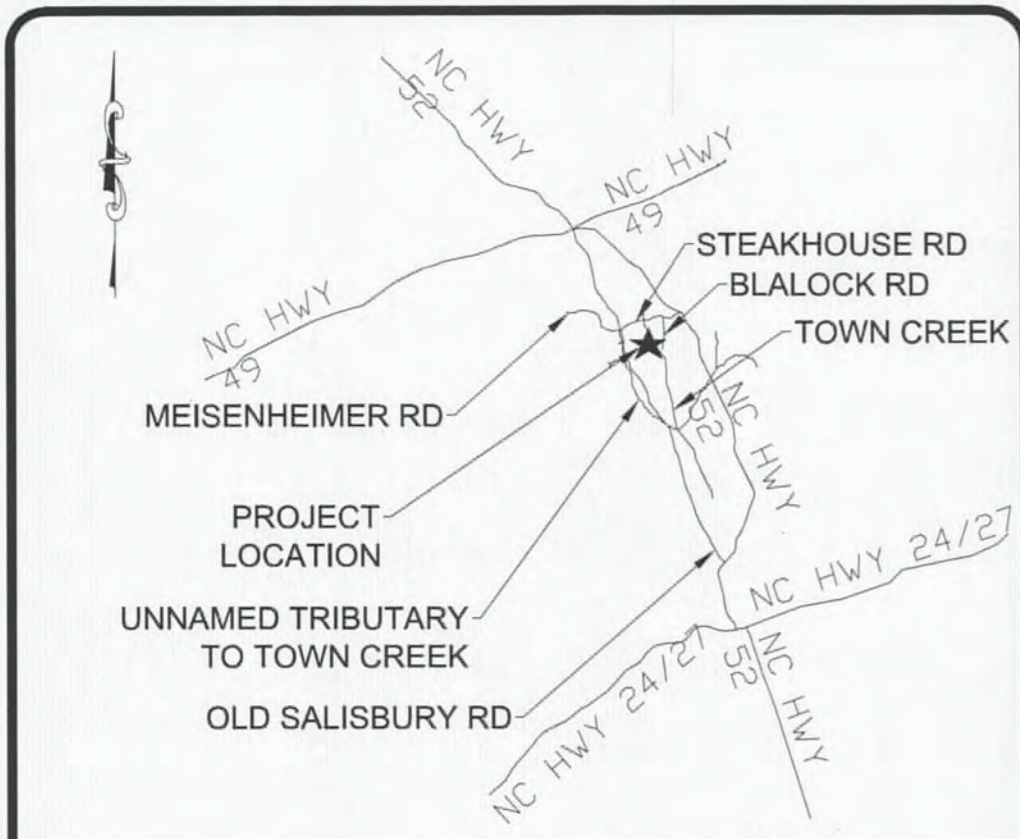


TOWN CREEK RESTORATION PROJECT-OPTION B

PROJECT: 124526



VICINITY MAP
NOT TO SCALE

NC DIVISION OF MITIGATION SERVICES

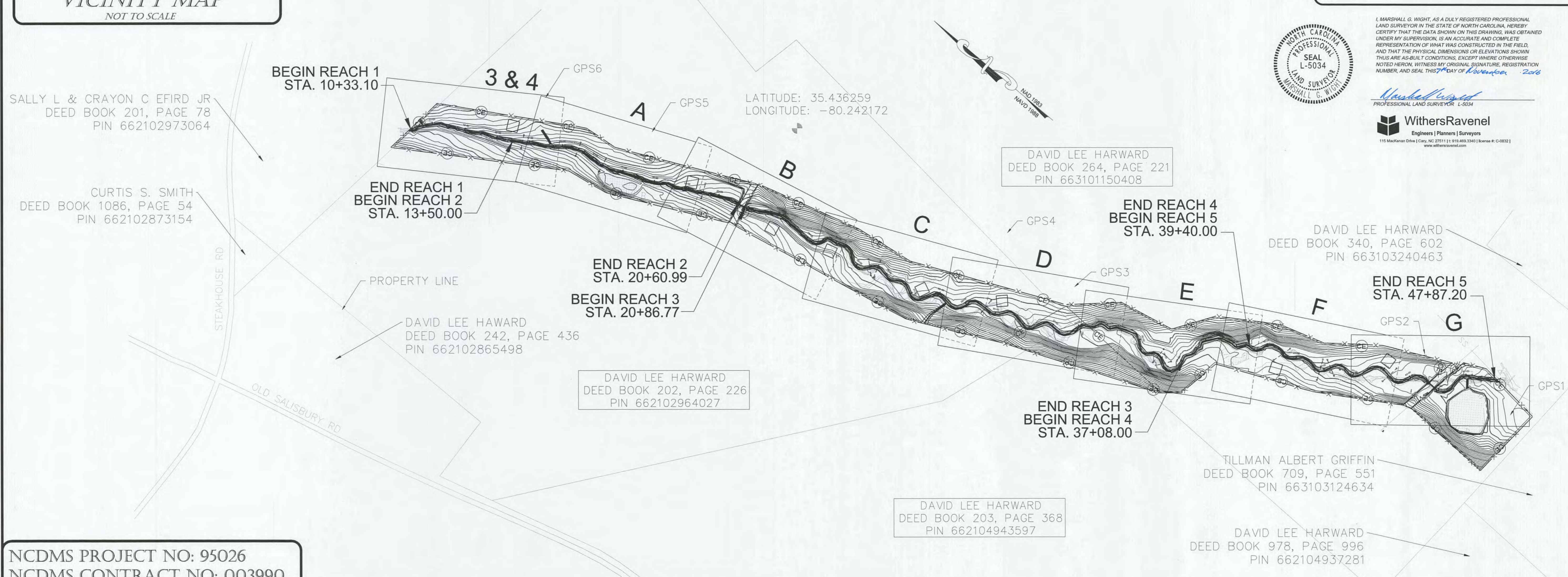
STANLY COUNTY

LOCATION:
APPROXIMATELY 1.5 MILES WEST OF THE TOWN OF NEW LONDON, NC NEAR
THE INTERSECTION OF STEAKHOUSE ROAD AND OLD SALISBURY ROAD

TYPE OF WORK: AS-BUILT SURVEY / RECORD DRAWING

STATE	BAKER PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	124526	1	24

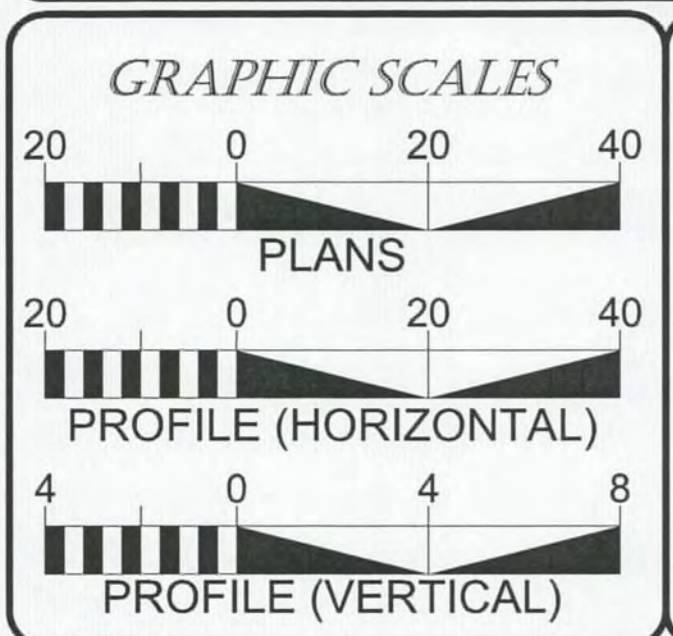
SHEET INDEX	
1	COVER SHEET
1-A	CONVENTIONAL SYMBOLS
1-B	GENERAL NOTES & VEGETATION SELECTION
2-2-D	TYPICAL CROSS SECTIONS & DETAILS
3-3-G	AS-BUILT SURVEY PLAN/PROFILE
4-4-G	RECORD DRAWING PLAN/PROFILE



I, MARSHALL G. WIGHT, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THEREON ARE AS-BUILT CONDITIONS, EXCEPT WHERE OTHERWISE NOTED HEREON, WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 7th DAY OF November, 2016.

WithersRavenel
Engineers | Planners | Surveyors
115 MacKinnon Drive | Cary, NC 27511 | P: 919.469.2340 | License #: C-0832 | www.wr-engineers.com

NCDMS PROJECT NO: 95026
NCDMS CONTRACT NO: 003990



CONTROL POINTS			
POINT	NORTHING	EASTING	ELEVATION
GPS1	613754.25	1630860.98	541.40
GPS2	614063.02	1630823.49	553.43
GPS3	614976.29	1630276.26	573.19
GPS4	615228.37	1630262.04	585.99
GPS5	616217.36	1629783.66	600.72
GPS6	616519.86	1629648.52	601.23

AS-BUILT SUMMARY		
REACH NAME	METHOD	AS-BUILT LENGTH (FT)
1	RESTORATION	317
2	ENHANCEMENT I	711
3	RESTORATION	1621
4	ENHANCEMENT I	232
5	RESTORATION	822

PREPARED FOR THE OFFICE OF:
NCDEQ
DIVISION OF MITIGATION SERVICES
5 RAVENCROFT DR., #102
ASHEVILLE, NC 28801

NCDMS CONTACT: HARRY TSOMIDES
PROJECT MANAGER

PREPARED IN THE OFFICE OF:
Michael Baker International
9716-B Rea Road #58
Charlotte, NORTH CAROLINA 28277
Phone: 704.665.2200
Fax: 704.665.2201
License #: F-1084

JACOB M. BYERS, PE
PROJECT ENGINEER
KRISTI SUGGS
PROJECT MANAGER

PROJECT ENGINEER

Jacob M. Byers 11/9/16 P.E.
SIGNATURE

AS BUILT /RECORD DRAWING

CONVENTIONAL SYMBOLS - PLAN VIEW

	EXISTING MAJOR CONTOUR		EXISTING TREE		TRANSPLANT
	EXISTING MINOR CONTOUR		EXISTING WETLAND		VEG PLOT
	EXISTING STREAM ALIGNMENT		ROCK CROSS VANE		CREST GUAGE
	EXISTING SANITARY SEWER		LOG J-HOOK		FLOW GUAGE
	EXISTING OVERHEAD ELECTRIC		BOULDER STEP		PHOTO POINT
	EXISTING FENCE		BOULDER TOE		AS-BUILT SURVEYED CROSS SECTION
	DESIGN STREAM ALIGNMENT		CONSTRUCTED RIFFLE		AS-BUILT MAJOR CONTOUR
	FLOW DIRECTION		LOG VANE		AS-BUILT MINOR CONTOUR
	DESIGN TOP OF BANK		ROOT WADS		AS-BUILT THALWEG
	LIMITS OF DISTURBANCE		ANGLED LOG STEP		AS-BUILT TOP OF BANK
	DESIGN FENCE		VEGETATED GEOLIFT		
	DESIGN GATE		TOE WOOD		
	CONSERVATION EASEMENT				

CONVENTIONAL SYMBOLS - PROFILE VIEW

	AS-BUILT THALWEG
	AS-BUILT LOW BANK
	PROPOSED THALWEG
	PROPOSED LOW BANK
	EXISTING GROUND

BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 1-B
NCDMS PROJECT NO. 95026	
PROJECT ENGINEER	
	 APPROVED BY: DATE: 11/8/16
Michael Baker International <small>Michael Baker Engineering Inc. 9716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.2201 License #: F-1084</small>	

AS BUILT /RECORD DRAWING

- GENERAL NOTES**
- CONSTRUCTION BEGAN IN OCTOBER 2015 AND WAS COMPLETED IN JANUARY 2016
 - RIPARIAN VEGETATION PLANTING BEGAN IN MARCH 2016 AND WAS COMPLETED IN MARCH 2016

- STANDARD SPECIFICATIONS**
- NORTH CAROLINA
- 6.06 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
 - 6.24 RIPARIAN AREA SEEDING
 - 6.62 TEMPORARY SILT FENCE
 - 6.63 TEMPORARY ROCK DAM
 - 6.70 TEMPORARY STREAM CROSSING

The following table lists the bare root vegetation selection for the project site. The planting area is approximately 11 acres.

Riparian Buffer - Overstory Trees (8' x 8' spacing - 680 stems / acre)

Scientific Name	Common Name	% Planted by Species	Wetland Tolerance	Approx. Number of Stems
<i>Betula nigra</i>	river birch	8%	FACW	612
<i>Carpinus caroliniana</i>	ironwood	2%	FAC	125
<i>Fraxinus pennsylvanica</i>	green ash	8%	FACW	589
<i>Liriodendron tulipifera</i>	tulip poplar	6%	FACU	448
<i>Platanus occidentalis</i>	sycamore	7%	FACW	542
<i>Quercus michauxii</i>	swamp chestnut oak	7%	FACW	500
<i>Quercus falcata</i>	Southern red oak	6%	FACU	440
<i>Quercus alba</i>	white oak	3%	FACU	200
<i>Quercus phellos</i>	willow oak	10%	FAC	730
<i>Quercus pagoda</i>	cherry bark oak	6%	FACW	400

Riparian Buffer - Understory (8' x 8' spacing - 680 stems / acre)

Scientific Name	Common Name	% Planted by Species	Wetland Tolerance	Approx. Number of Stems
<i>Cercis canadensis</i>	redbud	4%	FACU	300
<i>Callicarpa americana</i>	beautyberry	3%	FACU	250
<i>Sambucus nigra</i>	elderberry	1%	FAC	100
<i>Asimina triloba</i>	paw paw	8%	FAC	588
<i>Cornus amomum</i>	silky dogwood	10%	FACW	742
<i>Diospyros virginiana</i>	persimmon	11%	FAC	770
Total Species Planted		100%		7,336
Total Acreage Planted		10.73	# Stems / Acre	684

Live staking was applied to all restored streambanks following the details in this plan set and according to the construction specifications.

Scientific Name	Common Name	% Planted by Species	Wetland Tolerance
<i>Cornus amomum</i>	silky dogwood	10%	FAC
<i>Salix nigra</i>	black willow	10%	OBL
<i>Salix sericea</i>	silky willow	40%	OBL
<i>Sambucus nigra</i>	elderberry	40%	FAC

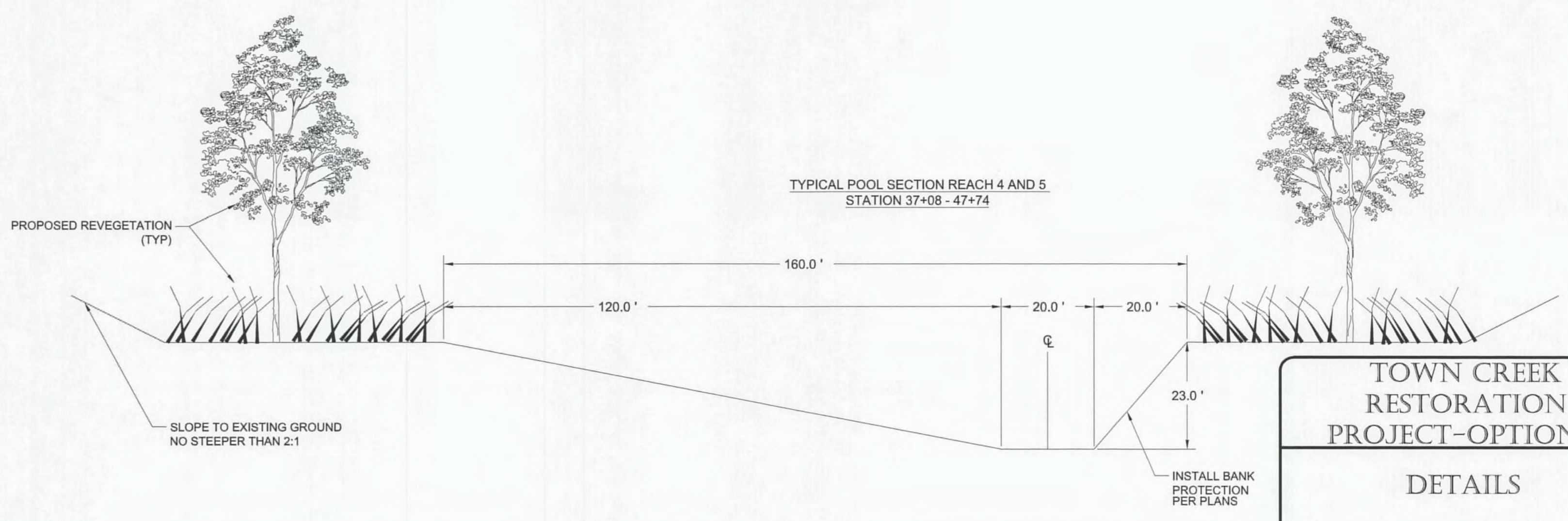
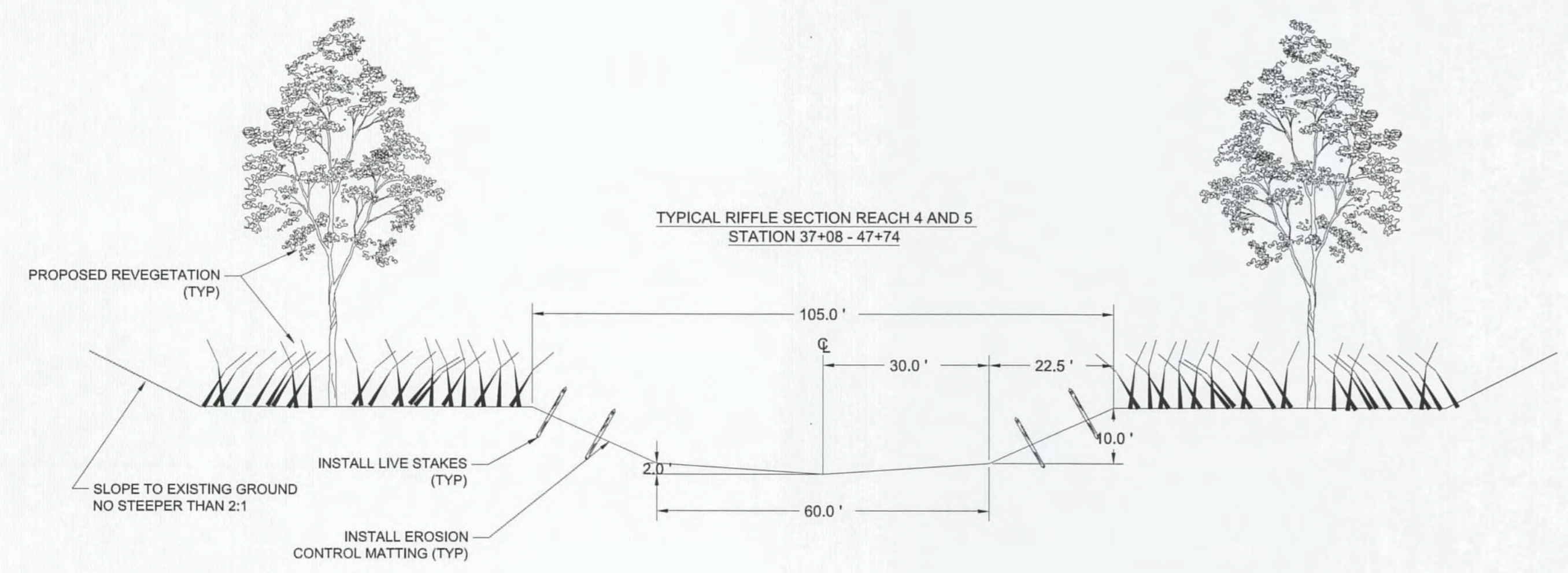
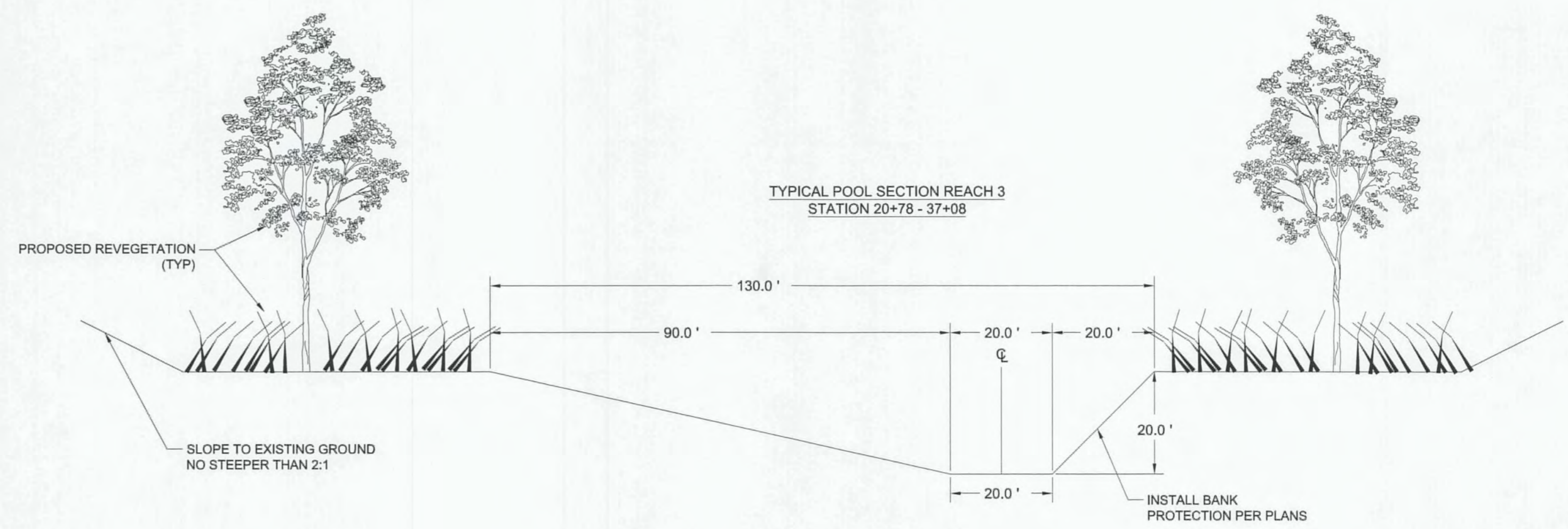
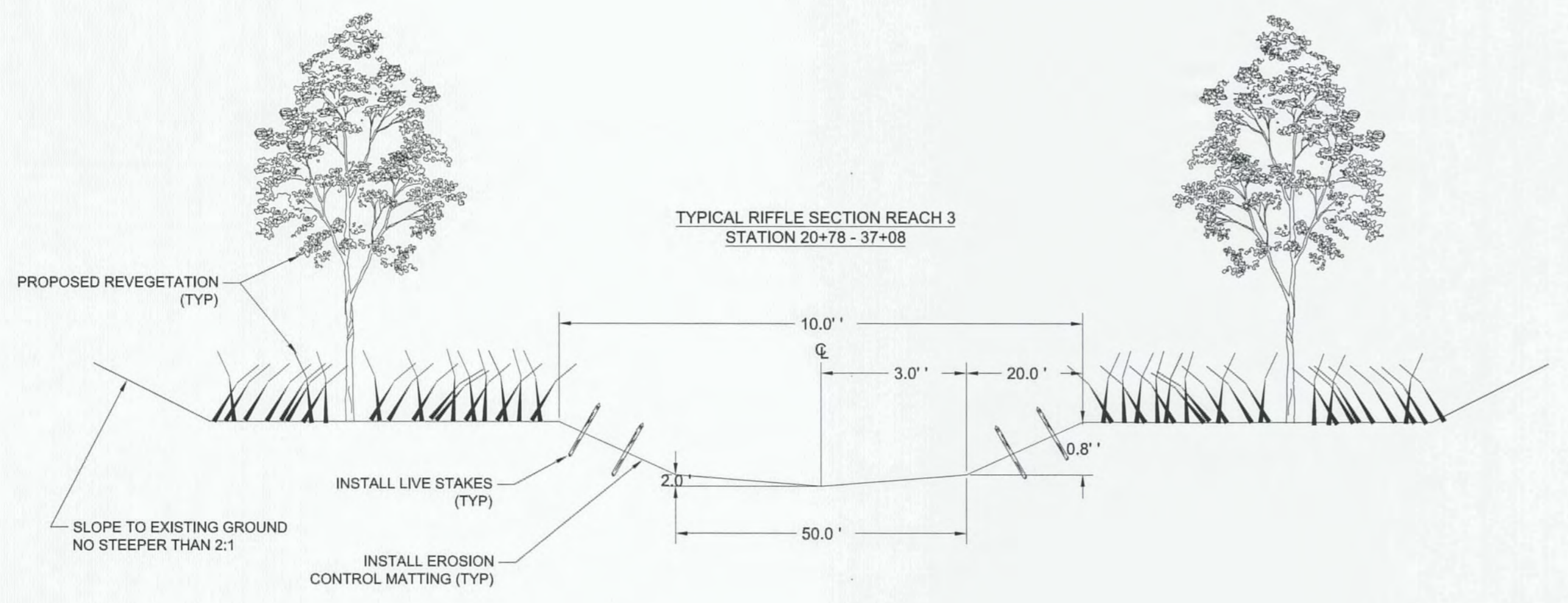
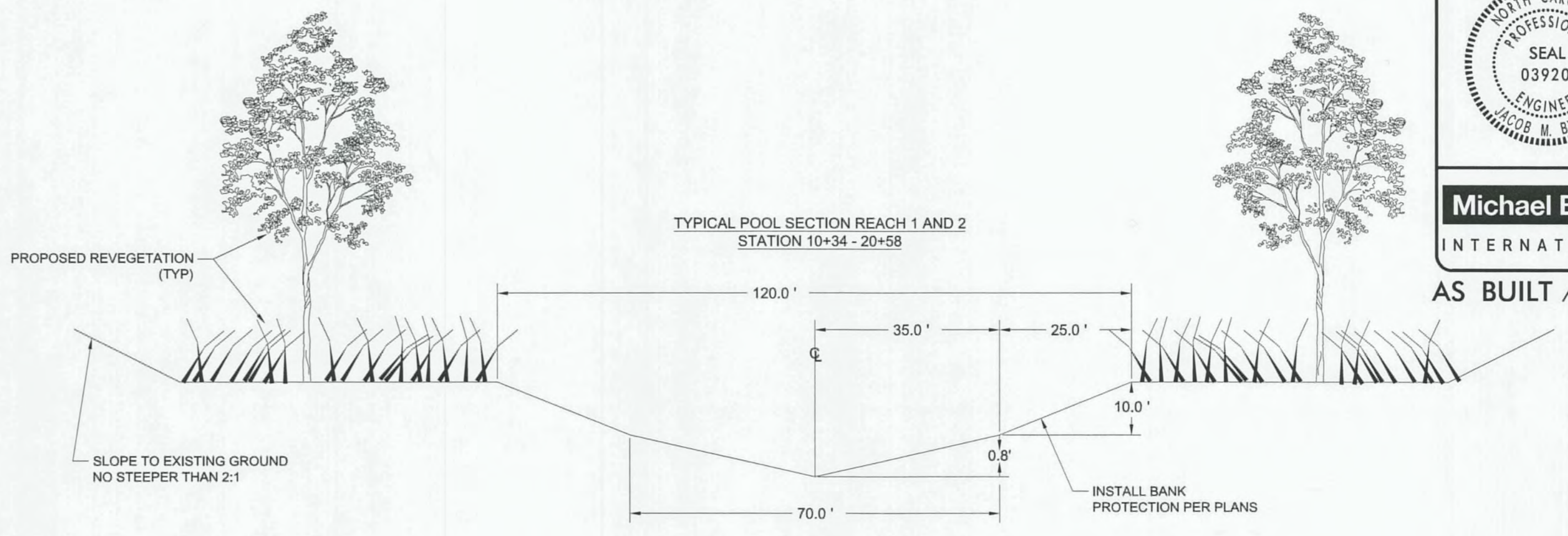
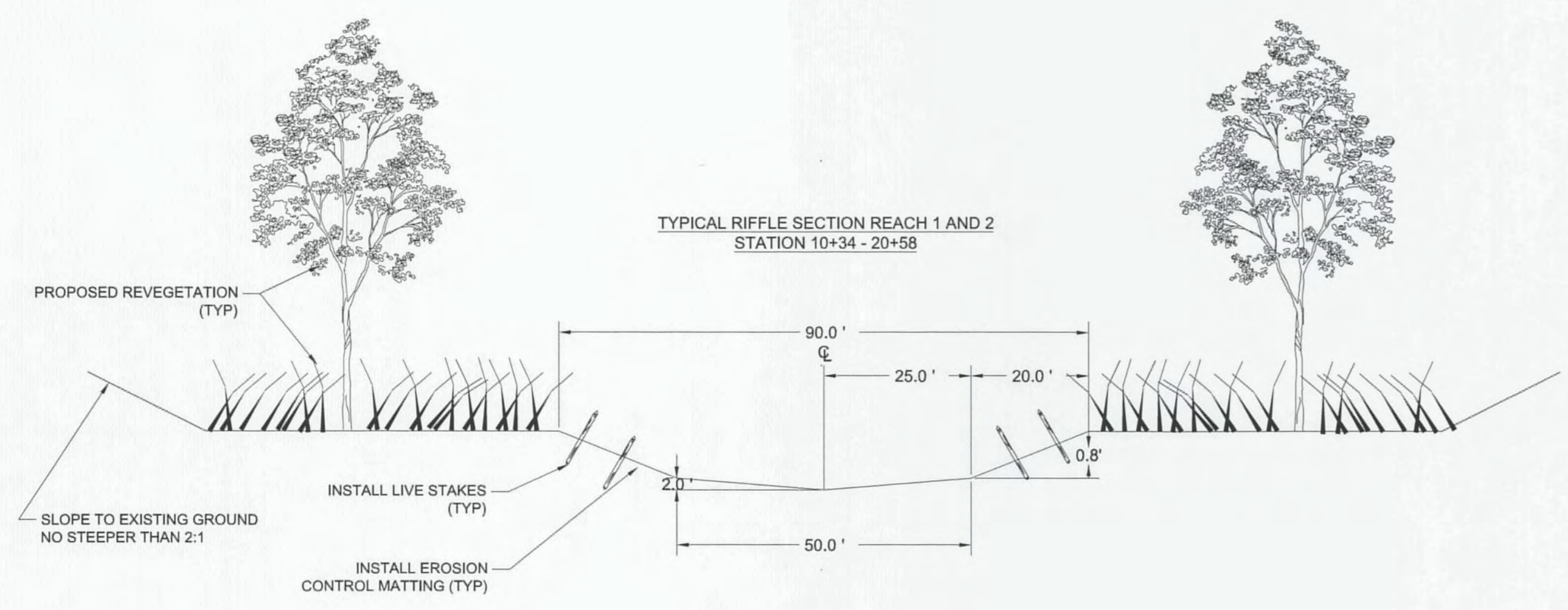
Permanent herbaceous seed mixtures for the project site were planted throughout the floodplain and riparian buffer areas. Permanent seed mixtures were applied with temporary seed, as defined in the construction specifications

