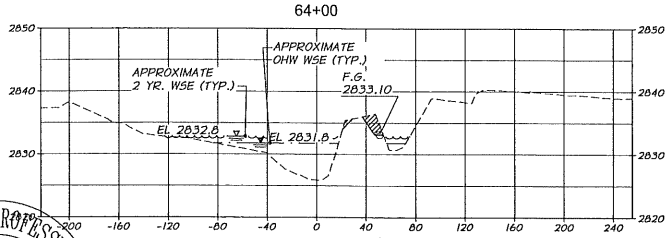
NEAT LINE CUT AREA = 22 SQ. FT.



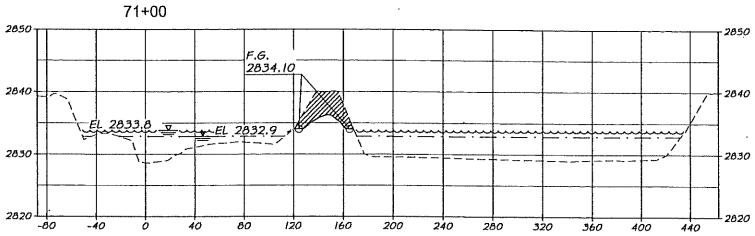
NEAT LINE CUT AREA = 101 SQ. FT.



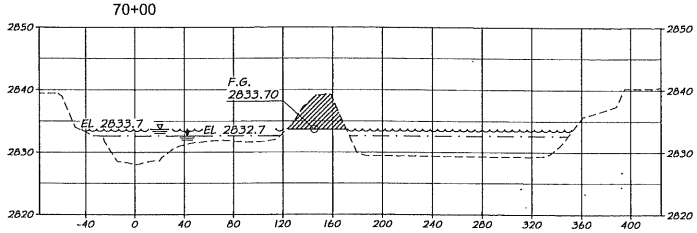
NEAT LINE CUT AREA = 36 SQ. FT.



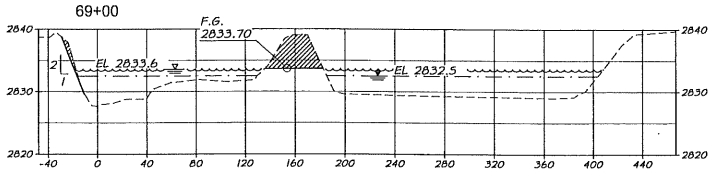
NEAT LINE CUT AREA = 158 SQ. FT.



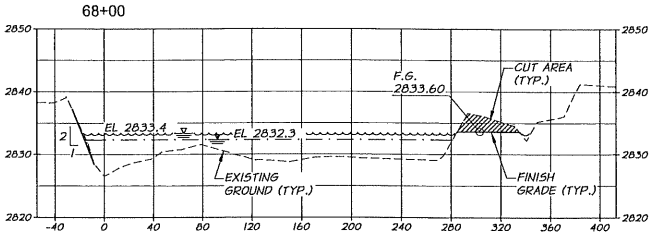
NEAT LINE CUT AREA = 158 SQ. FT.



NEAT LINE CUT AREA = 158 SQ. FT.



NEAT LINE CUT AREA = 158 SQ. FT.



NEAT LINE CUT AREA = 158 SQ. FT.

NOTES

1. SEE SIDE CHANNEL PROFILES FOR SIDE CHANNEL THALWEG ELEVATIONS.
2. ALL CUT MATERIAL TO REMAIN ON SITE AND SHALL BE UTILIZED AS FILL IN THE CONSTRUCTION OF THE WETLANDS. SEE WETLAND DRAWINGS.
3. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
4. CROSS SECTION STATIONING REFERS TO CROOKED RIVER STATIONING SHOWN ON SHEETS R2-R7.
5. CROSS SECTIONS ARE CUT PERPENDICULAR TO THALWEG AT STATION INDICATED.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE
DESIGNED BY C. HUTCHINS	XREFS: TB-Prineville.dwg	
DRAWN BY D. CHRISTMAN		
REVIEWED BY B. MOORE		

HORZ. SCALE IN FEET 50 0 50 100 150

VERT. SCALE IN FEET 10 0 10 20 30

HORZ. SCALE 1"=50' VERT. SCALE 1"=10'

JOB NUMBER 1260-10 DATE 2015

ACAD FILE: RiverXsects.dwg

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CITY OF PRINEVILLE

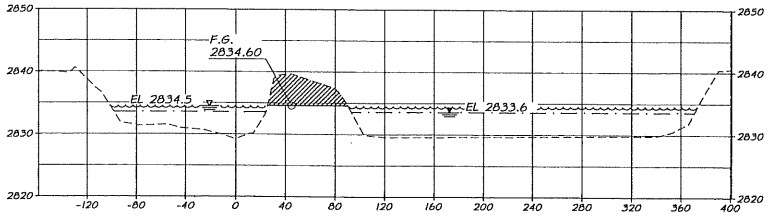
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
CROSS SECTIONS - STA. 64+00 TO STA. 71+00

SHEET **R14**

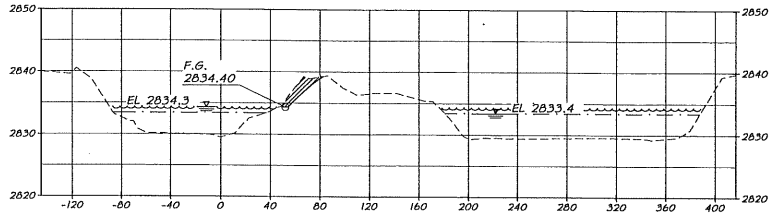
R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverXsects.dwg, XSECT VII, 10/21/2015 4:29:42 PM, \\lgprint64\HP 700M, DMC

75+00



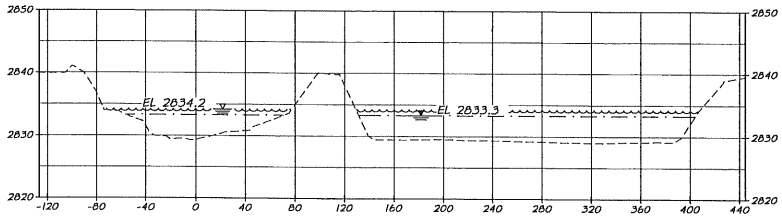
NEAT LINE CUT AREA = 232 SQ. FT.

74+00



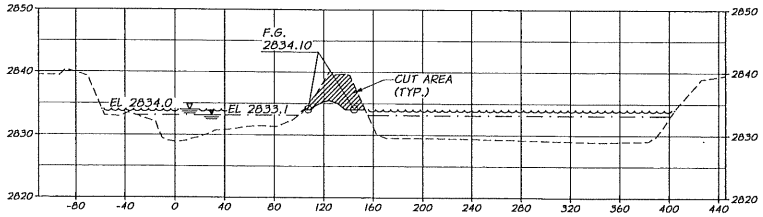
NEAT LINE CUT AREA = 45 SQ. FT.

73+00



NEAT LINE CUT AREA = 0 SQ. FT.

72+00

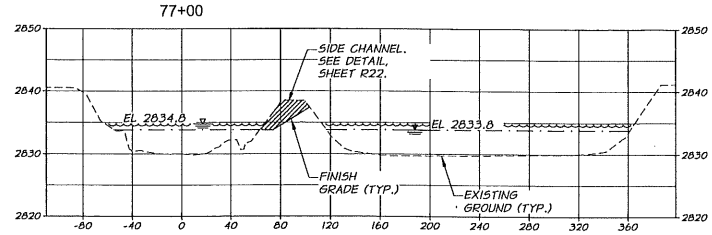


NEAT LINE CUT AREA = 160 SQ. FT.

NOTES

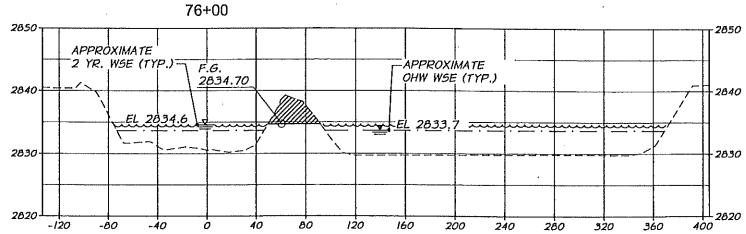
1. SEE SIDE CHANNEL PROFILES FOR SIDE CHANNEL THALWEG ELEVATIONS.
2. ALL CUT MATERIAL TO REMAIN ON SITE AND SHALL BE UTILIZED AS FILL IN THE CONSTRUCTION OF THE WETLANDS. SEE WETLAND DRAWINGS.
3. CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM.
4. CROSS SECTION STATIONING REFERS TO CROOKED RIVER STATIONING SHOWN ON SHEETS R2-R7.
5. CROSS SECTIONS ARE CUT PERPENDICULAR TO THALWEG AT STATION INDICATED.

77+00



NEAT LINE CUT AREA = 90 SQ. FT.

76+00



NEAT LINE CUT AREA = 114 SQ. FT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORZ. SCALE IN FEET (50 0 50 100 150)
VERT. SCALE IN FEET (10 0 10 20 30)

HORZ. SCALE 1"=50' | VERT. SCALE 1"=10'
JOB NUMBER 1260-10 | DATE 2015
ACAD FILE: RiverXsects.dwg

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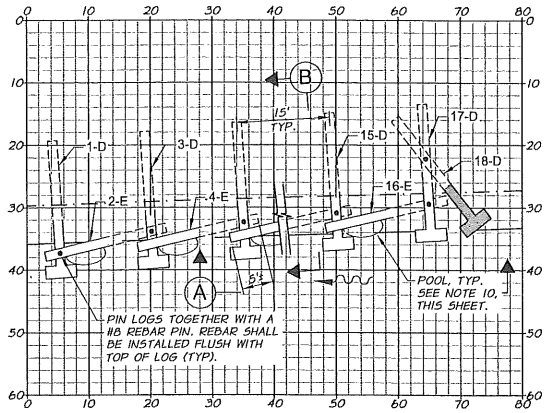
CITY OF PRINEVILLE

WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
CROSS SECTIONS - STA. 72+00 TO STA. 77+00

