# **REQUEST FOR BIDS**

# Upper Iowa River Flood Reduction Project UI-BID-005

Winneshiek County, IA

Due: 2:00 PM February 17, 2021

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#### PUBLIC NOTICE: ADVERTISEMENT FOR BIDS Winneshiek County, Iowa

The County of Winneshiek is seeking bids for the following project:

Construction of flood reduction projects in the Upper Iowa River Watershed, UI-BID-005

#### **Project Location:**

This project consists of 2 flood reduction structrues within the Upper Iowa River Watershed in Winneshiek County.

#### **Project Information:**

The project involves the construction of 2 pond structures.

# Plans and Specifications Will be Available January 21 at 2:00 PM at/from the Offices of:

Winneshiek Soil and Water Conservation District 2296 Oil Well Rd Decorah, IA, 52101

Electronic copies of the bid packet are available at Isqft.com and at upperiowariver.org

Questions regarding the bid packet can be sent to Paul Berland at pberland@northeastiowarcd.org or by phone at 563-864-7112.

#### **Pre-Bid Meeting**:

A Pre-Bid Meeting will be held February 3rd @ 10:00 AM at the Winneshiek Soil and Water Conservation District Office, 2296 Oil Well Road, Decorah, IA 52101. Engineer will be in attendance and site visits will occur dependent upon weather conditions.

#### Time and Place for Filing Sealed Proposals:

Sealed bids will be received from qualified contractors at the Northeast Iowa RC&D office, 101 E. Greene St., PO Box 916 Postville, IA 52162 until February 17, 2021 at 2:00 PM.

#### Time and Place Sealed Proposals Will be Opened and Considered:

Bids will be opened and tabulated at Northeast Iowa RC&D office at 2:00 PM on February 17, 2021 for consideration by the Winneshiek County Board of Supervisors at its meeting on February 22, 2021.

#### **Section 3 Requirements**

A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

D. The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.

F. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

<u>Section 3 Businesses are encouraged to respond to this proposal.</u> A Section 3 business is a business that is:

51% owned by Section 3 residents\*

Whose permanent, full-time staff is comprised of at least 30% Section 3 residents\*

Has committed 25% of the dollar amount of its subcontracts to Section 3 businesses

\*A Section 3 resident is defined as a public housing resident or someone with a household income that is less than 80% of the area median income. Businesses that believe they meet the Section 3 criteria are encouraged to register as a Section 3 Business through HUD's website:

https://portalapps.hud.gov/Sec3BusReg/BRegistry/RegisterBusiness

## **BID INSTRUCTIONS & AWARD PROCEDURE**

Please complete all documents properly. Failure to complete and sign all documents with respect to the requirements listed below may cause your bid not to be read.

#### BID BOND

- i. The bid security in the amount of five percent (5%) of the total bid price shall be in the form of a cashier's check, a certified check, or a bank money order drawn on a FDIC insured bank in Iowa or drawn on a FDIC insured bank chartered under the laws of the United States; or a certified share draft drawn on a credit union in Iowa or chartered under the laws of the United States; or a bid bond executed by a corporation authorized to contract as a surety in Iowa or satisfactory to the County of Winneshiek, hereinafter called the "Jurisdiction".
- ii. The bid bond must be submitted using the Bid Bond Form. All signatures on the bid bond must be original signatures in ink; facsimile (fax) of any signature on the bid bond is not acceptable.

#### PROPOSAL SUBMISSION

- i. The proposal shall be submitted in a sealed envelope properly identified as the Proposal with the project title and the name and address of the bidder. Proposals shall be delivered to Northeast Iowa RC&D, 101 E. Greene Street, P.O. Box 916, Postville, IA 52162 at or before 2:00 P.M., local time on February 17, 2021. It is the sole responsibility of the bidder to see that its proposal is delivered prior to the time for opening bids, along with the appropriate bid security sealed in the separate envelope identified as Bid Security or Bid Bond. Proposals received after the bid receipt deadline will be returned to the bidder unopened and will not be considered.
- ii. The following documents shall be completed, signed and returned in the Proposal envelope. The bid cannot be read if these documents are omitted from the Proposal envelope.
  - a. **UI-BID-005 BID FORM:** Signatures must be in original ink
  - b. **UI-BID-005 BID SCHEDULE (consisting of 3 pages):** the Bidder must provide the Unit Price, the Amount, the Division Subtotals and the Grand Total Bid. In case of discrepancy, the Unit Price governs. The quantities shown on the Proposal are approximate only, but are considered sufficiently adequate for the purpose of comparing bids. The Jurisdiction shall only use the Grand Total Bid for comparison of the bids.
  - c. Intent to Comply with Section 3 Requirements

#### SPECIAL NOTE ON BID INSTRUCTIONS

- i. The bidder should be sure to read and understand all required federal provisions, wage rate determinations, bonding requirements, contract requirements, labor standards and bid packet materials prior to submitting a bid.
- ii. The project consists of two (2) separate flood control structures at 2 locations. Bids should reflect the total cost to construct all of the structures. The Jurisdiction will enter into one (1) contract for the construction of both structures and will not sub-divide the projects and offer multiple contracts. The contractor awarded the contract may elect to hire sub-contractors, but will do so at their own desire and will be required to fulfill requirements and provisions related to sub-contracting.

#### AWARD PROCEDURE

i. The Jurisdiction reserves the right to reject any bids, and to accept in whole or in part the bid which in the judgment of the bid evaluators is the lowest, most responsive and responsible bid. The Jurisdiction, reserves the right to reject any and all bids, to waive technicalities or irregularities and to enter into such contract as it shall deem to be in the best interests of the County.

#### **UI-BID-005 BID FORM**

Submitting Firm:			
Address:			
City:	State:	Zip:	
Authorized Representative (print):			
Authorized Representative Signature:			
Date:	Email:		
Phone:			

#### Our/My bid, as shown in the Grand Bid Total from the Bid Schedule submitted is

\$\_\_\_\_\_

The correct summation of actual bid tabulation figures will supersede any amounts shown on this page.

**CERTIFICATIONS:** By signing this form, the bidder certifies that they have read and understand all bid packet items related to this solicitation, including, but not limited to, contract language, bonding requirements, federal provisions, wage rate determination, labor standards, reporting and records maintenance and construction specifications.

**FIRM PRICING**. Offered prices shall remain firm for a minimum of 30 days after the due date of this solicitation unless indicated otherwise. Accepted prices shall remain firm for the duration of the contract.

**ADDENDA (It is the Bidder's responsibility to check for issuance of any addenda)**. The authorized representative herby acknowledges receipt of the following addenda:

Addenda Number	Date	Addenda Number _	Date

Addenda Number \_\_\_\_\_ Date \_\_\_\_\_ Addenda Number \_\_\_\_\_ Date \_\_\_\_\_

#### UI-BID-005 BID SCHEDULE:

#### UPPER IOWA RIVER WATERSHED

## SITE:UI-019-SEED SAVERS

ITE NO	M WORK OR MATERIAL	SPEC. NO.	ΟΤΥ	UNIT	UNIT PRICE	AMOUNT
1	Site Clearing, Preparation & Waste Disposal	1	1	LS	\$	\$
2	Rolled Erosion Control Product	5	1040	SY	\$	\$
3	Structure Seeding	6	1.2	AC	\$	\$
4	Native Pasture Seeding	6	6	AC	\$	\$
5	Mobilization & Demobilization	8	1	LS	\$	\$
6	Overexcavation, Core Trench Excavation	21	394	CY	\$	\$
7	Earthfill	23	19964	CY	\$	\$
8	Filter Diaphragm Material, Sand	24	274	TON	\$	\$
9	Stone Filter	24	83	TON	\$	\$
10	Topsoil, Strip, Salvage, Respread	26	4230	CY	\$	\$
11	Structural Concrete	31	50	CY	\$	\$
12	Pcc Paving, 6"	31	172	SY	\$	\$
13	Dual-Wall Hdpe Pipe, 8"	45/620	143	LF	\$	\$
14	Hickenbottom Intake, 10"	45/620	1	EA	\$	\$
15	Corrugated Metal Pipe, 36"	51/620	38	LF	\$	\$
16	Corrugated Metal Pipe, 48"	51/620	128	LF	\$	\$
17	Corrugated Metal Pipe, 66"	51/620	191	LF	\$	\$
18	72" Cmp Riser With Trash Rack	51/620	1	LS	\$	\$
19	Class 'E' Riprap	61	490	TON	\$	\$
20	Granular Surfacing	61	208	TON	\$	\$
21	Fencing, 5-Strand Barbed Wire	92	713	LF	\$	\$
22	Fencing, Steel Gates	92	2	EA	\$	\$
	TOTAL BID-SEED SAVE	RS				. \$

#### UI-BID-005 BID SCHEDULE:

#### UPPER IOWA RIVER WATERSHED

# SITE:UI-039-BRANHAGEN

ITE	M	SPEC.			UNIT	
NO	WORK OR MATERIAL	NO.	QTY	UNIT	PRICE	AMOUNT
1	Topsoil, Strip, Salvage, Respread	26	993	CY	\$	\$
2	Compacted Earthfill	23	20,756	CY	\$	\$
3	Core Trench Excavation	21	963	CY	\$	\$
4	Aux Spillway Excavation	21	414	CY	\$	\$
5	Pipe, Appurtenances and Installation 8' riser/142' barrel w/ trashrack &	51	1	LS	\$	\$
	anti-vortex device Drainage Diaphragm	81 83 31/61/2				
	Concrete	4				
6	Erosion Control Blanket (Installed) (16 Ft x 600 Ft)	6	800	SY	\$	\$
7	Seeding (critical area)	6	2	AC	\$	\$
8	Seeding (wetland)	6	2	AC	\$	\$
9	Seeding (priaire)	6	10.5	AC	\$	\$
10	Mobilization & Demobilization	1	1	LS	\$	\$
11	Site Clearing, Preparation & Waste Disposal	1	1	LS	\$	\$
	TOTAL BID-BRANHAG	EN				\$

# **UI-BID-005 BID SCHEDULE**

UPPER IOWA RIVER WATERSHED

#### SUMMATION OF BIDS :

\$
\$
\$

Firm:\_\_\_\_\_

Signature:

## **BID BOND**

KNOW ALL BY THESE PRESENTS:

That we, \_\_\_\_\_\_, as Principal, and \_\_\_\_\_, as Surety, are held and firmly bound unto Winneshiek County, Iowa, as Obligee, (hereinafter referred to as "the Jurisdiction"), in the penal sum of five percent (5%) of the total bid price \$\_\_\_\_\_, lawful money of the United States, for which payment said Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

WHEREAS, the Principal is submitting a sealed proposal to the Jurisdiction for the purpose of entering into a contract for the following project;

Upper Iowa River Flood Reduction Project: UI-BID-005

NOW, THEREFORE, if said proposal by the Principal be accepted, and the Principal shall enter into a contract with Jurisdiction in accordance with the terms of such proposal, including the provision of insurance and of a bond as may be specified in the contract documents, with good and sufficient surety for the faithful performance of such contract, for the prompt payment of labor and material furnished in the prosecution thereof, and for the maintenance of said improvements as may be required therein, then this obligation shall become null and void; otherwise, the Principal shall pay to the Jurisdiction the full amount of the bid bond, together with court costs, attorney's fees, and any other expense of recovery.

Signed and sealed this day of , 20 .

SURETY:

Surety Company

Bidder

By

Authorized Surety Representative

Name (Print/Type)

Address, City, State, Zip

Address, City, State, Zip

Name (Print/Type)

By\_\_\_\_\_ Signature

PRINCIPAL:

#### **INTENT TO COMPLY WITH SECTION 3 REQUIREMENTS**

#### (To be provided with procurement documents and <u>returned with all submitted bids</u>)

Section 3 of the Housing and Urban Development Act of 1968 [12 U.S.C. 1701u and 24 CFR Part 135] is HUD's legislative directive for providing preference to low-income residents of the local community (regardless of race or gender), and the businesses that substantially employ these persons, for new employment, training and contracting opportunities resulting from HUD-funded projects. The regulations seek to ensure that low- and very low- income persons, and the businesses that employ these individuals, are notified about the expenditure of HUD funds in their community and encouraged to seek opportunities, if created.

A Section 3 resident is defined as a public housing resident <u>or</u> someone with a household income that is less than 80% of the area median income.

A Section 3 business is defined as a business that is:

51% owned by Section 3 residents

Whose permanent, full-time staff is comprised of at least 30% Section 3 residents\*\*

Has committed 25% of the dollar amount of its subcontracts to Section 3 businesses

Note: If your business meets the definition of a Section 3 business, you may register as a Section 3 Business through HUD's website here: https://portalapps.hud.gov/Sec3BusReg/BRegistry/RegisterBusiness

Businesses who self-certify that they meet one of the regulatory definitions of a Section 3 business will be included in a searchable online database. The database can be used by agencies that receive HUD funds, developers, contractors, and others to facilitate the award of covered construction and non-construction contracts to Section 3 businesses.

#### Please complete the following:

1. If awarded a contract for this CDBG funded project, do you anticipate hiring new employees to complete the project? (Hiring would be specific to this project)



Yes No If yes, please estimate the number of employees to be hired:

2. Is your business a Section 3 Business?

Yes		No
-----	--	----

3. Is the bidder willing to consider hiring Section 3 residents for future employment opportunities that are a direct result of this CDBG funded project?

Yes		No
-----	--	----

4. Is the bidder willing to consider subcontracting with Section 3 Businesses for this project?



I understand that this contracting opportunity is subject to HUD Section 3 requirements (24 CFR Part 135). I have read and understand the Section 3 requirements as generally described above and presented in the Section 3 contract language included in the procurement documents for this project. If awarded a contract, the business commits to following Section 3 requirements, as they apply to this project. If awarded a contract for this project, the business agrees to provide reports to (insert City/County) on Section 3 efforts and accomplishments.

Name of Contractor/Subcontractor	Address	
Print Name	Title	
Signature	Date	

Superseded General Decision Number: IA20200028

#### State: Iowa

Construction Types: Heavy and Highway

Counties: Adair, Adams, Allamakee, Appanoose, Audubon, Benton, Black Hawk, Boone, Bremer, Buchanan, Buena Vista, Butler, Calhoun, Carroll, Cass, Cedar, Cerro Gordo, Cherokee, Chickasaw, Clarke, Clay, Clayton, Clinton, Crawford, Dallas, Davis, Decatur, Delaware, Des Moines, Dickinson, Dubuque, Emmet, Fayette, Floyd, Franklin, Fremont, Greene, Grundy, Guthrie, Hamilton, Hancock, Hardin, Harrison, Henry, Howard, Humboldt, Ida, Iowa, Jackson, Jasper, Jefferson, Johnson, Jones, Keokuk, Kossuth, Lee, Linn, Louisa, Lucas, Lyon, Madison, Mahaska, Marion, Marshall, Mills, Mitchell, Monona, Monroe, Montgomery, Muscatine, O'Brien, Osceola, Page, Palo Alto, Plymouth, Pocahontas, Polk, Pottawattamie, Poweshiek, Ringgold, Sac, Shelby, Sioux, Story, Tama, Taylor, Union, Van Buren, Wapello, Warren, Washington, Wayne, Webster, Winnebago, Winneshiek, Woodbury, Worth and Wright Counties in Iowa.

EXCLUDES SCOTT COUNTY

#### HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification	Number	Publication	Date
0		01/01/2021	

#### SUIA2020-001 10/18/2017

	I	Rates	Fringes
Carpenter	& Piledrivermen		
ZONE	1\$	28.52	14.08
ZONE	2\$	26.73	14.08
ZONE	3\$	26.73	14.08
ZONE	4\$	26.25	11.50
ZONE	5**\$	25.15	9.90
CONCRETE	INISHER		
ZONE	1\$	28.10	7.40
ZONE	2\$	28.10	7.40
ZONE	3\$	28.10	7.40
ZONE	4\$	25.45	6.40
ZONE	5\$	24.40	6.40

HIGHWAY LIGHTING AND TRAFFIC	
STGNALS)	
70NF 1. 2. AND 3\$ 25.05	6.80
ZONE 4\$ 23.75	6.80
ZONE 5\$ 21.60	6.80
IRONWORKER (SETTING OF	
STRUCTURAL STEEL)	
ZONE 1\$ 31.50	10.90
ZONE 2\$ 29.41	10.90
ZONE 3\$ 29.41	11.20
ZONE 4\$ 27.35	9.90
ZONE 5**\$ 25.50	9.45
LABORER	
ZONE 1, 2 AND 3	
GROUP A\$ 23.75	9.68
GROUP AA\$ 26.13	9.68
GROUP B\$ 21.90	9.68
GROUP C\$ 18.82	9.68
ZONE 4	
GROUP A\$ 21.27	9.08
GROUP B\$ 19.95	9.08
GROUP C\$ 17.07	9.08
ZONE 5	
GROUP A\$ 21.77	7.63

GROUP B\$ 19	9.27 7	' <b>.</b> 63
GROUP C\$ 18	3.42 7	<b>'.</b> 63
POWER EQUIPMENT OPERATOR		
ZONE 1		
GROUP A\$ 32	2.55 14	.90
GROUP B\$ 31	.00 14	.90
GROUP C\$ 28	3.50 14	1.90
GROUP D\$ 28	R. 50 14	1.90
ZONE 2		
GROUP A\$ 31	.85 14	1.90
GROUP B	1.25 14	1.90
GROUP C\$ 27	7.70 14	1.90
GROUP D. \$ 27	7.70 14	1.90
ZONE 3	.,.	• • • •
GROUP A	. 70 24	L 65
GROUP B \$ 27	24	65
GROUP C \$ 26	.90 24 590 24	1 65
GROUP D \$ 26	5 90 24 5 90 24	1 65
70NF 4	27	.05
GROUP A \$ 31	05 12	50
GROUP B \$ 29	. 91 12	50
GROUP C \$ 27	/ 83 12	50
GROUP D \$ 27	· 83 12	50
ZONE 5	.05 12	
GROUP A \$ 28	102 10	1 70
GROUP B. \$ 26	. 98 10	1.70
GROUP C \$ 25	5 25 10	1 70
GROUP D \$ 24	125 10	1 70
	10	
TRUCK DRIVER (AND PAVEMENT		
MARKING DRIVER/SWITCHPERSON)		
ZONE 1\$ 24	1.45 11	.15
ZONE 2		
\$ 24	1.45 11	.15
70NF 3 \$ 24	1.45 11	.15
ZONE 4	1.45 6	5.95
ZONE 5		
\$ 22	.50 6	5.95

#### ZONE DEFINITIONS

ZONE 1 The Counties of Polk, Warren, and Dallas for all

Crafts, and Linn County Carpenters only.

ZONE 2 The Counties of Dubuque for all Crafts and Linn County for all Crafts except Carpenters.

ZONE 3 The Cities of Burlington, Clinton, Fort Madison, Keokuk, and Muscatine (and abutting municipalities of any such cities).

ZONE 4 Story, Black Hawk, Cedar, Jasper, Jones, Jackson, Louisa, Madison, and Marion Counties; Clinton County (except the City of Clinton), Johnson County, Muscatine

County (except the City of Muscatine), the City of Council Bluffs, Lee County and Des Moines County.

ZONE 5 All areas of the state not listed above.

#### LABORER CLASSIFICATIONS - ALL ZONES

GROUP AA - {Skilled pipelayer (sewer, water and conduits) and tunnel laborers; asbestos abatement worker} (Zones 1, 2 and 3).

GROUP A - Carpenter tender on bridges and box culverts; curb machine (without a seat); deck hand; diamond & core drills; drill operator on air tracs, wagon drills and similar drills; form setter/stringman on paving work; gunnite nozzleman; joint sealer kettleman; laser operator; powderman tender; powderman/blaster; saw operator; {pipelayer (sewer, water, and conduits); sign erector\*; tunnel laborer; asbestos abatement worker (Zones 4 and 5)}, sign erector.

GROUP B - Air, gas, electric tool operator; barco hammer; carpenter tender; caulker; chain sawman; compressor (under 400 cfm); concrete finisher tender; concrete processing materials and monitors; cutting torch on demolition; drill tender; dumpmen; electric drills; fence erectors; form line expansion joint assembler; form tamper; general laborer; grade checker; handling and placing metal mesh, dowel bars, reinforcing bars and chairs; hot asphalt laborer; installing temporary traffic control devices; jackhammerman; mechanical grouter; painter (all except stripers); paving breaker; planting trees, shrubs and flowers; power broom (not self-propelled); power buggyman; rakers; rodman (tying reinforcing steel); sandblaster; seeding and mulching; sewer utility topman/bottom man; spaders; stressor or stretcherman on pre or post tensioned concrete; stringman on re/surfacing/no grade control; swinging stage, tagline, or block and tackle; tampers; timberman; tool room men and checkers; tree climber; tree groundman; underpinning and shoring caissons over twelve feet deep; vibrators; walk behind trencher; walk behind paint stripers; walk behind vibrating compactor; water pumps (under three inch); work from bosun chair.

GROUP C - Scale weigh person; traffic control/flagger, surveillance or monitor; water carrier.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS - ALL ZONES GROUP A - All terrain (off road) forklift; asphalt breakdown roller (vibratory); asphalt laydown machine; asphalt plant; asphalt screed; bulldozer (finish); central mix plant; concrete pump; crane; crawler tractor pulling scraper; directional drill (60,000 (lbs) pullback and above); dragline and power shovel; dredge engineer; excavator (over cu. yd.); front end loader (4 cy and over); horizontal boring machine; master mechanic; milling machine (over 350 hp); motor grader (finish); push cat; rubber tired backhoe (over � cu. yd.); scraper (12 cu. yd. and over or finish); Self-propelled rotary mixer/road reclaimer; sidebroom tractor; slipform portland concrete paver; tow or push boat; trenching machine (Cleveland 80 or similar)

GROUP B - Articulated off road hauler, asphalt heater/planer; asphalt material transfer vehicle; asphalt roller; belt loader or similar loader; bulldozer (rough); churn or rotary drill; concrete curb machine; crawler tractor pulling ripper, disk or roller; deck hand/oiler; directional drill (less than 60,000 (lbs) pullback); distributor; excavator (1/2 cu. yd. and under); form riding concrete paver; front end loader (2 to less than 4 cu. yd.); group equipment greaser; mechanic; milling machine (350 hp. and less); paving breaker; portland concrete dry batch plant; rubber tired backhoe (1/2 cu. yd. and under); scraper (under 12 cu. yd.); screening, washing and crushing plant (mobile, portable or stationary); shoulder machine; skid loader (1 cu. yd. and over); subgrader or trimmer; trenching machine; water wagon on compaction.

GROUP C - Boom & winch truck; concrete spreader/belt placer; deep wells for dewatering; farm type tractor (over 75 hp.) pulling disc or roller; forklift; front end loader (under 2 cu. yd.); motor grader (rough); pile hammer power unit; pump (greater than three inch diameter); pumps on well points; safety boat; self-propelled roller (other than asphalt); self-propelled sand blaster or shot blaster, water blaster or striping grinder/remover; skid loader (under 1 cu. yd.); truck mounted post driver.

GROUP D - Boiler; compressor; cure and texture machine; dow box; farm type or utility tractor (under 75 hp.) pulling disk, roller or other attachments; group greaser tender; light plants; mechanic tender; mechanical broom; mechanical heaters; oiler; pumps (under three inch diameter); tree chipping machine; truck crane driver/oiler.

\*\* CARPENTERS AND PILEDRIVERMEN, or IRONWORKERS (ZONE 5)
Setting of structural steel; any welding incidental to bridge
or culvert construction; setting concrete beams.

\* ADDED CRAFT - SIGN ERECTOR

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

\_\_\_\_\_

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate

changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

#### -----

#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator

U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

\_\_\_\_\_

END OF GENERAL DECISION

## PERFORMANCE AND PAYMENT BOND

#### KNOW ALL BY THESE PRESENTS:

That we,	as Principal (hereinafter the "Contractor" or
"Principal" and	, as Surety are held and
firmly bound unto the County of Winneshiek, low	va (hereinafter referred to as "the Jurisdiction")
and to all persons who may be injured by any br	each of any of the conditions of this Bond in the
penal sum ofDo	ollars(\$)
lawful money of the United States, for the payme	ent of which sum, well and truly to be made, we
bind ourselves, our heirs, legal representatives a	and assigns, jointly or severally, firmly by these
presents.	

The conditions of the above obligations are such that whereas said Contractor entered into a contract with the Jurisdiction, bearing date the day of \_\_, 202\_, (hereinafter the "Contract") wherein said Contractor undertakes and agrees to construct the following described improvements: Upper Iowa River Flood Reduction Project – Bid Packet 004, UI-BID-005 unless modified herein, and to faithfully perform all the terms and requirements of said Contract within the time therein specified, in a good and workmanlike manner, and in accordance with the Contract Documents.

It is expressly understood and agreed by the Contractor and Surety in this bond that the following provisions are a part of this Bond and are binding upon said Contractor and Surety, to-wit:

1. PERFORMANCE: The Contractor shall well and faithfully observe, perform, fulfill and abide by each and every covenant, condition and part of said Contract and Contract Documents, by reference made a part hereof, for the above referenced improvements, and shall indemnify and save harmless the Jurisdiction from all outlay and expense incurred by the Jurisdiction by reason of the Contractor's default of failure to perform as required. The Contractor shall also be responsible for the default or failure to perform as required under the Contract and Contract Documents by all its subcontractors, suppliers, agents, or employees furnishing materials or providing labor in the performance of the Contract.

2. PAYMENT: The Contractor and the Surety on this Bond are hereby agreed to pay all just claims submitted by persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the performance of the Contract on account of which this Bond is given, including but not limited to claims for all amounts due for labor, materials, lubricants, oil, gasoline, repairs on machinery, equipment and tools, consumed or used by the Contractor or any subcontractor, wherein the same are not satisfied out of the portion of the contract price which the Jurisdiction is required to retain until completion of the improvement, but the Contractor and Surety shall not be liable to said persons, firms, or corporations unless the claims of said claimants against said portion of the contract price shall have been established as provided by law. The Contractor and Surety hereby bind themselves to the obligations and conditions set forth in Chapter 573, Code of Iowa, which by this reference is made a part hereof as though fully set out herein.

3. GENERAL: Every Surety on this Bond shall be deemed and held bound, any contract to the contrary notwithstanding, to the following provisions:

A. To consent without notice to any extension of time to the Contractor in which to perform the Contract;

B. To consent without notice to any change in the Contract or Contract Documents, which thereby increases the total contract price and the penal sum of this bond, provided that all such changes do not, in the aggregate, involve an increase of more than twenty percent of the total contract price, and that this bond shall then be released as to such excess increase; and

C. To consent without notice that this Bond shall remain in full force and effect until the Contract is completed, whether completed within the specified contract period, within an extension thereof, or within a period of time after the contract period has elapsed and the liquidated damage penalty is being charged against the Contractor.

The Contractor and every Surety on the bond shall be deemed and held bound, any contract to the contrary notwithstanding, to the following provisions:

D. That no provision of this Bond or of any other contract shall be valid which limits to less than five years after the acceptance of the work under the Contract the right to sue on this Bond.

E. That as used herein, the phrase "all outlay and expense" is not to be limited in any way, but shall include the actual and reasonable costs and expenses incurred by the Jurisdiction including interest, benefits and overhead where applicable. Accordingly, "all outlay and expense" would include but not be limited to all contract or employee expense, all equipment usage or rental, materials, testing, outside experts, attorney's fees (including overhead expenses of the Jurisdiction's staff attorneys), and all costs and expenses of litigation as they are incurred by the Jurisdiction. It is intended the Contractor and Surety will defend and indemnify the Jurisdiction on all claims made against the Jurisdiction on account of Contractor's failure to perform as required in the Contract and Contract Documents, that all agreements and promises set forth in the Contract and Contract Documents, in approved change orders, and in this Bond will be fulfilled, and that the Jurisdiction will be fully indemnified so that it will be put into the position it would have been in had the Contract been performed in the first instance as required. In the event the Jurisdiction incurs any "outlay and expense" in defending itself with respect to any claim as to which the Contractor or Surety should have provided the defense, or in the enforcement of the promises given by the Contractor in the Contract, Contract Documents, or approved change orders, or in the enforcement of the promises given by the Contractor and Surety in this Bond, the Contractor and Surety agree that they will make the Jurisdiction whole for all such outlay and expense, provided that the Surety's obligation under this bond shall not exceed 125% of the penal sum of this bond.

In the event that any actions or proceedings are initiated with respect to this Bond, the parties agree that the venue thereof shall be Howard County, State of Iowa. If legal action is required by the Jurisdiction to enforce the provisions of this Bond or to collect the monetary obligation incurring to the benefit of the Jurisdiction, the Contractor and the Surety agree, jointly and

severally, to pay the Jurisdiction all outlay and expense incurred therefore by the Jurisdiction. All rights, powers, and remedies of the Jurisdiction hereunder shall be cumulative and not alternative and shall be in addition to Surety for any amount guaranteed hereunder whether action is brought against the Contractor or whether Contractor is joined in any such action or actions or not.

NOW THEREFORE, the condition of this obligation is such that if said Principal shall faithfully perform all the promises of the Principal, as set forth and provided in the Contract, in the Contract Documents, and in this Bond, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

When a word, term, or phrase is used in this Bond, it shall be interpreted or construed first as defined in this Bond, the Contract, or the Contract Documents; second, if not defined in the Bond, Contract, or Contract Documents, it shall be interpreted or construed as defined in applicable provisions of the Iowa Code; third, if not defined in the Iowa Code, it shall be interpreted or construed according to its generally accepted meaning in the construction industry; and fourth, if it has no generally accepted meaning in the construction industry, it shall be interpreted or construed according to its common or customary usage.

Failure to specify or particularize shall not exclude terms or provisions not mentioned and shall not limit liability hereunder. The Contract and Contract Documents are hereby made a part of this Bond.

Witness our hands this day of , 2021.

SURETY:

By\_

Surety Company

Authorized Surety Attorney in Fact Officer

Name (Print/Type)

Address, City, State, Zip

Address, City, State, Zip

Name (Print/Type)

NOTE: All signatures on this performance and payment bond must be original signatures in ink; copies or facsimile of any signature will not be accepted. This bond must be sealed with the Surety's raised, embossing seal. The Certificate or Power of Attorney accompanying this bond must be valid on its face and sealed with the Surety's raised, embossing seal.

Bidder

By\_\_\_\_\_

Signature

PRINCIPAL:

# CONTRACT AGREEMENT

THIS AGREEMENT made and entered into this \_\_\_day of \_\_\_\_\_, by and between the County of Winneshiek, Iowa (hereinafter referred to as the COUNTY) and \_\_\_\_\_\_. (hereinafter referred to as the CONTRACTOR) WITNESSES THAT:

**WHEREAS**, the COUNTY and the CONTRACTOR are desirous of entering into a contract to formalize their relationship, and

**WHEREAS**, pursuant to Title I of the Housing and Community Development Act of 1974, as amended, the lowa Economic Development Authority (IEDA) is authorized by the federal Department of Housing and Urban Development (HUD) to provide State Community Development Block Grant Program funds (hereinafter referred to as CDBG funds) to units of local government selected to undertake and carry out certain programs and projects in compliance with all applicable local, state, and federal laws, regulations and policies, and

**WHEREAS,** IEDA submitted an application for funds from HUD under the Disaster Relief Appropriations Act, 2013, Public Law 113-2, for the Community Development Block Grant National Disaster Resilience (CDBG-NDR) competition on behalf of the Recipient and the Recipient agreed to abide by the application terms and conditions; and

**WHEREAS**, IEDA received funds under the Disaster Relief Appropriations Act, 2013. (Public Law 113-2) under the CDBG-NDR program; and

**WHEREAS**, Winneshiek County has been awarded a contract (13-NDRI-009) through IEDA for a grant of federal funds from HUD under the Disaster Relief Appropriations Act, 2013, Public Law 113-2; and

**WHEREAS**, CONTRACTOR submitted a bid for construction and has been selected to provide construction services for the project(s) identified in the bid packet,

**WHEREAS**, the Scope of Work included in this contract is authorized as part of the COUNTY's approved CDBG project, and

**WHEREAS**, it would be beneficial to the COUNTY to utilize the CONTRACTOR as an independent entity to accomplish the Scope of Work as set forth herein and such endeavor would tend to best accomplish the objectives of the local CDBG project;

**WITNESSETH:** That for and in consideration of the mutual covenants herein contained, the parties hereto agree with each other as follows:

**CONTRACT AMOUNT:** As outlined in the CONTRACTOR'S bid submitted \_\_\_\_\_ (herein as Attachment), the cost of services shall not exceed \$ \_\_\_\_\_.

#### I. GENERAL CONDITIONS

#### 1. <u>Time of Performance</u>:

Time is of the essence in this project. The COUNTY is obligated to issue a written Proceed Order within ten (10) days from the acceptance of the CONTRACTOR'S Proposal. If the Proceed Order is not received by the CONTRACTOR, the CONTRACTOR has the option of withdrawing his or her Quote and Proposal.

The CONTRACTOR shall commence work in a timely manner upon issuance of the Proceed Order and only after a pre-construction meeting where the engineer and labor standards officer are present.

The CONTRACTOR shall achieve substantial completion by November 30, 2021.

Prior to, or at Contract execution, CONTRACTOR must provide: a) performance bond on the part of the CONTRACTOR for 100 percent of the contract price. A "performance bond' is one executed in connection with a contract to secure fulfillment of all the CONTRACTOR'S obligations under such contract; and b) payment bond on the part of the CONTRACTOR for 100 percent of the contract price. A "payment bond' is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract

2. Contract:

The Contract consists of the:

- a. COUNTY'S Request for Bids (Attachment A)
- b. Written bid response submitted by CONTRACTOR (Attachment B)
- c. CONTRACTOR'S Payment and Performance Bond in the amount of \$\_\_\_\_\_
- d. County Board of Supervisor Approval of the Contract
- e. Notice to Proceed
- 3. Services:

The CONTRACTOR shall provide the work as outlined in the COUNTY's Request for Bids as outlined in the CONTRACTOR'S proposal.

4. Payment:

Payment under this Contract shall be progress payments and shall be made based on the work completed and invoiced. Payments will generally be made within 45 days of receipt of the invoice upon approval by the COUNTY Board of Supervisors. Invoices shall be directed to the Project Administrator:

Paul Berland Northeast Iowa RC&D 101 E. GREENE ST., P.O. Box 916 Postville, IA 52162

#### 5. Access and Maintenance of Records:

The contractor must maintain all required records for five years after final payments are made and all other pending matters are closed.

At any time during normal business hours and as frequently as is deemed necessary, the contractor shall make available to the Iowa Economic Development Authority, the State Auditor, the General Accounting Office, and the Department of Housing and Urban Development, for their examination, all of its records pertaining to all matters covered by this contract and permit these agencies to audit, examine, make excerpts or transcripts from such records, contract, invoices, payrolls, personnel records, conditions of employment, and all other matters covered by this contract.

6. <u>Relationship</u>:

The relationship of the CONTRACTOR to the COUNTY shall be that of an independent CONTRACTOR rendering professional services. The CONTRACTOR shall have no authority to

execute contracts or to make commitments on behalf of the COUNTY and nothing contained herein shall be deemed to create the relationship of employer and employee or principal and agent between the COUNTY and the CONTRACTOR.

7. <u>Suspension, Termination, and Close Out</u>:

If the CONTRACTOR fails to comply with the terms and conditions of this contract, the COUNTY may pursue such remedies as are legally available, including but not limited to, the suspension or termination of this contract in the manner specified herein:

- a. <u>Suspension</u> If the CONTRACTOR fails to comply with the terms and conditions of this contract, or whenever the CONTRACTOR is unable to substantiate full compliance with provisions of this contract, the COUNTY may suspend the contract pending corrective actions or investigation, effective not less than seven (7) days following written notification to the CONTRACTOR or its authorized representative. The suspension will remain in full force and effect until the CONTRACTOR has taken corrective action to the satisfaction of the COUNTY and is able to substantiate its full compliance with the terms and conditions of this contract. No obligations incurred by the CONTRACTOR or its authorized representative during the period of suspension will be allowable under the contract except:
  - (1) Reasonable, proper and otherwise allowable costs which the CONTRACTOR could not avoid during the period of suspension;
  - (2) If upon investigation, the CONTRACTOR is able to substantiate complete compliance with the terms and conditions of this contract, otherwise allowable costs incurred during the period of suspension will be allowed; and
  - (3) In the event all or any portion of the work prepared or partially prepared by the CONTRACTOR is suspended, abandoned or otherwise terminated, the COUNTY shall pay the CONTRACTOR for work performed to the satisfaction of the COUNTY, in accordance with the percentage of the work completed.
- b. <u>Termination for Cause</u> If the CONTRACTOR fails to comply with the terms and conditions of this contract and any of the following conditions exists:
  - The lack of compliance with the provisions of this contract were of such scope and nature that the COUNTY deems continuation of the contract to be substantially detrimental to the interests of the COUNTY;
  - (2) The CONTRACTOR has failed to take satisfactory action as directed by the COUNTY or its authorized representative within the time period specified by same;
  - (3) The CONTRACTOR has failed within the time specified by the COUNTY or its authorized representative to satisfactorily substantiate its compliance with the terms and conditions of this contract; then,

The COUNTY may terminate this contract in whole or in part, and thereupon shall notify the CONTRACTOR of termination, the reasons therefore, and the effective date, provided such effective date shall not be prior to notification of the CONTRACTOR. Notification will be by certified letter and may be in effect immediately. After this effective date, no charges incurred under any terminated portions of the Scope of Work are allowable.

c. <u>Termination for Other Grounds</u> – This contract may also be terminated in whole or in part:

- (1) By the COUNTY, with the consent of the CONTRACTOR, or by the CONTRACTOR with the consent of the COUNTY conditions of termination, including effective date and in case of termination in part, that portion to be terminated;
- (2) The COUNTY may terminate this contract at any time giving at least ten (10) days notice in writing to the CONTRACTOR. If the contract is terminated for convenience of the COUNTY as provided herein, the CONTRACTOR will be paid for time provided and expenses incurred up to the termination date.

#### 8. Changes, Amendments, Modifications:

The COUNTY may, from time to time, require changes or modifications in the Scope of Work to be performed. Such changes, including any decrease or increase in the amount of compensation, which are mutually agreed upon by the COUNTY and the CONTRACTOR shall be incorporated in written amendments to this contract.

#### 9. <u>Personnel</u>:

The CONTRACTOR represents that he/she has, or will secure at his/her own expense, all personnel and/or sub-contractors required in order to perform under this contract. Such personnel or sub-contractors shall not be employees of, or have any contractual relationship to, the COUNTY.

All services required hereunder will be performed by the CONTRACTOR, or under his/her supervision and all personnel, whether employee or sub-contractor, engaged in the work shall be fully qualified and shall be authorized or permitted under federal, state and local law to perform such services.

#### 10. Assignability:

The CONTRACTOR shall not assign any interest on this contract, and shall not transfer any interest on this contract (whether by assignment or notation), without prior written consent of the COUNTY thereto; provided, however, that claims for money by the CONTRACTOR from the COUNTY under this contract may be assigned to a bank, trust company, or other financial institution without such approval. Written notice of any such assignment or transfer shall be furnished promptly to the COUNTY by the CONTRACTOR.

