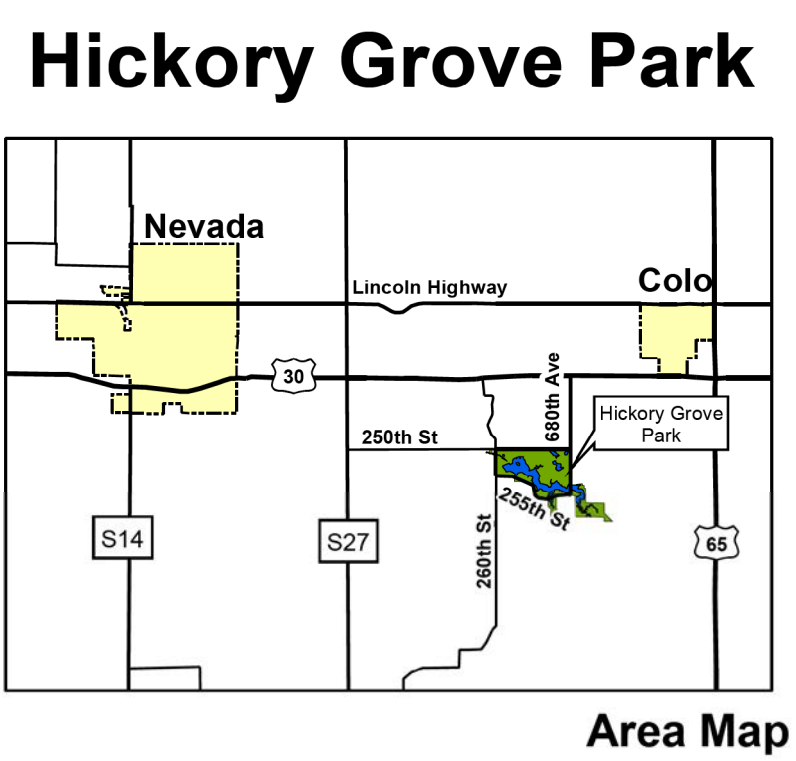
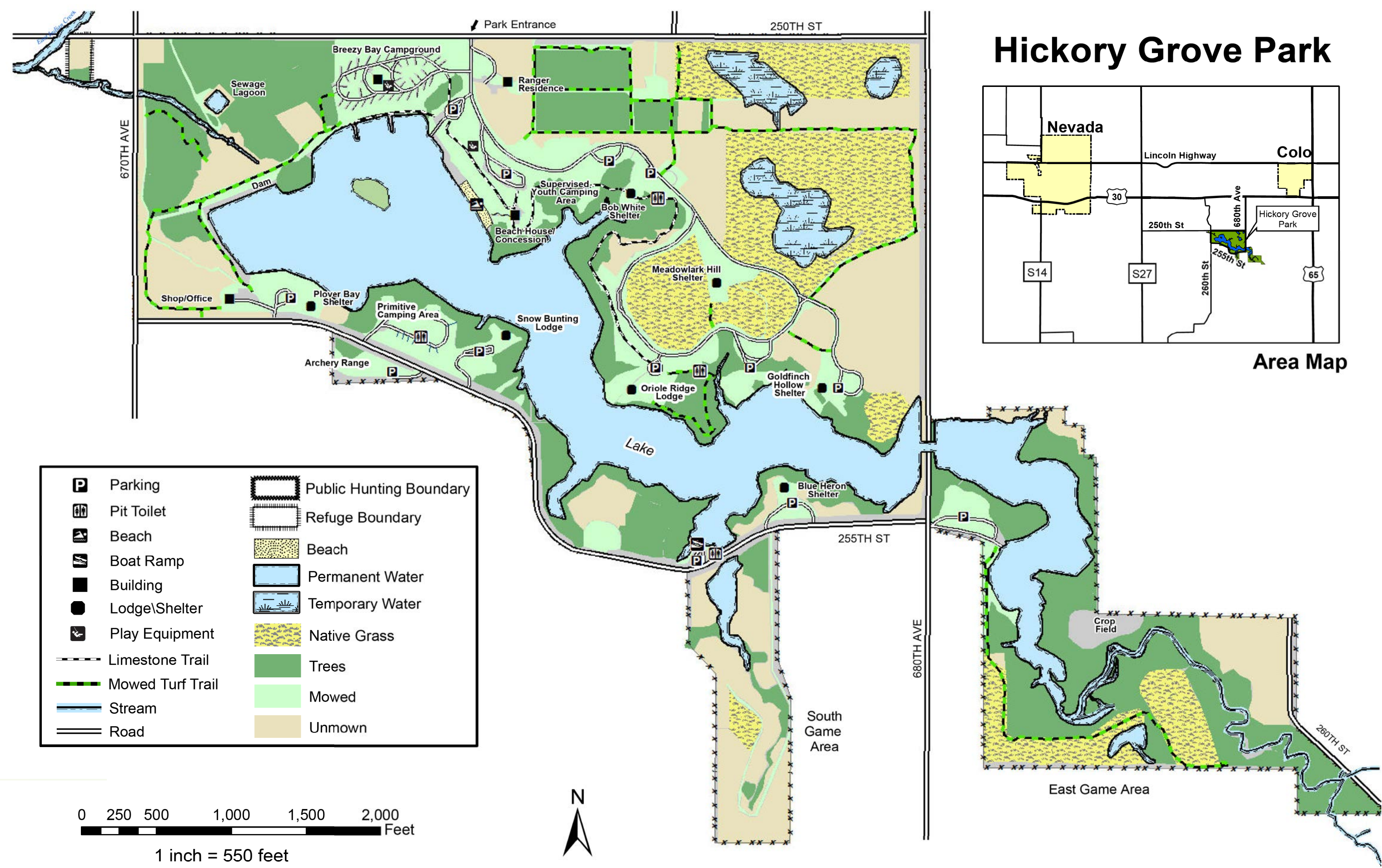


**PROJECT LOCATION**



CONSULTANT:



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



**LOCATION MAPS**

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**

STORY COUNTY

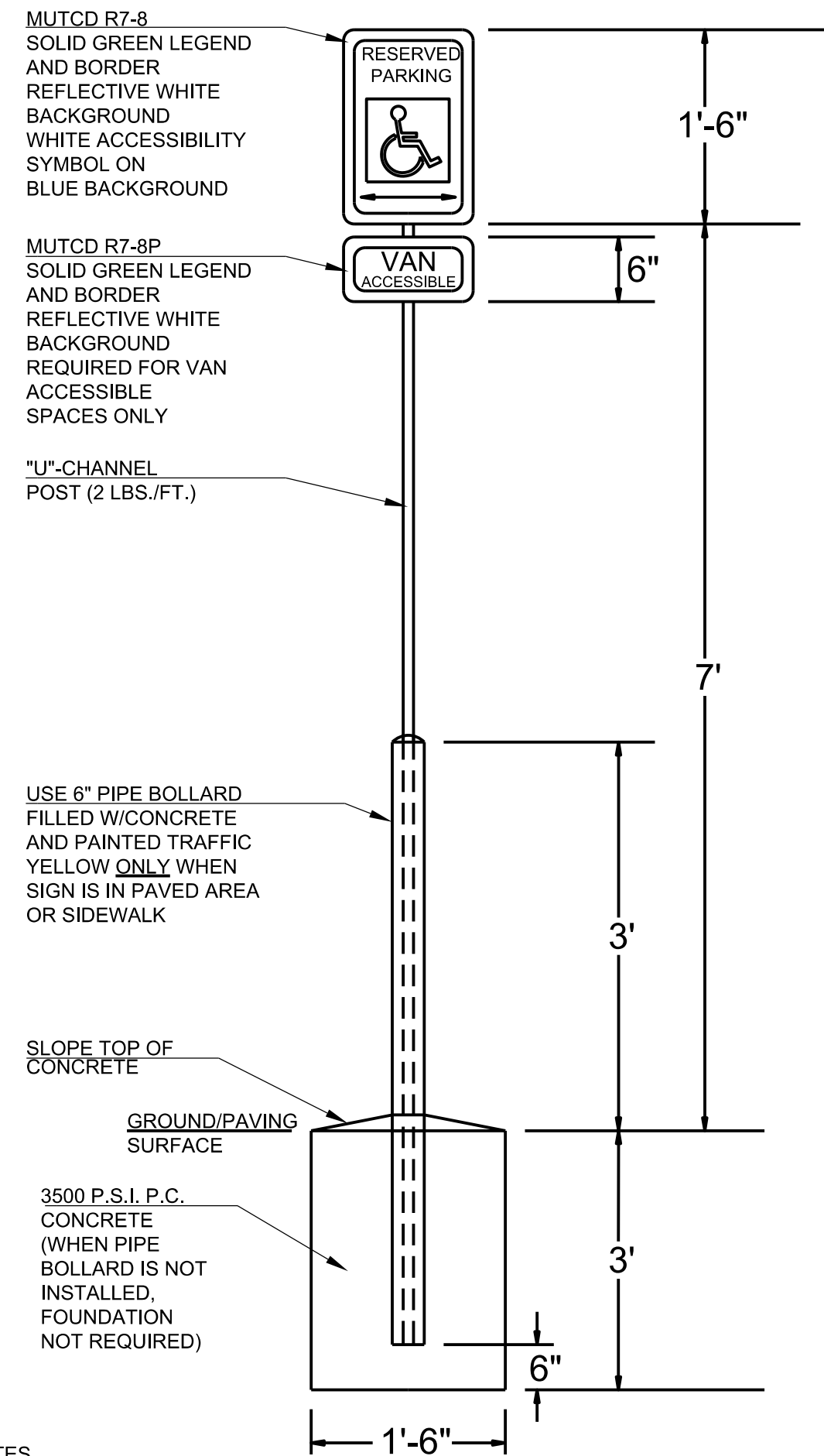
NO.	BY DATE	REVISION

DRAWN BY: HD PROJECT NUMBER: 16-02-85-05

CHKD BY: DATE: 10/2018

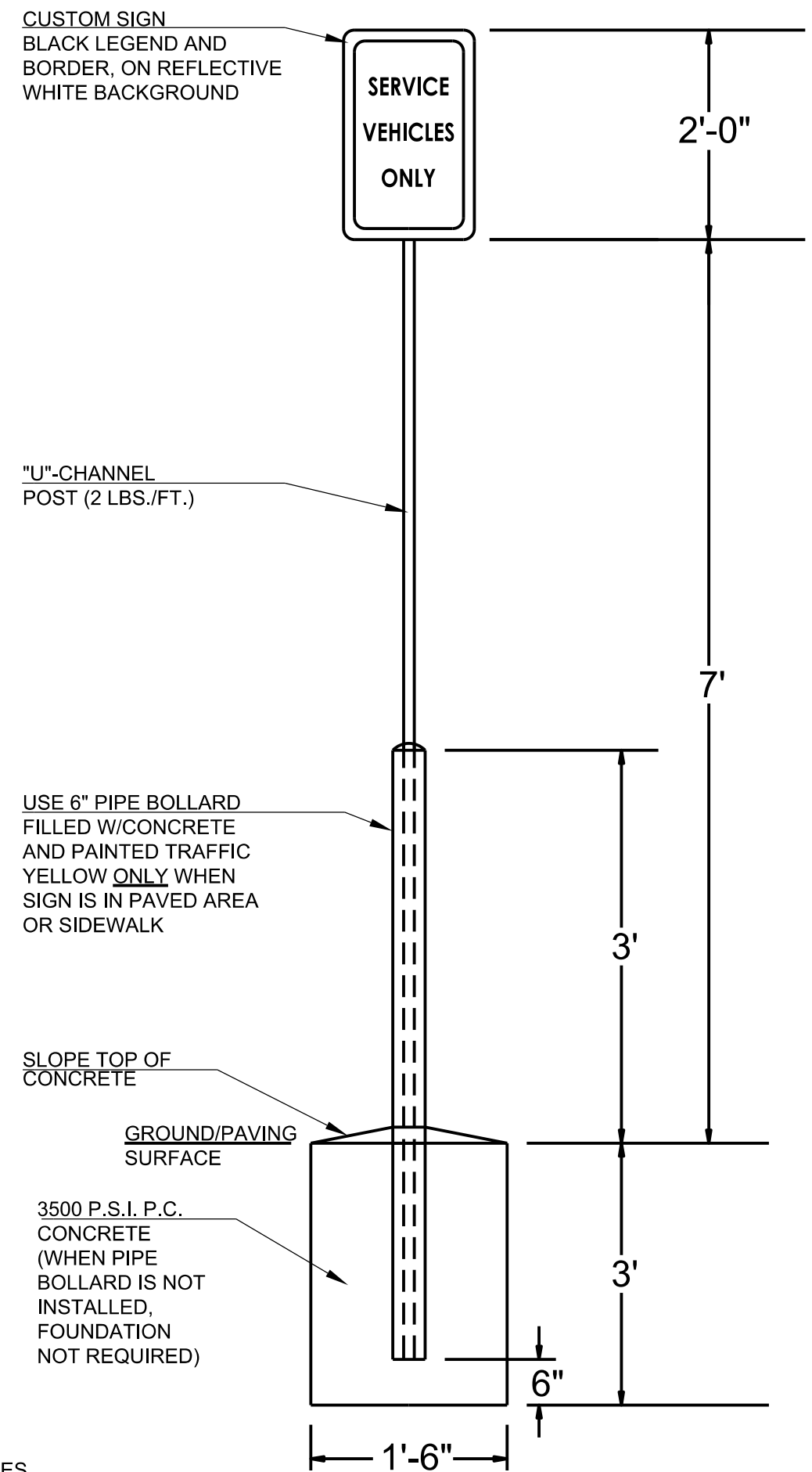
SHEET NO:

**A.02**



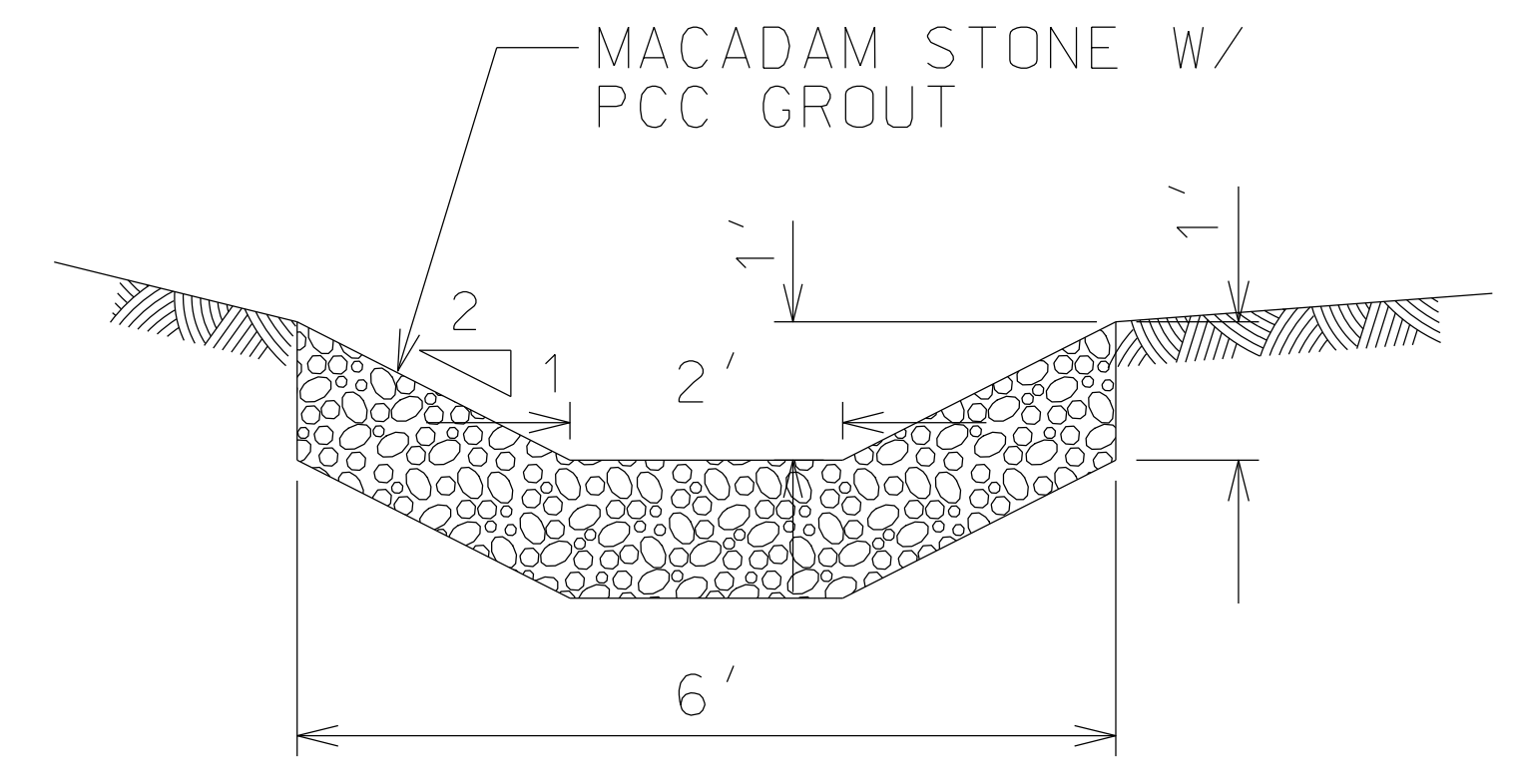
- NOTES**
1. 12"x18" ACCESSIBILITY SIGN (R7-8) SHALL BE MOUNTED 7' FROM FINISH GRADE TO BOTTOM EDGE OF SIGN FACE. MOUNTING HEIGHT MAY BE REDUCED TO 5' IF PLACED IN A LANDSCAPE AREA IN WHICH PEDESTRIANS ARE NOT EXPECTED TO USE.
  2. BOLLARD MAY BE OMITTED IF INSTALLED IN LANDSCAPE AREAS. WHEN INSTALLED IN LANDSCAPE AREAS, MOUNTING POST SHALL BE DRIVEN A MINIMUM OF 3' BELOW FINISHED GRADE. ALTERNATE MOUNTING POSTS MUST BE APPROVED BY THE FIELD INSPECTOR PRIOR TO CONSTRUCTION.
  3. SIGNAGE SHALL BE INSTALLED IN FRONT OF EACH ACCESSIBLE SPACE, CENTERED ON THE WIDTH OF THE SPACE.
  4. REFER TO AMERICANS WITH DISABILITIES ACT AND ARCHITECTURAL BARRIERS ACT ACCESSIBILITY GUIDELINES (ADAAG), LATEST EDITION, FOR REQUIRED NUMBER OF ACCESSIBLE SPACE. PER ADAAG, ONE VAN ACCESSIBLE SPACE SHALL BE PROVIDED, MINIMUM, WITH ADDITIONAL VAN ACCESSIBLE SPACES PER ADAAG REQUIREMENTS.
  5. ALL SIGNAGE SHALL BE ENGINEER GRADE .080 ALUMINUM REFLECTIVE SIGN MEETING THE REQUIREMENTS OF THE MUTCD AND ADAAG.

**HANDICAP SIGN DETAIL**  
NOT TO SCALE

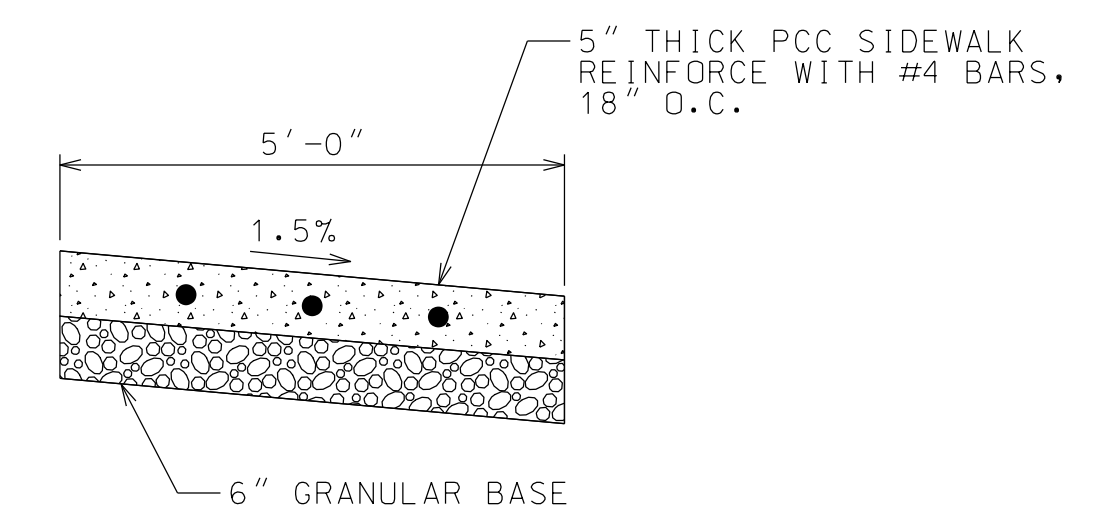


- NOTES**
1. 12"x24" SERVICE VEHICLES ONLY SIGN SHALL BE MOUNTED 7' FROM FINISH GRADE TO BOTTOM EDGE OF SIGN FACE. MOUNTING HEIGHT MAY BE REDUCED TO 5' IF PLACED IN A LANDSCAPE AREA IN WHICH PEDESTRIANS ARE NOT EXPECTED TO USE.
  2. BOLLARD MAY BE OMITTED IF INSTALLED IN LANDSCAPE AREAS. WHEN INSTALLED IN LANDSCAPE AREAS, MOUNTING POST SHALL BE DRIVEN A MINIMUM OF 3' BELOW FINISHED GRADE. ALTERNATE MOUNTING POSTS MUST BE APPROVED BY THE FIELD INSPECTOR PRIOR TO CONSTRUCTION.
  3. ALL SIGNAGE SHALL BE ENGINEER GRADE .080 ALUMINUM REFLECTIVE SIGN MEETING THE REQUIREMENTS OF THE MUTCD AND ADAAG.