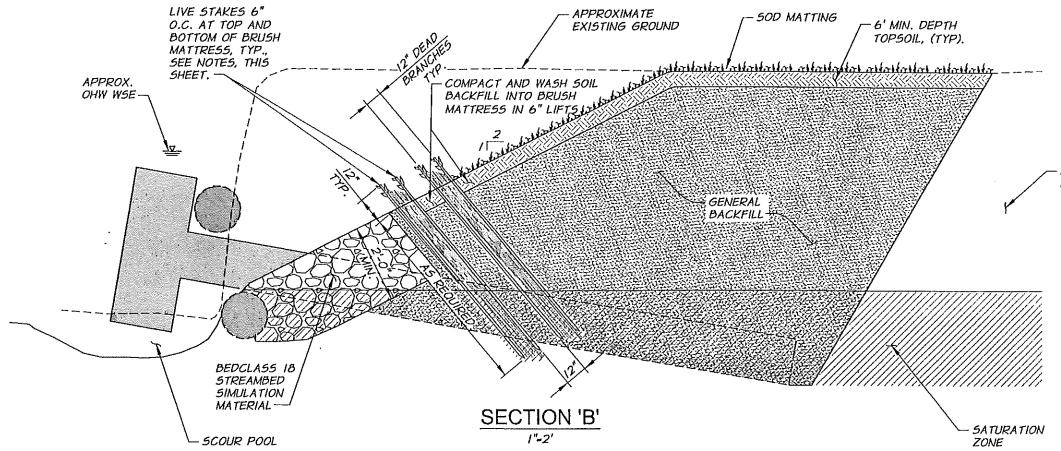
SHEET
R15
73 OF 83

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverXsects.dwg, XSECT VIII, 10/21/2015 4:29:49 PM, \\lgprint64\HP 700M, DMC



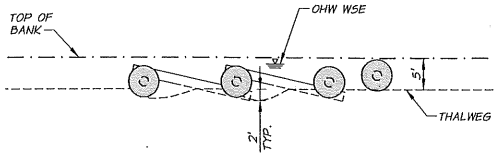
TYPE I BANK PROTECTON PLAN

1"=10'



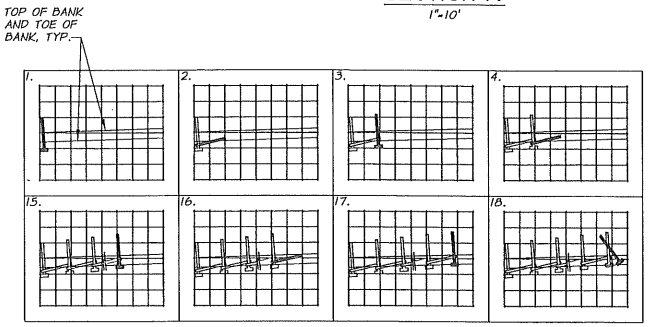
SECTION 'B'

1"=2'



SECTION 'A'

1"=10'



NOTE: REPEAT STEPS 3-4 UNTIL REACHING THE UPSTREAM END OF THE HABITAT STRUCTURE.

TYPE I BANK PROTECTION LOG PLACEMENT SEQUENCING

1"=40'

BRUSH MATTRESS CONSTRUCTION NOTES

1. BRUSH MATTRESS SHALL BE COMPOSED OF A 12 INCH LAYER OF DEAD BRANCHES OF NATIVE, NON-INVASIVE PLANTS PLACED BETWEEN TWO LAYERS OF LIVE CUTTINGS OF SALIX EXIGUA (COYOTE WILLOW), SALIX PROLIXA (MACKENZIE WILLOW), RED-OSIER DOGWOOD (CORNUS SERICEA), AND BLACK COTTONWOOD (POPULUS BALSAMIFERA).
2. LIVE CUTTINGS SHALL BE 3/4 TO 2 INCHES IN DIAMETER AND A MINIMUM OF 4 FEET LONG. SIDE BRANCHES MAY BE LEFT INTACT. THE MATERIAL SHALL BE FREE OF DISEASE, ROT, OR INSECT INFESTATION.
3. A TRENCH SHALL BE EXCAVATED AT LOCATION IDENTIFIED IN THESE PLANS TO 3 FEET MINIMUM BELOW FINISH GRADE.
4. LIVE CUTTINGS SHALL BE PLACED EVERY 6 INCHES FOR THE ENTIRE LENGTH OF TRENCH. LIVE CUTTINGS SHALL BE INSTALLED WITH BUDS ORIENTED UPWARD
5. DEAD BRANCHES SHALL BE PLACED UNIFORMLY ALONG THE TRENCH ON TOP OF THE LIVE CUTTINGS TO A COMRESSED DEPTH OF 12 INCHES.
6. A TOP LAYER OF LIVE CUTTINGS SHALL BE PLACED EVERY 6 INCHES ALONG THE LENGTH OF THE BRUSH MATTRESS. LIVE CUTTINGS SHALL BE INSTALLED WITH BUDS ORIENTED UPWARD.
7. SOIL SHALL BE BACKFILLED IN SIX INCH LIFTS. THE FIRST LIFT SHALL BE WASHED INTO THE BRUSH MAT WITH WATER TO ELIMINATE VOIDS. SUPPLEMENTAL LIFTS SHALL BE COMPACTED.

TYPE I BANK PROTECTION MATERIAL SCHEDULE

LOG	DESCRIPTION	TOTAL QTY. FOR 1560 L.F. IN 5 LOCATIONS
LOG TYPE D	20 FT. X 16"-18" DBH W/ 5' DIA. RW	114
LOG TYPE E	20 FT. X 16"-18" DBH W/O RW	104
RACKING MATERIAL C	10-20 FT. X 6"-10" DBH	104*
REBAR PIN	#8	114

* IN ADDITION TO THE RACKING MATERIAL, THE CONTRACTOR SHALL IMPORT THE TOPS AND LIMBS OF THE LOG TYPES D, AND E, AND USE THIS AS SLASH.

CONSTRUCTION NOTES

1. CONTRACTOR SHALL BACKFILL AROUND LOGS WITH A COMBINATION OF GENERAL BACKFILL AND RACKING MATERIAL.
2. PROVIDE RACKING MATERIAL BETWEEN EACH LAYER AS DIRECTED BY THE ENGINEER.
3. CONTRACTOR SHALL APPLY WATER TO THE BACKFILL PERIODICALLY FOR COMPACTION AND TO FORCE MATERIAL INTO VOIDS.
4. FOR ALL LOGS KEYED INTO BANKS MORE THAN TWO THIRDS OF THE LENGTH MUST BE BURIED.
5. TOP OF BACKFILL AREA SHALL BE COVERED WITH TOPSOIL WITH A MINIMUM THICKNESS OF 6".
6. FINAL INSTALLATION OF THE TYPE I BANK PROTECTION SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
7. DETAILS SHOWN ARE FOR RIVER RIGHT SITUATION. RIVER LEFT INSTALLATION TO BE MIRRORED.
8. AT REBAR PIN LOCATIONS, THE CONTRACTOR SHALL DRILL A PILOT HOLE APPROXIMATELY 7/8" DIAMETER. THE PIN SHALL BE DRIVEN THROUGH THE HOLE FITTING SNUGLY AND LEAVING NO VOID SPACE BETWEEN THE PIN AND THE PILOT HOLE.
9. ALL SAWCUT ENDS OF LOGS SHALL BE CHEWED OR FRAYED PRIOR TO PLACEMENT.
10. CONTRACTOR SHALL EXCAVATE POOLS SHOWN UNDER THE DIRECTION OF THE ENGINEER.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY R.RASMUSSEN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

HORIZ. SCALE SEE ABOVE
VERT. SCALE
JOB NUMBER 1260-10
DATE 2015
ACAD FILE type I bnk prt det.dwg

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WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
TYPE I BANK PROTECTION

SHEET R16

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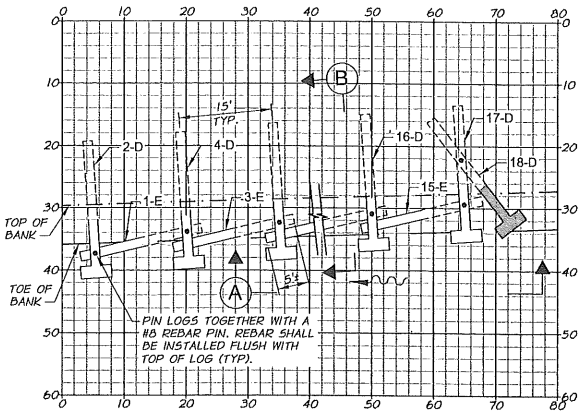
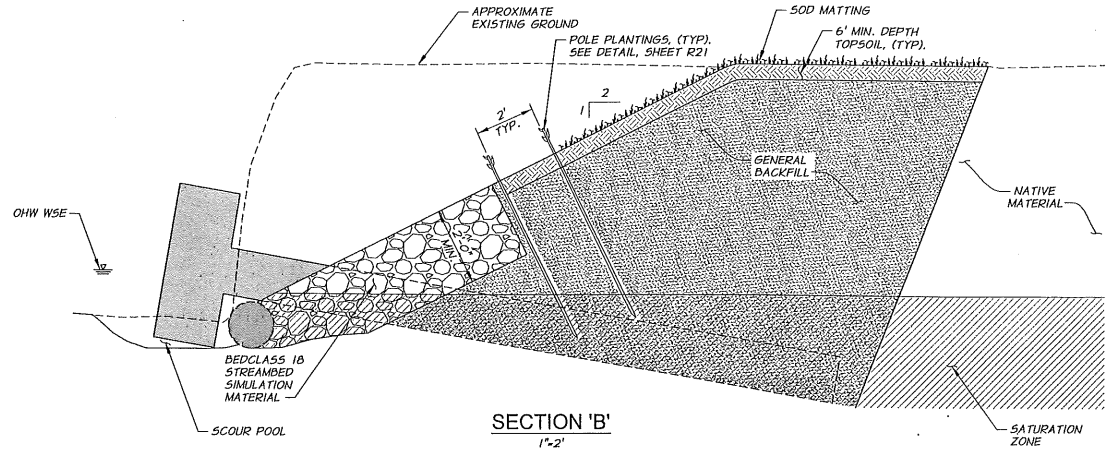


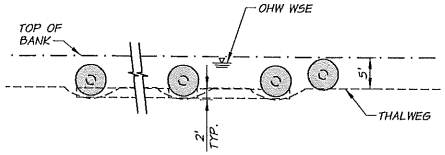
TYPE II BANK PROTECTON PLAN

1"=10'



SECTION 'B'

1"=2'

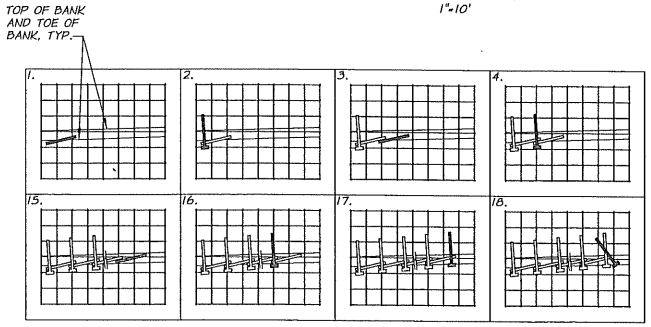


SECTION 'A'

1"=10'

TYPE II BANK PROTECTION MATERIAL SCHEDULE		
LOG	DESCRIPTION	TOTAL QTY. FOR 1125 L.F. IN 5 LOCATIONS
LOG TYPE D	20 FT. X 16"-18" DBH W/ 5' DIA. RW	85
LOG TYPE E	20 FT. X 16"-18" DBH W/O RW	75
RACKING MATERIAL C	10-20 FT. X 6"-10" DBH	75 *
REBAR PIN	#8	85

* IN ADDITION TO THE RACKING MATERIAL, THE CONTRACTOR SHALL IMPORT THE TOPS AND LIMBS OF THE LOG TYPES D, AND E, AND USE THIS AS SLASH.