#### 11. Reports and Information:

The CONTRACTOR, at such times and in such forms as the COUNTY may require, shall furnish the COUNTY such periodic reports as it may request pertaining to the work or services undertaken pursuant to this contract, the costs and obligations incurred or to be incurred in connection therewith, and any other matters covered by this contract.

#### 12. Copyright:

No report, maps or other documents produced in whole or in part under this contract shall be subject of an application for copyright by or on behalf of the CONTRACTOR.

#### 13. Compliance with Local Laws:

The CONTRACTOR shall comply with all applicable laws, ordinances and codes of the state and local government and the CONTRACTOR shall save the COUNTY harmless with respect to any damages arising from any tort done in performing any of the work embraced by this contract.

#### **II. CIVIL RIGHTS:**

- 1. CONTRACTOR agrees to comply with the following laws and regulations:
  - a. Title VI of the Civil Rights Act of 1964 (P.L. 88-352)

States that no person may be excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving Federal financial assistance on the basis of race, color, or national origin.

- b. Title VIII of the Civil Rights Act of 1968 (Fair Housing Act), as amended
- c. Iowa Civil Rights Act of 1965 (Iowa Code Chapter 216 and Iowa Code Chapter 19B.7)

This Act mirrors the Federal Civil Rights Act.

d. Section 109 of Title I of the Housing and Community Development Act of 1974, as amended (42 U.S.C. 5309)

Provides that no person shall be excluded from participation in, denied the benefits of, or subjected to discrimination on the basis of race, color, national origin, sex, age, or handicap under any program or activity funded in part or in whole under Title I of the Act.

e. The Age Discrimination Act of 1975, as amended (42 U.S.C. 1601 et seq.)

Provides that no person on the basis of age, be excluded from participation in, be denied the benefits of or be subjected to discrimination under any program or activity receiving Federal financial assistance.

f. Section 504 of the Rehabilitation Act of 1973, as amended (P.L. 93-112, 29 U.S.C. 794)

Provides that no otherwise qualified individual shall solely by reason of his/her handicap be excluded from participation in, be denied the benefits of, or be discriminated against under any program or activity receiving Federal financial assistance.

g. Americans with Disabilities Act (P.L. 101-336, 42 U.S.C. 12101-12213)

Provides comprehensive civil rights to individuals with disabilities in the areas of employment, public accommodations, state and local government services, and telecommunications.

h. Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. 1701u)

The purpose of section 3 of the Housing and Urban Development Act of 1968 (12 U.S.C. 1701u) (section 3) is to ensure that employment and other economic opportunities generated by certain HUD financial assistance shall, to the greatest extent feasible, and consistent with existing Federal, State and local laws and regulations, be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing, and to business concerns which provide economic opportunities to low- and very low-income persons.

i. Federal Executive Order 11063, as amended by Executive Order 12259.

#### III. Federal Executive Order 11246, as amended, by Federal Executive Order 11357

Provides that no one be discriminated in employment.

During the performance of this contract, CONTRACTOR agrees as follows:

a. CONTRACTOR will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. CONTRACTOR will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. CONTRACTOR agrees to post in conspicuous places, available to

employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

- b. CONTRACTOR will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
- c. CONTRACTOR will send to each labor union or representative of workers with which they has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of CONTRACTOR's commitments under Section 202 of the Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- d. CONTRACTOR will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- e. CONTRACTOR will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- f. In the event of CONTRACTOR's non-compliance with the nondiscrimination clause of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and CONTRACTOR may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- g. CONTRACTOR will include the provisions of Paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. CONTRACTOR will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance. **Provided, however**, that in the event CONTRACTOR becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency; CONTRACTOR may request the United States to enter into such litigation to protect the interests of the United States.

#### IV. HOUSING AND URBAN DEVELOPMENT ACT OF 1968 (Section 3)

- The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701 u. Section 3 requires that to the greatest extent feasible, opportunities for training and employment be given lower income residents of the project area and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the project.
  - a. The parties to this contract will comply with the provisions of said Section 3 and the regulations issued pursuant thereto by the Secretary of Housing and Urban Development set forth in 24 CFR Section 3, and all applicable rules and orders of the Department issued there under prior to the execution of this contract. The parties to this contract certify and agree that they are under no contractual or other disability that would prevent them from complying with these requirements.

- b. CONTRACTOR will send to each labor organization or representative of workers with which they has a collective bargaining agreement or other contract or understanding if any, a notice advising said labor organization or workers' representative of their commitments under this Section 3 clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.
- c. CONTRACTOR will include this Section 3 clause in every subcontract; for work in connection with the project and will, at the direction of the applicant for or recipient of Federal financial assistance, take appropriate action pursuant to the Subcontract upon finding that the subcontractor is in violation of regulations issued by the Secretary of Housing and Urban Development, 24 CFR Section 3. CONTRACTOR will not subcontract with any subcontractor where it has notice or knowledge that the latter has been found in violation of regulations under 24 CFR Section 3 and will not let any subcontract unless the subcontractor has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.
- d. Compliance with the provisions of Section 3, the regulations set forth in 24 CFR Section 3, and all applicable rules and orders of the Department issued there under prior to the execution of the contract, shall be a condition of the Federal financial assistance provided to the project, binding upon the applicant or recipient for such assistance, its successors, and assigns. Failure to fulfill these requirements shall subject the applicant or recipient, its contractors and subcontractors, its successors, and assigns to those sanctions specified by the grant or loan agreement or contract through which Federal assistance is provide, and to such sanctions as are specified by 24 CFR Section 135.135.
- e. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.
- f. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.
- g. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

#### V. CERTIFICATION REGARDING GOVERNMENT-WIDE RESTRICTION ON LOBBYING:

- 1. CONTRACTOR certifies, to the best of their knowledge and belief that:
  - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the CONTRACTOR, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
  - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee, or an employee of a Member of Congress in connection with this Federal contract, grant, loan or cooperative agreement, CONTRACTOR shall complete and submit

Standard Form-LLL, "Disclosure Form to Report Federal Lobbying" in accordance with its instruction.

c. CONTRACTOR shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure."

#### V. CLEAN AIR AND WATER ACTS COMPLIANCE: (APPLIES TO CONTRACTS ABOVE \$100,000)

In addition to the preceding provisions, contracts in excess of \$100,000 shall require compliance with the following laws and regulations:

Section 306 of the Clean Air Acts (42 U.S.C. 1857(h)).

Section 508 of the Clean Water Act (33 U.S.C. 1368).

Executive Order 11738. Providing administration of the Clean Air and Water Acts

Clean Air and Water Acts - required clauses:

This clause is required in all third-party contracts involving projects subject to the Clean Air Act (42 U.S.C. 1857 et seq.), the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.), and the regulations of the Environmental Protection Agency with respect to 40 CFR Part 15, as amended. It should also be mentioned in the bid document.

During the performance of this contract, the CONTRACTOR agrees as follows:

- 1. CONTRACTOR will certify that any facility to be utilized in the performance of any nonexempt contract or subcontract is not listed on the Excluded Party Listing System pursuant to 40 CFR 32.
- CONTRACTOR agrees to comply with all the requirements of Section 114 of the Clean Air Act, as amended, (42 U.S.C. 1857c-8) and Section 308 of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1318) relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.
- 3. CONTRACTOR agrees that as a condition for the award of the contract, prompt notice will be given of any notification received from the Director, Office of Federal Activities, Environmental Protection Agency, indicating that a facility utilized or to be utilized for the contract is under consideration to be listed on the Excluded Party Listing System.
- 4. CONTRACTOR agrees that it will include or cause to be included the criteria and requirements in Paragraph (1) through (4) of this section in every nonexempt subcontract and require every subcontractor to take such action as the Government may direct as a means of enforcing such provisions.

#### VI. STANDARDS AND POLICIES RELATING TO ENERGY EFFICIENCY

Pub. L. 94-163, 89 Stat. 871

Mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

# VII. NOTICE OF AWARDING AGENCY REQUIREMENTS AND REGULATIONS PERTAINING TO REPORTING

The Contractor must provide information as necessary and as requested by the Iowa Economic Development Authority for the purpose of fulfilling all reporting requirements related to the CDBG program.

#### **VIII. COMPREHENSIVE PROCUREMENT GUIDELINE: RECOVERED MATERIALS**

The CONTRACTOR agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

#### IX. FEDERAL LABOR STANDARDS PROVISIONS

#### U.S. Department of Housing And Urban Development Office of Labor Relations

#### Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A.1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section I(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii)(a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1)The work to be performed by the classification requested is not performed by a classification in the wage determination; and (2)The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c)In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d)The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii)Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv)If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

**3.** (i) **Payrolls and basic records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section I(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section I(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### 4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprentices or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under

the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprentices program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16. trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant ', to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
 5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

**6. Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8.** Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

**10.** (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of... influencing in any way the action of such Administration... makes, utters or publishes any statement knowing the same to be false... shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

**11. Complaints, Proceedings, or Testimony by Employees.** No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

**B.** Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards. (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

**C. Health and Safety.** The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000. (1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions

**X: IN WITNESS WHEREOF**, the COUNTY and the CONTRACTOR have executed this contract agreement as of the date and year last written below.

COUNTY OF WINNESHIEK	CONTRACTOR
Ву:	Ву:
Title:	Title:
Date:	Date:

# UI-019-SEED SAVERS EXCHANGE UPPER IOWA RIVER WMA WINNESHIEK COUNTY, IOWA

STATE OF IOWA







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# **CONTACT INFORMATION:**

ENGINEER SHIVE-HATTERY, INC ATTN: LUKE MONAT 4125 WESTOWN PARKWAY, SUITE 100 WEST DES MOINES, IOWA 50266 PH: (515) 223-8104 FX: (515) 223-0622

LANDOWNER SEED SAVERS 3094 NORTH V DECORAH, IOV PHONE: (563)

WATERSHED COORDINATOR MATT FRANA 2296 OIL WELL ROAD DECORAH IOWA, 52101 PH: (563) 382-4352

	Sheet List Table
Sheet Number	Sheet Title
C000	COVER SHEET
C001	PROJECT QUANTITIES AND NOTES
CD01	EXISTING CONDITIONS AND REMOVALS PLAN
C201	OVERALL GRADING PLAN
C202	CUT-FILL PLAN
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C501	CONSTRUCTION DETAILS
C502	CONSTRUCTION DETAILS
C503	CONSTRUCTION DETAILS
C601	SEEDING PLAN



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	3	
<text><text><text><text><text><text><text><text><text><text></text></text></text></text></text></text></text></text></text></text>	4	COVER SHEET       DRAWN:     J.H       APPROVED:     LTM       APPROVED:     LTM       ISSUED FOR:     BIDDING       DATE:     1/12/2021       PROJECT NO:     4185190       FIELD BOOK:

	A			В	
<u>ESTIM</u>	ATED PROJECT QUANTITIES:				
ITEM NO.	ITEM DESCRIPTION	SPEC. NO.	UNIT	BID QUANTITY	AS-BUILT QUANTITY
1	SITE CLEARING, PREPARATION & WASTE DISPOSAL	IA-1	LS	1	
2	ROLLED EROSION CONTROL PRODUCT	IA-5	SY	1,040	
3	STRUCTURE SEEDING	IA-6	AC	1.2	
4	NATIVE PASTURE SEEDING	IA-6	AC	6.0	
5	MOBILIZATION & DEMOBILIZATION	IA-8	LS	1	
6	OVEREXCAVATION, CORE TRENCH EXCAVATION	IA-21	СҮ	394	
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8	FILTER DIAPHRAGM MATERIAL, SAND	IA-24	TON	274	
9	STONE FILTER	IA-24	TON	83	
10	TOPSOIL, STRIP, SALVAGE & RESPREAD	IA-26	СҮ	4,230	
11	STRUCTURAL CONCRETE	IA-31	СҮ	50	
12	PCC PAVING, 6"	IA-31	SY	172	
13	DUAL-WALL HDPE PIPE, 8"	IA-45 & 620	LF	143	
14	HICKENBOTTOM INTAKE, 10"	IA-45 & 620	EA	1	
15	CORRUGATED METAL PIPE, 36"	IA-51 & 620	LF	38	
16	CORRUGATED METAL PIPE, 48"	IA-51 & 620	LF	128	
17	CORRUGATED METAL PIPE, 66"	IA-51 & 620	LF	191	
18	72" CMP RISER WITH TRASH RACK	IA-51 & 620	LS	1	
19	CLASS 'E' RIPRAP	IA-61	TON	490	
20	GRANULAR SURFACING	IA-61	TON	208	
21	FENCING, 5-STRANDS OF BARBED WIRE	IA-92	LF	713	
22	FENCING, STEEL GATES	IA-92	EA	2	

# POND PARAMETERS:

TOTAL DRAINAGE AREA	326	ACRES
PRINCIPAL SPILLWAY 1ST STAGE ELEVATION	1067.50	FT
PRINCIPAL SPILLWAY 2ND STAGE ELEVATION	1082.00	FT
TOP OF DAM EMBANKMENT	1095.00	FEET
STORAGE VOLUME AT TOP OF DAM	28.6	ACRE-FEET
10-YEAR PRE DEVELOPED DISCHARGE (Q10-PRE)	476	CFS
10-YEAR POST DEVELOPED DISCHARGE (Q10-POST)	335	CFS
10-YEAR DISCHARGE REDUCTION	30	%
10-YEAR HIGH WATER ELEVATION	1085.42	FEET
50-YEAR PRE DEVELOPED DISCHARGE (Q50-PRE)	858	CFS
50-YEAR POST DEVELOPED DISCHARGE (Q50-POST)	456	CFS
50-YEAR DISCHARGE REDUCTION	47	%
50-YEAR HIGH WATER ELEVATION	1091.98	FEET

# GENERAL NOTES:

1. THE LOCATIONS OF UTILITY MAINS, STRUCTURES AND SERVICE CONNECTIONS PLOTTED ON THIS DRAWING ARE APPROXIMATE ONLY AND WERE OBTAINED FROM RECORDS MADE AVAILABLE TO SHIVE-HATTERY, INC. THERE MAY BE OTHER EXISTING UTILITY MAINS, STRUCTURES AND SERVICE CONNECTIONS NOT KNOWN TO SHIVE-HATTERY, INC. AND NOT SHOWN ON THIS DRAWING. THE VERIFICATION OF EXISTENCE OF, AND THE DETERMINATION OF THE EXACT LOCATION OF, UTILITY MAINS, STRUCTURES AND SERVICE CONNECTIONS SHALL BE THE RESPONSIBILITY OF THE CONSTRUCTION CONTRACTOR(S).

- 2. IOWA CODE 480, UNDERGROUND FACILITIES INFORMATION, REQUIRES VERBAL NOTICE TO IOWA ONE-CALL 1-800-292-8989, NOT LESS THAN 48 HOURS BEFORE EXCAVATING, EXCLUDING WEEKENDS AND HOLIDAYS.
- 3. THE MEANS OF THE WORK AND THE SAFETY OF THE CONTRACTOR'S EMPLOYEES ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.
- 4. NO WORK SHALL BE PERFORMED BEYOND THE PROJECT LIMITS WITHOUT PRIOR AUTHORIZATION FROM THE OWNER'S REPRESENTATIVE.
- 5. REPLACE ANY PROPERTY MONUMENTS REMOVED OR DESTROYED BY CONSTRUCTION. MONUMENTS SHALL BE SET BY A LAND SURVEYOR REGISTERED TO PRACTICE IN THE STATE OF IOWA.
- 6. ALL DEBRIS AND TRASH ENCOUNTERED DURING CONSTRUCTION WITHIN THE PROJECT LIMITS, OR DIRECTED BY THE ENGINEER, SHALL BE PROPERLY DISPOSED OF.
- 7. CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION DE-WATERING THAT IS REQUIRED AT NO ADDITIONAL COST TO THE OWNER. DEWATERING SHALL BE CONDUCTED IN ACCORDANCE WITH NRCS SPECIFICATION IA-11.

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- 8. REPAIR OR REPLACE DAMAGE TO EXISTING FACILITIES (TILE, UTILITIES, FENCES, ETC.) DESIGNATED TO REMAIN, AT NO ADDITIONAL EXPENSE TO THE OWNER. ALL AREAS DISTURBED BY CONSTRUCTION, INCLUDING STAGING AREAS AND HAUL ROUTES, ARE TO BE REWORKED TO THEIR EXISTING CONDITIONS AND SEEDED AT NO ADDITIONAL COST TO THE DIVISION IF OUTSIDE OF PROJECT LIMITS AND NOT APPROVED BY ENGINEER.
- 9. WORK WHICH DOES NOT CONFORM TO THE REQUIREMENTS OF THE CONTRACT WILL BE CONSIDERED UNACCEPTABLE. UNACCEPTABLE WORK, WHETHER THE RESULT OF POOR WORKMANSHIP, USE OF DEFECTIVE MATERIALS, DAMAGE THROUGH CARELESSNESS OR ANY OTHER CAUSE, FOUND TO EXIST PRIOR TO THE FINAL ACCEPTANCE OF THE WORK, SHALL BE REMOVED AND REPLACED IN AN ACCEPTABLE MANNER, AS REQUIRED BY THE OWNER AT THE CONTRACTOR'S EXPENSE.
- 10. WORK DONE CONTRARY TO THE INSTRUCTIONS OF THE OWNERS REPRESENTATIVE, WORK DONE BEYOND THE LINES SHOWN ON THE PLANS OR ANY EXTRA WORK DONE WITHOUT AUTHORITY WILL NOT BE PAID FOR.
- 11. A SHRINKAGE FACTOR OF 20% WAS ESTIMATED FOR THIS PROJECT. THE CONTRACTOR SHALL MAKE CHANGES IN EARTHWORK AS NEEDED TO ADJUST FOR INACCURACIES INHERENT WITH ESTIMATING THE SHRINKAGE FACTOR. THESE CHANGES SHALL ONLY BE MADE AFTER CONSULTATION AND APPROVAL BY THE ENGINEER.
- 12. CONTOURS AND SPOT ELEVATIONS SHOWN ARE TO FINISHED GRADE.
- 13. THE CONTRACTOR SHALL KEEP ALL ROADS OPEN TO THROUGH TRAFFIC AT ALL TIMES.

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14. ALL WORK WITHIN THE PUBLIC RIGHT OF WAY SHALL BE COORDINATED WITH THE GOVERNING AUTHORITY AND SHALL BE DONE IN ACCORDANCE WITH THEIR STANDARDS.

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- 15. SUBMIT MANUFACTURER'S CERTIFICATION AND MATERIAL DATA FOR ALL MATERIALS DELIVERED TO THE PROJECT SITE AS REQUESTED BY THE OWNERS REPRESENTATIVE.
- 16. CONSTRUCTION SURVEY STAKING WILL BE PAID FOR BY THE OWNER AND PROVIDED BY THE ENGINEER. CONTROL POINTS WILL BE SET FOR USE WITH GPS CONTROLLED GRADING, IF DESIRED. CONTRACTOR SHALL PRESERVE STAKES TO THE EXTENT FEASIBLE. ANY RE-STAKING COSTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- 17. ALL WORK SHALL BE PER PER NRCS SPECIFICATIONS UNLESS STATED OTHERWISE IN THE PROJECT SPECIFICATIONS.
- 18. CONTRACTOR SHALL VISIT AND INSPECT THE PROJECT AREA AND THOROUGHLY FAMILIARIZE THEMSELVES WITH THE ACTUAL JOB CONDITIONS PRIOR TO THE START OF WORK. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR FROM PERFORMING THE WORK IN ACCORDANCE TO THE PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND CONTRACT.
- 19. ALL WORK SHALL CONFORM TO AND BE CONDUCTED IN ACCORDANCE WITH ALL APPLICABLE CODES AND ORDINANCES.
- 20. SITE ACCESS ROUTES AND PARKING SHALL BE DETERMINED/APPROVED BY THE LANDOWNER.

- PRESERVATION OFFICE.
- STATE PLANE COORDINATES (1401), US SURVEY FEET.

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21. IF A CULTURAL RESOURCE IS IDENTIFIED DURING CONSTRUCTION, CONTRACTORS SHALL IMMEDIATELY HALT ALL WORK AND NOTIFY SHIVE-HATTERY. WORK MAY NOT RECOMMENCE UNTIL THE SITE IS CLEARED BY THE STATE HISTORIC

22. CONTRACTOR SHALL MANAGE AND REPAIR EROSION AND SEDIMENT CONTROL THROUGHOUT THE PROJECT. THE CONTRACTOR SHALL HAVE MATERIALS EQUIPMENT AND LABOR AVAILABLE ON A DAILY BASIS TO INSTALL AND MAINTAIN EROSION CONTROL FEATURES IN ORDER TO COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS. THIS SHALL BE INCIDENTAL TO THE PROJECT.

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23. PROJECT COORDINATES AND ELEVATIONS ARE NAD83, NAVD88, IOWA NORTH



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- 1. A 25% SHRINKAGE FACTOR HAS BEEN USED FOR CALCULATION PURPOSES. SEE GEOTECHNICAL REPORT. EARTHWORK SHALL BE BALANCED ON SITE.
- 2. EXCAVATION FOR STRUCTURE REMOVAL AND INSTALLATION, INCLUDING THE EXISTING HDPE CULVERTS AND THE PROPOSED CMP CULVERTS AND RISER IS NOT INCLUDED IN THE ABOVE EARTHWORK TABLE. EXCAVATION AND BACKFILL FOR THESE STRUCTURES SHALL BE INCIDENTAL TO THE ASSOCIATED BID ITEMS. NO ADDITIONAL PAYMENT WILL BE MADE FOR EXCAVATION AND BACKFILL ASSOCIATED WITH REMOVAL OR INSTALLATION OF THESE STRUCTURES.



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# SECTION 02 CERTIFICATIONS PAGE UI-BID-005 UPPER IOWA RIVER WATERSHED MANAGEMENT AUTHORITY WATERSHED IMPROVEMENTS (13-NDRI-009) WINNESHIEK COUNTY, IOWA

#### STATE OF IOWA



CONTENTS

SECTION A: NRCS CONSTRUCTION SPECIFICATIONS SECTION B: SUPPLEMENTAL SPECIFICATIONS SECTION C: NRCS CONSERVATION PRACTICE 382 - FENCING SECTION D: GEOTECHNICAL REPORT

#### **END OF SECTION**

# SECTION A: NRCS CONSTRUCTION SPECIFICATIONS UPPER IOWA RIVER WMA UI-019-SEED SAVERS EXCHANGE

#### **CONTENTS**

**IA-1 SITE PREPARATION IA-3 STRUCTURE REMOVAL IA-5 POLLUTION CONTROL** IA-6 SEEDING AND MULCHING FOR PROTECTIVE COVER IA-8 MOBILIZATION AND DEMOBILIZATION IA-9 SUBSURFACE DRAIN INVESTIGATION, REMOVAL, AND REPAIR IA-11 REMOVAL OF WATER **IA-21 EXCAVATION IA-23 EARTHFILL IA-24 DRAINFILL IA-26 TOPSOILING IA-45 PLASTIC PIPE** IA-51 CORRUGATED METAL PIPE CONDUITS IA-61 LOOSE ROCK RIPRAP IA-81 METAL FABRICATION AND INSTALLATION **IA-92 FENCE IA-95 GEOTEXTILE** IA-620 UNDERGROUND OUTLET

# **IA-1 SITE PREPARATION**

### 1. SCOPE

Site preparation work shall consist of clearing, grubbing, stripping, refuse removal, bank sloping 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.

For wetland restoration, enhancement, or creation projects, the wetland area shall be disturbed as little as possible and existing naturally vegetated spillway areas shall not be disturbed.

### 2. FOUNDATION PREPARATION

The construction areas shall be stripped a minimum of 6 inches to remove 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 horizontal to 1 vertical.

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. Whenever possible, material shall not be disposed of in the pool area created by the structure.

Stockpiled materials around a construction site should be placed so as not to 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. Whenever possible, material shall not be disposed of in any pool area created by the structure.

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.

# **IA-3 STRUCTURE REMOVAL**

### 1. SCOPE

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

### 2. MARKING

Each structure or item 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. Whenever possible, material shall not be disposed of in the pool area created by the structure.

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

# **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 shall not be left open during a winter shutdown period and 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.

# IA-6 SEEDING AND MULCHING FOR PROTECTIVE COVER

# 1. SCOPE

The work shall consist of 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 horizontal to1 vertical, 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.

# **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 form 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. SPECIAL SPECIFICATIONS**

#### A. Measurement and Payment

- a. 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.
- b. 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.
- B. Items of Work and Construction Details
  - a. Items of work to be performed in conformance with this specification and the construction details therefor are:

#### i. Bid Item 4, Mobilization & Demobilization

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 site 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 items.

# IA-9 SUBSURFACE DRAIN INVESTIGATION, REMOVAL, AND REPAIR

### 1. SCOPE

The work shall consist of investigation, location, repair, and/or removal of subsurface drains (tile) near new or existing animal waste storage facilities or in wetland restoration, enhancement, or creation project areas, or other situations where subsurface drains may be present.

### 2. INVESTIGATION AND LOCATION

An inspection trench at least 10 inches wide shall be dug at the location shown on the drawings or as directed by the engineer or his representative. The trench shall be at least 6 feet deep measured from the original ground line, unless otherwise shown on the plans. The Engineer or his representative shall examine the trench and excavated material to identify tile lines.

Size, material, operating condition and direction of flow of each conduit shall be documented. Location and flow line elevation of each conduit shall be surveyed with horizontal and vertical control based on benchmarks shown on the plans.

The inspection trench shall be documented by surveying the natural ground and trench bottom location and elevations at the beginning, end, and every 50 feet for trenches longer than 50 feet.

Backfilling shall not be started without approval of the Engineer. See Section 5 for backfill specifications.

Trench shields, shoring and bracing, or other methods necessary to safeguard the workers and work, and to prevent damage to the existing improvements shall be furnished, placed, and subsequently removed by the contractor.

### 3. TILE REPAIR

Unless designated for removal, replace damaged conduit with new conduit having equal or greater capacity using material specified in Section 6 or 7. When replacing short sections of clay or concrete tile with single-wall corrugated polyethylene pipe, use the next larger nominal size.

Make connections with manufactured fittings and tight joints. Where joints have gaps that would allow soil to enter, cover the joint with a permanent type material such as coal tar pitch treated roofing paper, fiber glass sheet or mat, or plastic sheet.

If the investigation trench has been excavated below the existing drain grade, backfill the trench with gravel or well-pulverized soil in layers not over four (4) inches thick and tamp by hand or manually directed power tamper to provide a firm foundation for the conduit at the existing grade. Do not backfill with any soil containing broken tile fragments.

Using selected soil free of hard clods, rocks, or frozen soil, hand tamp the backfill material around the haunch of the pipe in layers not over four (4) inches thick to provide support. Hold the conduit in place mechanically while placing excavated material around and over the conduit to ensure proper alignment and grade is maintained. Complete the backfill operation according to Section 5.

# 4. TILE REMOVAL

Remove conduits as shown on the plans or directed by the Engineer or his representative, including envelope filter material or other flow enhancing material when present.

Cap or plug the open ends of the disconnected conduit to prevent soil entry when the conduit will continue to function downstream, or otherwise shown on the plans. For a minimum distance of two feet around each sealed conduit end, backfill in layers not over four (4) inches thick and tamp by hand or manually directed power tamper to a density equal to or greater than the surrounding undisturbed soil. Do not backfill with any soil containing broken tile fragments, large stones, frozen material, or large dry clods.

Where tile are located beneath an existing animal waste facility, remove the tile or fill the entire length of tile with concrete or Portland cement grout as shown on the plans. When tile removal is specified, the owner shall contact the Iowa Department of Natural Resources (IDNR) for permission to remove the drainage tile under the structure. The structure shall be emptied of waste or lowered to a point below the tile prior to its removal. The structure must be retested for percolation and the results submitted to IDNR and approval received prior to reusing the structure.

If shown on the plans or directed by the engineer, reroute upstream drain lines so the capacity of the upstream drainage system is maintained. Install conduit in accordance with Iowa Construction Specification IA-46, Tile Drains for Land Drainage.

# 5. BACKFILL

Compact soil around disturbed tile as specified in Section 3 (Tile Repair) and Section 4 (Tile Removal). Keep the backfill within 5 feet of the conduit free from large stones, frozen material, and large dry clods. Unless otherwise shown on the plans, backfill the remainder of the trench as follows:

For trenches located under or near structures, backfill in 12 inch layers and compact each layer to a density equal to or greater than the surrounding undisturbed soil.

For other locations, backfill the remainder of each trench with the excavated soil material which shall extend above the ground surface and be well rounded over the trench.

### 6. MATERIALS

Unless otherwise shown on the plans, conduit and fittings used for repair shall conform to the specifications listed in Table 1. Perforated pipe shall have a water inlet area of at least 1 square inch per foot, provided by perforations spaced uniformly along the long axis of the pipe. The perforations shall be circular or slots. Circular perforations shall not exceed 3/16 inch in diameter. Slots shall not be more than 1/8 inch wide.

Table 1. Acceptable pipe for subsurface drain repair

Kind of Pipe <sup>#</sup>	Specification
Corrugated Polyethylene (PE) Pipe and Fittings, 3 to 6 inch	ASTM F 405
Corrugated Polyethylene (PE) Pipe and Fittings, 3 to 24 inch	ASTM F 667
Corrugated Profile Wall (Dual Wall) Polyethylene (PE) pipe, 2 to 60 inch	ASTM F 2648 <sup>\$</sup>
Corrugated Profile Wall (Dual Wall) Polyethylene (PE) pipe, 12 to 60 inch	ASTM F 2306 <sup>\$</sup>
Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120	ASTM D 1785
PVC Pressure-Rated Pipe (SDR Series)	ASTM D 2241
Clay drain tile	ASTM C 4
Concrete drain tile	ASTM C 412

<sup>#</sup> Pipe sizes are nominal and the ranges are inclusive
 <sup>\$</sup> Pipe conforming to AASHTO M 252 (3 to 10 inch), or AASHTO M 294 (12 to 60 inch) is acceptable

# 7. SPECIAL SPECIFICATIONS

None

# **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.

# **IA-21 EXCAVATION**

# 1. SCOPE

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

### 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 to 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 NRCS and the landowner. On wetland projects, borrow shall not be taken from the wetland area within 10 feet of the embankment or as shown on the drawings.

Borrow areas shall be excavated and grading completed 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.

# IA-23 EARTHFILL

### 1. SCOPE

The work shall consist of the construction of earth fills required by the drawings and specifications. The completed work shall conform to the lines, grades, and elevations shown on the drawings or as staked in the field.

# 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 a minimum of 6 inches to remove vegetation and other unsuitable materials. Foundation surfaces shall be scarified to a minimum depth of 2 inches prior to placing fill material.

Foundation and abutment surfaces shall not be sloped steeper than 1.5 horizontal to 1 vertical 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 earth fill 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 minimum depth of 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.

When moving fill material from the borrow area(s) to the embankment by use of bulldozers only, the following steps shall be followed:

- Immediately after the borrow material is pushed to the embankment, it shall be spread in horizontal lifts placed parallel to the centerline of the embankment.
- Compactive effort will then be applied by operating equipment parallel to the centerline of the fill or embankment.
- Lift thicknesses shall be in strict compliance with Clause 6, below.

Sectional fills are not allowed unless they are shown on the construction drawings.

# 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

Earth fill shall be compacted by one of the following methods as specified on the plans or in Section 8, Special Specifications. If no method is specified, compaction will be in accordance with Method 1.

- Method 1 Earthfill shall be placed so that the wheels or tracks of the loaded hauling equipment, traveling in a direction parallel to the centerline of fill, pass over the entire surface of each layer being placed. Low ground pressure vehicles shall not be used for this purpose.
- 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 force of two hundred (200) pounds per square inch.
- Method 3 Minimum density shall be 90% of the maximum density as determined by ASTM D 698 and as shown on the plans.

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 appurtenances shall be placed in layers not more than 4 inches thick and compacted to a density equivalent to that of the surrounding fill. Methods used to obtain compaction for fine or coarse grained materials are as follows:

- For fine grained materials, hand tamping or manually directed power tampers may be used. Hand compaction only shall be used to compact the earthfill under the bottom half of circular pipes. Manually directed power tampers shall not be used in tight spaces where applying full compactive effort will result in direct contact of the tamper plate with the pipe. 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.
- For coarse grained materials (sands and gravels), vibratory plate compactors shall be used for obtaining compaction. However, hand tamping shall be used to compact the material under the bottom half of circular pipes.

In all cases, follow manufacturer instructions for the specific compaction equipment being used. Heavy equipment shall not be operated within 2 feet of any structure or pipe.

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

# 7. ISLANDS, MOUNDS, AND LOAFING AREAS ON WETLAND RESTORATION, ENHANCEMENT, OR CREATION PROJECTS

Islands shall be randomly located within the wetland area at locations shown on the drawings or as staked in the field. The 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 of islands shall be as shown on the drawings, but in no case shall be steeper than 6 horizontal to 1 vertical. Island 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. The elevation of at least one loafing area should be above the maximum water level whenever possible.

Excavated material not suitable for embankments, wetland dikes, or islands can be used to create 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.

# **IA-24 DRAINFILL**

# 1. SCOPE

The work shall consist of furnishing and placing drainfill required in the construction of structure drainage systems and filter diaphragms around conduits.

### 2. MATERIALS

Drainfill shall be sand, gravel, or crushed stone. It shall be composed of clean, hard, durable mineral particles free from organic matter, clay balls, soft particles, or other substances that would interfere with their free-draining properties. Aggregates of crushed limestone may be used only for coarse drainfill but shall be thoroughly washed and screened so that not more than 3 percent by weight is finer than a No. 4 sieve.

Coarse drainfill shall be graded as follows:

U.S. Sieve Designation	Percent Passing Sieve
1 1/2	100
3/4	75-100
1/2	25-80
3/8	20-60
No. 4	0-10
No. 8	0-5
No. 100	0-3

Fine drainfill shall be graded as follows:

U.S. Sieve Designation	Percent Passing Sieve
3/8	100
No. 4	95-100
No. 8	75-95
No. 16	50-70
No. 30	25-50
No. 50	10-20
No. 100	0-6
No.200	0-3

### 3. BASE PREPARATION

Foundation surfaces and trenches shall be free of organic matter, loose soil, foreign substances, and standing water when the drainfill is placed.

### 4. PLACEMENT

Drainfill shall not be placed until the trench excavation has been inspected and approved by NRCS. Installation of the drainage conduit shall be inspected and approved by NRCS before covering it with drainfill. No foreign materials shall be allowed to become intermixed with or otherwise contaminate the drainfill. Drainfill material shall be placed in a manner to avoid segregation of particles by size.

# 5. COMPACTION

- A. Foundation Trench Drain
  - (1) No compaction will be required beyond that resulting from the placing and spreading operations.
- B. Filter Diaphragm
  - (1) Each layer of sand material shall be flooded with clean water prior to compaction.
  - (2) Compaction shall be accomplished while the material is wet from step (1) above.
  - (3) Each layer shall be compacted by a minimum of 2 passes of a hand directed vibratory plate compactor over the entire layer surface.
  - (4) Layer thickness shall not exceed 12 inches after compaction.
- C. Filter Diaphragm Outlet
  - (1) Sand material shall be placed so the layer thickness does not exceed 4 inches after compaction.
  - (2) Each layer shall be compacted by a minimum of 2 passes of a hand directed vibratory plate compactor over the entire layer surface.

# 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.

# IA-31 CONCRETE

### 1. SCOPE

The work shall consist of furnishing, forming, placing, finishing, and curing Portland cement concrete including steel reinforcement.

#### 2. MATERIALS

Portland Cement shall conform to ASTM C 150 and shall be Type I or Type II.

Fine Aggregates shall conform to ASTM C 33 and shall be composed of clean, uncoated grains of material.

Coarse Aggregates shall be gravel or crushed stone conforming to ASTM C 33 and shall be clean, hard, durable and free from clay or coating of any character. The maximum size of coarse aggregate shall be 1 1/2 inches or as shown on the drawings.

Water shall be clean and free from injurious amounts of oil, acid, salt, alkali, organic matter, or other deleterious substances.

Air entraining agent shall conform to ASTM C 260.

Fly ash may be used as a partial substitution for Portland cement and shall be in strict compliance with ASTM C 618, Class F or C. The loss by ignition shall not exceed 4.0 percent.

Blast-furnace slag may be used as a partial substitution for Portland cement and shall be in conformance with ASTM C 989 for ground granulated blast-furnace slag (GGBF slag).

Water-reducing admixtures shall conform to ASTM C 494 and may be the following types:

- 1. Type A Water-reducing admixture
- 2. Type D Water-reducing and retarding admixture
- 3. Type F Water-reducing, high range admixture (superplasticizer).
- 4. Type G water-reducing, high range, and retarding admixture (superplasticizer).

Type D or G admixture may be used when the air temperature is over 80 degrees F. at the time of mixing and/or placement.

Calcium Chloride or other antifreeze compounds or accelerators will not be allowed.

Preformed expansion joint filler shall be a commercially available product made of bituminous, sponge rubber or closed cell foam materials with a minimum thickness of 1/2 inch.

Reinforcing steel shall be free from loose rust, oil, grease, paint, or other deleterious matter. Reinforcing steel shall conform to one or more of the following:

- 1. Reinforcing Bars ASTM A 615 or A 996, Grade 40 or greater, deformed.
- 2. Welded Wire Fabric ASTM A 185 or A 497.

Waterstops shall be either metallic or nonmetallic. Metallic waterstops shall be fabricated from sheets of copper or galvanized steel. Nonmetallic waterstops shall be made of natural or synthetic rubber or vinyl chloride polymer or copolymer. Rubber, polymer and copolymer waterstops shall have ribbed or bulb-type anchor flanges and a hollow tubular center bulb, unless otherwise shown on the drawings. All waterstops shall be of the sizes shown on the drawings.

Curing compound shall be a liquid membrane-forming compound suitable for spraying on the concrete surface. The curing compound shall meet the requirements of ASTM C 309 Type 2 (white pigmented).

# **3. CONCRETE DESIGN MIX**

The contractor will be responsible for the determining the design mix proportions in accordance with the requirements included in this paragraph and shall provide a copy of the mix to the NRCS Engineer at least 3 days prior to placing any concrete. The concrete mix shall be of such proportions as to provide a minimum strength of 3500 p.s.i. in 28 days, unless otherwise shown on the drawings. The air content shall be 4 to 8 percent of the volume of the concrete at the time of placement. The slump shall be 2 to 5 inches except when superplasticizer is used. The slump shall be 3 inches or less prior to the addition of superplasticizer admixture and shall not exceed 7 1/2 inches following addition and mixing. The fine aggregate shall be 30-50 percent of the total combined aggregate based on oven dry weights. The contractor shall provide tests to verify that the design mix meets the requirements. In lieu of this, one of the following mix proportions per cubic yard may be used:

	Minimum Cement,	Fly Ash,	GGBF Slag,	Maximum ** Water,
<u>Mix Number</u>	Pounds	Pounds	Pounds	Gallons
1	564	0	0	33
2	470	45-90	0	31-34
3	517	129	0	31 *
4	366	114	91	31 *
5	259	103	155	31 *

\*\* Total of available aggregate moisture, mixing water added at the plant and mixing water added at the job site (one gallon equals 8.33 pounds).

