

This transaction is for NRCs

This Transaction is for CCC

This Transaction is for NRCs. Check appropriate box.

SCHEDULE OF OPERATIONS

U.S. DEPARTMENT OF AGRICULTURE 66-6114-3-3609

Easement Number (if different) : **66-6114-3-3609**

3. NAME		4. COUNTY	Appanoose		5. STATE	6. CONTRACT OR AGREEMENT NO.	7. TOTAL ACRES UNDER CONTRACT	COMPLETION SCHEDULE AND ESTIMATED COST-SHARE OR PAYMENT BY YEAR (For Non-Cost Share Items Show Units)			REF. NO.	
ITEM NO.	FIELD	PLANNED CONSERVATION TREATMENT (Record of Decisions)	ESTIMATED AMOUNT (UNITS)	COST BASIS \$	Iowa	66-6114-9-3609	333.48	14	15	16	17	18
								Year	Year	Year	Year	Year
								2009	2010	2011	2012	2013
8	9	10	11	12	13		24	25	26	27	28	34
1	1	Auxiliary Spillway and Outlet Chute - construct earthen spillway and chute as specified in the engineering design.	1 ea.		100 AM		\$0.00					
2	1	Water Control Structure - construct a mechanical structure to control the rate and level of water in the system.	1 ea.		100 AM		\$0.00					
3	1	Shallow Water Excavation - excavation and selective spoil placement to recreate swales and shallow pools on the floodplain.	45 ac.		100 AM		\$0.00					
4	1	Conduit Removal - removal of existing CMP's and underground tile lines.	1 job		100 AM		\$0.00					

OMB DISCLOSURE STATEMENT

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collections is 0578-0013. The time required to complete this information collection is estimated to average 0.69 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection information.

PRIVACY ACT STATEMENT

The above statements are made in accordance with the Privacy Act of 1974 (5 U.S.C 522a). Furnishing this information is voluntary; however, failure to furnish correct, complete information will result in the withholding or withdrawal of such technical or financial assistance. The information may be furnished to other USDA agencies, the Internal Revenue Service, the Department of Justice, or other State or Federal law enforcement agencies, or in response to orders of a court, magistrate, or administrative tribunal.

NONDISCRIMINATION STATEMENT

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (202) 720-5964.

U.S. DEPARTMENT OF AGRICULTURE
CONSERVATION PLAN
SCHEDULE OF OPERATIONS

3. NAME: **IDNR (Brown)** 4. COUNTY: **Appanoose** 5. STATE: **Iowa** 6. CONTRACT OR AGREEMENT NO.: **66-6114-9-3609** 7. TOTAL ACRES UNDER CONTRACT: **333.48**

ITEM NO.	FIELD	PLANNED CONSERVATION TREATMENT (Record of Decisions)	ESTIMATED AMOUNT (UNITS)	COST BASIS \$	COST SHARE OR PAYMENT RATE %	COMPLETION SCHEDULE AND ESTIMATED COST-SHARE OR PAYMENT BY YEAR (For Non-Cost Share Items Show Units)					REF. NO.
						14 Year 2009	15 Year 2010	16 Year 2011	17 Year 2012	18 Year 2013	
8	9	10	11	12	13	24	25	26	27	28	34
5	1	Dike Construction - construct a linear earthen berm. Includes excavation and site preparation.	16861 yd3		100 AM	\$0.00					
6	1	Conservation Cover - establish a native grass and forb seeding on areas disturbed during excavation activities.	25 ac.		100 AM	\$0.00					
7	1	Mowing - mow native prairie seeding to control weeds during establishment. (2 passes/year @ \$15.00/acre/pass)	268.9 ac.		100 AM	\$0.00					
8	1	Use Exclusion - all livestock must be excluded from within the easement area. Refer to Easement Deed for details.	333.5 ac.	N/C	N/C	333.5 ac.	333.5 ac.	333.5 ac.	333.5 ac.	333.5 ac.	

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Iowa Revised AD-1155
 04-2003

The signature by the NRCS representative signifies a CCC or NRCS transaction as indicated above.
 Former CCC-1252, NRCS-LTP-11

This transaction is for NRCs

This transaction is for CCC

To be completed by NRCs; Check appropriate box.

3. NAME		4. COUNTY		5. STATE		6. CONTRACT OR AGREEMENT NO.		7. TOTAL ACRES UNDER CONTRACT		REF. NO.	
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8	9	10	11	12	13	14 Year 2009	15 Year 2010	16 Year 2011	17 Year 2012	18 Year 2013	34
9	1	<p>Operation and Maintenance</p> <p>The NRCs shall have the right to enter into the easement area to undertake, at its own expense or on a cost-share basis with the Landowner or other entity, any activities to restore, protect, manage, maintain, enhance, and monitor the wetland and other natural values of the easement area. The NRCs, at its own cost, may apply to impound additional waters on the easement area in order to maintain or improve wetland or other natural values. The Landowner is responsible for noxious weed control and emergency control of pests as required by all Federal, State and local laws. A plan to control noxious weeds and pests must be approved in writing by the NRCs prior to implementation by the Landowner. Refer to recorded Easement for details.</p>	333.5 ac.	N/C	N/C	333.5 ac.	333.5 ac.	333.5 ac.	333.5 ac.	333.5 ac.	

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Iowa Revised AD-1155

RE: EASEMENT # 633609
 CONTRACT # 693609

CPO
LINE ITEM

BID SCHEDULE
IDNR - Russell Brown
Appanoose County, Iowa

	ITEM NO.	WORK OR MATERIAL	SPEC. NO.	QUANTITY	UNIT	UNIT PRICE	AMOUNT
#5	1	Mobilization	IA-8	1	Job	XXX	\$ _____
#5	2	Site Preparation	IA-1	1	Job	XXX	\$ _____
#4	3	Removal of Culvert	IA-3	1	Each	\$ _____	\$ _____
	4	Removal of Tile	IA-657	570	Lin. Ft.	\$ _____	\$ _____
#1	5	Excavation	IA-21	5050	Cu. Yd.	\$ _____	\$ _____
#3	5	Shallow Water Excavation	IA-21	41,818	Cu. Yd.	\$ _____	\$ _____
#5	6	Earthfill	IA-23	20,667	Cu. Yd.	\$ _____	\$ _____
#2	7	Principal Spillway, 84" SMP Riser, 48" SMP Conduit	IA-51	1	Job	XXX	\$ _____
#1	8	Macadam Stone Base	IA-24	30	Tons	\$ _____	\$ _____
#5	9	Seeding, Islands	IA-6	5	Acres	\$ _____	\$ _____
#5	10	Seeding - Levee, Outlet Chute, Aux. Spillway	IA-6	10	Acres	\$ _____	\$ _____
#1							
					Total		\$ _____

Firm: _____

Signature: _____

TIN#/SSN#: _____

CPO LINE
ITEM #6

IA - CPA - 4 REV.
February-98
(File Code 180-12-12)

Seeding Plan

Page 1 of 2

Name IDNR (Brown) Easement No. 66-6114-3-3609
Prepared by R. Robb per Jennifer Anderson mix
Type of Seeding: **Bluejoint - Woolly Sedge Wet Meadow**

Date 3/3/2009
Tract No. _____
Field No. Easm't
Contract No. 693609

Acres 25.00

Seeding Mix Summary

Graminoids	Scientific Name	Common Name	Seeds/Ft ²	PLS Lbs / Total PLS	
				Acres	lb
1	Beckmannia syzigachne	American slough grass	2.00	0.109	2.723
2	Calamagrostis canadensis	Bluejoint	2.00	0.019	0.486
3	Carex hystericina	Porcupine sedge	1.60	0.145	3.630
4	Carex lupulina	Common hop sedge	0.05	0.041	1.031
5	Carex pellita	Woolly sedge	0.25	0.024	0.608
6	Carex stipata	Common fox sedge	1.60	0.128	3.203
7	Carex stricta	Common tussock sedge	0.60	0.031	0.771
8	Carex vulpinoidea	Brown fox sedge	1.60	0.044	1.089
9	Eleocharis obtusa	Blunt spikerush	1.60	0.044	1.089
10	Glyceria striata	Fowl manna grass	1.60	0.027	0.681
11	Juncus arcticus littoralis	Bog rush	1.90	0.028	0.690
12	Juncus dudleyi	Dudley's rush	1.60	0.001	0.034
13	Muhlenbergia racemosa	Marsh muhly	1.60	0.054	1.361
14	Poa palustris	Foul meadow grass	2.00	0.042	1.047
15	Spartina pectinata	Slough grass, cord grass	0.50	0.206	5.156
16					0.000
17					0.000
18					0.000
19					0.000
20					0.000
21					0.000
SUBTOTAL GRAMINOIDS			20.50	0.944	23.698

Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft ²	PLS Lbs / Total PLS	
				Acres	lb
1	Agalinis tenuifolia	Slender false foxglove	1.00	0.003	0.085
2	Anemone canadensis	Canada anemone	0.20	0.068	1.702
3	Asclepias incarnata	Swamp milkweed	0.20	0.113	2.836
4	Chamaecrista fasciculata	Partridge pea	0.95	0.958	23.948
5	Chelone glabra	White turtlehead	1.25	0.037	0.925
6	Cicuta maculata	Water hemlock	0.30	0.068	1.702
7	Eupatorium perfoliatum	Boneset	1.00	0.017	0.425
8	Helenium autumnale	Sneezeweed	1.00	0.021	0.524
9	Helianthus grosseserratus	Saw-tooth sunflower	0.25	0.045	1.134
10	Iris shrevei	Blue flag	0.05	0.136	3.403
11	Lilium michiganense	Michigan lily	0.05	0.014	0.340
12	Lobelia siphilitica	Great lobelia	1.00	0.005	0.136
13	Lycopus americanus	Water horehound	1.00	0.021	0.524
14	Lythrum alatum	Winged loosestrife	1.00	0.001	0.023
15	Mentha arvensis	Wild mint	1.00	0.009	0.227
16	Pedicularis lanceolata	Swamp lousewort	1.15	0.071	1.779
17	Physostegia virginiana	False dragonhead	0.10	0.025	0.619
18	Polygonum pensylvanicum laevigatum	Pinkweed	1.00	0.209	5.236
19	Pycnanthemum virginianum	Common mountain mint	1.00	0.012	0.309
20	Scutellaria lateriflora	Mad-dog skullcap	1.00	0.016	0.400
21	Stachys palustris	Woundwort	0.20	0.034	0.851
22	Symphotrichum lanceolatum	Panicled aster	1.25	0.078	1.945
23	Symphotrichum novae-angliae	New England aster	1.00	0.041	1.031
24	Teucrium canadense	American germander	0.75	0.102	2.552
25	Thalictrum dasycarpum	Purple meadow-rue	0.30	0.074	1.856
26	Verbena hastata	Blue vervain	1.00	0.029	0.732
27	Veronicastrum virginicum	Culver's root	1.00	0.003	0.085
28					0.000
29					0.000
30					0.000
SUBTOTAL FORBS			20.00	2.213	55.328
TOTAL			40.50	3.157	78.926

SEEDING MIX FLORISTIC QUALITY VALUES

Average Coefficient of Conservatism	4.5
Floristic Quality Index	28.9

Fertilizer & Lime	General Soil Test	Total Needed lbs
Lime (ECCE) (Actual Lime)	2000	0
Nitrogen	30	0
Phosphate (P205)	30	0
Potash (K20)	40	0

Additional Seeding Criteria:

Do not use a companion crop. Do not apply fertilizer.

Spring seeding dates are between April 15th to July 1st.

Dormant Seeding dates are between November 15th to freeze up.

Seeding was completed by _____ according to the above requirements.
(Date)

(Producer's Signature)

(Date)

Field Office _____

Certified by _____

(NRCS Representative)

When seeding is completed, return seeding plan to the Natural Resources Conservation Services.

For state cost-share projects, attach receipts for seed, fertilizer, lime and mulch.

For Federal cost-share, return receipts to Farm Service Agency.



CENTERVILLE SERVICE CENTER
 501 N. 12TH ST.
 CENTERVILLE, IA 52544
 (641) 856-3893

MARGARET A. COPE
 DISTRICT CONSERVATIONIST

Conservation Plan

DEPARTMENT OF NATURAL RESOURCES
 502 E 9TH ST
 DES MOINES, IA 50319

Wildlife

Tract: 3475

Conservation Cover

Establish perennial native wet prairie vegetation on areas disturbed during shallow water excavation activities. Refer to Seeding Plan for details.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	25 ac	11	2010		
Total:	25 ac				

Dike

Construct a lineal earthen embankment to block surface flows, capture upland runoff, and restore wetland ecosystem. Includes auxiliary spillway, stripping, earthfill, and critical area seeding. Refer to engineering design for details.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	4400 ft	11	2010		
Total:	4400 ft				

Pest Management

Mowing of areas seeded to native vegetation to control weeds during the establishment period.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	25 ac	11	2010		
Total:	25 ac				

Structure for Water Control

Install a structure to control direction, rate and/or level of water in the system. Refer to the engineering design for details.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	1 no	11	2010		
Total:	1 no				

Wetland Restoration

Restore the function and values of wetland ecosystems by negating man-made drainage systems.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	333.5 ac	11	2010		
Total:	333.5 ac				

Wetland Wildlife Habitat Management

Retain, create, or manage wetland habitat for water fowl, fur bearers, or other wildlife.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	333.5 ac	11	2010		
Total:	333.5 ac				

CERTIFICATION OF PARTICIPANTS

DEPARTMENT OF NATURAL RES DATE

CERTIFICATION OF:

DISTRICT CONSERVATIONIST

MARGARET A. COPE DATE

CONSERVATION DISTRICT

APPANOOSE SOIL & WATER C DATE

PUBLIC BURDEN STATEMENT

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USDA NON-DISCRIMINATION STATEMENT

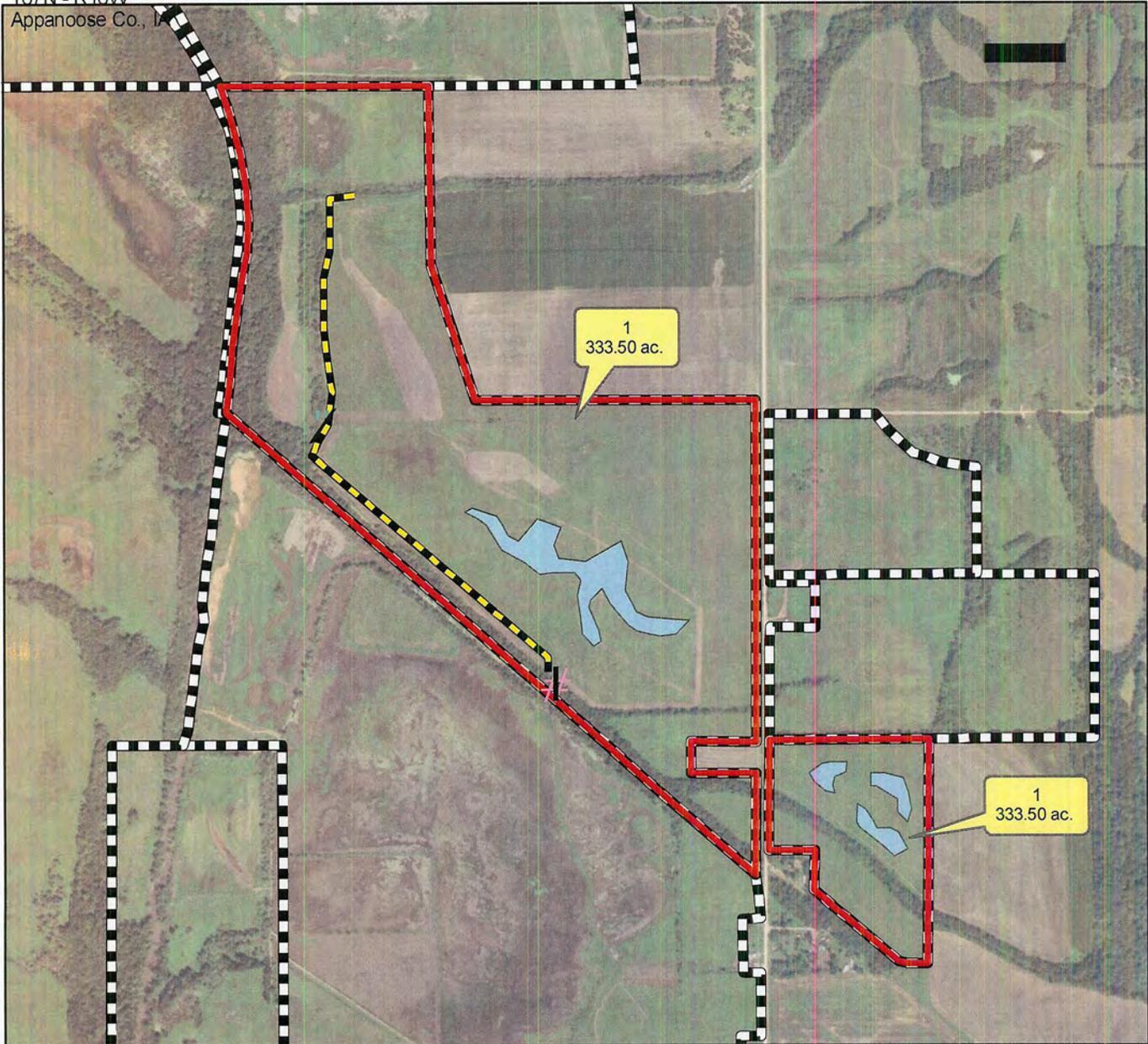
"The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, family status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, DC 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer."

Restoration Plan Map 66-6114-3-3609

Customer(s): DEPARTMENT OF NATURAL RESOURCES

Field Office: CENTERVILLE SERVICE CENTER
Agency: NRCS

Legal Description: Sections 32, 5, 4
T67N - R16W
Appanoose Co., IA



Legend

- Shallow Water Excavation Work Area
- Auxiliary Spillway
- Water Control Structure
- Dike Construction
- Consplan_t3475
- Iowa - NRCS Easements



Construction Specifications
for
IDNR/Brown Wetland
Appanoose County, IA
List of Specifications

Title	No.	Pages
Site Preparation	IA-1	2
Structure Removal	IA-3	1
Pollution Control	IA-5	2
Seeding and Mulching for Protective Cover	IA-6 IACPA-4	4
Mobilization	IA-8	2
Removal of Water	IA-11	1
Excavation	IA-21	2
Earthfill	IA-23	2
Topsoiling	IA-26	1
Steel Pipe Conduits	IA-52	2
Metal Fabrication and Installation	IA-81	1
Geotextile	IA-95	4
North American Green SC150 Specifications		3
Wetland Restoration, Enhancement or Creation w/GPS Waypoints	IA-657	7

These specifications are a part of the construction plans. The work shall be performed in accordance with the drawing and specifications unless otherwise approved, in writing, by the Inspector. For items of work requiring inspection, it is the responsibility of the Contractor to keep the Contracting Officer informed of the progress of work so that timely inspections may be performed. Work installed without inspection may not be certified as meeting NRCS standards.

