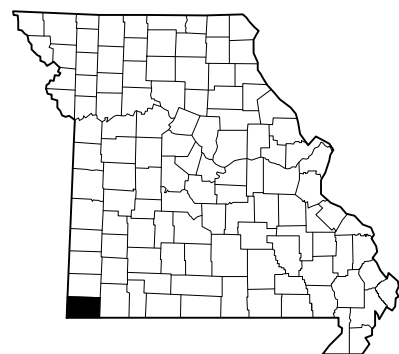


BANK STABILIZATION

BUFFALO CREEK AT KLONDIKE ROAD

MCDONALD COUNTY, MISSOURI

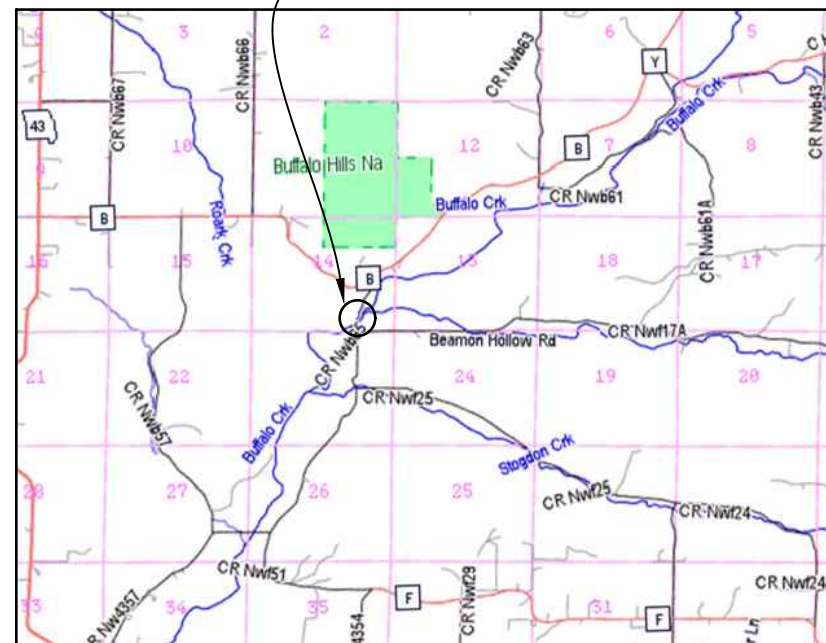
MISSOURI NRCS EMERGENCY WATERSHED PROTECTION



McDonald County, Missouri

PROJECT LOCATION: SE ¼ of Section 14, Township 23N, Range 34W

Latitude 36.723° N, Longitude 94.565° W



ESTIMATED PROJECT QUANTITIES

DESCRIPTION	BASE DESIGN		ADDITIONAL OPTION	
	LENGTH	QUANTITY	LENGTH	QUANTITY
Rock Blanket (Slope Protect)	550 LF	1,700 TN*	-	-
Rock Blanket (Flat Overflow)	1,225 SF	205 TN*	-	-
Stone Weirs	-	-	70 LF	210 TN*
Stone Tieback	50 LF	200 TN*	-	-
Excavation, Wet	-	1,160 CY	-	-
Seeding and Mulching	-	3/4 ACRE	-	-

* Estimate based on 1.5 tons per cubic yard of placed and compacted rock

NOTES:

1. PERMITTING: All construction shall be completed in compliance with the conditions of the U.S. Army Corps of Engineers Little Rock District General Permit (GP) 41, Application #SWL-2008-00066, Issue Date: April 23, 2018 – Expiration Date: April 23, 2023. The contractor is required to maintain a copy of the permit onsite throughout the duration of the construction period.
2. EXCAVATION: Missouri law requires that any person making or beginning any excavation notify all underground facility owners/operators which may be affected by said excavation at least three but not more than ten working days in advance, except in the case of an emergency. A "working day" is everyday, except Saturday, Sunday, or a legally declared local, state or federal holiday. To make this notification and locate all utilities at the site or on ingress & egress roads prior to excavation, contact the Missouri One Call system and submit a locate request. The phone number for the Missouri One Call System is 800-344-7483 (1-800-DIG-RITE).
3. TRANSPORTATION: Prior to construction, the contractor shall provide a transportation plan to the McDonald County Commission delineating haul routes and intended dates of use. The contractor shall coordinate with the county road district to ensure haul routes and loads conform to tonnage limitations on local bridges.
4. TECHNICAL ASSISTANCE: The contact numbers for technical assistance concerning the plan set are as follows:
5. JOBSITE SAFETY: The contractor and all subcontractors shall perform work on the jobsite in compliance with applicable OSHA standards and abide by all local, state, and federal regulations. The contractor shall submit to the engineer a project Safety Plan (SP) for all work performed by the contractor and all subcontractors prior to commencement of work. The purpose of the SP is to encourage and enable all work to be performed in the safest possible manner and that all parties involved are aware of their individual responsibility for safety on the jobsite. The SP shall outline and detail for all workers, the specific procedures and actions necessary to respond to a jobsite emergency and the measures taken to communicate these requirements to all workers. The SP shall include a list of local emergency contacts including phone numbers. A copy of the emergency contact list shall be accessible to workers. In the case where there is no cellular or land line phone service at the jobsite, the SP shall identify how to reach the nearest available phone service.

