

T-70N

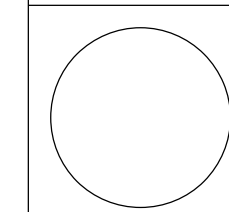
R-5W

LEE CO.

DES MOINES CO.

PROJECT LOCATION

CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

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



PROJECT LOCATION MAP

CULVERT RISERS AND SEDIMENT POND FOR:

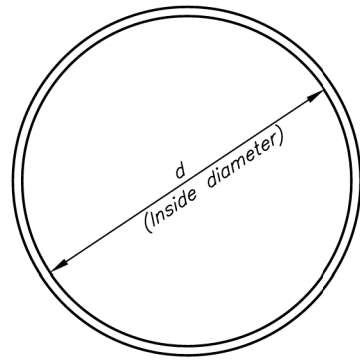
GEODE STATE PARK

HENRY COUNTY

NO.	BY	REVISION

DRAWN BY:	PROJECT NUMBER:
CHK'D BY:	DATE:

SHEET No: **A.02**

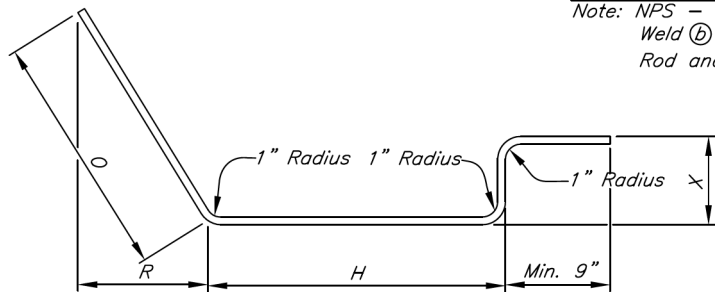


BENDING DIAGRAM FOR  
**(b) AND (c) RODS**

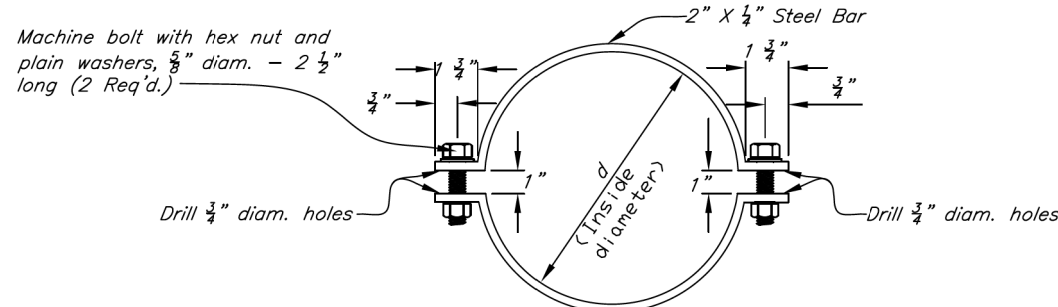
TABLE OF DIMENSIONS AND QUANTITIES  
WELDED STEEL PIPE

NPS	PIPE O.D.	APPROX. WEIGHT	(b) ROD SIZE	H	R	X	O	LENGTH	NUMBER REQUIRED	N	(c) ROD SIZE	d	LENGTH	NUMBER REQUIRED	(d) ROD SIZE	d	LENGTH	NUMBER REQUIRED	(e) ROD SIZE	d	LENGTH	NUMBER REQUIRED
IN.	IN.	LBS.	IN.	IN.	IN.	IN.	IN.	IN.		IN.	IN.	IN.	IN.		IN.	IN.	IN.		IN.	IN.	IN.	
6	6 5/8	18.9	3/8	9	4	6	9 1/2	33 1/2	14	4 1/2	3/8	17 1/2	53 3/4	3	--	--	--	0	2 X 1/2	7 3/8	14 5/8	2
8	8 5/8	22.3	3/8	11	4 1/2	6	10 1/2	36 1/2	10	6 1/2	3/8	19 1/2	60 1/2	3	--	--	--	0	2 X 1/2	9 3/8	17 3/4	2
10	10 3/4	24.7	3/8	13	4 1/2	6	11 1/2	39 1/2	10	7 1/2	3/8	21 1/2	66 3/4	3	--	--	--	0	2 X 1/2	11 1/2	21 1/2	2
12	12 3/4	27.1	3/8	15	4 1/2	6	12 1/2	42 1/2	10	7 3/4	3/8	23 1/2	73	3	--	--	--	0	2 X 1/2	13 1/2	24 1/2	2
14	14	48.4	1/2	17	6 1/2	6	14	46	10	8 1/2	1/2	24	75 3/8	3	1/2	10	31 3/8	1	2 X 1/2	15	26 5/8	2
16	16	52.4	1/2	19	7	6	15	49	10	8 3/4	1/2	26	81 5/8	3	1/2	12	37 5/8	1	2 X 1/2	17	29 3/4	2
18	18	69.5	1/2	22	9	9	19 1/2	59 1/2	12	9 3/8	1/2	34	106 3/8	3	1/2	14	44	1	2 X 1/2	19	32 3/8	2
20	20	112.4	5/8	25	9 1/2	9	20 1/2	63 1/2	12	10	5/8	35 1/2	111 1/2	3	5/8	16	50 1/4	1	2 X 1/2	21 1/4	36 3/8	2
24	24	124.6	5/8	30	11	9	23	71	12	11	5/8	39 1/2	124 1/2	3	5/8	18 3/4	58 3/8	1	2 X 1/2	25 1/4	42 3/8	2

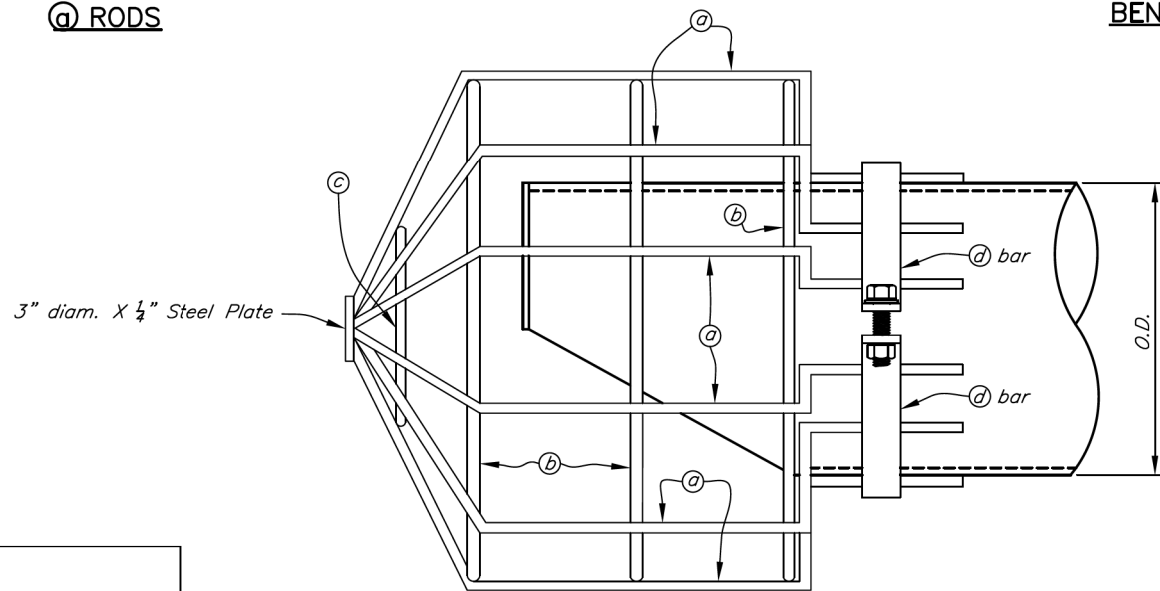
Note: NPS - Nominal Pipe Size.  
Weld (b) and (c) rods and (d) bars to (a) rods and weld (a) rods to 3" diam. Steel Plate.  
Rod and bar dimensions calculated from inside diameter and rounded to the nearest 1/8 inch.



