IOWA DEPARTMENT OF NATURAL RESOURCES

CONSTRUCTION DOCUMENTS FOR RED HAW STATE PARK SHORELINE STABILIZATION & WATER CONTROL STRUCTURE REPLACEMENT LUCAS COUNTY, IOWA

PROJECT # 22-05-59-01

LICENSED PROFESSIONAL ENGINEER
JASON KRUSE
19718
IOWA

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED UNDER MY SUPERVISION AND THAT ENGINEERING DECISIONS WITH REGARD TO THE DESIGN WERE MADE BY ME UNDER THE LAWS OF THE STATE OF IOWA.

SIGNATURE 1-19-2022 DATE

JASON KRUSE
PRINTED OR TYPED NAME

MY LICENCE RENEWAL DATE IS DECEMBER 31, 20 23

PAGES COVERED BY THIS SEAL: ALL

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SHEET INDEX

DIRECTORY

PROJECT MANAGER		CONSTRUCTION INSPECTOR	
COMPANY	IOWA DEPARTMENT OF NATURAL RESOURCES	COMPANY	IOWA DEPARTMENT OF NATURAL RESOURCES
ADDRESS	502 EAST 9TH STREET	ADDRESS	
CITY,STATE,ZIP	DES MOINES, IA, 50319	CITY,STATE,ZIP	
CONTACT	EMMANUEL SANG	CONTACT	JASON KRUSE
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PROJECT DESCRIPTION

THIS PROJECT INVOLVES 3,670 LINEAR FEET OF SHORELINE STABILIZATION BY PLACING CLASS 'E' REVETMENT ON 2:1 SLOPE ;REPLACING WATER CONTROL STRUCTURE ,SEEDING MULCHING AND FERTILIZING ALL DISTURBED AREAS.

AUTHORIZATION TO BID

Nick Dellaca Digitally signed by Nick Dellaca Date: 2022.01.19 14:53:19 -06'00'

AUTHORIZATION - PARKS | WILDLIFE | FISHERIES | LAW ENFORCEMENT | FORESTRY DATE

ENGINEERING BUREAU CHIEF 1/19/22 DATE

CONSULTANT:

IOWA DEPARTMENT OF NATURAL RESOURCES
ENGINEERING SERVICES - WALLACE BUILDING
502 E. 9TH ST., DES MOINES, IA 50319-0034

DNR

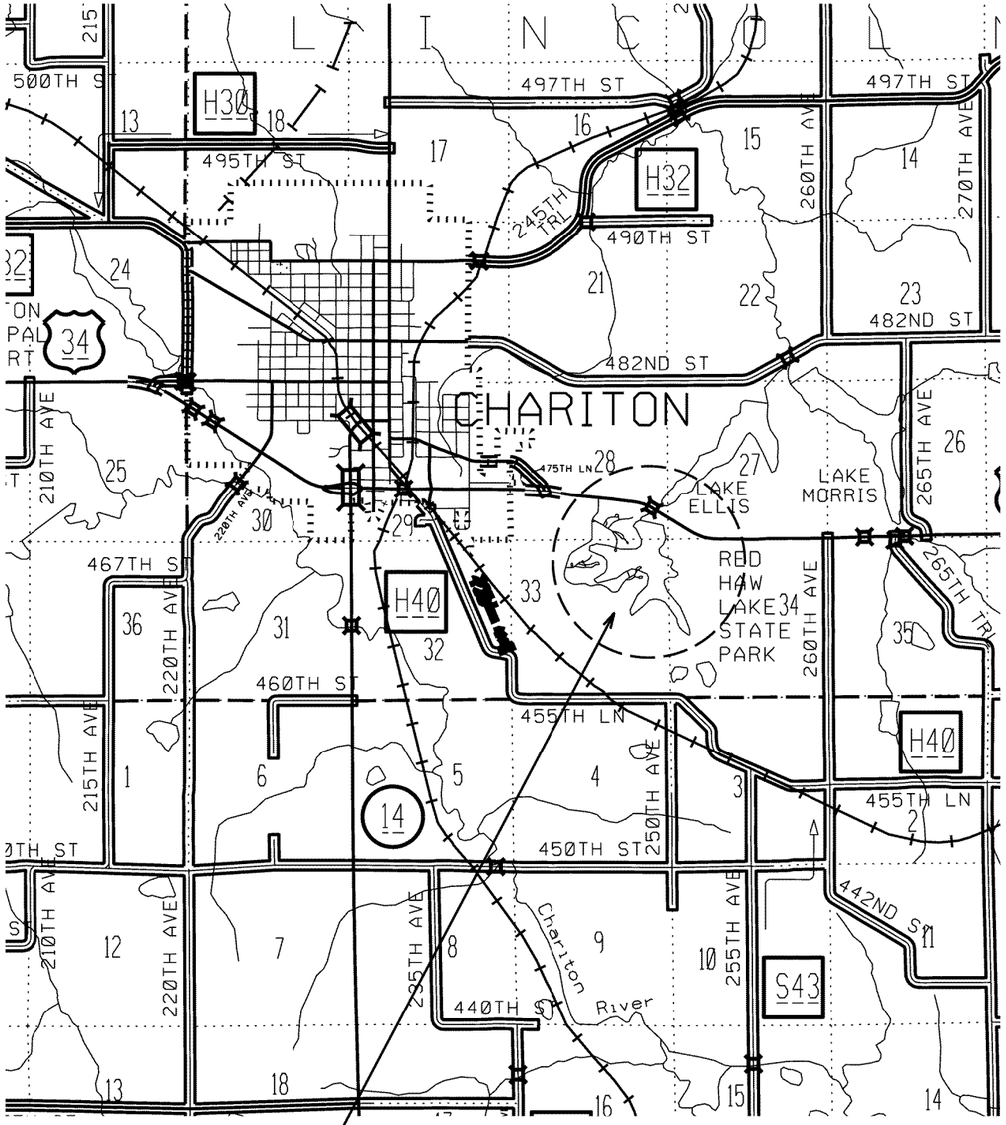
COVER SHEET

SHORELINE STABILIZATION AND WATER CONTROL STRUCTURE REPLACEMENT FOR:
RED HAW STATE PARK
LUCAS COUNTY

NO.	BY	DATE	REVISION

DRAWN BY: ESANG
PROJECT NUMBER: 22-05-59-01
CHK'D BY: JKRUSE
DATE:
SHEET No:

A.01



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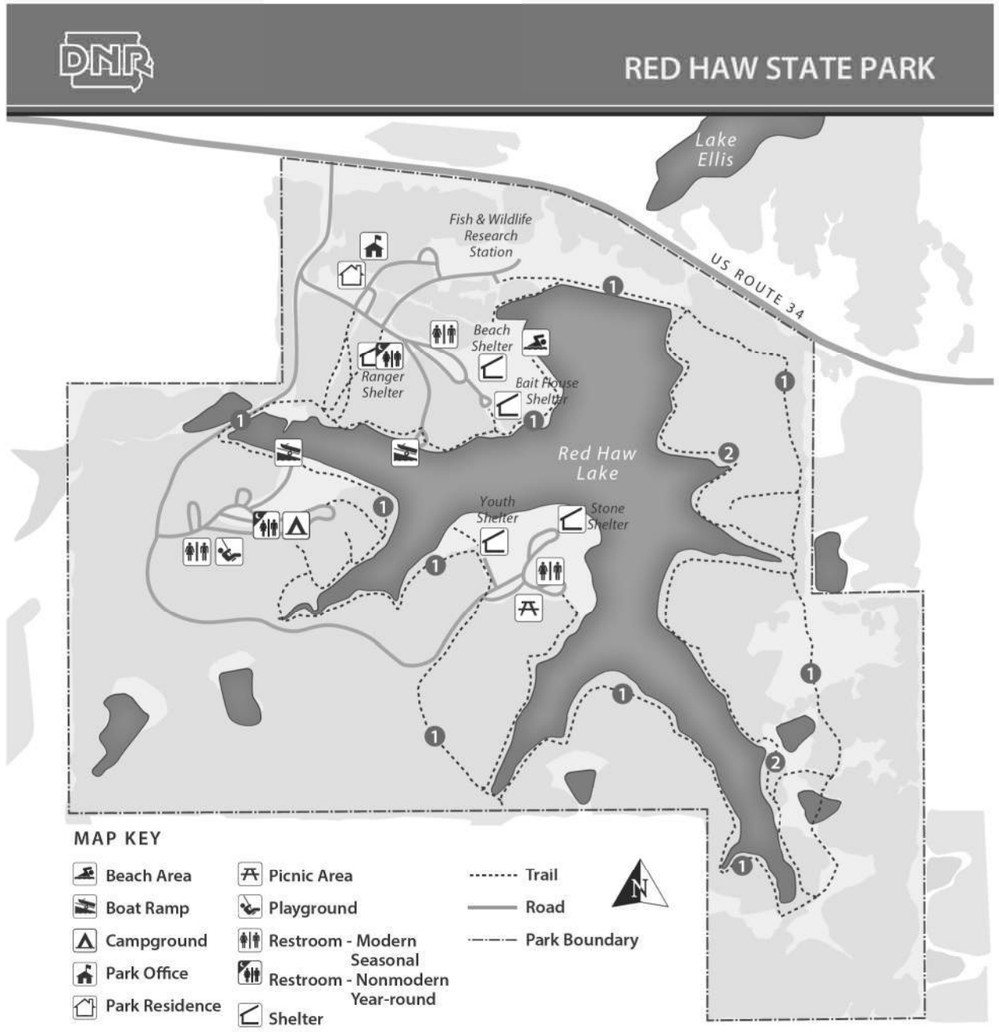


TRAIL INFORMATION

Trail Name	Trail Activity	Length	Level of Difficulty	Estimated Hike Time
1 *Lake Loop*	*Hiking, Biking, Snowmobiling*	*4 mi.*	*Moderate*	*1 hr 36 mins*
2 *Lower Lake Loop*	*Hiking, Biking, Snowmobiling*	*1.1 mi.*	*Moderate*	*26 minutes*

Walking times are figured at a rate of 2.5 mph.
www.iowadnr.gov/Places-to-Go/State-Parks

CONSULTANT:

IOWA DEPARTMENT OF NATURAL RESOURCES
ENGINEERING SERVICES - WALLACE BUILING
502 E. 9TH ST., DES MOINES, IA 50319-0034

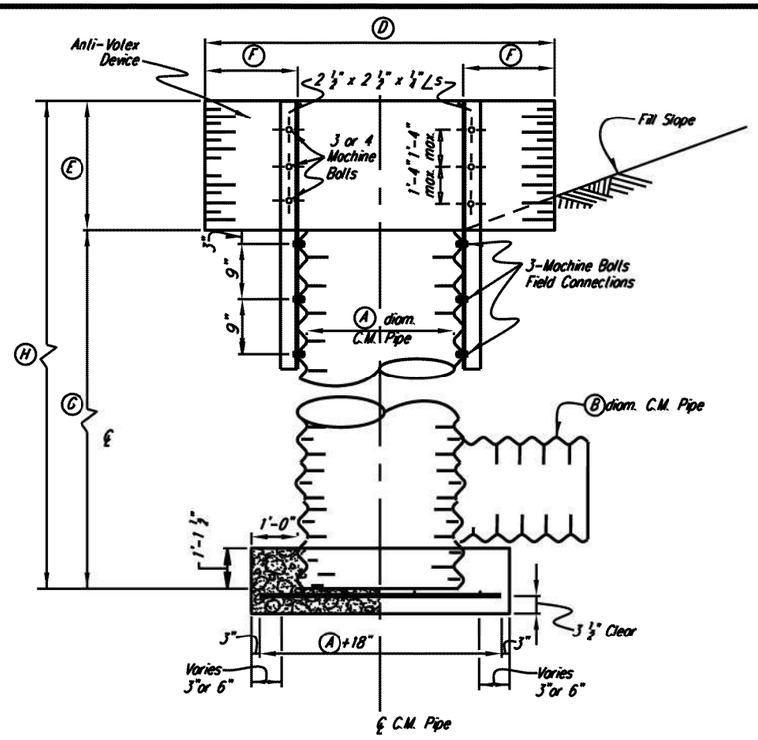
PROJECT LOCATION MAP

SHORELINE STABILIZATION AND WATER CONTROL STRUCTURE REPLACEMENT FOR:
RED HAW STATE PARK
LUCAS COUNTY

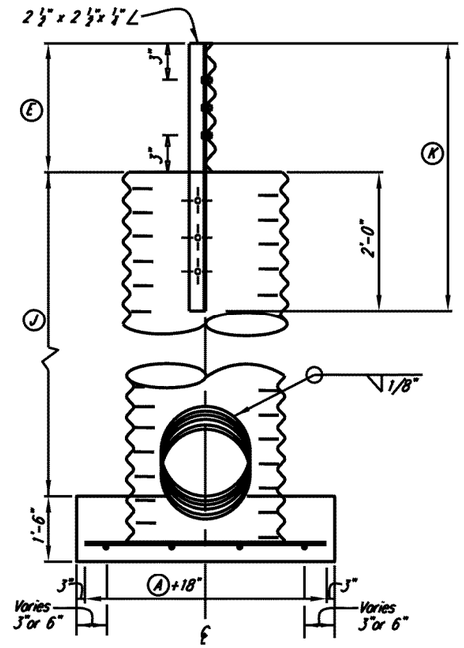
NO.	BY / DATE	REVISION

DRAWN BY: ESANG
PROJECT NUMBER: 22-05-59-01
CHKD BY: JARUSE
DATE:
SHEET No:
A.02

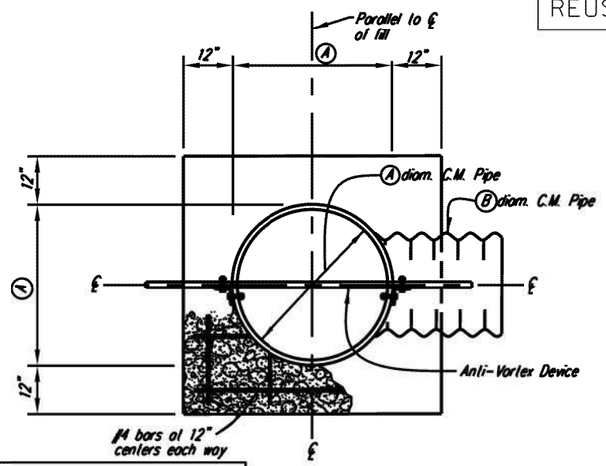
ANTIVORTEX & VERTICAL INLET (ADOPTED FROM IA-1131 NRCS)



SECTION ON CENTERLINE



REAR ELEVATION



PLAN

THE NEW RISER SHALL BE SMOOTH METAL PIPE(SMP) WITH A WALL THICKNESS OF 3/8". THE EXISTING TRASH RACK AND ANTI-VORTEXT DEVICE MAY BE REUSED

Notes:

All holes for bolts shall be 9/16" diam.

Vertical Inlet to be shop fabricated. After welding, damaged coatings shall be repaired as specified in Construction Specification 51.

Minimum (M) Dimension
B-36" M=2'-1 ½"
B-36" M=4'-1 ½"

Minimum (N) Dimension
N=2'-1 ½"

OPTIONAL © FABRICATION		
	C1	C2
Diameter, Inches		
Sheet Thickness		
Corrugations		
Position O'clock (B=12:00)		
(L)		
Ø2 Degrees-Angles		
Slope in ft./ft.		

DETAILS OF INLET

Not to Scale

TABLE-DIMENSIONS AND MATERIAL	
	Dimensions
(A)	30"
(B)	24"
(C)	
(D)	
(E)	
(F)	
(G)	
(H)	72"
(J)	60"
(K)	
(L)	
(M)	
(N)	
Sheet Thickness for (A) diam.	
Corrugations for (A) diam.	
Sheet Thickness for (B) diam.	
Corrugations for (B) diam.	
Sheet Thickness for (C) diam.	
Corrugations for (C) diam.	
Sheet Thickness for Anti-Vortex Device	
Corrugations for Anti-Vortex	
MATERIAL ITEMS	QUANTITY REQUIRED
2 ½" x 2 ½" x ¼" Ls x (K) Galv.	2
(D) x (E) Corr. Metal Sheets Galv.	1
½" x 1 ¼" Steel Codmium Plated Mech. Bolts	
½" Steel Split Lockwashers	
½" Steel Cadmium Plated Nuts	
Ø Degrees-Angles Ø1 / Ø2	
Slope of (B) diam. pipe in ft./ft.	
Slope of (C) diam. pipe in ft./ft.	

VERTICAL INLET BASE QUANTITIES				
Dimension (in.) (A)	Concrete Cu. Yd.	Steel Reinforcement #4 Bar		
		Length Each Bar	Number of Bars	Total Weight Pounds
18"	0.68	3'-0"	8	16.0
24"	0.89	3'-6"	8	18.7
30"	1.13	4'-0"	10	26.7
36"	1.39	4'-6"	10	30.1
42"	1.68	5'-0"	12	40.1
48"	2.00	5'-6"	12	44.1
54"	2.35	6'-0"	14	56.1
60"	2.72	6'-6"	14	60.8

STANDARD DWG. IA-1131

DATE Oct. 2012 | PAGE 1 OF 1

CONSULTANT:

IOWA DEPARTMENT OF NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILING
502 E. 9TH ST., DES MOINES, IA 50319-0034

ANTIVORTEX & VERTICAL INLET

SHORELINE STABILIZATION AND WATER CONTROL STRUCTURE REPLACEMENT FOR:

RED HAW STATE PARK

LUCAS COUNTY

NO.	BY / DATE	REVISION

DRAWN BY: ESANG | PROJECT NUMBER: 22-05-59-01

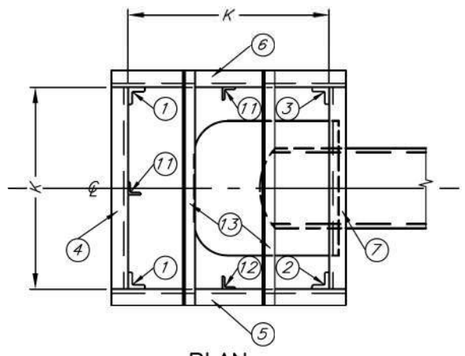
CHKD BY: JARUSE | DATE:

SHEET No:

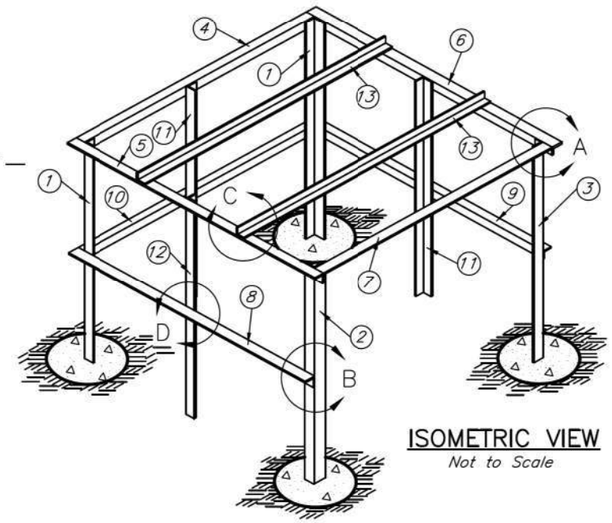
B.01

TRASH RACK(ADOPTED FROM IA-1100 NRCS)

