WATER PERMIT NO. 5882-3

Name of Applicant: **U.S. Fish and Wildlife Service**

Address: **PO Box 25486, Denver Federal Center, Denver CO. 80225** Phone: **605 236-5321**

Amount of Water Claimed: **37.1 AF storage capacity & 33.9 AF to offset evaporation** Total Acres: **NA**

Source of Water Supply: **unnamed tributary to Lake Sinai**

Water to be used for: **fish and wildlife propagation** County: **Brookings**

Type of Waste Disposal System: **NA**

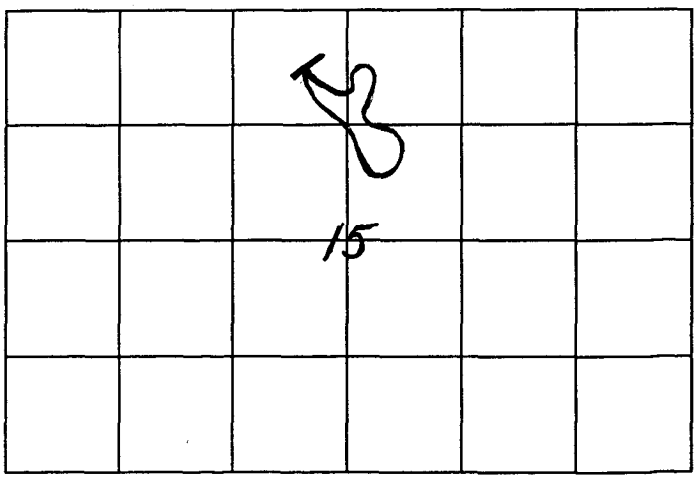
Location: **1 mile northwest of Sinai which is 12 miles southwest of Brookings**

PRIORITY Date Received: **8-30-95** Fee: **$150.00**

Corrected Application Received: **NA** Period of Annual Use: **January 1 - December 31**

Remarks:

Diversion Point: **NE 1/4 NW 1/4 Sec 15-T109N-R52W**



Area of Impounded Water: **NE 1/4 NW 1/4, W 1/2 NE 1/4 Sec 15-T109N-R52W**

Depth of Well: **NA** Well Driller: **NA**

Remarks:

Type of Map: **topo**

Prepared by: **Douglas J. Liptizky**

Reviewed and the Number Assigned on: **XX** By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

FORM 2: Application for uses other than irrigation
(type or print)

BOLSTAD WPA

Mail to:
Water Rights Division
Joe Foss Building
523 E Capitol
Pierre SD 57501-3181
605 773-3352

No. 5882-3 Hydrologic Unit 10170202
Basin Sioux River
Newspaper _____
(office use only)



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

Check use of water:

___ Municipal	___ Suburban Housing	___ Recreational	___ Institutional
___ Rural Water System	___ Commercial	_X_ Fish & Wildlife	___ Geothermal Heat
___ Domestic (over 18 gpm)	___ Industrial	___ Other _____	

Type of Application: (check one)
_X_ **New** ___ **Vested Right** (Use predates Mar 2, 1955) ___ **Future Use Reservation**
___ **Place to Beneficial Use Water Reserved by Future Use Permit No.** _____
___ **Amendment/Correction to Permit No.** _____

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.) _____

1. Name of Applicant Department of the Interior, Fish and Wildlife Svc. Phone (303) 236-5321
   Mailing Address P.O. Box 25486, Denver Federal Center, Denver State CO 80225
   (Street, RR, or Box) (City) (Zip Code)
2. Amount of water claimed _____ *CFS or _____ **GPM 71.0 * ***AF
   (*Cubic Feet per Second) (**Gallons per Minute) (***Acre Feet – storage capacity of dam/dugout or annual use if applicable)
3. Source of water supply Unnamed Trib to Lake Sinai
4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) _____
   Dam - NE1/4NW1/4 Sec. 15 T109N R52W Water Impounded: NE1/4 NW1/4, W1/2 NE1/4, Sec. 15-T109N-R52W County Brookings
5. County or counties where water will be used Brookings
6. Annual period during which water is to be used Jan. 1 - Dec. 31
7. Give a description of the 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)

   See Attached Design Report

Attachments: Attach Form 2A if diversion is from a well or dugout, or if storage of water is proposed. Attach map and any other technical information. (see instructions)

STATE OF ~~SOUTH DAKOTA~~ COLORADO
County of Jefferson)ss

I, Terry Terrell, the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary ~~construction~~.

Signed Terry Terrell
REGIONAL DIRECTOR

Subscribed and sworn to before me this 24th day of August 1995

Susan E. Craddock
Notary Public
My Commission Expires Aug. 5, 1997

7-92

*See Attach #1

Form 2A
(Complete applicable portions only)

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 to Water (ground surface to water level) _____

g) Distance to nearest existing domestic well:

On applicants property _____ On property owned by others _____

2. Dugout Information

a) Surface Dimensions _____ Depth _____

b) Depth to water (ground surface to water level) _____

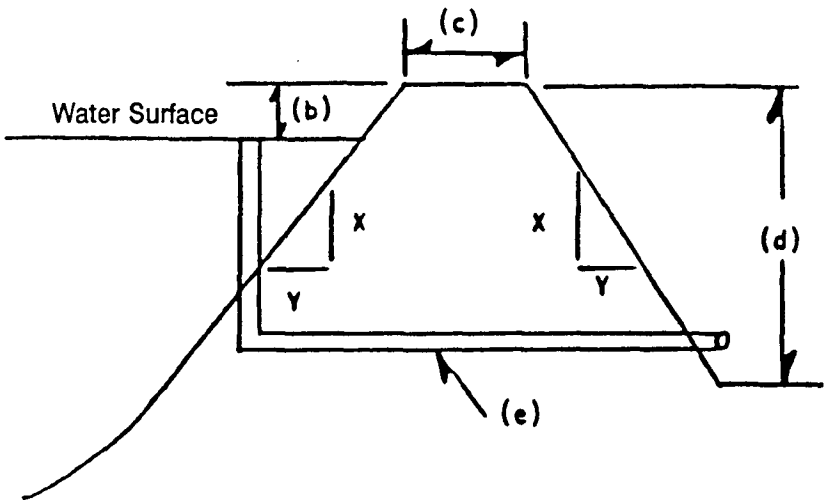
AUG 1995
WATER RIGHTS PROGRAM
Pierre, SD

3. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to 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:

Ducks Unlimited, Inc.
Doug Lipetzky, P.E.
Reg. Engineer
3502 Franklin Avenue
Bismarck, ND 58501-0761



b) Freeboard 3'

c) Crest Width 12' Dam / 10' Berm

Crest Length 269'

d) Height 6.5'

e) Primary Outlet Capacity 37.1 AF

If pipe, diameter 24" CMP

f) Secondary Spillway Capacity 64.3 AF

Spillway Width 80'

g) X & Y Slope

Upstream 3:1

Downstream 3:1

h) Surface Area of Impoundment 16.3 FSL

i) Storage 37.1 FSL Acre Feet

j) Drainage Area above Dam 147 Acres

Attachment #1



BOLSTAD WPA

BROOKINGS COUNTY, SOUTH DAKOTA

Net ET for Brookings County - Brookings 2 NE

AVG Class A Pan Evaporation, April - October is	45.98"
less AVG Annual Precipitation of	20.98"
equal Net Evaporation of	25.0" or 2.08'

Over the 16.3 surface acre marsh, this results in a net loss of 33.9 acre-feet annual seasonal use.

	37.1 AF Storage
+	33.9 AF Seasonal
	71.0 AF TOTAL

(Calculation per Gale Selken, South Dakota Department of Environment and Natural Resources, Water Rights Division)

SOUTH DAKOTA
WATER PERMIT NO. 5882-3

Date of first receipt of application August 30, 1995.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 5882-3 to U.S. Fish and Wildlife Service, PO Box 25486, Denver Federal Center, Denver CO 80225 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 5882-3 appropriates 71.0 acre-feet of water annually. The dam will impound 37.1 acre-feet of water with an additional 33.9 acre-feet requested to offset evaporation and maintain a pool elevation of 1749.5 feet mean sea level by constructing a dam on an unnamed tributary to Lake Sinai located in the NE 1/4 NW 1/4 Section 15 with water impounded in a portion of the NE 1/4 NW 1/4, W 1/2 NE 1/4 Section 15; all in T109N-R52W.

2. The water appropriated shall be used for the purpose of supplying water to provide habitat for fish and wildlife propagation 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. 5882-3 is November 3, 1995.

5. The date from which applicant may claim right is August 30, 1995.

6. One-fifth of the construction is to be completed on or before May 3, 1998.

7. All construction is to be completed on or before November 3, 2000.

8. Water is to be put to beneficial use on or before November 3, 2004.

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. 5882-3 authorizes a dam with a storage capacity of 37.1 acre-feet, and sufficient water annually to maintain the water level to the outlet elevation of 1749.5 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: _____ NOV 13 1995

John Hatch, Chief Engineer — date
Water Rights Program
Department of Environment and Natural Resources

DESIGN REPORT

February 20, 1995



PROJECT: BOLSTAD WPA
SD-0177-001

LOCATION: Section 15, T 109 N, R 52 W
½ mile north, ½ mile west of Sinai
Brookings County, South Dakota

MARSH DATA: Full Service Level (FSL) @ 1749.5
16.3 Surface Acres @ FSL
37.1 Acre-Feet Capacity @ FSL

Emergency Spillway Crest @ 1751.0
20.4 Surface Acres @ E.S. Crest
64.3 Acre-Feet Capacity @ E.S. Crest

Top of Compacted Embankment @ 1752.5
25.8 Surface Acres @ Top of Dam
99.2 Acre-Feet Capacity @ Top of Dam

PROJECT DESCRIPTION:

The project as proposed involves the construction of a small dam located on recently acquired Federal land to be managed by the U.S. Fish & Wildlife Service. No other private or public land will be affected by the project. The proposed embankment is on an unnamed drainage that discharges into Lake Sinai. Water levels in Lake Sinai have been extremely high in recent years, thus, any efforts to impound waters upstream would appear beneficial to local concerns. The contributing watershed for this project is quite limited consisting of approximately 147 acres or 0.23 square miles, however, there appears to be some groundwater contribution.

PRELIMINARY RISK ASSESSMENT:

The project site is located in a rural area of southwest Brookings County. No residences or other buildings are located directly downstream adjacent to the outlet channel. Upon leaving the outlet structure, flows will follow a channel on the WPA for approximately 1000 feet, then pass through an existing 36" diameter corrugated metal pipe (CMP) under a gravel section line road. The drainage then continues for 2000-3000 feet and enters Lake Sinai.

Based on information obtained in the field, data present on the U.S.G.S. quadrangular maps, and the relative small size and capacity of the created marsh, the general public would be in no danger in the unlikely event of a dam failure. No loss of life and minimal or no economic loss would be expected. Therefore, per the

classification criteria outlined in South Dakota Code Chapter 74:02:08 "Safety of Dams," it is recommended that the proposed dam be classified as a low hazard, small, Category 3 dam.

The product of the intermediate storage capacity (64.33 acre-feet) times the effective height (5 feet) is 322 which is less than 3000. Therefore, in accordance with 74:02:08:07.01 of the South Dakota rules, the minimum spillway design flood is a 25-year frequency and must be passed through the spillways without overtopping the embankment. However, the U.S. Fish & Wildlife Service requires that dams on their land be capable of passing flows produced by the 100-year, 24-hour rainfall event.

DESIGN:

As designed and as a result of the limited watershed contributing to surface water runoff, the primary spillway will pass flows produced by a 100-year, 24-hour rainfall without using an emergency spillway. However, a natural overflow, emergency spillway exists and will assist in passing flows in excess of those produced by a 100-year, 24-hour rainfall event.

A 48" diameter CMP riser with 4' long stoplogs and 24" diameter CMP inlet and outlet barrels is proposed as the primary spillway. The stoplogs will be removable to provide variable control and drawdown capability. The maximum stoplog overflow elevation or full service level (FSL) is proposed at elevation 1749.5. The low point on the natural emergency spillway is at elevation 1751.0 and the spillway is about 80' feet wide at elevation 1752.0.

Regression equations provided in *Techniques for Estimating Flood Peaks, Volumes, and Hydrographs on Small Streams in South Dakota*[1] were used to develop flood peaks for design purposes. The Natural Resource Conservation Service (formerly SCS) TR-20 Hydrology program was then calibrated by adjusting the curve number to produce a peak inflow for the various design events similar to those determined using the regression equations. The curve numbers were reviewed to ensure they were realistic for the runoff event. The calibrated TR-20 model was then used to determine the discharge at various reservoir stages with respect to time. The program uses accepted procedures to develop inflow and outflow hydrographs. 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. Although my modeling predictions do not indicate a need for an emergency spillway for the design events, flows through an emergency spillway could be calculated using Technical Release No. 39 *Hydraulics of Broad-Crested Spillways* developed by the SCS. A total discharge curve

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[1]Becker, Lawrence D., U.S. Geological Survey, Water Resources Investigations 80-80, September 1980.

for the proposed dam is attached.

