

WATER PERMIT NO. 1678-1

Name of Applicant: Vernon Hansen

Address: Rt 1 Box 103, Bowman ND 58623

Phone: (701) 574-3139

Amount of Water Claimed: 73.1 acre-feet

Total Acres: NA

Source of Water Supply: runoff - Dry Run^{House} Creek

Water to be used for: livestock water and fish & wildlife propagation

County: Harding

Type of Waste Disposal System: NA

Location: about 15 miles northwest of Buffalo

PRIORITY

Date Received: 1-7-1999

Fee: \$150.00

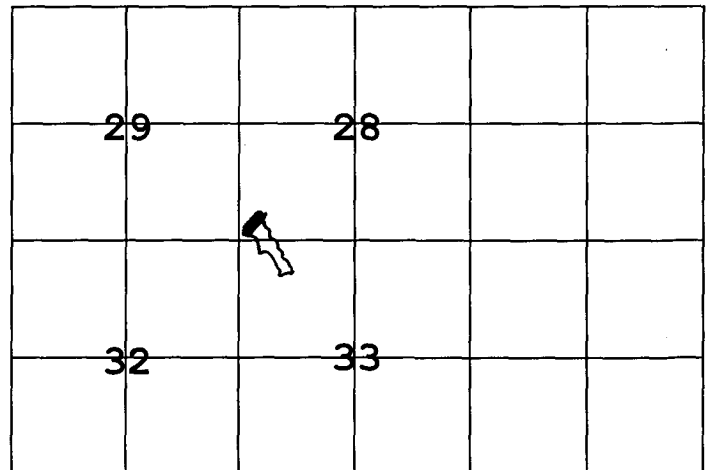
Corrected Application Received:

Period of Annual Use: January 1 - December 31

Remarks:

Diversion Point: SW ¼ SW ¼ Sec 28-T21N-R3W

Water Impounded: SW ¼ SW ¼ Sec 28 and
NW ¼ NW ¼ Sec 33; all in T21N-R3W



Depth of Well: NA

Well Driller:

Remarks:

Type of Map: topo

Prepared by: Roger C Smith, DU

Reviewed and the Number Assigned on: 1-8-1999

By: Karen Schlaak

Notice of Hearing - date to intervene: _____

**SOUTH DAKOTA
WATER PERMIT NO. 1678-1**

Date of first receipt of application January 7, 1999.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 1678-1 to Vernon Hansen, Rt 1 Box 103, Bowman ND 58623 authorizing the construction of a dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 1678-1 authorizes impoundment of 73.1 acre-feet of water from Dry House Creek by constructing a dam located in the SW ¼ SW ¼ Section 28 with water impounded in the SW ¼ SW ¼ Section 28 and the NW ¼ NW ¼ Section 33; all in T21N-R3E. This permit authorizes sufficient water annually to maintain water at the outlet elevation 3129.0 feet mean sea level.
2. The water appropriated shall be used for the purpose of providing habitat for fish and wildlife propagation and livestock watering and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 1678-1 is April 5, 1999.
5. The date from which applicant may claim right is January 7, 1999.
6. One-fifth of the construction is to be completed on or before October 5, 2001.
7. All construction is to be completed on or before April 5, 2004.
8. Water is to be put to beneficial use on or before April 5, 2008.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. Water Permit No. 1678-1 authorizes a dam with storage capacity of 73.1 acre-feet of water and sufficient water annually to maintain the water level to the outlet elevation of 3129.0 feet mean sea level.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

WATER MANAGEMENT BOARD

By: 
John Hatch, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

APR 23 1999

date



No. 1678-1 Hydrologic Unit 10110201
 Map No. _____ Basin _____
 Newspaper Nation's Center News, Buffalo, SD

Application For Permit To Appropriate Water Within The State Of South Dakota

Check use of water: Industrial ☐ Commercial ☐ Municipal ☐ Other Common Distribution System ☐
 Rural Water System ☐ Suburban Housing ☐ Geothermal Heat ☐ Institutional ☐ Recreational ☐
 Domestic ☐ (above 18gpm) Other ☐

Type of Application: Check one or more of the following



New ☒ Vested Right ☐ Future Use ☐ Change Use ☐

☐ Amend Permit No. _____ with old priority date retained

Change diversion point(s) ☐ Add diversion point(s) ☐ Other ☐ _____

☐ Application to: Change diversion point(s) ☐ Add diversion point(s) ☐ on Permit No. _____

☐ Construction to use water reserved by Future Use Permit No. _____

1. Name of Applicant Vernon Hansen Phone No. _____

Post Office Address Route 1 Box 103 ; Bowman State ND Zip Code 58623
(Street, RR or Box)

2. Amount of water claimed (c.f.s.) 73.1 acre feet

3. Source of water supply Surface Runoff - Dry House Creek

4. Location of point of diversion Dam located in SW 1/4 SW 1/4 of Section 28,

T. 21 N, R. 3^E Water Impounded: SW 1/4 SW 1/4 Sec. 28 and

NW 1/4 NW 1/4 Sec. 33; all in T21N-R3E County Harding

5. Counties where water will be used Harding

6. Annual period during which water is to be used 12 months Jan 1 - Dec 31

7. Give a brief description of proposed project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

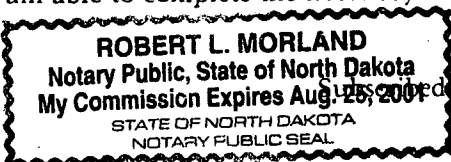
Construct an earthen embankment to store runoff water, see attached construction plans.

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map

^(see instruction)
 STATE OF ~~SOUTH~~ ^{NORTH} DAKOTA)
 County of Bowman)^{SS}

I, Vernon Hansen the applicant, certify that I have read the foregoing application, have examined the attached map and that the matters therein stated are true and that I intend, and am able to complete the necessary construction.

Signed Vernon Hansen



and sworn to before me this 31st day of December 19 98

Robert L. Morland
 Notary Public (or other qualified officer)

Supplemental Information

(type or print in ink)

1. Well Information - Proposed construction

- a) Drill Hole Diameter _____ Depth _____
- b) Casing Type _____ Diameter _____ Thickness _____
- c) Screen Type _____ Diameter _____ Thickness _____
- d) Gravel Pack Thickness _____ Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material _____
- f) Depth of Water (ground surface to water level) _____
- g) Distance to nearest existing domestic well:
- On applicants property _____ On property owned by others _____

2. Dugout Information Estimates

- a) Surface Dimensions _____ Depth _____
- b) Depth to water (ground surface to water level) _____



3. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information below. The locations of each dam should be shown on the map submitted with the application.

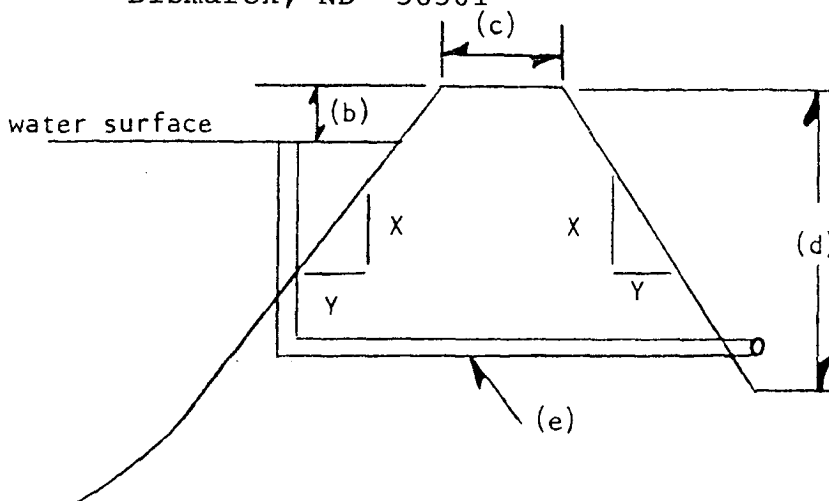
- a) If a private engineering firm or government agency was involved in the design of this dam please give their name and address

Roger Smith, P.E. #4325

Ducks Unlimited, Inc.

3502 Franklin Ave.
Bismarck, ND 58501

- b) Freeboard 5.0 feet
- c) Crest Width 12' top, 10' berm
Crest Length 672 feet
- d) Height 18.0 feet
- e) Outlet Dimensions: 72" CMP Riser
Pipe diameter 42" CMP Barrel
Spillway width 270' (natural)
- f) X & Y Slope
Upstream 1:3
Downstream 1:3



Surface Area of Impoundment 17.0 acres

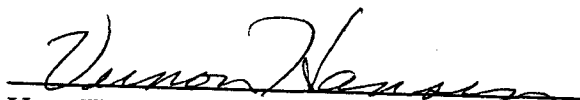
Storage 73.1 acre feet

Drainage area above dam 2854 acres

Signature of Applicant

Attachment to South Dakota Water Permit Application

I Mr. Vern Hansen, landowner, and Scott Collins, US Fish and Wildlife Service, representative, agree to release water from a water impoundment located in the SW1/4 of Section 28-T21N-R3W in Harding County, SD, to the immediate downstream impoundments, owned by Mr. Joe Painter, if they are naturally dry and the needs are for a livestock water source. This agreement, however, would be void should future livestock needs by the Mr. Vern Hansen or the current landowner, in the SW1/4 of Section 28-T21N-R3W, ever need to use this impoundment as a livestock water source.


Vern Hansen, landowner


Scott Collins, US Fish and Wildlife Service



RECEIPT

415244

Division of Water Rights

South Dakota Department of Environment and Natural Resources

Pierre, _____ February 7, 19 97

RECEIVED OF Vernon Hansen, Rt. 1, Box 103, Bowman, ND 58623

the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>1678-1</u> to Appropriate Water, to construct and to put water to beneficial use _____	150	00
Fee for Application for Permit No. _____ to Appropriate Water, for Future Use _____		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____		
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		

(Any Other Work Provided by Law)	Total	150 00

By John Hatcher
Chief Engineer

DESIGN REPORT

For

DRY HOUSE CREEK WETLAND
HARDING COUNTY, SD (SD-0267-001)

December 8, 1998



Prepared by:

Ducks Unlimited, Inc.
3502 Franklin Avenue
Bismarck, ND 58501

DESIGN REPORT

PROJECT: Dry House Creek
SD -0267-01

LOCATIONS: SW 1/4 SECTION 28 TWP. 21N RGE. 3E
Harding County, South Dakota

MARSH DATA: Full Service Level (FSL) @ 3129.0 (mean sea level)
17.0 Surface Acres @ FSL
73.1 Acre-Feet Capacity @ FSL
Maximum Depth - 10 feet (with the exception of structure excavation - 13')

PROJECT DATA: Top of Dam - elevation 3134.0
Primary Spillway - elevation 3129.0
Emergency Spillway - elevation 3131.5
Upstream Berm - 10' wide @ elevation 3129
Side Slopes - 3 (horizontal): 1 (vertical)

CLASSIFICATION: Based on the classification criteria outlined in Chapter 74:02:08 "Safety of Dams," it is recommended that the proposed dam be classified as a small, Category 3 dam. No loss of life and minimal economic loss is expected should failure occur. The product of the "maximum storage capacity" times the "effective height" is 1443. (111 x 13)

PRELIMINARY RISK ASSESSMENT: The proposed dam is approximately 600' upstream of an existing graveled farm-to-market road. The roadway presently has one 48" and one 24" CMP. The combined capacity of the culverts is estimated to be 132 cfs. A clear weather breach would overtop the highway, as currently happens with any event that generates flowrates exceeding the culvert's capacities. A review of the USGS topography map shows no other structures for at least six miles downstream of the project. Dry House Creek is a tributary to the Little Missouri River.

PROPOSED PROJECT: The dam will be constructed having an upstream berm at elevation 3129.0, a top width of 12' at elevation 3134.0, and downstream slope of 3:1. The dam will be constructed from local material obtained from below elevation 3129 where feasible. The intent is to contain the borrow area to below the reservoir elevation as much as possible.

PRIMARY SPILLWAY: The structure will have fixed level water control capabilities at elevation 3129.0. Variable level water control will be provided by a separate structure (Agri-drain inline water control structure) having the capability of retaining water at 6" increments between elevations 3129.0 and 3121.0. The riser, acting, as a circular weir will be a 72" 12 gage corrugated metal pipe. The outlet barrel will be a 42", 14 gage corrugated metal pipe at a 0% slope at elevation 3121.0. A protected plunge pool will be located at the discharge of the outlet pipe.

EMERGENCY SPILLWAY: The emergency spillway will be a minimum of 270' wide between elevation 3131.0 and 3134. The minimum length of the level crest is 200'. Flows will outlet into an existing swale that will deliver flows back to the original creek.

HYDROLOGY / HYDRAULICS: A hydrologic analysis of surface water runoff was performed using two methods. A peak discharge was determined from regression equations developed in WATER-RESOURCE INVESTIGATIONS REPORT 80-80 USGS. The NRCS TR-20 METHOD was used to determine the inflow hydrograph. The hydraulic curve number used in the TR-20 METHOD was manipulated to create peak discharges similar to those developed from the regression equation. Other assumptions made in developing inflow hydrographs by the TR-20 METHOD were:

Rain Duration = 1.00
Rain Table # = 1
Antecedent moisture condition = 2

Inflow hydrographs developed from the TR-20 METHOD were routed through the primary and emergency spillways. This yielded outflow hydrographs revealing peak discharges at maximum reservoir elevations corresponding to various runoff events. The following table is a summary of that printout:

PARAMETERS:

WATERSHED – 4.46 SQ MI

TIME OF CONCENTRATION - 10 HOURS

CURVE #'s – 75 (5 yr) 78 (10 yr) 78 (25yr) 82 (100 yr)

Event	Rainfall (in)	Runoff (ac-ft)	Peak Inflow (cfs)	Peak Discharge (cfs)	Max WSP (elevation)	Freeboard*	Flow in E.S. (cfs)
5 yr	2.4	141	175	129	3130.52	3.81	0
10 yr	2.8	235	333	225	3131.58	2.75	80
25yr	3.4	338	505	395	3132.20	2.13	120
100 yr	4.2	564	916	831	3133.11	1.22	900

*Calculated from a finish grade

The primary spillway capacity was calculated by comparing discharges developed by the weir flow formula and formulas for calculating head loss through corrugated metal pipe. The emergency spillway capacity was estimated using NRCS charts.

DROUGHT ANALYSIS: It is difficult to determine the frequency in which there will be adequate runoff to sustain the marsh through the brood-rearing period, criteria important to project sponsors. Using NRCS methods, the 80% and 50% annual runoff will generate 12 and 38 acre-feet respectively. The annual requirement assuming an evaporative loss of approximately 3.5 feet is 47 acre-feet. There is evidence that inflows will be supplemented, at least periodically, from subsurface contributions.

SOIL INVESTIGATION: As of this writing a soil investigation has not been completed. A preliminary investigation determined that suitable quantities of acceptable material are likely. A soil investigation report, to be completed in the near future, will be available upon request. The plans will be modified to show the approved borrow areas as well as any other modifications recommended by the geotechnical consultant.

IMPACTS TO SURROUNDING PROPERTY: The planned construction and subsequent reservoir will be contained within land owned by Vern Hansen and managed by the US Fish & Wildlife Service through a Cooperative Wildlife Agreement.

Dated: December 8, 1998

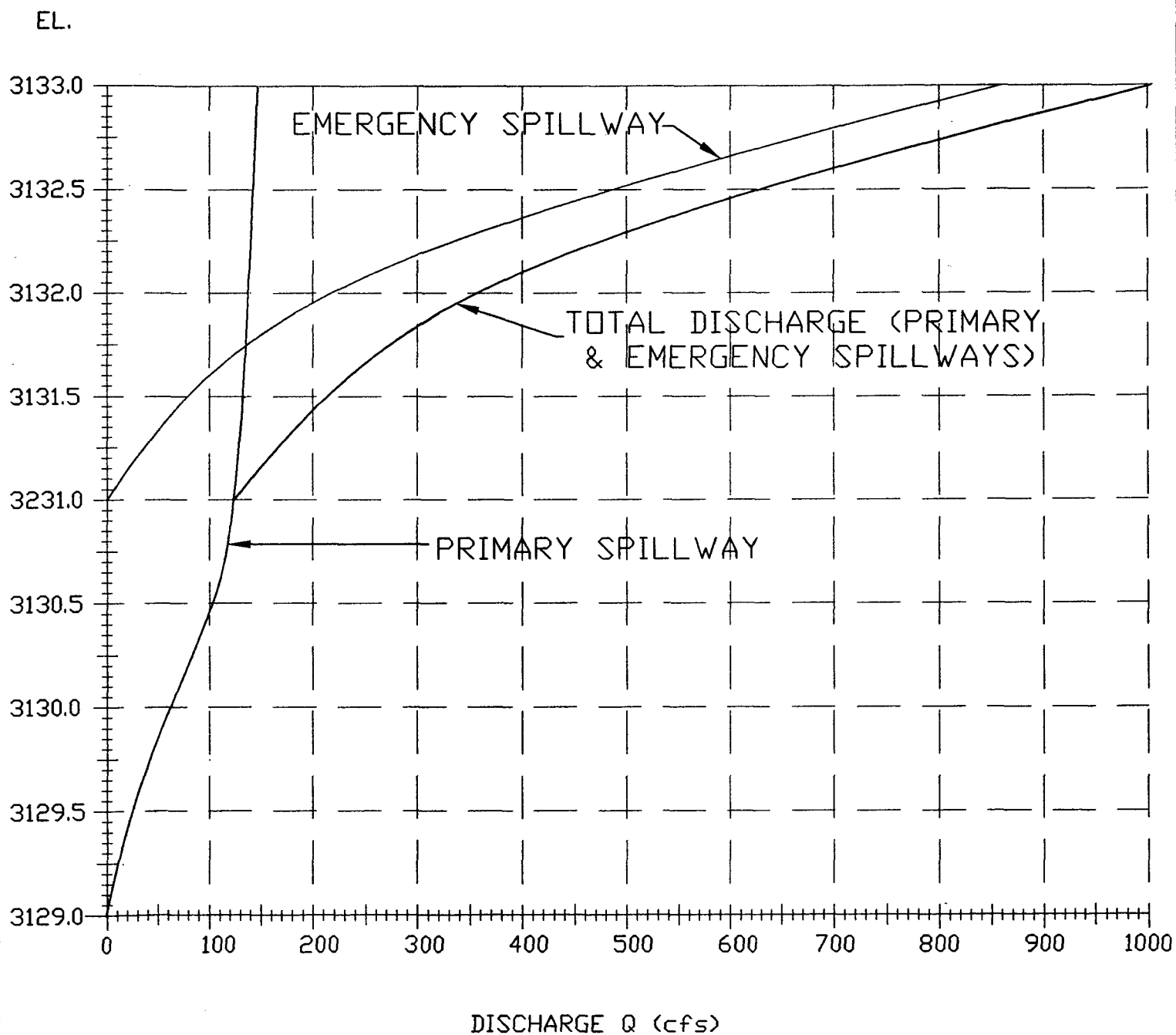
Submitted By:



Roger Smith, P.E (PE-4325)
Regional Engineer
Ducks Unlimited
Great Plains Regional Office

DRY HOUSE CREEK MARSH

DISCHARGE CURVE



U.S. FISH & WILDLIFE SERVICE PRIVATE LANDS PROGRAM



CONSTRUCTION DESIGN DATA AND
HYDRAULIC INFORMATION

LANDOWNER

LAST NAME: HANSEN
FIRST NAME: VERN
ADDRESS: RR 1 BOX 103
CITY: BOWMAN
STATE: ND
ZIP CODE: 58623

PHONE NO.?