Scientific Name	Common Name	% Planted by Species	Lbs. / Acre	Wetland Tolerance
<i>Andropogon gerardii</i>	Big blue stem	10%	1.5	FAC
<i>Dichanthelium clandestinum</i>	Deer Tongue	15%	2.25	FAC
<i>Carex crinita</i>	Fringed sedge	10%	1.5	OBL
<i>Chasmanthium latifolium</i>	River oats	5%	0.75	FACU
<i>Elymus virginicus</i>	Virginia wild rye	15%	2.25	FACW
<i>Juncus effusus</i>	Soft rush	5%	0.75	FACW
<i>Panicum virgatum</i>	Switchgrass	10%	1.5	FAC
<i>Polygonum pensylvanicum</i>	Pennsylvania Smartweed	5%	0.75	FACW
<i>Schizachyrium scoparium</i>	Little blue stem	10%	1.5	FACU
<i>Tripsacum dactyloides</i>	Eastern gamagrass	5%	0.75	FACW
<i>Sorghastrum nutans</i>	Indiangrass	10%	1.5	FACU

TOWN CREEK
RESTORATION
PROJECT-OPTION B
GENERAL NOTES &
VEGETATION
SELECTION

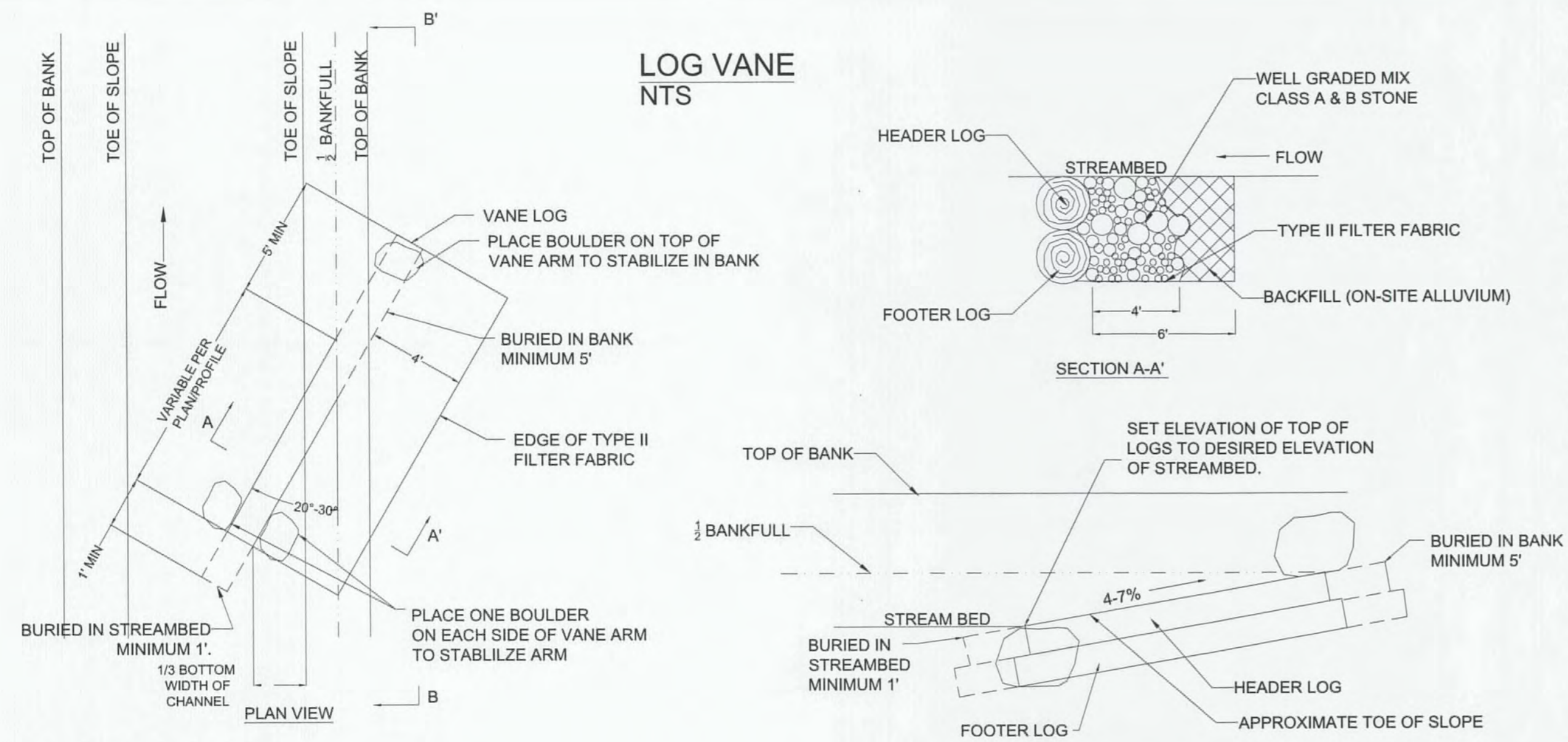
BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 2
NCEEP PROJECT NO. 95026	
PROJECT ENGINEER	
	 APPROVED BY: 11/8/16 DATE:
Michael Baker International	
Michael Baker Engineering Inc. 9716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.965.2200 Fax: 704.965.2201 License #: F-1084	

AS BUILT /RECORD DRAWING

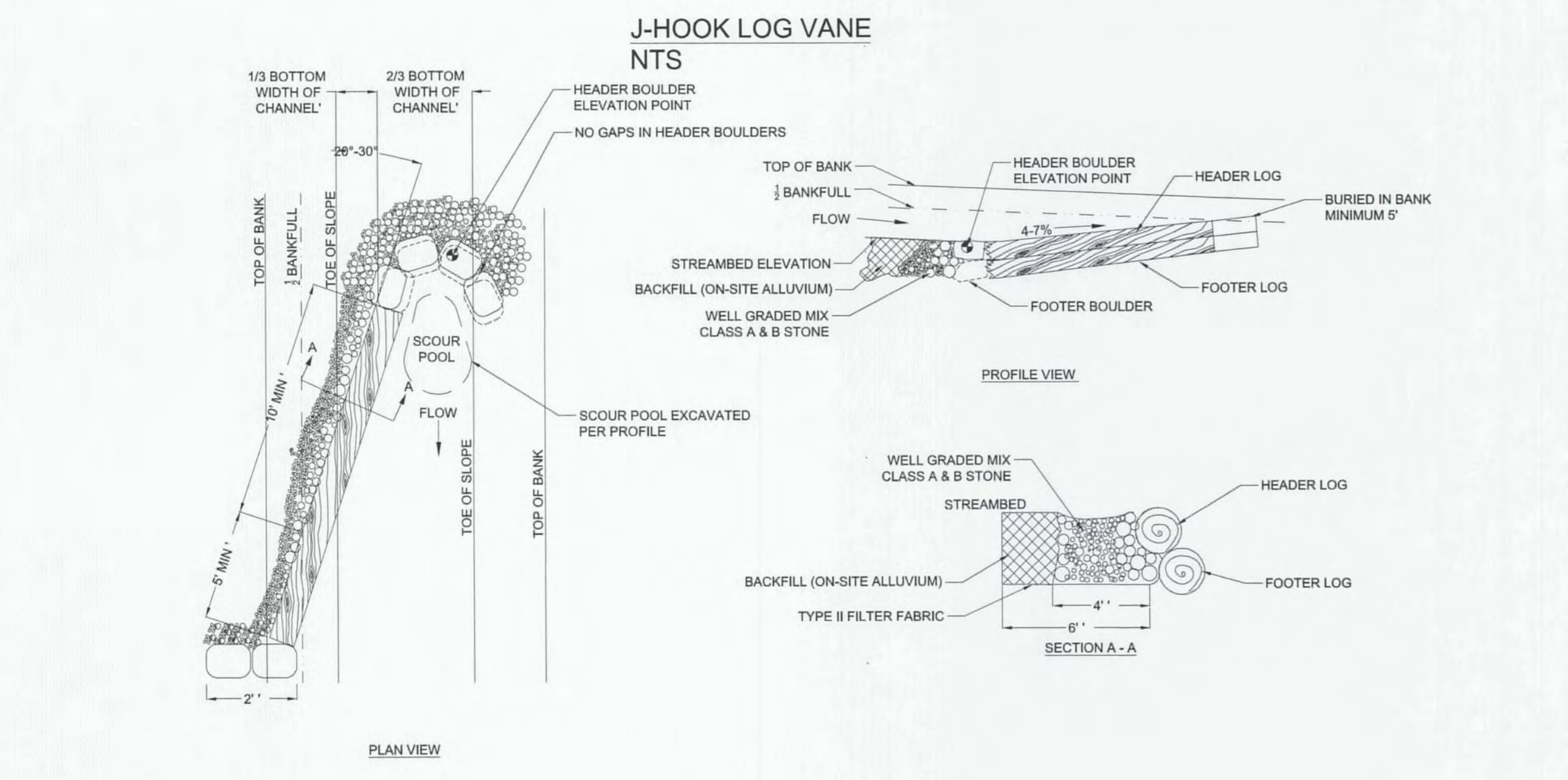
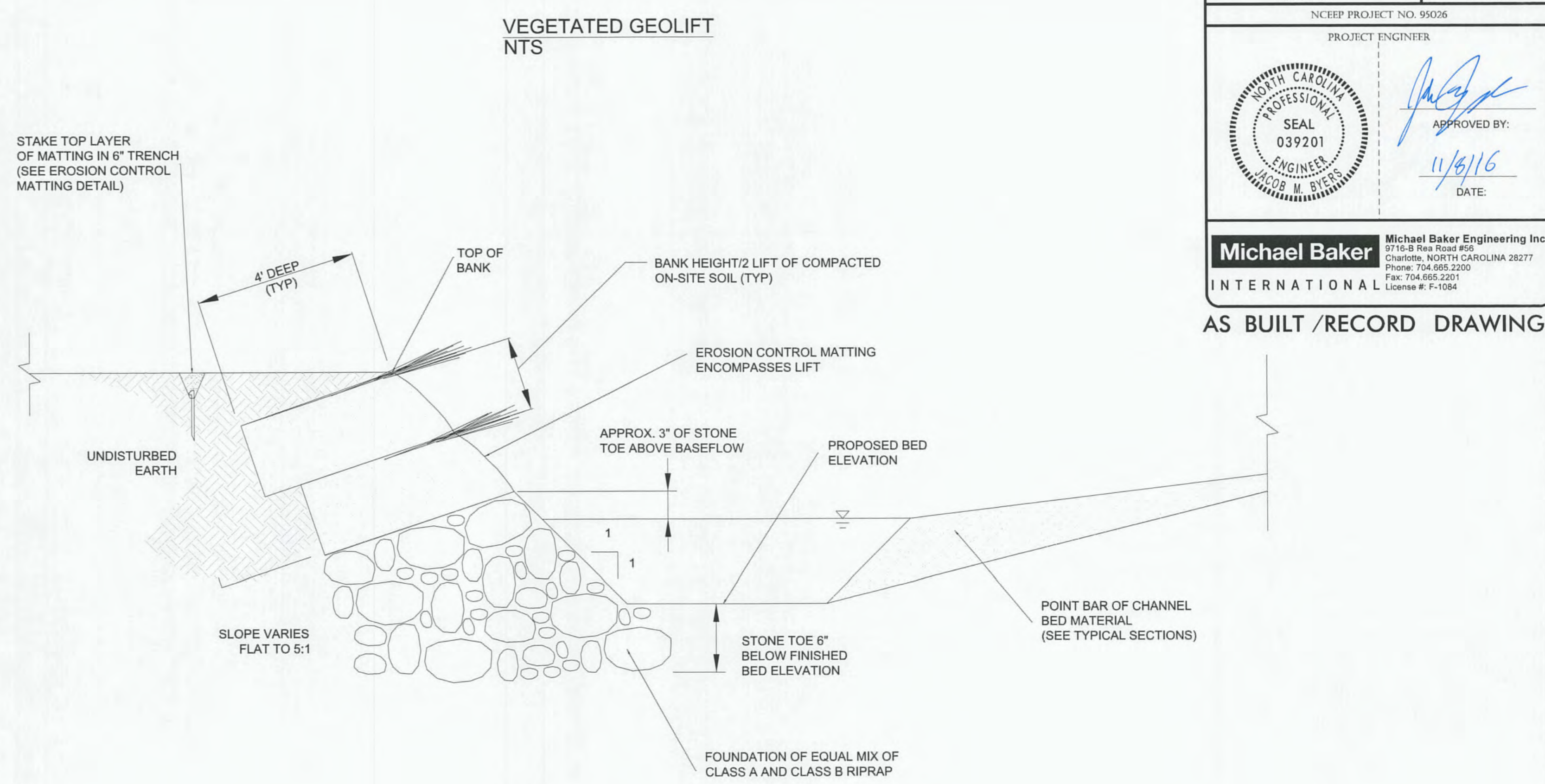


TOWN CREEK
RESTORATION
PROJECT-OPTION B
DETAILS

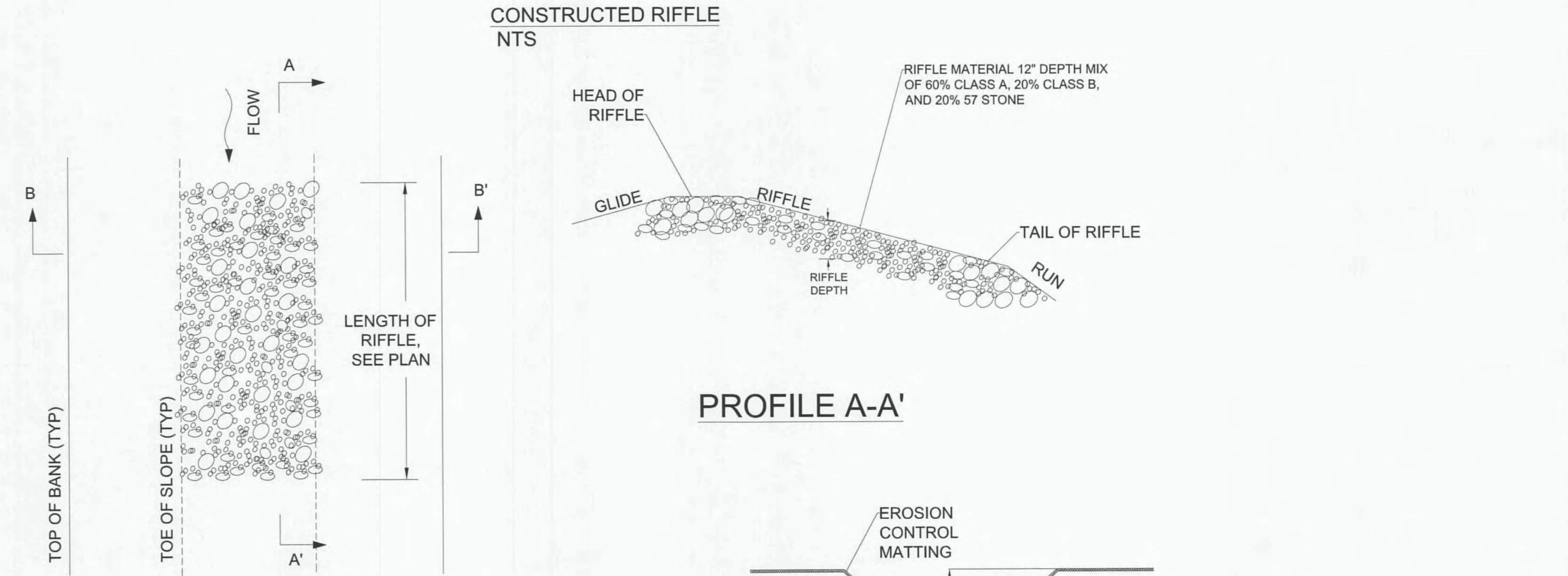
AS BUILT / RECORD DRAWING



- BOULDERS SHALL BE AT LEAST 3'X2'X1'.
- LOGS SHALL BE AT LEAST 12" IN DIAMETER WITH A MAXIMUM DIAMETER OF 24", RELATIVELY STRAIGHT, AND HARDWOOD.
- A SINGLE LOG WITH A MINIMUM DIAMETER OF 36 INCHES MAY BE USED IN PLACE OF TWO LOGS (A HEADER AND FOOTER) PER ON-SITE ENGINEER APPROVAL.
- LOGS FOR LOG VANES SHALL BE A MINIMUM OF 30' IN LENGTH.
- VANE ARM LOG SHALL BE BURIED INTO THE BANK A MINIMUM OF 5'.
- DIG A TRENCH BELOW THE BED FOR FOOTER LOG. START AT BANK AND PLACE FOOTER LOG FIRST AND THE HEADER LOGS. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
- USE FILTER FABRIC TO SEAL GAPS BETWEEN LOGS.
- INSTALL FILTER FABRIC FOR DRAINAGE BEGINNING AT THE MIDDLE OF THE HEADER LOG AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER LOG, AND THEN UPSTREAM FOR A MINIMUM OF SIX FEET.
- NAIL FILTER FABRIC TO TOP OF HEADER LOG USING 3" 10d GALVANIZED COMMON NAIL ON 1' SPACING ALONG LOG.
- USE WELL GRADED MIX OF CLASS A AND B STONE ON UPSTREAM SIDE OF STRUCTURE.
- AFTER ALL STONE HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH ON-SITE ALLUVIUM TO THE ELEVATION OF THE TOP OF THE HEADER LOG.
- FILTER FABRIC SHALL BE TRIMMED ALONG THE TRANSITION BETWEEN THE STONE BACKFILL AND THE HEADER LOG SO THAT THE FILTER FABRIC DOES NOT OVERLAP THE HEADER LOG.



- BOULDERS MUST BE AT LEAST 2'X2'X2'.
- LOGS SHOULD BE AT LEAST 12 INCHES IN DIAMETER WITH A MAXIMUM DIAMETER OF 24 INCHES, RELATIVELY STRAIGHT, HARDWOOD, AND RECENTLY HARVESTED.
- A SINGLE LOG WITH A MINIMUM DIAMETER OF 36 INCHES MAY BE USED IN PLACE OF TWO LOGS (A HEADER AND FOOTER) PER ON-SITE ENGINEER APPROVAL.
- USE FILTER FABRIC TO SEAL GAPS BETWEEN LOGS/BOULDERS.
- DIG A TRENCH BELOW THE BED FOR FOOTER LOGS/BOULDERS. START AT BANK AND PLACE FOOTER LOG/BOULDERS FIRST AND THE HEADER LOG/BOULDERS. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
- INSTALL FILTER FABRIC FOR DRAINAGE BEGINNING AT THE MIDDLE OF THE HEADER LOG/BOULDERS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER LOG/BOULDERS, AND THEN UPSTREAM FOR A MINIMUM OF SIX FEET.
- NAIL FILTER FABRIC TO TOP OF HEADER LOG USING 3" 10d GALVANIZED COMMON NAIL ON 1' SPACING ALONG LOG.
- USE WELL GRADED MIX OF CLASS A AND B STONE ON UPSTREAM SIDE OF STRUCTURE.
- AFTER ALL STONE HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH ON-SITE ALLUVIUM TO THE ELEVATION OF THE TOP OF THE HEADER LOG/ROCK.
- FILTER FABRIC SHALL BE TRIMMED ALONG THE TRANSITION BETWEEN THE STONE BACKFILL AND THE HEADER LOG/BOULDERS SO THAT THE FILTER FABRIC DOES NOT OVERLAP THE HEADER LOG/BOULDERS.



TOWN CREEK PROJECT SPECIFIC SPECS

ALL REACHES

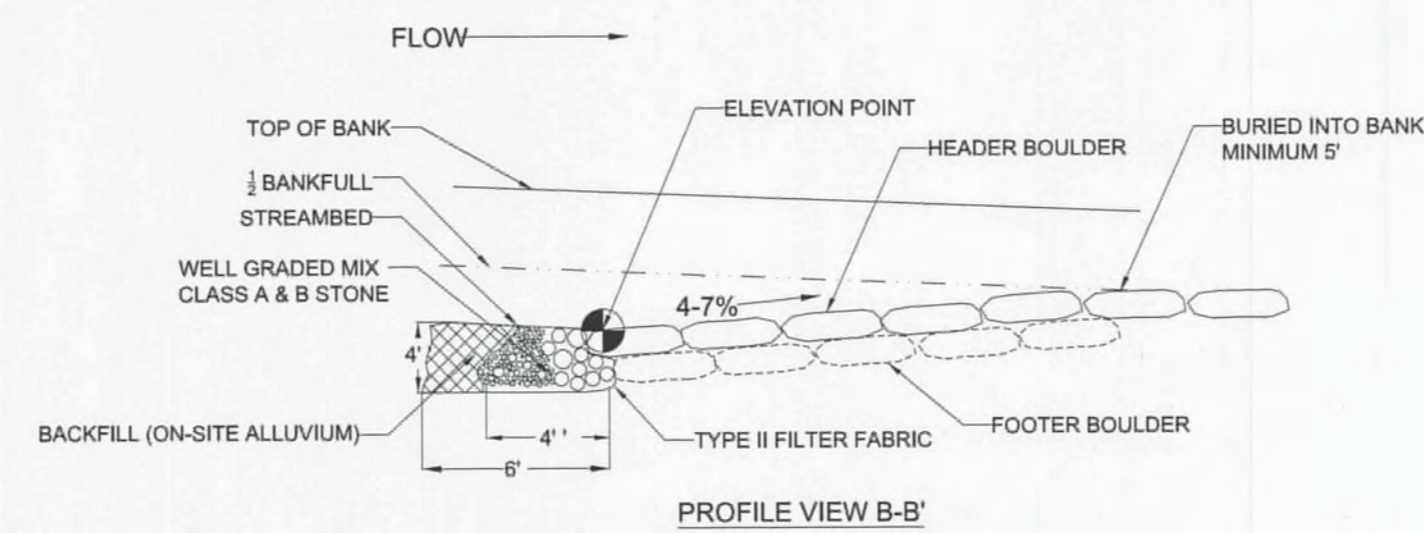
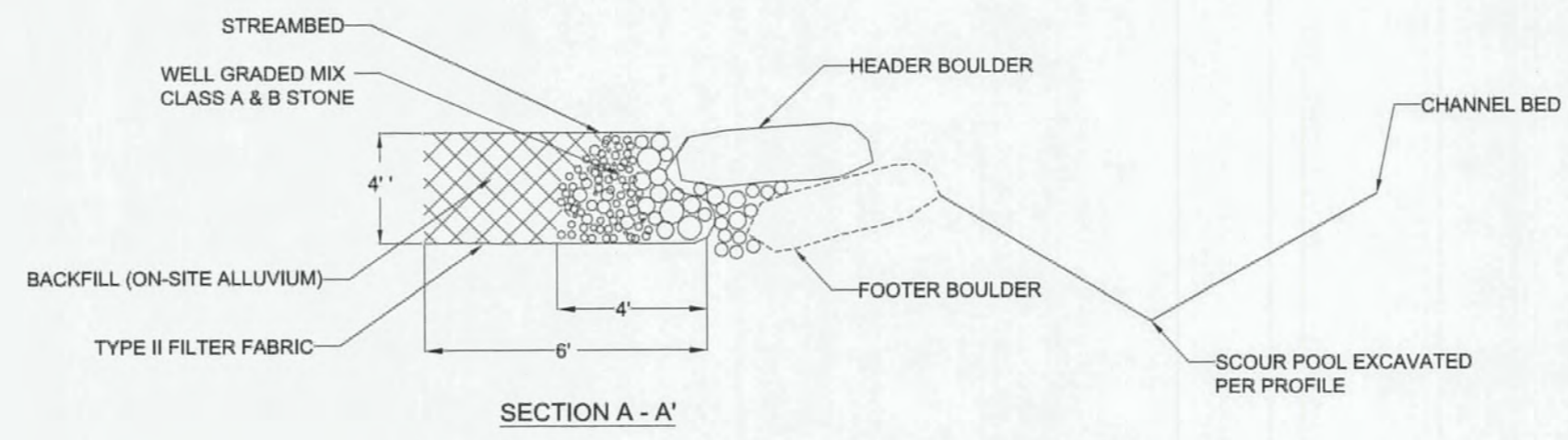
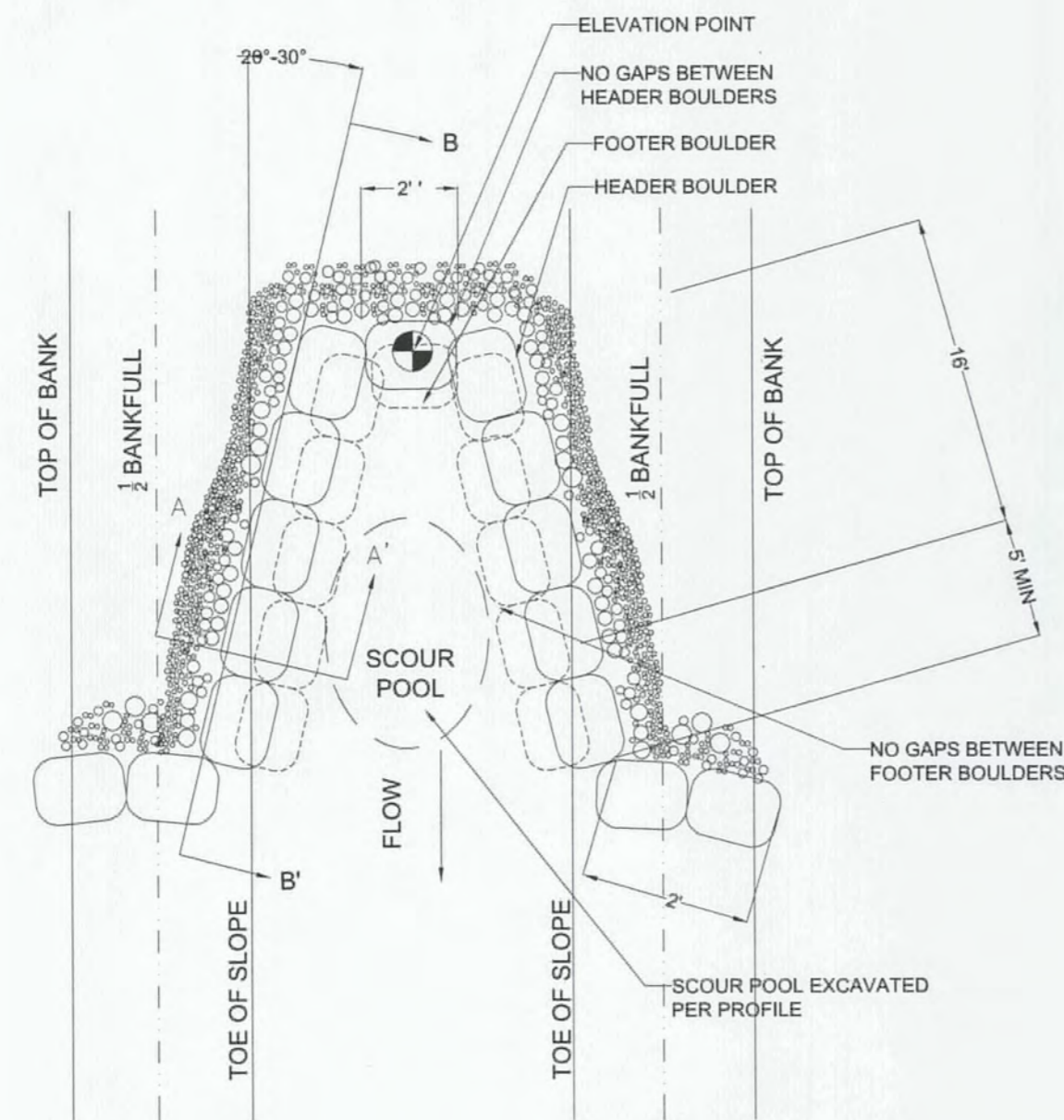
RIFFLE DEPTH	12	IN
RIFFLE COMPOSITION	0-10	% ONSITE COARSE ALLUVIUM
	60	% CLASS A
	20	% CLASS B
	20	% 57 STONE
	0	OTHER