The following is a relationship between peak inflows, corresponding outflows, and reservoir elevations using the previously-mentioned methods of analysis:

EVENT	PEAK INFLOWS	MAXIMUM WATER SURFACE ELEVATION	FREEBOARD AVAILABLE	TOTAL DISCHARGE
5 YR	42 CFS	1749.94	2.56 FT	3 CFS
10 YR	69 CFS	1750.10	2.40 FT	5 CFS
25 YR	106 CFS	1750.29	2.21 FT	8 CFS
50 YR	142 CFS	1750.46	2.04 FT	11 CFS
100 YR	183 CFS	1750.65	1.85 FT	15 CFS

Primary Spillway (Riser) FSL Elevation . . . @ 1749.5
Natural Emergency Spillway Crest . . . . . @ 1751.0
Top of Compacted Embankment Elevation. . . . @ 1752.5

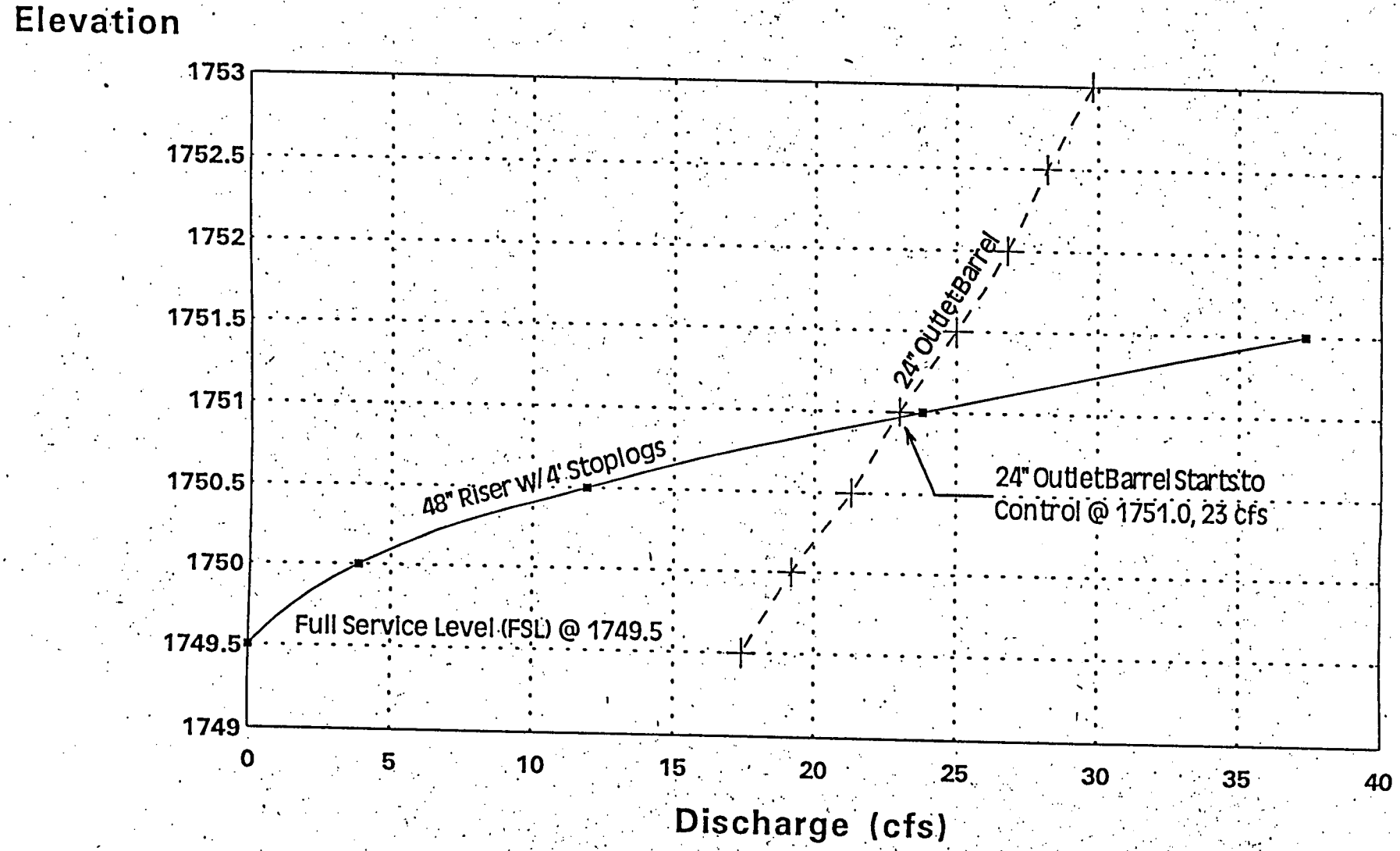
A preliminary set of plans is submitted with the Design Report. A set of standard construction specifications has previously been submitted to the Division of Water Rights.

Dated: February 20, 1995

Submitted By:

Doug Lipetzky, P.E.
PE-4499

BOLSTAD WPA
Discharge Curve



48" Riser/4' Stoplogs 24" CMP Outlet Pipe

NOTE: Natural Overflow Emergency Spillway @ 1751.0

RECEIPT

414604

Division of Water Rights

South Dakota Department of Environment and Natural Resources

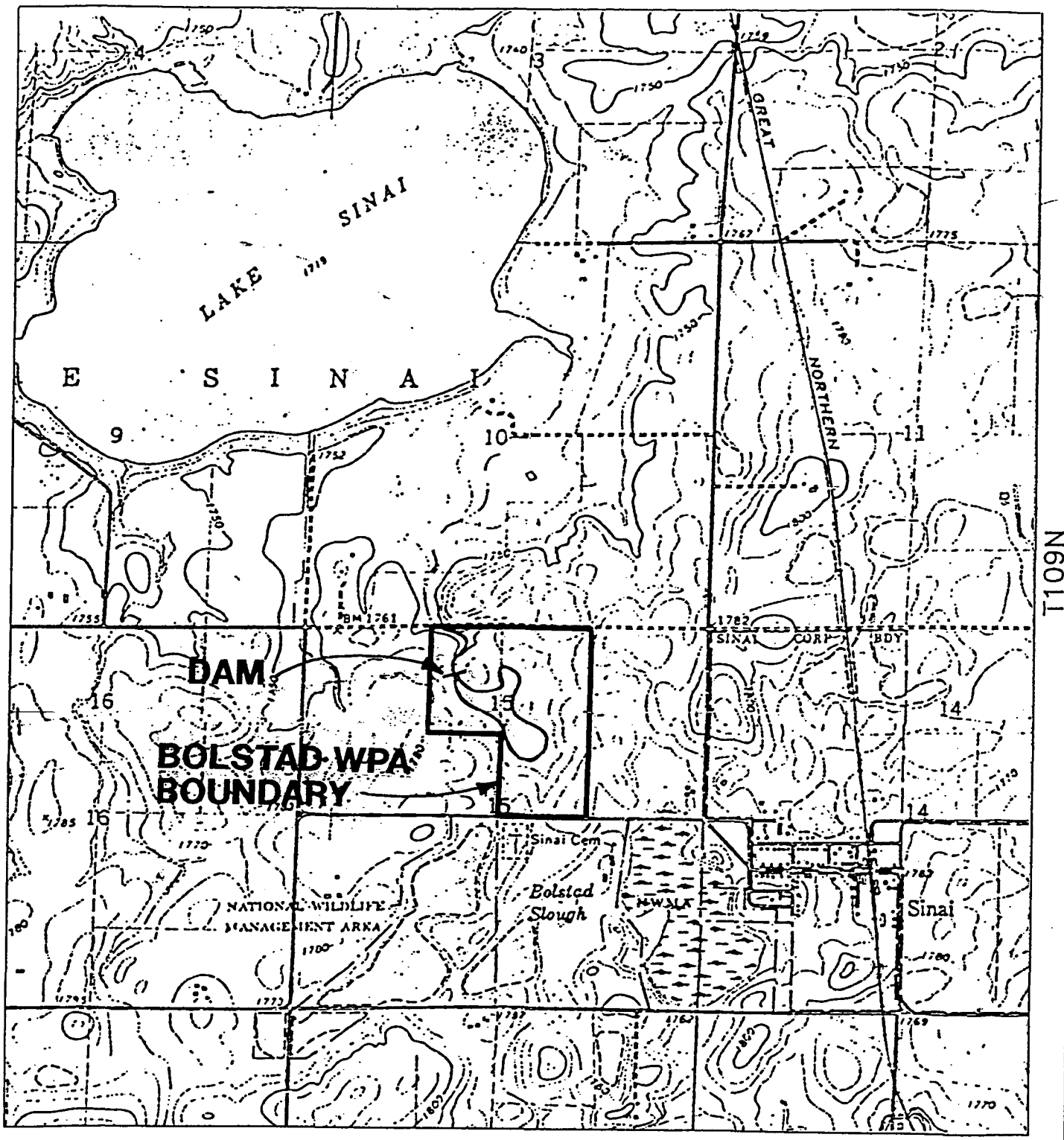
Pierre, August 31, 19 95

RECEIVED OF USFWS, PO Box 25486, Denver Federal Center, Denver, CO 80225-0486

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 _____	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 Hatch
Chief Engineer



SCALE: 1"=2000'

I, Albert E. Bevilacqua, of the U.S. Fish and Wildlife Service, P.O. Box 25486, DFC, Denver, CO. 80225, do hereby certify that this map was prepared from notes and drawings obtained under my direction, and that it correctly represents the works for the accompanying application.

Albert E. Bevilacqua
Regional Engineer

N

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ENGINEERING

MADISON
WETLAND MANAGEMENT DISTRICT
BROOKINGS COUNTY, SOUTH DAKOTA

WATER RIGHTS FILING MAP

DESIGNED:	DRAWN:	CHECKED:	DATE:	
LC	DLM	CW	8-95	DENVER, COLO.

DRAWING No. 6R-SD-672-WR-P-31.0

SHEET: 1 OF 1

5882-3

Water Permit Application #5882-3
USFWS
Bolstad WPA

Top of Dam Elevation - 1752.5
P. Spillway Elevation - 1749.5
2nd. Spillway Elevation - 1751.0
Bottom Elevation - 1746.0
} Height = 6.5 ft.

Cat. 3 - Low Hazard

Normal Storage Capacity - 37.1 Ac-Ft
Int. Storage Capacity - 64.3 Ac-Ft.
Maximum Storage Capacity - 99.2 Ac-Ft.

Int. Storage (64.3) x Eff Ht. (5) = 322 < 3000 ∴ 25 year frequency Min Spillway Design Flood

Using Tech. for Estimating Flood Peaks in SD (USGS WRI 80-80)

DA = 147 Ac = 0.23 mi²
Slope = 80 ft/mi
SI = 3.16

$Q_{25} = 83.4 A^{.6} S^{.44} SI^{-.72}$
$= 83.4(.23)^{.6}(80)^{.44}(3.16)^{-.72}$
$= 83.4(.4140)(6.88)(0.4367)$
$Q_{25} = 104$ cfs

$Q_{100} = 132 A^{.65} S^{.46} SI^{-.67}$
$= 132(.23)^{.65}(80)^{.46}(3.16)^{-.67}$
$= 132(.38)(7.5)(0.46)$
$Q_{100} = 175$ cfs

The Bolstad WPA Dam design has a 48" dia CMP Riser with stoplogs and a 24" dia inlet & outlet Barrel along with a natural emergency spillway at Elev. 1751.0 with a 80 ft. width at Elev. 1752.0. Ducks Unlimited uses SCS TR-20 to route a Q_{25} Peak of 106 cfs thru the primary spillway with 2.2 ft of freeboard available and a Q_{100} peak of 183 cfs thru the primary with 1.85 ft. of freeboard available.

Section 74:02:08:09

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

SCS Annual Yield

DA = 147 Ac
Use CN = 70
Soil Index = 2 1/2

50% chance = 0.26 Ac-In/Ac
.26 x 147 / 12 = 3.2 Ac-Ft.

10% chance = 1.5 Ac-In/Ac
1.5 x 147/12 = 18 Ac-Ft.

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

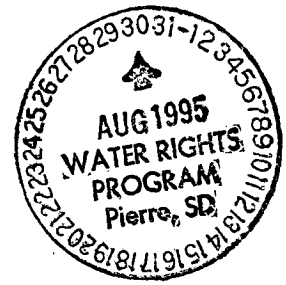
IN REPLY REFER TO:

BA WTR
WTR SD
Mail Stop 60189

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228

AUG 24 1995



Mr. John Hatch
Department of Environment
and Natural Resources
Joe Foss Building, 523 East Capitol
Pierre, South Dakota 57501-3181

Dear Mr. Hatch:

Please find enclosed the following documents pertaining to the Fish and Wildlife Service's Bolstad Waterfowl Production Area in Brookings County, South Dakota:

(1) Forms 2 and 2A, Application for Permit to Appropriate Water Within the State of South Dakota, with attachment;

(2) Engineer's Design Report;

(3) 1 set (6 pages) of standard construction specifications prepared by Ducks Unlimited;

(4) Filing Map No. 6R-SD-672-WR-P-31.0; and

(5) Money Order in the amount of $150 to cover filing fees.

Should you have any questions pertaining to the construction specificiations, please contact Doug Lipetzky at Ducks Unlimited at (701) 258-5599. For questions pertaining to the application for permit documents, please contact Ginger Price, Water Resources Division at (303) 236-5321.

Also, please notify this office of the newspaper selected, prior to publication of Notice of Hearing, so that the Authorization of Advertisement can be forwarded to them.

Sincerely,

TERRY T. TERRELL
DEPUTY Regional Director

Enclosures (5)

REPORT ON
WATER PERMIT APPLICATION NO. 5882-3
US Fish and Wildlife Service
September 13, 1995

Water Permit Application No. 5882-3 has been filed by the US Fish and Wildlife Service to appropriate 71.0 acre-feet of water annually by constructing a dam. The dam will impound 37.1 acre-feet of water with an additional 33.9 acre-feet to be appropriated to offset evaporation and maintain a reservoir level at the primary spillway elevation of 1749.5 feet mean sea level. The dam will be located in the NW 1/4 of Section 15-T109N-R52W on an unnamed tributary to Lake Sinai, in Brookings County. The water will be used to provide habitat for fish and wildlife propagation.

Discussion:

The Bolstad Waterfowl Production Area (WPA) 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 approved; however, construction of the dam can not begin until Water Permit Application No. 5882-3 is approved.

The dam will be 6.5 feet high with a normal storage capacity of 37.1 acre-feet with a reservoir level at the spillway elevation, and a maximum storage capacity of 99.2 acre-feet with a reservoir level at the top of dam elevation. A dam of this size and hazard classification is required to have a minimum spillway design capable of passing a 25 year frequency event.

The Bolstad WPA Dam is designed to have an 48 inch diameter CMP riser with a 24 inch diameter CMP inlet and outlet barrel with 3 feet of available head as the primary spillway and an 80 foot wide natural overflow emergency spillway with at least 0.5 feet of available head. The Bolstad WPA Dam will have a drainage area of 147 acres (0.23 square miles). Ducks Unlimited uses the Soil Conservation Service TR-20 model to route a 25-year frequency event peak of 106 cfs through the primary spillway with 2.2 feet of freeboard remaining. A 100-year frequency event peak of 183 cfs is routed through the primary spillway with 1.85 feet of freeboard remaining.

