Ware and Hinds Fish Bypass-Final Report (5-14-18).

Timeline of events.

Concept Design and Approval.

Jan.2013-April 2014.

1) The idea for a fish bypass at the Ware and Hinds Ditch Co. (WH) irrigation diversion came from Collin Robinson, a Colorado Parks and Wildlife (CPW) water engineer based in the NW Regional Office in Grand Junction.
2) Working with Rob Firth and Richard Van Gytenbeek from Trout Unlimited they presented the WH Ditch Co. board of directors with the idea and they gave their approval to continue to explore the concept.
3) With this approval TU and CPW entered into a project agreement.
4) Shortly thereafter One Fish Engineering was brought on to present some conceptual design alternatives.

May 2014-February 2015.

1) During this period the project became inactive due to the lead TU representative, Rob Firth retiring from TU.

Schematic Design Approval and Funding

March 2015-Sept. 2016.

1) In March 2015 Richard Van Gytenbeek was asked to resume the project after Rob Firth's retirement.
2) One Fish Engineering continued to provide services to the project completing a site survey, conceptual design verification and cost estimates.
3) CWCB-WSRF grant was approved with $31,750.00 approved by the CWCB board and $31,750.00 approved by the Colorado Basin Roundtable.
4) CPW-Fishing is Fun grant was approved by CPW and the Fish and Wildlife Service in the amount of $78,500.00.

Design Engineer Selection, Construction Drawings and Construction.

Oct. 2016-March 2017.

1) Request for proposals were sent to numerous engineering firms to complete the fish bypass construction drawings. In October only one local firm replied. The process was repeated in January and the result was identical. That firm was hired to complete the construction drawings and supervise the construction of the channel by May 2017. Construction drawings did not move forward in a timely manner and TU was forced to discharge the firm for non-performance.
2) All required State and Federal project permits were acquired during this period.

April 2017-Present.

1) The RFP for engineering services was reissued in June 2017. Two local firms replied and River Restoration from Carbondale was selected to do the work.
2) Construction drawing iterations were issued and approved by all stakeholders (Ware and Hinds Ditch Co., landowners and CPW) during the summer and early fall of 2017 with completion in November.
3) Construction documents were issued to qualified bidders in December 2017 and sealed bids were received Dec. 15th . The bids were substantially higher than the engineers estimate and could not be accepted.
4) During late December 2017 and January TU and RR value engineered the project in an effort to reduce costs. The original bidders were asked to re-bid and two complied. However, the project cost still exceeded grant reserves.
5) In February TU raised the additional monies required from a variety of sources: internal TU funds, local TU chapter funds and CPW (see budget detail). With the additional funds TU was able to award the construction project to Kissner General Contractors from Austin, CO.
6) Construction was initiated in March with substantial completion by April 12th.
7) Colorado Parks and Wildlife inspected the bypass channel and approved its completion on April 17th.
8) May 1st the "call" was removed from the Elk Creek drainage and the channel was opened to spawning rainbows and other spring spawning species moving up from the main-stem of the Colorado River.
9) Colorado Parks and Wildlife will be surveying the constructed channel in the coming weeks to create an exhibit for permanent "Access and Maintenance Easement" across the underlying landowners property.
10) Once this is complete, Trout Unlimited will conclude their agreement with Colorado Parks and Wildlife and the fish bypass channel will become the operation and maintenance responsibility of CPW.

Final inspection of the Ware and Hinds Fish Bypass channel by TU and CPW personnel.

Project Budget Summary

Original Budget Description (1/13-12/17). The original budget was based on preliminary estimates from engineering firms for their services to complete construction drawings, providing construction management services and the costs of physically constructing the project. In December of 2017, construction bids were received that substantially exceeded the funds in the original budget. Throughout the remainder of December 2017 and the first half of January 2018 the project engineer worked on value engineering the bid schedule while TU scrambled to find additional funds.

Original Budget Components

CWCB-WSRF Grant (cash)	$63,500.00
CPW-Fishing is Fun Grant (cash)	$78,500.00
Trout Unlimited Cash	$ 4,880.00

TU/CPW “in-kind” value (1/14-3/16)	$19,550.00
Total Original Budget	**$166,430.00**

Additional Funds added to the Project (1/18-4/18). By mid January additional funds had been procured from TU national, the local TU chapter (Ferdinand-Hayden) and CPW. Key bid schedule items were modified or eliminated and the original bidders were asked to re-bid the project. The re-bid produced bid totals low enough to proceed with construction, which was completed 3 months later. While “in-kind” values have been substantial throughout the project lifetime, they are not included in the following summary as cash outlays far exceed any matching requirements.

Additional Funds Required to Complete Project

TU Cash (TU Nat./local chapter)	$24,932.26
CPW-Cash	$ 6,000.00
TU/CPW “in-kind” value not added.	
Total Additional Funds to Complete	**$30,932.26**

Total Project Cost	$197,362.26

FISH BYPASS CHANNEL OF ELK CREEK

NEW CASTLE, CO
NOVEMBER 2017

FINAL DRAWINGS

SHEET INDEX

NOTE: CONTRACTOR SHALL HAVE A FULL SIZE PAPER COPY OF THIS PLAN SET ON SITE AT ALL TIMES WHEN WORK IS BEING PERFORMED.

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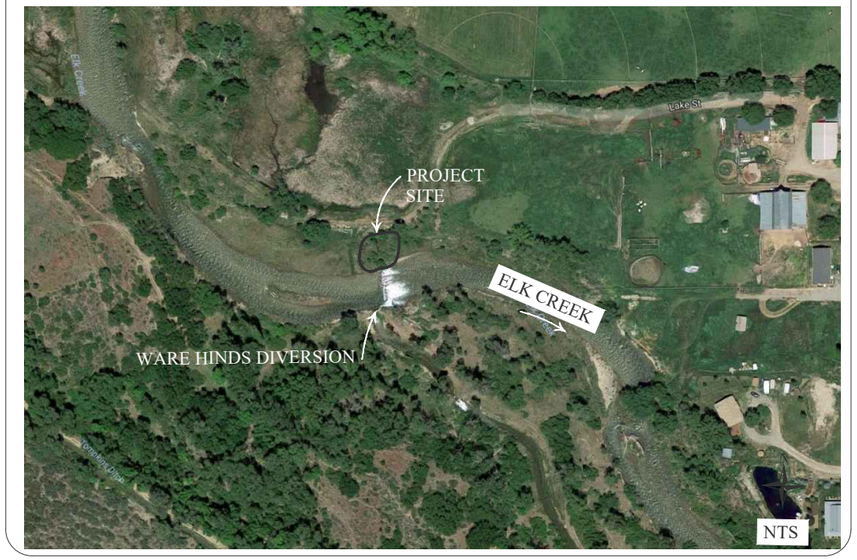
RiverRestoration.org
Mr. Jason Carey, P.E.
Project Engineer
RiverRestoration.org, LLC.
(970)-947-9568

LOCATION MAP



VICINITY MAP

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO
SHEET INDEX AND VICINITY MAP

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

TROUT UNLIMITED
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RIVER RESTORATION.ORG
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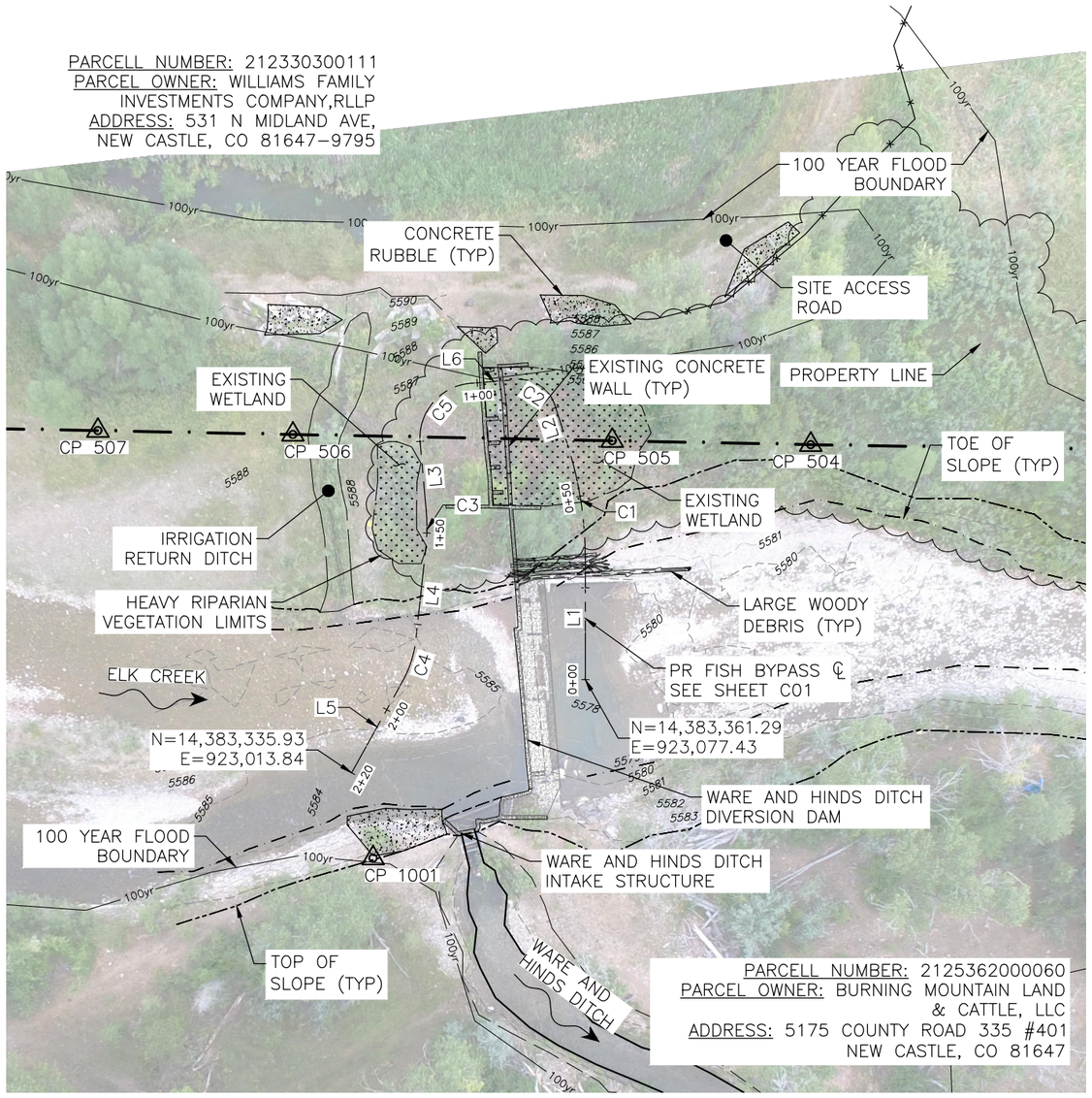
PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	G01
Date: NOV 2017	
Scale: NTS	

FINAL PLAN SET



BASE MAP

(WHEN FULL SIZE)

CONTROL POINT TABLE

CNTRL PTS	NORTHING	EASTING	ELEVATION	DESCRIPTION
504	14383425.21'	923138.82'	5582.57 FT	PLASTIC CAP ON REBAR*
505	14383426.28'	923084.78'	5583.74 FT	PLASTIC CAP ON REBAR*
506	14383427.99'	922997.86'	5588.11 FT	PLASTIC CAP ON REBAR*
507	14383429.03'	922944.79'	5588.19 FT	PLASTIC CAP ON REBAR*
1001	14383312.70'	923019.69'	5590.69 FT	AL CAP ON REBAR+

*CONTROL POINT SET BY FLATIRONS SURVEYING
+CONTROL POINT SET BY RIVERRESTORATION

PR FISH BYPASS ℄ TABLE

Proposed FP				
Number	Length	Radius	Line/Chord Direction	A Value
L1	33.28		N00° 00' 00.00"E	
C1	31.22	100.0	N08° 56' 36.22"W	
L2	11.29		N17° 53' 12.45"W	
C2	13.39	10.0	N56° 14' 36.76"W	
L6	12.61		S85° 23' 58.93"W	
C5	23.68	15.0	S40° 10' 30.28"W	
L3	18.66		S05° 02' 58.36"E	
C3	9.83	50.0	S00° 34' 54.60"W	
L4	25.17		S06° 12' 47.57"W	
C4	11.99	30.0	S17° 39' 29.28"W	
L5	28.53		S29° 06' 10.99"W	

CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE PR FISH BYPASS ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO

BASE MAP AND HORIZONTAL CONTROL PLAN

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

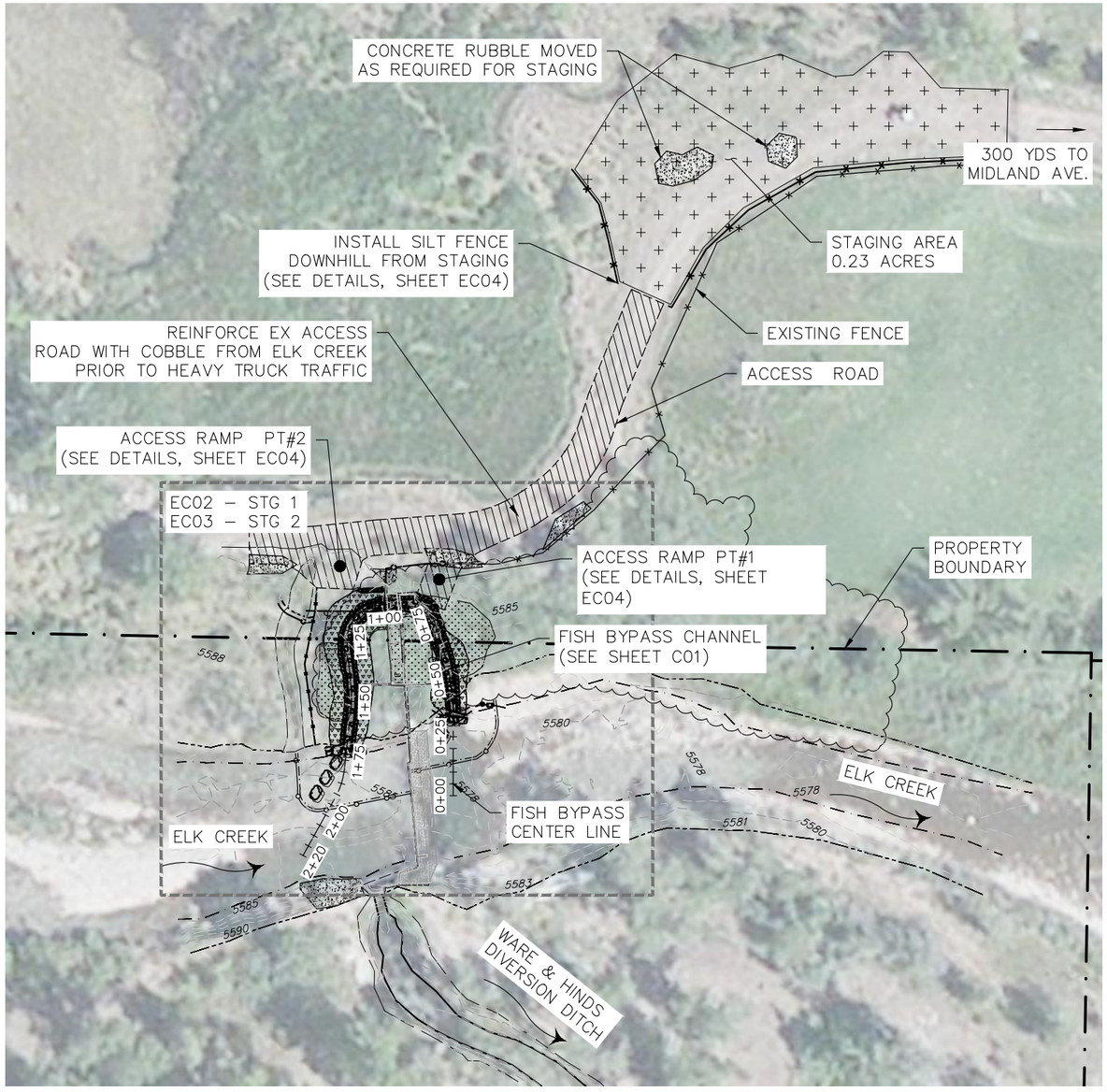
Project 38045

Date NOV 2017

Scale 1"=20' (FULL SIZE)

Sheet G02

FINAL PLAN SET



GENERAL NOTES:

1. SEE SHEETS R01 FOR RESTORATION PLANS.
2. CONSTRUCTION ACCESS AND STAGING IS ON PRIVATE PROPERTY. COORDINATE WITH LAND OWNER PRIOR TO STARTING MOBILIZATION AND WORK. SEE SPECIFICATIONS FOR CONTACT INFORMATION.
3. TREE TRIMMING WILL BE REQUIRED ALONG ACCESS ROAD FROM MIDLAND AVE (~135 YDS.)
4. PLACE TEMPORARY CONSTRUCTION FENCE ALONG SOUTH SIDE OF ACCESS ROAD FROM NW CORNER OF OUTBUILDING TO NEAR POST OF NEXT GATE (~55 YDS.)
5. PLACE TEMPORARY CONSTRUCTION FENCING ALONG NORTH SIDE OF ACCESS ROAD FROM CORRESPONDING GATE ON NORTH SIDE TO THE NEAR POST ON THE NEXT GATE. (~80 YDS.)

N

(WHEN FULL SIZE)

EROSION CONTROL NOTES:

1. ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT.
2. THE ESCP MEASURES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, UPGRADE THESE MEASURES AS NEEDED TO COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL EROSION AND SEDIMENT CONTROL REGULATIONS.
3. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION.
4. IDENTIFY, MARK, AND PROTECT (BY FENCING OFF OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING ALL TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS NOT SPECIFICALLY IDENTIFIED FOR REMOVAL. MARK IN THE FIELD VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS.
5. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE–VEGETATE OPEN AREAS. RE–VEGETATE OPEN AREAS WHEN PRACTICABLE AFTER GRADING OR CONSTRUCTION. THE TYPE OF VEGETATIVE SEED MIX USED MUST INCLUDE NATIVE VEGETATION. CPW STAFF CAN ASSIST WITH APPROPRIATE SEED MIX. IF VEGETATION USED TO RE–VEGETATE IS NOT ENDEMIC TO THE AREA, THEN ANY VEGETATION USED SHOULD BE VISUALLY INSPECTED FOR THE PRESENCE OF INVASIVE SPECIES.
6. EROSION AND SEDIMENT CONTROL MEASURES INCLUDING PERIMETER SEDIMENT CONTROL MUST BE IN PLACE BEFORE VEGETATION IS DISTURBED AND MUST REMAIN IN PLACE AND BE MAINTAINED, CLEANED, REPAIRED OR REPLACED, AND PROMPTLY IMPLEMENTED FOLLOWING PROCEDURES ESTABLISHED FOR THE DURATION OF CONSTRUCTION, INCLUDING PROTECTION FOR ACTIVE STORM DRAIN INLETS AND CATCH BASINS AND APPROPRIATE NON–STORMWATER POLLUTION CONTROLS.
7. ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT CONTAINED WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK.
8. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES AND FOR ALL ROADWAYS INCLUDING GRAVEL ROADWAYS.
9. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON–STORMWATER CONTROLS.
10. PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPS SUCH AS: GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AN EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND–DISTURBING ACTIVITIES.
11. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER–TIGHT TRUCKS OR DRAIN LOADS ON SITE.
12. BMP'S SHOULD BE IMPLEMENTED AND MONITORED THROUGHOUT THE PROJECT. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, LEFTOVER PAINTS, SOLVENTS, AND GLUES FROM CONSTRUCTION OPERATIONS.
13. IMPLEMENT THE FOLLOWING BMPS: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES. HAZARDOUS MATERIALS SHOULD BE STORED AWAY FROM THE CREEK TO ELIMINATE CHANCES FOR ACCIDENTAL SPILL.
14. USE WATER, SOIL–BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND–BLOWN SOIL.
15. IF USED, THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME–RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE.
16. IF A DEWATERING TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO–COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN ENGINEER'S PLAN APPROVAL BEFORE OPERATING THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
17. TEMPORARILY STABILIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE REGISTRANT IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR.
18. AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS.
19. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND CREATION OF BARE GROUND DURING WET WEATHER.
20. SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL.
21. OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT. AND BEFORE BMP REMOVAL.
22. THE INTENTIONAL WASHING OF SEDIMENT INTO ELK CREEK MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS.
23. THE ENTIRE SITE MUST BE TEMPORARILY STABILIZED USING VEGETATION OR A HEAVY MULCH LAYER, TEMPORARY SEEDING, OR OTHER METHOD SHOULD ALL CONSTRUCTION ACTIVITIES CEASE FOR 30 DAYS OR MORE.
24. PROVIDE PERMANENT EROSION CONTROL MEASURES ON ALL EXPOSED AREAS. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. HOWEVER, DO REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AS EXPOSED AREAS BECOME STABILIZED, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. PROPERLY DISPOSE OF CONSTRUCTION MATERIALS AND WASTE, INCLUDING SEDIMENT RETAINED BY TEMPORARY BMP'S.
25. WE RECOMMEND THAT THE CONSTRUCTION CONTRACTOR AND TROUT UNLIMITED COORDINATE ACTIVITIES WITH ALL RELEVANT LAND OWNERS AND THE WARE AND HINDS DITCH CO.

CARE OF WATER NOTES:

1. CARE OF WATER PLAN IS SHOWN FOR PERMITTING AND COST ESTIMATING PURPOSES ONLY. CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING A CARE OF WATER PLAN TO MEET PERMITTING REQUIREMENTS AND CONSTRUCTION NEEDS. SEE SPECIFICATIONS FOR ELK CREEK FLOW INFORMATION.

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO

EROSION CONTROL AND CARE OF WATER PLAN

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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DESIGN FIRM NAME AND ADDRESS

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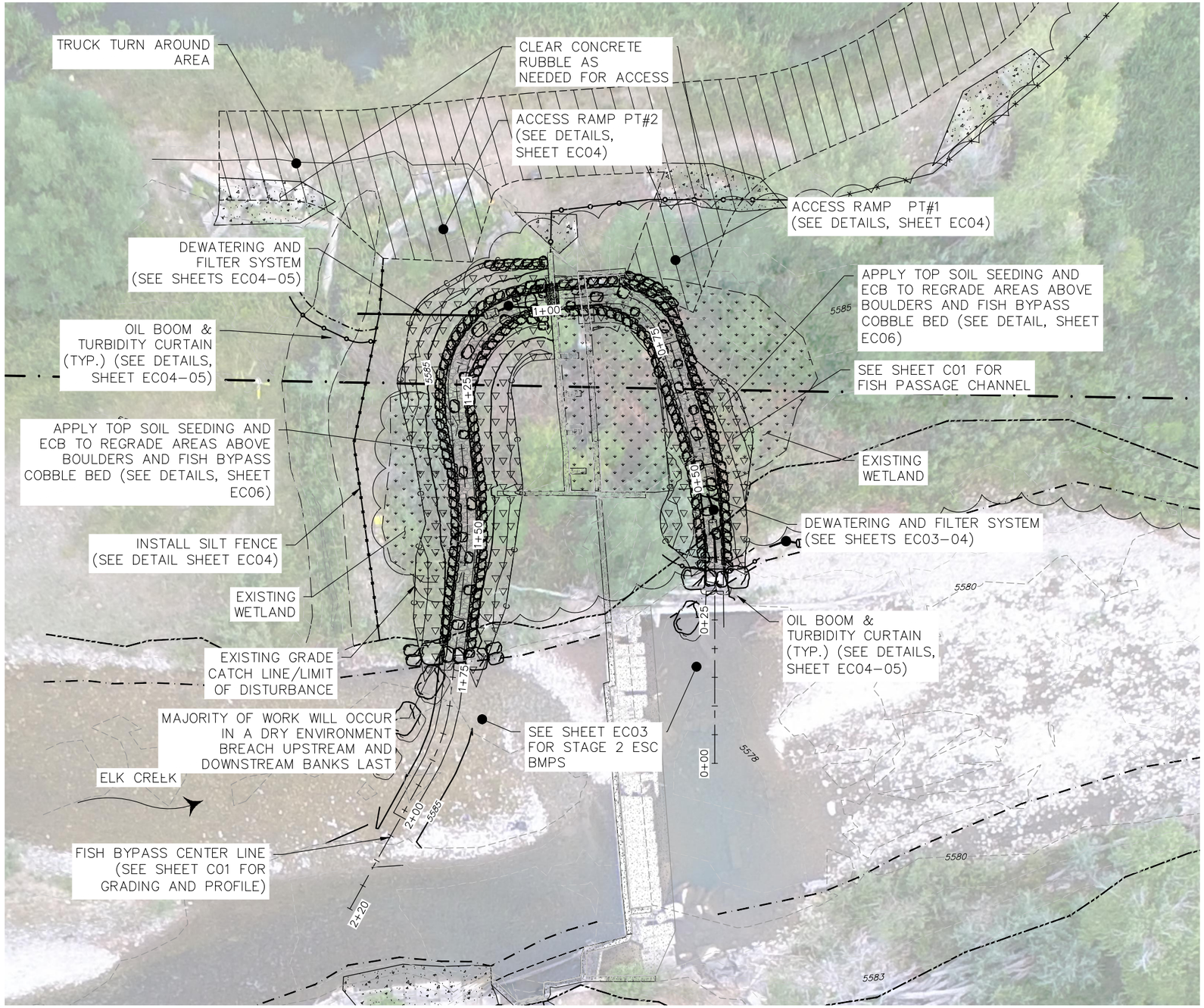
PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	EC01
Date: NOV 2017	
Scale: 1"=30' (FULL SIZE)	



STAGE 1 – PLAN VIEW

N

0 10 20 Feet

(WHEN FULL SIZE)

GENERAL NOTE:

1. STAGE 1 INCLUDES THE CONSTRUCTION OF THE MAIN PORTION OF THE FISH PASSAGE CHANNEL, INCLUDING THE DIVERSION DAM STRUCTURE MODIFICATIONS. SEE SHEET EC03 FOR STAGE 2 CONSTRUCTION OF AREAS INSIDE THE OHW OF ELK CREEK.
2. SEE SHEETS R01 FOR RESTORATION PLAN.
3. SEE SHEET EC01 FOR STAGING AREA.
4. PLANS SHOWN IS FOR REFERENCE ONLY. CONTRACTOR IS SOLELY RESPONSIBLE FOR CARE OF WATER DURING CONSTRUCTION, INCLUDING PLANNING, INSTALLATION, MAINTENANCE AND REMOVAL. SEE SPECS FOR MORE INFORMATION.
5. IN–CHANNEL WORK RELATED TO THE BREACHING OF THE UPSTREAM AND DOWNSTREAM EXISTING CONCRETE DAM AND ANY OTHER IN–CHANNEL WORK THAT COULD RELEASE SEDIMENT INTO THE STREAM SHOULD BE COMPLETE OUTSIDE OF THE SPAWNING AND EGG INCUBATION PERIOD FOR RAINBOW AND BROWN TROUT.