NOTE: REPEAT STEPS 3-4 UNTIL REACHING THE UPSTREAM END OF THE HABITAT STRUCTURE.

TYPE 2 BANK PROTECTION LOG PLACEMENT SEQUENCING

1"=40'

CONSTRUCTION NOTES

1. CONTRACTOR SHALL BACKFILL AROUND LOGS WITH A COMBINATION OF GENERAL BACKFILL AND RACKING MATERIAL.
2. PROVIDE RACKING MATERIAL BETWEEN EACH LAYER AS DIRECTED BY THE ENGINEER.
3. CONTRACTOR SHALL APPLY WATER TO THE BACKFILL PERIODICALLY FOR COMPACTION AND TO FORCE MATERIAL INTO VOIDS.
4. FOR ALL LOGS KEYED INTO BANKS MORE THAN TWO THIRDS OF THE LENGTH MUST BE BURIED.
5. TOP OF BACKFILL AREA SHALL BE COVERED WITH TOPSOIL WITH A MINIMUM THICKNESS OF 6".
6. FINAL INSTALLATION OF THE TYPE II BANK PROTECTION SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
7. DETAILS SHOWN ARE FOR RIVER RIGHT SITUATION. RIVER LEFT INSTALLATION TO BE MIRRORED.
8. AT REBAR PIN LOCATIONS, THE CONTRACTOR SHALL DRILL A PILOT HOLE APPROXIMATELY 7/8" DIAMETER. THE PIN SHALL BE DRIVEN THROUGH THE HOLE FITTING SNUGLY AND LEAVING NO VOID SPACE BETWEEN THE PIN AND THE PILOT HOLE.
9. ALL SAWCUT ENDS OF LOGS SHALL BE CHEWED OR FRAYED PRIOR TO PLACEMENT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY R.RASMUSSEN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg

HORIZ. SCALE SEE ABOVE
VERT. SCALE
JOB NUMBER 1260-10
DATE 2015
ACAD FILE: type II bnk prt det.dwg

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RIPARIAN IMPROVEMENTS
TYPE II BANK PROTECTION

SHEET R17

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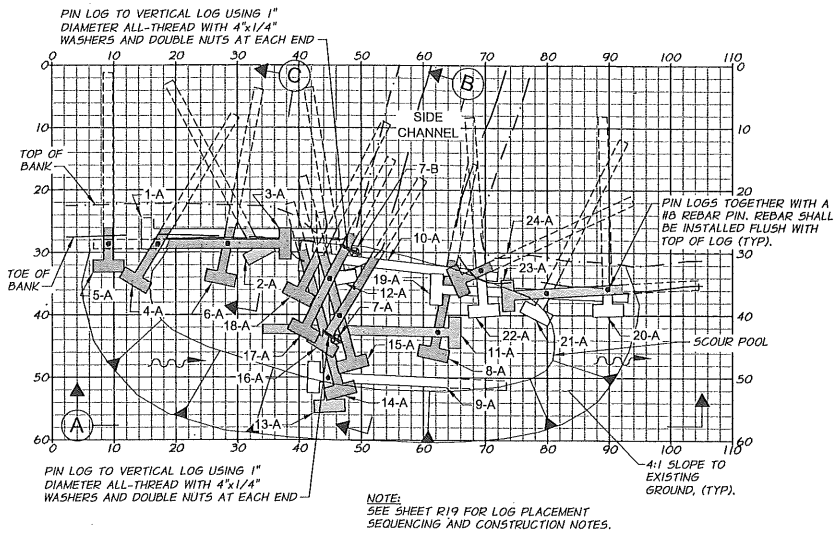
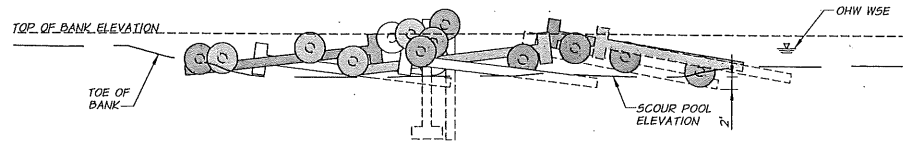


SIDE CHANNEL HABITAT STRUCTURE PLAN

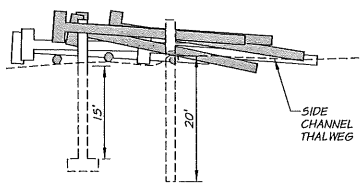
1"=10'



SECTION 'A'

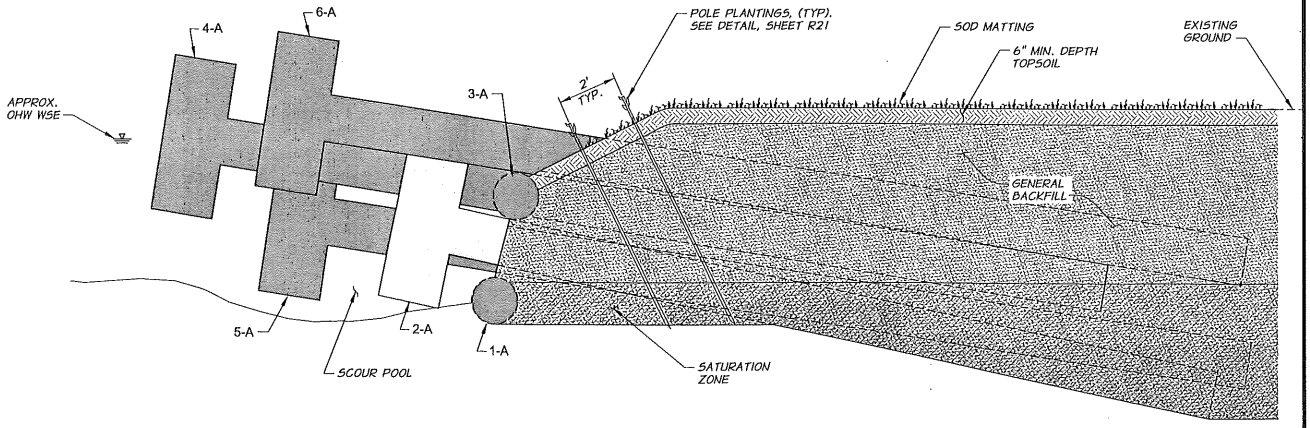
1"=10'

ELEVATION OF CRITICAL KEY MEMBERS							
LOG	SIDE CHANNEL 'B' ELEVATION	SIDE CHANNEL 'D' ELEVATION	SIDE CHANNEL 'E' ELEVATION	SIDE CHANNEL 'G' ELEVATION	SIDE CHANNEL 'H' ELEVATION	SIDE CHANNEL 'I' ELEVATION	SIDE CHANNEL 'J' ELEVATION
9 A (UPPER)	2826.5	2827.5	2828.0	2828.5	2830.0	2831.2	2833.3
9 A (LOWER)	2822.5	2823.0	2824.5	2824.0	2826.0	2827.7	2829.8
10 A	2827.0	2828.0	2828.5	2829.0	2830.5	2831.7	2833.8
11 A (UPPER)	2828.5	2829.5	2830.0	2830.5	2832.0	2833.2	2835.3
11 A (LOWER)	2822.5	2823.0	2824.5	2824.0	2826.0	2827.7	2829.8
TOP OF BANK	2828.8	2830.1	2830.7	2831.1	2831.9	2832.9	2834.8
SCOUR POOL	2822.5	2823.0	2824.5	2824.0	2826.0	2827.7	2829.8
TOE OF BANK	2826.5	2827.0	2828.5	2828.0	2830.0	2831.7	2833.8



SECTION 'B'

1"=10'



SECTION 'C'

1"=2'

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY R.RASMUSSEN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg
HORIZ. SCALE SEE ABOVE
VERT. SCALE
JOB NUMBER 1260-10
DATE 2015
ACAD FILE: side chan hab strct det.dwg

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WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
SIDE CHANNEL HABITAT STRUCTURE DETAILS I

SHEET R18

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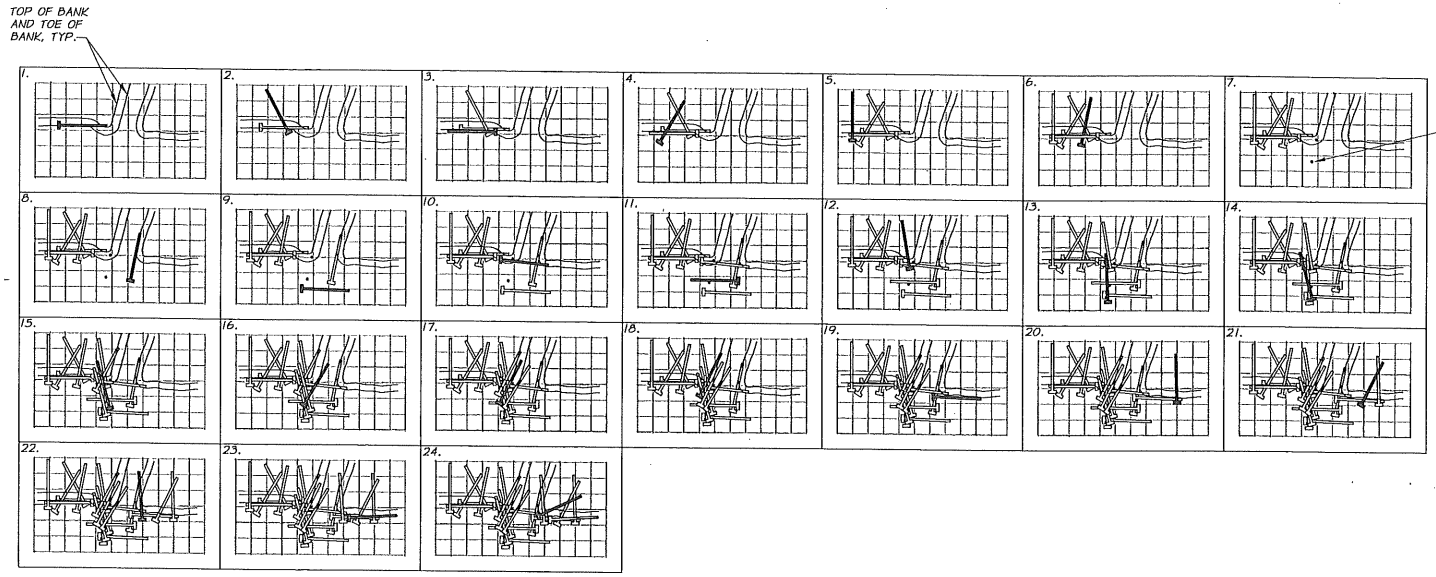

NOTE: LOG 7-A MAY BE INSTALLED EARLIER AS NEEDED TO ACCOMODATE SPACE NEEDED TO EXCAVATE THE HOLE FOR THE LOG. IN LIEU OF INSTALLING LOG 12-A, TWO LOG TYPE B's MAY BE INSTALLED IN THIS LOCATION AT A DEPTH OF 20' EACH.