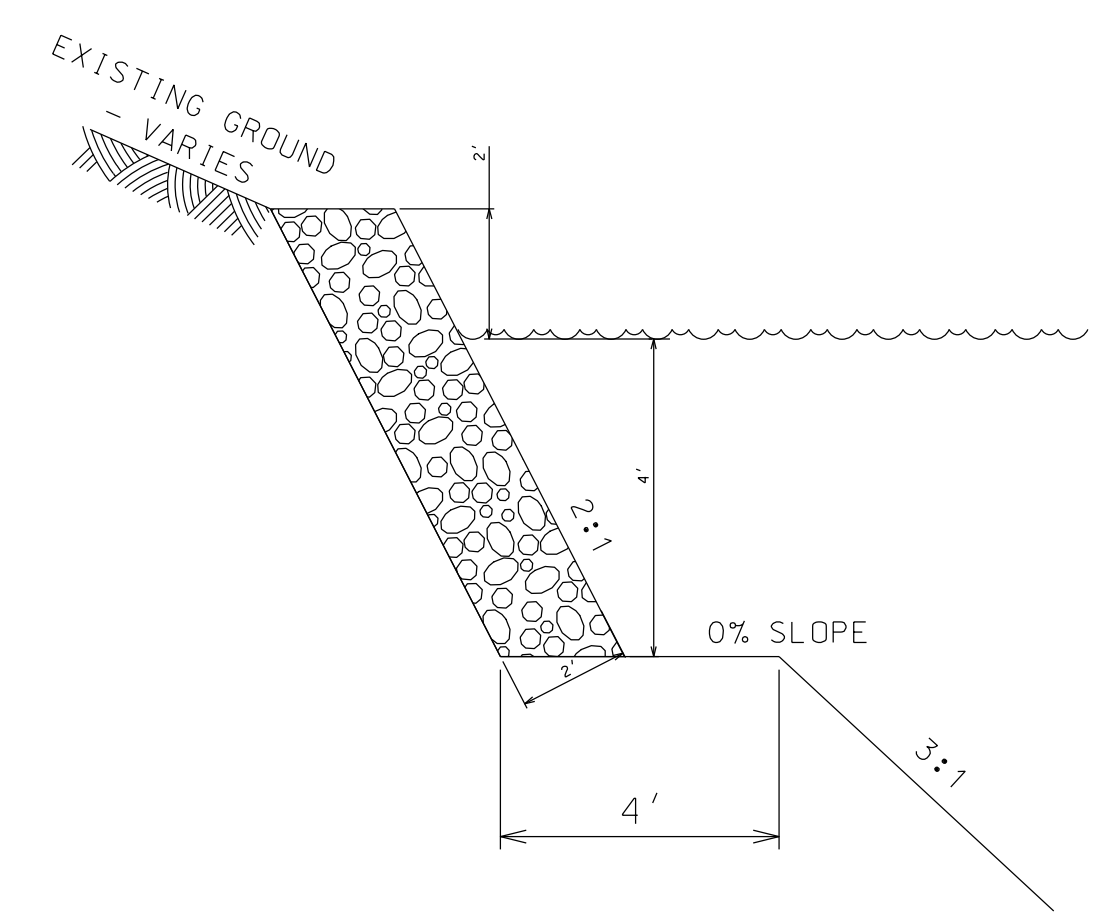
**SERVICE VEHICLE SIGN DETAIL**  
NOT TO SCALE



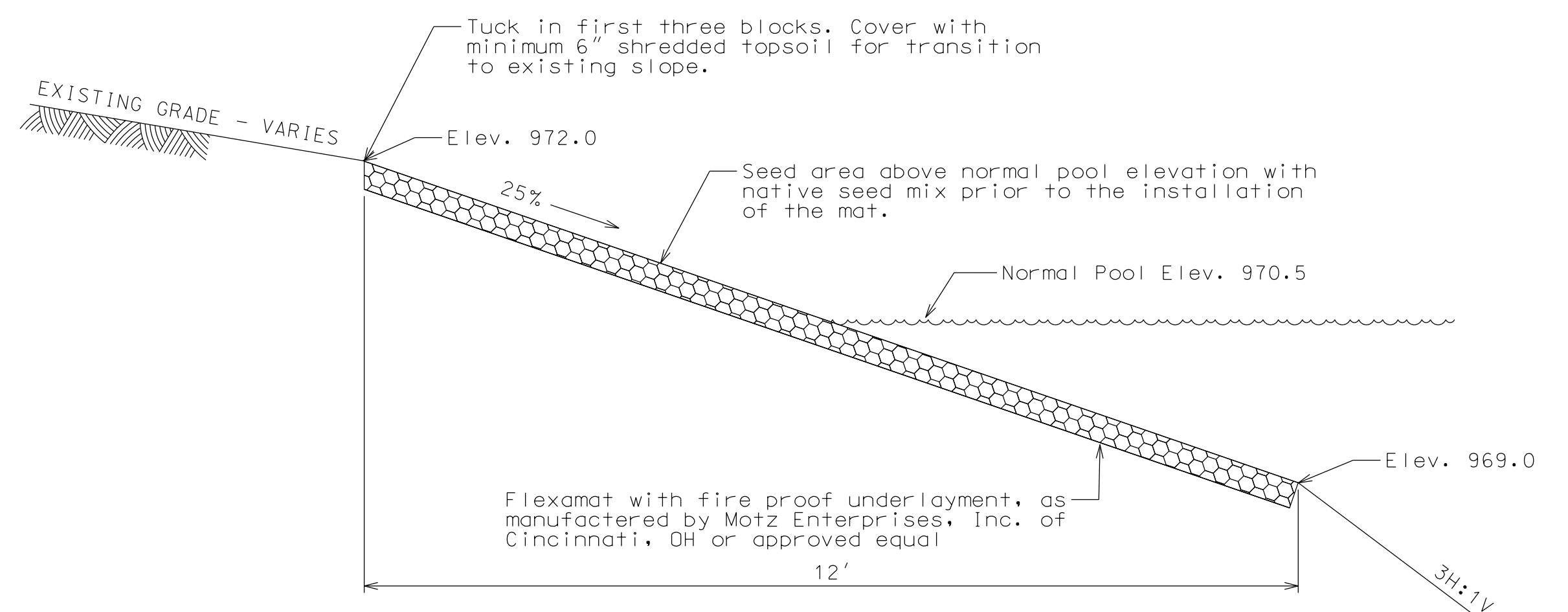
**ROCK CHUTE DETAIL**  
NOT TO SCALE



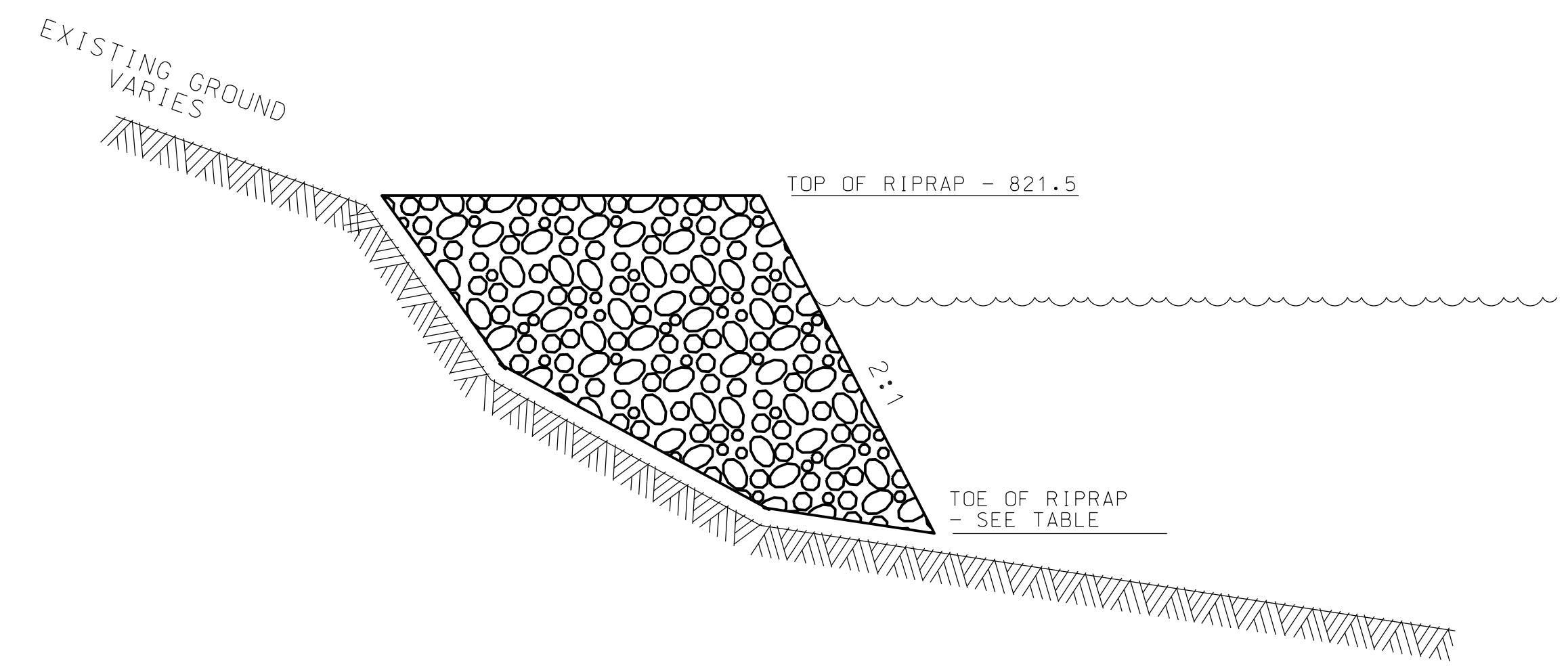
**SIDEWALK**  
NOT TO SCALE



**SHORELINE ARMORING DETAIL A**  
NOT TO SCALE



**SHORELINE ARMORING DETAIL B**  
NOT TO SCALE



**SHORELINE ARMORING DETAIL C**  
NOT TO SCALE

CONSULTANT:



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



TYPICAL CROSS SECTIONS AND DETAILS

MECHANICAL DREDGING & SHORELINE ARMORING FOR:

HICKORY GROVE PARK

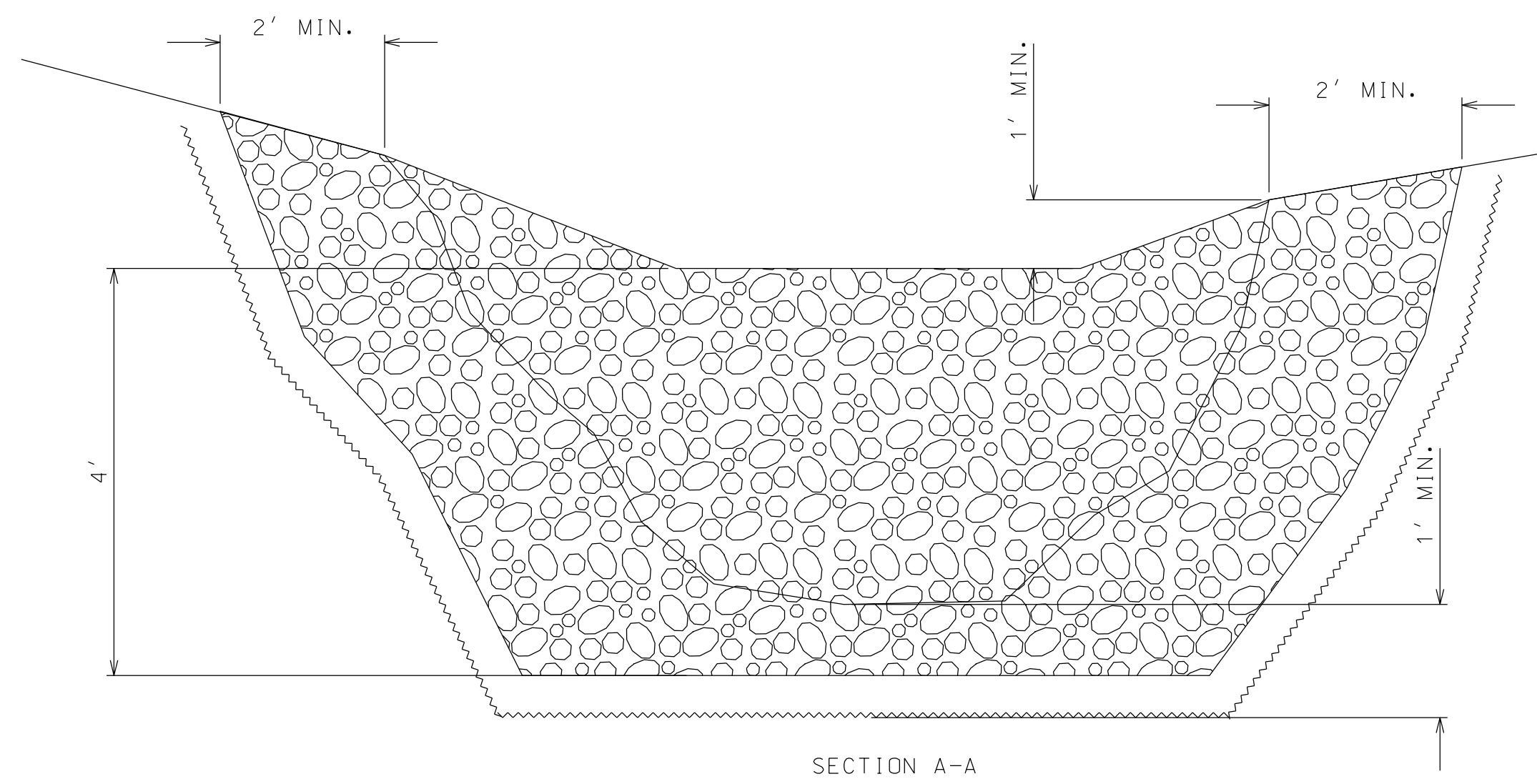
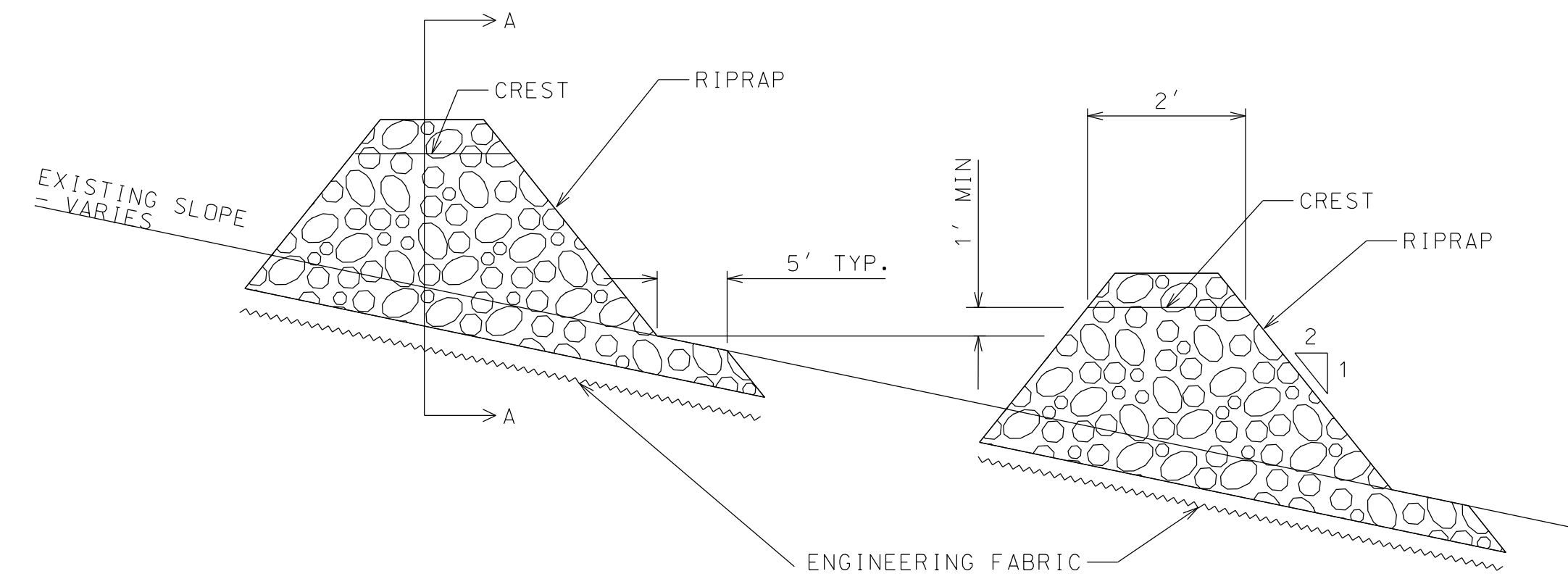
STORY COUNTY

NO.	BY	DATE	REVISION

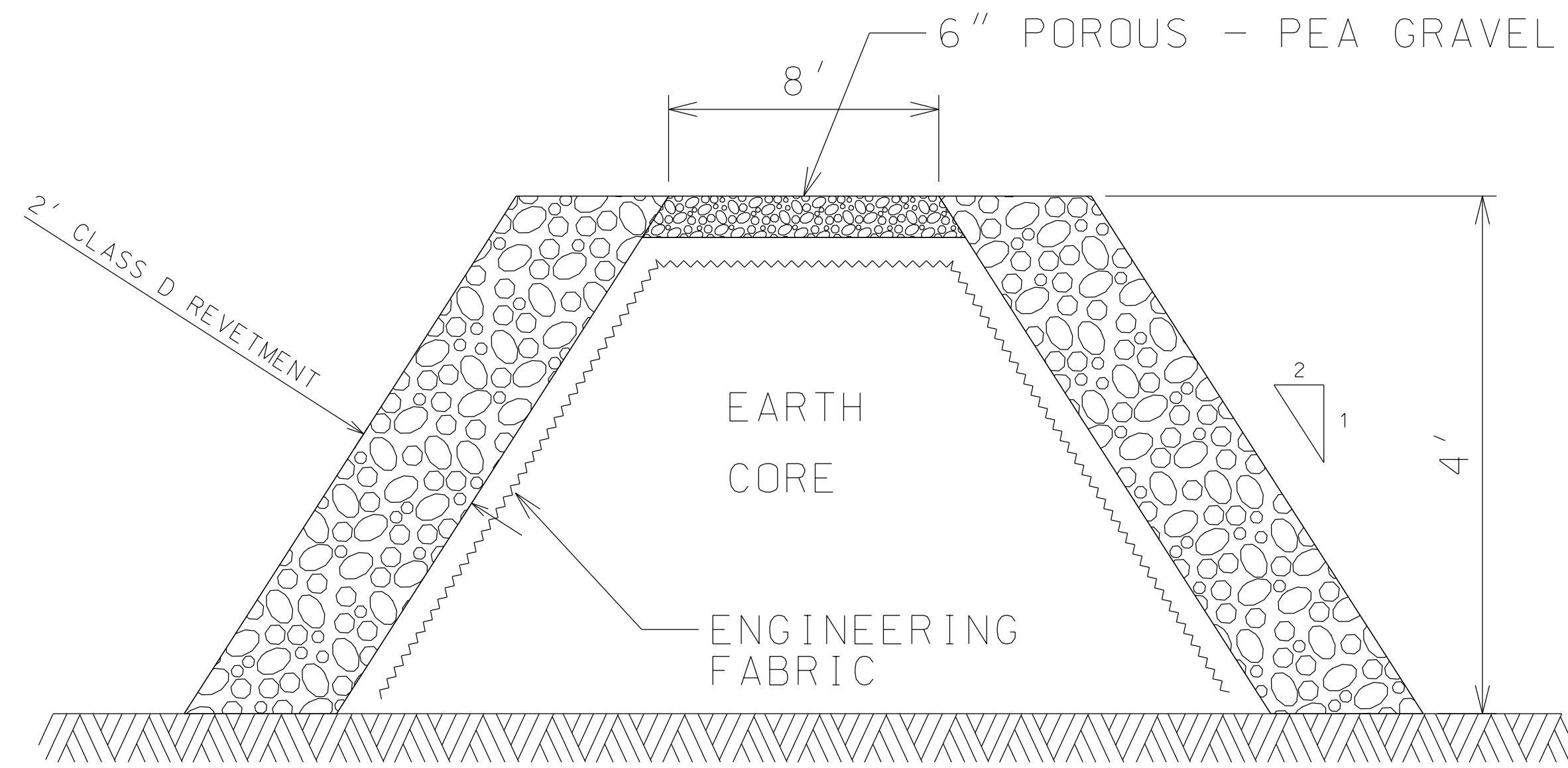
DRAWN BY: HD PROJECT NUMBER: 16-02-85-05  
CHKD BY: DATE: 10/2018