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO EROSION CONTROL AND CARE OF WATER PLAN - STAGE 1

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

TROUT UNLIMITED

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PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
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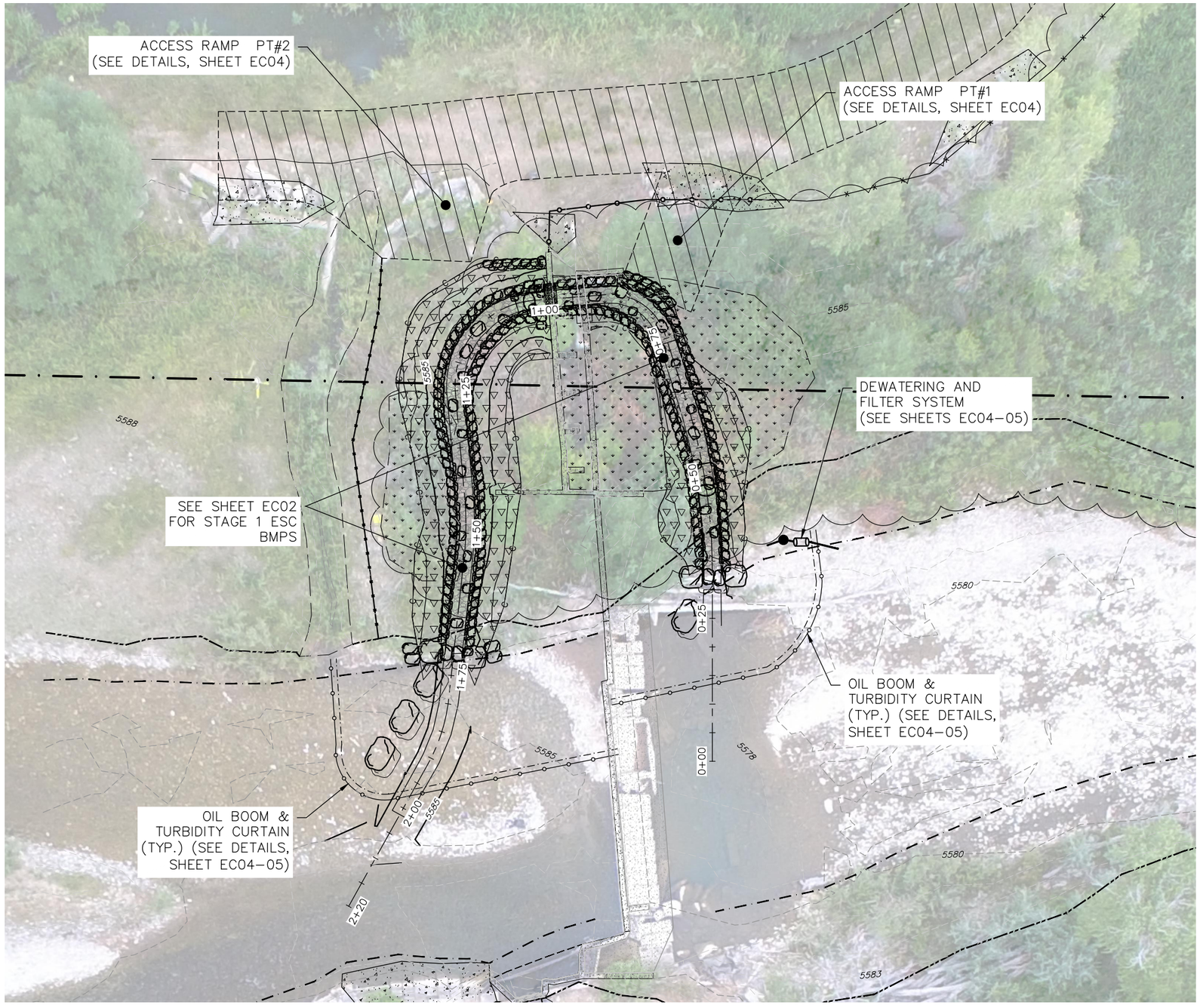
Date: NOV 2017	
Scale: 1"=10' (FULL SIZE)	

FINAL PLAN SET



STAGE 2 – PLAN VIEW

N

0 10 20 Feet

(WHEN FULL SIZE)

GENERAL NOTE:

1. STAGE 2 INCLUDES THE CONSTRUCTION OF THE INLET PROTECTION BOULDERS AND CHANNEL ENTRANCES. SEE SHEET EC02 FOR CONSTRUCTION OF THE FISH PASSAGE CHANNEL AND OTHER PROJECT ELEMENTS OUTSIDE OF ELK CREEK OHW.
2. SEE SHEETS R01 FOR RESTORATION PLAN.
3. SEE SHEET EC01 FOR STAGING AREA.
4. PLANS SHOWN IS FOR REFERENCE ONLY. CONTRACTOR IS SOLELY RESPONSIBLE FOR CARE OF WATER DURING CONSTRUCTION, INCLUDING PLANNING, INSTALLATION, MAINTENANCE AND REMOVAL. SEE SPECS FOR MORE INFORMATION.
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CARE OF WATER NOTES:

1. CARE OF WATER PLAN IS SHOWN FOR PERMITTING AND COST ESTIMATING PURPOSES ONLY. CONTRACTOR WILL BE RESPONSIBLE FOR DEVELOPING A CARE OF WATER PLAN TO MEET PERMITTING REQUIREMENTS AND CONSTRUCTION NEEDS. SEE SPECIFICATIONS FOR ELK CREEK FLOW INFORMATION.

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO EROSION CONTROL AND CARE OF WATER PLAN - STAGE 2

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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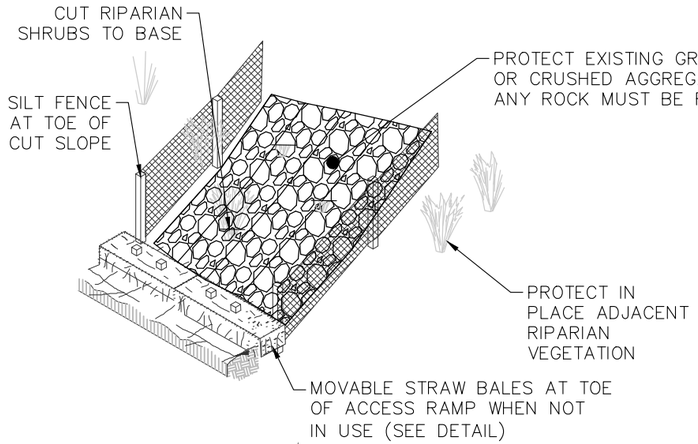
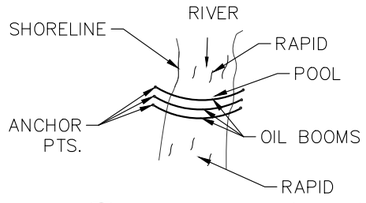
New Castle, Colorado
81647

Project	Sheet
38045	EC03
Date: NOV 2017	
Scale: 1"=10' (FULL SIZE)	

FINAL PLAN SET

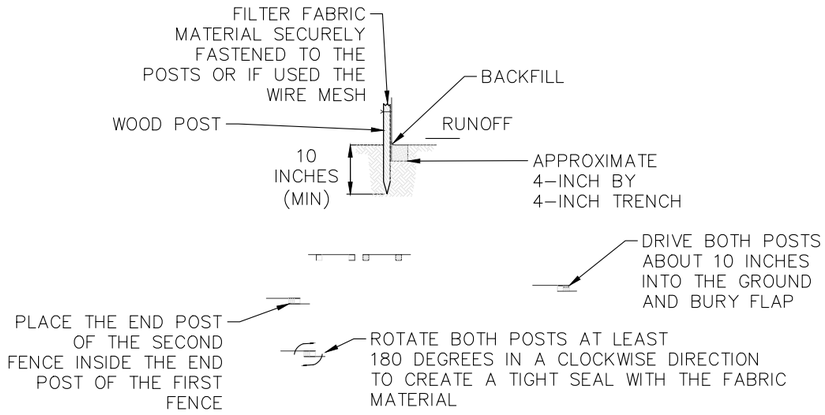


1 / EC04 TEMPORARY EQUIPMENT ACCESS (TYP.)
NTS

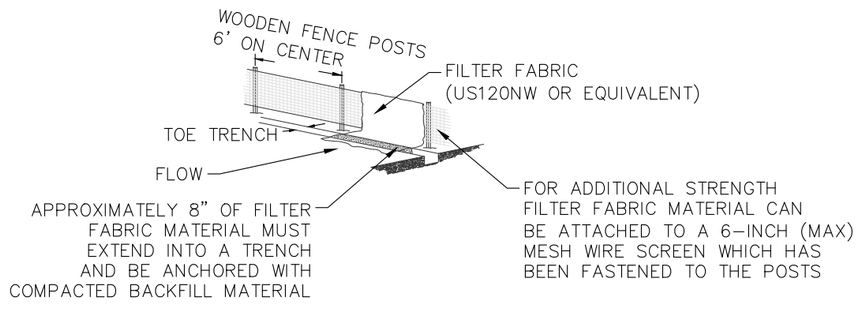


2 / EC04 OIL BOOM (TYP.)
PLAN VIEW-NTS

TYPICAL LAYOUT FOR STREAMS AND RIVERS TO BE PLACED DOWNSTREAM OF ANY EQUIPMENT WORKING IN THE WET



ATTACHING TWO SILT FENCES



3 / EC04 SILT FENCE (TYP.)
NTS

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO
EROSION CONTROL AND CARE OF WATER DETAILS

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

TROUT UNLIMITED

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38045	EC04
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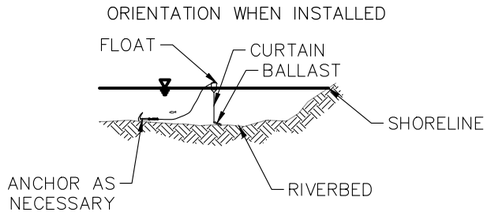
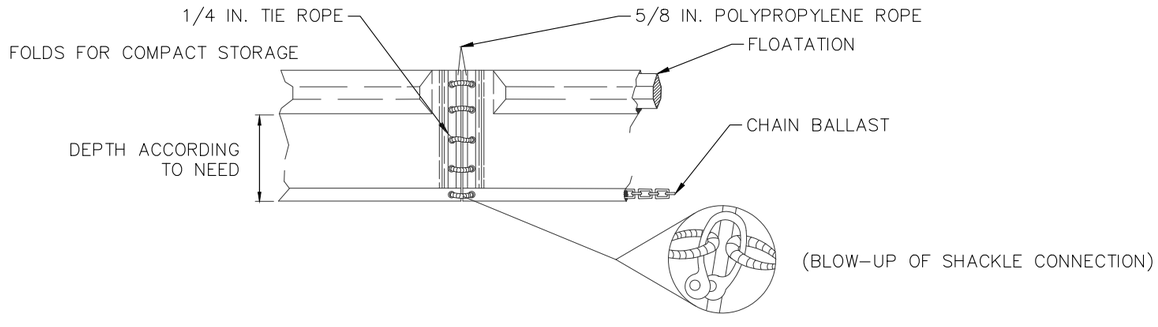
FINAL PLAN SET



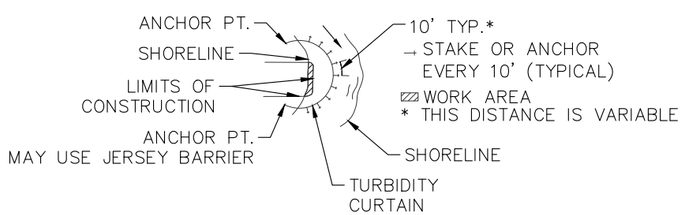
SECTION VIEW–NTS



SILTMASTER II PERMEABLE GEOTEXTILE DREDGE BARRIER NON–WOVEN DBNW BY PARKERSYSTEMS OR EQUIVALENT

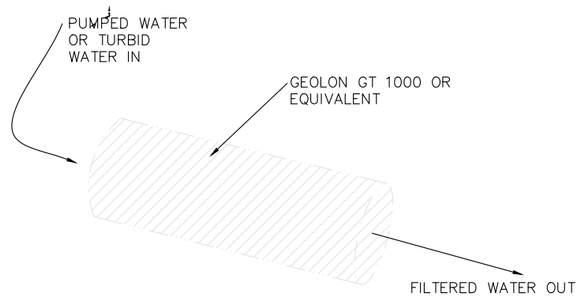
PROFILE VIEW–NTS

TYPICAL LAYOUTS
STREAMS, PONDS, AND LAKES (PROTECTED AND NON–TIDAL)



PLAN VIEW–NTS

1 / EC05 TURBIDITY CURTAIN



TO BE USED TO FILTER ALL PUMPED WATER

2 / EC05 GEO–TUBE FILTER

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO EROSION CONTROL AND CARE OF WATER DETAILS

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

TROUT UNLIMITED

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DESIGN FIRM NAME AND ADDRESS

