



State of Delaware  
Department of Natural Resources and Environmental Control  
**Delaware Division of Parks and Recreation**  
89 Kings Highway  
Dover, Delaware 19901

## **Auburn Heights Preserve (AHP) Farm Lane and Paper Mill Bridges Design Narrative**

### **Introduction**

DNREC's Division of Parks and Recreation is planning to redevelop the Auburn Mill Historic District as part of the Auburn Valley Master Plan. The planned improvements in this area will provide safe pedestrian travel routes between the proposed parking areas and nearby historic landmarks and complete a critical link to the existing recently completed trail networks, which are key components to the Master Plan vision.

### **Existing Conditions**

The Auburn Mill Historic District is bounded by Creek Road (Route 82) to the North and Red Clay Creek and Mill Race to the West, East and South. Existing Farm Lane is a gravel road, leading to an existing bridge over Red Clay Creek and a number of existing residences. Mill Race runs adjacent to Farm Lane, supplying water for the existing paper mill. East of the existing entrance to Farm Lane off of Benge Road is an existing concrete settling tank.

### **Proposed Conditions**

The proposed redevelopment includes the following improvements that are set to occur in two phases:

#### **Phase I – Construction In Fall 2017**

- Paper Mill Bridge which includes (2) proposed abutments and wing walls
- Paper Mill Deck over structure at Mill Race
- Farm Lane Asphalt parking lot, and parking lot along Benge Road
- Paper Mill asphalt parking lot on top of existing settling tank
- Marshall Steam Museum access road, sidewalk and asphalt parking lot

#### **Phase II – Construction To Be Completed In The Near Future**

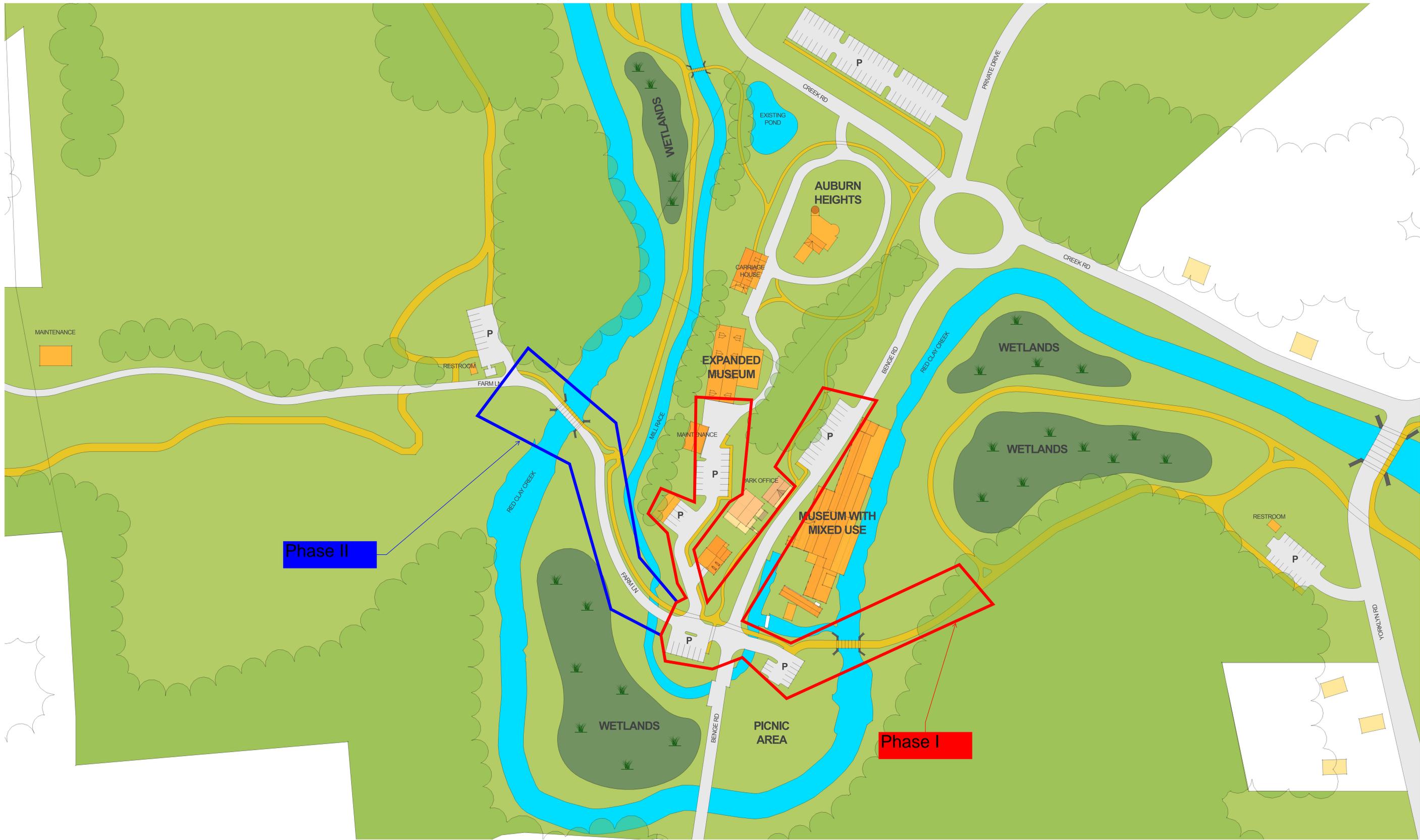
- Farm Lane Bridge Replacement which includes two (2) proposed abutments and wing walls
- Farm Lane Culvert over Mill Race

The above improvements will provide expanded access to and additional parking for the Marshall Steam Museum, nearby residences, and the existing trail system as part of the Auburn Valley Master Plan. See the attached plans for your use.

# Master Plan



## Auburn Valley Master Plan



Phase II

Phase I

WETLANDS

AUBURN HEIGHTS

EXPANDED MUSEUM

MUSEUM WITH MIXED USE

PICNIC AREA

WETLANDS

WETLANDS

WETLANDS

MAINTENANCE

RESTROOM

MAINTENANCE

MARK OFFICE

RESTROOM

CARRIAGE HOUSE

EXISTING POND

MILL RACE

FARM LN

FARM LN

BENGE RD

CREEK RD

PRIVATE DRIVE

CREEK RD

RED CLAY CREEK

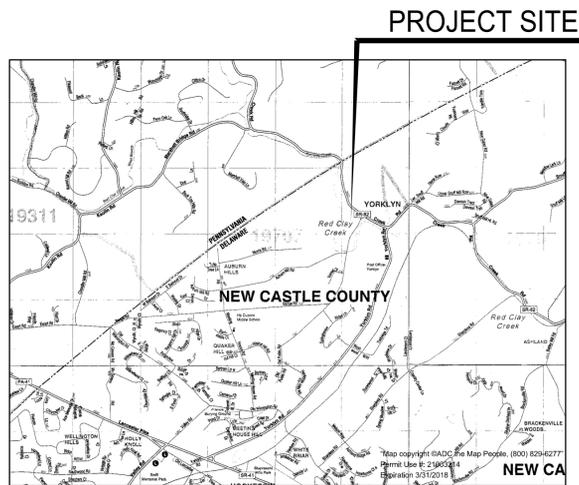
RED CLAY CREEK

YORKLIN RD

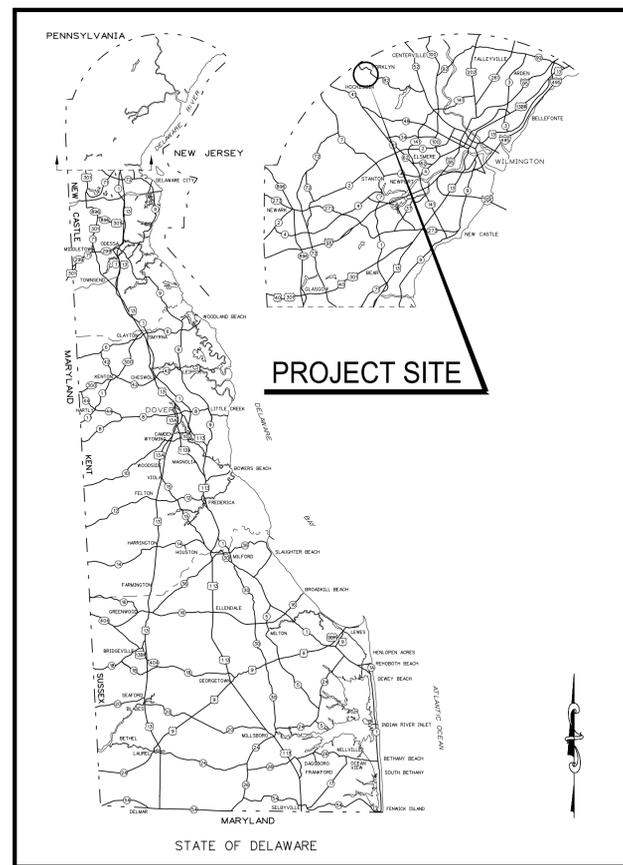
STATE OF DELAWARE  
 DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL  
 DIVISION OF PARKS & RECREATION