SHEET No:

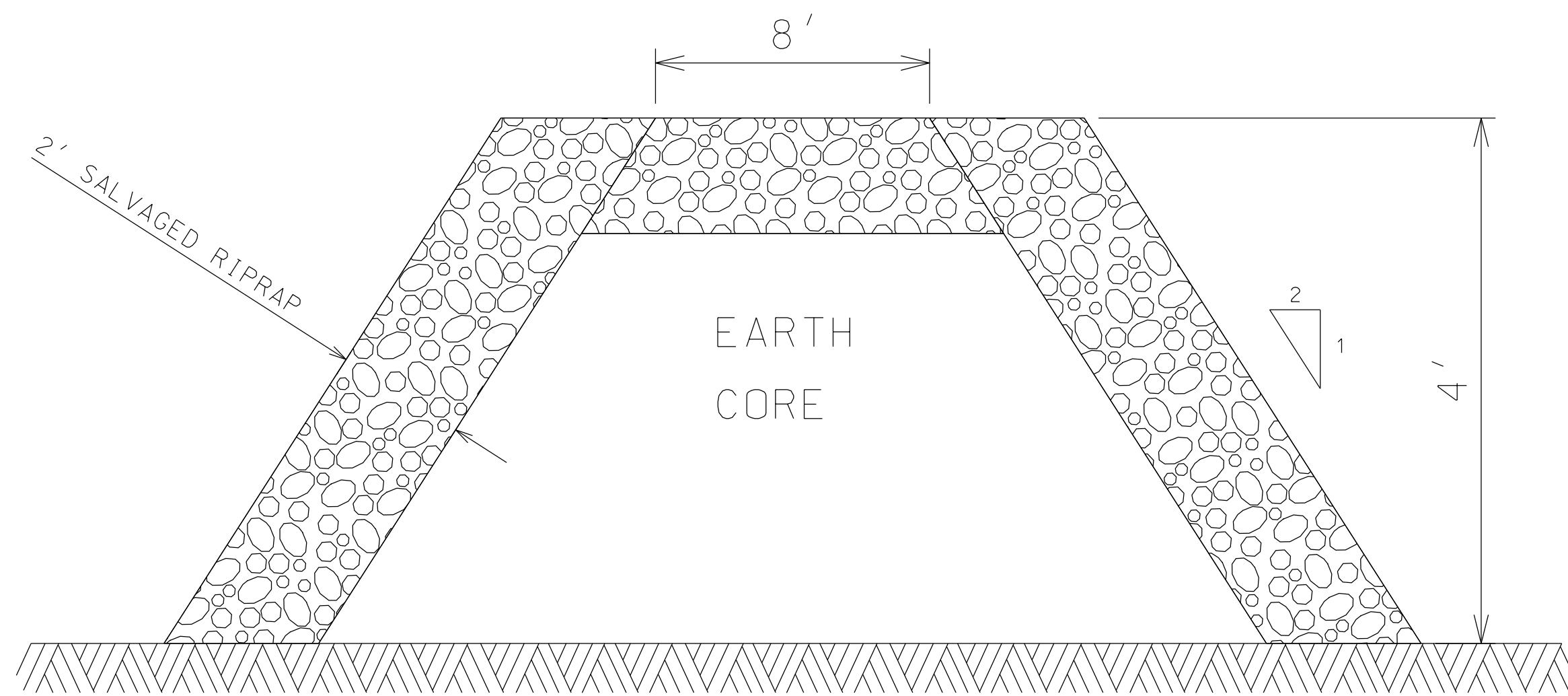
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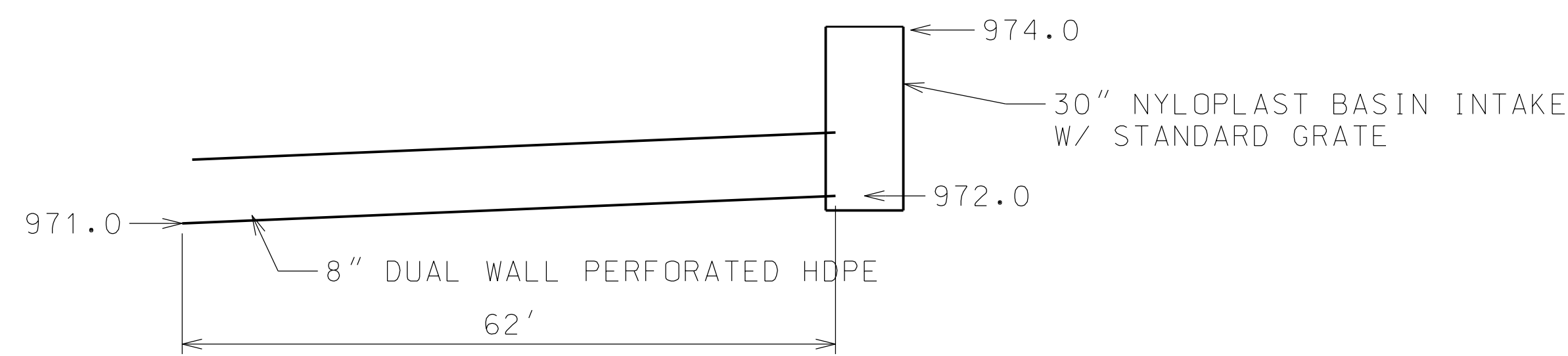
**ROCK CHECK DAM DETAIL**  
NOT TO SCALE



**LINEAR HABITAT DETAIL**  
NOT TO SCALE



**SALVAGED ROCK MOUND DETAIL**  
NOT TO SCALE



**BEACH INTAKE DETAIL**  
NOT TO SCALE

CONSULTANT:



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



TYPICAL CROSS SECTIONS AND DETAILS

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**

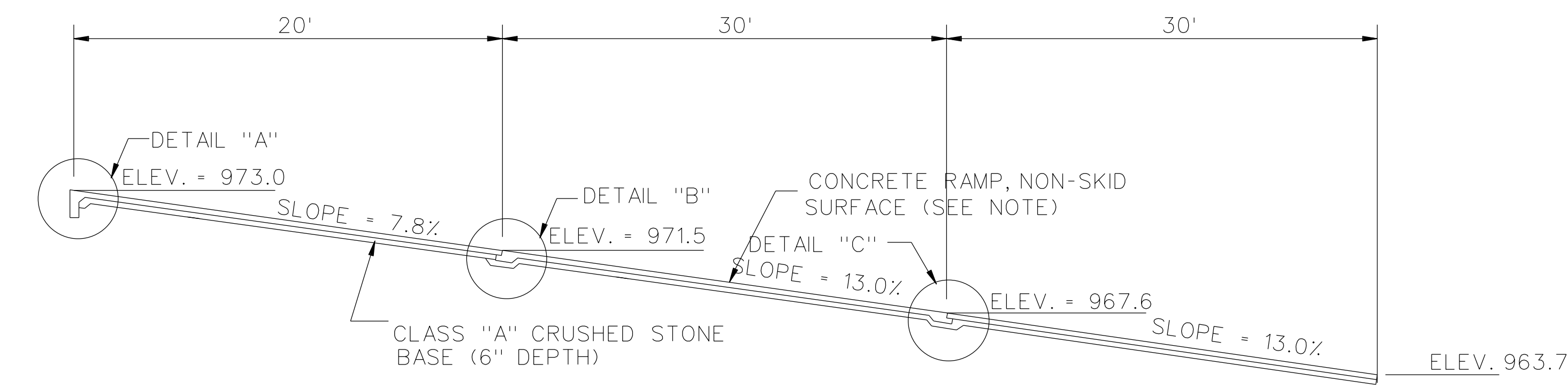
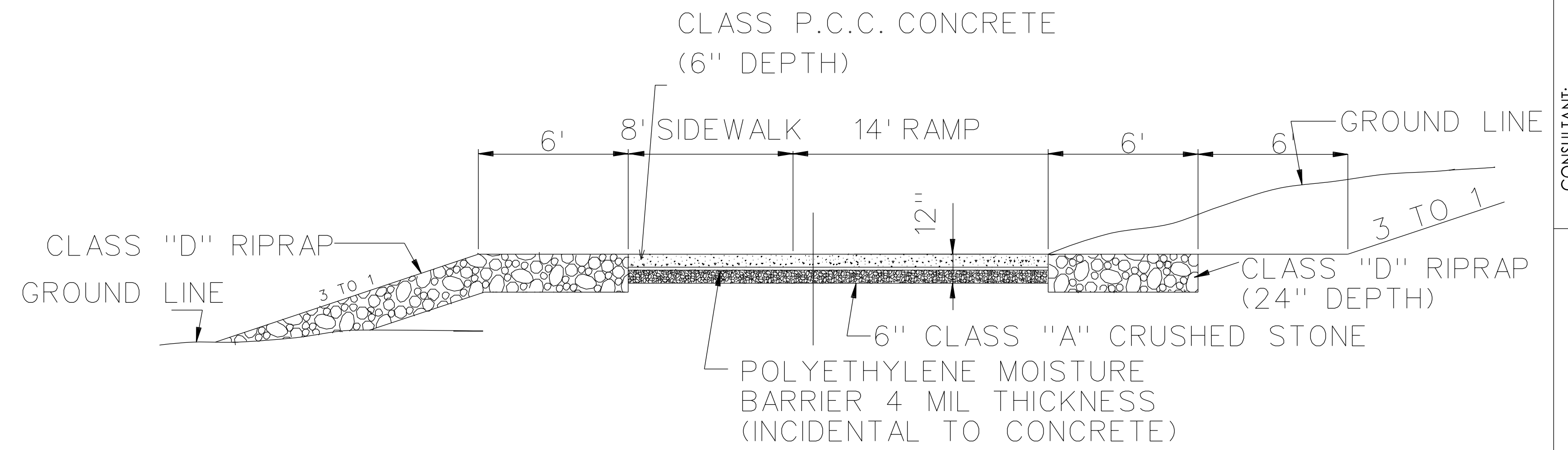
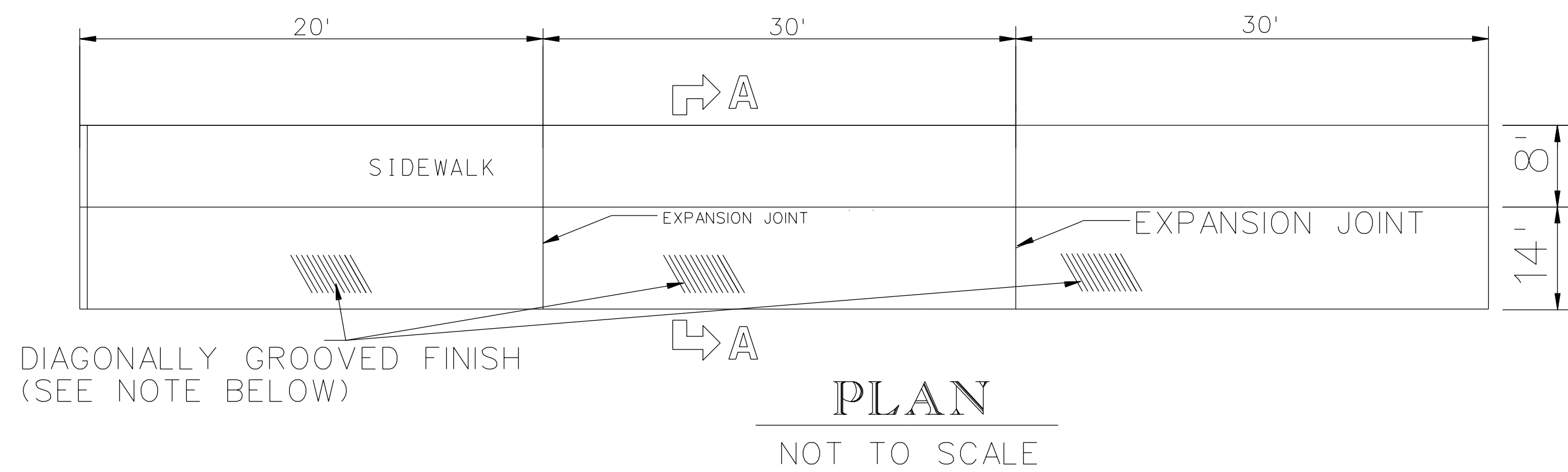
STORY COUNTY

NO.	DATE	REVISION

DRAWN BY: HD PROJECT NUMBER: 16-02-85-05

CHKD BY: DATE: 10/2018

SHEET No:

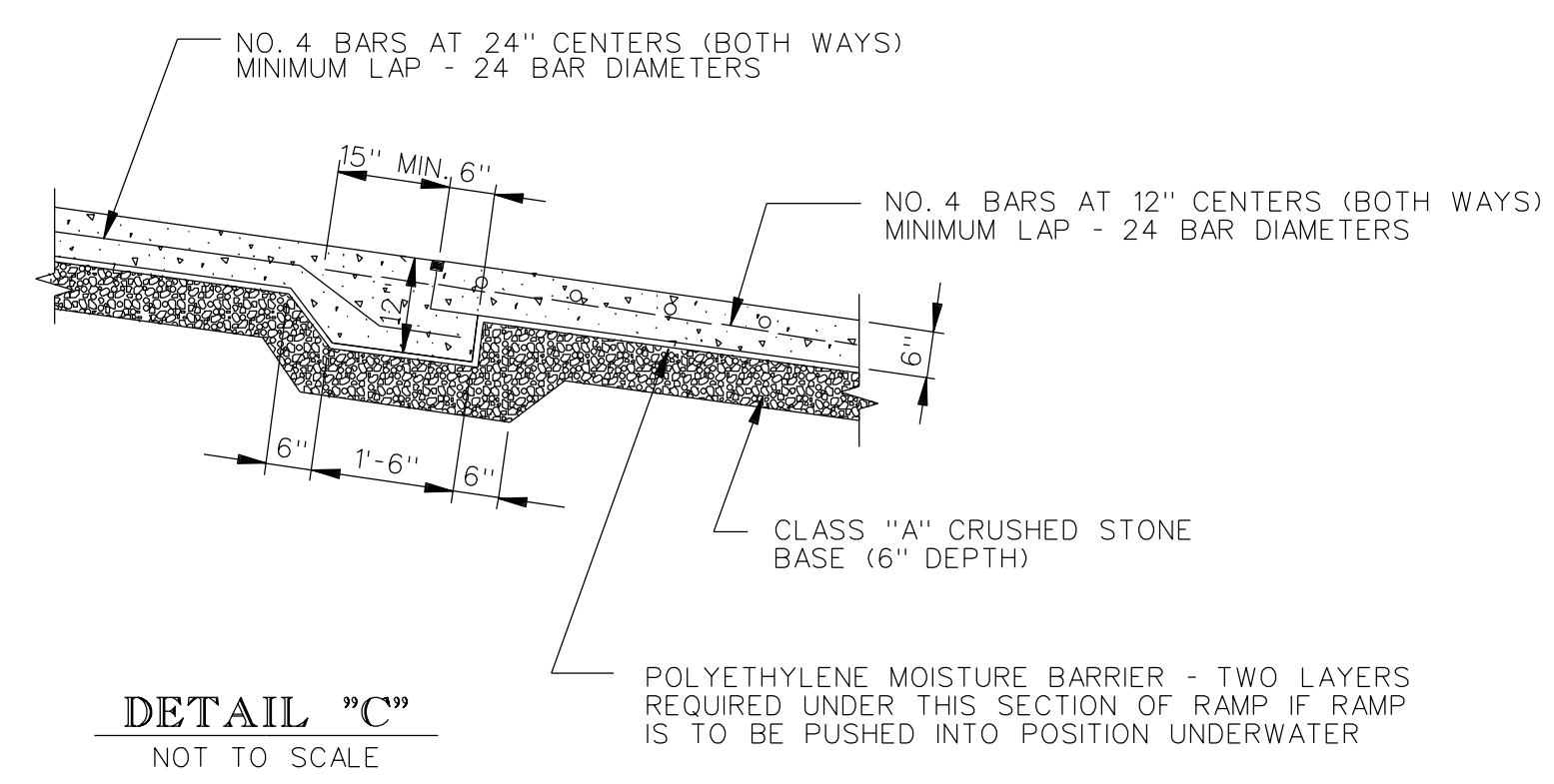
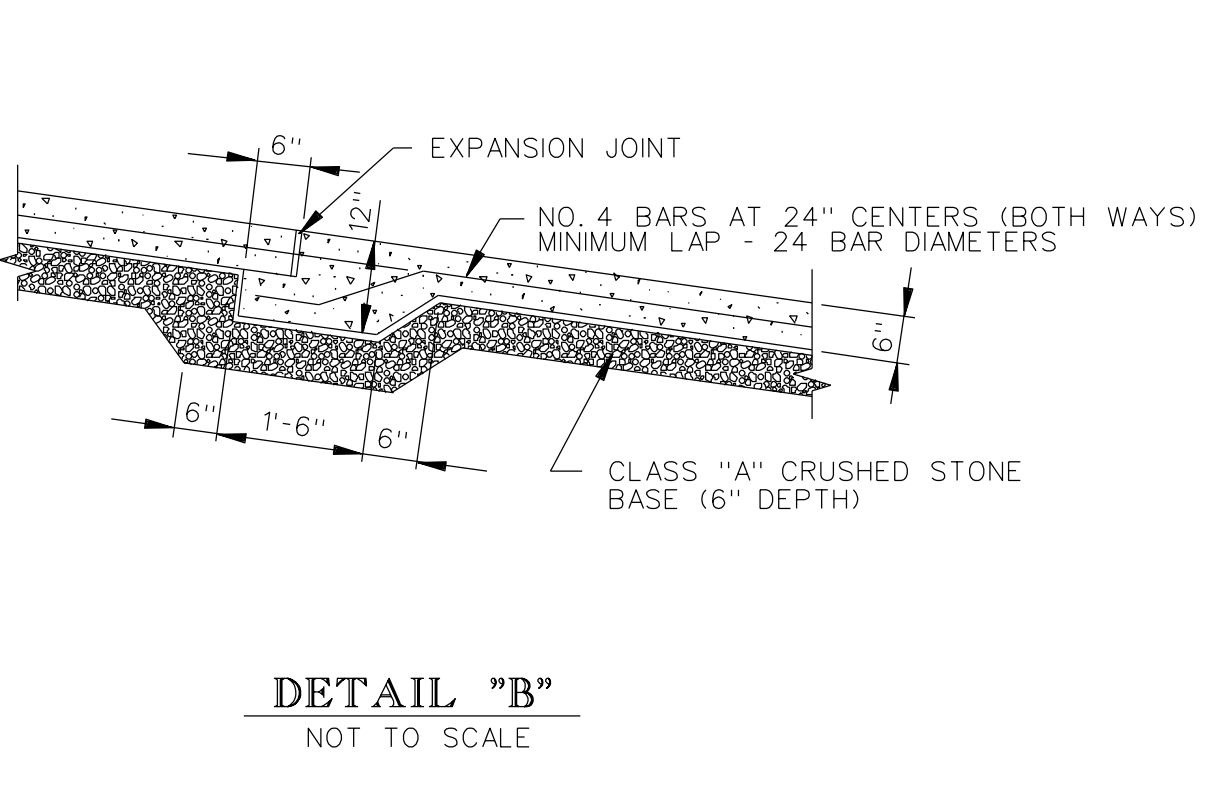
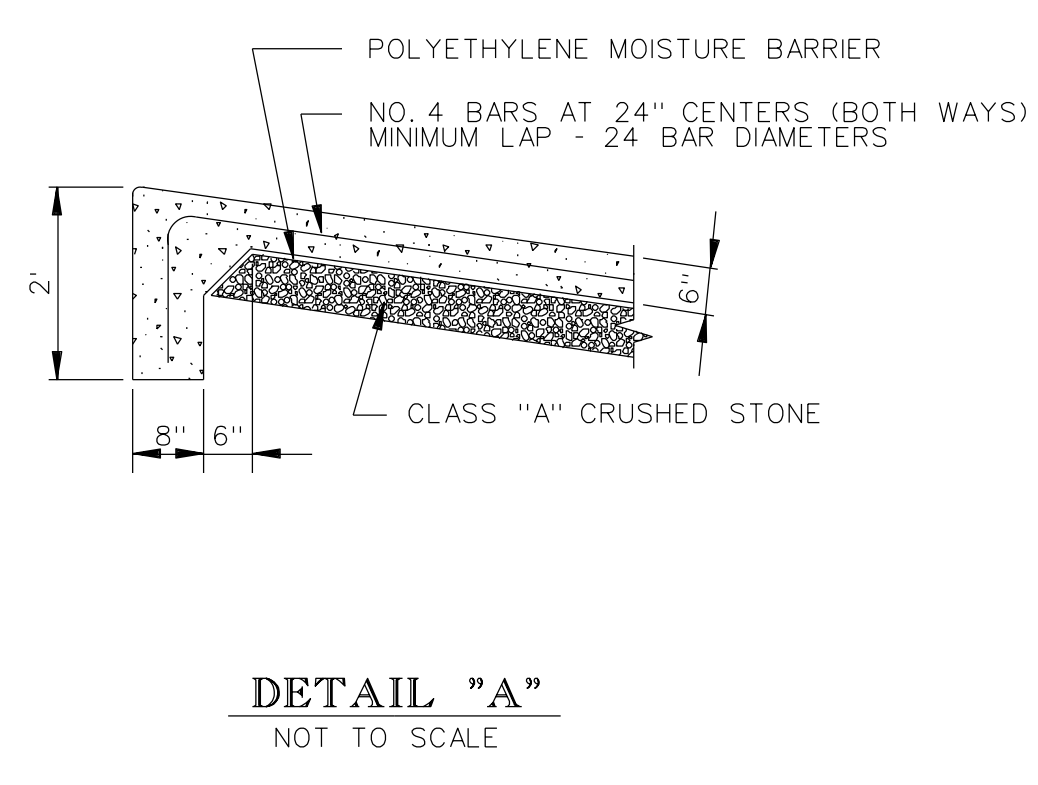
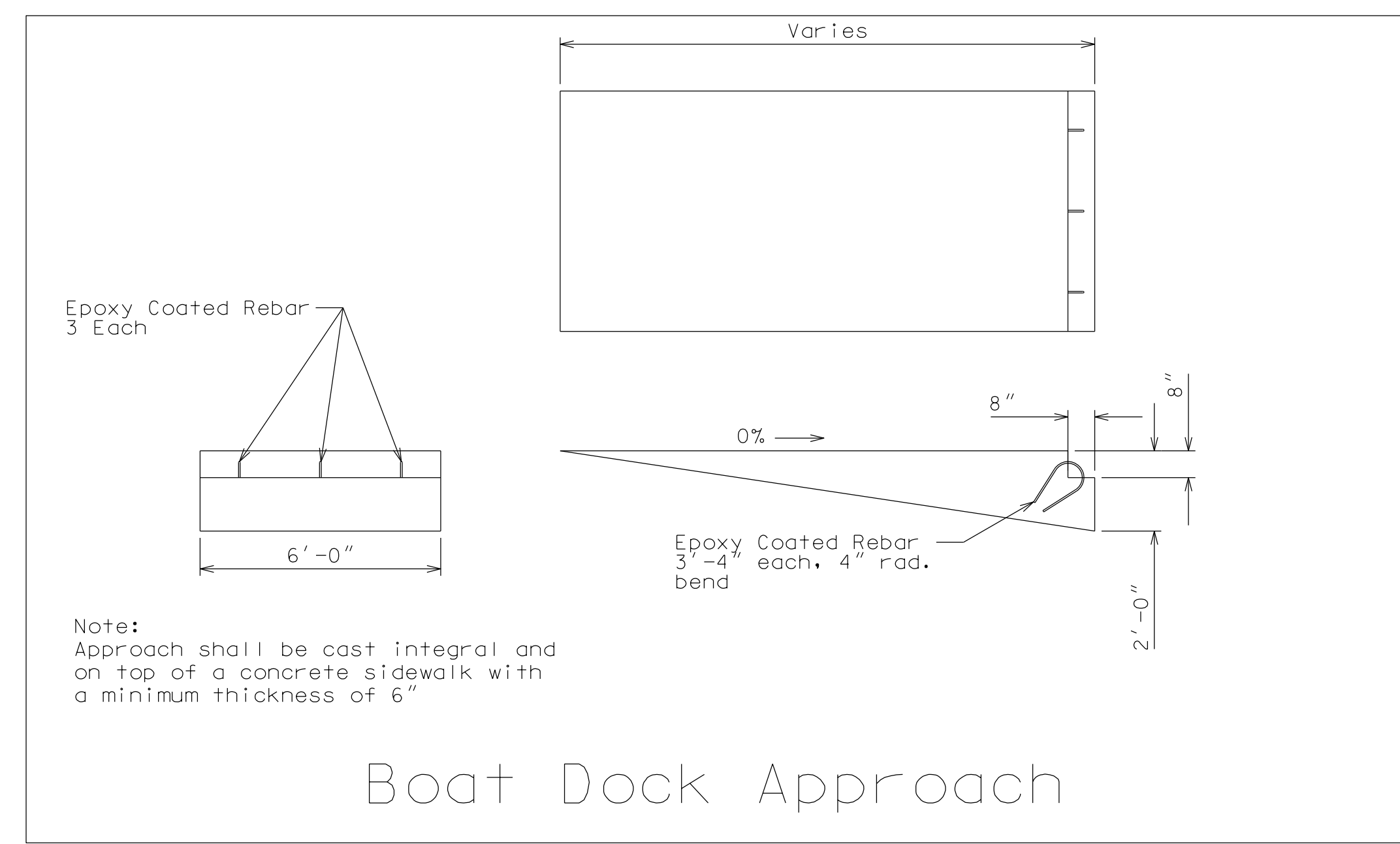