RIVER RESTORATION.ORG

Riverrestoration.org
P.O. Box248,
Carbondale, CO 81623

PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	EC05
Date: NOV 2017	
Scale: NTS	

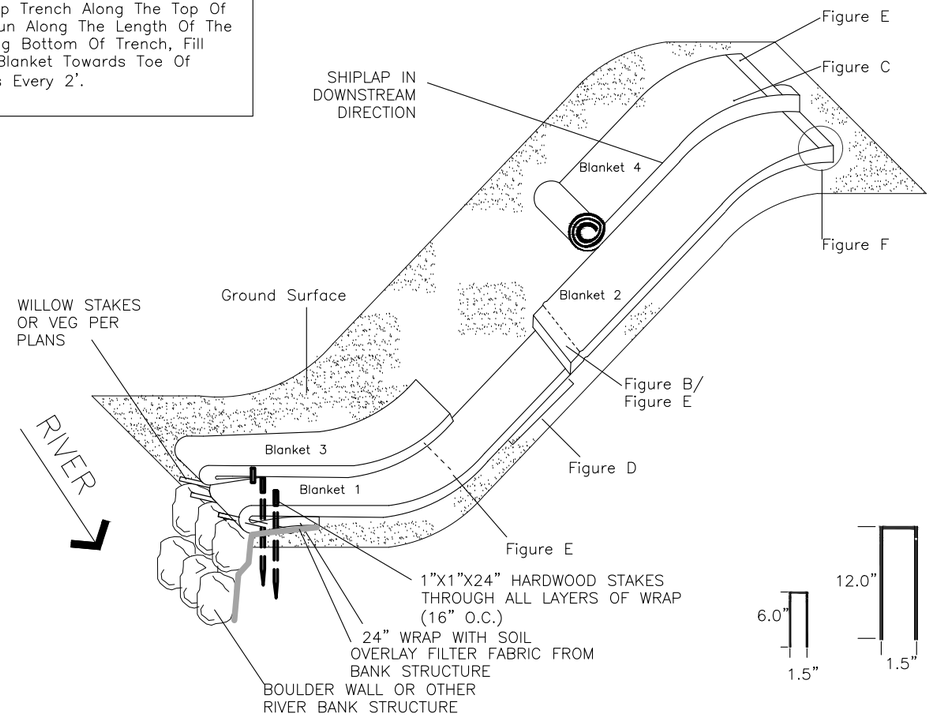
Notes:

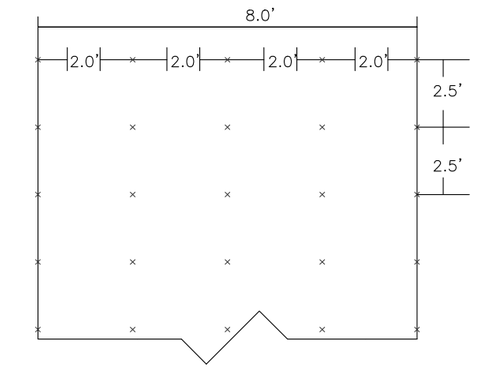
1. Detail represents example of manufacturer's specifications. Blankets shall be installed per manufacturer's specifications.
2. Contractor Shall Use All Natural 100% Biodegradable Erosion Control Blankets, See Specifications for additional information.
3. Stake Blanket In Place, Cut Holes Through The Layers, Then Dig The Planting Holes In The Soil. Staple Around Plant Every 1'.
4. Erosion Control Material Must Be Placed Loosely Over Ground Surface. Do Not Stretch.
5. Excavate A 6" Wide By 6" Deep Trench Along The Top Of The Slope. The Trench Shall Run Along The Length Of The Installation. Staple Blanket Along Bottom Of Trench, Fill With Compacted Soil, Overlap Blanket Towards Toe Of Slope, And Secure With Staples Every 2'.

*Approximately 200 Staples Per 8.0' Roll.

Drawings Not To Scale

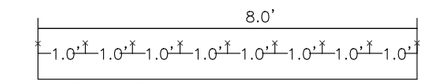
8.0' Wide Blanket Shown





× Denotes Staple Location

Figure D– Plan View



× Denotes Staple Location

Figure E– Plan View

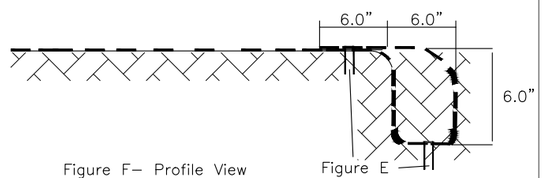


Figure F– Profile View

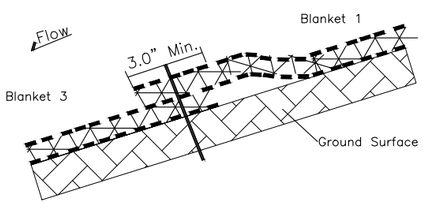


Figure B– Profile View

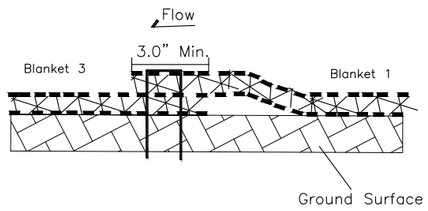


Figure C– Cross Section View

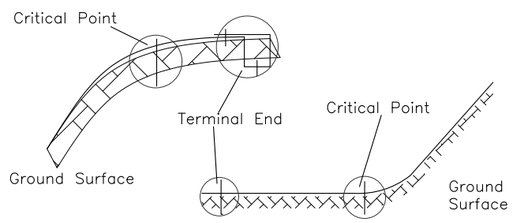


Figure G– Critical Point Securing

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO EROSION CONTROL AND CARE OF WATER DETAILS

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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PROJECT NAME AND ADDRESS

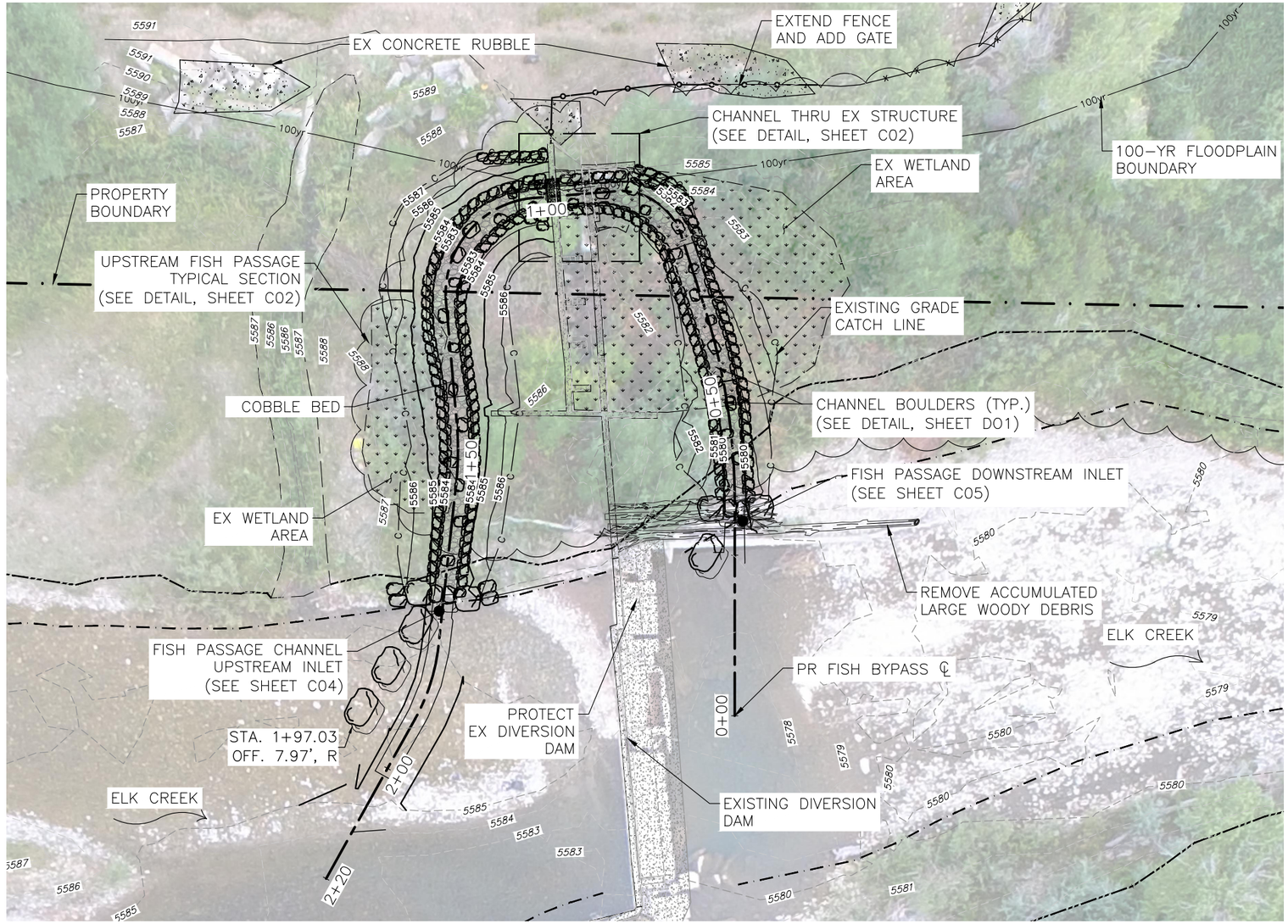
Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	EC06
Date: NOV 2017	
Scale: NTS	

FINAL PLAN SET

CONSTRUCTION NOTES:

1. CONTRACTOR SHOULD ANTICIPATE MAKING ADJUSTMENTS TO STRUCTURES AFTER FLOW IS INTRODUCED TO THE MAIN CHANNEL TO MEET PERFORMANCE CRITERIA, SEE SPECS FOR MORE INFORMATION
2. SEE SHEETS R01 FOR RESTORATION PLANS.
3. SEE SHEET C03 FOR FISH BOULDER LOCATIONS AND ELEVATIONS.

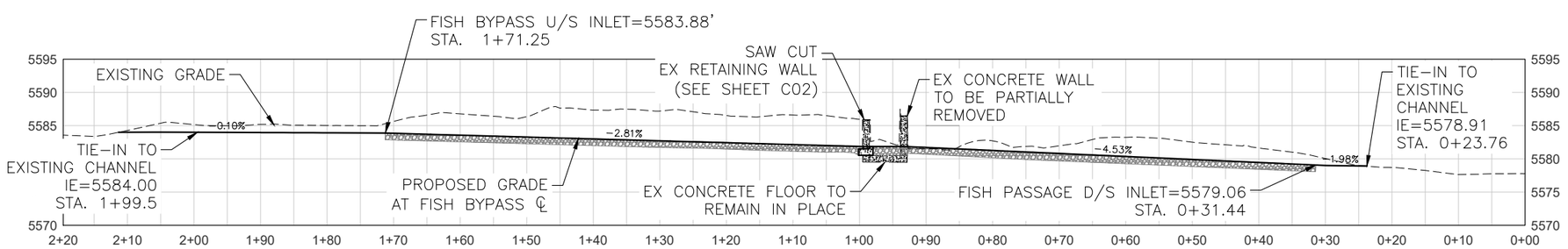


PLAN VIEW

N

0 10 20 Feet

(WHEN FULL SIZE)



PROFILE

1H:1V

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO FISH BYPASS PLAN AND PROFILE

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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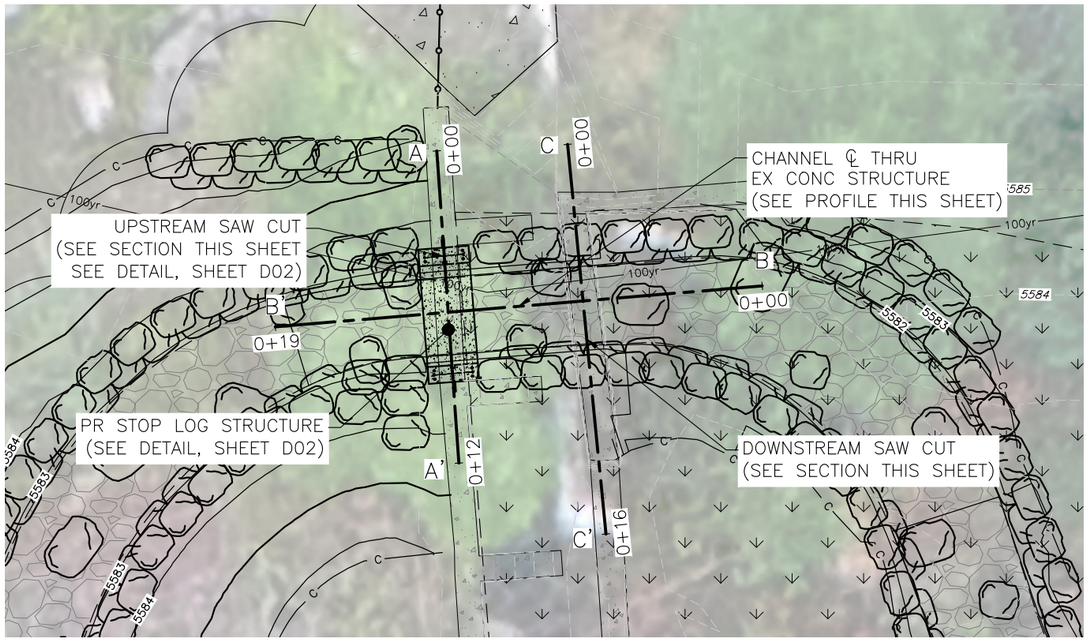
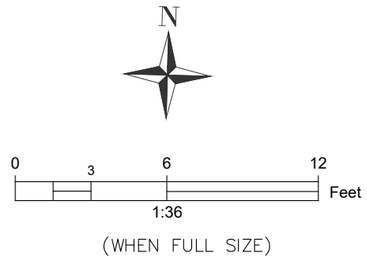
PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	C01
Date: NOV 2017	
Scale: 1"= 10' (FULL SIZE)	