Michael Malone, REI Civil Engineer, P.E. (417) 300-2705
Keith Lindquist, McDonald County Presiding Commissioner (417) 223-7530

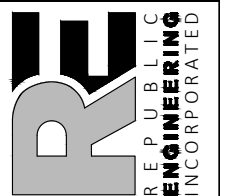


800-344-7483 (1-800-DIG-RITE)



COVER SHEET

BUFFALO CREEK AT KLONDIKE ROAD BANK STABILIZATION
MCDONALD COUNTY COMMISSION
MISSOURI NRCS EMERGENCY WATERSHED PROTECTION



SHEET IDENTIFICATION

G-01

SHEET 1 OF 7

Description	Date
Investigated:	04 JUN 18
Surveyed:	04 JUL 18
Designed:	07 JUL 18
Drafted:	15 JUL 18
Approved:	29 JUL 18

ABBREVIATIONS	
BM	BENCHMARK
C.C.	CENTER TO CENTER
CF	CUBIC FEET
CL	CENTERLINE
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
CY	CUBIC YARD
DC	DEGREE OF CURVE
DIA,	DIAMETER
E	EAST
EA	EACH
EL, ELEV	ELEVATION
FL	FLOWLINE
FT, '	FOOT, FEET
GA	GAUGE
GALV	GALVANIZED
H, HORZ	HORIZONTAL
HDWL	HEADWALL
HWY	HIGHWAY
I.D.	INSIDE DIAMETER
IN, "	INCH
LC	LENGTH OF CURVE
LPSTP	LONGITUDINAL PEAKED STONE TOE PROTECTION
LT	LEFT
MAX	MAXIMUM
MIN	MINIMUM
MODOT	MISSOURI DEPARTMENT OF TRANSPORTATION
N	NORTH
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NTS	NOT TO SCALE
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
PSI	POUNDS PER SQUARE INCH
PVMT	PAVEMENT
R	RADIUS
RC	RADIUS OF CURVE
RCP	REINFORCED CONCRETE PIPE
ROW, RW	RIGHT OF WAY
RT	RIGHT
S	SOUTH
STA	STATION
STL	STEEL
TEMP	TEMPORARY
TN	TON
TYP	TYPICAL
UNK	UNKNOWN
V, VERT	VERTICAL
VC	VERTICAL CURVE
VPC, VPI, VPT	VERTICAL POINT OF CURVATURE, INTERSECTION, OR TANGENCY
W	WEST
XING	CROSSING

LEGEND	
	SPOT ELEVATION
	VERTICAL/HORIZONTAL CONTROL POINT
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	PLANNED MAJOR CONTOUR
	PLANNED MINOR CONTOUR
	EXISTING TREES
	EXISTING TREE LINE
	EXISTING FENCE
	PLANNED FENCE
	EXISTING PIPE CULVERT (OPENING DIAMETER)
	EXISTING BOX CULVERT (OPENING WIDTH X HEIGHT)
	EXISTING UTILITY POLE
	EXISTING UNDERGROUND UTILITY MARKER
	ROCK RIPRAP
	ONSITE EXCAVATED SPOIL
	MULCH
	GRAVEL
	STABLE BASE
	EXISTING GROUNDLINE
	CENTERLINE
	DEPRESSION
	ROCK BLUFF
	APPROXIMATE FLOWLINE OR RIVER THALWEG
	HIDDEN
	NORTH INDICATOR

SYMBOLS	
	SECTION LETTER
	SHEET SECTION IS SHOWN
	SECTION LETTER
	SHEET SECTION IS FROM
	DETAIL NUMBER
	SHEET SECTION IS SHOWN
	DETAIL NUMBER
	SHEET DETAIL IS FROM
	VERTICAL AXIS ELEVATION (FT)
	HORIZONTAL AXIS FEET PER INCH
	DRAWING SCALE FEET PER INCH

Description	Date
	Investigated: 04 JUN 18
	Surveyed: 04 JUL 18
	Designed: 07 JUL 18
	Drafted: 15 JUL 18
	Approved: 29 JUL 18
ABBREVIATIONS, LEGEND, & SYMBOLS BUFFALO CREEK AT KLONDIKE ROAD BANK STABILIZATION McDONALD COUNTY COMMISSION MISSOURI NRCS EMERGENCY WATERSHED PROTECTION	
SHEET IDENTIFICATION	
G-02	
SHEET 2 OF 7	

ROCK RIPRAP MATERIAL SOURCE AND SELECTION:

1. Rock riprap shall be obtained from a MoDOT approved source for bulk rock aggregate, and consist of individual rock fragments that are dense, sound, and free from cracks, seams, and other defects conducive to accelerated weathering. Rock fragments shall be angular to subrounded, with the least dimension of an individual rock fragment not less than one-third the greatest dimension of the fragment.
2. Unless otherwise specified, rock riprap shall have a gradation in accordance with MoDOT material specification #609.60.2.4, Type 4 Rock Ditch Liner, consisting of material with a predominant rock size of 19 inches (475 mm), a maximum rock size of 28 inches (700 mm) and a gradation such that no more than 15 percent will be less than 6 inches (150 mm).
3. Rock riprap will consist of clean, uncontaminated materials free from dirt, clay, sand, rock fines and other materials not meeting the required gradation limits to minimize excessive turbidity by leaching of fines, as well as to preclude the entrance of deleterious and/or toxic materials into the waters of the United States by natural runoff or by leaching.
4. Prior to construction, the Contractor shall provide a representative gradation pile of rock at the project location for inspection and approval by the project engineer. The size of the gradation pile shall be a minimum of two (2) tons. The Contractor shall provide documentation from the quarry as to the quality (bulk specific gravity, absorption, soundness) of the source material. Only those materials approved by the engineer shall be used in construction.

ROCK RIPRAP SUBGRADE PREPARATION:

1. The subgrade surfaces on which the rock riprap is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. Subgrade surfaces shall be reasonably smooth, the condition and depths of which documented by field notes, photograph, or similar method prior to rock placement.
2. During construction, excess spoil will be stockpiled away from concentrated flow areas. After major construction operations are completed, excess spoil shall be spread uniformly in designated areas and along the toe of rock riprap erosion control measures.
3. The rock riprap shall be placed by equipment on subgrade surfaces to the depths specified and shall be constructed to the full course thickness in one operation in such a manner as to avoid serious displacement of the underlying materials. Larger rock shall be placed at the toe of the rock protection measures to form a stable base.
4. Rock shall be placed in a manner that will ensure that the installed measures are reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. All placed rock riprap shall require mechanical compaction efforts to enhance in-place consolidation that reduces the susceptibility of rock movement during future flood events.