AUBURN HEIGHTS PRESERVE  
 PAPER MILL BRIDGE

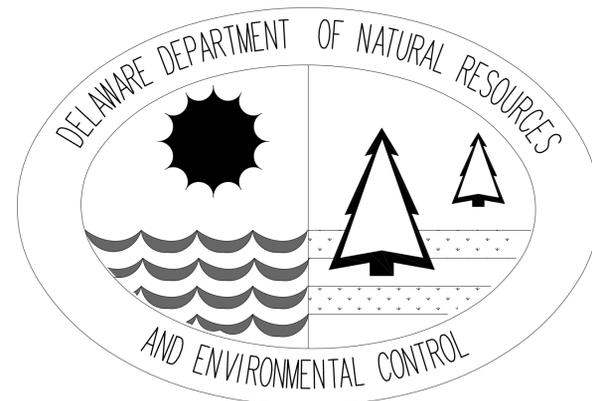
JUNE 30, 2017



SITE MAP



LOCATION MAP



SHEET INDEX  
 SCALE: 1"=200'

INDEX OF SHEETS	
SHEET NO.:	TITLE
C-1	GENERAL NOTES & LEGEND
C-2	HORIZONTAL AND VERTICAL CONTROL PLAN
C-3	TYPICAL SECTIONS
C-4 TO C-5	CONSTRUCTION PLANS
C-6 TO C-8	PROFILES
C-9	FARM LANE & PAPER MILL PARKING LOTS LAYOUT PLAN
C-10	MUSEUM DRIVE PARKING LOT LAYOUT PLAN
C-11	DEMOLITION PLAN
C-12	SETTLING TANK DETAIL
C-13 TO C-15	CONSTRUCTION DETAILS
C-16 TO C-17	SIGNING AND STRIPING PLANS
C-18 TO C-19	ENTRANCE PLANS
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ES-1	CONSTRUCTION SEQUENCING & EROSION AND SEDIMENT CONTROL NOTES
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ES-4 TO ES-7	CONSTRUCTION SEQUENCING & EROSION AND SEDIMENT CONTROL DETAILS
SN-1	STRUCTURAL GENERAL NOTES
S1-1 TO S1-5	PAPER MILL BRIDGE PLANS
S2-1 TO S2-2	MILL RACE DECKOVER STRUCTURE PLANS
SD-1 TO SD-4	STRUCTURAL DETAILS

SHEETS PREPARED BY CENTURY ENGINEERING INC.	
SHEET NO.:	TITLE
S3-1	CONNECTOR BOARDWALK PLAN, ELEVATION, SECTION
S3-2	CONNECTOR BOARDWALK ALIGNMENT, PROFILE, SCHEDULES
S3-3	CONNECTOR BOARDWALK DETAILS: OVERLOOK, RAILING, SECTIONS

SHEETS PREPARED BY OWNER	
SHEET NO.:	TITLE
P-1	BENGE ROAD PARKING LOT EXISTING CONDITIONS
P-2	BENGE ROAD PARKING LOT PROPOSED CONDITIONS
P-3	BENGE ROAD PARKING LOT STRIPING PLAN
R-1	RAILING DETAILS

FOR INFORMATION ONLY	
SHEET NO.:	TITLE
	THE MCINTYRE IRON BRIDGE (PAPER MILL ROAD BRIDGE)

LEGEND  
 CONSTRUCTION PLAN

PREPARED BY  
 THE CONSULTING FIRM OF  
**RK&K** RUMMEL, KLEPPER & KAHL, LLP  
 CONSULTING ENGINEERS  
 700 E PRATT ST., SUITE 500  
 BALTIMORE, MD 21202

*Nancy R. Bergman*  
 DIRECTOR 6/30/2017  
 DATE



PREPARED FOR:  
 OFFICE OF DESIGN & DEVELOPMENT  
 DELAWARE DIVISION OF PARKS & RECREATION  
 89 KINGS HIGHWAY  
 DOVER, DELAWARE 19901  
 PHONE: 302-739-9231  
 FAX: (302) 739-7026