SECTION B-B'

TOWN CREEK RESTORATION PROJECT-OPTION B
 DETAILS

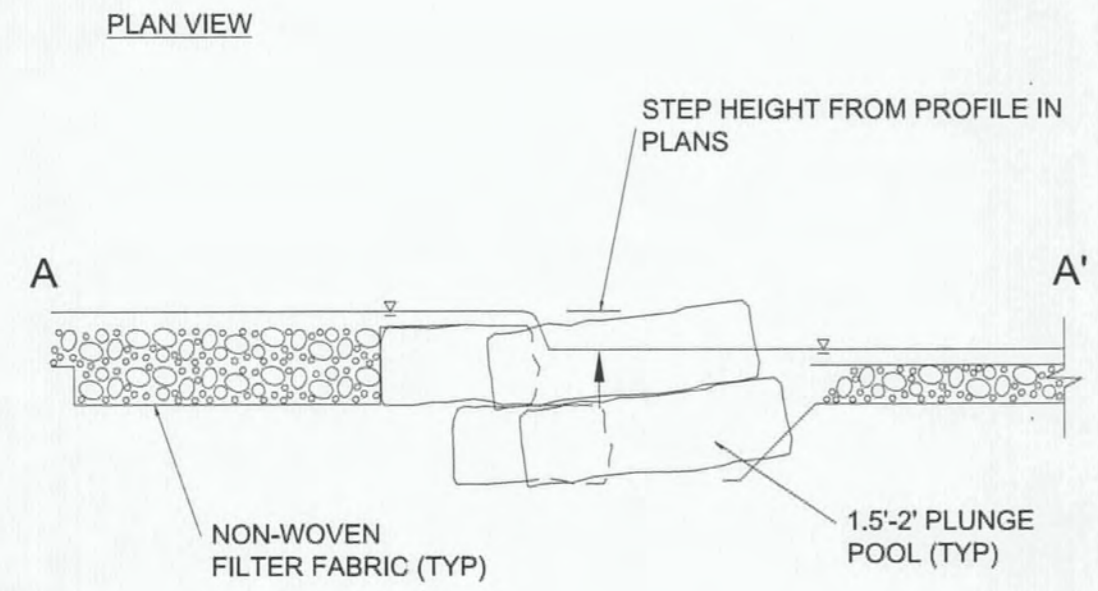
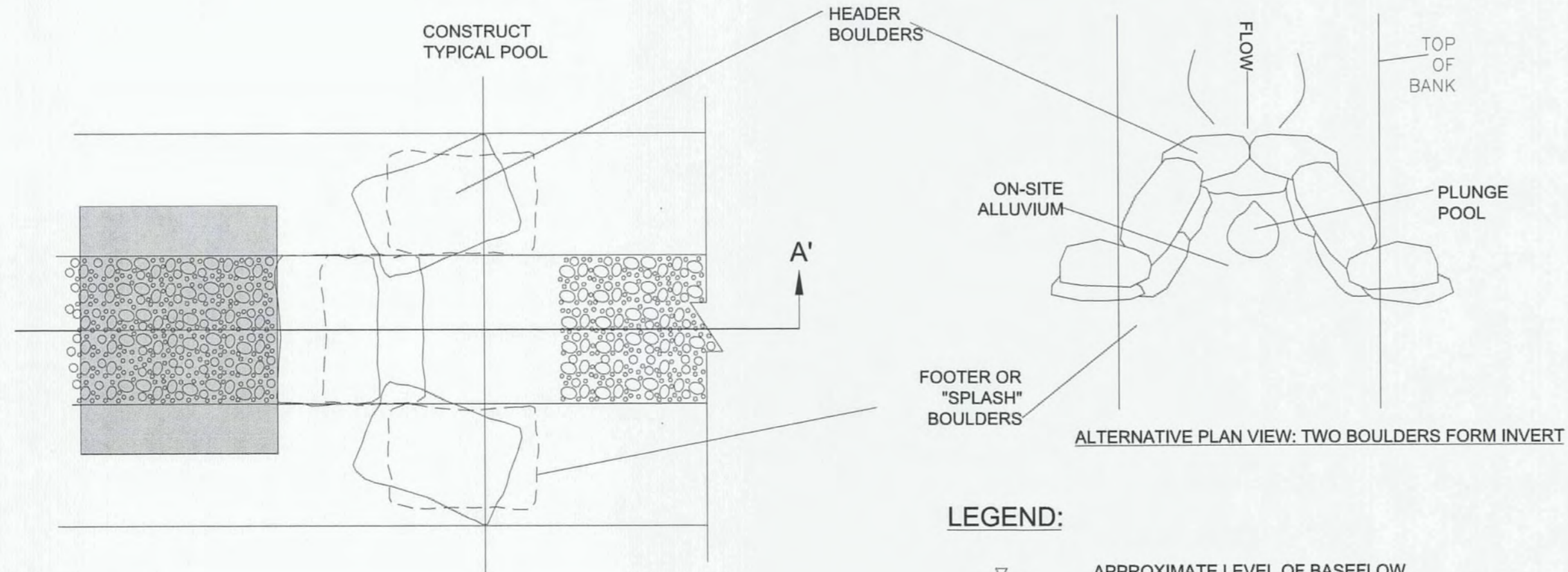
**ROCK CROSS VANE
NTS**

BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 2-B
NCEEP PROJECT NO. 95026	
PROJECT ENGINEER	
	APPROVED BY: DATE: 11/8/16
Michael Baker International Michael Baker Engineering Inc. 9716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.695.2200 Fax: 704.695.2201 License #: F-1084	
AS BUILT / RECORD DRAWING	



- ROCK CROSS VANE STRUCTURE NOTES:**
1. BOULDERS MUST BE AT LEAST 3'x2'x1'.
 2. USE FILTER FABRIC TO SEAL GAPS BETWEEN BOULDERS.
 3. DIG A TRENCH BELOW THE BED FOR FOOTER BOULDERS. START AT BANK AND PLACE FOOTER BOULDERS FIRST AND THE HEADER BOULDERS. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
 4. INSTALL FILTER FABRIC FOR DRAINAGE BEGINNING AT THE MIDDLE OF THE HEADER BOULDERS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER BOULDERS, AND THEN UPSTREAM FOR A MINIMUM OF SIX FEET.
 5. USE WELL GRADED MIX OF CLASS A AND B STONE ON UPSTREAM SIDE OF STRUCTURE.
 6. AFTER ALL STONE HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH ON-SITE ALLUVIUM TO THE ELEVATION OF THE TOP OF THE HEADER BOULDER.
 7. FILTER FABRIC SHALL BE TRIMMED ALONG THE TRANSITION BETWEEN THE STONE BACKFILL AND THE HEADER BOULDERS SO THAT THE FILTER FABRIC DOES NOT OVERLAP THE HEADER BOULDERS.

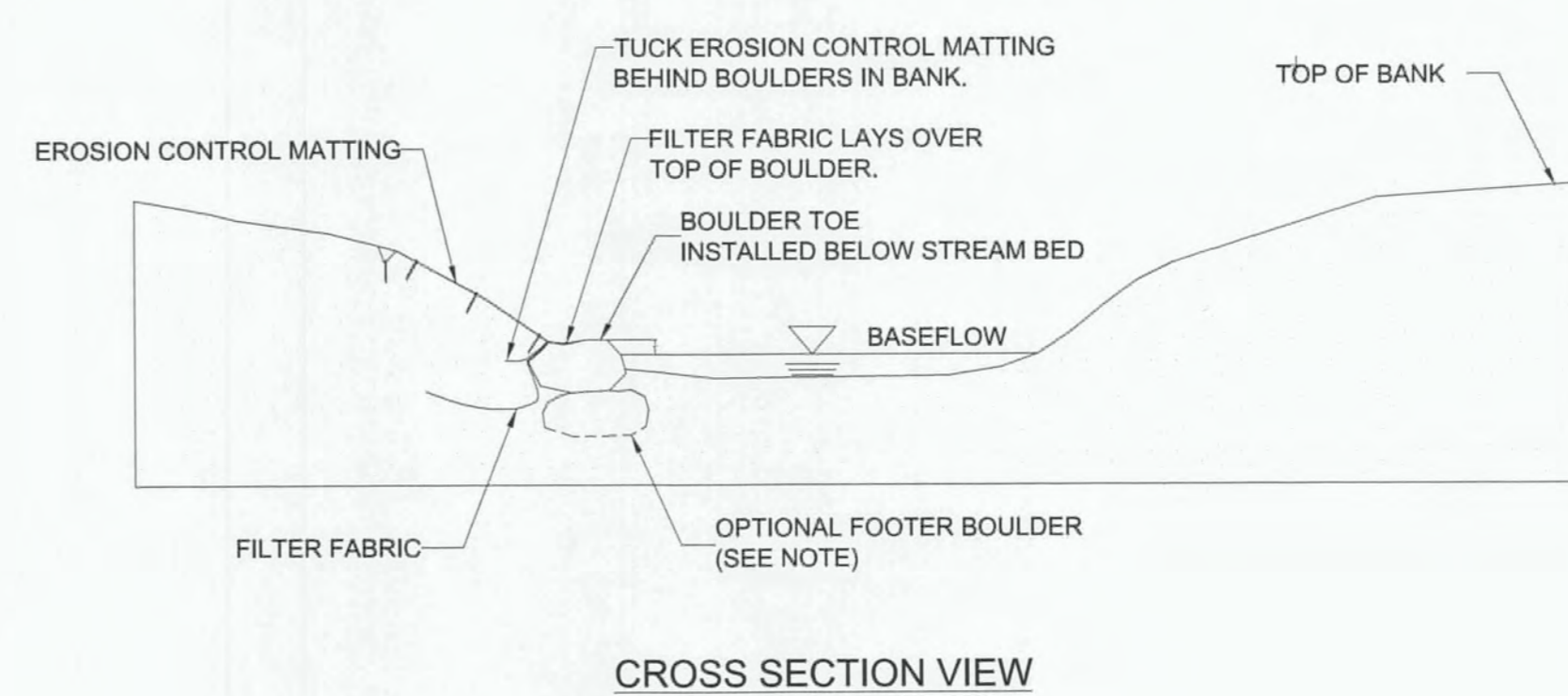
**BOULDER STEP
NTS**



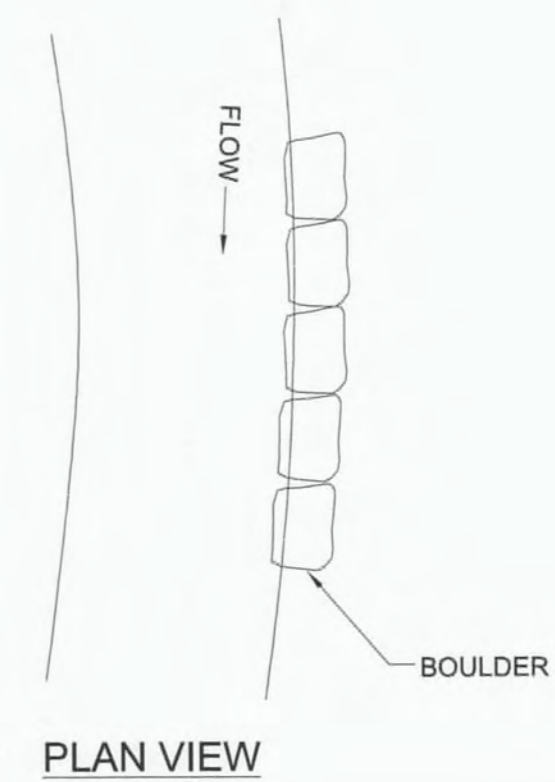
LEGEND:

- APPROXIMATE LEVEL OF BASEFLOW WATER SURFACE
- CHANNEL THALWEG / CONTROL LINE
- CHANNEL BED MATERIAL
- CHANNEL SEDIMENT
- UNDISTURBED IN-SITU SOIL
- NON-WOVEN FILTER FABRIC
- BOULDER: 2'x1.5'x1' to 3'x3'x2

**BOULDER TOE
NTS**



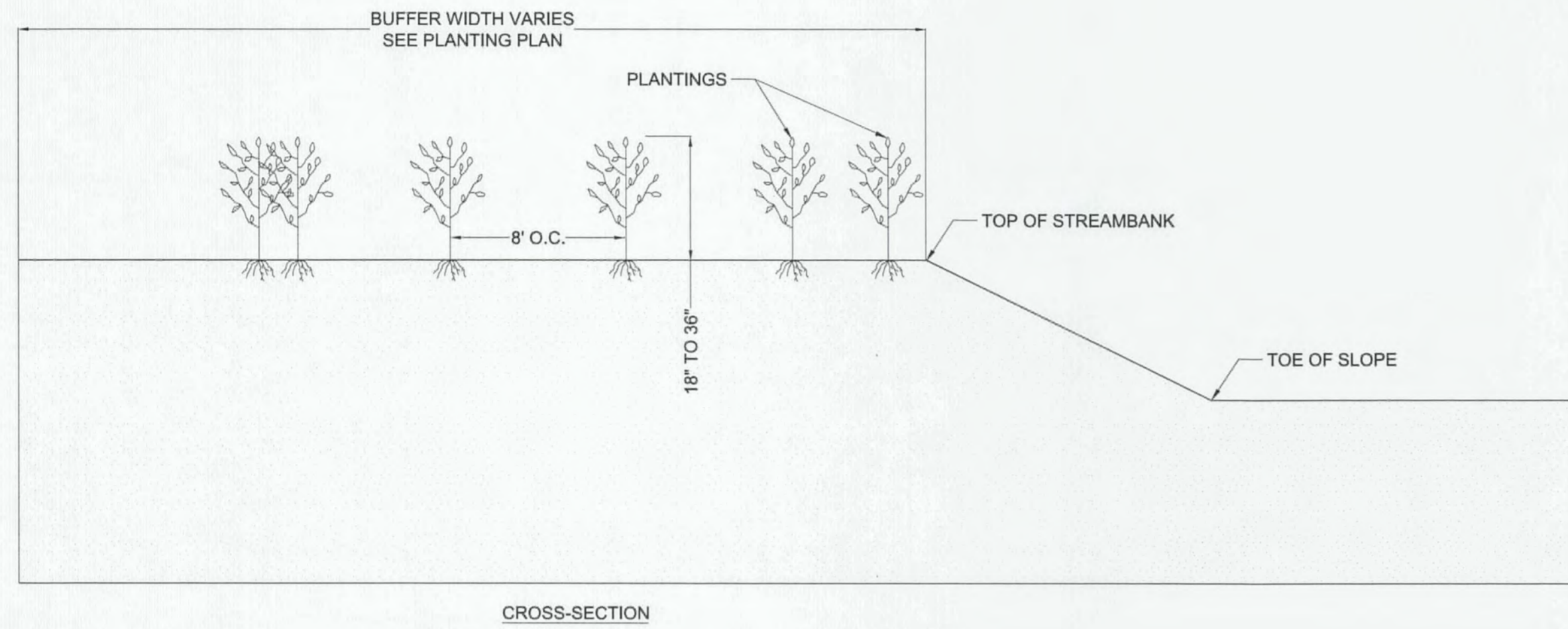
- NOTE:**
1. BOULDERS SHOULD EXTEND BELOW SCOUR DEPTH AND ABOVE BASE FLOW WATER LEVELS. FOOTER BOULDERS MAY BE REQUIRED, DEPENDING ON EXISTING BED MATERIAL.
 2. TOE BOULDERS SHALL BE TOUCHING SO THAT VOID SPACE IS MINIMIZED.
 3. THE MAJORITY OF THE BOULDER SHOULD BE BURIED IN THE STREAM BANK, LEAVING FACE OF BOULDER EXPOSED TO FLOW.
 4. FILTER FABRIC SHOULD BE PLACED BEHIND BOULDER TOE, BURIED BELOW BOULDER DEPTH, AND EXTEND INTO THE BANK.
 5. EROSION CONTROL MATTING SHOULD BE PLACED AGAINST BOULDER BEFORE BACKFILL, THEN FOLDED BACK OVER SEEDDED BANK SLOPE.
 6. BOULDER TOE SHOULD BE BACKFILLED AND COMPACTED, VOID SPACE BETWEEN FABRIC AND BOULDER TOE SHOULD BE MINIMIZED.
 7. BOULDER TOE SHOULD NOT EXCEED MAXIMUM BANKFULL ELEVATION.



**TOWN CREEK
RESTORATION
PROJECT-OPTION B**

DETAILS

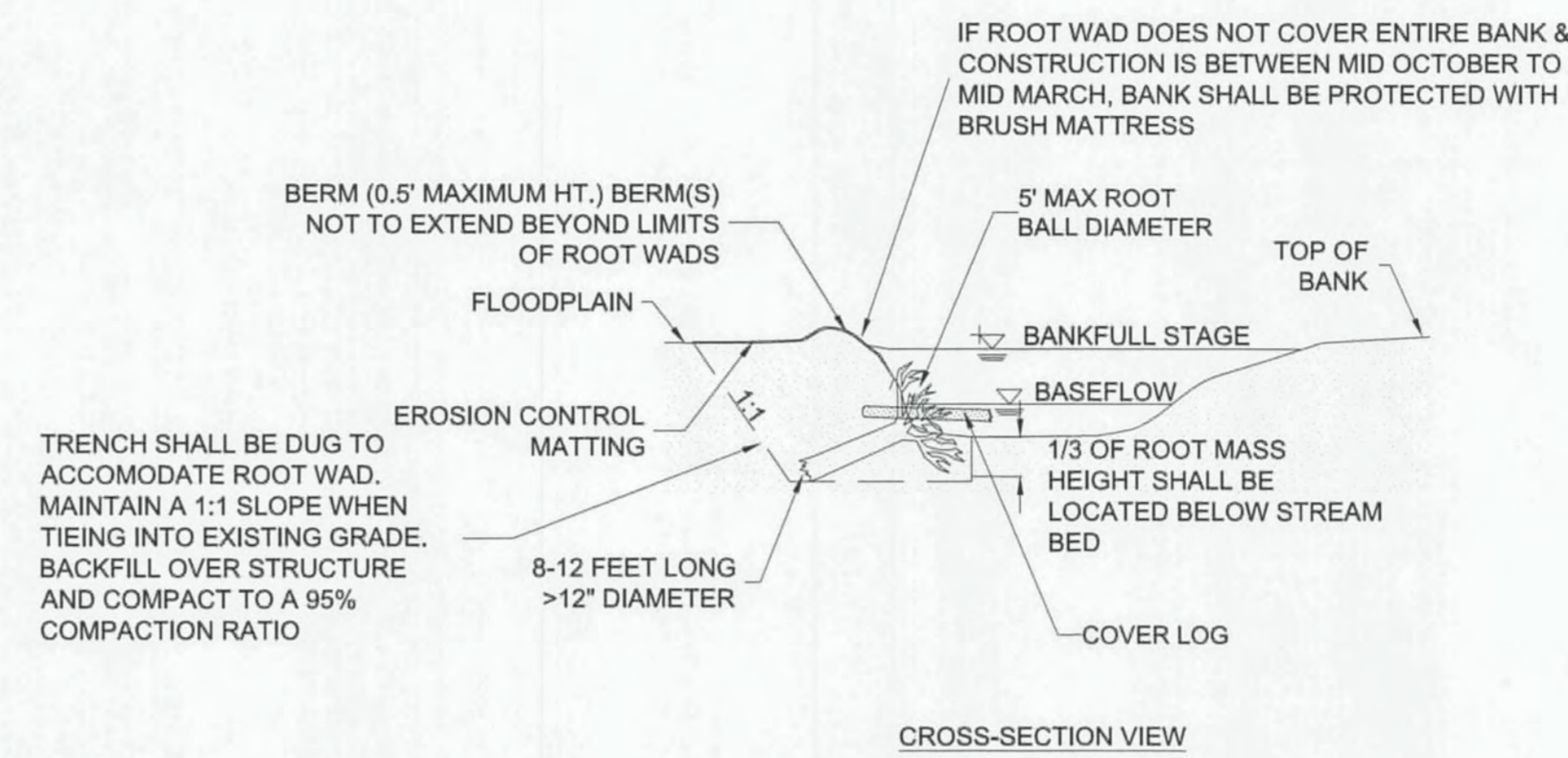
**BARE ROOT PLANTING
NTS**



BARE ROOT PLANTING NOTES:

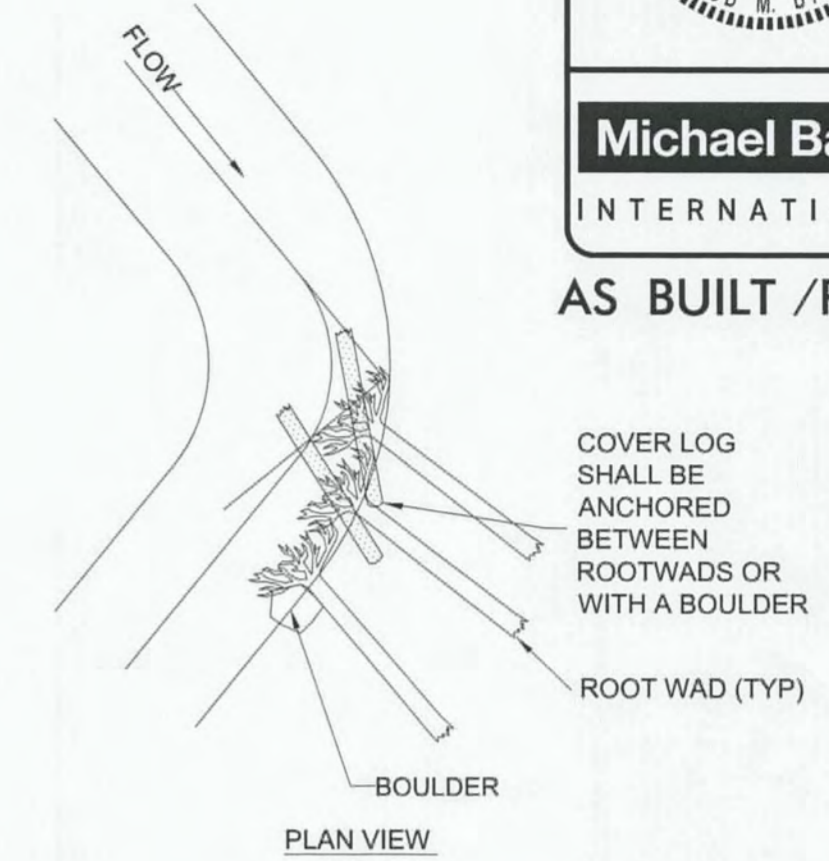
1. BARE ROOT SHRUBS AND TREES SHALL BE PLANTED AS SHOWN ON THE PLANS.
2. COMPACTED SOIL SHALL BE LOOSENED PRIOR TO PLANTING.
3. PLANTS SHALL BE PLACED IN HOLES DEEP AND WIDE ENOUGH TO ALLOW THE ROOTS TO SPREAD OUT AND DOWN WITHOUT J-ROOTING.
4. ROOTS SHALL BE KEPT MOIST BY MEANS OF WET CANVAS, BURLAP, OR STRAW WHILE DISTRIBUTING OR WAITING TO PLANT.
5. PLANTS SHALL BE HEeled-IN TO MOIST SOIL OR SAWDUST IF NOT PROMPTLY PLANTED UPON ARRIVAL AT PROJECT SITE.
6. SEE PLANTING PLAN FOR PLANT SPACING.
7. SEE SPECIAL PROVISION, SEE DETAIL 6/26, AND PLANTING PLAN FOR PLANTING DETAILS.

**ROOT WAD
NTS**



NOTE

1. ROOTWADS SHALL BE A HARDWOOD SPECIES WITH A 12" MINIMUM DIAMETER
2. THE CHANNEL BASEFLOW ELEVATION WILL VARY SEASONALLY AND MAY BE VERY LOW DURING TIMES OF DROUGHT. FOR CONSTRUCTION PURPOSES, THE BASEFLOW ELEVATION WILL BE CONSIDERED TO BE EQUAL TO THE DOWNSTREAM RIFFLE ELEVATION.
3. ELEVATION OF THE ROOTWADS WILL BE BASED ON THE DOWNSTREAM RIFFLE ELEVATION. ROOTWADS SHOULD BE CONSTRUCTED SUCH THAT HALF OF THE ROOTWAD MASS IS BELOW THE BASEFLOW WATER SURFACE
4. THE CONTRACTOR WILL BE RESPONSIBLE FOR CHANGES TO THE ROOTWADS ELEVATION AND PLACEMENT IF IT IS DETERMINED BY THE ENGINEER THAT THE ROOTWADS WERE NOT INSTALLED PROPERLY ACCORDING TO THIS DETAIL.