SIDE CHANNEL HABITAT STRUCTURE LOG PLACEMENT SEQUENCING

1"=40'

SIDE CHANNEL HABITAT STRUCTURE MATERIAL SCHEDULE			
	DESCRIPTION	QTY. EA.	TOTAL QTY. FOR 7 STRUCTURE(S)
LOG TYPE A	30 FT. X 16"-18" DBH W/ 5' DIA. RW	24	168
LOG TYPE B	30 FT. X 14"-16" DBH W/O RW	1	7
RACKING MATERIAL C	10-20 FT. X 6"-10" DBH	10*	70
REBAR PIN	#8	10	70

*IN ADDITION TO THE RACKING MATERIAL, THE CONTRACTOR SHALL IMPORT THE TOPS AND LIMBS OF THE LOG TYPES A, AND B, AND USE THIS AS SLASH.

CONSTRUCTION NOTES

1. CONTRACTOR SHALL BACKFILL AROUND LOGS WITH A COMBINATION OF GENERAL BACKFILL AND RACKING MATERIAL.
2. PROVIDE RACKING MATERIAL BETWEEN EACH LAYER AS DIRECTED BY THE ENGINEER.
3. CONTRACTOR SHALL APPLY WATER TO THE BACKFILL PERIODICALLY FOR COMPACTION AND TO FORCE MATERIAL INTO VOIDS.
4. FOR ALL LOGS KEYED INTO BANKS MORE THAN TWO THIRDS OF THE LENGTH MUST BE BURIED.
5. TOP OF BACKFILL AREA SHALL BE COVERED WITH TOPSOIL WITH A MINIMUM THICKNESS OF 6".
6. FINAL INSTALLATION OF THE HABITAT STRUCTURE SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
7. AT REBAR PIN LOCATIONS, THE CONTRACTOR SHALL DRILL A PILOT HOLE APPROXIMATELY 7/8" DIAMETER. THE PIN SHALL BE DRIVEN THROUGH THE HOLE FITTING SNUGLY AND LEAVING NO VOID SPACE BETWEEN THE PIN AND THE PILOT HOLE.
8. RACKING AND SLASH MATERIAL SHALL NOT BE PLACED IN THE OPENINGS TO THE SIDE CHANNELS.
9. ALL SAWCUT ENDS OF LOGS SHALL BE CHEWED OR FRAYED PRIOR TO PLACEMENT.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS
RENEWS 06-30-17
SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY R.RASMUSSEN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg
HORIZ. SCALE SEE ABOVE
VERT. SCALE
JOB NUMBER 1260-10
DATE 2015
ACAD FILE side chan hab strct det.dwg

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RIPARIAN IMPROVEMENTS
SIDE CHANNEL HABITAT STRUCTURE DETAILS II

SHEET R19

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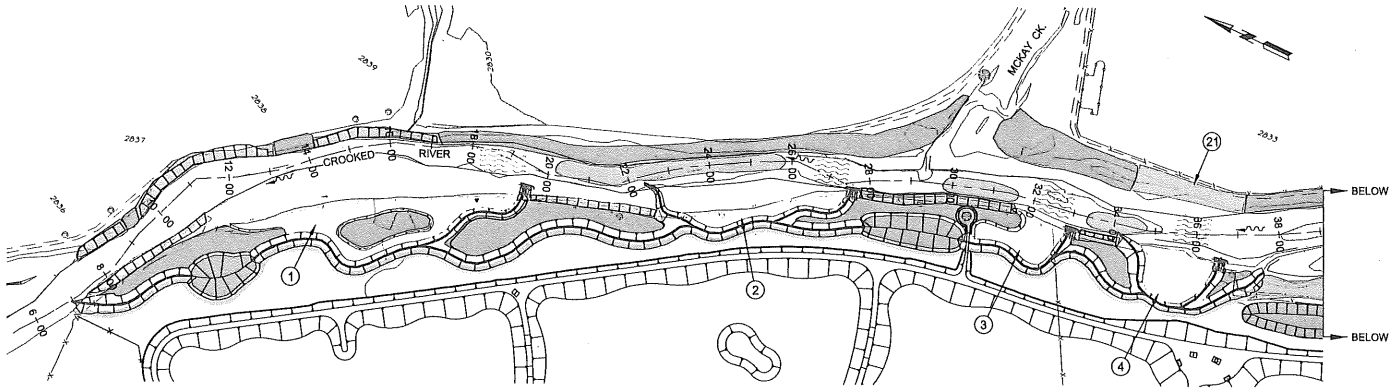
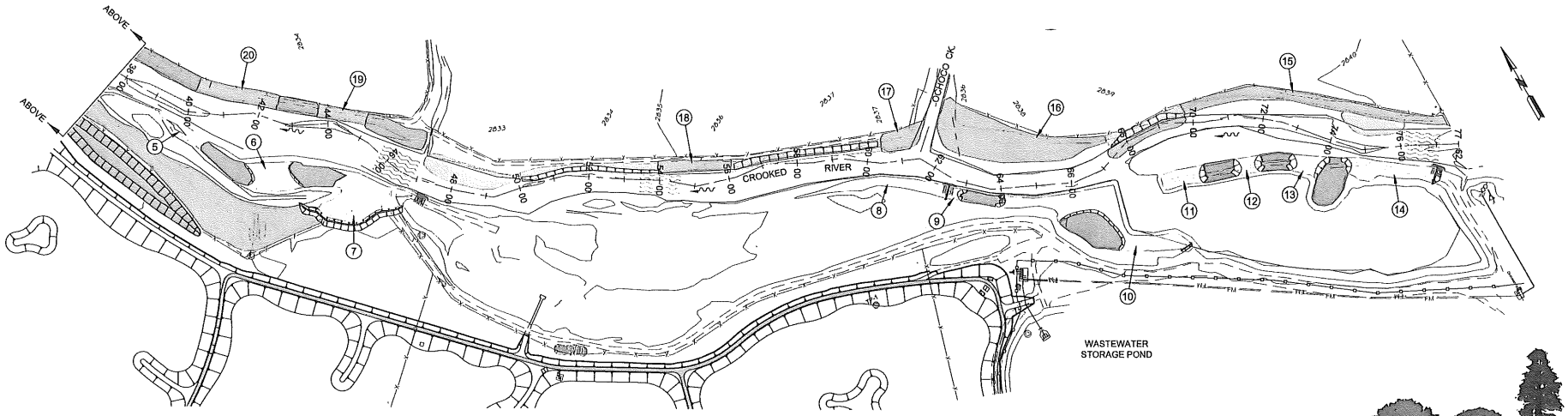
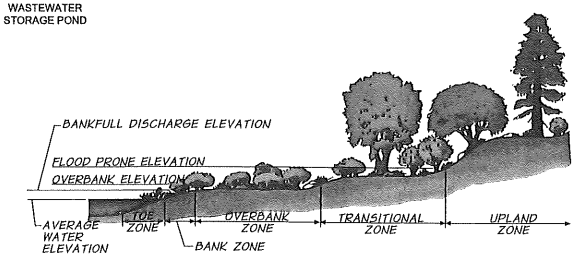
LEGEND

- RIPARIAN - PROPOSED POOL
- RIPARIAN - PLANTINGS
- RIPARIAN - EXISTING RIFFLE
- RIPARIAN - EXISTING POINT BAR
- RIPARIAN - LARGE WOOD HABITAT STRUCTURE
- RIPARIAN - CUT TO 2 YEAR W.S.E.
- RIPARIAN - TYPE 2 BANK PROTECTION
- RIPARIAN - TYPE 1 BANK PROTECTION
- RIPARIAN - UNDISTURBED HIGHER GROUND
- RIPARIAN - AREAS NOT TO BE DISTURBED
- RIPARIAN - PROPOSED SIDE CHANNEL
- (10) PLANTING AREA DESIGNATION. SEE TABLE, SHEET R21







RIPARIAN PLANTING ZONES

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS

RENEWS 06-30-17

SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE

XREFS: TB-Prineville.dwg

150 0 150 300 450
SCALE IN FEET

HORZ. SCALE 1"=150' VERT. SCALE
JOB NUMBER 1260-10 DATE 2015
ACAD FILE RiverPlantingPlan.dwg

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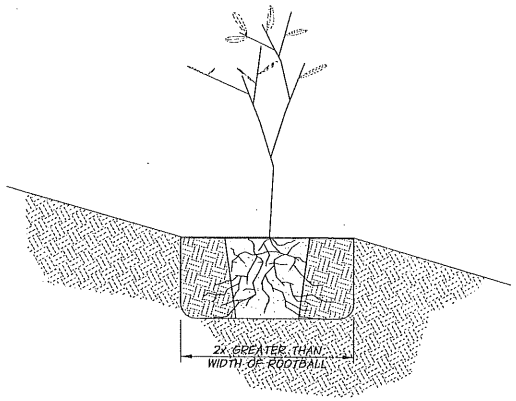
LA GRANDE, OR. WALLA WALLA, WA. PRINEVILLE, OR.

CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN PLANTING PLAN

SHEET **R20**

R:\PRINEVILLE\1260-10_WW-WETLANDS\dwg\RiverPlantingPlan.dwg, layout: 10/21/2015 4:41:43 PM, \\lgprint64\Xerox 550 Fiery, DMC

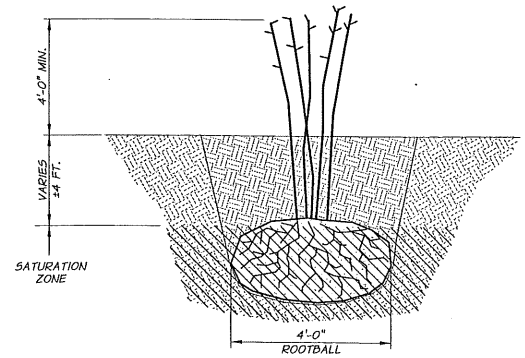


CONTAINER PLANT DETAIL

N.T.S.