DATE: JUNE 30, 2017

# GENERAL NOTES

- BEFORE EXCAVATION IS STARTED IN AREAS OF UNDERGROUND UTILITIES, THE CONTRACTOR SHALL GIVE NOTIFICATION BY TELEPHONE CALLING "MISS UTILITY", TEL (800) 282-8555. THE CONTRACTOR IS ADVISED THAT MISS UTILITY HAS REFUSED TO LOCATE UTILITIES ON PARK PROPERTY IN SOME INSTANCES. THE CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF ALL UTILITIES IN THE FIELD BY EMPLOYING A PROFESSIONAL UTILITY LOCATOR TO FIELD LOCATE EXISTING UTILITIES PRIOR TO ANY EXCAVATION. EXISTING UTILITIES ARE SHOWN ON THE DRAWINGS BASED ON THE BEST INFORMATION AVAILABLE, HOWEVER THIS INFORMATION HAS NOT BEEN FIELD VERIFIED AND IS NOT GUARANTEED. ALL EXISTING UTILITIES SHALL BE PROTECTED AND TEMPORARILY SUPPORTED OR RELOCATED AS NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH THE PERTINENT UTILITY COMPANY REQUIREMENTS. ALL COSTS SHALL BE INCIDENTAL TO THE CONTRACT.
- THE CONTRACTOR SHALL DESIGNATE A PERSON WHO SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING THE EROSION AND SEDIMENT CONTROL PLANS, AND A PERSON WHO SHALL BE RESPONSIBLE FOR WORK SAFETY. THE PERSON RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING THE EROSION AND SEDIMENT CONTROL PLANS SHALL BE CERTIFIED BY DNREC FOR EROSION AND SEDIMENT CONTROL RESPONSIBILITY (CERTIFIED CONSTRUCTION REVIEWER, CCR). THE CONTRACTOR SHALL PROVIDE CCR INSPECTION REPORTS CERTIFIED BY AN ENGINEER LICENSED IN THE STATE OF DELAWARE.
- THE CONTRACTOR IS RESPONSIBLE FOR SECURING THE AREA WITHIN THE LIMITS OF DISTURBANCE TO PROHIBIT GENERAL PUBLIC ACCESS UNTIL COMPLETION OF THE PROJECT. THE CONTRACTOR SHALL NOTE THAT ACCESS TO THE PRIVATE RESIDENCES SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT THE DURATION OF THE PROJECT. THE CONTRACTOR'S PROCEDURE/METHOD FOR LIMITING ACCESS SHALL BE REVIEWED BY, AND COORDINATED WITH THE OWNER PRIOR TO THE START OF WORK. THE COST SHALL BE INCLUDED IN THE CONTRACT.
- THE LIMIT OF DISTURBANCE SHALL BE AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL NOT WORK OR TRESPASS OUTSIDE OF THE LIMIT OF DISTURBANCE AS SHOWN ON THE PLANS UNLESS OTHERWISE APPROVED BY THE OWNER. THE CONTRACTOR SHALL DELINEATE THE LIMIT OF DISTURBANCE BY PLACING FLAGS AT 25' ON CENTER THROUGHOUT LIMITS OF THE PROJECT.
- APPROVED COVERS TO PREVENT MATERIAL FROM LEAVING THE TRUCKS MUST BE INSTALLED OVER ALL LOADED TRUCKS HAULING BORROW, EXCAVATED MATERIALS, AND/OR FINE AGGREGATES TO OR FROM THE PROJECT SITE OVER STATE MAINTAINED ROADS. THE TRUCKS SHALL BE FULLY COVERED AND THE COVERS SHALL BE TIED ON THE REAR AND BOTH SIDES TO PREVENT MATERIAL FROM LEAVING THE TRUCK DURING HAULING.
- IN CASE OF CONFLICT BETWEEN THE "MANUFACTURER'S RECOMMENDATIONS" FOR AN APPROVED MATERIAL AND THE GOVERNING "CONTRACT SPECIFICATIONS" FOR THE MATERIAL, THE MORE RESTRICTIVE OF THE TWO SHALL PREVAIL UNLESS OTHERWISE DIRECTED BY THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING, BY SURVEY, ALL POINTS AND LIMIT OF DISTURBANCE LINES NECESSARY FOR CONSTRUCTION OF THE PROJECT. THE CONTRACTOR SHALL ENGAGE A PROFESSIONAL LAND SURVEYOR, REGISTERED IN THE STATE OF DELAWARE, TO PERFORM REQUIRED SURVEYING SERVICES. ALL SURVEY STAKEOUT WORK SHALL BE INCLUDED IN THE CONTRACT.
- THE CONTRACTOR MUST SUBMIT A STAGING PLAN TO THE OWNER FOR APPROVAL PRIOR TO CONSTRUCTION OF THE PROJECT. THE STAGING PLAN SHALL INCLUDE SITE LOCATION, EROSION AND SEDIMENT CONTROLS, AND ALL OTHER INCIDENTALS, AS DIRECTED BY THE OWNER. ALL COSTS ASSOCIATED WITH PREPARING AND IMPLEMENTING THE STAGING PLAN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL CONSTRUCTION ACCESS SHALL USE THE STABILIZED CONSTRUCTION ENTRANCE. CONSTRUCTION, MAINTENANCE, CLEANING, RE-COMPACTING, REMOVAL AND REPLACEMENT OF THE BASE COURSE MATERIALS FOR THE STABILIZED CONSTRUCTION ENTRANCE SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AS DIRECTED BY THE CERTIFIED CONSTRUCTION REVIEWER AND THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING THE ROAD AT THE CONSTRUCTION ENTRANCE AT THE END OF EACH WORKING DAY.
- THE CONTRACTOR SHALL PROVIDE NECESSARY RESTROOM FACILITIES FOR WORKERS DURING CONSTRUCTION.
- ALL EXISTING DRAINAGE SYSTEMS SHOWN ARE TO REMAIN OPERATIONAL UNLESS DENOTED FOR ABANDONMENT.
- AT THE END OF THIS PROJECT'S CONSTRUCTION, ALL EXISTING DRAINAGE STRUCTURES AND PIPES WITHIN THE PROJECT LIMITS SHALL BE CLEANED OF ALL SEDIMENT AND DEBRIS IN COMPLIANCE WITH DNREC GUIDELINES AS DIRECTED BY THE OWNER. COST TO BE INCLUDED IN THE BID.
- ALL CONSTRUCTION IS TO BE IN ACCORDANCE WITH THE DELDOT STANDARDS SPECIFICATIONS AND DETAILS DATED 2011, UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIFICATIONS FOR THIS PROJECT AND AS FOLLOWS. FOR THIS PROJECT, DIVISION 100 GENERAL PROVISIONS IN THE DELDOT STANDARD SPECIFICATIONS DOES NOT APPLY. FOR GRADED AGGREGATE BASE COURSE, THE MATERIAL SHALL CONSIST OF CRUSHED STONE. CRUSHED SLAG FRAGMENTS OR PORTLAND CEMENT CONCRETE FRAGMENTS SHALL NOT BE USED AS GRADED AGGREGATE BASE COURSE. THERE WILL BE NO MEASUREMENT FOR PAYMENT EXCEPT WHERE SPECIFICALLY STATED IN THE PLANS AND SPECIFICATIONS FOR THIS PROJECT.
- STAGING AREAS: PROPER EROSION AND SEDIMENT CONTROL MEASURES AS DETERMINED BY THE OWNER SHALL BE INSTALLED IN ALL STAGING AREAS. ALL AREAS USED BY THE CONTRACTOR AND "WORKIN BRIDGES" FOR STAGING OPERATIONS SHALL BE FULLY RESTORED BY THE CONTRACTOR UPON COMPLETION OF THE PROJECT. IF THE STAGING AREA IS PAVED, IT SHALL BE RESTORED TO ITS ORIGINAL CONDITION. IF THE STAGING AREA IS UNPAVED, IT SHALL BE RE-GRADED, TOPSOILED, SEEDING AND MULCHED IN ACCORDANCE WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK, CURRENT VERSION (HEREAFTER KNOWN AS THE HANDBOOK), TO THE SATISFACTION OF THE OWNER. THE SEED SHALL ADHERE TO THE SPECIFICATIONS OF PERMANENT SEED MIX #5 AS NOTED IN THE HANDBOOK. ALL COSTS ASSOCIATED WITH RESTORATION OF THE STAGING AREA(S) SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE OWNER DETERMINES THAT A SATISFACTORY STAND OF GRASS DOES NOT EXIST AT THE TIME OF FINAL INSPECTION, ALL COSTS ASSOCIATED WITH RE-ESTABLISHING A SATISFACTORY STAND OF GRASS SHALL BE AT THE CONTRACTOR'S EXPENSE.
- A UNIT COST FOR ROCK EXCAVATION (NON-STRUCTURAL) HAS BEEN INCLUDED IN THE PROJECT. THIS EXCAVATION IS FOR AREAS WHERE THE EXCAVATION OF ROCK IS ENCOUNTERED ON THE PROJECT IN AREAS OTHER THAN EXCAVATION FOR STRUCTURES.
- EXCAVATED MATERIALS MEETING THE REQUIREMENTS OF THE DIFFERENT BORROW TYPES ARE INTENDED TO BE USED IN FILL AREAS OF THE PROJECT. THE CONTRACTOR SHALL BE REQUIRED TO HAVE THE MATERIAL TESTED. ALL UNUSED MATERIAL SHALL BE EMBANKED AT A LOCATION ON PARK OWNED PROPERTY AT THE DIRECTION OF THE OWNER. THE LOCATION SHALL BE WITHIN 5 MILES OF THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION AND SEDIMENT CONTROL, AND SEEDING AND MULCHING. ALL COST ASSOCIATED WITH PERFORMING THIS WORK SHALL BE INCLUDED IN THE LUMP SUM BID FOR THE PROJECT.

# LEGEND

## PROPOSED CONSTRUCTION

- ROADWAY PAVEMENT
- BRIDGE (BY OTHERS)
- PAVEMENT WEDGE
- HOT-MIX
- CONCRETE
- SCORED P.C.C. PAVEMENT
- 185 CONTOURS (FEET)
- X 190.5 SPOT ELEVATION
- 100+00 CONSTRUCTION BASELINE
- LOD -- LIMIT OF DISTURBANCE
- C--- CUT
- F--- FILL
- CURB, TYPE 1
- CURB, TYPE 2
- BARRIER
- GUARDRAIL
- SPLIT RAIL FENCE
- DITCH CENTERLINE
- RIPRAP
- SIGNS
- ADA LANDING AREA

- DND DO NOT DISTURB
- RM C REMOVE BY CONTRACTOR
- C-12 SECTION LINE
- C-16 DETAIL REFERENCE

## EXISTING DETAIL

- SURVEY TRAVERSE POINT
- POINT OF INTERSECTION - TANGENTS
- POINT OF TANGENCY & CURVATURE
- T.P. SURVEY TIE POINT LOCATION
- CATCH BASIN
- EXISTING DRAINAGE PIPE AND FLOW ARROW
- TOP OF DITCH
- BOTTOM OF DITCH
- STREAM, DITCH OR POND BOUNDARY
- OHW--- ORDINARY HIGH WATER
- 165.5 X SPOT ELEVATION
- 9--- CONTOUR LINE
- SMALL BUSH OR ORNAMENTAL SHRUB
- CONIFEROUS TREE 6" AND LARGER
- DECIDUOUS TREE 6" AND LARGER
- HEDGEROW OR THICKET
- WOODS LINE
- SIGN
- STRAND OR WOVEN WIRE FENCE
- WOODEN FENCE
- WOOD POLE
- A-4(4) A-2(4) SOIL BORING LOG - PROFILE VIEW
- SOIL BORING LOCATION - PLAN VIEW
- GmB2 GmB3 SOIL TYPE AND BOUNDARY LINE
- WOODEN POST
- ELECTRIC TRANSFORMER
- GAS MANHOLE
- SANITARY SEWER MANHOLE
- TELEPHONE MANHOLE
- ELECTRIC MANHOLE
- F.H. FIRE HYDRANT
- TELEPHONE BOOTH
- UTILITY POLE GUY WIRE ANCHOR
- G.V. GAS VALVE
- W.V. WATER VALVE
- WELL MONITORING/OBSERVATION WELL
- LUMINAIRE SUPPORT POLE AND/OR BASE
- POLE MOUNTED LUMINAIRE
- WATER METER