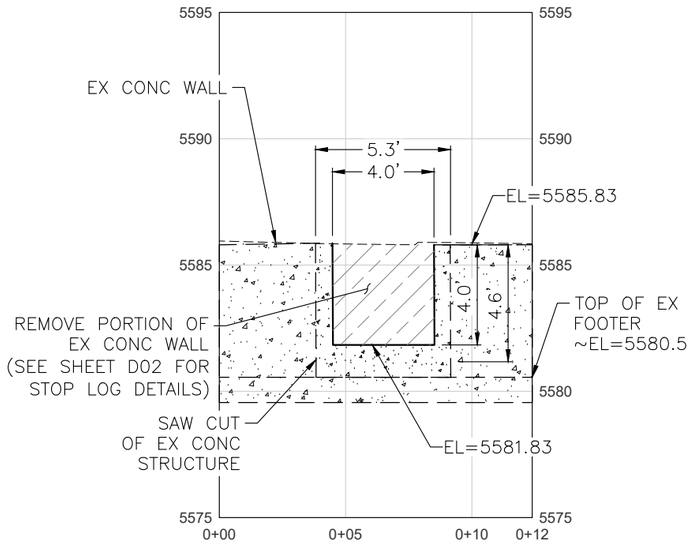


PLAN VIEW



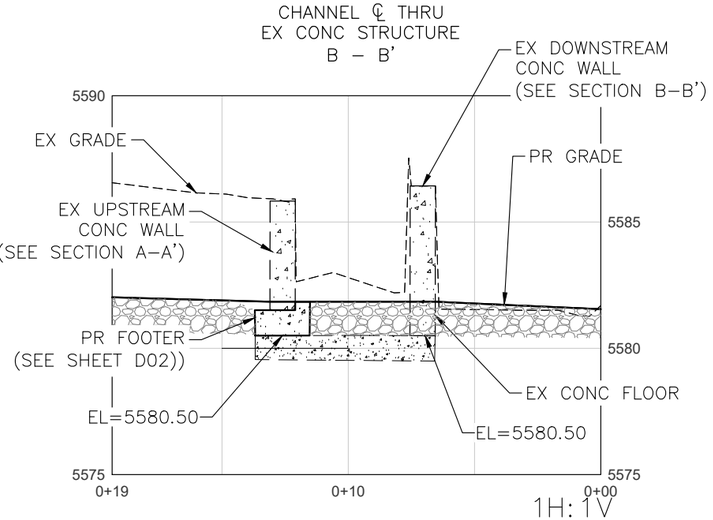
(WHEN FULL SIZE)

SAW CUT OF UPSTREAM
WALL SECTION
A – A'



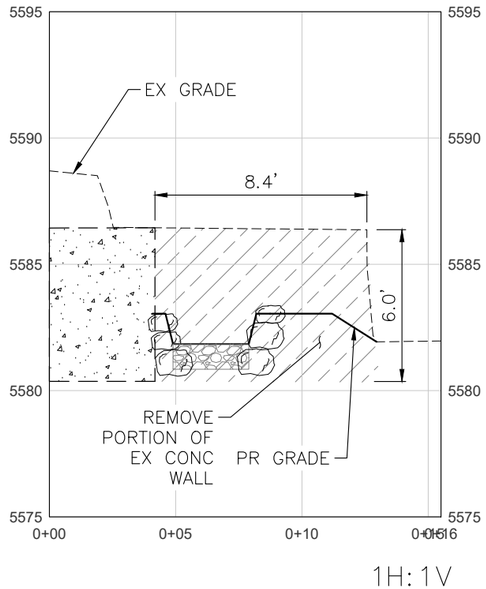
1H: 1V

CHANNEL ℄ THRU
EX CONC STRUCTURE
B – B'



1H: 1V

SAW CUT OF DOWNSTREAM
WALL SECTION
C – C'



1H: 1V

SECTIONS AND PROFILE

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO
CONCRETE STRUCTURE PLAN, SECTIONS AND PROFILE

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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DESIGN FIRM NAME AND ADDRESS

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PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	C02
Date: NOV 2017	
Scale: 1"=3' (FULL SIZE)	

PLAN VIEW

N

0 10 20 Feet

(WHEN FULL SIZE)

UPPER SECTION

ROCK ID	STATION OFFSET	TOP ELEV.	"B" DIA. (FT)
U1	STA. 1+65.80 OFF. 0.06', L	5584.55'	3.5'
U2	STA. 1+59.54 OFF. 1.27', L	5584.90'	3.5'
U3	STA. 1+53.99 OFF. 0.56', L	5585.00'	3.0'
U4	STA. 1+50.53 OFF. 0.92', R	5584.50'	3.5'
U5	STA. 1+44.59 OFF. 0.90', L	5584.40'	4.0'
U6	STA. 1+39.09 OFF. 0.07', R	5584.50'	4.0'
U7	STA. 1+32.57 OFF. 0.68', L	5584.00'	3.5'
U8	STA. 1+27.48 OFF. 0.54', R	5584.10'	3.5'
U9	STA. 1+22.23 OFF. 1.36', L	5584.00'	3.0'
U10	STA. 1+17.71 OFF. 0.61', L	5583.50'	4.0'
U11	STA. 1+13.18 OFF. 0.16', L	5583.80'	3.0'
U12	STA. 1+08.03 OFF. 1.78', L	5583.80'	3.5'
U13	STA. 1+04.81 OFF. 1.16', R	5583.60'	3.5'
U14	STA. 1+02.06 OFF. 1.21', L	5583.30'	3.0'
U15	STA. 1+00.53 OFF. 1.20', R	5582.85'	3.0'

LOWER SECTION

ROCK ID	STATION OFFSET	TOP ELEV.	"B" DIA. (FT)
L1	STA. 0+95.76 OFF. 1.25', L	5583.00'	3.5'
L2	STA. 0+94.54 OFF. 1.03', R	5582.80'	3.5'
L3	STA. 0+91.21 OFF. 0.21', L	5582.80'	3.0'
L4	STA. 0+86.62 OFF. 0.65', R	5583.00'	4.0'
L5	STA. 0+83.33 OFF. 1.90', L	5582.75'	3.5'
L6	STA. 0+77.38 OFF. 0.06', R	5582.20'	3.0'
L7	STA. 0+73.29 OFF. 1.68', L	5582.10'	4.0'
L8	STA. 0+70.31 OFF. 0.24', R	5581.80'	3.0'
L9	STA. 0+66.40 OFF. 0.87', L	5581.70'	3.0'
L10	STA. 0+61.87 OFF. 0.43', R	5581.30'	4.0'
L11	STA. 0+57.75 OFF. 0.25', L	5581.50'	3.5'
L12	STA. 0+52.35 OFF. 1.04', L	5581.50'	4.0'
L13	STA. 0+48.62 OFF. 0.49', R	5580.60'	3.0'
L14	STA. 0+43.98 OFF. 0.54', L	5580.70'	3.0'
L15	STA. 0+40.01 OFF. 0.53', R	5580.25'	3.0'

CONSTRUCTION NOTES:

1. STATION, OFFSETS AND ELEVATIONS ABOVE ARE FOR APPROXIMATE TOP CENTER OF BOULDER.
2. CONTRACTOR SHOULD ANTICIPATE MAKING ADJUSTMENTS TO STRUCTURES AFTER FLOW IS ROUTED INTO NEW CHANNEL TO MEET PERFORMANCE CRITERIA, SEE SPECS FOR MORE INFORMATION
3. CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE PR FISH BYPASS ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO

FISH BYPASS BOULDER LAYOUT

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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DESIGN FIRM NAME AND ADDRESS

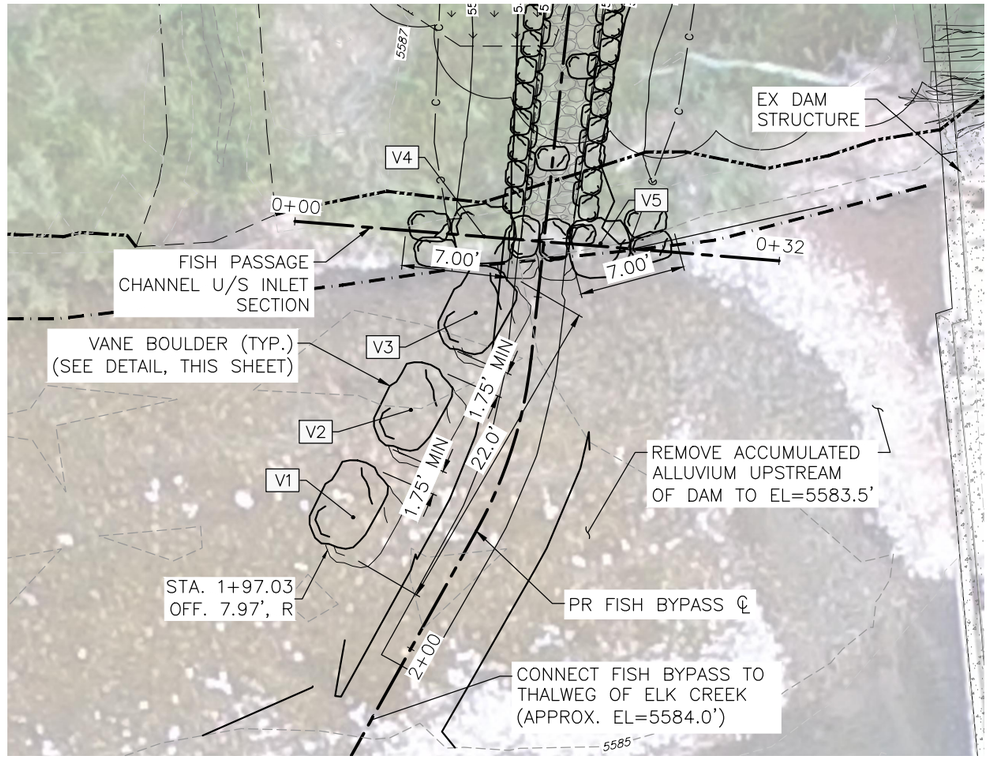
RIVER RESTORATION

Riverrestoration.org
P.O. Box248,
Carbondale, CO 81623

PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	C03
Date: NOV 2017	
Scale: 1"=5' (FULL SIZE)	



PLAN VIEW

N

0 5 10 Feet

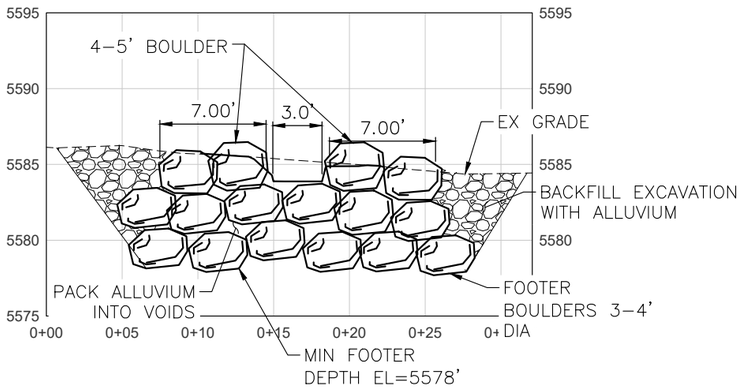
(WHEN FULL SIZE)

BOULDER TABLE

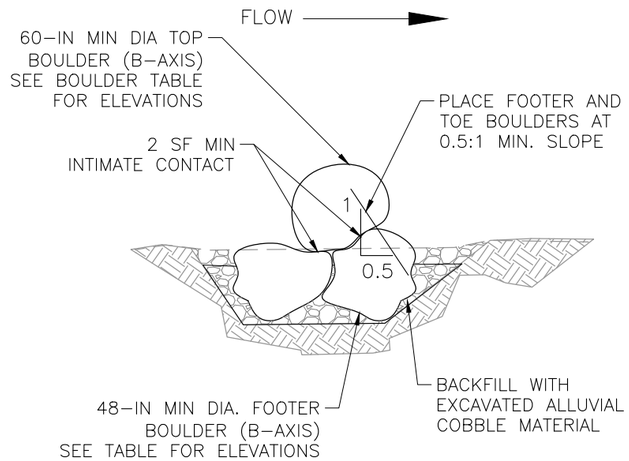
ROCK ID	STATION OFFSET	TOP ELEV. / FOOTER ELEV.	"B" DIA. (FT)
V1	STA. 1+93.77 OFF. 7.96', R	5585.75' 5576.00'	5'–6' TOP 4'–5' FOOTERS
V2	STA. 1+84.40 OFF. 7.03', R	5586.00' 5577.00'	5'–6' TOP 4'–5' FOOTERS
V3	STA. 1+76.21 OFF. 3.64', R	5586.25' 5577.50'	5'–6' TOP 4'–5' FOOTERS
V4	STA. 1+71.43 OFF. 3.99', R	5586.50' 5578.00'	4'–5' TOP 3'–4' FOOTERS
V5	STA. 1+71.59 OFF. 3.79', L	5586.50' 5578.00'	4'–5' TOP 3'–4' FOOTERS

CONSTRUCTION NOTES:

1. STATION, OFFSETS AND ELEVATIONS ABOVE ARE FOR APPROXIMATE TOP CENTER OF BOULDER.
2. CONTRACTOR SHOULD ANTICIPATE MAKING ADJUSTMENTS TO STRUCTURES AFTER FLOW IS ROUTED INTO NEW CHANNEL TO MEET PERFORMANCE CRITERIA, SEE SPECS FOR MORE INFORMATION
3. CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE PR FISH BYPASS ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.