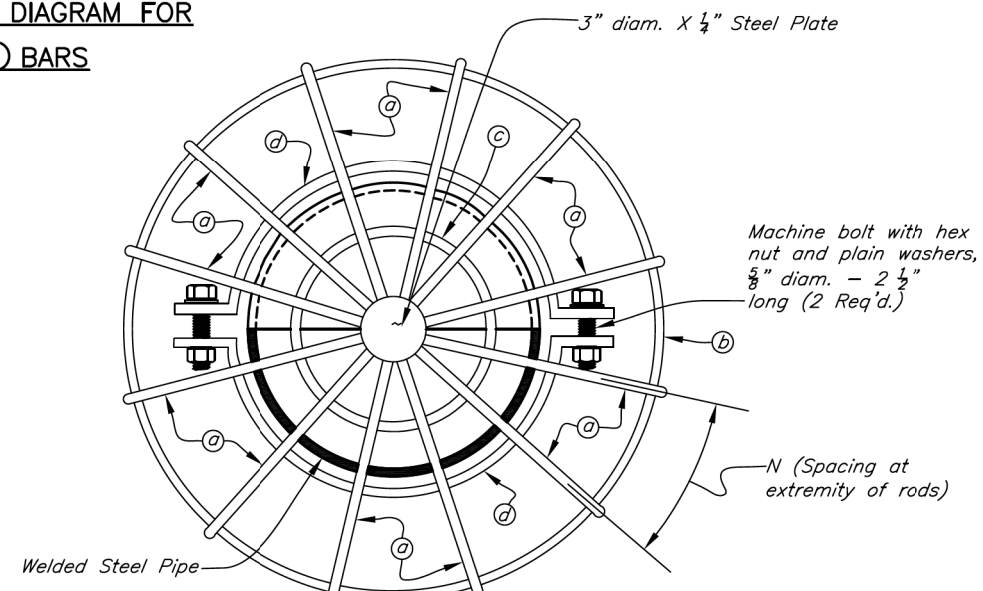
BENDING DIAGRAM FOR  
**(a) RODS**



BENDING DIAGRAM FOR  
**(d) BARS**



ELEVATION



END ELEVATION

STANDARD DWG. IA-1166

DATE Oct. 2012 | PAGE 1 OF 1

Date \_\_\_\_\_

Designed \_\_\_\_\_

Drawn \_\_\_\_\_

Checked \_\_\_\_\_

Approved \_\_\_\_\_

TRASH RACK FOR  
WELDED STEEL PIPE  
CANOPY INLET

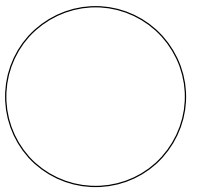
United States  
Department of  
Agriculture  
**USDA**  
Natural Resources  
Conservation Service

File No. \_\_\_\_\_

Drawing No. \_\_\_\_\_

Sheet of \_\_\_\_\_

CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

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



TYPICAL CROSS SECTIONS AND DETAILS

CULVERT RISERS AND SEDIMENT POND FOR:

GEODE STATE PARK

HENRY COUNTY

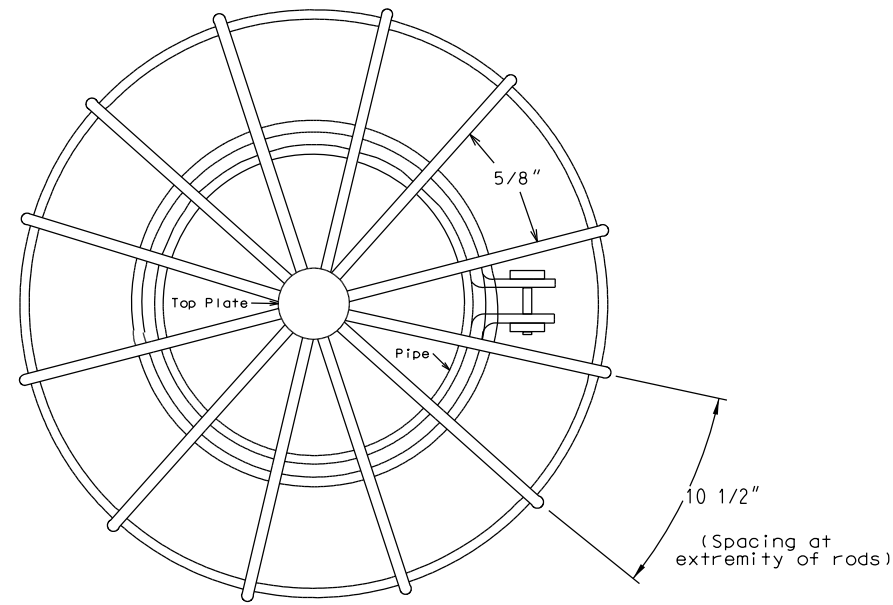
NO.	BY	REVISION
DATE		

DRAWN BY: \_\_\_\_\_ PROJECT NUMBER:  
16-06-44-04

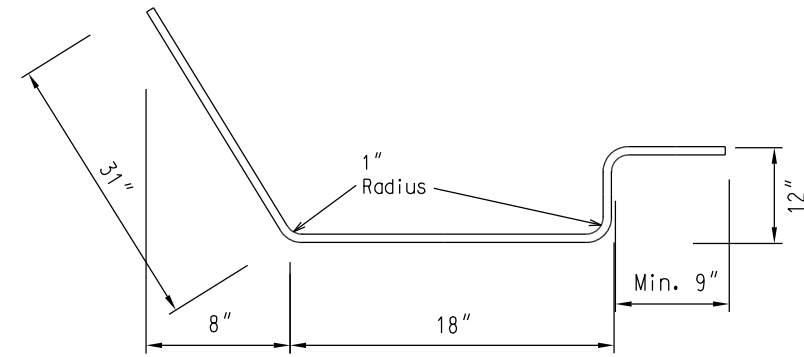
CHK'D BY: \_\_\_\_\_ DATE: \_\_\_\_\_

SHEET No.:

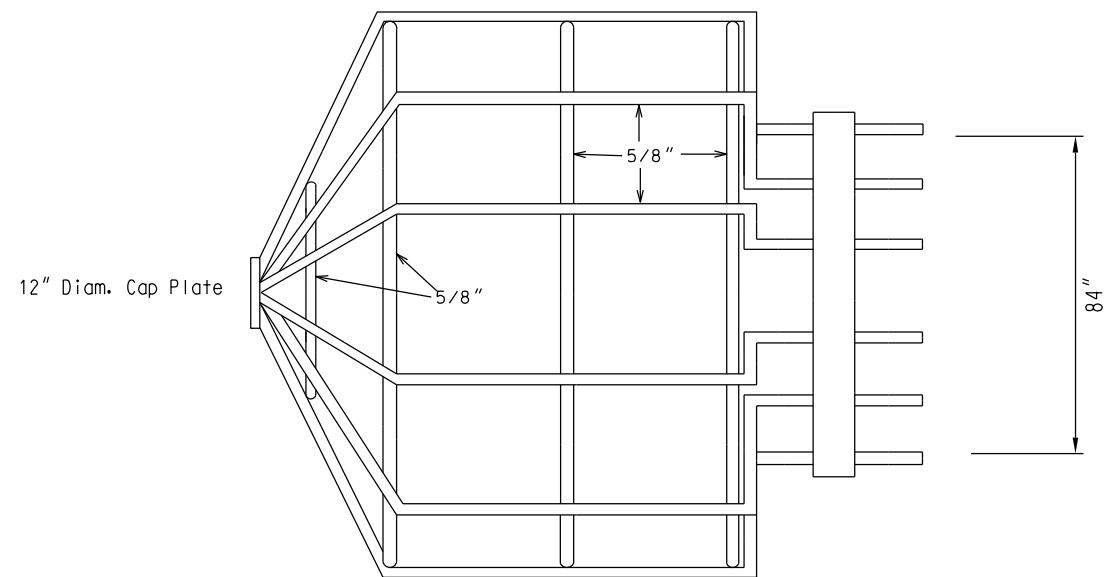
**B.01**



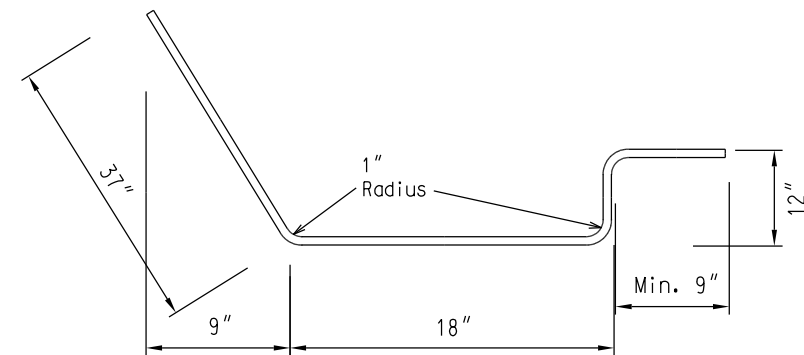
END ELEVATION



BENDING DIAGRAM FOR  
RODS - 36" DIA SMP

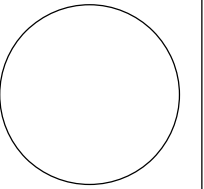


ELEVATION



BENDING DIAGRAM FOR  
RODS - 48" DIA SMP

CONSULTANT:



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NATURAL RESOURCES

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



TYPICAL CROSS SECTIONS AND DETAILS

CULVERT RISERS AND SEDIMENT POND FOR:

GEODE STATE PARK

HENRY COUNTY

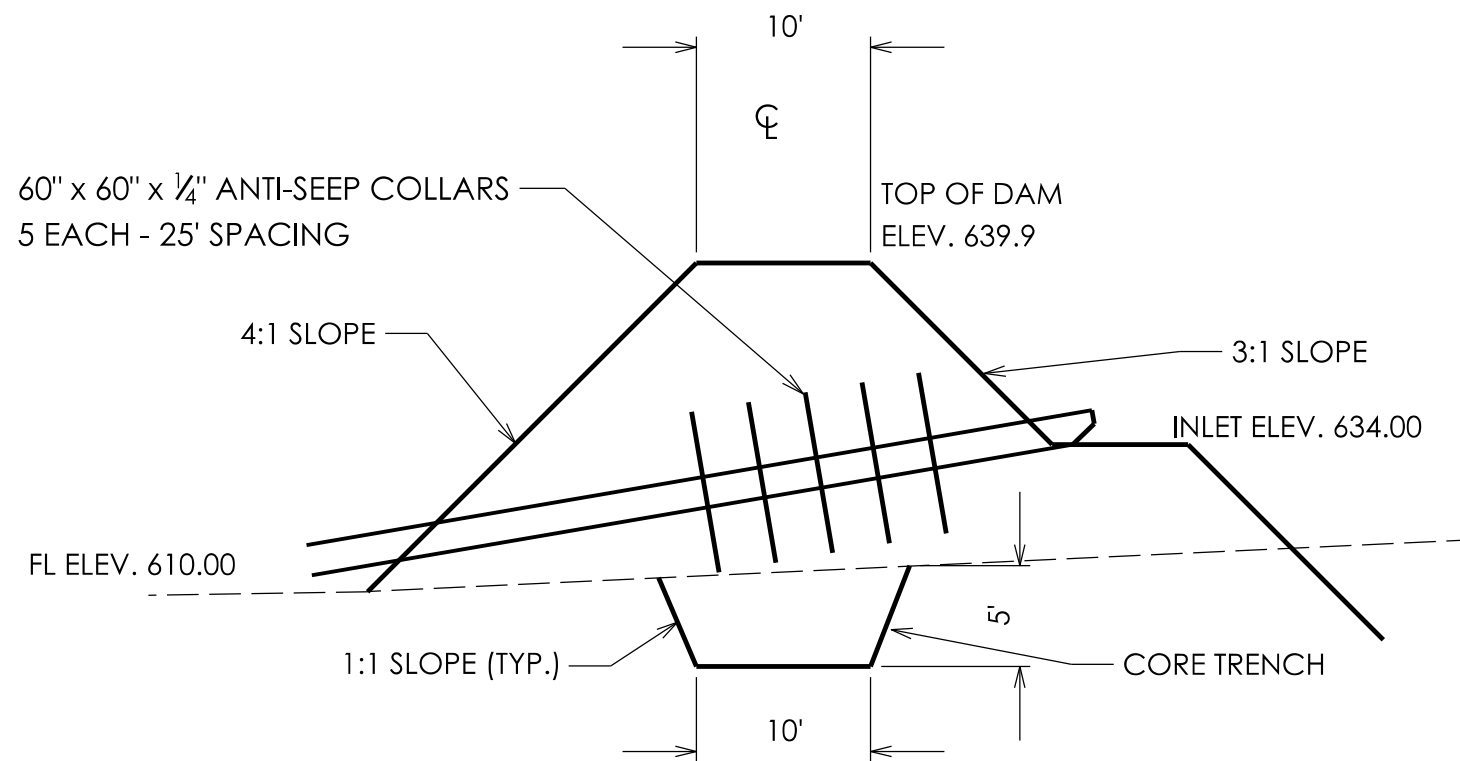
NO.	BY	REVISION

DRAWN BY: PROJECT NUMBER:  
16-06-44-04

CHK'D BY: DATE:

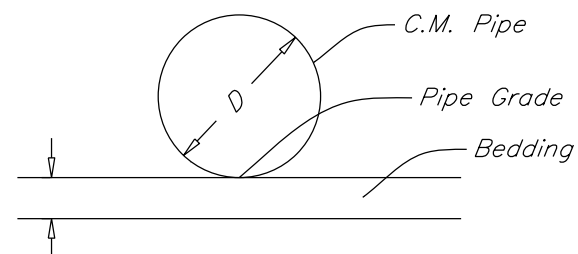
SHEET No:

**B.02**

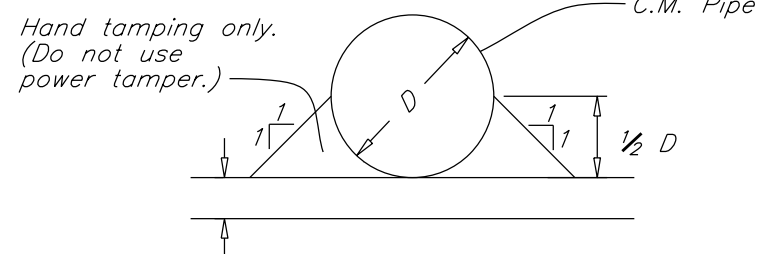


**PRINCIPAL SPILLWAY SECTION**  
NOT TO SCALE

**PIPE BEDDING**

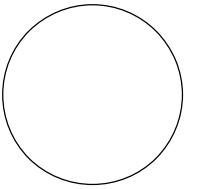


Excavate 2 to 3 inches below pipe grade. Then backfill with damp friable soil free from lumps and raked or graded to a true plane before placing C.M. Pipe. No compaction of bedding is required.



Note  
Begin backfill immediately after pipe has been placed.

CONSULTANT:



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TYPICAL CROSS SECTIONS AND DETAILS

CULVERT RISERS AND SEDIMENT POND FOR:  
**GEODE STATE PARK**

HENRY COUNTY

NO.	BY	REVISION

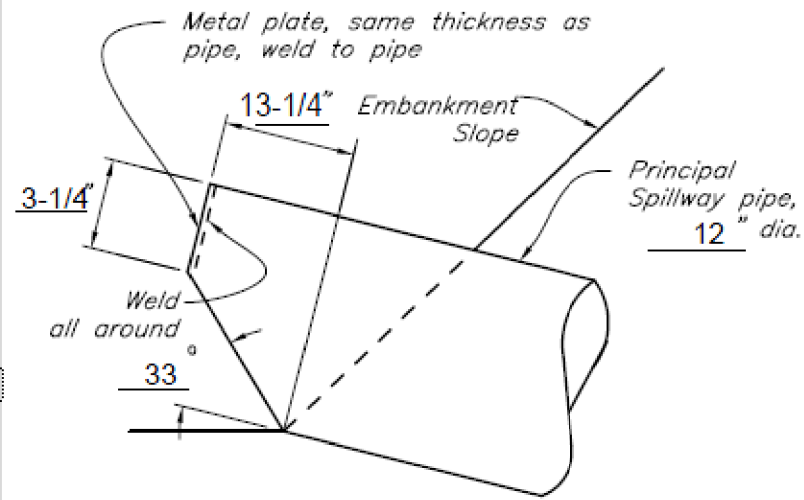
DRAWN BY: PROJECT NUMBER:  
16-06-44-04

CHK'D BY: DATE:

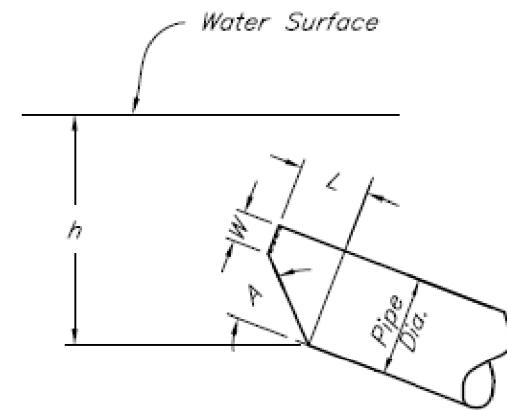
SHEET No:

**B.03**

Pipe Diam. In.	Pipe Grade %	W In.	L In.	A Deg.	h Ft.	
6	0-5	1 1/8	3 1/4	56	0.9	
	5.1-15	1 1/4	4 3/4	45	0.9	
	15.1-25	1 5/8	6 5/8	33	0.9	
	25.1-32	2 1/8	7 3/4	27	0.9	
8	0-5	1 1/2	4 3/8	56	1.2	
	5.1-15	1 5/8	6 3/8	45	1.2	
	15.1-25	2 1/8	8 3/4	33	1.2	
	25.1-32	2 3/4	10 3/8	27	1.2	
10	0-5	1 7/8	5 3/8	56	1.5	
	5.1-15	2	8	45	1.5	
	15.1-25	2 5/8	11	33	1.5	
	25.1-32	3 1/2	13	27	1.5	
12	0-5	2 1/4	6 1/2	56	1.8	
	5.1-15	2 3/8	9 5/8	45	1.8	
	15.1-25	3 1/4	13 1/4	33	1.8	
	25.1-32	4 1/4	15 5/8	27	1.8	
14	0-5	2 5/8	7 5/8	56	2.1	
	5.1-15	2 3/4	11 1/4	45	2.1	
	15.1-25	3 3/4	15 3/8	33	2.1	
	25.1-32	4 7/8	18 1/4	27	2.1	
16	0-5	3	8 5/8	56	2.4	
	5.1-15	3 1/4	12 3/4	45	2.4	
	15.1-25	4 3/8	17 5/8	33	2.4	
	25.1-32	5 5/8	20 7/8	27	2.4	
18	0-5	3 3/8	9 3/4	56	2.7	
	5.1-15	3 5/8	14 3/8	45	2.7	
	15.1-25	4 7/8	19 3/4	33	2.7	
	25.1-32	6 1/4	23 3/8	27	2.7	
20	0-5	3 3/4	10 7/8	56	3.0	
	5.1-15	4	16	45	3.0	
	15.1-25	5 3/8	22	33	3.0	
	25.1-32	7	26 1/8	27	3.0	
24	0-5	4 1/2	13	56	3.6	
	5.1-15	4 3/4	19 1/4	45	3.6	
	15.1-25	6 1/2	26 3/8	33	3.6	
	25.1-32	8 3/4	31 1/4	27	3.6	

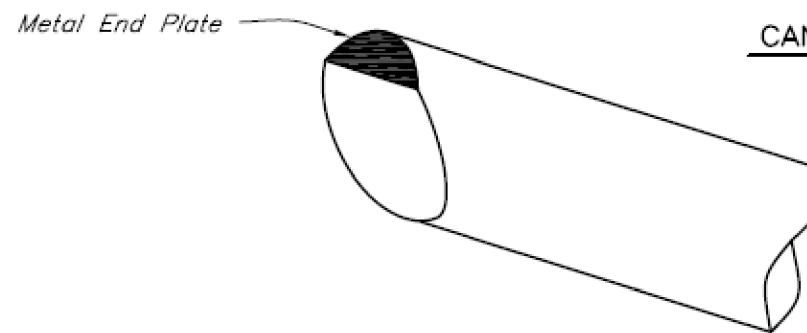


**DETAIL OF CANOPY INLET**



*h=Minimum height for full pipe flow.*

**CANOPY INLET DIMENSIONS**



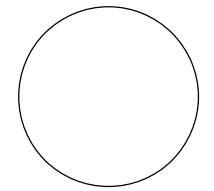
**PARTIAL ISOMETRIC VIEW**

**NOTES:**  
Materials and installation shall adhere to Iowa NRCS Construction Specification IA-52; "STEEL PIPE CONDUITS".