COUNTY OF PROJECT: HARDING, SD

TWNSP. 21
RANGE 3
SECTION 28

USFWS OFFICE: BISMARCK WETLAND HABITAT OFFICE

ADDRESS: 1500 EAST CAPITOL DRIVE
CITY: BISMARCK
STATE & ZIP CODE: NORTH DAKOTA 58501

PHONE NUMBER: (701) 250-4403

CONTACT PERSON: SCOTT COLLINS

DAM # 2

U.S. FISH & WILDLIFE SERVICE PRIVATE LANDS PROGRAM

WETLAND CREATION WORKSHEET

DESIGN & FILL COMPUTATIONS

UPSTREAM SLOPE	>	3 :1	DAM FILL	>	4441 CUYDS
TOP WIDTH	>	10 FEET	10% OVERFILL	>	444 CUYDS
DOWNSTRM SLOPE	>	3 :1	STRIPPING	>	362 CUYDS
DAM TOP ELEV	:	100 ELEV.	BERM	>	586 CUYDS
E.S. ELEV	:	97.5 ELEV.	BERM STRIPPING	>	48 CUYDS
PR. SP. ELEV	:	96 ELEV.			
			CORE TRENCH	>	596 CUYDS
DAM LOWPOINT	:	85 ELEV.			
10% OVERFILL-TOP:		101.5 ELEV.	SPWY. STRIPPING	>	18 CUYDS
			SPILLWAY	>	0 CUYDS
STRIPPING DEPTH	>	0.5 FEET	SPWY. UNDERCUT	>	18 CUYDS
			TOTAL FILL	=	6513 CUYDS

DAM PROFILE

BENCHMARK > 87.7 ELEV.
 BM DISCRIPTION : TOP OF 48" CMP ON WEST SIDE OF COUNTY ROAD, 1/4 MILE W
 DAM TOP = 100 ELEV. [0+00 END OF DAM ON N,S,E OR W END] ?
 B.S.> 0

SHOT	STATION	GROUND ELEVATION	FILL H.	AREA	SUM OF END AREAS	LENGTH	1/2 CL WIDTH
#1	0	100	0	0.00	172.63	40	5.0
#2	40	93.9	6.1	172.63	779.20	40	23.3
#3	80	87.35	12.65	606.57	1279.25	40	43.0
#4	120	86.6	13.4	672.68	1497.68	13	45.2
#5	133	85	15	825.00	1321.07	27	50.0
#6	160	88.7	11.3	496.07	931.82	40	38.9
#7	200	89.5	10.5	435.75	762.38	40	36.5
#8	240	91.1	8.9	326.63	476.71	40	31.7
#9	280	94.4	5.6	150.08	238.08	10	21.8
#10	290	96	4	88.00	159.75	10	17.0
#11	300	96.5	3.5	71.75	115.50	40	15.5
#12	340	97.5	2.5	43.75	43.75	0	12.5
#13	?	?		0.00	0.00	0	0.0
#14	?	?		0.00	0.00	0	0.0
#15	?	?		0	0.00	0	0.0

DAM FILL = 4441 CUYDS
 DAM STRIPPING = 362 CUYDS

HANSEN
 2

U.S. FISH & WILDLIFE SERVICE PRIVATE LANDS PROGRAM

==>CORE TRENCH DATA<=

SHOT	STATION	CUT DEPTH	CUT SQ. AREA	TOTAL END SQ.	LENGTH	VOLUME
#1	0	0	0	39	70	2730
#2	70	3	39	114	10	1140
#3	80	5	75	150	70	10500
#4	150	5	75	114	130	14820
#5	280	3	39	50	60	3000
#6	340	1	11	11	0	0
#7	?	?	0	0	0	0
#8	?	?	0	0	0	0

CORE TRENCH TOTAL = 596 CUYDS

==>BERM PROFILE<=

BERM ELEVATION = 96.00 ELEV.
 BERM WIDTH TOP = 10 FEET

SHOT	STATION	GROUND ELEVATION	FILL H.	AREA	SUM OF END AREA	LENGTH	FRONT CL WIDTH
#1	30	96	0	0	86.5	50	0.0
#2	80	87.35	8.65	86.5	180.5	40	53.0
#3	120	86.6	9.4	94	204	13	55.2
#4	133	85	11	110	183	27	60.0
#5	160	88.7	7.3	73	138	40	48.9
#6	200	89.5	6.5	65	114	40	46.5
#7	240	91.1	4.9	49	49	50	41.7
#8	290	96	0	0	0	0	0.0

BERM TOTAL = 586 CUYDS
 BERM STRIPPING = 48 CUYDS

==>SPILLWAY DESIGN<=

SP. BOTTOM WIDTH= 40 FEET DAM LOW POINT = 85 ELEV.
 SIDE SLOPES = 3 :1 SPILLWAY ELEV. = 97.5 ELEV.
 STRIPPING DEPTH = 0.15 FEET UNDERCUT DEPTH = 0.15 FEET

	STATION	ELEVATION	PLANNED		SUM	END	
	CENTER LINE	OF GROUND	ELEV.	CUT	AREA	AREA	LENGTH
#1	0	97.7	97.5	0.2	8.12	12.15	80
#2	80	97.6	97.5	0.1	4.03	4.03	0
#3	?	?	?	0	0.00	0.00	0
#4	?	?	?	0	0.00	0.00	0
#5	?	?	?	0	0.00	0.00	0
#6	?	?	?	0	0.00	0.00	0
#7	?	?	?	0	0.00	0.00	0
#8	?	?	?	0	0.00	0.00	0
#9	?	?	?	0	0.00	0.00	0
#10	?	?	?	0	0.00	0.00	0

SPILLWAY STRIPPING = 18 CUYDS
 SPILLWAY = 0 CUYDS
 SPILLWAY UNDERCUT = 18 CUYDS

HANSEN
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U.S. FISH & WILDLIFE SERVICE PRIVATE LANDS PROGRAM

HYDRAULIC DATA SHEET

RESERVOIR AREA

MAX WATER DEPTH > 11 FEET

CLASSIFICATION OF DAM

=> CLASS II <=

MAXIMUM DAM H. > 15 FEET

POND COEFFICIENT = 0.2455
(.3, .4, .5)

TYPE	ELEV.	RESERVOIR SURFACE ACRES	RESERVOIR CAPACITY (acre-feet)
TOP OF DAM	100.0	45	121.5
EMERGENCY SP.	97.5	24	64.8
PRINCIPAL SP.	96.0	16	43.2

HYDRAULIC DATA

PROGRAM	WATERSHED ACRES	WATERSHED LENGTH
OHIO	<=1000	<=10,000
EFM-2	<=2000	<=26,000
HYDRAIN	2000-10,000	<100,000

DRAINAGE AREA : 2410 ACRES WATERSHED LENGTH: 22810 FEET
3.8 SQ MILES
SLOPE : 0.70 % CURVE NUMBER : STAND. COEFF.
(calculate from Ohio)
PEAK DISCHARGE = 91 cfs FOR: 5 YEAR, 24-HR EVENT
INCHES OF RUNOFF: 0.44 INCHES (2,5,10 YEAR)

PRINCIPAL SPILLWAY:

PEAK INFLOW = Q_i > 91 cfs (cfs from peak discharge)

PEAK OUTFLOW OF PRINCIPAL SPILLWAY = Q_o
 $Q_o = Q_i \times 1 - \sqrt{.7 \times V_t / V_r}$

Adjustment Factor Chart

Condition of emergency spillway exit channel after construction	Adjustment Factor
Dense Sod, Good Spread, No overfalls	.20
Good Sod or Shrubs, Small overfalls	.35*
Poor vegetation, overfalls	.50
Good Veg., Overfalls, Erosive soils	.70

HANSEN
2

U.S. FISH & WILDLIFE SERVICE PRIVATE LANDS PROGRAM

Qo x 0.35 (adjustment factor)
 Qp.s. = 13.22 cfs (design pipe for Qp.s.)

IS A PIPE REQUIRED FOR THIS PROJECT? YES

Water storage (Vt) 43.2 (pond coefficient x surface acres x depth)
 Design storm (Vr) 88.4 (acres of watershed x inches of runoff/12)

SIZE AND TYPE OF PRINCIPAL SPILLWAY: (calculate from Ohio)

Riser Diameter = 24 inches TYPE = FR
 Riser Height = 8 feet (choose from list below)
 Pipe Outlet Diameter = 15 inches
 {FULL ROUND (FR) WHISTLE TUBE (WT) CULVERT (C)
 HALF ROUND (HR) HOODED INLET (HI) NONE (N)}

EARTHEN EMERGENCY SPILLWAY

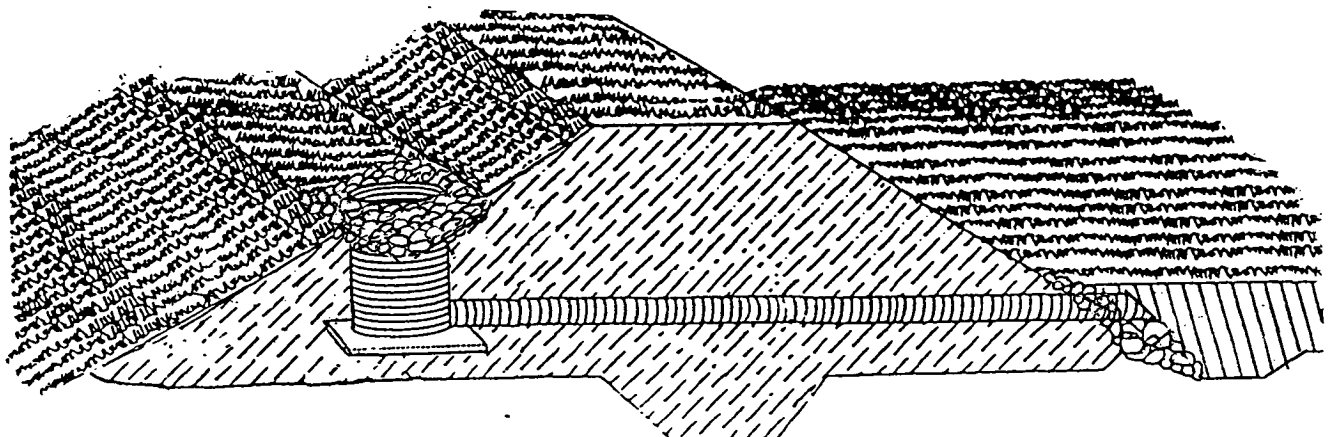
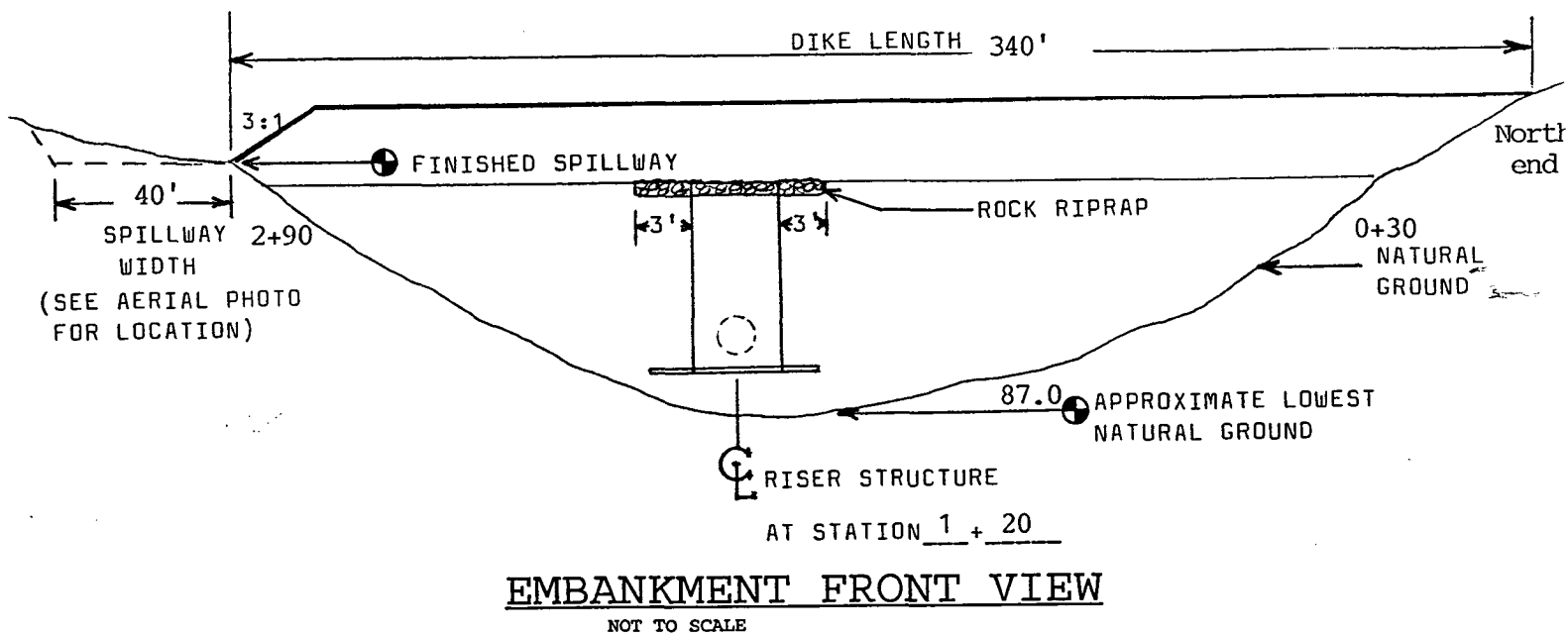
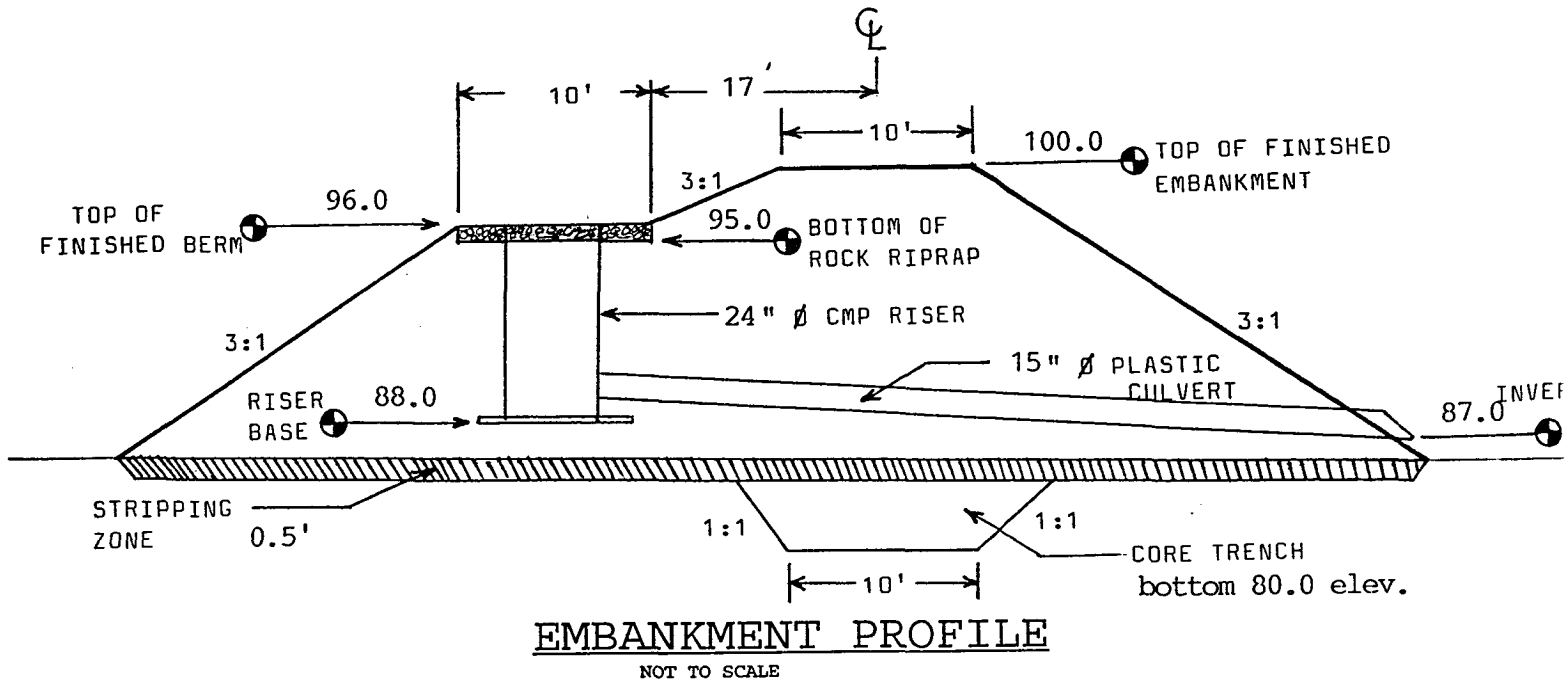
Permissible velocities for vegetated earthen spillways
 values of (q) in feet/second