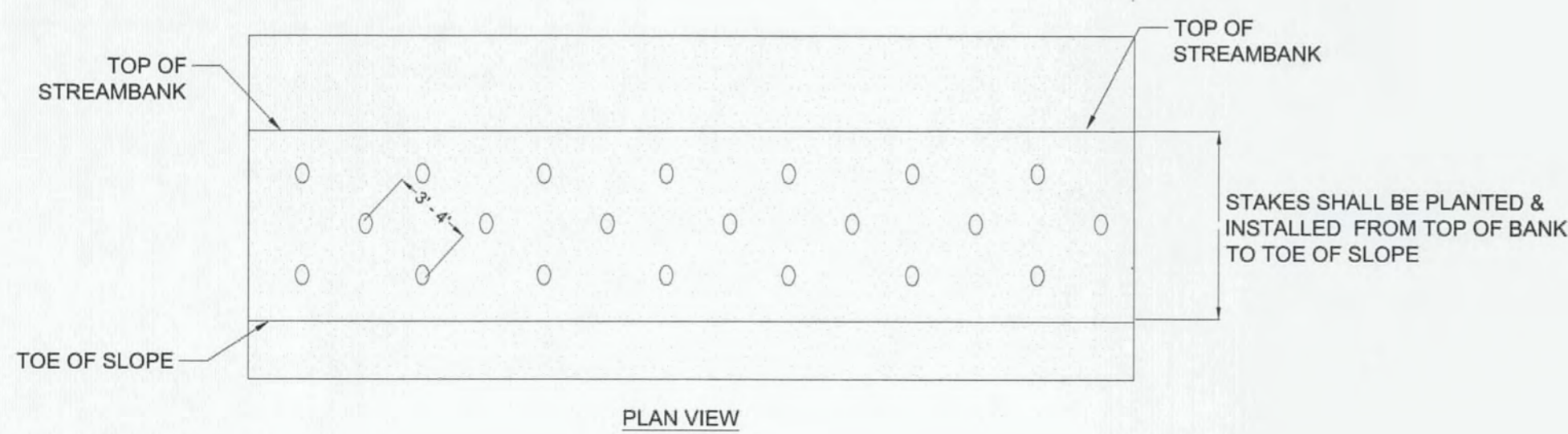
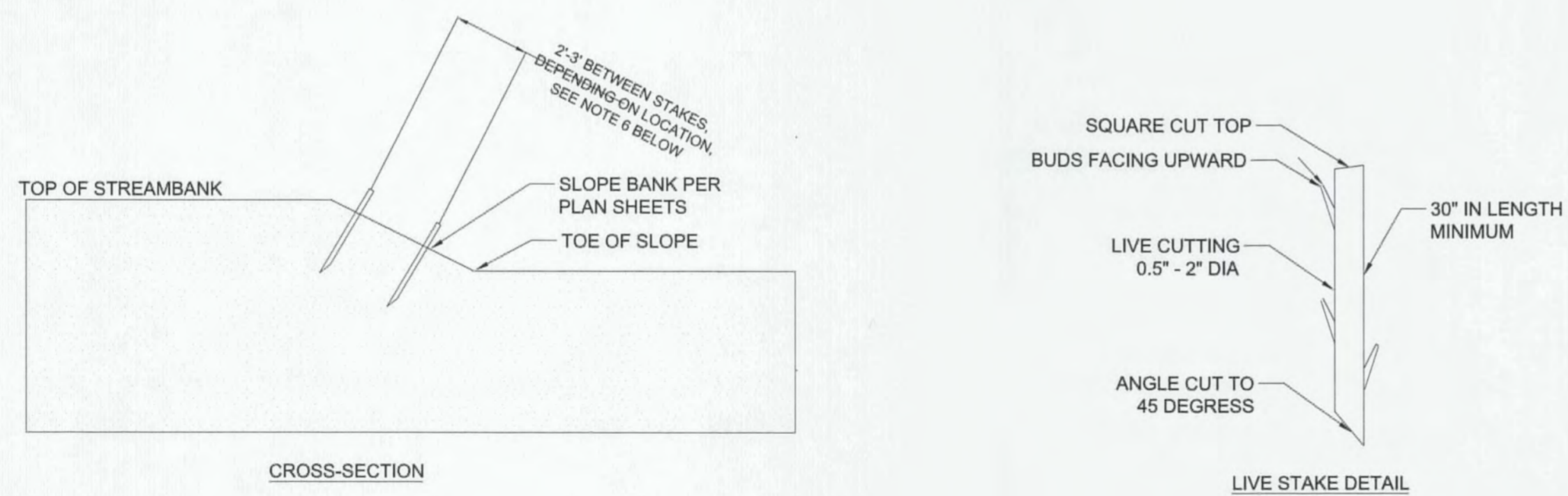
NOTE

TRENCHING METHOD:
IF THE ROOT WAD CANNOT BE DRIVEN INTO THE BANK OR THE BANK REQUIRES RECONSTRUCTION, THE TRENCHING METHOD SHALL BE USED. THIS METHOD REQUIRES THAT A TRENCH BE EXCAVATED FOR THE LOG PORTION OF THE ROOT WAD. ONE-THIRD OF THE ROOT WAD SHALL REMAIN BELOW NORMAL BASE FLOW CONDITIONS.

NOTE

DRIVE POINT METHOD:
THE TRUNK END OF THE LOG SHALL BE SHARPENED WITH A CHAINSAW BEFORE "DRIVING" IT INTO THE BANK. ROOT WADS SHALL BE ORIENTED UPSTREAM SO THAT THE STREAM FLOW MEETS THE ROOT WAD AT A 90-DEGREE ANGLE, DEFLECTING THE WATER AWAY FROM THE BANK. A TRANSPLANT OR BOULDER SHALL BE PLACED ON THE DOWNSTREAM SIDE OF THE ROOT WAD IF A BACK EDDY IS FORMED BY THE ROOT WAD. THE BOULDER SHALL BE APPROXIMATELY 4' X 3' X 2'.

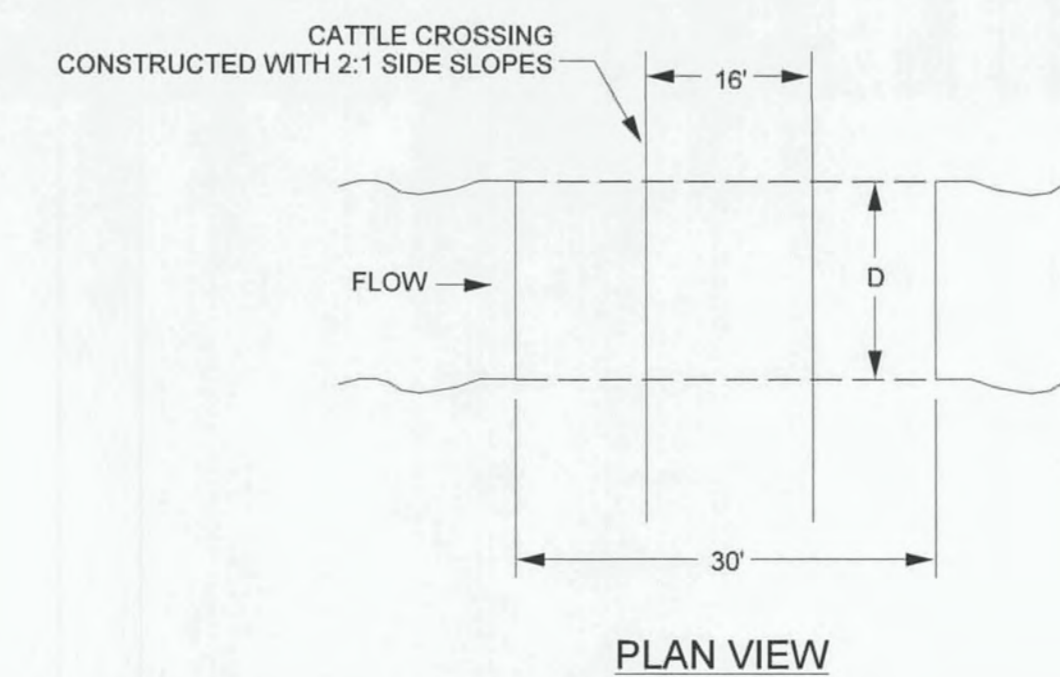
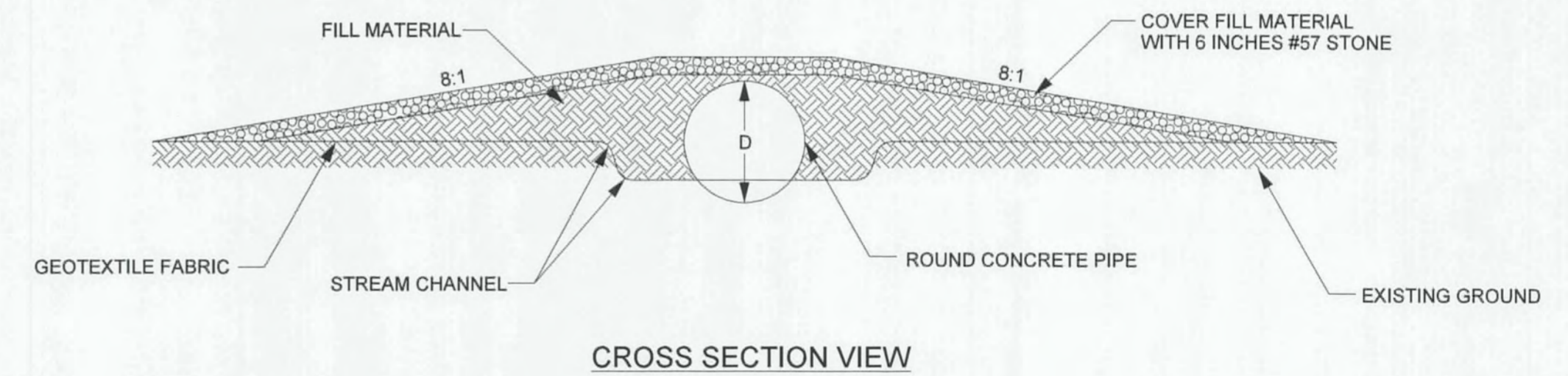
**LIVE STAKE
NTS**



NOTES

1. STAKES THAT HAVE BEEN SPLIT SHALL BE REJECTED AND NOT USED FOR CONSTRUCTION.
2. STAKES SHALL BE INSTALLED WITH BUDS POINTING UPWARD.
3. STAKES SHALL BE INSTALLED PERPENDICULAR TO BANK.
4. STAKES SHALL BE 0.5" - 2" INCHES IN DIAMETER AND 15" IN LENGTH MINIMUM.
5. STAKES SHALL BE INSTALLED WITH APPROXIMATELY 3" OF STAKE REMAINING ABOVE GROUND.
6. STAKE SPACING SHALL BE 4' ON CENTER ON RIFFLE BANKS AND 3' ON CENTER ON OUTSIDE BANK BENDS.

**PERMANENT STREAM CROSSING
NTS**



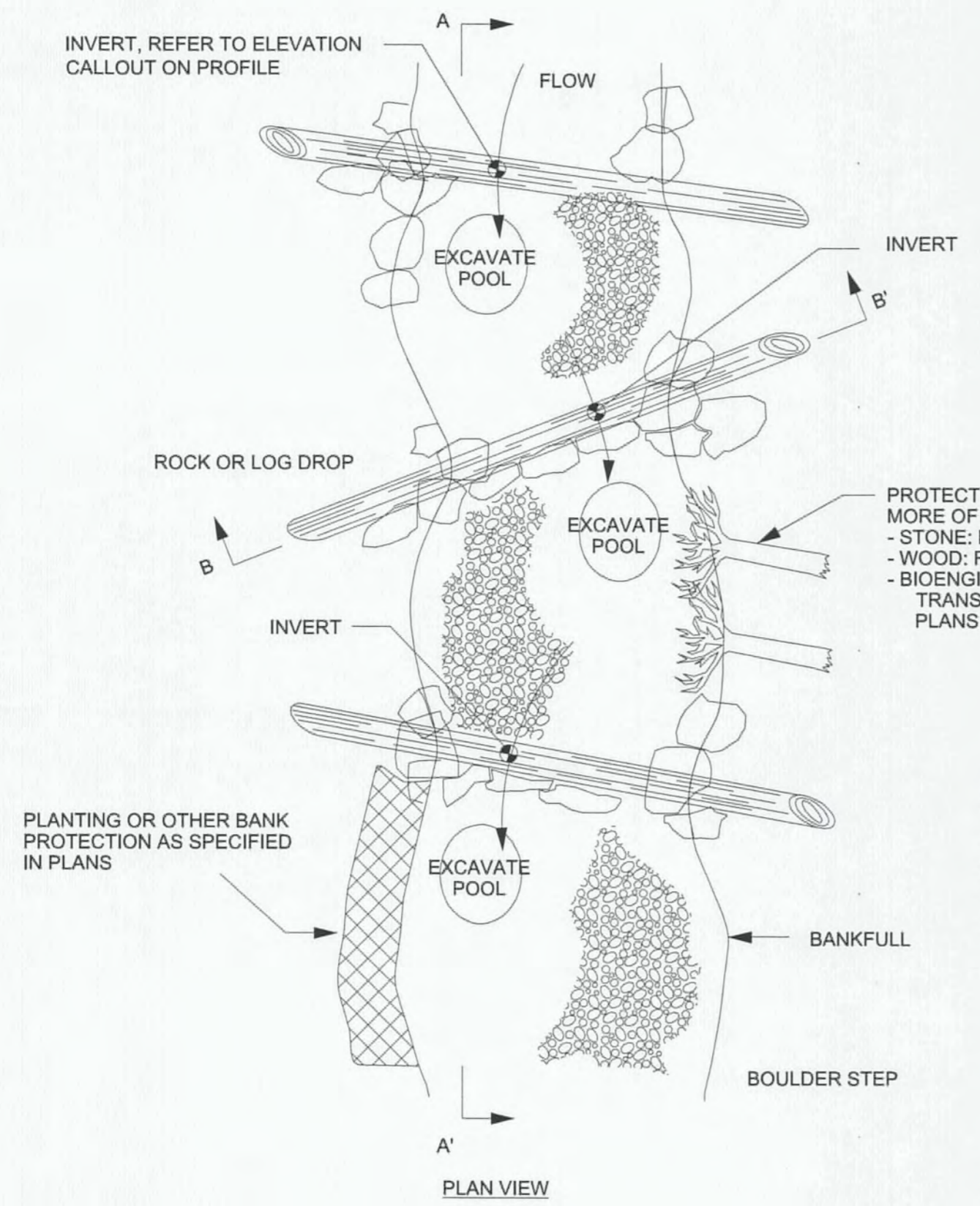
**TOWN CREEK
RESTORATION
PROJECT-OPTION B**

DETAILS

BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 2-C
NCEEP PROJECT NO. 95026 PROJECT ENGINEER	
	<p>APPROVED BY: 11/5/16 DATE:</p>
Michael Baker International Michael Baker Engineering Inc. <small>9716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.2201 License #: F-1084</small>	

BAKER PROJECT REFERENCE NO.	SHEET NO.
124526	2-D
NCEEP PROJECT NO. 95026	
PROJECT ENGINEER	
	 APPROVED BY: 4/18/16 DATE:
Michael Baker International Michael Baker Engineering Inc. 9716-B Rea Road #56 Charlotte, NORTH CAROLINA 28277 Phone: 704.965.2200 Fax: 704.965.2201 License #: F-1084	

AS BUILT /RECORD DRAWING



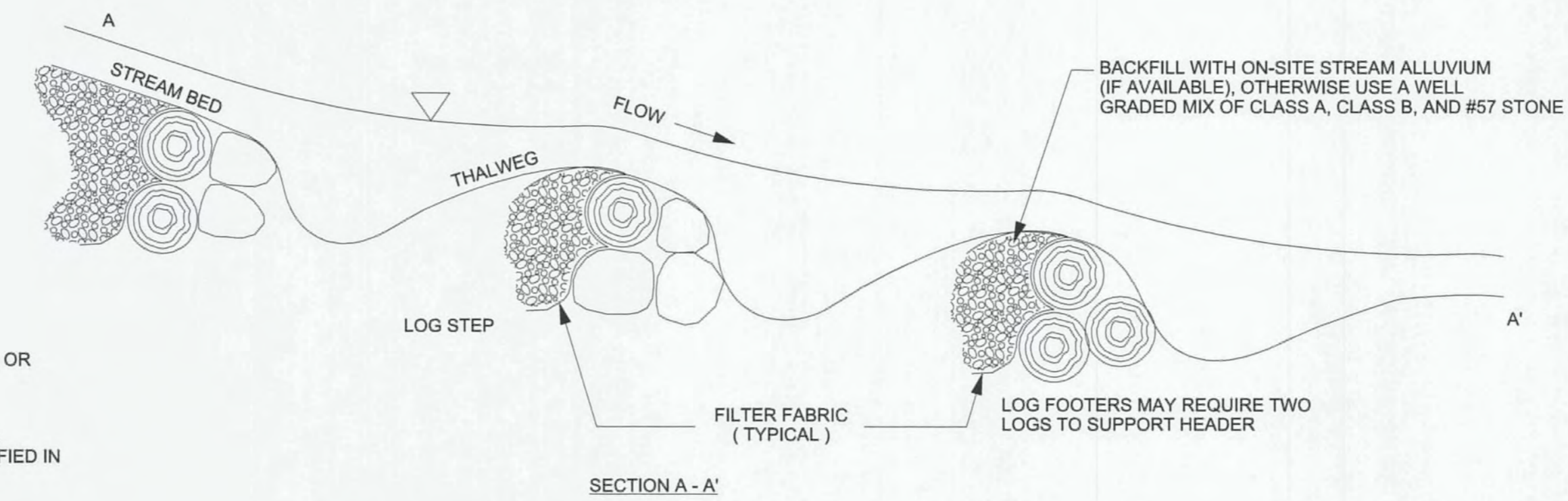
PROTECT BANK TYPICALLY USING ONE OR MORE OF THESE:
 - STONE: BOULDERS, OR CLASS 1
 - WOOD: ROOT WADS OR TOE WOOD
 - BIOENGINEERING: BRUSH MATTRESS, TRANSPLANTS OR OTHER AS SPECIFIED IN PLANS

- NOTES:
- LOGS SHOULD BE HARDWOOD, RECENTLY HARVESTED AND EXTENDING INTO THE BANK ON EACH SIDE AT MINIMUM DISTANCE SPECIFIED BELOW.
 - SOIL SHOULD BE COMPACTED WELL AROUND BURIED PORTIONS OF LOG
 - FILTER FABRIC SHOULD BE NAILED TO THE LOG BELOW THE BACKFILL
 - BOULDERS SHOULD BE PLACED ON TOP OF HEADER LOG FOR ANCHORING AND INCORPORATED INTO BANK
 - TRANSPLANTS CAN BE USED INSTEAD OF BOULDERS WITH ENGINEER'S APPROVAL

PROJECT SPECIFIC SPECS

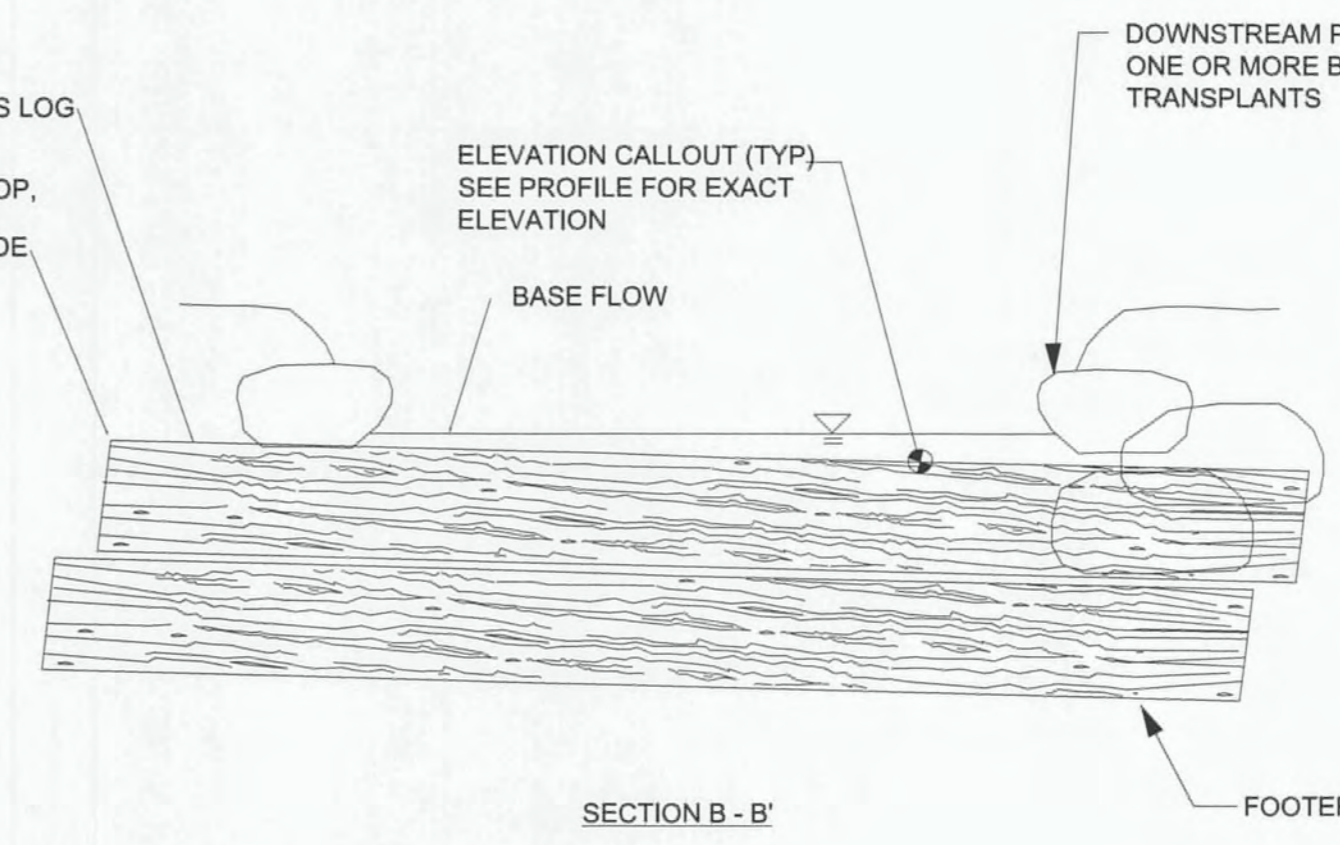
MINIMUM BOULDER SIZE	2.5x1.5x1	FT
MINIMUM LOG DIAMETER	10	IN
MINIMUM LOG EXTEND INTO BANKS	3	FT
AVERAGE CHANNEL BOTTOM WIDTH	5	FT
APPROXIMATE LOG LENGTHS	11+	FT

ANGLED LOG STEP
NTS

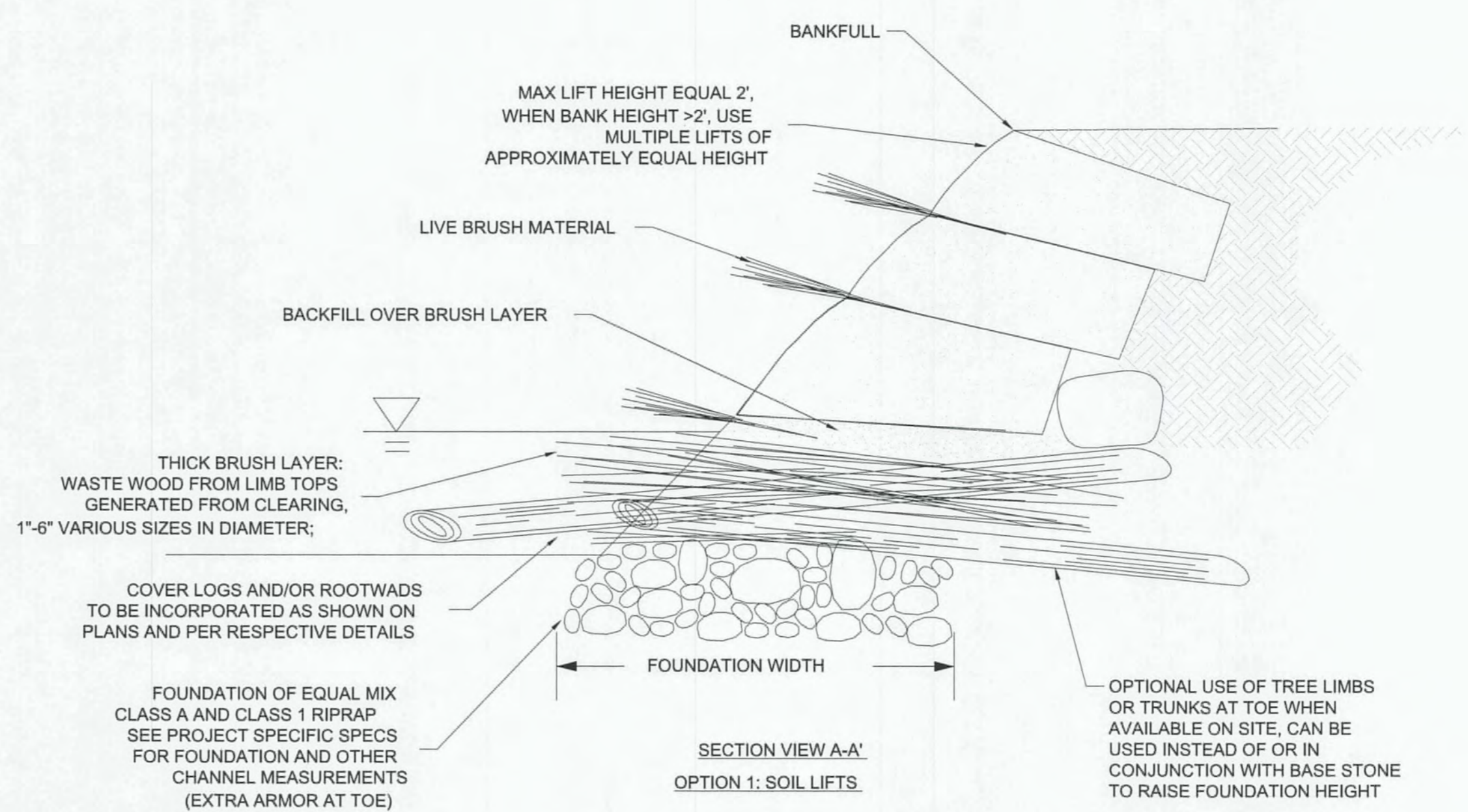
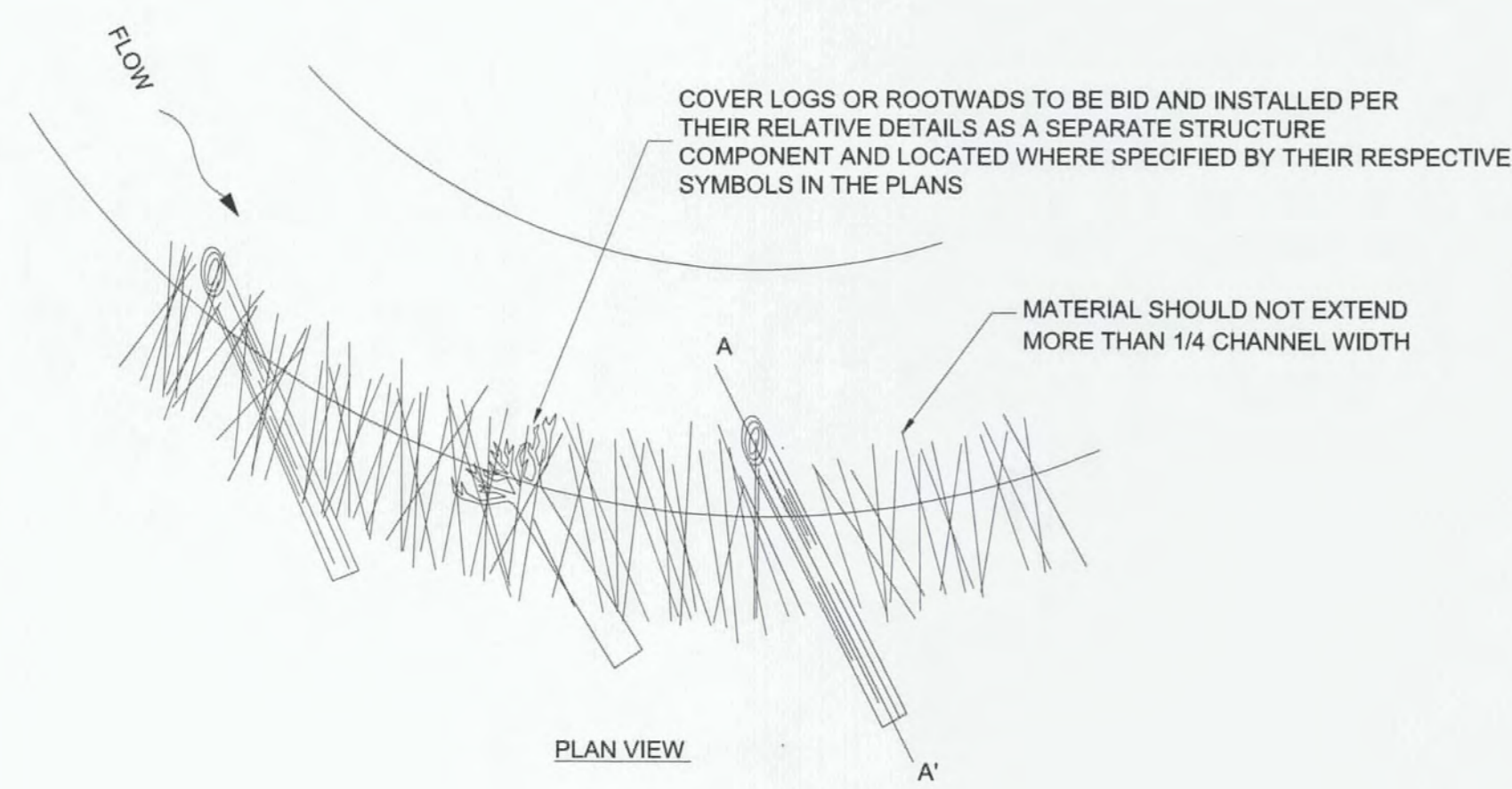