THE EXISTING TRASH RACK AND ANTI-VORTEXT DEVICE MAY BE REUSED. INSTALL ACCORDING TO THESE INSTRUCTIONS



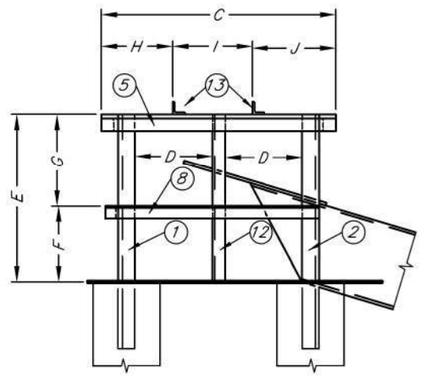
PLAN



ISOMETRIC VIEW
Not to Scale

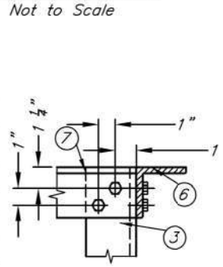
TRASH RACK DIMENSIONS							
Mark	Quantity	Item	15" Diam.	18" Diam.	21" Diam.	24" Diam.	30" Diam.
1	2	∠'s 3"x3"x$\frac{5}{16}$"	3–3	3–7	3–11	4–3	5–0
2	1	"	3–3	3–7	3–11	4–3	5–0
3	1	"	3–3	3–7	3–11	4–3	5–0
4	1	"	3–7	3–11	4–3	4–7	5–5
5	1	"	4–1	4–5	4–9	5–1	5–11
6	1	"	4–1	4–5	4–9	5–1	5–11
7	1	"	3–7	3–11	4–3	4–7	5–5
8	1	∠'s 2"x2"x$\frac{3}{16}$"	3–9	4–1	4–5	4–9	5–7
9	1	"	3–9	4–1	4–5	4–9	5–7
10	1	"	3–7	3–11	4–3	4–7	5–5
11	2	"	2–3	2–7	2–11	3–3	4–0
12	1	"	2–3	2–7	2–11	3–3	4–0
13	2	"	4–1	4–5	4–9	5–1	5–11
	32	$\frac{1}{2}$" ø Machine Bolts w/Lock Washers and Hex. Nuts	0–1$\frac{1}{2}$	0–1$\frac{1}{2}$	0–1$\frac{1}{2}$	0–1$\frac{1}{2}$	0–1$\frac{1}{2}$
		Concrete_____0.6 Cu.Yd.					

Construction Notes:
Structure is symmetrical about ℄.
Trash Rack to be fabricated of steel angles, bolted together with $\frac{1}{2}$ inch ø machine bolts.
All cuts shall be saw cuts.
All holes for bolts shall be $\frac{1}{16}$ inch larger than bolt diam.

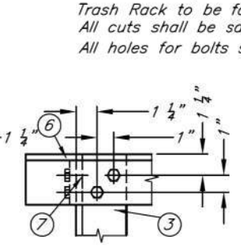


SIDE ELEVATION

TRASH RACK DIMENSIONS					
	15" Diam.	18" Diam.	21" Diam.	24" Diam.	30" Diam.
A	3–4	3–8	4–0	4–4	5–2
B	1–8	1–10	2–0	2–2	2–7
C	4–1	4–5	4–9	5–1	5–11
D	1–5$\frac{1}{2}$	1–7$\frac{1}{2}$	1–9$\frac{1}{2}$	1–11$\frac{1}{2}$	2–4$\frac{1}{2}$
E	2–3	2–7	2–11	3–3	4–0
F	1–1	1–3	1–5	1–7	1–11
G	1–2	1–4	1–6	1–8	2–1
H	1–3	1–4	1–5	1–7	1–10
I	1–4	1–5	1–7	1–8	1–11
J	1–6	1–8	1–9	1–10	2–2
K	3–7	3–11	4–3	4–7	5–5



FRONT ELEV.



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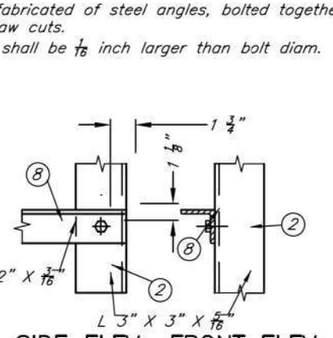
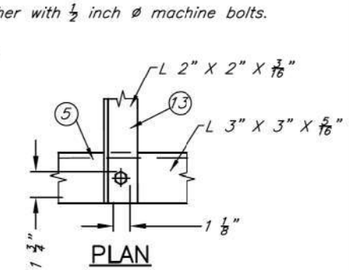
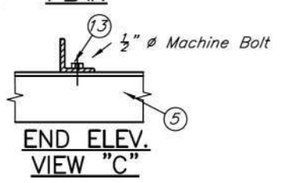


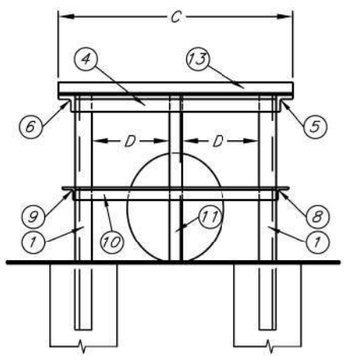
SIDE ELEV. FRONT ELEV.
VIEW "B"



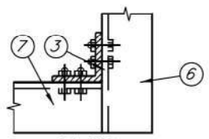
PLAN



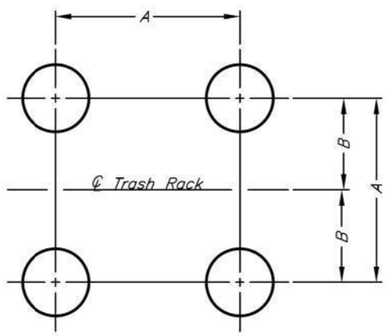
END ELEV.
VIEW "C"



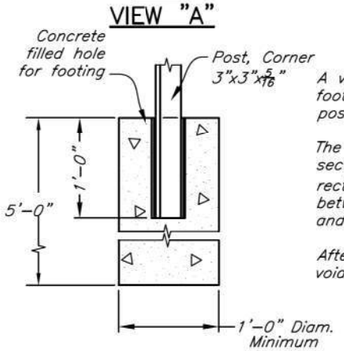
UPSTREAM ELEVATION



PLAN
VIEW "A"



CONCRETE FOOTING LAYOUT

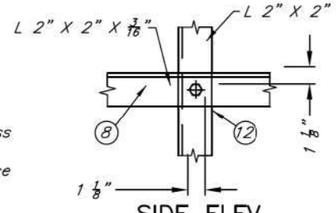


FOOTING DETAIL

A void shall be formed in the concrete footings to receive the Mark 1, 2 and 3 posts.