Operation and Maintenance of IDNR-R Brown Wetland

An operation and maintenance (O&M) plan will be prepared for each wetland site.

Specified actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance). If applicable, the following activities shall be addressed in the plan:

- Timing and level setting of water control structures required for establishment of desired hydrologic conditions or for management of vegetation. Refer to Iowa Biology Technical Note 20
- Inspection schedule of dikes and structures for damage assessment
- Depth of sediment accumulation allowed before removal is required
- Management needed to maintain vegetation, including control of unwanted vegetation in and around the wetland area
- Acceptable uses and timing (e.g.: grazing and haying)

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides, and other chemicals shall assure that the intended purpose of the wetland restoration shall not be compromised.

Biological control of undesirable plant species and pests (e.g.: using predator or parasitic species) shall be implemented where available

The Principal Spillway is designed to handle storm flow that raises water levels higher than normal pool. Brush, debris and excess vegetation around the riser will impede flow. The area around the pipe should be mowed short to properly handle storm water. Beaver and muskrat will burrow into fills and attempt to dam the riser and the inlet. Rodent control is necessary to keep them from damaging the fill and pipe.

The stop logs in the riser need checked to assure the tightest fit to keep leakage at a minimum. They are intended to be removed when water levels are lowered or raised to promote a diverse wetland.

Periodical mowing of the Dike and Berm and the area 10' out from the dike toes will promote vigorous sod growth and remove woody vegetation.

Immediately repair any damage to the earthfill or pipes.

BID SCHEDULE
IDNR - Russell Brown
Appanoose County, Iowa

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6	Earthfill	IA-23	20,667	Cu. Yd.	\$ _____	\$ _____
7	Principal Spillway, 84" SMP Riser, 48" SMP Conduit	IA-51	1	Job	<u>XXX</u>	\$ _____
8	Macadam Stone Base	IA-24	30	Tons	\$ _____	\$ _____
9	Seeding, Islands	IA-6	5	Acres	\$ _____	\$ _____
10	Seeding - Levee, Outlet Chute, Aux. Spillway	IA-6	10	Acres	\$ _____	\$ _____
Total						<u>\$ _____</u>

Firm: _____

Signature: _____

TIN#/SSN#: _____

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-1 SITE PREPARATION

1. SCOPE

Site preparation work shall consist of clearing, grubbing, stripping, refuse removal, banksloping and structure removal on the site as necessary to rid the site of all undesirable materials on or near the surface and prepare the site for the structure. All woody growth within the construction area shall be cleared and all stumps and roots one inch in diameter or larger shall be grubbed from the site. In addition, all areas within 25 feet of the footprint of the structure shall be cleared and grubbed except as directed by NRCS. The work shall also consist of the removal and disposal of structures (including fences) that must be removed to perform other items of work.

2. FOUNDATION PREPARATION

The construction areas shall be stripped of all unsuitable materials such as organic matter, grasses, weeds, sod, debris, and stones larger than 6 inches in diameter.

In an earth embankment foundation area, all channel banks and sharp breaks shall be sloped to no steeper than 1.5:1.

The foundation area shall be thoroughly scarified before placement of fill material. The surface shall have moisture added or shall be compacted if necessary so that the first layer of fill material can be compacted and bonded to the foundation.

3. STRIPPED MATERIAL DISPOSAL

Suitable soil material shall be stockpiled for use as topsoil. The other stripped materials shall be buried, removed from the site, or disposed of as directed by the owner or NRCS.

Stockpiled materials around a construction site should not hinder subsequent construction operations.

4. DISPOSAL OF REFUSE MATERIALS

Waste materials from clearing and structure removal shall be burned or buried at locations approved by the owner. Buried materials shall be covered with a minimum of 2 feet of earthfill.

All refuse shall be disposed of in a manner which complies with all local and state regulations.

5. SALVAGE

Items to be salvaged shall be as shown on the drawings. Structures and fencing materials that are designated to be salvaged shall be carefully removed and neatly placed in the specified storage areas.

6. SPECIAL SPECIFICATIONS

See next page.

SPECIAL SPECIFICATIONS, IA-1 SITE PREPARATION

STRIPPING EXISTING LEVEE:

The existing levee w/new berm added will be stripped of vegetation from the inside (wetland) toe of the levee to a distance of 5' off the outside edge of the levee top. Total approximate length = 2,400'. The vegetation under the planned New Dike w/ Berm will be stripped.

Total approximate length = 2,500'.

Material will be placed as 5 Stripping Islands as shown on Sht. 2

STRIPPING BORROW AREA:

The Borrow Area Boundary is the maximum area allowed to obtain earthfill for the construction of the existing levee w/ berm and the new dike w/ berm. The stripping will be placed as 5 Stripping Islands as shown on Sht. 2. Stripping areas will be properly spaced to allow even distribution of material to the 5 required islands.

BRUSH PILE PLACEMENT:

Brush and trees will be removed from the existing levee and within 25' of the outside toe if not removed during the stripping of the existing levee. The trees piled on the outside can be spaced every 400' and will not obstruct drainage or flood flow.

Brush and trees will be removed within 25' of the auxiliary spillway and its cut/fill slopes. The trees will be piled on the wetland side and will not obstruct flood flow.

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-3 STRUCTURE REMOVAL

1. SCOPE

The work shall consist of the removal, salvage and disposal of structures (including fences) from the designated areas and as indicated on the drawings.

2. MARKING

Each structure unit to be removed will be marked by means of stakes, flags, painted markers or other suitable methods.

3. REMOVAL

All structures designated for removal shall be removed to the specified extent and depth.

4. SALVAGE

Structures that are designated to be salvaged shall be carefully removed and neatly placed in the specified storage areas. Salvaged structures that are capable of being disassembled shall be dismantled into individual members or sections. Such structures shall be neatly match marked with paint prior to disassembly. All pins, nuts, bolts, washers, plates and other loose parts shall be marked or tagged to indicate their proper location in the structure and shall be fastened to the appropriate structural member or packed in suitable containers. Materials from fences designated to be salvaged shall be placed outside the work area on the property from which they are removed. Wire shall be rolled into uniform rolls of convenient size. Posts and rails shall be neatly piled.

5. DISPOSAL OF REFUSE MATERIALS

Refuse materials resulting from structure removal shall be burned or buried at locations shown on the drawings. Buried materials shall be covered with a minimum of 2 feet of earthfill.

All refuse shall be disposed of in a manner which complies with all local and state regulations.

6. SPECIAL SPECIFICATIONS

Dispose and/or salvage materials as directed by the owner and as shown on the drawings.

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-5 POLLUTION CONTROL

1. SCOPE

The work shall consist of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air during construction operations.

2. MATERIALS

All materials furnished shall meet the requirements shown on the drawings or in the specifications.

3. EROSION AND SEDIMENT CONTROL MEASURES AND WORKS

The measures and works shall include, but are not limited to, the following:

Staging of Earthwork Activities: The excavation and moving of soil materials shall be scheduled so that areas unprotected from erosion will be minimized. These areas will be unprotected for the shortest time feasible.

Seeding: Structures and disturbed areas shall be seeded as soon as possible after construction is completed.

Temporary seedings may be used as an alternative to other stabilization measures as approved by NRCS.

Mulching: Construction areas that have been disturbed but have no construction activity scheduled for 21 days or more shall have erosion protection measures applied by the 14th day. This erosion protection may be mulching or other approved temporary measures. Construction areas left open during a winter shutdown period shall be protected by mulching.

All seeding and mulching shall be completed in accordance with the seeding plan and Iowa Construction Specification IA-6, Seeding and Mulching for Protective Cover.

The following works may be temporary. If they are installed as a temporary measure, they shall be removed and the area restored to its original state when they are no longer needed or when permanent measures are installed.

Diversions: Diversions may be required to divert clean runoff water away from work areas and to collect runoff from work areas for treatment and safe disposition.

Stream Crossings: Culverts or bridges may be required where construction equipment must cross streams.

Sediment Basins: Sediment basins may be required to settle and filter out sediment from eroding areas to protect properties and streams below the construction site.

Sediment Filters: Straw bale filters, geotextile sediment fences, or other equivalent methods may be used to trap sediment from areas of limited runoff. Sediment filters shall be properly anchored to prevent erosion under them.

Waterways: Waterways may be required for the safe removal of runoff from fields, diversions, and other structures or measures.

4. CHEMICAL POLLUTION

The Contractor shall provide watertight tanks or barrels or construct a sump sealed with plastic sheets to be used to dispose of chemical pollutants, such as drained lubricating or transmission oils, greases, soaps, concrete mixer wash water, asphalt, etc., produced as a by-product of the construction work. At the completion of the construction work, sumps shall be removed and the area restored without causing pollution.

Sanitary facilities such as chemical toilets or septic tanks shall not be placed adjacent to live streams, wells, or springs. They shall be located at a distance sufficient to prevent contamination of any water sources. At the completion of construction work, facilities shall be disposed of without causing pollution.