\* Requires water reducing admixture.

### 4. MIXTURES AND MIXING

Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C 94. Concrete shall be uniform and thoroughly mixed when delivered to the forms. No mixing water in excess of the amount shown for the design mix or in an amount that would cause the maximum slump to be exceeded shall be added to the concrete during mixing, hauling or after arrival at the point of delivery. The concrete shall be batched and mixed so that the temperature of the concrete at the time of placing shall be between 50 and 90 degrees F.

# 5. BATCH TICKET

The contractor shall obtain from the supplier a delivery ticket for each batch of concrete before unloading at the site. The following information shall be included on the ticket: name of concrete supplier, job name or location, date, truck number, amount of concrete, time loaded or time of first mixing cement, aggregate, and mixing water added at the plant, type and amount of cement, type and amount of admixtures, oven dry weights of fine and coarse aggregate, and moisture content(%) or weight of water contained in the aggregates.

The following information shall be added to the batch ticket on site: mixing water added on site, time concrete arrived on site and time concrete was unloaded.

Upon completion of the concrete placement, copies of all batch tickets shall be provided to NRCS.

## 6. REINFORCING STEEL

Before reinforcement is placed, the surfaces of the bars or mesh shall be cleaned to remove any loose, flaky rust, mill scale, oil, grease, or other foreign substances. After placement, the reinforcement shall be maintained in a clean condition until it is completely embedded in the concrete.

Reinforcing bars shall be cut and bent according to ACI Standard 315.

Tack welding of bars shall not be permitted. Reinforcement shall be accurately placed as shown on the drawings and secured in position in a manner that will prevent its displacement during placement of concrete. Metal chairs, metal hangers, metal spacers or concrete chairs shall be used to support reinforcement. Precast concrete chairs shall be manufactured from concrete equal in quality to the concrete being placed. Precast concrete chairs shall be moist at the time concrete is placed

Splices of reinforcing bars shall be made only at the locations shown on the drawings, unless other wise approved by the NRCS Engineer. All reinforcing splices and placement shall be in accordance with ACI 318 and shown on the drawings.

After placement of the reinforcement, concrete shall not be placed until the reinforcement has been inspected and approved by NRCS.

# 7. PREPARATION OF FORMS AND SUBGRADE

Prior to placement of concrete, the forms and subgrade shall be free of woodchips, sawdust, debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings. Any oil on the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed. All surfaces shall be firm and damp prior to placing concrete. Placement of concrete on mud, dried earth, uncompacted fill, or frozen subgrade will not be permitted.

The forms and associated false-work shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and elevations. Forms will be mortar tight. Forms with torn surfaces, worn edges, dents or other defects will not be used. Forms shall be coated with a nonstaining form release agent before being set into place. Excess form coating material shall not stand in puddles in the forms or come in contact with the steel reinforcement or hardened concrete against which fresh concrete is to be placed.

Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be of a commercially manufactured type. Non fabricated wire shall not be used. Form ties shall be constructed so that the ends or end fasteners can be removed without causing spalling at the surface of the concrete.

Metal form ties used within the forms on structures with a total volume of concrete exceeding fifteen cubic yards shall be equipped with cones or other devices that permit their removal to a depth of at least one inch without damage to the concrete. The holes resulting from cones and other devices shall be patched in accordance with Section 9.

Form ties except those specifically covered by the preceding paragraph shall be broken off flush with the formed surface. Any surface areas which have been spalled or otherwise damaged shall be repaired in accordance with Section 9.

Steel tying and form construction adjacent to new concrete shall not be started until concrete has cured at least 12 hours.

Concrete joints shall be of the type and at the locations shown on the drawings.

Splices in metal waterstops shall be brazed, welded or overlapped and bolted. Splices in nonmetallic waterstops shall be cemented or joined as recommended by the manufacturer.

# 8. PLACING CONCRETE

Concrete shall not be placed until the subgrade, forms, and steel reinforcement have been inspected and approved by the NRCS Inspector. Any deficiencies are to be corrected before the concrete is delivered for placement.

Concrete shall be delivered to the site and discharged into the forms within 1 1/2 hours after the introduction of the cement to the aggregates. When a superplasticizer is used, the concrete shall be discharged within the manufacturer's recommended time limit for discharge after addition of the admixture. In hot weather or under conditions contributing to quick setup of the concrete, discharge of the concrete shall be accomplished in 45 minutes unless a set-retarding admixture is used, in which case the manufacturer's recommended time limit will apply.

Addition of water at the job site may be done at the beginning of placement of each load of concrete in order to obtain allowable slump, provided that the maximum water content and water/cement ratio in the design mix is not exceeded. Addition of water will not be permitted after placement of the load has started.

The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into corners and around reinforcement and other embedded items in a manner which prevents segregation. Formed concrete shall be deposited in layers 24 inches or less in depth and shall be continuously deposited so that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of "cold joints". Concrete containing superplasticizer shall be placed in lifts not exceeding 5 feet in depth. If the surface layer of concrete sets during placement to the degree that it will not flow and merge with the succeeding layer when tamped or vibrated, the contractor shall discontinue placing concrete and install a construction joint. Construction joints shall be completed as shown on the drawings or by one of the following methods:

- 1. The joint shall be constructed using a 6 inch wide by 1/4 inch steel plate. The surfaces of the construction joint shall be prepared by washing and scrubbing with a wire brush or wire broom to expose coarse aggregate. The steel plate shall be embedded 3" in the concrete.
- 2. The joint surface shall be cleaned to expose coarse aggregate by sandblasting or air-water cutting after the concrete has gained sufficient strength to prevent displacement of the coarse aggregate or cement fines. The surface of the concrete shall not be cut so deep as to undercut the coarse aggregate. The joint shall be washed to remove all loose material after cutting.

The surfaces of all construction joints shall be kept continuously moist for at least 1 hour prior to placement of the new concrete. The new concrete shall be placed directly on the cleaned and washed surface. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

Concrete shall not be dropped more than 5 feet vertically unless suitable equipment is used to prevent segregation. Concrete containing superplasticizer shall not be dropped more than 12 feet vertically.

Immediately after the concrete is placed in the forms, it shall be consolidated by vibration, spading or hand tamping as necessary to insure smooth surfaces and dense concrete. Care should be taken not to over-vibrate concrete containing superplasticizer. Vibration shall not be supplied directly to the reinforcing steel, the forms or concrete which has hardened to the degree that it does not insure a monolithic bond with the preceding layer, The use of vibrators to transport concrete in the forms or conveying equipment will not be permitted.

# 9. FORM REMOVAL AND FINISHING

Forms shall be left in place for at least 24 hours after placing concrete. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit concrete to take the stresses due to its own weight uniformly and gradually.

Immediately after removal of the forms, concrete which is honey combed, damaged or otherwise defective shall be repaired or replaced. All cavities or depressions resulting from form tie removal shall be patched with a non-shrink grout, mortar mix or epoxy-type sealer. Non-shrink grout consists of 1 part cement and 2-1/2 parts sand that will pass a No. 16 sieve. Only enough water shall be added to produce a filling which is at the point of becoming rubbery when the material is solidly packed.

All repaired and patched areas shall be cured as required in Section 10.

# **10. CURING**

Concrete shall be cured for a period of not less than 7 consecutive days by one of the following approved methods:

- A. Membrane Curing: Concrete shall be cured with white pigmented curing compound. The compound shall be sprayed on moist concrete as soon as free water has disappeared, but shall not be applied to any surface until patching, repairs and finishing of that surface are completed. Curing compound shall not be applied to surfaces requiring bond to subsequently placed concrete, such as construction joints, shear plates, reinforcing steel, and other embedded items. Surfaces subjected to heavy rainfall or running water within 3 hours after curing compound has been applied or surfaces damaged by subsequent construction operations during the curing period, shall be reapplied in the same manner as the original application.
- B. Moist Curing: Concrete shall be cured by maintaining all surfaces continuously wet for the entire curing period.
- C. Cover: Adequately cover an exposed structure with burlap mats, or other material and continually soak with water.

# **11. BACKFILLING**

Backfilling may begin when the curing period has ended. Backfill against the structure will be placed in no more than 4-inch layers and compacted by hand tamping or with manually directed power tampers or plate vibrators. Layers compacted in this manner shall extend not less than 2 feet from any part of the concrete structure.

# **12. HOT AND COLD WEATHER CONCRETING**

When the atmospheric temperature may be expected to drop below 40<sup>o</sup> F. at the time concrete is delivered to the work site, during placement, or at any time during curing period, concrete shall be mixed, placed and protected in accordance with ACI Standard 306, "Recommended Practice for Cold Weather Concreting."

When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed  $90^{\circ}$  F. at the time of delivery to the work site, during placement or during the first 24 hours after placement, concrete shall be mixed, placed and protected in accordance with ACI Standard 305, "Recommended Practice for Hot Weather Concreting."

# IA-45 PLASTIC (PVC, PE) PIPE

### 1. SCOPE

The work shall consist of furnishing and installing plastic pipe and the necessary fittings specified herein or as shown on the drawings. This specification does not cover subsurface drainage systems.

# 2. MATERIALS

<u>Corrugated Polyethylene (PE) Tubing</u>. Corrugated PE tubing and fittings shall conform to the requirements of the applicable specification listed below:

Kind of Pipe	Specification
Corrugated Polyethylene(PE) Tubing and Fittings, Nominal Sizes 3 to 6 inch, inclusive	ASTM F 405
Large Diameter Corrugated Polyethylene Tubing and Fittings, Nominal Sizes 8 to 24 inch, inclusive	ASTM F 667
Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe	ASTMF 894

<u>Poly(Vinyl Chloride) (PVC) Plastic Pipe</u>. PVC pipe and fittings shall conform to the requirements of the applicable specification listed below:

Kind of Pipe	<b>Specification</b>
PVC Plastic Pipe, Schedules 40, 80 and 120	ASTM D 1785
PVC Pressure-Rated Pipe (SDR Series)	ASTM D 2241
PVC Pressure Pipe, 4 in. through 12 in., for Water Distribution	AWWA C900
PVC Water Transmission Pipe, Nominal Diameters 14 in through 36 in	AWWA C905

<u>PVC and PE Plastic Pipe</u>. Plastic pipes meant for non-potable, livestock water supply shall conform to the requirements of the applicable specification listed below:

Kind of Pipe	<b>Specification</b>
Polyethylene (PE) Plastic Pipe, (SIDR-PR) Based on	
Controlled Inside Diameter	. ASTM D 2239
PVC Pressure-Rated Pipe (SDR Series)	. ASTM D 2241

### 3. FITTINGS AND JOINTS

Pipe joints shall conform to the details shown on the drawings. Pipe shall be installed and joined in accordance with the manufacturer's recommendations.

Joints may be bell and spigot type with elastomeric gaskets, coupling type with elastomeric gasket on each end, or solvent cemented. Gaskets shall conform to ASTM D 1869. Solvent cemented joints shall not be used for pond spillway pipes. Solvent cemented joints for PVC pipe and fittings shall be in accordance with ASTM D 2855. When a lubricant is required to facilitate joint assembly, it shall be a type having no detrimental effect on the gasket or pipe material.

Mechanical joints (split couplings and snap couplings) may be used when joining PE pipe and fittings when the pipe is used for non-pressure flow and a free draining sand or gravel bedding material is provided. Elastomeric-sealed mechanical joints shall be used when joining PE pipe and
fittings under pressure flow or where seepage cannot be tolerated. Where non-pressure pipe is specified, the fittings shall be of the same or similar materials as the pipe and shall provide the same durability and strength as the pipe.

A special case of livestock water supply involves pipes through a dam or embankment. Only PE pipe meeting the above specification may be used. PE pipe, of 1 <sup>1</sup>/<sub>4</sub>, 1 <sup>1</sup>/<sub>2</sub>, or 2-inch diameter shall be installed so that there are no joints within the embankment area.

Where pressure pipe is specified, fittings shall have a design capacity equal to or exceeding that specified for the pipe to which it is attached. Fittings shall be cast iron, steel, one piece injection molded plastic fitting or fabricated from plastic pipe and one piece injection molded plastic fittings. Pressure pipe fittings shall conform to the requirements of the applicable specification listed below.

Kind of Fitting	<b>Specification</b>
Threaded PVC Plastic Pipe Fittings, Schedule 80	. ASTM D 2464
PVC Plastic Pipe Fittings, Schedule 40	. ASTM D 2466
PVC Plastic Pipe Fittings, Schedule 80	. ASTM D 2467
Butt Heat Fusion (PE) Plastic Fittings for PE Plastic Pipe and Tubing	. ASTM D 3261
Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	. ASTM D 3139
PVC Pressure Pipe, 4 in. through 12 in., for Water Distribution	AWWA C900
PVC Water Transmission Pipe, Nominal Diameters 14 in through 36 in	AWWA C905

## 4. HANDLING AND STORAGE

Pipe shall be delivered to the job site and handled by means which provide adequate support to the pipe and does not subject it to undue stresses or damage. When handling and placing plastic pipe, care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting (by metal surfaces or rocks). All special handling requirements of the manufacturer shall be strictly observed. Special care shall be taken to avoid impact when the pipe must be handled at temperatures of 40 degrees F (4.4 degrees C) or less.

Pipe shall be stored on a relatively flat surface so that the barrels are evenly supported. Unless the pipe is specifically coated to withstand exposure to ultraviolet radiation, it shall be covered with an opaque material when stored outdoors for a period of 15 days or longer.

## 5. TRENCHING

Plastic pipe conduits shall be installed in trenches or plowed in according to the following methods:

- A. **Trencher Constructed** When conditions permit, trenching for pipelines, which are buried from 5 to 6 feet deep, are usually done with a narrow 4 to 6 inch wide chain trencher. Where there is little gravel and the ground is not too wet, these trenchers bring up well pulverized soil that makes good backfill material. Where rocks are not present, any of this material may be backfilled directly around the pipe. There is no practical way to compact the fill in these narrow trenches. The owner must be made aware that this material normally consolidates to its maximum extent in two to five years, but depressions or low spots can be hazards to livestock, humans and equipment.
- B. **Backhoe Constructed Trench** Backhoe trenches are usually a minimum of 12 inches wide. The material frequently comes out of the trench as clods, large chunks, and rocks. Immediately backfill over the pipe with 4 to 6 inches of soil that is free of these clods, large chunks, and rocks. If adequate excavated material is not available, then material such as sand or fine gravel should be imported and placed around the pipe to a depth of 4 to 6 inches over the top of the pipe. Fill the trench with the remaining excavated material.

C. **Plowing** – Plowing, or ripping, is a trenchless method for installing plastic pipe. It is a multi-stage process consisting of positioning a vibrating or static (non-vibrating) plow equipped with a trailing product guide which feeds pipe to the depth setting of the plow as it moves forward. The pipe is inserted into the ground continuously along a predetermined path and depth. The vertical depth of installation is controlled by hydraulic adjustment of the plow shear head and the surface contours. The depth of insertion must be continually adjusted to compensate for changes in terrain.

## 6. LAYING AND BEDDING THE PIPE

Plastic pipe conduits and fittings shall be installed as shown on the drawings and specified herein. The pipe shall be laid so that there is no reversal of grade between joints, unless otherwise shown on the drawings. The pipe shall be placed with the bell end upstream, unless otherwise specified. The pipe shall be carefully placed on the bedding or into the pipe trench.

Care shall be taken to prevent distortion and damage during unusually hot (over 90 degrees F) or cold weather (under 40 degrees F). After the pipe has been assembled in the trench, it shall be allowed to reach ground temperature before backfilling to prevent pull out of joints due to thermal contraction.

The pipe ends and the couplings shall be free of foreign material when assembled. During the placement of the pipe, each open end of the pipeline shall be closed off by a suitable cover or plug at the end of work on the pipeline each day and until work resumes or installation is complete.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about the vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

Pipe shall be firmly and uniformly supported throughout the entire length. Bell-holes shall be made in the bedding under bells or couplings and other fittings to prevent the pipe from being supported by fittings.

- a. <u>Earth Bedding</u>. When bedding is specified, the pipe shall be firmly and uniformly bedded in a shaped bedding groove that closely conforms to the bottom of the pipe for a depth equal to a minimum of 1 inch or 5 percent of the diameter of the pipe, whichever is greater. The bedding material shall be free of rocks or stones greater than 0.5 inch diameter and earth clods greater than 2 inch diameter.
- b. <u>Sand or Gravel Bedding</u>. When sand or gravel bedding is specified, the pipe shall be firmly and uniformly placed on a sand or gravel bed. Sand or gravel fill shall be carefully placed and compacted as specified herein and as shown on the drawings.

A few installations of above ground pipelines have been noted. These installations are normally laid directly on the ground and very close to an existing fence line for protection. Only those pipelines designed to withstand exposure to ultraviolet radiation may be utilized for these installations. Adequate thrust control shall be incorporated in these installations.

#### 7. BACKFILL

The pipe shall be held down during backfilling to the top of the pipe to prevent its being lifted from its original placement.

Within 2 feet of the pipe, backfill shall be carefully placed and compacted by means of hand tamping or manually directed power tampers or plate vibrators to form a continuous uniform support around the pipe. Maximum thickness of layers before compaction within 2 feet of the pipe shall be 4 inches and at more than 2 feet from the pipe a maximum thickness before compaction shall be 9 inches. Unless otherwise specified, the initial backfill shall be compacted to a density equivalent to that of the adjacent fill or foundation materials.

The water content of cohesive backfill material shall be such that, kneaded in the hand, the soil will form a ball which does not readily separate. For non-cohesive sand and gravel backfill material, water content is not a concern for thin lifts.

## 8. SPECIAL SPECIFICATIONS

## **IA-46 TILE DRAINS FOR LAND DRAINAGE**

#### 1. SCOPE

The work shall consist of furnishing and installing drainage pipe (tubing) and tile and the necessary fittings and appurtenances.

#### 2. MATERIALS

Concrete drain tile shall conform to the requirements of ASTM C 412 and clay drain tile shall conform to the requirements of ASTM C 4.

Corrugated polyethylene (PE) pipe (tubing) and fittings shall conform to ASTM F 405 (3" to 6") or F 667 (3" to 24"), as appropriate. Corrugated profile wall (dual wall) polyethylene (PE) pipe shall meet or exceed the requirements of ASTM F 2648 (2" to 60") or ASTM F 2306 (12" to 60"). Pipe conforming to AASHTO M 252 (3" to 10"), or AASHTO M 294 (12" to 60") is acceptable. Perforated tubing shall have a water inlet area of at least 1 square inch per foot, provided by perforations spaced uniformly along the long axis of the tubing. The perforations shall be circular or slots. Circular perforations shall not exceed 3/16 inch in diameter. Slots shall not be more than 1/8 inch wide.

## 3. EXCAVATION

Unless otherwise specified, excavation for and subsequent installation of each drain line shall begin at the outlet end and progress upstream.

The trench or excavation for the conduit shall be constructed to the line, depth, cross section, and grade shown on the drawings, or as directed by the NRCS Inspector. The trench bottom shall be smooth and free of exposed rock. If rock is encountered in the trench bottom, over-excavate the trench and place at least 6 inches of compacted earth or sand bedding in the trench to bring it up to the conduit grade.

If not otherwise shown on the drawings, trench width at the top of the conduit shall be the minimum required to permit installation and provide bedding conditions suitable to support the load on the conduit, but with not less than three (3) inches of clearance on each side of the conduit. Maximum trench width shall be the conduit diameter plus 12 inches measured at the top of the conduit, unless approved bedding is installed.

Trench shields, shoring and bracing, or other methods, necessary to safeguard the workers and work, and to prevent damage to the existing improvements shall be furnished, placed, and subsequently removed by the contractor.

Plow installation is allowed. Minimum trench width shall be two (2) inches wider than the conduit on each side. Grade control and bedding conditions shall be closely inspected during plow installation. Boulders, cobbles, or cemented soils can cause the plow to jump and lose grade. These hardpoints can also puncture or dimple and deform the pipe.

#### 4. PREPARING THE BEDDING

Unless otherwise specified, no filter or envelope is required. In stable soils, the bottom of the trench shall be shaped to form a semicircular, trapezoidal, or 90-degree "V" groove in its center. The groove shall be shaped to fit the size of tile. The 90-degree "V" groove shall not be used on conduits greater than 6 inches in diameter.

If the bottom of the trench does not provide a sufficiently stable or firm foundation for the drain tile, a sand-gravel mix or other approved materials shall be used to stabilize the bottom of the trench.

## 5. FILTER OR ENVELOPE MATERIAL

When a filter is specified, the shape of the bottom of the trench, gradation and the thickness of the filter or envelope material to be placed around the conduit will be as shown on the drawings. The envelope or filter material shall be placed in the bottom of the trench just prior to the laying of the conduit. The conduit shall then be laid and the envelope or filter material placed over the conduit.

## 6. PLACEMENT AND JOINT CONNECTIONS

All drains shall be laid to grade.

Joints between lateral concrete and clay drain tiles shall vary with soil type as follows:

- a. Peat and muck 1/4 inch preferred, 3/8 inch maximum
- b. Clay 1/8 inch preferred, 1/4 inch maximum
- c. Silt and loam 1/16 inch preferred, 1/8 inch maximum
- d. Sand tightest possible fit.

Joints between main drain tile, which serve only to collect and transport drainage water from lateral tile lines, should be the tightest fit possible.

Where the joint width exceeds the maximum above, the joint shall be covered with a permanent type material such as coal tar pitch treated roofing paper, fiber glass sheet or mat, or plastic sheet.

After placement and blinding of plastic tubing, but prior to backfilling, sufficient time shall elapse to allow the tubing to reach the ambient temperature of the trench. All split fittings shall be securely tied with nylon cord before backfill is placed. When corrugated plastic tubing is used, no more than5% stretch will be allowed.

#### 7. CONNECTIONS

Lateral connections will be made with manufactured appurtenances (wyes, tees, etc.) comparable in strength and durability with the specified conduit unless otherwise shown on the drawings.

Existing drain lines not shown on the drawings but encountered during installation shall be bridged across the trench or connected into the new line, as directed by NRCS.

Connections with the outlet pipe shall be made watertight.

#### 8. OUTLETS

A continuous section of non-perforated conduit at least 20 feet long shall be used at the outlet. At least two- thirds of the outlet pipe shall be buried in the ditch bank, and the cantilever section must extend to the toe of the ditch side slope or the side slope protected from erosion. Acceptable materials for use at the outlet include the following:

- a. Corrugated metal pipe, galvanized or aluminum, 16 gauge minimum;
- b. Smooth steel pipe with a minimum wall thickness of 3/16 inch;
- c. Smooth plastic pipe, polyvinyl chloride (PVC), with a SDR of 26 or less or schedule 40 or heavier; or
- d. Corrugated profile wall (dual wall) polyethylene pipe (PE).

All plastic (PVC) and polyethylene pipe (PE) outlets shall include ultra-violet stabilizer. PVC and PE pipe outlets shall not be used where burning vegetation on the outlet ditch bank is likely to create a fire hazard.

The outlet shall be equipped with a flap-gate type rodent guard.

#### 9. BLINDING

After the conduit is placed in the excavated groove, friable material from the sides of the trench shall be placed around the conduit, completely filling the trench to a depth of not less than six (6) inches over the top of the conduit. For material to be suitable it must not contain hard clods, rocks, frozen soil, or fine material which will cause a silting hazard to the drain. Conduit placed during any one day shall be blinded by the end of the day's work.

#### **10. BACKFILLING**

The backfilling of the trench shall be completed as rapidly as consistent with the soil conditions. Automatic backfilling machines may be used. Backfill shall extend above the ground surface and be well rounded over the trench.

Unless otherwise shown on the plans, in mineral soils, the minimum depth of cover over subsurface drains shall be 2.4 feet. In organic soils, the minimum depth of cover after initial subsidence shall be 3.0 feet.

#### **11. SPECIAL SPECIFICATIONS**

# IA-51 CORRUGATED METAL PIPE CONDUITS

## 1. SCOPE

The work shall consist of furnishing and placing circular, arched or elliptical corrugated metal pipe and the necessary fittings.

## 2. MATERIALS

Metallic-coated steel corrugated pipe and fittings shall be zinc-coated or aluminized, Type 2, and shall conform to the requirements of ASTM A 760 and A 929 for the specified type and size of pipe. Aluminum corrugated pipe shall conform to the requirements of ASTM B 745 for the specified type and size of pipe. All pipe is subject to the following additional requirements:

- A. When polymer coating is specified, pipe, coupling bands and anti-seep collars shall be coated in accordance with ASTM A 762. All riveted joints shall be caulked as described in paragraph B.
- B. Pipe with annular corrugations shall be furnished with caulked seams. Riveted pipe joints shall be caulked with a bituminous mastic material during fabrication to provide a watertight joint. All circumferential and longitudinal seams shall be caulked before riveting. This shall be accomplished by applying a uniform bead of the mastic compound to the inner lap surface before riveting such that when the rivets are in place, all voids are filled and a coating of mastic is between the lap surfaces. The inner surface of coupling bands shall be asphalt coated in the field prior to installation. A neoprene gasket having a minimum thickness of 3/8 inch and a minimum width of 7 inches may be used in lieu of mastic coated coupling bands.
- C. Welded or lock seams in helical corrugated pipe are considered to be watertight.
- D. When close riveted pipe is specified: (1) the pipe shall be fabricated so that the rivet spacing in the circumferential seams shall not exceed 3 inches, except that 12 rivets will be sufficient to secure the circumferential seams in 12-inch pipe, and (2) in those portions of the longitudinal seams that will be covered by the coupling bands, the rivets shall have finished flat heads or the rivets and holes shall be omitted and the seams shall be connected by welding to provide a minimum of obstruction to the seating off the coupling bands.
- E. Double riveting or double spot welding of pipe less than 42 inches in diameter may be required. If specified, the riveting or welding shall be done in the manner specified for pipe 42 inches or greater in diameter.

## 3. COUPLING BANDS

Coupling bands shall meet the requirements of the table below or have detailed drawings submitted for approval by the State Conservation Engineer. Coupling bands shall be of the same minimum thickness (gage) as the pipe being connected.

Description of Coupling Band	Maximum Fill Height, Ft.	Maximum Pipe Diam., In.	
24-inch wide coupling band with four 1/2-inch Diam. galvanized rods with tank lugs for annular or helical corrugated metal pipe. Bands shall have a minimum lap of 3 inches.	All	All	
Hugger band from Armco Steel Corp. for helical corrugated metal pipe with reformed ends; and for annular corrugated pipe. Bands include O-ring gaskets and two 1/2-inch Diam. galvanized rods and lugs. $\frac{1}{2}$	35	48	
Hugger band without rods and lugs but including O-ring gaskets. $\frac{1}{2}$	20	24	
Angles riveted or welded to a coupling band and drawn tight with bolts. Bands shall be a minimum of 7 corrugations wide and have a minimum lap of 2 inches.	35	15	
Flanged couplings for helical corrugated pipe welded to the ends of the pipe and field assembled by a minimum of 3/8-inch Diam. bolts. A joint sealer shall be placed between the flanges to ensure water tightness.	25	12	

1/ Use is limited to sites where soft foundation and conduit elongation is not anticipated.

#### 4. FABRICATION

Fabrication of all appurtenances shall be done as shown on the drawings. All appurtenances shall be made of metallic-coated steel when corrugated steel pipe is used and aluminum when used with aluminum pipe. Dissimilar metals shall not be installed in contact with each other.

#### 5. REPAIR OF DAMAGED COATINGS

The Contractor shall place the pipe without damaging the pipe or coatings. The pipe shall be transported and handled in a manner to prevent damage to the pipe or coating.

Breaks, scuffs, or other damage to the various coatings shall be repaired as follows:

- A. Metallic Coating by thoroughly wire brushing the damaged area and cleaning with solvent, and then painting two coats of one of the following paints:
  - (1) Zinc Dust Zinc Oxide Primer conforming to ASTM D 79 and D 520.
  - (2) Single package, moisture cured urethane prime in silver metallic color.
  - (3) Zinc-rich cold galvanized compound, brush, or aerosol applications.

B. Polymer Coating - apply two coats of polymer material similar to and compatible with the durability, adhesion and appearance of the original polymer coating. The repair coating shall be a minimum thickness of 0.010 (10 mils) after drying and shall bond securely to the pipe.

## 6. LAYING AND BEDDING THE PIPE

The pipe shall be laid to the line and grade shown on the drawings and shall be firmly and uniformly bedded throughout its entire length. Details of the bedding are as shown on the drawings.

The pipe shall be laid with the outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides at approximately the vertical mid-height of the pipe. Field welding of corrugated galvanized steel pipe will not be permitted. The pipe sections shall be joined with coupling bands.

## 7. BACKFILLING

Special care shall be taken during backfill operations not to disturb the grade and alignment.

The pipe shall be tied down or loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

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.

## 8. SPECIAL SPECIFICATIONS

# IA-61 LOOSE ROCK RIPRAP

## 1. SCOPE

The work shall consist of the construction of loose rock riprap revetments, structures and blankets, including filter layers or bedding where specified.

#### 2. MATERIALS

Rock for loose rock riprap, filter layers or bedding shall come from sources approved by NRCS. The rock shall be excavated, selected and handled as necessary to meet the quality and grading requirements of this specification and the construction drawings.

Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments shall be angular to sub rounded in shape. The least dimension of an individual rock fragment shall not be less than 1/3 the greatest dimension of the fragment unless otherwise specified on the construction drawings.

#### 3. SUBGRADE PREPARATION

The subgrade surfaces on which the riprap or bedding is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall be compacted to a density equal to the adjacent existing soil material.

Rock materials shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by NRCS.

#### 4. EQUIPMENT-PLACED ROCK RIPRAP

Rock shall be placed by equipment on the surfaces and to the depths specified. The riprap shall be constructed to the full thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock shall be delivered and placed in a manner that will insure that the riprap in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact, one to another, with the smaller rocks and spalls filling the voids between the larger rocks. Placement of rock shall begin at the bottom of the slope or downstream end of the structure.

Riprap shall be placed in a manner to prevent damage to structures. Hand placing will be required to the extent necessary to prevent damage to adjacent structures.

#### 5. HAND-PLACED RIPRAP

Rock shall be placed by hand on the surfaces and to the depths specified. It shall be securely bedded with the larger rocks firmly in contact, one to another. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on edge unless otherwise specified. Placement of rock shall begin at the bottom of the slope or downstream end of the structure.

#### 6. FILTER LAYERS OR BEDDING

When the drawings specify filter layers or bedding beneath riprap, the filter or bedding material shall be spread uniformly on the prepared subgrade surfaces to the depth specified. Compaction of filter layers or bedding will not be required, but the surface of such layers shall be finished reasonably free of mounds, dips or windrows.

# **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

## IA-92. FENCES

#### 1. SCOPE

The work shall consist of furnishing and installing fences, including gates and fittings.

#### 2. STANDARD FENCE

**Barbed wire** fences shall have a minimum of 4 wires for farm borders. A minimum of three wires shall be used for interior fencing, cross fencing, or excluding livestock from special areas such as wildlife area, forested tracts or other special use areas. Wires shall be spaced approximately an equal distance apart. The top wire shall be at least 42 inches high and 2 inches below the top on wood posts and 1 inch below the top on steel posts. The bottom wire shall be 18 inches or less above the ground level. Wire shall be spaced no more than 12 inches apart.

Each barbed wire shall consist of 2 twisted strands of either 12  $\frac{1}{2}$  gauge wire or 15  $\frac{1}{2}$  gauge high tensile strength wire. The barbs shall be either 2-point barbs on approximately 4 inch centers or 4-point barbs on approximately 5 inch centers. Wire shall be stretched and attached after the posts are properly set and backfilled. Attach wire to the side of the post closest to the livestock, except on corners and curves where the wire should be placed on the outside of the corner or curve.

Top and bottom strands of woven wire shall be a minimum of 12 ½ gauge. Wire for intermediate strands shall be 14 1/3 gauge or heavier. Fences with woven wire 32 inches or less in height shall have at least 2 barbed wires above the woven wire spaced 8 to 12 inches apart. Fences constructed with woven wire higher than 32 inches shall have at least 1 barbed wire 8 to 12 inches above the woven wire. The base of the woven wire shall be placed near the ground surface. The top wire shall be at least 42 inches above the ground level and 2 inches below the top of wood posts and 1 inch below the top of steel posts. All wire shall be galvanized. Wire shall be stretched and attached after the posts are properly set and backfilled. Attach wire to the side of the post closest to the livestock, except on corners and curves where the wire should be placed on the outside of the corner or curve.

Staples shall be 9 gauge steel or heavier with a minimum length of 1 ½ inches for soft woods and a minimum length of 1 inch for close grained hardwoods. Drive staples diagonal to the grain of the wood and at a slight downward angle. Space should be left between the staple and the post to permit free movement of the wire. Wires may be attached to steel posts by use of manufacturer's clips or by 14 gauge galvanized wire twisted at least two turns.

All wooden posts (except red cedar, Osage orange, or black locust) shall be treated with pentachlorophenol, creosote, or chromated copper arsenate (CCA) by a method that ensures complete penetration of the sapwood. At least half of the diameter of red cedar shall be heartwood. Quality of treated wood shall provide sufficient strength and quality to last for the expected life of the fence.

All corner posts, gate posts, end posts, pull posts and brace posts normally shall be wood with sufficient length for the construction of at least a 42 inch high fence and permit setting the post at least 36 inches deep. Earth backfill shall be thoroughly tamped. On areas where soil depth is restricted to less than 36 inches, additional anchors or deadman applied against the direction of pull may be needed. Wood posts shall have a minimum top diameter of 5 inches. A 2-½ inch steel pipe with appropriate bracing or set in concrete of sufficient depth also may be used. Reinforced concrete or metal posts of equivalent strength may be substituted if they have suitable means of attaching wires and braces.

The maximum spacing of line posts shall be one rod (16.5 feet). Wood line posts shall have a 3 inch top (2 ½ inch for Osage orange). Wood line posts shall have a minimum length of 6 ½ feet and shall be set or driven to a minimum depth of 24 inches where conditions permit. When posts are set, earth backfill shall be thoroughly tamped. Steel line posts shall weigh not less than 1.33 pounds per foot and shall have a steel anchor plate securely fastened to the plate. The posts shall be "T", "U", or "Y" shaped and have corrugations, knobs, studs, or grooves suitable for fastening fencing to the posts. Steel posts shall be rolled from high carbon steel and shall have a protective coating; either galvanized by the hot dip process, painted with one or more coats of high grade weather resistant paint for steel, or enameled and baked. Steel line posts shall be at least 6 feet in length and shall be set in the ground a minimum of 20 inches. Steel posts shall be used as line posts at least once every 6 rods (99 feet) to act as a ground for lightning protection.

End bracing will be installed at locations where the fence ends and on both sides of gate openings. Corner bracing should be installed where fence alignment changes 15 degrees or more. Bracing is required at all corner, gate, pull and end assemblies in a fence. The brace member shall be the equivalent of a wood post with at least a 3 ½ inch diameter at the top or standard weight 2 inch diameter galvanized steel pipe. The brace shall be at least 3 feet above the ground and at least 8 inches below the top of the post. The brace member shall be 6 to 8 feet in length. A brace wire consisting of 2 complete loops of 9 gauge smooth wire, 2 loops of barbed wire or a single loop of 12 ½ gauge high tensile strength wire shall be installed. "H" braces or angle braces as shown in figure 3 will be used in standard fences.

Pull post assemblies consisting of three posts with braces shall be installed in straight reaches of fence at intervals 660 feet (40 rods), at any point where the vertical angle described by two adjacent reaches of wire is upward and exceeds 10 percent and at the beginning and end of each curve.

For a narrow ditch or draw crossing with slopes steeper than 8 feet horizontal to 1 foot vertical, the fence shall be anchored with a concrete anchor weighing at least 150 pounds and buried with at least 18 inches of cover or a commercial screw-in type metal anchor 5 inches in diameter and not less than 48" long to position the fence to the contour of the ditch or draw.

Wire gates shall be made of the same materials as used for the fence. Panel or tube type gates shall be equivalent in quality to the fencing material and shall be fitted with at least two hinges and a latch or galvanized chain for fastening.

#### 3. CHAIN LINK FENCE

Chain link fence, fabric, posts, top rails, braces, gates and accessories shall conform to the requirements of ASTM Specifications types, classes and materials listed below. The fence shall be constructed in a workmanlike manner.

**Fabric** shall be ASTM A392, 2-inch mesh, 9 gauge galvanized steel wire. Zinc coating shall be Class 2. Fabric shall be 60 inches in height. Fabric shall not be stretched until at least 4 days after the posts are set in concrete backfill or grouted in concrete walls. A stretcher bar of the same length as the fabric width shall secure each end of each run of fabric. The bar and fabric shall be stretched taut and secured to the end post by tension bands equally spaced not more than 15 inches apart. The fabric shall be attached to all braces; the top rail, all line posts and the tension wire by wire ties or clips at intervals not exceeding two feet.

**Posts** and fence framework shall conform to the requirements of ASTM F1043 Group 1A, for Heavy Industrial Fence. Coatings shall be type A galvanized coating both internal and external surfaces. Steel pipe for posts shall conform to the requirements of ASTM F1043 and F1083. The minimum diameter of end, corner, and pull posts shall be 2 3/8 inches. Line posts shall be at lest 1.9 inches in diameter. Gate posts shall have a minimum diameter of 2 7/8 inches. The maximum spacing of line posts shall be ten feet. Post holes shall be at least 6 inches in diameter and 18 inches deep for line posts and 24 inches for corner, end, pull and gate posts. All posts shall be set in concrete backfill. Concrete shall completely fill the annular space around the posts and shall be neatly finished to slope

up to the post approximately 1 ½ inches above the ground surface. Pull posts shall be located in long straight runs of fence at intervals of 500 feet or less. Posts set in concrete walls shall be grouted into preformed holes at lest 12 inches in depth. Where posts are installed in highly corrosive soils such as disturbed mine spoil, the posts shall be vinyl coated in addition to the above requirements and set in concrete poured inside a 6 inch clay tile or plastic tubing at least 24 inches long.

When used, **braces and top rails** shall be installed horizontally at the height shown on the drawings or recommended by the manufacturer. See previous paragraph for specifications. Braces and top rails shall be attached to the posts by suitable fittings, as recommended by the manufacturer. When the brace has been placed, a 6 gauge double truss galvanized steel wire with adjustable tightener and fittings shall be attached to the corner post just below the brace and to the brace post approximately 4 inches above ground level. A similar truss wire shall be attached to brace post just below the brace and to the corner post approximately 4 inches above ground level. A 7 gauge galvanized steel tension wire, tightened by mechanical means, shall be placed approximately 4 inches from the ground level. A similar tension wire shall be placed at the top of the fence if a top rail is not used.

Gates, gateposts and gate accessories shall conform to the requirements of ASTM F900. Coating shall be the same as the adjoining fence and framework.