ROCK STABILIZATION DESCRIPTION:

1. Rock Blanket for slope protection shall be a minimum of thirty (30) inches thick when measured perpendicular to the slope. The slope shall be no steeper than 3.0 H to 1.0 V unless otherwise noted. The blanket shall be anchored at the base by a bench that is six (6) feet wide and four (4) feet tall with an angle of repose no steeper than 1:1 as shown. This stabilization measure shall be placed with sufficient density to require approximately 3.8 tons of rock per linear foot to construct.
2. Rock Blanket placed horizontally for overflow protection shall be a minimum of thirty-six (36) inches thick. The rock shall be sufficiently consolidated that the underlying subgrade surface cannot be seen from any angle.
3. Rock tieback shall be comprised of consolidated rock that is four (4) feet wide at the crest, fourteen (14) feet wide at the base, and seven (7) feet tall with an angle of repose no steeper than 1:1. This stabilization measure shall be placed with sufficient density to require approximately 4 tons of rock per linear foot to construct.
4. Rock weirs shall be comprised of consolidated rock that is eight (8) feet wide at the crest, sixteen (16) feet wide at the base, and six (6) feet tall with an angle of repose no steeper than 1:1. This stabilization measure shall be placed with sufficient density to require approximately 4.5 tons of rock per linear foot to construct.
5. Assumed rock weight to volume conversion is 1.5 TN to 1.0 CY. Refer to cross-section details listed on Plate C-04 for additional information on rock stabilization dimensions.

EROSION CONTROL MEASURES:

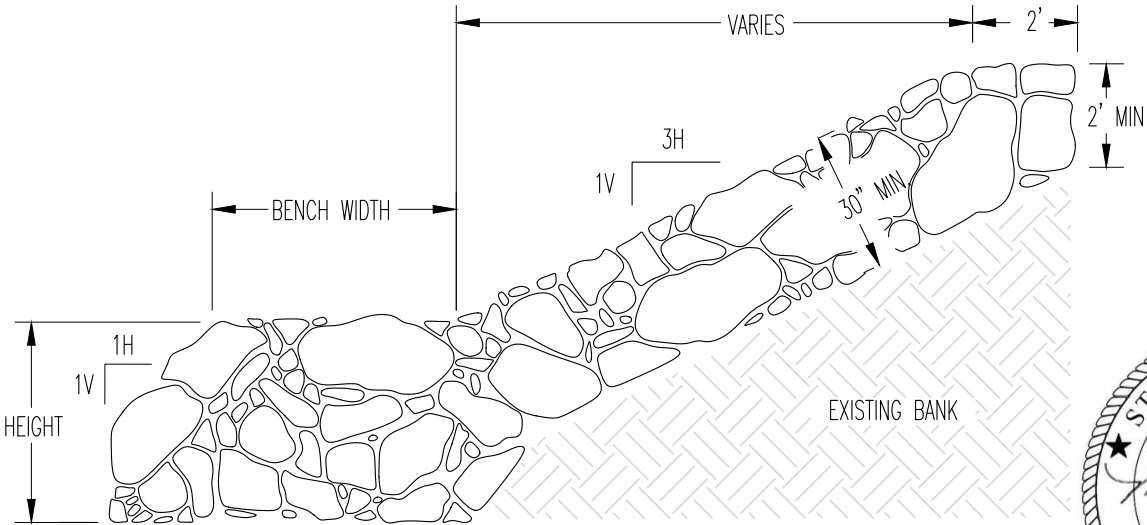
1. Prior to commencement of work, the contractor shall submit to the engineer an erosion control plan for all phases of work performed by the contractor and all subcontractors.
2. Any excavation and/or moving of soil materials shall be scheduled to minimize the size of areas disturbed and unprotected from erosion for the shortest reasonable time. All stripping, clearing, grubbing and earthwork activities will be staged to ensure no greater than 1/2 acre is disturbed at any one time.
3. For disturbed areas above the normal highwater mark of the watercourse, seeding and mulching shall be conducted as soon as reasonably possible following completion of that earthwork activity to provide protection of exposed soil surfaces from erosion in accordance with GP-41 Special Condition #13. Separate topsoil from all on-site excavate. Use separated topsoil as a final cover over disturbed and low bank areas to provide a sufficient substrate for seed.
4. In-stream diversions and sediment basins constructed to divert water or treat water from the work areas are temporary and shall be removed and restored to the near original condition when they are no longer required to enable major construction operations.
5. Sediment filters consisting of straw bales or geotextile sediment fences to trap sediment from runoff into waters of the U.S. shall be sufficiently anchored to prevent subsequent undermining or flanking. These erosion control measures shall be removed once major construction operations are complete.

PRESERVATION AND MANAGEMENT OF WOODY VEGETATION:

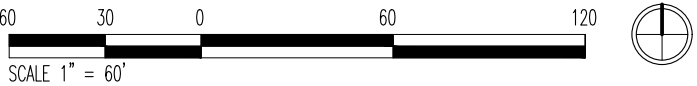
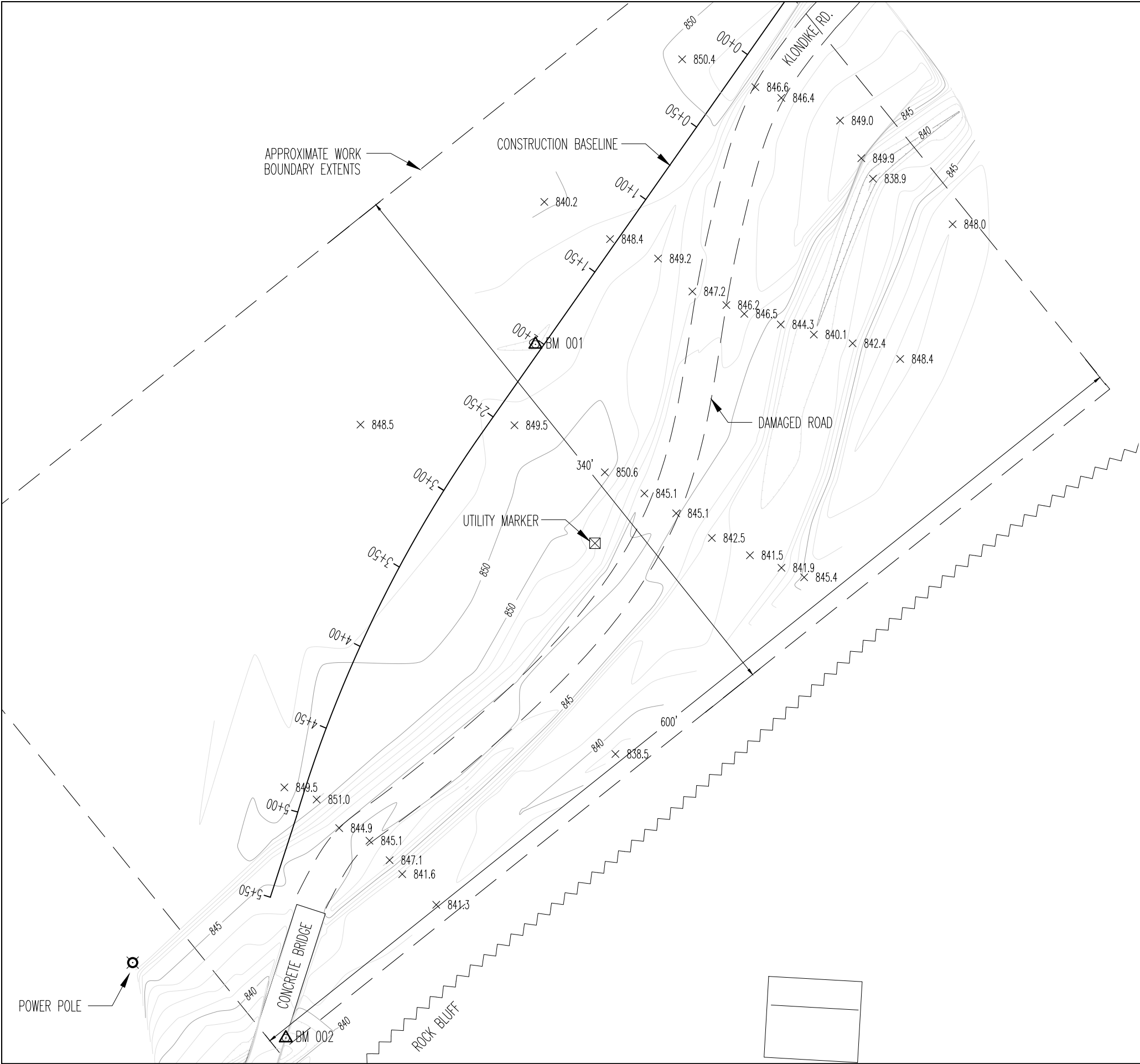
1. Trees and other vegetation designated to remain undisturbed shall be protected from damage throughout the duration of the construction period as supported by GP-41 Special Condition #12. Any damages resulting from the contractor's operations or neglect shall be repaired by the contractor.
2. Any cleared vegetation or in-channel post-flood vegetative debris (trees, logs, brush) that must be removed to enable placement of stabilization works shall relocated as indicated in the plans or disposed in an approved location away from the project site.

ACCESS AND EGRESS:

1. The contractor shall provide a plan of equipment ingress/egress as well as equipment staging areas within the work limits to the McDonald County Commission prior to mobilization to the site to minimize disturbances to adjacent businesses and private residences.
2. The contractor shall, at his/her own expense, remove and replace all fences, posts, culverts, street signs, and the like as required within the work limits as shown on Plate C-01.

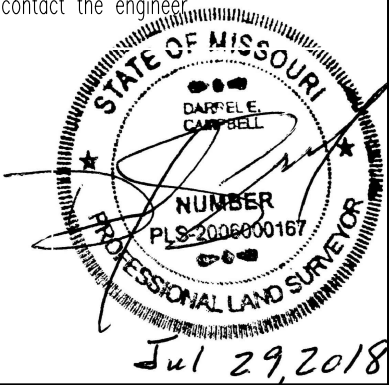


CONSTRUCTION NOTES		Description	Date
BUFFALO CREEK AT KLONDIKE ROAD BANK STABILIZATION MCDONALD COUNTY COMMISSION MISSOURI NRCS EMERGENCY WATERSHED PROTECTION		Investigated:	04 JUN 18
		Surveyed:	04 JUL 18
		Designed:	07 JUL 18
		Drafted:	15 JUL 18
		Approved:	29 JUL 18
			
SHEET IDENTIFICATION			
G-03			
SHEET 3 OF 7			



DESCRIPTION	NORTHING	EASTING	ELEVATION
BENCHMARK 001	13,337,628.55	1,181,570.91	847.90
BENCHMARK 002	13,337,236.78	1,181,429.94	843.14
STATION 0+00	13,337,792.24	1,181,690.61	---
STATION 0+50	13,337,751.31	1,181,661.89	---
STATION 1+00	13,337,710.38	1,181,633.16	---
STATION 1+50	13,337,669.46	1,181,604.44	---
STATION 2+00	13,337,628.53	1,181,575.72	---
STATION 2+50	13,337,587.60	1,181,547.00	---
STATION 3+00	13,337,546.06	1,181,519.12	---
STATION 3+50	13,337,502.81	1,181,494.04	---
STATION 4+00	13,337,457.99	1,181,471.88	---
STATION 4+50	13,337,411.80	1,181,452.73	---
STATION 5+00	13,337,364.44	1,181,436.70	---
STATION 5+50	13,337,316.30	1,181,421.22	---