5. AIR POLLUTION

The burning of brush or trash or disposal of other materials shall adhere to local and state regulations.

Fire prevention measures shall be taken to prevent the start or the spreading of wild fires, which result from project work. Fire breaks or guards shall be constructed at locations shown on the drawings.

All public access or haul roads used by the contractor during construction of the project shall be sprinkled or otherwise treated to fully suppress dust. All dust control methods shall insure safe operations at all times. If chemical dust suppressants are used, the material shall be a commercially available product specifically designed for dust suppression and the application shall follow manufacturer's requirements and recommendations. A copy of the product data sheet and manufacturer's recommended application procedures shall be provided to the Engineer five working days before use.

6. MAINTENANCE, REMOVAL, AND RESTORATION

All pollution control measures and works shall be adequately maintained in a functional condition as long as needed during the construction operation. All temporary measures shall be removed and the site restored to as near original conditions as practical.

7. SPECIAL SPECIFICATIONS

None

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-6 SEEDING AND MULCHING FOR PROTECTIVE COVER

1. SCOPE

The work shall consist seeding, mulching, and fertilizing all disturbed areas and other areas as indicated on the drawings or otherwise designated.

2. SEEDBED PREPARATION AND APPLICATION

The entire area to be seeded shall be reasonably smooth and all washes and gullies shall be filled to conform to the desired cross-section before actual seedbed preparation is begun. At this stage of the operation, the required fertilizer and lime shall be applied uniformly and incorporated into the top 3 inches of the soil with suitable tillage equipment. The seedbed preparation operation shall be suspended when the soil is too wet or too dry. The seedbed shall be loosened to a depth of at least three inches.

On side slopes steeper than 2-1/2:1, the 3 inch minimum depth of seedbed preparation is not required, but the soil shall be worked enough to insure sufficient loose soil to provide adequate seed cover.

Unless otherwise specified, the seeding operation shall be performed immediately after preparation of the seedbed. The seed shall be drilled or broadcast by equipment that will insure uniform distribution of the seed.

3. MATERIALS

The seeding, fertilizing, and mulching requirements are as specified on Form IA-CPA-4.

Straw from cereal grains or hay will be used as mulching material. It shall be relatively free of weeds.

4. MULCH APPLICATION

The required mulching shall be performed as soon as possible after seeding unless otherwise specified. The mulch shall be applied uniformly over the area. The type and rate shall be as specified. When mulching is required, all areas seeded during any one day shall be mulched within 24 hours. The mulch may be spread by any means that results in a uniform cover.

The mulch shall be anchored. Anchoring of the mulch may be performed by a mulch anchoring tool or regular farm disk weighted and set nearly straight, by installation of mulch netting, or by other methods approved by NRCS.

5. SPECIAL SPECIFICATIONS

The 5 areas shown as "Stripping Islands" on Sheet 2 of 10 will be seeded according to the "Island Seeding Plan". All other seeding will follow the Levee, Outlet Chute and Auxiliary Spillway Seeding Plan.

**Special Specifications IA-6
IDNR/Brown**

The 5 areas noted as “Stripping Islands” on Sheet 2 of 10 on the Construction Drawings will be seeded according to the “Island Seeding Plan”. All other seeding will be seeded according to the Levee, Outlet Chute and Auxiliary Spillway Seeding Plan.

The Outlet Chute will have Erosion Control Blanket (ECB) material installed as shown in the Construction Drawings.

The ECB material shall be similar in performance and specifications to North American Green SC150 extended-term degradable ECB. The product will be pre-approved by the government inspector.

The ECB will be installed in accordance with the manufacturer’s recommendation for chutes.

Island Seeding Plan

Name IDNR/Brown Date 4/10 Tract No. _____
Appanoose County Field No. _____
 Type of Seeding: Structure Pasture
 Contract No. _____
 Prepared By _____
 Waterway CRP EWRP/WRP

Seeding *Percent Pure Live Seed = $\frac{(\% \text{ germination} + \% \text{ hard seed}) \times \% \text{ purity}}{100}$

Species	Total Acres	Pounds Per Acre (Circle One) Bulk <u>PLS*</u>	Total Pounds Needed
Smooth Bromegrass	5	15	75
Red Clover (Medium)		5	25
Fertilizer & Lime			
Lime (ECCE)		--	
Nitrogen			
Phosphate (P ₂ O ₅)			
Potash (K ₂ O)			

Seeding will be completed: 3/1 to 5/15 4/1 to 6/1
 8/1 to 9/15 **Other**
(Immediately after construction)

Additional seeding criteria:

Seeding was completed by _____ according to the above requirements.
 (Date)

 (Producer's signature) (Date)

Field Office: _____ Certified by : _____
 (NRCS Representative)

When seeding is complete, return Seeding Plan to the Natural Resources Conservation Service. Attach receipts for seed, fertilizer, lime and mulch.

Levee, Outlet Chute and Auxiliary Spillway Seeding Plan

Name IDNR/ Brown Date 4/10 Tract No. _____
Appanoose County Field No. _____
 Contract No. _____
 Prepared By _____

Type of Seeding: Structure Pasture
 Waterway CRP EWRP/WRP

Seeding *Percent Pure Live Seed = $\frac{(\% \text{ germination} + \% \text{ hard seed}) \times \% \text{ purity}}{100}$

Species	Total Acres	Pounds Per Acre (Circle One) Bulk <u>PLS*</u>	Total Pounds Needed
Switchgrass (Cave-in-Rock)	10	5	50
Smooth Bromegrass		15	150
Red Clover (Medium)		5	50
Birdsfoot Trefoil (Empire)		5	50
Perennial Ryegrass		10	100
Fertilizer & Lime			
Lime (ECCE)		--	
Nitrogen		50	500
Phosphate (P ₂ O ₅)		100	1000
Potash (K ₂ O)		100	1000

Seeding will be completed: 3/1 to 5/15 4/1 to 6/1
 8/1 to 9/15 **Other**
(Immediately after construction)

Additional seeding criteria:
 Spread and anchor cereal grain straw mulch at a rate of 2000 lbs./acre.

Seeding was completed by _____ according to the above requirements.
 (Date)

 (Producer's signature) (Date)

Field Office: _____ Certified by : _____
 (NRCS Representative)

When seeding is complete, return Seeding Plan to the Natural Resources Conservation Service. Attach receipts for seed, fertilizer, lime and mulch.

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-8. MOBILIZATION AND DEMOBILIZATION

1. SCOPE

This work shall consist of the mobilization and demobilization of the Contractor's forces and equipment necessary for performing the work required under the contract.

The work shall not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract.

Mobilization will not be considered as work in fulfilling the contract requirement for commencement of work.

2. EQUIPMENT AND MATERIALS

Mobilization shall include all activities and costs for transportation of personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary facilities for the Contractor's operations at the site; premiums paid for performance and payment bonds, including coinsurance and reinsurance agreements as applicable; and other items specified in Section 4.

Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not included in the contract from the site; including the disassembly, removal and site cleanup of offices, buildings, and other facilities assembled for this contract.

The work includes mobilization and demobilization activities required by the contract at the time of award. If additional mobilization and demobilization activities and costs are required during the performance of the contract as a result of changed, deleted or added items of work for which the contractor is entitled to an adjustment in contract price, compensation of such costs will be included in the price adjustment for the item or items of work changed or added.

3. PAYMENT

Payment will be made as the work proceeds, after presentation of invoices by the contractor showing specific mobilization and demobilization costs and evidence of the charges of suppliers, subcontractors, and others. If the total of such payments is less than the lump sum contract price, the unpaid balance will be included in the final contract payment. Payment of the lump sum contract price for mobilization and demobilization will constitute full compensation for the completion of the work.

Payment will not be made under this item for the purchase costs of materials having a residual value, the cost of materials to be incorporated in the project, or the purchase costs of operating supplies.

4. SPECIAL SPECIFICATIONS

Items of work to be performed in conformance with this specification and the construction details therefor are:

a. Bid Item, Mobilization

- (1) This item shall consist of mobilizing and demobilizing personnel and equipment in preparation to perform the work within the scope of this contract.
- (2) Any work that is necessary to provide access to the sites including, but not limited to, grading, temporary culverts, and clearing will be included in this item. When construction is completed access areas will be restored, as close as practical, to its original condition.
- (3) Any fence removed for access and /or to provide work area shall be replaced with same or like materials as approved by the engineer.
- (4) The Contractor shall exercise caution to minimize the amount of damage caused by the grading and clearing operations.
- (5) Portable toilets shall be provided at the construction site and used for the sanitary facilities.
- (6) This item shall not include transportation of personnel, equipment and operating supplies within the work limits areas of this contract.
- (7) Payment will constitute full compensation for related subsidiary item, Pollution Control.

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-11 REMOVAL OF WATER

1 SCOPE

The work shall consist of the removal of surface water and ground water as needed to perform the required construction in accordance with the plans and specifications.

2. DIVERTING SURFACE WATER

The Contractor shall build, maintain and operate all cofferdams, channels, diversions, flumes, sumps, and other temporary protective works needed to divert surface water away from the construction site while construction is in progress.

3. DEWATERING THE CONSTRUCTION SITE

Foundations, cutoff trenches, borrow areas and other parts of the construction site shall be dewatered as needed for proper execution of the construction work. The Contractor shall furnish, install, operate and maintain all works and equipment needed to perform the dewatering.