Spillway veg. and slope of exit channel	Easily Eroded	Resistant Soils
Poor veg., slopes 0-5%	3.0	4.0
Good veg., slopes +5%	4.0	5.5*
Good veg., slopes 0-5%	5.0	7.0

Q FOR: 25 YEAR, 24HR EVENT > 130 cfs (10,25,50 YEAR)
 (calculate from Ohio, Efm-2 or Hydrain program)
 DISCHARGE PER FOOT OF WIDTH (q) > 5.5 f/s
 DESIGN WIDTH = Q/q > 24 feet
 DEPTH OF WATER ABOVE E.S.CREST (Hp) > 1 feet
 LENGTH OF SPILLWAY EXIT SLOPE (L) > 180 feet
 SLOPE OF EARTHEN SPILLWAY > 6.9 %
 LENGTH OF LEVEL SECTION OF SPILLWAY > 80 feet

NOTES:	COST ESTIMATE: 6513 CUYDS @\$1.05/CUYD = \$6,838.7
CHECKED BY: _____	APPROVED BY: _____

HANSEN
2



EMBANKMENT WITH BERM - RISER STRUCTURE

Vern Hansen

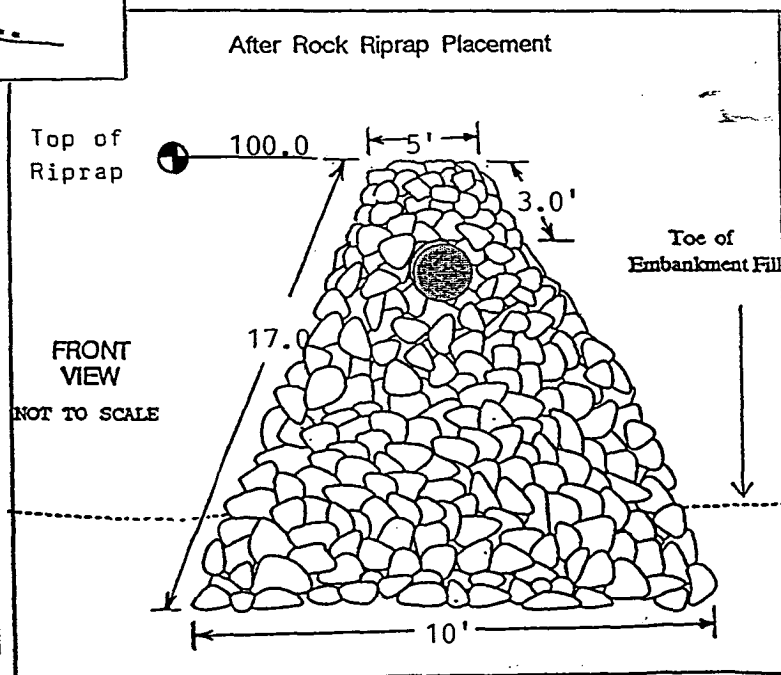
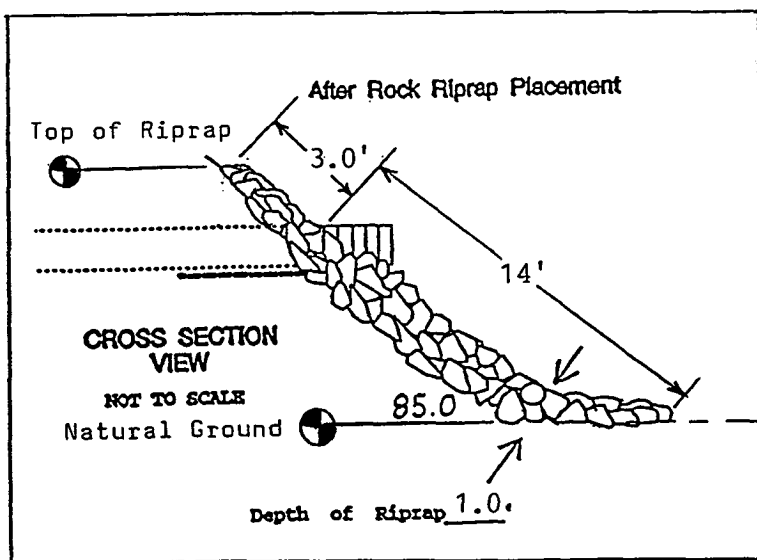
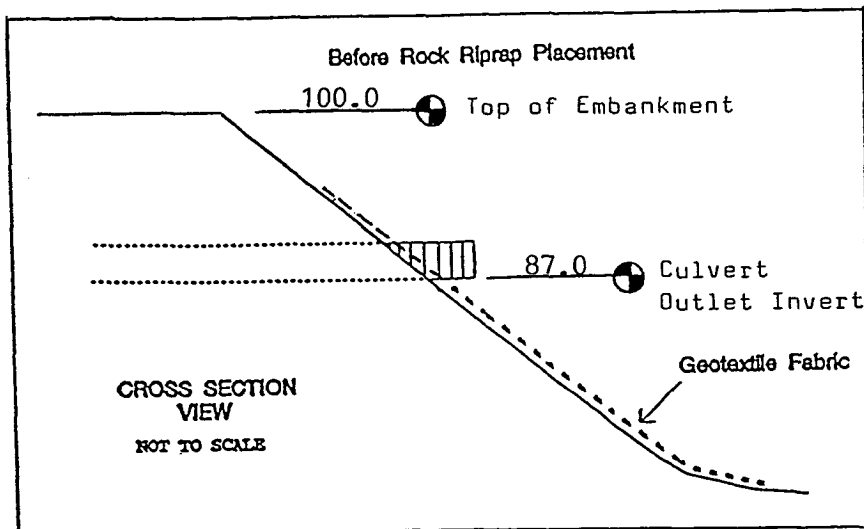
PROJECT

WETLAND NO. ²

ELEVATED CULVERT OUTLET WITH RIP RAP

Outlet of culvert will go into a natural glory hole. No plunge pool will need to be excavated. Pipe outlet should be centered in glory hole.

ROCK RIP RAP REQUIRED 4.7 YARDS³



ROCK RIP RAP SHALL CONSIST OF FIELD STONE OF A MINIMUM OF 80% ROCKS 8 TO 18 INCHES IN DIAMETER. ROCKS SHALL BE HAND PLACED ON GEOTEXTILE FABRIC. THE ROCKS SHALL NOT BE DROPPED UPON THE FABRIC FROM A HEIGHT GREATER THAN ONE FOOT. RIP RAP SHALL BE PLACED BY STARTING AT THE LOWEST ELEVATION AND WORKING UPWARDS.

US Department of Agriculture
Soil Conservation Service

DESIGN WORKSHEET
for
Pipe Drop Structure

prepared for

VERN HANSEN

in

HARDING County, North Dakota

Designer : SC

Date : 12/19/96

Checker _____

Date _____

13

Top Width = 20 ft.
Upstream sideslope = 3.0 :1
Downstream sideslope = 3.0 :1

'n' value = 0.010
Discharge = 16.6 cfs.
Pipe diameter = 15 in.
Riser diameter = 24 in.
Pipe length = 72 ft.
(including 1 foot
beyond the toe.)
Riser length = 7.0 ft.

Low Orifice Controls
E/S Also has flow.

Elevation of top = 100.0
Elevation of emergency = 97.5
Elevation of design storm = 98.5
Elevation of riser = 96.0
Elevation of inlet = 90.0
Elevation of outlet = 87.0

***** HYDRO - Version 5.0 *****
* HEC19 / Design Event vs Return Period Program *
* Date of Run: 11-15-96 *

Page No 1

VERN HANSEN (WETLAND NO. 2)

--- Input File: C:\HYDRO\STEGNER.HDO

FLW 1

=== FLOW ANALYSIS (Rational Method Suboption) Selected ...

TCO 22810 0.007 B 1

*** Notice: Using SCS Curve Number Approach ...

--- Overland Runoff Length: 22810.0 feet.
Overland Runoff Slope: .007 ft/ft,
Soil Type "B" Selected.
Antecedent Moisture Condition 1 Selected.

BAS 0000 0 1700 710

--- The Basin Area is 2410.00 Acres

RTL * * * * *

LOC 45 90 103 40

* The Peak Flow is 67. cfs *

--- The Latitude is 45 degrees, 90 minutes.
--- The Longitude is 103 degrees, 40 minutes.

63 cfs 88 cfs

RPD 2

--- The Selected Return Period is 2 years.

TLG 24

--- The User-Supplied Time Lag is 24.00 hours.

*** End of Command File

Subarea Acreages & Runoff Coefficients

Meadow	.00 C = .200*
Woods	.00 C = .200*
Pasture	1700.00 C = .300*
Crops	710.00 C = .300*
Residential	.00 C = .400*
Urban/Highway ...	.00 C = .700*
Pavement	.00 C = .900*
- TOTAL Basin Area 2410.00 Acres -	
Weighted runoff coefficient is .300	

Notice: * indicates that a default
runoff coefficient used.

VERN HANSEN (WETLAND NO. 2)

--- Input File: C:\HYDRO\STEGNER.HDO

FLW 1

=== FLOW ANALYSIS (Rational Method Suboption) Selected ...

TCO 22810 0.007 B 1

*** Notice: Using SCS Curve Number Approach ...

--- Overland Runoff Length: 22810.0 feet.
Overland Runoff Slope: .007 ft/ft,
Soil Type "B" Selected.
Antecedent Moisture Condition 1 Selected.

BAS 0000 0 1700 710

--- The Basin Area is 2410.00 Acres

RTL * * * * *

LOC 45 90 103 40

--- The Latitude is 45 degrees, 90 minutes.
--- The Longitude is 103 degrees, 40 minutes.

RPD 5

--- The Selected Return Period is 5 years.

TLG 24

--- The User-Supplied Time Lag is 24.00 hours.

*** End of Command File

* Time of Concentration equals 16.70 hours *
* Intensity equals .13 inches/hour *

* The Peak Flow is 91. cfs *

Subarea Acreages & Runoff Coefficients

Meadow	.00 C = .200*
Woods	.00 C = .200*
Pasture	1700.00 C = .300*
Crops	710.00 C = .300*
Residential	.00 C = .400*
Urban/Highway ...	.00 C = .700*
Pavement	.00 C = .900*
- TOTAL Basin Area 2410.00 Acres -	
Weighted runoff coefficient is .300	

Notice: * indicates that a default
runoff coefficient used.

VERN HANSEN (WETLAND NO. 2)

--- Input File: C:\HYDRO\STEGNER.HDO

FLW 1

=== FLOW ANALYSIS (Rational Method Suboption) Selected ...

TCO 22810 0.007 B 1

*** Notice: Using SCS Curve Number Approach ...

--- Overland Runoff Length: 22810.0 feet.
Overland Runoff Slope: .007 ft/ft,
Soil Type "B" Selected.
Antecedent Moisture Condition 1 Selected.

BAS 0000 0 1700 710

--- The Basin Area is 2410.00 Acres

RTL * * * * *

* Time of Concentration equals 16.70 hours *
* Intensity equals .18 inches/hour *

LOC 45 90 103 40

--- The Latitude is 45 degrees, 90 minutes.
--- The Longitude is 103 degrees, 40 minutes.

***** HYDRO ***** (Version 5.0) *****

VERN HANSEN (WETLAND NO. 2)

RPD 25

--- The Selected Return Period is 25 years.

* The Peak Flow is 130. cfs *

TLG 24

--- The User-Supplied Time Lag is 24.00 hours.

69-curve - 199 cfs

63-curve - 172 cfs

*** End of Command File

Subarea Acreages & Runoff Coefficients

Meadow	.00 C = .200*
Woods	.00 C = .200*
Pasture	1700.00 C = .300*
Crops	710.00 C = .300*
Residential	.00 C = .400*
Urban/Highway ...	.00 C = .700*
Pavement	.00 C = .900*
- TOTAL Basin Area 2410.00 Acres -	
Weighted runoff coefficient is .300	

Notice: * indicates that a default
runoff coefficient used.

Water Permit Application No 1678-1

Vernon Hansen

Top of Dam Elev. - 3134
 2nd Spillway Elev. - 3131
 P. Spillway Elev. - 3129
 DIS Toe Elev. - 3116

Cat. 3 Low Hazard Dam

Ht. = 18 ft.

Normal Storage Capacity = 73 Ac-Ft
 Int. Storage Capacity = 111
 Max. Storage Capacity = 191

Int Storage Capacity x Eff. Height = $111 \times 15 = 1665 < 3000$ ∴
25 year frequency, Min. Spillway Design

From USGS WRI 80-80 "Tech. for Est. Flood Peaks ... in SD"

SI = 2.20

DA = 2854 Ac = 4.46 mi.²

Slope = 40 ft/mile

$$Q_{15} = 83.4 A^{.60} S^{.44} S^{-.72}$$

$$= 83.4 (4.46)^{.60} (40)^{.44} (2.20)^{-.72}$$

$$= 83.4 (2.45) (5.07) (0.57)$$

$$= \underline{587 \text{ cfs}}$$

$$Q_{100} = 132 A^{.65} S^{.46} S^{-.67}$$

$$= 132 (4.46)^{.65} (40)^{.46} (2.20)^{-.67}$$

$$= 132 (2.64) (5.46) (0.59)$$

$$= \underline{1120 \text{ cfs}}$$

Secondary Spillway Flow

$$Q = CLH^{3/2} \quad C = 2.6 \quad L = 270 \quad H = 3'$$

$$= 2.6 (270) (3)^{1.5}$$

$$= \underline{3650 \text{ cfs}}$$

Ducks Unlimited uses NRCS TR-20 Model to route a Q_{15} peak of 505 cfs through the dam with 2.13 feet of freeboard remaining, and Q_{100} peak of 916 cfs with 1.22 feet of freeboard remaining.

Section 74:02:08:09

NRCS Annual Yield

CN=75

DA=2854 Ac

ISO = 1

1. Topo Map - OK
2. Dam Axis Profile - OK
3. Dam X-Sec. - OK
4. Area-Capacity Data - OK
5. Outlet Details - OK
6. Discharge Rating - OK
7. Spillway Details - OK
8. Specs. - STD DV - OK
9. EPP - N/A Cat. 3 - OK

$$80\% = 0.052$$

$$0.052 \times 2854/12 = 12 \text{ Ac-Ft.}$$

$$50\% = 0.16$$

$$0.16 \times 2854/12 = 38 \text{ Ac-Ft.}$$

$$10\% = 1.0$$

$$1.0 \times 2854/12 = 238 \text{ Ac-Ft.}$$



February 18, 1997

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181

Scott Collins
US Fish & Wildlife Service
1500 E. Capitol Avenue
Bismarck, ND 58501

Dear Mr. Collins:

I am writing as a follow up to the phone conversation you had with Tim Schaal on February 14, 1997, concerning the plans and specifications we received for the Vernon Hansen Water Permit Application for a dam located in the SW 1/4 SW 1/4 of Section 28-T21N-R3W, in Harding County. We can not accept these plans as being complete, even with the letter submitted by Roger Smith from Ducks Unlimited.

Enclosed is a copy of our Safety of Dams Rules, Chapter 74:02:08. They require plans and specifications to be submitted by a registered professional engineer if the dam is 25 feet high or has a maximum water storage capacity of 50 acre-feet or more at the top of dam elevation. We would also require a preliminary risk assessment for this application.

The term "engineer" is defined under Section 74:02:08:01 (10) as a person who is registered as a professional engineer pursuant to SDCL 36-18, or a person who is employed by a federal or state agency and who designs or inspects dams as part of the person's employment, acting under the supervision of a professional engineer registered pursuant to SDCL 36-18. A "risk assessment" helps determine the hazard classification based on potential downstream hazards and is defined under section 74:02:08 (21) as the process of identifying the likelihood and consequences of dam failure to provide the basis for informed decisions on a course of action. Section 74:02:08:05.01 describes a preliminary risk assessment and also states that it must be performed by an engineer as defined within the rules.