TYPICAL SECTION - FILL

**SECTION A - A**  
NOT TO SCALE

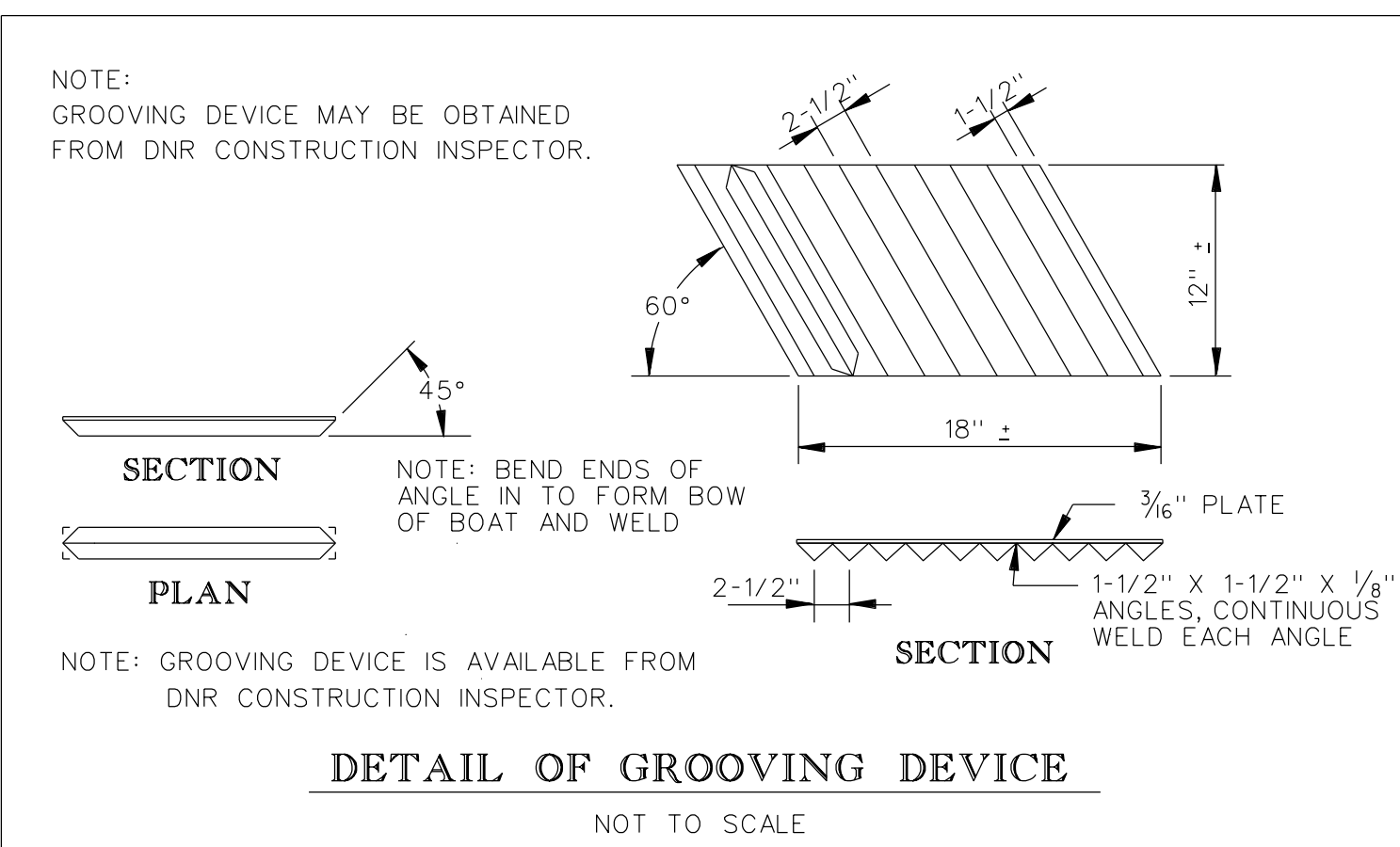
TYPICAL SECTION - CUT

**NOTE:**  
CONCRETE RAMP FINISH SHALL BE GROOVED DIAGONALLY TO FORM A NON-SKID SURFACE - MIN. 1" DEPTH, MAX. 2-1/2" BETWEEN GROOVES AND/OR AS DIRECTED BY THE INSPECTOR.



**GENERAL NOTES**

- ALL CONCRETE SHALL CONFORM TO CLASS "C" MIX 4 I. D. O. T. SPECIFICATION SERIES 2015
- ALL EXPOSED EDGES OF CONCRETE TO BE BEVELED WITH 3/4" CHAMFER STRIPS
- THE TOP 1" OF ALL EXPANSION JOINTS TO RECEIVE A SILICONE BASE POURING TYPE SEALER
- EXPANSION JOINTS - 3/4" PREFORMED RESILIENT FILLER MATERIAL
- REINFORCING STEEL - GRADE 40 - DEFORMED
- THAT PORTION OF THE RAMP TO BE PLACED BELOW THE WATERLINE MAY BE FORMED ABOVE THE WATERLINE AND CAREFULLY PUSHED INTO POSITION UNDERWATER TO THE LOCATION AND ELEVATION AS SHOWN ON THE PLAN AND AS APPROVED BY THE INSPECTOR. THE REMAINING SECTIONS OF THE RAMP SHALL BE FORMED AND POURED IN PLACE.



**NOTE:**  
EXPANSION JOINT MATERIAL, REINFORCING STEEL AND TIE BARS TO BE INCIDENTAL TO CONCRETE BID ITEM.

**Southeast Boat Ramp**

CONSULTANT:

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

**TYPICAL CROSS SECTIONS AND DETAILS**

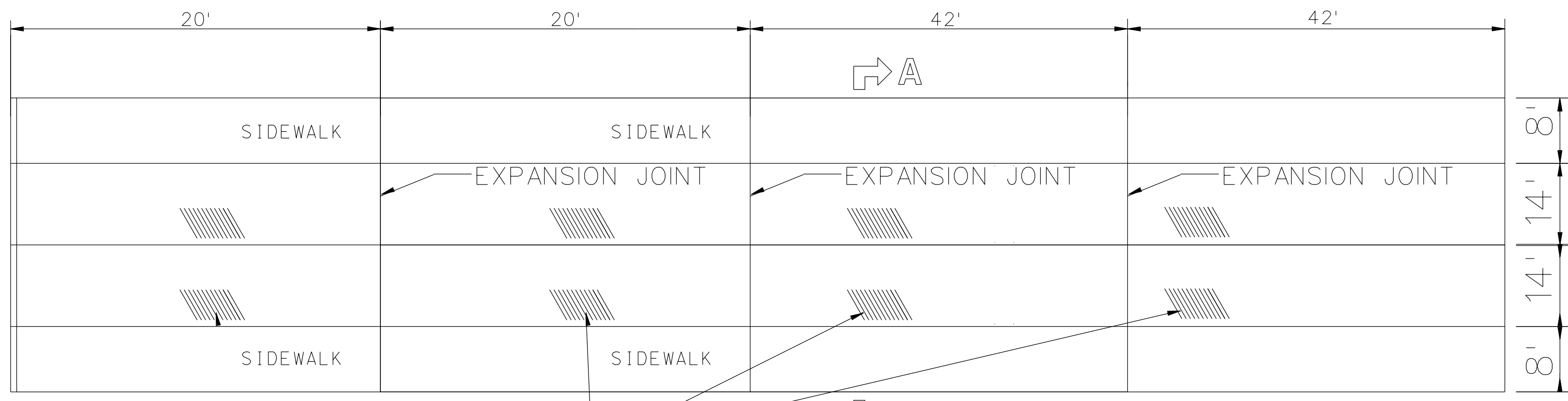
MECHANICAL DREDGING & SHORELINE ARMORING FOR:

**HICKORY GROVE PARK**

STORY COUNTY

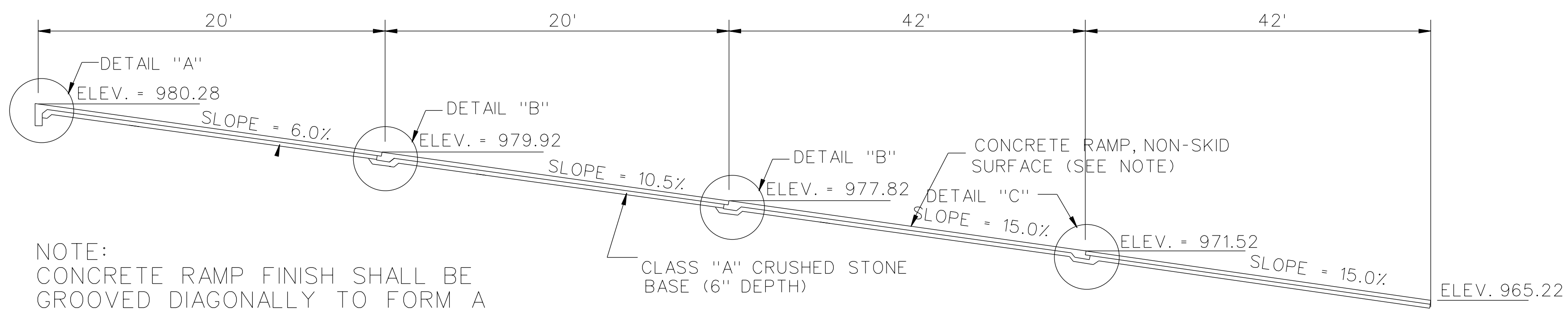
NO.	BY	REVISION

DRAWN BY: HD PROJECT NUMBER: 16-02-85-05  
CHKD BY: DATE: 10/2018



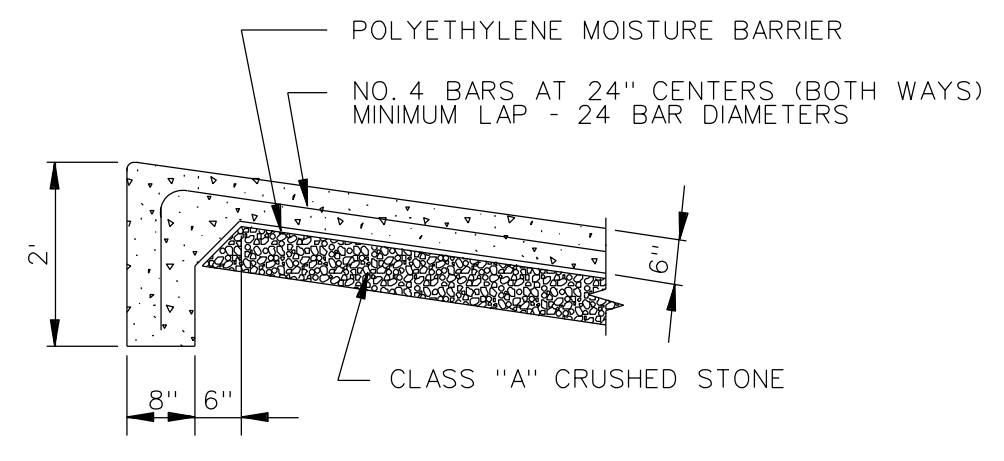
DIAGONALLY GROOVED FINISH  
(SEE NOTE BELOW)

**PLAN**  
NOT TO SCALE

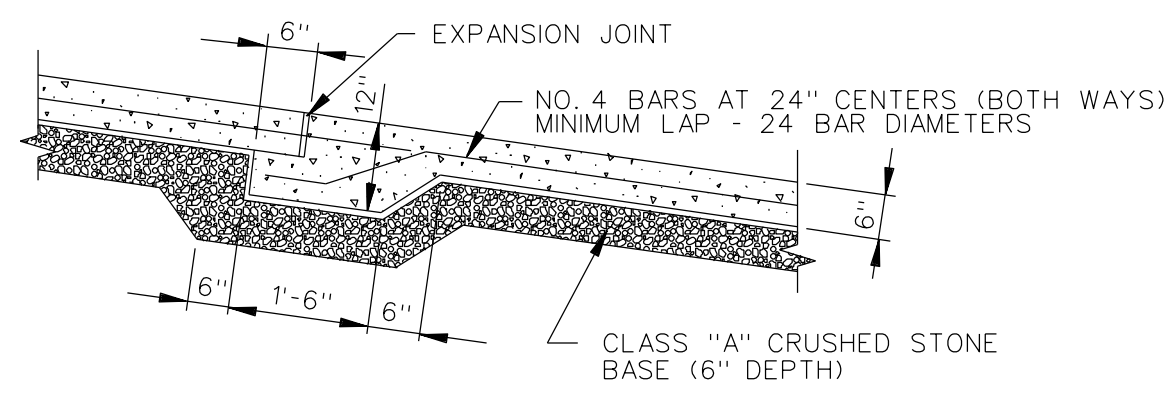


NOTE:  
CONCRETE RAMP FINISH SHALL BE  
GROOVED DIAGONALLY TO FORM A  
NON-SKID SURFACE - MIN. 1" DEPTH,  
MAX. 2-1/2" BETWEEN GROOVES AND/OR  
AS DIRECTED BY THE INSPECTOR.