STANDARD DWG. IA-1213

DATE June 2008 PAGE 1 OF 1

CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

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



**TYPICAL CROSS SECTIONS AND DETAILS**

CULVERT RISERS AND SEDIMENT POND FOR:

**GEODE STATE PARK**

HENRY COUNTY

NO. BY REVISION

DATE

DRAWN BY PROJECT NUMBER:

16-06-44-04

CHK'D BY DATE:

SHEET No:

**B.04**

SITE M

48" Dia. SMP Riser  
w/ trash rack

Rim Elev. 100.00

Invert Elev. 93.00

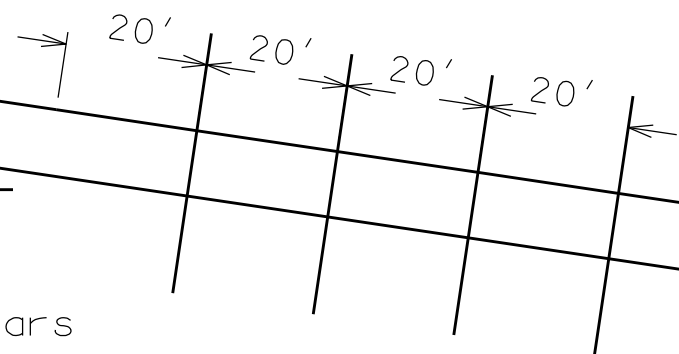
7' X 7' X 3/4" PLATE

4 - 84" x 84" anti-seep collars

1/4" Steel

Length of Pipe = 130 ft.

Road CL Elev. 104.19



Outlet Elev. 76.00

36" Dia. SMP spillway

SITE N

36" Dia. SMP Riser  
w/ trash rack

Rim Elev. 96.42

12" Hickenbottom Intake

12" Elbow  
Elev. 94.42

Invert Elev. 89.92

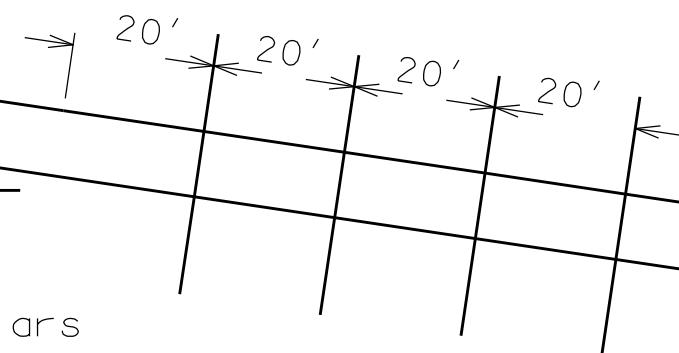
6' X 6' X 3/4" PLATE

4 - 60" x 60" anti-seep collars

1/4" Steel

Length of Pipe = 110 ft.

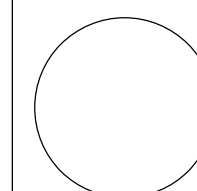
Road CL Elev. 99.89



Outlet Elev. 72.19

24" Dia. SMP spillway

CONSULTANT:



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



TYPICAL CROSS SECTIONS AND DETAILS

CULVERT RISERS AND SEDIMENT POND FOR:  
GEODE STATE PARK  
HENRY COUNTY

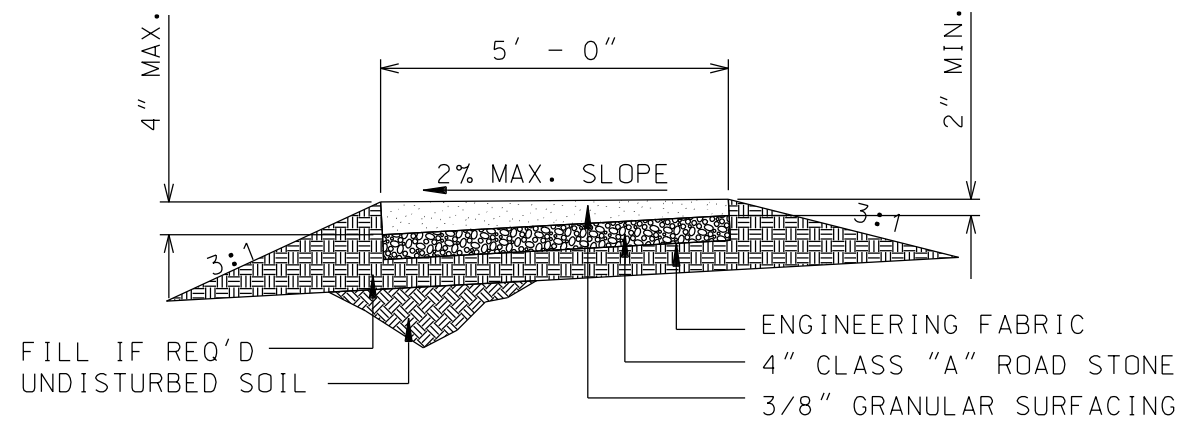
NO.	DATE	REVISION

DRAWN BY: PROJECT NUMBER:  
16-06-44-04

CHK'D BY: DATE:

SHEET NO:

B.05



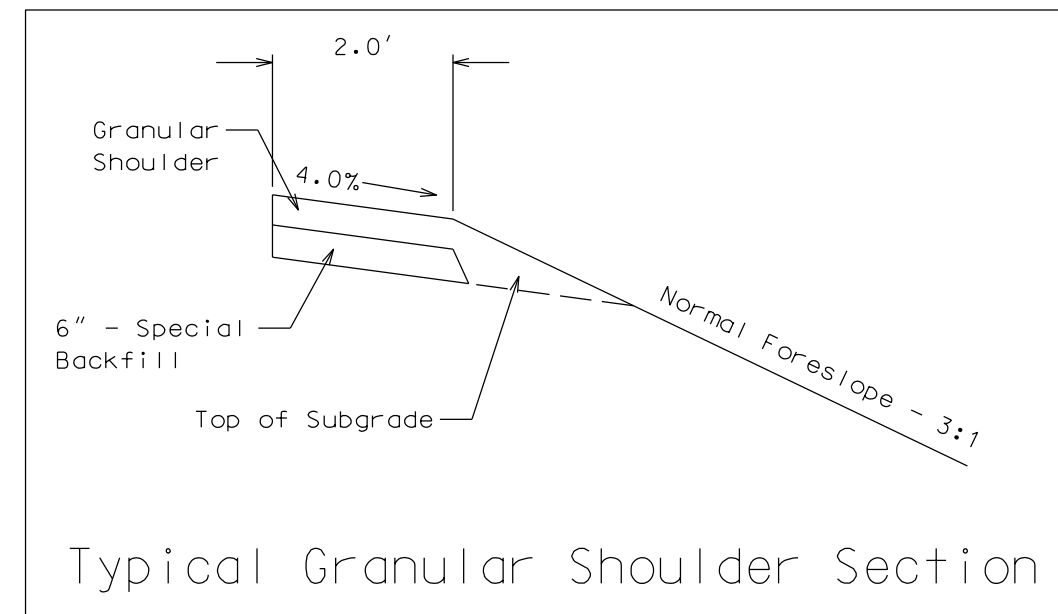
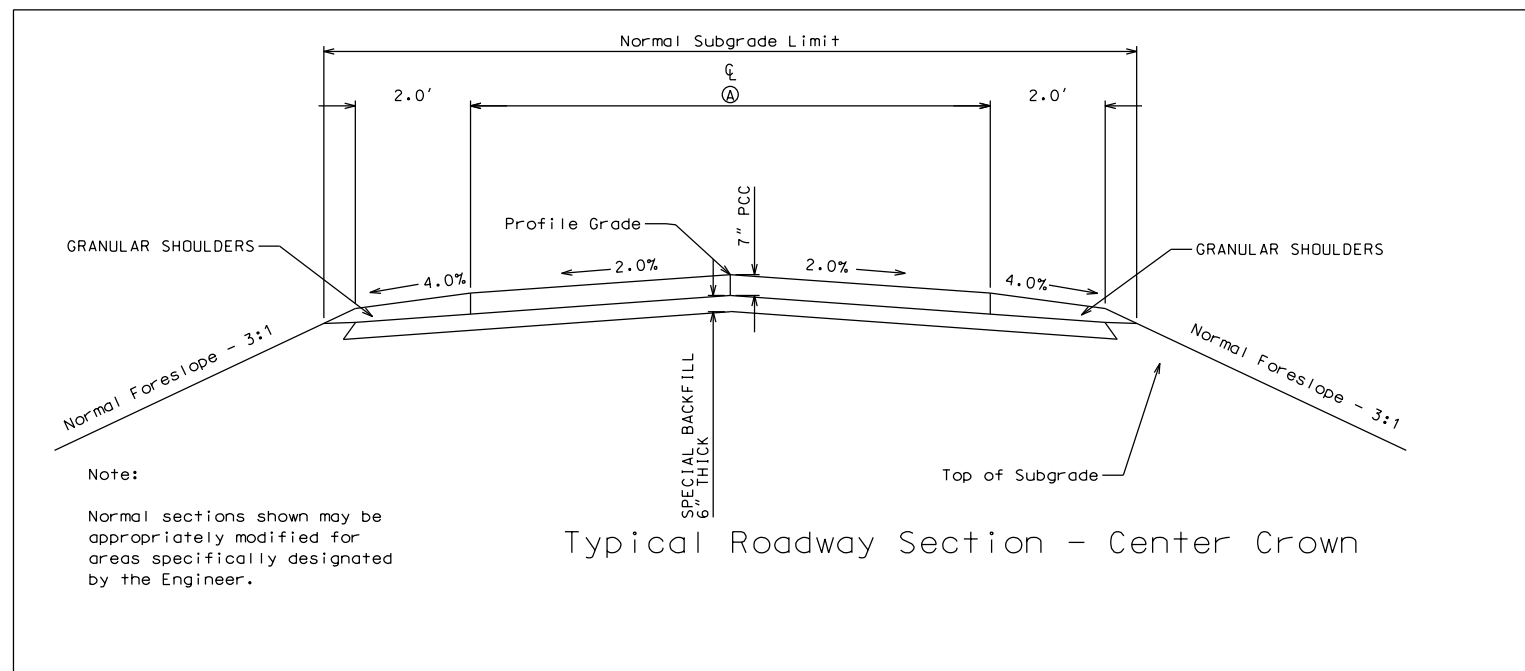
NOTES:

MAXIMUM SLOPE OF ACCESSIBLE ROUTE IS 1:20 (5%)

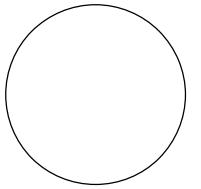
BLADING AND SHAPING OF ROUTES TO BE APPROVED BY THE ENGINEER, AND ARE TO BE INCIDENTAL TO THE GRANULAR SURFACING BID ITEM.

## GRANULAR FOOT PATH

NOT TO SCALE



CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

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



TYPICAL CROSS SECTIONS AND DETAILS

CULVERT RISERS AND SEDIMENT POND FOR:

GEODE STATE PARK

HENRY COUNTY

NO. BY DATE REVISION

DRAWN BY: PROJECT NUMBER:  
16-06-44-04

CHK'D BY: DATE:

SHEET NO.:

**B.06**



ESTIMATED PROJECT QUANTITIES			
ITEM NO.	ITEM	UNIT	TOTAL
1	12" SMP	LF	200
2	Earthfill	CY	11728
3	60" x 60" Anti-seep Collars	Each	5
4	Clearing and Grubbing	Acre	2.5
5	Seeding, Fertilizing, and Mulching	Acre	2.2
6	Mulch Sock	LF	85
7	Pavement Removal	SY	330
8	7" PCC	SY	330
9	Special Backfill	Tons	112
10	Excavation (Culvert Replacement)	CY	1900
11	Excavation (Sediment Removal)	CY	875
12	Earthfill (Imported)	CY	150
13	Granular Shoulder	Tons	14
14	48" Dia SMP Riser	Each	1
15	36" Dia SMP Spillway	LF	130
16	84" x 84" Anti-seep Collars	Each	4
17	36" Dia SMP Riser	Each	1
18	24" Dia SMP Spillway	LF	110
19	72" x 72" Anti-seep Collars	Each	4
20	3/8" Minus Crushed Stone	Tons	8
21	Engineering Fabric	SY	53
22	Mobilization	Lump Sum	1
23	Traffic Control	Lump Sum	1

**ESTIMATE REFERENCE INFORMATION**

ITEM NO.	DESCRIPTION
1	A. Used pipe in good condition is acceptable. Condition determination shall be made by the field engineer. B. Trash rack and associated hardware shall be incidental to this bid item
2	A. 30% shrink is included in this quantity. B. Borrow shall be from within the pool. C. Final borrow slopes shall be 3H:1V or flatter.
4	A. Woody debris may be burned within the pool. B. Stumps may be buried within the pool.
5	A. Seeding, Fertilizing, and Mulching shall conform to Iowa DOT Standard Specifications for Highway and Bridge Construction, Series 2015. B. Seed mix shall be IDOT Rural.
8	A. Concrete paving shall conform to Iowa DOT Standard Specifications for Highway and Bridge Construction, Series 2015. B. Center steel shall consist of 30" long #4 bars at 3' centers, and shall be incidental to this bid item. C. Centerline and transverse sawcuts shall be incidental to this bid item.
9	A. Material shall conform to Iowa DOT Standard Specifications for Highway and Bridge Construction, Series 2015. B. The following Iowa DOT gradations shall be accepted: 12a, 12b, 14, 30, and 31
12	A. Clay material shall be furnished, placed, and compacted.
14	A. Used pipe in good condition is acceptable. Condition determination shall be made by the field engineer. B. Trash rack and associated hardware shall be incidental to this bid item
15	A. Used pipe in good condition is acceptable. Condition determination shall be made by the field engineer.
17	A. Used pipe in good condition is acceptable. Condition determination shall be made by the field engineer. B. Trash rack and associated hardware shall be incidental to this bid item
18	A. Used pipe in good condition is acceptable. Condition determination shall be made by the field engineer.
23	A. Minimum traffic control shall consist of two "Road Closed" signs placed at the intersections of the main road and barricades near the construction site.

**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 contractor's 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.