We would suggest that you send your design and preliminary risk assessment to your regional office in Denver for approval, or obtain the services of an agency like Ducks Unlimited or the Natural Resource Conservation Service (NRCS) to design the dam.

If you have any questions, please feel free to contact us.

Sincerely,

Gale N. Selken, P.E.
Natural Resources Engineer IV
for John Hatch, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

c: Vernon Hansen, landowner/applicant
Roger Smith, Ducks Unlimited



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Wetland Habitat Office
1500 East Capitol Avenue
Bismarck, North Dakota 58501



January 4, 1999

Ron Duvall
Water Rights Division
DWNR, Foss Bldg.
Pierre, SD 57501



Dear Mr. Duvall:

Enclosed are two sets of plans engineered by Roger Smith of Ducks Unlimited and the Water Appropriation application for the Vern Hansen earthen embankment.

I had filed another permit and plan along with the \$150.00 fee in February of 1997. I understand that permit is still pending. The original application and plan was not designed by a Professional Engineer so it was never accepted by your Department. Please void the original application and plan and replace it with the Ducks Unlimited plan and Vern Hansen's application.

If you have any questions you can call me at 701-250-4403, or Roger Smith, DU at 701-258-5599.

Sincerely,

Scott Collins
Wildlife Biologist

File No. XXX

Water Rights Division -DENR
Conversation or File Documentation

NAME OF PERSON OR FILE: Scott Collins (Vernon Hansen Application)

ADDRESS: USF&W Service Bismarck, ND

COUNTY: XXXXXX

DATE: February 11, 1997

TELEPHONE: (701) 250-4404

RE: P&S Vernon Hansen Application

I talked to Scott Collins today about the Plans and Specs we received for the Vernon Hansen Water Permit Application. I told him that we need the P&S submitted by a registered Professional Engineer, or at least a cover letter from a PE stating that he has reviewed and approved them. Also, a risk assessment or downstream hazard classification of the dam is needed. I asked Scott about the specs for the primary spillway and he said he would include some. Also asked him about two downstream dams that show up on the topo map. He said they were not owned by Mr. Hansen and thought that the dam located immediately downstream was breached.



Timothy G. Schaal, P.E.
Natural Resources Engineer III
Water Rights Program



DUCKS UNLIMITED, INC.

DUCKS UNLIMITED, INC. / GREAT PLAINS REGIONAL OFFICE
3502 Franklin Avenue • Bismarck, North Dakota 58501-0761 • (701) 258-5599

February 12, 1997

Tim Schall
Water Rights Division
SD Dept Water & Natural Resources
523 E. Capitol
Pierre, SD 57501

Re: Vern Hansen Project

Dear Tim:

I received a request from Scott Collins, Bismarck Wetland Habitat Office (WHO), U.S. Fish & Wildlife Service, to evaluate the design for the Vern Hansen Dam project currently being reviewed by your agency. My evaluation was limited to a review of the design report and subsequent conversation with Mr. Collins. I have not seen the proposed site.

The hydrologic and hydraulic calculations are from various computer programs developed mostly by the NRCS and for small dam design by non engineering professionals. I do have some concerns with the methods, and have suggested some changes to Mr. Collins for future designs.

Mr. Collins described the site as having a large natural spillway of approximately 400', that exists below the elevation of the top of the proposed dam. Foundation soils include clay at approximately 3 feet below the surface and loose sand to the surface. A coffer dam will address the seepage below the dam but not settlement. I commented to him that there is some inherent risks from settlement by installing a structure within embankment fill that is placed on "soft" foundations.

I can not comment on the downstream risk potential without being more familiar with the site. Assuming the absence of downstream structures, I believe that the design is adequate. This type of design has been used on many small dams in North Dakota with success. I am convinced that the WHO office in Bismarck is making every attempt to increase their proficiency in hydrologic and hydraulic modeling and small dam construction.

Sincerely,

Roger C. Smith, P.E.
Regional Engineer

Water Rights Division -DENR
Conversation or File Documentation

NAME OF PERSON OR FILE: Vern Hansen

ADDRESS: Rt. 1, Box 103, Bowman, ND 58623

COUNTY: Harding

DATE: March 4, 1999

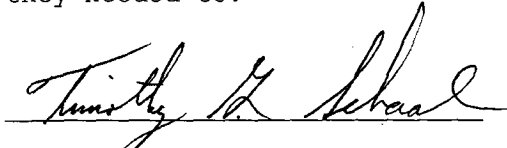
TELEPHONE: XXXXXXX

RE: Agreement attached to Application

I talked to Scott Collins from the US Fish and Wildlife Service (701/250-4403) today about the agreement they attached to Mr. Hansen's Water Permit Application No. 1678-1. He said the only reason they included the attachment was to appease the downstream landowner, Mr. Joe Painter, who has a dam on Dry House Creek about one mile below the proposed Ducks Unlimited dam. I explained to him that we always include the low flow bypass qualification on these permits and they would not have had to include the agreement. I also told him that the agreement was not exactly correct. Mr. Hansen would be required to bypass livestock water even if he had livestock needs himself. Mr. Collins did not think there would be a problem since the land around the proposed dam is in CRP (no livestock) and it sounded like Mr. Hansen and Mr. Painter have discussed this project and seem to get along together.

I also talked to Joe Painter today about this application. He said he did not really have any problems with the application; however, he did talk to Vern Hansen and Scott Collins about downstream water. He said Scott Collins suggested the agreement, but Mr. Painter did not think the agreement reflected everything they talked about. I told Mr. Painter that the agreement was not correct and we would put the low flow bypass qualification on the permit.

I also talked to Mr. Hansen on March 5, 1999, about the agreement and explained to him the low flow bypass qualification. He did not think they would have any trouble and said they got along and could work things out if they needed to.



Timothy G. Schaal, P.E.
Natural Resources Engineer III
Water Rights Program

REPORT ON
WATER PERMIT APPLICATION No. 1678-1
Vernon Hansen
March 3, 1999

Water Permit Application No. 1678-1 has been filed by Vernon Hansen to construct a dam with a storage capacity of 73.1 acre-feet of water on Dry House Creek. The dam will be located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 28-T21N-R3E, in Harding County. The application requests sufficient water annually to maintain the water level at the primary spillway elevation of 3129 feet mean sea level. The water will be used for fish and wildlife production and livestock watering.

Discussion:

The Hansen Dam will be classified as a Category 3, Low Hazard dam. It has been designed by Ducks Unlimited, Inc. and the plans and specifications have been reviewed and will be approved. Construction of the dam can not begin until Water Permit Application No. 1678-1 is approved.

The Hansen Dam will be 18 feet high with a normal storage capacity of 73.1 acre-feet with a reservoir level at the spillway elevation, and a maximum storage capacity of 191 acre-feet with a reservoir level at the top of dam elevation. A dam of this size and hazard category is required to have a minimum spillway design capable of passing a 25-year frequency event. The dam has a drainage area of 4.46 square miles.

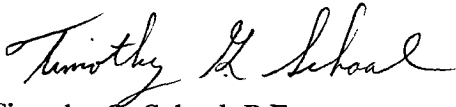
Hansen Dam is designed to have a CMP drop inlet primary spillway with a 72 inch diameter riser with a 42 inch barrel with 5 feet of available head and a 270 foot wide natural secondary spillway with 3 feet of available head. Ducks Unlimited, Inc. uses the Natural Resources Conservation Service (NRCS) TR-20 model to route a 25-year frequency event peak of 505 cfs through the spillways with 2.13 feet of freeboard remaining, and a 100-year frequency event peak of 916 cfs with 1.22 feet of freeboard remaining.

The annual yield for this drainage area with a 10 percent chance of occurrence, or 1 out of 10 years, is expected to be 238 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 38 acre-feet, and the annual yield with a 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 12 acre-feet.

The Hansen Dam will be located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 28-T21N-R3W on Dry House Creek about 5 miles upstream of its confluence with the Little Missouri River. It is also located on the South Fork of Dry House Creek about one-quarter mile upstream of the confluence of the North Fork and South Fork of Dry House Creek. There are no existing Water Rights/Permits located on Dry House Creek between the proposed dam and the Little Missouri River; however, there is a dam on Dry House Creek, about one mile downstream of the proposed dam, in the SW $\frac{1}{4}$ of Section 29-T21N-R3W. This dam is on property owned by Joe Painter and has a combined drainage area from the North and South Forks of Dry House Creek of approximately 8.7 square miles. The landowners have discussed the proposed project and water availability; however, the low flow bypass qualification should be included on Water Permit Application No. 1678-1.

Conclusions:

1. Water Permit Application No. 1678-1 should be approved since unappropriated water is available and approval should not have any adverse effect on existing Water Permits/Rights.
2. If approved, the low flow bypass requirement for downstream domestic use should be a qualification on Water Permit Application No. 1678-1.



Timothy G. Schaal, P.E.
Natural Resources Engineer III

Approved by:



Gale N. Selken, P.E.
Natural Resources Engineer IV

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 1678-1, Vernon Hansen**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 1678-1, Vernon Hansen, Rt 1 Box 103, Bowman ND 58623.

The Chief Engineer is recommending APPROVAL of Application No. 1678-1 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. Water Permit No. 1678-1 authorizes a dam with storage capacity of 73.1 acre feet of water and sufficient water annually to maintain the water level to the outlet elevation of 3129.0 feet mean sea level.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

See report on application for additional information.

A handwritten signature in cursive script, appearing to read "John Hatch".

JOHN HATCH, Chief Engineer
March 4, 1999



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

March 10, 1999

Joe Painter
Painter, Inc.
Box 57
Buffalo SD 57720

Dear Mr. Painter:

Please find enclosed a copy of the report, recommendation and notice of hearing for Water Right Permit Application No. 1678-1 filed by Vernon Hansen. This information is being sent to you because you own property downstream of the proposed dam.

The notice of hearing is set to be published March 17 and 24, 1999 in the Nation's center News printed at Buffalo SD. If you wish in petition in either support or opposition to the application, the petition must be submitted by April 5, 1999.

If you have any questions about the application, please call Tim Schaal at (605) 773-3352.

Sincerely,

Eric Gronlund
Water Rights Program
(605) 773-3352

enclosures



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

March 10, 1999

Vernon Hansen
Rt 1, Box 103
Bowman, ND 58623

Dear Mr. Hansen:

We have reviewed the plans and specifications for the Ducks Unlimited Dry House Creek Project in Section 28-T21N-R3E, in Harding County. The plans and specifications as submitted are approved. Approval of the plans and specifications does not authorize construction of the dam. Construction may not begin until Water Permit Application No. 1678-1 is approved.

Our review was to determine compliance with the requirements of the Water Management Board Safety of Dams Rules, Chapter 74:02:08. Approval of these plans and specifications does not release you, as owner of the dam, from the responsibility for operating and maintaining the dam in good repair to ensure their safety.

The Hansen Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 18 feet, a normal storage capacity of 73 acre-feet and a maximum storage capacity of 191 acre-feet.

If you have any questions, please feel free to contact us.

Sincerely,

Gale N. Selken, P.E.
Natural Resources Engineer IV
for John Hatch, Chief Engineer
Water Rights Program
(605) 773-3352

c: Roger Smith, Ducks Unlimited



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPER RIGHT AWAY.

March 10, 1999

Vernon Hansen
Rt 1, Box 103
Bowman, ND 58625

Dear Mr. Hansen:

Water Permit Application No. 1678-1 for livestock water and fish & wildlife propagation has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of hearing has been sent to the Publisher of the Nation's Center News printed at Buffalo, SD (Ph # (605) 375-3228). For your information, a copy of the notice, the recommendation of the Chief Engineer and a report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspaper to authorize publication of your Notice of Hearing and to arrange for payment. Early contact with the paper can eliminate delays. The publisher has been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. The newspaper has been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

Eric Gronlund
Natural Resources Engineer
(605) 773-3352

enclosures

c: Scott Collins, Wildlife Biologist, US Fish & Wildlife Services, 1500 E. Capitol Ave., Bismarck, ND 58501

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

March 10, 1999

Nation's Center News
Box 107
Buffalo, SD 57720-0107

ATTENTION: Legal Public Notice

Enclosed is a Notice of Hearing on Application No. 1678-1 to Appropriate Water to be published twice. Please publish the first notice on March 17, 1999, with the second publication 7 days later.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is Vernon Hansen, Rt 1, Box 103, Bowman, ND.

Please send the Water Rights Program the first publication immediately. The publication is checked for accuracy so any corrections can be made in the second publication. You may use the form below or fax a copy of the first publication. Any fax should be sent to the attention of Karen Schlaak at (605) 773-4068. Publication errors can invalidate the public notice.

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CU T HERE-----

No. 1678-1

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of March 10, 1999, enclosing Notice of Hearing to Appropriate Water by Application No. 1678-1 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper

Instruction to Newspaper - Publish first Notice on March 17, 1999, with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 1678-1 to Appropriate Water.

Notice is given that Vernon Hansen, Rt 1, Box 103, Bowman ND 58623 has filed an application for a water permit to impound 73.1 acre-feet of water from Dry House Creek by constructing a dam located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 28 with water impounded in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 28 and the NW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 33; all in T21N-R3W. This application requests impoundment of sufficient water to maintain water at the outlet elevation 3129.0 feet mean sea level and is to be used to provide habitat for fish and wildlife propagation and livestock watering. E

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 1678-1 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider the application. Notice of the hearing will be given to the applicant and any person filing a petition.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by April 5, 1999.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.

NOTICE OF APPLICATION NO.
1678-1 TO APPROPRIATE
WATER

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 1678-1 because 1) unappropriated water is available, 2) existing rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider the application. Notice of the hearing will be given to the applicant and any person filing a petition.

The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.

3-17, 24

20.66
16.53

Linda Stephens

Walter Stephens

My commission expires JUNE 15, 2003



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

APR 23 1999

Vernon Hansen
Rt 1, Box 103
Bowman, ND 58623

Dear Mr. Hansen:

Enclosed is Water Permit No. 1678-1 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the acquisition of a water right.

An informational sheet *Common Water Right Questions* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Very truly yours,

JOHN HATCH, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

c: Scott Collins, Wildlife Biologist, USFWS, 1500 E. Capitol Ave., Bismarck, ND 58501.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

February 5, 2004

1678-1

Vernon Hansen
Rt 1 Box 103
Bowman ND 58623

Dear Mr. Hansen:

On November 18, 2003 the investigation of your water use system, including the extent of application of water to beneficial use, as developed under Water Permit No. 1678-1, was completed by Tim Schaal, a staff engineer with our program. Your final water right document, the water license, can now be issued.

State law requires that we charge a \$50.00 fee for the investigation and issuance of the water license. Upon receipt of the \$50.00 fee from you, we will complete processing your water license. The check or money order for the fee should be made payable to the "Water Rights Program".

Your licensed water right will be similar to a property right that can not be lost as long as the water use continues and you abide by the permit requirements.

If you have any questions regarding the water permit, investigation of your water use system or payment of the fee, please contact Genny McMath with our program at (605) 773-3352.

Sincerely,

Karen Schlaak
Water Rights Program
(605) 773-3352



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

RECEIVED

AUG 02 2004

WATER RIGHTS
PROGRAM

July 26, 2004

REMINDER NOTICE

1678-1

Vernon Hansen
RR 1 Box 103
Bowman ND 58623

Dear Mr. Hansen:

On February 5, 2004, we advised you that a \$50.00 fee was due for the completed investigation of your Water Permit No. 1678-1. The fee also covers issuance of your water license which is the final document in obtaining and perfecting a water permit.

To date, we have not received the fee and therefore can not issue the water license. Your licensed water right will be similar to a property right that can not be lost as long as the water use continues and you abide by any permit requirements.

If you have any questions regarding the water permit, investigation of your water use system or payment of the fee, please contact Genny McMath with our program at (605) 773-3352. The check or money order for the fee should be made payable to the "Water Rights Program".

Sincerely,

Garland Erbele, Chief Engineer
Water Rights Program

*I didn't recall needing or asking for a
water permit.*

CERTIFICATION

I hereby certify that on July 26, 2004 , I have personally deposited with the United States mail at Pierre, South Dakota, first class postage, prepaid envelopes containing a Notice dated July 26, 2004 regarding Reminder Notice for fee due for the completed investigation addressed as stated below:

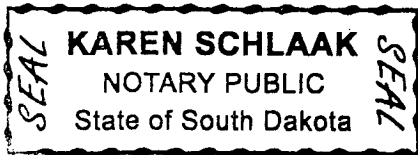
Vernon Hansen
RR 1 Box 103
Bowman ND 58623


Eric Gronlund
Natural Resource Engineer
Water Rights

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 27th day of July, 2004.


Karen Schlaak
Notary Public
My Commission expires April 1, 2007



RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date AUGUST 2, 20 04

RECEIVED OF Vernon Hansen, RR 1 Box 103, Bowman ND 58623

The following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct and to put water to beneficial use	50	00
Fee for Application for Permit No. _____ to Appropriate Water for Future use		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>1678-1</u>		
Fee for Filing Transfer Form _____		
Fee for _____		
Fee for Issuing New Well Driller's License No. _____ for C.Y. _____		
Fee for Renewal of Well Driller's License No. _____ for C.Y. _____		
Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____		
Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____		
(Any Other Work Provided by Law)	TOTAL	50.00

No.