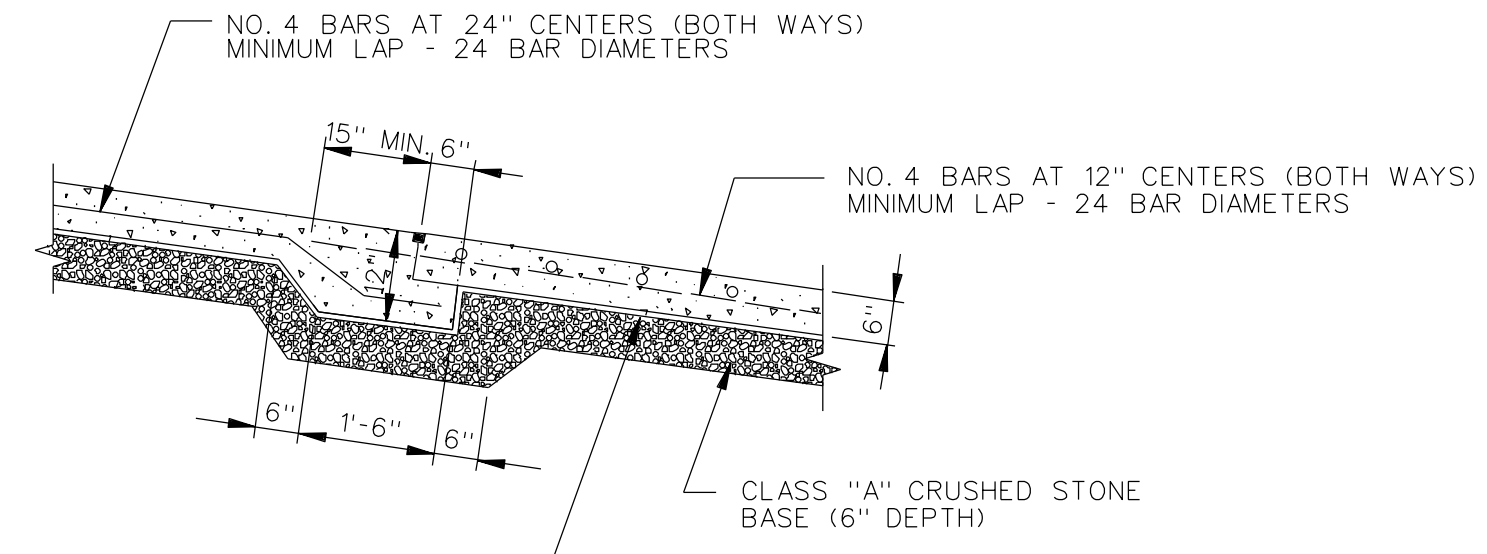
**PROFILE**  
NOT TO SCALE



**DETAIL "A"**  
NOT TO SCALE



**DETAIL "B"**  
NOT TO SCALE



**DETAIL "C"**  
NOT TO SCALE

# Main Boat Ramp

## GENERAL NOTES

ALL CONCRETE SHALL CONFORM TO CLASS "C" MIX 4 I. D. O. T. SPECIFICATION SERIES 2015

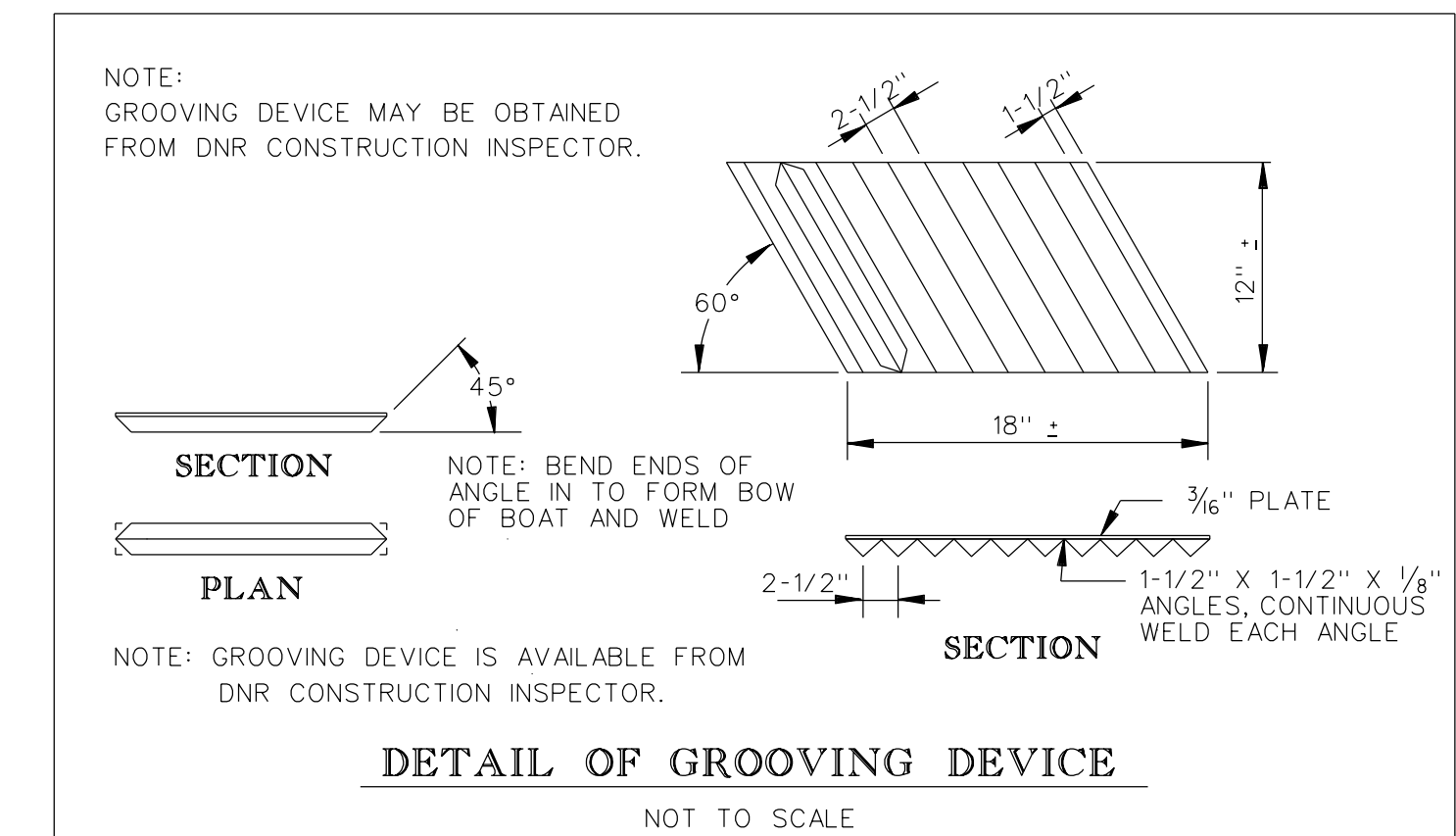
ALL EXPOSED EDGES OF CONCRETE TO BE BEVELED WITH 3/4" CHAMFER STRIPS

THE TOP 1" OF ALL EXPANSION JOINTS TO RECEIVE A SILICONE BASE POURING TYPE SEALER

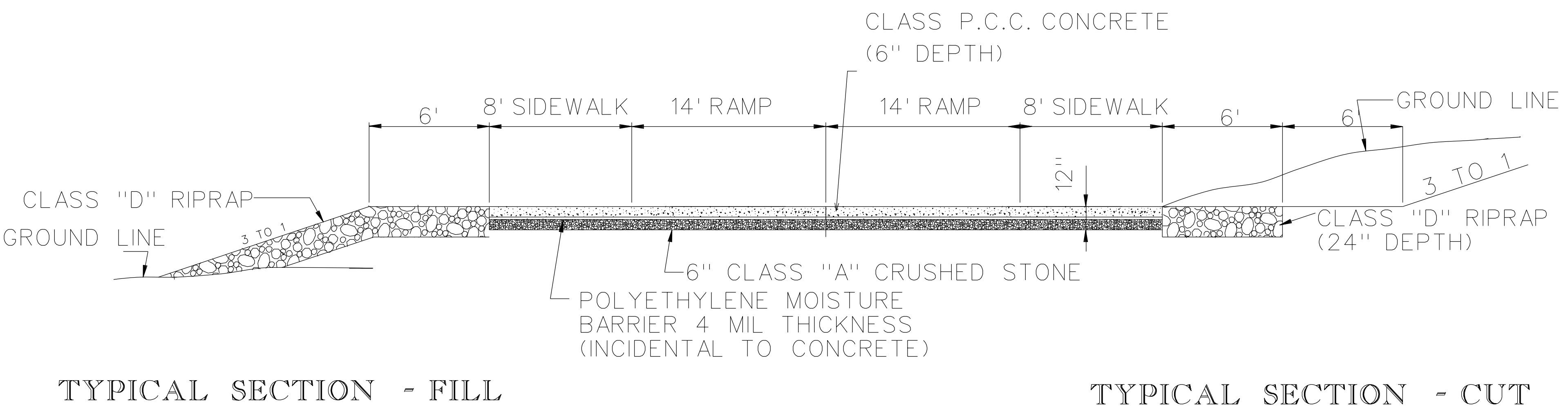
EXPANSION JOINTS - 3/4" PREFORMED RESILIENT FILLER MATERIAL  
REINFORCING STEEL - GRADE 40 - DEFORMED

THAT PORTION OF THE RAMP TO BE PLACED BELOW THE WATERLINE MAY BE FORMED ABOVE THE WATERLINE AND CAREFULLY PUSHED INTO POSITION UNDERWATER TO THE LOCATION AND ELEVATION AS SHOWN ON THE PLAN AND AS APPROVED BY THE INSPECTOR. THE REMAINING SECTIONS OF THE RAMP SHALL BE FORMED AND POURED IN PLACE.

NOTE:  
EXPANSION JOINT MATERIAL,  
REINFORCING STEEL  
AND TIE BARS TO BE INCIDENTAL TO  
CONCRETE BID ITEM.



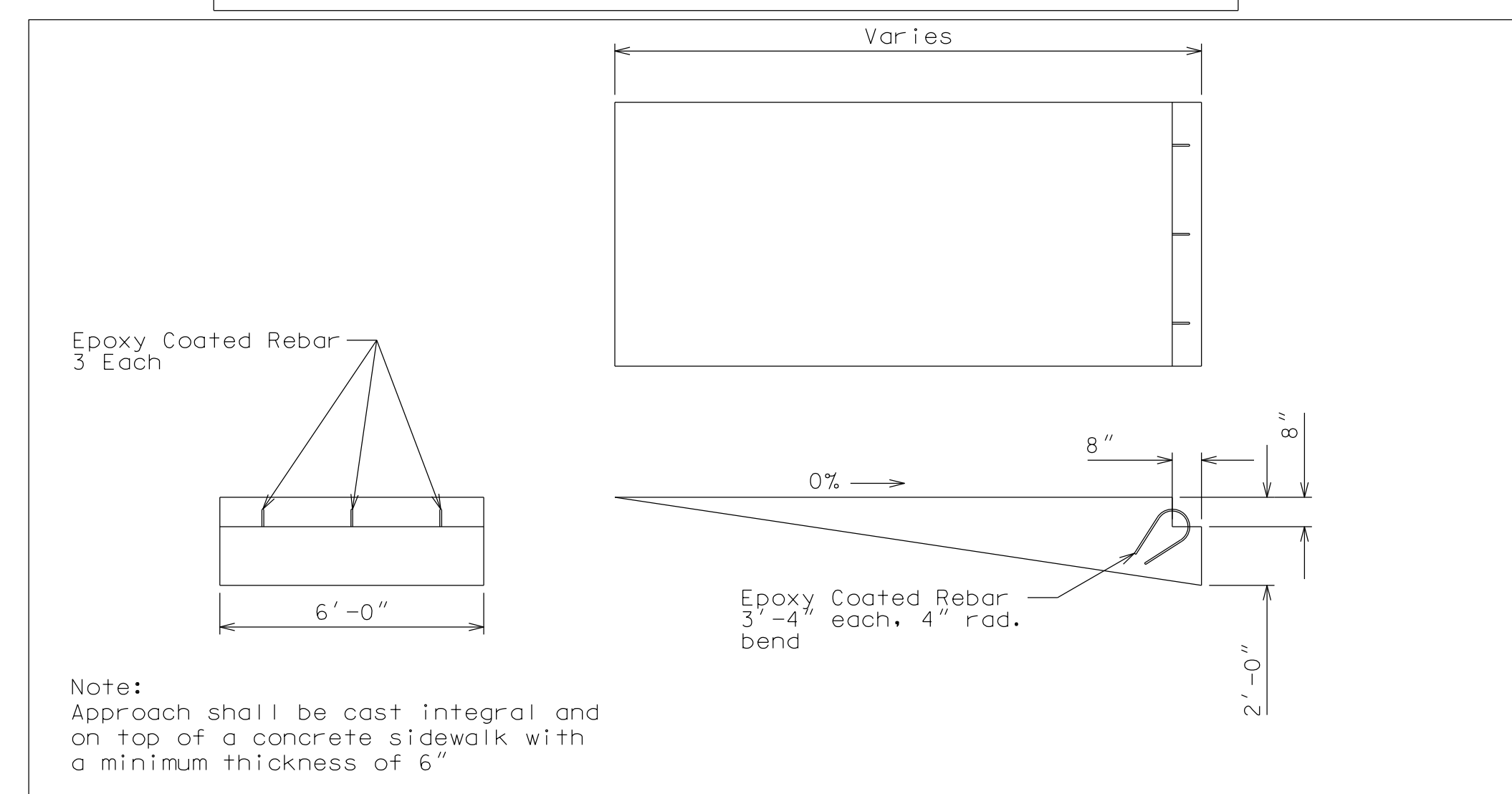
**DETAIL OF GROOVING DEVICE**  
NOT TO SCALE



**TYPICAL SECTION - FILL**

**TYPICAL SECTION - CUT**

**SECTION A - A**  
NOT TO SCALE



Note:  
Approach shall be cast integral and on top of a concrete sidewalk with a minimum thickness of 6"

Boat Dock Approach

CONSULTANT:



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



TYPICAL CROSS SECTIONS AND DETAILS

MECHANICAL DREDGING & SHORELINE ARMORING FOR:

HICKORY GROVE PARK

STORY COUNTY

NO.	BY	DATE	REVISION

DRAWN BY: PROJECT NUMBER:  
HD 16-02-85-05  
CHKD BY: DATE:  
10/2018

SHEET No: **B.04**

Description	Quantity	Unit
1 24" Dia CMP	418	Lin. Ft.
2 3/8" Minus Crushed Stone	6	Tons
3 30" Dia. CMP	45	Lin. Ft.
4 36" Dia. CMP	76	Lin. Ft.
5 5" PCC	84	SY
6 6" PCC	4530	SY
7 8" Dia. CMP	53	Lin. Ft.
8 942 Draw Down	2	Each
9 Class 10 Excavation (Embankment)	73279	CY
10 Class 10 Excavation (Waste)	21979	CY
11 Class A Crushed Stone	84	Tons
12 Class D Revetment	266	Tons
13 Class D Revetment - Linear Mounds - Labor Only	1300	Tons
14 Class D Revetment - Salvaged Rock - Labor Only	660	Tons
15 Class E Revetment	13688.6	Tons
16 Clearing and Grubbing	3.38	Acres
17 Compaction with Moisture and Density Control	29109	CY
18 Concrete Testing	1	Lump Sum
19 Construction Staking	1	Lump Sum
20 Dewatering	1	Lump Sum
21 Dock Abutment	4	Each
22 Engineering Fabric	1900	SY
23 Flexamat	962	Lin. Ft.
24 Handicap Signs	5	Each
25 In-Lake Access	1	Lump Sum
26 M&D Testing	1	Lump Sum
27 Mobilization	1	Lump Sum
28 Mulch Sock	7116	Lin. Ft.
29 Parking Bumpers	10	Each
30 Pavement Removal	1946	SY
31 Pavement Striping	1584	Lin. Ft.
32 Pedestrian Trail Bridge - 10' x 100'	1	Each
33 Porous Backfill - Pea Gravel - Labor Only	240	Tons
34 Precast Concrete Bridge Abutment System	2	Each
35 Seeding - Native Grass	12	Acres
36 Seeding - Stabilizing Crop	13.8	Acres
37 Service Vehicle Sign	1	Each
38 Site Restoration	1	Lump Sum
39 Special Backfill	1796	Tons
40 Structural Concrete	788	SY
41 Swale w/ Intake and Tile	1	Lump Sum
42 Traffic Control	1	Lump Sum
43 Woody Debris Removal	1	Lump Sum
Alternate 1		
44 Class 10 Excavation (Waste) Alternate 2	42382	CY
45 Class 10 Excavation (Waste) Alternate 3	11215	CY
46 Class A Crushed Stone	362	Tons
47 24" Dia CMP	40	Lin. Ft.
48 Class D Revetment	15	Tons
49 Engineering Fabric	25	SY
50 Canoe Access	1	Lump Sum

**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.

ESTIMATE REFERENCE INFORMATION	
ITEM NO.	DESCRIPTION
1	A. Payment for this bid item includes all material and labor to connect to an existing pipe, if necessary.
2	A. Material shall conform to gradation 21 and specification section 4125.
3	A. Payment for this bid item includes all material and labor to connect to an existing pipe, if necessary.
4	A. Payment for this bid item includes all material and labor to connect to an existing pipe, if necessary.
5	A. Control joints shall be incidental to this bid item and shall be spaced as directed by the DNR Engineer.
6	A. Control joint sawing, sealing, and center-steel is incidental to this bid item. B. Contractor shall submit joint plan to DNR Engineer for review and approval. Joint Plan shall conform to Iowa Department of Transportation standards. Joint construction shall follow the Iowa Department of Transportation Standard Road Plan PC-101. Joint spacing shall be approximately 12' O.C., and not exceeding 15'. The centerline joint along the driving lanes shall be centered in the lane, and shall be an "L" joint. Sidewalk cold joints shall meet detail "F". All other cold joints shall be a "KT" joint. 2' (min.) blockouts are required at acute angles.
7	A. Payment for this bid item includes all material and labor to connect to an existing pipe.
8	A. Payment for this item consists of drawing the lake down to elevation 942 on a date determined by the contractor, within the window designated herein. The purpose of the draw down is to allow DNR fishery biologists the opportunity to manage rough fish. The contractor shall provide a two-week notice prior to the draw down. Continued dewatering pumping may resume no sooner than four weeks after 942 pool is achieved. B. This line item is for "2 each". The window for the first draw down is between ice-out of 2019 and 5/1/2019. The window for the second draw down is between 9/15/2019 and 11/30/2019. C. The initial draw down rate is limited to one foot per day, to prevent sloughing. D. Intake depth shall be no less than 5' below water surface. E. A trash screen shall be used on the inlet with openings no larger than 3".
9	A. 30% has been added to this bid item to account for shrinkage. B. Topsoil to be stripped and stockpiled and respread to a minimum depth of 4".
10	A. No shrink has been added to this bid item. B. It is expected that the material used for the earth core of the proposed habitat linear mound and salvaged rock mounds will be constructed from this material.
11	A. Material shall conform to gradations 12a, 12b, 14, 30, or 31, and their respective specification sections.
13	A. Story County Conservation shall purchase this material. The contractor shall be responsible for hauling and placement.
14	A. Material for this bid item shall be sourced from the existing shoreline that is immediately adjacent to the proposed mound locations.
17	A. Per section 2107
19	A. An three dimensional DGN file with design information will be provided to the contractor upon execution of the contract.
20	A. Payment for this bid item includes all necessary expenses to adequately dewater the construction site. B. The initial draw down rate is limited to one foot per day, to prevent sloughing. C. Intake depth shall be no less than 5' below water surface. D. A trash screen shall be used on the inlet with openings no larger than 3".
23	A. Payment for this bid item includes all necessary materials and labor to construct the Shoreline Armoring Detail B.
26	A. Contractor shall hire an independant geotechnical firm to conduct Moisture and Density testing during construction. All testing shall be conducted under the supervision of an engineer licensed by the State of Iowa.
28	A. Mulch filter socks shall be 8" diameter.
29	A. Parking Bumpers shall be constructed of steel reinforced concrete, and anchored into pavement with epoxy coated #4 rebar or ½" dowels, 18-inch length.
30	A. Existing HMA pavement is assumed to be 4" thick. B. Asphalt millings meeting gradation 10 may be spread on existing granular surfaced parking areas, as allowed by the engineer.
31	A. Pavement striping shall be yellow.
33	A. Story County Conservation shall purchase this material. The contractor shall be responsible for hauling and placement. B. Material shall consist of pea gravel (river rock) meeting gradation 29.
35	A. All disturbed areas, with the exceptions of the Primary Spoil Site and the Secondary Spoil Site shall by hydro seeded and hydro mulched with the Native Grass seed mix.
36	A. Disturbed areas within the Primary Spoil Site and the Secondary Spoil Site shall be hydroseeded and hydro mulched with the Rural Stabilizing Crop.
39	A. Material shall conform to gradations 14, 30, or 31, and their respective specification sections.
42	A. Traffic control shall consist of class III barricades at the entrance to the boat ramp, on the road at the west end of the spoil sites, and truck traffic signs along the county highways near active haul routes.
46	A. This bid item will be accepted if Alternate 1 is accepted, Alternate 2 is accepted, or both.
47	A. This bid item will be accepted if Alternate 1 is accepted, Alternate 2 is accepted, or both.
48	A. This bid item will be accepted if Alternate 1 is accepted, Alternate 2 is accepted, or both.
49	A. This bid item will be accepted if Alternate 1 is accepted, Alternate 2 is accepted, or both.
50	A. This bid item will be accepted if Alternate 1 is accepted, Alternate 2 is accepted, or both.