BACKFILL WITH ON-SITE STREAM ALLUVIUM (IF AVAILABLE), OTHERWISE USE A WELL GRADED MIX OF CLASS A, CLASS B, AND #57 STONE

1-3% SLOPE ACROSS LOG
 HEADER LOG OR ROCK DROP, INSTALL ON SLOPE WITH INVERT OFFSET TO ONE SIDE



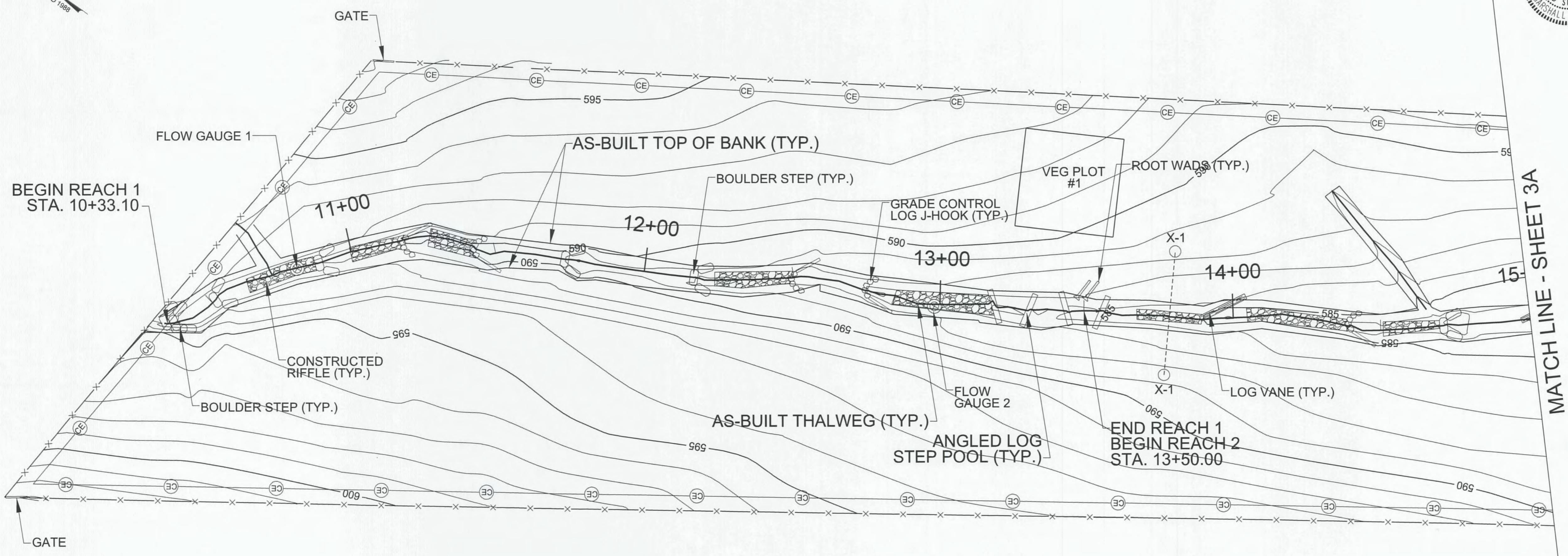
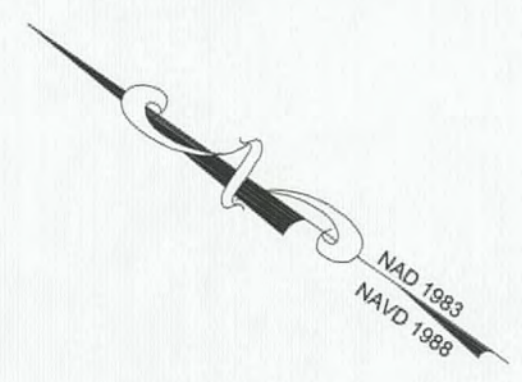
TOE WOOD
NTS



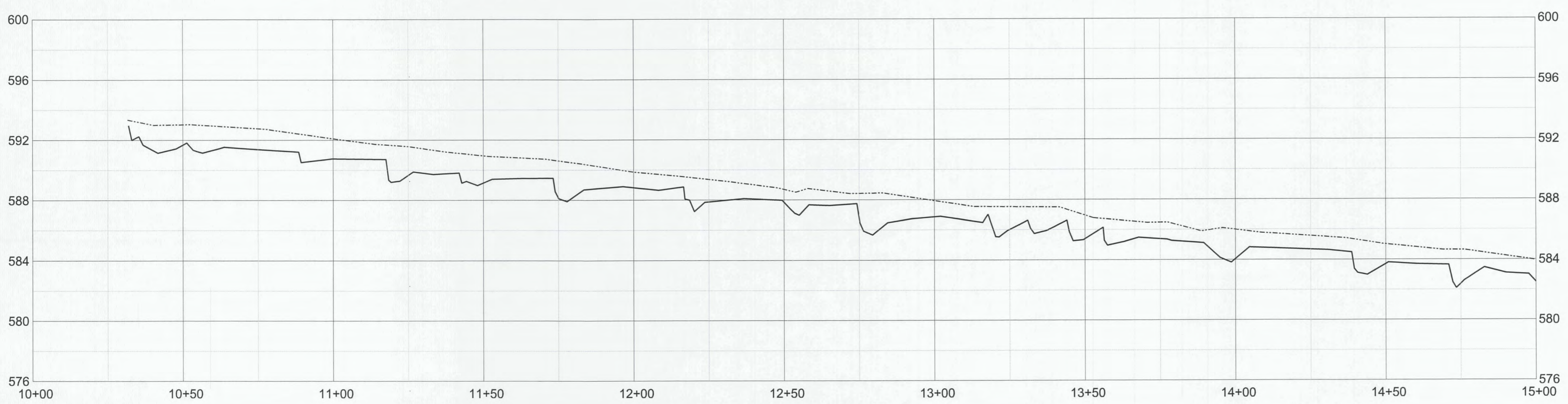
PROJECT SPECIFIC SPECS

POOL WATER DEPTH	2.0	FT
FOUNDATION HEIGHT	12	IN
FOUNDATION WIDTH	2	FT
BRUSH THICKNESS	~8	IN

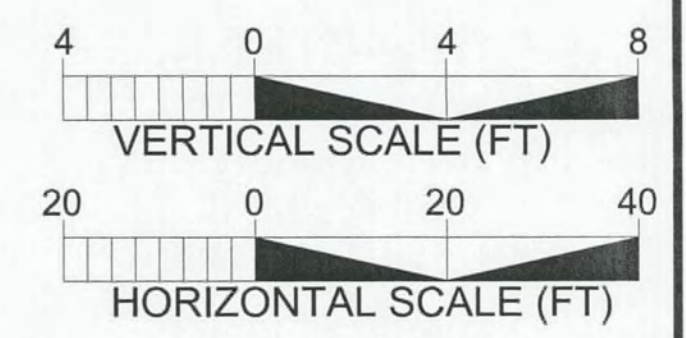
TOWN CREEK
RESTORATION
PROJECT-OPTION B
DETAILS




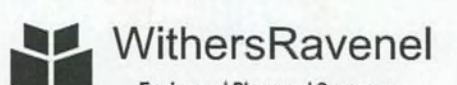

MATCH LINE - SHEET 3A

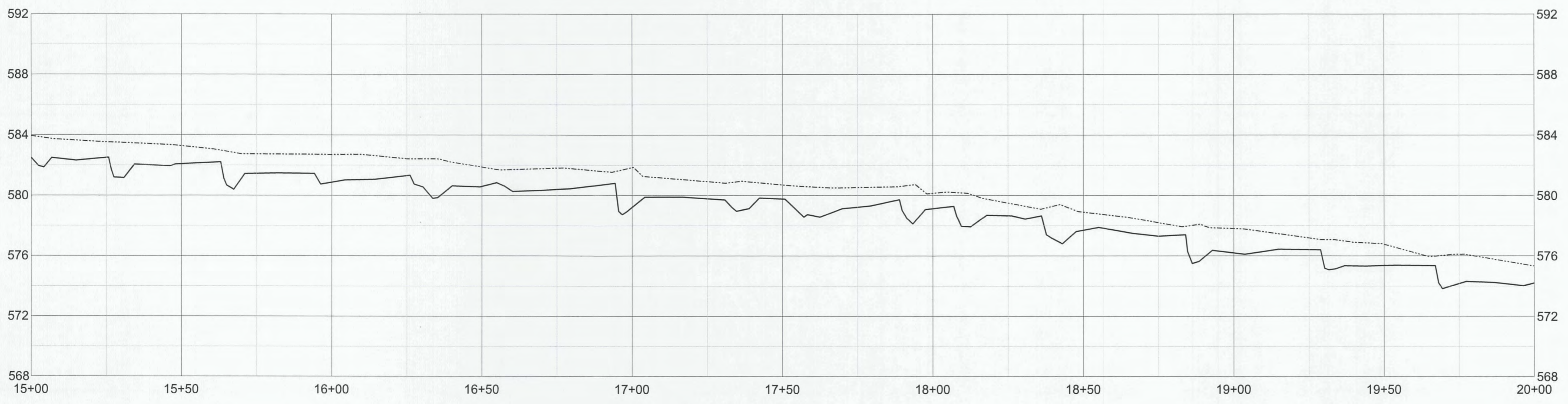
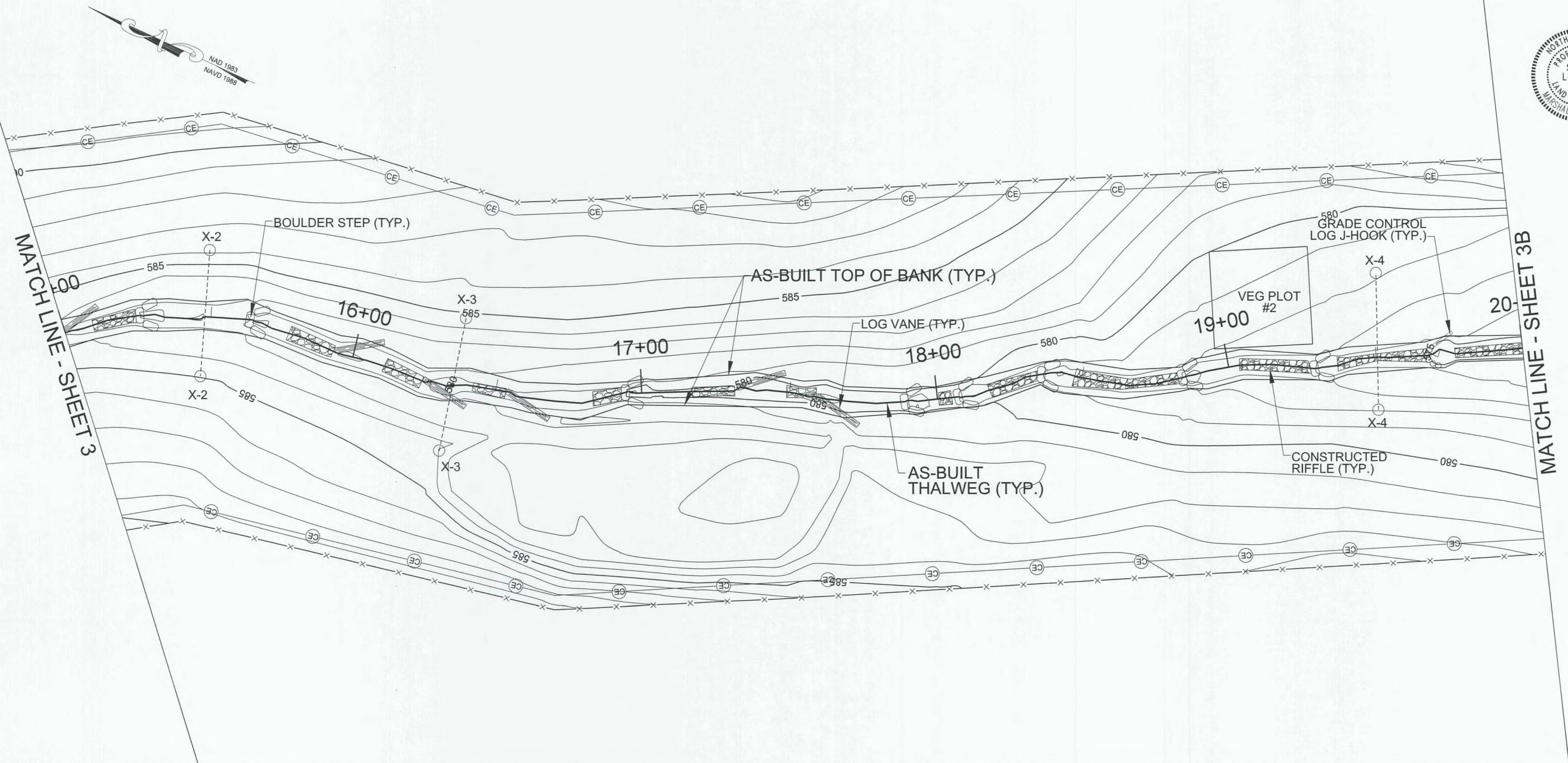


LEGEND OF PROFILES
 — AS-BUILT THALWEG
 - - - AS-BUILT LOW BANK



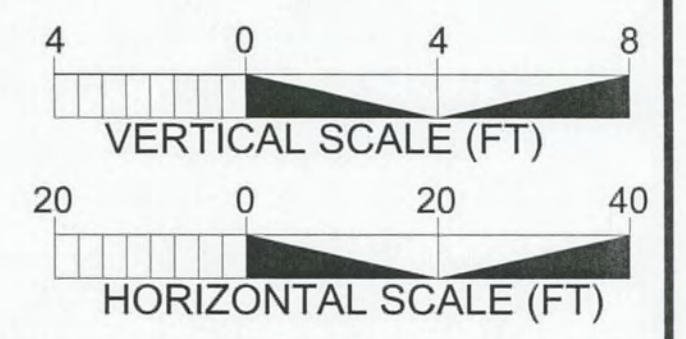
TOWN CREEK RESTORATION PROJECT-OPTION B
AS-BUILT SURVEY PLAN & PROFILE

BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 3A
NCDMS PROJECT NO. 95026	
I, MARSHALL G. WIGHT, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THIS ARE AS-BUILT CONDITIONS, EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 7 TH DAY OF November 2016.	
 Marshall G. Wight PROFESSIONAL LAND SURVEYOR, L-5034	
 WithersRavenel Engineers Planners Surveyors 115 MacKinnon Drive Cary, NC 27511 (919) 465-3340 license # C-0832 www.withersravenel.com	
 Michael Baker Engineering Inc. 9716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.2201 License #: F-1084	



LEGEND OF PROFILES

- AS-BUILT THALWEG
- - - AS-BUILT LOW BANK



TOWN CREEK RESTORATION PROJECT-OPTION B

AS-BUILT SURVEY PLAN & PROFILE

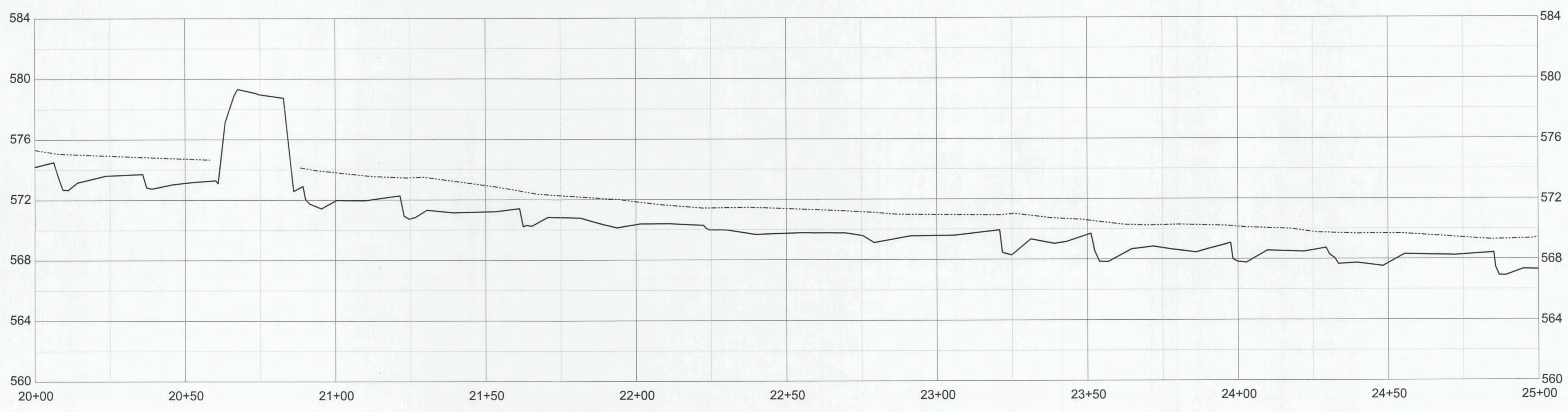
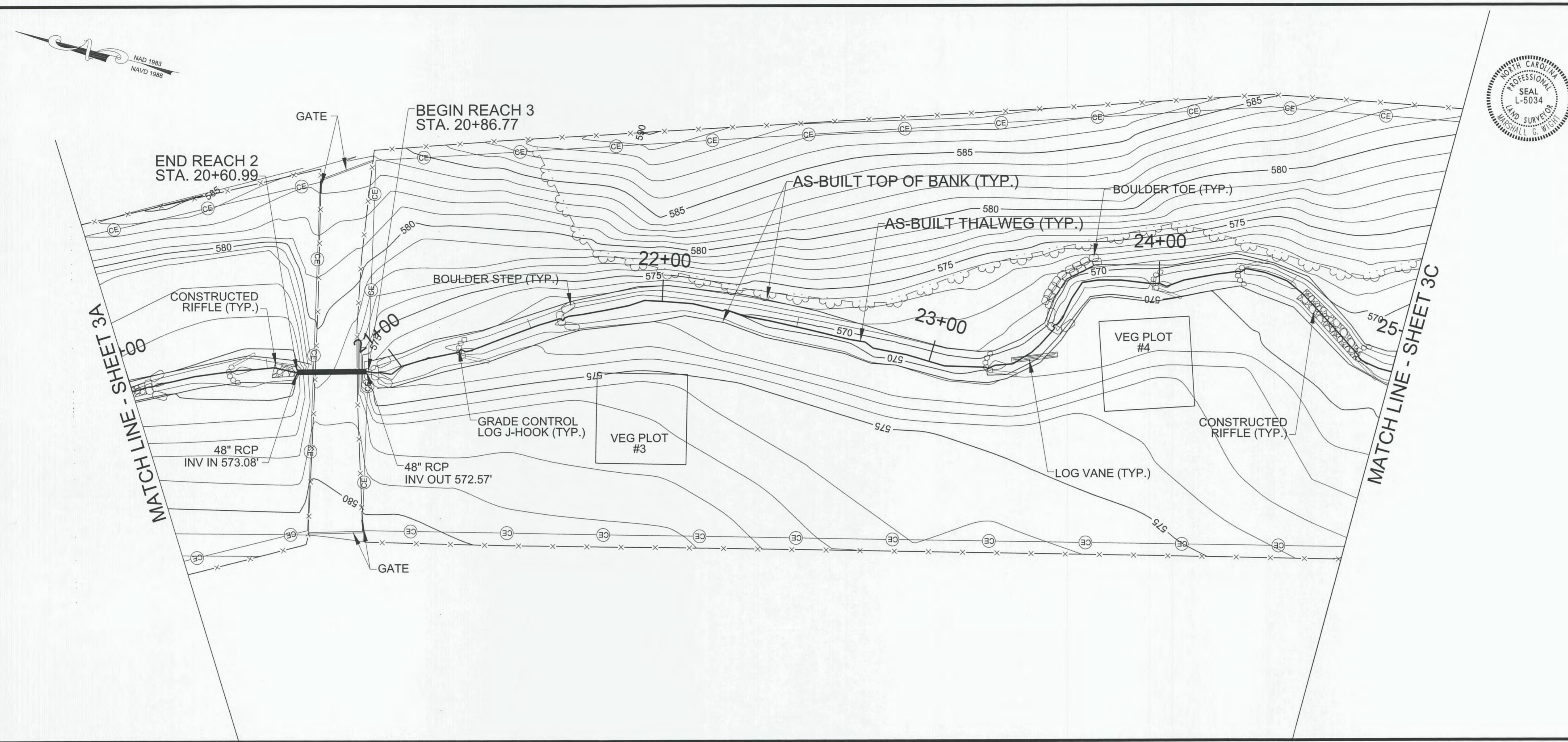
I, MARSHALL G. WRIGHT, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THEREON ARE AS-BUILT CONDITIONS, EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 27th DAY OF November, 2016.



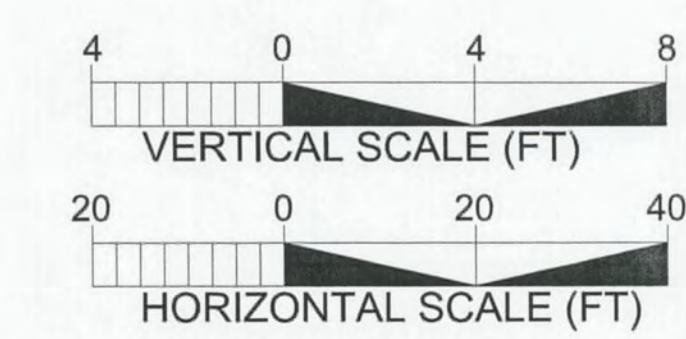
Marshall G. Wright
PROFESSIONAL LAND SURVEYOR L-5034

WithersRavenel
Engineers | Planners | Surveyors
116 Macklin Drive | Cary, NC 27511 | P: 919.466.2340 | B: 919.466.2341 | www.wrt.com

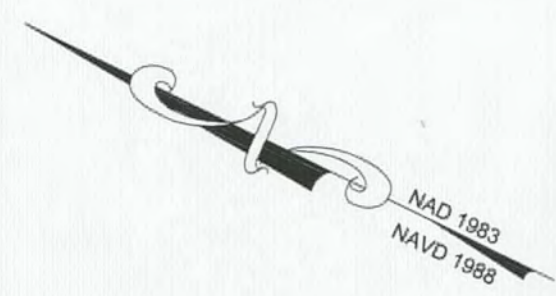
Michael Baker International | Michael Baker Engineering Inc.
9715-B Pines Road #50
Charlotte, NORTH CAROLINA 28277
Phone: 704.665.2200
Fax: 704.665.2201
License #: F-1084

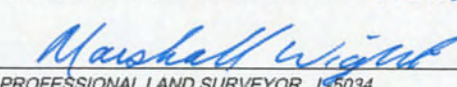
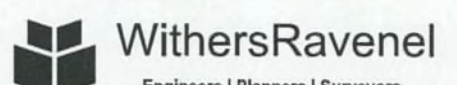



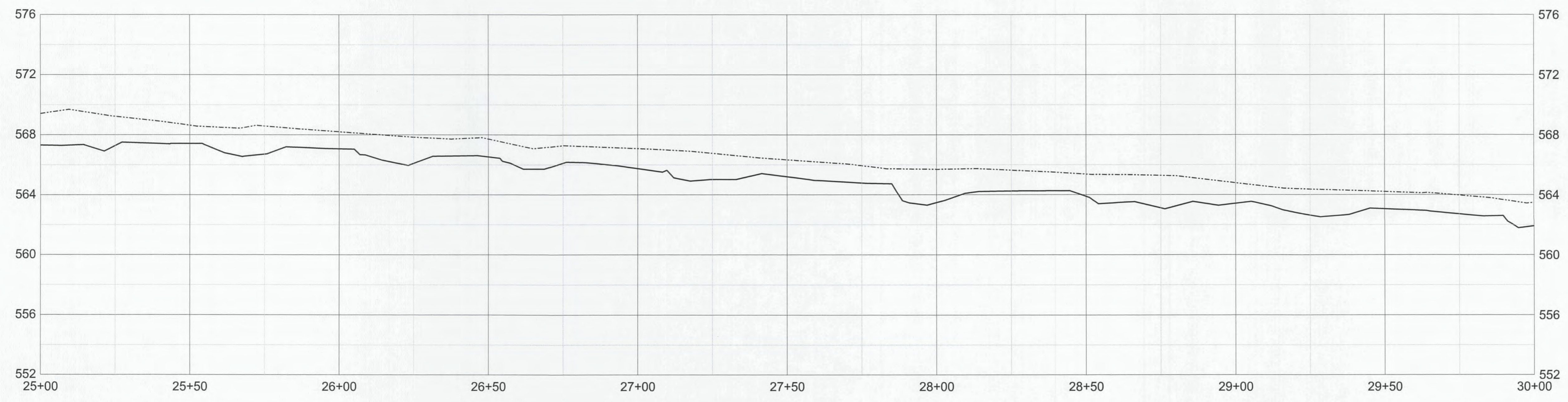
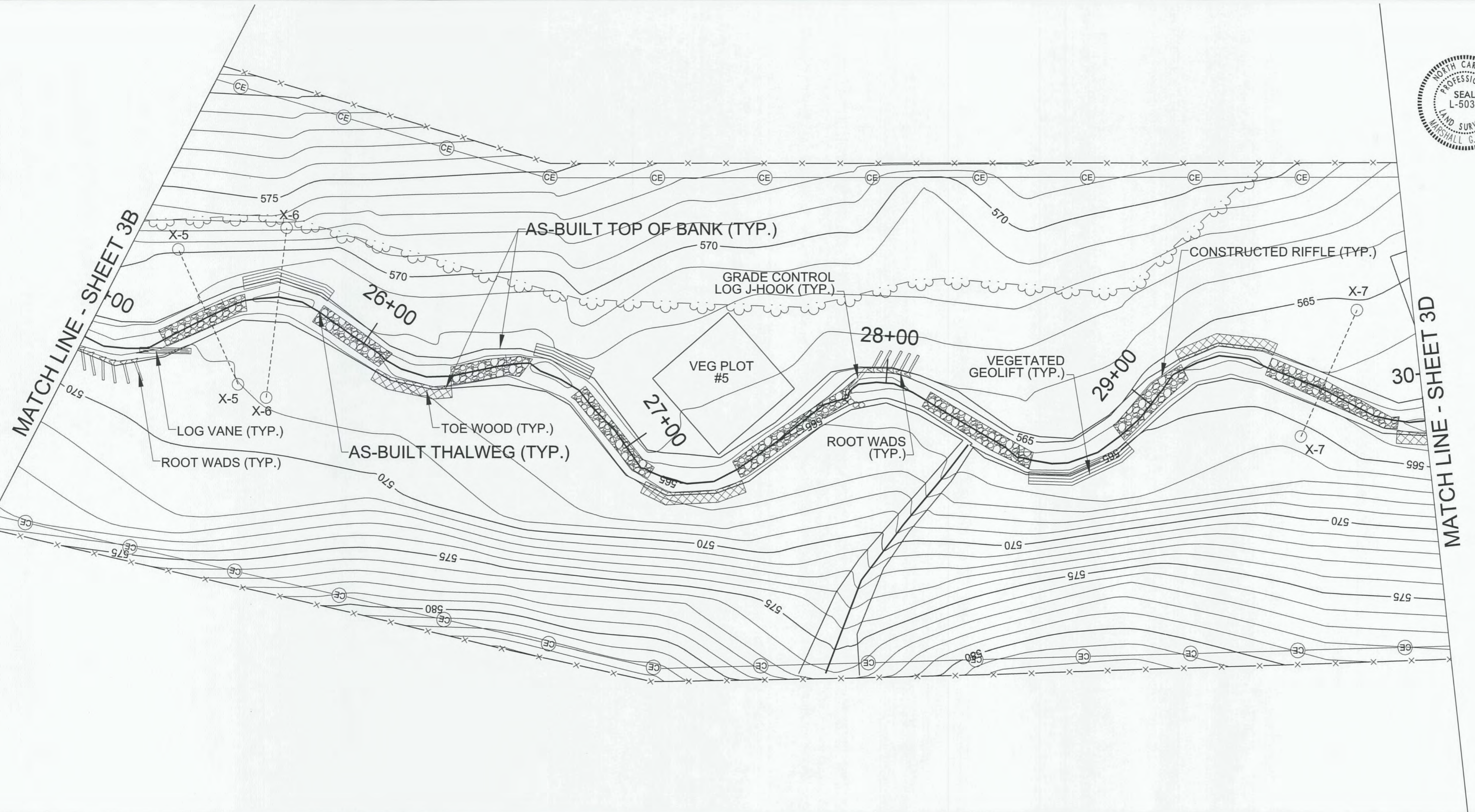
LEGEND OF PROFILES
 — AS-BUILT THALWEG
 AS-BUILT LOW BANK