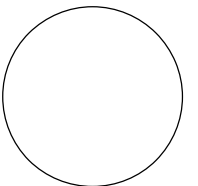
The contractor shall not disturb desirable grass areas and desirable trees outside the construction limits. The contractor will not be permitted to park or service vehicles and equipment or use these areas for storage of materials. Storage, parking and service areas will be subject to the approval of 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 contractor's 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**

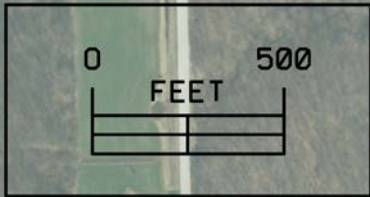
ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



**QUANTITIES AND GENERAL INFORMATION**

CULVERT RISERS AND SEDIMENT POND FOR:  
**GEODE STATE PARK**  
HENRY COUNTY

NO.	BY	REVISION
DRAWN BY:	PROJECT NUMBER:	
	16-06-44-04	
CHK'D BY:	DATE:	

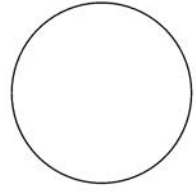


Site L →

Site M →

Site N →

CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

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



**SITE PLAN**

CULVERT RISERS AND SEDIMENT POND FOR:

**GEODE STATE PARK**

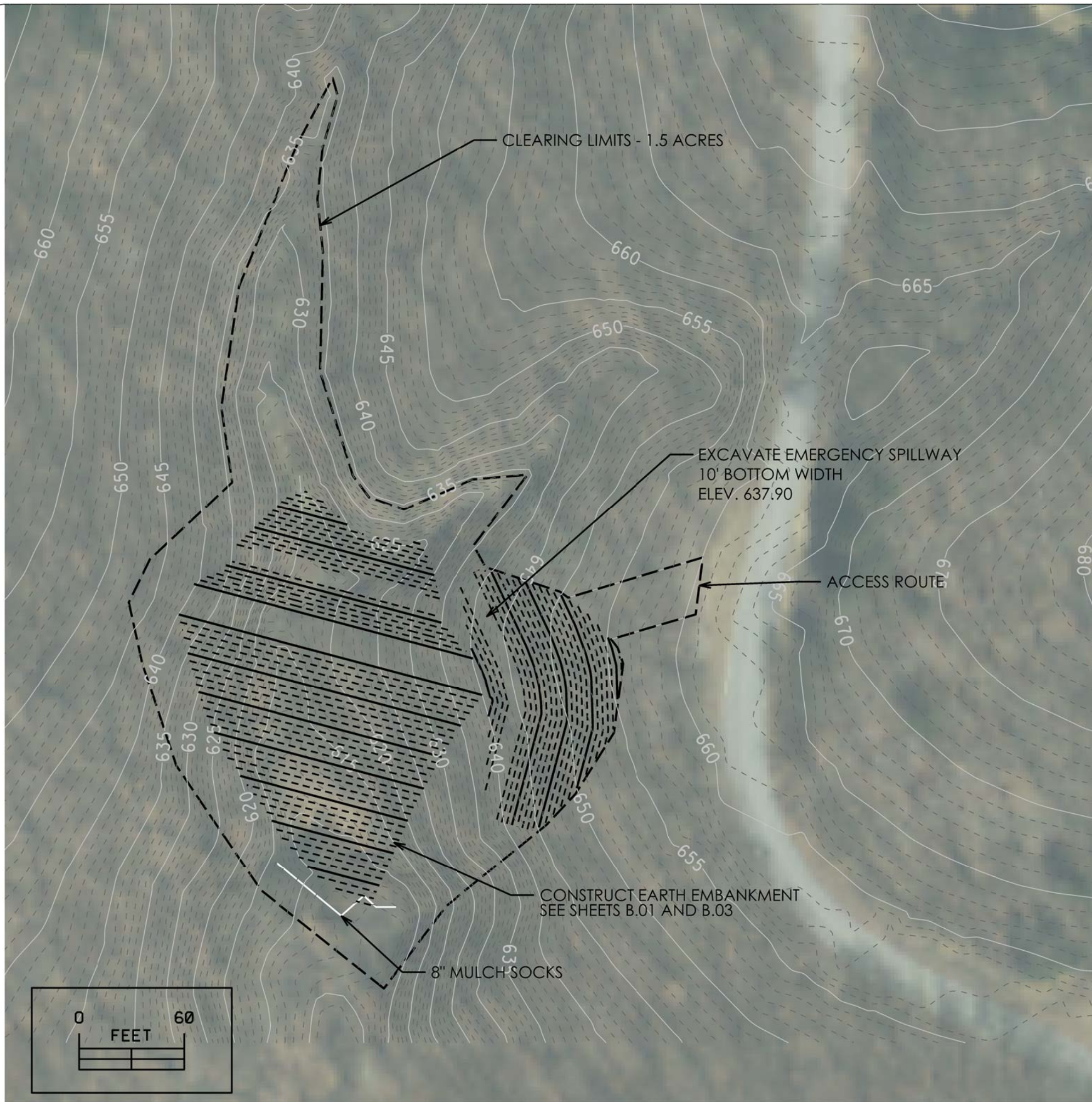
HENRY COUNTY

NO.	BY	REVISION

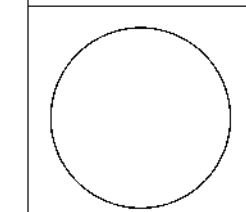
DRAWN BY: PROJECT NUMBER:  
16-06-44-04

CHK'D BY: DATE:

SHEET NO: **D.01**



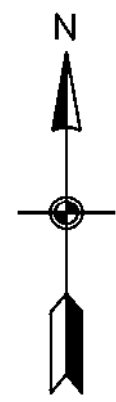
CONSULTANT:



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



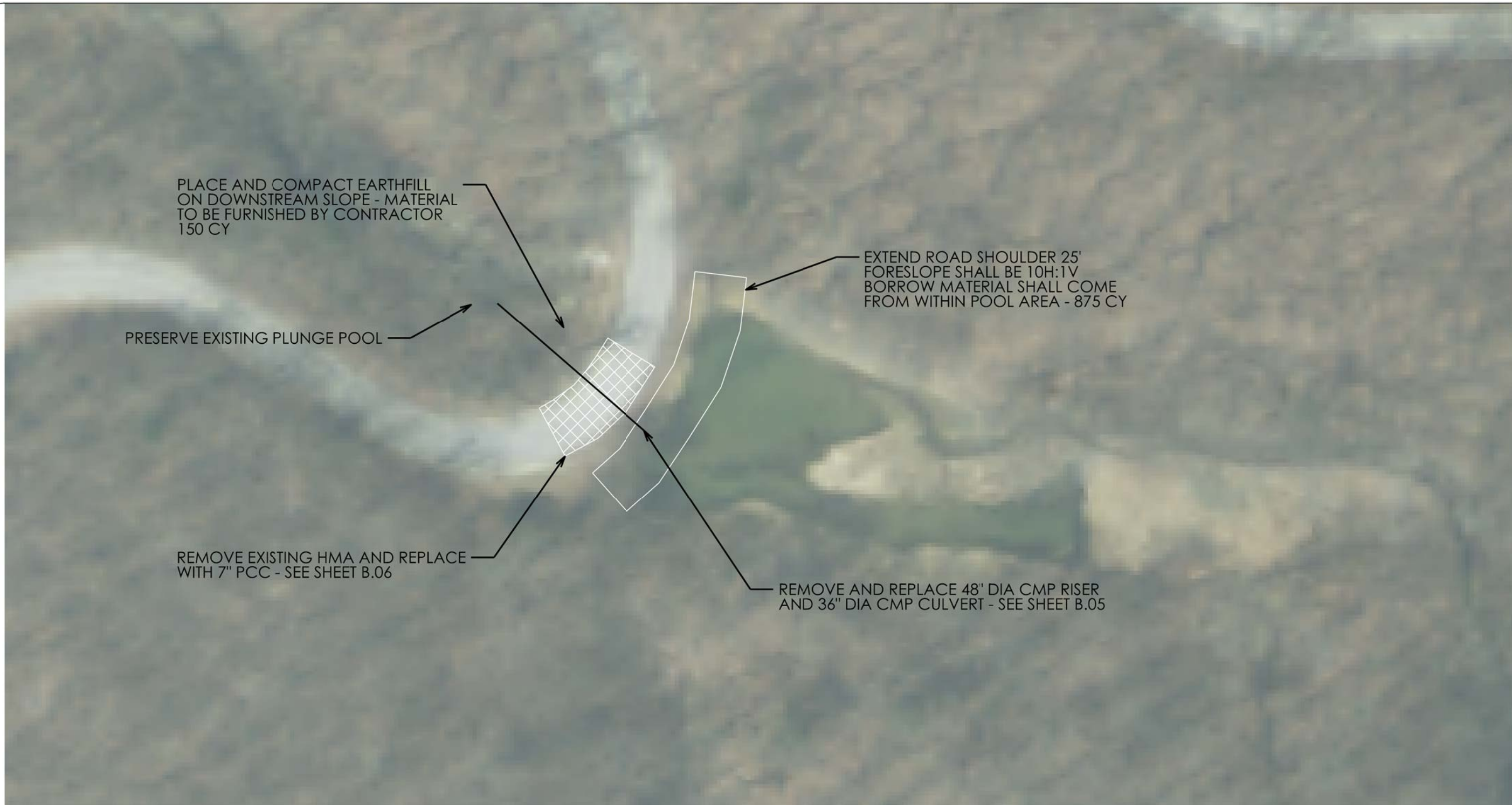
**SITE L PLAN**  
CULVERT RISERS AND SEDIMENT POND FOR:  
GEODE STATE PARK  
HENRY COUNTY



- EARTHFILL - 11,728 CY
- 12" SMP - 200 LF
- 60" X 60" ANTI-SEEP COLLARS - 5 EACH
- CLEARING AND GRUBBING - 1.5 ACRES
- SEEDING, FERTILIZING, AND MULCHING - 1.2 ACRES
- 8" MULCH SOCK - 85' LF

NO.	BY	REVISION

DRAWN BY: PROJECT NUMBER:  
16-06-44-04  
CHK'D BY: DATE:  
SHEET NO:  
**D.02**



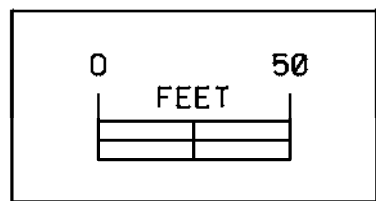
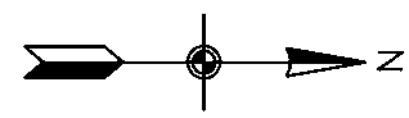
PLACE AND COMPACT EARTHFILL  
ON DOWNSTREAM SLOPE - MATERIAL  
TO BE FURNISHED BY CONTRACTOR  
150 CY

PRESERVE EXISTING PLUNGE POOL

REMOVE EXISTING HMA AND REPLACE  
WITH 7" PCC - SEE SHEET B.06

EXTEND ROAD SHOULDER 25'  
FORESLOPE SHALL BE 10H:1V  
BORROW MATERIAL SHALL COME  
FROM WITHIN POOL AREA - 875 CY

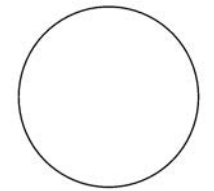
REMOVE AND REPLACE 48" DIA CMP RISER  
AND 36" DIA CMP CULVERT - SEE SHEET B.05



NOTE: CONTRACTOR SHALL BE RESPONSIBLE  
FOR PROTECTING THE EXISTING 3" HDPE  
SANITARY SEWER PRESSURE MAIN LOCATED  
IN THE ROAD SHOULDER DURING  
CONSTRUCTION

PAVEMENT REMOVAL - 165 SY  
CLEARING AND GRUBBING - 0.5 ACRES  
EXCAVATION (CULVERT REPLACEMENT) - 900 CY  
7" PCC PAVEMENT - 165 SY  
SPECIAL BACKFILL - 52 TONS  
SEEDING, FERTILIZING, AND MULCHING - 0.5 ACRES  
EXCAVATION (SEDIMENT REMOVAL) - 875 CY  
EARTHFILL (IMPORTED) - 150 CY  
GRANULAR SHOULDER - 7 TONS  
48" DIA SMP RISER - 1 EACH  
36" DIA SMP SPILLWAY - 130 LF  
84" X 84" ANTI-SEEP COLLAR - 4 EACH

CONSULTANT:



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



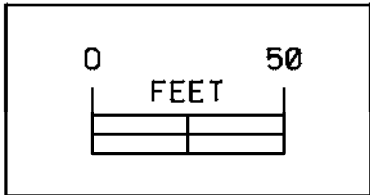
SITE M PLAN

CULVERT RISERS AND SEDIMENT POND FOR:  
GEODE STATE PARK

HENRY COUNTY

NO.	BY	REVISION

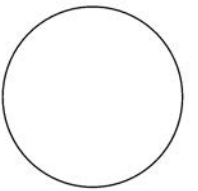
SHEET No: **D.03**



NOTE: CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE EXISTING 3" HDPE SANITARY SEWER PRESSURE MAIN LOCATED IN THE ROAD SHOULDER DURING CONSTRUCTION

- PAVEMENT REMOVAL - 165 SY
- CLEARING AND GRUBBING - 0.5 ACRES
- EXCAVATION (CULVERT REPLACEMENT) - 1000 CY
- 7" PCC PAVEMENT - 165 SY
- SPECIAL BACKFILL - 60 TONS
- SEEDING, FERTILIZING, AND MULCHING - 0.5 ACRES
- GRANULAR SHOULDER - 7 TONS
- 36" DIA SMP RISER - 1 EACH
- 24" DIA SMP SPILLWAY - 110 LF
- 72" X 72" ANTI-SEEP COLLAR - 4 EACH
- 3/8" MINUS CRUSHED STONE- 8 TONS
- ENGINEERING FABRIC - 53 SY

CONSULTANT:



IOWA DEPARTMENT OF NATURAL RESOURCES

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



SITE N PLAN

CULVERT RISERS AND SEDIMENT POND FOR:

GEODE STATE PARK

HENRY COUNTY

NO.	BY	REVISION

DRAWN BY: PROJECT NUMBER:  
16-06-44-04

CHK'D BY: DATE:

SHEET No:

D.04