## 4. HIGH TENSILE WIRE (HTW) FENCE

HTW fence shall have a minimum of eight smooth strands of galvanized 12 ½ gauge **wire** with not less than 0.8 ounce of zinc per square foot of wire surface and a tensile strength of 200,000 pounds per square inch. Each strand of wire shall be strung to a tension of not less than 250 pounds. The top wire shall be 48 to 54 inches above the ground surface. The bottom wire shall not be more than 6 inches above the ground surface. The wire shall be fastened on a direct line splice with enough nicopress sleeves that the accumulated strength of the sleeves exceeds the tensile strength of the wire. End wrap splices shall be fastened with two nicopress sleeves. Splices may also be made with other products used as directed by the manufacturer.

**Posts** shall be the same size and material as posts for standard fences. Line posts shall be spaced not more than 30 feet apart with spacer made of wood or fiberglass spaced at not more than 15 feet from either post. Corners, pull assemblies, ends and gates shall have a double assembly consisting of three driven posts with horizontal braces. Each assembly shall be further braced with a double wrap of high tensile wire (see attachment A).

#### 5. PERMANENT HTW ELECTRIC FENCE

Permanent HTW electric fences are constructed with the intent of being in place for years. It is the equivalent of any non-electric permanent fence. Electric fences provide psychological deterrent rather than a physical barrier to livestock and wildlife. To be effective, a shock of at least 1,000 volts must be delivered to cattle, 2,000 volts to sheep and 2,500-3,000 volts to deer, dogs, and coyotes.

**Wire** shall be a single strand of 12 ½ gauge or larger with a minimum tensile strength of 110,000 pounds per square inch. The wire shall galvanized (Type III) or aluminum or copper clad. Barbed wire should not be used on electric fences because of safety hazard. Wire will be attached to the posts by a method that allows them to slip. Wires will be attached to stays in a manner that prevents stay slippage along the fence. The tension of each wire shall be sufficient to maintain the wires at the appropriate height. Suggested wire heights and spacing are shown by intended use in the following table:

Fence Description	Number of Wires	Wire Height (In.)
<b>Internal/Cross Fence</b>		
Cow /calf & stocker	1 wire	30 to 34
Hogs	1 wire	12
Cow /calf & stocker	2 wire	22;32
Sheep and cattle	3 wire	10; 20; 32
Sheep and cattle	4 wire	10; 20;32;46
Perimeter Fence		
Cattle, horses, sheep (Non-	5 wire	10; 20; 30; 40; 50
predator)		
Sheep, goats (Predator)	8 wire	4; 8; 12; 18; 24; 30; 40; 52

Electronic energizers of power fence controllers shall be installed according to manufacturer's recommendations. The energizers shall be high power, low impedance with 5,000 volt peak output and a pulse that is less than 300 mAmps in intensity, finished within 0.0003 of a second and at a rate of 35-65 pulses per minute. Energizers shall be provided with high impact, weather resistant cases. Circuitry shall be solid state. Service modules shall be snap-in for fast field repair. A safety fuse to prevent over pulsing shall be provided. The system shall be 110 volt, 220 volt or 12-volt battery powered. The battery-powered system shall be capable of working for at least 3 weeks without replacing the battery. If the length of the fence requires more than 4 joules (watts times seconds equals joules), a solar charger will be needed for 12 volt systems. The energizer shall be capable of producing one joule for each mile of planned fence when average energy loss is expected.

All electric fences must be properly grounded. The energizer ground wire should be connected to a galvanized pipe or rod ½ inch or larger in diameter. Bury 3 feet of ground rod for each joule of energy output. Ground rods should be buried where soil remains moist for best results. Ground rods should be driven into the ground at least 10 feet apart when multiple rods are necessary to provide the required length of ground rod. Normally individual ground rods will be driven no more than 6 to 8 feet into the ground. Connect a continuous ground wire from the energizer to each ground rod with aluminum or galvanized steel clamp. If energizer terminals are not stainless steel or copper, do not use copper ground rods with copper wire may be used if energizer terminals are stainless steel or copper. Use copper clamps with copper wire and copper rods.

The ground wire(s) of the fence may be connected to the same ground as the energizer or to a separate ground with the same size and depth requirements. More ground rods may be needed for the system to function properly. Do not use the grounding system for other existing applications, such as power poles, breaker boxes and milk barns,. At least 25 feet should separate the fence grounding system from any other grounding system.

Lightening can cause damage to the energizer. Most energizers are poorly protected from damage caused by lightning. External **lightning arrestors** and an induction loop (lightning choke) should be installed for added protection. Lightning arrestor grounding rods should be placed at least 65 feet from those of the energizer (See attachment B).

Install an additional set of ground rods and attach to a lightning arrestor. The lightning arrestor ground must be better than the energizer ground for it to function properly, because lightning will seek the path of least resistance to ground. Use at least 1 more ground rod on the arrestor than was used on the energizer. Attach the lightning arrestor to the wires of the fence. Install a lightning choke in the fence line immediately between the lightning arrestor and the energizer.

For protection of energizers, it is recommended that for 120 or 240-volt energizers that a voltage **spike protector** be used. Also, a ground rod should be installed at electric company's transformer pole (primary ground) and another ground rod installed at the electrical circuit breaker box (secondary ground), if they do not exist. Additionally, a surge protector should be installed between the energizer and power supply.

**Insulation** used for positive charged wire(s) must be high-density polyethylene with ultra-violet stabilizer or high-density polypropylene with ultra-violet stabilizer.

**Braces and end assemblies** are required at all corners, gates and angles in the fence line (See attachment A for criteria on corners, angles, and brace assemblies.)

For 1 and 2 wire fences, corner, gate, end and brace assemblies use one of the following:

- Steel "T" post that are a minimum of 1.25 pounds per foot of length, with appropriate knee, deadman, angle or H-brace.
- Wood posts with a minimum top diameter of 3.5 inches set two feet in the ground with appropriate knee, deadman, angle, or H-brace.
- Wood, steel pipe or fiberglass post with a minimum top diameter of 5 inches, set to a depth equal to, or greater than, the height of the post above the ground without bracing.
- Steel pipe or fiberglass posts with a minimum diameter of 2 inches, set 2 feet in the ground with appropriate knee, angle, or H-brace, deadman or anchor plate.
- Steel pipe or fiberglass posts with a minimum diameter of 2 inches and set in concrete to a depth of 2 feet.
- Steel pipe or fiberglass posts with a minimum diameter of 1 inch with appropriate angle bracing and sufficient ground anchoring to maintain wire tension while remaining erect and firmly anchored.

For 3 or more wire power fences; corner, gate, end and brace assemblies will be either a floating angle brace or H-brace assembly. Posts will be 4-inch nominal wood, 2-inch nominal steel pipe (capped), 2-inch fiberglass or steel "T" posts with appropriate appurtenances for corner and end bracing. Posts must be set a minimum of 2 feet in the ground.

All wood posts shall be at least 2 inches higher than the top wire of the fence. Posts of any other material shall be at least 1 inch higher than the top wire of the fence.

Line post and stays will be either:

- Australian ironwood (eucalyptus) at least 2 inches in diameter; fiberglass, rigid plastic and PVC solid round sucker rod of at least 5/8 inch diameter, or fiberglass "T" post and stays of at least 1 inch in cross-section. Attach wire to the post with loose wire clips or run the wire through holes in the post. Attach the wire to stays with tight clips.
- Wood posts at least 3 inches in diameter of black locust, red cedar, Osage orange, redwood, pressure treated pine or any other wood of equal life and strength may be used. At least one half of the diameter of the red cedar and redwood post shall be heartwood. Pressure treated posts shall be treated with pentachlorophenol, creosote, or chromated copper arsenate (CCA) by a method which ensures the complete penetration of the sapwood. Insulators shall attach wire.
- Steel "U" or "T" posts that are a minimum of 1.25 pounds per foot of length. Wire shall be attached with insulators.

Posts for one or two wire fences shall be long enough to be set at least 18 inches in the ground, except that in soils which are sandy loam or coarser in texture, the posts shall be set at least 24 inches into the ground. Posts for 3 or more wire fences shall be set at least 24 inches into the ground. Posts in dips shall be constructed so that they do not pull out of the soil. Posts 2 inch or smaller shall be anchored. Wood posts shall be set to a depth sufficient to resist pull out.

Wood posts shall be at least 2 inches higher than the top wire on the fence. All other posts shall be at least 1 inch higher than the top wire of the fence.

Spacing of the line posts and stays depends on the terrain and the number of wires. Maximum spacing is as follows

- One or two wire fences may have line posts spaced up to 100 feet apart with no stays. Line posts may be spaced 150 feet apart with stays every 50 feet between the posts
- For three and four wire fences, the line posts may be spaced every 50 feet with no stays or every 150 feet with stays at spacing of not more than every 50 feet.
- Fences with more than 4 wires shall have posts and stays spaced every 30 feet, with posts not further apart than every 90 feet.
- In undulating terrain, space posts and stays as needed to maintain the fence height.

**Insulators** for conductive material posts, end, corner and angle braces shall be high-density polyethylene with ultra-violet stabilizer, high density polypropylene with ultra-violet stabilizer, or porcelain. All insulators shall be capable of withstanding 10,000 volts or more of current leakage. Red insulators attract hummingbirds and should not be used.

Electrified **gates** may be constructed of a single straight wire, galvanized cable, or polytape with a insulated spring loaded handle or an expandable, coiled, high tensile, 12 ½ gauge wire attached to an insulated handle. The number of wires shall be determined by the objective of the fence. The gate shall be constructed so that it is non-electrified when the gate is open. Overhead or underground transmission lines will be used to carry electricity past the gate to the remainder of the fence.

Use insulated galvanized wire for crossing gates and areas where an electrical shock to livestock and humans is undesirable. All underground wires must be insulated for a minimum of 15,000 volts. Insulated underground wire should be specifically designed for high voltage electric fence. The insulation shall be high-density polyethylene with ultra-violet stabilizer or high-density polypropylene with ultra-violet stabilizer. Placing buried wire inside plastic pipe helps to decrease the likelihood of short-circuiting. Overhead transmission lines shall be at a height where the lines do not impeded movement of livestock or equipment.

An electrified **floodgate** may be used in lieu of a non-electrified gate if desired. The electrified floodgate should be constructed by stretching an electrified wire across the drainage above the high water level. Attach droppers of 12 ½ gauge high tensile fence wire, galvanized cable or galvanized chains to the electrified wire at a spacing of 6 inches for sheep and 12 inches for cattle. The droppers shall be extended to approximately 6 inches above normal water level. Connect gate to electric fence with a double insulated cable through a cutoff switch and flood control gate controller. If flooding is expected to last for an extended period of time, switch the floodgate off. (See attachment C).

Other materials of equivalent strength, durability and design may be used.

## 6. TEMPORARY ELECTRIC FENCE

Temporary electric fencing is constructed with the intent of being left in place for only a short period of time. The fence is not intended as a substitute or equivalent of permanent fence. The temporary fence requires materials, design and construction that will accomplish the intended purpose and last for the planned time period with no more maintenance than is desired.

Many companies market portable fence systems that use materials such as polyethylene wire and tape with steel or aluminum wire woven into them, aluminum wire, plastic and fiberglass posts, reels to roll up wire, and battery operated energizers that are high voltage and low impedance (see previous section on energizers). A minimum of six strands of steel or aluminum wire should be woven into the polywire or polytape. Temporary fences may be attached to permanent fences to subdivide pasture. Follow manufacturer's directions for construction, use and operation of temporary electric fences

## 7. SPECIAL SPECIFICATIONS



Note: Distance from point A to B shall be a minimum twice the height between the top wire and the ground surface.

Single Post End Brace (Floating Angle Brace) Assembly



having over 2 wires or where pull distances is > 660 feet.

wood, fibergloss, or steel pipe with a minimum top diameter of 5" set to depth greater than or equal to the height of the post above ground.





Knee or Deadman Braces may be used on fences with 2 wires or where pull distances is < 660 feet.

Electric Fencing Bracing Alternatives



(a)

(b)

Standard Suspension Fence, Corner and Pull Assembly



- Materials: Post must be new eastern red juniper, blueberry juniper, bois-d'arc, treated pine, treated hardwood, or steel pipe (cemented). Used steel pipe is acceptable and must be painted.
- Splices: Use "western---union splices, figure "8" knots or crimping sleeves for malleable wire. Use crimping sleeves or figure "8" knot for high tensile strength wire.

2 Post Brace With Deadman

(c)

Standard Suspension Fence, Corner and Pull Assembly



Single Post Corner or Angle Brace Assembly

(d)

Standard Suspension Fence, Corner and Pull Assembly



Materials: Post must be new eastern red juniper, blueberry juniper, bois-d'arc, treated pine, treated hardwood, or steel pipe. Used steel pipe is acceptable and must be painted.

Splices: Use "western-union splices, figure "8" knots or crimping sleeves for malleable wire.

Use crimping sleeves or figure "8" knot for high tensile strength wire.

Deadmaned 3-Post Corner



Welded Steel 3–Post Diagonal End Brace Assembly



Note:

Materials shown above may be substituted using 2 1/2" nominal steel pipe, capped, set in concrete (12 in. diameter hole). Pipe must be painted.

Wooden 3 Post Double "H" Brace End Assembly Without Deadman





Deadman is optional except where surface of soli is more than 20 inches in depth of loamy fine sand or coarser.

End Brace Assembly Deer Managemet Fence

Tigure 8



Note: If standard steel "T" posts are used, install 2 1/2" nominal steel pipe post, with cap or 6" top wooden post every 150' (Wooden stays may be placed between line post as needed.

General Installation Specification For Deer Management Fence



L.



system

An induction loop may be as an alternative to a choke.

An induction loop is made by coiling 8 to 10 loops of heavily insulated 12 gage wire in  $10-12^{\circ}$  diameter circles and taping the loops together.

Electric Fence



Electric Flood Gate

# **IA-95 GEOTEXTILE**

## 1. SCOPE

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

#### 2. MATERIAL QUALITY

Geotextile 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. <u>Woven Geotextile</u> shall conform to the physical properties listed in <u>Table 1</u>. 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. <u>Nonwoven Geotextile</u> shall conform to the physical properties listed in <u>Table 2</u>. Nonwoven geotextile 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 geotextile, in addition to mechanically bonded, nonwoven geotextile, 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 shown 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. Geotextile shall be placed in accordance with the following applicable specification according to the use indicated in drawings:

*Slope protection* – Class I or II as indicated in Tables 1 and 2.

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. Rock shall not be pushed or rolled over the geotextile.

Class I, unprotected – limit height for dropping stone onto bare geotextile to 3 feet.

Class II, protected – require the use of 6 inches a clean pit-run gravel over the geotextile to cushion the stone and limit the height of drop to 3 feet.

On slopes with strong seepage flow, the geotextile must be in intimate contact with the soil to prevent erosion of the soil surface. Use 6 inches of a clean pit-run gravel over the geotextile to hold it in place and minimize voids under the riprap. Embedment of the geotextile in a trench to form a cutoff at regular intervals down the slope will prevent erosion under the fabric. Place cutoffs more closely together in highly erodible soils and wider apart in more stable soils.

Subsurface drains – Class III as indicated in Tables 1 and 2.

The geotextile shall not be placed until drainfill or other material can be used to provide cover within the same working day. Drainfill material shall be placed in a manner that prevents damage to the geotextile. In no case shall material be dropped on uncovered geotextile from a height of more than 5 feet.

Iowa

*Road stabilization* – Class IV as indicated in Tables 1 and 2.

The geotextile shall be unrolled in a direction parallel to the roadway centerline in a loose manner permitting conformation to the surface irregularities when the roadway fill material is placed on its surface. In no case shall material be dropped on uncovered geotextile from a height of more than 5 feet. Unless otherwise specified, the minimum overlap of geotextile panels joined without sewing shall be 24 inches. The geotextile may be temporarily secured with pins recommended or provided by the manufacturer, but they shall be removed before the permanent covering material is placed.

#### 6. SPECIAL SPECIFICATIONS

Property	Test Method	Class I	Class II	Class III	Class IV
Grab tensile strength (pounds)	ASTM D4632	247 minimum	180 minimum	180 minimum	315 minimum
Elongation at failure (%)	ASTM D4632	< 50	< 50	< 50	< 50
Trapezoidal tear strength (pounds)	ASTM D4533	90 minimum	67 minimum	67 minimum	112 minimum
Puncture strength (pounds)	ASTM D6241	495 minimum	371 minimum	371 minimum	618 minimum
Ultraviolet light (% retained strength)	ASTM D4355	50 minimum	50 minimum	50 minimum	70 minimum
Permittivity (sec <sup>-1</sup> )	ASTM D4491	as specified			
Apparent opening size (AOS) <sup>2/</sup>	ASTM D4751	as specified			
Percent open area (POA) (%)	USACE <sup>3/</sup> CWO-02215-86		a	as specified	

## TABLE 1. REQUIREMENTS FOR WOVEN GEOTEXTILES 1/

1/ All values are minimum average roll values (MARV) in the weakest principal direction, unless otherwise noted.

2/ Maximum average roll value.

3/ Note: CWO is a USACE reference.
# TABLE 2. REQUIREMENTS FOR NONWOVEN GEOTEXTILES 1/

Property	Test Method	Class I <sup>2/</sup>	Class II <sup>2/</sup>	Class III <sup>2/</sup>	Class IV <sup>2/</sup>
Grab tensile strength (pounds)	ASTM D4632 grab test	202 minimum	157 minimum	112 minimum	202 minimum
Elongation at failure (%)	ASTM D4632	50 minimum	50 minimum	50 minimum	50 minimum
Trapezoidal tear strength (pounds)	ASTM D4533	79 minimum	56 minimum	40 minimum	79 minimum
Puncture strength (pounds)	ASTM D6241	433 minimum	309 minimum	223 minimum	433 minimum
Ultraviolet light (retained strength) (%)	ASTM D4355	50 minimum	50 minimum	50 minimum	50 minimum
Permittivity (sec <sup>-1</sup> )	ASTM D4491		0.70 minimum	or as specified	
Apparent opening size (AOS) (mm) $^{3/}$	ASTM D4751		0.22 maximum	or as specified	

1/ All values are minimum average roll values (MARV) in the weakest principal direction, unless otherwise noted.

2/ Needle punched geotextiles may be used for all classes. Heat-bonded or resin-bonded geotextiles may be used for class IV only.

3/ Maximum average roll value.

## NATURAL RESOURCES CONSERVATION SERVICE CONSTRUCTION SPECIFICATION

# **IA-600 TERRACES**

## 1. SCOPE

The work shall consist of terrace construction as shown on the drawings or staked in the field.

## 2. MATERIALS

Earth materials used in constructing the terraces shall be taken from areas adjacent to the terrace alignment or other approved sources. The fill material shall be free from brush, roots, sod, frozen material, stones over 6 inches in diameter, or other objectionable material.

## 3. GENERAL REQUIREMENTS

The terraces shall be constructed according to the staked alignment, grade, and cross section with the specified overfill for settlement and the channel graded to drain.

Channel blocks shall be built to the full design height of the terrace unless otherwise specified. Blocks must be compacted and farmable with side slopes of 5 horizontal to 1 vertical or flatter unless otherwise specified. Cuts and fills should be made in such a manner that topography will be enhanced. Cuts should not be made in depressions to secure borrow to build the terrace ridge through those areas, since this increases field slopes. Borrow for large fills across depressions shall be taken from the adjacent ridges.

The surface of the finished terrace shall be reasonably smooth and present a workmanlike finish. Borrow areas shall be uniformly graded. Cuts shall be blended with existing topography so that the finished area is farmable. Any ditch or depression at the bottom of the backslope shall be filled and smoothed so that drainage will be away from the terrace and not parallel to it. Excavation for grassedback, farmable front slope and narrow-base terraces shall be taken from the downhill side of the terrace except as specified by the NRCS. See the "Minimum Dimensions" sketches in section 7 for definitions and terrace types.

## 4. FOUNDATION PREPARATION

All dead furrows, ditches or gullies shall be filled before or during the construction of the terraces. All old terraces, fence rows, hedge rows, trees, and other obstructions shall be removed, as necessary, to install a farmable system.

The total disturbed area of the terrace shall be cleared, grubbed, and stripped a minimum of 6 inches to remove vegetation and other unsuitable materials. Smooth surfaces where fill material is to be placed shall be scarified to insure bonding.

## 5. PLACEMENT

Fill material shall not be placed on sod or on a frozen foundation. The moisture content of terrace 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 or work shall be stopped until moisture conditions are satisfactory.

Fill material shall be placed so that the entire terrace receives compactive effort of the construction equipment on the fill. When the base width of the fill exceeds 12 feet, the fill shall be placed in lifts not exceeding one foot with each lift compacted with the construction equipment.

If specified, topsoil shall be stockpiled and spread over borrow areas and the terrace embankment.

## 6. TERRACE OUTLETS

Conduits shall be embedded and backfilled throughout the base width of the terrace ridge. Friable soil material shall be placed in 6 inch layers and hand tamped to a depth of approximately 18 inches over the pipe. The sides of the remaining trench shall be sloped no steeper than 3 horizontal to 1 vertical and backfill placed in 6 inch layers and machine compacted. The materials used for the inlet, outlet, and conduit shall be as specified.

## 7. MINIMUM DIMENSIONS



Length of front slope and backslope shall be in increments of machinery width but not less than 15 feet h = Design height of the terrace

#### **BROADBASE TERRACE CROSS SECTION**



Length of backslope shall be in increments of machinery width but not less than 15 feet  $$\rm h$$  = Design height of the terrace

**GRASSED FRONT, FARMABLE BACKSLOPE TERRACE CROSS SECTION** 



Length of front slope shall be in increments of machinery width but not less than 15 feet \*The backslope shall be no steeper than 2:1 except when built on Ida and Monona soil series types which may have the backslope constructed no steeper than 1.5:1 h = Design height of the terrace

## GRASSED-BACK, FARMABLE FRONT SLOPE TERRACE CROSS SECTION



h = Design height of the terrace

#### NARROW-BASE TERRACE CROSS SECTION

## 8. SEEDING

Grassed-back, farmable front slope terraces shall have the entire backslope seeded. Narrow-base terraces shall have both the front slope and backslope seeded. Grassed front, farmable backslope terraces shall have the front slope seeded. A protective cover of vegetation shall be established on these areas. Seeding operations shall begin as soon as possible after the terrace earth work has been completed. Seedbed preparation and seeding, liming, fertilizing and mulching rates shall be in accordance with the IA-CPA-4, Seeding Plan, and Construction Specification IA-6, Seeding and Mulching for Protective Cover.

## 9. SPECIAL SPECIFICATIONS

## NATURAL RESOURCES CONSERVATION SERVICE CONSTRUCTION SPECIFICATIONS

# IA-620 UNDERGROUND OUTLET

## 1. SCOPE

This work shall consist of installation of underground outlets and any appurtenant water control structures in accordance with an approved plan and design.

## 2. MATERIALS

Materials for underground outlets shall meet the requirements as shown in the plans and specifications. They shall be field inspected for any deficiencies such as thin spots or cracking prior to installation.

## Conduit

The following reference specifications pertain to products currently acceptable for use as underground outlets:

## Plastic

Corrugated Polyethylene (PE) Pipe and Fittings (3-6 inch)	ASTM F 405
3 through 24 inch Corrugated Polyethylene (PE) Pipe and Fittings	ASTM F 667
Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth	
Interior and Fittings (4-36 inch)	ASTM F 949
Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings	ASTM D 2729
Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings	ASTM D 3034
Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)	ASTM D 2241
Polyethylene Plastics Pipe and Fittings Materials	ASTM D 335

## Clay

Clay Drain Tile	ASTM C 4
Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated	ASTM C 700
Vitrified Clay Pipe, test methods	ASTM C 301

#### Concrete

Concrete Drain Tile (4-36 inch)	ASTM C 412
Concrete Pipe for Irrigation or Drainage	ASTM C 118
Concrete Pipe, Manhole Sections, or Tile (test methods)	ASTM C 497
Concrete Sewer, Storm Drain and Culvert Pipe	ASTM C 14
Reinforced Concrete Culvert, Storm Drain and Sewer Pipe	ASTM C 76
Perforated Concrete Pipe	ASTM C 444
Portland Cement	ASTM C 150
Perforated Concrete Pipe	ASTM C 444 ASTM C 150

## Other

Styrene-Rubber (SR) Plastic Drain Pipe and Fittings	ASTM D	2852
Corrugated Aluminum Pipe for Sewers and Drains	ASTM B	745
Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains	ASTM A	760

## Inlet

The inlet shall be fabricated and installed as shown on the plans. Inlets must be of durable material, structurally sound, and resistant to damage by rodents or other animals. Inlets shall be of rigid material, which does not require supplemental support to remain in a vertical position. Materials, which meet these requirements, include the following:

- 1. Corrugated metal pipe, galvanized or aluminum, 16 gauge minimum,
- 2. Smooth steel pipe, with 3/16 inch minimum wall thickness,
- 3. Smooth plastic pipe, polyvinyl chloride (PVC), with an SDR of 43 or less,
- 4. High-density polyethylene pipe (PE). Round pipe shall have an SDR of 43 or less. Square intakes shall have minimum wall thickness as shown in the following table:

Minimum Thickness
0.16 inch
0.21 inch
0.26 inch
0.31 inch

All plastic and polyethylene inlets shall include ultra-violet stabilizer to protect from solar degradation.

Perforations in the inlet shall be smooth and free of burrs. Unless otherwise specified, the above ground portion of the inlet shall have holes evenly spaced around the perimeter of the inlet in accordance with the following table:

Inlet	Minimum Number of 1" Diameter
Size	Holes per Foot of Inlet
4 inch	20
5 inch	24
6 inch	30
8 inch	40
10 inch	50
12 inch	60

If slots or round holes other than 1 inch in diameter are provided, the total cross sectional area of the openings per foot shall be equivalent to that provided by 1 inch diameter round holes meeting the above criteria.

The below ground portion of the inlet may be perforated with holes 5/16 of an inch in diameter or less to provide drainage around the inlet.

Appurtenances (i.e. tees and elbows) for polyvinyl chloride (PVC) inlets shall be schedule 40 or heavier.

Additional subsurface drainage tubing or tile may be used in conjunction with the surface inlet to improve access and farmability around the inlet. These underground extensions (when used) shall have a minimum length of 10 feet.

The inlet shall be offset from the main conduit except as noted below. A minimum of 8 feet of non-perforated conduit shall be installed between the inlet and the main conduit. The minimum diameter of the offset line shall be 3 inches. When conduit capacity is based on orifice flow from the inlet, such inlets shall be fabricated so that an orifice can easily be installed.

Only the top inlet in a terrace system may be placed directly on the main conduit. If the top most inlet in a terrace system is placed directly on the main conduit, the conduit shall be non-perforated from the inlet to the toe of the terrace back slope.

## Outlet

A continuous section of non-perforated conduit at least 20 feet long shall be used at the outlet. Twothirds of the outlet pipe shall be buried in the ditch bank, and the cantilever section must extend to the toe of the ditch side slope or the side slope shall be protected from erosion. Acceptable materials for use at the outlet include the following:

- 1. Corrugated metal pipe, galvanized or aluminum, 16 gauge minimum;
- 2. Smooth steel pipe, with 3/16 inch minimum wall thickness;
- 3. Smooth plastic pipe, polyvinyl chloride (PVC), with a SDR of 26 or less or schedule 40 or heavier; or
- 4. Corrugated profile wall (dual wall) polyethylene (PE) pipe meeting or exceeding the requirements of ASTM F 2648 (2" to 60"), ASTM F 2306 (12" to 60"). Pipe conforming to AASHTO M 252 (3" to 10"), or AASHTO M 294 (12" to 60") is acceptable.

All plastic and polyethylene pipe outlets shall include ultra-violet stabilizer. PVC and PE pipe outlets shall not be used where burning vegetation on the outlet ditch bank is likely to create a fire hazard.

Connections with the outlet pipe shall be made watertight.

The outlet shall be equipped with a flap-gate type rodent guard.

## 3. TRENCH EXCAVATION

Trench excavation shall be sufficient to provide required cover after other construction is completed.

The trench bottom shall be smooth and free of exposed rock. If rock is encountered in the trench bottom, over-excavate the trench and place at least 6 inches of compacted earth or sand bedding in the trench to bring it up to the conduit grade. In stable soils, the bottom of the trench shall be shaped to form a semicircular, trapezoidal, or 90-degree "V" groove in its center. The groove shall be shaped to fit the size of conduit. The 90-degree "V" groove shall not be used on conduits greater than 6 inches in diameter.

Unless otherwise shown on the drawings, trench width at the top of the conduit should be the minimum required to permit installation and provide bedding conditions suitable to support the load on the conduit, but with not less than 3 inches of clearance on each side. Maximum trench width shall be the conduit diameter plus 12 inches measured at the top of the conduit, unless approved bedding is installed.

Plow installation is allowed except under the base width of the terrace or embankment. Trench width shall be at least two (2) inches wider than the conduit on each side to allow sufficient bedding to support the pipe.

## 4. INSTALLATION

The underground outlet system shall be installed to the line and grade shown in the plans or as staked in the field. Conduit lines shall be installed and properly blinded or bedded prior to placement of any other earthfill over the lines.

Conduit lines shall be joined with standard factory couplers, if applicable, to produce a continuous system. Internal couplers may be used if they do not cause excessive flow restrictions. Conduit ends shall be protected during installation.

All appurtenant structures, including trash and rodent guards, shall be installed promptly and provisions shall be made for protecting them during installation. All conduit ends except the outlet and inlets with screens shall be capped with standard factory end caps or concrete. When corrugated plastic tubing is used, no more than 5% stretch will be allowed.

Orifice plates, when specified, shall have smooth edges and fit tightly.

## 5. TRENCH BACKFILL

Conduits shall be bedded and backfilled throughout the base width of the basin embankment or terrace ridge. Friable soil material shall be placed in 4 inch layers and hand tamped to a depth of 2 feet above the conduit. The sides of the remaining trench shall be sloped no steeper than 3 horizontal to 1 vertical and backfill placed in 9 inch layers and machine compacted.

Water packing may be used as an alternative to mechanical compaction. If the conduit is nonperforated, it shall be filled with water during the water packing procedure. The initial backfill, before wetting, shall be of sufficient depth to ensure complete coverage of the pipe after consolidation has taken place. Water packing is accomplished by adding water in such quantity as to thoroughly saturate the initial backfill without inundation. The wetted fill shall be allowed to dry until firm before final backfill is begun. Final backfill shall be accomplished by placing friable soil material in 4 inch layers and hand tamping to a depth of 2 feet above the conduit. The sides of the remaining trench shall be sloped no steeper than 3 horizontal to 1 vertical and backfill placed in 9 inch layers and machine compacted.

Conduit which is not under the embankment or terrace ridge shall be backfilled with select bedding material containing no hard objects larger than 1½ inches in diameter to a minimum depth of 6 inches over the conduit. The conduit shall be held in place mechanically while select backfill material is placed around and over the conduit. This is to ensure that the proper conduit grade is maintained. All backfill material shall be placed so that deflection or displacement of the conduit will not occur. The remainder of the trench above the conduit shall be backfilled as rapidly as consistent with the soil conditions. Backfill shall extend above the ground surface and be well rounded over the trench. Large stones, frozen material, and large clods are not allowed in the backfill material.

## 6. FINISH

Work areas shall be smoothed and left in a workmanlike manner. Vegetation or other protective cover shall be established as specified.

## 7. SPECIAL SPECIFICATIONS

## SECTION B: SUPPLEMENTAL SPECIFICATIONS UPPER IOWA RIVER WMA UI-019-SEED SAVERS EXCHANGE

#### EXPLANATION

- A. The purpose of this Section of the Specifications is to provide supplemental information which is required to complete the Standard Construction Specifications and to set forth supplementary requirements, modifications and/or deletions which are required to make the whole of the Construction Specifications project specific.
- C. Where there is any variance between the Standard Construction Specifications and these Supplemental Specifications, the Supplemental Specifications shall take precedence.
- D. Where any section of the Standard Construction Specifications is modified, or any Paragraph, Sub-paragraph or Clause thereof is changed or deleted by these Supplemental Specifications, the unaltered provisions of that Section, Paragraph, Sub-paragraph or Clause in the Standard Construction Specifications shall remain in effect. Unless these Supplemental Specifications make specific reference to the modification or deletion of a Paragraph, Sub-paragraph or Clause in the Standard Construction Specifications, no changes are intended, and paragraphs contained in these Supplemental Specifications are intended only to supplement, amplify, or clarify said Standard Construction Specifications.

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#### **IA-1 SITE PREPARATION**

#### A. Measurement and Payment

- 1. Compensation for Site Clearing, Preparation, & Waste Disposal (Bid Item 1) shall be made on a lump sum basis. Any work item described in the contract documents but not explicitly listed in the bid schedule will be included in the lump sum payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified in the Items of Work and Construction Details section of this specification.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.
- B. Items of Work and Construction Details
  - 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    - a. Bid Item 1-Site Clearing, Preparation, & Waste Disposal
      - (1) This item will consist of the removal and proper off-site disposal of all woody growth within the construction area. Trees may also be burned and buried onsite in an owner and engineer approved location and manner.
      - (2) This item includes the removal and proper off-site disposal of existing pipes/outlets encountered during construction. Removal of all pipes/outlets shall be completed in accordance with IA-1 and IA-3. Payment for the removal or salvage of pipes and outlets shall be incidental to Bid Item 1.
      - (3) This item includes the removal of field tile located during excavation or general grading activities. Any field tile encountered within the project grading limits shall be removed by the contractor in accordance to IA-1, IA-3, and IA-9. Payment for the removal or salvage of field tile shall be incidental to Bid Item 1.
      - (4) This item includes stripping, salvaging, and replacing the existing gravel surfacing on the existing driveways inside the grading limits. Additional removal beyond the limits shown on the plans is not included in this item.
      - (5) This item includes the removal and proper off-site disposal of all refuse and debris encountered on grade in areas being graded or seeded.
      - (1) This item includes the removal and proper off-site disposal of any fence indicated to be removed on the plans. Any fence removed for access and /or to provide work area shall be salvaged if practical or replaced with same or like materials as approved by the engineer and in accordance with specification IA-92. Removal or salvage shall be completed in accordance with IA-1 and IA-3. Payment for the removal or salvage of fence shall be incidental to Bid Item 1.
      - (6) All removals shall be completed in accordance with IA-5 Pollution Control.

#### **IA-5 POLLUTION CONTROL**

- A. Measurement and Payment
  - 1. Compensation for any work item described in the contract documents but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified Items of Work and Construction Details section of this specification.
  - 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.
- B. Items of Work and Construction Details
  - 1. Items of work to be performed in conformance with the specification and the construction details therefore are:
    - a. Subsidiary Item, Sediment Filters
      - (1) This item consists of all work to install, maintain and remove sediment filters for the project. Sediment filters to be removed once vegetation is established.
      - (2) No separate payment will be made for sediment filters. Compensation for this item will be incidental to other items of work.
      - (3) Contractor shall perform all construction activities in a manner that will minimize water pollution, air pollution, and soil erosion. Sediment filters shall be placed as needed where off-site erosion could occur.
    - b. Subsidiary Item, Pollution Control
      - (1) This item will consist of applying and performing all construction activities in a manner that will minimize water pollution, air pollution and soil erosion and shall be completed in compliances with all state, local and federal regulations.
      - (2) No separate payment will be made for Pollution Control. Compensation for this item will be incidental to other items of work.
    - c. Rolled Erosion Control Product (Bid Item 2)
      - (1) Payment for this item shall include the cost to obtain, install, and maintain rolled erosion control products in the locations indicated in the plans.
      - (2) Measurement and payment of this bid item will be based on the quantity (in square yards) listed on the plans unless the WMA or Engineer directs the contractor to install a different amount in the field. In that case, payment shall be made based on the actual quantity (measured in square yards) installed, at the bid unit price.

Issued for Construction 1/12/2021

#### IA-6 SEEDING AND MULCHING FOR PROTECTIVE COVER

- A. Measurement and Payment
  - 1. For items of work for which specific prices are established in the contract each area treated is measured and the area calculated to the nearest 0.1 acre.
  - 2. Payment for seeding is made at the contract unit price per acre for the designated treatment, which will constitute full compensation for completion of the work.
- B. Items of Work and Construction Details
  - 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    - a. Seeding, Structure and Channel Mix (Bid Item 3)
      - (1) This item will consist of seeding the embankment, terrace flowlines, ditches, all concentrated flow paths, and any area steeper than 4:1 (H:V).
      - (2) All seed must be cleaned and weed free. Seeding rates are expressed in bulk pounds per acre. Seed quality shall not drop below 70% Pure Life Seed (PLS) where PLS = (% germination + % dormant seed) times % purity.
      - (3) Seed mix shall be 25.0 lbs./ac Smooth Bromegrass.
      - (4) Prepare a firm seedbed for all planting methods:
        - (a) If the land was in soybeans, no additional tillage is required. If the land was in corn or other vegetation, till all areas to be seeded by disking or other approved methods; thoroughly loosen and pulverize the soil to a depth of three (3) inches. This may require multiple passes of the disk or other approved equipment. If the land was used for pasture and has a smooth surface, the preparation in non-disturbed areas to be seeded shall include mowing any vegetation taller than 12 inches and applying a burn down herbicide, such as glyphosate, at the labeled rates to emergent growth 2 to 4 weeks after mowing. After the vegetation has died, the area shall be disked as needed to thoroughly loosen and pulverize the soil to a depth of three (3) inches. If emergent growth occurs again prior to seeding, the area shall receive a second application of herbicide. Seeding shall not occur until the existing vegetation has died. If the pasture has a rough surface that would negatively impact the seeding, the area shall be thoroughly disked and the cultipacked prior to seeding.
          - (b) After the disking operation, and prior to seed application, firm the seedbed with a cultipacker or similar piece of equipment.
      - (5) Fertilizer shall be applied on the entire seeding area at the following rate:
        - (a) Nitrogen: 30 lbs./acre
        - (b) Phosphorus (P2O5): 30 lbs./acre
        - (c) Potassium (K2O): 40 lbs./acre
      - (6) Straw much shall be applied at a rate of 2 tons per acre.

- (7) Seeding will be completed during the follow seeding periods
  - Spring: March 1 to May 15
  - Summer: August 1 to September 15
  - Fall: November 15 to freeze up
- (8) Sow seeds with the contour using a grassland or rangeland drill set for the specified seeding rates. The drill shall be equipped with double coulter furrow openers. The drill shall be subject to acceptance by Engineer. Overlap each successive seeding pass to ensure complete coverage.
- (9) For seeding occurring in the spring, contractor shall ensure the seedbed remains moist until plant establishment. Moisture may be maintained during dry conditions through regular watering. Consult the engineer for recommended moisture control methods. Seeding should occur when rain is in the forecast when possible. Failure to make a good faith effort to maintain moisture may result in re-seeding by the Contractor at no additional expense to the Owner.
- (10) If seeding is completed during the spring seeding period, a companion crop of oats shall be seeded at ½ bushel per acre.
- (11) Plant seed using a drill between  $\frac{1}{4}$  and  $\frac{1}{2}$  inch deep
- (12) Broadcasting by centrifugal-type or hydroseeder broadcasters, or by hand shall also be allowed in areas no accessible to drills or other equipment. Once broadcast, the seed must be covered with soil to a depth no greater than one half (1/2) inch by means of hand rakes or other approved methods.
- (13) Upon completion of the seeding operation, cultipack the seedbed to provide a positive seed-soil contact. If the drill seeder is equipped with an approved cultipacker or press wheels, separate operations shall not be necessary. The type of cultipacker / seeder to be used shall be subject to acceptance by Engineer.
- (14) Measurement and payment will be based on the area successfully seeded.