0041008

By

Darland Eide
Chief Engineer
gm

Permit No. 1678-1
Little Missouri River - Water District

Report Of Examination Of Works And/Or Application of Water To Beneficial Use

TO: Chief Engineer, Water Rights Program, DENR, Foss Bldg., Pierre, SD 57501

I have this day, November 18, 2003, made a thorough examination of the water use system constructed by Vernon Hansen of Rt. 1 Box 103, Bowman, ND 58623 holder of Permit No. 1678-1, bearing the priority of January 7, 1999 authorizing the storage of 73.1 acre-feet of the waters of runoff (Dry House Creek) for livestock water and fish & wildlife propagation purposes, in Harding County.

I have to report on the conditions of the same as follows:

A. Works used to divert the water:

An 18 foot high earthen dam with a normal storage capacity of 73.1 acre-feet

B. Works used to transport water to place of use:

N/A

C. Works used to apply water to beneficial use:

An 18 foot high earthen dam with a normal storage capacity of 73.1 acre-feet

The system is in the following condition good. The point of diversion is located 350 feet north & 250 feet east of the SW corner of Sec. 28-T21N-R3E (SW ¼ SW ¼). The works are capable of storing 73.1 acre-feet of water which is to be used for livestock water and fish & wildlife propagation. Water has been put to beneficial use to the maximum extent as follows:

An 18 foot high earthen dam with a normal storage capacity of 73.1 acre-feet

and the license should be issued for 73.1 acre-feet of storage.

Applicable permit qualifications have been complied with: Yes X

Exceptions to compliance are: none Date Report Completed: January 29, 2004



Timothy G. Schaal, P.E.
Natural Resources Engineer Specialist
DENR, Water Rights Program

REPORT ON INSPECTION OF PERMIT NO. 1678-1

DATE OF INSPECTION: November 18, 2003

NAME & ADDRESS OF INSPECTION CONTACT/ Mrs. Vernon Hansen

RELATIONSHIP TO PERMIT HOLDER, IF APPLICABLE: owner

NAME & ADDRESS OF PERMIT HOLDER: Vernon Hansen, Rt. 1 Box 103, Bowman, ND 58623

DIVERSION POINT LEGAL LOCATION: 350 feet north & 250 feet east of the SW corner of Sec. 28-T21N-R3E (SW ¼ SW ¼).

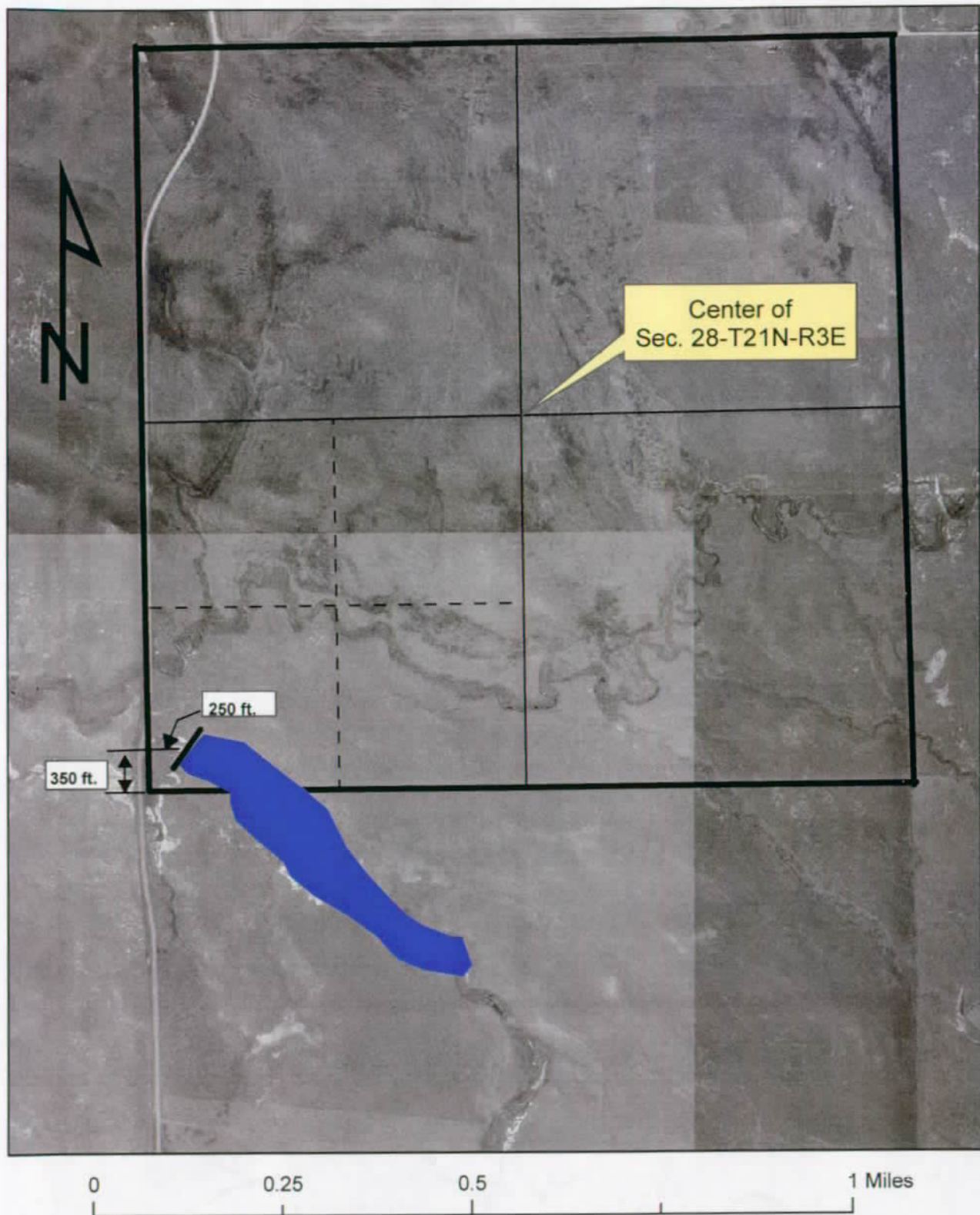
DAM INFORMATION:

- 1) Height to crest 18 feet
- 2) Height to primary spillway 13 feet
- 3) Height to secondary spillway 15 feet
- 4) Crest width 12 feet
- 5) Crest length 672 feet
- 6) Spillway length XXX feet
- 7) Spillway width 270 feet
- 8) Approx. storage (Normal) 73.1 acre-feet
- 9) Approx. storage (Maximum) 191 acre-feet
- 10) Date constructed: Fall 2000

PERMIT QUALIFICATIONS AND REGULATIONS:

- 1) Soil and water permit lands agree with lands being irrigated and lands listed on permit N/A
- 2) Special qualifications to permit being abided by yes
- 3) All structures, wells and lands on map yes
- 4) Irrigation Questionnaires checked to determine if permit owner started irrigation by the end of construction period N/A

Water Permit Application No. 1678-1



South Dakota Department of
Environment and Natural Resources



Protecting South Dakota's Tomorrow ... Today



Timothy G. Schaal
Timothy G. Schaal, P.E. 1/29/04
Natural Resources Engineer Specialist
Water Rights Program

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 1678-1

(1) Vernon Hansen, Rt 1 Box 103, Bowman ND 58623 made Application No. 1678-1, January 7, 1999 for a water permit to impound 73.1 acre feet of water from runoff (Dry House Creek), Harding County, South Dakota for fish and wildlife propagation and livestock watering purposes. Permit No. 1678-1, with a priority date of January 7, 1999 was approved April 5, 1999 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before April 5, 2004 and for the application to beneficial use of water on or before April 5, 2008.

(2) The water supply system has been completed and water applied to beneficial use in accordance with South Dakota State Law. Pursuant to South Dakota Codified Law 46-5-30.1, the holder and/or owner of Water Right No. 1678-1 is issued a license, bearing a priority date of January 7, 1999 to impound 73.1 acre feet of water from runoff (Cry Horse Creek) to be used for fish and wildlife propagation and livestock watering.

The location of the storage dam (spillway) is 350 feet north and 250 feet east of the southwest corner of Section 28-T21N-R3E (SW ¼ SW ¼).

(3) This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Permit No. 1678-1, including the following now applicable qualifications:

Water Permit No. 1678-1 authorizes a dam with storage capacity of 73.1 acre-feet of water and sufficient water annually to maintain the water level to the outlet elevation of 3129.0 feet mean sea level.

Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

Garland Erbele

Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

AUG 13 2004

date





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

AUG 13 2004

1678-1

Vernon Hansen
Rt 1 Box 103
Bowman ND 58623

Dear Mr. Hansen:

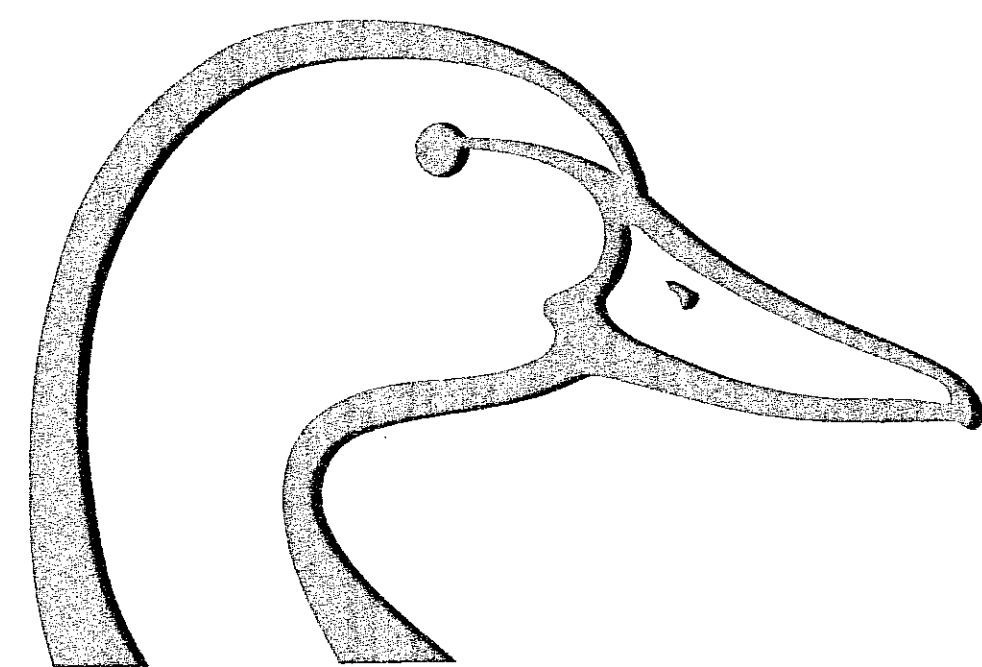
Enclosed is Water License No. 1678-1. This is the final water right document completing your process of obtaining a Water Right. Enclosed is Receipt No. 001388 in the amount of \$50.00 which you paid for the investigation and issuance of the Water License.

As long as you use the water beneficially, as stated in the Water License, State Water Laws provide that you have a continuing right to use the water.

Sincerely,

Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures



DUCKS UNLIMITED

SPECIFICATIONS

GENERAL CONDITIONS	101
MOBILIZATION	201
SITE PREPARATION	202
EXCAVATION	203
EMBANKMENT CONSTRUCTION	204
WATER	205
WATER CONTROL	
STRUCTURE INSTALLATION	206
WATER CONTROL STRUCTURE	
& CULVERT APPURTENANCES	206A
CULVERT INSTALLATION	207
CAST-IN-PLACE	
REINFORCED CONCRETE	208
RIPRAP PLACEMENT	209

PLAN INDEX

VICINITY MAP	1
PROJECT TOPOGRAPHY	2
SITE PLAN	3
STRUCTURE PLAN & PROFILE	4
STRUCTURE DETAILS	5

QUANTITIES

MOBILIZATION	1 L.S.
SITE PREPARATION	1654 C.Y.-P
EMBANKMENT CONSTRUCTION	12,714 C.Y.-S*
WATER	190 M-GAL.**
WATER CONTROL	
STRUCTURE INSTALLATION	
72"Ø CMP RISER	1 L.S.
DRAWDOWN STRUCTURE	1 L.S.
APPURTENANCES	INC.
CULVERT INSTALLATION	
42"Ø CMP	81 L.F.
12"Ø PVC	35 L.F.
RIPRAP PLACEMENT	
CLASS I	8 C.Y.-P
CLASS II	48 C.Y.-P

*INCLUDES 15% FOR SHRINKAGE
 **BASED ON 15 GAL./C.Y. ONLY ACTUAL
 GALLONS USED WILL BE PAID FOR.