- NOTES:
- Control established using GPS survey method. Horizontal control is reference the North American Datum 83. Vertical control is reference the North American Vertical Datum 88. All displayed units in feet.
 - BM 001 control is the center top of a 3/4" dia. steel pin driven flush with the ground marked with fluorescent paint.
 - BM 002 control is the top of concrete on the NE corner of the box culvert, a small flat section approximately 6" lower than the roadway, marked with fluorescent paint.
 - A select subset of ground data point elevations are shown for drawing clarity. Contact the engineer for a complete listing of all collected surface measurements.
 - Locations of buildings shown on this drawing are approximate and for site orientation and contractor awareness. Do not block drives to private residences during construction.
 - For assistance with establishing the construction baseline and work extents at the construction site, contact the engineer.



DESCRIPTION

DATE

Investigated: 04 JUN 18

Surveyed: 04 JUL 18

Designed: 07 JUL 18

Drafted: 15 JUL 18

Approved: 29 JUL 18

EXISTING CONDITION

BUFFALO CREEK AT KLONDIKE ROAD BANK STABILIZATION

MCDONALD COUNTY COMMISSION

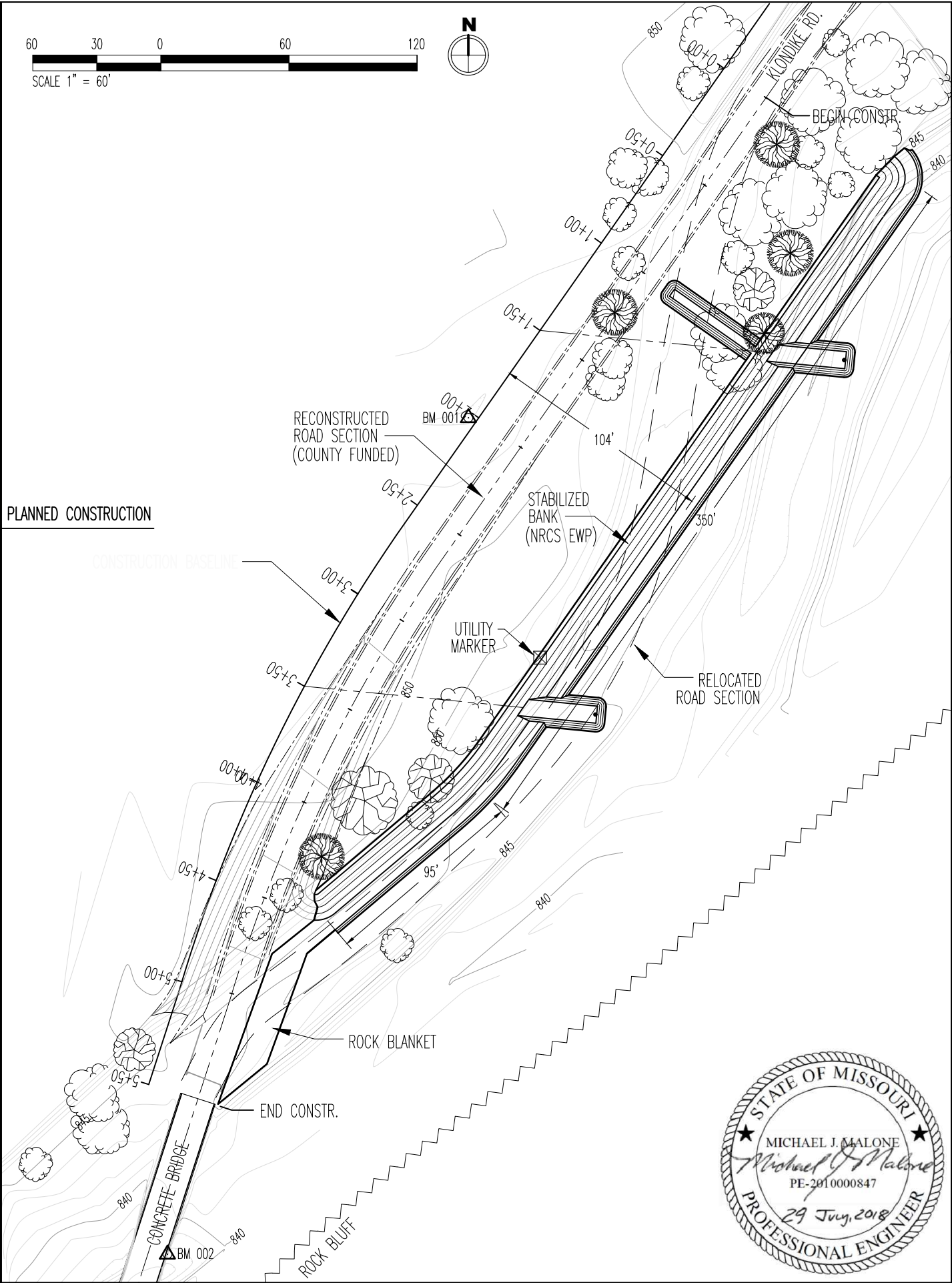
MISSOURI NRCS EMERGENCY WATERSHED PROTECTION

REPUBLIC ENGINEERING INCORPORATED

SHEET IDENTIFICATION

C-01

SHEET 4 OF 7



Description	Date
Investigated:	04 JUN 18
Surveyed:	04 JUL 18
Designed:	07 JUL 18
Drafted:	15 JUL 18
Approved:	29 JUL 18