The annual yield for this drainage area with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 3.2 acre-feet. The annual yield with a 10 percent chance, or 1 out of 10 years, is expected to be 18 acre-feet.

The Bolstad WPA Dam will be located on an unnamed tributary to Lake Sinai. It will be located approximately 0.5 miles upstream of the confluence of the unnamed tributary and Lake Sinai. The Department of Game, Fish and Parks holds Vested Water Right Claim No. 897-3 for the storage of 18,000 acre-feet of water in Lake Sinai. Figure 1 represents a stage-storage curve for Lake Sinai which indicates that Lake Sinai has a volume of 18,000 acre-feet with a lake level at 1733.0 feet mean sea level (msl). Figure 2 represents ten years of record (1984 through 1994) for

Lake Sinai lake level elevations. The information indicates that the Department of Game, Fish and Parks Vested Water Right Claim No. 897-3 has been satisfied for about one-half of those years with a lake elevation above 1733 msl. Figure 1 also indicates that the appropriation of 71.0 acre-feet of water by the USFWS would have little effect on the Lake Sinai water level.

Conclusions:

1. Water Permit Application No. 5882-3 should be approved since unappropriated water is available and approval should not have any adverse effects 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. 5882-3.

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

Approved by:

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

References:

1. Water Rights files, September 1995, Water Rights Program, Dept. of Environment and Natural Resources, Joe Foss Bldg. Pierre, SD

2. Hydrologic Analysis, Lake Sinai-Brookings County, September 1985, Water Rights Program, Dept. Of Environment and Natural Resources, Joe Foss Bldg. Pierre, SD

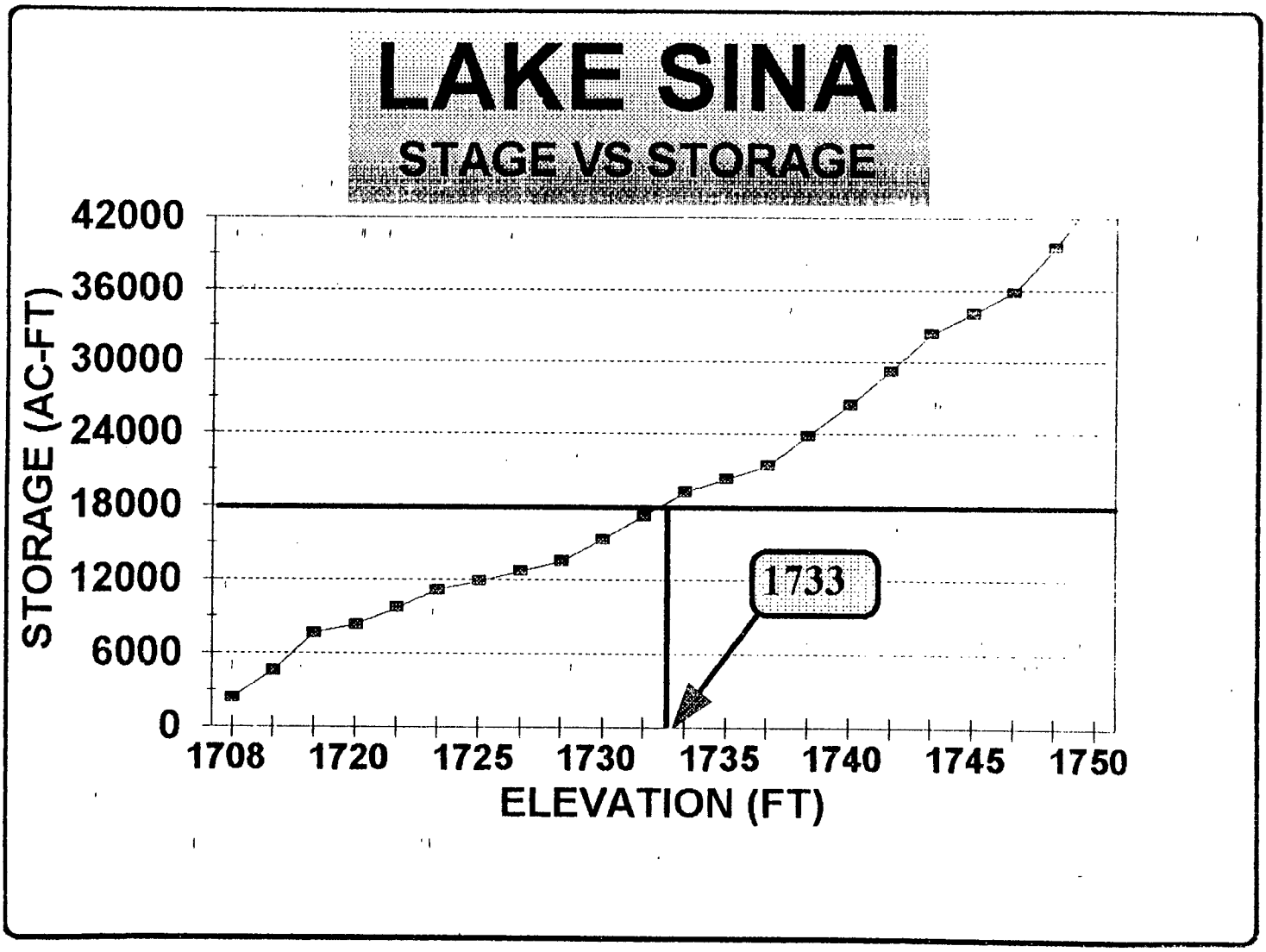

LAKE SINAI
STAGE VS STORAGE
STORAGE (AC-FT)
42000
36000
30000
24000
18000
12000
6000
0
1708
1720
1725
1730
1735
1740
1745
1750
ELEVATION (FT)
1733

FIGURE I

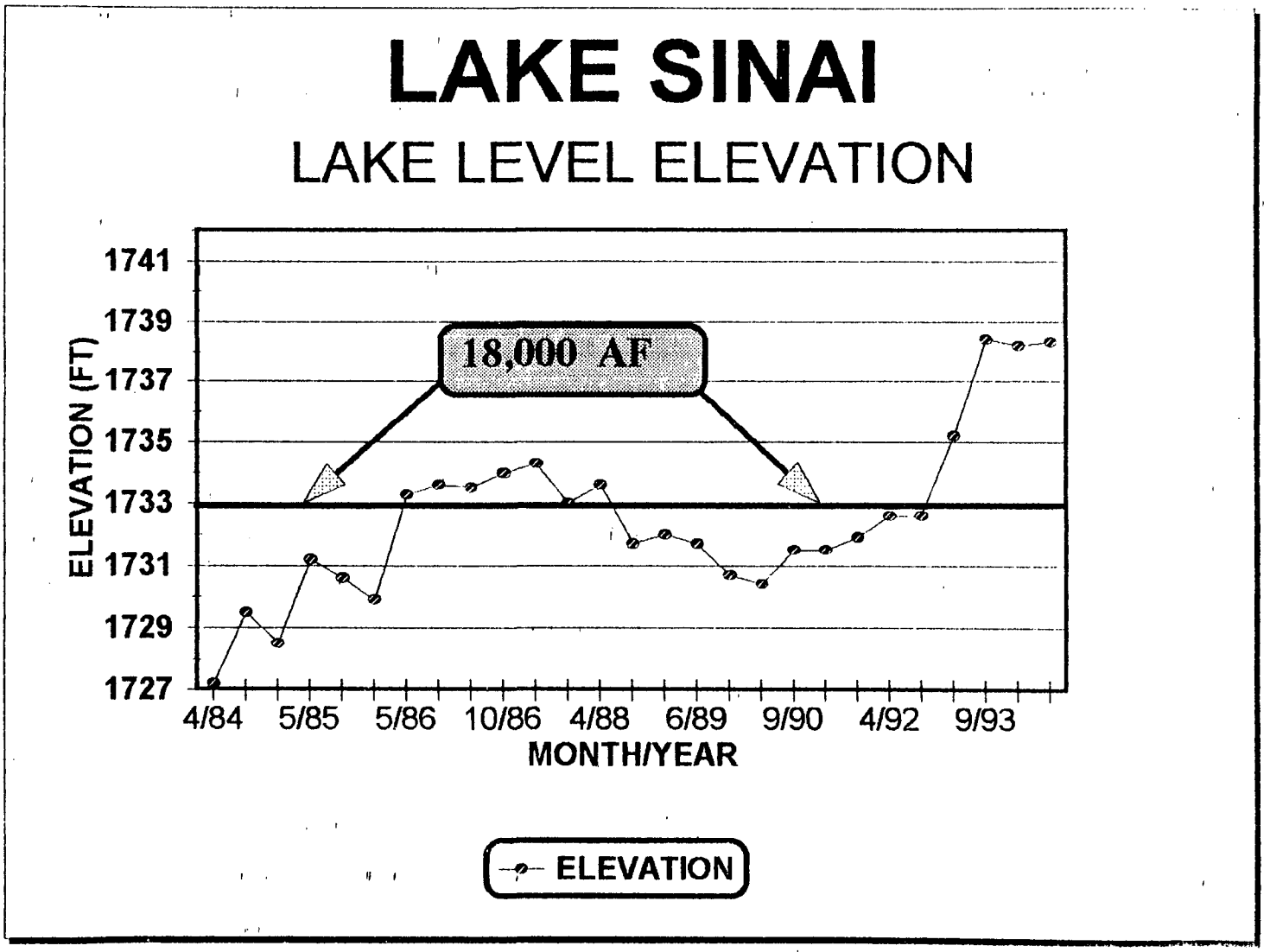

LAKE SINAI
LAKE LEVEL ELEVATION
18,000 AF
ELEVATION (FT)
1741
1739
1737
1735
1733
1731
1729
1727
4/84
5/85
5/86
10/86
4/88
6/89
9/90
4/92
9/93
MONTH/YEAR
ELEVATION

FIGURE 2

File No. 5882-3

Water Rights Division -DENR
Conversation or File Documentation

NAME OF PERSON OR FILE: **US Fish and ?Wildlife Service**

ADDRESS: **XXXXXXXXXXXX** COUNTY: **Brookings**

DATE: **August 22, 1996** TELEPHONE: **XXXXXXX**

RE: **Correction to application report**

There is an error in my Report on Water Permit Application No. 5882-3 for the US Fish and Wildlife Service. The storage in Lake Sinai authorized by Vested Water Right Claim No. 897-3 should be 1,800 acre-feet NOT 18,000 as mentioned in the report.

Timothy G. Schaal

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

RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 5882-3, U.S. Fish and Wildlife Service

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. 5882-3, U.S. Fish and Wildlife Service, %Terry Terrell, Deputy Regional Director, P.O. Box 25486, Denver Federal Center, Denver, CO 80225.

The Chief Engineer is recommending APPROVAL of Application No. 5882-3 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) in the public interest with the following qualifications:

1. Water Permit No. 5882-3 authorizes a dam with a storage capacity of 37.1 acre feet, and sufficient water annually to maintain the water level to the outlet elevation of 1749.5 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.

JOHN HATCH, Chief Engineer
September 29, 1995

GREAT FACES. GREAT PLACES.

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181

October 6, 1995

Doug Lipetzky, P.E.
Regional Engineer
Ducks Unlimited, Inc.
3502 Franklin Ave.
Bismarck, ND 58501-0761

Dear Mr. Lipetzky:

We have reviewed the plans and specifications for the USFWS Bolstad WPA Dam located in the NW 1/4 of Section 15-T109N-R52W, in Brookings 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. 5882-3 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 the U. S. Fish & Wildlife Service, as owner of the dam, from the responsibility for operating and maintaining the dam in good repair to ensure the safety of the dam.

The Bolstad WPA Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 6.5 feet and a normal storage capacity of 37.1 acre-feet and a maximum storage capacity of 99.2 acre-feet.

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

Sincerely,

Gale N. Selken

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

c: Ginger Price, USFWS

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181

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

October 6, 1995

Terry Terrell, Regional Director
U.S. Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225

Dear Mr. Terrell:

Water Permit Application No. 5882-3 for fish and wildlife propagation use 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 Brookings Register printed at Brookings, SD (Ph # 605-692-6271). 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

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

October 6, 1995

Brookings Register
P.O. Box 177
Brookings, SD 57006-0177

ATTENTION: Legal Department

Enclosed is a Notice of Hearing on Application No. 5882-3 to be published twice. Please publish the first notice on October 17, 1995, 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 U.S. Fish and Wildlife Service, %Terry Terrell, Regional Director, P.O. Box 25486, Denver Federal Center, Denver, CO 80225 (Ph # 605-236-5321).

A copy of BOTH publications must be SENT to the WATER RIGHTS PROGRAM. IMMEDIATELY return the FIRST publication with the FIRST Transmittal form on the bottom of this page. The first copy is needed to check the publication for errors so any corrections can be made in the second publication. Publication errors can invalidate the public notice and cause the applicant costly delays.

Please be sure the SECOND publication is returned IMMEDIATELY with the enclosed Proof of Publication form. DO NOT WAIT until the end of the month or the billing cycle. No action may be taken on the permit application until proof of publication has been received.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

----------CUT HERE----------

FIRST TRANSMITTAL NOTICE

No._____

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

Date_____

We are in receipt of your letter of _____ enclosing Notice of Hearing to Appropriate Water by Application No._____ 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 October 17, 1995, with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 5882-3 to Appropriate Water

Notice is given that U.S. Fish and Wildlife Service, P.O. Box 25486, Denver Federal Center, Denver, CO 80225 has filed an application for a water permit to appropriate 71.0 acre-feet of water annually. The dam will impound 37.1 acre-feet of water with an additional 33.9 acre-feet requested to offset evaporation and maintain a pool elevation of 1749.5 feet mean sea level by constructing a dam on an unnamed tributary to Lake Sinai located in the NE 1/4 NW 1/4 Section 15 with water impounded in a portion of the NE 1/4 NW 1/4, W 1/2 NE 1/4 Section 15; all in T109N-R52W. Water is to be used to provide habitat for fish and wildlife propagation.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 5882-3 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 November 3, 1995.