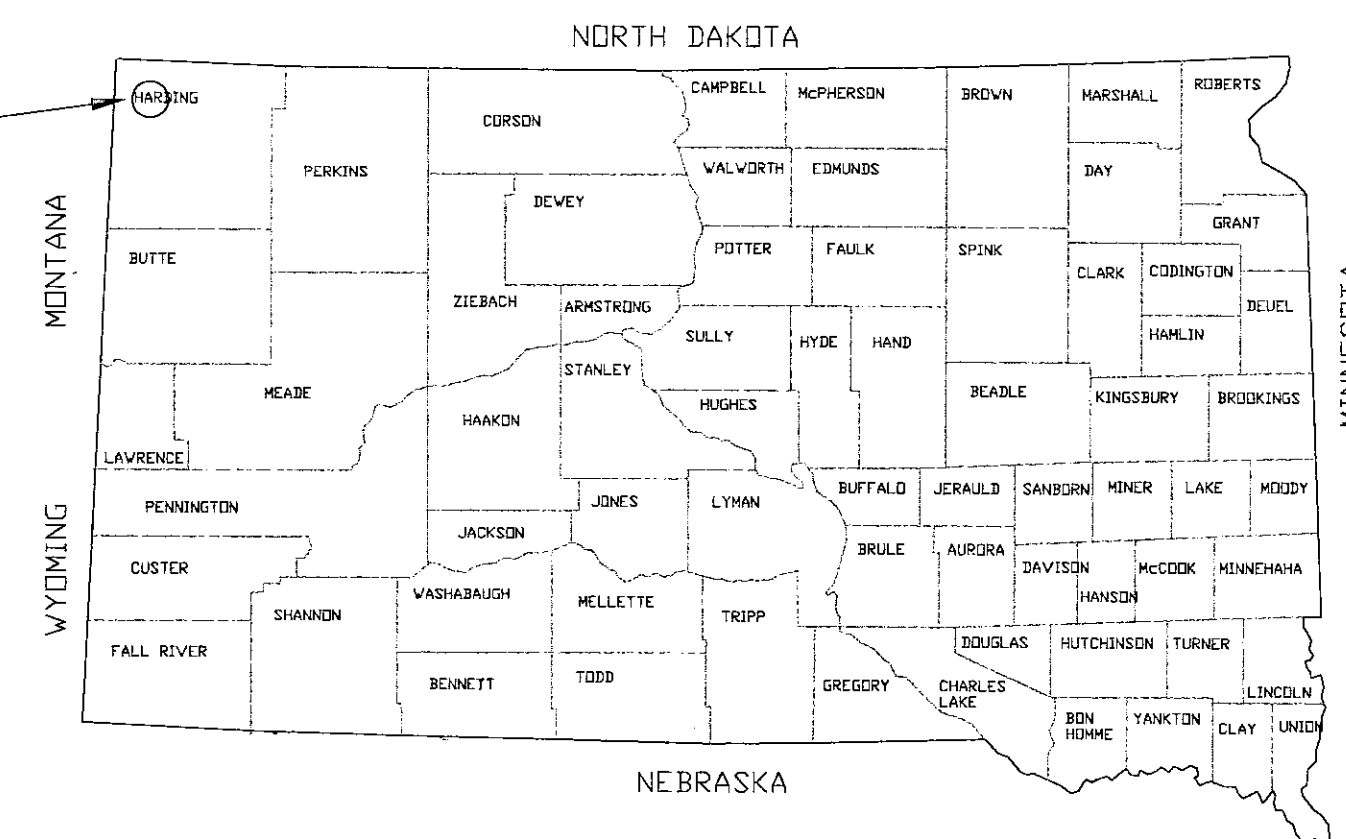
DUCKS UNLIMITED

PROJECT

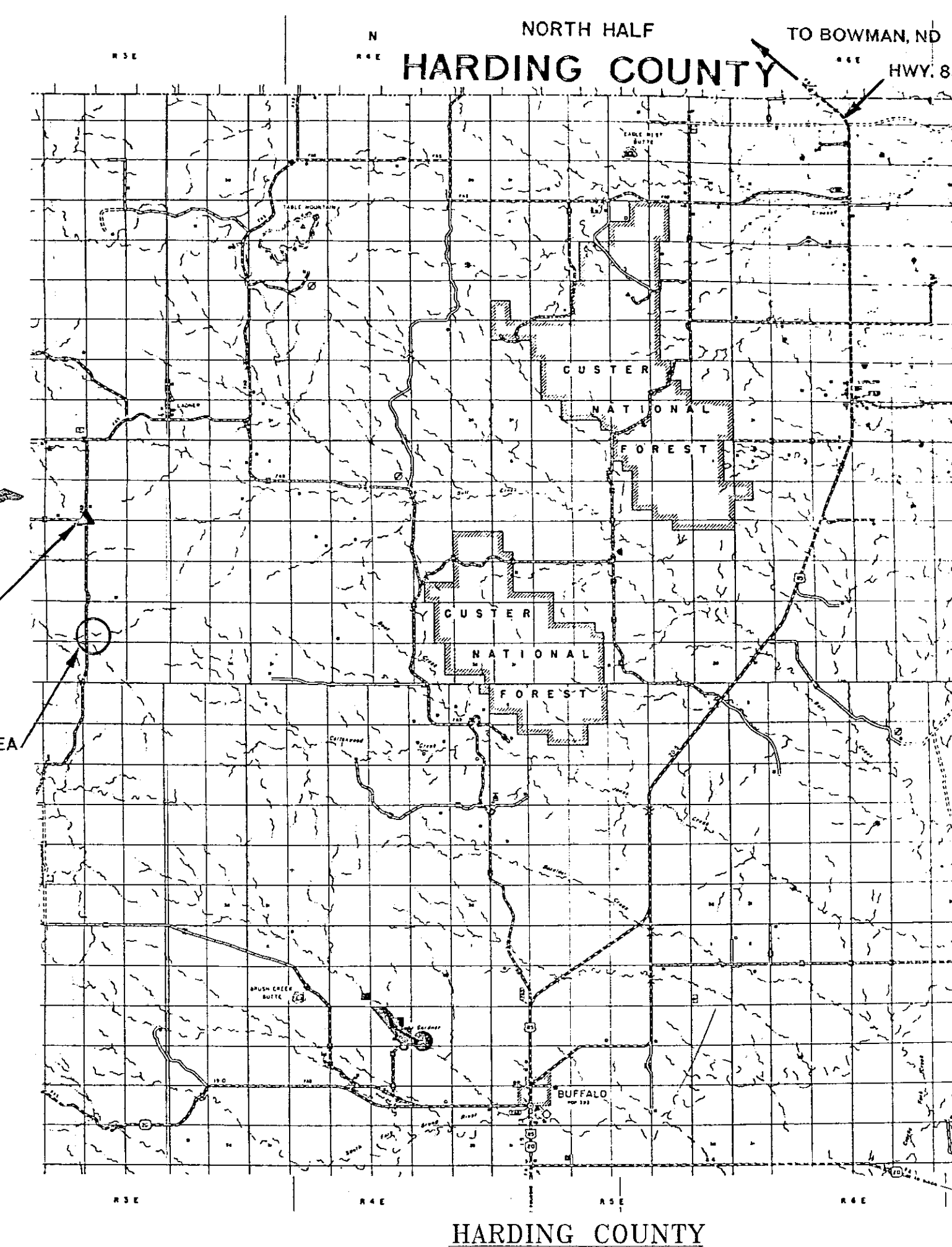
DRY HOUSE CREEK SECTION 28, T21N, R3E HARDING COUNTY, SOUTH DAKOTA

IN COOPERATION WITH

U.S. FISH & WILDLIFE SERVICE

PROJECT
LOCATION

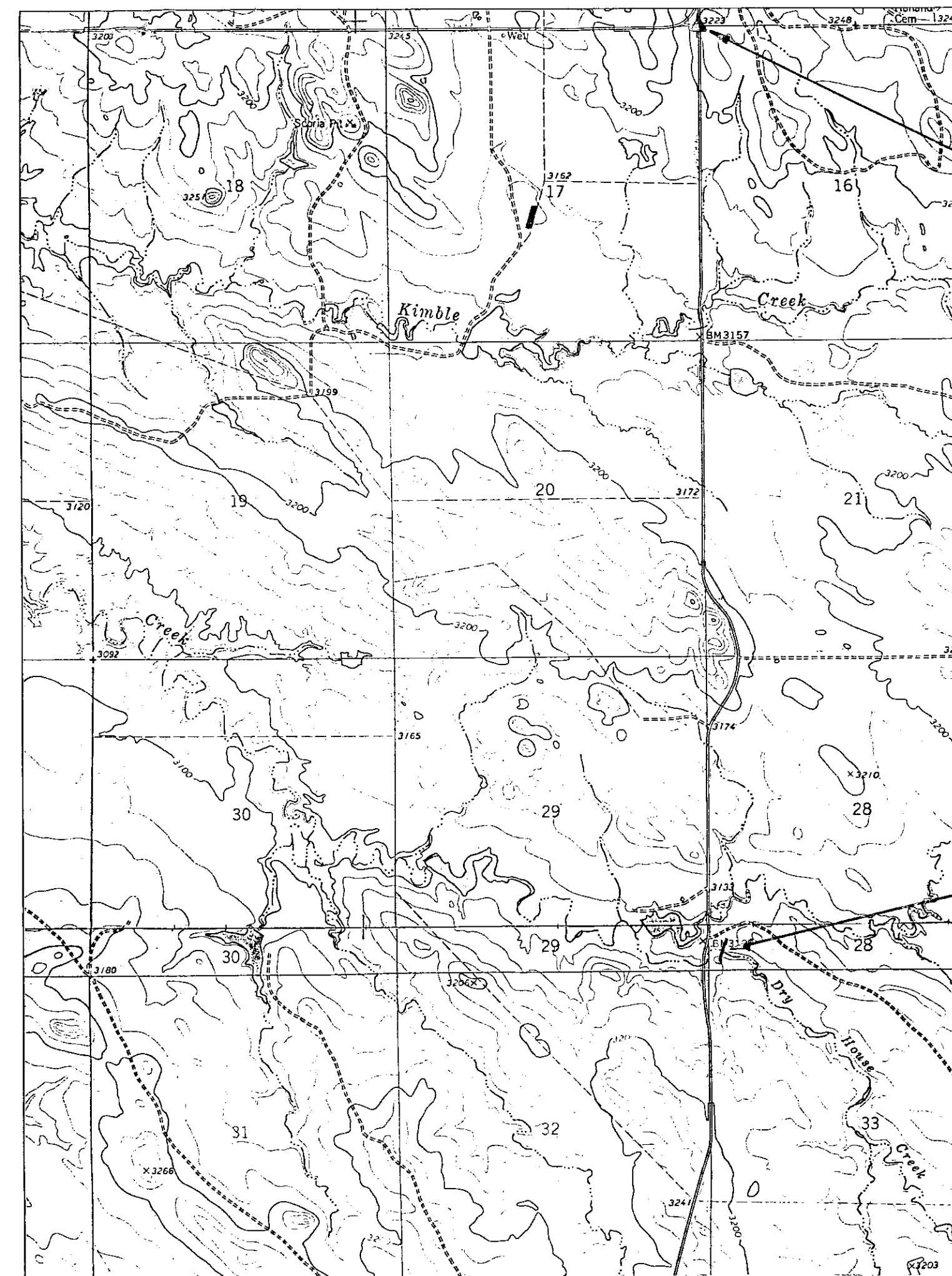
SOUTH DAKOTA



MAP POINT

PROJECT AREA

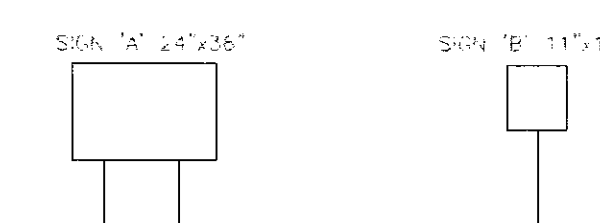
PROJECT SITE



VICINITY MAP
 SCALE: 1"=2000'

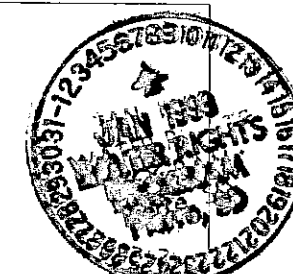
AGENCY CONTACT:
 SCOTT COLLINS
 USFWS-BISMARCK, ND
 701/250-4403
 LANDOWNER:
 VERN HANSON
 701/574-3139

PROJECT SIGNING

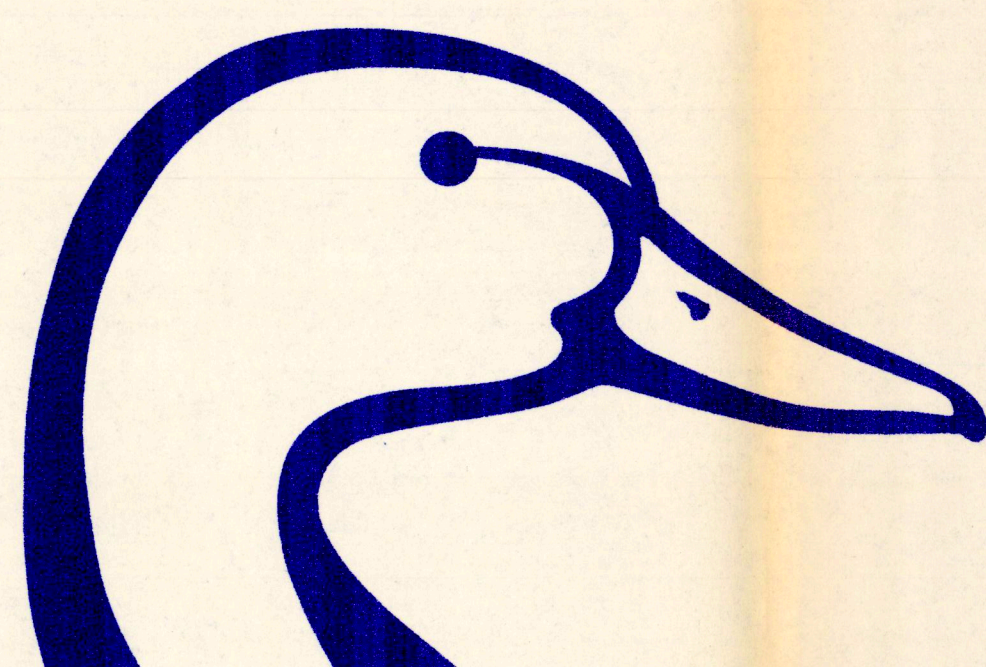


Sign 'A' and Sign 'B' will be provided by
 DUCKS UNLIMITED and delivered to the cooperating
 agency. The agency is responsible for installing
 the signs at the location(s) designated on the plans.

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE DATE: 12-2-98	PROJECT NO. SD-0267-001 DRY HOUSE CREEK SHEET NO. 1 OF 5	DESIGNED BY: R.C.S. DRAWN BY: B SURVEYED BY: G.L.J. CHECKED BY:
	VICINITY MAP APPROVED BY: <i>[Signature]</i>	



1678-1



DUCKS UNLIMITED

SPECIFICATIONS

GENERAL CONDITIONS	101
MOBILIZATION	201
SITE PREPARATION	202
EXCAVATION	203
EMBANKMENT CONSTRUCTION	204
WATER	205
WATER CONTROL	
STRUCTURE INSTALLATION	206
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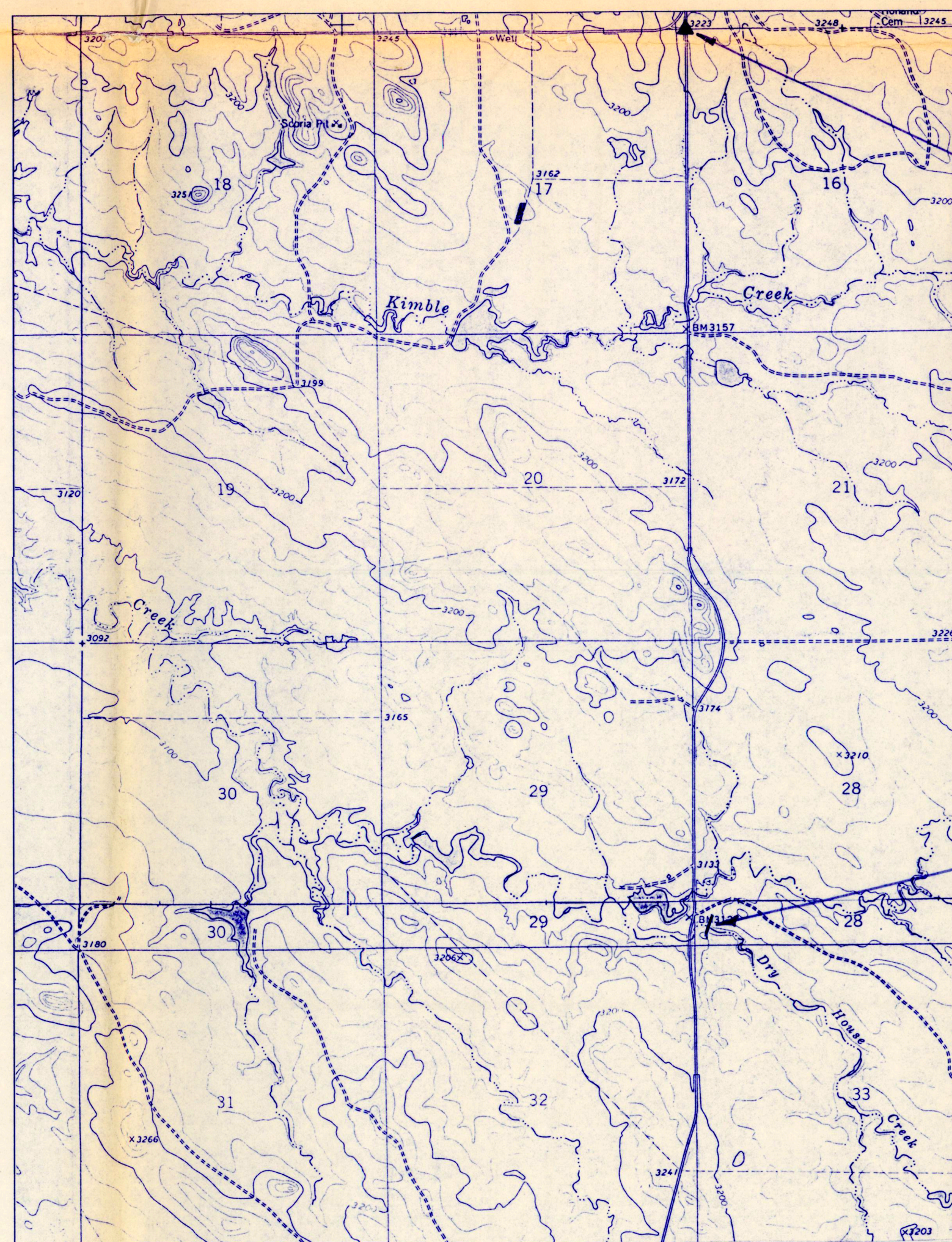
DUCKS UNLIMITED