## UTILITIES

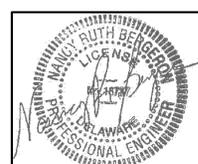
- |                          |                                    |            |
|--------------------------|------------------------------------|------------|
| E-OH ELECTRIC (OVERHEAD) | T TELECOMMUNICATIONS (UNDERGROUND) | E ELECTRIC |
| E ELECTRIC (UNDERGROUND) | W WATER                            | S SANITARY |
| SAN. SANITARY SEWER      | SAN. FM. SANITARY FORCE MAIN       | W WATER    |
| G GAS                    |                                    |            |

BY:	
DESCRIPTION:	
DATE:	
DESCRIPTION:	

# AUBURN HEIGHTS PRESERVE PAPER MILL BRIDGE GENERAL NOTES & LEGEND



DESIGNED BY:	RKK
DRAWN BY:	RKK
BUILDING NO.:	N/A
DATE:	6/30/2017
SCALE:	NOT TO SCALE
SHEET NO.:	C-1
PARKS PROJECT #:	NVF-4
CONTRACT #:	2015-NVF-100



5/17/2017 3:18:59 PM \\BALSRV01\1\2014\2014-14078\_DNREC\TASK 10 - MB\_NVF\CADD\CONTRACTS\FARMLIN\_PAPERMILL\PLANS\GN01\_AHP.DGN

CONTROL COORDINATES

DESCRIPTION	STATION	NORTHING	EASTING
<b>FARM LANE @ CONSTRUCTION</b>			
PC	107+16.55	658368.2517	581960.7739
PI	107+67.39	658323.8619	581985.5445
CC		658429.1630	582069.9289
PT	108+13.11	658309.3586	582034.2652
PC	109+80.47	658261.6088	582194.6697
PI	109+94.70	658257.5502	582208.3036
CC		658154.2641	582162.7149
PT	110+08.77	658250.2122	582220.4900
POE	111+00.00	658203.1514	582298.6449

CONTROL COORDINATES

DESCRIPTION	STATION	NORTHING	EASTING
<b>PAPER MILL BRIDGE @ CONSTRUCTION</b>			
POB	201+00.00	658242.2391	582233.7311
PC	201+13.35	658252.1240	582242.9934
PI	201+35.61	658268.2246	582258.0800
CC		658217.9364	582279.4791
PT	201+55.10	658267.9320	582280.1423
POE	203+25.00	658265.6784	582450.0244

CONTROL COORDINATES

DESCRIPTION	STATION	NORTHING	EASTING
<b>MUSEUM DRIVE @ CONSTRUCTION</b>			
POB	300+00.00	658207.6110	582025.5676
PC	301+34.19	658336.2221	582063.8530
PI	301+40.39	658342.1685	582065.6231
CC		658341.9284	582044.6843
PT	301+46.22	658348.0727	582063.7171
PC	302+31.93	658429.6345	582037.3866
PI	302+53.49	658450.1590	582030.7606
CC		658441.9232	582075.4521
PT	302+71.49	658466.9734	582044.2675
PC	303+41.49	658521.5468	582088.1056
PI	303+54.83	658531.9485	582096.4611
CC		658546.5971	582056.9209
PT	303+67.24	658545.2833	582096.8993
PI	304+57.96	658635.9519	582099.8787
POE	305+05.00	658676.5014	582123.7196

CONTROL COORDINATES

DESCRIPTION	STATION	NORTHING	EASTING
<b>BENGE ROAD @ CONSTRUCTION</b>			
POB	400+00.00	657753.0773	582045.8603
PC	404+38.75	658187.1721	582109.5839
PI	405+30.71	658278.1610	582122.9408
CC		658078.9744	582846.6426
PT	406+21.75	658363.1700	582158.0244
PC	406+68.54	658406.4255	582175.8761
PI	407+29.68	658462.9381	582199.1991
CC		658238.1122	582583.7064
PT	407+90.04	658510.9795	582237.0100
POE	409+00.00	658597.3850	582305.0154

NOTE:

1. TOPOGRAPHY SUPPLIED BY DNREC. TOPOGRAPHY WAS FLOWN BY AXIS GEOSPATIAL, LLC ON 03-13-2004.

FARM LANE CURVE DATA

①	②
$\Delta = 44^{\circ}15'36.0138''$ Left	$\Delta = 14^{\circ}28'36.4534''$ Right
$D_c = 45^{\circ}50'11.8450''$	$D_c = 5^{\circ}09'25.0056''$
$R = 125.0000$	$R = 112.0000$
$T = 50.8335$	$T = 14.2252$
$L = 96.5603$	$L = 28.2988$
$E = 9.9409$	$E = 0.8998$

PAPER MILL CURVE DATA

③
$\Delta = 47^{\circ}37'20.517''$ Right
$D_c = 114^{\circ}35'29.6125''$
$R = 50.0000$
$T = 22.0643$
$L = 41.5584$
$E = 4.6519$

MUSEUM DRIVE CURVE DATA

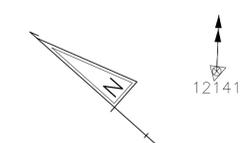
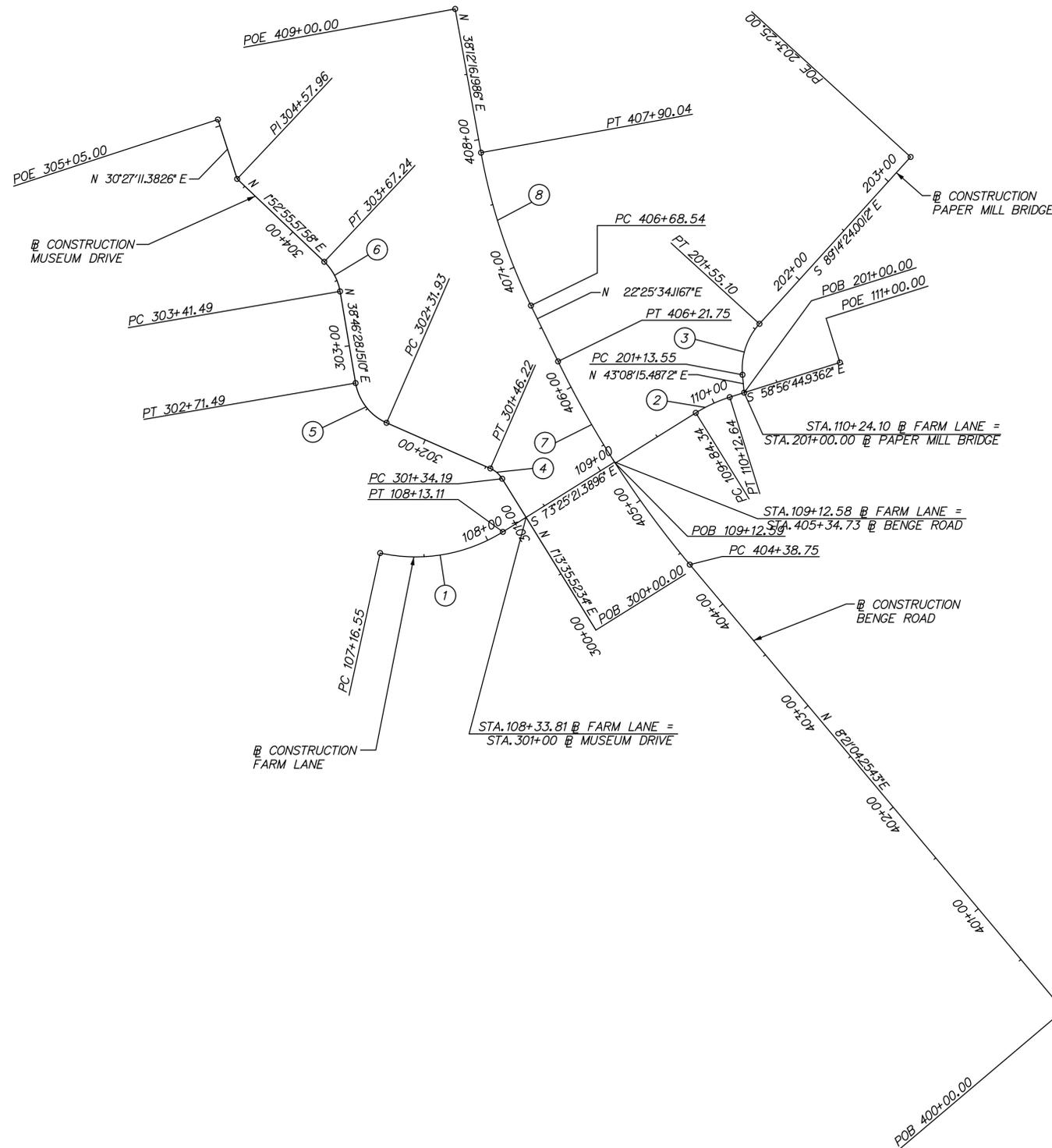
④	⑤	⑥
$\Delta = 34^{\circ}28'08.3753''$ Left	$\Delta = 56^{\circ}39'57.9159''$ Right	$\Delta = 36^{\circ}53'32.5753''$ Left
$D_c = 286^{\circ}28'44.0312''$	$D_c = 143^{\circ}14'22.0156''$	$D_c = 143^{\circ}14'22.0156''$
$R = 20.0000$	$R = 40.0000$	$R = 40.0000$
$T = 6.2042$	$T = 21.5675$	$T = 13.3421$
$L = 12.0319$	$L = 39.5604$	$L = 25.7557$
$E = 0.9402$	$E = 5.4440$	$E = 2.1665$