4. EROSION AND POLLUTION CONTROL

Removal of water from the construction site, including the borrow areas shall be accomplished in such a manner that erosion and the transmission of sediment and other pollutants are minimized.

5. REMOVAL OF TEMPORARY WORKS

After temporary works have served their purposes and before the Contractor leaves the site, they shall be removed.

6. SPECIAL SPECIFICATIONS

None

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-21 EXCAVATION

1. SCOPE

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

2. USE OF EXCAVATED MATERIALS

Suitable materials from the specified excavations shall be used in the construction of required permanent earth fill. The suitability of materials for specific purposes shall be determined by the NRCS Inspector.

3. DISPOSAL OF WASTE MATERIAL

All surplus or waste material shall be disposed of in areas shown on the drawings or as approved by the NRCS Inspector. The waste material shall be smoothed and sloped to provide drainage.

4. STRUCTURE AND TRENCH EXCAVATION

Structure or trench excavations will conform with all safety requirements of OSHA.

5. BORROW EXCAVATION

When the quantities of suitable materials obtained from specified excavations are insufficient to construct the specified fills, additional materials shall be obtained from the designated borrow areas as shown on the drawings or as approved by the NRCS and the landowner.

Borrow areas shall be excavated and finally graded in a manner to eliminate steep or unstable side slopes or hazardous or unsightly conditions.

6. OVER-EXCAVATION

Excavation beyond the specified lines and grades shall be corrected by filling the resulting voids with compacted earthfill, except that if the earth is to become the subgrade for riprap, sand or gravel bedding or drainfill, the voids shall be filled with material conforming to the specifications for the riprap, bedding or drainfill, as appropriate.

7. SPECIAL SPECIFICATIONS

See page IA-21-2.

SPECIAL SPECIFICATIONS, IA-21 EXCAVATION:

SHALLOW WATER EXCAVATION

Excavated material from the 3 Shallow Water Excavation (SWE) Sites will be placed within each Site's Spoil Boundary as waste material.

Median fill above existing ground: 1.25' Maximum fill: 2' Slope range: 6:1 to 10:1
Fills will undulate in height and configuration. Length and height of mounds will not exceed 200' before a change of configuration is required.

Stripping is not required prior to applying excavated material.

Finish will be considered adequate for the operation of a farm tractor and implement to achieve a seed bed.

Median fill heights over allowable spoil areas will utilize 2,016 cu yds/acre.

STRIPPING ISLANDS

Material stripped from the borrow areas and/or areas where earthfill is to be placed will be used to construct 5 Stripping Islands as shown on the drawings. Other waste material may be placed in the Stripping Islands as approved by the Inspector.

Each Island will be located approximately where shown on the drawings. Side slopes will be 10:1. The Islands will conform to the approximate shape and sized according to available stripping material. The top of each Island will be built level to elevations between 800.0 and 801.0. Finish quality will be sufficient to allow a farm tractor and implement to prepare an adequate seedbed.

EXCAVATION OF MEANDERING STREAM, OUTLET CHUTE and AUXILLARY SPILLWAY:

Excavated material, if stripped, can be used as Earthfill.

Excavated material can be placed as waste material as allowed in Shallow Water Excavation.

EXCAVATION of BORROW AREA:

The borrow sites will be properly spaced to allow an irregular finish throughout the Borrow Area as required below, unless determined otherwise by the Inspector.

36 acres available in Borrow Area.

Average depth of cut: 1'

Maximum depth of cut: 2'

No excavation allowed within 50' of the toe of the islands.

Borrow will be irregular by alternating cut depth and direction of cuts.

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-23 EARTHFILL

1. SCOPE

The work shall consist of the construction of earthfills required by the drawings and specifications.

2. MATERIALS

All fill materials shall be obtained from required excavations and designated borrow areas. Fill materials shall contain no sod, brush, roots or other bio-degradable materials. Rocks larger than 6 inches in diameter shall be removed prior to compaction of the fill.

3. FOUNDATION PREPARATION

Foundations for earthfill shall be stripped to remove vegetation and other unsuitable materials. Foundation surfaces shall be scarified to a minimum depth of 2 inches.

Foundation and abutment surfaces shall not be sloped steeper than 1.5:1 unless otherwise shown on the drawings.

4. PLACEMENT

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by NRCS. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

Adjacent to structures or pipes, fill shall be placed in a manner which will prevent damage. The height of the fill adjacent to structures or pipes shall be increased at approximately the same rate on all sides.

The materials used throughout the earthfill shall be essentially uniform. Selective placement shall be as shown on the drawings or approved by NRCS.

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

The top surfaces of embankments shall be maintained approximately level during construction, except that a cross-slope of approximately 2% shall be maintained to ensure effective drainage.

5. CONTROL OF MOISTURE CONTENT

The moisture content of the fill material shall be adequate for obtaining the required compaction. Material that is too wet shall be dried to meet this requirement, and material that is too dry shall have water added and mixed until the requirement is met.

The moisture content of the fill material shall be such that a ball formed with the hands does not crack or separate when struck sharply with a pencil and will easily ribbon out between the thumb and finger.

Earth foundations under and adjacent to concrete structures shall be prevented from drying and cracking before concrete and backfill are placed.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as possible.

6. COMPACTION

Earthfill shall be compacted by one of the following methods as specified on the plans. If no method is specified, compaction will be in accordance Method 1.

Method 1 - Earthfill shall be placed so that the wheels of the loaded, rubber tired, hauling equipment traveling in a direction parallel to the centerline of fill pass over the entire surface of the layer being placed.

Method 2 - Two (2) complete passes of a tamping-type roller will be made over each layer. The roller shall be capable of exerting a minimum of one-hundred (100) pounds per square inch.

Method 3 - Minimum density shall be 90% of the maximum density as determined by ASTM 698.

The maximum thickness of a lift of fill before compaction shall be 9 inches, unless otherwise indicated on the drawings

Fill adjacent to structures, pipe conduits, and anti-seep collars shall be placed in layers not more than 4 inches thick and compacted to a density equivalent to that of the surrounding fill by hand tamping, manually directed power tampers, or plate vibrators. Care should be taken so that compaction around the spillway pipe does not cause uplift of the pipe resulting in a void beneath the pipe. Hand tamping only shall be used to compact the earthfill under the bottom half of circular pipes. Equipment shall not be operated within 2 feet of any structure or pipe.

Compacting of fill adjacent to structures shall not be started until the concrete is 7 days old.

7. SPECIAL SPECIFICATIONS

None

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-26 TOPSOILING

1. SCOPE

The work shall consist of salvaging topsoil from borrow areas or required excavations and spreading it on the exposed disturbed areas.

2. QUALITY OF TOPSOIL

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

3. EXCAVATION

After the site has been cleared and grubbed, the topsoil shall be removed from borrow areas and required excavation areas to the depth as shown on the drawings. Topsoil shall be stockpiled at locations approved by NRCS.

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 designated to be covered shall be lightly scarified just prior to the spreading operation. Where compacted fills are designated to be covered by topsoil, the topsoil shall be placed concurrently with the fill and shall be bonded to the compacted fill with the equipment.

Topsoil shall be placed to the minimum depth shown on the drawings. After the spreading operation is completed, the surface shall be finished to a reasonably smooth surface.

5. SPECIAL SPECIFICATIONS

The existing levee, new dike and berms will be topdressed following completion of the earthfill with 6" of topsoil. The topsoil will be brought in from the Borrow Area.

NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-52 STEEL PIPE CONDUITS

1. SCOPE

The work shall consist of furnishing and installing steel pipe complete with appurtenances.

2. MATERIALS

Steel pipe shall be new, new reject or used seamless and welded steel pipe. Reject or used pipe may be accepted if inspected by the Soil Conservation Service before installation and found to be in good condition. All pipe must have the following minimum wall thickness.

<u>Pipe Diameter</u>	<u>Minimum Wall Thickness</u>
4-16"	1/4"
18-26"	9/32"
over 26"	3/8"

Unless otherwise specified, special fittings and appurtenances shall be of the same material as the pipe.

Steel welding electrodes shall conform to the requirements of American Welding Society specifications AWS A5.1. "Specification for Mild Steel Covered Arc-Welding Electrodes," except that they shall be uniformly and heavily coated (not washed) and shall be of such a nature that the coating will not chip or peel while being used with the maximum amperage specified by the manufacturer.

3. LAYING AND BEDDING THE PIPE

Pipe shall be laid to the line and grade shown on the drawings. Unless otherwise specified, the pipe shall be laid so that there are no reversals of grade between joints, and shall also be installed in accordance with the manufacturer's recommendations. The pipe shall be firmly and uniformly bedded to the depth and in the manner specified on the drawings. An ample "bell hole" working area may be left at pipe joints to perform welding, coating, etc., activities. The "bell hole" area shall then be bedded, as specified, prior to backfill operations.

The pipe shall be weighed down sufficiently to prevent its displacement from the bedding during placement of the backfill under the haunches.

4. JOINTS

Pipe joints shall conform to the details shown on the drawings and shall be sound and watertight.

Welded Joints. Welding and welded joints shall conform to the welding procedure details and requirements of AWWA Standard C 206. Field welding shall be done in such a way as to avoid burning the protective coating on the pipe except in the immediate vicinity of the weld.

Welded field joints shall be single welded butt joints or lap welded slip joints, as shown on the drawings. Special closure lap joints shall be used as described in AWWA Standard C 206.

5. HANDLING THE PIPE

The Contractor shall furnish such equipment as is necessary to place the pipe without damaging the pipe.