- b. Seeding, Native Pasture Seed Mix (Bid Item 4)
  - (1) This item will consist of seeding native pasture areas as shown in the drawings.
  - (2) All seed must be cleaned and weed free. Seeding rates are expressed in bulk pounds per acre. Seed quality shall not drop below 70% Pure Life Seed (PLS) where PLS = (% germination + % dormant seed) times % purity.
  - (3) Seed mix shall be as specified in the native pasture seed mix table on the following page.
  - (4) A seed mix different from the one provided below may be required when re-seeding disturbed areas within CRP contract limits. Prepare a firm seedbed for all planting methods:
    - (a) If the land was in soybeans, no additional tillage is required. If the land was in corn or other vegetation, till all areas to be seeded by disking or other approved methods; thoroughly loosen and pulverize the soil to a depth of three (3) inches. This may require multiple passes of the disk or other approved equipment. If the land was used for pasture and has a smooth surface, the preparation in non-disturbed areas to be seeded shall include mowing any vegetation taller than 12 inches and applying a burn down herbicide, such as glyphosate, at the labeled rates to emergent growth 2 to 4 weeks after mowing. After the vegetation has died, the area shall be disked as needed to thoroughly loosen and pulverize the soil to a depth of three (3) inches. If emergent growth occurs again prior to seeding, the area shall receive a second application of herbicide. Seeding shall not occur until the existing vegetation has died. If the pasture has a rough surface that would negatively impact the seeding, the area shall be thoroughly disked and the cultipacked prior to seeding.
    - (b) After the disking operation, and prior to seed application, firm the seedbed with a cultipacker or similar piece of equipment.
  - (5) Fertilizer shall be applied on the entire seeding area at the following rate:(a) Nitrogen: 30 lbs./acre
    - (b) Phosphorus (P2O5): 30 lbs./acre
    - (c) Potassium (K2O): 40 lbs./acre
  - (6) No mulch shall be applied.
  - (7) Seeding will be completed during the follow seeding periods:
    - Spring: March 1 to May 15
    - Fall: November 15 to freeze up
  - (8) For seeding occurring in the Spring seeding period, scarification of the seed must be completed by the seed provider.
  - (9) Sow seeds using a broadcast seeder at the specified rates.
  - (10) If seeding is completed during the spring seeding period, a companion crop of oats shall be seeded at ½ bushel per acre.
  - (11) Broadcasting by centrifugal-type or hydroseeder broadcasters, or by hand shall also be allowed in areas no accessible to other equipment.
  - (12) Upon completion of the seeding operation, lightly cultipack the seedbed to provide a positive seed-soil contact. The type of cultipacker / seeder to be used shall be subject to acceptance by Engineer.
  - (13) Measurement and payment will be based on the area successfully seeded.

Upper Iowa WMA Watershed Improvements Shive-Hattery Project # 4185190

Issued for Construction 1/12/2021

SUPPLEMENTAL SPECIFICATIONS UI-019 – SEED SAVERS EXCHANGE

# **Seeding Plan**

Seed Savers - Native Pasture Plan

Name

				Tract No.
-				Field No.
Program:	Upper Iowa Watershed Project	Acres:	1.00	Contract No. JI-019-Seed Savers

Date

12/16/2020

# Seeding Mix Summary

				PLS	PLS Lbs
Grasses	Scientific Name	Common Name	Seeds/Ft <sup>2</sup>	Lbs/Acre	Total
1	Andropogon gerardii	Big Bluestem	5.510	1.500	1.50
2	Sorghastrum nutans	Indiangrass	6.612	1.500	1.50
3	Panicum virgatum	Switchgrass	1.028	0.200	0.20
4	Elymus virginicus	Virginia Wildrye	3.085	2.000	2.00
5	Sporobolus heterolepis	Prairie Dropseed	1.704	0.290	0.29
6	Sporobolus clandestinus	Rough Dropseed	1.102	0.100	0.10
7	Carex vulninoidea	Fox Sedge	0 735	0 020	0.020
8	Elvmus canadensis	Canada Wildrve	3 820	2 000	2 00
9	Koeleria macrantha	Prairie Junegrass	3.673	0.050	0.050
10	Bouteloua curtipendula	Sideoats Grama	1.102	0.500	0.50
11	Schizachyrium scoparium	Little Bluestem	1.377	0.250	0.25
12	Carex brevior	Shortbeak Sedge	0.320	0.030	0.030
13					
		SUBTOTAL GRASSES	30.068	8.440	8.440
				PLS	PISIbe
Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft <sup>2</sup>	Lbs/Acre	Total
1	Rudbeckia hirta	Black-eved Susan	3 379	0.100	0.10
2	Ratibida ninnata	Grav-beaded Coneflower	2 204	0.100	0.20
3	Dalea purpurea	Purple Prairie Clover	3 636	0.550	0.55
4	Chamaecrista fasciculata	Partridge Pea	0 198	0.200	0.20
•		r annago r oa	0.100	0.200	0.20
5	Lespedeza capitata	Round-headed Bush Clover	0.029	0.010	0.010
6	Dalea candida	White Prairie Clover	0.349	0.050	0.050
7	Symphyotrichum laeve	Smooth Blue Aster	0.505	0.025	0.025
8	Verbena stricta	Hoary Vervain	0.103	0.010	0.010
9	Asclepias tuberosa	Butterfly Milkweed	0.032	0.020	0.020
10	Baptisia alba	White Wild Indigo	0.006	0.010	0.010
11	Echinacea pallida	Pale Coneflower	0.096	0.050	0.050
12	Vernonia fasciculata	Ironweed	0.088	0.010	0.010
13	Monarda fistulosa	Wild Bergamot	1.800	0.070	0.070
14	Solidago speciosa	Showy Goldenrod	0.523	0.015	0.015
15	Desmanthus illinoensis	Prairie Mimosa	0.771	0.500	0.50
16	Silphium terebinthinaceum	Prairie Rosinweed	0.004	0.010	0.010
17	Tradescantia ohiensis	Common Spiderwort	0.029	0.010	0.010
18	Symphyotrichum	White Heath Aster	0.367	0.005	0.0050
	ericoides				
19	Oligoneuron rigidum	Stiff Goldenrod	0.226	0.015	0.015
20	Heliopsis helianthoides	Ox-eye	0.231	0.100	0.10
21	Zizia aurea	Golden Alexander's	0.202	0.050	0.050
22	Veronicastrum virginicum	Culver's Root	2.938	0.010	0.010
23	Pycnanthemum virginianum	Common Mountain Mint	0.808	0.010	0.010
24	Physostegia parviflora	Obedient Plant	0.162	0.020	0.020
25	Liatris pycnostachya	Prairie Blazing Star	0.040	0.010	0.010

26	Ruellia humilis	Wild Petunia	0.019	0.010	0.010	
2/	Astragalus canadensis	SUBTOTAL FORBS	<b>20.077</b>	<b>2.179</b>	<b>2.179</b>	
Woody	Scientific Name		Seeds/Ft <sup>2</sup>	PLS Lbs/Acre	PLS Lbs Total	
		TOTAL	50.498	10.679	10.679	
	Estimated Cost/Acro	e	I	Estimated	Total Cost	\$0.00
		Soil Test Information	Total N Ib	leeded s		
Lime (E	CCE) (Actual Lime)					
Dha	Nitrogen					
Pho	Potash (K20)	-				
	Seeding Dates Additional Seeding Criteria	Spring (April 1 - June 2017)	uly 1) For additiona	L SEEDING INF	ORMATION	
To be used on design	ated pasture areas disturbed by cor	nstruction.				
Seeding was com	pleted by(Date)	according to the above requir	ements.			
(Con	tractors Signature)		(Da	te)		
		Certified by				
	•					

#### IA-8 MOBILIZATION AND DEMOBILIZATION

- A. Measurement and Payment
  - 1. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.
  - 2. Initial payment of 50% of the contract price will be made in the first pay application after mobilization of the contractor's equipment to the project site and commencement of the project work has started. Final payment of the remaining 50% of the contract price will be made in the pay application following when the project is considered substantially complete by the Engineer.

- 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
  - a. Mobilization & Demobilization (Bid Item 5)
    - (1) This item shall consist of mobilizing and demobilizing personnel and equipment to and from the project location in preparation to perform the work within the scope of this contract.
    - (2) Any work that is necessary to provide access to the site including, but not limited to, grading, access road construction, temporary culverts, and clearing shall be included in this item. When construction is completed access areas will be restored, as close as practical, to its original condition unless approval is obtained from the Engineer and the landowner.
    - (3) The Contractor shall exercise caution to minimize the amount of damage caused by the grading and clearing operations.
    - (4) Portable toilets shall be provided at the construction site and used for the sanitary facilities. Toilets must be removed upon completion of the work.
    - (5) This item shall not include transportation of personnel, equipment, and operating supplies within the work limits areas of this contract.
    - (6) Payment will constitute full compensation for related subsidiary items.

#### IA-9 SUBSURFACE DRAIN INVESTIGATION, REMOVAL, AND REPAIR

#### A. MEASUREMENT AND PAYMENT

- 1. Compensation for any work item described in the contract documents but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified Items of Work and Construction Details section of this specification.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

## B. ITEMS OF WORK AND CONSTRUCTION DETAILS

- 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
  - a. Subsidiary Item, Drainage Tile Investigation and Removal
    - (1) Any drainage tiles encountered within the project area shall be traced to the upstream inlet or practice boundary, whichever is encountered first in accordance with this specification.
    - (2) This item shall consist of the excavation necessary to locate and remove all tile under the embankment, to remove tile at the other tile locations shown on the plans and locate the field tile lines in the practice. This item shall also consist of backfilling tile trenches if required.
    - (3) This item does not include the additional tile removal that occurs as part of the proposed project earthwork. Tile removal occurring in these areas is made subsidiary to specification IA-1, Site Preparation.
    - (4) The extent of tile investigation and removal shall be as required to locate and extend tiles as shown on the plans.
    - (5) The investigation should reveal where the tile crosses the embankment footprint or where it is located if it does not cross the embankment footprint.
    - (6) Removal shall be completed in accordance with IA-1, IA-3, IA-5, and IA-9.

#### IA-11 REMOVAL OF WATER

#### A. MEASUREMENT AND PAYMENT

- 1. Compensation for any work item described in the contract documents but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and bid items to which they are made subsidiary are identified Items of Work and Construction Details section of this specification.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

- 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
  - a. Subsidiary Item, Dewatering
    - (1) This item shall include all costs to divert, pump, dam or other means to control water run-on, run-off, and accumulation within the construction site.
    - (2) No separate or additional payment will be made for control or removal of water from the project location. Compensation for this item shall be subsidiary to other work items.

#### **IA-21 EXCAVATION**

#### A. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section. Items of Work and Construction Details.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.
- B. Items of Work and Construction Details
  - 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    - a. Over-Excavation, Core Trench Excavation (Bid Item 6)
      - (1) This item will consist of excavating the core trench as shown in the plans and construction details. Measurement and payment of this bid item will be based on the quantity (in cubic yards) listed on the plans unless the WMA or Engineer directs the contractor to excavate a different amount in the field. In that case payment shall be made based on the actual quantity excavated (measured in cubic yards), at the bid unit price. Depth and width of over-excavation may vary depending on the soils encountered. Over-excavation must terminate in suitable soils as determined by the Engineer.
      - (2) Fill for the core trench excavation shall be paid for under Earthfill (Bid Item 7).
      - b. Subsidiary Item, Excavation for Earthfill
        - This item will consist of the excavation of material in locations shown on the plans for use as Earthfill. All excavation required for the project will be balanced onsite, unless otherwise noted, in areas designated as Earthfill.
        - (2) No separate payment will be made for excavation.
        - (3) Compensation for this item will be included in the payment for Earthfill (Bid Item 7).

#### IA-23 EARTHFILL

#### A. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

- 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
  - a. Earthfill (Bid Item 7)
    - (1) This item shall consist of excavating, placing, and compacting the earthfill necessary to construct the embankment and adjacent fill areas as shown on the plans.
    - (2) Earthfill approved soil material shall be taken from excavation and designated borrow areas unless other areas are approved by the engineer.
    - (3) Compaction shall be Method 2 unless otherwise noted on the plans.
    - (4) Rocks larger than 6" shall be removed prior to compaction.
    - (5) Measurement and payment for Earthfill shall be on a plan "P" cubic yard basis. Plan basis means that the plan quantity listed in the proposal will be used to measure and pay for the bid item regardless of the actual quantity.
      - (a) This quantity may be adjusted to account for changes made to Bid Item 6: Over-Excavation, Core Trench Excavation, if necessary.
    - (6) A 25% shrinkage factor was used to determine the plan quantity.
  - b. Subsidiary Item, Backfill Required Excavation
    - (1) This item shall consist of backfilling the areas excavated to install other components related to the project such as piping or structures and to locate and remove the tile line.
    - (2) Compaction adjacent to the structures shall be as indicated above. All other compaction shall be Method 1 or equivalent.
    - (3) No separate payment will be made for Backfill of Structure Excavation. Compensation for this item will be included in payment for Corrugated Metal Pipe, Water Control Structure, Riser Inlet Structure, Tile Investigation and Removal, Corrugated Plastic Tubing Tile Drains, or Interceptor Drains if applicable.

#### IA-24 DRAINFILL

#### A. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

- 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
  - a. Filter Diaphragm Material, Sand (Bid Item 8)
    - (1) This item shall consist of procurement and placement of sand in the filter diaphragm, as shown on the drawings.
    - (2) Measurement and payment shall be on an actual per ton basis of sand installed. Weigh tickets shall be provided to the Engineer.
  - b. Stone Filter (Bid Item 9)
    - (1) This item shall consist of procurement and placement of the material for the stone filter behind the class E rip rap at the toe of the embankment, as shown on the drawings.
    - (2) This item shall also consist of procurement and placement of the material for the coarse-grain drainage course below the PCC paving, as shown on the drawings.
    - (3) Measurement and payment shall be on an actual per ton basis of stone filter material installed. Weigh tickets shall be provided to the Engineer.

#### IA-26 TOPSOILING

#### C. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

- 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
  - a. Topsoil, Strip, Salvage and Re-spread (Bid Item 10)
    - (1) This item will consist of stripping, salvaging, stockpiling and spreading salvaged (stockpiled) topsoil as the surface layer of all excavations and earth fills that will be disturbed as shown on the drawings.
    - (2) All other areas being excavated or receiving fill should be stripped of the top six (6) inches of topsoil and stockpiled.
    - (3) A minimum six (6) inch layer of topsoil shall be applied to all disturbed areas that will be seeded prior to project seeding.
    - (4) Measurement and payment for top soiling shall be on a plan "P" cubic yard basis. Plan basis means that the plan quantity listed in the proposal will be used to measure and pay for the bid item regardless of the actual quantity.

#### IA-31 Concrete

A. Revisions to the standard NRCS IA 31 Concrete Specification:

- 1. Materials
  - a. Reinforcing Bars ASTM A 615 or A 996, Grade 60 or greater, deformed.
  - b. Waterstops shall be self-adhering butyl Strip waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch. Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.
- 2. Concrete Design Mix
  - a. The concrete mix shall be of such proportions as to provide a minimum strength of 4,000 psi in 28 days, unless otherwise shown on the drawings.
  - b. Use a water to cementitious materials ratio less than or equal to 0.5.
  - c. Omit mix design table.

#### B. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.
- C. Items of Work and Construction Details
  - 1. Items of work to be performed in conformance with this specification and the construction details therefore are:
    - a. Structural Concrete (Bid Item 11)
      - (1) This item shall consist of furnishing and placing poured concrete and reinforced concrete as shown on the drawings for the low water crossing stem walls.
      - (2) Concrete shall be measured and paid for on a cubic yard basis.
      - (3) Compensation for this item includes the cost to purchase, transport, place, and cure the concrete as shown in the plans. The cost of any steel reinforcing shall be incidental to this item. No additional compensation will be given for costs incurred because of hot, cold, or other adverse weather conditions.
      - (4) Compensation for this item also includes the costs associated with any excavation and forming required to place the concrete as shown on the plans.
    - b. PCC Paving, 6" (Bid Item 12)
      - (1) This item shall consist of furnishing and placing poured concrete and reinforced concrete as shown on the drawings for the low water crossing driveway surface.
      - (2) Concrete shall be measured and paid for on a square yard basis.
      - (3) Compensation for this item includes the cost to purchase, transport, place, and cure the concrete as shown in the plans. The cost of any steel reinforcing shall be incidental to this item. No additional compensation

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SUPPLEMENTAL SPECIFICATIONS UI-019 – SEED SAVERS EXCHANGE will be given for costs incurred because of hot, cold, or other adverse weather conditions.

- (4) Compensation for this item also includes the costs associated with any excavation and forming required to place the concrete as shown on the plans.
- c. Subsidiary Item Concrete
  - (1) This item shall consist of furnishing and placing poured concrete and reinforced concrete as shown on the drawings for the 72" CMP Riser with Trash Rack (Bid Item 18) and the 10" Hickenbottom Intake (Bid Item 14).
  - (2) No separate payment will be made for Concrete. Compensation for this item will be included in the payment for the 72" CMP Riser with Trash Rack (Bid Item 18) and the 10" Hickenbottom Intake (Bid Item 14).

#### IA-45 PLASTIC PIPE

#### A. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.
- B. Items of Work and Construction Details
  - 1. Items of work to be performed in accordance with this specification and the construction details therefore are:
    - a. Dual-Wall HDPE Pipe, 8" (Bid Item 13)
      - (1) This item will consist of furnishing and installing the 8" Dual-Wall HDPE Pipe as shown on the plans.
      - (2) All costs to purchase, transport, and install the pipe, fittings, and appurtenances shall be included in this item. It is the contractor's responsibility to determine what fittings will be required.
      - (3) All costs to purchase, transport, and place backfill required for the pipe, as shown on the plans, shall be included in this item.
      - (4) Installation of pipe shall also be in accordance with IA-45 Plastic Pipe and IA-620 Underground Outlet.
      - (5) Installation shall include rodent guard as specified in IA-51.
      - (6) Linear foot measurement and payment will constitute full compensation for this bid item and related subsidiary items.
      - (7) No payment will be made for quantities of this item that are installed without the Engineer's approval.
    - b. Hickenbottom Intake, 10" (Bid Item 14)
      - (1) This item will consist of furnishing and installing the 10" Hickenbottom Intake as shown on the plans.
      - (2) All costs to purchase, transport, and install the intake, fittings, and appurtenances shall be included in this item. It is the contractor's responsibility to determine what fittings will be required.
      - (3) All costs to purchase, transport, and place backfill required for the intake, as shown on the plans, shall be included in this item.
      - (4) Installation of the intake shall also be in accordance with IA-45 Plastic Pipe and IA-620 Underground Outlet.
      - (5) Measurement and payment on an "Each" basis will constitute full compensation for this bid item and related subsidiary items.
      - (6) No payment will be made for quantities of this item that are installed without the Engineer's approval.

#### IA-51 CORRUGATED METAL PIPE CONDUITS

#### A. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

- 1. Items of work to be performed in accordance with this specification and the construction details therefore are:
  - a. Corrugated Metal Pipe, 36" (Bid Item 15):
    - (1) This item will consist of furnishing and installing the corrugated metal pipe outlet, including trash guard.
    - (2) The corrugated metal pipe shall be 14-gauge aluminum coated with annular or helical corrugations as noted on the drawings. The minimum corrugation size shall be 2-2/3"x1/2".
    - (3) Pipe materials with recycled content that meet ASTM A 760 and A 929 for the specified size of pipe are preferred and should be used where feasible. Post-consumer Steel Content of 15 to 70% and total recoverable steel material of 25-100% is recommended if available. Engineer may request information regarding recycled content of pipe materials for review.
    - (4) Coupling bands, repair of damaged coatings, and other appurtenances are subsidiary to this item and shall not warrant separate payment.
    - (5) Linear foot measurement and payment will constitute full compensation for this bid item and related subsidiary items.
  - b. Corrugated Metal Pipe, 48" (Bid Item 16):
    - (1) This item will consist of furnishing and installing the corrugated metal pipe outlet including trash guard.
    - (2) The corrugated metal pipe shall be 16-gauge aluminum coated with annular or helical corrugations as noted on the drawings. The minimum corrugation size shall be 3"x1".
    - (3) Pipe materials with recycled content that meet ASTM A 760 and A 929 for the specified size of pipe are preferred and should be used where feasible. Post-consumer Steel Content of 15 to 70% and total recoverable steel material of 25-100% is recommended if available. Engineer may request information regarding recycled content of pipe materials for review.
    - (4) Coupling bands, anti-seep collars, repair of damaged coatings, and other appurtenances are subsidiary to this item and shall not warrant separate payment.
    - (5) Linear foot measurement and payment will constitute full compensation for this bid item as related subsidiary items.

- c. Corrugated Metal Pipe, 66" (Bid Item 17):
  - (1) This item will consist of furnishing and installing the corrugated metal pipe outlet.
  - (2) The corrugated metal pipe shall be 10-gauge aluminum coated with annular or helical corrugations as noted on the drawings. The minimum corrugation size shall be 3"x1".
  - (3) Pipe materials with recycled content that meet ASTM A 760 and A 929 for the specified size of pipe are preferred and should be used where feasible. Post-consumer Steel Content of 15 to 70% and total recoverable steel material of 25-100% is recommended if available. Engineer may request information regarding recycled content of pipe materials for review.
  - (4) Coupling bands, anti-seep collars, repair of damaged coatings, and other appurtenances are subsidiary to this item and shall not warrant separate payment.
  - (5) Linear foot measurement and payment will constitute full compensation for this bid item as related subsidiary items.
- d. 72" CMP Riser with Trash Rack (Bid Item 18):
  - (1) This item will consist of furnishing and installing the corrugated metal pipe riser as shown on the drawings.
  - (2) The corrugated metal pipe shall be 12 gage aluminum coated with annular corrugations unless otherwise noted on the drawings. The minimum corrugation size shall be 3"x1".
  - (3) Pipe materials with recycled content that meet ASTM A 760 and A 929 for the specified size of pipe are preferred and should be used where feasible. Post-consumer Steel Content of 15 to 70% and total recoverable steel material of 25-100% is recommended if available. Engineer may request information regarding recycled content of pipe materials for review.
  - (4) Coupling bands, repair of damaged coatings, metal fabrication, trash rack, anti-vortex device, and other appurtenances are subsidiary to this item and shall not warrant separate payment.

#### IA-61 LOOSE ROCK RIPRAP

#### A. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

- 1. Items of work to be performed in accordance with this specification and the construction details therefore are:
  - a. Class E Rip Rap (Bid Item 19):
    - (1) This item shall consist of procurement and placement of rip-rap or revetment stone as shown on the drawings
    - (2) Rip-Rap Materials shall meet Iowa DOT Section 4130 Class E Revetment.
    - (3) Alternative materials, including natural field stone, may be substituted in place of rip-rap if the size, shape, and quantity is approved by the Engineer. Field stone may be sourced locally by the contractor or from the project landowner. Substitution requests shall be submitted to the Engineer and include photos showing the relative size and quantity of stone to be used.
    - (4) Measurement and payment shall be on an actual per ton basis of stone installed. Weigh tickets shall be provided to the Engineer.
    - (5) Subsidiary Item Geotextile Fabric, IA-95
      - (a) Geotextile shall be installed under all rip rap as shown on the drawings.
      - (b)No separate payment will be made for geotextile.
  - b. Granular Surfacing (Bid Item 20):
    - (1) This item shall consist of procurement and placement of 1.5" roadstone to a depth of 8", as shown on the drawings.
    - (2) Alternative materials may be substituted in place of 1.5" road stone if the size, shape, and quantity is approved by the Engineer. Substitution requests shall be submitted to the Engineer.
    - (3) Measurement and payment shall be on an actual per ton basis of stone installed. Weigh tickets shall be provided to the Engineer.
    - (4) Any costs associated with the respreading of existing granular material stripped as part of Site Preparation (Bid Item 1) shall be considered incidental to this bid item. No additional compensation shall be given.
    - (5) No additional compensation shall be given for the procurement or placement of additional granular material required to restore disturbed areas beyond the grading/construction limits. Any additional material shall be provided at the Contractor's expense.

## IA-81 Metal Fabrication and Installation

- A. Measurement and Payment
  - 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
  - 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.
- B. Items of Work and Construction Details
  - 1. Items of work to be performed in accordance with this specification and the construction details therefore are:
    - a. Subsidiary Item- Metal and Metal Fabrication
      - (1) This item will consist of furnishing and installing all steel and aluminum shown on the drawings.
      - (2) No separate payment will be made for Steel, aluminum or metal fabrication. Payment for this item will be considered subsidiary to the following Bid Items:
        - (a) Corrugated Metal Pipe, 36" (Bid Item 15)
        - (b) Corrugated Metal Pipe, 48" (Bid Item 16)
        - (c) Corrugated Metal Pipe, 66" (Bid Item 17)
        - (d) 72" CMP Riser with Trash Rack (Bid Item 18)

#### IA-92 FENCE

#### A. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

- 1. Items of work to be performed in accordance with this specification and the construction details therefore are:
  - a. Fencing, 5-Strands of Barbed Wire (Bid Item 21)
    - (1) This item will consist of furnishing and installation of fencing as shown on the project drawings.
    - (2) Fencing shall be 5 strands of barbed wire and in accordance with IA-92 (2) Standard Fence.
    - (3) Measurement and payment shall be on a per linear foot of fence installed and accepted basis.
  - b. Fencing, Steel Gates (Bid Item 22)
    - (1) This item will consist of furnishing and installation of steel gates as shown on the project drawings and per IA-92.
    - (2) Measurement and payment shall be on a per gate installed and accepted basis.
  - c. Subsidiary Items Fence repair or replacement
    - (1) This item is subsidiary to Site Clearing, Preparation, & Waste Disposal (Bid Item 1).
    - (2) Any fence damaged or removed by the contractor that was not specified in the project drawings shall be replaced per IA-92. The fence type shall be determined by the type of existing fence that was damaged. Sufficient length of fencing shall be replaced to provide a seamless transition between the existing and replacement fence.

#### IA-95 GEOTEXTILE

#### A. Measurement and Payment

- 1. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in this specification Section.
- 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work.

- 1. Items of work to be performed in accordance with this specification and the construction details therefore are:
  - a. Subsidiary Item Geotextile Fabric
    - (1) This item shall consist of furnishing and placing geotextile on all earth surfaces that contact the rock riprap or roadstone as shown on the drawings.
    - (2) Geotextile shall be Class I, nonwoven.
    - (3) The geotextile shall be placed with the long dimension parallel to the channel.
    - (4) Geotextile shall not be measured and shall be considered subsidiary to Rock Riprap bid items.
    - (5) No additional payment will be made for geotextile.

# TABLE 2. REQUIREMENTS FOR NONWOVEN GEOTEXTILES

Property	Test Method	Class I	Class II	Class III	Class IV <sup>3/</sup>	
Tensile strength (pounds) <sup>1/</sup>	ASTM D 4632 grab test	180 minimum	120 minimum	90 minimum	115 minimum	
Elongation at failure (%) $1^{1/2}$	ASTM D 4632	<u>&gt;_50</u>	<u>&gt;</u> 50	<u>&gt;</u> 50	> 50	
Puncture (pounds)	ASTM D 4833	<mark>80 minimum</mark>	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 <sup>2/</sup>	As specified max. # $4\theta^{2/}$	As specified max. # 40 $^{2/}$	As specified max. # $4\theta^{2/}$	
Permittivity sec <sup>-1</sup>	ASTM D 4491	<mark>0.70 minimum</mark>	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.

#### IA-620 UNDERGROUND OUTLET

- A. Measurement and Payment
  - 1. For items of work for which specific unit prices are established in the contract, the length of pipe will be computed to the nearest foot along the centerline of pipe and shall include the length of the aprons. Payment will be made to constitute full payment for all labor, materials, equipment, and all other items necessary and incidental to the completion of the work.
  - 2. For items of work which lump sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for each item will be made at the contract lump sum prices and will constitute full compensation for completion of the work
- B. Items of Work and Construction Details
  - 1. Each of the following items shall be completed in accordance with IA-45 and IA-620. Measurement and payment for the following items shall be according to IA-45:
    - a. Dual-Wall HDPE Pipe, 8" (Bid Item 13)
    - b. Hickenbottom Intake, 10" (Bid Item 14)
  - 2. Each of the following items shall be completed in accordance with IA-51 and IA-620. Measurement and payment for the following items shall be according to IA-51:
    - a. Corrugated Metal Pipe, 36" (Bid Item 15)
    - b. Corrugated Metal Pipe, 48" (Bid Item 16)
    - c. Corrugated Metal Pipe, 66" (Bid Item 17)
    - d. 72" CMP Riser with Trash Rack (Bid Item 18)

END OF UI-019-SEED SAVERS EXCHANGE SUPPLEMENTAL SPECIFICATIONS

Issued for Construction 1/12/2021

# SECTION C: NRCS CONSERVATION PRACTICE 382: FENCING UPPER IOWA RIVER WMA UI-019-SEED SAVERS EXCHANGE


# Fence: Barbed & Woven Wire

## Iowa Job Sheet

Natural Resources Conservation Service (NRCS) Des Moines, Iowa Iowa Conservation Practice 382 September 2018

## Definition

A constructed barrier to animals or people.

## Purpose

Facilitate the application of conservation practices by providing a means to control movement of animals and people.

## **Conditions Where Practice Applies**

This practice may be applied on any area where management of animal or people movement is needed. Fences are not needed where natural barriers will serve the purpose.

# General Criteria and Specifications *A. Barbed Wire*

Barbed wire fences shall have a minimum of 4 wires for farm borders. A minimum of three wires shall be used for interior fencing, cross fencing, or excluding livestock from special areas such as wildlife areas, forested tracts, or other special use areas. Wires shall be placed approximately an equal distance apart. The top wire shall be at least 42 inches high and 2 inches below the top on wood posts and 1 inch below the top on steel posts. Wire shall be spaced no more than 12 inches apart.

Each barbed wire shall consist of 2 twisted strands of either  $12 \frac{1}{2}$  gauge wire or  $15 \frac{1}{2}$  gauge high tensile strength wire. The barbs shall be either 2-point barb or 4-point barb. Wire shall be stretched taut and attached after the posts are properly set and backfilled. Attached wire to the side of the post closest to the livestock, except on corners and curves where the wire should be placed on the outside of the corner or curve.

#### Barb wire fences shall not be electrified.

#### B. Woven Wire

Top and bottom strands of woven wire shall be a minimum of  $12 \frac{1}{2}$  gauge. Wire for intermediate strands shall be  $14 \frac{1}{3}$  gauge or heavier. Woven wire fences 32 inches or less in height shall have at least 2 barbed wires above the woven wire, spaced 8 to 12 inches apart. Fences constructed with woven wire 33-47 inches shall have at least 1 barbed wire above the woven wire. Woven wire fence 48 inches are not required to have barbed wire above except if it is needed to contain livestock or deter predators. The base of the woven



wire shall be placed near the ground surface. Optional barbed wire may be ran near the ground. The top wire shall be at least 42 inches above the ground level and 2 inches below the top of wood posts and 1 inch below top of steel posts. All wire shall be galvanized (Class 3). Wire shall be stretched and attached after the posts are properly set and backfilled. Attach wire to the side of the post closest to the livestock, except on corners and curves where the wire should be placed on the outside of the corner or curve.

#### C. Staples

Staples shall be 9 gauge steel or heavier with a minimum length of  $1 \frac{1}{2}$  inches for soft woods and a minimum length of 1 inch for close grained hardwoods. Space should be left between the staple and the post to permit free movement of the wire. Wires may be attached to steel posts by use of manufacturer's clips or by 14 gauge galvanized wire twisted at least two turns.

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#### D. Posts

All wooden posts (except red cedar, osage orange, or black locust) shall be treated with creosote, pentachloraphenol, or chromate copper arsenate (CCA) by a method that ensures complete penetration of the sapwood. Quality of treated wood shall provide sufficient strength and quality to last for the expected life of the fence. At least half of the diameter of red cedar shall be heartwood.

#### E. Corner, Gate, Brace, and End Posts

Corner posts, gate posts, end posts, pull posts and brace posts shall be wood with sufficient length for the construction of at least a 42 inch high fence and permit setting the post at least 36 inches deep. Earth backfill shall be thoroughly tamped. Where soil depth is restricted to less than 36 inches, additional anchors or deadman applied against the direction of pull may be needed. Wood posts shall have a minimum top diameter of 5 inches. A  $2^{1/2}$ -inch steel pipe with appropriate bracing or set in concrete of sufficient depth also may be used. Reinforced concrete or metal posts of equivalent strength may be substituted if they have suitable means of attaching wires and braces.

#### F. Line Posts

The maximum spacing of line posts shall be one rod (16  $\frac{1}{2}$ feet). Wood line posts shall have a minimum 3 inch top diameter. Wood line posts shall have a minimum length of  $6^{1/2}$  feet and shall be set or driven to a minimum depth of 24 inches where conditions permit. When posts are set, earth backfill shall be thoroughly tamped. Steel line posts shall not weigh less than  $1^{1/3}$  pounds per foot and shall have a steel anchor plate securely fastened to the plate. The posts shall be "T", "U", or "Y" shaped and have corrugations, knobs, studs, or grooves suitable for fastening fencing to the posts. Steel posts shall be rolled from high carbon steel and shall have a protective coating; either galvanized by the hot dip process, or painted with one or more coats of high grade weather resistant paint for steel, or enameled and baked. Steel line posts shall be at least 6 feet in length and shall be set in the ground a minimum of 20 inches. Steel posts shall be used as line posts at least once every 6 rods (99 feet) to act as a ground for lightning protection.

#### G. Bracing

End bracing will be installed at locations where the fence ends and on both sides of gate openings. Corner bracing should be installed where fence alignment changes 15 degrees or more. Bracing is required at all corner, gate, pull and end assemblies in a fence. The brace member shall be the equivalent of a wood post with a 3  $1/_2$  inch diameter at the top or a standard weight 2-inch diameter galvanized steel pipe. The brace shall be at least 3 feet above the ground and at least 8 inches below the top of the post. The brace member shall be 6 to 8 feet in length. A brace wire consisting of 2 complete loops of 9 gauge smooth wire, 2 loops of barbed wire or a single loop of  $12 \frac{1}{2}$  gauge high tensile strength wire shall be installed. "H" braces or angle braces will be used in standard fences.

Pull post assemblies consisting of three posts with braces shall be installed in straight reaches of fence at intervals of 660 feet (40 rods), at any point where the vertical angle described by two adjacent reaches of wire is upward and exceeds 10 percent and at the beginning and end of each curve.

#### H. Crossings

For a narrow ditch or draw crossing with slopes steeper than 8 feet horizontal to 1 foot vertical, the fence shall be anchored with a concrete anchor weighing at least 150 pounds and buried with at least 18 inches of cover or a commercial screw-in type metal anchor 5 inches in diameter and not less than 48" long to position the fence to the contour of the ditch or draw.

#### I. Gates

Gates weighing less than 100 lbs. may be hung from single end posts properly installed. Heavy metal or wood gates more than 6 ft. wide shall best be attached to the pull post of an H-brace or diagonal floating brace.

All gates must be substantial enough to withstand expected pressures from livestock, predators, and/or wildlife.

Wire gates shall be made of the same materials as used for the fence. Panel or tube type gates shall be equivalent in quality to the fencing material and fitted with at least two hinges and a latch or chain for fastening.

Electrified perimeter fence gates may consist of a pair of 12  $1/_2$  gauge straight or coiled wires installed to be non-electrified when opened. A 12  $1/_2$  gauge overhead or insulated underground trans-mission line will be used to carry electricity across all gate openings (including electrified gates to charge the remain-der of the fence.

#### **Operation and Maintenance**

Regular inspection of fences should be part of an on-going management program. Inspection of fences at regular intervals and after storm events is needed to facilitate the function of the intended use of the fence. Maintenance and repairs will be performed as needed to facilitate the operation of the fence.

### Specifications

Site-specific requirements are listed on the specifications sheet. Additional provisions are entered on the job sketch. Specifications are prepared in accordance with the NRCS Field Office Technical Guide. See Conservation Practice Standard – Fence (382).

Client:			Farm #:					
Field(s):			Tract #:					
Planned By:			Location:					
Date:				Length of Fence (ft):	:			
Landowner Objectives:				I				
<b>Purpose:</b> (check all that apply)								
Reduce erosion and improv livestock access to streams	e water qua springs, we	lity by contro etlands, and	olling ponds.	Protect sensitive vehicular, pedest	environme rian, or an	ental areas and flora from imal traffic use.		
Protect newly planted areas established.	from distur	bances until		Protect the safety limiting or denying	/ or people g access t	e, livestock, and wildlife by o hazardous areas.		
Facilitate handling, movement	ent, and feed	ling of livest	ock in	Improve distributi	on and tim	ning of livestock grazing		
Other (specify)								
Type of Fence – Barbed (check	c all that app	oly)	dharbad	wire		and barbad wire		
6-strand barbed wire		8-strar	nd barbed	wire	Othe	r:		
Wire Gauge and Barbs								
$\square$ 12 ½ gauge wire				2-point barbs on 4" or 5" centers				
$\square$ 15 ½ gauge wire				4-point barbs on 5" centers				
Type of Fence – Woven Wire								
Woven Wire Ht (ft):	# of Wire(s	s):	Top/Bott	om Wire Gauge: Wire Spacing (in):				
Woven Wire Type:			Intermed	Top Deterrent Type:				
Attachment to Posts			-	<u> </u>				
Staple Gauge:	Staple leng	gth (in):		Manufacturer clips 14 gauge wire				
Line Posts (check all that apply	)			<u> </u>		1 —		
Type: Red Cedar or Osage Orar Black Locust or pressure treated other preservative wood or Standard steel line posts ( posts)	Size: Line or longer 3' Or Or 6' Sta anchor plat	wood 6 1/2 feet         a top diameter         b top diameter         beel line post with <b>Spacing: Spacing: Wood line posts spaced a</b> maximum of 16 1/2 feet apart set 2 ft         deep minimum with a steel post every         99 ft for lightning protection <b>Or</b> Steel line posts spaced a         maximum of 16 1/2 ft apart set to top of         anchor plate or 20"						
Braces, Corners, Ends, & Gat	es (check a	ll that apply)						
Corners, Ends, & Gates: (6 - 8 5" top diameter wood post of 2 1/2" galvanized steel pipe. Braces 3 1/2 top diameter wood 2" galvanized steel pipe Horizontal brace rails be and 8" below top of post	ft minimum r post or and etween 3' at	length) bove ground	Brace Wire 2 complete lo 2 loops of ba 2 loops of ba Single loop o steel	oops of 9 g urbed wire of 12 <sup>1</sup> / <sub>2</sub> ga	gauge smooth wire uge high tensile, galvanized			

#### Iowa One Call

The contractor is required to follow Iowa One Call law.