CONSULTANT:



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



**QUANTITIES AND GENERAL NOTES**

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**

STORY COUNTY

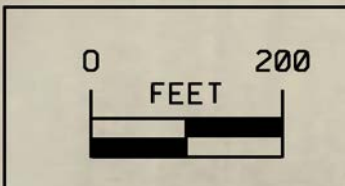
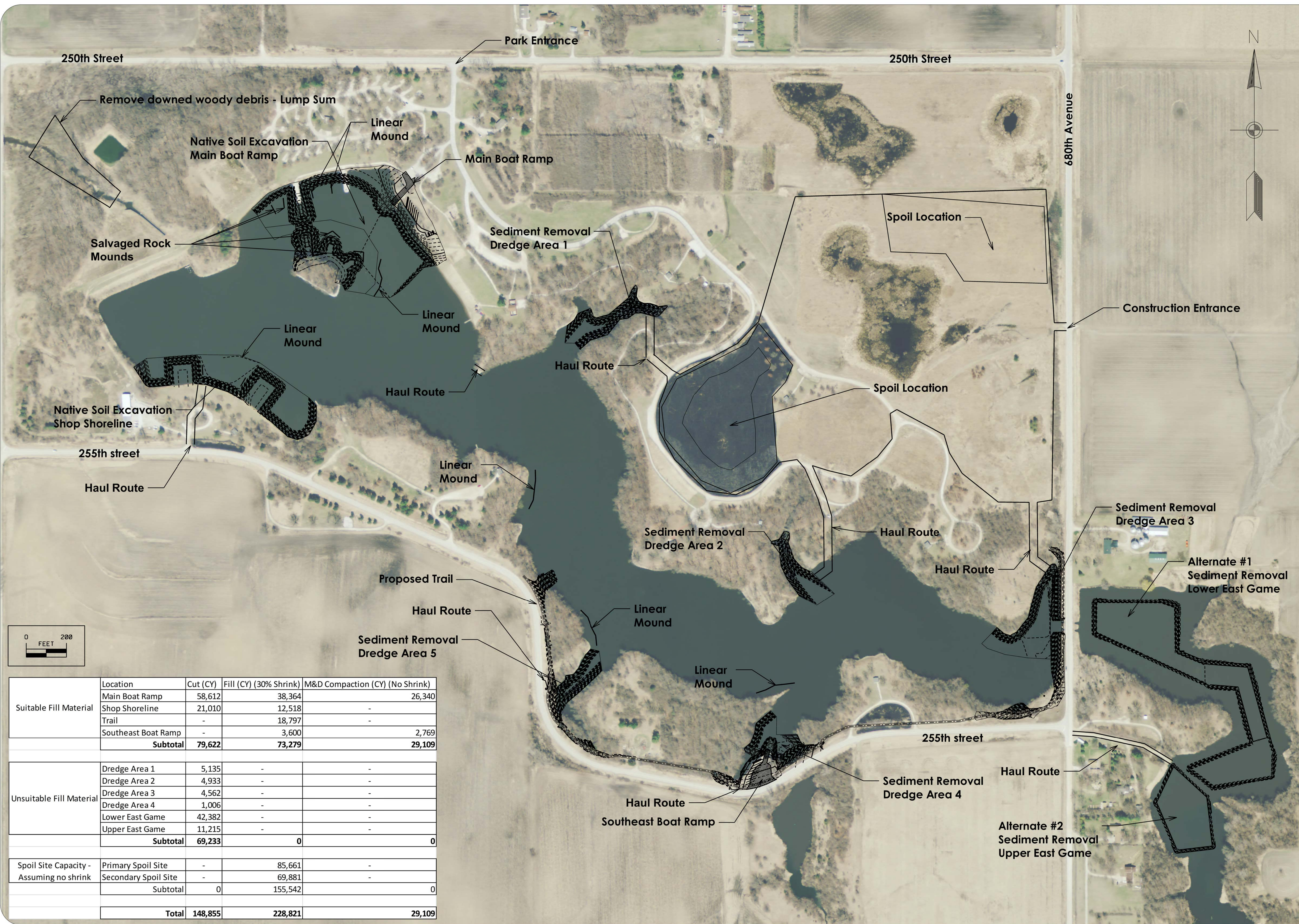
NO. BY DATE REVISION

DRAWN BY: PROJECT NUMBER:  
HD 16-02-85-05

CHKD BY: DATE:  
10/2018

SHEET No:

**C.01**



	Location	Cut (CY)	Fill (CY) (30% Shrink)	M&D Compaction (CY) (No Shrink)
Suitable Fill Material	Main Boat Ramp	58,612	38,364	26,340
	Shop Shoreline	21,010	12,518	-
	Trail	-	18,797	-
	Southeast Boat Ramp	-	3,600	2,769
	<b>Subtotal</b>	<b>79,622</b>	<b>73,279</b>	<b>29,109</b>
Unsuitable Fill Material	Dredge Area 1	5,135	-	-
	Dredge Area 2	4,933	-	-
	Dredge Area 3	4,562	-	-
	Dredge Area 4	1,006	-	-
	Lower East Game	42,382	-	-
	Upper East Game	11,215	-	-
	<b>Subtotal</b>	<b>69,233</b>	<b>0</b>	<b>0</b>
Spoil Site Capacity - Assuming no shrink	Primary Spoil Site	-	85,661	-
	Secondary Spoil Site	-	69,881	-
	<b>Subtotal</b>	<b>0</b>	<b>155,542</b>	<b>0</b>
	<b>Total</b>	<b>148,855</b>	<b>228,821</b>	<b>29,109</b>

CONSULTANT:



**STORY COUNTY CONSERVATION**

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



**DNR**

**Overall Plan**  
MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**  
STORY COUNTY

NO.	BY DATE	REVISION

DRAWN BY: HD      PROJECT NUMBER: 16-02-85-05  
 CHKCD BY:      DATE: 10/2018  
 SHEET No: **D.01**



**Main Boat Ramp  
Shoreline Deepening**  
Cut - 58,612 CY  
Fill - 38,364 CY incl. 30% shrink

Moisture and Density control  
required - 6,704 CY

Remove existing CMP  
Install new CMP  
24" Dia. CMP - 135 LF

Moisture and Density control  
required - 19,636 CY

**Dredge Area 1  
Sediment Removal**  
Cut - 5,135 CY

**Shop Shoreline  
Shoreline Deepening**  
Cut - 21,010 CY  
Fill - 12,518 CY incl. 30% shrink

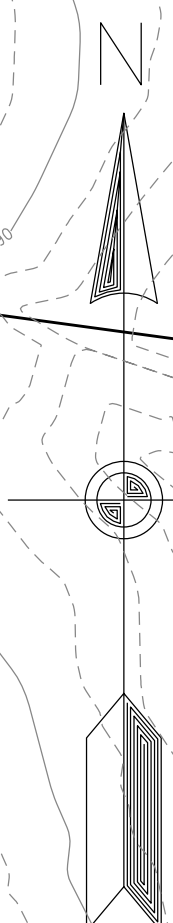
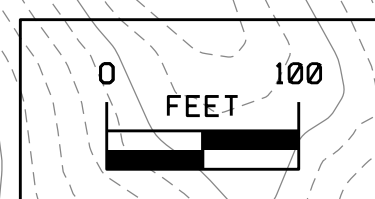
Haul Route

Haul Route

Haul Route

**Note:**

Suitable material shall be placed as shown for the fill portions of the Main Boat Ramp Shoreline Deepening area and the Shop Shoreline Deepening area.



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**DREDGE PLAN**

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**

STORY COUNTY

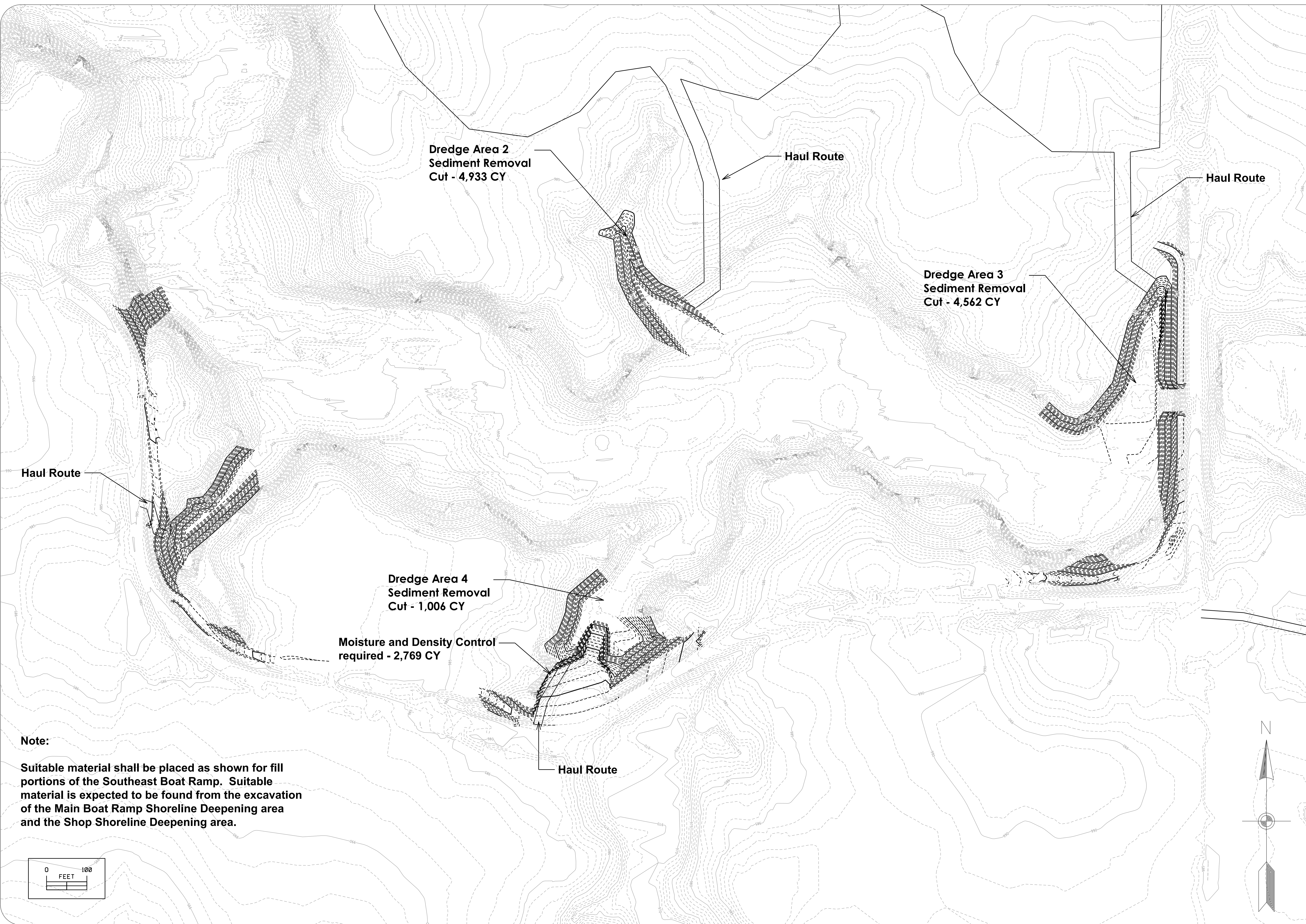
NO.	BY	DATE	REVISION

DRAWN BY: HD PROJECT NUMBER: 16-02-85-05

CHKD BY: DATE: 10/2018

SHEET No:

**D.02**



**Dredge Area 2  
Sediment Removal  
Cut - 4,933 CY**

**Haul Route**

**Haul Route**

**Dredge Area 3  
Sediment Removal  
Cut - 4,562 CY**

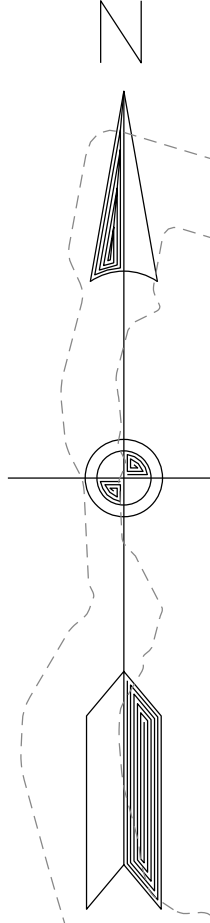
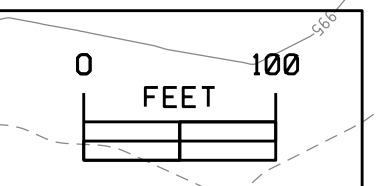
**Haul Route**

**Dredge Area 4  
Sediment Removal  
Cut - 1,006 CY**


**Moisture and Density Control  
required - 2,769 CY**

**Haul Route**

**Note:**  
Suitable material shall be placed as shown for fill portions of the Southeast Boat Ramp. Suitable material is expected to be found from the excavation of the Main Boat Ramp Shoreline Deepening area and the Shop Shoreline Deepening area.



CONSULTANT:




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502 E. 9TH ST., DES MOINES, IA 50319-0034

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**DREDGE PLAN**

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**

STORY COUNTY

NO.	BY	DATE	REVISION

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DRAWN BY: HD	PROJECT NUMBER: 16-02-85-05
CHK'D BY:	DATE: 10/2018

D.03

Haul Route

An existing 54" dia. x 200' elongated CMP with an approximate flowline of 951.5 is located north of the existing twin road culverts.

Alternate #1  
Lower East Game  
Sediment Removal  
Cut - 42,382 CY

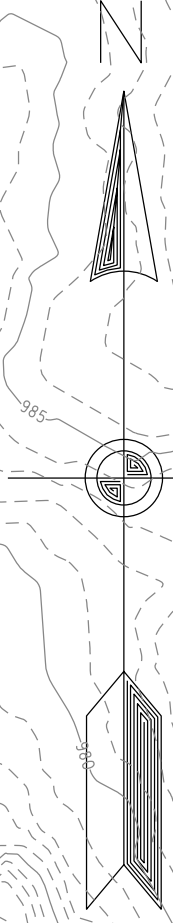
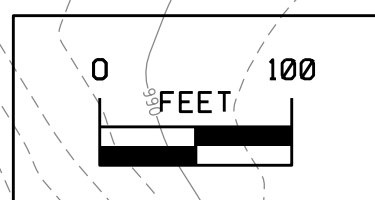
Alternate #3  
Install new culvert  
24" Dia. CMP - 40 LF  
Install two rock check dams downstream  
of the culvert  
Class D Revetment - 15 tons  
Engineering Fabric - 25 SY

Haul Route

Alternate #3  
Upon completion of the dredging operation,  
contractor shall restore haul road, and  
spread 362 tons of Class A Crushed Stone.

Alternate #3  
Place a 16' x 16' grid of Truegrid Pro Plus  
(or approved equal) permeable pavers  
filled with pea gravel on a 10% grade,  
as directed by the Engineer.  
Canoe Access - Lump Sum

Alternate #2  
Upper East Game  
Sediment Removal  
Cut - 11,215 CY



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ALTERNATE DREDGE PLAN

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
HICKORY GROVE PARK

STORY COUNTY

NO. BY DATE REVISION

DRAWN BY: PROJECT NUMBER:  
HD 16-02-85-05

CHKD BY: DATE:  
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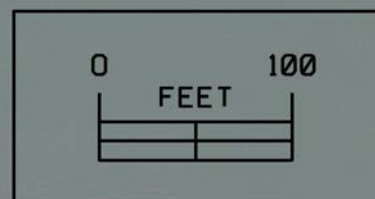
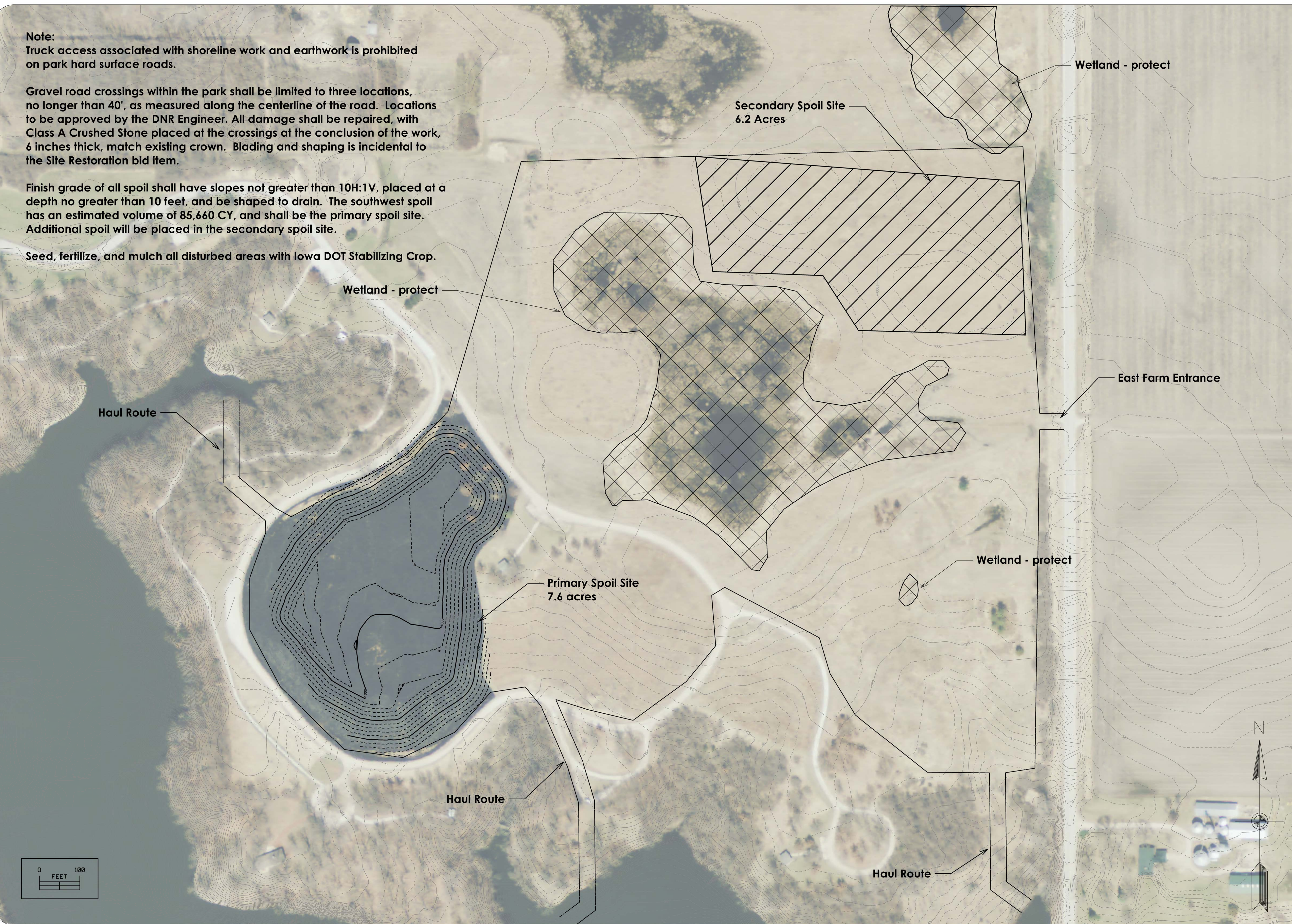
D.04

**Note:**  
Truck access associated with shoreline work and earthwork is prohibited on park hard surface roads.

Gravel road crossings within the park shall be limited to three locations, no longer than 40', as measured along the centerline of the road. Locations to be approved by the DNR Engineer. All damage shall be repaired, with Class A Crushed Stone placed at the crossings at the conclusion of the work, 6 inches thick, match existing crown. Blading and shaping is incidental to the Site Restoration bid item.

Finish grade of all spoil shall have slopes not greater than 10H:1V, placed at a depth no greater than 10 feet, and be shaped to drain. The southwest spoil has an estimated volume of 85,660 CY, and shall be the primary spoil site. Additional spoil will be placed in the secondary spoil site.

Seed, fertilize, and mulch all disturbed areas with Iowa DOT Stabilizing Crop.



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**Spoil Plan**  
MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**  
STORY COUNTY

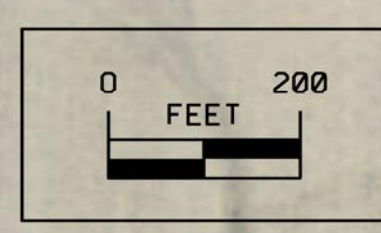
NO.	BY DATE	REVISION

DRAWN BY: HD  
PROJECT NUMBER: 16-02-85-05  
CHKD BY: DATE: 10/2018


SHEET No: **D.05**




**Note:**  
 All woody debris may be burned and buried within the lake. Trees larger than 10" may be placed whole in the lake, as directed by the Engineer.  
 Clearing associated with the haul roads is incidental.