6. BACKFILLING

Backfill material shall have sufficient moisture so that optimum compaction can be obtained. Backfill around the pipe shall be placed in layers not more than 4 inches thick before compaction.

Each layer of backfill shall be compacted with power tampers, hand tampers, or plate vibrators to the same density requirements as specified for the adjacent embankment. Backfill over and around the pipe shall be brought up uniformly on all sides. The passage of earth moving equipment will not be allowed over the pipe until backfill has been placed above the top of the pipe surface to a depth of two (2) feet.

7. SPECIAL SPECIFICATIONS

None

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-81. METAL FABRICATION AND INSTALLATION

1. SCOPE

The work shall consist of furnishing, fabricating, and installing metalwork including metal parts of composite structures.

2. MATERIALS

Steel shall be of structural quality. Finished surfaces shall be smooth and true to assure proper fit.

Bolts, nuts, washers, rods, rivets, etc., shall be of a material equal to the steel being fastened.

3. PROTECTIVE COATINGS

Protective coatings will consist of either galvanizing or painting and shall be applied by the fabricator.

Galvanizing shall consist of a zinc coating by the hot dip process, except that bolts, nuts, and washers may have a electrodeposited zinc coating.

Paint System for this specification shall consist of the application of one coat of Epoxy Polyamide Primer (lead and chromate free) and one or more coats of Epoxy Polyamide (intermediate or finish), lead free. When finished, it will have a minimum dry film thickness of 8.0 mils.

4. FABRICATION

Materials shall be carefully fabricated as shown on the drawings. The fabrication shall be smooth and true to assure proper fit. Galvanized items shall not be cut, welded, or drilled after the zinc coating is applied.

5. ERECTION

The metal shall be erected true and plumb, closely conforming to the drawings.

6. SPECIAL SPECIFICATIONS

None

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

IA-95 GEOTEXTILE

1. SCOPE

This work shall consist of furnishing all materials, equipment, and labor necessary for the installation of geotextiles.

2. MATERIAL QUALITY

Geotextiles shall be manufactured from synthetic long chain or continuous polymeric filaments or yarns, having a composition of at least 95 percent, by weight, of polypropylene, polyester or polyvinylidene-chloride. The geotextile shall be formed into a stable network of filaments or yarns that retain their relative position to each other, are inert to commonly encountered chemicals and are resistant to ultraviolet light, heat, hydrocarbons, mildew, rodents and insects. Unless otherwise specified, the class and type of geotextile shall be as shown on the drawings and shall meet the requirements for materials that follow:

- a. Woven Geotextile shall conform to the physical properties listed in Table 1. The woven geotextile shall be manufactured from monofilament yarns that are woven into a uniform pattern with distinct and measurable openings. The geotextile shall be manufactured so that the yarns will retain their relative position with regard to each other. The yarns shall contain stabilizers and/or inhibitors to enhance their resistance to ultraviolet light or heat exposure. The edges of the material shall be selvaged or otherwise finished to prevent the outer yarn from unraveling.
- b. Nonwoven Geotextile shall conform to the physical properties listed in Table 2. Nonwoven geotextiles shall be manufactured from randomly oriented fibers that have been mechanically bonded together by the needle-punched process. In addition, one side may be slightly heat bonded. Thermally bonded, nonwoven geotextiles, in addition to mechanically bonded, nonwoven geotextiles, may be used for Road Stabilization. The filaments shall contain stabilizers and/or inhibitors to enhance their resistance to ultraviolet light or heat exposure.
- c. The geotextile shall be shipped in rolls wrapped with a protective covering to keep out mud, dirt, dust, debris and direct sunlight. Each roll of geotextile shall be clearly marked to identify the brand, type and production run.

3. STORAGE

Prior to use, the geotextile shall be stored in a clean dry place, out of direct sunlight, not subject to extremes of either hot or cold, and with the manufacturer's protective cover in place. Receiving, storage, and handling at the job site shall be in accordance with the requirements in ASTM D 4873.

4. SURFACE PREPARATION

The surface on which the geotextile is to be placed shall be graded to the neat lines and grades as shown on the drawings. The surface shall be reasonably smooth and free of loose rock and clods, holes, depressions, projections, muddy conditions and standing or flowing water (unless otherwise on the drawings).

5. PLACEMENT

Prior to placement of the geotextile, the soil surface will be inspected for quality assurance of design and construction. The geotextile shall be placed on the approved prepared surface at the locations and in accordance with the details shown on the drawings. The geotextile shall be unrolled along the placement area and loosely laid (not stretched) in such a manner that it will conform to the surface irregularities when material is placed on or against it. The geotextile may be folded and overlapped to permit proper placement in the designated area.

The geotextile shall be joined by overlapping a minimum of 18 inches (unless otherwise specified), and secured against the underlying foundation material. Securing pins, approved and provided by the geotextile manufacturer, shall be placed along the edge of the panel or roll material to adequately hold it in place during installation. Pins shall be steel or fiberglass formed as a "U", "L", or "T" shape or contain "ears" to prevent total penetration. Steel washers shall be provided on all but the "U" shaped pins. The upstream or up-slope geotextile shall overlap the abutting down-slope geotextile. At vertical laps, securing pins shall be inserted through both layers along a line through approximately the midpoint of the overlap. At horizontal laps and across slope laps, securing pins shall be inserted through the bottom layer only. Securing pins shall be placed along a line approximately 2 inches in from edge of the of the placed geotextile at intervals not to exceed 12 feet unless otherwise specified. Additional pins shall be installed as necessary and where appropriate, to prevent any undue slippage or movement of the geotextile. The use of securing pins will be held to the minimum necessary. Pins are to be left in place unless otherwise specified.

Should the geotextile be torn or punctured, or the overlaps disturbed, as evidenced by visible geotextile damage, subgrade pumping, intrusion, or grade distortion, the backfill around the damaged or displaced area shall be removed and restored to the original approved condition. The repair shall consist of a patch of the same type of geotextile being used, overlaying the existing geotextile. The patch shall extend a minimum of 2 feet from the edge of any damaged area.

The geotextile shall not be placed until it can be anchored and protected with the specified covering within 48 hours or protected from exposure to ultraviolet light. In no case shall material be dropped on uncovered geotextile from a height greater than 3 feet.

6. SPECIAL SPECIFICATIONS

The Outlet Chute will have Erosion Control Blanket (ECB) material installed as shown in the Construction Drawings.

The ECB material shall be similar in performance and specifications to North American Green SC150 extended-term degradable ECB. The product will be pre-approved by the government inspector.

The ECB will be installed in accordance with the manufacturer's recommendation for chutes.

TABLE 1. REQUIREMENTS FOR WOVEN GEOTEXTILES

Property	Test Method	Class I	Class II & III	Class IV
Tensile strength (pounds) ^{1/}	ASTM D 4632 grab test	200 minimum in any principal direction	120 minimum in any principal direction	180 minimum in any principal direction
Elongation at failure (percent) ^{1/}	ASTM D 4632 grab test	<50	<50	< 50
Puncture (pounds) ^{1/}	ASTM D 4833	90 minimum	60 minimum	60 minimum
Ultraviolet light (% residual tensile strength)	ASTM D 4355 150-hr exposure	70 minimum	70 minimum	70 minimum
Apparent opening size – AOS	ASTM D 4751	As specified, but no smaller than 0.212 mm (#70) ^{2/}	As specified, but no smaller than 0.212 mm (#70) ^{2/}	As specified, but non smaller than 0.212 mm (#70) ^{2/}
Percent open area (percent)	CWO-02215-86	4.0 minimum	4.0 minimum	1.0 minimum
Permittivity sec ⁻¹	ASTM D 4491	0.10 minimum	0.10 minimum	0.10 minimum

1/ Minimum average roll value (weakest principal direction).

2/ U.S. standard sieve size

Note: CWO is a USACE reference.

TABLE 2. REQUIREMENTS FOR NONWOVEN GEOTEXTILES

Property	Test Method	Class I	Class II	Class III	Class IV ^{3/}
Tensile strength (pounds) ^{1/}	ASTM D 4632 grab test	180 minimum	120 minimum	90 minimum	115 minimum
Elongation at failure (%) ^{1/}	ASTM D 4632	≥50	≥50	≥ 50	>50
Puncture (pounds)	ASTM D 4833	80 minimum	60 minimum	40 minimum	40 minimum
Ultraviolet light (% residual tensile strength)	ASTM D 4355 150-hr exposure	70 minimum	70 minimum	70 minimum	70 minimum
Apparent opening size – AOS	ASTM D 4751	As specified max. # 40 ^{2/}			
Permittivity sec ⁻¹	ASTM D 4491	0.70 minimum	0.70 minimum	0.70 minimum	0.10 minimum

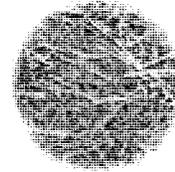
1/ Minimum average roll value (weakest principal direction).

2/ U.S. standard sieve size

3/ Heat-bonded or resin bonded geotextile may be used for classes III and IV. They are particularly well suited to class IV. Needle punched geotextiles are required for all other classes.



MATERIAL SPECIFICATION



SC150

The extended-term erosion control blanket shall be a machine-produced blanket of 70% agricultural straw and 30% coconut fiber matrix with a functional longevity of up to 24 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographic location, and elevation).