The void shall be one foot deep. The cross section of the void may be triangular, rectangular or circular the $\frac{1}{4}$ inch clearance between the concrete and the Mark 1, 2 and 3 posts.

After the posts are installed, the remaining voids shall be filled with bituminous mastic.



SIDE ELEV.
VIEW "D"

Not to Scale

STANDARD DWG. IA–1100

DATE *Nov. 2008* | PAGE *1* OF *1*

CONSULTANT:

IOWA DEPARTMENT OF NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILING
502 E. 9TH ST., DES MOINES, IA 50319-0034

TRASH RACK DETAILS

SHORELINE STABILIZATION AND WATER CONTROL STRUCTURE REPLACEMENT FOR:

RED HAW STATE PARK

LUCAS COUNTY

NO.	BY / DATE	REVISION

DRAWN BY: ESANG
PROJECT NUMBER: 22-05-59-01
CHKD BY: JARUSE
DATE:

SHEET No:

B.02

ESTIMATED PROJECT QUANTITIES

ITEM NO.	ITEM	UNIT	TOTAL
1	MOBILIZATION	L.S	1
2	CLASS E RIPRAP	TONS	4,620
3	24" DIA. SMP CULVERT	LF	30
4	WATER CONTROL STRUCTURE REPLACEMENT (COMPLETE)	L.S	1
5	SILT FENCE	L.F	200
6	SEEDING,MULCHING AND FERTILIZING	L.S	1

ESTIMATE REFERENCE INFORMATION

ITEM NO.	DESCRIPTION
2	CLASS 'E' REVETMENT – BID ITEM INCLUDE SHAPING & PLACING REVETMENT ON THE LAKE SHORELINE AND AS SHOWN ON THESE PLANS. THE REVETMENT SHALL MEET IOWA D.O.T STANDARD SPECIFICATIONS OF HIGHWAY AND BRIDGE SECTION 4130 SERIES 2015 PLUS CURRENT SUPPLEMENTAL SPECIFICATION AND SPECIAL PROVISION. APPROX 1.25 TONS/FT.
3	24" DIA.SMP CULVERT BID ITEM INCLUDE ALL LABOR, EQUIPMENT REQUIRED TO REMOVE EXISTING CORRODED CULVERT AND REPLACING WITH A NEW 24" DIA SMP. ALL EARTHWORK SHALL BE CONSIDERED INCIDENTAL TO REPLACING THE PIPE. THE CONTRACTOR SHALL ARMOR WITH 10 TONS OF CLASS 'E' RIP RAP THE INLET AND OUTLET. SEE SHEET D.01
4	WATER CONTROL STRUCTURE REPLACEMENT (COMPLETE) BID ITEM IS FOR SUPPLY, FABRICATION & INSTALLATION OF NEW WATER CONTROL STRUCTURE AS SHOWN IN THESE PLANS. IT SHALL INCLUDE ALL ASSOCIATED ITEMS. THE CONTRACTOR SHALL EXCAVATE THE EXISTING DIKE AND REMOVE THE CORRODED STRUCTURE AND DISPOSE OFF SITE. INSTALL A NEW WATER CONTROL STRUCTURE AND ASSOCIATED ITEMS,ARMOUR THE OUTLET WITH CLASS E RIP RAP AND SEED ALL DISTURBED AREA. THIS SHALL INCLUDE: 30" DIA. SMP 6 FEET TALL, 110 LF 24" DIA. SMP, 25 TONS OF FINE DRAIN SAND AND 1.7 TONS OF 1.5" MINUS BEDDING STONE. THE TRASH RACK AND ANTI –VORTEX MAY BE REUSED.
6	SEEDING,MULCHING AND FERTILIZING BID ITEM INCLUDE EQUIPMENT, MATERIAL AND LABOR REQUIRED TO LEVEL AND PREPARE TOPSOIL FOR SEEDING AND MULCHING IN ALL DISTURBED AREAS. SEED MIXTURE SHALL BE SMOOTH BROME GRASS(20LBS/ACRE) WITH A COVER OF OATS(25LBS/ACRE). MULCH SHALL BE HYDRAULICALLY APPLIED WOOD CELLULOSE FIBER.

GENERAL NOTES

VERIFY ACTUAL LOCATIONS AND ELEVATIONS WITH DNR ENGINEER.

ALL WORK SHALL CONFORM TO AND BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE CODES AND ORDINANCES.

THE CONTRACTOR SHALL VISIT THE SITE AND INSPECT THE PROJECT AREA AND THOROUGHLY FAMILIARIZE THEMSELVES WITH THE ACTUAL JOB CONDITIONS PRIOR TO BIDDING AND THE START OF WORK. FAILURE TO VISIT THE PROJECT SITE SHALL NOT RELIEVE THE CONTRACTOR FROM PERFORMING THE WORK IN ACCORDANCE TO THE PLANS, SPECIFICATION, SPECIAL PROVISIONS AND CONTRACT.

THE CONTRACTOR SHALL VERIFY, AT THE SITE, ALL DIMENSIONS AND CONDITIONS SHOWN ON THE PLANS AND SHALL NOTIFY THE DNR ENGINEER OF ANY DISCREPANCIES, OMISSIONS, AND/OR CONFLICTS PRIOR TO PROCEEDING WITH THE WORK.

IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PROVIDE WASTE AREAS OR DISPOSAL SITES FOR EXCESS MATERIAL (EXCAVATED MATERIAL OR BROKEN CONCRETE) WHICH IS NOT DESIRABLE TO BE INCORPORATED INTO THE WORK INVOLVED ON THIS PROJECT. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES. NO MATERIAL SHALL BE PLACED WITHIN THE RIGHT-OF-WAY, UNLESS SPECIFICALLY STATED IN THE PLANS OR APPROVED BY THE DNR ENGINEER.