BENGE ROAD CURVE DATA

⑦	⑧
$\Delta = 14^{\circ}04'29.8624''$ Right	$\Delta = 15^{\circ}46'42.0819''$ Right
$D_c = 7^{\circ}41'28.1152''$	$D_c = 12^{\circ}59'11.6882''$
$R = 744.9579$	$R = 441.971$
$T = 91.9640$	$T = 61.1362$
$L = 183.0022$	$L = 121.4987$
$E = 5.6550$	$E = 4.2157$

SURVEY CONTROL POINTS

POINT NO.	NORTHING	EASTING	ELEVATION
1006	658607.9360	581356.9390	235.0
1007	659264.6300	580122.9570	354.7
1009	660312.0600	581459.1300	236.6
2146	657181.3710	583200.6330	187.1
12141	659233.1150	583933.9330	171.9

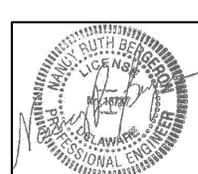


DATE:	DESCRIPTION:
BY:	BY:

**AUBURN HEIGHTS PRESERVE  
PAPER MILL BRIDGE  
HORIZONTAL & VERTICAL  
CONTROL PLAN**

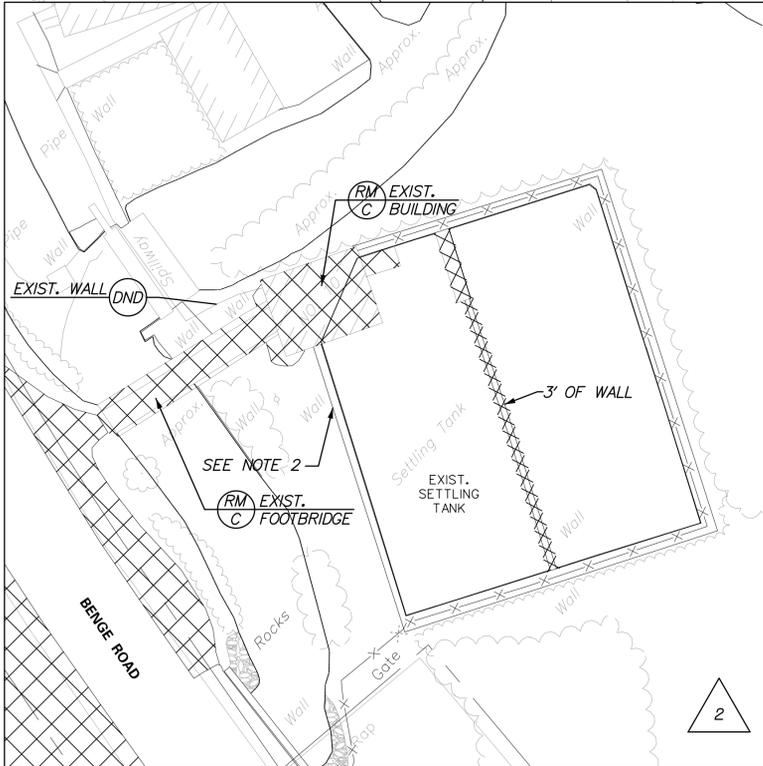
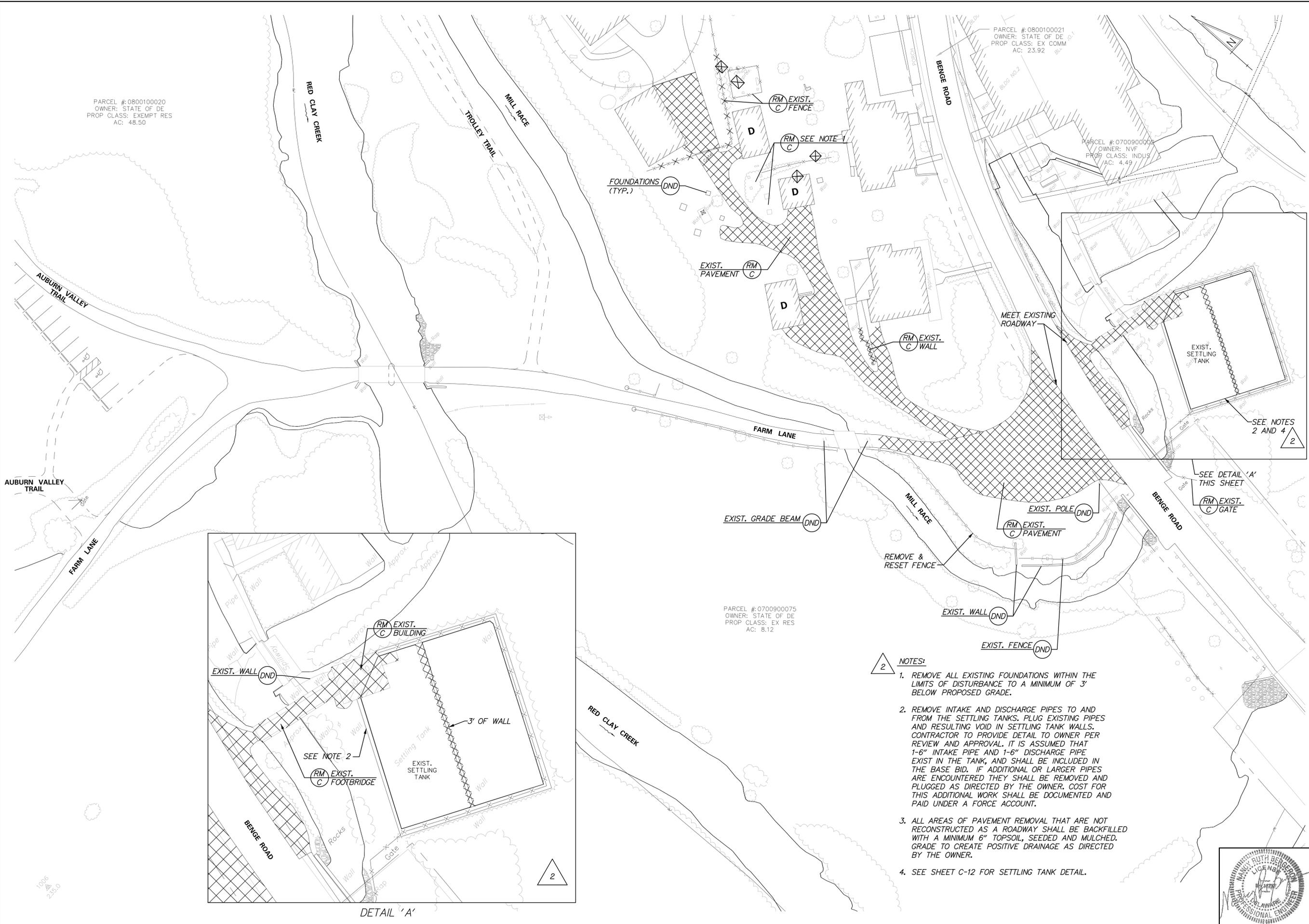