IowaOneCall.com or Call 811

Ticket # \_\_\_\_\_

	Layout Sketch and Drawing (Provide sketch, drawings, maps, and/or aerial photos)													
Scale 1" =	: ft	. (NA indica	ites sketch i	not to scale	: grid size =	½" by ½" )								
[		[				ſ	·					[]		

Attach IA-92 Fence Specifications and relevant fence drawings as needed.

USDA is an equal opportunity provider, employer, and lender.

## SECTION D: GEOTECHNICAL REPORT UPPER IOWA RIVER WMA UI-019-SEED SAVERS EXCHANGE

## ALLENDER BUTZKE ENGINEERS INC.

GEOTECHNICAL . ENVIRONMENTAL . CONSTRUCTION Q. C.



December 18, 2020

Shive-Hattery, Inc. 4125 Westown Parkway, Suite 100 West Des Moines, IA 50266 Attn: Luke Monat, P.E. RE: Geotechnical Exploration UI-019 Seed Savers Exchange North Winn Road, Canoe Township Winneshiek County, Iowa PN 191488A

Dear Mr. Monat:

This letter report is an addendum to the geotechnical report, PN 191488A issued January 31, 2020, and presents additional information for the <u>Embankment Foundation (Slope</u> <u>Stability)</u> and <u>Internal Drainage</u> sections. All other aspects of the original geotechnical report not specifically addressed in this letter remain valid.

In the <u>Embankment Foundation (Slope Stability)</u> and <u>Internal Drainage</u> sections, it was recommended that a 2-feet thick 100 feet long sand blanket be provided below the proposed dam. This was recommended based on modelling of long-term steady state conditions with a permanent pool near elevation 1,076 feet. It is our understanding the current design does not include a permanent pool and that the structure will be used for temporary short-term storage. Therefore, saturated embankment conditions during steady state are not expected to occur. Our analysis indicates the current dam design without a sand blanket results in a long-term factor of safety of 1.5 or greater.

We appreciate the opportunity to provide our geotechnical engineering services for this project. If you have any questions or need further assistance, please contact us at your convenience.

Respectfully submitted, ALLENDER BUTZKE ENGINEERS INC.

the Hun

Seth Hansen, P.E. Staff Engineer

Matt Drummond, P.E. Project Engineer



1 Email Above





GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q. C.

**JANUARY 31, 2020** 

PN 191488A

## **GEOTECHNICAL EXPLORATION**

## UI-019 SEED SAVERS EXCHANGE NORTH WINN ROAD, CANOE TOWNSHIP WINNESHIEK COUNTY, IOWA

**PERFORMED FOR** 

SHIVE-HATTERY 4125 WESTOWN PKWY, SUITE 100 WEST DES MOINES, IA 50266

## ALLENDER BUTZKE ENGINEERS INC



GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q. C.

January 31, 2020

Shive-Hattery, Inc. 4125 Westown Pkwy, Suite 100 West Des Moines, IA 50266 Attn: Luke Monat, P.E. RE: Geotechnical Exploration UI-019 Seed Savers Exchange North Winn Road, Canoe Township Winneshiek County, Iowa PN 191488A

Dear Mr. Monat:

As authorized, Allender Butzke Engineers Inc. (ABE) has completed the geotechnical exploration for the above referenced project. The geotechnical exploration was conducted to evaluate physical characteristics of subsurface conditions with respect to design and construction of this project. The enclosed report summarizes the project characteristics as we understand them, presents the findings of the borings and laboratory tests, discusses the observed subsurface conditions, and provides geotechnical engineering recommendations for this project.

We appreciate the opportunity to provide our geotechnical engineering services for this project. If you have any questions or need further assistance, please contact us at your convenience. We are also staffed and equipped to provide construction testing and inspection services on this project as well as environmental site assessments.

Respectfully submitted, ALLENDER BUTZKE ENGINEERS INC.

Seth Hansen, E.I. Staff Engineer

Matt Drummond, P.E. Project Engineer



1 PC and 1 Email Above 1 Email Shive - Hattery, Inc.; Attn: Anthony Harbaugh, EI

## **GEOTECHNICAL EXPLORATION**

## UI-019 SEED SAVERS EXCHANGE NORTH WINN ROAD, CANOE TOWNSHIP WINNESHIEK COUNTY, IOWA

## PN 191488A

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#### **GEOTECHNICAL EXPLORATION**

### UI-019 SEED SAVERS EXCHANGE NORTH WINN ROAD, CANOE TOWNSHIP WINNESHIEK COUNTY, IOWA

#### PN 191488A

#### January 31, 2020

#### **PROJECTINFORMATION**

The Upper Iowa River Watershed Management Authority (WMA) with design assistance from Shive-Hattery, Inc. is planning water quality improvements at several sites in Winneshiek County, Iowa. The project at this site includes the construction of an earthen dam to be located approximately 1,000 feet east of North Winn Road and adjacent to Seed Savers Exchange facility in Decorah, Iowa. The planned 30 to 35 feet tall earthen dam will have backslopes and foreslopes configured at 3:1 (horizontal (H): vertical (V)). Normal water elevation upstream of the dam is planned near elevation 1,076 feet. The top of the dam will be established near elevation 1,095 feet. A 14 feet wide access road is planned across the downstream side of the dam. The following Figure No. 1 depicts a typical dam cross-section through the center of the dam.



Figure No. 1 – Typical Dam Cross-Section (excluding internal drainage systems)

The dam will be located in a steeply incised drainageway that slopes from north to south. The existing ground surface in the valley varies between elevations 1,068 on the upstream side of the dam to near elevation 1,060 feet on the downstream side of the dam. Side slopes are steep and existing slope configurations on the order of 1.5 to 2:1 are common within the drainageway. Based on a top of dam elevation near 1,095 feet we anticipate as much as 35 feet of new fill will be placed for construction of the earthen dam. Cut depths in the borrow area are expected to be less than 5 feet deep. It is our understanding that a natural spring is located 100 feet or more south of the dam toe. We are not aware of any other natural springs at this site.

#### **FIELD EXPLORATION**

Six borings were conducted at this site to depths between 5.3 and 12.2 feet below existing grades on October 30 and 31, 2019. Boring Nos. 1 through 4 were conducted in the upland borrow area east of the drainageway while Boring Nos. 5 and 6 were conducted in and on valley side slopes near the centerline of the dam. Approximate locations of the borings are shown on the enclosed Site Plan and were located and staked at the site by Erdman Engineering prior to the field exploration. Boring Nos. 4, 5 and 6 were offset from the staked locations. The boring surface elevations, indicated on the enclosed Boring Logs were provided by Shive-Hattery, Inc. The surface elevations of the offset boring locations were interpolated between topographic contours (LiDAR). Methods of drilling, sampling, standard laboratory testing, and classifying of subsurface materials are discussed in the Boring Log Description/Legend pages of the Appendix.

#### SUBSURFACE CONDITIONS

#### Site Geology

Winneshiek County is located within a geomorphic region of Iowa referred to as the Paleozoic Plateau. The landscape in the Paleozoic Plateau region is dominated by bedrock outcroppings and deep narrow valleys that have formed as result of erosion into Paleozoic age rock strata. Overburden soil materials at the site have been deposited by different geomorphic processes including water, wind, gravity, and ice. As a result, soil stratigraphy at the site varies by geographic position.

Soil stratigraphy in upland areas generally consists of discontinuous loess cover underlain by glacial till and/or bedrock. The loess is an eolian (wind-blown) deposit derived from flood plain sediments and tends to have relatively uniform silt and clay particle sizes. Glacial till typically consists of a more homogeneous mixture of sand, silt, and clay. Glacial till soils were not encountered at this site.

Colluvium is commonly located near the bottom toes of steep to very steep side slopes along valleys and is typically comprised of silt and clay materials with various sized rock fragments eroded or moved from the upland areas and deposited in lower positions on the slopes.

The overburden soils are underlain by weathered limestone and sandstone bedrock formations of the Ordovician bedrock system. The site is located within an area of Karst terrain common where near surface soluble bedrock, such as limestone, is present. Several known sinkholes are present in upland areas surrounding the proposed dam site.

#### Soil Profile

Detailed descriptions of soils encountered by this exploration are provided on the Boring Logs enclosed in the Appendix. The Profile of Borings (Plates A-1 and A-2) presented in the Appendix depicts the relative deposit elevations in the borings. Following is a discussion of the subsurface materials encountered in the borings. Unless otherwise indicated, the depths of soil

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stratum and groundwater levels are referenced from below existing grade at the individual boring locations at the time of drilling.

**Upland Borrow Borings (Boring Nos. 1 through 4)** – The upland borrow area borings encountered dark brown lean clay (CL) topsoil at the ground surface with trace amounts of organics. The topsoil extended to depths between 0.3 and 1 foot. Brown lean clay (CL) loess underlaid the topsoil in all upland borings. In Boring Nos. 2 and 3 the loess became very moist below respective depths of 2.5 and 5 feet. Boring Nos. 2 and 3 terminated in medium stiff loess near depths of 10 feet.

Reddish brown fat clay (CH) and brown lean clay (CL) residuum underlaid the loess in Boring Nos. 1 and 4. Limestone fragments were observed within the residuum and the quantity of limestone fragments generally increased with depth. Fractured limestone bedrock underlaid the residuum near respective depths of 8 and 8.5 feet in Boring Nos. 1 and 4 which terminated in weathered bedrock near depths of 8.5 and 10 feet.

Valley Borings along Dam Profile (Boring Nos. 5 and 6) – Very dark brown lean clay (CL) topsoil was encountered at the ground surface in Boring No. 5. Brown lean clay (CL) residuum underlaid the topsoil in Boring No. 5 and extended to a depth of 2.5 feet. Light gray limestone was encountered near a depth of 2.5 feet. Boring No. 5 terminated in the hard limestone near a depth of 5.3 feet.

Boring No. 6 was conducted on an existing access road and encountered 2 feet of fill consisting of very dark brown lean clay (CL) with limestone fragments. Colluvium consisting of dark brown lean clay (CL) with limestone fragments underlaid the existing fill. The colluvium extended to bedrock which was encountered near a depth of 6.5 feet. Fractures in the brown limestone were partially filled with clay. The upper 5 feet of the bedrock was highly weathered and medium dense. Below a depth of 11.8 feet the bedrock became very hard. Boring No. 6 terminated in the very hard less weathered limestone bedrock near a depth of 12.2 feet.

Due to the existing steep to very steep slope conditions within the drainageway, borings were not able to be conducted in all areas of the proposed dam. Shallow probing with hand equipment on the steep side slopes indicated weathered/fractured limestone is typically present on the side slopes at depths generally less than 2 feet with several limestone outcrops visible on the side slopes. Similarly, the drainageway channel consisted primarily of fractured limestone cobbles, boulders, and flags with little to no overburden cover.

#### **Groundwater Level Observations**

The borings were monitored during and shortly after drilling operations to detect moisture seepage and groundwater accumulation. The results of our water level observations are noted on the Boring Logs enclosed in the Appendix.

During drilling operations, no moisture seepage was observed and no groundwater accumulation was observed after the completion of drilling operations. These short-term water

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levels are not necessarily a true indication of the groundwater table. Long-term observations would be necessary to accurately define the groundwater variations at this site.

In upland areas, it is common to encounter a perched water table within the loess present above the denser less permeable high clay content (CH) residuum. The site is located within an area of Karst terrain and several known sinkholes are present in upland areas surrounding the proposed dam site. Furthermore, it is our understanding that a natural spring is located 100 feet or more south of the dam toe. We are not aware of other springs at this site.

Fluctuation of groundwater levels can occur due to seasonal variations in the amount of rainfall, surface drainage, subsurface drainage, site topography, irrigation practices, and ground cover (pavement or vegetation).

### **LABORATORY TESTING**

Laboratory tests including Standard Proctor, Grain Size Distribution, Atterberg Limits and a falling head permeability test were conducted on a soil sample of lean clay (CL) loess collected from Boring No. 3 between depths of 0.5 and 5 feet to determine physical characteristics of the onsite soils. Standard Proctor, Grain Size Distribution and Atterberg Limits test results have been included in the Appendix of this report. Results of the falling head permeability test is provided in the following Table A. Laboratory testing provided on the Boring Logs also included moisture content, dry density and unconfined compressive strength tests of undisturbed samples obtained during drilling operations. The soil types shown on the Boring Logs were visually classified utilizing the Unified Soil Classification System (USCS).

Soil Type (Sample Location)	Moisture Content (percent)	Dry Density (pcf)	Percent Compaction	Permeability (ft/day)	
Loess (CL) Boring No. 1 (0.5' to 5')	23.3%	99.7	94.6%	5.9x10 <sup>-5</sup>	

TABLE ARESULTS OF FALLING HEAD PERMEABILITY TEST

#### ANALYSIS AND RECOMMENDATIONS

#### **Summary**

Analyses and recommendations for design of the proposed earthfill dam are based upon test boring data, laboratory test results, our experience with similar soil types, and our understanding of the project. In our opinion, the proposed earthfill dam can be constructed at this site; however, seepage and water loss from the pond will likely occur through fractures and joints in the weathered bedrock present in the valley floor and side slopes. As a result, it may be difficult

to maintain a consistent permanent pool level for the pond. It is our understanding that the dam will function to temporarily store stormwater during runoff events and maintaining a permanent pool level is not necessary. If maintaining a permanent pool elevation is desired, a compacted clay liner on the order of 2 feet thick could be constructed for the area extending 2 feet above the proposed desired permanent pool elevation. Another option may be to construct a key trench to reduce seepage below the dam. However, construction of a key trench would likely require excavation of fractured bedrock to depths on the order of 5 feet and may not cut off all avenues of seepage and water loss below the dam, possibly resulting in pool flucuation. Test pits could be conducted to better determine the level of effort required to remove fractured bedrock.

The following sections discuss design and construction considerations for the proposed earthfill dam at this site. It is our understanding that NRCS Construction Specifications will be used for the project.

#### Site Preparation

Prior to site grading, we recommend that the site be stripped of all vegetation and/or organic and loose materials to depths of 4 to 6 inches in the upland areas and side slopes. Deeper stripping depths may be required to remove thicker organics or soft sediments if present along the valley foot slopes. The strippings could be used for landscaping purposes in non-critical areas. Tree root balls and large roots from mature trees should be completely removed. The subgrade should be proof-rolled or hand probing should be conducted prior to filling operations to delineate zones of soft soils present near the surface which may require additional removal or compaction. Existing slopes to receive fill such as side slopes below the proposed dam should be horizontally benched to remove loose materials and bedrock to integrate new fill sections with the existing terrain.

#### **Borrow Material**

It is our understanding that borrow soils will be imported to the site from an agricultural field located in the upland area east of the dam. Boring Nos. 1 through 4 encountered lean clay (CL) loess soils in the proposed borrow area. In our opinion, the lean clay (CL) loess would be suitable for use as compacted fill for embankment construction. Strippings and organic soils are unsuitable for compacted fill for the dam and should be wasted in non-critical fill areas.

The contractor should be aware that very moist loess soils encountered below depths of 2 to 5 feet in Boring Nos. 1 through 4 are easily disturbed and may not provide adequate support for heavy construction equipment, especially under repeated traffic loadings. Therefore, it may be necessary to utilize low impact excavation methods and equipment to complete cuts through these zones deeper than 2 feet, such as top loading with excavators. The grading contractor should also be aware that it may be necessary to control groundwater seepage as well as surface water drainage during excavations. We expect that any groundwater seepage from the on-site soils could be controlled with diversionary ditches and sump pumps.

We understand the NRCS Specification "IA-23 Earthfill" will be used to specify moisture condition and compaction of fill for the project. At the time of this geotechnical exploration, moisture contents of the lean clay (CL) loess borrow soils were generally above to well above the

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recommended moisture content range for compaction. Therefore, adjustment of soil moisture content may be required in order to lower or raise the moisture to within the recommended moisture content range. Discing and aeration is generally the most economical method to lower soil moisture content, if climactic conditions allow. Compaction of soils on the dry side of optimum moisture results in significant increases in soil permeability and potential leakage through the dam. Therefore, depending on the time of year, if the embankment fill soils are too dry controlled wetting with a water truck may be necessary to raise the soil moisture content prior to compacting. Also, once embankment fill soils have been placed, they should not be allowed to dry excessively (and form a 'crust') between lifts of fill. If this does occur, provisions should be made to strip the surficial dry soils prior to the placement of new fill sections.

Cohesive soils can generally be suitably compacted with sheepsfoot or pneumatic type compactors, while granular soils (such as for the internal drainage layers) can generally be suitably compacted with vibratory compaction equipment. Care should be exercised in properly backfilling and compacting all trenches. In addition, hand compaction equipment will likely be required to ensure adequate compaction and continuous intimate contact of embankment soils with below grade structures, such as the outlet structure and outlet pipes. If compaction and low permeability conditions cannot be achieved in these areas, it may be necessary to incorporate bentonite into the soils to provide an adequate seal.

We estimate that shrinkage for earthwork quantification for the cohesive loess soils will be on the order of 20 to 30 percent (1.2 to 1.3). However, settlement of the embankment due to consolidation of underlying foundation soils will also appear as shrinkage and require additional volume.

Vertical weight of the earthfill embankment will consolidate underlying compressible residuum and colluvium soils and portions of the dam to settle. The magnitude of embankment settlement will depend upon the embankment fill height and thickness of the underlying compressible soils. We anticipate most of the compressible soils will be located near the toes of the valley side slopes. In areas near the center of the valley, the embankment will be placed directly on weathered bedrock which is not compressible.

Based upon newly placed fill sections on the order of 35 feet and compressible soils extending to depths of 3 to 6 feet below existing grades near the toe of the valley side slopes, we estimate that area settlements on the order of 1 to 3 inches could occur. Embankment settlement will decrease toward the center and upstream and downstream limits of the embankment as fill section thicknesses and compressible layer thicknesses decrease. To reduce settlement, the cohesive soils present near the toes of the side slopes could be over-excavated down to weathered bedrock and the excavated materials used as embankment fill.

#### **Embankment Foundation (Slope) Stability**

An earthfill dam should be designed and constructed to have an adequate factor of safety to withstand the shearing stresses induced in the embankment slopes and foundation soils. In our opinion, a long-term factor of safety of 1.5 or greater is generally considered adequate for low to moderate hazard dams, with respective temporary factors of safety of 1.3 and 1.2 or more being

adequate during construction and under sudden draw down conditions. Stability evaluation requires consideration of the following three dam conditions: 1) during and immediately following construction, 2) steady state seepage (full reservoir), and 3) sudden draw down.

Typically embankment stability analyses indicate the most critical period for shear failure of the embankment is during and at the end of construction. This critical period is a result of the potential reduction in shear strength in compressible saturated foundation soils due to the development of excess pore water pressure caused by embankment fill loads. However, since soft saturated clay soils were not encountered at the bottom of the existing valley or on valley side slopes, it is our opinion that significant excess pore pressures will not likely develop during construction of the dam.

Our global stability analyses considered a dam with side slopes on the order of 3:1 (H:V) with a top of dam elevation near 1,095 feet and a width of 14 feet and a 14 feet wide access road near elevation 1,095 feet on the downstream side. Our evaluation for proposed earthfill slopes indicated that the critical period for shear failure of the embankment is immediately after a sudden drawdown event on the upstream side of the dam.

Our stability analysis indicates that immediately following a rapid drawdown event where the upstream water level drops from near elevation 1,093 (2 feet below top of dam) to near elevation 1,068 feet results in a factor of safety against shear of approximately 1.3, which is above the recommended minimum factor of safety for dam embankments under short-term conditions. Under steady state seepage conditions at a normal pool water elevation, our analyses indicate the long-term factor of safety is greater than 1.5, and would be adequate under long-term conditions. Our steady state seepage model assumes internal drainage, i.e. a sand blanket, is constructed on the downstream side of the dam to intercept seepage and reduce uplift as discussed in the following *Internal Drainage* section of this report.

#### **Internal Drainage**

We recommend that an internal drainage system be installed to control internal seepage, prevent piping failure, avoid saturating the downstream toe, and reduce uplift. The drainage system should be capable of controlling seepage and reducing uplift at the downstream portions of the dam due to seepage through fractured limestone foundation soils. Internal seepage control can be accomplished with a horizontal sand drainage blanket with a minimum 2 feet thick and extend approximately 100 feet upstream from the downstream toe of the dam at the middle of the dam and taper off at the abutments (see the following Figure No. 2). The horizontal sand blanket should be extended up the valley side slopes to a minimum elevation of 1,078 feet or 2 feet above the design normal pool elevation.



Figure No. 2 – Recommended Sand Blanket

Granular drainage material for internal drainage systems should be well graded and free draining coarse sand with less than 3 percent passing the No. 200 sieve, such as ASTM C33 Concrete Sand. Granular drainage material should be compacted to a minimum of 98 percent of maximum dry density as determined by the Standard Proctor Test (ASTM D698) or approximate NRCS specification. Including a geotextile fabric at the bottom of the sand blanket would reduce loss of sand into the underlying fractured bedrock. Observation of the foundation by a geotechnical engineer or other qualified engineer should be conducted to identify fractures or other areas that may warrant additional consideration prior to construction of the sand blanket. A rock toe or revetment should be constructed at the toe of the dam to protect the sand blanket.

Seepage along the outlet structure should be controlled with anti-seep collars and/or an anti-seep chimney of granular material. The anti-seep granular chimney could be constructed integrally with the internal drainage system which would provide a controlled outlet for any seepage water along the outlet structure.

It may be beneficial to provide a toe drain collector at the downstream edge of the drainage blanket and outlet the internal drainage system pipe in such a way that discharge rates could be monitored throughout the life of the structure. Flow rates could be monitored weekly or monthly while the pond is being filled and then semi-annually thereafter as a means of monitoring the integrity of the dam.

#### **Erosion Control**

We recommend the upstream embankment be protected from wave erosion. Common erosion control measures for dam embankments include construction of a berm near high water/crest elevation and/or installation of rip rap revetment. The layer of rip rap should be underlain by a geotextile fabric to prevent erosion of underlying embankment soils due to wave action. The downstream embankment slopes and other areas subject to erosion from surface water should be protected with vegetation or other erosion control measures. Areas of intense water erosion, such as the outlet channel and steep side slopes, should also be protected with properly designed erosion control which may include appropriate vegetation or rip rap.

#### **Excavation Stability and Dewatering**

Boring information indicates shallow excavations in the upland areas will encounter predominately cohesive soils. Excavations in the drainageway and side slopes will encounter relatively thin sections of cohesive overburden soils overlying fractured limestone bedrock. The overburden soils can typically be excavated utilizing conventional excavation equipment. Excavations encountering hard limestone bedrock, will likely require rippers, pneumatic tools, hydraulic breakers, or heavier excavation equipment. If a key trench is constructed to reduce seepage below the dam, rock excavation with heavier equipment will likely be necessary and it may be beneficial to conduct test pits to better determine the level of effort required.

If excavations encounter only cohesive soils with no wet sand seams or layers, it is expected that the water seepage can be controlled by permitting it to drain into temporary construction sumps and be pumped outside the perimeter of the excavations.

The extent of bracing or sloping of open cut excavations will be dependent upon depth of cut, groundwater conditions, soils encountered, length of time the excavation will be open, area available for excavation and local governing regulations. Predominately cohesive soils may appear to stand nearly vertical in shallow excavations for short periods of time. However, soil creep, surcharge loads, precipitation, subsurface moisture seepage, construction activity vibrations and other factors may cause these soils to cave within an unpredictable period of time. Excavations encountering sand may tend to cave rapidly, especially if water is flowing through the sand. Unstable granular excavation walls may also cause surrounding cohesive soils to become unstable. Temporary shoring, flattening of the excavation slopes or use of trench boxes may be required to maintain a safe condition. Determining the appropriate OSHA classifications of the soil types encountered and implementing the required provisions for sloping, shoring, and bracing of excavations throughout the project during construction are the responsibility of the contractor per OSHA.

#### **Construction Observation**

We recommend that site grading operations such as stripping, key trench excavations, borrow material, and embankment construction be observed and monitored under direction of a geotechnical engineer or other qualified engineer.

#### **GENERAL**

The analyses and recommendations in this report are based in part upon the data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations which may occur between borings or across the site. The nature and extent of such variations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

#### PN 191488A

It is recommended that the geotechnical engineer be provided the opportunity to review the plans and specifications so that comments can be made regarding the interpretation and implementation of our geotechnical recommendations in the design and specifications. It is further recommended that the geotechnical engineer be retained for testing and observation during earthwork and foundation construction phases to help determine that the design requirements are fulfilled.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, expressed or implied, is made. In the event that any changes in the nature, design or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing by the geotechnical engineer.

The scope of our service was not intended to include any environmental assessment or exploration for the presence of hazardous or toxic materials in the soil, surface water, groundwater or air on, below or adjacent to this site.

## APPENDIX





#### **BORING LOG DESCRIPTION/LEGEND**

(page 1 of 3)

The material types encountered during the drilling operations were recorded on field logs. The profile represented on the Boring Log is based on final classification performed by a geotechnical engineer using the field logs, laboratory observation and testing. The material stratigraphy demarcation lines shown on the Boring Logs indicate changes in soil characteristics, however, actual soil changes or variations may occur as a gradual transition. Soil profile discussion, Log Boring information, water levels and recommendations presented in this report are based upon measured depths below ground levels existing at time of the field exploration, unless otherwise specified.

#### **DRILLING AND SAMPLING**

The borings were conducted with either a truck or all-terrain rotary drill rig using the drilling methods indicated on each Boring Log. Soil sampling and/or in-situ testing such as Shelby Tube (ST), split-spoon (SS), drive cone (DC), or core (C) was conducted at depth intervals which were selected in consideration of the characteristics of the proposed construction. Generally undisturbed soil samples are taken at 5 foot depth intervals or change in soil types. Disturbed soil samples from the auger, either jar size or bulk size samples, may be taken at intermediate intervals for the purpose of soil classification or laboratory testing. Borings conducted for soil classification only, will show no designation of sampling although disturbed sampling is performed. Soil samples obtained in the field were identified and sealed for transportation to the laboratory for performance of pertinent physical testing and engineering classification.

#### **Drilling Methods**

- CFA Continuous Flight Auger: 4, 6, or 8-inch diameter (ASTM D1452).
- RD Rotary Drilling: Using drilling fluid in cased or uncased boring (ASTM D2113).
- HSA Hollow Stem Auger: 6 or 8-inch diameter, continuous flight auger remains in boring with soil removed from the hollow stem through which undisturbed sampling is conducted.
- HA Hand Auger: 4-inch or less diameter.

#### Sample Types

- ST Shelby Tube: Thin-walled tube samples of cohesive soils (ASTM D1587).
- SS Split Spoon with 140 lb. manual hammer: Standard penetration test and split-barrel samples (ASTM D1586).
- SSA Split Spoon with 140 lb. automatic hammer: Standard penetration test and split-barrel samples (ASTM D1586).
- DC Drive Cone: Dynamic in-place testing of soil using a 2-inch diameter cone with a 60 degree point driven into the soil for continuous 1-foot intervals in the same manner as Split Spoon, no sample is obtained.
- C Core: Sampling hard soil or bedrock with a diamond core barrel in a rotary drill boring (ASTM D2113).
- SPT Standard Penetration Test: Number of blows required to drive sampler (split spoon or drive cone) into the soil with a 140pound weight dropping a distance of 30-inches (ASTM D1586), number of blows recorded for each 6-inch interval in an 18inch (or more) penetration depth, values shown are for each 6-inch interval (if series of number sets are shown) or a total of the last two 6-inch intervals (if only one number is shown) which is commonly referred to as "N" in blows per foot. High resistance is indicated by a high number of blows for a lesser penetration depth listed in inches.
- BS Bulk Sample: Disturbed.
- CPT Cone Penetration Test: Quasi-static in-place testing of soils using a 60 degree cone and friction sleeve which are steadily pushed into the soil and measure skin friction and end bearing (ASTM D3441).

#### STANDARD LABORATORY TESTING

Representative undisturbed soil samples obtained by the Shelby Tube sampler were tested for moisture content (ASTM D2216), density (dry) and unconfined compressive strength (ASTM D2166) in the laboratory. Results of these tests appear on the respective Boring Logs. Additional soil testing including particle size analysis (ASTM D422) and Atterberg Limits (ASTM D4318) may be conducted, if necessary, to define in more detail pertinent soil characteristics for classification in accordance with the Unified Soil Classification System. Specialized laboratory tests (if conducted) to determine pertinent soil characteristics are discussed in the "Laboratory Testing" section of the report.

#### WATER LEVEL MEASUREMENT

Water levels indicated on the Boring Logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with short term observations.

## **BORING LOG DESCRIPTION/LEGEND**

(page 2 of 3)

## **DESCRIPTIVE SOIL CLASSIFICATION**

Soil description is based on the Unified Classification System as outlined in ASTM Designations D-2487 and D-2488. This classification is primarily based upon visual and apparent physical soil characteristics, comparison with other soil samples, and our experience with the soil. Additional laboratory testing may be conducted, if necessary to define in more detail pertinent soil characteristics. The Unified Soil Classification group symbol shown on the boring logs corresponds with the group names listed below. The description includes soil constituents, moisture conditions, color and any other appropriate descriptive terms.

Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name
GW	Well-Graded Gravel	SW	Well-Graded Sand	CL	Lean Clay	СН	Fat Clay
GP	Poorly-Graded Gravel	SP	Poorly-Graded Sand	ML	Silt	MH	Elastic Silt
GM	Silty Gravel	SM	Silty Sand	OL	Organic Clay Organic Silt	ОН	Organic Clay Organic Silt
GC	Clayey Gravel	SC	Clayey Sand			РТ	Peat

RF	CLATIVE PROPORTIO	GRAIN SIZE TERMINOLOGY				
Descriptive Term(s) (Of components also present in sample)	Sand and Gravel % of Dry Weight	Fines % of Dry Weight	Major Component of Sample	Size Range		
Trace	<15	<5	Cobbles	12 in. to 3 in. (300mm to 75mm)		
With	15-30	5-12	Gravel	3 in. to #4 sieve (75mm to 4.75mm)		
Modifier	>30	>12	Sand	#4 to #200 sieve (4.75mm to 0.074mm)		
			Silt or Clay	Passing #200 sieve (.074 mm)		

CONSISTEN	CY OF FINE-GRAINE	RELATIVE DENSITY OF COARSE-GRAINED SOILS			
Unconfined Compressive Strength, Qu, psf	Consistency	SPT, bpf	SPT, bpf	Relative Density	
< 500	Very Soft	0-2	0-4	Very Loose	
500-1,000	Soft	2-4	4-10	Loose	
1,000-2,000	Medium Stiff	4-8	10-30	Medium Dense	
2,000-4,000	Stiff	8-15	30-50	Dense	
4,000-8,000	Very Stiff	15-30	50-80	Very Dense	
8,000-16,000	Hard	30-100	80+	Extremely Dense	
> 16,000	Very Hard	>100			

## **BORING LOG DESCRIPTION/LEGEND**

(page 3 of 3)

## ABBREVIATIONS

COMMONLY USED	ABBREVIATIONS			
ft. or ' - feet	elev Elevation			
in. or " - inches	% - Percent			
psf - pounds per square foot	No Number			
plf - pound per lineal foot	TB - Test Boring			
pcf - pounds per cubic feet	N - blow count (SPT, bpf)			
kip - 1000 pounds	USCS - Unified Soil Classification System			
ksf - 1000 pounds per square foot	LL - Liquid Limit			
klf - 1000 pounds per lineal foot	PL - Plastic Limit			
tsf - tons per square foot	PI - Plasticity Index			
bpf - blows per foot (SPT, N)				

### BORING LOG DESCRIPTION/LEGEND BEDROCK

	CLASSIFICATION									
LIMESTONE	Light to dark colored, crystalline to fine-grained texture, composed of CaCO <sub>3</sub> , reacts with HCl.									
DOLOMITE	Light to dark colored, crystalline to fine-grained texture, composed of MgCO <sub>3</sub> , slightly harder than limestone, reacts with HCl when powdered.									
CHERT	Light to dark colored, smooth, very fine-grained texture, composed of micro-crystalline quartz (SiO <sub>2</sub> ), brittle, breaks into angular fragments, will scratch glass.									
SANDSTONE	Usually light colored, coarse to fine texture, composed of cemented sand-sized grains of quartz, feldspar, etc.									
SHALE	Light to dark colored, very fine-grained texture, composed of consolidated mud, silt, or clay, usually bedded in thin layers. The unlaminated equivalent is frequently referred to as siltstone, claystone, or mudstone.									
COAL	Usually black graphite-like material composed of carbonaceous matter (decomposed organics) and clay, brittle.									

Rock Quality Designation, RQD is based on a modified core recovery procedure which, in turn, is based indirectly on the number of fractures and amount of softening or alteration in the rock mass as observed in the rock cores from a drill hole. Instead of counting the fractures, an indirect measure is obtained by summing up the total length of core recovered but counting only those pieces of core which are 4 inches in length or longer, and which are hard and sound.

RQD	Description of Rock Quality
0-25	Very Poor
25 - 50	Poor
50 - 75	Fair
75 – 90	Good
90 - 100	Excellent

## **ROCK QUALITY DESIGNATION (RQD)**





BORING LOG NO. 1 NORTH							NORTH	HING <u>3972750.3</u> EASTING <u>5372129.6</u> Project No.: <u>191488A</u>
Project: UI-019-Seed Savers Exchange						ge		Client: Shive-Hattery
	<u>Nort</u>	th Wi	nn Ro als Car	ad, Ca	noe To	ownsh	ip	4125 Westown Pkwy, Suite 100
winnesmek County, 10wa           Surface Elevation:         1155 1!						'		Date Drilled: 10/30/2019 Drilling Method: 4" CFA
Datum	:		Ι	lidar S	urvey	L		Drilling Depth, ft.:         8.5         Page:         1         of         1
Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description * USCS Log Log Level * USCS *
	0							Dark brown lean clay, trace organics, moist
_	-				23.8			Brown lean clay, moist
	- 4				25.9			LOESS
	_							Reddish brown fat clay, moist CH 1149.6
1140	_				33.8			RESIDUUM
1148	- 8							With limestone fragments after 7'
_	-							Light gray limestone, damp WEATHERED BEDROCK End of Boring I147.1 8.5 1146.6
1144	- 12							
- 1140 — - -	-  16 							
	- - 20 -							
1132	- 24 							
1128	- - 28							
*The	stratifica	ation li	nes re	present	the app	oroxim	ate bounda	ry lines between material types: in-situ, the transition may be gradual.
Time:	at com	pletior	ei Leve 1	hr	s.		davs	ALLENDER BUTZKE ENGINEERS, INC.
Depth to	) Drv	ft. =	<u></u>	f	- t. ₹		, , , , , , , , , , , , , , , , ,	Geotechnical   Environmental   Construction O.C.

BOR	ING	LOC	S NC	)	2		NORTH	IING <u>3972942.6</u> EASTIN	NG <u>5372331.0</u>	Pro	ject No	5.: <u>1</u>	91488A
Project	: <u>UI-0</u>	)19-Se	ed Sa	vers Ex	xchang	ge		Client: Shive-Hattery		_			,
	Nor	th Wi	nn Ro	ad, Ca	noe To	wnsh	ip	4125 Westown Pkwy, S	Suite 100	_			
	Win	neshi	ek Co	unty, I	owa			West Des Moines, Iowa	a 50266				
Surface	e Eleva <sup>.</sup>	tion: _	T	idər S	<u>1176.(</u> urvev	)'		Date Drilled: <u>10/30/2019</u>	Drilling Method: $\underline{4''}$	CFA 1			
Datam	·		1			~						-	
Elevation ft.	Depth ft.	Sample No	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressiv Strength psf	Material Descrip	otion*	Graphic Log	NSCS	Water Leve	Elevation ft.
1176	0							Dark brown lean clay, trace orga	nics, moist		CL		0.8
-	-				25.7			Brown lean clay, moist	/		CL		1175.2 _
-	_							Moist to very moist after 2.5'					_
-	_				28.8			Worst to very moist after 2.5					
1172 -	-4												_
-	-							LOESS					_
-	-												
-	-							Brown-gray after 6.5'					-
1168 -	- 8				27.1								_
-	_				27.1								
-	-												10
_	_							End of Boring					1166
1164	- 12												_
													-
													-
	_												
1160 -	- 16												_
-	-												-
-	_												
-	-												
1156 -	- 20												_
-	_												_
	-												
-	-												-
1152 -	- 24												_
_	_												
_	_												_
	_												-
1140	_ 20												
1148	20												
*The	stratifica	ation li	nes re	present	the app	oroxim	ate bounda	ry lines between material types: in-sit	u, the transition may	be grad	dual.		
Time:	at com	vvat pletior	ei Leve	ei Obse hr	s.		davs	ALLENDER BUTZ	ZKE ENGI	NE	ERS	5, I	NC.
Depth to	) D	, <sup>7</sup>	7				<b>_</b>	Cooteshnisel   Envin	onmontal Ca	naterra	ntine		с
water:	Drv	ft. 🗦	<u>_</u>	f	t. ≚		ft. 💻	Geotechnical   Envir	onmental   Co	nstruo	ction	Ų.	U.

BORING LOG NO. <u>3</u> NORTH								HING <u>3972328.9</u> EASTING <u>5372486.5</u> Project No.: <u>1914</u>	488A			
Project: UI-019-Seed Savers Exchange								Client: Shive-Hattery				
	<u>Nort</u>	th Wi	nn Ro	ad, Ca	noe To	wnsh	ip	4125 Westown Pkwy, Suite 100				
Surface	e Elevat	tion.	ek Co	unity, Io	<u>1166.9</u>	)'		Date Drilled: 10/31/2019 Drilling Method: 4" CFA				
Datum: Lidar Survey								Drilling Depth, ft.:         10         Page:         1         of         1				
Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Mater Level U SCS Log Depth	Elevation ft.			
	-				24.4			Dark brown lean clay, trace organics, moist TOPSOIL Brown lean clay, moist CL 0. CL 116	5			
1164	- 4 				29.6			Very moist after 5' LOESS Brown-gray after 6.5'				
-	- 8				28.9				0			
1156	- - 12 -							End of Boring	'6.9 _ 			
1152	- 16 											
- 1148	- - 20 -								_			
- 1144	- 24 -								_			
1140 - - -	- - 28	ation			the arr	provim			_			
i ne	suaullua	Wate	er Leve	el Obsei	rvation							
Time:	Time: at completion hrs days   ALLENDER BUTZKE ENGINEERS, INC.											
Depth to water:	Depth to water: Dry ft. ₹ ft. ₹ ft. ₹ Geotechnical   Environmental   Construction O.C.											