FISH PASSAGE CHANNEL UPSTREAM INLET SECTION



VANE BOULDER DETAIL

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO

FISH BYPASS CHANNEL U/S INLET PLAN AND SECTION

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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DESIGN FIRM NAME AND ADDRESS

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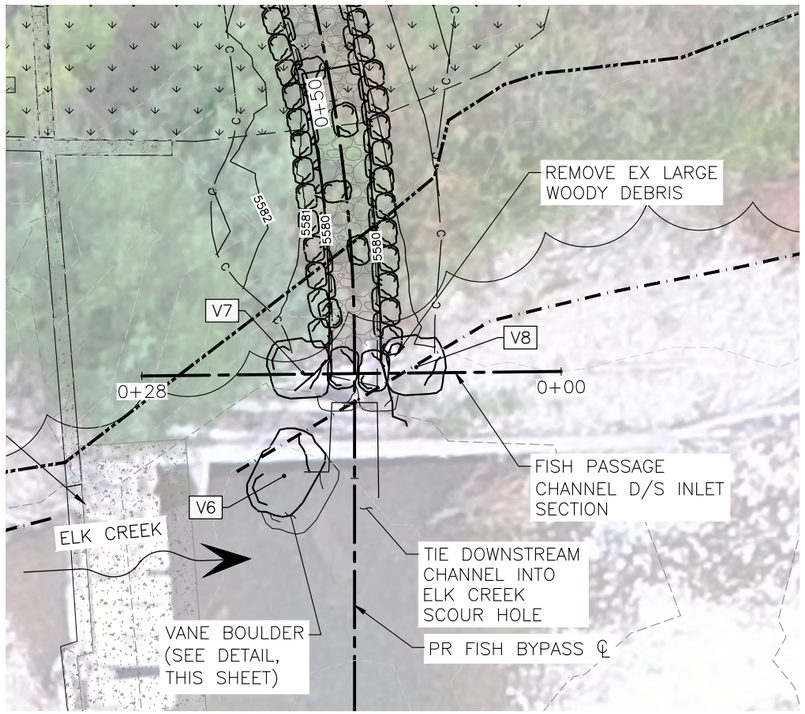
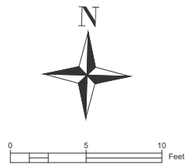
PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	C04
Date: NOV 2017	
Scale: 1"=5' (FULL SIZE)	



PLAN VIEW



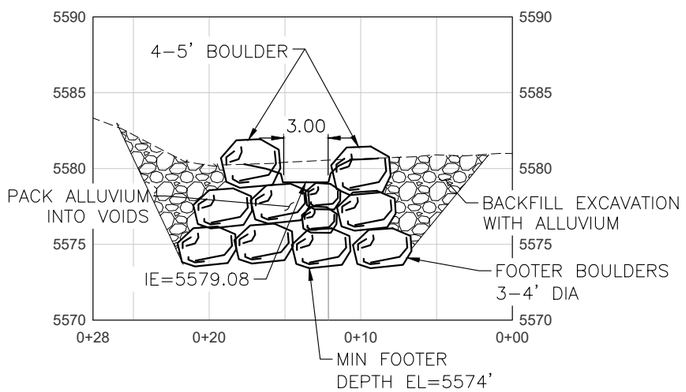
(WHEN FULL SIZE)

BOULDER TABLE

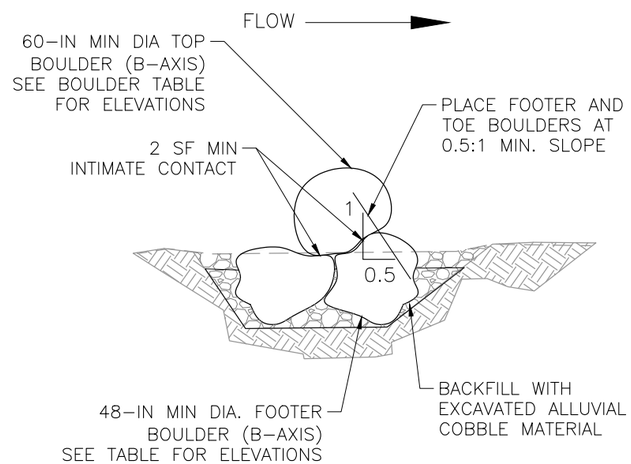
ROCK ID	STATION OFFSET	TOP ELEV. / FOOTER ELEV.	"B" DIA. (FT)
V6	STA. 0+25.19 OFF. 4.63', L	5581.0 5574.00'	5'–6' TOP 4'–5' FOOTERS
V7	STA. 0+31.98 OFF. 3.46', L	5582.00' 5574.00'	4'–5' TOP 3'–4' FOOTERS
V9	STA. 0+32.34 OFF. 4.14', R	5581.50' 5574.00'	4'–5' TOP 3'–4' FOOTERS

CONSTRUCTION NOTES:

1. STATION, OFFSETS AND ELEVATIONS ABOVE ARE FOR APPROXIMATE TOP CENTER OF BOULDER.
2. CONTRACTOR SHOULD ANTICIPATE MAKING ADJUSTMENTS TO STRUCTURES AFTER FLOW IS ROUTED INTO NEW CHANNEL TO MEET PERFORMANCE CRITERIA, SEE SPECS FOR MORE INFORMATION
3. CONTRACTOR IS REQUIRED TO PROVIDE CAPABILITY OF STAKING STATIONS AND OFFSETS OF THE PR FISH BYPASS ALIGNMENT REAL TIME DURING CONSTRUCTION WITH TOTAL STATION OR SURVEY GRADE GPS. SEE SPECS, SECTION 2 FOR MORE DETAILS.



FISH PASSAGE CHANNEL DOWNSTREAM INLET SECTION



NOTE: WHEN TOP BOULDER IS EXPOSED, OFFSET FOOTER BOULDERS IN THE UPSTREAM & DOWNSTREAM DIRECTIONS, PERPENDICULAR TO FLOW

VANE BOULDER DETAIL

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO

FISH BYPASS CHANNEL D/S INLET PLAN AND SECTION

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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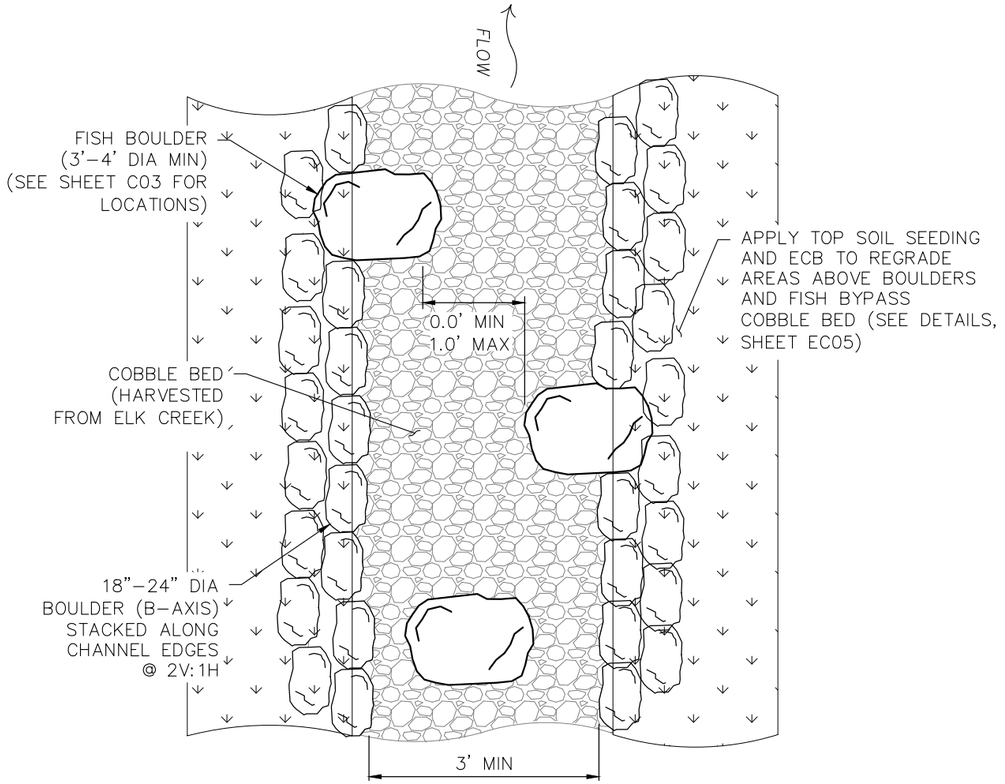
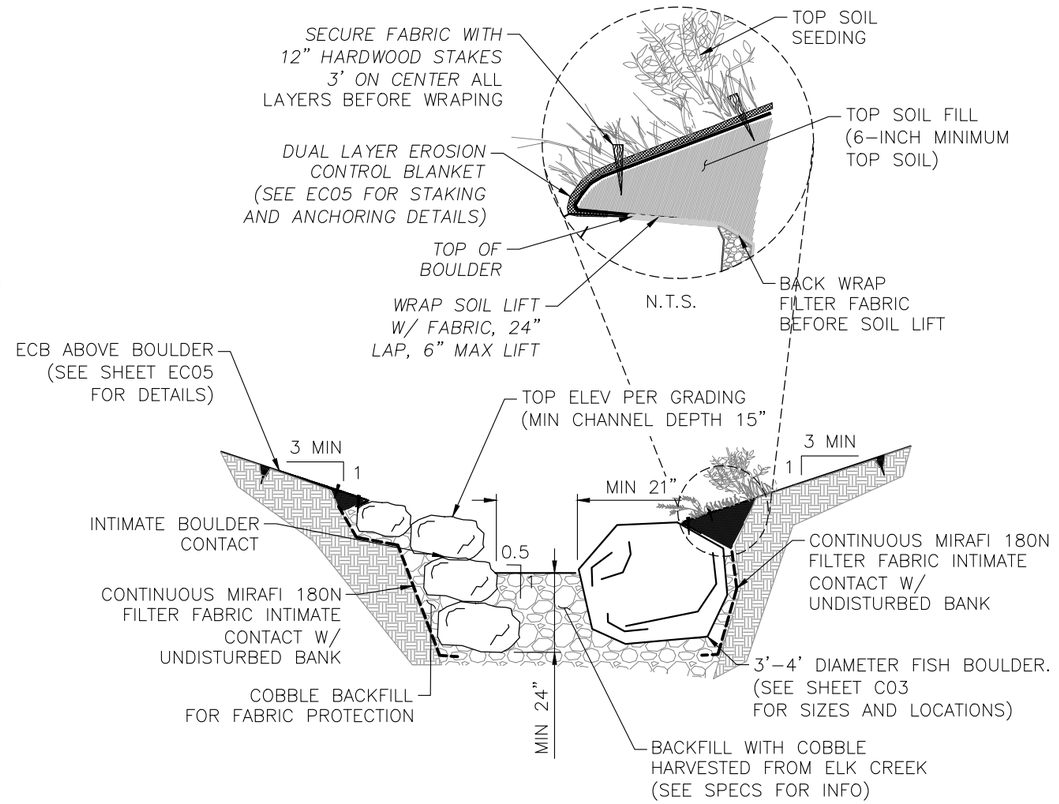
New Castle, Colorado
81647

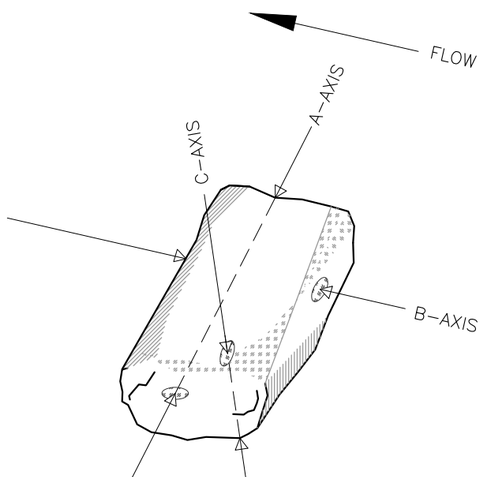
Project	Sheet
38045	C05
Date: NOV 2017	
Scale: 1"=5' (FULL SIZE)	