DESIGNED BY:	RKK
DRAWN BY:	RKK
BUILDING NO.:	N/A
DATE:	6/30/2017
SCALE:	1" = 50'
SHEET NO.:	<b>C-2</b>
PARKS PROJECT #:	NVF-4
CONTRACT #:	2015-NVF-100



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DETAIL 'A'

2

NOTES:

1. REMOVE ALL EXISTING FOUNDATIONS WITHIN THE LIMITS OF DISTURBANCE TO A MINIMUM OF 3' BELOW PROPOSED GRADE.
2. REMOVE INTAKE AND DISCHARGE PIPES TO AND FROM THE SETTLING TANKS. PLUG EXISTING PIPES AND RESULTING VOID IN SETTLING TANK WALLS. CONTRACTOR TO PROVIDE DETAIL TO OWNER PER REVIEW AND APPROVAL. IT IS ASSUMED THAT 1-6" INTAKE PIPE AND 1-6" DISCHARGE PIPE EXIST IN THE TANK, AND SHALL BE INCLUDED IN THE BASE BID. IF ADDITIONAL OR LARGER PIPES ARE ENCOUNTERED THEY SHALL BE REMOVED AND PLUGGED AS DIRECTED BY THE OWNER. COST FOR THIS ADDITIONAL WORK SHALL BE DOCUMENTED AND PAID UNDER A FORCE ACCOUNT.
3. ALL AREAS OF PAVEMENT REMOVAL THAT ARE NOT RECONSTRUCTED AS A ROADWAY SHALL BE BACKFILLED WITH A MINIMUM 6" TOPSOIL, SEEDED AND MULCHED. GRADE TO CREATE POSITIVE DRAINAGE AS DIRECTED BY THE OWNER.
4. SEE SHEET C-12 FOR SETTLING TANK DETAIL.

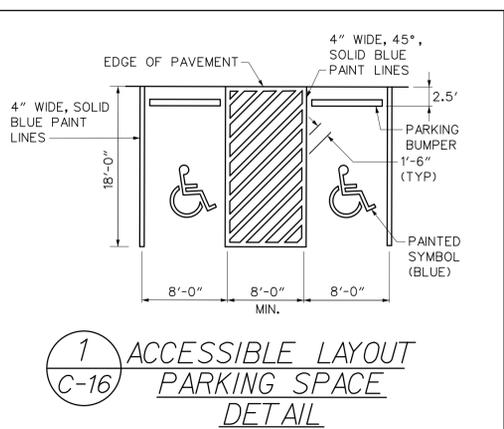
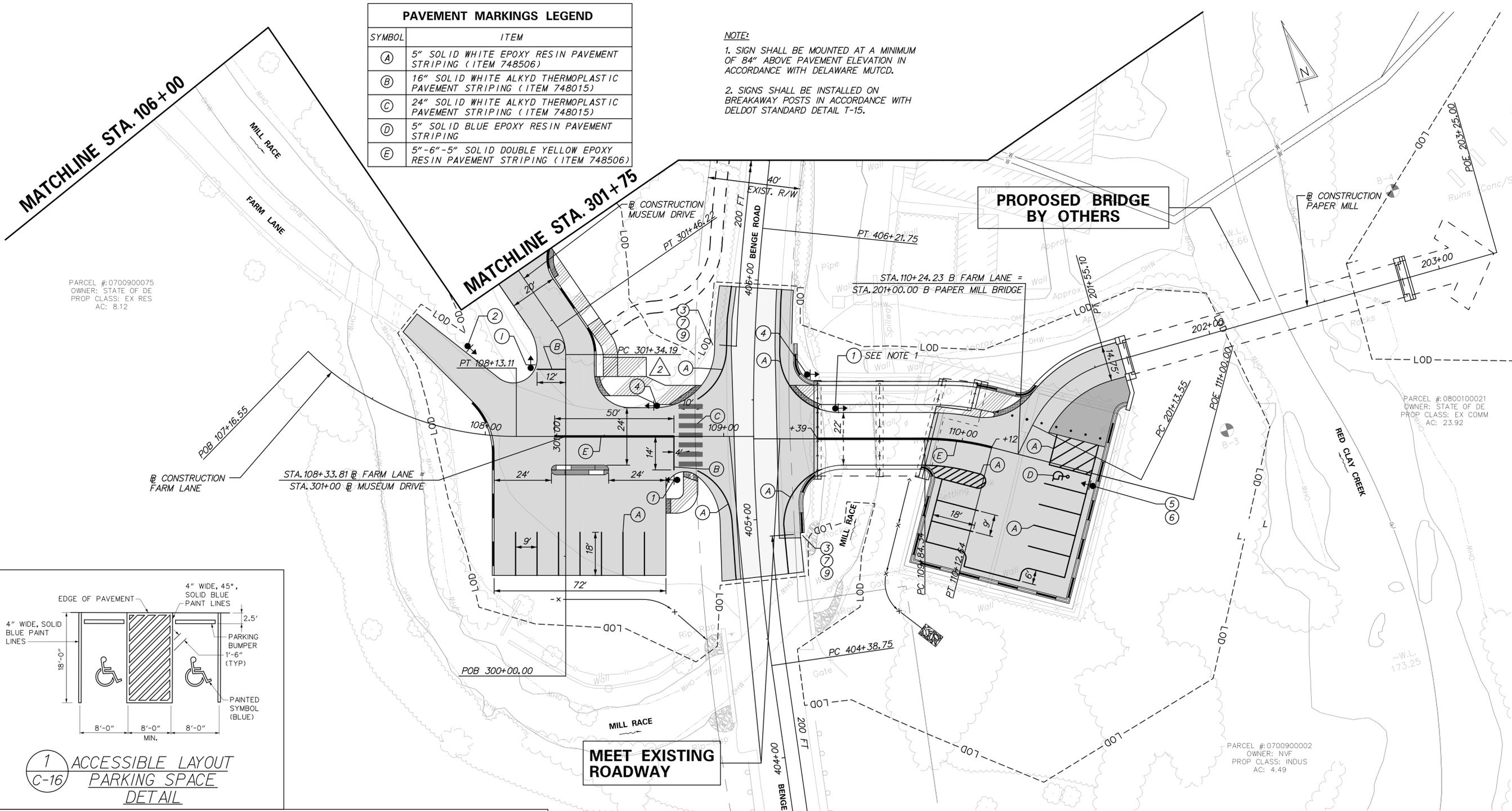


<b>BY:</b> DESCRIPTION: DATE: 8/10/17 REVISIONS:	BY: RLS DATE: 8/10/17 REVISIONS:
	<b>DATE:</b> DESCRIPTION: DATE: 8/10/17 REVISIONS:
<b>AUBURN HEIGHTS PRESERVE          PAPER MILL BRIDGE          DEMOLITION PLAN</b>	
DESIGNED BY:	RKK
DRAWN BY:	RKK
BUILDING NO.:	N/A
DATE:	6/30/2017
SCALE:	1" = 30'
SHEET NO.:	<b>C-11</b>
PARKS PROJECT #:	NVF-4
CONTRACT #:	2015-NVF-100

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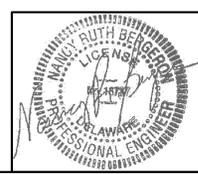
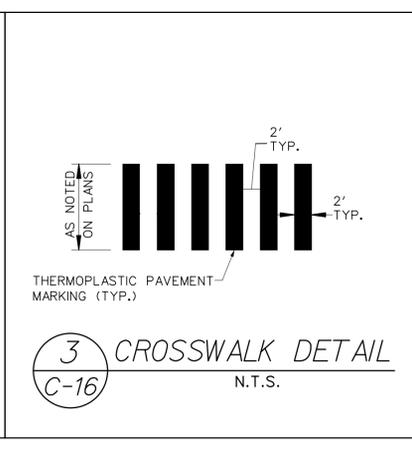
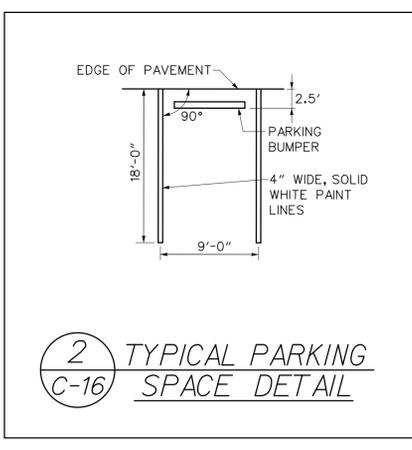
PAVEMENT MARKINGS LEGEND	
SYMBOL	ITEM
(A)	5" SOLID WHITE EPOXY RESIN PAVEMENT STRIPING (ITEM 748506)
(B)	16" SOLID WHITE ALKYD THERMOPLASTIC PAVEMENT STRIPING (ITEM 748015)
(C)	24" SOLID WHITE ALKYD THERMOPLASTIC PAVEMENT STRIPING (ITEM 748015)
(D)	5" SOLID BLUE EPOXY RESIN PAVEMENT STRIPING
(E)	5"-6"-5" SOLID DOUBLE YELLOW EPOXY RESIN PAVEMENT STRIPING (ITEM 748506)

**NOTE:**  
 1. SIGN SHALL BE MOUNTED AT A MINIMUM OF 84" ABOVE PAVEMENT ELEVATION IN ACCORDANCE WITH DELAWARE MUTCD.  
 2. SIGNS SHALL BE INSTALLED ON BREAKAWAY POSTS IN ACCORDANCE WITH DELDOT STANDARD DETAIL T-15.