TOWN CREEK RESTORATION PROJECT-OPTION B
AS-BUILT SURVEY PLAN & PROFILE

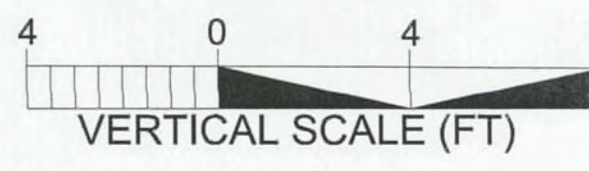


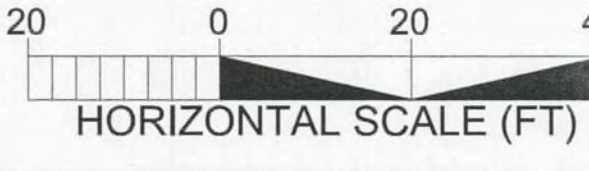
BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 3C
NCDMS PROJECT NO. 95026	
<small>I, MARSHALL G. WIGHT, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THEREON ARE AS-BUILT CONDITIONS, EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 24th DAY OF November 2016.</small>	
 Marshall G. Wight PROFESSIONAL LAND SURVEYOR 195034	
 WithersRavenel <small>Engineers Planners Surveyors</small> <small>115 MacKinnon Drive Cary, NC 27511 E: 919.468.3340 Route #: C-0832 www.withersravenel.com</small>	
 Michael Baker Engineering Inc. <small>9716-B Ross Road #50</small> <small>Charlotte, NORTH CAROLINA 28277</small> <small>Phone: 704.665.2200</small> <small>Fax: 704.665.2201</small> <small>License #: F-1084</small>	



LEGEND OF PROFILES

- AS-BUILT THALWEG
- - - AS-BUILT LOW BANK

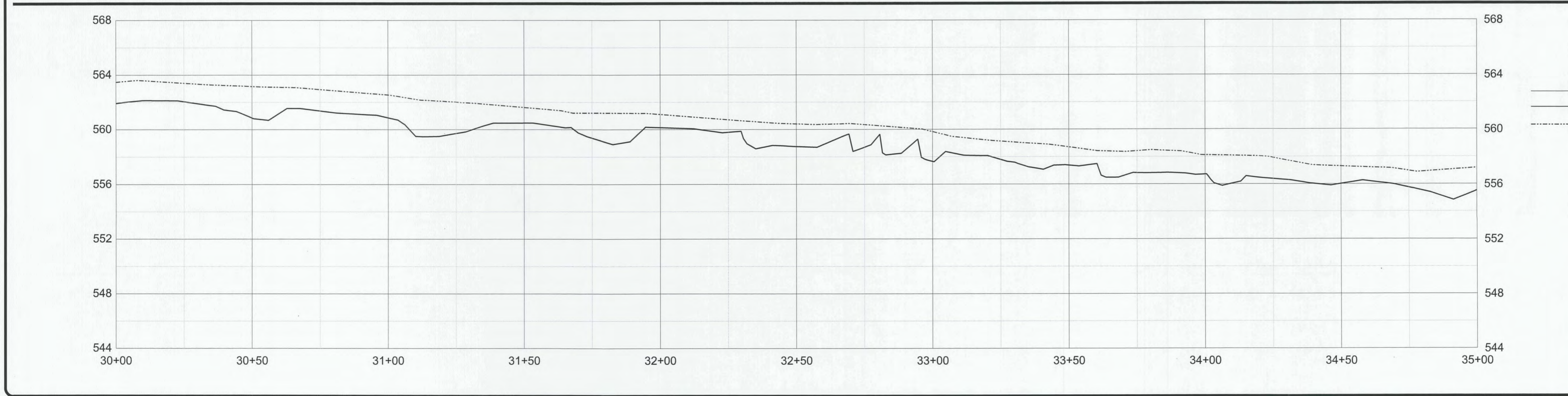
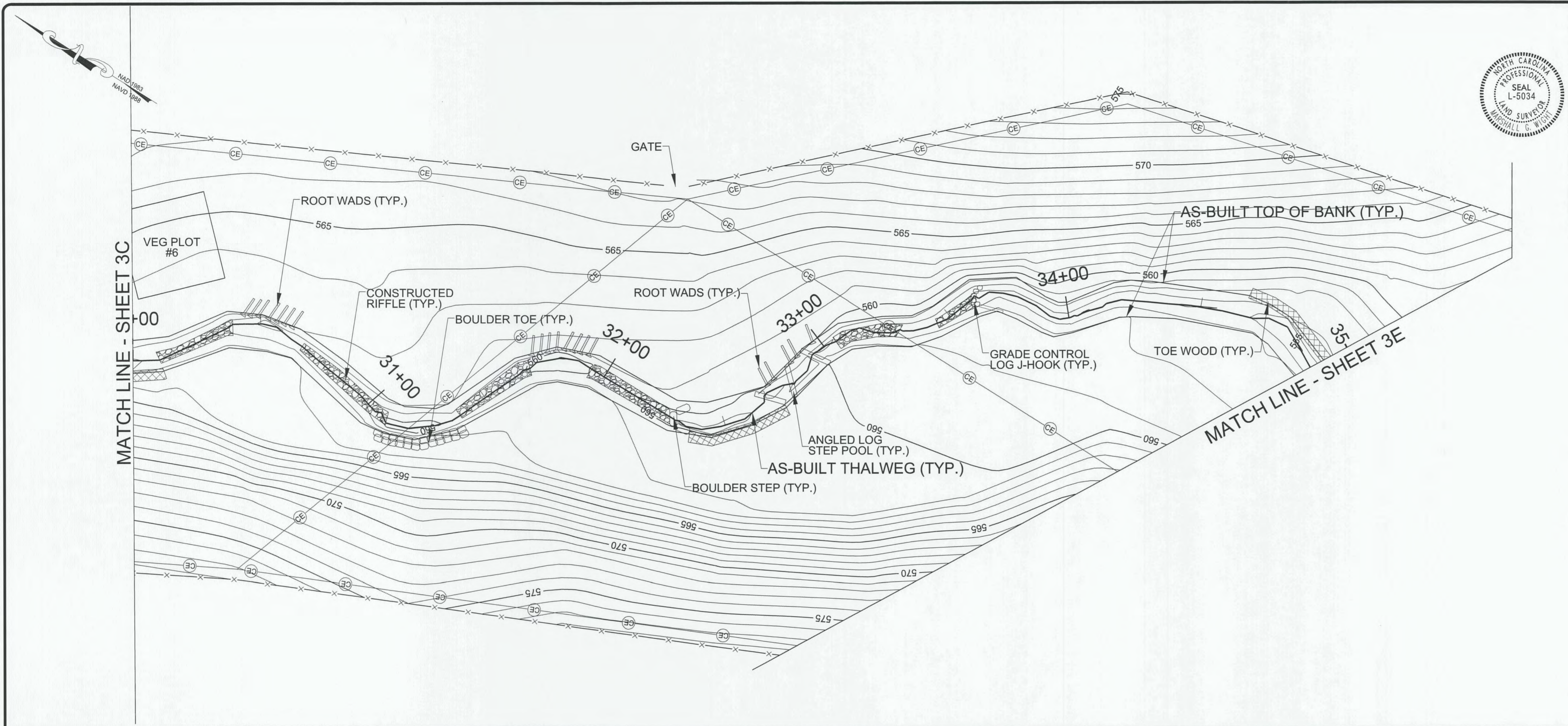

 VERTICAL SCALE (FT)


 HORIZONTAL SCALE (FT)

TOWN CREEK RESTORATION PROJECT-OPTION B

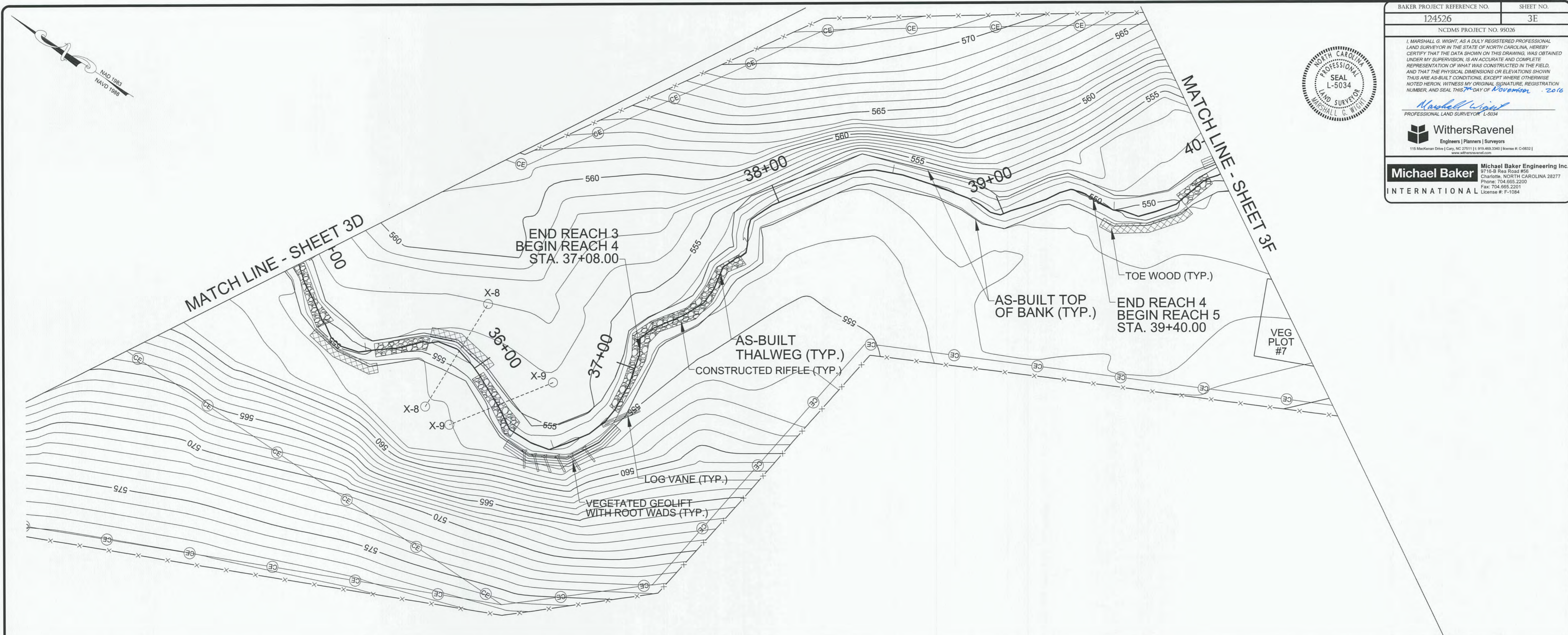
AS-BUILT SURVEY PLAN & PROFILE

BAKER PROJECT REFERENCE NO.	SHEET NO.
124526	3D
NCDMS PROJECT NO. 95036	
I, MARSHALL G. WIGHT, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THIS ARE AS-BUILT CONDITIONS, EXCEPT WHERE OTHERWISE NOTED HEREON, WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 7 th DAY OF November 2016	
 <i>Marshall Wight</i> PROFESSIONAL LAND SURVEYOR L-5034	
 WithersRavenel Engineers Planners Surveyors 115 MacKean Drive Cary, NC 27511 P: 919.489.3340 License #: C-6832 www.withersravenel.com	
 Michael Baker Engineering Inc. 8716-B Riva Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.695.2200 Fax: 704.695.2201 License #: F-1084	

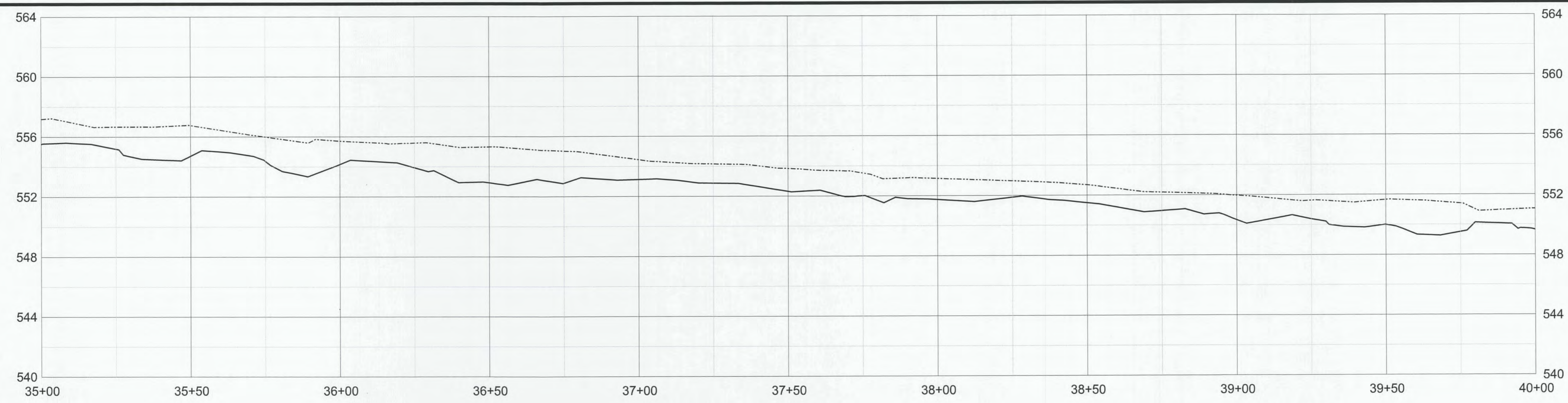


TOWN CREEK
 RESTORATION
 PROJECT-OPTION B

AS-BUILT SURVEY
 PLAN & PROFILE



BAKER PROJECT REFERENCE NO.	SHEET NO.
124526	3E
NCDMS PROJECT NO. 95026	
I, MARSHALL G. WIGHT, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THIS ARE AS-BUILT CONDITIONS, EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 27th DAY OF November, 2016.	
 WithersRavenel Engineers Planners Surveyors 115 MacKean Drive Cary, NC 27511 T: 919.469.3340 License #: C-0832 www.wr.com	
 Michael Baker Engineering Inc. 8716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.685.2200 Fax: 704.685.2201 License #: F-1084	



LEGEND OF PROFILES



- AS-BUILT THALWEG
- AS-BUILT LOW BANK

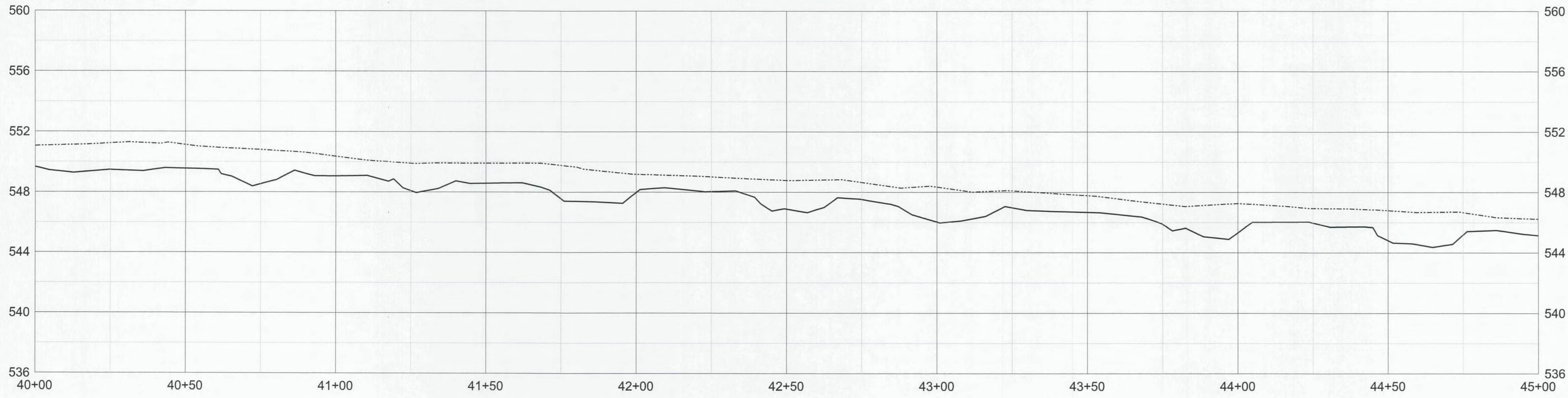
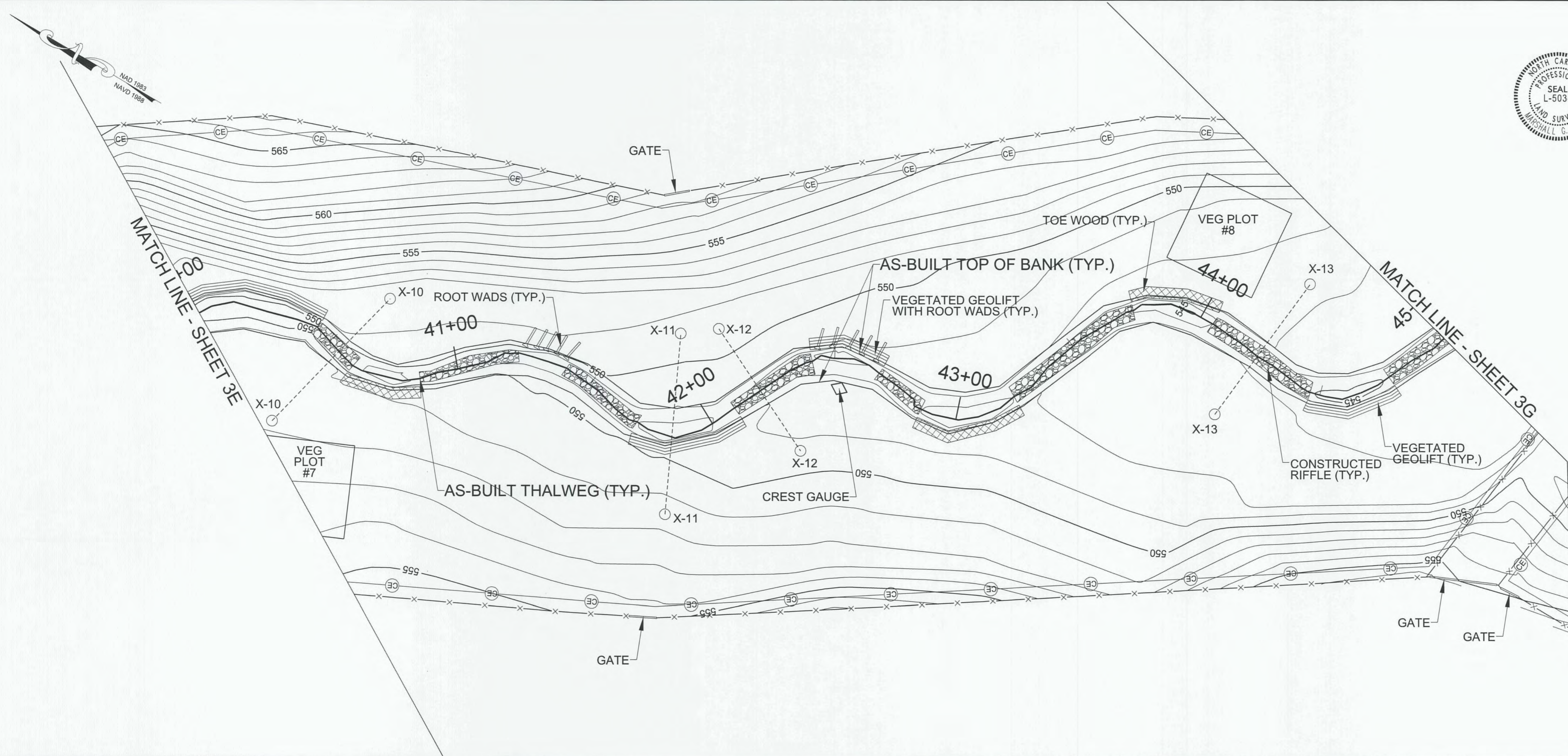
VERTICAL SCALE (FT)

HORIZONTAL SCALE (FT)

TOWN CREEK RESTORATION PROJECT-OPTION B


AS-BUILT SURVEY PLAN & PROFILE

BAKER PROJECT REFERENCE NO.	SHEET NO.
124526	3F
NCDMS PROJECT NO. 95026	
<small>I, MARSHALL G. WIGHT, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THEREON ARE AS-BUILT CONDITIONS, EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 24th DAY OF November 2016.</small>	
	
	
Michael Baker Engineering Inc. <small>INTERNATIONAL</small>	




LEGEND OF PROFILES

- AS-BUILT THALWEG
- - - AS-BUILT LOW BANK



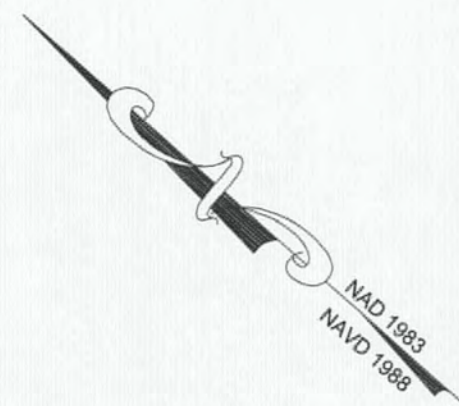
 VERTICAL SCALE (FT)



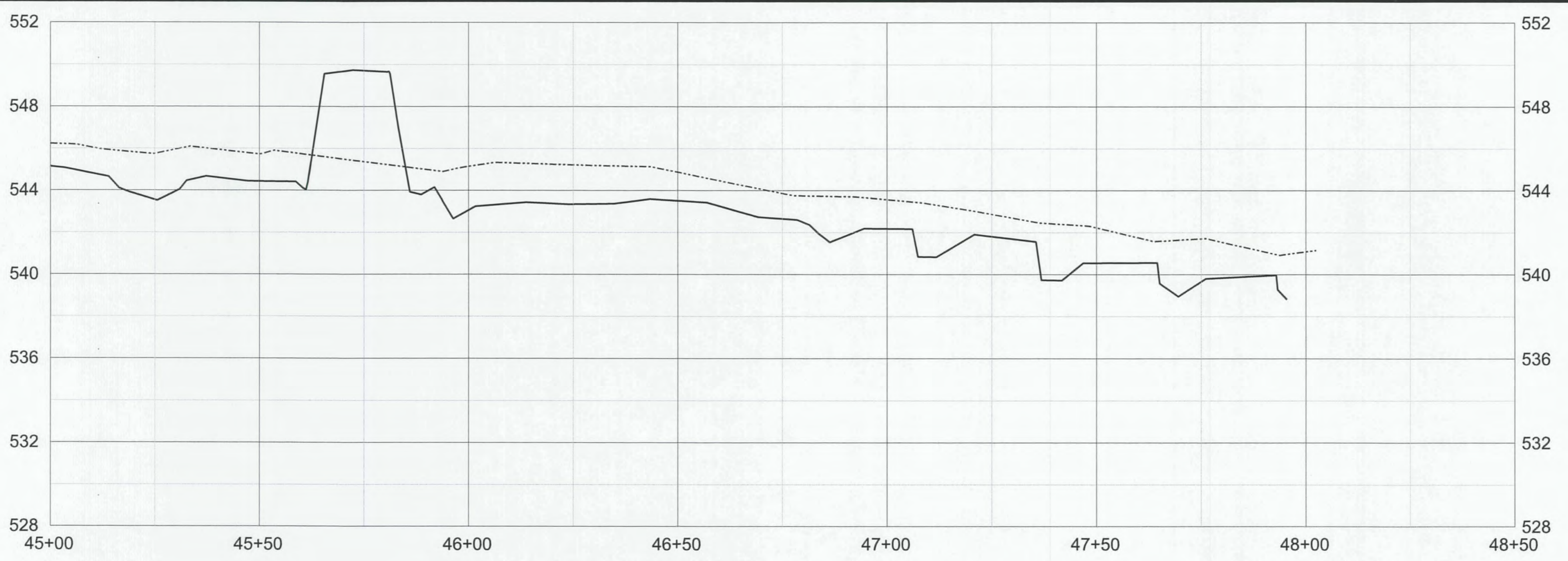
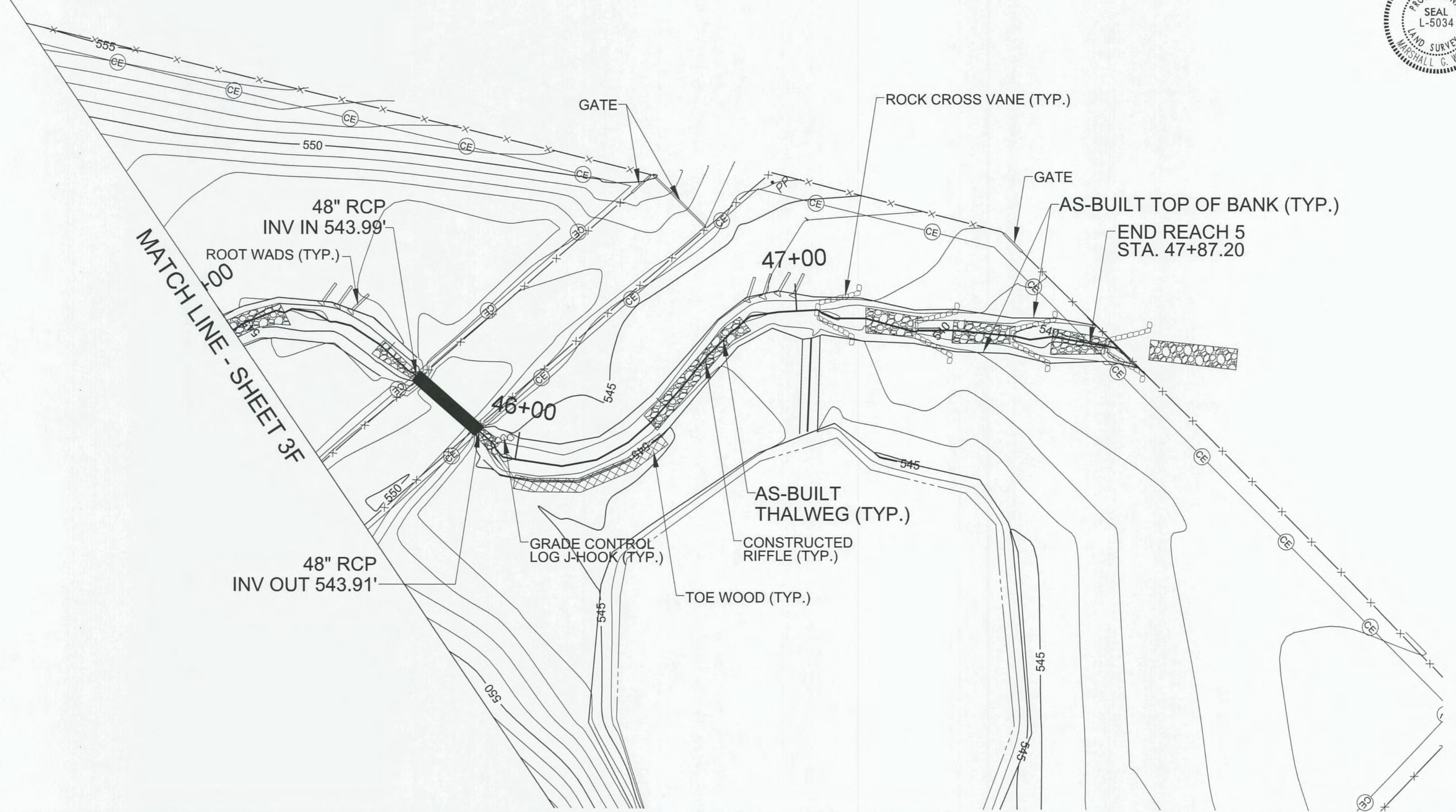
 HORIZONTAL SCALE (FT)