CONTAINER PLANT INSTALLATION NOTES

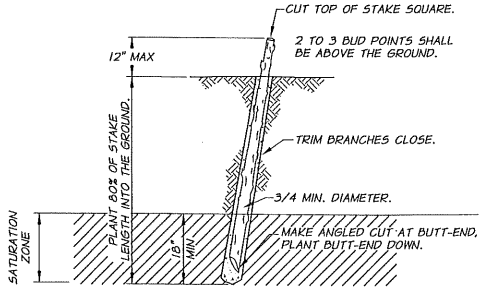
1. PRIOR TO INSTALLATION OF CONTAINER PLANT, CLEANLY PRUNE ANY BROKEN BRANCHES AND SCARIFY OUTER 1" OF ROOTBALL. CLEANLY PRUNE BROKEN, DEAD, OR DISEASED ROOTS. ROOTBOUND PLANTS SHALL BE REJECTED.
2. EXCAVATE CIRCULAR PLANTING HOLE WITH VERTICAL SIDES. SCARIFY SIDES AND BOTTOM OF PLANTING HOLE.
3. PLACE ROOTBALL ON UNDISTURBED NATIVE SOIL AT BASE OF PLANTING HOLE AND SPREAD ROOTS OUT TO SIDES OF HOLE. CLEANLY TRIM ANY ROOTS THAT ARE TOO LONG TO LAY STRAIGHT IN PLANTING HOLE. PLANTS SHALL BE UPRIGHT, PLUMB, AND TOP OF ROOTBALL SHALL BE EVEN WITH FINISH GRADE. WHEN PLANTING ON SLOPES, CREATE LEVEL PLANTING SURFACE TO ENSURE COVER OF ROOTS ON DOWNHILL SIDE OF PLANT.
4. BACKFILL PLANTING HOLE WITH SOIL EXCAVATED FROM PLANTING HOLE AND TAMP SOIL AROUND ROOTS. ANY TRASH OR DEBRIS FOUND IN EXCAVATED SOIL SHALL NOT BE USED TO BACKFILL THE PLANTING HOLE. BACKFILL SOIL SHALL MAKE GOOD CONTACT WITH THE ROOTBALL, LEAVING NO VOIDS.
5. PLANTS SHALL BE PLANTED IN CLUSTERS USING TYPICAL SPACING SHOWN ON THE SCHEDULE WHILE OTHER AREAS ARE LEFT UNPLANTED TO ALLOW FOR DISTRIBUTION OF THE PLANTS THROUGHOUT THE PLANTING AREA.
6. WITHIN 4 HOURS OF PLANT INSTALLATION, THOROUGHLY WATER IN EACH INSTALLED PLANT.



PLANT MATERIAL SCHEDULE AND DENSITY PRESCRIPTION

PLANTING AREA	AREA (SQ FT)	REDOSIER DOGWOOD (CP)	BLACK COTTONWOOD (CP)	PEACHLEAF WILLOW (PP)	WOODS ROSE (CP)	GOLDEN CURRANT (CP)	WILLOW CLUMP (LOCAL)
	SPACING, FT	4	8	4	8	8	VARIES
	% OF AREA	15%	15%	20%	2.5%	2.5%	VARIES
	LOCATION	BANK AND OVERBANK ZONES	UPPER OVERBANK AND TRANSITION ZONES	UPPER OVERBANK AND TRANSITION ZONES	OVERBANK ZONES	TRANSITION AND LOWER UPLAND ZONES	UPPER OVERBANK AND TRANSITION ZONES
1	42,440	400	100	540	17	17	14
2	11,590	110	30	150	5	5	4
3	18,800	180	50	240	8	8	6
4	16,450	160	40	210	7	7	6
5	4,140	40	10	60	2	2	2
6	11,600	110	30	150	5	5	4
7	22,140	210	60	280	9	9	7
8	8,160	80	20	110	4	4	3
9	900	10	10	20	1	1	1
10	23,160	220	60	290	10	10	8
11	2,980	30	10	40	2	2	1
12	1,210	20	10	20	1	1	1
13	1,960	20	10	30	1	1	1
14	8,700	90	30	110	4	4	3
15	23,530	230	60	300	10	10	8
16	49,540	470	120	620	20	20	16
17	7,070	70	20	90	3	3	3
18	8,200	80	20	110	4	4	3
19	4,800	50	20	60	2	2	2
20	9,420	90	30	120	4	4	3
21	13,690	130	40	180	6	6	5
22	32,220	310	80	410	13	13	
23	59,650	560	140	750	24	24	9
Total	382,350	3,670	1,000	4,890	162	162	110

CP = CONTAINER PLANTS
PP = POLE PLANTING



POLE PLANTING INSTALLATION NOTES:

1. HARVEST AND PLANT STAKES DURING THE DORMANT SEASON.
2. USE HEALTHY, STRAIGHT AND LIVE WOOD AT LEAST 1 YEAR OLD.
3. MAKE CLEAN CUTS AND DO NOT DAMAGE STAKES OR SPLIT ENDS DURING INSTALLATION. USE A PILOT BAR OR OTHER APPROVED METHOD IN FIRM SOILS.
4. CUTTINGS HARVESTED FRESH AT THE TIME OF INSTALLATION SHALL BE SOAKED FOR A MINIMUM OF 24 HOURS PRIOR TO INSTALLATION PLANTING. CUTTINGS HARVESTED AND STORED SHALL BE SOAKED FOR A MINIMUM OF 10 DAYS PRIOR TO PLANTING.
5. TAMP THE SOIL AROUND THE STAKE.
6. EXTEND STAKES INTO WATER SATURATION ZONE.
7. APPROVED SPECIES:
   - SALIX EXIGUA (COYOTE WILLOW)
   - SALIX LASIOLEPSIS (ARROYO WILLOW)
   - CORNUS SERICEA (REDOSIER DOGWOOD)

TYPICAL POLE PLANTING DETAIL

N.T.S.

WILLOW CLUMP INSTALLATION NOTES:

1. WILLOW CLUMPS SHALL BE PLACED AT THE LOCATIONS SHOWN ON THE DRAWINGS.
2. HARVEST THE ENTIRE LIVE WILLOW CLUMP INCLUDING THE ABOVEGROUND STEMS AND THE BELOWGROUND ROOTS.
3. USE WILLOWS THAT ARE YOUNG AND VIGOROUS, RANGE IN HEIGHT FROM 8 TO 15 FEET, AND ARE APPROXIMATELY THE DIAMETER OF A 4-FOOT BACKHOE BUCKET.
4. START THE HOLE FOR THE WILLOW CLUMP BY DIGGING APPROXIMATELY 10 INCHES AWAY FROM THE STEMS AND DIG DOWN APPROXIMATELY 2 FEET IN ORDER TO GET AS MUCH OF THE ROOT MASS AS POSSIBLE.
5. TRANSPORT THE WILLOW CLUMP TO THE PLANTING LOCATION IMMEDIATELY UPON DIGGING THE WILLOW CLUMP AND PLANT IT SO THE WILLOW CLUMP DOES NOT DRY OUT. TARPING OF THE WILLOW CLUMP MAY BE NECESSARY IF TRANSPORTING THE CLUMP A LONG DISTANCE AND IF THE WEATHER IS SUNNY AND HOT.
6. PRE-DIG THE PLANTING LOCATION FOR THE WILLOW CLUMP AND EXCAVATE DOWN TO THE SOIL SATURATION ZONE BUT NOT INTO THE GROUNDWATER TABLE.
7. PLACE THE WILLOW CLUMP INTO THE PLANTING HOLE AND BACKFILL IN AND AROUND THE WILLOW CLUMP WITH SOIL AND WATER TO REMOVE AIR POCKETS AROUND THE CLUMP.
8. A MINIMUM 4 TO 5 FEET OF THE WILLOW STEMS SHALL PROTRUDE ABOVE THE FINISHED GROUND SURFACE.
9. CUT OFF ABOUT ONE-THIRD TO ONE-HALF OF THE WILLOW TOPS STRAIGHT ACROSS AT THE FINISHED GROUND SURFACE ONCE PLACED AND BACKFILLED.

WILLOW CLUMP DETAIL

N.T.S.

PLANTING NOTE

THE CONTRACTOR PERFORMING THE PLANTING SHALL BE EXPERIENCED AND SPECIALIZED IN PLANT SPECIES AND TECHNIQUES NATIVE TO THE AREA. PLANTING SHALL OCCUR DURING THE DORMANT SEASON TO MAXIMIZE THE SURVIVAL RATE OF THE PLANTINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IRRIGATION, MAINTENANCE AND MONITORING OF ALL THE PLANTINGS FOR A PERIOD OF TWO YEARS. MAINTENANCE SHALL INCLUDE MECHANICAL CONTROL OF WEEDS AND GRASSES SUCH AS REED CANARY GRASS. THE PLANTINGS SHALL BE MONITORED TO ENSURE THE AREA IS ACHIEVING A SUFFICIENT PERCENT SURVIVAL. IN ORDER TO MONITOR THE AREA, PHOTO POINTS SHALL BE ESTABLISHED TO VISUALLY COMPARE THE PLANTINGS PROGRESS FROM YEAR TO YEAR. TRANSECTS SHALL ALSO BE UTILIZED TO ESTIMATE PLANTING GROWTH, SURVIVAL RATE, AND UNWANTED SPECIES INFILTRATION. THE CONTRACTOR SHALL PREPARE A REPORT AT THE END OF EACH YEAR SUMMARIZING THE COLLECTED DATA AND INFORMATION.

REGISTERED PROFESSIONAL ENGINEER 83517PE OREGON NOV. 10, 2009 CHAS B. HUTCHINS
RENEWS 06-30-17
SIGNED 10-22-15

REVISION	BY	DATE

DESIGNED BY C. HUTCHINS
DRAWN BY D. CHRISTMAN
REVIEWED BY B. MOORE
XREFS: TB-Prineville.dwg
HORIZ. SCALE NONE
VERT. SCALE
JOB NUMBER 1260-10
DATE 2015
ACAD FILE: RiverDets.dwg

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CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
MISCELLANEOUS DETAILS I

SHEET
R21

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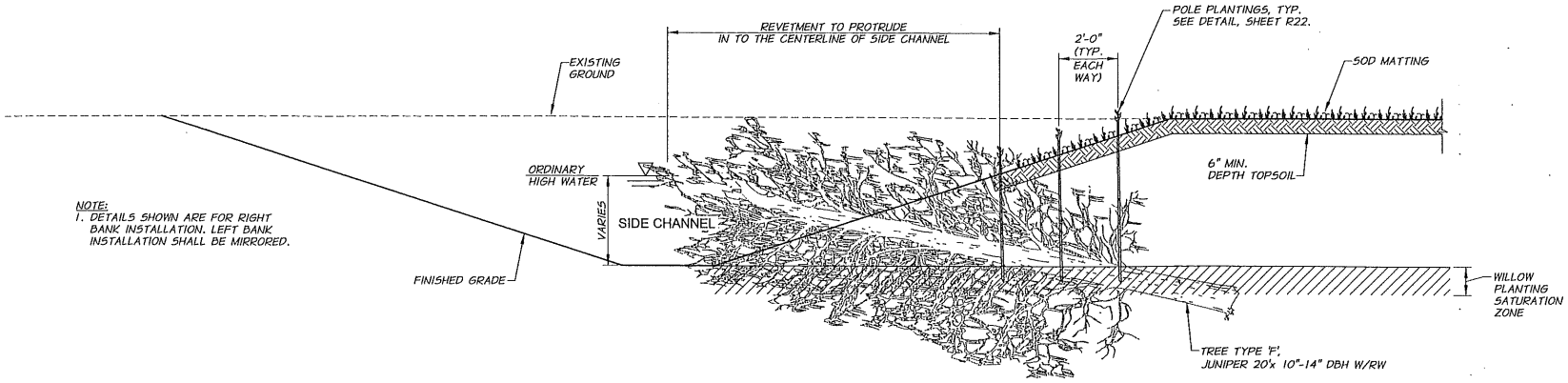
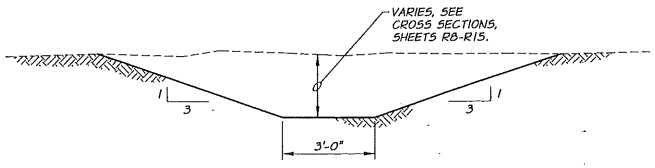


NOTE:
1. DETAILS SHOWN ARE FOR RIGHT BANK INSTALLATION. LEFT BANK INSTALLATION SHALL BE MIRRORED.