BOR	ING	LOC	G NC	)	4		NORTH	HING <u>3971951.20</u> EASTING <u>5372126.31</u>	Project N	o.: <u>191488A</u>			
Project: UI-019-Seed Savers Exchange								Client: Shive-Hattery					
North Winn Road, Canoe Township								4125 Westown Pkwy, Suite 100					
Quinta a	<u>Win</u>	neshi	ek Co	unty, I	$\frac{0}{1142}$			West Des Moines, Iowa 50266					
Datum:         Lidar Survey         I								Date Drilled: $10/31/2019$ Drilling Method: $4^{\circ}$ Original Drilling Depth, ft.: 10 Page: 1 of	<u>_FA</u> 1				
						کر ا	φą						
Elevation ft.	Depth ft.	Sample No	Type	SPT bpf	Moisture Content, %	Dry Densit pcf	Unconfine Compressiv Strength psf	Material Description*	Graphic Log USCS	Water Lew Depth  Elevation ft.			
	0 Dark brown lean clay, trace organics moist									0.3			
	-							Brown lean clay, moist	CL	1141./ _			
1140 -	_							LOESS					
-	-												
-	-4	1	ST		23.9	97	1940			4.5			
-	-							Brown lean clay with limestone fragments, moist	CL	1137.5			
1136 -	-							Moisture seepage near 6'					
-	-							Reddish brown sandy fat clay with limestone	СН	-			
-	- 8							RESIDUUM		85			
-	_	2	551	51				Light gray fractured limestone, damp		1133.5			
1132 -	-		SSA	51				WEATHERED BEDROCK		10			
-	-							End of Boring		1132			
_	- 12												
	12												
1100										-			
1128 -	-									_			
	-												
-	- 16									_			
-	-									-			
1124 -	_												
-	-												
-	-20									_			
-	-												
1120 -	-												
_	_									-			
_	- 24												
1116										-			
1116 -	-									-			
-	-												
-	- 28												
*The	stratifica	ation li	nes re	present	the ap	proxim	ate bounda	ry lines between material types: in-situ, the transition may b	e gradual.				
<b>T</b> :	Water Level Observation												
Lime: Depth to	Ime: at completion hrs days												
water:	water: <b>Dry</b> ft. $\neq$ ft. $\neq$ ft. $\neq$ ft. $\neq$ Geotechnical   Environmental   Construction Q.C.												

BORING LOG NO. <u>5</u> NORTH								HING <u>3972022.6</u> EASTING <u>5371720.5</u> Project No.: <u>19148</u>					
Project:	: <u>UI-0</u>	19-Se	ed Sa	vers Ex	xchang	ge		Client: Shive-Hattery					
	Nort	th Wi	nn Ro	ad, Ca	noe To	ownsh	ip	4125 Westown Pkwy, Suite 100					
	Win	neshi	ek Co	unty, I	owa			West Des Moines, Iowa 50266					
Surface	e Elevat	tion: _			1102.0	)'		Date Drilled: 10/31/2019 Drilling Method: 4" CFA					
Datum: Lidar Survey								Drilling Depth, ft.:         5.3         Page:         1         of         1					
Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Mater Level USCS Leog Level * water Level *					
	0							Very dark brown lean clay, trace organics, moist					
1100-	_							Brown lean clay with limestone fragments, moist					
	_	1	SSA	150				Light gray limestone, damp 1099.					
								PEDDOCK					
	-4												
†	-	2	SSA	200				With clay seam from 5' to 5.2'					
1096 -	-							End of Boring					
-	-												
_	- 8												
	_												
1092 -	-												
+	-												
+	-12												
_	-												
1088 -	_												
1000													
	-												
†	- 16												
+	-												
1084 -	-												
_	-												
	20												
	20												
+	-												
1080 -	-												
-	-												
_	- 24												
	_												
1051													
10/6	-												
+	-												
+	- 28												
*The «	stratifica	 ation li	nes rei	oresent	the an	oroxim	 ate boundar	ry lines between material types: in-situ, the transition may be gradual					
	Water Level Observation												
Time: a	Time: at completion hrs days   ALLENDER BUTZKE ENGINEERS, INC.												
Depth to	1	ft =	Z	f	t <u>v</u>		ft 💻	Geotechnical   Environmental   Construction O C					

BORING LOG NO. <u>6</u> NORTHING <u>39720023.0</u> EASTING <u>5371888.8</u> Project No.: <u>191488A</u>													
Project: UI-019-Seed Savers Exchange								Client: Shive-Hattery					
	Nor	th Wi	nn Ro	oad, Ca	noe To	wnsh	ip	4125 Westown Pkwy, Suite 100					
	Win	neshi	ek Co	unty, I	owa			West Des Moines, Iowa	a 50266				
Surfac	e Eleva	tion:	T	idar S	<u>1070.(</u>	)'		Date Drilled: <u>10/31/2019</u>	Drilling Method: $\underline{4''}$	<u>CFA</u> 1			
Datam												-	
Elevation ft.	Depth ft.	Sample No	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressiv Strength psf	Material Descrip	otion*	Graphic Log	NSCS	Water Leve Depth	Elevation ft.
_	0							Very dark brown lean clay with fragments, moist	limestone		CL		_
1068 -	_							Dark brown lean clay, moist					2 1068
_	-4	1	SSA	7	26.8			COLLUVIUN	1				_
-	_							With limestone fragments after :	5'				-
1064 -	-							Drown fronting d limestone with	alari dama			1	6.5
-	_ 0							Brown mactured innestone with	ciay, damp			1	
_	-	2	55 4	16	10.2			WEATHERED BED	DROCK				
1060 -	-		SSA	10	10.5								-
_	-												11.8
-	- 12	3	SSA	50/				Light gray limestone, damp BEDROCK				1	12.2
1056 -	_			272				End of Boring				1	057.8 -
-	_												-
-	- 16												_
-	-												-
1052 -	_												-
_	- 20												_
-	-												_
1048 -	-												
-	-												
-	- 24 -												_
1044 -	_												-
-	-												-
-	- 28												_
*The	stratific	ation li	ines re	present	the app	broxim	ate bounda	y lines between material types: in-sit	tu, the transition may	be gra	dual.		
Time:	at com	Wat pletio	er Lev n	el Obse hi	rvation s.		davs	ALLENDER BUT	ZKE ENGI	NE	ERS	5, I	NC.
Depth to	Drv	ft		i	- it. ¥		ft. ₹	Geotechnical   Envir	onmental   Cor	nstru	ction	0.0	с.



## **NOTES**


### UPPER IOWA WATERSHED IMPROVEMENTS 100% DESIGN COST OPINION - UI - 019 - SEED SAVERS EXCHANGE

#	ITEM DESCRIPTION	QUANTITY	UNITS		UNIT COST		TOTAL COST
CON	NSTRUCTION EXPENSES						
1	Site Clearing, Preparation & Waste Disposal	1	LS	*	\$8,000.00	=	\$8,000.00
2	Rolled Erosion Control Product	1,040	SY	*	\$1.75	=	\$1,820.00
3	Structure Seeding	1.2	AC	*	\$1,000.00	=	\$1,200.00
4	Native Pasture Seeding	6.0	AC	*	\$1,000.00	=	\$6,000.00
5	Mobilization & Demobilization	1	LS	*	\$10,000.00	=	\$10,000.00
6	Overexcavation, Core Trench Excavation	394	CY	*	\$3.00	=	\$1,182.00
7	Earthfill	19,964	CY	*	\$3.50	=	\$69,874.00
8	Filter Diaphragm Material, Sand	274	TON	*	\$30.00	=	\$8,220.00
9	Stone Filter	83	TON	*	\$25.00	=	\$2,075.00
10	Topsoil, Strip, Salvage & Respread	4,230	CY	*	\$3.00	=	\$12,690.00
11	Structural Concrete	50	CY	*	\$350.00	=	\$17,500.00
12	Pcc Paving, 6"	172	SY	*	\$80.00	=	\$13,760.00
13	Dual-Wall Hdpe Pipe, 8"	143	LF	*	\$30.00	=	\$4,290.00
14	Hickenbottom Intake, 10"	1	EA	*	\$250.00	=	\$250.00
15	Corrugated Metal Pipe, 36"	38	LF	*	\$80.00	=	\$3,040.00
16	Corrugated Metal Pipe, 48"	128	LF	*	\$110.00	=	\$14,080.00
17	Corrugated Metal Pipe, 66"	191	LF	*	\$175.00	=	\$33,425.00
18	72" Cmp Riser With Trash Rack	1	LS	*	\$10,000.00	=	\$10,000.00
19	Class 'E' Riprap	490	TON	*	\$25.00	=	\$12,250.00
20	Granular Surfacing	208	TON	*	\$28.00	=	\$5,824.00
21	Fencing, 5-Strands Of Barbed Wire	713	LF	*	\$2.50	=	\$1,782.50
22	Fencing, Steel Gates	2	EA	*	\$500.00	=	\$1,000.00
	•				Subtota	ľ	\$238,300.00

Contingency (10%) \$23,900.00

**Project Total** 

\$262,200.00

\*\*TOTAL PROJECT COSTS AND CONSTRUCTION COSTS PROVIDED HEREIN ARE MADE ON THE BASIS OF ENGINEER'S EXPERIENCE AND QUALIFICATIONS AND REPRESENT THE ENGINEER'S BEST JUDGMENT. HOWEVER, THE ENGINEER CANNOT AND DOES NOT GUARANTEE THAT BIDS OR ACTUAL TOTAL PROJECT OR CONSTRUCTION COSTS WILL NOT VARY FROM THE ESTIMATE OF PROBABLE CONSTRUCTION COST. THIS ESTIMATE IS INTENDED TO ASSIST IN BUDGETARY ASSESSMENT AND DOES NOT GUARANTEE THAT ACTUAL PROJECT COSTS WILL NOT EXCEED OR BE LOWER THAN THE AMOUNTS STATED IN THIS ESTIMATE.

#### Branhagen Upper Iowa Project Summary

UI-039-BRANHAGEN (Pond)

Landowner: Darrel Branhagen Assisted By: Matt Frana (UIR Project Coordinator) Location: Winneshiek County T97N R08W Section

#### **Project Details:**

- A pond (378) will be constructed on the site.
- Review design plans for construction details.
- Efforts should be made to obtain all borrow from within the pasture area.
- Soil investigations suggest there should be enough material within the pasture to complete the project. Review soil investigations (3) for more info on borrow area soils.
- However, with the quantities needed for this project, there is potential that material would need to be obtained from the cropland. If this becomes necessary efforts should be made to minimize impact to cropland.
- Ideally project construction will begin as soon as feasible in the spring and be finished before crops need to be planted. That way if we do need to get into the cropland for material, we wouldn't have to disturb already planted crops.



Date: 12/17/20



#### Post Construction Seeding Plans:

Mapped seeding areas are approximant locations based off LiDAR Contours to determine approximant seed mix quantities. Elevations will likely change during construction, potentially changing seed quantities needed. Actual seeding areas will be flagged post construction when new elevation boundaries can be determined using survey equipment.

There are trees that were recently planted along the west and north fence line. Avoid disturbing this area.

- Critical Vegetation Mix:
  - For on/around structure and disturbed areas on south side of the stream
  - Estimate area: 2 acres
  - Ensure fertilizer requirements are followed.
  - Review Critical Area Seeding Plan and 342 (Critical Area) Job Sheet for more details.
- Wetland Vegetation Mix Elevation:
  - Because the project has negative impacts to wetlands, this area is required by the Army Corps of Engineers to be seeded to wetland vegetation to offset the project's impact to wetlands.
  - Will be seeded between elevations 1078.5ft 1084ft within pool area
  - Estimated area: 2 acres
  - Review Wetlands Seeding Plan and 327 (Conservation Cover) Job Sheet for more details.

#### • Prairie Vegetation Mix:

- $\circ$   $\;$  Above 1084ft on the north side of the stream within pasture area.
- Areas in the prairie where present vegetation isn't significantly disturbed by construction should be sprayed with herbicide and disked before seeding OR scraped off to remove present vegetation. If the current vegetation isn't killed off before planting the prairie mix, the prairie mix will not sufficiently establish and need to be reseeded.
- Estimated Area: 10.5 acres
- Review Wetlands Seeding Plan and 327 (Conservation Cover) Job Sheet for more details.

View seeding plans and guidelines provided in bid packet for more detailed instructions. Note seeding dates. Depending on when construction is completed, a temporary cover may need to be seeded until frost seeding can be completed (after Nov. 15<sup>th</sup>)

Signed seeding plans and bills/seed tickets listing what was seeded will need to be provided before payment can be made.

Upper Iowa Watershed Project Estimate
Project: Branhagen

Date: 12/17/20

Item No.	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
Cost-shar	red Expenses					
1	Topsoil, Strip, Salvage, and Respread	IA-26	993	cu. Yd.	\$2.10	\$2,085.30
2	Compacted Earthfill	IA-23	20,756	cu. Yd.	\$3.50	\$72,646.00
3	Core Trench Excavation	IA-21	963	cu. Yd.	\$3.00	\$2,889.00
4	Aux Spillway Excavation	IA-21	414	cu. Yd.	2.10	\$869.40
5	Pipe, Appurtenances and Installation	IA-51	1	job	\$15,500.00	\$15,500.00
	8' riser/142' barrel w/trashrack & anti-vortex					
	device	IA-81				
	Drainage Diaphragm	IA-83				
	Concrete	IA-31				
		IA-61				
		IA-24				
6	Erosion Control Blanket (installed)	IA-6	800	sq. yd.	\$2.00	\$1,600.00
	(16Ft x 600Ft)					
7	Seeding - (critical area)	IA-6	2	acre	\$500.00	\$1,000.00
8	Seeding - (wetland)		2	acre	\$750.00	\$1,500.00
9	Seeding - (prairie)		10.5	acre	\$750.00	\$7,875.00
	also attach IA-5				Total	\$105,964.70
					Landowner	
					Cost (10%)	\$10,596.47
Other	Expenses					
10	Mobilization & Demobilization	IA-1	1	job	\$2,500.00	\$2,500.00
11	Site Clearing, Preperation & Waste Disposal	IA-1	1	job	\$1,500.00	\$1,500.00
					Total	\$4,000.00
					Grand Total	\$109,964.70



	Date:	d and agree with the content of the plans and orepared by the NRCS.	Date:	Date:	his practice has been constructed in accordance and specifications.		west fence along ROW from fence corner	h property line fence approx. m fence corner	CRIPTION		1 Loose Rock Riprap 1 Metal Fabrication and Installation 3 Timber Fabrication and Installation	4 Uraintill 5 Salvaging and Spreading Topsoil 1 Concrete 1 Corrugated Metal Pipe Conduits	Pollution Control Pollution Control Seeding and Mulching for Protective Cover 1 Excavation 3 Earthfill	truction Specifications	15 15 15 14 14 14 13 12 13 12 13 12 13 12 13 12 13 12 13 12 13 12 14 14 13 14 14 14 14 14 14 14 14 14 14 14 14 14	HWY RD	IN NORDI INCOLN		ILL RUS AND
6/10/20 9: Sheet 1 c	Drawing N	File No.	USE	A	United St Departme Agricultur	ates ent of re				В	ranha Plai	gen 1 Vi	Pono ew	d		Designed Drawn	N. Klingenberg N. Klingenberg	7 <u>5</u> 7 <u>5</u>	Date 5/2020 5/2020
48 AM of 8	0.		Vatura Conse	al Re rvati	sources ion Servi	се	EJC IV							Wini	neshiek County, IA	Checked Approved	Herry Schuler	AE G	22/20



100 200 Scale in Feet	Stong Hill Rd		Stone Hill Rd		
300 HW	5	P			<u> </u>
Drawing No. 6/1/20 3:46 PM Sheet 2 of <i>8</i>	United States Department of Agriculture Natural Resources Conservation Service	Branhagen Stage Storage POOL AREA	Winneshiek County, IA	Designed <u>N. Klingenberg</u> Drawn <u>N. Klingenberg</u> Checked · Approved ·	Date 5/2020 5/2020















Sheet $\delta$ of $\delta$		Drawing No.	File No.	Na	S	D ral	Re	Uni Der Agr SOU	ted bartr ricult rce: Ser	Stat men ture S ViCe	t of		DET. VE	AIL R1	_S FIC	O	F	C	:OI LE	RR T De	RU W EV	GA ITI ICI	NTE H E	ED AN	N NT	ЛЕ <sup>-</sup> І—`	TA VC	L )R <sup>-</sup>	PI TE	PE X	-		)esig )raw Chec	gned n ked		Kliii 	nger	berg	7	
60.8	56.1	44.1	40.1	<u> 30. 1</u>	26.7	18.7	16.0	Total Weight Pounds	nt #4 Bar	ES	N/A	0.067	93.8*	12	12	12	1	2	VTITY REQUIRED	23" x 2"	16 ga	N/A	N/A	23" x 2"	16 ga	23" x 2"	16 ga	N/A	2'-1.5"	N/A	4'	7'	10'-1.5"	8'-1.5"	2'-6"	2'	8'	N/A	24"	
14	14	12	12	10	10	в	8	Number of Bars	Reinforceme	QUANTITI			1			Bolts			QUAN																					
6-6"	6'-0"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	Length Each Bar	Steel F	ET BASE	; in ft./ft.	; in ft./ft.	A	ated Nuts	washers	lated Mach. E	eets Galv.	x & Galv.	S	i-Vortex	Vortex Device	) diam.	🕑 diam.	) diam.	B diam.	) diam.	(d) diam.													
2	35	00	86	39	13	68	83	řđ.	crete	Z	n. pipe	n. pipe	les	ium Pl	t Lock	iium P	etal Sh	",4 " ∠ <sub>S</sub>	IL ITEM	for Ant	r Anti-	for C	ss for	for (B	ss for	for A	ss for	ß		$\square$	3	$\odot$	Ð	0	B	Ð	0	0	B	



DATE Oct. 2012 PAGE 1 OF 1	STANDARD DWG. IA-1107	vosts. <u>SIDE ELEV.</u> V be <u>VIEW "D"</u>	ceive $(a)$	NATERIALS LENGTHS Item <u>36</u> $3.3^{*}3.3^{*}3.5^{*}3.5^{*}}$ $3.3^{*}3.3^{*}3.5^{*}3.5^{*}}$ $3.3^{*}2.3^{*}3.5^{*}3.5^{*}}$ $3.7^{*}2.3^{*}3.5^{*}3.5^{*}}$ $4.7^{*}3.5^{*$
Sheet 7 of	Drawing No	Hile No.	United States Department of Agriculture	DETAILS OF TRASH RACK FOR 36" C.M. PIPE VERTICAL INLET Designed N. Klingenberg 5/2020 Drawn N. Klingenberg 5/2020 Checked 65 3/26
00		Conse	ervation Service	Approved



	with	1Ce	x 12" timbers. ements of 3 feet	(For 15" diam pipe, only one timber required.) ELEVATION of to Scale)	<i>C. Pipe</i> <i>I2"x12" Timbers</i> <i>Not to Scale</i> <i>C. Pipe</i> <i>Saw off the top of timbers</i> <i>With a bevel toward the bevel toward toward the bevel toward toward</i>	
Sheet <i>8</i>	Drawing N	File No.	USDA	United States Department of Agriculture	DETAILS OF PROPPED OUTLET WITH Designed N.K.1:-yenberg 21 TIMBER SUPPORT Drawn	Date 2020
of <i>8</i>	ō.		atural Re Conservat	sources ion Service	15 to 24" DIAM. C.M. PIPE	<u></u>

#### NATURAL RESOURCES CONSERVATION SERVICE CONSTRUCTION SPECIFICATIONS

For

Branhagan 378

Winneshiek \_\_\_\_ County, Iowa

### List of Specifications

Specification Number	Title	<u>Pages</u>
IA-1	Site Preparation	1
IA-5	Pollution Control	2
IA-6	Seeding & Mulching for Protective Cover	1
IA-21	Excavation	1
IA-23	Earthfill	3
IA-24	Drainfill	2
IA-26	Salvaging and Spreading Topsoil	1
IA-31	Concrete	6
IA-51	Corrugated Metal Pipe Conduits	3
IA-81	Metal Fabrication and Installation	1
IA-83	Timber Fabrication and Installation	1
IA-61	Loose Rock Rip Rap	2

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

For temporary seeding recommendations refer to (342) standard.



# **Critical Area Seeding Plan**

-

**\_** . .

Name Branhagen Seeding	l Plan		Date	12/17/2020	Tract No.	
					Field No.	
Type of Seeding: Critical are	2	-		Prepared by M	att Frana	01-039-DITANITAGEN
Chicarare	a (	Cooding Doroo	nt Runa Liva Saad-10/ Carm	vinction + Hard Soud) * % Durity		
	<u>-</u>	beeding Percer	100	ination + Hard Seed) % Punty		
					Critical area	•
Enter Agroation $2$			Asses 0/ of Stand Assa Circ	de Ore Beleur	T	tel Needed
Enter Acres. 2	-	Г	Pounds Per Acre	- Circle One Below	10	ital Needed
Species	Acres	% of Stand		PLS*	Total	Needed
Smooth Brome 🔻	2	100	25.0	Pounds	50.00	Pounds
•				Pounds		Pounds
•				Pounds		Pounds
•				Pounds		Pounds
•				Pounds		Pounds
Oats <b>OR</b> Cereal Ry	e 2		1.5	Bushels	3.0	Bushels
Fertilizer & Lime						
Lime (ECCE)	0	Lbs/Ac			0	Pounds
Nitrogen	30	Lbs/Ac			60	Pounds
Phosphate (P205)	30	Lbs/Ac			60	Pounds
Potash (K20)	40	Lbs/Ac			80	Pounds
Seeding will be	completed:	March 1 - May	15 🔻			
		1				
Seeding Time: If se	eding can	't be compl	leted prior to May 15	, Plant Oats/Cereal Rye a	nd wait until A	ugust 1st-Sept
15th to seed brome	-			-		-
Additional Seeding Crite	ria: To be	used on an	d around strucure.			

Oats OR Cereal Rye will be used as a companion crop while brome establishes. If seeding will be done in the fall, recommended to ensure adequate cover into winter and through spring until brome can establish. Oats will winter

Seeding was completed according to the above requirements on:

(Contractor Signature)

(Date)

(Date)

Certified by



IA - CPA - 4 REV. April 2020 (File Code 180-12-12)

# Wetland Seeding Plan

Name		Branhagen Wetland Seeding			Date	12/17/2020
	_	(PF fall 20 wet + wet bump)	_		Tract No.	
	-		-		Field No.	
	Program:	Upper Iowa Watershed Project	Acres:	2.00	Contract No.	UI-039-Branhagen

## Seeding Mix Summary

			2	PLS	PLS Lbs
Grasses	Scientific Name	Common Name	Seeds/Ft	Lbs/Acre	lotal
1	Andropogon gerardii	Big Bluestem	0.918	0.250	0.50
2	Elymus virginicus	Virginia Wildrye	1.543	1.000	2.00
3	Carex vulpinoidea	Fox Sedge	1.837	0.050	0.10
4	Carex hystericina	Bottlebrush Sedge	0.110	0.010	0.020
5	Carex bebbii	Bebb's Sedge	0.125	0.010	0.020
6	Carex Iurida	Shallow Sedge	0.022	0.005	0.010
7	Glyceria striata	Fowl Mannagrass	4.408	0.075	0.15
8	Scirpus atrovirens	Green Bulrush	3.379	0.020	0.040
9	Elymus hystrix	Eastern Bottlebrush Grass	0.698	0.250	0.50
10	Sorghastrum nutans	Indiangrass	1.102	0.250	0.50
11	Scirpus cyperinus	Woolgrass	3.122	0.005	0.010
12	Carex scoparia	Broom Sedge	0.309	0.010	0.020
13	Carex molesta	Troublesome Sedge	0.092	0.010	0.020
14	Poa palustris	Fowl Bluegrass	2.388	0.050	0.10
		SUBTOTAL GRASSES	20.051	1.995	3.990
				PLS	PLS Lbs
Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft <sup>2</sup>	Lbs/Acre	Total
1	Hypericum ascyron	Giant St. Johnswort	2.443	0.035	0.070
2	Thalictrum dasycarpum	Purple Meadow-rue	0.020	0.005	0.010
3	Asclepias incarnata	Swamp Milkweed	0.123	0.070	0.14
4	Lythrum alatum	Winged Loosestrife	2.204	0.002	0.0040
5	Helianthus	Saw-tooth Sunflower	0.055	0.010	0.020
·	arosseserratus				
6	Iris shrevei	Blue Flag	0.092	0.250	0.50
7	Lobelia cardinalis	Cardinal Flower	1.028	0.007	0.014
. 8	Lobelia siphilitica	Great Lobelia	0.918	0.005	0.010
9	Eupatorium perfoliatum	Boneset	0.882	0.015	0.030
10	Symphyotrichum novae-	New England Aster	0 121	0.005	0.010
	angliae		0.121	0.000	0.010
11	Verbena hastata	Blue Vervain	0.683	0.020	0.040
12	Vernonia fasciculata	Ironweed	0.088	0.010	0.020
13	Ludwigia alternifolia	Seedbox	4.775	0.010	0.020
14	Eupatoriadelphus	Spotted Trumpetweed	1.396	0.040	0.080
15	Mimulus ringens	Monkey Flower	3 370	0.004	0.0080
10	Anemone canadensis	Canadian Anemone	0.000	0.004	0.0060
10	Silnhium	Prairie Rosinweed	0.009	0.003	0.010
17	terebinthinaceum		0.002	0.000	0.010
18	Helenium autumnale	Sneezeweed	1,433	0.030	0.060
19	Zizia aurea	Golden Alexander's	0.404	0.100	0.20
20	Oligoneuron riddellii	Riddell's Goldenrod	0.683	0.020	0.040
21	Silphium perfoliatum	Cup Plant	0,103	0.200	0.40
22	Rudbeckia triloha	Brown-eved Susan	0.624	0.050	0.10
22	Rudbeckia subtomentosa	Fragrant Coneflower	0 158	0.000	0.020
23		ragiant conclower	0.100	0.010	0.020
24	Desmodium canadense	Showy Ticktrefoil	0.404	0.200	0.40
25	Eupatorium purpureum	Sweetscented Joe Pye Weed	1.543	0.100	0.20

26	Veronicastrum virginicum	Culver's Root	1.469	0.005	0.010	
27	Asclepias syriaca	Common Milkweed	0.016	0.010	0.020	
		SUBTOTAL FORBS	25.055	1.221	2.442	
Woody	Scientific Name	Common Name	Seeds/Ft <sup>2</sup>	PLS Lbs/Acre	PLS Lbs Total	
		SUBTOTAL VINES/WOODY	0.000	0.000	0.000	
		TOTAL	45.107	3.216	6.432	
	Estimated Cost/Acre		E	Estimated	Total Cost	\$0.00
		Soil Test Information	Total N Ib:	eeded s	]	
Lime (E	CCE) (Actual Lime)					
Pho	osphate (P205)					
F	Potash (K20)					
	Seeding Dates:	Spring (April 1 - Ju	uly 1)			
	Additional Seeding Criteria:	REVIEW IOWA JOBSHEET (327) F	OR ADDITIONAL	L SEEDING INFO	ORMATION	
Seeding was com	(Date)	according to the above requir	ements.			
(Con	tractor's Signature)		(Da	te)		
		Certified by				



IA - CPA - 4 REV. November-17 (File Code 180-12-12)

# Prairie Seeding Plan

Name	<b>BRANHAGEN PRAIRIE</b>	(PF 20F Leopold#1)		Date	12/17/2020
Prepared by	Matt Frana			Tract No.	
_				Field No.	
Program:	-	Field Area (acres):	10.500	Contract No.	UI-039-Branhagen

## Seeding Mix Summary

				PLS	PLS Lbs	Estimated
Grasses	Scientific Name	Common Name	Seeds/Ft <sup>2</sup>	Lbs/Acre	Total	Cost/Acre
1	Andropogon gerardii	Big Bluestem	0.918	0.250	2 63	
2	Sorahastrum nutans	Indiangrass	1 102	0.250	2.63	
3	Boutelous curtinenduls	Sideoats Grama	1 653	0.750	7.88	
3	Schizachvrium scoparium	Little Bluestem	5 510	1 000	10.50	
4	Schizachynum Scopanum		5.510	1.000	10.50	
5	Carex brevior	Shortbeak Sedge	0.213	0.020	0.21	
6	Elymus virginicus	Virginia Wildrye	0.154	0.100	1.05	
7	Sporobolus compositus	Composite Dropseed	0.165	0.015	0.16	
8	Sporobolus heterolepis	Prairie Dropseed	0.088	0.015	0.16	
9	Tridens flavus	Purpletop Tridens	0.048	0.005	0.053	
10	Carex vulpinoidea	Fox Sedge	0.184	0.005	0.053	
	•	SUBTOTAL GRASSES	10.035	2.410	25.305	\$0
				<b>DI 0</b>		
			· · · · · · · · · · · · · · · · · · ·	PLS	PLSLDS	Estimated
Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft <sup>-</sup>	Lbs/Acre	Total	Cost/Acre
1	Allium stellatum	Autumn Onion	0.040	0.010	0.11	
2	Anemone virginiana	Tall Thimbleweed	0.051	0.005	0.053	
3	Agastache foeniculum	Blue Giant Hyssop	0.331	0.010	0.11	
4	Verbena hastata	Blue Vervain	1.025	0.030	0.32	
5	Verbena stricta	Hoary Vervain	0.514	0.050	0.53	
6	Baptisia alba	White Wild Indigo	0.006	0.010	0.11	
7	Asclepias tuberosa	Butterfly Milkweed	0.032	0.020	0.21	
8	Asclepias incarnata	Swamp Milkweed	0.035	0.020	0.21	
9	Asclepias verticillata	Whorled Milkweed	0.040	0.010	0.11	
10	Tradescantia ohiensis	Common Spiderwort	0.029	0.010	0.11	
11	Silphium laciniatum	Compass Plant	0.002	0.010	0.11	
12	Silphium perfoliatum	Cup Plant	0.005	0.010	0.11	
13	Silphium	Prairie Rosinweed	0.004	0.010	0.11	
15	terebinthinaceum		0.001	0.010	0.11	
14	Silphium integrifolium	Rosinweed	0.004	0.010	0.11	
15	Symphyotrichum novae-	New England Aster	0.242	0.010	0.11	
	angliae	5				
16	Symphyotrichum laeve	Smooth Blue Aster	0.202	0.010	0.11	
17	Symphyotrichum	Skyblue Aster	0.294	0.010	0.11	
	oolentangiense					
18	Oligoneuron album	Stiff Aster	0.118	0.005	0.053	
19	Rudbeckia hirta	Black-eyed Susan	3.717	0.110	1.16	
20	Rudbeckia triloba	Brown-eyed Susan	0.125	0.010	0.11	
21	Ratibida pinnata	Gray-headed Coneflower	2.755	0.250	2.63	
22	Echinacea pallida	Pale Coneflower	0.096	0.050	0.53	
23	Eupatorium perfoliatum	Boneset	0.588	0.010	0.11	
24	Brickellia eupatorioides	False Boneset	0.118	0.010	0.11	
25	Eupatorium altissimum	Tall Thoroughwort	0.184	0.010	0.11	
26	Eupatoriadelphus	Spotted Trumpetweed	0.349	0.010	0.11	
	maculatus					
27	Eupatorium purpureum	Sweetscented Joe Pye Weed	0.771	0.050	0.53	
28	Astragalus canadensis	Canadian Milkvetch	0.624	0.100	1.05	
29	Chamaecrista fasciculata	Partridge Pea	0.298	0.300	3.15	
30	Desmanthus illinoensis	Prairie Mimosa	0.771	0.500	5.25	
31	Crotalaria sagittalis	Rattle Box	0.165	0.100	1.05	
32	Hypericum ascvron	Giant St. Johnswort	1.047	0.015	0.16	
33	Mimulus ringens	Monkey Flower	0.845	0.001	0.011	
	-	-				

34	Pycnanthemum	Common Mountain Mint	0.808	0.010	0.11	
	virginianum	Large flowered	0 102	0.020	0.04	
35	Penstemon granditiorus	Large-nowered	0.103	0.020	0.21	
36	Penstemon digitalis	Foxglove Penstemon	0.955	0.020	0.21	
37	Oligoneuron rigiaum	Stim Goldenrod	0.452	0.030	0.32	
38	Solidago speciosa	Showy Goldenrod	0.698	0.020	0.21	
39	Liatris aspera	Tall Blazing Star	0.059	0.010	0.11	
40	Liatris pycnostachya	Prairie Blazing Star	0.202	0.050	0.53	
41	Coreopsis tripteris	Tall Tickseed	0.051	0.010	0.11	
42	Helianthus rigidum	Prairie Sunflower	0.029	0.020	0.21	
43	Helianthus occidentalis	Western Sunflower	0.103	0.020	0.21	
44	Heliopsis helianthoides	Ox-eye	0.231	0.100	1.05	
45	Parthenium integrifolium	Feverfew, Wild Quinine	0.051	0.020	0.21	
46	Euphorbia corollata	Flowering Spurge	0.029	0.010	0.11	
47	Zizia aurea	Golden Alexander's	0.404	0.100	1.05	
48	Vernonia fasciculata	Ironweed	0.176	0.020	0.21	
49	Physostegia virginiana	False Dragonhead	0.081	0.020	0.21	
50	Lespedeza capitata	Round-headed Bush Clover	0.147	0.050	0.53	
51	Desmodium canadense	Showy Ticktrefoil	0.040	0.020	0.21	
52	Dalea purpurea	Purple Prairie Clover	3.636	0.550	5.78	
53	Dalea candida	White Prairie Clover	0.349	0.050	0.53	
54	Phlox pilosa	Prairie Phlox	0.035	0.005	0.053	
55	Eryngium yuccifolium	Rattlesnake Master	0.014	0.005	0.053	
56	Ludwigia alternifolia	Seedbox	2.388	0.005	0.053	
57	Oenothera biennis	Common Evening	1.653	0.050	0.53	
58	Veronicastrum virginicum	Culver's Root	1.469	0.005	0.053	
59	Monarda fistulosa	Wild Bergamot	0.257	0.010	0.11	
60	Geranium maculatum	Wild Geranium	0.009	0.005	0.053	
61	Ruellia humilis	Wild Petunia	0.191	0.100	1.05	
62	Asclepias syriaca	Common Milkweed	0.016	0.010	0.11	
		SUBTOTAL FORBS	30.065	3.121	32.771	\$0
			o	PLS	PLS Lbs	Estimated
Woody	Scientific Name	Common Name	Seeds/Ft <sup>2</sup>	PLS Lbs/Acre	PLS Lbs Total	Estimated Cost/Acre
Woody 1	Scientific Name Amorpha canescens	Common Name Lead Plant	<b>Seeds/Ft<sup>2</sup></b> 0.059	PLS Lbs/Acre 0.010	PLS Lbs Total 0.11	Estimated Cost/Acre
Woody 1 2	Scientific Name Amorpha canescens Ceanothus americanus	Common Name Lead Plant New Jersey Tea	<b>Seeds/Ft<sup>2</sup></b> 0.059 0.028	PLS Lbs/Acre 0.010 0.010	PLS Lbs Total 0.11 0.11	Estimated Cost/Acre
Woody 1 2 3	Scientific Name Amorpha canescens Ceanothus americanus Rosa arkansana	<b>Common Name</b> Lead Plant New Jersey Tea Prairie Wild Rose	Seeds/Ft <sup>2</sup> 0.059 0.028 0.005	PLS Lbs/Acre 0.010 0.010 0.005	PLS Lbs Total 0.11 0.053	Estimated Cost/Acre
Woody 1 2 3	Scientific Name Amorpha canescens Ceanothus americanus Rosa arkansana	Common Name Lead Plant New Jersey Tea Prairie Wild Rose SUBTOTAL VINES/WOODY	Seeds/Ft <sup>2</sup> 0.059 0.028 0.005 0.091	PLS Lbs/Acre 0.010 0.010 0.005 0.025	PLS Lbs Total 0.11 0.053 0.263	Estimated Cost/Acre \$0
Woody 1 2 3	Scientific Name Amorpha canescens Ceanothus americanus Rosa arkansana	Common Name Lead Plant New Jersey Tea Prairie Wild Rose SUBTOTAL VINES/WOODY TOTAL	Seeds/Ft <sup>2</sup> 0.059 0.028 0.005 0.091 40.191	PLS Lbs/Acre 0.010 0.010 0.005 0.025 5.556	PLS Lbs Total 0.11 0.11 0.053 0.263 58.338	Estimated Cost/Acre \$0 \$0
Woody 1 2 3	Scientific Name Amorpha canescens Ceanothus americanus Rosa arkansana	Common Name Lead Plant New Jersey Tea Prairie Wild Rose SUBTOTAL VINES/WOODY TOTAL	Seeds/Ft <sup>2</sup> 0.059 0.028 0.005 0.091 40.191	PLS Lbs/Acre 0.010 0.010 0.005 0.025 5.556	PLS Lbs Total 0.11 0.11 0.053 0.263 58.338	Estimated Cost/Acre \$0 \$0
Woody 1 2 3	Scientific Name Amorpha canescens Ceanothus americanus Rosa arkansana	Common Name Lead Plant New Jersey Tea Prairie Wild Rose SUBTOTAL VINES/WOODY TOTAL	Seeds/Ft <sup>2</sup> 0.059 0.028 0.005 0.091 40.191 Total N	PLS Lbs/Acre 0.010 0.005 0.025 5.556 eeded	PLS Lbs Total 0.11 0.11 0.053 0.263 58.338	Estimated Cost/Acre \$0 \$0
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Soils on-site investigation form for:

Branhagen - pond

Neil Sass, Area Soil Scientist 120 N Industrial Pkwy #4 West Union, IA 52175 Phone: (563) 412-3019

Date of Investigation: 10/7/19

Investigated by: Frana, Oyloe, Sass Purpose: determine site suitability for pond Landowner: Darrel Branhagen Location: Winneshiek County Boring Method/Equipment: backsaver hand probe

Overview of soils/area: Red arrow is proposed site(s):





## Soil Description #1: Beside water in ditch. along CL

**GPS Location:** 

Depth Horizon Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
	Est. clay %	Redox features, clay films, etc	
0 to 45 inches - 10YR 3/2 silty	/ clay loam t	o silt loam sedimer	nts.
45 inches - probe refusal			

#### Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc):

Would like to see 60 inches soil material for core trench construction. May be able to get adequate depth with excavator.

# Soil Description #2: south end of proposed structure

**GPS Location:** 

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
			Est. clay %	Redox features, clay films, etc	
0 to 4 in	ches - 10	YR 2/2 silt l	oam		
4 to 18 i	nches - 1	.0YR 4/3 wit	h mixed colo	rs. silt loam to silty	clay loam texture
18 inche	es - probe	e refusal			
<u>5</u> - 1					

#### Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc):

Poked a couple holes up from centerline. Depth to bedrock ranged from on surface to several inches. Suspect rotten fractured limestone/residuum.

Very high risk of lateral seepage (leakage) along south hillside.

# Soil Description # <sup>3</sup> : proposed borrow in pool area

**GPS Location:** 

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
			Est. clay %	Redox features, clay films, etc	
0 to 6 i	nches -	10YR 2/1	silt loam		
6 to 42 i	nches - 1	.0YR 2/2 silt	y clay loam		
42 to 76	inches -	· 10YR 5/1 s	ilt loam		
76 to 78	inches -	10YR 5/1 sil <sup>-</sup>	t loam with g	ravel.	

## Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc):

horizon described from 6 to 42 inches has adequate clay content for core trench & structure construction. clay estimate 27-30%.