PROJECT

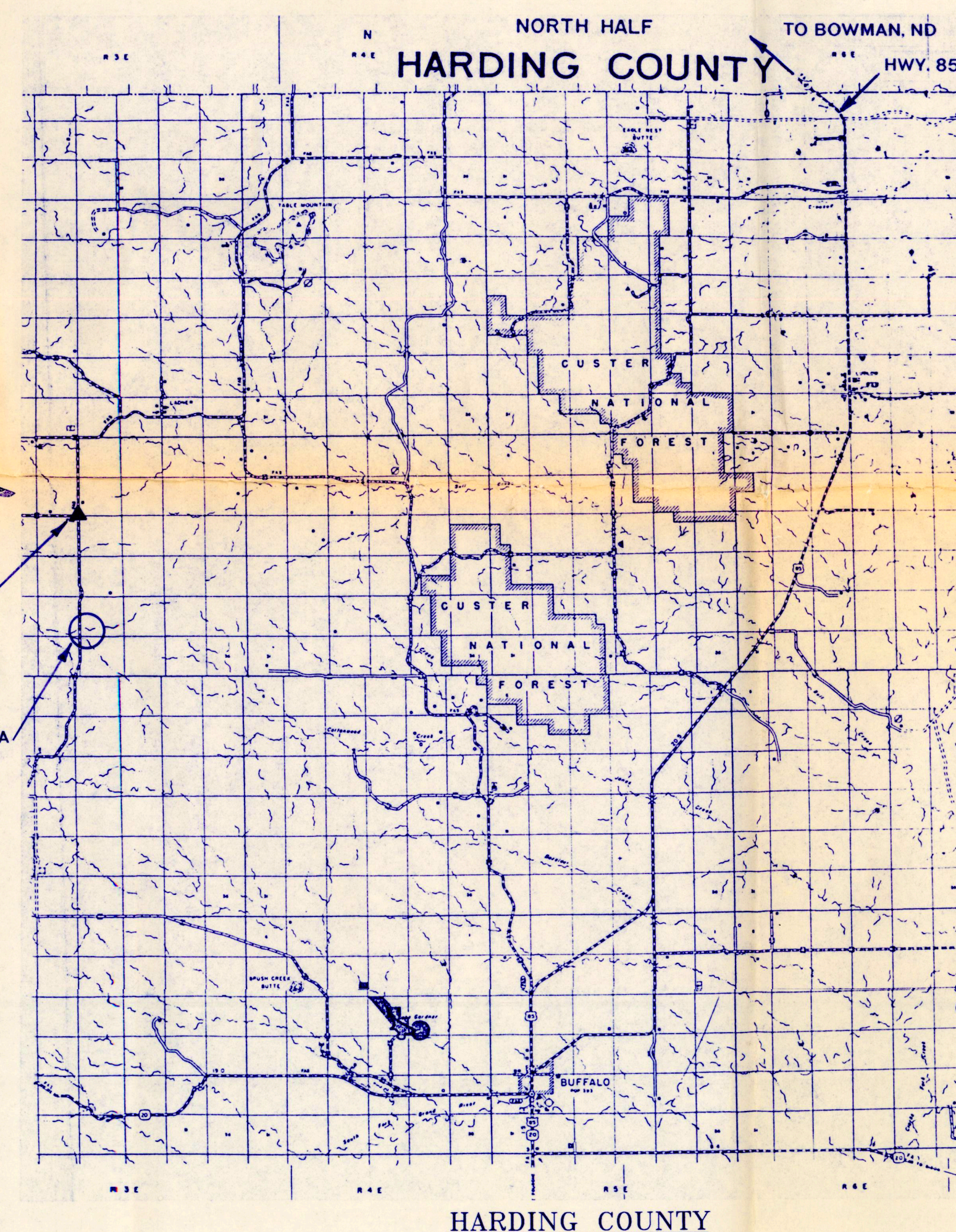
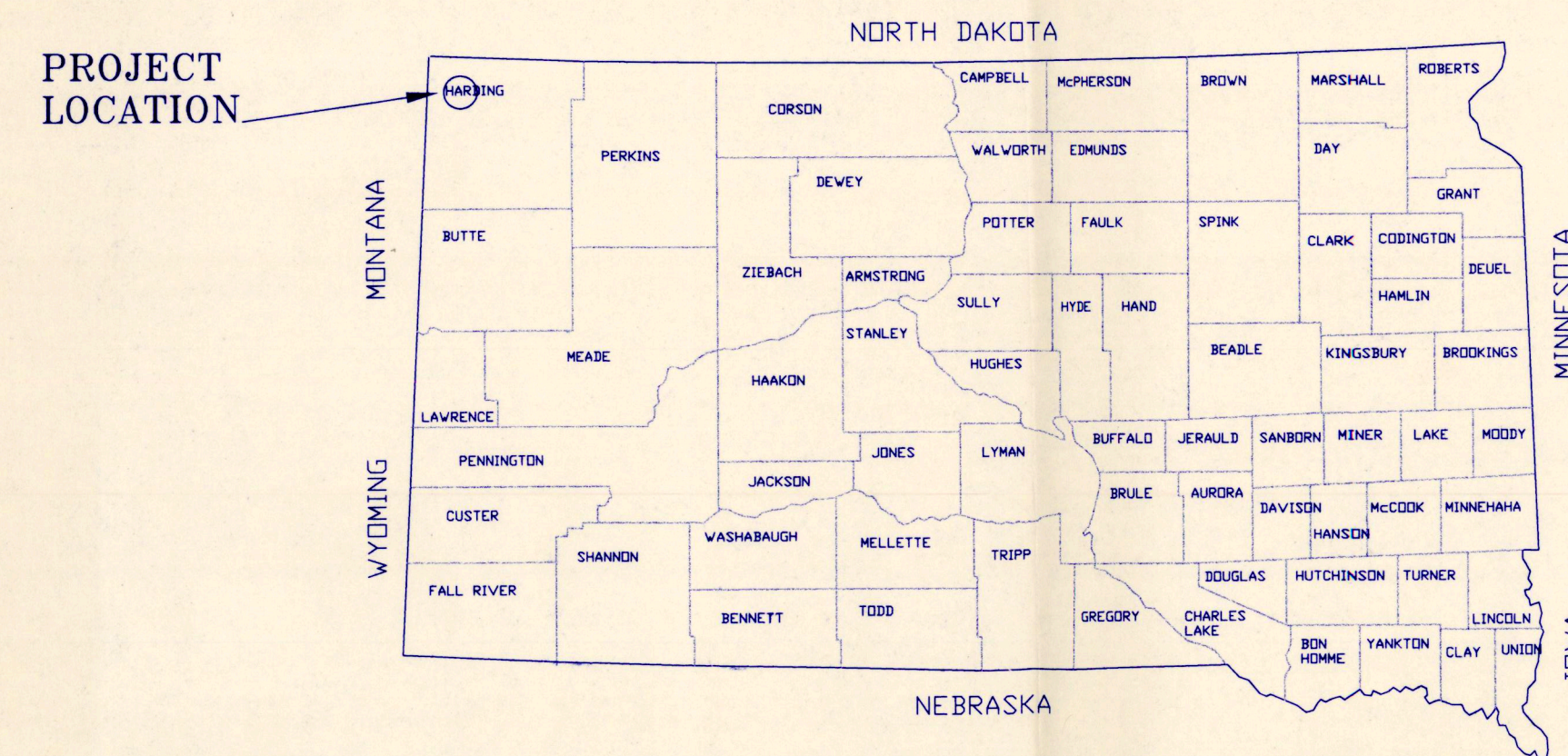
DRY HOUSE CREEK SECTION 28, T21N, R3E HARDING COUNTY, SOUTH DAKOTA

IN COOPERATION WITH

U.S. FISH & WILDLIFE SERVICE



VICINITY MAP
 SCALE: 1"=2000'



AGENCY CONTACT:
 SCOTT COLLINS
 USFWS-BISMARCK, ND
 701/250-4403
 LANDOWNER:
 VERN HANSON
 701/574-3139

PROJECT SIGNING

SIGN "A" 24"x36" SIGN "B" 11"x14"

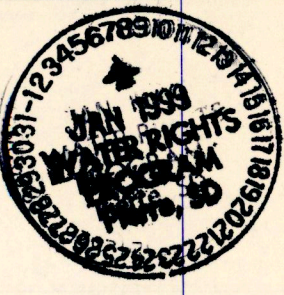
SIGN "A" AND SIGN "B" WILL BE PROVIDED BY
 DUCKS UNLIMITED AND DELIVERED TO THE COOPERATING
 AGENCY. THE AGENCY IS RESPONSIBLE FOR INSTALLING
 THE SIGNS AT THE LOCATION(S) INDICATED ON THE PLANS.

DUCKS UNLIMITED INC.
 GREAT PLAINS REGIONAL OFFICE

PROJECT NO. SD-0267-001
 DRY HOUSE CREEK
 VICINITY MAP

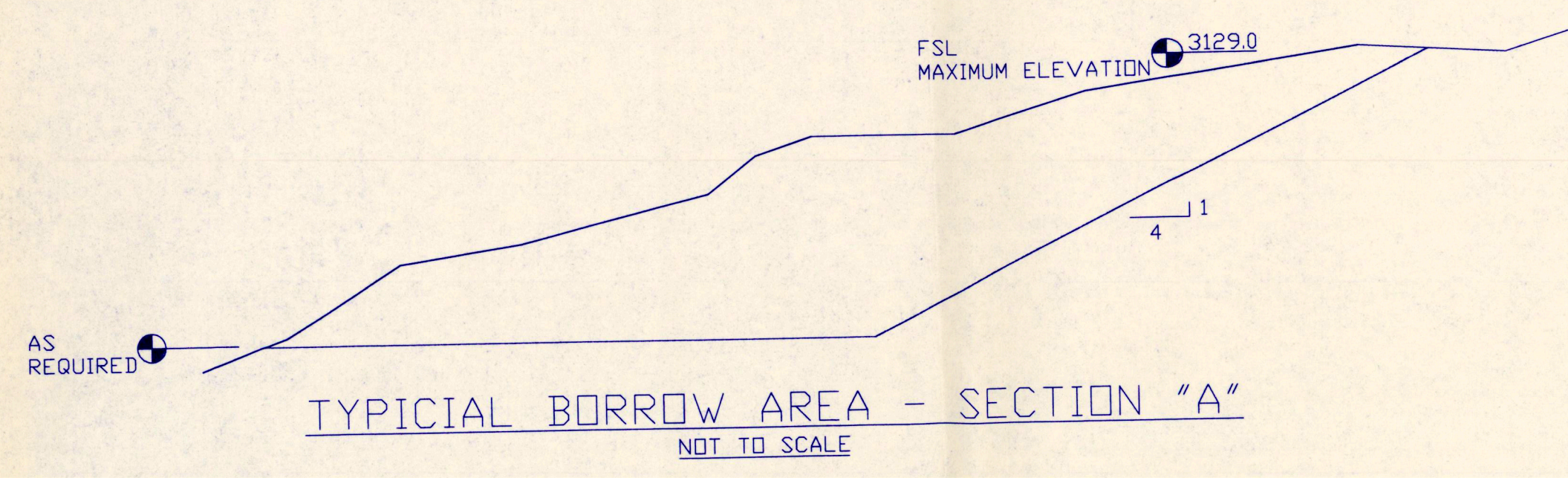
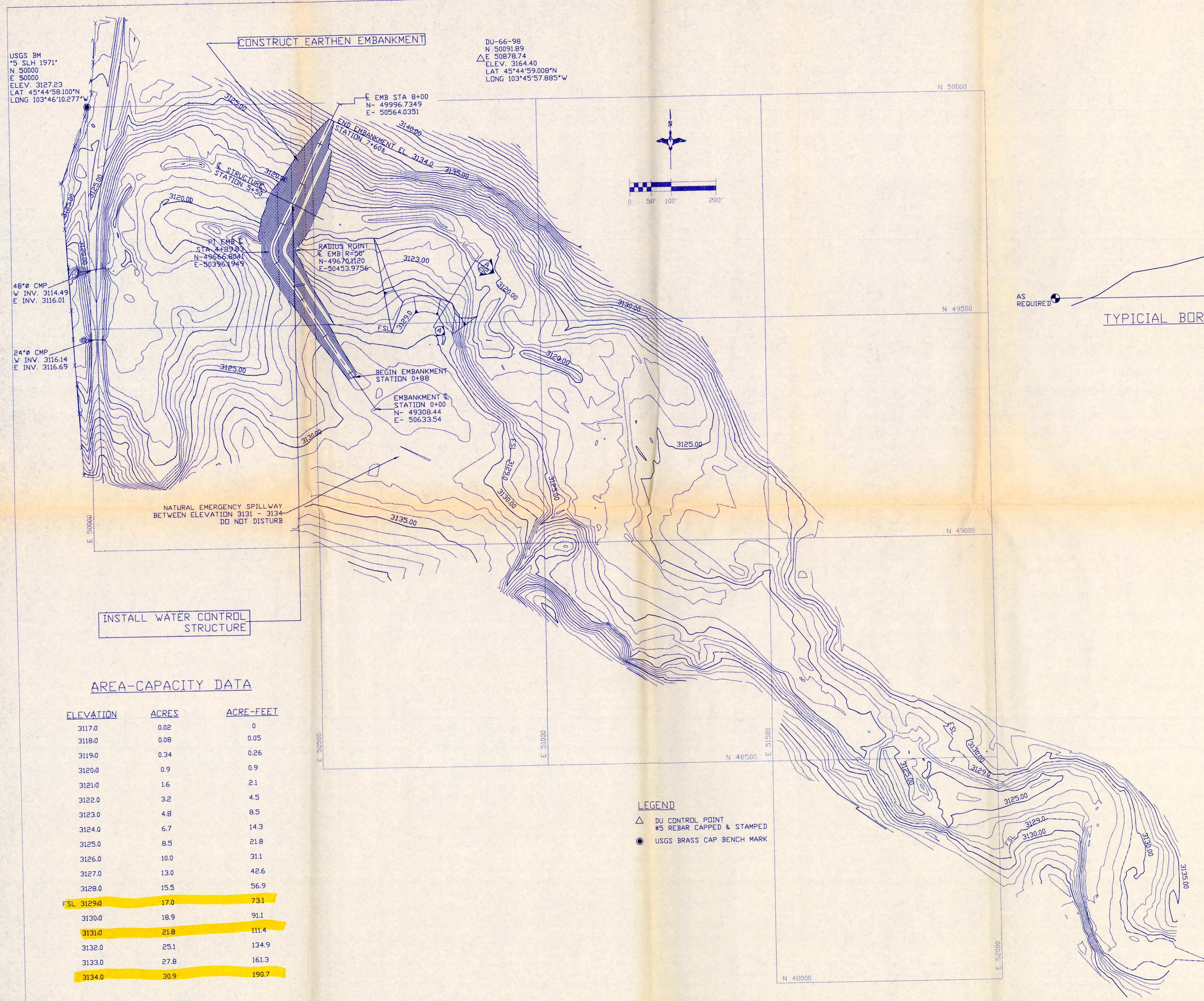
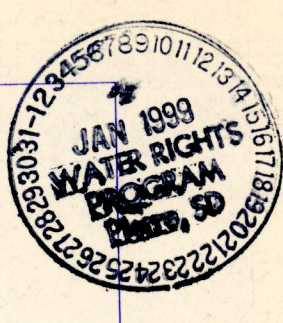
DESIGNED BY: R.C.S.
 DRAWN BY: J.B.
 SURVEYED BY: G.L.J.
 CHECKED BY: J.B.
 APPROVED BY: J.B.

DATE: 12-2-98 SHEET NO. 1 OF 5



1678-1

1678-1



AREA-CAPACITY DATA

ELEVATION	ACRES	ACRE-FEET
3117.0	0.02	0
3118.0	0.08	0.05
3119.0	0.34	0.26
3120.0	0.9	0.9
3121.0	1.6	2.1
3122.0	3.2	4.5
3123.0	4.8	8.5
3124.0	6.7	14.3
3125.0	8.5	21.8
3126.0	10.0	31.1
3127.0	13.0	42.6
3128.0	15.5	56.9
FSL 3129.0	17.0	73.1
3130.0	18.9	91.1
3131.0	21.8	111.4
3132.0	25.1	134.9
3133.0	27.8	161.3
3134.0	30.9	190.7

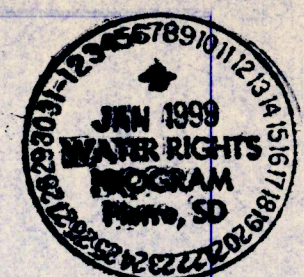
LEGEND

- △ DU CONTROL POINT #5 REBAR CAPPED & STAMPED
- USGS BRASS CAP BENCH MARK

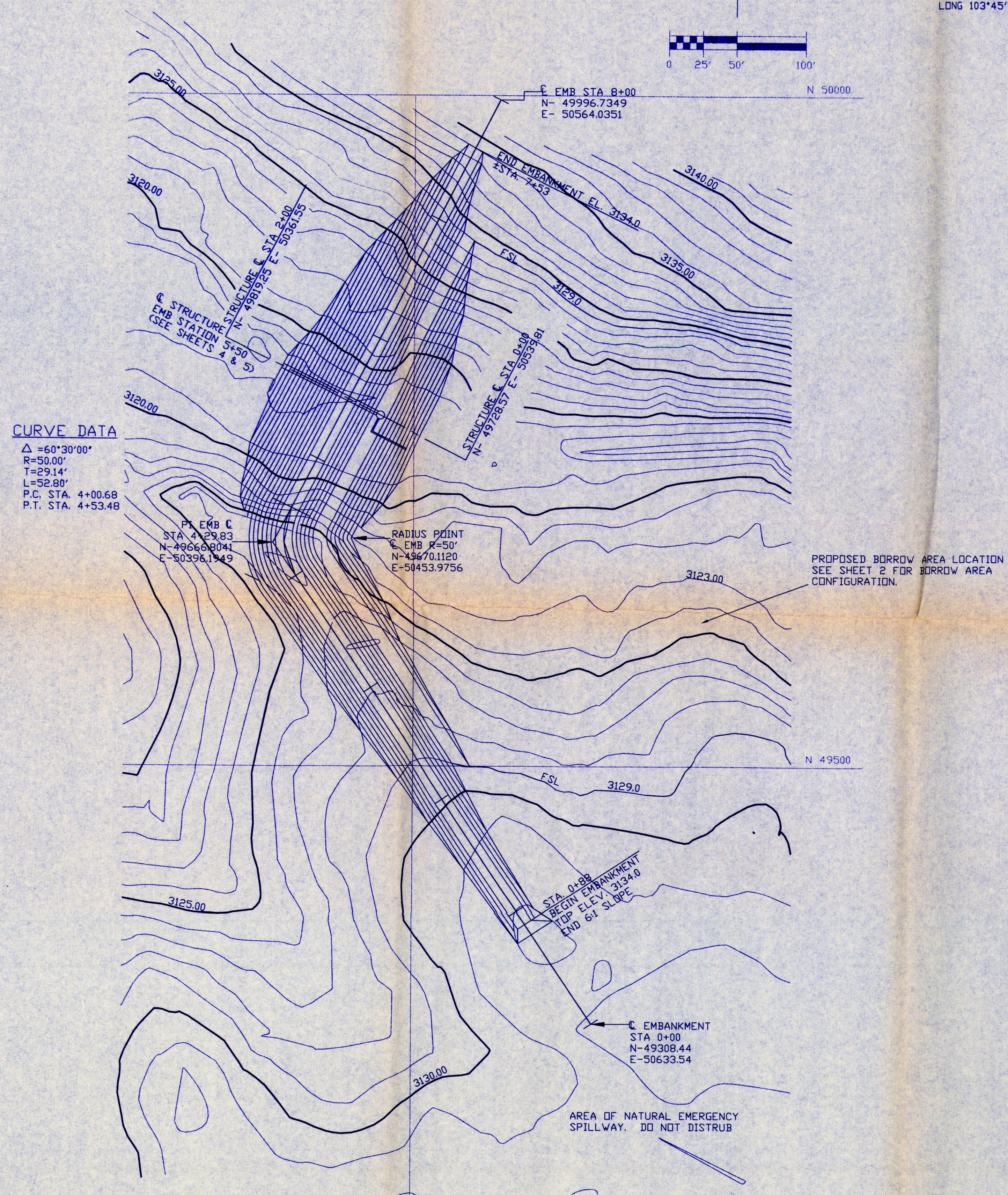
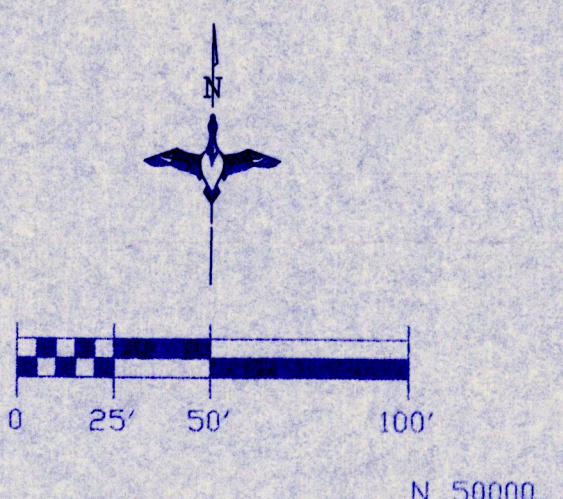
SURVEY DATA
HORIZONTAL CONTROL:
LOCAL DU COORDINATES WITH AZIMUTH REFERENCED TO TRUE NORTH
WITH OBSERVATIONS FROM TRIMBLE 4400 GPS RECEIVERS ON SEPT. 9,
1998 FROM THE WGS 84 ELLIPSOID.
VERTICAL CONTROL:
CALIBRATED FROM GPS INFORMATION TO USGS BENCH MARK STAMPED
"S SLH 1971" WITH A PUBLISHED ELEVATION GIVEN TO DU OVER THE
PHONE BY THE USGS AS 3127.234 FEET WHICH IS ON NAVD29.