JUNIPER REVETMENT DETAIL

SCALE: 1/2"=1'-0"



TYPICAL SIDE CHANNEL DETAIL

N.T.S.

REGISTERED PROFESSIONAL ENGINEER
83517PE
OREGON
NOV. 10, 2009
CHAS B. HUTCHINS
RENEWS 06-30-17
SIGNED 10-22-15

REVISION	BY	DATE	HORZ. SCALE NONE	VERT. SCALE
DESIGNED BY C. HUTCHINS	XREFS: TB-Prineville.dwg		JOB NUMBER 1260-10	DATE 2015
DRAWN BY D. CHRISTMAN			ACAD FILE RiverDets.dwg	
REVIEWED BY B. MOORE			COPYRIGHT 2015 BY ANDERSON PERRY & ASSOC., INC.	

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CITY OF PRINEVILLE
WASTEWATER SYSTEM IMPROVEMENTS

RIPARIAN IMPROVEMENTS
MISCELLANEOUS DETAILS II

SHEET
R22
80 OF 83

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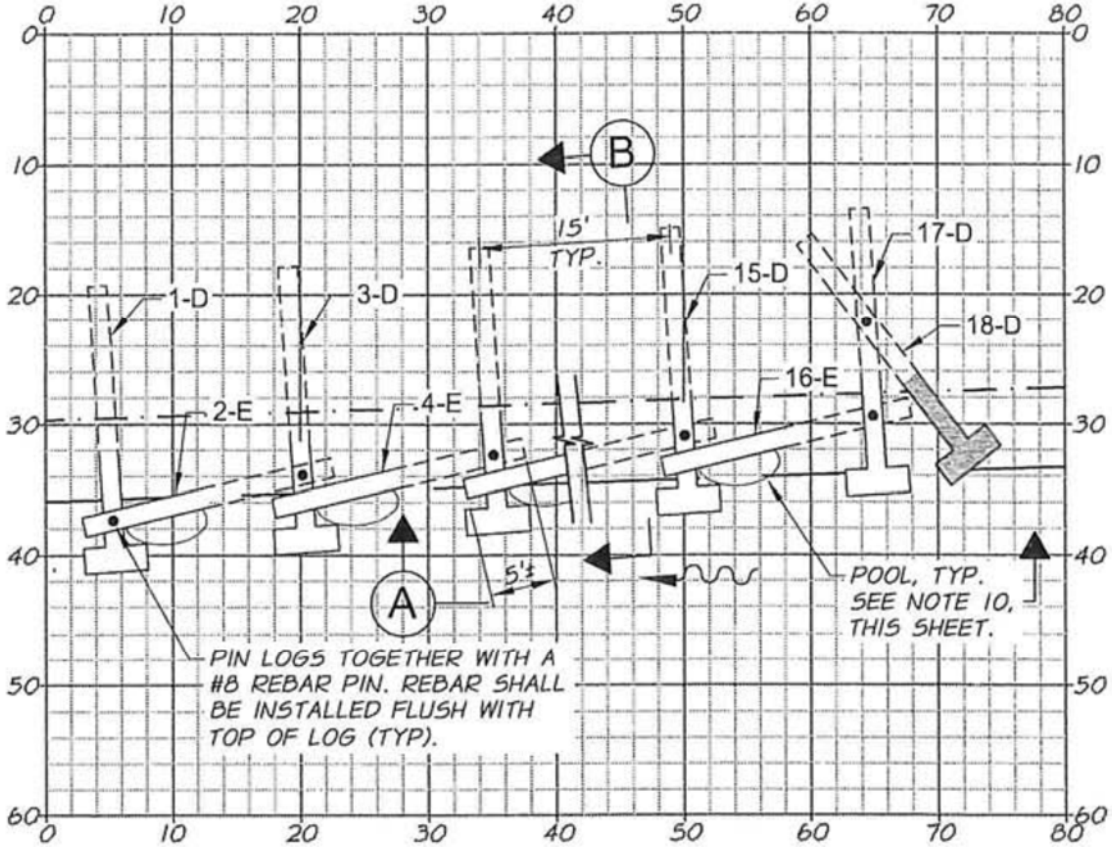
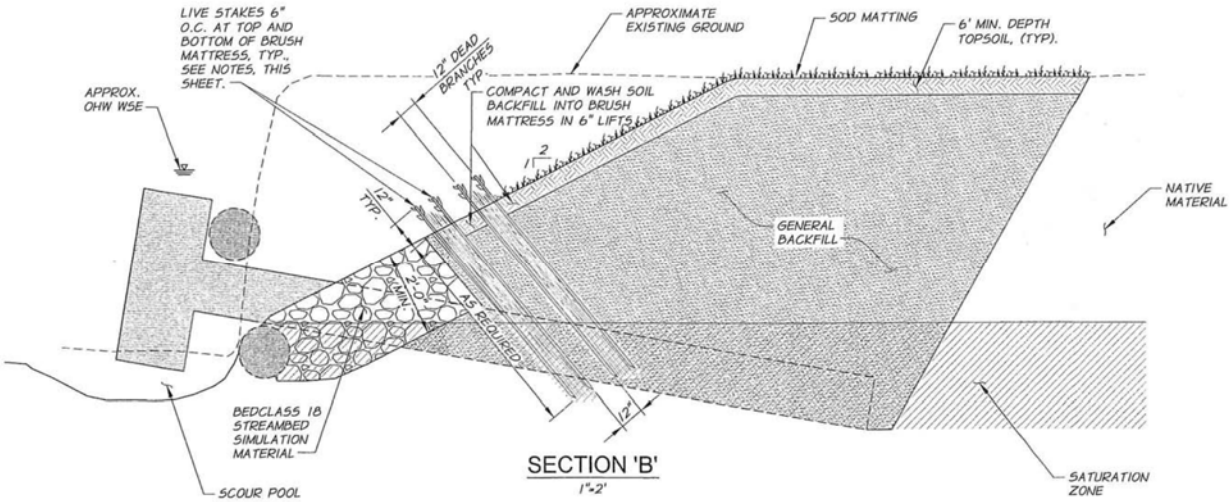


TYPE I BANK PROTECTON PLAN

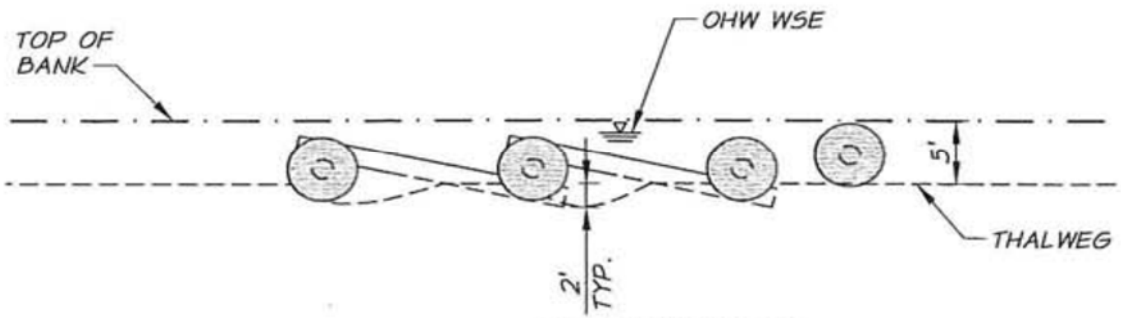
1"=10'



SECTION 'B'
1"=2'

TYPE I BANK PROTECTON PLAN

1"=10'



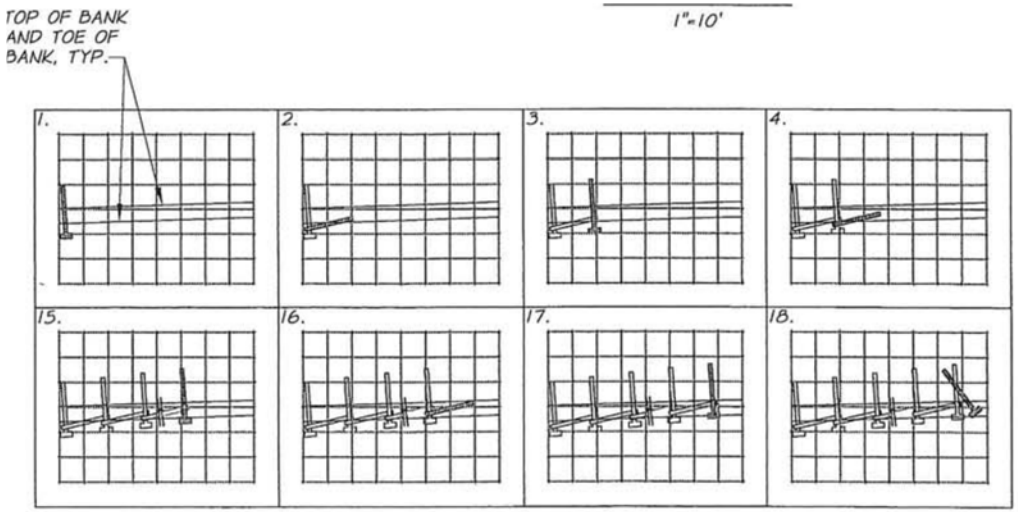
SECTION 'A'

1"=10'

TYPE I BANK PROTECTION MATERIAL SCHEDULE		
LOG	DESCRIPTION	TOTAL QTY. FOR 1560 L.F. IN 5 LOCATIONS
LOG TYPE D	20 FT. X 16"-18" DBH W/ 5' DIA. RW	114
LOG TYPE E	20 FT. X 16"-18" DBH W/O RW	104
RACKING MATERIAL C	10-20 FT. X 6"-10" DBH	104*
REBAR PIN	#8	114

* IN ADDITION TO THE RACKING MATERIAL, THE CONTRACTOR SHALL IMPORT THE TOPS AND LIMBS OF THE LOG TYPES D, AND E, AND USE THIS AS SLASH.