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.

Form 8

PROOF OF PUBLICATION



STATE OF SOUTH DAKOTA)
) SS
County of Brookings)

I, Nancy P. Skyberg

certify that the attached printed Notice was taken from the Brookings Register

printed and published in Brookings

County of Brookings and State of South Dakota. The notice was published in the newspaper on the following two dates:

October 17, 1995

October 24, 1995

Cost of Printing: thirty-nine dollars and twenty-two cents = $39.22

Nancy P. Skyberg
(Signature)

Legal Ad Coordinator
(Title)

Oct. 24, 1995
(Date Signed)

Legal 693, 2x, October 17, 24

NOTICE OF APPLICATION NO. 5882-3 to Appropriate Water

Notice is given that U.S. Fish and Wildlife Service, P.O. Box 25486, Denver Federal Center, Denver, CO 80225 has filed an application for a water permit to appropriate 71.0 acre-feet of water annually. The dam will impound 37.1 acre-feet of water with an additional 33.9 acre-feet requested to offset evaporation and maintain a pool elevation of 1,749.5 feet mean sea level by constructing a dam on an unnamed tributary to Lake Sinai located in the NE 1/4 NW 1/4 Section 15 with water impounded in a portion of the NE 1/4 NW 1/4, W 1/2 NE 1/4 Section 15; all in T109N -R52W. Water is to be used to provide habitat for fish and wildlife propagation.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 5882-3 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.

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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.

GREAT FACES. GREAT PLACES.

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181

November 1, 1995

Dick Ericsson, Attorney
PO Box 406
Madison, SD 57042

Dear Mr. Ericsson:

Following up on our telephone conversation November 1, 1995, enclosed is a copy of the report and recommendation for Water Permit Application No. 5882-3, U.S. Fish and Wildlife Service. If you have further questions, please feel free to contact us.

Very truly yours,

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

Enclosures

c: Diane Best, Assistant Attorney General

Ericsson, Ericsson & Leibel

Richard L. Ericsson
Jay M. Leibel

Attorneys & Counselors at Law
P.O. Box 406
100 N. Egan Avenue
Madison, SD 57042
605-256-4597
Fax 605-256-2424

L.F. Ericsson (1909-1979)
Robert R. Spencer (1925-1986)

November 1, 1995



U.S. Fish & Wildlife Service
PO Box 25486
Denver Federal Center
Denver, Colorado 80225

Chief Engineer
Water Rights Program
Foss Building
523 E. Capitol
Pierre, South Dakota 57501

RE: Notice of Application No. 5882-3 to Appropriate Water, Section 15-109-52, West of the 5th PM, Lake Sinai Twp., SD

Dear Sir/Madam:

Please find enclosed herein a copy of a Petition by Lake Sinai Township which is being submitted by the undersigned as attorney for Lake Sinai Township. By this Petition, please consider this a written request that the Board of Water Management hold a public hearing on this Application to review the project.

Lake Sinai Township, as indicated in the Petition, has been confronted with severe water problems in the Township and is continually having to deal with water problems, both in the form of drainage questions and that of providing adequate roads for township residents. The Township needs to know the effect of this project on the Township and its residents.

If you have any questions, please feel free to contact the undersigned. I am

Very truly yours,

R. L. Ericsson
FOR THE FIRM

RLE:so

cc: Lake Sinai Township Supervisors

Encl.

PETITION FOR HEARING

TO: U.S. Fish & Wildlife Service
PO Box 25486
Denver Federal Center
Denver, Colorado 80225
Applicant

and

Chief Engineer
Water Rights Program
Foss Building
523 E. Capitol
Pierre, South Dakota 57501

Dear Sir/Madam:

Comes now the Petitioner, R. L. Ericsson, being first duly sworn, on his oath deposes and says: That he is a practicing attorney licensed to practice within the State of South Dakota; that he is the attorney for Lake Sinai Township, a governmental entity within the State of South Dakota; that he has been requested by the Board of Township Supervisors for Lake Sinai Township to file a Petition in their behalf as an interested person for the purpose of requesting a hearing before the Water Management Board to consider the application for a certain water permit to appropriate 71.0 acre feet of water annually from a dam which will impound 37.1 acre feet of water with an additional 33.9 acre feet requested to offset evaporation and maintain a pool elevation of 1749.5 feet mean sea level by constructing a dam on an unnamed tributary to Lake Sinai located in the NE 1/4 NW 1/4 of Section 15 with water impounded in a portion of the NE 1/4 NW 1/4, W 1/2 NE 1/4 of Section 15, all in Township 109 North, Range 52, West of the 5th P.M. Water is to be used to provide habitat for fish and wildlife propagation, Notice of Application No. 5882-3 to Appropriate Water.

That this Petition is made and filed to state that the Lake Sinai Township Board believes itself to be an interested person and if not as a governmental entity, then each of the supervisors acting individually are requesting a hearing pursuant to the notice.

The Petitioner and undersigned further states that the Lake Sinai Board of Township Supervisors state that they have been extremely concerned with water problems within the Township and that they are, as the governmental entity of the township, constantly addressing road problems and other problems concerning drainage relative to water appropriation and containment of water and accordingly, your petitioner states that they have not been fully advised or informed of the plans relative to the Application of the U.S.

Fish & Wildlife Service as the applicant for this project and the undersigned as petitioner for and on behalf of Lake Sinai Township states that Lake Sinai Township is without sufficient knowledge to state whether they oppose or support the Application but state that it is within their right and in the public interest to request a hearing on this project; and that further the undersigned states that he is the legal counsel for the petitioners and his address is PO Box 406, Madison, South Dakota, 57042, with street address of 100 N. Egan Ave., Madison, South Dakota, 57042, telephone number (605) 256-4597.

R. L. Ericsson
ERICSSON, ERICSSON & LEIBEL
PO Box 406, Madison, SD 57042
Phone No. (605) 256-4597
Attorney for Lake Sinai Township

Ericsson, Ericsson & Leibel

Richard L. Ericsson

Jay M. Leibel

Attorneys & Counselors at Law
P.O. Box 406
100 N. Egan Avenue
Madison, SD 57042
605-256-4597
Fax 605-256-2424

L.F. Ericsson (1909-1979)

Robert R. Spencer (1925-1986)

November 8, 1995



Mr. John Hatch
Chief Engineer
Water Rights Program
Dept. of Environment &
Natural Resources
Joe Foss Bldg.
523 E. Capitol
Pierre, South Dakota 57501-3181
Fax No. (605) 773-4068

RE: Notice of Application No. 5882-3 to Appropriate Water, Section 15-109-52, Lake Sinai Township, SD

Dear Mr. Hatch:

Pursuant to a discussion which I have had with the supervisors of Lake Sinai Township, please consider this letter Lake Sinai Township's written letter of instruction to cancel the written request to hold a public hearing which we had made on November 1st, 1995.

Very truly yours,

R. L. Ericsson
FOR THE FIRM

RLE:so

GREAT FACES. GREAT PLACES.

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181

November 13, 1995

R. L. Ericsson
Ericsson, Ericsson & Leibel
P.O. Box 406
Madison, SD 57042

Dear Mr. Ericsson:

I am in receipt of your letter canceling Lake Sinai Township's petition requesting a public hearing on U. S. Fish and Wildlife Service's Water Permit Application No. 5882-3. The water permit authorizing the storage dam will now be issued as recommended with qualifications.

If you have any questions on the issuance of this water permit, please contact Eric Gronlund at (605) 773-3352.

Very truly yours,

John Hatch, Chief Engineer
Water Rights Program
(605) 773-3352

c: Ginger Price, USFWS

GREAT FACES. GREAT PLACES.

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181

NOV 13 1995

Linda Coe
U.S. Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225

Dear Ms. Coe:

Enclosed is Water Permit No. 5882-3 authorizing construction of your water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Also enclosed is Form 10, Notice of Completion of Works and Application of Water to Beneficial Use, which you are to complete and submit to the Chief Engineer when you have completed the system and/or have put the water to beneficial use. An inspection can then be scheduled so that the Water License may be issued, thus completing your acquisition of a Water Right.

Very truly yours,

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

enclosures

PLEASE NOTE: Certain changes can be made in your permit within the five year construction period, usually without affecting the priority date provided an application to amend your permit is made within the five year period - i.e. changes in location or number of diversion points (wells) or location of land to be irrigated. Well locations for wells into the same aquifer can be moved up to 660 feet without application.

Applications to amend a permit after the five year construction period will be assigned a new priority date. Applications to change water sources, to add lands or increase original diversion rates, if approved will usually receive the date of the new application as a priority date regardless of the five year construction period.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

IN REPLY REFER TO:
WTR BA
WR SD
Mail Stop 60189

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228-1807

JUN 08 1998



Department of Environment and
Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Dear Sir or Madam:

Enclosed are Notices of Completion of Works and Application of Water to Beneficial Use forms for the following water permits:

5714-3	Hamlin County WPA
5855-3	Bullis WPA (Dry Lake)
5882-3	Bolstad WPA
5938-3	Big Slough WPA, and
5945-3	Dry Lake

Also enclosed is FedSelect Check in the amount of $250 to cover the inspection fees and issuance of the Water Licenses.

If you have questions or require further information, please contact Linda Coe, Water Rights Branch at (303) 236-5321.

Sincerely,

Cheryl C. Williss
Chief, Division of Water Resources

Enclosures

Bolstad WPA

Form 10



NOTICE OF COMPLETION OF WORKS AND APPLICATION OF WATER TO BENEFICIAL USE

Date JUN 0 2 1998

TO: Water Rights Division, DENR
523 E. Capitol
Pierre, SD 57501-3181

FROM: UNITED STATES OF AMERICA
Fish and Wildlife Service (name) P.O. Box 25486, Denver Federal Center (address)

Denver, CO 80225 (city) (state) (zip) (303) 236-5321 (phone)

I have completed the construction of the water diversion system and I have put the water to beneficial use to the maximum extent it is going to be used. I have not exceeded the amounts specified in Water Permit No. 5882-3.

Water Permit No. 5882-3 states that the diversion system is to be constructed by 11-03-2000 (date), and that the water is put to beneficial use by 11-03-2004 (date).

The diversion system was completed on 11-24-95 (date).

Applying the water to beneficial use was completed on 04-11-97 (date).

You may schedule an inspection so that the Water License may be issued.

Cheryl C. Williss

(signature)
Cheryl C. Williss, Agent

RECEIPT

No 415796

Water Rights Program

South Dakota Department of Environment and Natural Resources

Pierre, June 11, 1998

RECEIVED OF USFWS, P.O. Box 25486, Dener, CO 80225-0486
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 _____		
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. 5882-3	50	00
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		
_____		
_____		
_____		
(Any Other Work Provided by Law) **Total**	50	00

By _____ Chief Engineer John Hatch

Permit No. 5882-3

Big Sioux River - Water District

Contact Person & Address: **Colleen Kolbeck, US FWS, PO Box 48 Madison SD 57042**

Report Of Examination Of Works

On, **May 23 2000**, I made a thorough examination of the water use system constructed by **US Fish and Wildlife Service** of **PO Box 25486, Denver Federal Center, Denver CO 80225** holder of Permit No. **5882-3**, bearing the priority of **August 30, 1995** authorizing the storage of **37.1** acre-feet and an additional **and sufficient water to annually maintain the water level to the outlet elevation of 1749.5 fmsl** of the waters of **surface water** for **fish and wildlife propagation** purposes, in **Brookings** County.

The system is in the following condition **good**. The point of diversion is located **NE ¼ NW ¼ of Section 15 T109N-R52W** with a longitude of **-97.02079** and a latitude of **44.23749**. The works are storing **37.1** acre-feet of water which is to be used for **fish and wildlife propagation**. Water has been put to beneficial and the license should be issued **37.1** acre-feet of storage.

Review of Permit Qualifications And Regulations:

1) Special qualifications to permit being abided by **yes**

2) All structures, wells and lands on map **yes**

3) Exceptions to compliance are: **none**

Report On the Specifics of the System

Dam Information:

1) Height to crest **7** feet
2) Height to primary spillway or outlet **3** feet
3) Height to secondary spillway **4.5** ft
4) Crest width **12** feet
5) Crest length **269** feet
6) Spillway length **150** feet
7) Spillway width **80** feet
8) Approx. storage **37.1** ac-ft
9) Outlet tubes:
   a) diameter **24** inches
   b) type **cmp**
   c) valved **yes**
   d) valve type **stop log**

COMMENTS: The original map adequately describes the project and will be used for licensing.

2/13/01

Mark D. Rath
Natural Resources Engineer
DENR, Water Rights Program

Date

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 5882-3

(1) US Fish & Wildlife Service, PO Box 25486, Denver Federal Center, Denver CO 80225 made Application No. 5882-3, August 30, 1995 for a water permit to impound 37.1 acre-feet of water from an unnamed tributary to Lake Sinai, Brookings County, South Dakota for fish & wildlife propagation purposes. Permit No. 5882-3, with a priority date of August 30, 1995 was approved November 3, 1995 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before November 3, 2000 and for the application to beneficial use of said water on or before November 3, 2004.

The permit holder submitted a *Notice of Completion of Works and Application of Water to Beneficial Use* on June 11, 1998. The *Notice* stated the diversion system was completed on November 24, 1995 and the water placed to beneficial use on April 11, 1997.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of the construction of the storage dam and is entitled to impound 37.1 acre-feet of water for beneficial use with sufficient water annually to maintain the water level to the outlet elevation of 1749.5 feet mean sea level. The location of the storage dam (spillway) is NE ¼ NW ¼ Section 15-T109N-R52W.

(3) The permit holder has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use.

(4) Pursuant to South Dakota Water Law 46-5-30.1 US Fish & Wildlife Service, PO Box 25486, Denver Federal Center, Denver CO 80225 the holder and/or owner of Water Right No. 5882-3 is issued a license to appropriate water, the right to impound 37.1 acre-feet of water from an unnamed tributary to Lake Sinai with sufficient water annually to maintain the water level to the outlet elevation of 1749.5 feet mean sea level with a priority date of August 30, 1995 from the location specified in (2) of this license for fish & wildlife propagation. This license is subject to any limitations or qualifications listed in Water Right No. 5882-3 and subject to South Dakota State Law.

Garland Erbele

APR 04 2001

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

date

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

APR 04 2001

5714-3, 5855-3, 5882-3, 5938-3,5945-3

Cheryl Willis, Agent
US Fish & Wildlife Service
PO Box 25486
Denver Federal Center
Denver, CO 80225

Dear Ms. Willis:

Enclosed are Water License Nos. 5714-3, 5855-3, 5882-3, 5945-3 and 5938-3. This is the final water right document completing your process of obtaining a Water Right. Enclosed are Receipt Nos. 415794, 415795, 415796, 415798 and 415797 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

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

enclosures

Appl 5882-3

DUCKS UNLIMITED

DUCKS UNLIMITED

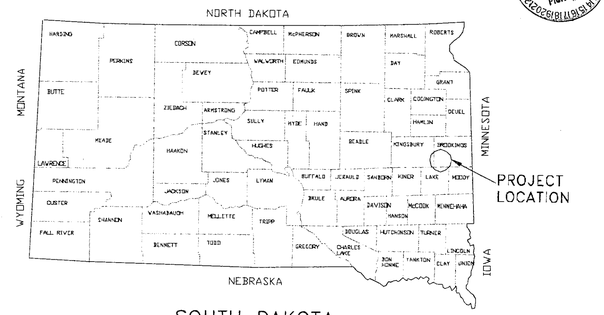
PROJECT

BOLSTAD WATERFOWL PRODUCTION AREA

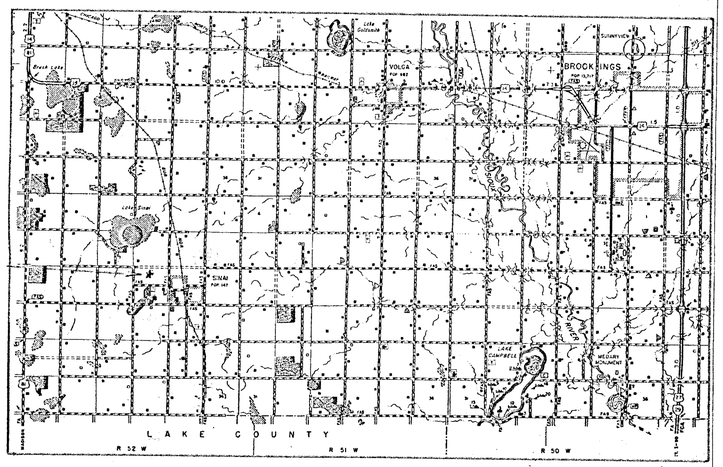
SECTION 15, T 109 N, R 52 W, BROOKINGS COUNTY, SOUTH DAKOTA

IN COOPERATION WITH

U.S. FISH & WILDLIFE SERVICE



SOUTH DAKOTA



BROOKINGS COUNTY

SPECIFICATIONS

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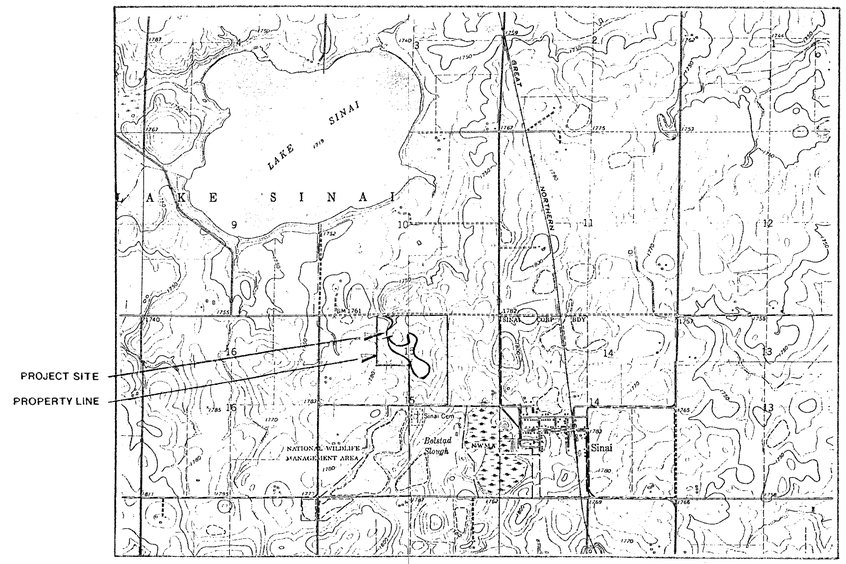
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STRUCTURE PLAN & PROFILES	4
STRUCTURE DETAILS	5
SOILS INFORMATION	6

ESTIMATED QUANTITIES

MOBILIZATION	1 L.S.
SITE PREPARATION	200 C.Y.-P
EXCAVATION	608 C.Y.-P*
EMBANKMENT	1427 C.Y.-S**
WATER	3 M-GAL.***
WATER CONTROL STRUCTURE INSTALLATION	1 L.S.
APPURTENANCES	1 INC.
CULVERT INSTALLATION 24"ø CMP	53 L.F.
CAST-IN-PLACE REINFORCED CONCRETE	1 INC.
CLASS I RIPRAP	10 C.Y.-P

*OUTLET CHANNEL
**INCLUDES 15% FOR SHRINKAGE
***BASED ON 2 GAL./C.Y., HOWEVER, ONLY ACTUAL AMOUNT USED WILL BE PAID FOR.



VICINITY MAP
SCALE: 1"=2000'

REGISTERED PROFESSIONAL ENGINEER REG. NO. 4471 SOUTH DAKOTA P.E.

AGENCY CONTACT:
TOM TORNOW
MADISON WMD
605\256-2974

PROJECT SIGNING

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

1 SIGN "A" AND 1 SIGN "B" WILL BE PROVIDED BY DUCKS UNLIMITED AND DELIVERED TO THE COOPERATING AGENCY. THIS AGENCY IS RESPONSIBLE FOR INSTALLING THE SIGNS AT THE LOCATION(S) DESIGNATED ON THE PLANS.

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE	PROJECT NO. SD-0177-001		DESIGNED BY: D.J.L.
	BOLSTAD WPA		DRAWN BY: KB
			SURVEYED BY:
	VICINITY MAP		CHECKED BY:
DATE: 7-19-95	SHEET NO. 1 OF 6	APPROVED BY: P.E.	APPROVED BY: 5882-3

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Appl. 5882-3

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Pierre, SD

DUCKS UNLIMITED

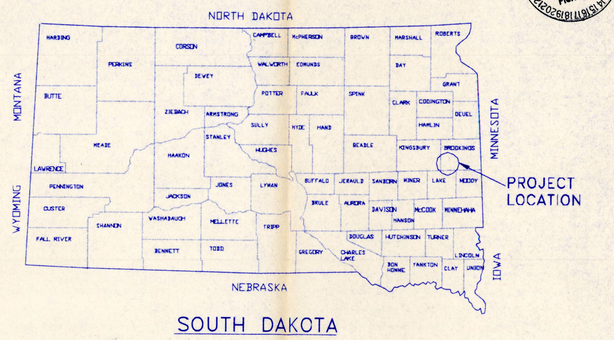
DUCKS UNLIMITED

PROJECT

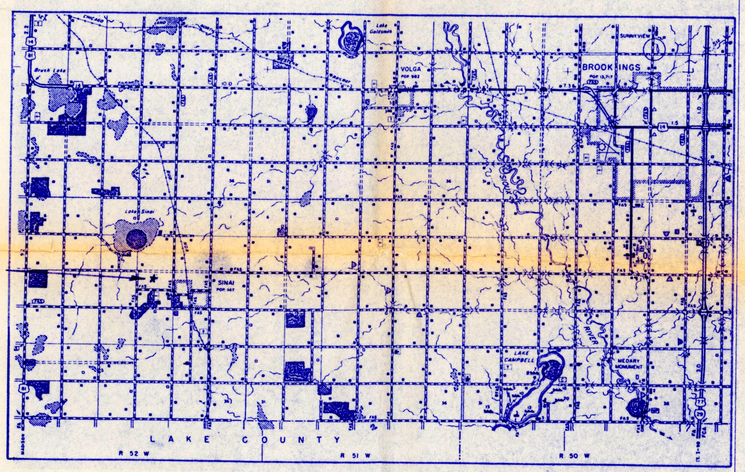
BOLSTAD
WATERFOWL PRODUCTION AREA
SECTION 15, T 109 N, R 52 W,
BROOKINGS COUNTY, SOUTH DAKOTA

IN COOPERATION WITH

U.S. FISH & WILDLIFE SERVICE



SOUTH DAKOTA



BROOKINGS COUNTY

SPECIFICATIONS

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

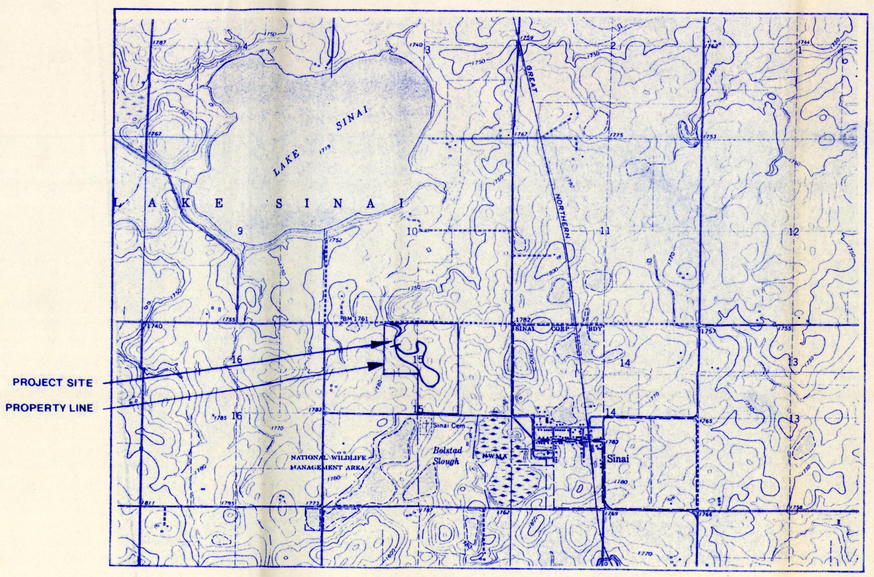
PLAN INDEX

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PROJECT TOPOGRAPHY	2
PROJECT SITE PLAN	3
STRUCTURE PLAN & PROFILES	4
STRUCTURE DETAILS	5
SOILS INFORMATION	6

ESTIMATED QUANTITIES

MOBILIZATION	1 L.S.
SITE PREPARATION	200 C.Y.-P
EXCAVATION	608 C.Y.-P*
EMBANKMENT	1427 C.Y.-S**
WATER	3 M-GAL.***
WATER CONTROL STRUCTURE INSTALLATION	1 L.S.
APPURTENANCES	1 INC.
CULVERT INSTALLATION 24"ø CMP	53 L.F.
CAST-IN-PLACE REINFORCED CONCRETE	1 INC.
CLASS I RIPRAP	10 C.Y.-P

*OUTLET CHANNEL
**INCLUDES 15% FOR SHRINKAGE
***BASED ON 2 GAL./C.Y., HOWEVER, ONLY ACTUAL AMOUNT USED WILL BE PAID FOR.



VICINITY MAP
SCALE: 1"=2000'

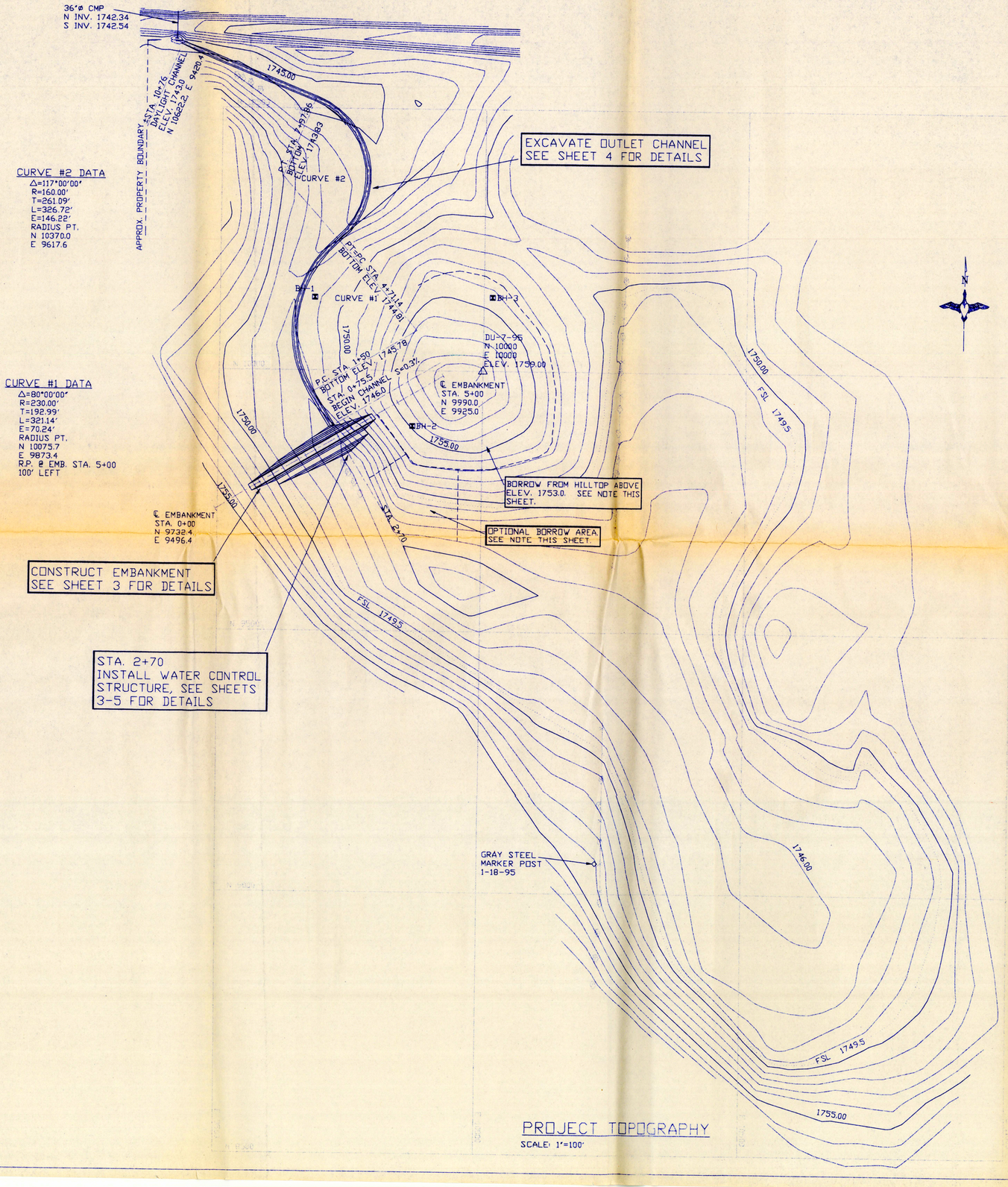
REGISTERED PROFESSIONAL ENGINEER
REG. NO. 6469
DOUGLAS L. JOHNSON
SOUTH DAKOTA
P.E.

AGENCY CONTACT:
TOM TORNOW
MADISON WMD
605\256-2974

PROJECT SIGNING
SIGN "A" 24"x36"
SIGN "B" 11"x14"
1 SIGN "A" AND 1 SIGN "B" WILL BE PROVIDED BY DUCKS UNLIMITED AND DELIVERED TO THE COOPERATING AGENCY. THE AGENCY IS RESPONSIBLE FOR INSTALLING THE SIGN(S) AT THE LOCATION(S) DESIGNATED ON THE PLANS.

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE	PROJECT NO. SD-0177-001 BOLSTAD WPA VICINITY MAP		DESIGNED BY: D.J.L.
			DRAWN BY: KB
			SURVEYED BY:
			CHECKED BY:
DATE: 7-19-95	SHEET NO. 1 OF 6	APPROVED BY: P.E.	APPROVED BY: 5882-3

5882-3



CURVE #2 DATA
∆=117°00'00"
R=160.00'
T=261.09'
L=326.72'
E=146.22'
RADIUS PT.
N 10370.0
E 9617.6

CURVE #1 DATA
∆=80°00'00"
R=230.00'
T=192.99'
L=321.14'
E=70.24'
RADIUS PT.
N 10075.7
E 9873.4
R.P. @ EMB. STA. 5+00
100' LEFT

PROJECT TOPOGRAPHY
SCALE: 1"=100'

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AREA/CAPACITY DATA

ELEVATION	AREA (ACRES)	CUMULATIVE VOLUME (ACRE-FEET)
1743.0	0	0
1745.0	0.40	0.40
1746.0	2.60	1.90
1747.0	7.22	6.81
1748.0	11.15	16.00
1749.0	14.83	28.99
1749.5	16.30	37.10
1750.0	17.70	45.26
1751.0	20.43	64.33
1752.0	23.48	86.29
1753.0	28.08	112.07

MARSH DATA

FULL SERVICE LEVEL (FSL) @ 1749.5
SURFACE ACRES @ FSL = 16.3 ACRES
AREA-CAPACITY @ FSL = 37.1 ACRE-FEET

TREE NOTE:
ANY TREES OR BRUSH IN THE CONSTRUCTION AREA SHALL BE REMOVED & STOCKPILED AS DIRECTED BY THE FIELD ENGINEER. THE COST OF SUCH WORK SHALL BE CONSIDERED INCIDENTAL TO "SITE PREPARATION."

CHANNEL EXCAVATION:
MATERIAL EXCAVATED FROM THE OUTLET CHANNEL SHALL BE DEPOSITED ON THE UPLAND ADJACENT TO THE CHANNEL AT AN ELEVATION ABOVE THE WETLAND VEGATATION AS APPROVED BY THE FIELD ENGINEER. THE MATERIAL SHALL BE BLENDED INTO THE EXISTING TOPOGRAPHY. NO TOPSOIL STRIPPING IS NECESSARY ON THE OUTLET CHANNEL OR DESIGNATED WASTE AREA, HOWEVER, BLACK ORGANIC MATERIAL SHALL BE SPREAD OVER ANY CLAY MATERIAL IN THE WASTE AREA.

BORROW AREA:
CONTRACTOR MAY BORROW FROM HILLTOP OR OPTIONAL AREA CLOSER TO WETLAND IF WETTER MATERIAL IS NEEDED. TOPSOIL SHALL BE STRIPPED FROM THE BORROW AREA & STOCKPILED. SUITABLE MATERIAL FROM THE BORROW AREA SHALL BE USED TO CONSTRUCT THE EMBANKMENT. FINISHED BORROW AREA SLOPES SHALL BE 6:1 OR FLATTER. TOPSOIL SHALL BE RESPREAD OVER BORROW AREA ABOVE ELEVATION 1749.0.

VERTICAL CONTROL:
ESTABLISHED FROM A 7 1/2 MINUTE USGS QUADRANGLE MAP SPOT ELEVATION AT THE W 1/4 CORNER OF SECTION 15, QUAD SPOT 1783.

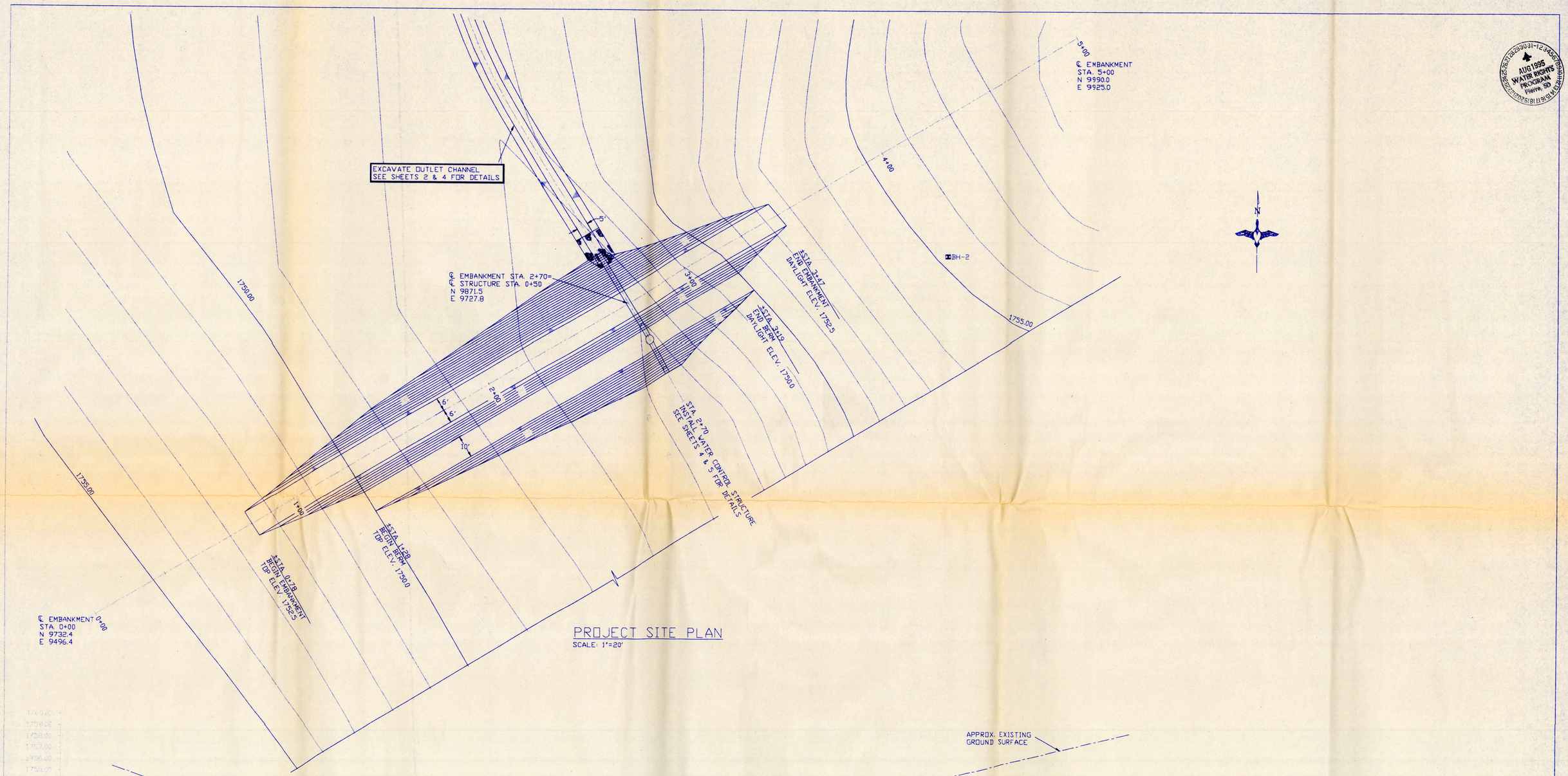
HORIZONTAL CONTROL:
LOCAL DU COORDINATES WITH AZIMUTH REFERENCED TO TRUE NORTH WITH A BRUNTON COMPASS WITH 8 1/2° OF MAGNETIC DECLINATION ACCOUNTED FOR.

DUCKS UNLIMITED INC.
GREAT PLAINS REGIONAL OFFICE

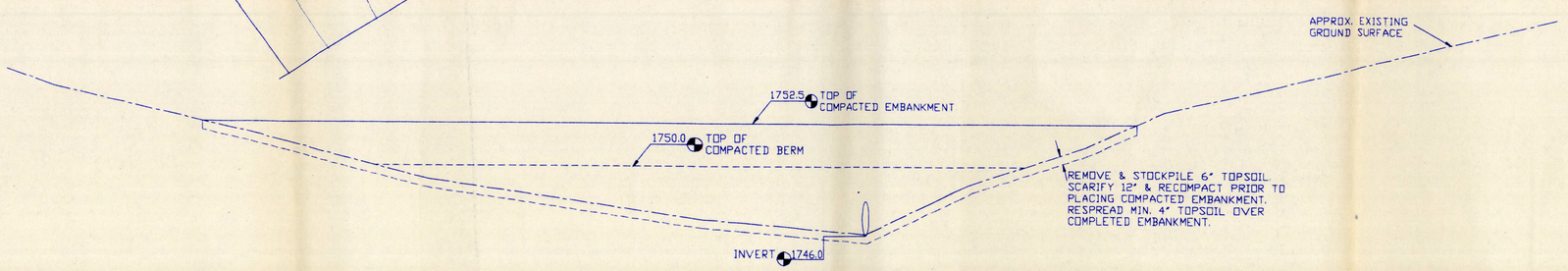
PROJECT NO. SD-0177-001	BOLSTAD WPA		DESIGNED BY: D.J.L.
	PROJECT TOPOGRAPHY		DRAWN BY: KB
			SURVEYED BY:
			CHECKED BY:
DATE: 7-19-95	SHEET NO. 2 OF 6	APPROVED BY: P.E.	APPROVED BY:

5882-3

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PROJECT SITE PLAN
SCALE: 1"=20'

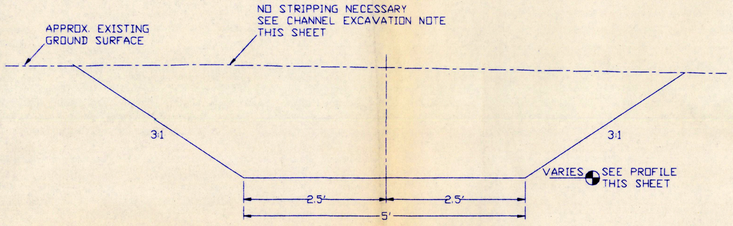


EMBANKMENT ℄ PROFILE

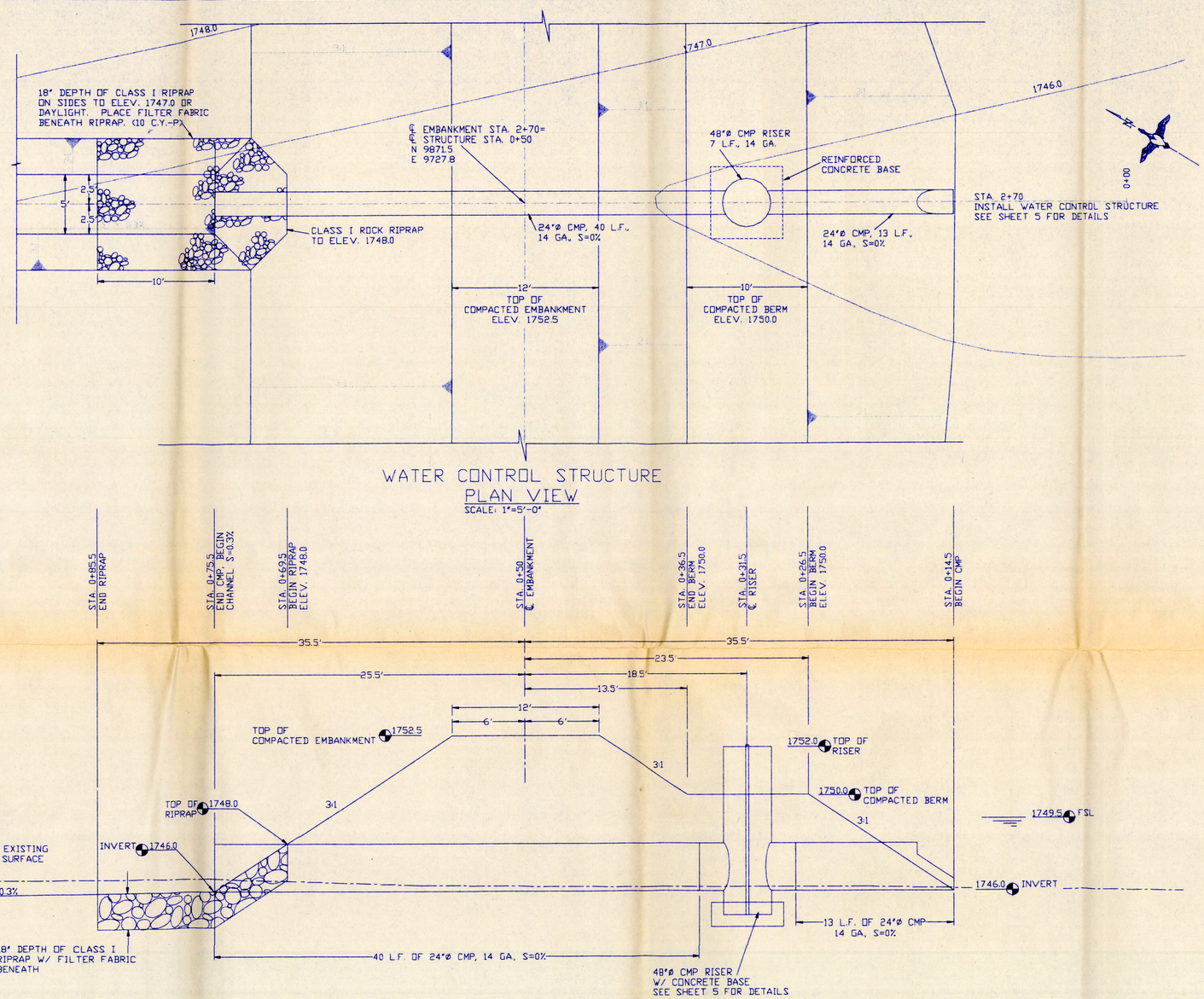
DUCKS UNLIMITED INC.
GREAT PLAINS REGIONAL OFFICE

PROJECT NO. SD-0177-001		DESIGNED BY: D.J.L.
BOLSTAD WPA		DRAWN BY: KB
		SURVEYED BY:
PROJECT SITE PLAN		CHECKED BY:
DATE: 7-20-95	SHEET NO. 3 OF 6	APPROVED BY: P.E. / APPROVED BY:

5882-3

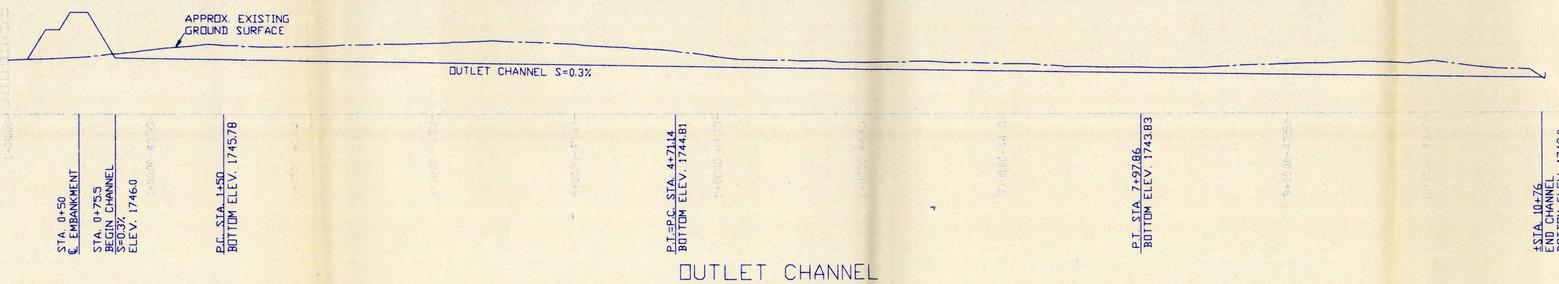


OUTLET CHANNEL
EXCAVATION SECTION
NOT TO SCALE



WATER CONTROL STRUCTURE
PLAN VIEW
SCALE: 1"=5'-0"

WATER CONTROL STRUCTURE
℄ PROFILE
SCALE: 1"=5'-0" HORIZ., 1"=2.5' VERT.



OUTLET CHANNEL
℄ PROFILE
SCALE: 1"=50' HORIZ., 1"=10' VERT.

CHANNEL EXCAVATION:
MATERIAL EXCAVATED FROM THE OUTLET CHANNEL SHALL BE DEPOSITED ON THE UPLAND ADJACENT TO THE CHANNEL AT AN ELEVATION ABOVE THE WETLAND VEGATATION AS APPROVED BY THE FIELD ENGINEER. THE MATERIAL SHALL BE BLENDED INTO THE EXISTING TOPOGRAPHY. NO TOPSOIL STRIPPING IS NECESSARY ON THE OUTLET CHANNEL OR DESIGNATED WASTE AREA. HOWEVER, BLACK ORGANIC MATERIAL SHALL BE SPREAD OVER ANY CLAY MATERIAL IN THE WASTE AREA.

STRUCTURE EXCAVATION:
ANY EXCAVATION REQUIRED TO REACH STRUCTURE BASE & INVERT ELEVATIONS SHALL BE CONSIDERED INCIDENTAL TO "WATER CONTROL STRUCTUE INSTALLATION." ANY EXCAVATION OF UNSUITABLE MATERIAL BELOW THOSE ELEVATIONS SHALL BE CONSIDERED "EXTRA WORK" & PAID FOR AS SUCH. THE COST OF EXCAVATION FOR RIPRAP SHALL BE CONSIDERED INCIDENTAL TO "RIPRAP."

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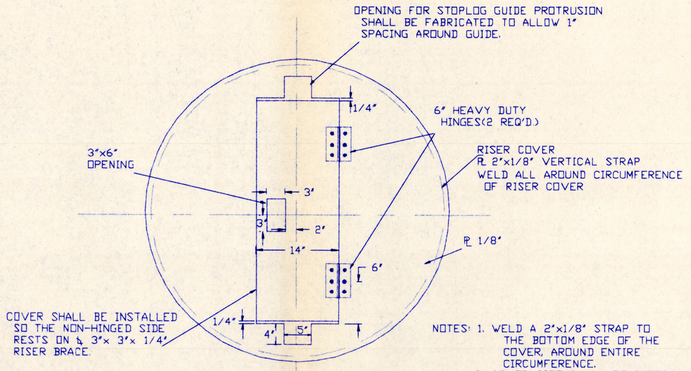
DUCKS UNLIMITED INC.
GREAT PLAINS REGIONAL OFFICE

PROJECT NO. SD-0177-001
BOLSTAD WPA
STRUCTURE PLAN & PROFILE

DESIGNED BY: D.J.L.
DRAWN BY: KB
SURVEYED BY:
CHECKED BY:
APPROVED BY:
APPROVED BY:

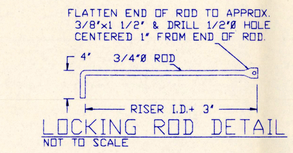
DATE: 7-20-95
SHEET NO. 4 OF 6

5882-3

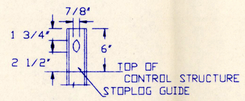


NOTES: 1. WELD A 2"x1/8" STRAP TO THE BOTTOM EDGE OF THE COVER, AROUND ENTIRE CIRCUMFERENCE.
2. COVER SIZE SHALL BE DETERMINED BY THE RISER DIAMETER PLUS 4".
3. HINGED DOOR LENGTH SHALL BE DETERMINED BY THE RISER DIAMETER MINUS 5" EITHER SIDE OF RISER.

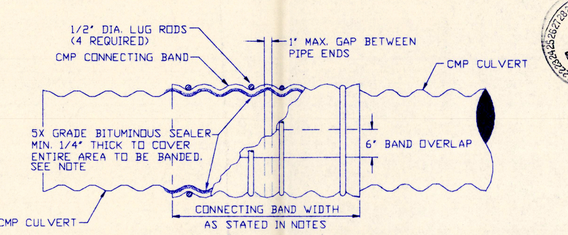
RISER COVER DETAIL
NOT TO SCALE



LOCKING ROD DETAIL
NOT TO SCALE



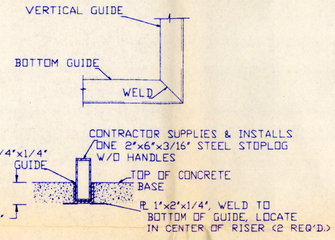
LOCKING ROD SLOT DETAIL
NOT TO SCALE



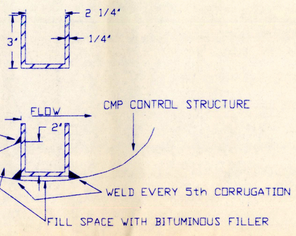
AFTER BANDS HAVE BEEN TIGHTENED, A COAT OF 5X SEALER SHALL BE APPLIED AROUND THE CULVERT AT THE ENDS OF THE CONNECTING BAND AND ALONG THE SEAM OF THE BAND OVERLAP.

NOTE TO SUPPLIERS:
IF ANNULAR PIPE IS USED, USE A 2 FT. WIDE ANNULAR BAND. IF HELICAL PIPE WITH 4 CORRUGATIONS REROLLED TO ANNULAR IS USED, USE A 21 INCH WIDE ANNULAR BAND. SEE SPECIFICATION 207.2.

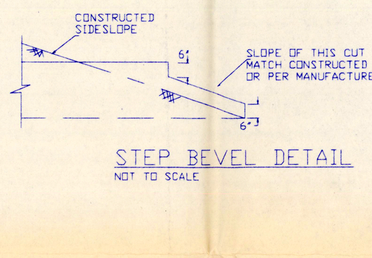
CONNECTING BAND DETAIL
NOT TO SCALE



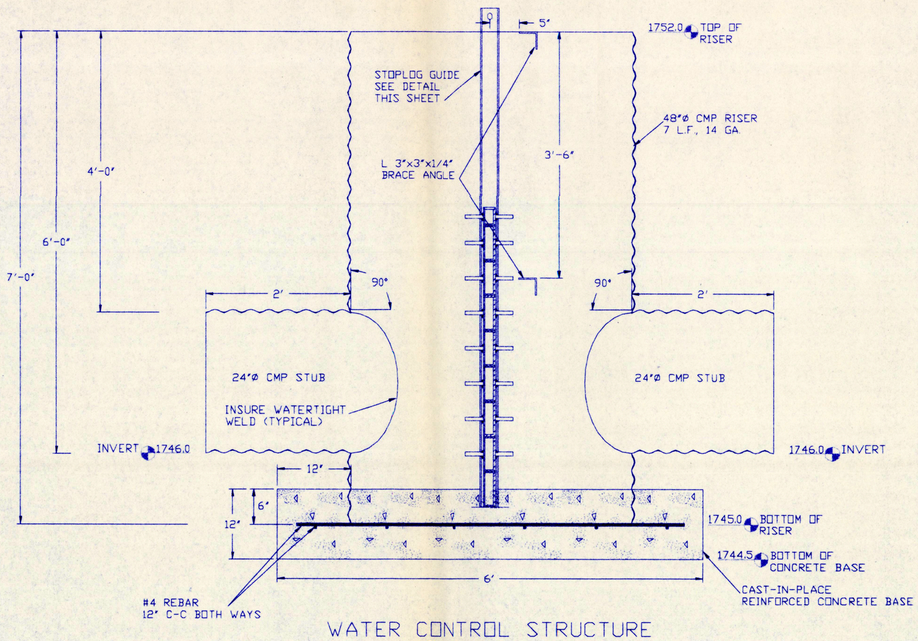
HORIZONTAL STOPLOG GUIDE DETAIL
NOT TO SCALE



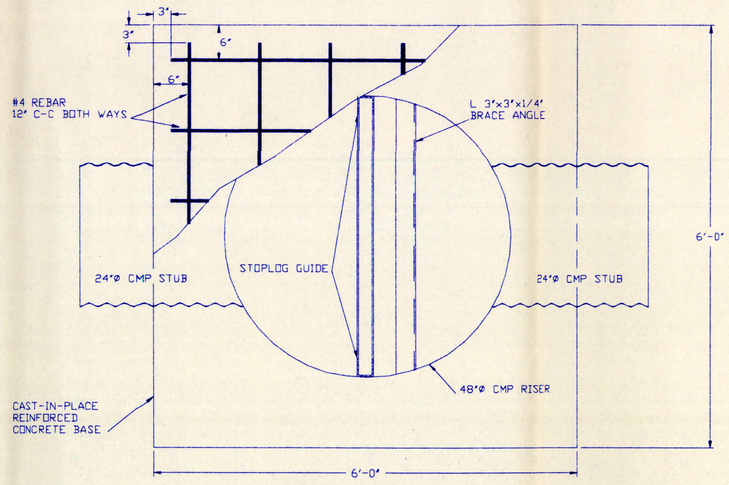
STOPLOG GUIDE DETAIL
NOT TO SCALE



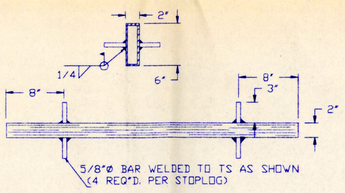
STEP BEVEL DETAIL
NOT TO SCALE



WATER CONTROL STRUCTURE ℄ PROFILE
NOT TO SCALE

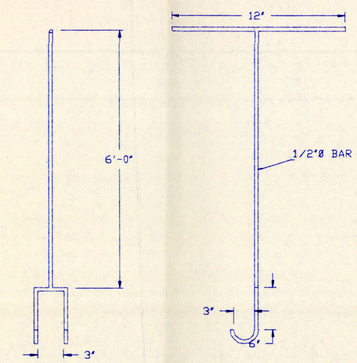


WATER CONTROL STRUCTURE PLAN VIEW
NOT TO SCALE



NOTE: STEEL STOPLOGS, EXCEPT BOTTOM ONE, FURNISHED BY DUCKS UNLIMITED. CONTRACTOR SHALL SUPPLY & WELD ON 5/8"Ø BARS & DELIVER LOGS TO PROJECT SITE.

STEEL STOPLOG DETAIL
NOT TO SCALE



STOPLOG LIFTING HOOK DETAIL
NOT TO SCALE

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE	PROJECT NO. SD-0177-001		DESIGNED BY: D.J.L.
	BOLSTAD WPA		DRAWN BY: KB
	WATER CONTROL STRUCTURE DETAILS		SURVEYED BY:
			CHECKED BY:
DATE: 7-20-95	SHEET NO. 5 OF 6	APPROVED BY: [signature], P.E.	APPROVED BY:

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5882-3

MIDWEST TESTING LABORATORY

JOB NO. B3804 LOG OR TEST BORING NO. 1 VERTICAL SCALE 1"=2'

PROJECT Bolstad WPA, Brookings County, South Dakota

DEPTH IN FEET	SOIL DESCRIPTION (SURFACE ELEV. 1748.5)	SAMPLE NO.	SAMPLE TYPE	N VALUE	LAB TESTS: MOISTURE	DENSITY	LL/PL	Qu
	FAT CLAY-dark grayish brown to grayish brown, medium, trace of gravel, surface vegetation in upper 6", frost to 6", moist (CH)	1	SB	7				
		2	SB	8				
5	FAT CLAY WITH SAND-grayish brown, rather stiff to stiff, trace of gravel, moist (CH)	3	SB	11				
		4	SB	13				
		5	SB	19				
11	END OF BORING							

WATER LEVEL DATA			
DATE	TIME	CAVE IN DEPTH	WATER LEVEL
3-1-95	16:35	HSA 9½'	6'
3-1-95	16:40	9'	8½'
3-1-95	17:30	8½'	5'

BORING DATA
STARTED 3-1-95 COMPLETED 3-1-95 @ 16:40
METHOD USED: 3 1/4" HSA 0-9 1/2'
CREW CHIEF T Volk

MIDWEST TESTING LABORATORY

JOB NO. B3804 LOG OR TEST BORING NO. 2 VERTICAL SCALE 1"=2'

PROJECT Bolstad WPA, Brookings County, South Dakota

DEPTH IN FEET	SOIL DESCRIPTION (SURFACE ELEV. 1754.5)	SAMPLE NO.	SAMPLE TYPE	N VALUE	LAB TESTS: MOISTURE	DENSITY	LL/PL	Qu
	FAT CLAY WITH SAND-dark grayish brown to grayish brown, stiff to rather stiff, trace of gravel, surface vegetation in upper 10", frost to 2', moist (CH)	1	SB	*34				
		2	SB	20				
		3	SB	12				
6	END OF BORING *N value influenced by frost							

WATER LEVEL DATA			
DATE	TIME	CAVE IN DEPTH	WATER LEVEL
3-1-95	16:55	HSA 4½'	None
3-1-95	16:58	3½'	None

BORING DATA
STARTED 3-1-95 COMPLETED 3-1-95 @ 16:55
METHOD USED: 3 1/4" HSA 0-4 1/2'
CREW CHIEF T Volk

MIDWEST TESTING LABORATORY

JOB NO. B3804 LOG OR TEST BORING NO. 3 VERTICAL SCALE 1"=2'

PROJECT Bolstad WPA, Brookings County, South Dakota

DEPTH IN FEET	SOIL DESCRIPTION (SURFACE ELEV. 1753.5)	SAMPLE NO.	SAMPLE TYPE	N VALUE	LAB TESTS: MOISTURE	DENSITY	LL/PL	Qu
	FAT CLAY WITH SAND-dark grayish brown to grayish brown, rather stiff, trace of gravel, surface vegetation in upper 12", frost to 2', moist (CH)	1	SB	*30				
		2	SB	15				
		3	SB	10				
6	END OF BORING *N value influenced by frost							

WATER LEVEL DATA			
DATE	TIME	CAVE IN DEPTH	WATER LEVEL
3-1-95	17:10	HSA 4½'	None
3-1-95	17:20	3½'	None

BORING DATA
STARTED 3-1-95 COMPLETED 3-1-95 @ 17:10
METHOD USED: 3 1/4" HSA 0-4 1/2'
CREW CHIEF T Volk

MIDWEST TESTING LABORATORY

1900 Commerce St. / P.O. Box 2084 / Bismarck, North Dakota 58502
Phone (701) 258-2833 / Fax (701) 258-2857

REPORT OF: TESTS OF SOILS

PROJECT: Bolstad WPA, Brookings County, South Dakota
DATE: March 29, 1995

REPORTED TO: Ducks Unlimited, Inc
Attn: Doug Lipetzky
3502 Franklin Ave
Bismarck, ND 58501-0761
COPIES:

PROJECT NO: B3804

SAMPLE NUMBER: 1

LOCATION: Test boring 3, depth 1-5'

CLASSIFICATION: FAT CLAY WITH SAND (ch)

COLOR: Brown

ATTERBERG LIMITS:

Liquid Limit	55
Plastic Limit	17

LABORATORY MOISTURE-DENSITY RELATION (see attached curve):

Method	ASTM:D698-91, Method A
Optimum Moisture (%)	21.9
Maximum Density (#/cu.ft.)	98.5

LABORATORY PERMEABILITY:

Method	Falling head
Remolded Specimen Density (#/cu.ft.)	93.6
Remolded Moisture Content (%)	21.9
Coefficient of Permeability (cm/sec)	7.1×10^{-8}
Saturated Moisture Content (%)	26.4

REMARKS: Material as represented by the above sample for permeability was remolded to 95% maximum dry density and at optimum moisture content. Sample was allowed to to saturate prior to testing.

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MIDWEST TESTING LABORATORY

1900 Commerce St. / P.O. Box 2084 / Bismarck, North Dakota 58502
Dial (701) 258-2833 / Fax. (701) 258-2857

REPORT OF: MOISTURE-DENSITY RELATIONS OF SOIL

PROJECT: Bolstad WPA, Brookings County, South Dakota
DATE: March 29, 1995

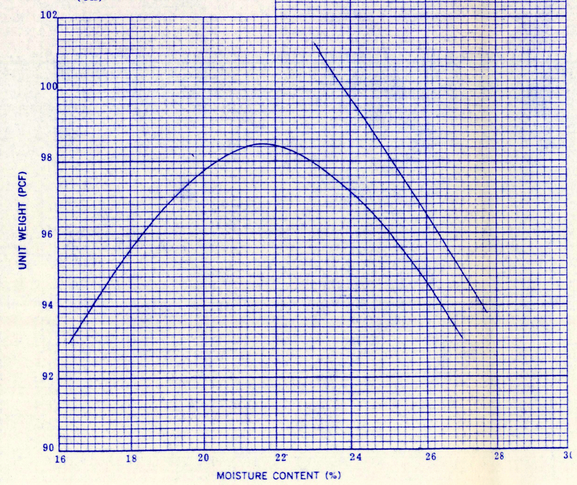
REPORTED TO: Ducks Unlimited, Inc
Attn: Doug Lipetzky
3502 Franklin Ave
Bismarck, ND 58501-0761
COPIES:

PROJECT NO: B3804 (Test boring 3, depth 1-5')

SAMPLE NUMBER: 1 MAXIMUM DENSITY: 98.5#/cu.ft. OPTIMUM MOISTURE: 21.9%

METHOD: ASTM:D698-91, Method A, (-#4 Basis)

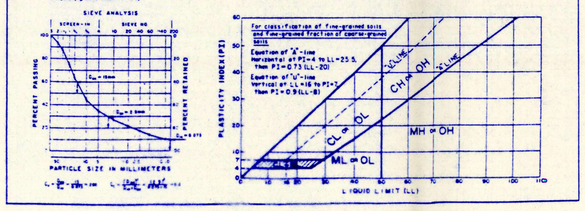
SOIL TYPE: FAT CLAY WITH SAND-brown (CH)



Classification of Soils For Engineering Purposes
ASTM:D 2487-85

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]			Soil Classification: Group Symbol	Group Name[B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3^{D}$	GW	Well-graded gravel[E]
			$Cu < 4$ and/or $1 > Cc > 3^{D}$	GP	Poorly graded gravel[E]
		Gravels with Fines: More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[E,F,G]
			Fines classify as CL or CH	GC	Clayey gravel[E,F,G]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines[H]	$Cu \geq 6$ and $1 \leq Cc \leq 3^{D}$	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3^{D}$	SP	Poorly graded sand[I]
		Sands with Fines: More than 12% fines[H]	Fines classify as ML or MH	SM	Silty sand[F,G,I]
			Fines classify as CL or CH	SC	Clayey sand[F,G,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
Highly organic soils: Fibric Peat >67% Fibers	Primarily organic matter, dark in color, and organic odor: Hemic Peat 33%-67% Fibers			PT	Peat: Sapric Peat <33% Fibers

[A] Based on the material passing the 3-in. (75-mm) sieve.
[B] If soil contains cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt; GW-GC well-graded gravel with clay; GP-GM poorly graded gravel with silt; GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt; SW-SC well-graded sand with clay; SP-SM poorly graded sand with silt; SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥15% gravel, add "with gravel" to group name.
[J] Atterberg limits plot in hatched area: soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥30% plus No. 200, predominantly sand, add "sandy" to its group name.
[M] If soil contains ≥30% plus No. 200 predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



DESCRIPTIVE TERMINOLOGY

RELATIVE DENSITY OF COHESIONLESS SOILS

Term	"N" Value
Very Loose	0-4
Loose	5-8
Medium Dense	9-15
Dense	16-30
Very Dense	Over 30

CONSISTENCY OF COHESIVE SOILS

Term	"N Value"
Soft	0-4
Medium	5-8
Rather Stiff	9-15
Stiff	16-30
Very Stiff	Over 30

RELATIVE PROPORTIONS

Term	Range
Trace	0-5%
A Little	5-15%
With	15-50%

DRILLING & SAMPLING SYMBOLS

Symbol	Definition
FA	Flight Auger
SS	Split Spoon
TW	Thin-Walled Tube
HSA	Hollow Stem Auger
N	Penetration Resistance: blows required to drive a two-inch OD split spoon sampler one foot by means of a 140-pound hammer falling 30 inches

THICKNESS OF SOIL INTRUSIONS

Term	Range
Lense/Lamination	0-1/8"
Seam	1/8"-1"
Layer	1"-12"

PARTICLES SIZES

Term	Range
Boulders	Over 8"
Cobbles	3"-8"
Gravel	
Coarse	3/4"-3"
Fine	#4-3/4"
Sand	
Coarse	#4-#10
Medium	#10-#40
Fine	#40-#200
Silt	#200-0.005 mm
Clay	Less than 0.005 mm

Note: Sieve sizes shown are U.S. Standard

LABORATORY TEST SYMBOLS

Symbols	Definition
LL	Liquid Limit, %
PL	Plastic Limit, %
Q_u	Unconfined Compressive Strength, psf
Additional insertions in Q_u column	
G	Specific Gravity
SL	Shrinkage Limit, %
pH	Hydrogen Ion Content-Meter Method
O	Organic Content, % - Combustion Method
M.A.	Grain Size Analysis - Mechanical Method
Hyd.	Grain Size Analysis - Hydrometer Method
C	One-Dimensional Consolidation
Q_t	Triaxial Compression
K	Coefficient of Permeability

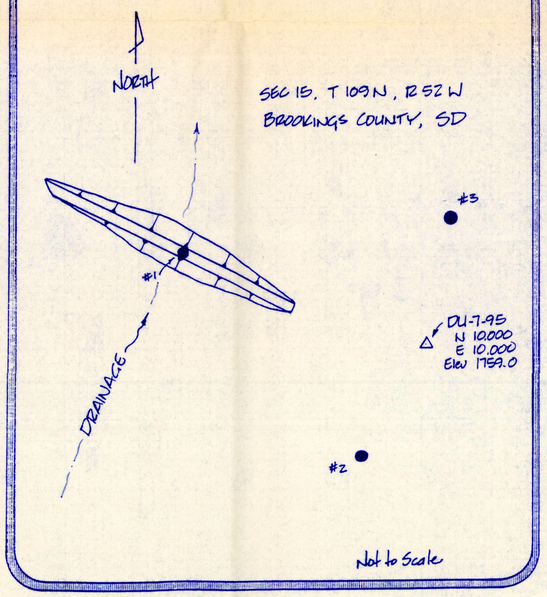
WATER LEVEL INFORMATION

Water levels shown on the boring logs are levels measured in the borings at the time and under the conditions noted. In sand, the indicated levels can be considered reliable. In clay soil, it is not possible to determine the ground water level within the normal scope of a test boring investigation, except where lenses or layers of more pervious water-bearing soils are present. Even then, a long period of time may be necessary to reach equilibrium. Therefore, the position of the water level noted on the boring logs for cohesive or mixed-texture soils may not indicate the true level of the ground water table.

SOIL STRATIFICATION BOUNDARIES

The soil stratification lines shown on the boring logs indicate the approximate boundary between different soil types. In the field, the transition between soil types may be gradual.

TEST BORING LAYOUT



THE BORINGS DONE ON THIS PROJECT REPRESENT THE SOILS FOUND AT THE LOCATIONS OF THE BORINGS ONLY. SOILS MAY VARY BETWEEN LOCATIONS AND OTHER AREAS OF THE PROJECT SITE NOT DRILLED. A COMPLETE GEOTECHNICAL ENGINEERING REPORT IS AVAILABLE FOR REVIEW AT DUCKS UNLIMITEDS GREAT PLAINS REGIONAL OFFICE. THE CONTRACTOR WARRANTS THAT SITE CONDITIONS HAVE BEEN EXAMINED AS REQUIRED BY SECTION 101.203 EXAMINATION OF SITE CONDITIONS OF THE GENERAL CONDITIONS PRIOR TO BIDDING OR CONSTRUCTING THIS PROJECT. NO ADJUSTMENTS TO THE CONTRACT WILL BE MADE DUE TO CHANGED SITE CONDITIONS.

DUCKS UNLIMITED INC. GREAT PLAINS REGIONAL OFFICE

PROJECT NO: SD-0177-001
BOLSTAD WPA
SOILS INFORMATION

DESIGNED BY: DJL
DRAWN BY: KB
SURVEYED BY:
CHECKED BY:

DATE: 7-19-95
SHEET NO: 6 OF 6
APPROVED BY: [signature] P.E.
APPROVED BY:

44839