The blanket shall be of consistent thickness with the straw and coconut evenly distributed over the entire area of the blanket. The blanket shall be covered on the top side with heavyweight photodegradable polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.63 x 0.63 inch (1.59 x 1.59 cm) mesh, and on the bottom side with a lightweight photodegradable polypropylene netting with an approximate 0.50 x 0.50 inch (1.27 x 1.27 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread.

The SC150 shall meet requirements established by the Erosion Control Technology Council (ECTC) Specification and the U.S. Department of Transportation, Federal Highway Administration's (FHWA) *Standard Specifications For Construction of Roads and Bridges on Federal Highway Projects, FP-03 2003 Section 713.17* as a *Type 3.B Extended-term Erosion Control Blanket*.

The SC150 is also available upon request with the DOT System™. The DOT System™ consists of installation staple patterns clearly marked on the erosion control blanket with environmentally safe paint. The blanket shall be manufactured with a colored line or thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) to ensure proper material overlapping.

The extended-term straw/coconut fiber erosion control blanket shall be SC150 as manufactured by North American Green, or equivalent. The SC150 erosion control blanket shall have the following properties:

Material Content

Matrix	70% Straw Fiber (0.35 lb/yd ²) (0.19 kg/m ²) 30% Coconut Fiber (0.15 lb/yd ²) (0.08 kg/m ²)
Netting	Top side heavyweight photodegradable with UV additives (3.0 lbs/1,000 ft ² [1.47 kg/100 m ²] approximate weight) Bottom side lightweight photodegradable Minimum netting weight (1.50 lbs/1,000 ft ² [0.73 kg/100 m ²] approx. weight)
Thread	Degradable

SC150 is Available with the Following Physical Specifications Per Roll [English Units (Metric Units)]

Width	6.67 ft (2.03 m)	16.0 ft (4.87 m)
Length	108.00 ft (32.92 m)	108.0 ft (32.92 m)
Weight ± 10%	44.00 lbs (19.95 kg)	105.6 lbs (47.90 kg)
Area	80.00 yds ² (66.89 m ²)	192.0 yd ² (165.53 m ²)

Roll Widths Also Available Upon Special Request

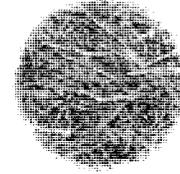
Width	8.0 ft (2.43 m)	13.3 ft (4.05 m)
Length	112.5 ft (34.29 m)	108.0 ft (32.92 m)
Weight ± 10%	55.8 lbs (25.31 kg)	88.0 lbs (39.92 kg)
Area	100.0 yd ² (83.61 m ²)	160.0 yd ² (133.78 m ²)

Stitch Spacing for All Rolls = 1.50 inches (3.81 cm)



SUPPLEMENTAL SPECIFICATION

SC150



The North American Green SC150 extended-term degradable erosion control blanket is constructed with a 70% agricultural straw and 30% coconut fiber matrix and has a functional longevity of up to 24 months (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographic location, and elevation). The straw and coconut fibers shall be evenly distributed over the entire area of the blanket. The blanket shall be covered on the top with a heavyweight polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.625 x 0.625 inch (1.59 x 1.59 cm) mesh size. The blanket shall be covered on the bottom with a lightweight polypropylene net having a 0.50 inch x 0.50 inch (1.27 cm x 1.27 cm) mesh size. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The following list contains further physical properties of the SC150 erosion control blanket.

<u>Property</u>	<u>Test Method</u>	<u>Typical</u>
Thickness	ASTM D5199/ECTC	0.34 in (8.64 mm)
Resiliency	ECTC Guidelines	75%
Mass per Unit Area	ASTM D6475	11.44 oz/yd ² (388 g/m ²)
Water Absorption	ASTM D1117/ECTC	200%
Swell	ECTC Guidelines	30%
Stiffness/Flexibility	ASTM D1388/ECTC	1.11 oz-in (12,397 mg-cm)
Light Penetration	ECTC Guidelines	11.70%
Smolder Resistance	ECTC Guidelines	Yes**
MD Tensile Strength	ASTM D5035	205.20 lbs/ft (2.99 kN/m)
MD Elongation	ASTM D5035	28.00%
TD Tensile Strength	ASTM D5035	152.40 lbs/ft (2.22 kN/m)
TD Elongation	ASTM D5035	23.10%

**Material is smolder resistant according to the specified test

MD – Machine direction

TD – Transverse direction

Bench Scale Testing[†]

Test Method - Description	Parameters	Results
ECTC Method 2 – Determination of unvegetated RECP's ability to protect soil from rain splash and associated runoff	50 mm (2 in)/hr for 30 min	Soil loss ratio* = 5.47
	100 mm (4 in)/hr for 30 min	Soil loss ratio* = 5.67
	150 mm (6 in)/hr for 30 min	Soil loss ratio* = 5.88
ECTC Method 3 – Determination of unvegetated RECP's ability to protect soil from hydraulically-induced shear stress. Failure criteria = 0.50 inch soil loss	Shear: 2.39 lbs/ft ² for 30 min	Soil loss: 336g
	Shear: 2.73 lbs/ft ² for 30 min	Soil loss: 443g
	Shear: 2.96 lbs/ft ² for 30 min	Soil loss: 566g
	Shear at 0.50 inch soil loss (450g)	2.72 lbs/ft²
ECTC Draft Method 4 – Determination of temporary RECP performance in encouraging seed germination and plant growth	Top soil; Fescue (Kentucky 31); 21 day incubation 27° C ± 2° & approximately 50% RH	Percent improvement = 538% (increased biomass)

* Soil Loss Ratio = Soil Loss with Bare Soil / Soil Loss with RECP (NOTE: Soil loss based on regression analysis)

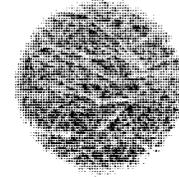
[†]Bench Scale Performance Testing

Bench scale tests are index property tests. These tests are not indicative of field performance and therefore should not be used in design to establish performance levels for rolled erosion control products. Bench scale tests are performed according to methods developed by the Erosion Control Technology Council (ECTC).



PERFORMANCE SPECIFICATION

SC150



The North American Green SC150 extended-term degradable erosion control blanket is constructed with a 70% agricultural straw and 30% coconut fiber matrix and has a functional longevity of approximately 24 months (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographic location, and elevation). The straw and coconut fibers shall be evenly distributed over the entire area of the mat. The blanket shall be covered on the top with a heavyweight polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.625 x 0.625 inch (1.59 x 1.59 cm) mesh size. The blanket shall be covered on the bottom with a lightweight polypropylene net having a 0.50 inch x 0.50 inch (1.27 cm x 1.27 cm) mesh size. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The following list contains further physical properties of the SC150 erosion control blanket.

<u>Property</u>	<u>Test Method</u>	<u>Typical</u>
Thickness	ASTM D5199/ECTC	0.34 in (8.64 mm)
Resiliency	ECTC Guidelines	75%
Mass per Unit Area	ASTM D6475	11.44 oz/yd ² (388 g/m ²)
Water Absorption	ASTM D1117/ECTC	200%
Swell	ECTC Guidelines	30%
Stiffness/Flexibility	ASTM D1388/ECTC	1.11 oz-in (12,397 mg-cm)
Light Penetration	ECTC Guidelines	11.70%
Smolder Resistance	ECTC Guidelines	Yes**
MD Tensile Strength	ASTM D5035	205.20 lbs/ft (2.99 kN/m)
MD Elongation	ASTM D5035	28.00%
TD Tensile Strength	ASTM D5035	152.40 lbs/ft (2.22 kN/m)
TD Elongation	ASTM D5035	23.10%

**Material is smolder resistant according to the specified test

MD - Machine direction

TD - Transverse direction

Slope Design Data

Channel Design Data

Bench Scale Testing[†]

	Cover Factors (C)			Channel Roughness Coefficients	
	Slope Gradient (S)			Flow Depth	Manning's 'n'
Slope Length (L)	≤ 3:1	3:1 - 2:1	≥ 2:1	≤ 0.50 ft (0.15 m)	0.050
≤ 20 ft (6 m)	0.001	0.048	0.100	0.50-2.00 ft	0.050-0.018
20 - 50	0.051	0.079	0.145	≥ 2.00 ft (0.60 m)	0.018
≥ 50 ft (15.2 m)	0.100	0.110	0.190	Max. Permissible Shear Stress 2.00 lbs/ft ² (96.0 Pa)	

Unvegetated Channel	3.9 lbs/ft ²
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Approximate Max Flow Velocity	8.00 ft/s (2.44 m/s)
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For most accurate design data consult ECMDST[™]
Manning's 'n' value expressed in English units

†Bench Scale Performance Testing

Bench scale tests are index property tests. These tests are not indicative of field performance and therefore should not be used in design to establish performance levels for rolled erosion control products. Bench scale tests are performed according to methods developed by the Erosion Control Technology Council (ECTC).

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION**

**IA-657 WETLAND RESTORATION, ENHANCEMENT
OR CREATION**

1. SCOPE

The work shall consist of activities involved with restoring, creating or enhancing wetlands.

2. GENERAL

Construction activities shall be carried out so that the wetland area shall be disturbed as little as possible. Existing naturally vegetated spillway areas shall not be disturbed.

3. ENVIRONMENT

Construction operations shall be carried out in such a manner that air and water pollution and erosion shall be minimized and held within legal limits. See Iowa Construction Specification IA-5, Pollution Control.