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**Clearing and Grubbing**  
 MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**  
 STORY COUNTY

NO.	BY DATE	REVISION

DRAWN BY: HD PROJECT NUMBER: 16-02-85-05  
 CHK'D BY: DATE: 10/2018  
 SHEET No: **D.06**



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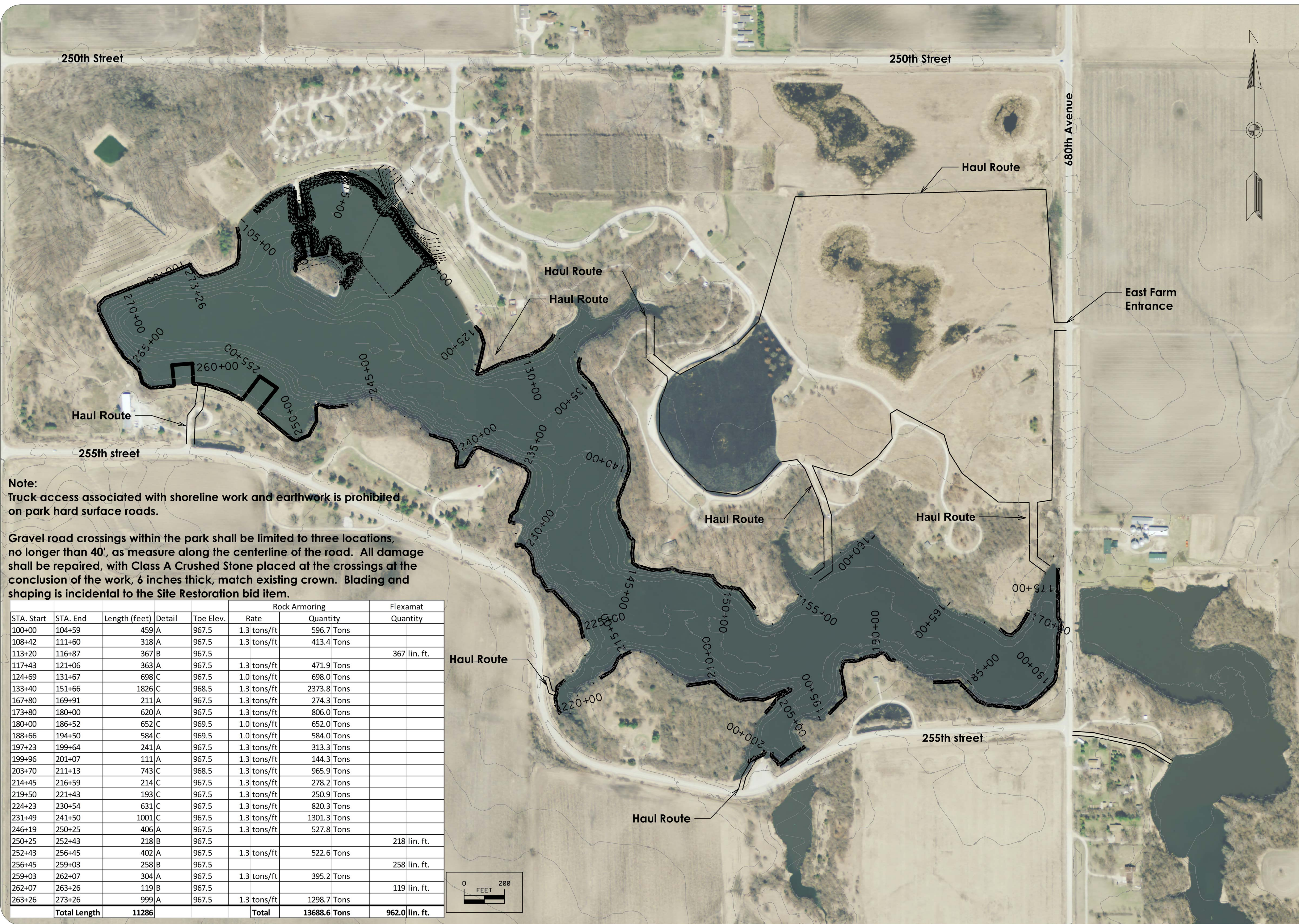


**Erosion Control**  
MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**  
STORY COUNTY

NO.	BY DATE	REVISION

DRAWN BY: HD      PROJECT NUMBER: 16-02-85-05  
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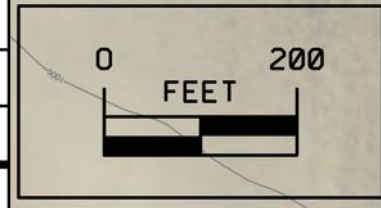
SHEET No: **D.07**



**Note:**  
Truck access associated with shoreline work and earthwork is prohibited on park hard surface roads.

Gravel road crossings within the park shall be limited to three locations, no longer than 40', as measure along the centerline of the road. All damage shall be repaired, with Class A Crushed Stone placed at the crossings at the conclusion of the work, 6 inches thick, match existing crown. Blading and shaping is incidental to the Site Restoration bid item.

STA. Start	STA. End	Length (feet)	Detail	Toe Elev.	Rock Armoring		Flexamat Quantity
					Rate	Quantity	
100+00	104+59	459	A	967.5	1.3 tons/ft	596.7 Tons	
108+42	111+60	318	A	967.5	1.3 tons/ft	413.4 Tons	
113+20	116+87	367	B	967.5			367 lin. ft.
117+43	121+06	363	A	967.5	1.3 tons/ft	471.9 Tons	
124+69	131+67	698	C	967.5	1.0 tons/ft	698.0 Tons	
133+40	151+66	1826	C	968.5	1.3 tons/ft	2373.8 Tons	
167+80	169+91	211	A	967.5	1.3 tons/ft	274.3 Tons	
173+80	180+00	620	A	967.5	1.3 tons/ft	806.0 Tons	
180+00	186+52	652	C	969.5	1.0 tons/ft	652.0 Tons	
188+66	194+50	584	C	969.5	1.0 tons/ft	584.0 Tons	
197+23	199+64	241	A	967.5	1.3 tons/ft	313.3 Tons	
199+96	201+07	111	A	967.5	1.3 tons/ft	144.3 Tons	
203+70	211+13	743	C	968.5	1.3 tons/ft	965.9 Tons	
214+45	216+59	214	C	967.5	1.3 tons/ft	278.2 Tons	
219+50	221+43	193	C	967.5	1.3 tons/ft	250.9 Tons	
224+23	230+54	631	C	967.5	1.3 tons/ft	820.3 Tons	
231+49	241+50	1001	C	967.5	1.3 tons/ft	1301.3 Tons	
246+19	250+25	406	A	967.5	1.3 tons/ft	527.8 Tons	
250+25	252+43	218	B	967.5			218 lin. ft.
252+43	256+45	402	A	967.5	1.3 tons/ft	522.6 Tons	
256+45	259+03	258	B	967.5			258 lin. ft.
259+03	262+07	304	A	967.5	1.3 tons/ft	395.2 Tons	
262+07	263+26	119	B	967.5			119 lin. ft.
263+26	273+26	999	A	967.5	1.3 tons/ft	1298.7 Tons	
<b>Total Length</b>		<b>11286</b>			<b>Total</b>	<b>13688.6 Tons</b>	<b>962.0 lin. ft.</b>



CONSULTANT:

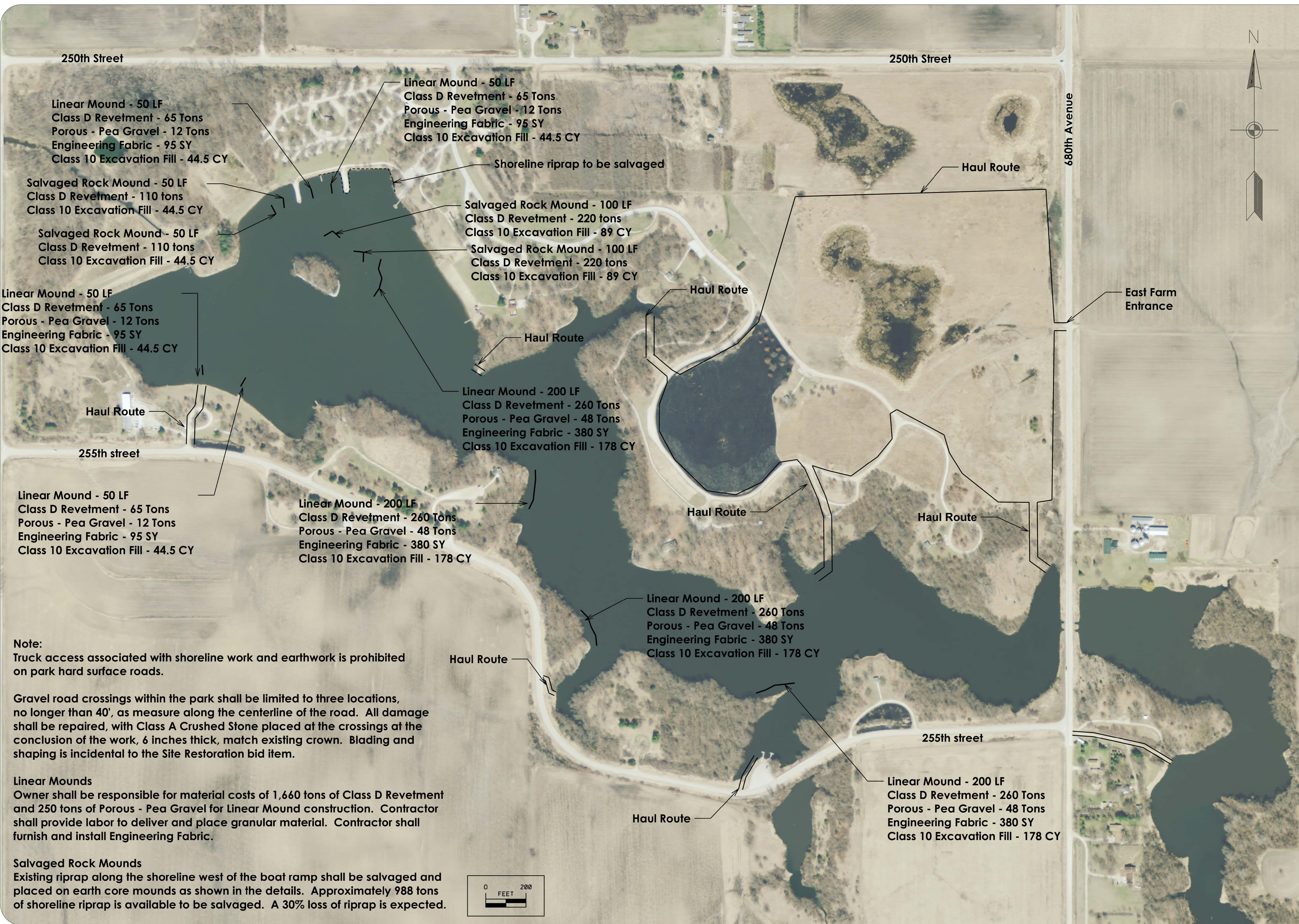
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502 E. 9TH ST., DES MOINES, IA, 50319-0034

Shoreline Armoring  
MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**  
STORY COUNTY

NO.	BY	DATE	REVISION

DRAWN BY: HD	PROJECT NUMBER: 16-02-85-05
CHK'D BY:	DATE: 10/2018

SHEET No: **E.01**



250th Street

250th Street

680th Avenue

East Farm Entrance

255th street

255th street

Linear Mound - 50 LF  
Class D Revetment - 65 Tons  
Porous - Pea Gravel - 12 Tons  
Engineering Fabric - 95 SY  
Class 10 Excavation Fill - 44.5 CY

Linear Mound - 50 LF  
Class D Revetment - 65 Tons  
Porous - Pea Gravel - 12 Tons  
Engineering Fabric - 95 SY  
Class 10 Excavation Fill - 44.5 CY

Shoreline riprap to be salvaged

Salvaged Rock Mound - 50 LF  
Class D Revetment - 110 tons  
Class 10 Excavation Fill - 44.5 CY

Salvaged Rock Mound - 100 LF  
Class D Revetment - 220 tons  
Class 10 Excavation Fill - 89 CY

Salvaged Rock Mound - 50 LF  
Class D Revetment - 110 tons  
Class 10 Excavation Fill - 44.5 CY

Salvaged Rock Mound - 100 LF  
Class D Revetment - 220 tons  
Class 10 Excavation Fill - 89 CY

Linear Mound - 50 LF  
Class D Revetment - 65 Tons  
Porous - Pea Gravel - 12 Tons  
Engineering Fabric - 95 SY  
Class 10 Excavation Fill - 44.5 CY

Linear Mound - 200 LF  
Class D Revetment - 260 Tons  
Porous - Pea Gravel - 48 Tons  
Engineering Fabric - 380 SY  
Class 10 Excavation Fill - 178 CY

Linear Mound - 200 LF  
Class D Revetment - 260 Tons  
Porous - Pea Gravel - 48 Tons  
Engineering Fabric - 380 SY  
Class 10 Excavation Fill - 178 CY

Linear Mound - 50 LF  
Class D Revetment - 65 Tons  
Porous - Pea Gravel - 12 Tons  
Engineering Fabric - 95 SY  
Class 10 Excavation Fill - 44.5 CY

Linear Mound - 200 LF  
Class D Revetment - 260 Tons  
Porous - Pea Gravel - 48 Tons  
Engineering Fabric - 380 SY  
Class 10 Excavation Fill - 178 CY

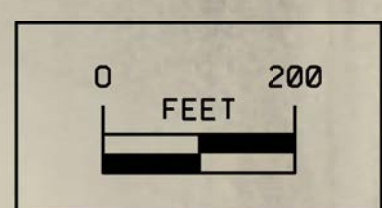
Linear Mound - 200 LF  
Class D Revetment - 260 Tons  
Porous - Pea Gravel - 48 Tons  
Engineering Fabric - 380 SY  
Class 10 Excavation Fill - 178 CY

**Note:**  
Truck access associated with shoreline work and earthwork is prohibited on park hard surface roads.

Gravel road crossings within the park shall be limited to three locations, no longer than 40', as measure along the centerline of the road. All damage shall be repaired, with Class A Crushed Stone placed at the crossings at the conclusion of the work, 6 inches thick, match existing crown. Blading and shaping is incidental to the Site Restoration bid item.

**Linear Mounds**  
Owner shall be responsible for material costs of 1,660 tons of Class D Revetment and 250 tons of Porous - Pea Gravel for Linear Mound construction. Contractor shall provide labor to deliver and place granular material. Contractor shall furnish and install Engineering Fabric.

**Salvaged Rock Mounds**  
Existing riprap along the shoreline west of the boat ramp shall be salvaged and placed on earth core mounds as shown in the details. Approximately 988 tons of shoreline riprap is available to be salvaged. A 30% loss of riprap is expected.



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Fish Habitat

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
HICKORY GROVE PARK

STORY COUNTY

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E.02



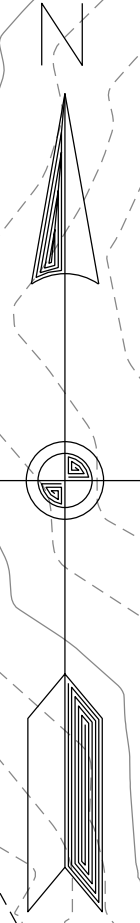
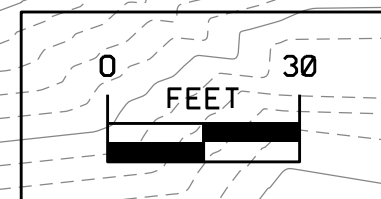
**Note:**  
 Pedestrian bridge to have a 100-foot span, 10-foot width, deck type to be pressure treated wood, finish to be weathering steel

Place rock pad at abutment.  
 10' x 10' x 6" thick  
 3/8" Minus Crushed Stone - 3 tons

Place rock pad at abutment.  
 10' x 10' x 6" thick  
 3/8" Minus Crushed Stone - 3 tons

Install 10' x 100' Contech Express Truss Pedestrian bridge with Contech Precast Abutment System as manufactured by Contech Engineered Solutions, LLC of Shakopee MN, or approved equal.

**Bridge Deck Elevation: 977.50'**



CONSULTANT:



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**Trail Bridge Plan**

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**

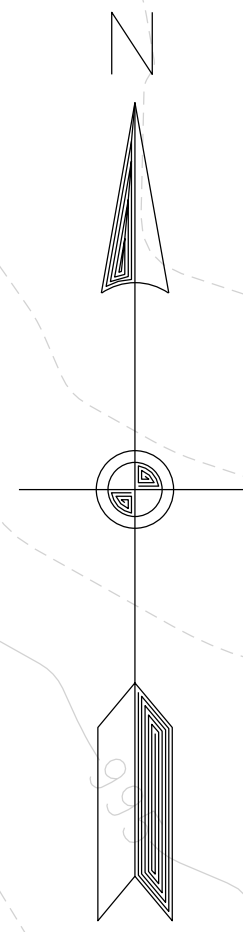
STORY COUNTY

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CHKD BY:	DATE: 10/2018

SHEET No:

**E.03**



Pavement Removal - 613 SY  
Sawcut existing asphalt pavement,  
incidental to pavement removal

N: 4959334.46  
E: 3460157.20  
Elev.: 980.28

N: 4959388.24  
E: 3460196.68  
Elev.: 981.58

N: 4959404.05  
E: 3460203.74  
Elev.: 982.00

N: 4959417.84  
E: 3460184.07  
Elev.: 982.00

N: 4959401.72  
E: 3460173.80  
Elev.: 981.58

N: 4959427.81  
E: 3460135.33  
Elev.: 981.58

N: 4959413.88  
E: 3460125.89  
Elev.: 981.24

N: 4959424.04  
E: 3460111.08  
Elev.: 981.00

Parking lot and maneuvering area  
6" PCC - 2,454 SY  
Special Backfill - 803 Tons  
Pavement Striping - 944 LF  
Parking Bumpers - 10 Each

Boat Ramp  
Structural Concrete - 592 SY  
Special Backfill - 186 Tons  
Class D Revetment - 160 Tons  
Dock Abutment - 2 Each

N: 4959494.37  
E: 3460008.64  
Elev.: 981.00

N: 4959384.12  
E: 3460083.96  
Elev.: 980.28

Handicap Sign  
1 each

N: 4959519.64  
E: 3459971.83  
Elev.: 981.00

N: 4959393.34  
E: 3460090.21  
Elev.: 980.44

N: 4959433.45  
E: 3459965.92  
Elev.: 979.88

N: 4959535.29  
E: 3459935.14  
Elev.: 980.41

N: 4959383.79  
E: 3460038.81  
Elev.: 979.88

N: 4959443.63  
E: 3459930.95  
Elev.: 979.59

N: 4959545.67  
E: 3459911.25  
Elev.: 980.02

N: 4959478.56  
E: 3459912.93  
Elev.: 979.52

Handicap Sign  
3 Each

Service Vehicle Sign  
1 Each

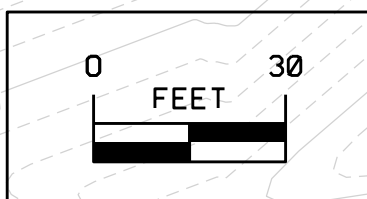
N: 4959490.56  
E: 3459887.56  
Elev.: 979.12

N: 4959527.98  
E: 3459800.50  
Elev.: 974.12

Construct 6" deep drainage swale with  
intake and tile outlet - See sheet B.02  
Lump Sum

N: 4959580.17  
E: 3459780.22  
Elev.: 972.00

Sidewalk  
5" PCC - 84 SY  
Special Backfill - 26 Tons



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Main Ramp

MECHANICAL DREDGING & SHORELINE ARMORING FOR:

HICKORY GROVE PARK

STORY COUNTY

NO. BY DATE REVISION

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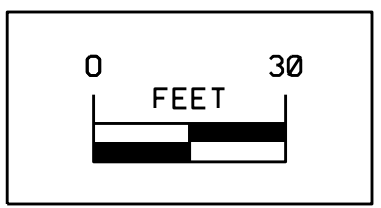
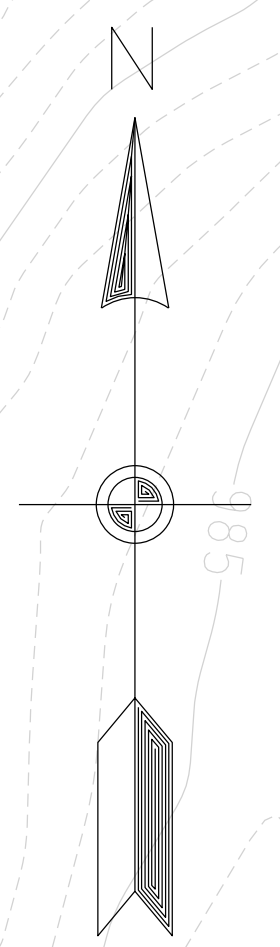
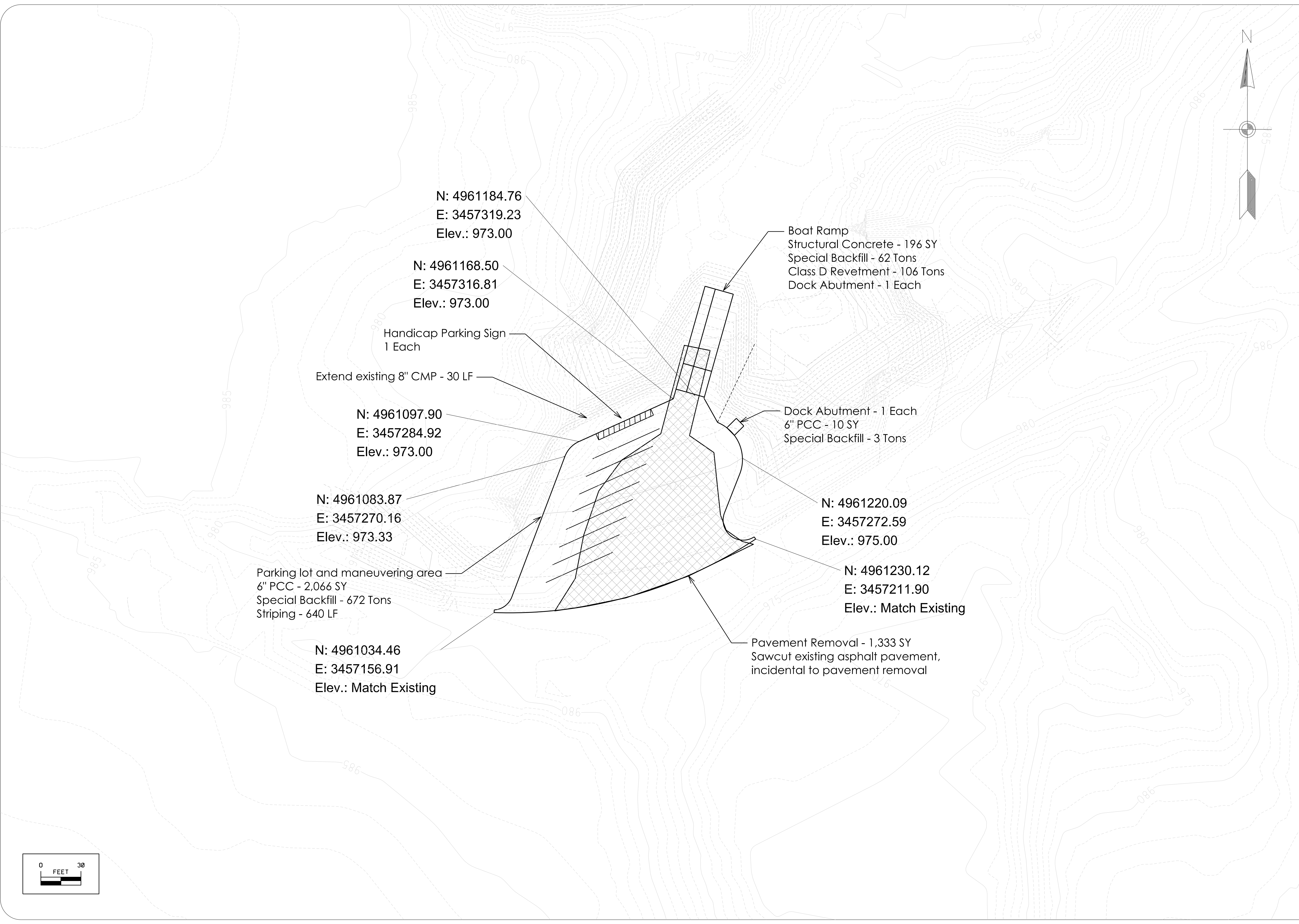
HD 16-02-85-05