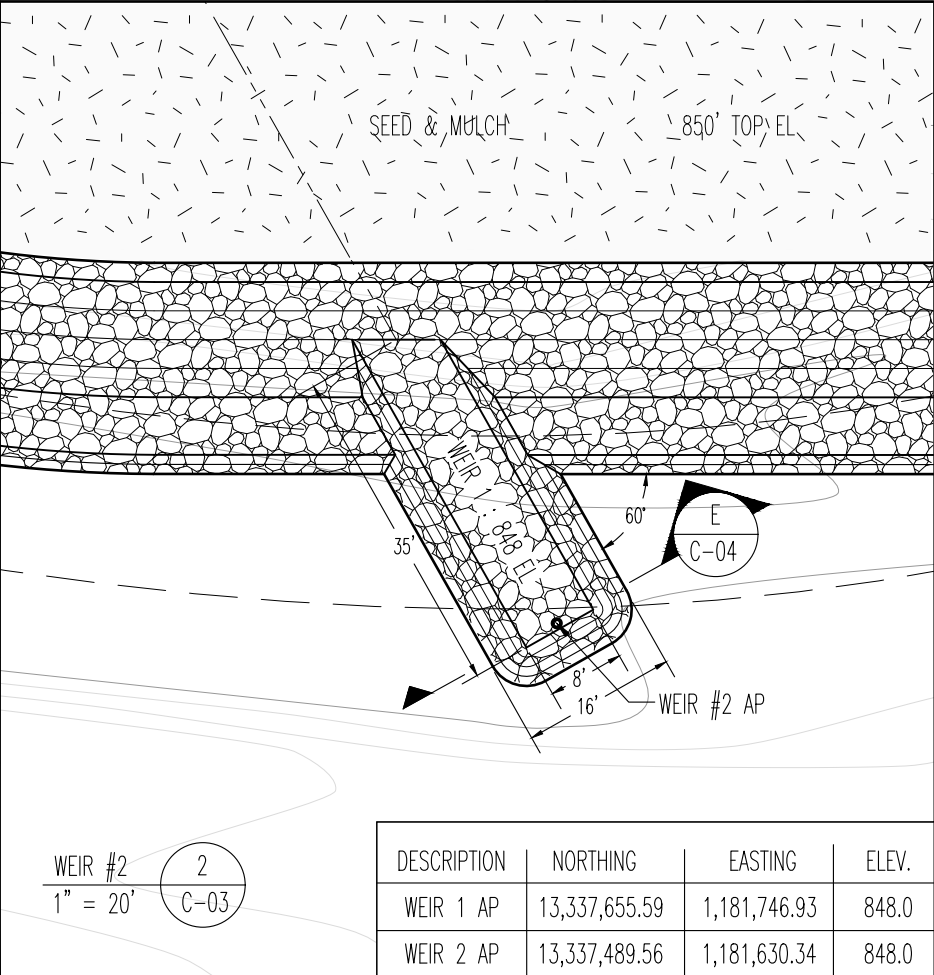
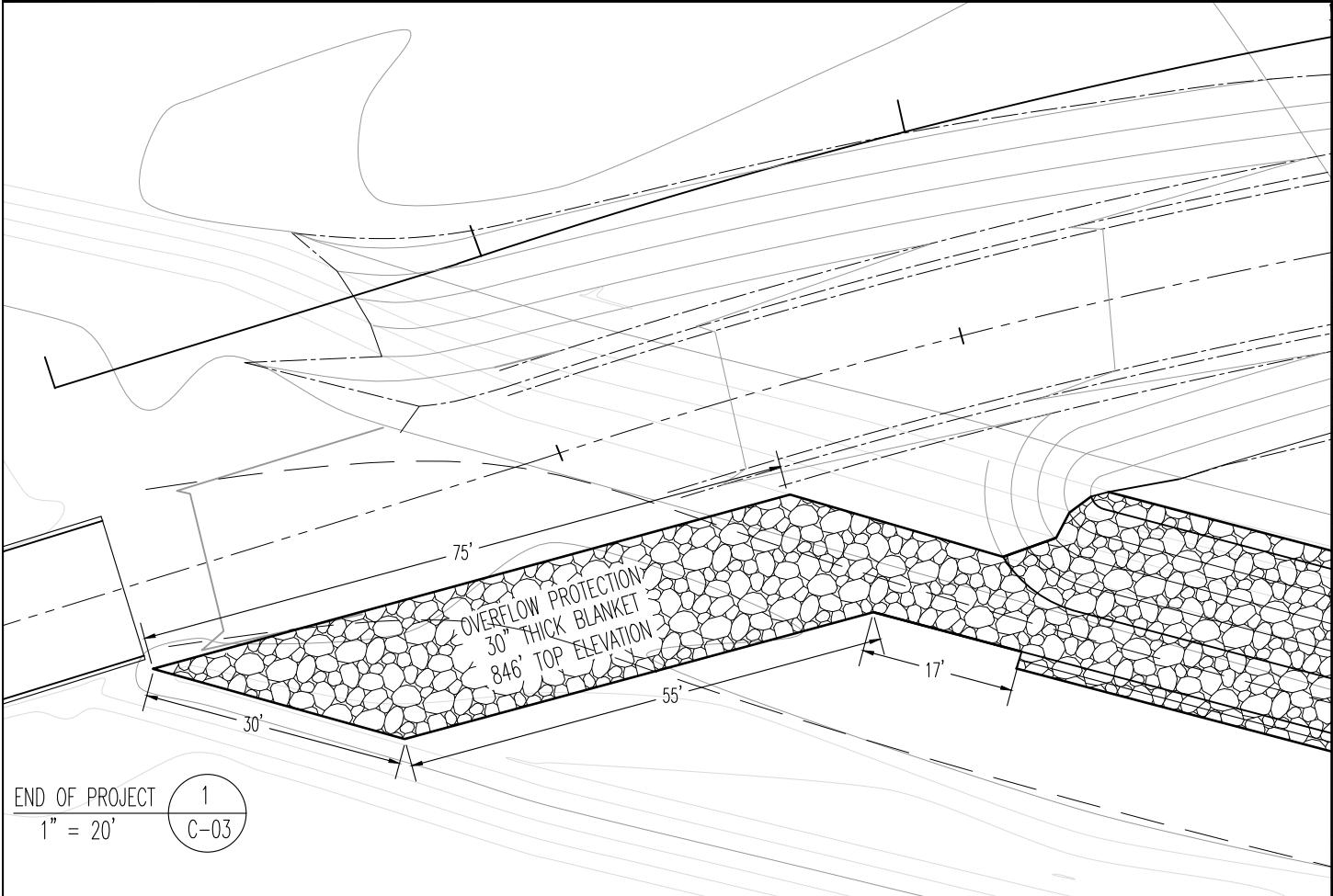