4. SUBSURFACE DRAIN PLUGGING OR REMOVAL

Subsurface drains shall be removed as shown on the plans. All envelope, filter material or other flow enhancing material shall be removed. The trench shall be backfilled in 12 inch layers and compacted with similar soil to obtain a density of not less than the adjacent natural soils.

The ends of the abandoned and disconnected drains shall be blocked with manufactured caps or plugs or with concrete.

Any additional subsurface drains located during construction shall be brought to the attention of the landowner and the Natural Resources Conservation Service. For subsurface drainage alterations, the upstream drainage must be maintained at its current capacity.

5. EMBANKMENT

The foundation area shall be cleared of trees, logs, stumps, roots, brush, boulders, sod, and rubbish. Topsoil and sod shall be stripped to a depth of six inches, stockpiled and spread on the completed earthfill. Foundation surfaces shall be sloped no steeper than 1:1 unless shown otherwise on the drawings. The foundation area shall be thoroughly scarified before placing fill material.

All trees and shrubs shall be cleared and grubbed within a minimum distance of 10 feet from an embankment or any spillway.

The cutoff trench and any other required excavations shall be dug to the lines and grades shown on the drawings or as staked in the field. Structure or trench excavations will conform to all safety requirements of OSHA.

Suitable excavated materials may be used in the permanent fill. All surplus or waste material shall be disposed of in areas shown on the drawings or as approved by the NRCS Inspector. The waste material shall be smoothed and sloped to provide drainage.

Borrow should not be taken from the wetland area within 10 feet of the embankment or as shown on the plans.

Fill material shall be free of detrimental amounts of sod, roots, frozen soil, stones more than 6 inches in diameter, and other objectionable material. The moisture content of the fill material shall be such that a ball formed with the hands does not crack or separate when struck sharply with a pencil and will easily ribbon out between the thumb and finger. Material that is too wet shall be dried, and material that is too dry shall have water added and mixed until the requirement is met.

The placing and spreading of fill material shall be started at the lowest point of the foundation and the fill brought up in horizontal layers not to exceed 9 inches in thickness prior to compaction.

Earth fill shall be compacted by one of the following methods as specified on the plans. If no method is specified, compaction will be Method 1.

Method 1 – Earthfill shall be placed so that the wheels of the loaded, rubber tired, hauling equipment traveling in a direction parallel to the centerline of fill pass over the entire surface of the layer being placed.

Method 2 – Two (2) complete passes of a tamping-type roller will be made over each layer. The roller shall be capable of exerting a minimum of one hundred (100) pounds per square inch.

Method 3 – Minimum density shall be 90% of the maximum density as determined by ASTM D-698.

The completed work shall conform to the lines, grades, and elevations shown on the drawings or as staked in the field.

6. ISLANDS, MOUNDS AND LOAFING AREAS

Islands shall be randomly located within the wetland area at locations shown on the drawings or as staked in the field.

Orientation of island shorelines shall be random with attention given to prevailing winds to limit wave damage. In general, the side of the island with the longest dimension shall be parallel to the prevailing wind direction.

Side slopes shall be as shown on the construction drawings, but in no case shall be steeper than 6:1.

Shapes shall be irregular.

Loafing areas shall be constructed in the areas shown on the drawings or as staked in the field and shall be graded to drain runoff water.

Elevation of at least one loafing area should be above maximum water level whenever possible.

Compaction of mounds is not necessary.

All excavated material not suitable for embankments, wetland dikes, and islands can be used for mounds or blended into surrounding topography to create a natural appearance. Spoil material shall not be spread on existing wetland areas.

Organic soils shall not be used to construct islands, loafing areas, dikes or embankments.

7. WATER CONTROL STRUCTURE

The structure shall be installed to the line and grade shown on the drawings. Excavations below grade shall be corrected by backfilling and compacting by hand-operated or power equipment as specified by NRCS.

Equipment shall not be operated within 2 feet of any structure or pipe. Fill adjacent to structures, pipe conduits, and anti-seep collars shall be placed in 4 inch layers and compacted to a density equivalent to that of the surrounding fill by means of hand tamping or manually directed power tampers. Care should be taken that compaction around the spillway pipe does not cause uplift on the pipe with a resulting void beneath the pipe. Hand tamping, only, should be used to compact the fill under the bottom half of the pipe.

Conduits installed in a trench shall be bedded and backfilled throughout the width of the embankment. Broken pieces of clay tile shall be kept away from the conduit. Friable soil shall be placed in 4 inch lifts and hand tamped to a depth of 2 feet above the conduit. The sides of the remaining trench under the embankment shall be sloped no steeper than 3 horizontal to 1 vertical and backfilled meeting embankment requirements.

8. FINISH

The surface of work areas shall be smooth and present a quality appearance.

9. SEEDING AND MULCHING

A protective cover of vegetation shall be established on all exposed surfaces of the embankment, spillway, borrow area, and other areas disturbed by construction as shown on the plans or staked in the field. Seeding and mulching shall be performed in accordance with the IA-CPA-4, Seeding Plan, and Construction Specification IA-6, Seeding and Mulching for Protective Cover.

10. SPECIAL SPECIFICATIONS

See IA-655 page 4, IA-21, Excavation and IA-23, Earthfill for Special Specifications.

Special Specifications IA-657, cont'd
IDNR-Russell Brown

Existing tile as shown on the drawings shall be removed from its outlet to a minimum of 100' above the planned, wetland-side, toe. Remove 100' of tile at permanent pool ground elevation 800.0 and about 1000' upstream. Locations are approximate. Other tiles found during construction will be removed according to Inspector.

IA-657 SPECIAL SPECIFICATIONS:
Waypoints for Shallow Water Excavation

SWE D	Latitude (decimal degrees)	Longitude (decimal degrees)
D1	40.6302826289696	-92.7118383385022
D2	40.6302100033451	-92.7115057421592
D3	40.6300988175526	-92.7115600116943
D4	40.6301180904715	-92.7118320880981
D5	40.6299921176184	-92.7119111379887
D6	40.6299096488323	-92.7116008776418
D7	40.629828356067	-92.711489571971
D8	40.6297694584027	-92.7118370025648
D9	40.6299481894915	-92.7121432871774
D10	40.6302262383636	-92.7121264434138
SWE E		
E1	40.6300653533578	-92.7106735342378
E2	40.6299631205787	-92.7101307950044
E3	40.629826535773	-92.7100198234811
E4	40.6296762772154	-92.7095713571876
E5	40.6294998757868	-92.7098888700966
E6	40.6296683350094	-92.7101663310483
E7	40.6298735273034	-92.7103737832519
E8	40.6297457775152	-92.7108760099602
E9	40.6299209876708	-92.7109193271248
SWE F		
F1	40.6296693157156	-92.7112992034418
F2	40.6295279561253	-92.711170743065
F3	40.6294730678462	-92.7106127559175
F4	40.6293244471354	-92.7101463626751
F5	40.629004346551	-92.7098920581672
F6	40.6288358176062	-92.7102343558776
F7	40.6291096208637	-92.7103951733359
F8	40.6292618723503	-92.7106716753874
F9	40.6292791262471	-92.7110346393401
F10	40.6293871786401	-92.711370685401
F11	40.6295909806445	-92.7114654477576

**IA-657 SPECIAL SPECIFICATIONS;
Waypoints for Shallow Water Excavation**

SWE G	Latitude (decimal degrees)	Longitude (decimal degrees)
G1	40.6373285688241	-92.7212177624502
G2	40.6372487923094	-92.720938019753
G3	40.6368370621326	-92.7208456092718
G4	40.6366419846164	-92.7207019095078
G5	40.6365748683528	-92.7203599182506
G6	40.6367176778471	-92.7201284427856
G7	40.6365415920915	-92.7199874090227
G8	40.6363147912064	-92.7202088426735
G9	40.6361837271305	-92.720197237963
G10	40.6361428124164	-92.7198531155605
G11	40.6361973820267	-92.7195847548766
G12	40.6358465075882	-92.7192014269118
G13	40.6356681618701	-92.7185372179222
G14	40.6354925829975	-92.7182660892263
G15	40.6353446966344	-92.7182375820705
G16	40.6348501482057	-92.7177213366593
G17	40.634506865175	-92.7178713641552
G18	40.6344204172988	-92.7177811057943
G19	40.6344834895261	-92.7173795188874
G20	40.6343528161909	-92.7173379958551
G21	40.6342179355586	-92.7175910083485
G22	40.6342237492547	-92.717953466722
G23	40.6344214131185	-92.7181888966632
G24	40.6349581243796	-92.718040996851
G25	40.6351517355553	-92.7182413479864
G26	40.6351969097809	-92.7185809916523
G27	40.6354632701016	-92.7186996232365
G28	40.6354859315058	-92.7189001905356
G29	40.6350697006293	-92.7192202827023
G30	40.6350611058204	-92.7195807254101
G31	40.6347374808585	-92.7202814986972
G32	40.635195794009	-92.7191344372726
G33	40.6356670184736	-92.7191732642572
G34	40.6359375528784	-92.719470140077
G35	40.6357671831311	-92.7197565839613
G36	40.6357320084191	-92.7200556975267
G37	40.6362083353997	-92.7205516040749
G38	40.6363955545012	-92.7205161350796
G39	40.6367027079922	-92.7209409894196
G40	40.6368832311983	-92.7212575987129
G41	40.6370381482522	-92.721007134701
G42	40.6371702646543	-92.7211753341668
G43	40.637219016863	-92.7213905730102