CHKD BY: DATE:

10/2018

SHEET No:

F.01



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**Southeast Ramp**

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**

STORY COUNTY

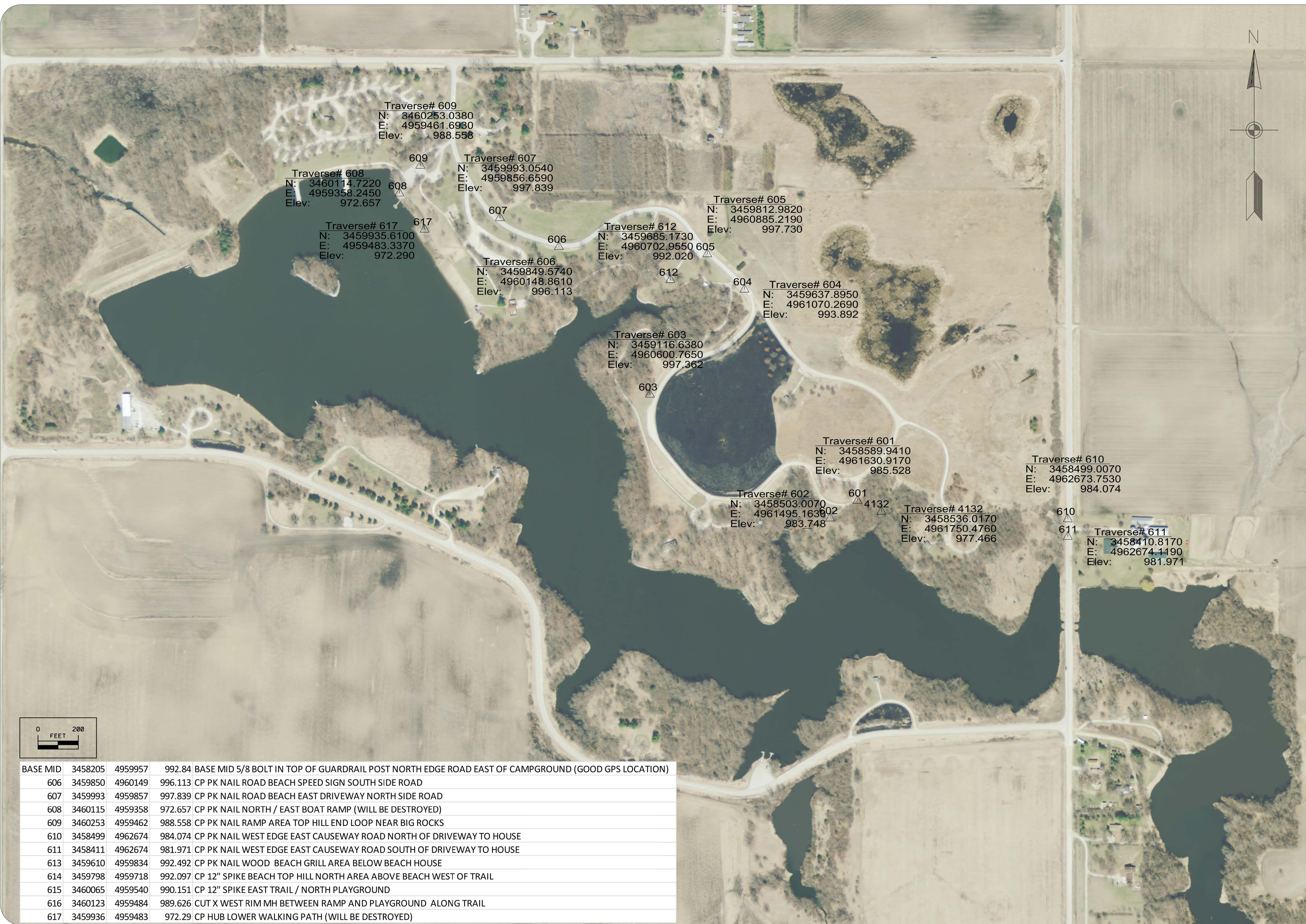
NO.	BY DATE	REVISION

DRAWN BY: HD PROJECT NUMBER: 16-02-85-05

CHKD BY: DATE: 10/2018

SHEET No:

**F.02**



Traverse# 609  
 N: 3460253.0380  
 E: 4959461.6930  
 Elev: 988.558

Traverse# 608  
 N: 3460114.7220  
 E: 4959358.2450  
 Elev: 972.657

Traverse# 617  
 N: 3459935.6100  
 E: 4959483.3370  
 Elev: 972.290

Traverse# 607  
 N: 3459993.0540  
 E: 4959856.6590  
 Elev: 997.839

Traverse# 606  
 N: 3459849.5740  
 E: 4960148.8610  
 Elev: 996.113

Traverse# 612  
 N: 3459685.1730  
 E: 4960702.9550  
 Elev: 992.020

Traverse# 605  
 N: 3459812.9820  
 E: 4960885.2190  
 Elev: 997.730

Traverse# 603  
 N: 3459116.6380  
 E: 4960600.7650  
 Elev: 997.362

Traverse# 604  
 N: 3459637.8950  
 E: 4961070.2690  
 Elev: 993.892

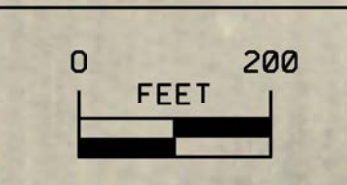
Traverse# 601  
 N: 3458589.9410  
 E: 4961630.9170  
 Elev: 985.528

Traverse# 610  
 N: 3458499.0070  
 E: 4962673.7530  
 Elev: 984.074

Traverse# 602  
 N: 3458503.0070  
 E: 4961495.1630  
 Elev: 983.748


Traverse# 4132  
 N: 3458536.0170  
 E: 4961750.4760  
 Elev: 977.466

Traverse# 611  
 N: 3458410.8170  
 E: 4962674.1190  
 Elev: 981.971




BASE MID	3458205	4959957	992.84	BASE MID 5/8 BOLT IN TOP OF GUARDRAIL POST NORTH EDGE ROAD EAST OF CAMPGROUND (GOOD GPS LOCATION)
606	3459850	4960149	996.113	CP PK NAIL ROAD BEACH SPEED SIGN SOUTH SIDE ROAD
607	3459993	4959857	997.839	CP PK NAIL ROAD BEACH EAST DRIVEWAY NORTH SIDE ROAD
608	3460115	4959358	972.657	CP PK NAIL NORTH / EAST BOAT RAMP (WILL BE DESTROYED)
609	3460253	4959462	988.558	CP PK NAIL RAMP AREA TOP HILL END LOOP NEAR BIG ROCKS
610	3458499	4962674	984.074	CP PK NAIL WEST EDGE EAST CAUSEWAY ROAD NORTH OF DRIVEWAY TO HOUSE
611	3458411	4962674	981.971	CP PK NAIL WEST EDGE EAST CAUSEWAY ROAD SOUTH OF DRIVEWAY TO HOUSE
613	3459610	4959834	992.492	CP PK NAIL WOOD BEACH GRILL AREA BELOW BEACH HOUSE
614	3459798	4959718	992.097	CP 12" SPIKE BEACH TOP HILL NORTH AREA ABOVE BEACH WEST OF TRAIL
615	3460065	4959540	990.151	CP 12" SPIKE EAST TRAIL / NORTH PLAYGROUND
616	3460123	4959484	989.626	CUT X WEST RIM MH BETWEEN RAMP AND PLAYGROUND ALONG TRAIL
617	3459936	4959483	972.29	CP HUB LOWER WALKING PATH (WILL BE DESTROYED)

CONSULTANT:



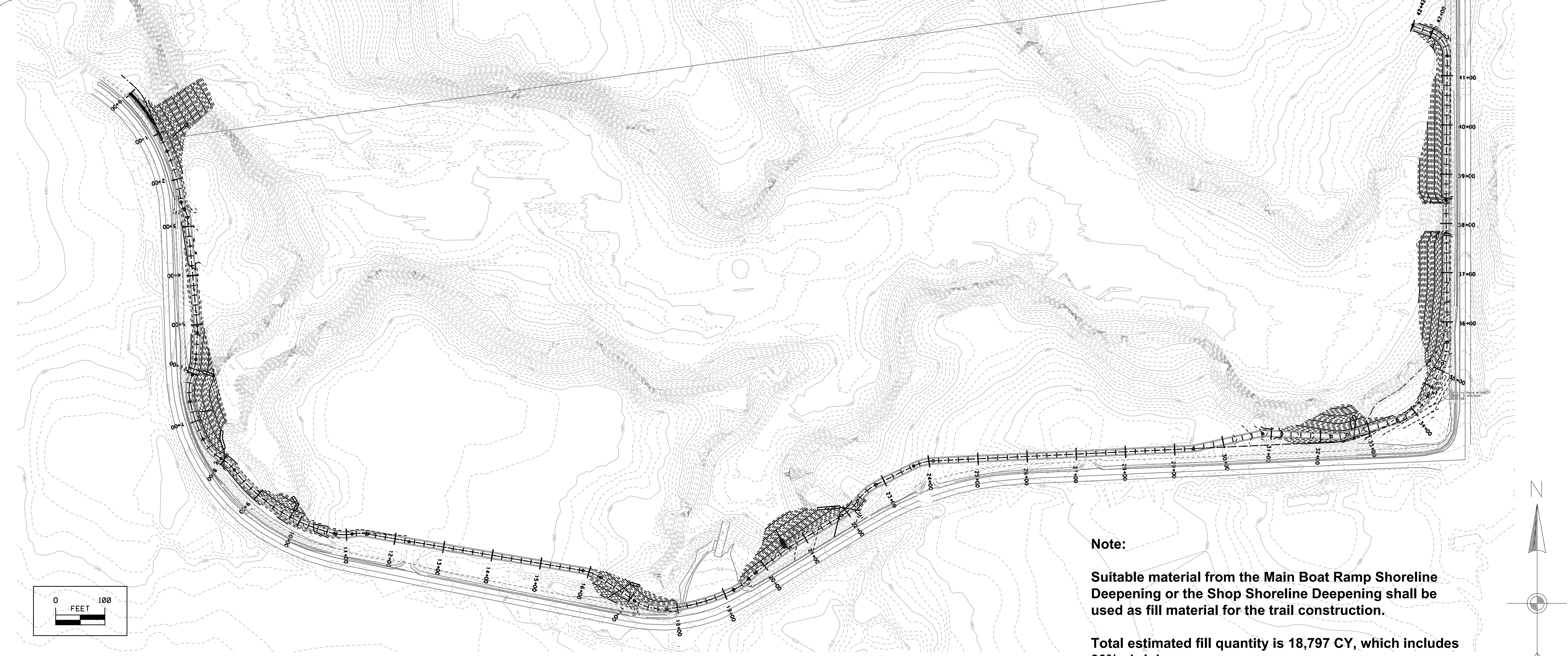
**IOWA DEPARTMENT OF  
NATURAL RESOURCES  
&  
STORY COUNTY  
CONSERVATION BOARD**  
ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



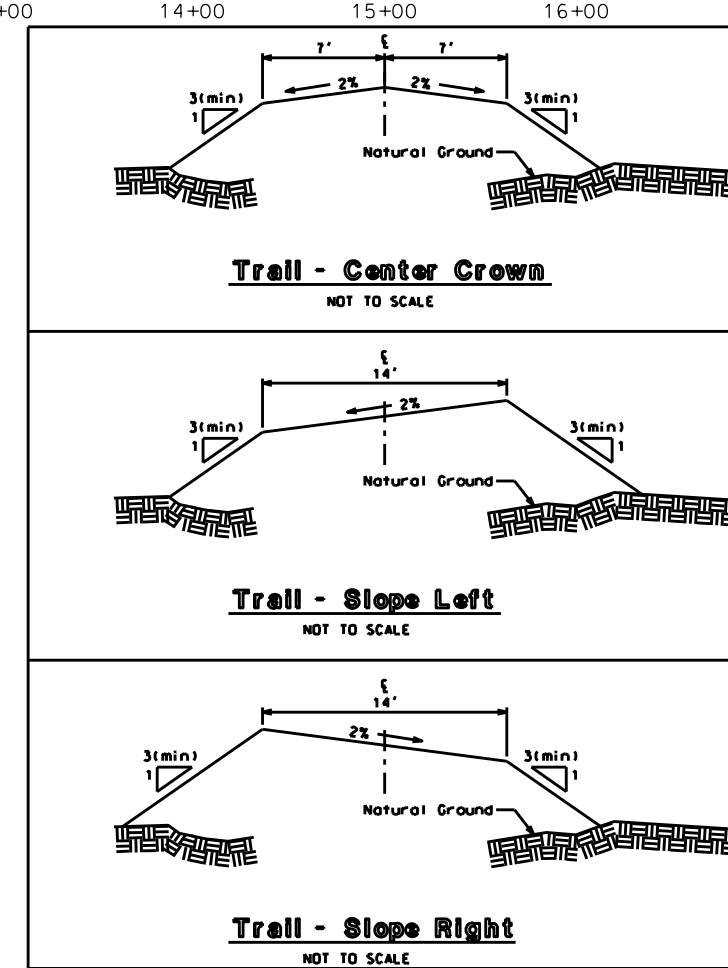
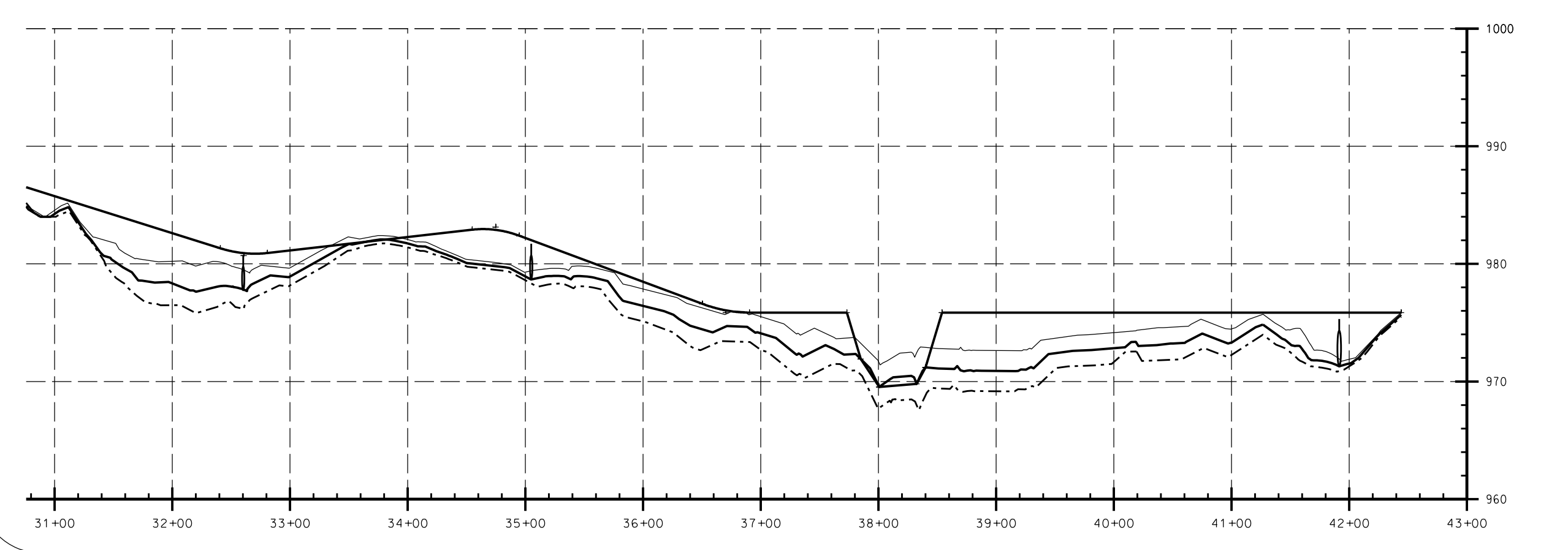
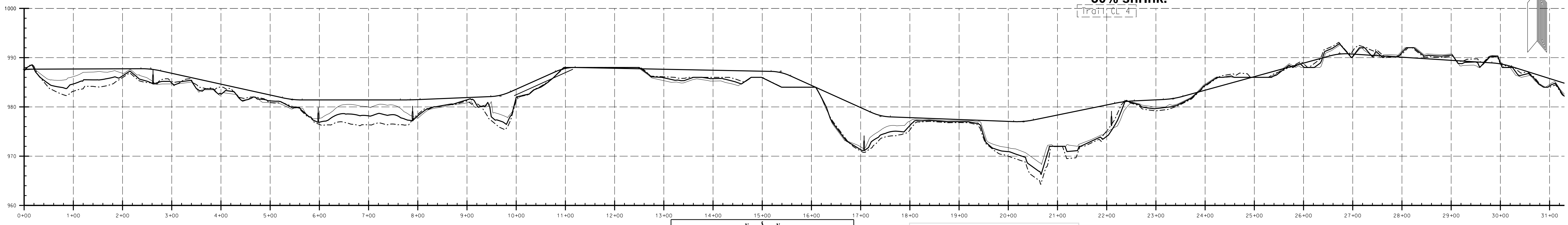
**Survey Control**  
MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**  
STORY COUNTY

NO.	BY	DATE	REVISION

DRAWN BY: HD      PROJECT NUMBER: 16-02-85-05  
 CHK'D BY:      DATE: 10/2018  
 SHEET No: **G.01**



**Note:**  
 Suitable material from the Main Boat Ramp Shoreline Deepening or the Shop Shoreline Deepening shall be used as fill material for the trail construction.  
 Total estimated fill quantity is 18,797 CY, which includes 30% shrink.



Station	Cross Section
0+00	Trail - Slope Left
2+65	Trail - Slope Right
6+00	Trail - Slope Left
7+90	Trail - Slope Right
12+25	No Grading
16+00	Trail - Slope Left
18+00	Parking Lot
19+40	Trail - Slope Left
22+45	No Grading
30+20	Trail - Center Crown
33+00	Trail - Slope Left
37+85	No Grading
38+40	Trail - Slope Left
41+72	Trail - Center Crown

Hickory Grove Trail Culvert Schedule						
Station	Size	Plan Length	Inlet Invert	Outlet Invert	Grade	
1+26	24" Extension	44	Match Existing	Grade Dependant	Match Existing	
5+90	24"	31	979	978	3.2%	
6+83	36" Extension	28	Match Existing	Grade Dependant	Match Existing	
8+01	24"	42	979	977	4.8%	
9+78	8" Extension	23	Match Existing	Grade Dependant	Match Existing	
16+73	24"	58	975	970	8.8%	
20+56	36" Extension	21	Match Existing	Grade Dependant	Match Existing	
22+10	24"	42	978	977	2.0%	
32+65	36" Extension	27	Match Existing	Grade Dependant	Match Existing	
32+69	24"	42	981	977	14.8%	
34+62	24"	24	983	979	17.4%	
41+89	30"	45	973	970	6.8%	

**Trail Plan and Profile**

MECHANICAL DREDGING & SHORELINE ARMORING FOR:  
**HICKORY GROVE PARK**

STORY COUNTY

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CONSULTANT:

DRAWN BY: HD PROJECT NUMBER: 16-02-85-05

CHK'D BY: DATE: 10/2018

SHEET No:

**T.01**