1 D01 TYPICAL CHANNEL PLAN
N.T.S.



2 D01 TYPICAL CHANNEL SECTION
N.T.S.



3 D01 BOULDER AXIS DETAIL
N.T.S.

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO

FISH BYPASS CHANNEL DETAILS

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

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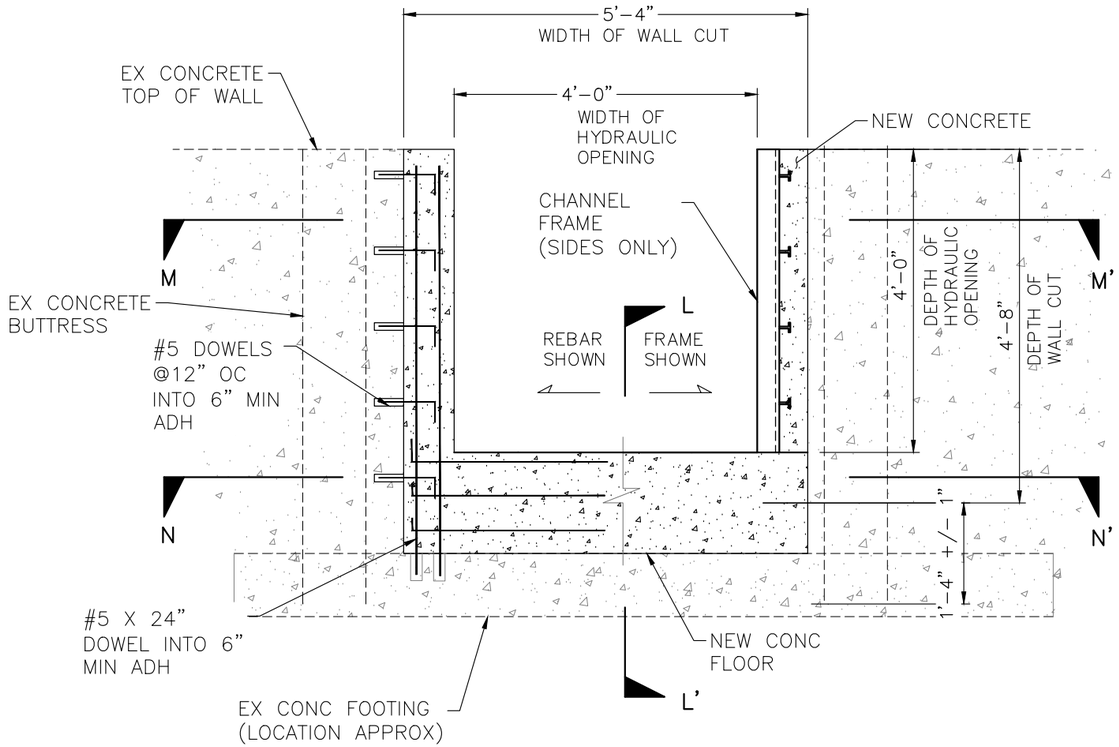
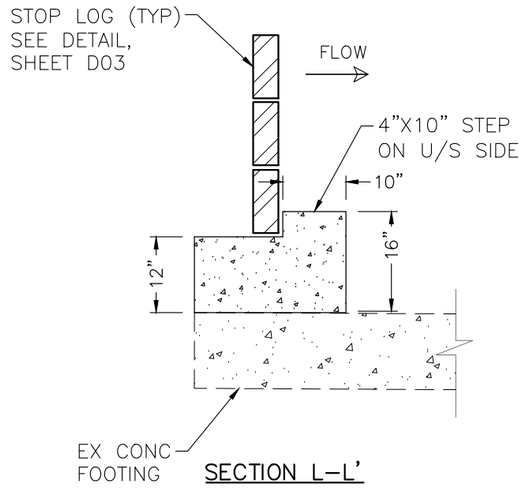
Carbondale, CO 81623

PROJECT NAME AND ADDRESS

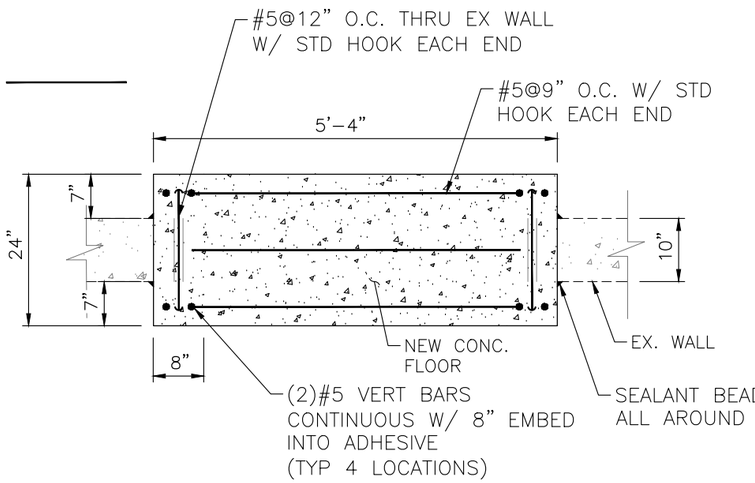
Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	D01
Date: NOV 2017	
Scale: NTS	

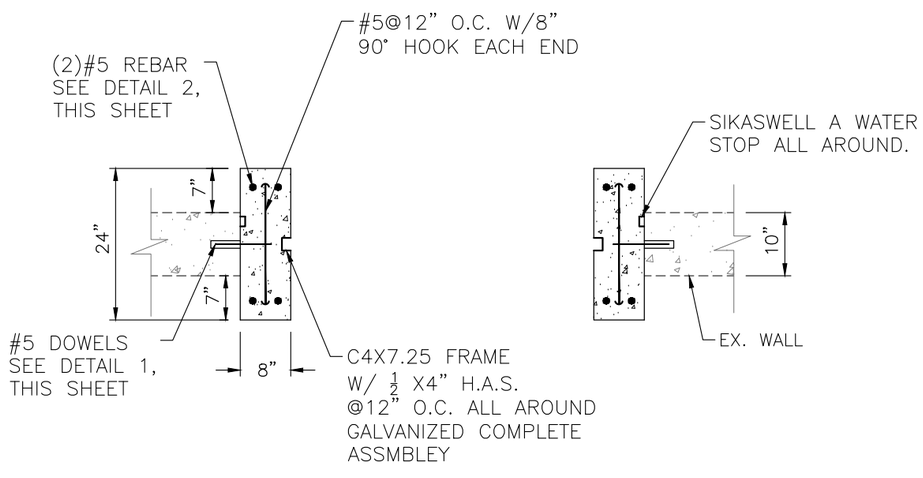




SECTION L-L'



SECTION N-N'



SECTION M-M'

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO
STOP LOG STRUCTURE DETAILS

No.	REVISION/UPDATE	Date

CLIENT NAME AND ADDRESS

TROUT UNLIMITED

Richard Van Gytenbeek
Trout Unlimited
115 North 5th Street, Suite#409
Grand Junction, CO 81501

DESIGN FIRM NAME AND ADDRESS

RIVER RESTORATION.ORG

Riverrestoration.org
P.O. Box248,
Carbondale, CO 81623

PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	D02
Date: NOV 2017	
Scale: NTS	

FINAL PLAN SET

1 / D03 STOP LOG DETAIL
N.T.S.

2 / D03 XX DETAIL
N.T.S.

3 / D03 YY DETAIL
N.T.S.

4 / D03 ZZ DETAIL
N.T.S.

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO
STOP LOG STRUCTURE DETAILS

No.	REVISION/UPDATE	Date

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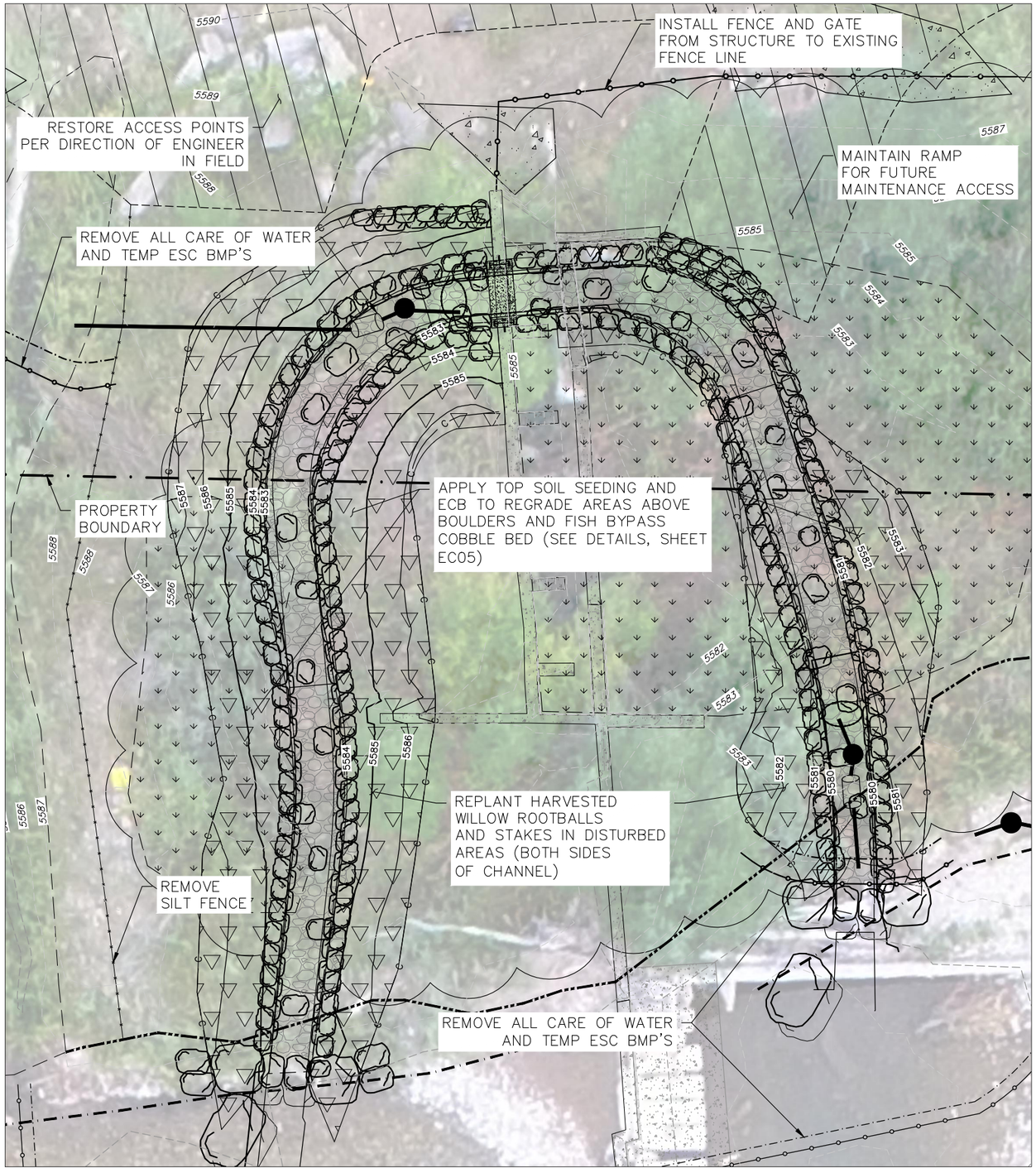

PLAN VIEW

SEED MIX TABLE

Common name	Scientific name	Growth form	Revegetation technique	% in mix *
Riparian buffer (Upstream of Structure)				
Western wheatgrass	*Pascopyrum smithii*	grass	seed (drill or broadcast)	25
Blue grama	*Bouteloua gracilis*	grass	seed (drill or broadcast)	25
Slender wheatgrass	*Elymus trachyculus*	grass	seed (drill or broadcast)	10
Alkali sacaton	*Sporobolus airoides*	grass	seed (drill or broadcast)	11
Indian ricegrass	*Achatherum hymenoides*	grass	seed (drill or broadcast)	10
Inland saltgrass	*Distichlis spicata*	grass	seed (drill or broadcast)	15
Palmer penstemon	*Penstemon palmeri*	forb	seed (drill or broadcast)	2
Solidago canadensis	*Canada goldenrod*	forb	seed (drill or broadcast)	2
Wetland areas (Downstream of Sturcture)				
Western wheatgrass	*Pascopyrum smithii*	grass	broadcast seeding	20
Inland saltgrass	*Distichlis spicata*	grass	broadcast seeding	30
Alkali grass	*Puccinellia airoides*	grass-like	broadcast seeding	20
Alkali muhley	*Mulenberghia aspertifolia*	grass-like	broadcast seeding	20
Arctic rush	*Juncus arcticus*	grass-like	broadcast seeding	2
Common spikerush	*Eleocharis palustris*	grass-like	broadcast seeding	2
Alkali bulrush	*Scirpus maritimus*	grass-like	broadcast seeding	2
Marsh milkweed	*Asclepsia incarnata*	forb	broadcast seeding	2
Nutall's sunflower	*Helianthus nuttallii*	forb	broadcast seeding	2

* Note - species percentages are a general guidance and can be changed with Engineer's approval. All seeds must be raked into placed topsoils and covered with soil (or drill-seeded), then soils tamped down prior to installation of the erosion control blankets.