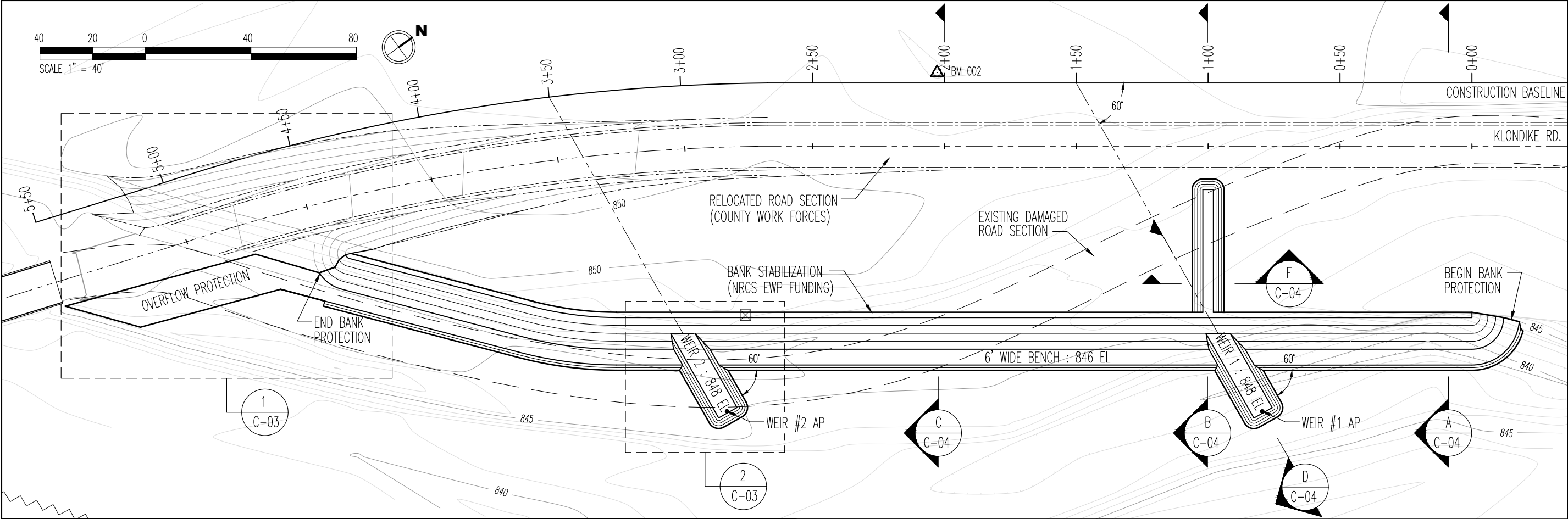
PLANNED CONSTRUCTION