TOWN CREEK RESTORATION PROJECT-OPTION B

AS-BUILT SURVEY PLAN & PROFILE

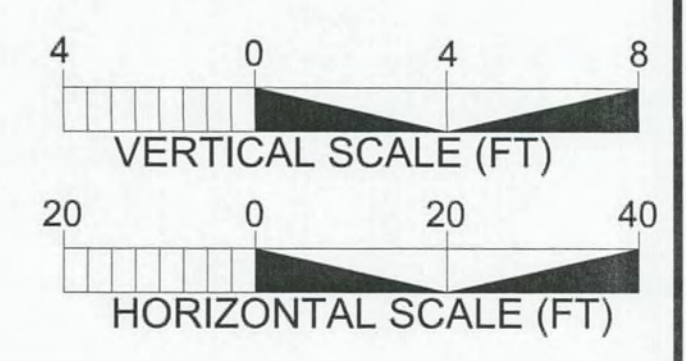


BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 3G
NCDMS PROJECT NO. 95026	
<small>I, MARSHALL G. WIGHT, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THEREON ARE AS-BUILT CONDITIONS, EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 27th DAY OF November, 2016.</small>	



LEGEND OF PROFILES

- AS-BUILT THALWEG
- - - - - AS-BUILT LOW BANK
- AS-BUILT TOP OF BANK



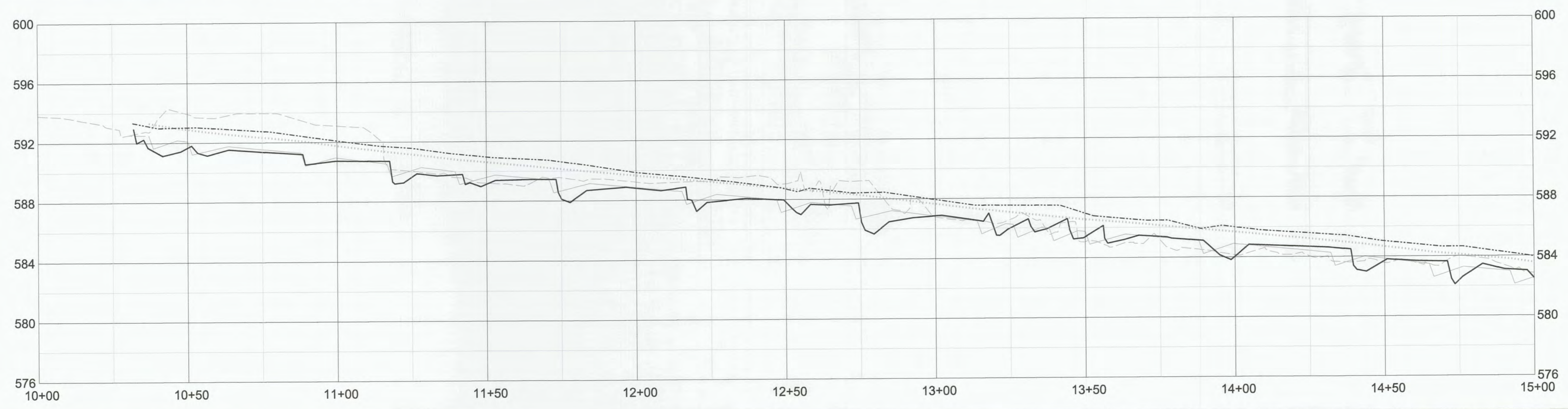
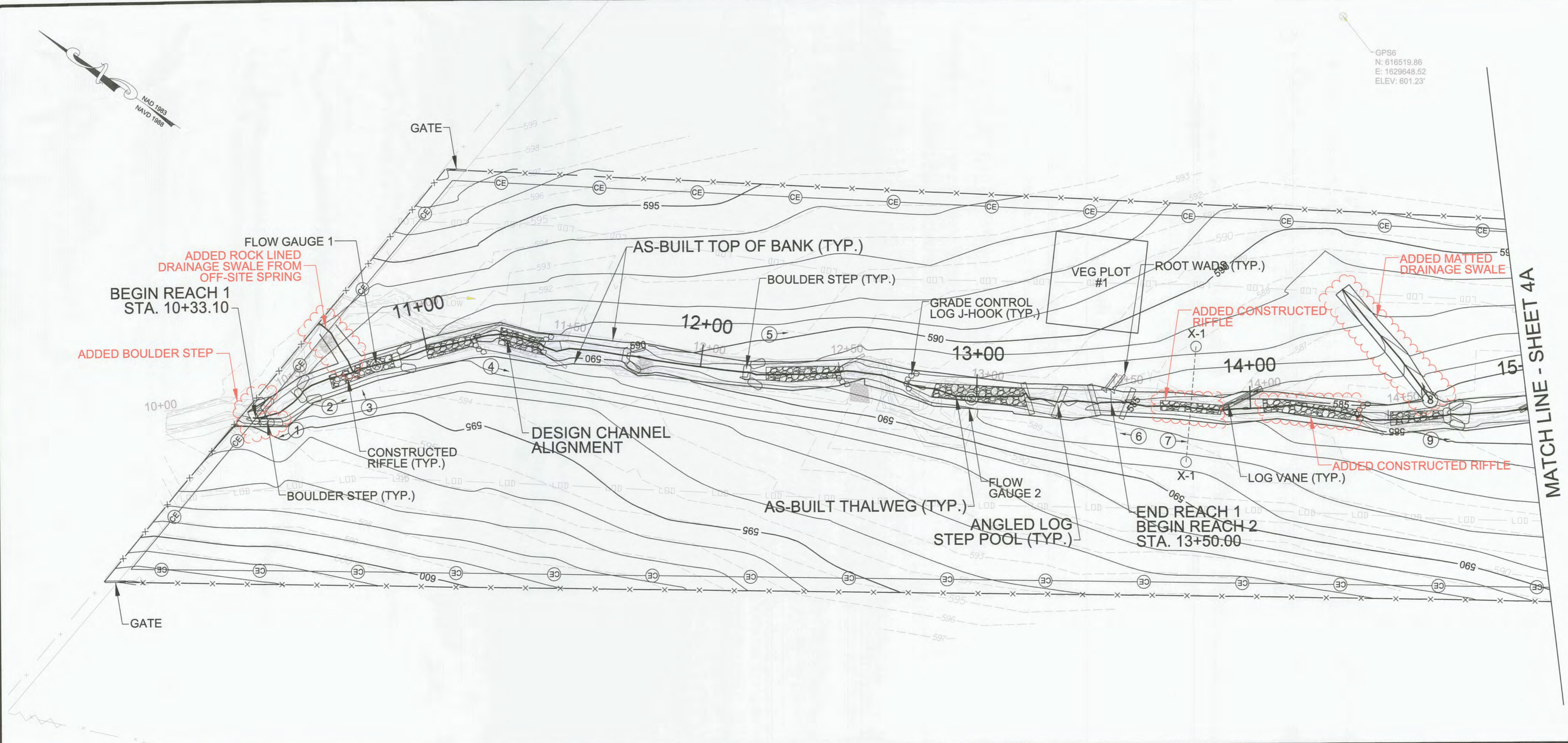
TOWN CREEK RESTORATION PROJECT-OPTION B

AS-BUILT SURVEY PLAN & PROFILE

GPS6
N: 616519.86
E: 1629648.52
ELEV: 601.23'

APPROVED BY: *[Signature]*
DATE: 11/9/16

Michael Baker International Michael Baker Engineering Inc.
9716-B Reel Road #50
Charlotte, NORTH CAROLINA 28277
Phone: 704.665.2200
Fax: 704.665.2201
License #: F-1084



LEGEND OF PROFILES

- AS-BUILT THALWEG
- - - AS-BUILT LOW BANK
- PROPOSED THALWEG
- · - · - PROPOSED LOW BANK
- EXISTING GROUND

4 0 4 8
VERTICAL SCALE (FT)

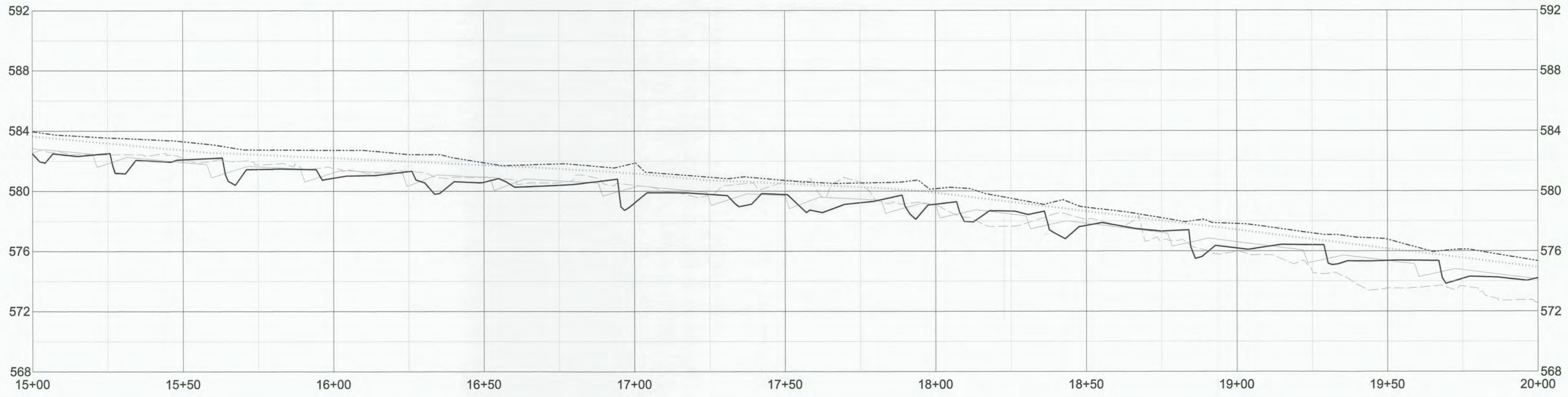
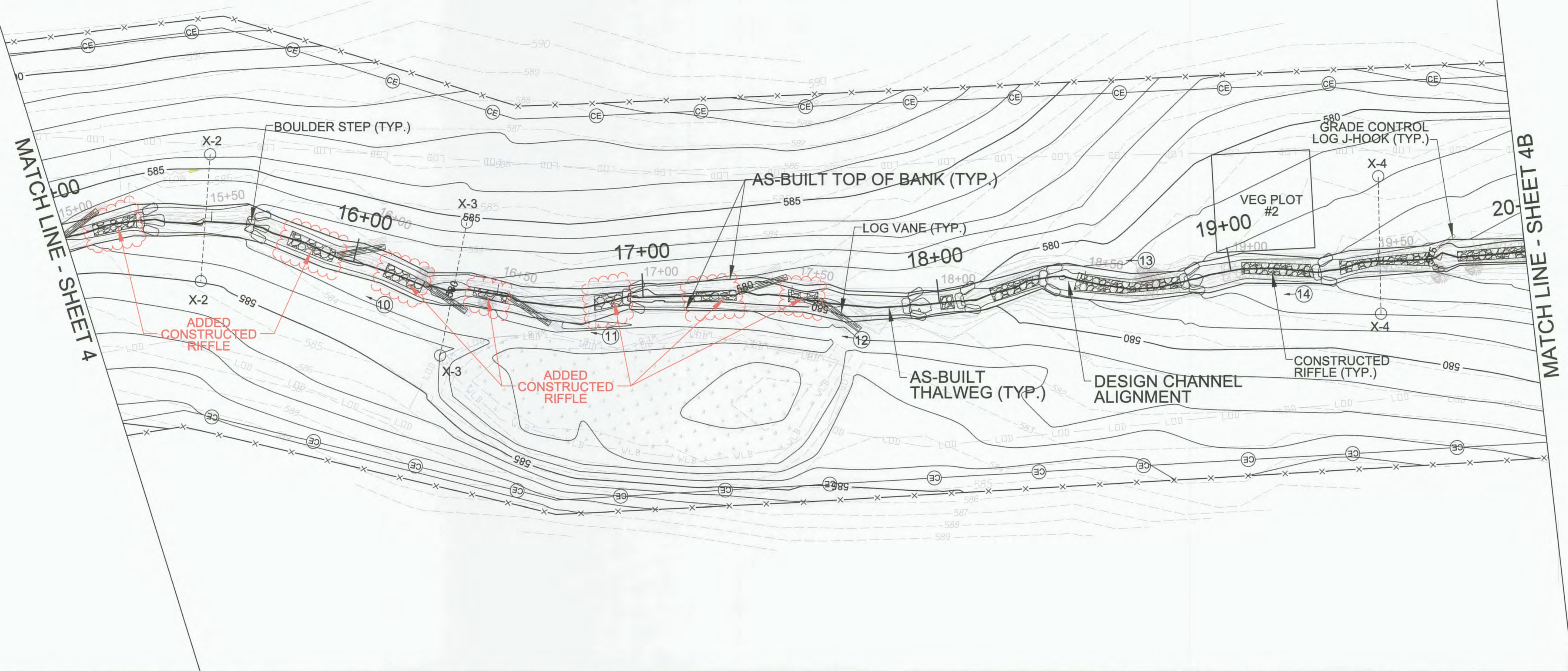
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HORIZONTAL SCALE (FT)

TOWN CREEK RESTORATION PROJECT-OPTION B

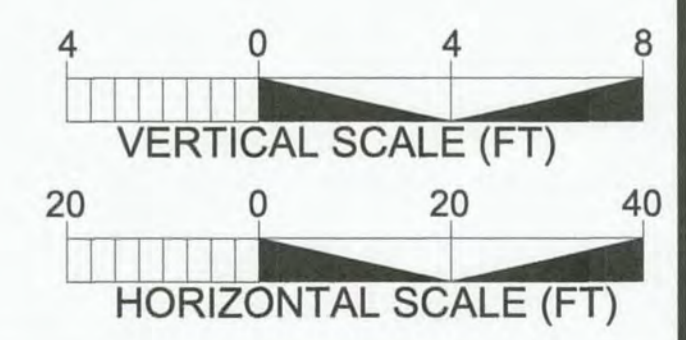
RECORD DRAWING PLAN & PROFILE

BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 4A
NCDMS PROJECT NO. 95026	
PROJECT ENGINEER	
	APPROVED BY: 
	DATE: 4/9/16
Michael Baker International <small>Michael Baker Engineering Inc. 9716-B Rea Road #66 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.2201 License #: F-1084</small>	

GPS5
 N: 616217.36
 E: 1629783.66
 ELEV: 600.72'



- LEGEND OF PROFILES**
- AS-BUILT THALWEG
 - - - AS-BUILT LOW BANK
 - PROPOSED THALWEG
 - . - . PROPOSED LOW BANK
 - - - - EXISTING GROUND

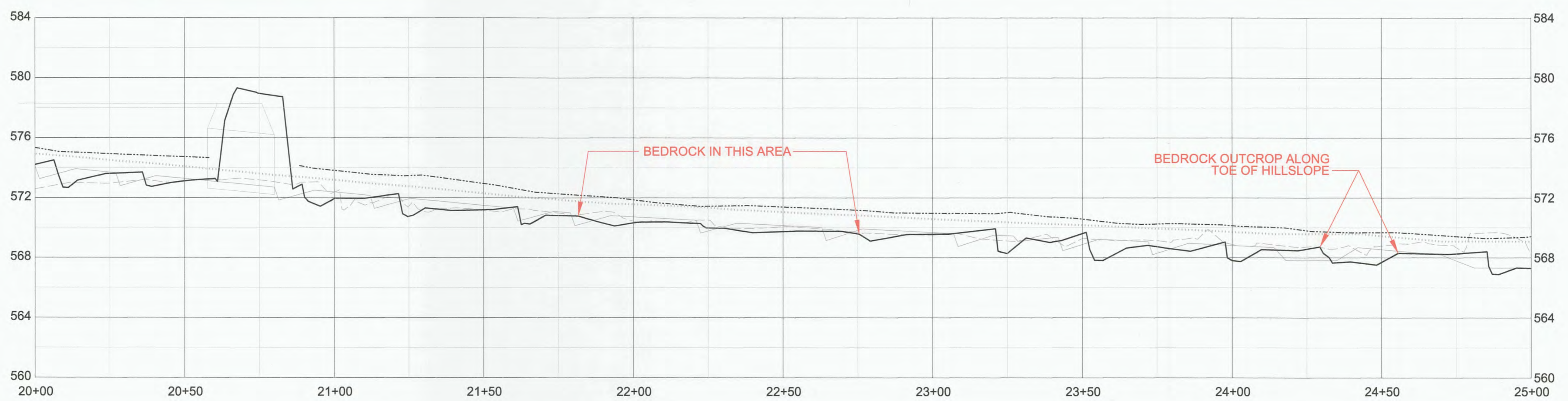
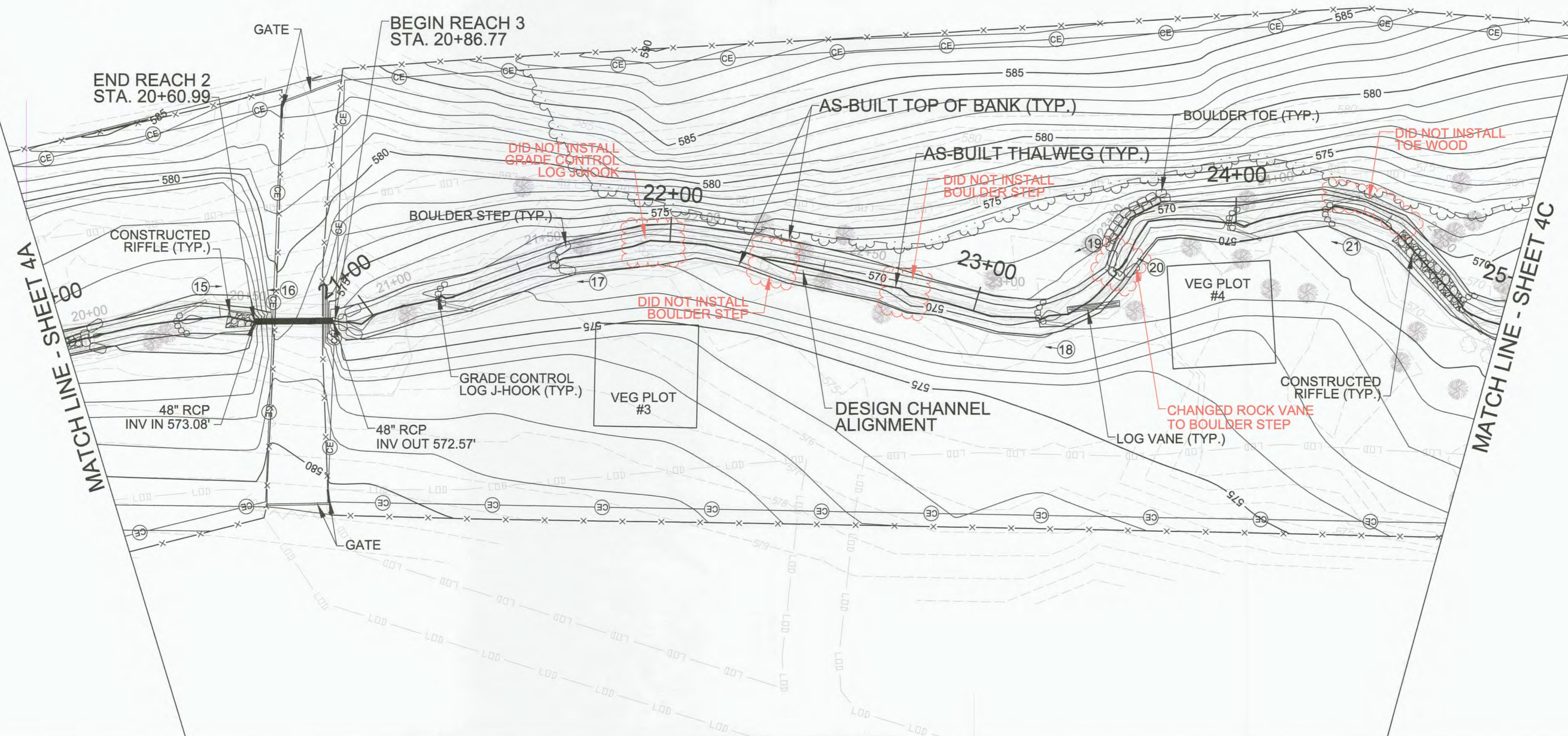


**TOWN CREEK
 RESTORATION
 PROJECT-OPTION B**

**RECORD DRAWING
 PLAN & PROFILE**



BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 4B
NCDMS PROJECT NO. 99026	
PROJECT ENGINEER	
	APPROVED BY:
	DATE: 11/4/16
Michael Baker International <small>Michael Baker Engineering Inc. 9716-B Rea Road #56 Charlotte, NORTH CAROLINA 28277 Phone: 704.685.2200 Fax: 704.685.2201 License #: F-1094</small>	



LEGEND OF PROFILES

- AS-BUILT THALWEG
- - - AS-BUILT LOW BANK
- PROPOSED THALWEG
- · - · - PROPOSED LOW BANK
- EXISTING GROUND

4 0 4 8
VERTICAL SCALE (FT)

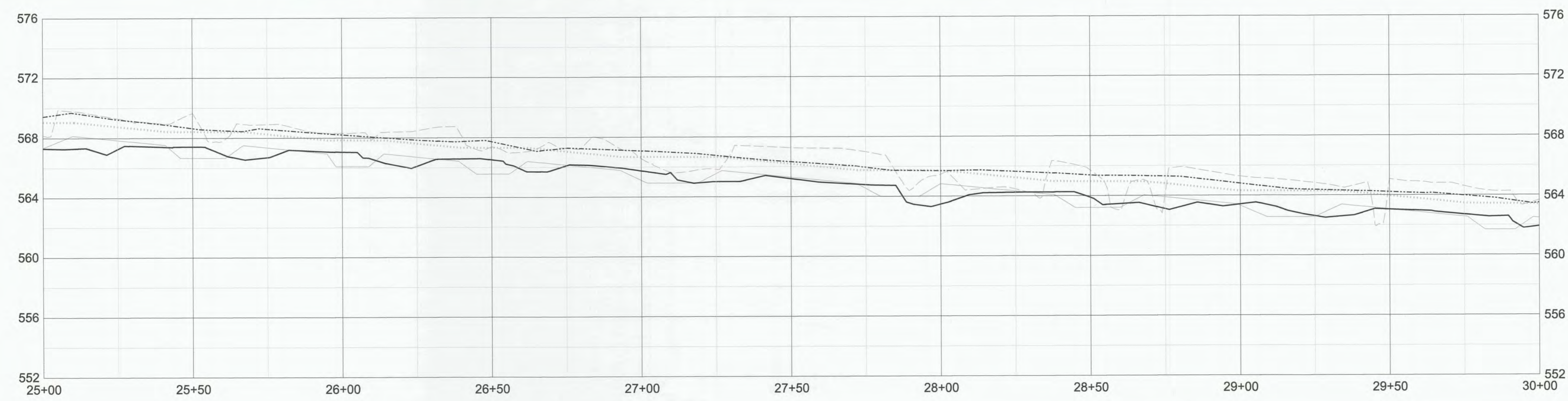
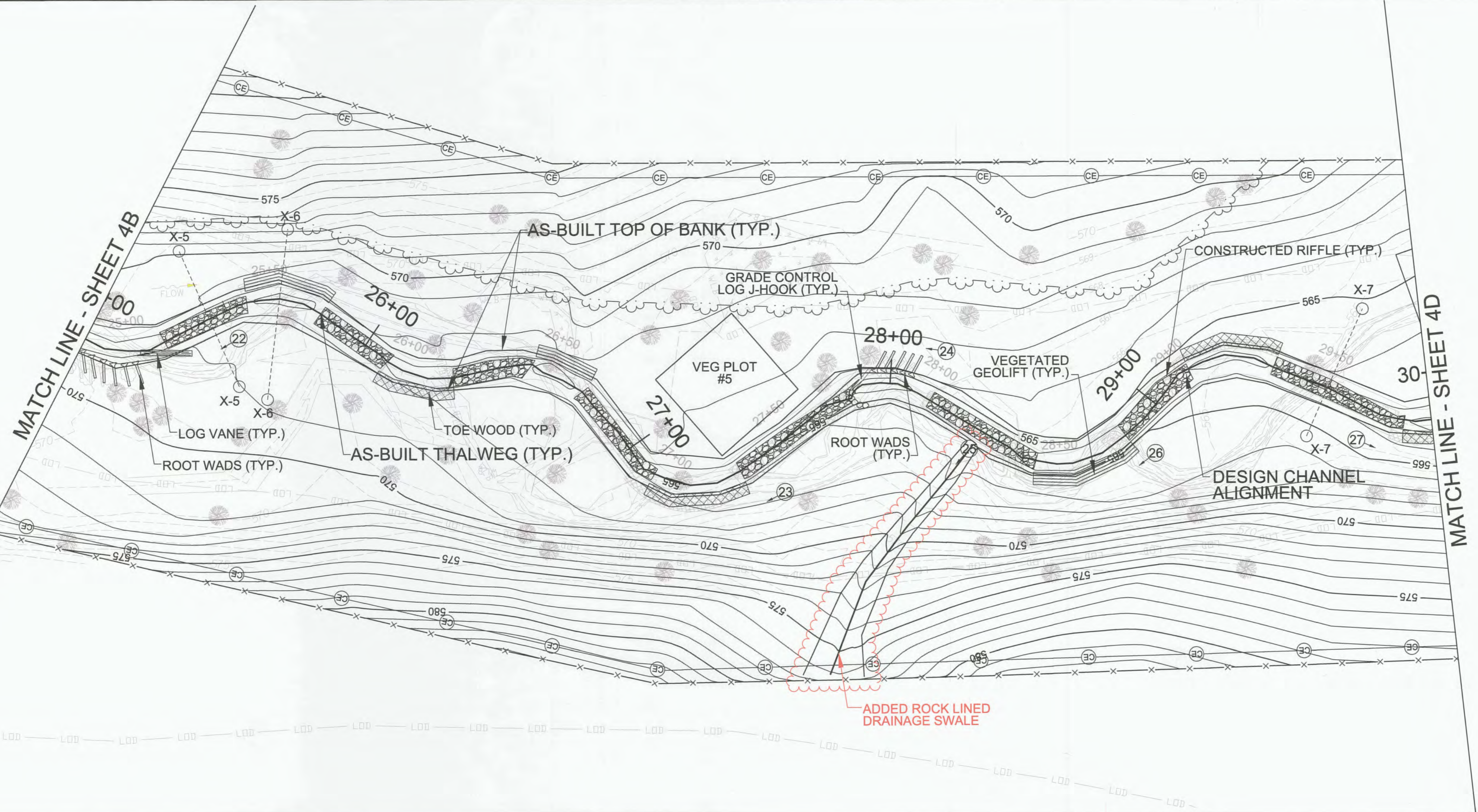
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HORIZONTAL SCALE (FT)