N

0 5 10 Feet

(WHEN FULL SIZE)

FINAL PLAN SET

PROFESSIONAL ENGINEER STAMP

PRELIMINARY

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO REVEGETATION PLAN

No.	REVISION/UPDATE	Date

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RIVER RESTORATION FOUNDATION

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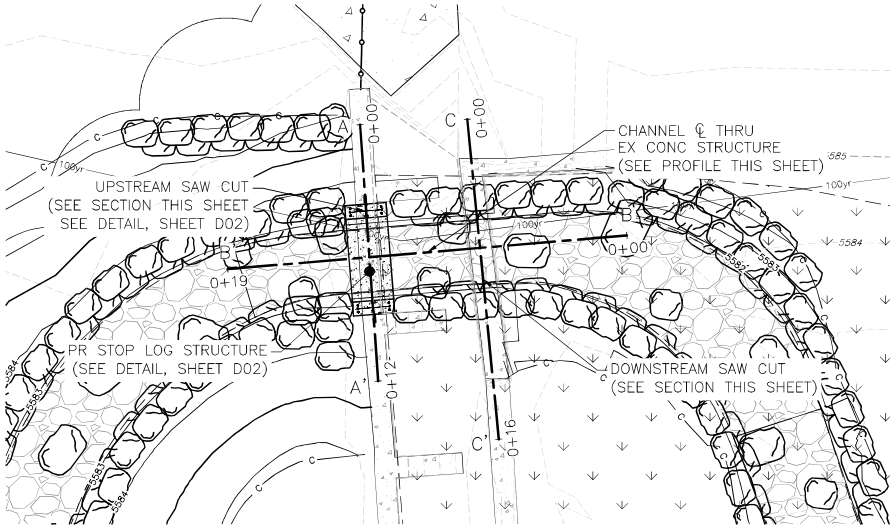
Carbondale, CO 81623

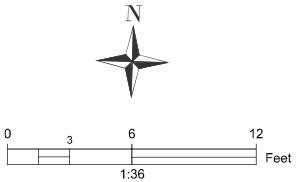
PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of Elk Creek
New Castle, Colorado
81647

Project	Sheet
38045	R01
Date: NOV 2017	
Scale: 1"=5' (FULL SIZE)	

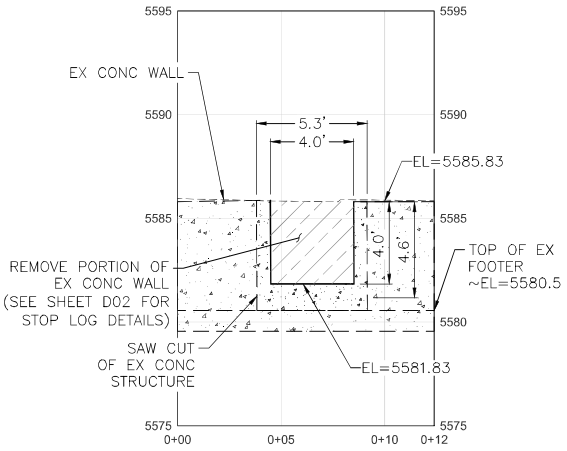


PLAN VIEW



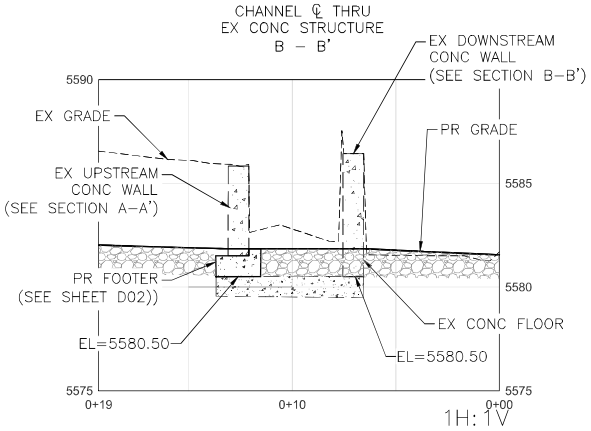
(WHEN FULL SIZE)

SAW CUT OF UPSTREAM
WALL SECTION
A – A'



1H: 1V

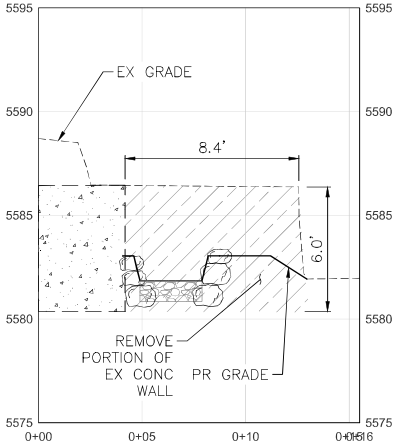
CHANNEL ℄ THRU
EX CONC STRUCTURE
B – B'



1H: 1V

SECTIONS AND PROFILE

SAW CUT OF DOWNSTREAM
WALL SECTION
C – C'



1H: 1V

BID SET

PROFESSIONAL ENGINEER STAMP

FISH BYPASS CHANNEL OF ELK CREEK - NEW CASTLE, CO
CONCRETE STRUCTURE PLAN, SECTIONS AND PROFILE

No.	REVISION/UPDATE	Date

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DESIGN FIRM NAME AND ADDRESS

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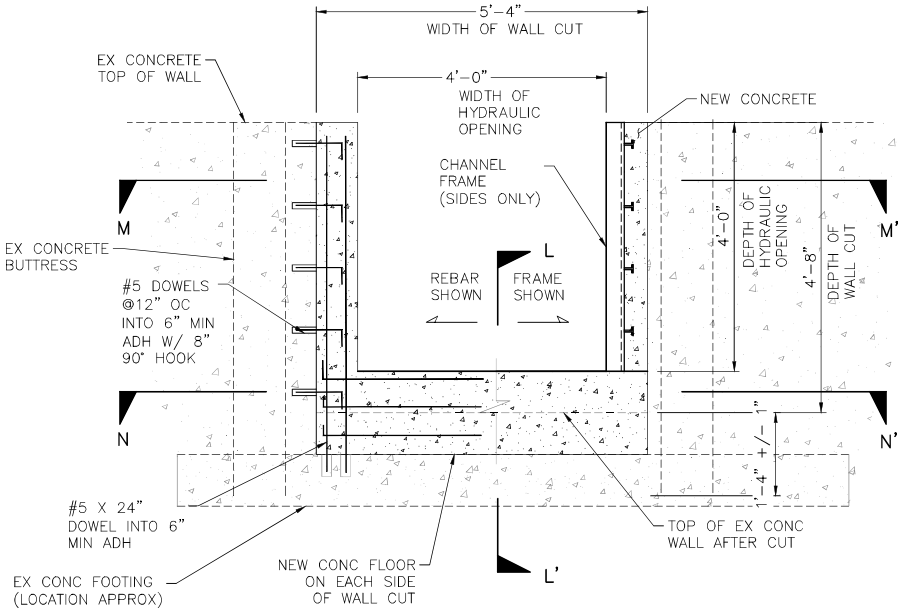
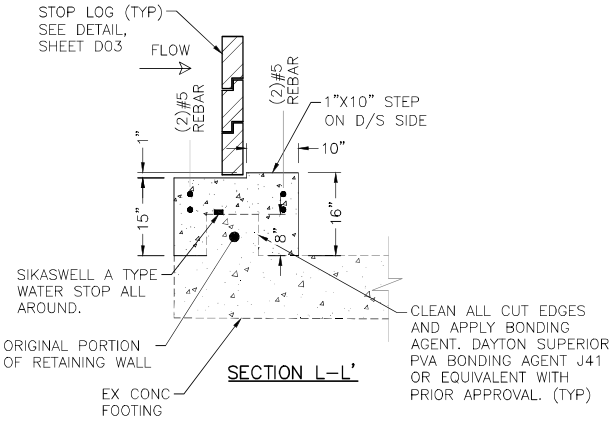
PROJECT NAME AND ADDRESS

Ware and Hinds - Fish Bypass of
Elk Creek
New Castle, Colorado
81647

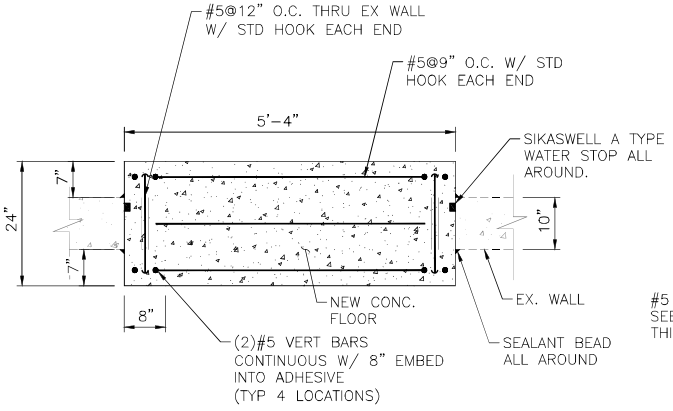
Project	Sheet
36045	C02
Date: DEC 2017	
Scale: 1"=3' (FULL SIZE)	



NOTES:
1. CONCRETE F'c=4,000 PSI
2. REINFORCEMENT STEEL Fy=60 KSI



SECTION L-L'



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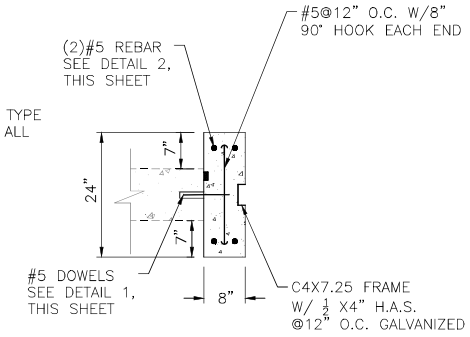
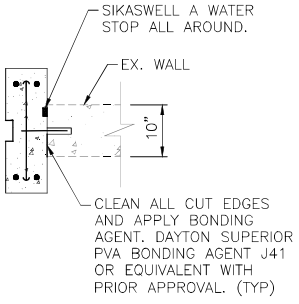


SECTION M-M'



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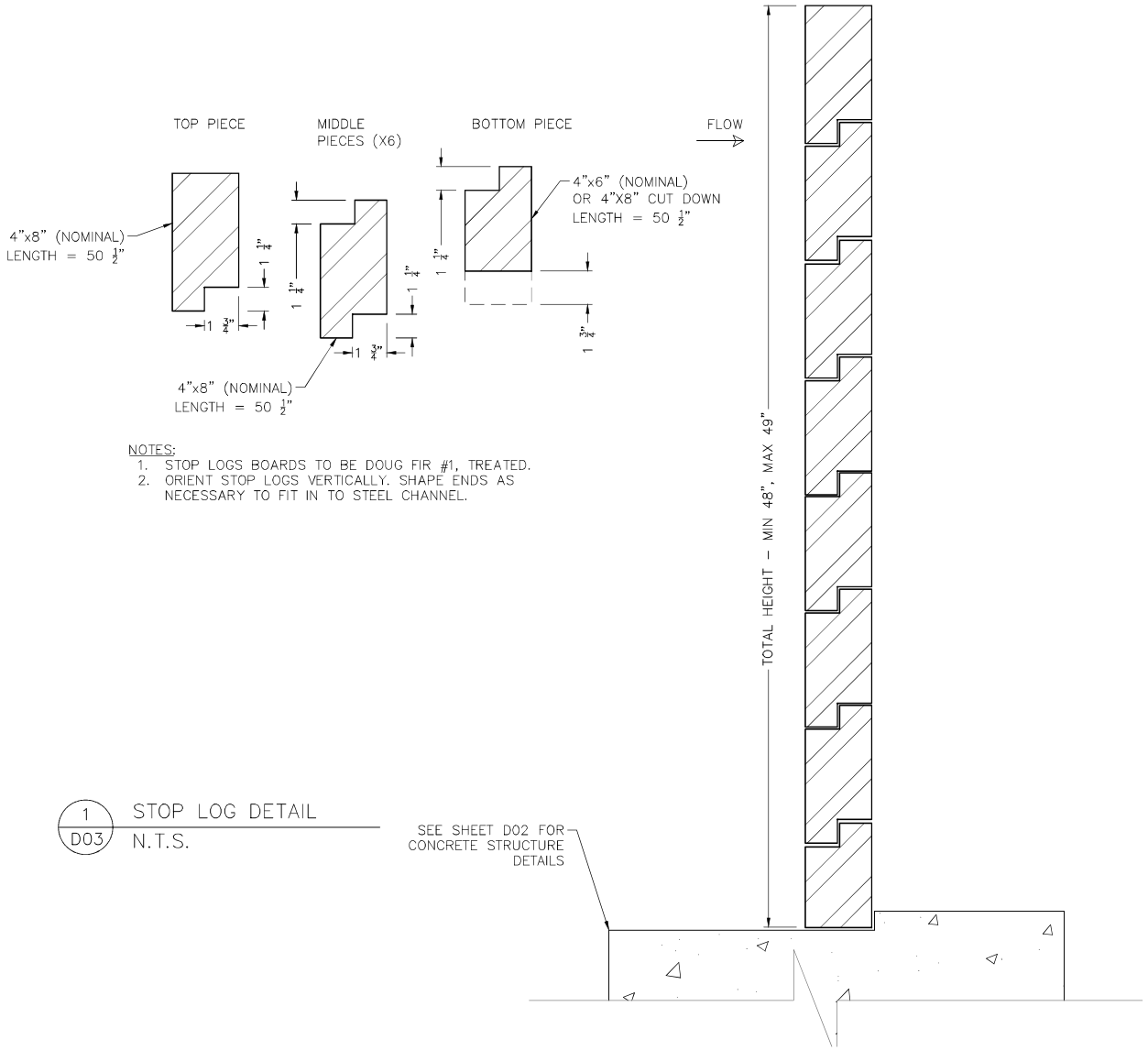

NOTES:
1. STOP LOGS BOARDS TO BE DOUG FIR #1, TREATED.
2. ORIENT STOP LOGS VERTICALLY. SHAPE ENDS AS NECESSARY TO FIT IN TO STEEL CHANNEL.

1 / D03 STOP LOG DETAIL
N.T.S.

BID SET

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