SIGN LEGEND					
①	R1-1 (36" X 36")	④	SR1-16-DE (24" X 42")	⑦	W11-15P (24" X 18")
②	W5-3 (30" X 30")	⑤*	R7-8 (12" X 18")	⑧	W16-9P (24" X 12")
③	W5-4 (30" X 30")	⑥*	R7-8P (12" X 6")	⑨	W16-7P (24" X 12")

\* ALL ACCESSIBLE SIGNS SHALL BE 60" MINIMUM ABOVE THE GROUND SURFACE MEASURED TO THE BOTTOM OF THE SIGN



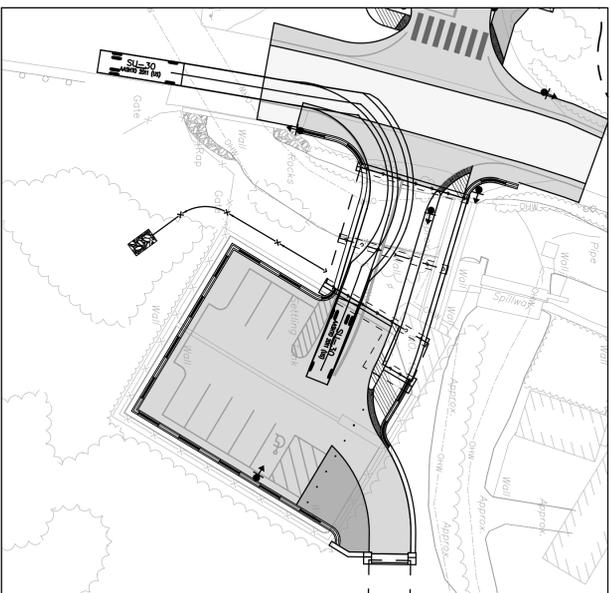
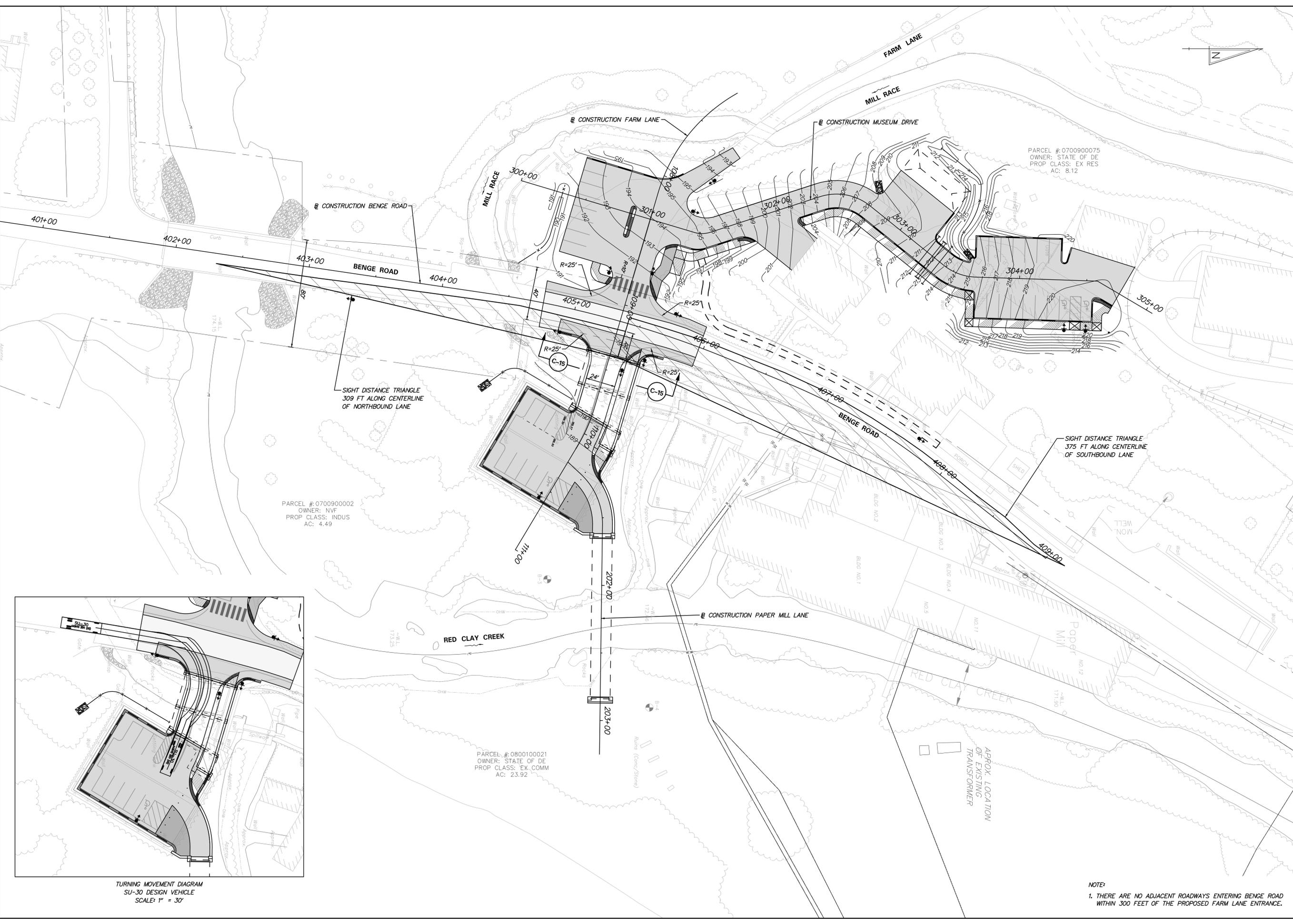
DATE:	8/10/17	DESCRIPTION:	REVISED SHARED USE PATH MATERIAL
BY:	RLS	DESIGNED BY:	RKK
BY:	RLS	DRAWN BY:	RKK
		BUILDING NO.:	N/A
		DATE:	6/30/2017
		SCALE:	1" = 20'
		SHEET NO.:	C-16
		PARKS PROJECT #:	NVF-4
		CONTRACT #:	2015-NVF-100

**AUBURN HEIGHTS PRESERVE  
PAPER MILL BRIDGE  
SIGNING AND STRIPING PLAN**





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TURNING MOVEMENT DIAGRAM  
 SU-30 DESIGN VEHICLE  
 SCALE: 1" = 30'