THE CONTRACTOR SHALL NOT DISTURB DESIRABLE GRASS AREAS AND DESIRABLE TREES OUTSIDE THE CONSTRUCTION LIMITS. THE CONTRACTOR WILL NOT BE PERMITTED TO PARK OR SERVICE VEHICLES AND EQUIPMENT OR USE THESE AREAS FOR STORAGE OF MATERIALS. STORAGE, PARKING AND SERVICE AREAS WILL BE SUBJECT TO THE APPROVAL OF THE DNR ENGINEER.

WHERE UTILITIES AND FIXTURES ARE SHOWN AS EXISTING ON THE PLANS OR ENCOUNTERED WITHIN THE CONSTRUCTION AREA, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE DNR ENGINEER OF THOSE UTILITIES PRIOR TO THE BEGINNING OF ANY CONSTRUCTION. THE CONTRACTOR SHALL BE AFFORDED ACCESS TO THESE FACILITIES FOR NECESSARY MODIFICATION OF SERVICES. UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS AND THEREFORE THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THERE MAY BE OTHERS, THE EXISTENCE OF WHICH IS PRESENTLY NOT KNOWN OR SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXISTENCE AND EXACT LOCATION AND TO AVOID DAMAGE THERETO. NO CLAIMS FOR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR ANY INTERFERENCE OR DELAY CAUSED BY SUCH WORK.

THE CONTRACTOR SHALL SHAPE GRADED AREA TO MAINTAIN SURFACE DRAINAGE. ALL ELEVATIONS ARE TO FINISH GRADE.

THE CONTRACTOR IS EXPECTED TO HAVE MATERIALS, EQUIPMENT, AND LABOR AVAILABLE ON A DAILY BASIS TO INSTALL AND MAINTAIN EROSION CONTROL FEATURES ON THE PROJECT. THIS MAY INVOLVE SEEDING, SILT FENCE, ROCK DITCH CHECKS, SILT BASINS OR SILT DIKES.

CONSULTANT:

IOWA DEPARTMENT OF NATURAL RESOURCES
ENGINEERING SERVICES - WALLACE BUILING
502 E. 9TH ST., DES MOINES, IA 50319-0034

QUANTITIES AND GENERAL INFORMATION

SHORELINE STABILIZATION AND WATER CONTROL STRUCTURE REPLACEMENT FOR:

RED HAW STATE PARK

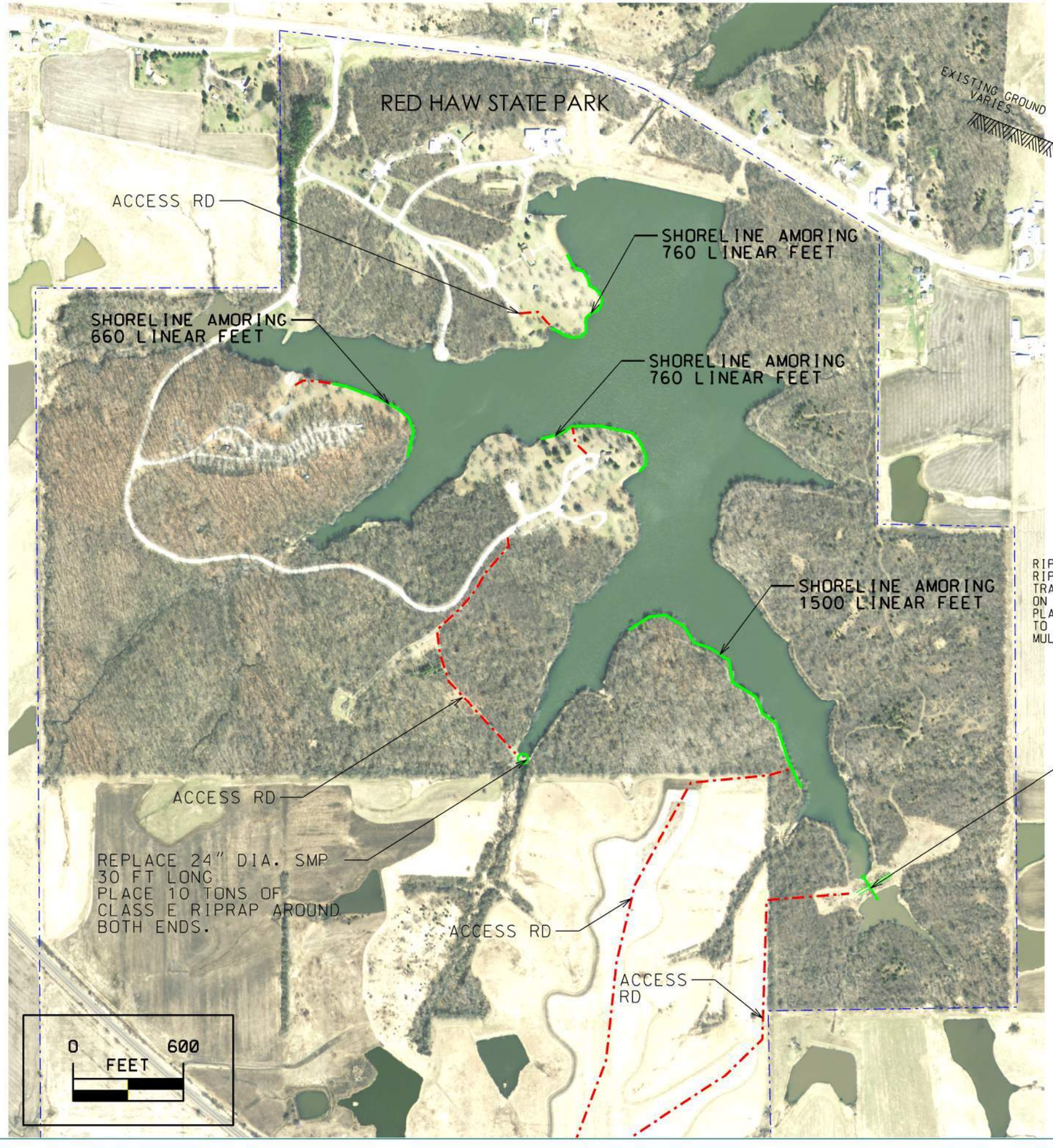
LUCAS COUNTY

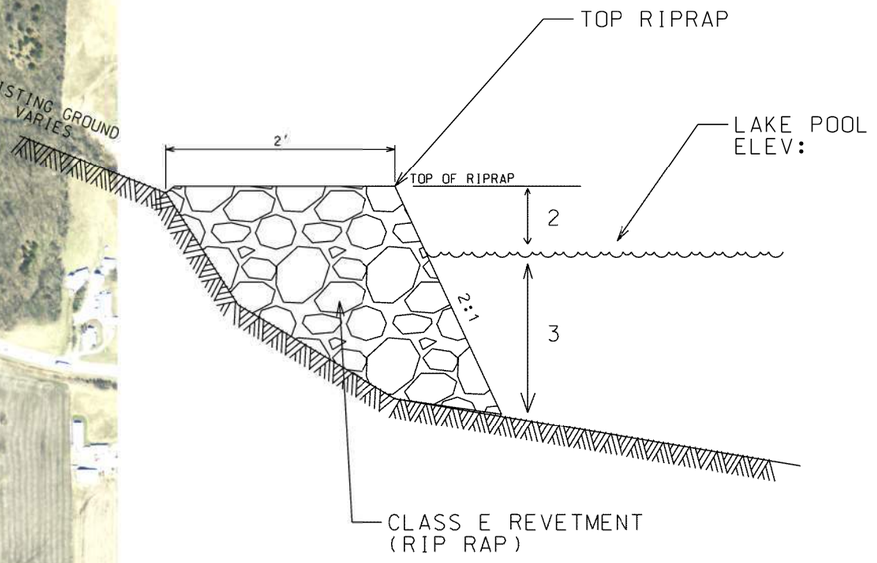
NO.	BY DATE	REVISION

DRAWN BY: E.SANG
PROJECT NUMBER: 22-05-59-01
CHK'D BY: J.KRUSE
DATE:

SHEET No:

C.01





SHORELINE ARMORING DETAIL

NOT TO SCALE

RIP RAP NOTE:
RIPRAP MAY BE STOCKPILED IN EXISTING GRAVEL PARKING LOTS AND TRANSPORTED INTO SMALLER EQUIPMENT. IT SHALL BE TRANSPORTED ON EXISTING PARK TRAILS TO WORK AREAS. RIPRAP SHALL BE PLACED WITH SMALL EQUIPMENT SUCH AS SKID LOADERS, MINI-EXCAVATORS, ETC. TO AVOID REMOVAL OR DAMAGE TO TREES. UNDERBRUSH MAY BE RUN OVER, MOWED, MULCHED, OR OTHERWISE DAMAGED OR REMOVED WITHOUT DISRUPTION OF THE SOILS

WATER CONTROL STRUCTURE
REPLACEMENT SEE DETAILS
ON B.01,B.02 AND D.02

N

CONSULTANT:

IOWA DEPARTMENT OF
NATURAL RESOURCES
ENGINEERING SERVICES - WALLACE BUILING
502 E. 9TH ST., DES MOINES, IA 50319-0034

SITE PLAN

SHORELINE STABILIZATION AND WATER CONTROL STRUCTURE REPLACEMENT FOR:

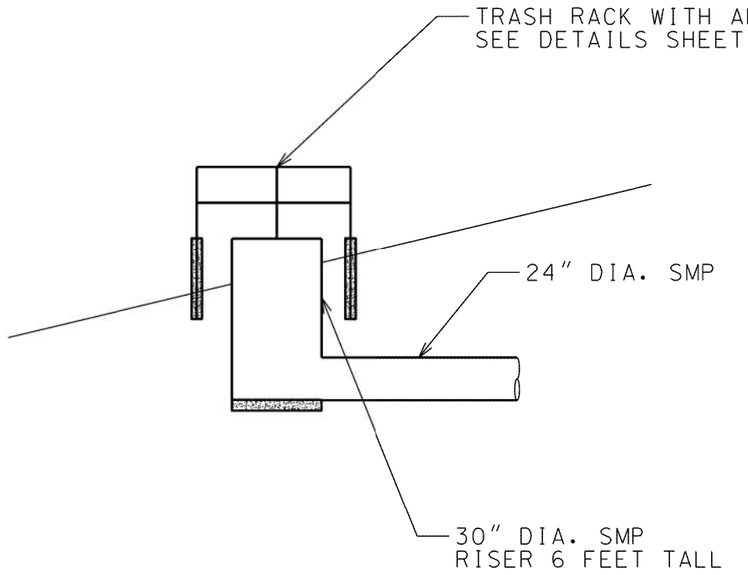
RED HAW STATE PARK

LUCAS COUNTY

NO	BY DATE	REVISION

DRAWN BY: ESANG
PROJECT NUMBER: 22-05-59-01
CHK'D BY: JARUSE
DATE:
SHEET No:

D.01



CONSULTANT:

IOWA DEPARTMENT OF NATURAL RESOURCES
ENGINEERING SERVICES - WALLACE BUILING
502 E. 9TH ST., DES MOINES, IA 50319-0034

WATER CONTROL STRUCTURE REPLACEMENT

SHORELINE STABILIZATION AND WATER CONTROL STRUCTURE REPLACEMENT FOR:

RED HAW STATE PARK

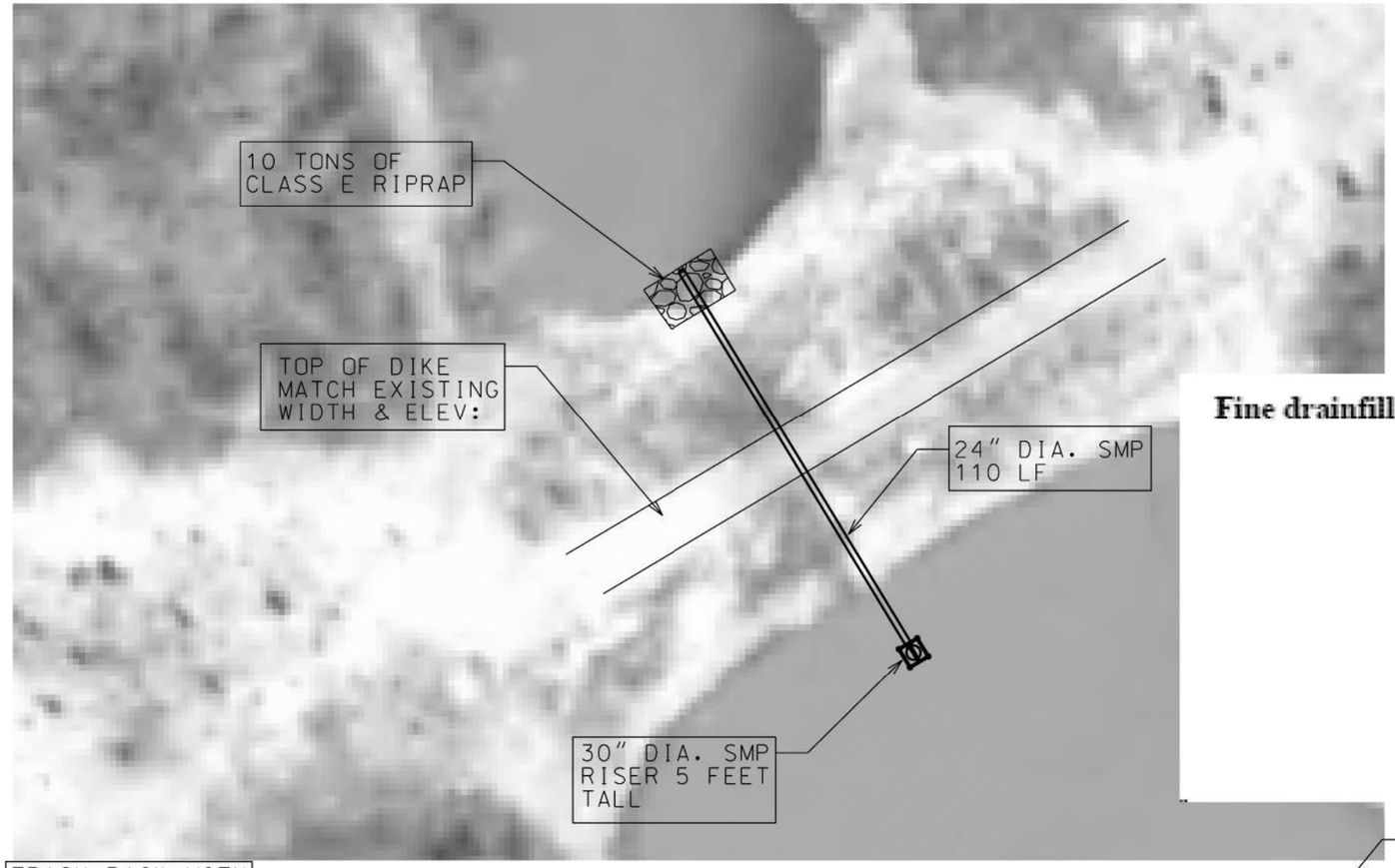
LUCAS COUNTY

NO	BY / DATE	REVISION

DRAWN BY: ESANG
PROJECT NUMBER: 22-05-59-01
CHKD BY: JARUSE
DATE:

SHEET No:

D.02

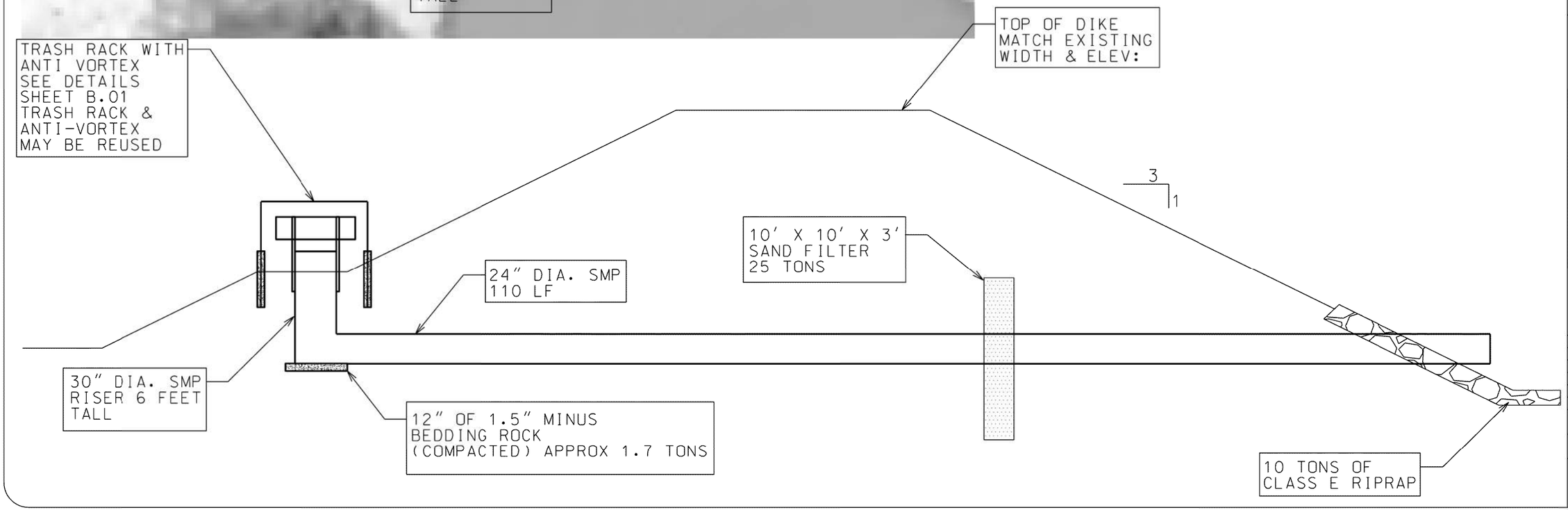


CONSTRUCTION NOTE:

1. REMOVE EXISTING WATER CONTROL STRUCTURE AND ALL ITS APPURTENANCES SAVE THE TRASH RACK AND ANTI VORTEX TO BE REUSED
2. THE CONTRACTOR SHALL STORE EXCAVATED SOIL TO BE USED AS PART OF BACK FILL MATERIAL
3. COMPACT THE SOIL AS PER SPECIFICATION AND RE SEED ALL DISTURBED AREA.

Fine drainfill shall be graded as follows:

U.S, Sieve Designation	Percent Passing Sieve
3/8	100
No. 4	95-100
No. 8	75-95
No. 16	50-70
No. 30	25-50
No. 50	10-20
No. 100	0-6
No.200	0-3



CONSULTANT:

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ENGINEERING SERVICES - WALLACE BUILING
502 E. 9TH ST., DES MOINES, IA 50319-0034

WATER CONTROL STRUCTURE REPLACEMENT

SHORELINE STABILIZATION AND WATER CONTROL STRUCTURE REPLACEMENT FOR:

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