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE	PROJECT NO. SD-0267-001	DESIGNED BY: R.C.S.
	DRY HOUSE CREEK	DRAWN BY: B
	PROJECT TOPOGRAPHY	SURVEYED BY: G.L.J.
	DATE: 12-1-98	SHEET NO. 2 OF 5

1678-1

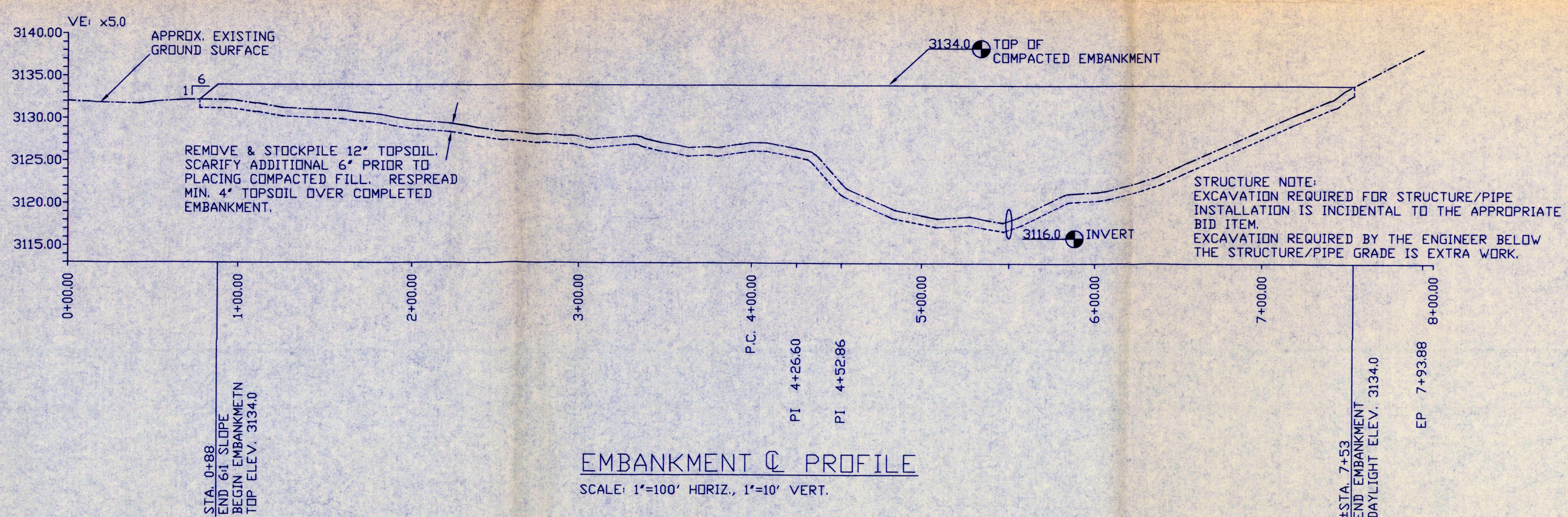
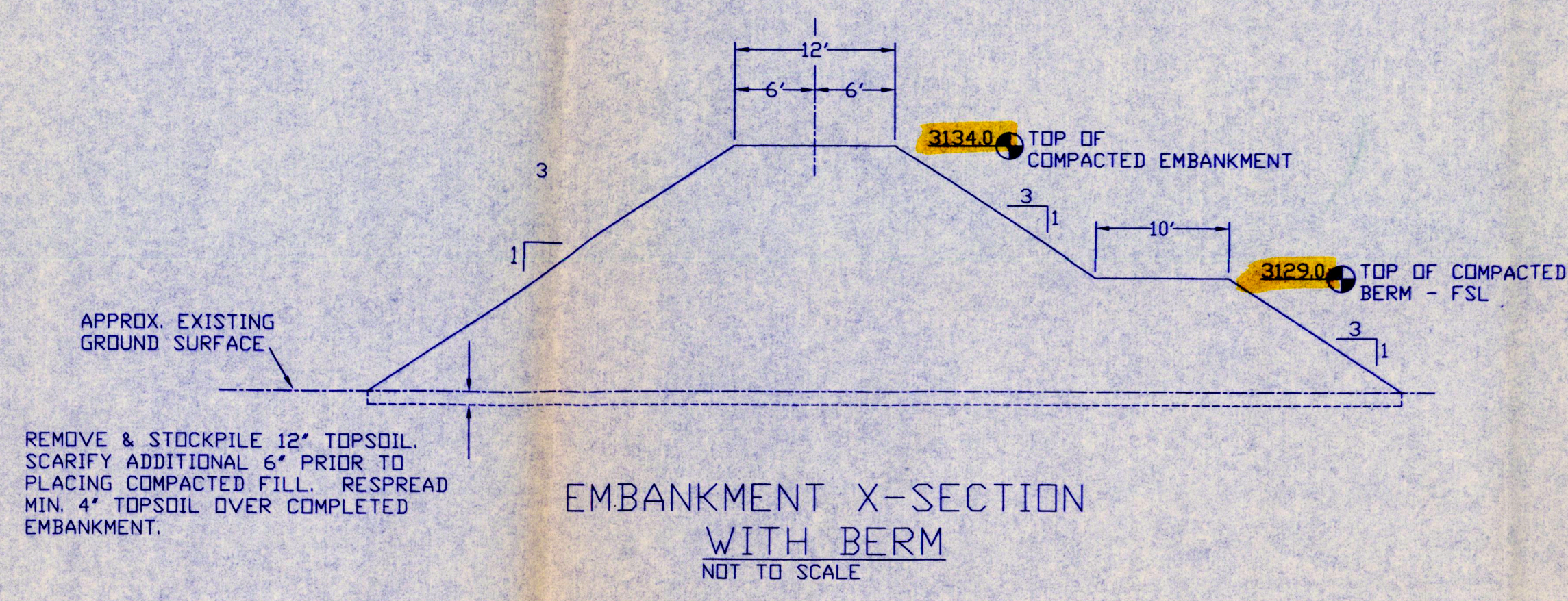
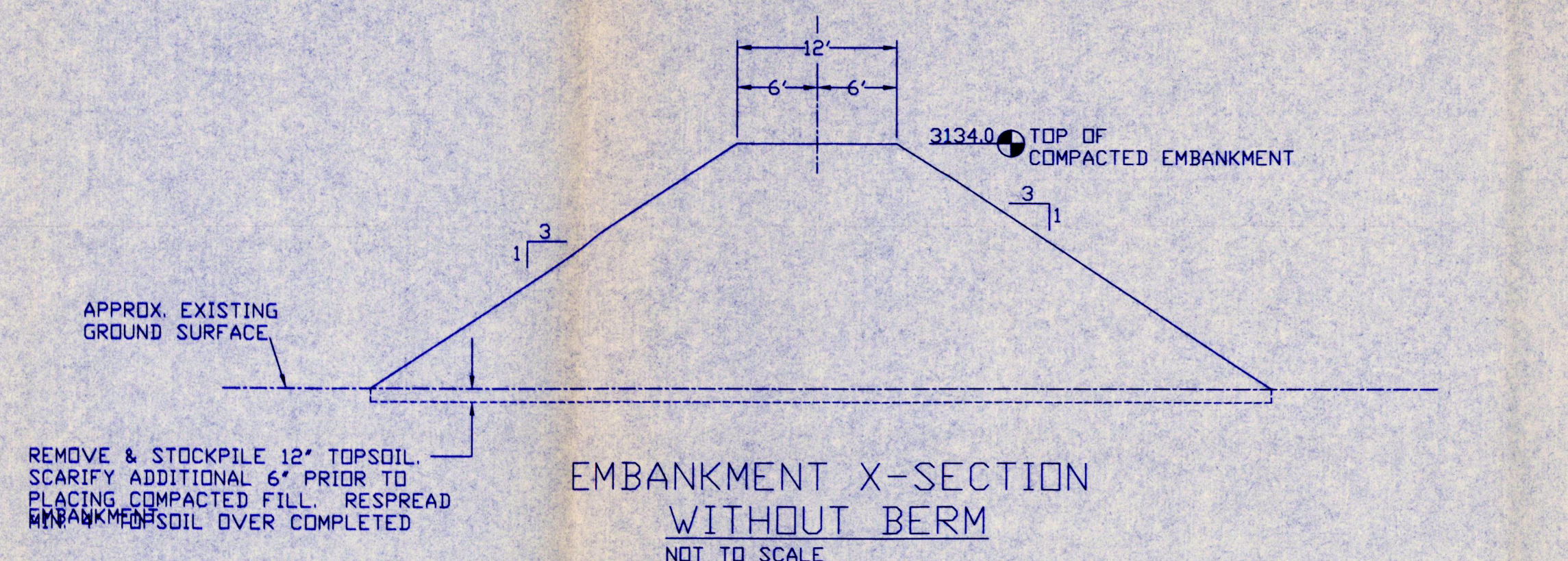


DU-66-98
N 50091.89
E 50878.74
ELEV. 3164.40
LAT 45°44'59.008"N
LONG 103°45'57.885"W



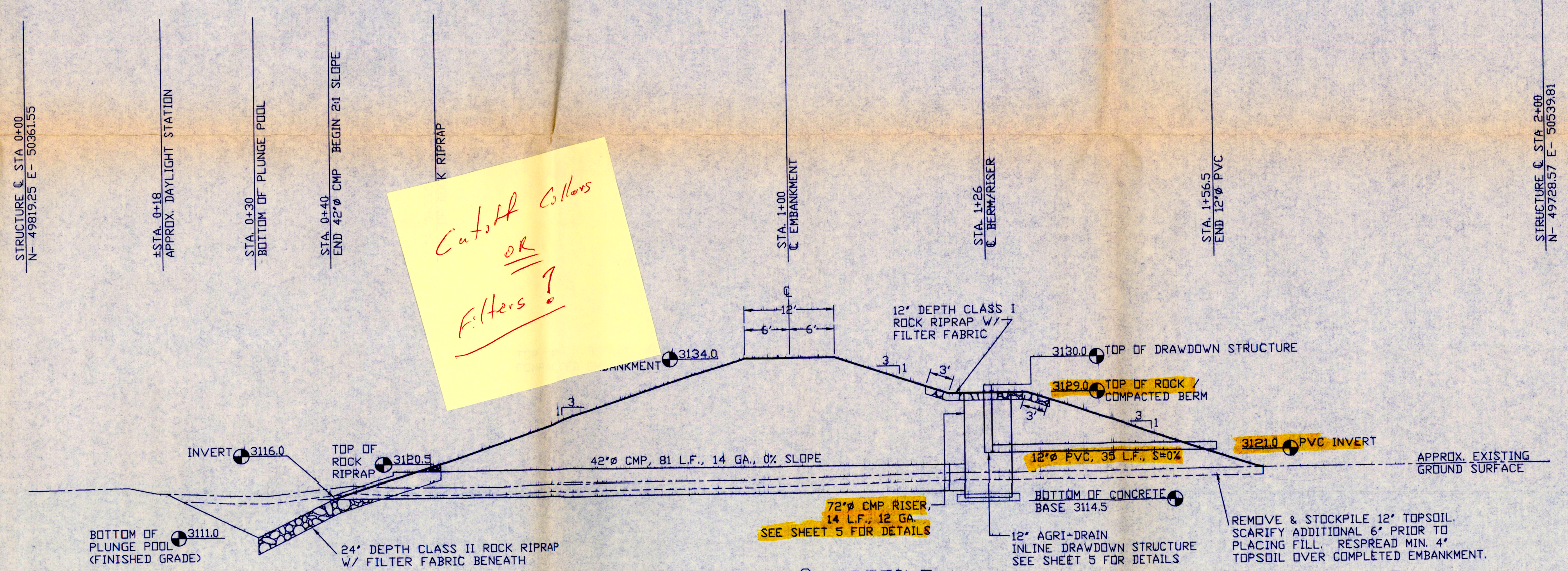
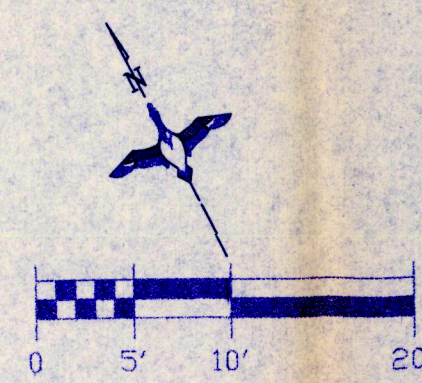
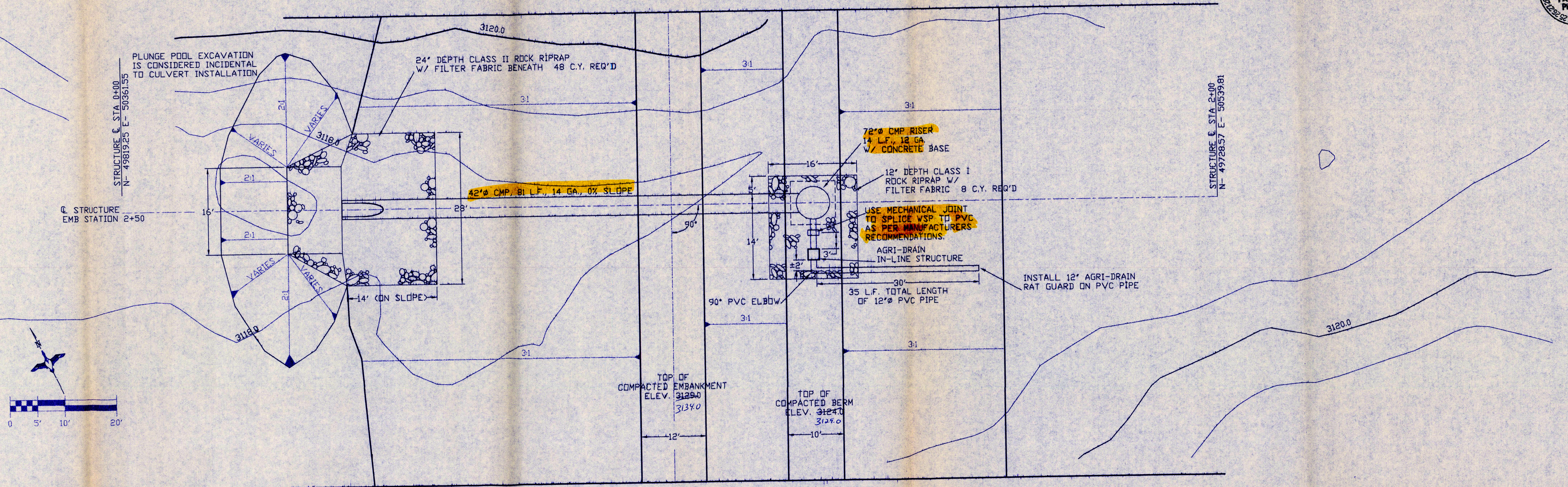
CURVE DATA
Δ = 60°30'00"
R = 50.00'
T = 29.14'
L = 52.80'
P.C. STA. 4+00.68
P.T. STA. 4+53.46

LEGEND
△ DU CONTROL POINT
#5 REBAR CAPPED & STAMPED
● USGS BRASS CAP BENCH MARK



GREAT PLAINS REGIONAL OFFICE DATE: 12-2-98	PROJECT NO. SD-0267-001	DESIGNED BY: R.C.S.
	DRY HOUSE CREEK	DRAWN BY: 16
	SITE PLAN & PROFILE	SURVEYED BY:
	SHEET NO. 3 OF 5	CHECKED BY:

1678-1



Catfish Collars
OR
Filters?

STRUCTURE C PROFILE
SCALE: 1"=10' H & V

EXCAVATION NOTE:
EXCAVATION REQUIRED FOR STRUCTURE/PIPE INSTALLATION IS CONSIDERED INCIDENTAL TO APPROPRIATE BID ITEM.
EXCAVATION REQUIRED BY THE ENGINEER BELOW THE STRUCTURE/PIPE GRADE IS CONSIDERED EXTRA WORK.

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE	PROJECT NO. SD-0267-001	DESIGNED BY: R.C.S.
	DRY HOUSE CREEK	DRAWN BY: MB
	STRUCTURE PLAN & PROFILE	SURVEYED BY:
	DATE: 12-2-98	CHECKED BY:
SHEET NO. 4 OF 5	APPROVED BY:	APPROVED BY:

