

WATER PERMIT NO. 6547-3

Name of Applicant: **Frank McGowan**

Address: **PO Box 969, Suwanee GA 30024**

Phone: **404 293-5159**

Amount of Water Claimed: **32 AF**

Total Acres: **NA**

Source of Water Supply: **runoff**

Water to be used for: **recreation, fish & wildlife propagation**

County: **Jerauld**

Type of Waste Disposal System:

Location: **5 miles west of Wessington Springs**

PRIORITY

Date Received: **10-28-04**

Application/License Fee: **\$200**

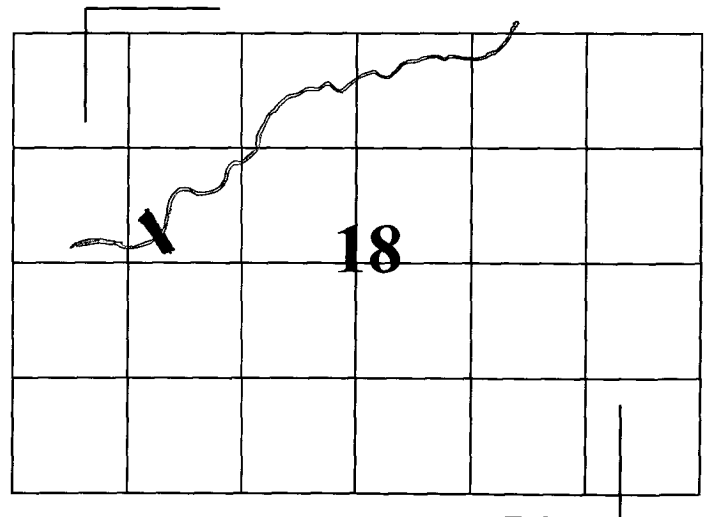
Corrected Application Received:

Period of Annual Use: **January 1 – December 31**

Remarks:

Diversion Point: **SW ¼ NW ¼ Sec 18-T107N-R65W**

Water Impounded: **S ½ NW ¼, NE ¼ NW ¼ Sec 18-T107N-R65W**



Depth of Well: **NA**

Well Driller:

Remarks:

Type of Map: **topo**

Prepared by: **Angela Roman, NRCS**

Reviewed and the Number Assigned on: **11-02-04**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

SD EForm - 1585 V1
FORM 2: Application for uses other than irrigation
(type or print)

Mail to:
Water Rights Program
Joe Foss Building
523 E. Capitol
Pierre, SD 57501-3181
(605) 773-3352

No. 6547-3 (office use only)
Hydrologic Unit 10160011
Basin James River
Newspaper True Dakotan, Wessington Springs

RECEIVED
OCT 28 2004
WATER RIGHTS
PROGRAM

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

Check use(s) of water:

- | | | | |
|---|---|---|--|
| ☐ Municipal | ☐ Suburban Housing | ☒ Recreational | ☐ Institutional |
| ☐ Rural Water System | ☐ Commercial | ☒ Fish & Wildlife | ☐ Geothermal Heat |
| ☐ Domestic (over 18 gpm) | ☐ Industrial | ☐ Other _____ | |

Type of Application: (check one)
☒ **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 Frank McGowan Phone (404) 293-5159
(check one) ☒ Owner ☐ Tenant/lessee
Mailing Address PO Box 969, Suwanee State GA 30024
(Street, RR, or Box and City) (Zip Code)
2. Amount of water claimed _____ *CFS or _____ **GPM 32.0 ***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 Runoff
4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W) County Jerauld
SW1/4NW1/4 Section 18 T107N R65W Water Impounded S. 1/2 NW 1/4 NE 1/4 NW 1/4
Sec 18 - T107N - R65W
5. County or counties where water will be used Jerauld
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)

Construct an embankment across a no name draw in Jerauld County. This project will include a primary spillway and emergency spillway.

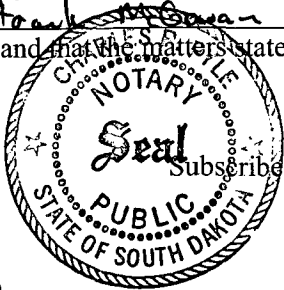
STATE OF SOUTH DAKOTA)
County of Jerauld) SS

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)

I, Frank McGowan, 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.

Applicant's signature Frank McGowan

Subscribed and sworn to before me this 1 day of July 20 03



[Signature]
Notary Public Signature

SOUTH DAKOTA
WATER PERMIT NO. 6547-3

Date of first receipt of application October 28, 2004.

Date of return to applicant for corrections, amendments or changes October 29, 2004.

Date of receipt of corrected application November 4, 2004.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 6547-3 to Frank McGowan, PO Box 969, Suwanee GA 30024 authorizing the construction of the dam and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 6547-3 authorizes impoundment of 32 acre-feet of water from runoff by constructing a dam located in the SW 1/4 NW 1/4 Section 18 with water impounded in the S 1/2 NW 1/4, NE 1/4 NW 1/4 Section 18; all in T107N-R65W.
2. The water appropriated shall be used for the purpose of fish and wildlife propagation and recreational purposes 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. 6547-3 is December 3, 2004.
5. The date from which applicant may claim right is October 28, 2004.
6. One-fifth of the construction is to be completed on or before June 3, 2007.
7. All construction is to be completed on or before December 3, 2009.
8. Water is to be put to beneficial use on or before December 3, 2013.
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. 6547-3 authorizes a dam with a storage capacity of 32 acre feet of water and sufficient water annually to maintain the water level to an outlet elevation.
2. Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

WATER MANAGEMENT BOARD

By: Garland Erbele

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

DEC 16 2004

date



(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 _____ 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. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field) _____
- b) System Capacity (gallons) _____ Year Constructed _____
- c) Connected to the City of _____ Sanitary System _____

3. Dugout Information

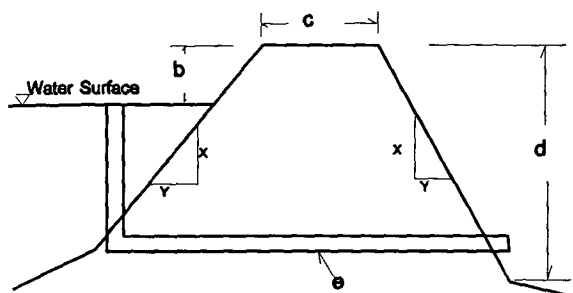
- a) Surface Dimensions _____ Depth _____
- b) Depth to water (ground surface to water level) _____

4. 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:

USDA-NRCS
314 S. HENRY SUITE #300
PIERRE, SD



- b) Freeboard _____ 6.4
- c) Crest Width _____ 12'
- Crest Length _____ 447'
- d) Height _____ 17.2'
- e) Primary Outlet Capacity _____ 32.1 CFS
If pipe, diameter _____ 18"
- f) Secondary Spillway Capacity _____ 627.5 CFS
Spillway Width _____ 80'
- g) X & Y Slope _____
Upstream _____ 3:1
Downstream _____ 3:1
- h) Surface Area of Impoundment _____ 8.3 Acres
- i) Storage _____ 32.0 Acre Feet
- j) Drainage Area Above Dam _____ 1,439.0 Acres

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date November 4, 20 04

RECEIVED OF Frank McGowan, PO Box 969, Suwanee GA 30024

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. _____		
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.

001153

By

Barbara E. Ebele
Chief Engineer
gm

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date October 28, 20 04

RECEIVED OF McGowan Family Farming Partnership, PO Box 969, Suwanee GA 30024

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

Fee for Application for Permit No. <u>6547-3</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 _____		
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	150.00

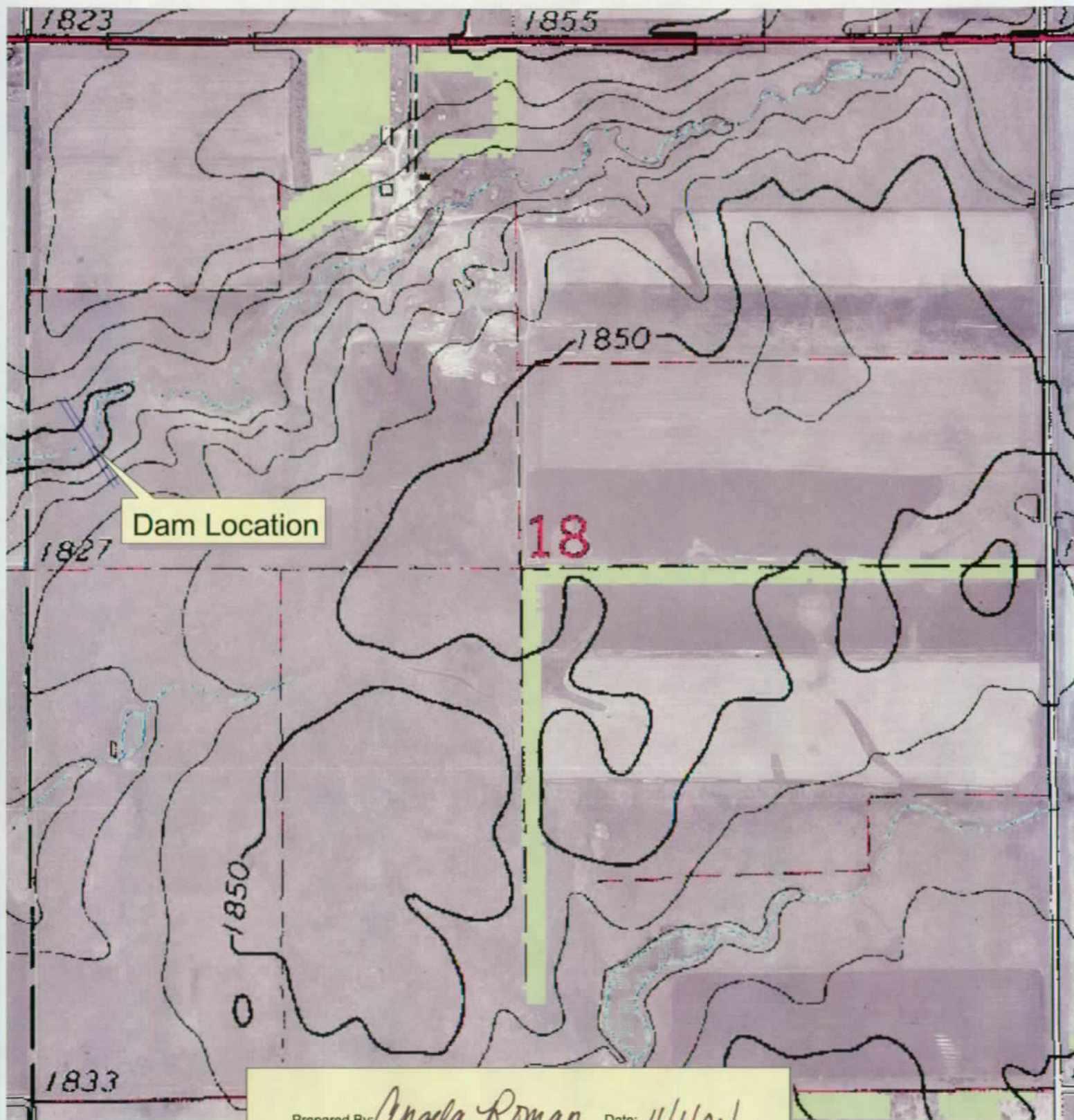
No

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By

Darlene Erbe
Chief Engineer
gm

Frank McGowan
Proposed Dam Site
18-107-65



1000 0 1000 2000 Feet

6547-3

**Design Report
Frank McGowan
Jerauld County**

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OCT 28 2004

WATER RIGHTS
PROGRAM

Summary

This is a multi-purpose dam for sediment control, livestock water, and wildlife. This is a new construction of the dam. Funding for this project will be provided by the United States Fish and Wildlife Service and Frank McGowan.

Job Description

This site is a Hazard "A" and Job Class IV structure with a drainage area of 1439 acres. In the event of a breach, cropland and pastureland could be damaged. The principal spillway of this site is an 18" diameter corrugated smooth lined polyethylene pipe, with a hood inlet.

Basis for Design

Overall design of this structure was governed by the 378 Pond standard. The design is routing the 2yr- 24 hr storm through the principal spillway. SITES program was used to flood route the design.

General Basic Data

This pond will require a Water Rights Permit from South Dakota Department of Environment and Natural Resources.

Hydraulic Data Summary	
Drainage Area	1439 Acres
Time of Concentration	3.92 hours
Runoff Curve Number	78
Principal Spillway, 2 YR 24-hr. Rainfall	2.3 inches
Emergency Spillway, 50 YR 24-hr. Rainfall	4.9 inches
Principal Spillway Discharge in ES	32 CFS
Emergency Spillway Discharge	588 CFS
Required Sediment Storage	8.4 ACFT
Sed. Storage Below Crest	6.7 ACFT
Sed. Storage Above Crest	1.7 ACFT
Crest of Normal Pool	8.3 Acres 32.0 ACFT storage
Crest of Emergency Spillway	13.3 Acres 68.8 ACFT storage
Top of Dam	18.3 Acres 115.1 ACFT storage

Angela Roman, EIT
Agricultural Engineer
Date: 9/21/04

1*****
 SITES XEQ 09/10/2004 WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM
 VER 2000 (USER MANUAL - DATED MAY 2001)
 TIME 09:02:21

***** 80-80 LIST OF INPUT DATA *****

SITES 05/01/2000 McGowan Dam 2.2484375 H5
 SAVMOV 0 101
 SAVMOV 101 1 1
 * Principle Spillway @ 86
 * 2 year storm through principle
 * ~~50~~ 25 year storm through emergency

STRUCTURE

76	.0011
77	.2848
78	.8729
79	1.2966
80	1.9516
81	2.5907
82	3.4956
83	4.6378
84	5.8050
85	6.8812
86	8.3255
87	9.7881
88	11.2547
89	12.7294
90	14.2199
91	15.7949
92	17.5497
93	19.6682
94	21.8302

ENDTABLE

WSDATA	5A1	AC 75	1439	23817	3.3	
PDIRECT		2.3	4.90	4.30		
POOLDATA	ELEV	86	86	75.7	74.7	HD
PSHOOD	100	20	76	75	1	1 B
PSDATA	1	18		.009	75.7	
ASDATA	41	300	130	3	.019	2
ASINSURF	41		4.4	5.6		DC
ASINLET	41	0.0	0.0	58	0.0	3
	158	3				

ENDTABLE

ASEXSURF	41		.035
		.67	0
	2		
	2	0	
		.01	

ENDTABLE

ASEXIT	41	N		100
BTMWIDTH	FEET	80		
GRAPHICS	1			
GO,DESIGN	HL	TYPE2	24	TYPE2378 24
SAVMOV	2	101	1	
ENDJOB				

1SITES XEQ 09/10/2004 ----- COMMENT PAGE -----
VER 2000 McGowan Dam WSID =

Principle Spillway @ 86

2 year storm through principle

25 year storm through emergency

**** MESSAGE - ALTERNATE STRUCTURE ID (S 1) BEING USED
SINCE USER DID NOT INPUT AN ID.

**** MESSAGE - ALTERNATE SUBWATERSHED ID (A) BEING USED SINCE
USER DID NOT INPUT AN ID.

**** MESSAGE - DRAINAGE AREA FROM WSDATA CONTROL BEING CONVERTED FROM
ACRES TO SQUARE MILES FOR COMPUTATION PURPOSES.

1SITES -----
XEQ 09/10/2004 McGowan Dam WSID=
VER 2000 SUBW= A
TIME 09:02:21 SITE = S 1 PASS= 1 PART= 1

***** BASIC DATA *****
CLIMATE AREA - NOT DEFINED DESIGN CLASS A1 = LT 3000.

STORM DISTRIBUTION-PSH 24 HOUR TYPE II RAINFALL DISTRIBUTION

STORM DISTRIBUTION AUX. -24 HOUR TYPE II RAINFALL DISTRIBUTION

PRECIP. - P-PS,1-DAY	P-PS,10-DAY	P-SD	P-FB
2.30	0.00	4.90	4.30

WSDATA - CN	DA-SM	TC/L	-/H	QRF
75.00	2.25	23817.00	3.30	0.00

SITEDATA- PERM POOL	CREST PS	FP SED	VALLEY FL	378?
86.00	86.00	0.00	74.70	YES

BASEFLOW	INITIAL EL	EXTRA VOL	SITE TYPE
0.00	0.00	0.00	DESIGN

PSDATA - NO. COND	COND L	DIA/W	-/H
1.00	0.00	18.00	0.00

PS N	KE	WEIR L	TW EL
0.009	0.00	0.00	75.70

2ND STG	ORF H	ORF L	START AUX.
0.00	0.00	0.00	0.00

PSHOOD - OUTLET MITER LENGTH LENGTH
 ELEV. ELEV. INLET TO MITER TO
 MITER(FT) OUTLET(FT)
 75.00 76.00 100.0 20.0

ASCRESTS - AUX.1 AUX.2 AUX.3 AUX.4 AUX.5
 0.00 0.00 0.00 0.00 0.00

AUX.DATA - REF.NO. RETARD. Ci TIE STATION INLET LENGTH
 41 0.00 300.00 130

AUX.DATA - INLET Ci SIDE SLOPE EXIT N EXIT SLOPE ACTUAL AUX?
 4.400 3.00 0.035 0.019 NO

BTM WIDTH - BW1 BW2 BW3 BW4 BW5
 ft 80.00 0.00 0.00 0.00 0.00

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES -----
 XEQ 09/10/2004 McGowan Dam WSID=
 VER 2000 SUBW= A
 TIME 09:02:21 SITE = S 1 PASS= 1 PART= 2

PERM POOL 86.00 FT 32.0 ACFT 8.33 AC 0.0 CFS

CREST PS 86.00 FT 32.0 ACFT 8.33 AC 0.0 CFS

SED ACCUM 86.00 FT 32.0 ACFT 8.33 AC 0.0 CFS

START ELEV 86.00 FT 32.0 ACFT 8.33 AC 0.0 CFS

NRCS-PSH D= 24.00 HR P= 2.30 IN Q= 0.54 IN DA= 2.25 SM
 TC= 4.28 HR CN= 75.00 VOL= 64.4 ACFT

PEAK = 123.3 CFS, AT 14.8 HRS.

ROUTED RESULT - HYD TYPE EMAX VOL-MAX AMAX QMAX
 NRCS-PSH 89.38 FT 68.5 ACFT 13.30 AC 29.9 CFS

PS STORAGE 36.5 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

DRAWDOWN (DDT) TEST 86.00 FT 32.0 ACFT 0.00 CFS
 CONTROL IS 0.000 DETENTION STORAGE

TIME LIMIT REACHED = 10.00 DAYS; FLOW WAS 0.04 CFS, ELEV = 86.02
 ROUTING CONTINUING.

RATING TABLE DEVELOPED, SITE = S 1:
 BY PROGRAM FOR PS AND AUX. SPILLWAYS

AUX. RATING USED WSPVRT METHOD.

RATING TABLE NUMBER 1

	ELEV. FEET	Q-TOTAL CFS	Q-PS CFS	Q-AUX. CFS	VOLUME AC-FT	AREA ACRE
1	86.00	0.00	0.00	0.00	31.98	8.33
2	86.50	0.88	0.88	0.00	36.33	9.06
3	87.00	3.56	3.56	0.00	41.04	9.79
4	87.50	7.08	7.08	0.00	46.11	10.52
5	87.68	7.85	7.85	0.00	48.05	10.79
FULL CONDUIT FLOW, ELEV = 87.96 FT						
6	87.96	28.34	28.34	0.00	51.12	11.20
7	88.82	29.33	29.33	0.00	61.33	12.47
8	89.69	30.28	30.28	0.00	72.64	13.75
9	90.55	31.20	31.20	0.00	85.07	15.08
10	91.41	32.10	32.10	0.00	98.68	16.52
11	92.27	32.97	32.97	0.00	113.60	18.13
12	93.14	33.82	33.82	0.00	130.03	19.96
13	94.00	34.65	34.65	0.00	148.06	21.83

1SITES

XEQ 09/10/2004 McGowan Dam WSID=
 VER 2000 SUBW= A
 TIME 09:02:21 SITE = S 1 PASS= 1 PART= 3

AUX. CREST 89.38 FT 68.5 ACFT 13.30 AC 29.9 CFS

PS STORAGE 36.5 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

START ELEV 86.02 FT 32.2 ACFT 8.36 AC 0.0 CFS

EFFECTIVE HEIGHT(H)= 13.7 FEET, PRODUCT= 937. (H * STORAGE AT CREST AUX.).

INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.

NRCS-SDH D= 24.00 HR P= 4.90 IN Q= 2.37 IN DA= 2.25 SM
 TC= 4.28 HR CN= 75.00 VOL= 284.0 ACFT

PEAK = 627.5 CFS, AT 14.8 HRS.

NRCS-FBH D= 24.00 HR P= 4.30 IN Q= 1.89 IN DA= 2.25 SM
 TC= 4.28 HR CN= 75.00 VOL= 227.2 ACFT

PEAK = 496.3 CFS, AT 14.8 HRS.

RATING TABLE DEVELOPED, SITE = S 1:
 BY PROGRAM FOR PS AND AUX. SPILLWAYS
 AUX. RATING USED WSPVRT METHOD.

RATING TABLE NUMBER 2

	ELEV. FEET	Q-TOTAL CFS	Q-PS CFS	Q-AUX. CFS	VOLUME AC-FT	AREA ACRE
1	86.00	0.00	0.00	0.00	31.98	8.33
2	86.28	0.27	0.27	0.00	34.37	8.74
3	86.56	1.12	1.12	0.00	36.88	9.15
4	86.84	2.53	2.53	0.00	39.50	9.56
5	87.12	4.42	4.42	0.00	42.23	9.97
6	87.40	6.48	6.48	0.00	45.08	10.38
7	87.68	7.85	7.85	0.00	48.05	10.79
FULL CONDUIT FLOW, ELEV = 87.96 FT						
8	87.96	28.34	28.34	0.00	51.12	11.20
9	88.24	28.67	28.67	0.00	54.36	11.62
10	88.53	29.00	29.00	0.00	57.72	12.03
11	88.81	29.32	29.32	0.00	61.20	12.45
12	89.10	29.63	29.63	0.00	64.80	12.87
13	89.38	29.95	29.95	0.00	68.52	13.30
14	89.61	36.74	30.20	6.54	71.63	13.64
15	89.84	43.53	30.45	13.08	74.82	13.99
16	90.26	109.65	30.90	78.75	80.76	14.63
17	90.77	285.26	31.43	253.83	88.40	15.43
18	91.69	753.59	32.39	721.20	103.36	17.01
19	92.85	1509.90	33.54	1476.37	124.30	19.34
20	94.00	2452.54	34.65	2417.89	148.06	21.83

SUMMARY OF AUXILIARY SPILLWAY SURFACE CONDITIONS USED IN COMPUTATIONS BY REACH

REACH	FROM STA (ft)	TO STA (ft)	SLOPE (%)	RETARDANCE CURVE INDEX@	VEGETAL COVER FACTOR	MAINT. CODE	ROOTING DEPTH (ft)	LOCATION
1	170.	242.	-3.0	4.4	**	**	**	INLET
2	242.	300.	0.0	4.4	**	**	**	CREST
3	300.	400.	1.9	0.035	0.67	2	2.0	EXIT !

@ The program interprets retardance curve index entries of less than 1 as Manning's n values.

* Upper case indicates a reach of constructed spillway channel.

** The program does not use vegetal cover factor, maintenance code, and rooting depth for inlet and crest reaches in computations.

! Reach 3 used in computing exit channel velocities.

ROUTED RESULTS	BTM FT	WIDTH FT	MAX ELEV ACFT	VOL-MAX AC	AREA-MAX FT	AUX.-HP ACFT	VOL-AUX.
NRCS-SDH	80.0	91.36	97.9	16.4	1.98	29.4	

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGE = 32.0 549.6 581.6

	CRITICAL DEPTH	CRITICAL VELOCITY	CRITICAL SLOPE-Sc	25% OF Q Sc
AUXILIARY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY --	1.12	5.89	0.018	0.024

AUXILIARY SPILLWAY DURATION FLOW = 17.0 HOURS

***** MESSAGE - NHCP378 CRITERIA USED BUT AUXILIARY SPILLWAY RATING NOT
BASED ON ASFILE RATINGS.

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 6.0 FT/SEC
EXIT SLOPE = 0.019 FT/FT
FLOW DEPTH = 1.1 FT

EFFECTIVE STRESS FOR STABILITY ANALYSIS OF AUX. EXIT CHANNEL
(Refer to Ag. Handbook 667, Chapt. 3, for allowable stresses.)
Aux. Discharge = 550. cfs; Bottom Width = 80. ft

REACH FROM TO SLOPE MANNING'S VELOCITY STRESS

NO.	STA	STA	%	n	ft/s	lb/ft^2
3	300.	400.	1.90	0.035	6.04	0.257

DRAWDOWN USING FREEBOARD STORM FOLLOWS, STARTING AT ELEVATION 89.38 FT.

DRAWDOWN (DDT) TEST 86.00 FT 32.0 ACFT 0.00 CFS
CONTROL IS 0.000 DETENTION STORAGE

TIME LIMIT REACHED = 10.00 DAYS; FLOW WAS 0.08 CFS, ELEV = 86.08
ROUTING CONTINUING.

ROUTED	BTM WIDTH	MAX ELEV	VOL-MAX	AREA-MAX	AUX.-HP	VOL-AUX.
RESULTS	FT	FT	ACFT	AC	FT	ACFT
NRCS-FBH	80.0	91.10	93.6	16.0	1.72	25.1

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGE = 31.8 415.8 447.6

	CRITICAL	CRITICAL	CRITICAL	25% OF Q
	DEPTH	VELOCITY	SLOPE-Sc	Sc
AUXILIARY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY ---	0.93	5.39	0.019	0.025

AUXILIARY SPILLWAY DURATION FLOW = 16.3 HOURS
ATTACK, OE/B = 1.9 ACFT/FT

***** MESSAGE - NHCP378 CRITERIA USED BUT AUXILIARY SPILLWAY RATING NOT
BASED ON ASFILE RATINGS.

EXIT CHANNEL FLOW SUPERCRITICAL: MAX VELOCITY= 5.4 FT/SEC
EXIT SLOPE = 0.019 FT/FT
FLOW DEPTH = 0.9 FT

>>>>> NHCP378 RUN - MINIMUM DEPTH, CREST AUX. TO TOP OF DAM IS 2.00 FT.
NEW TOP OF DAM ELEVATION = 91.38.

ROUTED	BTM WIDTH	MAX ELEV	VOL-MAX	AREA-MAX	AUX.HP	VOL-AUX.
RESULTS	FT	FT	ACFT	AC	FT	ACFT

MINIMUM AUX. 80.0 91.38 98.4 16.5 2.01 29.8

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGES = 32.1 564.8 596.8

CRITICAL CRITICAL CRITICAL 25% OF Q
DEPTH VELOCITY SLOPE-Sc Sc
AUXILIARY FT FT/SEC FT/FT FT/FT
SPILLWAY --- 1.14 5.94 0.017 0.023

>>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED
FOR THIS PASS. NEW TOP OF DAM ELEVATION = 92.10.

ROUTED BTM WIDTH MAX ELEV VOL-MAX AREA-MAX AUX.HP VOL-AUX.
RESULTS FT FT ACFT AC FT ACFT
MINIMUM AUX. 80.0 92.10 110.7 17.8 2.73 42.2

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGES = 32.8 987.3 1020.1

CRITICAL CRITICAL CRITICAL 25% OF Q
DEPTH VELOCITY SLOPE-Sc Sc
AUXILIARY FT FT/SEC FT/FT FT/FT
SPILLWAY --- 1.64 7.07 0.016 0.021

INFLOW HYD 1 PSH-PEAK = 29.93 CFS AT 22.18 HRS, LOCATION POINT

INFLOW HYD 1 SDH-PEAK = 581.61 CFS AT 15.53 HRS, LOCATION POINT

INFLOW HYD 1 FBH-PEAK = 447.59 CFS AT 15.53 HRS, LOCATION POINT
HYDOUT 1

1SITES.....JOB NO. 1 COMPLETE.

McGowan Dam

0 SUBWATERSHED(S) ANALYZED.

1 STRUCTURE(S) ANALYZED.

3 HYDROGRAPHS ROUTED AT LOWEST SITE.

0 TRIALS TO OBTAIN BOTTOM WIDTH FOR SPECIFIED STRESS OR VELOCITY.

SITES.....COMPUTATIONS COMPLETE

>>> SITE SUBWS SUBWS DA CURVE TC TOTAL DA TYPE STRUC <<<
 ID ID (SQ MI) NO. (HRS) (SQ MI) DESIGN CLASS

S 1 A 2.25 75. 4.28 2.25 378CR A1

PASS DIA./ AUX.CREST BTM. MAX. MAX. EMB. INTEGR.* EXIT* TYPE
 NO. WIDTH ELEV WIDTH HP ELEV VOL. DIST. VEL. HYD
 (IN/FT) (FT) (FT) (FT) (FT) (CY) (FT) (FT/SEC)

1 18.0 89.4 80.0 2.7 92.1 0. 0. 5.4 MIN. AUX.

* INTEGRITY DIST. AND EXIT VEL. ARE BASED ON THE ROUTED HYDROGRAPH
 AND WILL NOT RELATE TO THE MAX. ELEV. (TOP OF DAM),
 WHICH IS SET BY MINIMUM DESIGN CRITERIA.

SITES.....SUMMARY TABLE 1 COMPLETED.

NRCS SITES VERSION 2000 ,05/01/2000
 FILES

INPUT

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2.D2C

OUTPUT - DATED 09/10/2004 09:02:21

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2.OUT

GRAPHICS FILES GENERATED

OPTION "L" DATED 09/10/2004 09:02:21

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2.DRG

OPTION "P" DATED 09/10/2004 09:02:21

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2.DHY

OPTION "E" DATED 09/10/2004 09:02:21

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2.DEM

1*****
 SITES XEQ 09/10/2004 WATER RESOURCE SITE ANALYSIS COMPUTER PROGRAM
 VER 2000 (USER MANUAL - DATED MAY 2001)
 TIME 09:03:35

***** 80-80 LIST OF INPUT DATA *****

SITES 05/01/2000 McGowan Dam 2.2484375 H4

SAVMOV 0 101

SAVMOV 101 1 1

* Principle Spillway @ 86

* 2 year storm through principle

* 50 year storm through emergency

STRUCTURE

76	.0011
77	.2848
78	.8729
79	1.2966
80	1.9516
81	2.5907
82	3.4956
83	4.6378
84	5.8050
85	6.8812
86	8.3255
87	9.7881
88	11.2547
89	12.7294
90	14.2199
91	15.7949
92	17.5497
93	19.6682
94	21.8302

ENDTABLE

WSDATA 5A1 AC 75 1439 23817 3.3

PDIRECT 4.90 4.90

POOLDATA ELEV 86 86 75.7 74.7 HD

PSHOOD 100 20 76 75 1 1 B

PSDATA 1 18 .009 75.7

ASDATA 41 300 125 3 .01 2

ASCREST ELEV 89.4

ASINSURF 41 4.4 5.6 DC

ASINLET 41 0.0 0.0 25 0.0 3

125 1.5

ENDTABLE

ASEXSURF 41 .035

.67 0

2

2 0

.01

ENDTABLE

ASEXIT 41 N 100

BTMWIDTH FEET 80

GRAPHICS I

GO,DESIGN HL TYPE2 24 TYPE2378 24

SAVMOV 2 101 1

ENDJOB

1SITES XEQ 09/10/2004 ----- COMMENT PAGE -----
VER 2000 McGowan Dam WSID =

Principle Spillway @ 86

2 year storm through principle

50 year storm through emergency

**** MESSAGE - ALTERNATE STRUCTURE ID (S 1) BEING USED
SINCE USER DID NOT INPUT AN ID.

**** MESSAGE - ALTERNATE SUBWATERSHED ID (A) BEING USED SINCE
USER DID NOT INPUT AN ID.

**** MESSAGE - DRAINAGE AREA FROM WSDATA CONTROL BEING CONVERTED FROM
ACRES TO SQUARE MILES FOR COMPUTATION PURPOSES.

1SITES -----
XEQ 09/10/2004 McGowan Dam WSID=
VER 2000 SUBW= A
TIME 09:03:35 SITE = S 1 PASS= 1 PART= 1

***** BASIC DATA *****
CLIMATE AREA - NOT DEFINED DESIGN CLASS A1 = LT 3000.

STORM DISTRIBUTION-PSH 24 HOUR TYPE II RAINFALL DISTRIBUTION

STORM DISTRIBUTION AUX. -24 HOUR TYPE II RAINFALL DISTRIBUTION

PRECIP. - Q-PS,1-DAY Q-PS,10-DAY P-SD P-FB
0.00 0.00 4.90 4.90

WSDATA - CN DA-SM TC/L -/H QRF
75.00 2.25 23817.00 3.30 0.00

SITEDATA- PERM POOL CREST PS FP SED VALLEY FL 378?
86.00 86.00 0.00 74.70 YES

BASEFLOW INITIAL EL EXTRA VOL SITE TYPE
0.00 0.00 0.00 DESIGN

PSDATA - NO. COND COND L DIA/W -/H
1.00 0.00 18.00 0.00

PS N KE WEIR L TW EL
0.009 0.00 0.00 75.70

2ND STG ORF H ORF L START AUX.

0.00	0.00	0.00	0.00		
PSHOOD -	OUTLET	MITER	LENGTH	LENGTH	
ELEV.	ELEV.	INLET TO	MITER TO		
		MITER(FT)	OUTLET(FT)		
75.00	76.00	100.0	20.0		
ASCRESTS -	AUX.1	AUX.2	AUX.3	AUX.4	AUX.5
89.40	0.00	0.00	0.00	0.00	
AUX.DATA -	REF.NO.	RETARD. Ci	TIE STATION	INLET LENGTH	
41	0.00	300.00	125		
AUX.DATA -	INLET Ci	SIDE SLOPE	EXIT N	EXIT SLOPE	ACTUAL AUX?
4.400	3.00	0.035	0.010	NO	
BTM WIDTH -	BW1	BW2	BW3	BW4	BW5
ft 80.00	0.00	0.00	0.00	0.00	

AUXILIARY SPILLWAY RATING DEVELOPED USING WSPVRT.

1SITES -----
 XEQ 09/10/2004 McGowan Dam WSID=
 VER 2000 SUBW= A
 TIME 09:03:35 SITE = S 1 PASS= 1 PART= 2

PERM POOL	86.00 FT	32.0 ACFT	8.33 AC	0.0 CFS
CREST PS	86.00 FT	32.0 ACFT	8.33 AC	0.0 CFS
SED ACCUM	86.00 FT	32.0 ACFT	8.33 AC	0.0 CFS
START ELEV	86.00 FT	32.0 ACFT	8.33 AC	0.0 CFS

1SITES -----
 XEQ 09/10/2004 McGowan Dam WSID=
 VER 2000 SUBW= A
 TIME 09:03:35 SITE = S 1 PASS= 1 PART= 3

AUX. CREST	89.40 FT	68.8 ACFT	13.33 AC	30.0 CFS
------------	----------	-----------	----------	----------

PS STORAGE 36.8 ACFT, BETWEEN AUX. CREST AND SED. ACCUM ELEVATIONS.

START ELEV	86.00 FT	32.0 ACFT	8.33 AC	0.0 CFS
------------	----------	-----------	---------	---------

EFFECTIVE HEIGHT(H)= 13.7 FEET, PRODUCT= 942. (H * STORAGE AT CREST AUX.).

INPUT DESIGN CLASS = A1 = LT 3000. PRODUCT.

NRCS-SDH	D= 24.00 HR	P= 4.90 IN	Q= 2.37 IN	DA= 2.25 SM
	TC= 4.28 HR	CN= 75.00	VOL= 284.0 ACFT	

50yr - 24hr.

PEAK = 627.5 CFS, AT 14.8 HRS.

NRCS-FBH D= 24.00 HR P= 4.90 IN Q= 2.37 IN DA= 2.25 SM
TC= 4.28 HR CN= 75.00 VOL= 284.0 ACFT

PEAK = 627.5 CFS, AT 14.8 HRS.

RATING TABLE DEVELOPED, SITE = S 1:
BY PROGRAM FOR PS AND AUX. SPILLWAYS
AUX. RATING USED WSPVRT METHOD.

RATING TABLE NUMBER 2

	ELEV. FEET	Q-TOTAL CFS	Q-PS CFS	Q-AUX. CFS	VOLUME AC-FT	AREA ACRE
1	86.00	0.00	0.00	0.00	31.98	8.33
2	86.28	0.27	0.27	0.00	34.37	8.74
3	86.56	1.12	1.12	0.00	36.88	9.15
4	86.84	2.53	2.53	0.00	39.50	9.56
5	87.12	4.42	4.42	0.00	42.23	9.97
6	87.40	6.48	6.48	0.00	45.08	10.38
7	87.68	7.85	7.85	0.00	48.05	10.79
FULL CONDUIT FLOW, ELEV = 87.96 FT						
8	87.96	28.34	28.34	0.00	51.12	11.20
9	88.25	28.68	28.68	0.00	54.40	11.62
10	88.54	29.01	29.01	0.00	57.81	12.05
11	88.82	29.33	29.33	0.00	61.34	12.47
12	89.11	29.65	29.65	0.00	64.99	12.90
13	89.40	29.97	29.97	0.00	68.76	13.33
14	89.63	37.50	30.22	7.28	71.87	13.67
15	89.86	45.02	30.47	14.55	75.05	14.01
16	90.27	129.36	30.91	98.44	80.98	14.65
17	90.78	306.01	31.45	274.56	88.60	15.45
18	91.70	771.06	32.40	738.67	103.52	17.02
19	92.85	1521.77	33.54	1488.22	124.39	19.35
20	94.00	2460.85	34.65	2426.20	148.06	21.83

SUMMARY OF AUXILIARY SPILLWAY SURFACE CONDITIONS USED IN COMPUTATIONS BY REACH

REACH	FROM STA (ft)	TO STA (ft)	SLOPE (%)	RETARDANCE CURVE INDEX@	VEGETAL COVER FACTOR	MAINT. CODE (ft)	ROOTING DEPTH *	REACH
-------	---------------------	-------------------	--------------	-------------------------------	----------------------------	------------------------	-----------------------	-------

1	175.	275.	-1.5	4.4	**	**	**	INLET
2	275.	300.	0.0	4.4	**	**	**	CREST
3	300.	400.	1.0	0.035	0.67	2	2.0	EXIT !

@ The program interprets retardance curve index entries of less than 1 as Manning's n values.

* Upper case indicates a reach of constructed spillway channel.

** The program does not use vegetal cover factor, maintenance code, and rooting depth for inlet and crest reaches in computations.

! Reach 3 used in computing exit channel velocities.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.-HP FT	VOL-AUX. ACFT
NRCS-SDH	80.0	91.34	97.4	16.4	1.94	28.7

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGE = 32.0 549.7 581.7

good

	CRITICAL DEPTH	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
AUXILIARY SPILLWAY ---	1.12	5.89	0.018	0.024

AUXILIARY SPILLWAY DURATION FLOW = 17.0 HOURS

***** MESSAGE - NHCP378 CRITERIA USED BUT AUXILIARY SPILLWAY RATING NOT BASED ON ASFILE RATINGS.

EXIT CHANNEL FLOW SUBCRITICAL: MAX VELOCITY= 4.9 FT/SEC
EXIT SLOPE = 0.010 FT/FT
FLOW DEPTH = 1.3 FT

great

EFFECTIVE STRESS FOR STABILITY ANALYSIS OF AUX. EXIT CHANNEL
(Refer to Ag. Handbook 667, Chapt. 3, for allowable stresses.)
Aux. Discharge = 550. cfs; Bottom Width = 80. ft

NO.	STA	TO STA	%	n	ft/s	lb/ft^2
3	300.	400.	1.00	0.035	4.95	0.164

DRAWDOWN USING FREEBOARD STORM FOLLOWS, STARTING AT ELEVATION 89.40 FT.

DRAWDOWN (DDT) TEST 86.00 FT 32.0 ACFT 0.00 CFS
CONTROL IS 0.000 DETENTION STORAGE

TIME LIMIT REACHED = 10.00 DAYS; FLOW WAS 0.08 CFS, ELEV = 86.08
ROUTING CONTINUING.

ROUTED RESULTS	BTM WIDTH FT	MAX ELEV FT	VOL-MAX ACFT	AREA-MAX AC	AUX.-HP FT	VOL-AUX. ACFT
NRCS-FBH	80.0	91.34	97.5	16.4	1.94	28.7

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGE = 32.0 550.0 582.0

	CRITICAL DEPTH	CRITICAL VELOCITY FT/SEC	CRITICAL SLOPE-Sc FT/FT	25% OF Q Sc FT/FT
AUXILIARY SPILLWAY ---	1.12	5.89	0.018	0.024

AUXILIARY SPILLWAY DURATION FLOW = 17.0 HOURS
ATTACK, OE/B = 2.5 ACFT/FT

***** MESSAGE - NHCP378 CRITERIA USED BUT AUXILIARY SPILLWAY RATING NOT
BASED ON ASFILE RATINGS.

EXIT CHANNEL FLOW SUBCRITICAL: MAX VELOCITY= 4.9 FT/SEC
EXIT SLOPE = 0.010 FT/FT
FLOW DEPTH = 1.3 FT

>>>> NHCP378 RUN - MINIMUM DEPTH, CREST AUX. TO TOP OF DAM IS 2.00 FT.
NEW TOP OF DAM ELEVATION = 91.40.

ROUTED	BTM	WIDTH	MAX	ELEV	VOL-MAX	AREA-MAX	AUX.HP	VOL-AUX.
RESULTS	FT	FT	ACFT	AC	FT	ACFT		
MINIMUM AUX.	80.0	91.40	98.7	16.5	2.01	29.9		

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGES = 32.1 587.3 619.4

	CRITICAL	CRITICAL	CRITICAL	25% OF Q
	DEPTH	VELOCITY	SLOPE-Sc	Sc
AUXILIARY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY ---	1.17	6.01	0.017	0.023

>>>> NHCP378 RUN - MINIMUM DEPTH, DESIGN FLOW TO TOP OF DAM; 1.00 FT REQUIRED
FOR THIS PASS. NEW TOP OF DAM ELEVATION = 92.34.

ROUTED	BTM	WIDTH	MAX	ELEV	VOL-MAX	AREA-MAX	AUX.HP	VOL-AUX.
RESULTS	FT	FT	ACFT	AC	FT	ACFT		
MINIMUM AUX.	80.0	92.34	115.1	18.3	2.96	46.3		

PEAK - CFS Q-PS Q-AUX. Q-TOT.
DISCHARGES = 33.0 1153.7 1186.7

	CRITICAL	CRITICAL	CRITICAL	25% OF Q
	DEPTH	VELOCITY	SLOPE-Sc	Sc
AUXILIARY	FT	FT/SEC	FT/FT	FT/FT
SPILLWAY ---	1.82	7.42	0.015	0.020

INFLOW HYD 1 SDH-PEAK = 581.69 CFS AT 15.53 HRS, LOCATION POINT

INFLOW HYD 1 FBH-PEAK = 581.97 CFS AT 15.53 HRS, LOCATION POINT
HYDOUT 1

1SITES.....JOB NO. 1 COMPLETE.

McGowan Dam

0 SUBWATERSHED(S) ANALYZED.

1 STRUCTURE(S) ANALYZED.

2 HYDROGRAPHS ROUTED AT LOWEST SITE.

0 TRIALS TO OBTAIN BOTTOM WIDTH FOR SPECIFIED STRESS OR VELOCITY.

SITES.....COMPUTATIONS COMPLETE

```
>>> SITE SUBWS SUBWS DA CURVE TC TOTAL DA TYPE STRUC <<<
      ID  ID  (SQ MI) NO. (HRS) (SQ MI) DESIGN CLASS
      ---  ---  ---  ---  ---  ---  ---
      S 1  A    2.25  75. 4.28  2.25 378NR  A1
```

```
PASS DIA./ AUX.CREST BTM. MAX. MAX. EMB. INTEGR.* EXIT* TYPE
NO. WIDTH ELEV WIDTH HP ELEV VOL. DIST. VEL. HYD
  (IN/FT) (FT)  (FT) (FT) (FT) (CY) (FT) (FT/SEC)
  ---  ---  ---  ---  ---  ---  ---  ---
  1 18.0  89.4  80.0  2.9  92.3   0.   0.   4.9 MIN. AUX.
```

* INTEGRITY DIST. AND EXIT VEL. ARE BASED ON THE ROUTED HYDROGRAPH
AND WILL NOT RELATE TO THE MAX. ELEV. (TOP OF DAM),
WHICH IS SET BY MINIMUM DESIGN CRITERIA.

SITES.....SUMMARY TABLE 1 COMPLETED.

NRCS SITES VERSION 2000 ,05/01/2000
FILES

INPUT

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2em.D2C

OUTPUT - DATED 09/10/2004 09:03:35

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2em.OUT

GRAPHICS FILES GENERATED

OPTION "L" DATED 09/10/2004 09:03:35

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2em.DRG

OPTION "P" DATED 09/10/2004 09:03:35

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2em.DHY

OPTION "E" DATED 09/10/2004 09:03:35

C:\home\angela.roman\SITES\McQuistonWest\McGowan18hood2em.DEM

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
SOUTH DAKOTA

**OPERATION AND MAINTENANCE PLAN
POND
CODE 378**

Landowner/Operator Frank McGowan

Job Location SW ¼, NW ¼, Sec 18 Twn 107N, R65W

Prepared by Angela Roman

Date _____

Operation and Maintenance Items

A properly operated and maintained Pond is an asset to your farm. This structure was designed and installed to provide storage to runoff water for beneficial use. The estimated life span of this installation is at least 20-35 years. The life of this installation can be assured and usually increased by developing and carrying out an effective operation and maintenance program. Here are some recommendations for effective operation and maintenance:

- ☐ Inspect the pond after the first significant rainfall and again after each rain until the pond is filled to the inlet elevation.
- ☐ Avoid using vegetated spillways as a travel lane for vehicles and/or farm machinery.
- ☐ Excessive erosion, settlement and/or cracks in earthen sections must be investigated (to determine the cause) and repaired.
- ☐ Periodically inspect spillways and control gates, valves and weirs for proper functioning and their ability to maintain the water level to design elevations. Remove debris or flow blockages.
- ☐ Inspect metal surfaces for rust and other damage. Especially inspect sections in contact with earthfill and/or other materials. Repair or replace damaged sections and apply a protective covering.
- ☐ Inspect concrete for accelerated weathering, spalling, settlement, misalignment or cracks. Repair defects.
- ☐ Inspect rock riprap for accelerated weathering and displacement. Repair to original grades if necessary.
- ☐ Check for unusual seepage on the backside of the dam. Check for water flowing underneath the pipe at the outlet, water flowing in the inlet but not out the outlet, and for water flowing out the outlet but not in the inlet. Make sure all structure drains are functional and soil is not being transported through the drainage system. Screens and/or rodent guards must be maintained and in place.
- ☐ Repair any rodent, burrowing animal, vandalism, vehicle, or livestock damage.
- ☐ Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization, and application of herbicides when necessary. Periodic mowing or short term grazing may also be needed.
- ☐ If fences are installed, they must be maintained to prevent unauthorized entry.

Other _____

Date 9-29-04

Hole No. 1

Gettys-Peno

CL of Dam

Notes: Very small amount of sand mixed with clay at 6

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Group	
-------	--

Z

United Symbols and Group Names		Agricultural Waste Management Field Handbook, Chapter 10					
		Table 10D-3 (1161 test results)		Table 10D-2			
		Soil Group	Median K, cm/s	Median K, ft/d	Unified Class	Perm Group I II III IV	In Perm Group
GW = Well graded gravel, gravel-sand mix, few fines							
GP = Poorly graded gravel, gravel-sand mix, few fines							
GC = Clayey gravel, gravel-sand-clay mix							
GM = Silty gravel, gravel-sand-silt mix							
SW = Well graded sand, gravelly sand with few fines		I	7.2x10-4	2.0	CH	N N S U	A=Always
SP = Poorly graded sand, gravelly sand with few fines		I	3.5x10-4	1.0	MH	N S U S	
SC = Clayey sand, sand-clay mix					CL	N S U S	N=Never
SM = Silty sand, sand-silt mix					ML	N U S N	
CL = Lean inorganic clay, low to medium plastic LL < 50		II	4.8x10-6	0.014	CL-ML	N A N N	
CH = Fat inorganic clay, gravelly/sandy/silty clay LL > 50		II	1.5x10-6	0.004	GC	N S U S	S=Sometimes
CL-ML = Silty Clay					GM	N S U S	
OL = Organic silts and organic silty clays, low plasticity		III	8.8x10-7	0.0025	GW	A N N S	U=Usually
OH = Organic silt/clay, medium to high plasticity		III	2.1x10-7	0.0006	SM	S S S S	
ML = Inorganic silt, very fine sand, low plastic LL < 50		IV	4.9x10-7	0.0014	SC	N N U S	
MH = Inorganic silt, fine sand or silty soils LL > 50		IV	3.5x10-8	0.0001	SW	A N N N	
					SP	A N N N	
					GP	A N N N	

SD-ENG-13 Page 1 of 5
REV. 07/02

Date 9-29-04

Hole No. 2Soil Name Gettys-Peno

Drilling Location CL of Dam

Notes:

Location In Section (x)

Z

Unified Symbols and Group Names	Agricultural Waste Management Field Handbook, Chapter 10					
	Table 10D-3 (1161 test results)				Table 10D-2	
	Soil Group	Median K, cm/s	Median K, ft/d	Unified Class	Perm Group I II III IV	In Perm Group
GW = Well graded gravel, gravel-sand mix, few fines				CH	N S U	
GP = Poorly graded gravel, gravel-sand mix, few fines				MH	N S U S	A=Always
GC = Clayey gravel, gravel-sand-clay mix				CL	N S U S	
GM = Silty gravel, gravel-sand-silt mix				ML	N U S N	N=Never
SW = Well graded sand, gravely sand with few fines	I	7.2x10-4	2.0		N A N N	
SP = Poorly graded sand, gravely sand with few fines	I	3.5x10-4	1.0		N S U S	
SC = Clayey sand, sand-clay mix	II	4.8x10-6	0.014	CL-ML	N A N N	
SM = Silty sand, sand-silt mix	II	1.5x10-6	0.004	GC	N S U S	S=Sometimes
CL = Lean inorganic clay, low to medium plastic LL < 50	III	8.8x10-7	0.0025	GM	S U S S	
CH = Fat inorganic clay, gravelly/sandy/silty clay LL > 50	III	2.1x10-7	0.0006	GW	A S N N	U=Usually
CL-ML = Silty Clay	III			SM	S S S S	
OL = Organic silts and organic silty clays, low plasticity	IV	4.9x10-7	0.0014	SW	A N N N	
OH = Organic silt/clay, medium to high plasticity	IV	3.5x10-8	0.0001	SP	A N N N	
ML = Inorganic silt, very fine sand, low plastic LL < 50				GP	A N N N	
MH = Inorganic silt, fine sand or silty soils LL > 50						

Z

Date 9-29-04

Hole No. 3

Soil Name Gettys-Peno

Drilling Location	CL of Dam
1	100
2	100
3	100
4	100
5	100
6	100
7	100
8	100
9	100
10	100
11	100
12	100
13	100
14	100
15	100
16	100
17	100
18	100
19	100
20	100
21	100
22	100
23	100
24	100
25	100
26	100
27	100
28	100
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98	100
99	100
100	100

Notes:

Unified Symbols and Group Names		Agricultural Waste Management Field Handbook, Chapter 10				
	Table 10D-3 (1161 test results)		Table 10D-2			In Perm Group
	Soil Group	Median K, cm/s	Median K, ft/d	Unified Class	Perm Group I II III IV	
GW = Well graded gravel, gravel-sand mix, few fines						
GP = Poorly graded gravel, gravel-sand mix, few fines						
GC = Clayey gravel, gravel-sand-clay mix						
GM = Silty gravel, gravel-sand-silt mix						
SW = Well graded sand, gravelly sand with few fines	I	7.2x10-4	2.0	CH	N S U	A=Always
SP = Poorly graded sand, gravelly sand with few fines	I	3.5x10-4	1.0	MH	N S U S	
SC = Clayey sand, sand-clay mix				CL	N U S N	N=Never
SM = Silty sand, sand-silt mix				ML	N A N S	
CL = Lean inorganic clay, low to medium plastic LL < 50	II	4.8x10-6	0.014	CL-ML	N A N N	
CH = Fat inorganic clay, gravelly/sandy/silty clay LL > 50	II	1.5x10-6	0.004	GC	N S U S	S=Sometimes
CL-ML = Silty Clay				GM	S U S S	
OL = Organic silts and organic silty clays, low plasticity	III	8.8x10-7	0.0025	GW	A N N N	U=Usually
OH = Organic silt/clay, medium to high plasticity	III	2.1x10-7	0.0006	SM	S S S S	
ML = Inorganic silt, very fine sand, low plastic LL < 50	IV	4.9x10-7	0.0014	SC	N N U S	
MH = Inorganic silt, fine sand or silty soils LL > 50	IV	3.5x10-8	0.0001	SW	A N N N	
				SP	A N N N	
				GP	A N N N	

EARTHWORK COMPUTATION BALANCE SHEET

State: South Dakota

By: Angela Roman, EIT

Project: Frank McGowan

Date: 9/10/2004

Checked By:

Date:

Subject: EARTHWORK ESTIMATES

	Layer	Quantity	Units	
EXCAVATION -	Emergency Core Trench	4,586.0 c.y.		
		398.0 c.y.		
		4,984.0 c.y.		

	Layer	Quantity	Units	
EARTHFILL -	Pond Dike Core	10,284.0 c.y.		
		153.0 c.y.		
		398.0 c.y.		
		10,835.0 c.y.		

EARTHWORK BALANCE: (Assuming 30% Shrinkage)

EARTHFILL	10,835.0 c.y.	
requires -	14,085.5 c.y.	@ 30% Shrinkage
EXCAVATION	4,984.0 c.y.	
BALANCE -	9,101.5 c.y.	Borrow Needed

Trimble
5475 Kellenburger Road
Dayton, Ohio 45424-1099, USA
1-937-233-8921
Wednesday, September 08, 2004 9:01:56 AM

PROJECT: C:\home\angela.roman\Dams\McGowan\Frank McGowan.pro

DTM TO DTM VOLUME

Cut and Fill Volumes

Shrinkage/swell factors:	Cut	1.0000	Fill	1.0000
Original DTM Layer Name	# of Points	Final DTM Layer Name	# of Points	
POINTS	707	NEW SPILLWAY	124	
Cut Volume (Cu. Yd.)	Cumulative Cut Volume	Fill Volume (Cu. Yd.)	Cumulative Fill Volume	
4,585.8	4,585.8	0.0	0.0	

Net Difference: 4585.8 Cu. Yd. WASTE

Area = 30,027.48 sq. ft.

Trimble
5475 Kellenburger Road
Dayton, Ohio 45424-1099, USA
1-937-233-8921
Tuesday, October 12, 2004 10:52:23 AM

PROJECT: C:\home\angela.roman\Dams\McGowan\Frank McGowan.pro

DTM TO DTM VOLUME

Cut and Fill Volumes

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	# of Points	Final DTM Layer Name	# of Points
POINTS	707	DAM	89
Cut Volume (Cu. Yd.)	Cumulative Cut Volume	Fill Volume (Cu. Yd.)	Cumulative Fill Volume
0.0	0.0	10,611.7	10,611.7

Net Difference: 10611.7 Cu. Yd. BORROW

Trimble
5475 Kellenburger Road
Dayton, Ohio 45424-1099, USA
1-937-233-8921
Wednesday, September 08, 2004 9:22:44 AM

PROJECT: C:\home\angela.roman\Dams\McGowan\Frank McGowan.pro

DTM TO DTM VOLUME

Cut and Fill Volumes

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	# of Points	Final DTM Layer Name	# of Points
MERGE	677	DIKE	23
Cut Volume (Cu. Yd.)	Cumulative Cut Volume	Fill Volume (Cu. Yd.)	Cumulative Fill Volume
0.2	0.2	152.2	152.2

Net Difference: 152.1 Cu. Yd. BORROW

Area: 2081.59 sq. ft.

STATE <u>SD</u>		PROJECT		
BY <u>ARoman</u>	DATE <u>9/10/04</u>	CHECKED BY	DATE	JOB NO.
SUBJECT <u>Core Trench</u>				SHEET _____ OF _____

Core Trench $1.13 \frac{1}{10} / 1:1$

$$\text{length} = \left[447' \times \left(\frac{10 + 3 + 3}{2} \right) \times 3 \right] \div 27 = 397.3 \approx \underline{\underline{398 \text{ CY}}}$$

DRAINAGE DIAPHRAGM LOCATOR

McGowan

Data Input	
Elev. Invert	86
Pipe slope (ft/ft)	0.11
Top of Fill	92.4
SS ratio	3
Dist from invert to ds edge top dam	32
pipe diam (ft)	1.5
dist from pipe CL to top diaphragm	3.75
Diaphragm thickness (ft)	2

(This solver button doesn't work

X (max dist from invert to U/S diaph.) 41

(PLAY WITH THIS UNTIL b16 AND b17
ARE EQUAL)

theta 18.43495

1/2 of top of fill to top Diaphragm 3.26

0.976233

perp dist from to diaph to backslope 3.339365 Adjust X so that these are equal

Elevation of top of Diaphragm 85.88

Data Input	
Pipe Size (in)	18
Corrugation depth (in)	1
Outside Diameter	20
Req. Projection	3.333333
Total Width	8.333333
use	11
volume	363

13.44444 cu.yds

Annual Yield and Sediment Storage

Project: Frank McGowan Dam

Calculations By: Angela Roman

Checked By:

*****Annual Surface Yield*****

Input Data

Isogram # = 2 1/2

Curve Number = 78

Contributing Acres = 1439

% chance = 50

runoff= 0.65 inches

$$\frac{\text{Contributing Acres} * \text{Inches of Runoff}}{12} = 77.9 \text{ ACFT}$$

$$\text{Storage at Principal Spillway} = 32.0 \text{ ACFT}$$

*****Sediment Yield*****

Input Data

Erodibility Area = H

Gross Rate = 0.0011 25%-50% Cultivated

Drainage Area = 1439

Delivery Rate = 18

Design Life = 20

$$\text{Gross Rate} * \text{Drainage Area} * \text{Delivery Rate} * \text{Years} = 5.7 \text{ ACFT}$$

$$\text{Available Sediment Storage} = \text{####} \text{ years}$$

REF:

EFM 2-83 Method A

Prepared By Angela Roman, Pierre FSO

9/21/04

9/21/2004

McGowan Family Farming Partnership
Pond

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY	"AS BUILT" QUANTITY
Excavation (core trench)	cu. yd.	398	
Earth Fill Class S	cu. yd.	10,612	
Topsoil	sq. yd.	3,337	
Seeding	acre	1.8	
18" dia. Corrugated dual wall PE Pipe	lin. ft.	91	
4" PVC Perforated Pipe (SCH 40 min)	lin. ft.	10	
4" PVC NON Perforated Pipe (SCH 40 min)	lin. ft.	45	
Fine Drain Fill	cu. yd.	6	
Outlet Support	each	1	

Construction Specifications

Cleaning and Grubbing
SD-2
SD-4
SD-5
SD-7
SD-8
SD-9
SD-10
SD-55
SD-16
SD-28

Excavation
Earth Fill, Class S
SD-5
SD-7
SD-8
SD-9
SD-10
SD-55
SD-16
SD-28

Rock Riprap
SD-8
SD-9
SD-10
SD-55
SD-16
SD-28

Drain Fill and Filter
SD-8
SD-9
SD-10
SD-55
SD-16
SD-28

Salvaging and Spreading Topsoil
SD-8
SD-9
SD-10
SD-55
SD-16
SD-28

Plastic Pipe
SD-8
SD-9
SD-10
SD-55
SD-16
SD-28

Wood Fabrication and Installation
SD-8
SD-9
SD-10
SD-55
SD-16
SD-28

Seeding
SD-8
SD-9
SD-10
SD-55
SD-16
SD-28

Hydraulic Data

Drainage Area
1439 Acres

Time of Concentration
3.92 hours

Runoff Curve Number
78

Principal Spillway, 24-hr. Rainfall
2.3 inches

Emergency Spillway 24-hr. Rainfall
4.9 inches

Principal Spillway Discharge in ES
32 CFS

Emergency Spillway Discharge
588 CFS

Required Sediment Storage
5.7 AcFt

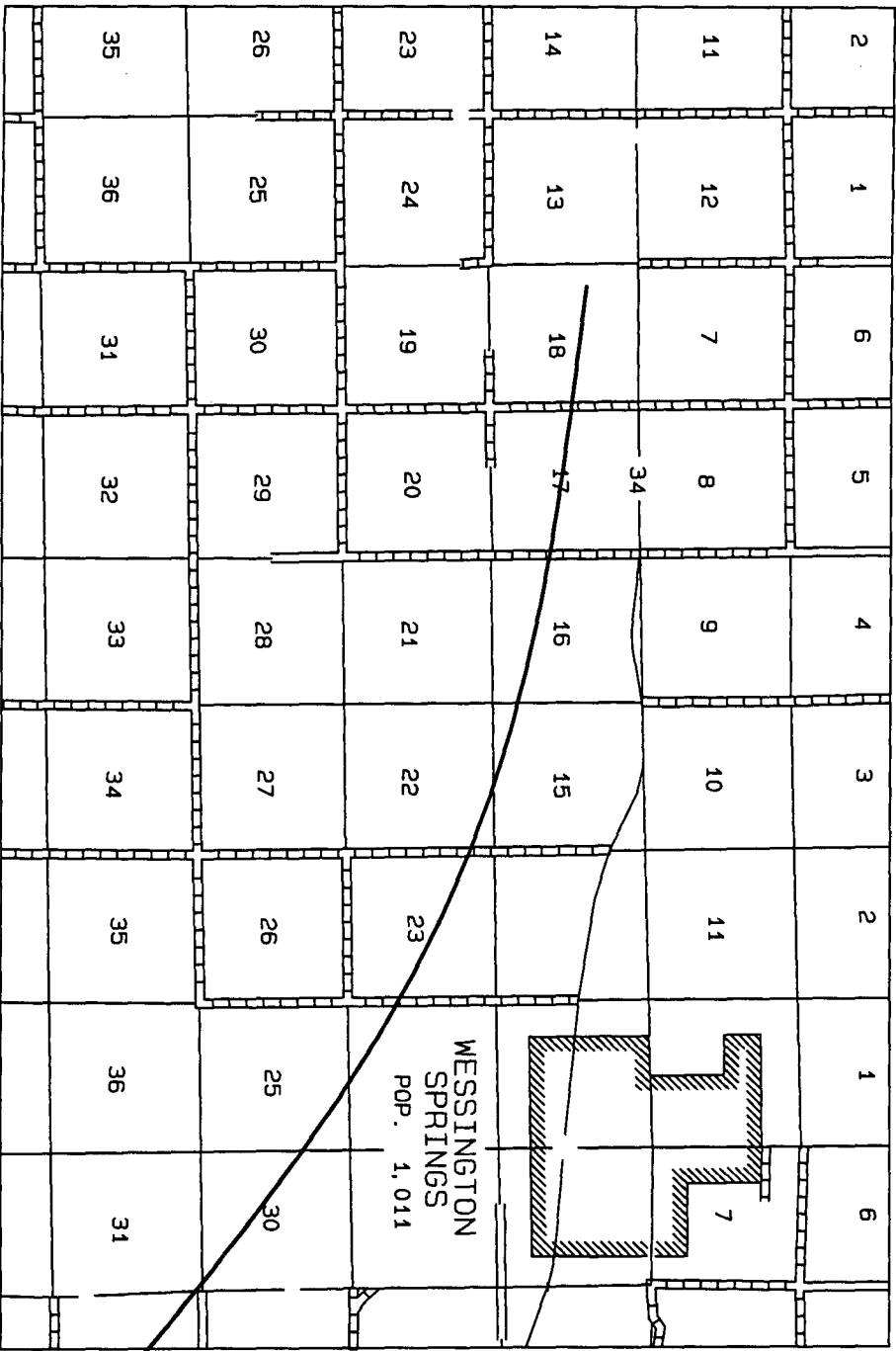
Sed. Storage Below Crest
5.7 AcFt

Sed. Storage Above Crest
0.0 AcFt

Crest of Normal Pool
8.3 Acres 32.0 AcFt

Crest of Emergency Spillway
13.3 Acres 68.8 AcFt

Top of Dam
18.3 Acres 115.1 AcFt



Notes

1. A preconstruction meeting is required before construction between NRCS, USFWS, and the contractor.
2. Water Rights Permit is required by the South Dakota Department of Environment and Natural Resources. This is the responsibility of the landowner.
3. During a runoff event, the existing crossing may be under water or in standing water while the pipe is functioning. This will be temporary.

Hazard Class A
Job Class IV

Project Location

- Sheet Index
- 1 Cover Sheet
 - 2 Plan Map
 - 3 Plan Details
 - 4 Profile of Dam
 - 5 Cross Sections
 - 6 Hood Inlet and Baffle
 - 7 Timber Pipe Support
 - 8 Sand Anti Seep Collar

RECEIVED
OCT 28 2004
WATER RIGHTS
PROGRAM



NATURAL RESOURCES
CONSERVATION SERVICE

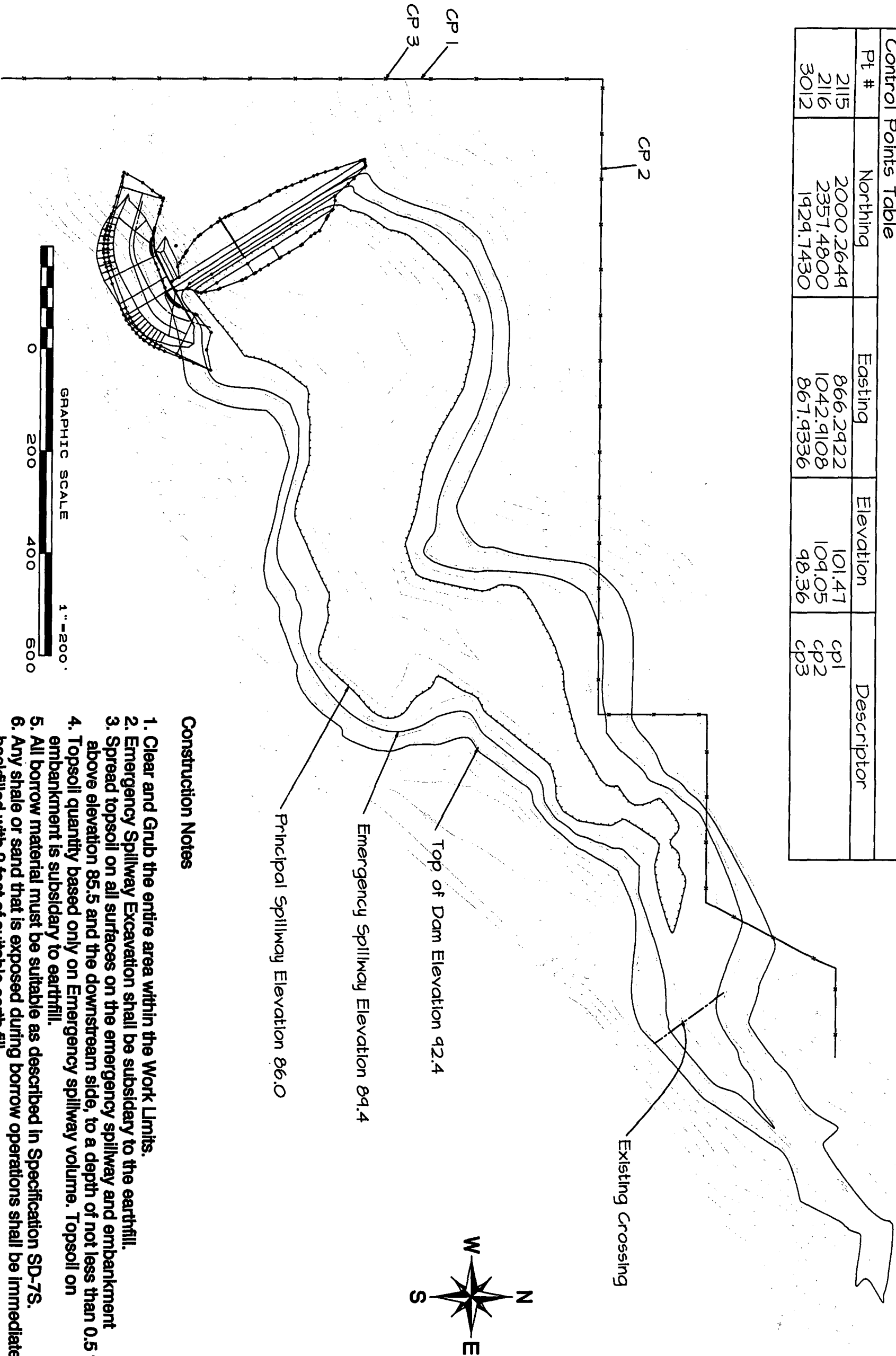
USDA-NRCS PIERRE FIELD SUPPORT OFFICE
314 South Henry Suite #300
PIERRE, SOUTH DAKOTA 57501-1258

Date: 9/8/04
Designed by: A. Roman
Drawn by: A. Roman
Traced by:
Checked by: D. Edwards 9/14/04

Approved by: [Signature]
Title: ASST. STATE ENG.
10/09

Frank McGowan
SW 1/4 NW 1/4 Section 18 T107N R65W
Jerauld County, South Dakota

Control Points Table				
Pt #	Northing	Easting	Elevation	Descriptor
2115	2000.2649	866.2922	101.47	cp1
2116	2357.4800	1042.9108	109.05	cp2
3012	1929.7430	867.9336	98.36	cp3



Construction Notes

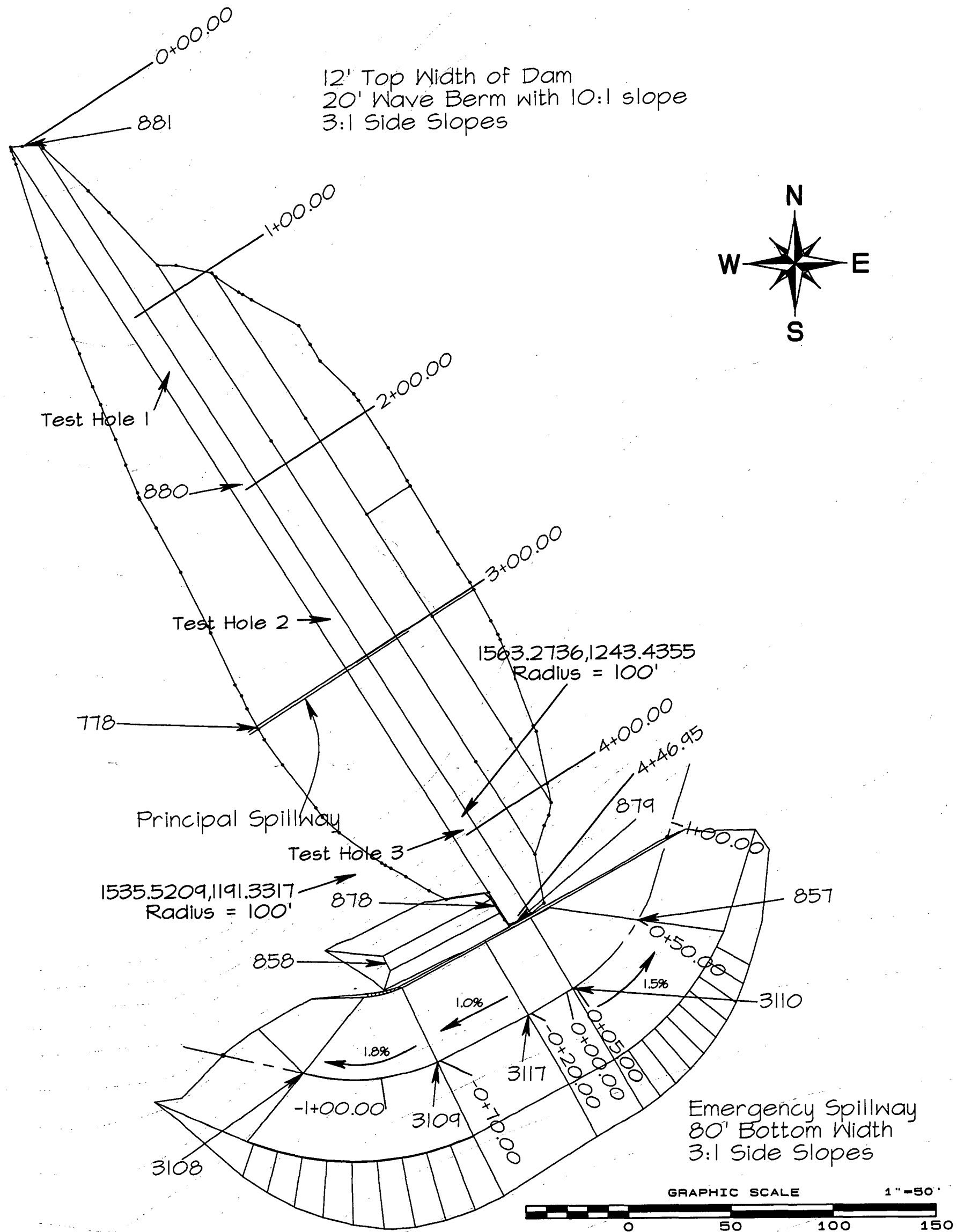
1. Clear and Grub the entire area within the Work Limits.
2. Emergency Spillway Excavation shall be subsidiary to the earthfill.
3. Spread topsoil on all surfaces on the emergency spillway and embankment above elevation 85.5 and the downstream side, to a depth of not less than 0.5 feet.
4. Topsoil quantity based only on Emergency spillway volume. Topsoil on embankment is subsidiary to earthfill.
5. All borrow material must be suitable as described in Specification SD-7S.
6. Any shale or sand that is exposed during borrow operations shall be immediately backfilled with 2 feet of suitable earth fill.

Approved by: _____
Title: _____
Title: _____

Date: 9/8/04
Designed by: A. Roman
Drawn by: A. Roman
Traced by: _____
Checked by: D. Edwards

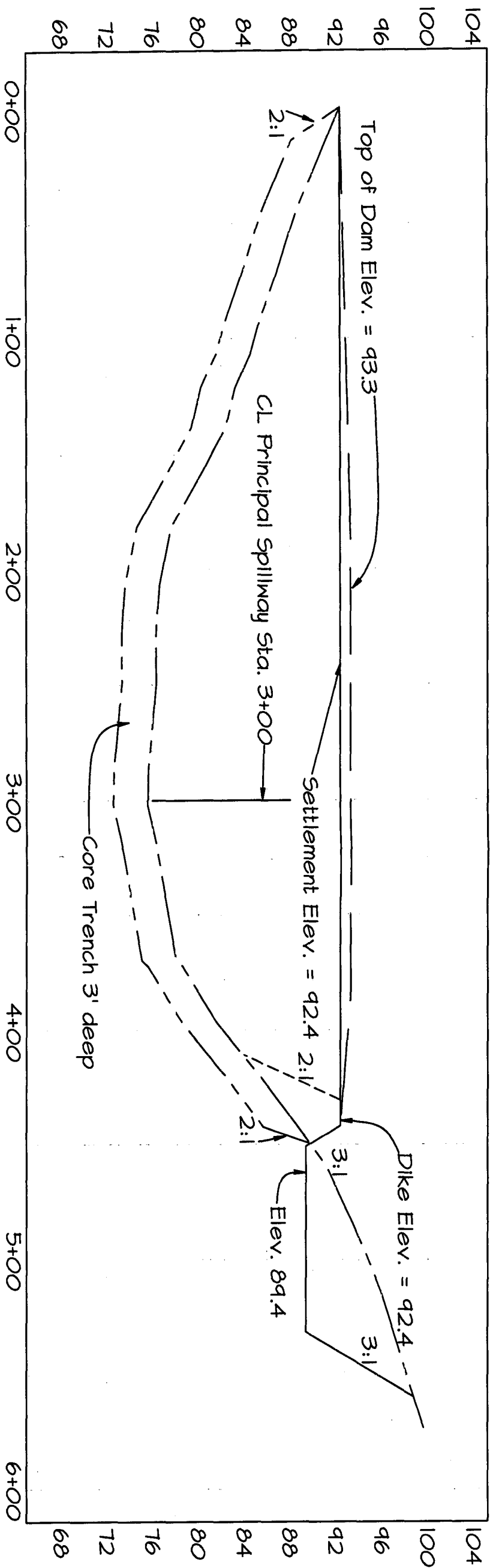
NATURAL RESOURCES CONSERVATION SERVICE
USDA-NRCS PIERRE FIELD SUPPORT OFFICE
314 South Henry Suite #300
PIERRE, SOUTH DAKOTA 57501-1258

Frank McGowan
SW 1/4 NW 1/4 Section 18 T107N R65W
Jerauld County, South Dakota



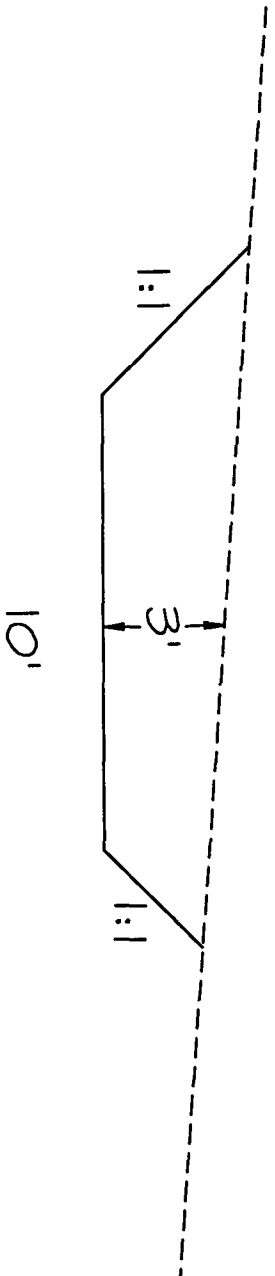
Coordinate Table					
Pt #	Northing	Easting	Elevation	Descriptor	
778	1607.4981	1143.7306	76.50	CL Pipe	
857	1512.2486	1329.4231	89.00	CL Spillway	
858	1491.9268	1206.6219	91.90	CL Dike	
878	1519.5065	1259.5565	92.40	CL Dike	
879	1514.7295	1270.7918	92.40	CL Dam	
880	1725.8529	1136.7401	92.40	CL Dam	
881	1892.0623	1031.2063	92.40	CL Dam	
3108	1438.8957	1165.9663	87.60	CL Spillway	
3109	1443.8692	1231.3313	88.90	CL Spillway	
3110	1479.1560	1297.5117	89.40	CL Spillway	
3117	1466.4858	1275.9600	89.40	CL Spillway	

Drawing: Frank McGowan Sheet No: 3 of 8	Frank McGowan SW 1/4 NW 1/4 Section 18 T107N R65W Jerauld County, South Dakota	NATURAL RESOURCES CONSERVATION SERVICE USDA-NRCS PIERRE FIELD SUPPORT OFFICE 314 South Henry Suite #300 PIERRE, SOUTH DAKOTA 57501-1258	Date: 9/8/04 Designed by: A. Roman Drawn by: A. Roman Traced by: D. Edwards Checked by: D. Edwards	Approved by: _____ Title: _____ Title: _____
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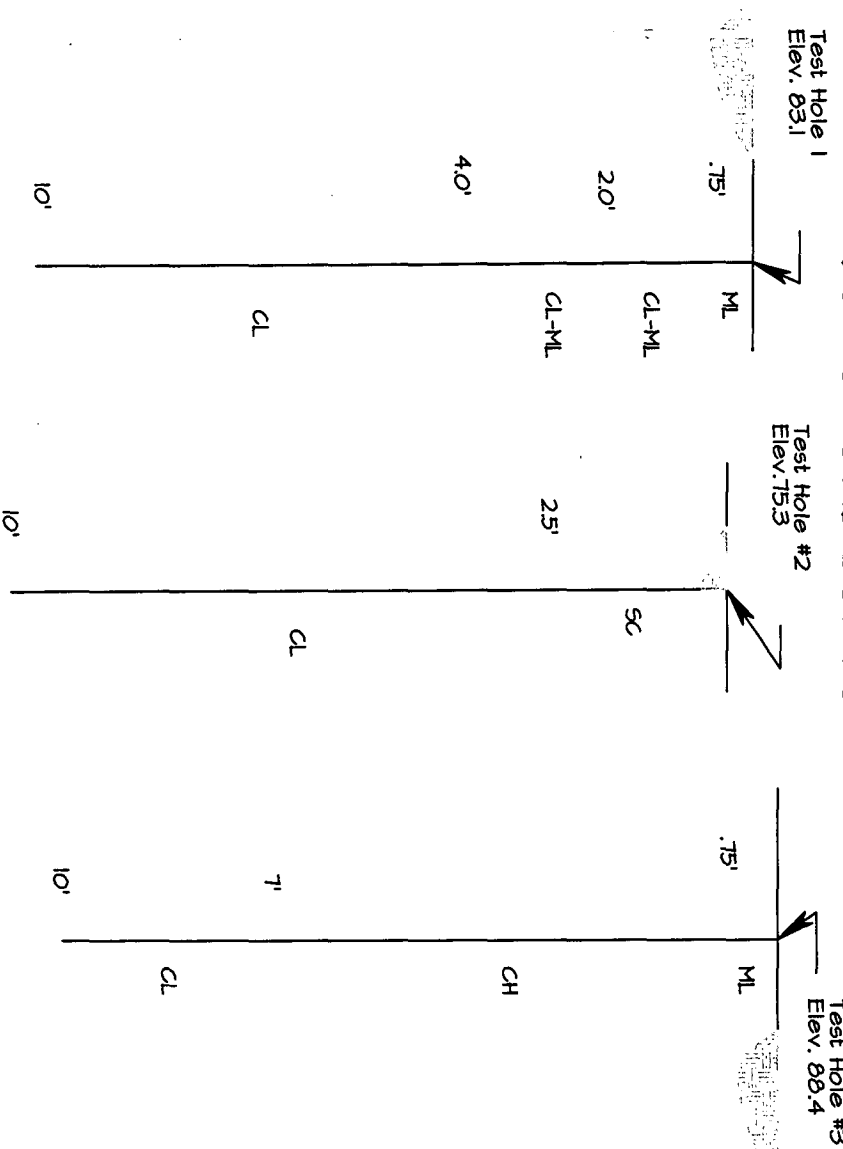


Cross Section on Centerline of Embankment (Looking Upstream)

Typical Core Trench Cross Section
Not to Scale



LOG OF SOIL BORINGS

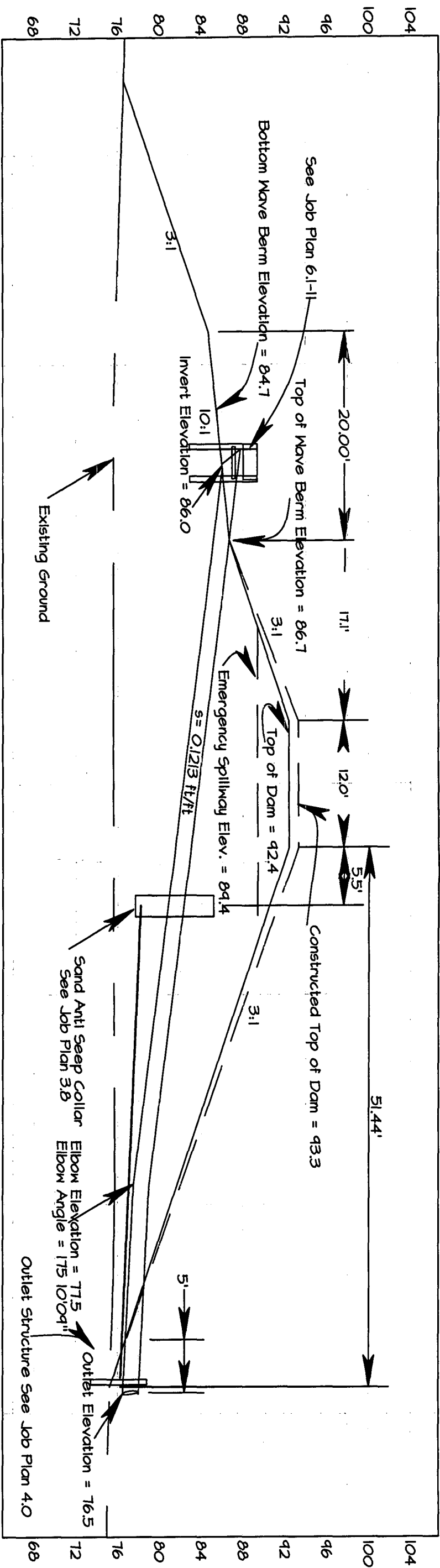


Approved by: _____
Title: _____
Title: _____

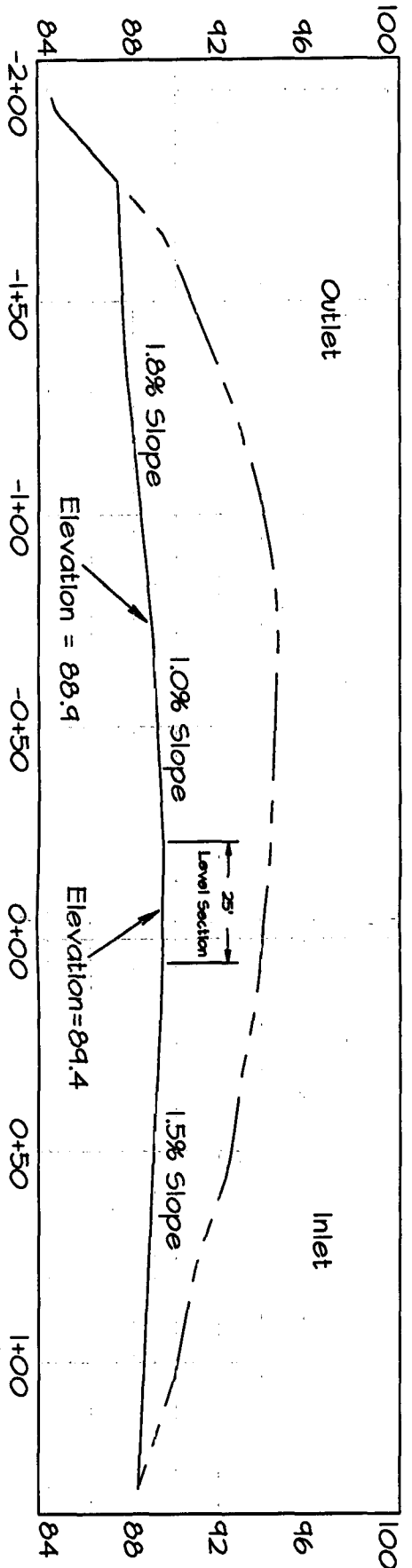
Date: 9/8/04
Designed by: A. Roman
Drawn by: A. Roman
Traced by: _____
Checked by: D. Edwards 9/14/04

NRCS NATURAL RESOURCES CONSERVATION SERVICE
USDA-NRCS PIERRE FIELD SUPPORT OFFICE
314 South Henry Suite #300
PIERRE, SOUTH DAKOTA 57501-1258

Frank McGowan
SW 1/4 NW 1/4 Section 18 T107N R65W
Jerauld County, South Dakota



Cross Section of Dam



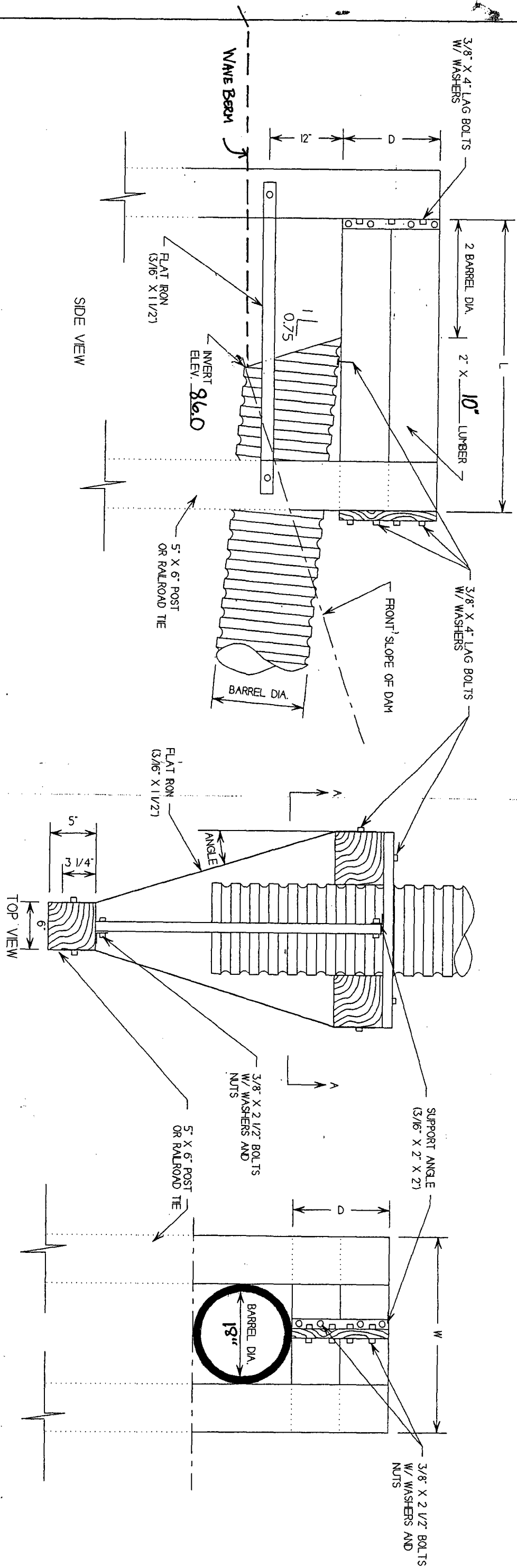
Emergency Spillway Profile

Approved by: _____
 Title: _____
 Title: _____

Date: 9/8/04
 Designed by: A. Roman
 Drawn by: A. Roman
 Traced by: _____
 Checked by: D. Edwards

NRCS NATURAL RESOURCES CONSERVATION SERVICE
 USDA-NRCS PIERRE FIELD SUPPORT OFFICE
 314 South Henry Suite #300
 PIERRE, SOUTH DAKOTA 57601-1258

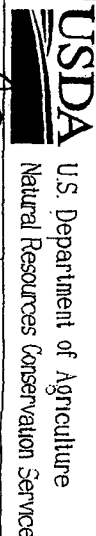
Frank McGowan
 SW 1/4 NW 1/4 Section 18 T107N R65W
 Jerauld County, South Dakota



ANTIVORTEX BAFFLE AND GUARD POST SUPPORT QUANTITIES

BARREL DIA.	D	LENGTH FT.-IN.	NO. REOD	FLAT RON LENGTH FT.-IN.	NO. REOD	3/8" X 4" LAG BOLTS W/ WASHERS NO. REOD	SUPPORT ANGLE LENGTH FT.-IN.	NO. REOD	POSTS LENGTH FT.-IN.	NO. REOD	W LENGTH FT.-IN.	NO. REOD	3/8" X 2 1/2" BOLTS, NUTS & WASHERS EA.	ANGLE
15"	1-2 3/4"	12" X 10" X 4-4 1/2"	1	4-8"	2	16	1-2 3/4"	2	6-0"	3	12" X 10" X 2-5 3/4"	1	12 (24 WASHERS)	14"
(18)"	1-6 1/2"	12" X 10" X 5-3"	2	5-6"	2	16	1-6 1/2"	2	8-0"	3	12" X 10" X 2-9 1/2"	2	12 (24 WASHERS)	13"
24"	1-10 1/2"	12" X 12" X 7-0"	2	7-3"	2	16	1-10 1/2"	2	8-0"	3	12" X 12" X 3-4 3/8"	2	12 (24 WASHERS)	12"

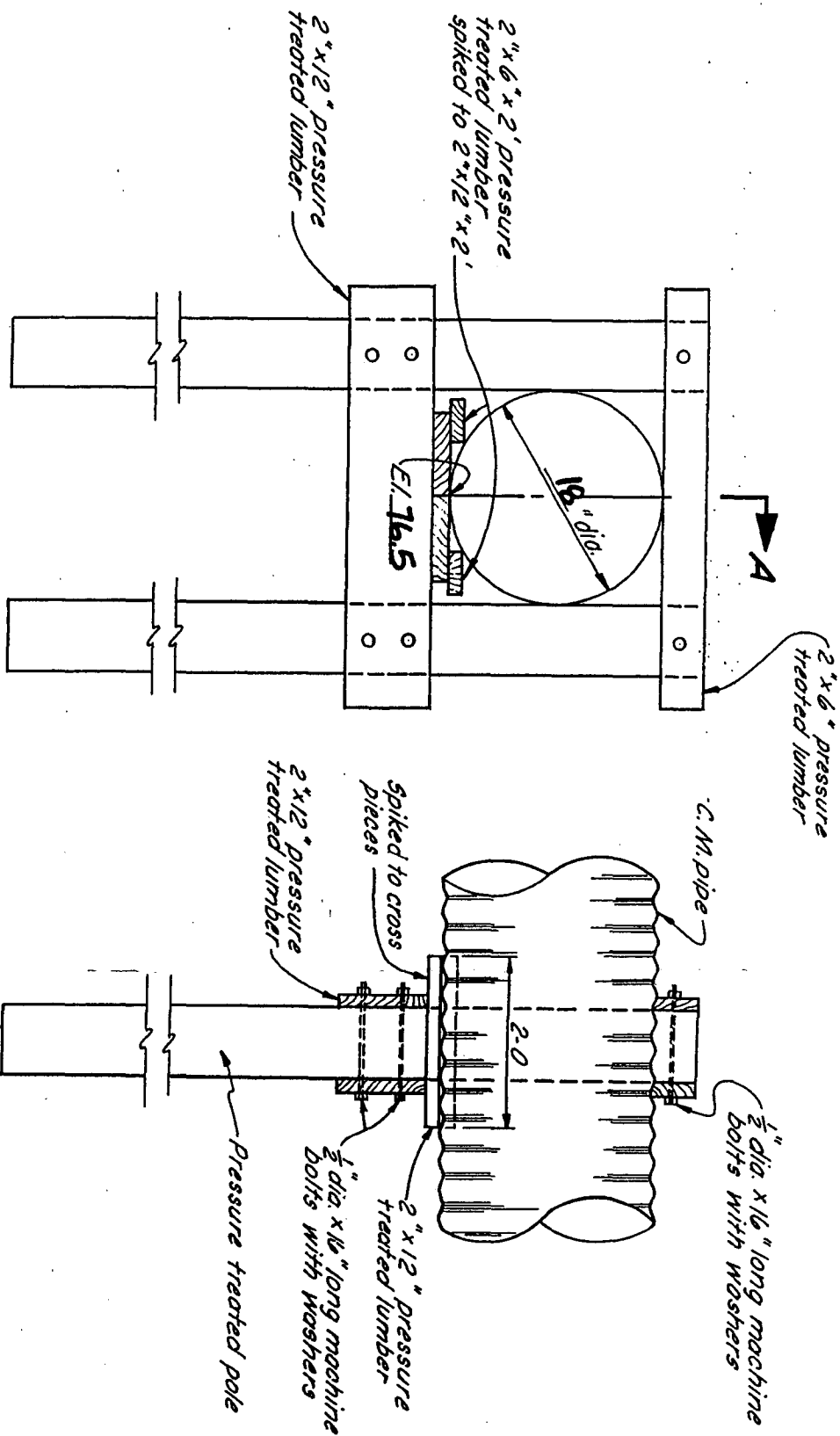
NOTE: ALL LUMBER AND POSTS WILL BE PRESSURE TREATED



FRANK MCGOWAN
JERARD COUNTY

DESIGNED BY *Frank McGowan*
DRAFTED BY *Frank McGowan*
DATE *4/24*
APPROVED BY *Frank McGowan*
TITLE *Antivortex Baffle and Guard Post Support*
SHEET *6* OF *8*
JOB NO. *148-REL-gcd*

JOB PLAN 5-4C2 1/01



ELEVATION A-A

TABLE OF QUANTITIES

ITEM	LENGTH FOR 18" DIA. C.M. PIPE	UNIT	QUANTITY
PRESSURE TREATED POLE ____" DIA.	8-0	EACH	2
2" X 12" PRESSURE TREATED LUMBER	4-0	EACH	4
2" X 6" PRESSURE TREATED LUMBER	4-0	EACH	2
2" X 12" PRESSURE TREATED LUMBER	2-0	EACH	3
2" X 6" PRESSURE TREATED LUMBER	2-0	EACH	2
1/2" DIA. MACHINE BOLTS WITH NUTS	1-4	EACH	10
1/2" DIA. WASHERS		EACH	20

NOTES:

- HAND OR MACHINE TAMP BACKFILL THOROUGHLY AROUND FOOTINGS AND COLUMNS.

TIMBER PIPE SUPPORT

OPERATOR: Frank McEwen
CONSERVATION DISTRICT: Serauld

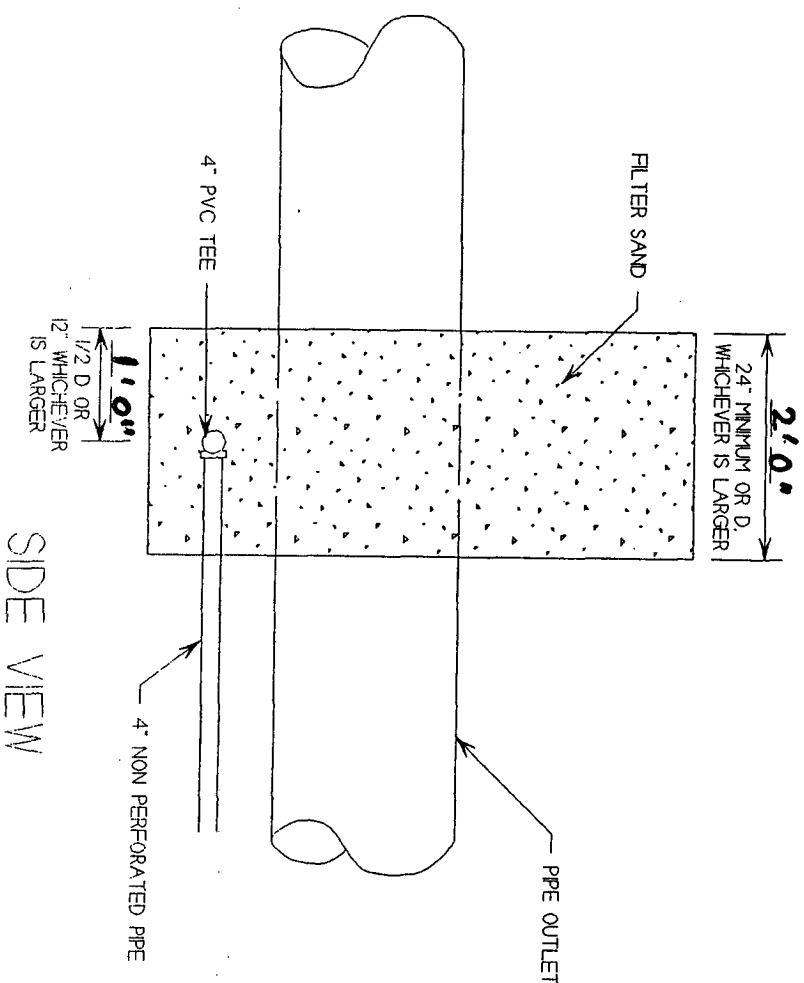
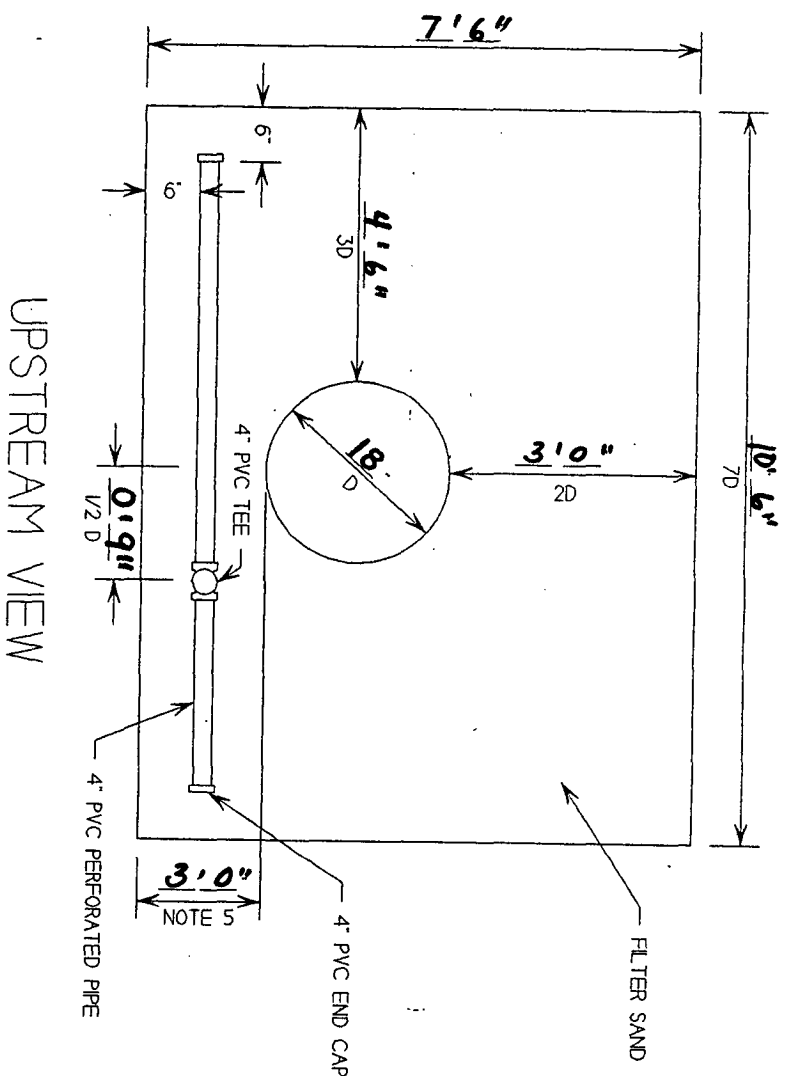
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed by <u>Al Rona</u>	Approved by <u>1/21</u>
Drawn <u>Al Rona</u>	Title <u>1/21</u>
Traced <u>1/21</u>	Sheet No. <u>1</u>
Checked <u>1/21</u>	Drawing No. <u>1</u>

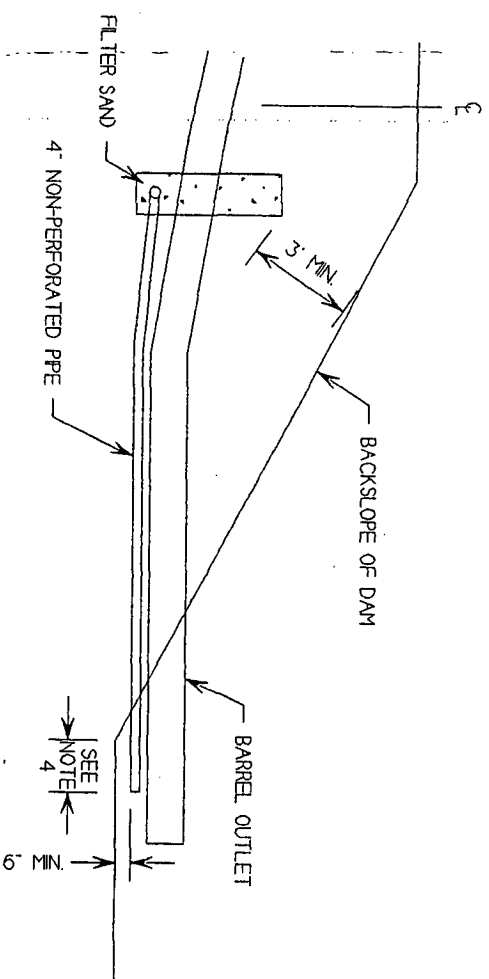
REFERENCE: GUIDE PLAN NO. 4.0

JOB PLAN NO. 4.0

5, N-29, 073.40



OUTLET DETAIL



FILTER GRADATION	
SIEVE SIZE	PERCENT PASSING
3/8"	100
4	85-100
8	80-100
16	50-85
30	25-60
50	10-30
100	2-10

LIST OF MATERIALS

ITEM NO.	ITEM	UNIT	QUANTITY
1	4" PVC PERFORATED PIPE	lf.	10
2	4" PVC NON-PERFORATED PIPE	lf.	45
3	4" PVC END CAP	ea.	2
4	4" PVC TEE	ea.	1
5	SAND	cy.	6
6	ANIMAL GUARD (see note 2)	ea.	1

SAND ANTISEEP COLLAR

Frank Mcowan
JERARD COUNTY

USDA U.S. Department of Agriculture
Natural Resources Conservation Service

JOB PLAN NO. 5.3 - rev. C/02

DESIGNED BY **Frank Mcowan**
DRAFTED **9/04**
DATE **8-8**
SHEET **8-8**
APPROVED BY
TITLE
Dwg. No.
unmodified

- NOTE 1 THE 4" DIA. PIPE SHALL BE SDR 35 PVC OR STRONGER
- PROVIDE AN ANIMAL GUARD ON DRAIN OUTLET PIPE. DRILL 2-2 1/2" HOLES ON 6" FROM END OF PIPE AND PLACE A 3/8" DIA. 5 1/2" LONG GALVANIZED STEEL BOLT THRU THEM AND SECURE WITH A NUT (PLACE BOLT HORIZONTAL).
- FILTER SAND WILL BE CLEAN CONCRETE SAND.
- 4" PIPE WILL BE SECURED TO PIPE SUPPORT AND EXTEND A MIN OF 2' BEYOND SUPPORT.
- DISTANCE EQUALS 18" MINIMUM IF BARREL AND 4" PIPE ARE LOCATED IN ORIGINAL FOUNDATION MATERIAL AND 2D MINIMUM IF LOCATED IN FILL MATERIAL FOR DAM.
- INSTALL COLLAR IN LOWER SEGMENT OF MIDDLE 1/3 OF DAM CROSS SECTION INTERCEPTED BY THE PRINCIPAL SPILLWAY.

CONSTRUCTION SPECIFICATIONS

For:

Frank McGowan
Section 18-T107N-R65W

Prepared by:

USDA-NATURAL RESOURCES CONSERVATION SERVICE
Pierre Field Support Office
605-224-2476

Assisting:

Jerauld County Conservation District

According to South Dakota State Law no excavator may begin any excavation without first notifying the One-Call Notification Center of the proposed excavation.

1-800-781-7474

CHECKLIST
SOUTH DAKOTA CONSTRUCTION SPECIFICATIONS

Check Column	Specification Number	Specification Title	Rev.
	SD-1	Clearing	9/02
✓	SD-2	Clearing and Grubbing	9/02
	SD-3	Structure Removal	9/02
	SD-4	Stripping	9/02
✓	SD-5	Excavation	9/02
	SD-6	Excavated Pond (Dugout)	9/02
	SD-7A (Ag Waste)	Earth Fill – Class A (Test Controlled Compaction, Ag Waste Str.)	9/02
	SD-7A	Earth Fill – Class A (Test Controlled Compaction)	9/02
✓	SD-7S	Earth Fill – Class S (Method Controlled Compaction)	9/02
	SD-7U	Earth Fill – Class U (Uncompacted)	9/02
	SD-8	Rock Riprap and Bedding	9/02
	SD-8A	Rock Riprap and Bedding (Riprap SDDOT Size A)	9/02
	SD-8B	Rock Riprap and Bedding (Riprap SDDOT Size B)	9/02
✓	SD-9	Drainfill and Filter	9/02
✓	SD-10	Salvaging and Spreading Topsoil	9/02
	SD-12A	Concrete (Class 3500)	9/02
	SD-12B	Concrete for Minor Structures (Generally less than 10 cubic yards)	9/02
	SD-13	Steel Reinforcement	9/02
	SD-14	Wood and Steel Structures	8/03
	SD-15	Corrugated Metal Pipe	9/02
✓	SD-16	Wood Fabrication and Installation	9/02
	SD-17	Metal Fabrication and Installation	9/02
	SD-18	Gabion Baskets and Mattresses (Wire Mesh)	9/02
	SD-19	PVC Drain for Sediment Basin (Ag Waste)	9/02
	SD-20	Plastic Pipeline (Irrigation)	9/02
	SD-20A	Plastic Pipeline (Stockwater and/or Domestic) (Use with SD-55)	9/02
	SD-20RC	Plastic Pipeline (Stockwater and/or Domestic) (Includes materials)	9/02
	SD-21	Steel Pipeline	9/02
	SD-22	Concrete pipeline	9/02
	SD-24	Land Leveling	9/02
	SD-25	Diversion	9/02
	SD-26	Terraces	9/02
	SD-27	Grassed Waterway	9/02
✓	SD-28	Seeding (Add site specific requirements.)	9/02
	SD-29	Sodding (Add site specific requirements.)	9/02
	SD-30	Fence	9/02
	SD-31	Cathodic Protection	9/02
	SD-32	Well	9/02
	SD-33	Mulch Blankets and Nets	9/02
	SD-34	Clay Lining (Ag Waste)	8/03
	SD-95	Geotextile	9/02
	SD-484	Dormant Woody Plantings (Cuttings, Stakes, and Posts)	9/02
	SD-521	Bentonite Sealant	9/02

CHECKLIST

SOUTH DAKOTA MATERIAL SPECIFICATIONS

[illegible]

CONSTRUCTION SPECIFICATION SD-2 CLEARING AND GRUBBING

1. Scope

The work shall consist of clearing, grubbing and disposal of trees, snags, logs, brush, shrubs, stumps, and rubbish from the designated areas.

2. Protection of Existing Vegetation

Trees and other woody vegetation designated to remain undisturbed shall be protected from damage throughout the entire construction period. Vehicles, stockpiled materials, and/or ground disturbance shall not be allowed within the dripline of the vegetation designated to remain in place. The contractor shall repair any damage resulting from the contractor's operations or neglect.

3. Marking

Limits of the areas to be cleared and grubbed will be marked by stakes, flags, tree markings or other suitable methods. Trees to be left standing and uninjured will be designated by special markings placed on the trunks at a height of about 6 feet above the ground surface.

4. Clearing and Grubbing

Unless otherwise specified, all stumps, roots, and root clusters that have a diameter 1 inch or larger shall be grubbed out to a depth of at least 2 feet below subgrade for concrete structures and 1 foot below ground surface for embankment and other designated sites. All trees not marked for preservation, and all snags, logs, brush, shrubs, stumps, rubbish, and similar materials shall be cleared from within the limits of the marked areas.

5. Disposal

Where brush piles for wildlife are not specified on the drawings, cleared and grubbed materials shall be disposed of by burning and/or burying at locations shown on the drawings or shall be disposed of by methods and at sites selected by the contractor and approved by the NRCS Inspector. Materials to be buried shall be placed at least 2 feet below the surrounding ground line, and shall be covered by at least 2 feet of soil with the soil surface graded to drain.

The contractor is responsible for complying with all applicable laws and regulations and the payment of any and all fees that may result from disposal at locations away from the construction site.

CONSTRUCTION SPECIFICATION SD-5 EXCAVATION

1. Scope

The work shall consist of excavation required by the drawings and specifications and disposal of the excavated material.

2. Classification

Common Excavation is defined as the excavation of all materials that can be excavated, transported and unloaded using heavy ripping equipment, and heavy rubber tired loaders or scrapers with pusher tractors. This classification includes rocks smaller than 1 cubic yard.

Rock Excavation is defined as the excavation of all hard, compacted, or cemented materials that require blasting or the use of unusually large ripping and excavating equipment. This classification includes the removal of isolated rocks larger than 1 cubic yard.

Unclassified Excavation is defined as the excavation of all materials (including rock) encountered, regardless of the nature of the material or the excavation method needed.

3. Use of Excavated Materials

To the extent needed, all suitable materials from excavations shall be used in the construction of specified earth or rock fills. Suitability of materials for specific purposes will be determined by the NRCS Inspector. The contractor shall not waste or otherwise dispose of suitable excavated materials.

4. Disposal of Waste Materials

All surplus and unsuitable excavated materials will be disposed of at the locations shown on the drawings or designated by the landowner or NRCS Inspector. The disposal site shall be left in a neat condition and sloped to provide drainage.

5. Excavation Limits

Excavated surfaces too steep to be safe without support, shall be supported as necessary to safeguard the work and workers. The width of the excavation shall be increased if necessary to provide space for sheeting, bracing, shoring and other supporting installations. The contractor shall furnish, place and subsequently remove such supporting installations. Excavation side slopes may be flattened for safety reasons where approved by the NRCS Inspector. Excavations shall be completed to specified lines and grades prior to placement of earth fill or construction of structures.

7. Borrow Excavation

When suitable materials from specified excavations are insufficient to construct specified fills, additional material shall be obtained from designated borrow areas. The extent and depth of borrow pits shall be as approved by the NRCS Inspector. Borrow pits must be shaped to eliminate unsightly conditions and steep or unstable slopes.

CONSTRUCTION SPECIFICATION SD-7S EARTH FILL-CLASS S

1. Scope

The work shall consist of the construction of compacted earth fills where the amount of compaction is to be controlled by specifying a construction method.

2. Materials

All fill materials shall be obtained from required excavations and designated borrow areas. Selection, blending, placement and compaction of fill will be subject to approval of the NRCS Inspector.

Fill materials shall contain no frozen material, sod, roots or other perishable material, or rocks larger than 8 inches in diameter. Fill shall not be placed on a frozen surface.

3. Foundation Preparation

All foundation (including abutment) surfaces shall be shaped one horizontal to one vertical or flatter except as otherwise specified.

After stripping (see stripping specification), the foundation shall be loosened thoroughly by scarifying or plowing to a minimum depth of 4 inches. The foundation shall then be compacted by the process specified for the fill.

4. Placement

All foundation excavation and preparation shall be completed before placing fill. Except as required by the drawings, fill material shall be mixed and uniformly placed throughout the entire fill without lenses, streaks, pockets, or layers of material that differ significantly from surrounding material.

Placement and compaction methods must prevent damage to structures and allow the structure to assume backfill loads gradually and uniformly. Within 2 feet of any structure, fill layer thickness must not exceed 4 inches and equipment loads must not exceed 400 pounds.

Fill shall be placed in approximately horizontal layers. Except as described above, fill layer thickness shall not exceed 9 inches for compaction by large machines or 4 inches for small hand directed power tampers.

If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill, to a depth of not less than 2 inches, before the next layer is placed.

Except as otherwise specified, openings temporarily left in dam fills (for pipe installation, streamflow, etc.) shall have side slopes 3 horizontal to 1 vertical or flatter. When filling the opening, the bonding surface of the fill in place shall be stripped of all material not meeting the requirements of this specification and shall be scarified, moistened, and recompacted as new earthfill is placed.

5. Control of Moisture Content

At the time of compaction, earth fill shall have a moisture content that when kneaded in the hand will form a ball that does not easily crumble when pressed between the hands. If the soil is too wet, it will yield free water when kneaded in the hand.

Fill materials must be wetted or dried as needed to achieve proper moisture prior to compaction.

6. Compaction (Class S)

Fill layers shall be compacted by one of the following methods.

- a. By routing the hauling and spreading equipment such that all points of the fill are traversed by at least one tread track of the loaded equipment traveling parallel to the centerline of the fill.
- b. By at least 2 passes of a tamping (sheepsfoot) roller weighing at least 100 pounds per square inch of bearing area.

Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping or manually directed power tampers or plate vibrators. Within 2 feet of any structure, equipment loads must not exceed 400 pounds.

Compaction of fill adjacent to concrete structures shall not be started for at least the following number of days after placement of the concrete.

Concrete Structure	Days After Concrete Placement
Vertical or near-vertical walls with earth load on one side only	14
Walls backfilled on both sides simultaneously	7
Conduits and spillway risers, cast-in-place (with inside forms in place)	7
Conduits and spillway risers, cast-in-place (forms removed)	14
Conduits, pre-cast, cradled	2
Conduits, pre-cast, bedded	1
Anti-seep Collars and Cantilever Pipe Supports (backfill both sides simultaneously)	3

CONSTRUCTION SPECIFICATION SD-9 DRAINFILL AND FILTER

1. Scope

The work shall consist of furnishing, placing and compacting drain fill and filter sands and/or gravels.

2. Materials

Aggregates shall be sand, gravel, crushed stone, or mixtures thereof, composed of clean, hard, durable mineral particles free of organic matter, clay balls, soft particles or other substances that would interfere with free draining properties of the aggregates.

Not more than 5% of the material may be limestone, and not more than 15% may be flat elongated particles.

The aggregates shall meet the following gradation requirements except as otherwise specified.

Filter Aggregate Size	% Finer by Weight
3"	100
1"	90 to 100
#4	50 to 85
#50	10 to 40
#200	0 to 5

3. Subgrade Preparation

Surfaces on which drain fill will be placed shall be as undisturbed as possible (do not scarify), and must be free of standing water during placement of drain aggregates. Care shall be taken to prevent collapse of drain walls.

4. Placement

Drain fill shall not be placed until the subgrade has been made available for inspection by the NRCS Inspector. Drain fill shall not be placed around pipes until the pipe installation has been made available for inspection by the NRCS Inspector.

Material must be placed in uniform, approximately 6-inch thick layers. Extreme care shall be taken to assure uniformity of the drain fill, and to prevent segregation or contamination of the drain fill with foreign mater. When collector pipes are included in drains, the fill materials shall be placed in a manner to avoid displacing the pipe.

**CONSTRUCTION SPECIFICATION
SD-10 SALVAGING AND SPREADING TOPSOIL**

1. Scope

The work shall consist of salvaging topsoil from borrow pits or other excavations and spreading it in the designated areas to the specified depths.

2. Quality of Topsoil

Topsoil shall consist of friable soil reasonably free of grass, roots, weeds, sticks, stones or other foreign materials.

3. Excavation

Topsoil shall be removed after clearing, grubbing and removing vegetation and shall be stockpiled. Objectionable materials shall be removed and buried, or disposed of, at locations approved by the NRCS Inspector.

4. Spreading

Spreading shall not be done when the ground or topsoil is frozen, excessively wet or otherwise in a condition detrimental to the work. Surfaces to be covered shall be lightly scarified just prior to the spreading operation.

All earth fills not to be submerged shall be covered with topsoil to a depth of 6 to 18 inches measured perpendicular to the surface of the fill and placed to the neat lines shown on the drawings.

After placement is completed, the topsoil surface shall be left in a condition that will permit seeding equipment to be operated without excessive smoothing.

CONSTRUCTION SPECIFICATION SD-16 WOOD FABRICATION AND INSTALLATION

1. Scope

The work shall consist of furnishing and constructing wood structures and wood parts of composite structures.

2. Plywood Material

Plywood and Oriented Strand Board (OSB) for use in above ground sheltered construction (buildings etc.) shall meet Product Standard PS-1 and shall conform to the requirements shown on the drawings.

Plywood for use in exposed above ground construction shall be exterior grade, meet Product Standard PS-1 and shall conform to the requirements shown on the drawings.

Treated plywood for use above ground shall meet Product Standard PS-1 and be pressure treated with waterborne preservatives (Arsenicals) to a retention level of at least 0.4 pounds per cubic foot except as shown on the drawings.

Treated plywood that is to be in permanent contact with water or the earth must meet Product Standard PS-1 and be pressure treated with waterborne preservatives (Arsenicals) to a retention level of 0.6 pounds per cubic foot, except as shown on the drawings.

3. Structural Timber and Lumber Material

All wood material shall be sound wood free from decay and disease damage, shall be straight, not cracked, and shall meet the requirements shown on the drawings. Structural timber and lumber shall be structural grade or better.

Unless otherwise specified, all timber and all nominal lumber sizes 2X10 or larger shall be pressure treated by one of the following preservatives:

Cresote

Pentachlorophenol

Waterborne Preservatives (Arsenicals) treated to 0.4 pounds per cubic foot retention

Unless otherwise specified, all nominal lumber sizes 2X8 or smaller shall be pressure treated using waterborne preservatives (Arsenicals). Wood for use above ground shall be treated to a retention level of at least 0.4 pounds per cubic foot. Wood for use in permanent contact with water or earth shall be treated to a retention level of at least 0.6 pounds per cubic foot.

4. Metal Hardware

Bolts, nuts, washers, rods, angle iron, and other metal hardware shall be an appropriate grade of steel, and if installed underground, shall be galvanized, or have equal corrosion protection.

5. Installation

All framing shall be true and exact. Timber and lumber shall be accurately cut and assembled to close fit. Nails and spikes shall be driven with just sufficient force to set the heads flush with the surface of the wood.

Bolt holes shall be drilled for snug fit. Holes for lag screws shall be bored with a bit not larger than the body of the screw at the base of the thread.

Washers shall be used in contact with all bolt heads and nuts that would otherwise be in contact with wood.

**CONSTRUCTION SPECIFICATION
SD-28 SEEDING**

1. Scope

The work shall consist of furnishing all labor, equipment, and materials needed for seeding the areas shown on the drawings.

2. General

Seeding and related operations shall be performed in the following time period.

Dates: See attached SD-CPA-4

3. Fertilizer

Fertilizer shall be uniformly applied commercial liquid or dry fertilizer conforming to South Dakota laws and regulations. Fertilizer shall be supplied and applied as follows.

Types and rates: N/A

4. Seed

Seed requirements and seeding rates are listed below. Documentation must be provided showing the seed meets current South Dakota laws and regulations. The seed must be planted within one year of its latest germination test.

See attached SD-CPA-4

5. Seedbed Preparation

The area to be seeded shall be made reasonably smooth and firm. Ditches shall be filled to conform to design lines and grades before seedbed preparation is begun. Prior to seeding, required fertilizer shall be applied and mixed with the soil surface to a depth of 3 inches. The contractor shall suspend operations when the soil is too wet.

6. Cover and/or Nurse Crops

When specified, cover and/or nurse crops shall be seeded as follows:

NA if seeded during specified plan. (Nov 1 - May 1)

7. Sowing Seed

Except as otherwise specified, seeding shall be performed immediately after seedbed preparation. Seeding shall be drilled or broadcast and incorporated in a manner that will achieve uniform distribution of seed placed at appropriate soil depth.

When seeding waterways or similar water flow areas, machinery operations must be performed in a direction that is not parallel to water flow (use figure 8, serpentine, etc.).

8. Mulching

Except as otherwise specified, required mulching must be performed as soon as possible after seeding. Mulch shall be applied uniformly as follows.

Straw mulch is highly recommended.

Critical Area Seeding

MLRA

55.53

Frank McGowan

Cons. District Jerauld

Practice No. 378

Practice Name: Pond

Seeded by:

Angela Roman

PLANNED**APPLIED**

Field Number	Dam Seeding	
Seedbed Preparation	Firm and weed free	
Seeding Equipment	Broadcast	
Acres	1.6	
Date Planted	Nov. 1 - May 1	
Ecological Site or Forage Group	F	
Protection Provided	Fenced Out	

PLANNED

[illegible]

APPLIED

1/ The origin of Common seed must be ND, SD, NE, MT, WY, MN, or IA

[illegible]

** Thickspike wheatgrass may be substituted for western wheatgrass if the later is not available and only west of the Missouri River. Multiply the western wheatgrass seeding rate by .72

LOCATION MAP

X	18

Tract

N

S. 18

T. 107

R. 65

Planning Assistance By: Angela Roman 9/21/04

(Name and Date)

Practice Meets SD Standards and Specifications:

Yes	No
-----	----

Certified By:

(Name and Date)

Recheck of Quantities By:

(Name and Date)

**MATERIAL SPECIFICATION
SD-55A CORRUGATED POLYETHYLENE (PE) PIPE**

1. Scope

This specification covers the quality of corrugated polyethylene (PE) tubing and fittings.

2. Pipe and Tubing

Corrugated polyethylene tubing shall conform to the following requirements for the specified tubing types, sizes, and fittings.

ASTM F667	Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings
ASTM F667	Standard Specification for Corrugated Polyethylene Pipe and Fittings
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
AASHTO M252	Standard Specification for Polyethylene Corrugated Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 12" to 36" diameter

Water Permit Application No. 6547-3
Frank McGowan

Top of Dam Elev. - 92.4
2nd Spillway Elev. - 89.4
P. Spillway Elev. - 86
D/S Toe Elev. - 75.2

Cont. 3. Low Hazard Dam

Ht. = 17.2 ft.

Normal Storage Capacity - 32 Ac-Ft
Int. Storage Capacity - 69
Max. Storage Capacity - 151

Int Capacity x Eff. Height: $69 \times 14.2 = 979 < 3000 \therefore 25 \text{ yr.}$
Minimum Spillway Design

From USGS WRI 98-4055 "Tech. Serv. List. Peak-Flow Magnitude ... in 50"
DA = 1439 Ac = 2.25 mi.² PIF = 0.9

$$\begin{aligned} Q_{25} &= 148 \text{ CA}^{.584} \text{ PIF}^{.730} \\ &= 148 (2.25)^{.584} (0.9)^{.730} \\ &= 148 (1.61) (0.93) \\ &= \underline{220 \text{ cfs}} \end{aligned}$$

$$\begin{aligned} Q_{100} &= 275 \text{ CA}^{.625} \text{ PIF}^{.742} \\ &= 275 (2.25)^{.625} (0.9)^{.742} \\ &= 275 (1.66) (.9248) \\ &= \underline{425 \text{ cfs}} \end{aligned}$$

Secondary Spillway Flow

$$\begin{aligned} Q &= C L H^{3/2} \quad C = 2.6 \\ &= (2.6)(80)(3)^{1.5} \quad L = 80 \\ &= \underline{1080 \text{ cfs}} \quad H = 3 \end{aligned}$$

NRCS Annual Yield

$$DA = 1439 \quad CN = 75 \quad Iso = 2\frac{1}{2}$$

Section 74:02:08:09

1. Topo Map - OK
2. Dam Axis Profile - OK
3. Dam Max X-sec. - OK
4. Area Capacity - OK
5. Outlet Details - OK
6. Spillway Rating - OK
7. Spillway Details - OK
8. Specs. Std. NRCS - OK
9. EPP - N/A Cat. 3 - OK

$$\begin{aligned} 80\% \text{ chance} &= 0.18 \\ 0.18 \times 1439^{1/2} &= \underline{22 \text{ Ac-Ft}} \end{aligned}$$

$$\begin{aligned} 50\% \text{ chance} &= 0.46 \\ 0.46 \times 1439^{1/2} &= \underline{55 \text{ Ac-Ft}} \end{aligned}$$

$$\begin{aligned} 10\% \text{ chance} &= 2.2 \\ 2.2 \times 1439^{1/2} &= \underline{264 \text{ Ac-Ft}} \end{aligned}$$

United States Department of Agriculture



Natural Resources Conservation Service
Field Support Office
314 S. Henry Street, Suite 300
P. O. Box 1258
Pierre, SD 57501-1258

Telephone: (605) 224-2476
Fax: (605) 224-6615

September 21, 2004

South Dakota Department of
Environment and Natural Resources
Foss Building
523 E. Capitol Avenue
Pierre, SD 57501

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OCT 28 2004

WATER RIGHTS
PROGRAM

To Whom It May Concern:

Attached are plans, specifications, design data, and a completed water rights permit application for a dam for Frank McGowan in Jerauld County. The producer wishes to construct this dam this fall, your promptness is greatly appreciated.

Please don't hesitate to call me at the above number with any concerns or questions.

A handwritten signature in cursive script that reads "Angela Roman".

ANGELA D. ROMAN
Agricultural Engineer

Attachments

cc: Dana Edwards, Civil Engineer, NRCS, Pierre, SD



October 29, 2004

Frank McGowan
PO Box 969
Suwanee GA 30024

Dear Mr. McGowan:

On October 28, 2004, we received your *Application for a Permit to Appropriate Water* for 32 acre-foot storage dam to be located in Jerauld County.

We have received the \$150 application filing fee. In addition to the application filing fee, the Water Rights Program collects the \$50 licensing fee at the time of filing. Please submit \$50 for the licensing of the water permit.

Upon receipt of the fee, further processing of your application will proceed. If you have any questions, please contact me.

Sincerely,

Karen Schlaak
Water Rights Program
605 773-3352

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
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www.state.sd.us/denr

November 12, 2004

Frank McGowan
PO Box 969
Suwanee, GA 30024

Dear Mr. McGowan:

We have reviewed the plans and specifications for your dam project located in the SW ¼ NW 1/4 of Section 18-T107N-R65W, in Jerauld County. The plans and specifications as submitted are approved. Approval of the plans and specifications does not authorize construction of the dam. The construction of the dam may not begin until Water Permit No. 6547-3 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 you, 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 McGowan Dam will be classified as a small size Category 3, Low Hazard dam with a dam height of 17 feet and a normal storage capacity of 32 acre-feet and a maximum storage capacity of 151 acre-feet.

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

Sincerely,

Gale N. Selken, P.E.
Natural Resources Engineer Director
for Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

c: Angela Roman, NRCS, Pierre

If your construction project will disturb at least one acre of land, a construction storm water discharge permit is required. This is an existing general permit with a short application that is required to be submitted 15 days prior to the start of construction. For more information on storm water permitting, please contact Stacy Reed at 1-800-SDSTORM (737-8676).

REPORT ON
WATER PERMIT APPLICATION No. 6547-3
Frank McGowan
November 8, 2004

Water Permit Application No. 6547-3 has been filed by Frank McGowan to impound 32 acre-feet of water from runoff by constructing a dam located in the SW ¼ NW ¼ of Section 18-T107N-R65W, in Jerauld County. The application also requests impoundment of sufficient water to maintain water at the outlet elevation. The water will be used for fish and wildlife production and recreational purposes.

Discussion:

The dam will be classified as a small size, Category 3, Low Hazard dam. The Natural Resources Conservation Service (NRCS) has designed the dam. The plans and specifications have been reviewed and will be approved; however, construction of the dam can not begin until Water Permit Application No. 6547-3 is approved.

The McGowan Dam will be 17 feet high with a normal storage capacity of 32 acre-feet with a reservoir level at the primary spillway elevation, and a maximum storage capacity of 151 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.

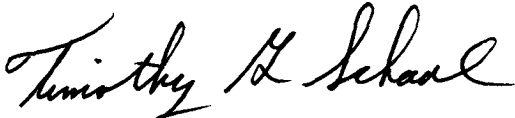
The dam has a drainage area of 1439 acres or 2.25 square miles. The dam is designed to have an 18 inch HDPE culvert with 6.4 feet of available freeboard as the primary spillway, and an 80 foot wide earthcut secondary spillway with 3 feet of available freeboard. A 25-year frequency event for this drainage produces a peak runoff of approximately 220 cfs and a 100-year frequency event produces a peak runoff of approximately 425 cfs. The 80 foot wide secondary spillway has a capacity of approximately 1080 cfs.

The annual yield for this drainage area with an 80 percent chance of occurrence, or 8 out of 10 years, is expected to be 22 acre-feet. The annual yield with a 50 percent chance of occurrence, or 1 out of 2 years, is expected to be 55 acre-feet and the annual yield with a 10 percent chance, or 1 out of 10 years, is expected to be 264 acre-feet.

The McGowan Dam will be located in the SW ¼ NW ¼ of Section 18-T107N-R65W on an unnamed tributary of Smith Creek about one and one-half miles upstream of the confluence of the unnamed tributary and Smith Creek. There are no existing Water Permits/Rights located on the unnamed tributary between the proposed dam and Smith Creek.

Conclusions:

1. Water Permit Application No. 6547-3 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. 6547-3.



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

Approved by:



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



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 6547-3, Frank McGowan**

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. 6547-3, Frank McGowan, PO Box 969, Suwanee GA 30024.

The Chief Engineer is recommending APPROVAL of Application No. 6547-3 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) it is in the public interest with the following qualifications:

1. Water Permit No. 2535-2 authorizes a dam with a storage capacity of 32 acre feet of water and sufficient water annually to maintain the water level to an outlet elevation.
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.

Garland Erbele, Chief Engineer
November 12, 2004

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)

County of Jerault) SSI, Penny Wenzel

certify that the attached printed Notice was taken

from the True Dakotanprinted and published in Wess. SpringsCounty of Jerault and

state of South Dakota. The notice was published

in the newspaper on the following two dates:

Nov. 16, 2004Nov. 23, 2004Cost of Printing \$42.41Penny Wenzel
(Signature)Business Manager
(Title)11-29-04
(Date Signed)NOTICE OF
APPLICATION NO.
6547-3 to
Appropriate Water

Notice is given that Frank McGowan, PO Box 969, Suwanee, GA 30024 has filed an application for a water permit to impound 32 acre-feet of water from runoff by constructing a dam located in the SW 1/4 NW 1/4 Section 18 with water impounded in the S 1/2 NW 1/4, NE 1/4 NW 1/4 Section 18; all in T107N- R65W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation and recreational purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6547-3 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 December 3, 2004.

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. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.

c-6.7

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WATER RIGHTS
PROGRAM

Instruction to Newspaper - Publish first Notice on November 16, 2004 with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 6547-3 to Appropriate Water

Notice is given that Frank McGowan, PO Box 969, Suwanee GA 30024 has filed an application for a water permit to impound 32 acre-feet of water from runoff by constructing a dam located in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 18 with water impounded in the S $\frac{1}{2}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 18; all in T107N-R65W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation and recreational purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6547-3 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 December 3, 2004.

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. Steven M. Pirner, Secretary, Department of Environment and Natural Resources.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

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

November 12, 2004

Frank McGowan
PO Box 969
Suwanee GA 30024

Dear Mr. McGowan:

Water Permit Application No. 6547-3 for recreation, fish & wildlife use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Publisher of the True Dakotan printed at Wessington Springs, SD (Ph # 605-539-1281). You will need to contact the newspaper and authorize publication of this notice. 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 and to arrange for payment. Early contact with the paper can eliminate delays. Upon receiving authorization, the publisher has been instructed to publish your notice once each week for two consecutive weeks. The newspaper has also 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

cc: Angela Roman, NRCS

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.

Instruction to Newspaper - Publish first Notice on November 16, 2004 with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 6547-3 to Appropriate Water

Notice is given that Frank McGowan, PO Box 969, Suwanee GA 30024 has filed an application for a water permit to impound 32 acre-feet of water from runoff by constructing a dam located in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 18 with water impounded in the S $\frac{1}{2}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 18; all in T107N-R65W. This application requests impoundment of sufficient water to maintain water to the outlet elevation. The water is for fish and wildlife propagation and recreational purposes.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6547-3 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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DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

November 12, 2004

True Dakotan
PO Box T
Wessington Springs SD 57382

ATTENTION: Legal Public Notice

Enclosed is a Notice on Application No. 6547-3 to Appropriate Water to be published twice. Please publish the first notice on November 16, 2004 with the second publication 7 days later. The text of the notice can be e-mailed to your paper by contacting Karen Schlaak at (605) 773-3352.

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 Frank McGowan, PO Box 969, Suwanee GA 30024 (Ph # 404-293-5159).

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

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

No. 6547-3

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

Date _____

We are in receipt of your letter of November 12, 2004 enclosing Notice to Appropriate Water by Application No. 6547-3 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper



DEC 16 2004

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

Frank McGowan
PO Box 969
Suwanee GA 30024

Dear Mr. McGowan:

Enclosed is Water Permit No. 6547-3 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.

Sincerely,

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

enclosures

United States Department of Agriculture



Natural Resources Conservation Service
1717 North Lincoln Avenue, Suite #104
Pierre, South Dakota 57501

RECEIVED

AUG - 1 2007

WATER RIGHTS
PROGRAM

Phone: (605) 224-2476, Ext. 5
Fax: (605) 224-6615

July 31, 2007

Chuck Pyle
USFWS
Federal Bulding
200 4th Street Rm 309
Huron, SD 57350

This letter is regarding the dam on Frank McGowan's property located in the SW ¼, of the NW ¼, of Section 18 T107N R65W.

On September 8, 2006 I completed my construction check on the above dam. I have attached my as built plans for your file, as well as photos taken at various dates. At the time of the construction check I indicated to you that the inlet pipe needed to be modified to a hooded inlet. As of May 1, 2007 the pipe has not been corrected.

The hood on the pipe allows the pipe to function properly. The elevations of the pipe, emergency spillway, and the top of dam are all calculated based on the performance of this pipe. Without the hood on the pipe, the pipe is not operating as designed. With out the hood on the inlet, the pipe flows at roughly half the capacity. This causes the emergency spillway to flow more frequently. As the pipe is right now, the emergency spillway would have to be raised to an elevation of 90.6 (original design was for 89.4). The top of dam needs to be 93.6, versus the original design of 92.4. At the time of the construction check last fall, the elevation of the emergency was 90.2 and the top of dam was 93.3.

This letter concludes the Natural Resources Conservation Service's involvement in the project. The pipe correction is not the responsibility of this agency. It is strongly advised that the pipe be corrected to ensure a properly functioning and long lasting dam.

Please call me with any questions or concerns.

Sincerely,

A handwritten signature in cursive script that reads "Angela Roman".

ANGELA ROMAN
Agricultural Engineer

Cc: Dana Edwards, NRCS, Pierre
Frank McGowan, owner
Tim Schaal, DENR



Inlet on September 8, 2006



Inlet on September 8, 2006



Inlet on May 1, 2007



McGowan Family Farming Partnership Pond

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY	AS BUILT
			QUANTITY
Excavation (core trench)	cu. yd.	398	398
Earth Fill Class S	cu. yd.	10,612	10,612
Topsoil	sq. yd.	3,337	3,337
Seeding	acre	1.8	
18" dia. Corrugated dual wall PE Pipe	lin. ft.	91	84.3
4" PVC Perforated Pipe (SCH 40 min)	lin. ft.	10	10
4" PVC NON Perforated Pipe (SCH 40 min)	lin. ft.	45	45
Fine Drain Fill	cu.yd.	6	6
Outlet Support	each	1	1

* Seeding not completed as of 9/8/06.

Construction Specifications

Cleaning and Grubbing
SD-2
Stripping
SD-4
Excavation
SD-5
Earth Fill, Class S
SD-7
Rock Riprap
SD-8
Drain Fill and Filter
SD-9
Salvaging and Spreading Topsoil
SD-10
Plastic Pipe
SD-55
Wood Fabrication and Installation
SD-16
Seeding
SD-28

Hydraulic Data

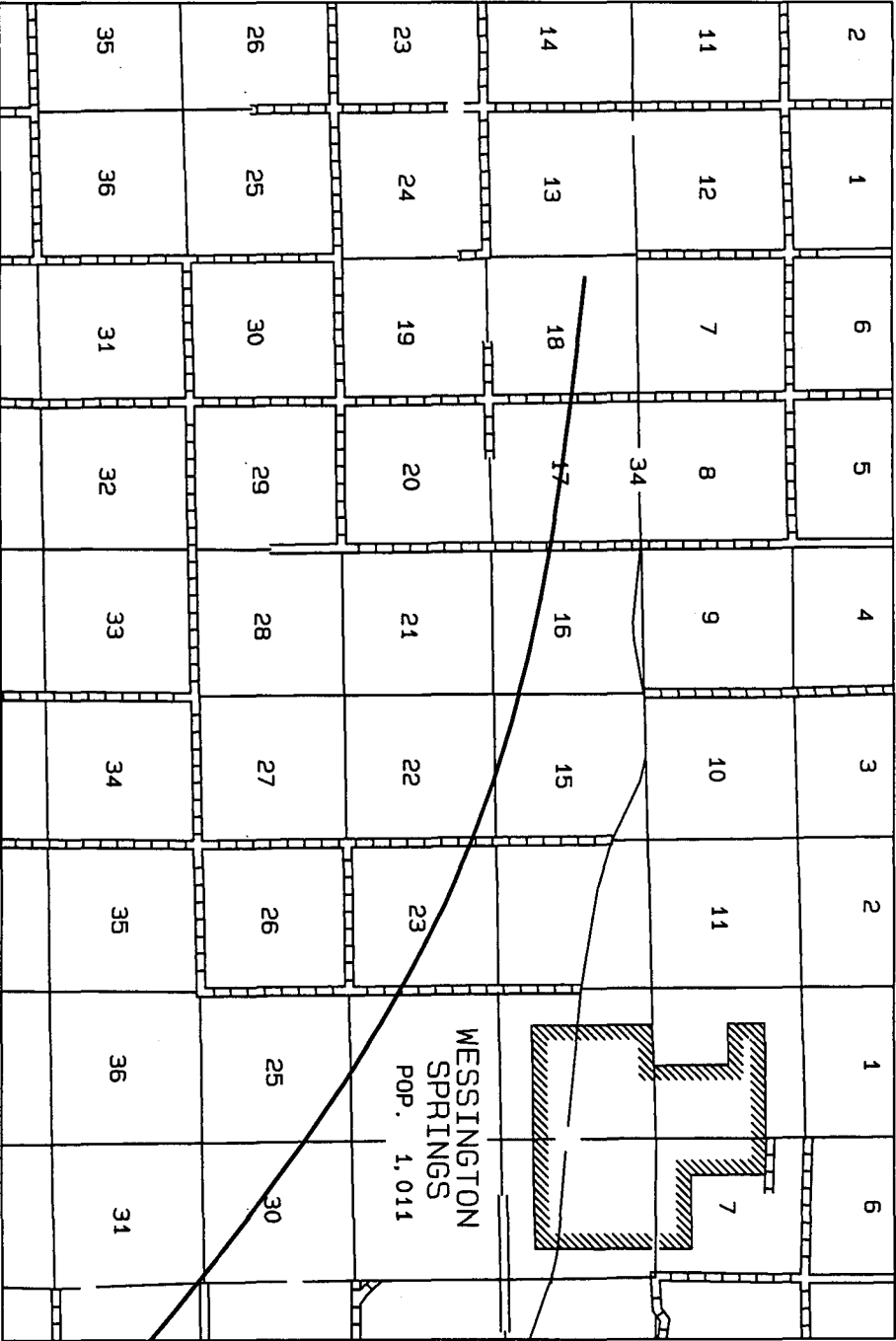
Drainage Area
1439 Acres
Time of Concentration
3.92 hours
Runoff Curve Number
78

Principal Spillway, 24-hr. Rainfall
2.3 inches
Emergency Spillway 24-hr. Rainfall
4.9 inches

Principal Spillway Discharge in ES
32 CFS
Emergency Spillway Discharge
588 CFS

Required Sediment Storage
5.7 AcFt
Sed. Storage Below Crest
5.7 AcFt
Sed. Storage Above Crest
0.0 AcFt

Crest of Normal Pool
8.3 Acres 32.0 AcFt
Crest of Emergency Spillway
13.3 Acres 68.8 AcFt
Top of Dam
18.3 Acres 115.1 AcFt

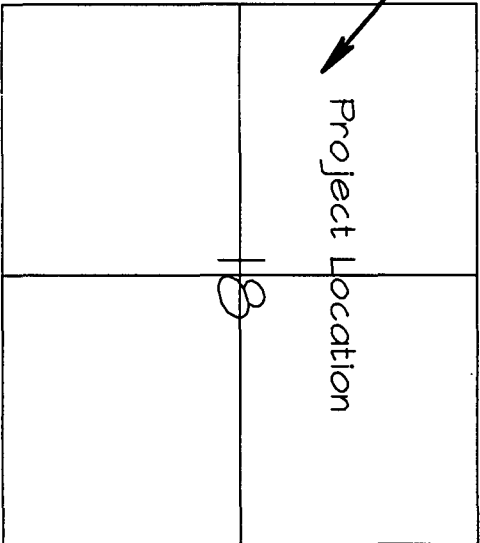


Notes

1. A preconstruction meeting is required before construction between NRCS, USFWS, and the contractor.
2. Water Rights Permit is required by the South Dakota Department of Environment and Natural Resources. This is the responsibility of the landowner.
3. During a runoff event, the existing crossing may be under water or in standing water while the pipe is functioning. This will be temporary.

Hazard Class A
Job Class IV

Project Location



According to South Dakota State Law, "No excavator may begin any excavation without first notifying the One-Call Notification Center of the proposed excavation" at 1-800-781-7474

As built's completed by Angela Roman 9/8/06

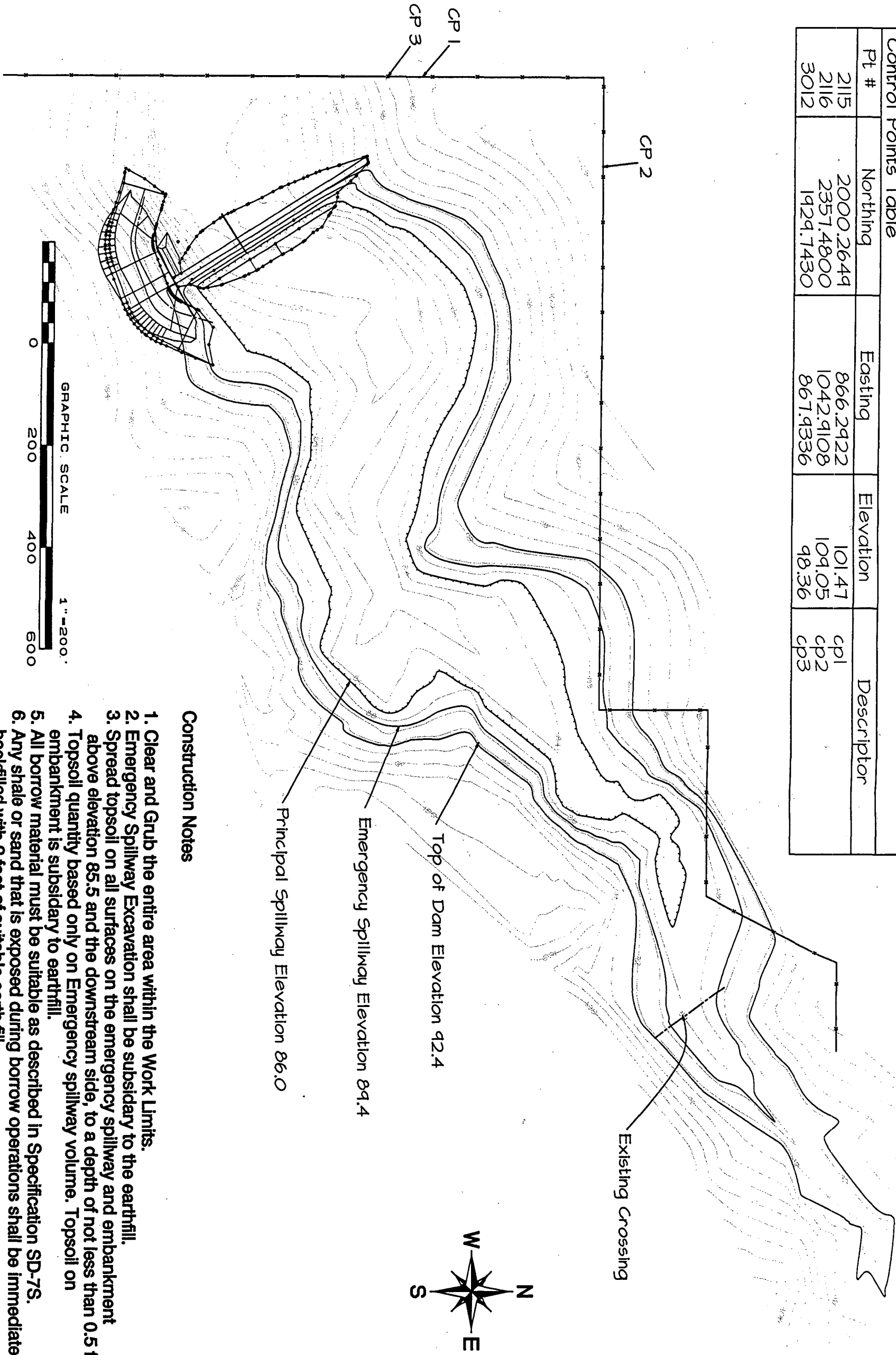
Frank McGowan
SW 1/4 NW 1/4 Section 18 T107N R65W
Jerauld County, South Dakota

NRCS NATURAL RESOURCES
CONSERVATION SERVICE
USDA-NRCS PIERRE FIELD SUPPORT OFFICE
314 South Henry Suite #300
PIERRE, SOUTH DAKOTA 57501-1258

Designed by: A. Roman 9/8/04
Drawn by: A. Roman 9/8/04
Traced by: 9/14/04
Checked by: D. Edwards 9/14/04

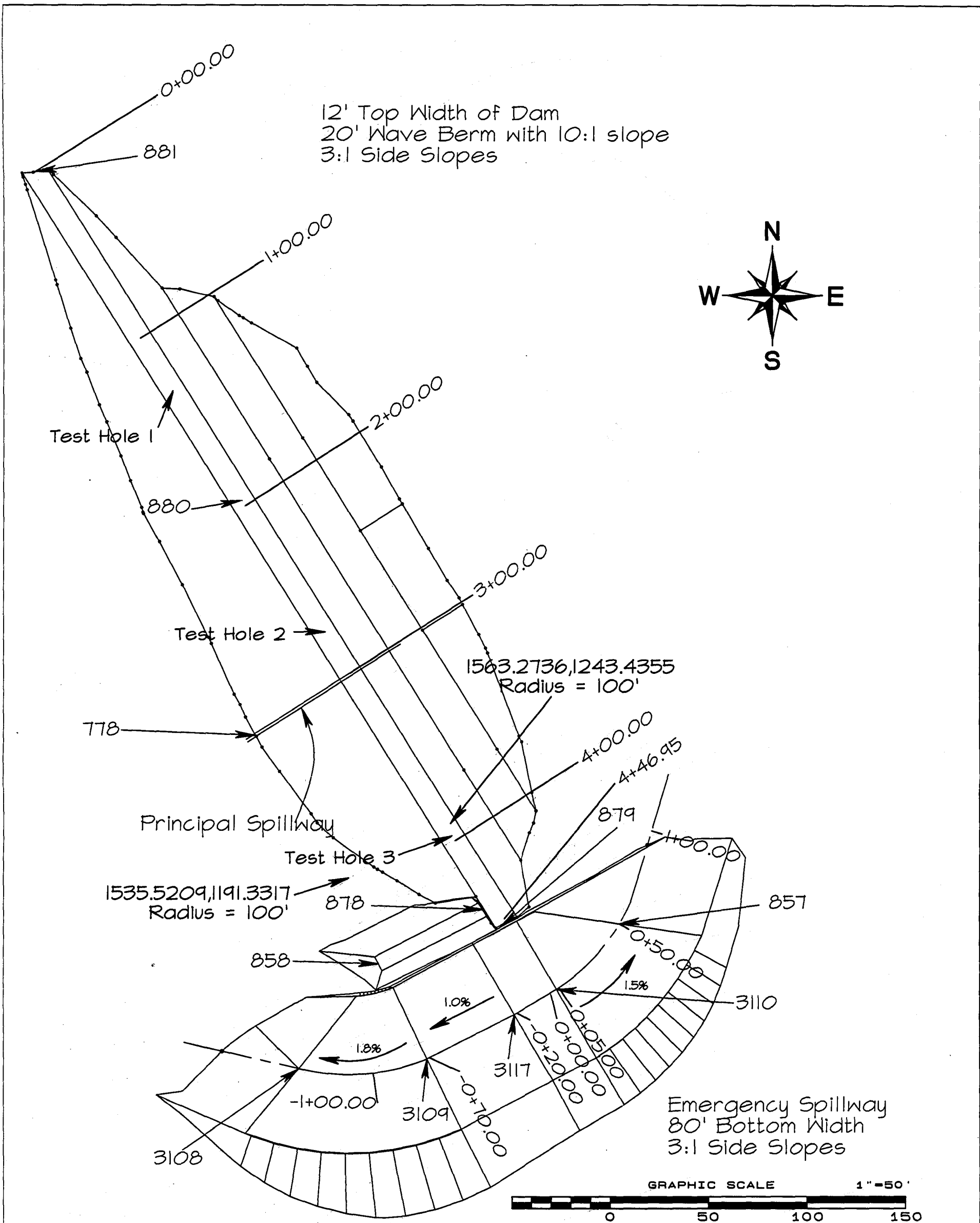
Approved by: [Signature]
Title: Asst Site Cons Eng
Title: 10/09

Control Points Table				
Pt #	Northing	Easting	Elevation	Descriptor
2115	2000.2649	866.2922	101.47	cp1
2116	2357.4800	1042.9108	109.05	cp2
3012	1929.7430	867.9336	98.36	cp3

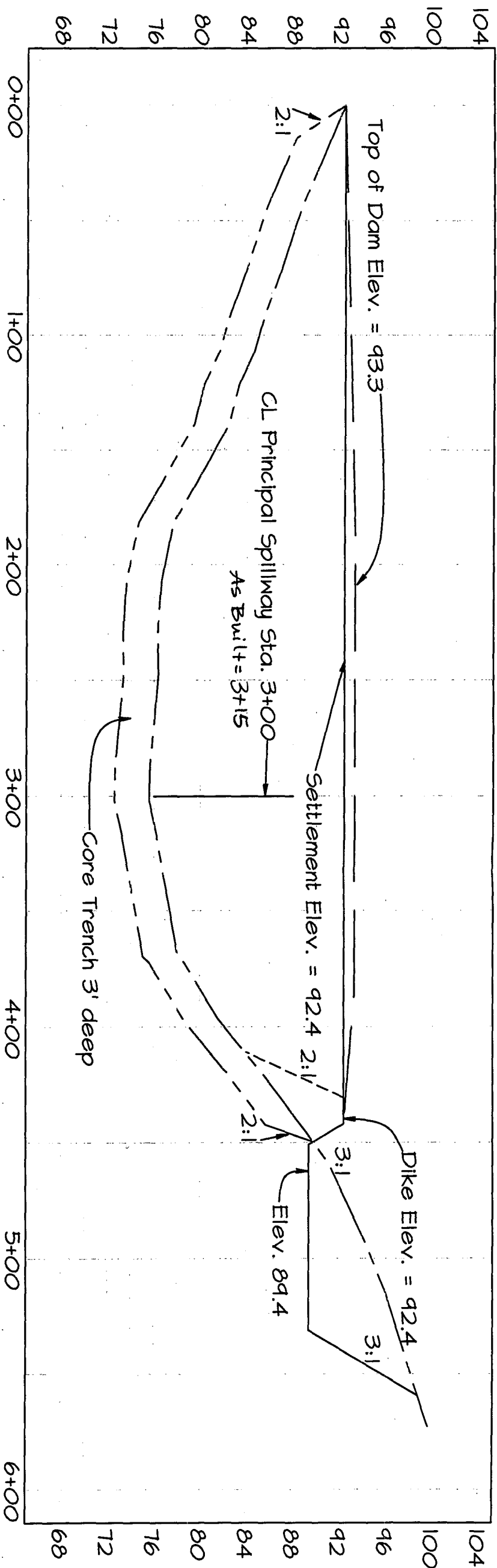


Construction Notes

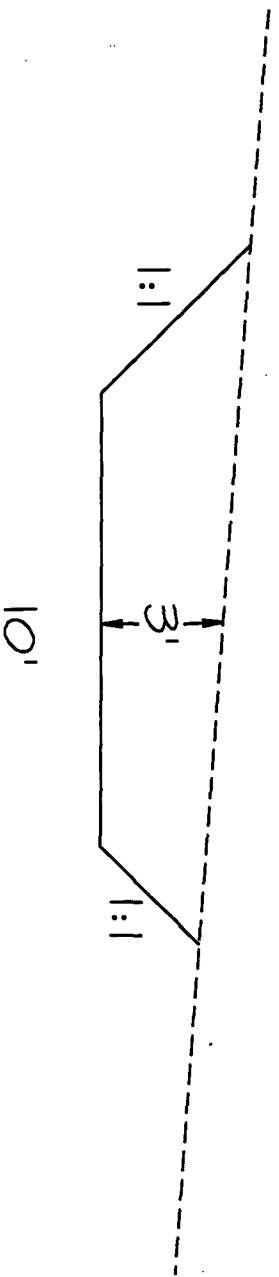
1. Clear and Grub the entire area within the Work Limits.
2. Emergency Spillway Excavation shall be subsidiary to the earthfill.
3. Spread topsoil on all surfaces on the emergency spillway and embankment above elevation 85.5 and the downstream side, to a depth of not less than 0.5 feet.
4. Topsoil quantity based only on Emergency spillway volume. Topsoil on embankment is subsidiary to earthfill.
5. All borrow material must be suitable as described in Specification SD-7S.
6. Any shale or sand that is exposed during borrow operations shall be immediately backfilled with 2 feet of suitable earth fill.



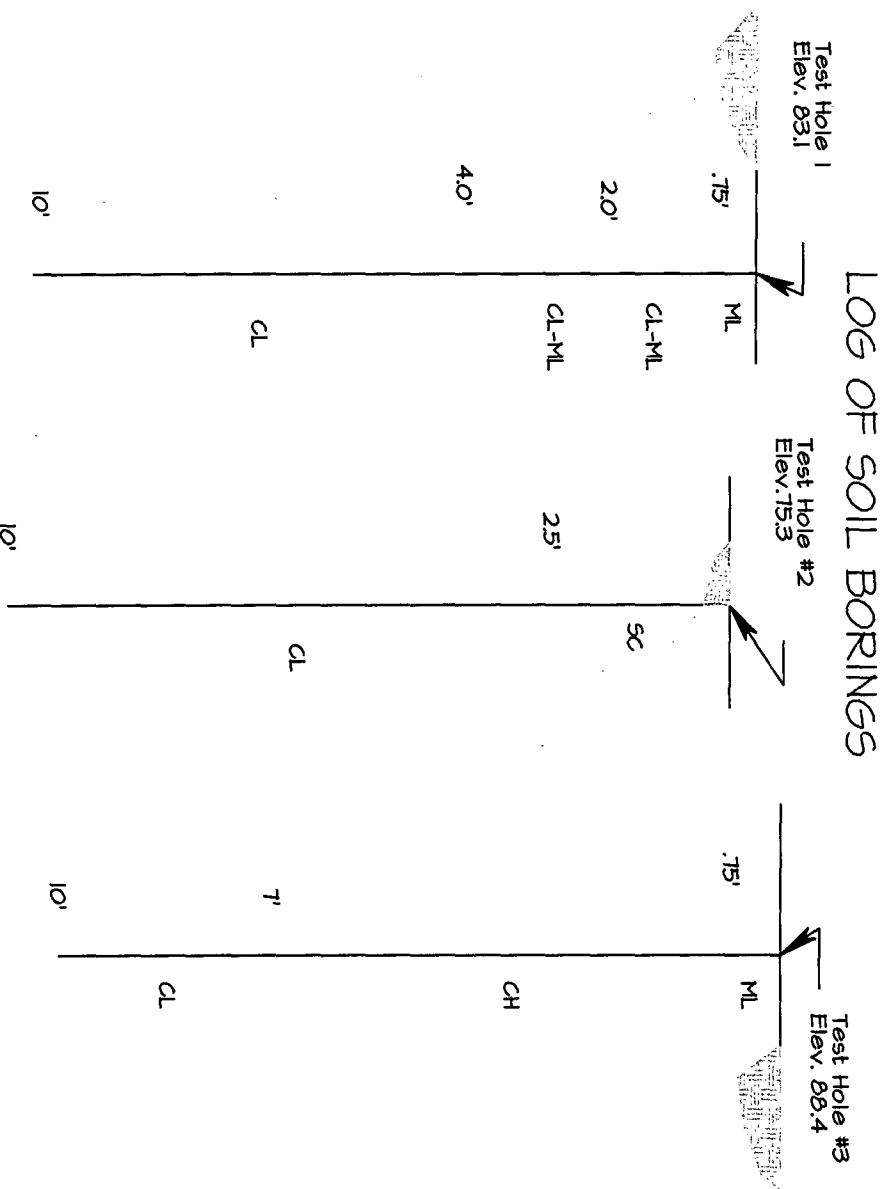
Coordinate Table				
Pt #	Northing	Easting	Elevation	Descriptor
778	1607.4981	1143.7306	76.50	CL Pipe
857	1512.2486	1329.4231	89.00	CL Spillway
858	1491.9268	1206.6219	91.90	CL Dike
878	1519.5065	1259.5565	92.40	CL Dike
879	1514.7295	1270.7918	92.40	CL Dam
880	1725.8529	1136.7401	92.40	CL Dam
881	1892.0623	1031.2063	92.40	CL Dam
3108	1438.8957	1165.9663	87.60	CL Spillway
3109	1443.8692	1231.3313	88.90	CL Spillway
3110	1479.1560	1297.5117	89.40	CL Spillway
3117	1466.4858	1275.9600	89.40	CL Spillway



Cross Section on Centerline of Embankment (Looking Upstream)



Typical Core Trench Cross Section
Not to Scale

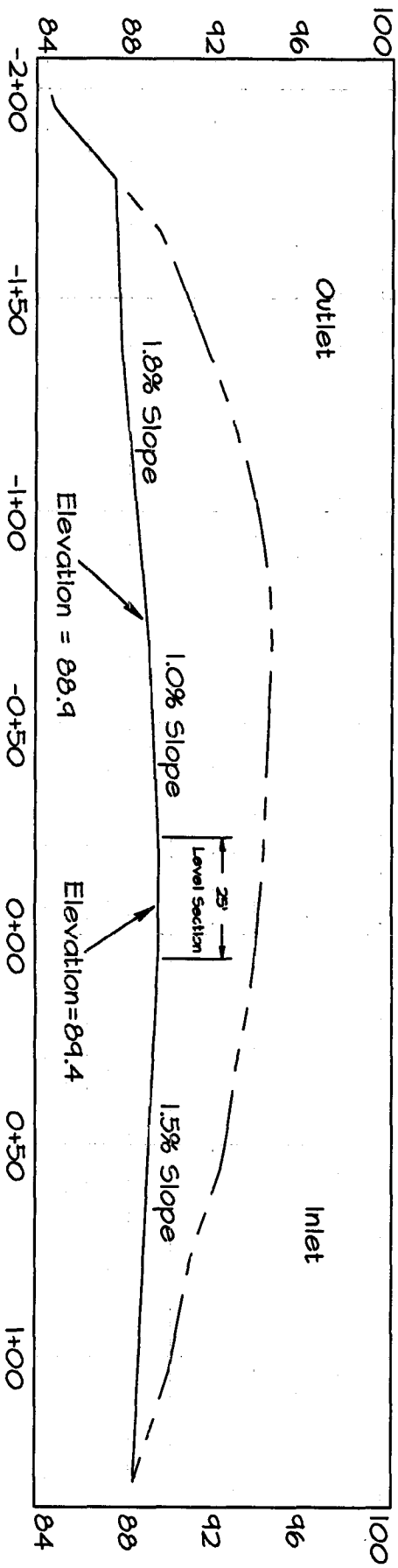
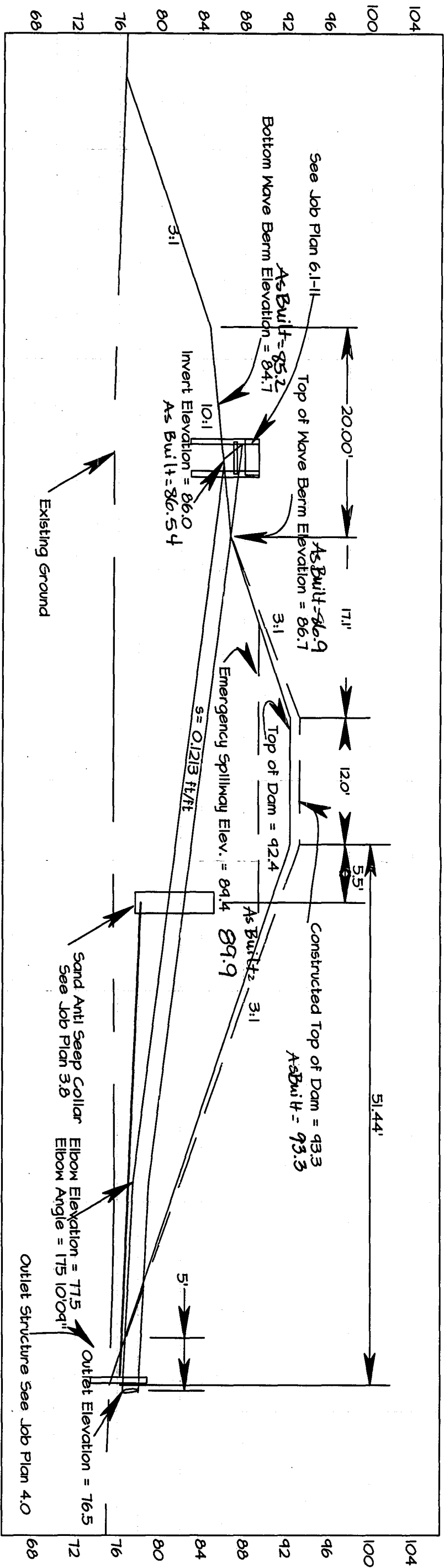


Approved by: _____
Title: _____
Title: _____

Date: 9/8/04
Designed by: A. Roman 9/8/04
Drawn by: A. Roman 9/8/04
Traced by: _____
Checked by: D. Edwards 9/14/04

NRCS NATURAL RESOURCES
CONSERVATION SERVICE
USDA-NRCS PIERRE FIELD SUPPORT OFFICE
314 South Henry Suite #300
PIERRE, SOUTH DAKOTA 57501-1258

Frank McGowan
SW 1/4 NW 1/4 Section 18 T107N R65W
Jerauld County, South Dakota

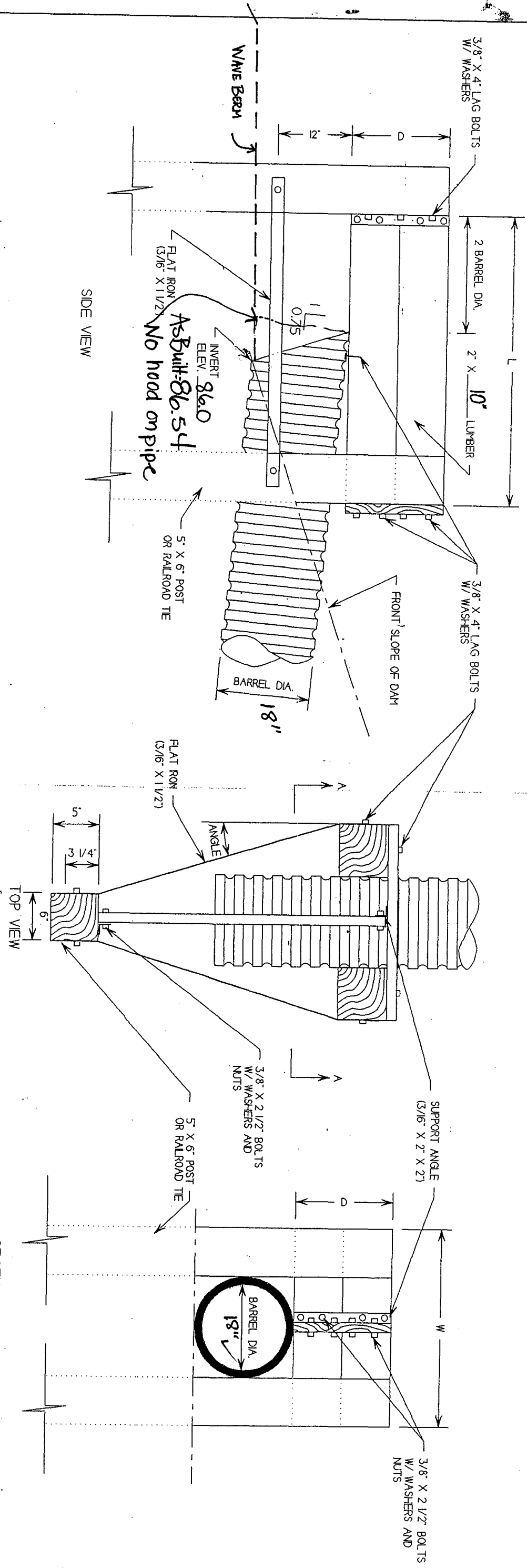


Frank McGowan
 SW 1/4 NW 1/4 Section 18 T107N R65W
 Jerauld County, South Dakota

NRCS NATURAL RESOURCES
 CONSERVATION SERVICE
 USDA-NRCS PIERRE FIELD SUPPORT OFFICE
 314 South Henry Suite #300
 PIERRE, SOUTH DAKOTA 57501-1258

Designed by: A. Roman Date: 9/8/04
 Drawn by: A. Roman Date: 9/8/04
 Traced by: _____
 Checked by: D. Edwards Date: 9/14/04

Approved by: _____
 Title: _____
 Title: _____



ANTIVORTEX BAFFLE AND GUARD POST SUPPORT QUANTITIES

BARREL DIA.	D	LENGTH FT.-IN.	NO. REQD.	FLAT IRON LENGTH FT.-IN.	NO. REQD.	3/8" X 4" LAG BOLTS & WASHERS NO. REQD.	SUPPORT ANGLE LENGTH FT.-IN.	NO. REQD.	POSTS LENGTH FT.-IN.	NO. REQD.	W LENGTH FT.-IN.	NO. REQD.	3/8" X 2 1/2" BOLTS, NUTS & WASHERS EA.	ANGLE
15"	1'-2 3/4"	(2" X 10") X 4'-4 1/2"	1	4'-8"	2	16	1'-2 3/4"	2	6'-0"	3	(2" X 10") X 2'-5 3/4"	1	12 (24 WASHERS)	14°
18"	1'-6 1/2"	(2" X 10") X 5'-3"	2	5'-6"	2	16	1'-6 1/2"	2	8'-0"	3	(2" X 10") X 2'-9 1/2"	2	12 (24 WASHERS)	13°
24"	1'-10 1/2"	(2" X 12") X 7'-0"	2	7'-3"	2	16	1'-10 1/2"	2	8'-0"	3	(2" X 12") X 3'-4 3/8"	2	12 (24 WASHERS)	12°

NOTE: ALL LUMBER AND POSTS WILL BE PRESSURE TREATED

POLYETHYLENE HOOD INLET
W/ ANTIVORTEX BAFFLE
AND GUARD POST SUPPORT
FOR 15" thru 24" PIPE

FRANK MCGOWAN
JERARD COUNTY

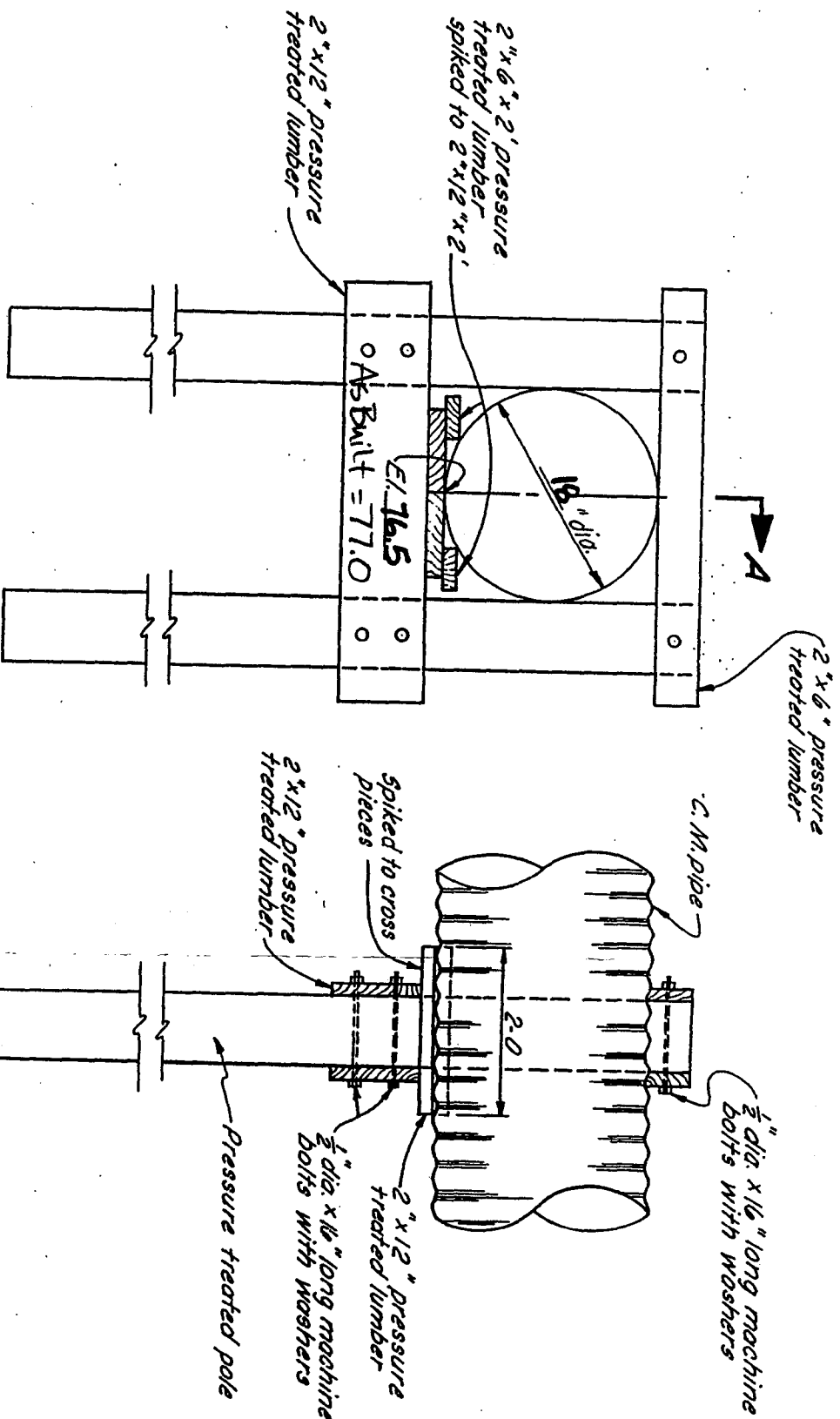
U.S. Department of Agriculture
Natural Resources Conservation Service

DESIGNED BY

DRAFTED BY
DATE 6/24

APPROVED BY
T/TITLE
SHEET 6 OF 8

DWG NO.
448-PBL-94d



ELEVATION

SECTIONAL ELEVATION A-A

TABLE OF QUANTITIES

ITEM	LENGTH FOR 16" DIA. C.M. PIPE	UNIT	QUANTITY
PRESSURE TREATED POLE ____" DIA.	8-0	EACH	2
2" X 12" PRESSURE TREATED LUMBER	4-0	EACH	6
2" X 6" PRESSURE TREATED LUMBER	4-0	EACH	2
2" X 12" PRESSURE TREATED LUMBER	2-0	EACH	3
2" X 6" PRESSURE TREATED LUMBER	2-0	EACH	2
1/2" DIA. MACHINE BOLTS WITH NUTS	1-4	EACH	10
1/2" DIA. WASHERS		EACH	20

NOTES:

- HAND OR MACHINE TAMP BACKFILL THOROUGHLY AROUND FOOTINGS AND COLUMNS.

TIMBER PIPE SUPPORT

OPERATOR: Frank McEwan
CONSERVATION DISTRICT: Jerrald

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed <u>ARman</u> <u>7/67</u>	Approved by _____
Drawn <u>ARman</u> <u>7/67</u>	Title _____
Traced _____	Sheet <u>2</u> of <u>2</u>
Checked _____	Drawing No. _____

REFERENCE: GUIDE PLAN NO. 4.0

JOB PLAN NO. 4.0

5, N-29, 073.40

Permit No. 6547-3
Red Rainy - 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, **June 15, 2007**, made a thorough examination of the water use system constructed by **Frank McGowan** of **PO Box 969, Suwanee, GA 30024** holder of Permit No. **6547-3**, bearing the priority of **October 28, 2004** authorizing the storage of **32** acre-feet of the waters of **runoff** for **recreation, fish & wildlife propagation** purposes, in **Jerauld** County.

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

A. Works used to divert the water:

A 17 ft. high earth dam with a normal storage capacity of 32 acre-feet.

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

N/A

C. Works used to apply water to beneficial use:

A 17 ft. high earth dam with a normal storage capacity of 32 acre-feet.

The system is in the following condition **good**. The point of diversion is located **2150 ft. south & 300 ft. east of the NW corner of Sec. 18-T107N-R65W (SW ¼ NW ¼); Lat. 44.075394 Long. -98.687774.** The works are capable of storing **32** acre-feet of water which is to be used for **recreation, fish & wildlife propagation**. Water has been put to beneficial use to the maximum extent as follows:

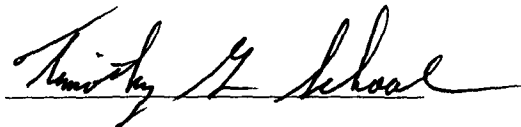
A 17 ft. high earth dam with a normal storage capacity of 32 acre-feet.

and the license should be issued for **32** acre-feet of storage.

Applicable permit qualifications have been complied with: Yes **X**

Exceptions to compliance are: **none**

Date Report Completed: **March 31, 2008**



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

REPORT ON INSPECTION OF PERMIT NO. 6547-3

DATE OF INSPECTION: **June 15, 2007**

NAME & ADDRESS OF PERMIT HOLDER: **Frank McGowan, PO Box 969, Suwanee, GA 30024**

DIVERSION POINT LEGAL LOCATION: 2150 ft. south & 300 ft. east of the NW corner of Sec. 18-T107N-R65W (SW ¼ NW ¼); Lat. 44.075394 Long. -98.687774.

DAM INFORMATION:

- 1) Height to crest **17** feet
- 2) Height to primary spillway **11** feet
- 3) Height to secondary spillway **14** feet
- 4) Crest width **12** feet
- 5) Crest length **447** feet
- 6) Spillway length **XXX** feet
- 7) Spillway width **80** feet
- 8) Approx. storage (Normal) **32** acre-feet
- 9) Approx. storage (Maximum) **69** acre-feet
- 10) Date constructed: **Fall 2006**

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 **yes**

Water Permit Application No. 6547-3



Timothy G. Schaal
Timothy G. Schaal, P.E.
Natural Resources Engineering Specialist
SD DENR, Water Rights Program
3/31/05



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

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

APR 09 2008

6547-3

Frank McGowan
PO Box 969
Suwanee GA 30024

Dear Mr. McGowan:

Enclosed is Water License No. 6547-3. This is the final water right document completing your process of obtaining a Water Right. Also included with your license is a map prepared by the staff engineer who conducted the investigation.

As long as you use the water beneficially, as stated in the Water License, the State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Sincerely,

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

enclosures

STATE OF SOUTH DAKOTA

WATER LICENSE NO. 6547-3

(1) Frank McGowan, PO Box 969, Suwanee GA 30024 made Application No. 6547-3, October 28, 2004 for a water permit to impound 32 acre feet of water from runoff, Jerauld County, South Dakota for fish and wildlife propagation and recreational purposes. Permit No. 6547-3, with a priority date of October 28, 2004 was approved December 3, 2004 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before December 3, 2009 and for the application to beneficial use of water on or before December 13, 2013.

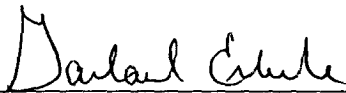
(2) The water supply system has been completed and water applied to beneficial use in accordance with South Dakota State Law. Pursuant to South Dakota Codified Law 46-5-30.1, the holder and/or owner of Water Right No. 6547-3 is issued a license, bearing a priority date of October 28, 2004, to impound 32 acre feet of water for fish and wildlife propagation and recreational purposes.

The location of the storage dam (spillway) is 2,150 feet south and 300 feet east of the northwest corner of Section 18-T107N-R65W (SW ¼ NW ¼).

(3) This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Permit No. 6547-3 including the following now applicable qualifications:

Water Permit No. 6547-3 authorizes a dam with a storage capacity of 32 acre feet of water and sufficient water annually to maintain the water level to an outlet elevation.

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



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

APR 09 2000

date