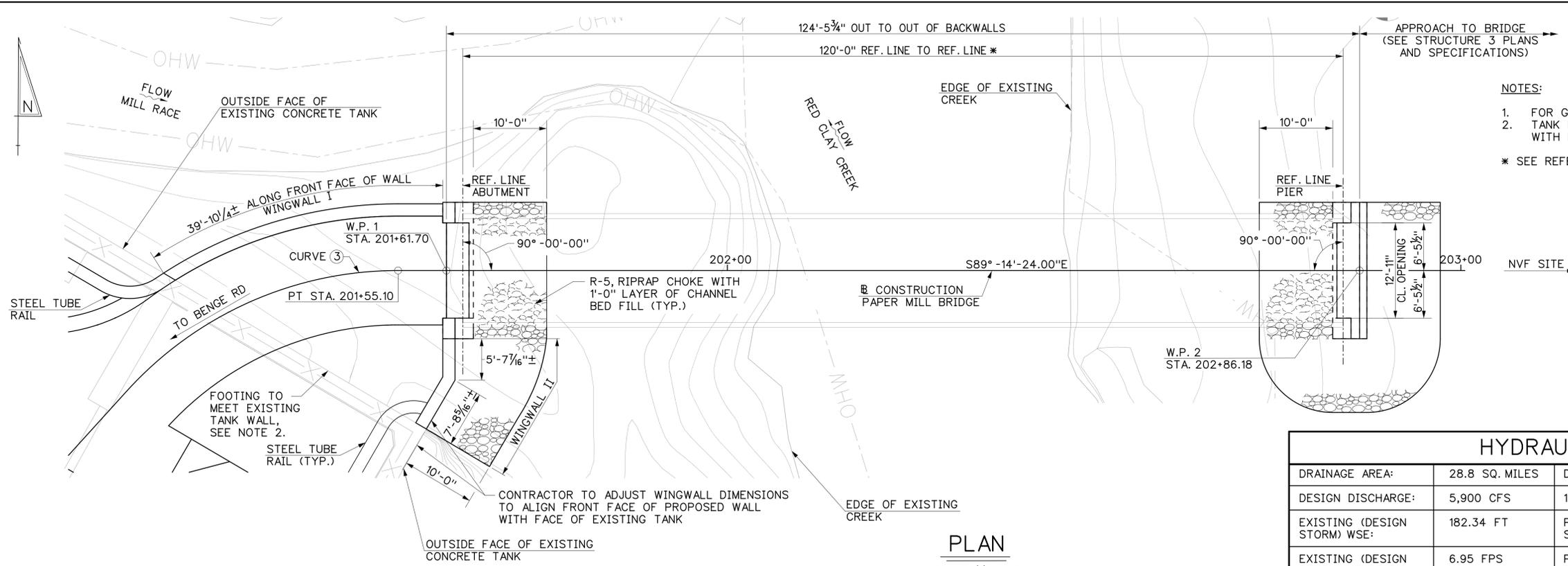
NOTE:  
 1. THERE ARE NO ADJACENT ROADWAYS ENTERING BENG ROAD WITHIN 300 FEET OF THE PROPOSED FARM LANE ENTRANCE.

DATE:	DESCRIPTION:	BY:
<b>AUBURN HEIGHTS PRESERVE          PAPER MILL BRIDGE          ENTRANCE PLAN</b>		
DESIGNED BY:	RKK	
DRAWN BY:	RKK	
BUILDING NO.:	N/A	
DATE:	6/30/2017	
SCALE:	1" = 30'	
SHEET NO.:	<b>C-18</b>	
PARKS PROJECT #:	NVF-4	
CONTRACT #:	2015-NVF-100	

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<b>AUBURN HEIGHTS PRESERVE PAPER MILL BRIDGE</b>		<b>DESCRIPTION:</b>	<b>DATE:</b>	<b>BY:</b>
<b>OVERALL CONSTRUCTION PLAN</b>				
		<b>DESIGNED BY:</b>		
		RKK		
		<b>DRAWN BY:</b>		
		RKK		
		<b>BUILDING NO.:</b>		
		N/A		
		<b>DATE:</b>	6/30/2017	
		<b>SCALE:</b>	1" = 200'	
		<b>SHEET NO.:</b>	<b>C-20</b>	
		<b>PARKS PROJECT #:</b>	NVF-4	
		<b>CONTRACT #:</b>	2015-NVF-100	

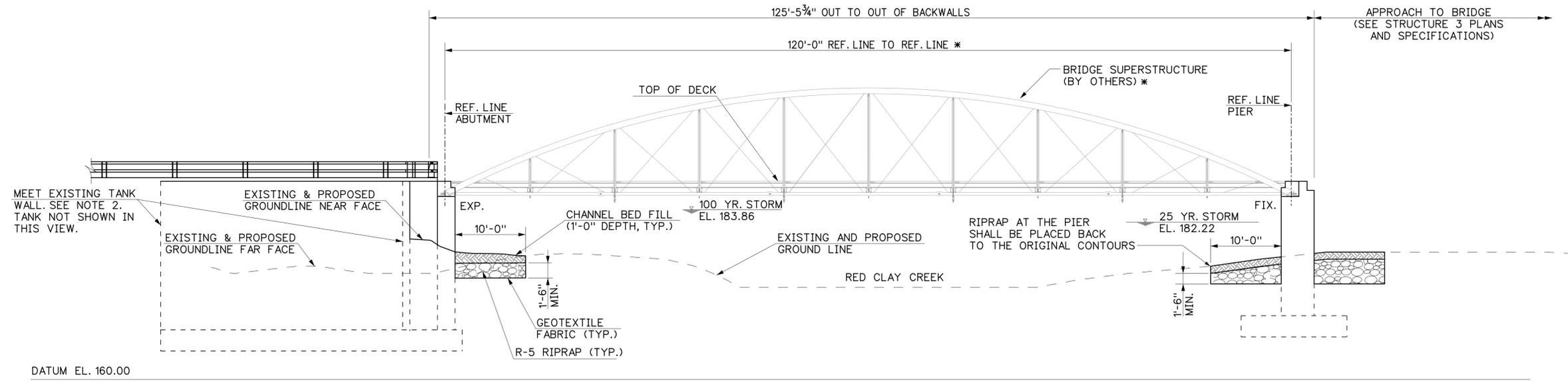


**PLAN**  
SCALE: 1/8"=1'-0"

**NOTES:**  
 1. FOR GENERAL NOTES, SEE DRAWING NO. SN-1.  
 2. TANK FOOTING CONFIGURATION UNKNOWN. COORDINATE WITH ENGINEER BASED ON FIELD CONDITION.  
 \* SEE REFERENCE DRAWINGS.

HYDRAULIC DATA			
DRAINAGE AREA:	28.8 SQ. MILES	DESIGN FREQUENCY:	25 YEARS
DESIGN DISCHARGE:	5,900 CFS	100 YEAR DISCHARGE:	8,700 CFS
EXISTING (DESIGN STORM) WSE:	182.34 FT	PROPOSED (DESIGN STORM) WSE:	182.22 FT
EXISTING (DESIGN STORM) VELOCITY:	6.95 FPS	PROPOSED (DESIGN STORM) VELOCITY:	7.24 FPS
EXISTING 100-YEAR WSE:	183.99 FT	PROPOSED 100-YEAR WSE:	183.86 FT
EXISTING 100-YEAR VELOCITY:	8.34 FPS	PROPOSED 100-YEAR VELOCITY:	8.75 FPS
EXISTING WATERWAY OPENING:	N/A	PROPOSED WATERWAY OPENING:	955 SQ. FT

**SCOUR ANALYSIS:**  
 A. SCOUR DESIGN FREQUENCY: (100-YEAR)  
 B. SCOUR DESIGN FLOOD DISCHARGE: 8,700 CFS  
 C. SCOUR DESIGN FLOOD VELOCITY: 8.75 FPS (AT BRIDGE OUTLET)  
 D. WATER SURFACE ELEVATION: 183.86 FT (IMMEDIATELY UPSTREAM OF BRIDGE)  
 E. CALCULATED SCOUR DEPTH AT EACH SUBSTRUCTURE UNIT:  
 1. ABUTMENT: 7.7 FT  
 2. PIER: 7.1 FT  
 F. SCOUR COUNTERMEASURES HAVE BEEN DESIGNED FOR THE SCOUR DESIGN FLOOD IN ACCORDANCE WITH HEC 23-BRIDGE SCOUR AND STREAM INSTABILITY COUNTERMEASURES.



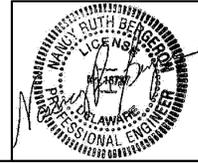
**ELEVATION**  
SCALE: 1/8"=1'-0"

BY:	
DESCRIPTION:	
DATE:	
DESCRIPTION:	

**AUBURN HEIGHTS PRESERVE  
 PAPER MILL BRIDGE  
 GENERAL PLAN AND ELEVATION**



DESIGNED BY:	RKK
DRAWN BY:	RKK
BUILDING NO.:	N/A
DATE:	6/30/2017
SCALE:	1/8"=1'-0"
SHEET NO.:	<b>S1-1</b>
PARKS PROJECT #:	NVF-4
CONTRACT #:	2015-NVF-100



7/12/2017  
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