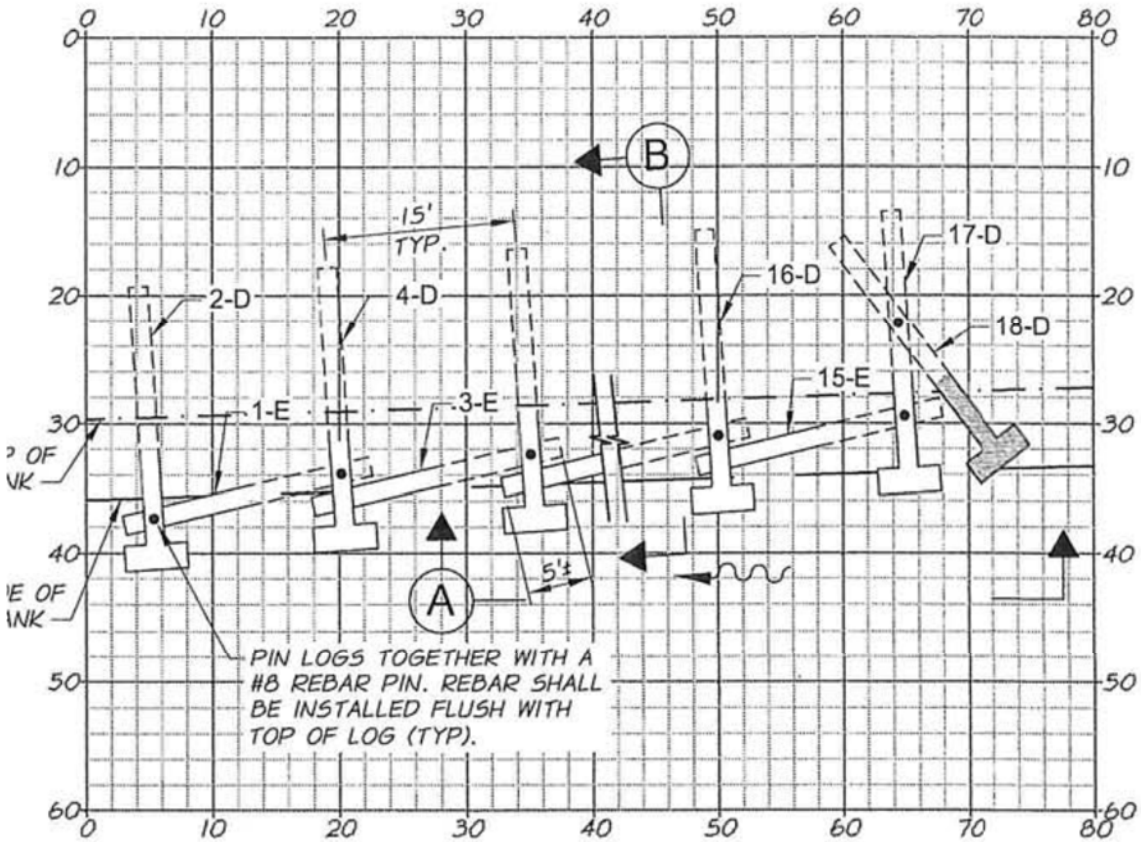
1"=10'



NOTE: REPEAT STEPS 3-4 UNTIL REACHING THE UPSTREAM END OF THE HABITAT STRUCTURE.

TYPE I BANK PROTECTION LOG PLACEMENT SEQUENCING

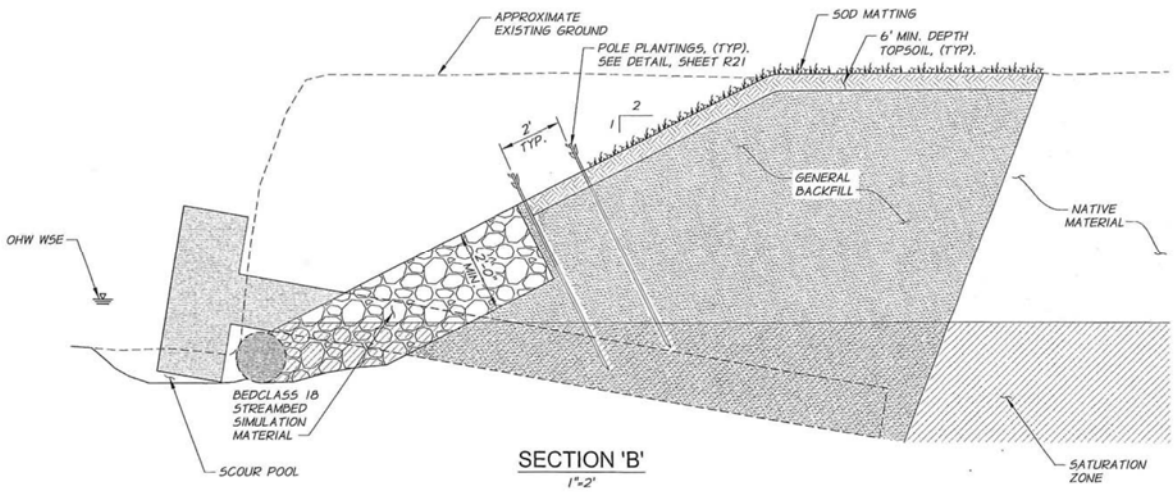
1"=40'



TYPE II BANK PROTECTON PLAN

1"=10'

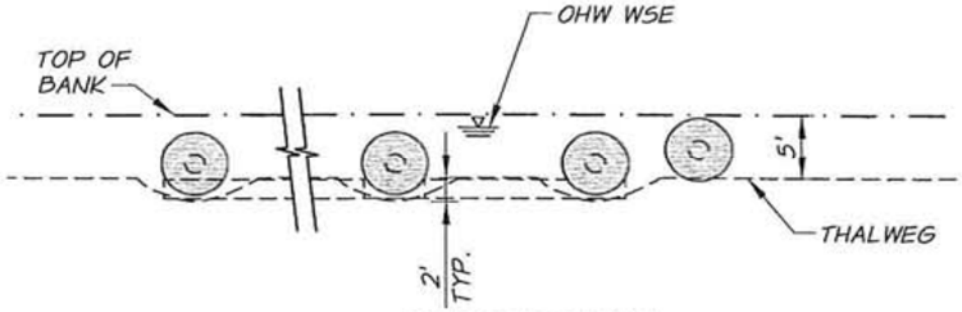
OHW WSE



SECTION 'B'
1"=2'

TYPE II BANK PROTECTON PLAN

1"=10'

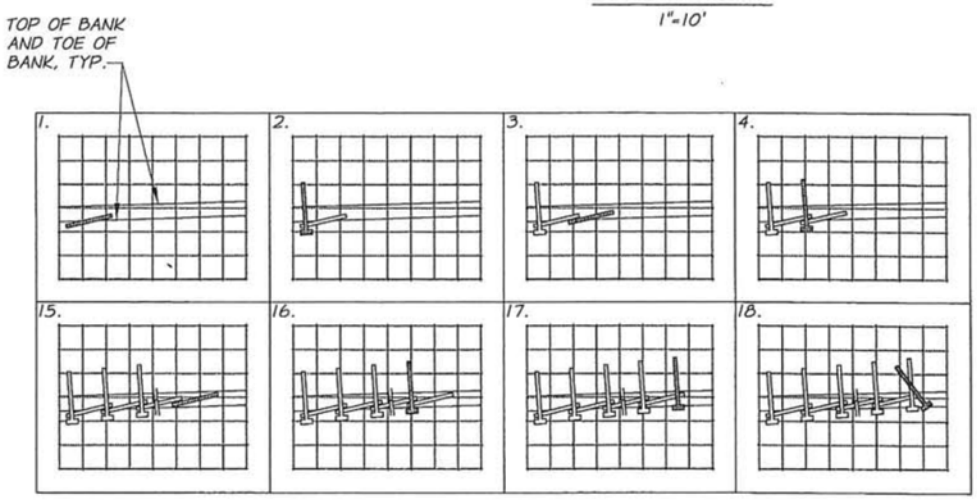


SECTION 'A'
1"=10'

TYPE II BANK PROTECTION MATERIAL SCHEDULE		
LOG	DESCRIPTION	TOTAL QTY. FOR 1125 L.F. IN 5 LOCATIONS
LOG TYPE D	20 FT. X 16"-18" DBH W/ 5' DIA. RW	85
LOG TYPE E	20 FT. X 16"-18" DBH W/O RW	75
RACKING MATERIAL C	10-20 FT. X 6"-10" DBH	75 *
REBAR PIN	#8	85

* IN ADDITION TO THE RACKING MATERIAL, THE CONTRACTOR SHALL IMPORT THE TOPS AND LIMBS OF THE LOG TYPES D, AND E, AND USE THIS AS SLASH.

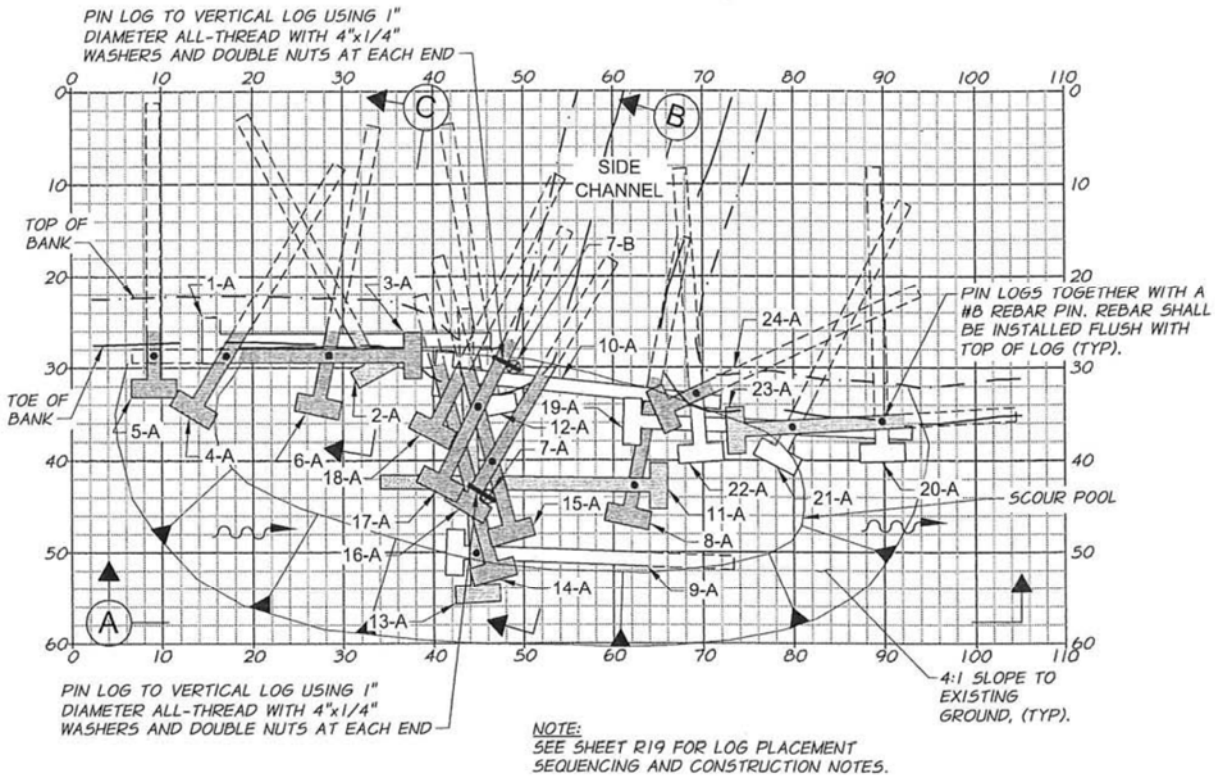
1"=10'



NOTE: REPEAT STEPS 3-4 UNTIL REACHING THE UPSTREAM END OF THE HABITAT STRUCTURE.

TYPE 2 BANK PROTECTION LOG PLACEMENT SEQUENCING

1"=40'

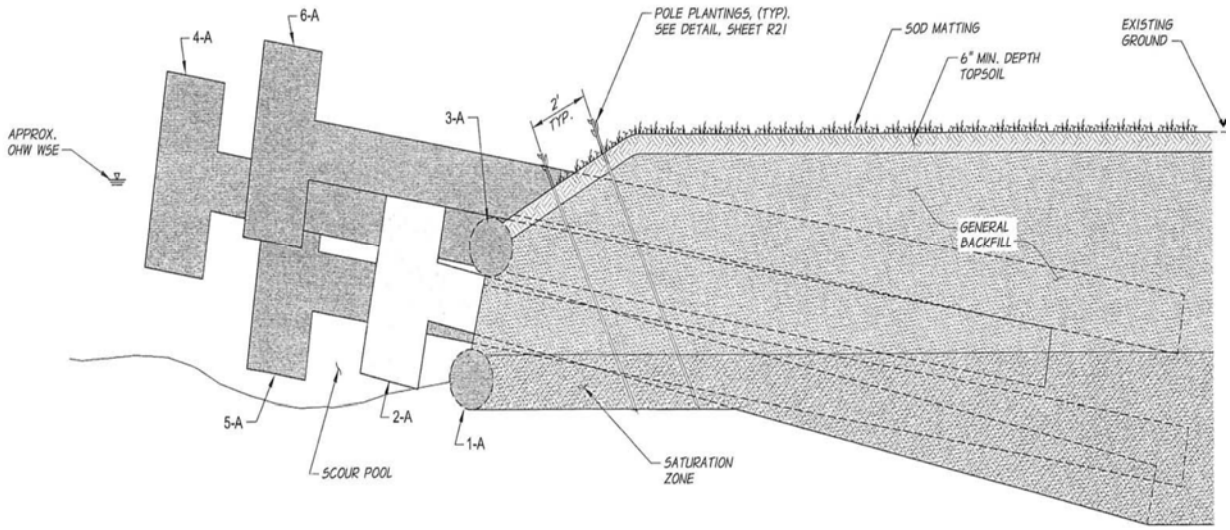


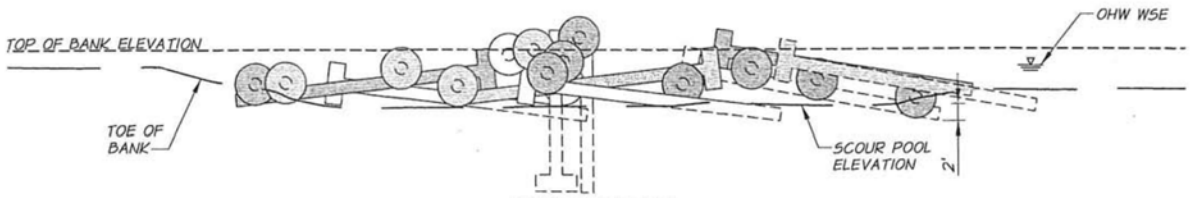
PIN LOG TO VERTICAL LOG USING 1" DIAMETER ALL-THREAD WITH 4"x1/4" WASHERS AND DOUBLE NUTS AT EACH END

NOTE:
SEE SHEET R19 FOR LOG PLACEMENT SEQUENCING AND CONSTRUCTION NOTES.

SIDE CHANNEL HABITAT STRUCTURE PLAN

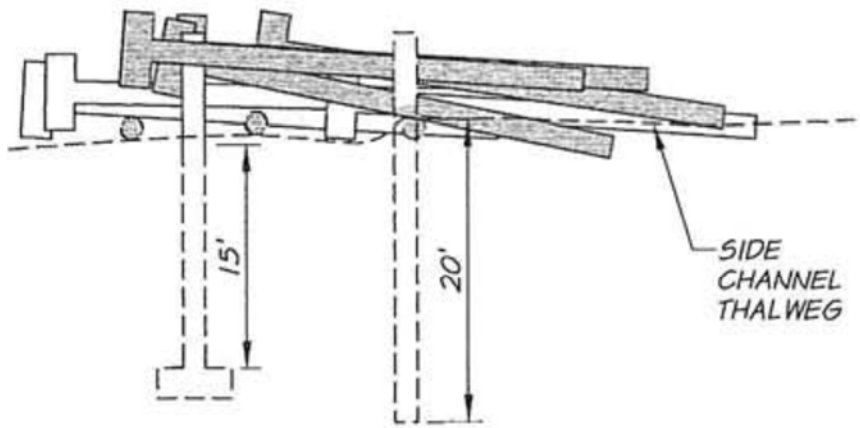
1"=10'





SECTION 'A'

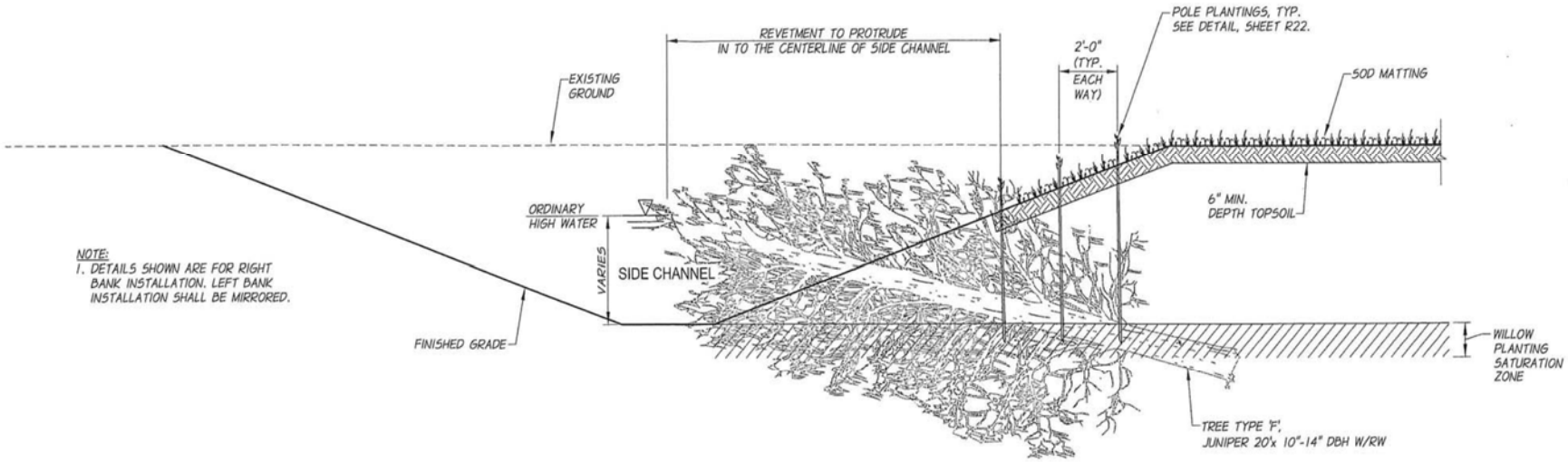
1"=10'



SECTION 'B'

1"=10'

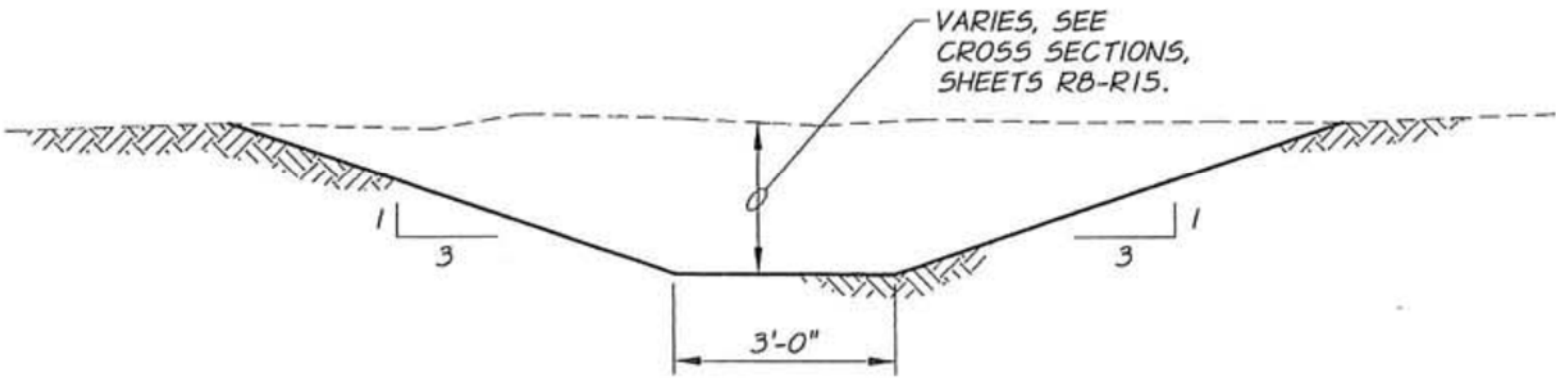
ELEVATION OF CRITICAL KEY MEMBERS							
LOG	SIDE CHANNEL 'B' ELEVATION	SIDE CHANNEL 'D' ELEVATION	SIDE CHANNEL 'E' ELEVATION	SIDE CHANNEL 'G' ELEVATION	SIDE CHANNEL 'H' ELEVATION	SIDE CHANNEL 'I' ELEVATION	SIDE CHANNEL 'J' ELEVATION
9 A (UPPER)	2826.5	2827.5	2828.0	2828.5	2830.0	2831.2	2833.3
9 A (LOWER)	2822.5	2823.0	2824.5	2824.0	2826.0	2827.7	2829.8
10 A	2827.0	2828.0	2828.5	2829.0	2830.5	2831.7	2833.8
11 A (UPPER)	2828.5	2829.5	2830.0	2830.5	2832.0	2833.2	2835.3
11 A (LOWER)	2822.5	2823.0	2824.5	2824.0	2826.0	2827.7	2829.8
TOP OF BANK	2828.8	2830.1	2830.7	2831.1	2831.9	2832.9	2834.8
SCOUR POOL	2822.5	2823.0	2824.5	2824.0	2826.0	2827.7	2829.8
TOE OF BANK	2826.5	2827.0	2828.5	2828.0	2830.0	2831.7	2833.8



NOTE:
1. DETAILS SHOWN ARE FOR RIGHT BANK INSTALLATION. LEFT BANK INSTALLATION SHALL BE MIRRORED.

JUNIPER REVETMENT DETAIL

SCALE: 1/2"=1'-0"



TYPICAL SIDE CHANNEL DETAIL

N.T.S.