BUFFALO CREEK AT KLONDIKE ROAD BANK STABILIZATION
MCDONALD COUNTY COMMISSION
MISSOURI NRCS EMERGENCY WATERSHED PROTECTION

STATE OF MISSOURI
MICHAEL J. MALONE
PE-2010000847
29 July 2018
PROFESSIONAL ENGINEER

RE
ENGINEERING
INCORPORATED

SHEET IDENTIFICATION
C-02
SHEET 5 OF 7



- NOTES:
- The weir AP coordinates do not indicate the ends of the weirs, but rather the point at which the weirs no longer need to maintain the design 848' elevation. Proper layout of Weir 1 & 2 can be accomplished by visually aligning each Weir AP with stations 1+50, and 3+50 respectively.
 - Construction of the weirs is an optional component of the design. The weirs will only be installed if funding is sufficient to enable their construction, and the contractor is specifically instructed to install the weirs under contract with the McDonald County Commission.



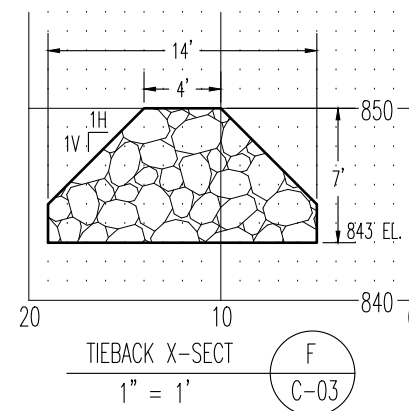
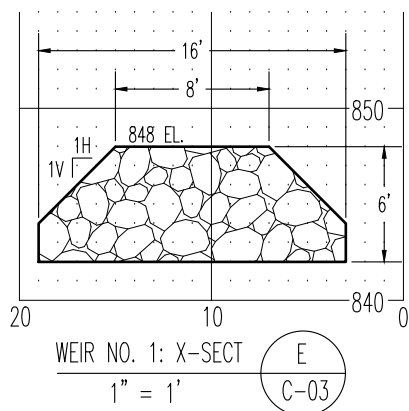
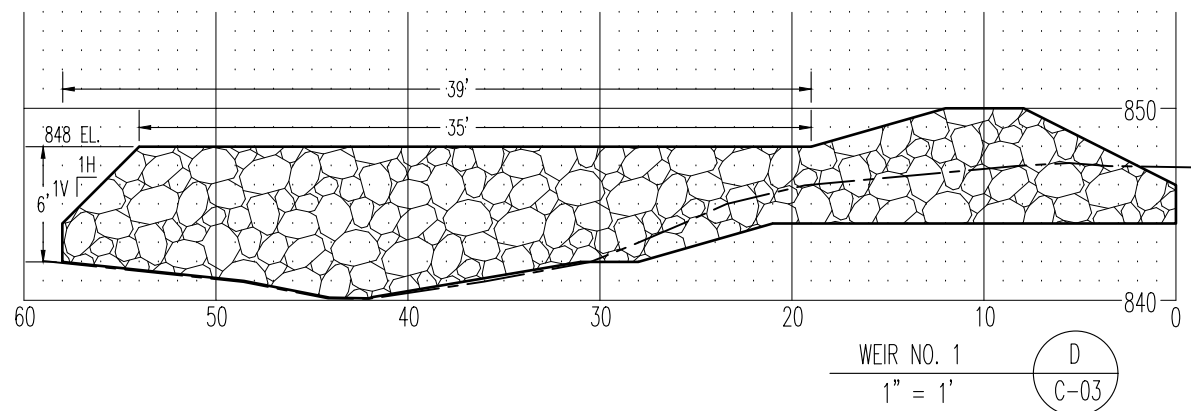
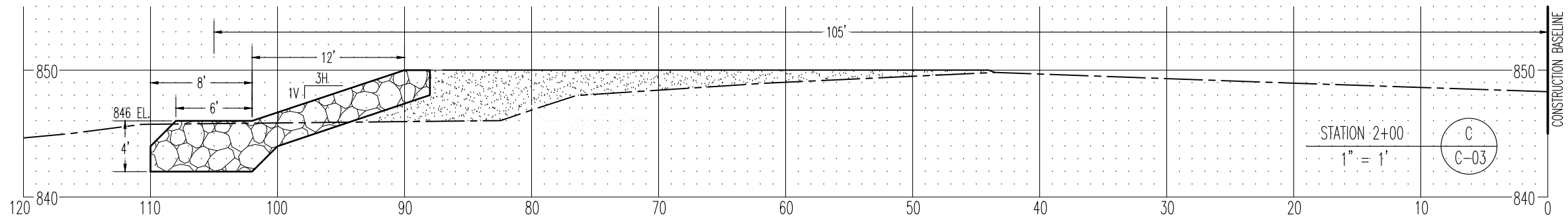
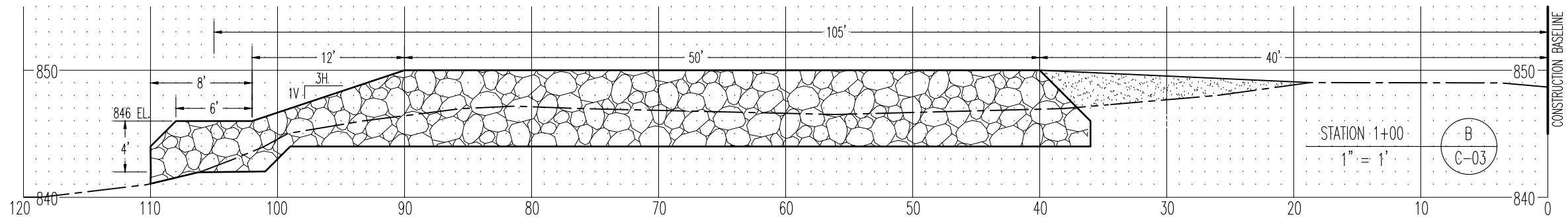
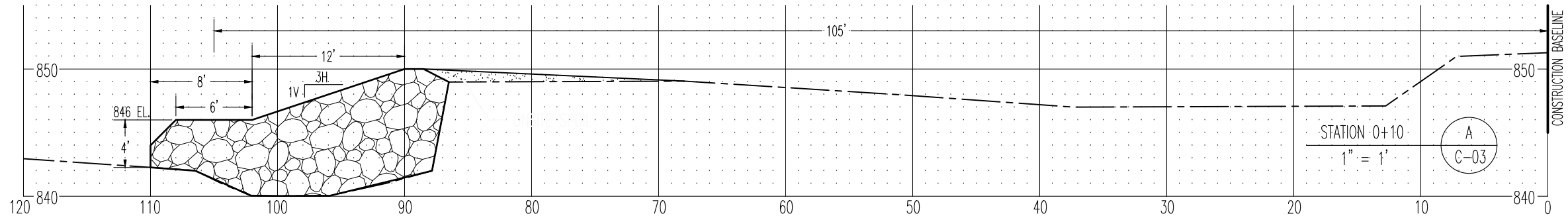
Description	Date
Investigated:	04 JUN 18
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Designed:	07 JUL 18
Drafted:	15 JUL 18
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CONSTRUCTION DETAILS

BUFFALO CREEK AT KLONDIKE ROAD BANK STABILIZATION
MCDONALD COUNTY COMMISSION
MISSOURI NRCS EMERGENCY WATERSHED PROTECTION

RE
ENGINEERING
INCORPORATED

SHEET IDENTIFICATION
C-03
SHEET 6 OF 7

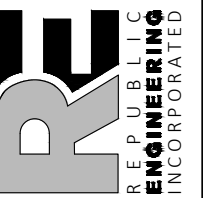


CROSS SECTION DATA

BUFFALO CREEK AT KLONDIKE ROAD BANK STABILIZATION

MCDONALD COUNTY COMMISSION

MISSOURI NRCS EMERGENCY WATERSHED PROTECTION



SHEET IDENTIFICATION
C-04
SHEET 7 OF 7

Description	Date
Investigated:	04 JUN 18
Surveyed:	04 JUL 18
Designed:	07 JUL 18
Drafted:	15 JUL 18
Approved:	29 JUL 18