TOWN CREEK RESTORATION PROJECT-OPTION B

RECORD DRAWING PLAN & PROFILE



BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 4C
NCDMS PROJECT NO. 95026	
PROJECT ENGINEER	
	APPROVED BY:
	DATE: 11/3/11
Michael Baker International <small>Michael Baker Engineering Inc. 9716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.2201 License #: F-1084</small>	



LEGEND OF PROFILES

- AS-BUILT THALWEG
- - - AS-BUILT LOW BANK
- PROPOSED THALWEG
- · - · - · PROPOSED LOW BANK
- - - - - EXISTING GROUND

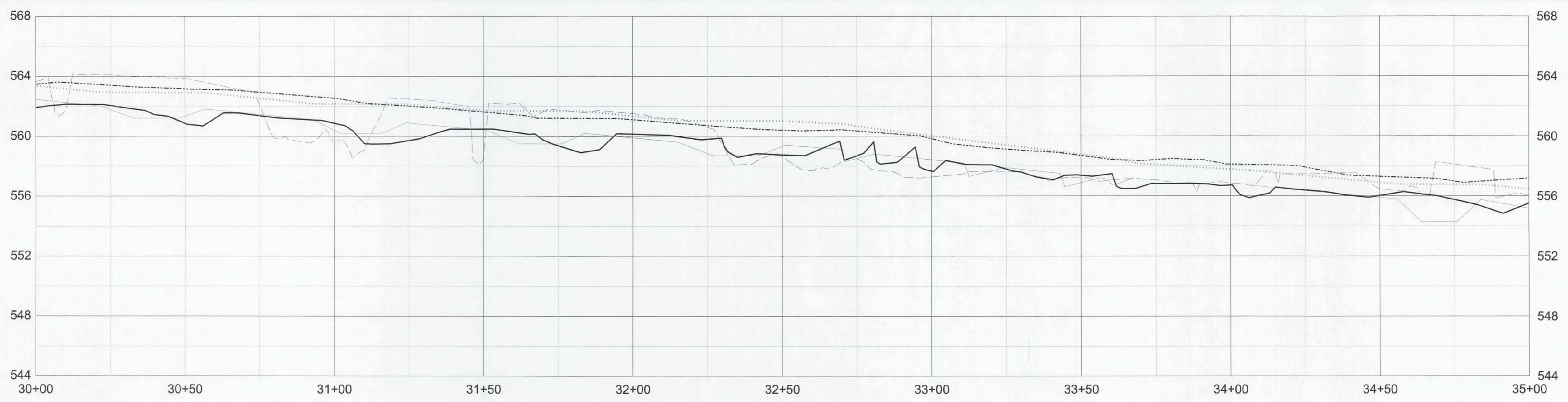
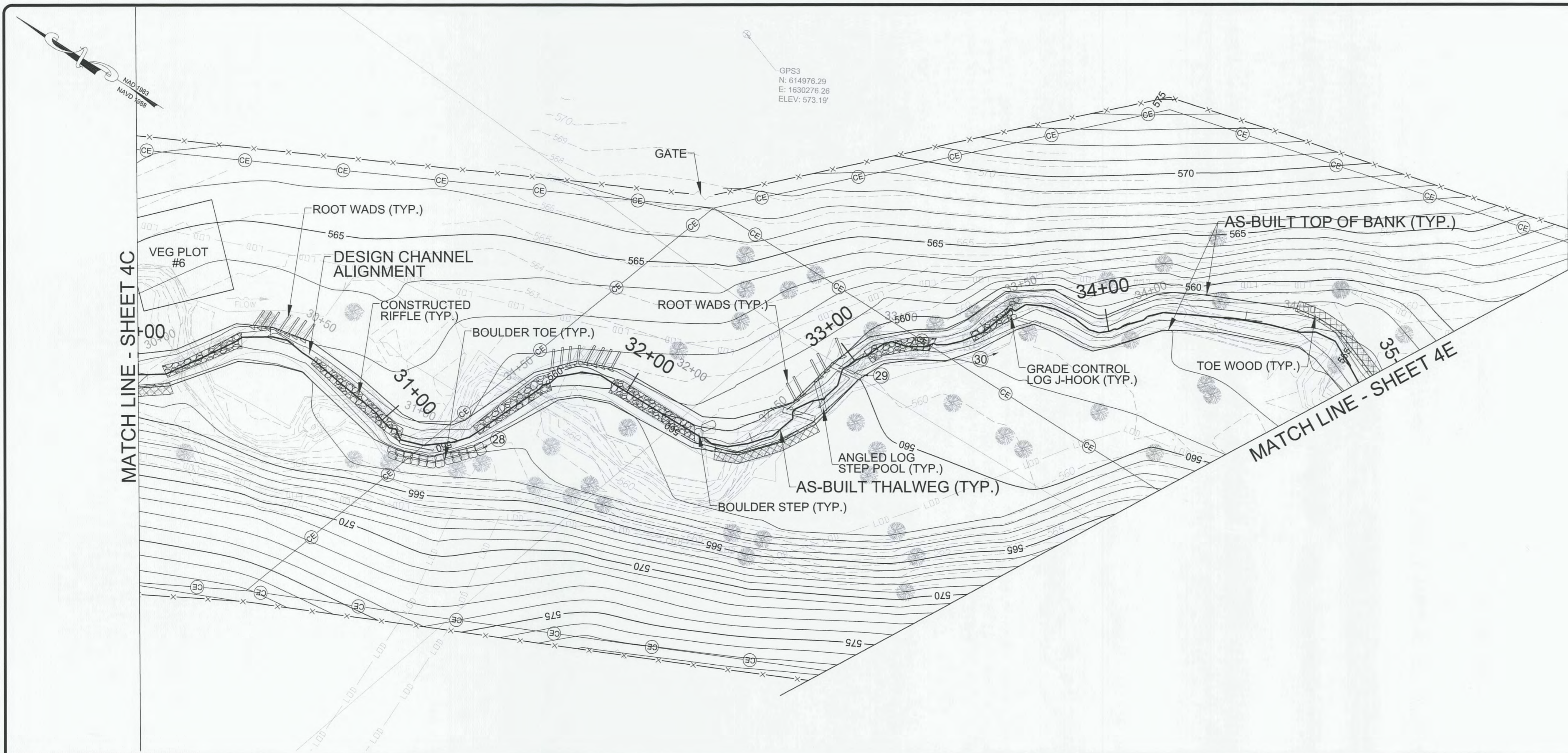
VERTICAL SCALE (FT)

HORIZONTAL SCALE (FT)

TOWN CREEK RESTORATION PROJECT-OPTION B

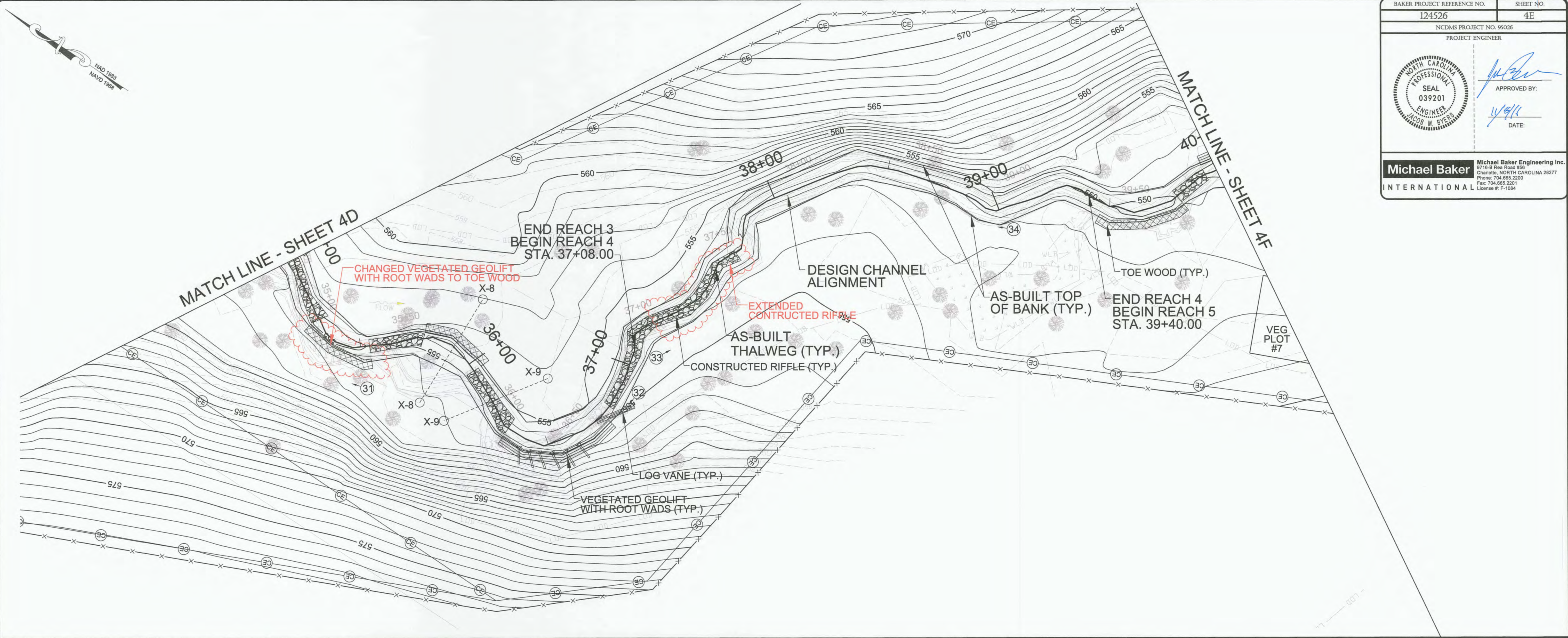
RECORD DRAWING PLAN & PROFILE

BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 4D
NCDMS PROJECT NO. 95036	
PROJECT ENGINEER	
	APPROVED BY:
	DATE: 11/16/16
Michael Baker International	
<small>Michael Baker Engineering Inc. 9715-B Rags Road #56 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.2201 License #: F-1084</small>	

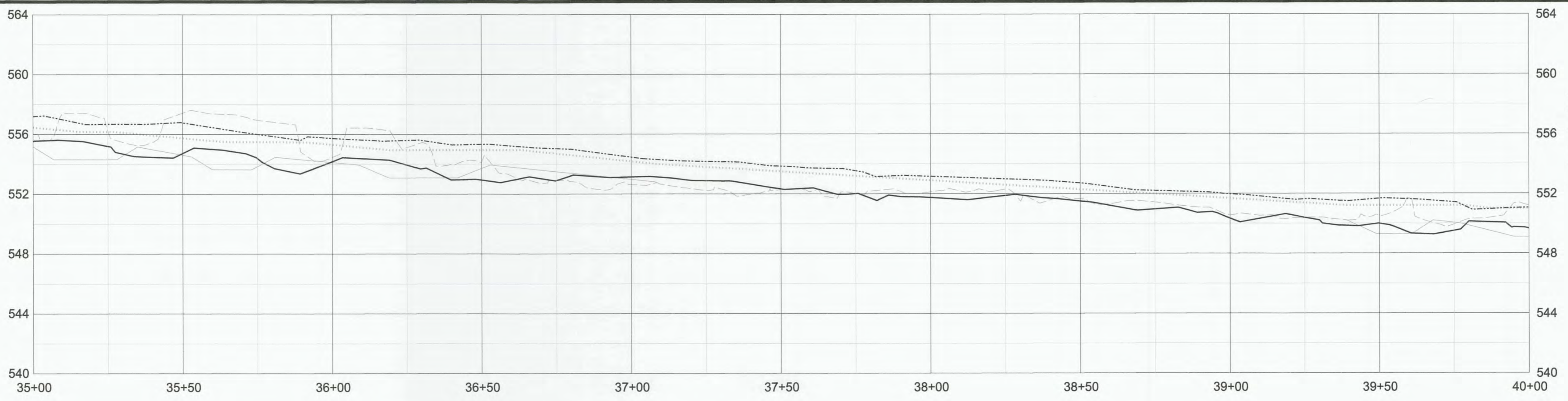


TOWN CREEK
RESTORATION
PROJECT-OPTION B

RECORD DRAWING
PLAN & PROFILE



BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 4E
NCDMS PROJECT NO. 95026	
PROJECT ENGINEER	
	APPROVED BY: <i>[Signature]</i>
	DATE: 11/9/11
Michael Baker International	
<small>Michael Baker Engineering Inc. 8716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.2201 License #: F-1084</small>	





LEGEND OF PROFILES

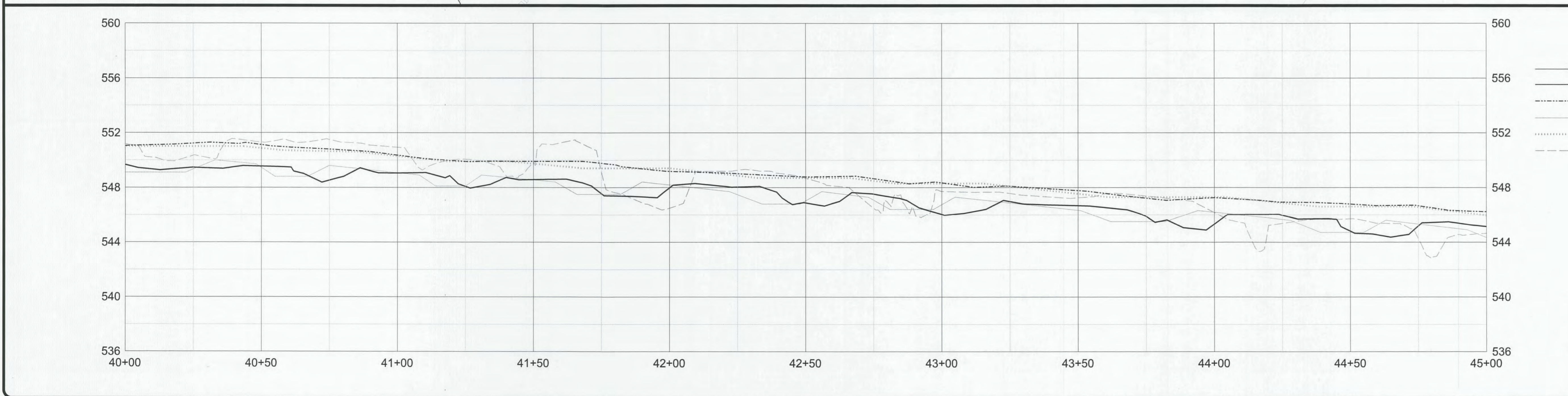
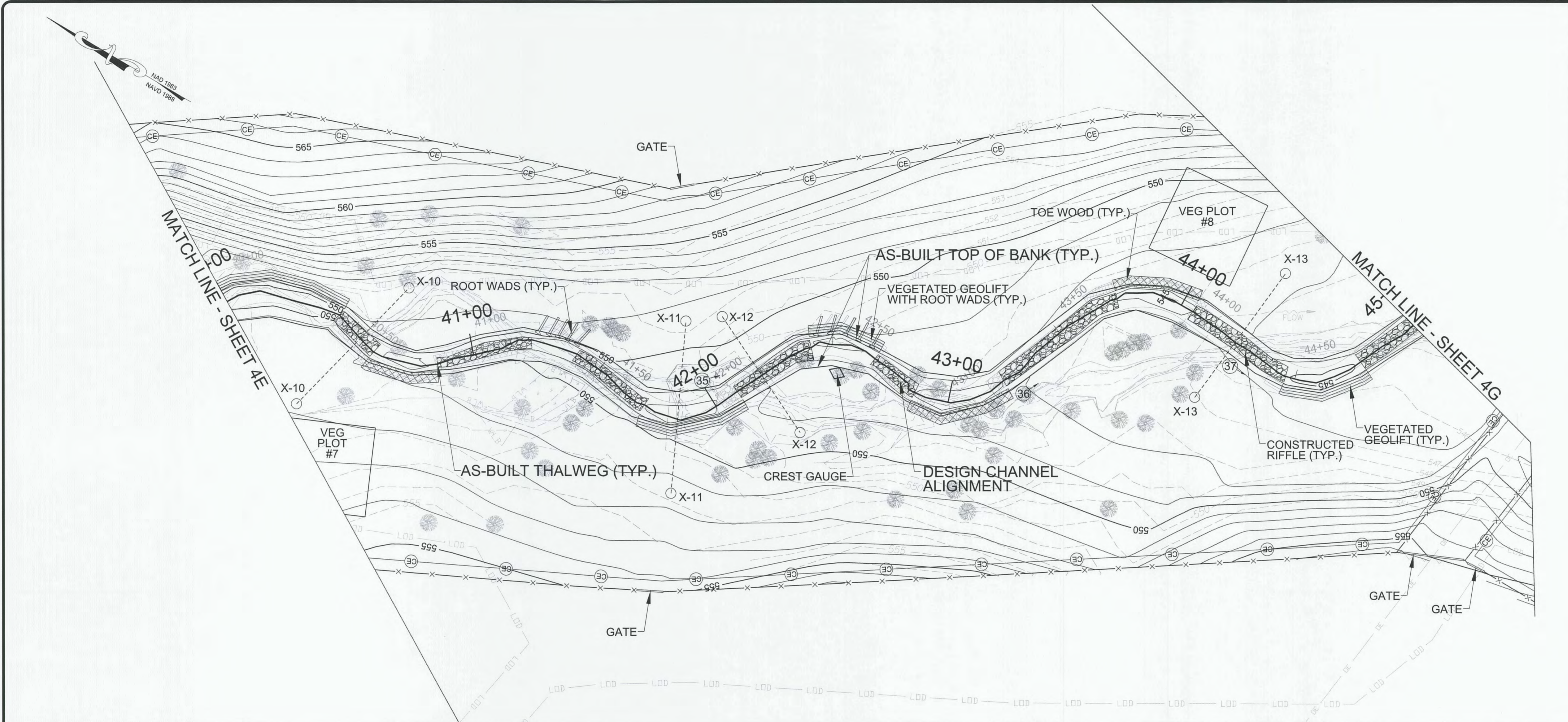
- AS-BUILT THALWEG
- - - AS-BUILT LOW BANK
- PROPOSED THALWEG
- - - PROPOSED LOW BANK
- - - EXISTING GROUND

VERTICAL SCALE (FT)

HORIZONTAL SCALE (FT)

**TOWN CREEK
RESTORATION
PROJECT-OPTION B**
**RECORD DRAWING
PLAN & PROFILE**

BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 4F
NCDCMS PROJECT NO. 95026	
PROJECT ENGINEER	
	APPROVED BY: 
	DATE: 1/19/16
Michael Baker International	
<small>Michael Baker Engineering Inc. 9715-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.2201 License #: F-1084</small>	



LEGEND OF PROFILES

- AS-BUILT THALWEG
- AS-BUILT LOW BANK
- PROPOSED THALWEG
- PROPOSED LOW BANK
- EXISTING GROUND

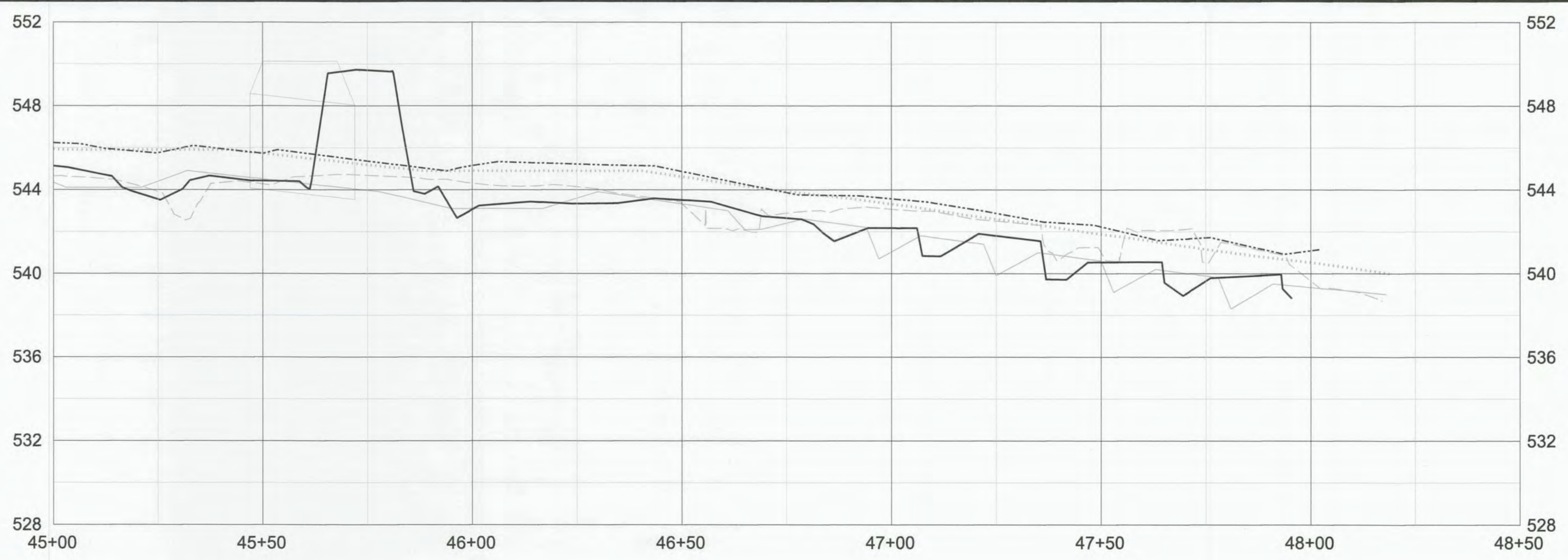
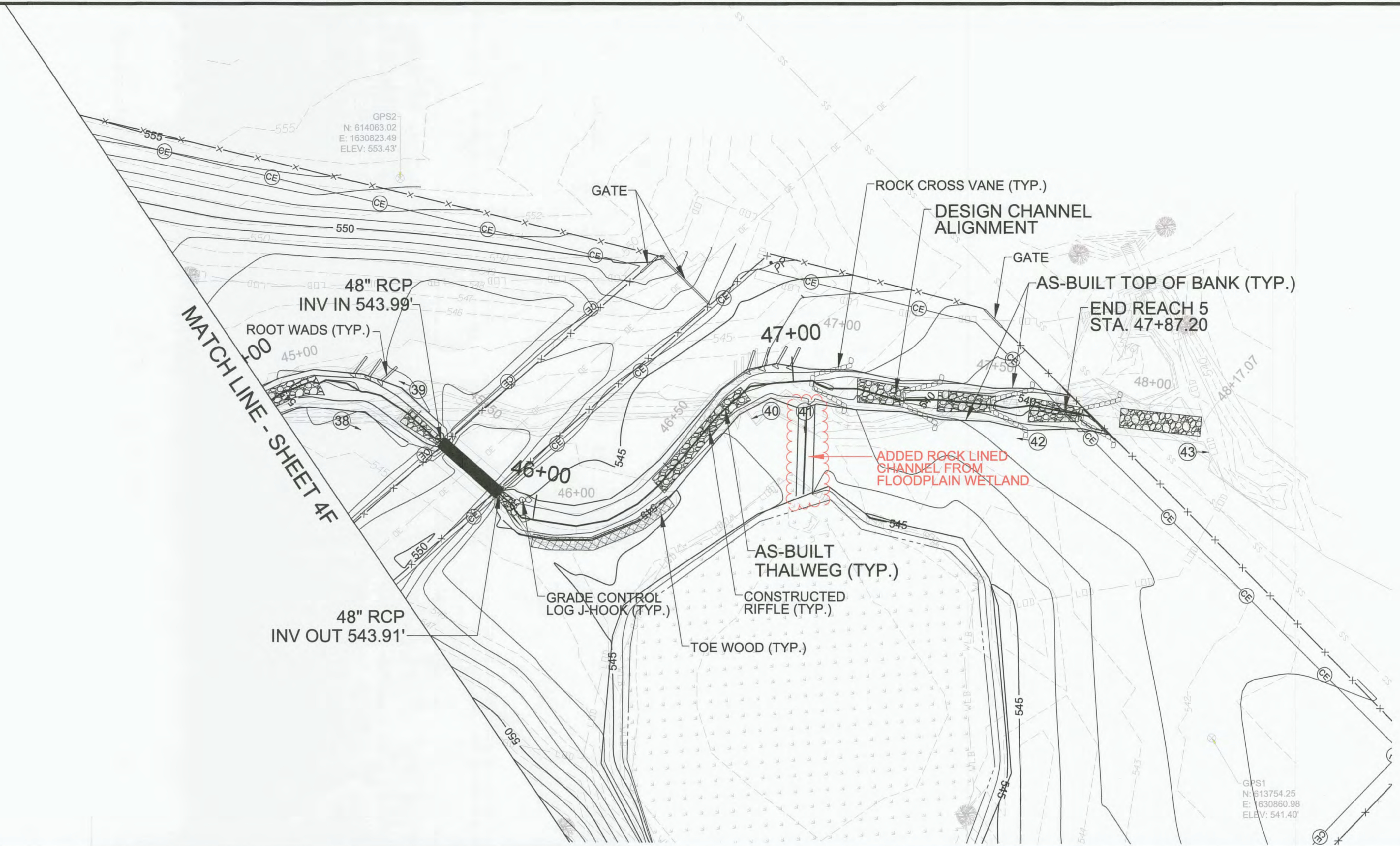
4 0 4 8
 VERTICAL SCALE (FT)

20 0 20 40
 HORIZONTAL SCALE (FT)

TOWN CREEK RESTORATION PROJECT-OPTION B

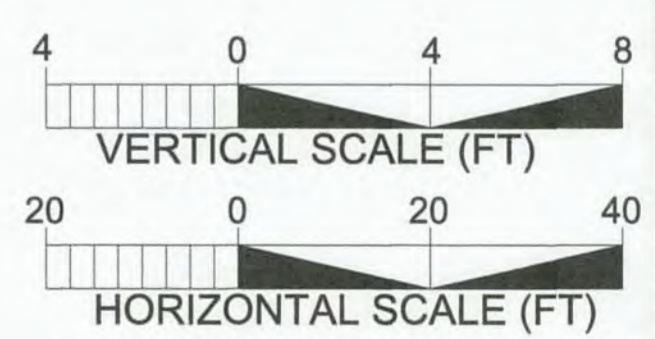
RECORD DRAWING PLAN & PROFILE

BAKER PROJECT REFERENCE NO. 124526	SHEET NO. 4G
NCDMS PROJECT NO. 95026	
PROJECT ENGINEER	
	APPROVED BY: <i>J. Byers</i>
	DATE: 11/8/16
Michael Baker International	
<small>Michael Baker Engineering Inc. 9716-B Rea Road #50 Charlotte, NORTH CAROLINA 28277 Phone: 704.665.2200 Fax: 704.665.3201 License #: F-1084</small>	



LEGEND OF PROFILES

- AS-BUILT THALWEG
- - - AS-BUILT LOW BANK
- PROPOSED THALWEG
- . - . PROPOSED LOW BANK
- - - - EXISTING GROUND



TOWN CREEK RESTORATION PROJECT-OPTION B

RECORD DRAWING PLAN & PROFILE