# Soil Description # 4 : proposed borrow on N knob

**GPS Location:** 

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
			Est. clay %	Redox features, clay films, etc	
0 to 8 i	nches -	10YR 3/2	silt loam		
8 to 15	inches	- 10YR 4/3	3 silt loam		
15 to 40	inches -	10YR 4/4 sil	ty clay loam		
40 to 78	inches - 1	.0YR 5/4 silt	loam with fev	w 5/2 colors.	
				an ann ann an	

#### Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc.):

highest clay material in 15 to 40 inch horizon. No bedrock described in this location to 78 inches; though the soil type (903E2) mapped has it at 28 inches.

Soil Descrip	tion # 5 : P	roposed borrov	w on "high knob	" to North <u>GPS Loca</u>	tion:
Depth	Horizon	Matrix Color	USDA Texture Est. clay %	Additional observations Redox features, clay films, etc	Estimated unified Classification
very sir	milar pro	ofile to test	hole 4. Dic	I hit bedrock at 7	76" in this hole.

Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc):

highest clay material in 15 to 40 inch horizon.

# <u>Soil Description # 6</u> : proposed borrow on N side. knob to east <u>GPS Location</u>:

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification			
			Est. clay %	Redox features, clay films, etc				
0 to 4 in	ches - 10	YR 3/2 silt l	oam. topsoil					
4 to 7 in	4 to 7 inches - 10YR 4/3 silt loam.							
7 to 40 i	nches - 10	OYR 4/4 silty	clay loam. cla	y estimate 27-30%				
40 to 72	40 to 72 inches - 10YR 5/4 silt loam.							
72 to 84 i	nches - Sh	ale? residuu	m? some kind	of bedrock. not suital	ble for borrow.			

Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc.):

Best borrow material 7 to 40 inches. highest clay of horizons described. silt loam to 6 foot.

#### Investigator's summary of site: (suitable or not):

45 inches soil material in bottom of ditch. would like to see core trench excavated to 60 inches. may be possible with excavator.

shallow & rocky hillside on south side of proposed structure. Very high risk of leakage in proposed structure. Likely scenario is that the pond water level would raise to whatever level the limestone fractures allow, may not get to desired water depth.

Borrow material is available in several locations. Some within pool area. some on nose slopes & knobs to NW and NE of proposed structure.

Long dam structure. will require quite a bit of borrow. risk of leakage is high. These concerns should be evaluated by both the planner and the landowner.



Soils on-site investigation form for:

Branhagen - Pond

Neil Sass, Area Soil Scientist 120 N Industrial Pkwy #4 West Union, IA 52175 Phone: (563) 412-3019

Date of Investigation: 6/19/20

Investigated by: Klingenberg, Frana, Oyloe, Sass Purpose: determine borrow material for pond Landowner: Darrel Branhagen Location: Winneshiek Co Boring Method/Equipment: Giddings probe truck



## Soil Description #1: Knob hilltop to north

**GPS Location:** 

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
			Est. clay %	Redox features, clay films, etc	
0 to 11 i	nches - 1	.0YR 3/2 silt	loam		
11 to 17	' inches -	10YR 4/3 si	lt loam		
17 to 30	inches -	10YR 4/3 sil	ty clay loam		
30 to 37	inches -	10YR 4/4 sil	t loam		
37 to 72	- residuu	m. bedrock			
-					

Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc.):

Best clay material 17-30 inches. clay estimate 27-30%

Residuum bedrock at 37 inches.

# Soil Description #2: next knob to the south

**GPS Location:** 

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
			Est. clay %	Redox features, clay films, etc	
0 to 11 i	nches - 1	.0YR 3/2 silt	loam		
11 to 14	inches -	10YR 4/3 si	lt loam		
14 to 40	inches -	10YR 4/4 si	lty clay loam		
40 to 55	inches -	10YR 4/4 sil <sup>-</sup>	t loam		
55 to 59	inches - r	esiduum. beo	drock		
59 inches	s - probe	refusal.			

Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc):

Best clay material 14-40 inches. clay estimate 27-30%

Residuum bedrock at 55 inches.

# <u>Soil Description # <sup>3</sup></u> : half way down hill from hole #2

**GPS** Location:

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
			Est. clay %	Redox features, clay films, etc	
0 to 12	inches	- 10YR 3/	1 silt loam		
12 to 27	inches -	10YR 3/3 si	lty clay loam	. 27-29% clay estim	ate.
27 to 33	3 inches	- 10YR 5/4	silty clay loa	am w/few rock fra	gs. 28-32% clay est.
33 inche	s - probe	refusal			

Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc):

some good clay material 12-33 inches.

Bedrock at 33 inches. if too much soil material is taken, water holding capacity will decrease & area will be droughty.

Soil Description # 4 : bottom of hill. flat.

**GPS Location:** 

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification	
			Est. clay %	Redox features, clay films, etc		
0 to 49	inches ·	- 10YR 3/3	3 silt loam.	silty depositional	sediments.	
49 to 72 inches - 10YR 2/1 silt loam. Buried A horizon						
72 to 96	inches - 2	LOYR 2/2 sil	ty clay loam.	28-32% clay estima	te.	

# Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc.):

if this area is within proposed pool, may be able to borrow some materials here.

silty deposits 49" Buried A horizon, original soil surface 49-72 then some black clayey materials 72-96 inches.



Soils on-site investigation form for:

Branhagen - borrow

Neil Sass, Area Soil Scientist 120 N Industrial Pkwy #4 West Union, IA 52175 Phone: (563) 412-3019

Date of Investigation: 7/10/20

Investigated by: Klingenberg, Grove, Wilson, Lapham, Hilgerson, Slifka, Oyloe, Frana, Sass Purpose: locate borrow material for dam structure Landowner: Darrel Branhagen Location: Winneshiek Co Boring Method/Equipment: Giddings probe truck

Overview of soils/area: Red arrow is proposed site(s):



**GPS Location:** 

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification		
			Est. clay %	Redox features, clay films, etc			
0 to 35 inches - 10YR 3/1 with 4/1 & 4/6 silt loam.							
35 to 78 inches - 10YR 2/2 with 4/6 silt loam to silty clay loam. 25-28% clay est.							
78 to 12	0 inches	- 10YR 4/4 v	vith 5/1 & 5/0	6 redox. silt loam 20	)-25% clay est.		
120 to 1	44 inches	- 5Y 5/6 wit	h 5/2. silt loa	m 18-22% clay. wat	er table @120 inches.		

Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc.):

some usuable material at this location. best material 35 to 78 inches. clay estimate 25-28% also decent material 78 to 120 inches. clay estimate 20-25%

**GPS Location:** 

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
			Est. clay %	Redox features, clay films, etc	
0 to 32 i	nches - 1	.0YR 2/1 silt	loam to loar	n texture	
32 to 52	inches -	10YR 5/6 si	lty clay loam	29-33% clay estim	ate.
52 to 72	inches -	2.5Y 5/6 w,	/ 5/3. silty cla	ay loam 27 to 30%	clay estimate.
72 inche	s - probe	refusal (be	drock)		

Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc.):

some good clayey material 32 to 72 inches. will be able to utilize some if necessary, but sloping/shaping will be limiting factor here.
<u>Soil Description # <sup>3</sup></u> : on N draw near head cut. bottom of WWay <u>GPS Location</u>:

Depth	Horizon	Matrix Color	USDA Texture	Additional observations	Estimated unified Classification
			Est. clay %	Redox features, clay films, etc	
0 to 27	inches ·	- PSA silty	deposits.	2.5Y 3/2 silt loam	. 12-15% clay est.
27 to 84	inches -	10YR 3/1 sil	t loam. 18-	24% clay estimate.	
84 to 13	6 inches	- 2.5Y 5/2 8	& 5/6 silt lo	oam. 12-18% clay est	imate.
136 to 1	44 fractu	red limestor	ne/frags.		

Investigator's comments (topsoil depth, parent material, seasonal high water table, depth to bedrock, etc):

Bored a hole here previously to 8 foot. Wanted to see what was below that. got into fractured limestone at 136. will likely not be able to borrow that deep due to shaping/sloping considerations.

# Investigator's summary of site: (suitable or not):

Identified some additional borrow material with this on-site investigation. We have bored holes in almost every possible borrow source within this grass area. Still unsure if there will be enough for proposed structure.

did not bore a hole in crop field, but there are some 903E2 and 162D2 soil types mapped in the field. the 162D2 areas in particular would have additional borrow material if needed. the 903E2 would as well, but i would predict the thickness would be less per map unit description.

Per investigations & descriptions above. suitable material is available for the proposed structure.



# Department of Agriculture

# Construction Specification 000 IA-1 Site Preparation

# 1. SCOPE

Site preparation work shall consist of clearing, grubbing, stripping, refuse removal, bank sloping 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.

For wetland restoration, enhancement, or creation projects, the wetland area shall be disturbed as little as possible and existing naturally vegetated spillway areas shall not be disturbed.

# 2. FOUNDATION PREPARATION

The construction areas shall be stripped a minimum of 6 inches to remove 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 horizontal to 1 vertical.

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. Whenever possible, material shall not be disposed of in the pool area created by the structure.

Stockpiled materials around a construction site should be placed so as not to 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. Whenever possible, material shall not be disposed of in any pool area created by the structure.

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.



#### Construction Specification 000 000 IA CS-005 Pollution Control 2011

# 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 shall not be left open during a winter shutdown period and 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.



#### Construction Specification 000 IA-6 Seeding and Mulching for Protective Cover

# 1. SCOPE

The work shall consist of 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 horizontal to1 vertical, 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.



#### United States Department of Agriculture

#### Construction Specification 000 IA-21 Excavation

# 1. SCOPE

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

# 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 to 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 NRCS and the landowner. On wetland projects, borrow shall not be taken from the wetland area within 10 feet of the embankment or as shown on the drawings.

Borrow areas shall be excavated and grading completed 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.



# Construction Specification 000 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.



#### Construction Specification 000 IA-51 Corrugated Metal Pipe Conduits

# 1. SCOPE

The work shall consist of furnishing and placing circular, arched or elliptical corrugated metal pipe and the necessary fittings.

# 2. MATERIALS

Metallic-coated steel corrugated pipe and fittings shall be zinc-coated or aluminized, Type 2, and shall conform to the requirements of ASTM A 760 and A 929 for the specified type and size of pipe. Aluminum corrugated pipe shall conform to the requirements of ASTM B 745 for the specified type and size of pipe. All pipe is subject to the following additional requirements:

- 1. When polymer coating is specified, pipe, coupling bands and anti-seep collars shall be coated in accordance with ASTM A 762. All riveted joints shall be caulked as described in paragraph B.
- 2. Pipe with annular corrugations shall be furnished with caulked seams. Riveted pipe joints shall be caulked with a bituminous mastic material during fabrication to provide a watertight joint. All circumferential and longitudinal seams shall be caulked before riveting. This shall be accomplished by applying a uniform bead of the mastic compound to the inner lap surface before riveting such that when the rivets are in place, all voids are filled and a coating of mastic is between the lap surfaces. The inner surface of coupling bands shall be asphalt coated in the field prior to installation. A neoprene gasket having a minimum thickness of 3/8 inch and a minimum width of 7 inches may be used in lieu of mastic coated coupling bands.
- 3. Welded or lock seams in helical corrugated pipe are considered to be watertight.
- 4. When close riveted pipe is specified: (1) the pipe shall be fabricated so that the rivet spacing in the circumferential seams shall not exceed 3 inches, except that 12 rivets will be sufficient to secure the circumferential seams in 12-inch pipe, and (2) in those portions of the longitudinal seams that will be covered by the coupling bands, the rivets shall have finished flat heads or the rivets and holes shall be omitted and the seams shall be connected by welding to provide a minimum of obstruction to the seating off the coupling bands.
- 5. Double riveting or double spot welding of pipe less than 42 inches in diameter may be required. If specified, the riveting or welding shall be done in the manner specified for pipe 42 inches or greater in diameter.

#### 3. COUPLING BANDS

Coupling bands shall meet the requirements of the table below or have detailed drawings submitted for approval by the State Conservation Engineer. Coupling bands shall be of the same minimum thickness (gage) as the pipe being connected.

# 4. FABRICATION

Fabrication of all appurtenances shall be done as shown on the drawings. All appurtenances shall be made of metallic-coated steel when corrugated steel pipe is used and aluminum when used with aluminum pipe. Dissimilar metals shall not be installed in contact with each other.

	Maximum Fill	Maximum Pipe
Description of Coupling Band	Height, Ft.	Diam., In.
24-inch wide coupling band with four	All	All
1/2-inch Diam. galvanized rods with tank		
lugs for annular or helical corrugated		
metal pipe. Bands shall have a minimum		
lap of 3 inches.		

	Maximum Fill	Maximum Pipe
Description of Coupling Band	Height, Ft.	Diam., In.
Hugger band from Armco Steel Corp. for	35	48
helical corrugated metal pipe with reformed		
ends; and for annular corrugated pipe. Bands		
include O-ring gaskets and two 1/2-inch Diam.		
Hugger band without rods and lugs but	20	24
Angles riveted or welded to a coupling band	35	15
and drawn tight with bolts. Bands shall be a		
minimum of 7 corrugations wide and have a		
minimum lap of 2 inches.		
Flanged couplings for helical corrugated	25	12
pipe welded to the ends of the pipe and		
field assembled by a minimum of 3/8-inch		
Diam. bolts. A joint sealer shall be placed		
between the flanges to ensure water tightness.		
1/ Use is limited to sites where soft foundation a	and conduit elongation is no	t anticipated.

# 5. REPAIR OF DAMAGED COATINGS

The Contractor shall place the pipe without damaging the pipe or coatings. The pipe shall be transported and handled in a manner to prevent damage to the pipe or coating.

Breaks, scuffs, or other damage to the various coatings shall be repaired as follows:

- 1. Metallic Coating by thoroughly wire brushing the damaged area and cleaning with solvent, and then painting two coats of one of the following paints:
  - a. Zinc Dust Zinc Oxide Primer conforming to ASTM D 79 and D 520.
  - b. Single package, moisture cured urethane prime in silver metallic color.
  - c. Zinc-rich cold galvanized compound, brush, or aerosol applications.
- 2. Polymer Coating apply two coats of polymer material similar to and compatible with the durability, adhesion and appearance of the original polymer coating. The repair coating shall be a minimum thickness of 0.010 (10 mils) after drying and shall bond securely to the pipe.

# 6. LAYING AND BEDDING THE PIPE

The pipe shall be laid to the line and grade shown on the drawings and shall be firmly and uniformly bedded throughout its entire length. Details of the bedding are as shown on the drawings.

The pipe shall be laid with the outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides at approximately the vertical mid-height of the pipe. Field welding of corrugated galvanized steel pipe will not be permitted. The pipe sections shall be joined with coupling bands.

#### 7. BACKFILLING

Special care shall be taken during backfill operations not to disturb the grade and alignment.

The pipe shall be tied down or loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

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.



#### United States Department of Agriculture

### Construction Specification 000 IA-61 Loose Rock Riprap

# 1. SCOPE

The work shall consist of the construction of loose rock riprap revetments, structures and blankets, including filter layers or bedding where specified.

# 2. MATERIALS

Rock for loose rock riprap, filter layers or bedding shall come from sources approved by NRCS. The rock shall be excavated, selected and handled as necessary to meet the quality and grading requirements of this specification and the construction drawings.

Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments shall be angular to sub rounded in shape. The least dimension of an individual rock fragment shall not be less than 1/3 the greatest dimension of the fragment unless otherwise specified on the construction drawings.

# 3. SUBGRADE PREPARATION

The subgrade surfaces on which the riprap or bedding is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall be compacted to a density equal to the adjacent existing soil material.

Rock materials shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by NRCS.

# 4. EQUIPMENT-PLACED ROCK RIPRAP

Rock shall be placed by equipment on the surfaces and to the depths specified. The riprap shall be constructed to the full thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock shall be delivered and placed in a manner that will insure that the riprap in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact, one to another, with the smaller rocks and spalls filling the voids between the larger rocks. Placement of rock shall begin at the bottom of the slope or downstream end of the structure.

Riprap shall be placed in a manner to prevent damage to structures. Hand placing will be required to the extent necessary to prevent damage to adjacent structures.

# 5. HAND-PLACED RIPRAP

Rock shall be placed by hand on the surfaces and to the depths specified. It shall be securely bedded with the larger rocks firmly in contact, one to another. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on edge unless otherwise specified. Placement of rock shall begin at the bottom of the slope or downstream end of the structure.

# 6. FILTER LAYERS OR BEDDING

When the drawings specify filter layers or bedding beneath riprap, the filter or bedding material shall be spread uniformly on the prepared subgrade surfaces to the depth specified. Compaction of filter layers or bedding will not be required, but the surface of such layers shall be finished reasonably free of mounds, dips or windrows.



#### Construction Specification 000 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.



#### Construction Specification 000 IA-83 Timber Fabrication and Installation

### SCOPE

This specification covers the quality and installation of plywood and pressure treated structural timber poles, posts, and lumber structures and also timber and lumber portions of composite structures.

#### MATERIAL

Plywood shall be new and of exterior grade. Plywood for use underground shall be pressure treated.

Structural timber and lumber shall be structural grade or better. Structural timber poles and posts shall be sound, free of cracks, decay free, and straight. All lumber shall be treated in conformance with ASTM D 1760 by any of the following preservatives:

Creosote

Creosote – Coal Tar Solutions

Creosote – Petroleum Solutions Pentachlorophenol

Water-borne preservative (ACC, ACA, CCA)

Bolts, rods, nuts, washers, and other hardware shall be an appropriate grade of steel and shall be galvanized.

#### INSTALLATION

All framing shall be true and exact. Timber and lumber shall be accurately cut and assembled to a close fit and shall have even bearing over the entire contact surface. Holes for machine bolts shall be bored to the same diameter as that of the bolt.

Raw ends of lumber which have been cut after treatment shall be immersed in the preservative solution, or painted with four (4) heavy coats of the treatment solution. Each application should be allowed to dry before subsequent applications.



# **Conservation Cover**

Natural Resources Conservation Service Des Moines, Iowa

# Definition

Establishing and maintaining permanent vegetative cover.

# Purpose

This practice may be applied to accomplish one or more of the following:

- » Reduce soil erosion and sedimentation.
- » Improve water quality.
- » Improve air quality.
- » Enhance wildlife, pollinator, and beneficial organism habitat.
- » Improve soil quality.

# Condition Where Practice Applies

This practice applies on all lands needing permanent vegetative

cover. This practice does not apply to plantings for forage production or to critical area plantings.

# **Criteria for Conservation Cover**

# A. Seeding Periods

Permanent, perennial vegetative cover and/or shrubs will be established during the first recommended seeding or best planting period for the selected species or mixture. Planting dates are outlined on Table 1 of this job sheet.

# **B.** Fertilizer and Lime Requirements

Soil fertility and pH level will be amended on introduced species to satisfy the needs of the specific plant species planned. Soil samples will be collected on the area to be seeded according to the protocol in ISU CROP 3108 "Take a good soil sample to help make decisions." Samples will be tested at a state approved testing laboratory.

» <u>Introduced Species</u> - Recommendations will be based on pastureland, according to ISU Extension publication PM 869 "Fertilizing Pastures for Conservation Cover Establishment." Lime



recommendations will be developed from Table 16 of ISU PM 1688 "General Guide for Crop Nutrient Recommendations in Iowa." Soil tests that are less than four years old may be used to make recommendations.

Fertilizer or lime will not be used when establishing seeding in Hydrologic zones B, C, or D, including floodplain filter strips as outlined in Technical Note #27, Guidance on Seeding for Pothole, Floodplain, and Other Wetlands.

» <u>Native Species</u> - For native grass and forb establishment, no N, P, K, or lime is required.

# C. Companion Crop

» Introduced Species - Companion crops are required on tilled fields and where slopes are >5%. Companion crops will not be required in fields that are no-tilled into existing residue, if the residue is adequate to reduce soil erosion. A Companion crop of spring cereal grain at the rate of 1 bushel/acre will be drilled or broadcasted. See Table 4 in the 327 Job Sheet for a list of acceptable companion crops. The companion

# Iowa Job Sheet

lowa Conservation Practice 327 May 2017 crops shall be clipped 4-6 inches high at the time of seed head emergence to promote growth of the new permanent cover. The use of the companion crop is not required when interseeding, and is optional for all other seeding periods outside the spring seeding period.

 <u>Native Species</u> - Companion crops are required on tilled fields, and where slopes are >5%. Companion crops will not be required in fields that are no-tilled into existing residue, if the residue is adequate to reduce soil erosion. A companion crop of spring cereal grain at the rate of 1 bushel/acre will be drilled or broadcasted. See Table 4 in the 327 Job Sheet for a list of approved companion crops. The companion crop will be clipped 8 inches high at the time of seed head emergence to promote growth of the new permanent cover.

# D. Seedbed preparation and Seeding

- 1. Perennial vegetation must be killed prior to seeding.
- 2. Conventional seeding for spring, late summer, and dormant seeding periods where site conditions allow for safe operation of equipment.
  - » The seedbed shall be worked to a depth of 3", smooth, friable and firm before seeding. Native seedings will be rolled or cultipacked before and after seeding.
  - » All tillage operations shall be performed across the general slope of the land.
  - » Seeds shall be drilled uniformly over the area at a 1/8 - 1/4 inch depth depending on site conditions, or broadcast uniformly over the area and rolled/ harrowed into the seedbed. Native forbs will be seeded no deeper than 1/8-inch and must be rolled, not harrowed.
  - » Where erosion is a concern prepare a seedbed with tillage tool that will leave enough residue or mulch to provide adequate protection.
- 3. No-till seeding for spring, late summer and dormant seeding periods where site conditions allow for safe operation of equipment.
  - » Approved herbicides shall be applied to kill or suppress existing weed competition prior to planting, as necessary. Herbicides will not be used in grassed waterways or filter strips adjacent to wetlands or other waterbody, unless it is labeled for use adjacent to or over water.
  - » A drill designed for no-till planting shall be used to plant the seed at a depth of 1/8 - 1/4-inch

depending on site conditions. Native forbs will be seeded no deeper than 1/8-inch.

- 4. Dormant seeding is done after soil temperatures drop below what is needed for seeds to germinate in the fall (4-inch soil temperature is less than 50 degrees) and before frost is completely out in the spring. This generally occurs around Nov. 15.
  - » Seeding in cornstalks or sod can be done conventionally by preparing the seedbed with tillage, or no-tilled provided there is sufficient seed to soil contact.
  - » On tilled ground, soybean stubble, or corn fields that had residue (burned or removed), the seed may be broadcasted and rolled to provide seed to soil contact and prevent seed from blowing away from site. This shall be done when the top 1-2 inches are thawed to ensure good seed to soil contact.
- 5. Frost Seeding is done when the ground is frozen at night and thaws during the day. Seed is incorporated by the freezing and thawing. No additional incorporation is required.
  - » Species approved for frost seeding are shown in Table 2. Native species suitable for frost seeding are debeard or smooth coated species.
  - » Frost seeding is not recommended on corn stalks or high residue fields.
  - » Frost seeding cannot be done on ground with ice cover, crusted snow, or snow depth > 4 inches.

# E. Seeding Stand Improvement

This includes any stand modification that maintains some vegetative component of the original stand.

- 1. Incorporation of grasses, forbs and/or legumes with light tillage:
  - » When interseeding into existing sod, graze, burn, mow or apply herbicides to suppress existing vegetation and to control weed competition. Herbicides will not be used in grassed waterways or filter strips adjacent to wetlands or other waterbody, unless it is labeled for use adjacent to or over water.
  - » Use a disk, field cultivator, or similar tool to disturb 40-50% of the existing stand.
  - » Grasses, forbs and/or legumes shall be drilled uniformly over the area at 1/8 - 1/4-inch depth, or broadcast uniformly over the area and rolled into the seedbed. Native forbs will be seeded no deeper than 1/8-inch.

- » Harrow may be used to incorporate seed for introduced species only.
- » Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.
- 2. Incorporation of grasses and/or legumes with notillage (interseeding) for spring, late summer and dormant seeding periods:
  - » When interseeding into existing sod, graze, burn, mow or apply herbicides to suppress existing vegetation and to control weed competition. Herbicides will not be used in grassed waterways or filter strips adjacent to wetlands or other waterbody, unless it is labeled for use adjacent to or over water.
  - » Control weeds prior to seeding.
  - » Grasses, forbs and/or legumes shall be drilled uniformly over the area at 1/8 - 1/4-inch depth. Native forbs will be seeded no deeper than 1/8inch.
  - » Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.
- 3. Incorporation of grasses and/or legumes with frost seeding.
  - » When interseeding into existing sod, graze, burn, mow or apply herbicides to suppress existing vegetation and to control weed competition. Herbicides will not be used in grassed waterways or filter strips adjacent to wetlands or other waterbody, unless it is labeled for use adjacent to or over water.
  - » Broadcast species only approved for frost seeding as shown in Table 2. Small, smooth (shiny) seeded species are best for incorporation into the soil during freezing and thawing.
  - » Frost interseeding is only allowed if existing stand is weak and less than 50 percent of the ground is covered with perennial vegetation.

# F. Seed Quality

- 1. All seed shall be of high quality and comply with Iowa Seed and Weed Laws.
- 2. Cool season (introduced) grass and legume seeding rates are expressed in pounds/acre of Pure Live Seed (PLS) where PLS = (% germination + dormant seed) X % purity).
- 3. Native grass species seeding rates are expressed in PLS pounds/acre. Either the germination test or Tetrazolium (TZ) test is acceptable to determine PLS for native species.

# G. Approved Plant Species and Seeding Rates.

Plant species and cultivars shall be selected based upon the adaptation to site conditions, including moisture regime and landscape preference. See the Native Seeding Calculator.

# Introduced Species

The pure stand rates in table 2 of this Job Sheet are the minimum rates for planting a single species stand into well-prepared seedbed at the proper placement. The pure stand rates are decreased to a percentage of the desired stand when used to calculate a mixture of two or more species. Select combinations of plant species and cultivars best adapted to site conditions.

- » Approved introduced plant species, allowable mixture composition and the pure stand seeding rate are shown in Table 2.
- » A designed seeding mixture shall meet criteria specified in table 2 as to species composition and seeding rate.
- » For seedings used for erosion control, at least 50% of mixture shall be composed of grasses.
- » Tall Fescue shall not compose more than 10% of the mixture if the primary or secondary purpose is for wildlife.
- » Mixtures may include up to 20% native species. Use the criteria for the predominant species in the mixture for stand establishment.

# Native Species

The Iowa Native Seeding Calculator will be used to develop the Native Seeding mixture. Approved native species are determined by county location, longevity of stand, and moisture regime. They are presorted when using the calculator. The user must select moisture regime, seeding type (prairie, savanna, wetland) and longevity.

- » A designed seeding mixture shall meet criteria specified in the Iowa Native Seeding Calculator as to species composition and seeding rate. At least 25 percent by # of seeds/sq. ft. (10 seed/sq. ft.) of the mixture shall be composed of grasses. For wildlife mixtures not more than 4 seeds/sq. ft. of the total mixture will be composed of switchgrass and not more than 8 seeds/sq. ft. of Canada wild rye. Some programs may be more restrictive.
- » When developing seeding plans, except eastern gramma grass, use 40 seeds/sq. ft. for pure grass stands. Grass and forb mixtures use 10-30 seeds/ sq. ft. for the grass component and a minimum of 10-30 seeds/sq. ft. for the forb component. (The sum of the grass and forb mixtures total 40 total

seeds/sq. ft.) Seeding mixtures composed of 20 seeds/sq. ft. or less may only be used on 5 percent slopes or less, unless a nurse crop of 1 bu/ac is used, or on any land if the mix is no-tilled.

- » When using a grass/forb mixture, develop a mix of tall, medium and short species. This allows for more light penetration to promote the forb component.
- » For diverse prairie restorations and pollinator plantings with a minimum of 10 species or more, no more than 20% of the total mix can comprise of a single species of grass and 10% of the total mix can comprise of a single species of forb. No more than 33% of the stand can be comprised of early successional species. Early successional species is defined as a species with a Coefficient of Conservatism (CC) ≤ 3.
- » Mixtures may include up to 20 percent introduced forbs, of which no single introduced forb species may comprise more than 10 percent of the mix. The percentage is based on the total grass and forb mix. Use stand establishment and seeding criteria for native plants when including introduced forbs. Although introduced legumes are allowed in native mixtures, it is not recommended for prairie restoration efforts.
- » Annual and biannual forbs/legumes are to be limited to no more than 20% by # of seeds/sq. ft. of the forb/legume component, and no more than 20% of any one species of total mix.
- » For long-term prairie reconstruction, use local source identified seed. Refer to Technical Note 28, "Guidance for Seeding Natives on Prairie Reconstruction Sites."
- » When planting within one mile of an existing native prairie remnant, the native seeding will be a local ecotype or source identified (seed harvested from remnant sites). Refer to Technical Note 28, "Guidance for Seeding Natives on Prairie Reconstruction Sites."

Additional Criteria for Enhancing Wildlife Habitat

- » Grasses, forbs, shrubs, and/or legumes shall be planted in a diverse mix to promote biodiversity and meet the needs of the targeted species of wildlife.
- » Tall fescue shall not compose more than 10% (or 4 seeds/sq. ft.) of the mixture if the primary or secondary purpose is wildlife.
- » When developing seeding plans for wildlife, restoration or reconstruction of pothole,

floodplain, and other wetland ecosystems, consider the soils, moisture regimes, and topography of the site to develop seeding mixtures to meet the site characteristics. See Agronomy Technical Note 27, "Guidance on Seeding For Pothole, Floodplain, and other Wetlands."

- » Any mowing after seeding establishment, except for noxious weed control will be done outside primary nesting season, May 15 to Aug. 1, to protect nesting wildlife.
- » Annual mowing of an entire field is not permitted.
- » For pollinator and monarch habitat, refer to appropriate Job Sheet or habitat guide.

#### H. Management during the Establishment Year

Weed control during the establishment year shall be provided to ensure survival of the new permanent seeding.

- 1. To manage weed competition, native species may be mowed no closer than 8 inches and introduced species no closer than 4 inches. Mow to allow for sunlight to get down to young seedlings and reduce the amount of thatch from covering the stand. Mowing should start before vegetation reaches a height of 18 inches, and continue about every two weeks throughout the first growing season. Mow at least once in the second season. Additional mowing beyond that will be based on the amount of weed pressure.
- 2. Approved herbicides may be used on both cool and native plantings to control weed species.
- 3. When establishing forbs with warm season grasses, the cover will be suppressed by mowing, grazing, chemicals or burning in the second season to avoid grasses or weeds from shading out the forbs.

# I. Establishment of Temporary Cover

Temporary cover may be required to reduce potential weed and erosion problems where one of the following conditions exists:

- 1. Fields with herbicide carry over.
- 2. Where planting is delayed due to unavailability of seed.
- 3. The normal planting period has passed.
- 4. Delayed planting to ensure previous perennial vegetation is terminated.

The temporary cover shall be seeded as specified in Table 3.

### Table 1. Seeding dates for introduced and native species

Type of Seeding	Introduced Species <sup>2</sup> (Grasses and Legumes)	Native Species <sup>3</sup>
Spring	March 1 - May 15	April 1 - July 1
Late Summer	August 1 - September 15	Not Recommended
Dormant <sup>1</sup>	November 15 - March 1	November 15 - March 31
Frost⁴	February 1 - March 15	February 1 - March 31

1 Only if seed can be incorporated by drilling or cultipacking to ensure seed to soil contact can be obtained and reduce predation. 2 Includes all species generally considered introduced.

3 Includes all warm and cool season natives planted in mixture.

4 Refer to Table 2 for applicable Introduced plant species. Native species suitable are debeard or smooth coated.

"Seeding cannot be done on ground with ice cover, crusted snow, or snow depth greater than 4 inches."

#### Table 2. Seeding chart for introduced plant species

	% of Mixture (R	ange Allowed)	
Plant Species	Grassland <sup>2</sup> & Wildlife	Trees and Shrubs	Seeding Rate PLS/acre
Grasses			
Kentucky bluegrass	0-100	0-10	5
Orchardgrass	0-50	0-100	8
Smooth bromegrass	0-100	0	10
Tall fescue <sup>1</sup>	0-25	0	8
Timothy <sup>1</sup>	0-50	0-100	4
Red top <sup>1</sup>	0-50	0-100	3
Intermediate wheatgrass	0-25	0	10
Perennial rye <sup>1</sup>	0-25	0-50	10
Legumes			
Alfalfa <sup>1</sup>	0-100	0-50	10
Alsike clover <sup>1</sup>	0-50	0-50	4
Kura clover <sup>1</sup>	0-50	0-50	8
White clover <sup>1</sup>	0-50	0-50	3
Red clover <sup>1</sup>	0-50	0-50	8

1 Species suitable for frost seeding.

2 Mixtures may include 20% native grasses. See the Iowa Native Seeding Calculator for seeding rates. Use the criteria for the predominate species in the mixture for establishment.

# Table 3. Temporary Seeding Recommendations

Fields with atrazine <sup>1</sup> carryover, lack suitable seed or la	ate planting date	
Sudangrass	20 lbs./acre	
Sorghum-Sudangrass hybrid	20 lbs./acre	
Corn	2 bushels/acre	
Fields where planting is delayed, due to lack of suitable seed or late planting date		
Fields where planting is delayed, due to lack of suitab	ble seed or late planting date	
<b>Fields where planting is delayed, due to lack of suitab</b> Oats	<b>ble seed or late planting date</b> 3 bushels/acre	
Fields where planting is delayed, due to lack of suitable Oats Winter rye	ble seed or late planting date 3 bushels/acre 2 bushels/acre	

1 For other carryover problems, check with the area office.

# Table 4. Companion Crop Recommendations

Spring Grain	
Oats	1 bushel/acre
Spring Wheat	1 bushel/acre
Spring Barley	1 bushel/acre

# **Critical Area Planting**

# Natural Resources Conservation Service Des Moines, Iowa

# Iowa Job Sheet

Iowa Conservation Practice 342 June 2017

# Definition

Establishing permanent vegetation on sites that have or are expected to have high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

# Purpose

- » Stabilize areas with existing or expected high rates of soil erosion by water and wind.
- » Stabilize areas, such as sand dunes and other riparian areas.
- » Stabilize stream and channel banks, ponds and other shorelines, and earthen features of structural conservation practices.

# **Condition Where Practice Applies**

This practice applies to highly disturbed areas, such as: active or abandoned mined lands; urban restoration sites; construction areas; conservation practice construction sites; eroded banks of natural and constructed channels and lake shorelines; areas needing stabilization before or after natural disasters, such as floods, hurricanes, tornadoes and wildfires; and other areas degraded by human activities or natural events.

# **Criteria for Conservation Cover**

# A. Seeding Periods

Permanent, perennial vegetative cover and/or trees will be established during the first recommended seeding or planting period for the selected species or mixture. Planting dates are outlined on Table 1 of this job sheet. Planting immediately after construction of earthen structures such as terraces, grade stabilization, or ponds may be completed at the discretion of the Conservation Planner with Job Approval Authority.

# **B.** Fertilizer and Lime Requirements

Soil fertility and pH level will be amended to satisfy the needs of the specific plant species planned. Recommendations for establishment will be determined by an approved testing laboratory from soil samples collected in the area to be seeded. Fertilizer requirements



may be waived at the discretion of the Conservation Planner with Job Approval Authority on a site where:

- » application equipment cannot access the site (i.e. steep sides of terraces, grade stabilization, ponds).
- » field practices, such as waterways and terraces, when soil tests for adjacent cropland is at optimum or higher.

# C. Companion Crop

All critical area plantings will contain a companion crop of spring cereal rye or will be mulched. Mulching is recommended on slopes steeper than 4:1 where mowing of a companion crop may be difficult or dangerous. Mulch of small grain straw shall be used at the rate of 2 tons/ac.

For spring seedings of introduced species, oats or a spring cereal grain shall be seeded at a rate of 1 1/2 bushels/acre to reduce soil erosion and help control weed competition. The oats shall be clipped at the time of seed head emergence to promote growth of the new permanent cover. The use of the companion crop is not required when interseeding.

# D. Seedbed preparation and Seeding

1. Conventional seeding for spring and late summer

# Critical Area Planting (342)

seeding periods where site conditions allow for safe operation of equipment.

- » The seedbed shall be worked to a depth of 3", smooth, friable and firm before seeding.
- » All tillage operations shall be performed across the general slope of the land.
- » Grass and legume seed shall be drilled uniformly over the area at a 1/4-1/2 inch depth, or broadcast uniformly over the area and rolled into the seedbed.
- » Where erosion is a concern prepare a seedbed with tillage tool that will leave enough residue or provide mulch to provide adequate protection.
- 2. No-till seeding for spring, late summer and dormant seeding periods where site conditions allow for safe operation of equipment.
  - » Approved herbicides shall be applied to kill or suppress existing weed competition, as necessary. Herbicides will not be used in waterways or filter strips adjacent to wetlands or other waterbody.
  - » A drill designed for no-till planting shall be used to plant the seed at a depth of 1/4 - 1/2 inch.
- 3. Frost Seeding
  - » Broadcast seed for only those species approved for frost seeding as shown in table 2 and table 3.
- 4. Hydro-seeding

Hydro-seeding can be used on all sites but especially on sites that are too steep for regular seeding equipment to operate. The prescribed procedure will be to apply the seed and fertilizer in a water slurry uniformly over the surface. A second trip will be needed to apply an asphalt emulsion to long fiber mulch as it is blown on.

# 5. Sodding

All sod used shall be free of noxious weeds as listed in Iowa State Laws and shall be cut from stands giving not less than 90 percent ground cover.

Only moist, fresh sod shall be used. Lay sod as soon as possible after delivery to the site. Wet soil to a depth of 2 inches or more prior to laying the sod. Lay the sod from the lower end of the slope. Sod strips shall be laid at right angles to the flow of water; stagger joints. Fill any open joints with loose soil. Tamp or roll laid sod to insure a solid contact of root mass to soil surface.

On severely steep sites or when anticipating overland flow, sod shall be held in place by woven wire, wooden pegs, wire staples, or similar material. Pegs or staples will be a minimum of 10 inches long.

#### E. Seeding Stand Improvement

This includes any stand modification that maintains some vegetative component of the original stand.

- 1. Incorporation of grasses and/or legumes with light tillage.
  - » Weaken the existing stand in the fall or early winter by use of herbicides, grazing, mowing or a combination of these methods.
  - » Use a disk, cultivator, or similar tool to disturb 40- 50% of the existing stand.
  - » Grass and legumes shall be drilled uniformly over the area at 1/4-1/2 inch depth, or broadcast uniformly over the area and rolled into the seedbed.
  - » Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.
- 2. Incorporation of grasses and/or legumes with notillage (interseeding) for spring, late summer and dormant seeding periods.
  - » When interseeding into existing sod, graze, burn, mow or apply herbicides to kill strips or suppress existing vegetation and to control weed competition. Herbicides will not be used in waterways or filter strips adjacent to wetlands or other waterbody.
  - » Control broadleaf weeds by applying herbicide at least two weeks prior to applying contact herbicides and prior to seeding.
  - » Grass and legumes shall be drilled uniformly over the area at 1/4-1/2 inch depth.
  - » Remove early spring regrowth by mowing to reduce competition and allow the new seedlings to become established.
- 3. Incorporation of grasses and/or legumes with frost seeding.
  - » Broadcast seed only species approved for frost seeding as shown in table 2 and table 3. Small smooth (shiny) seeded species are best for incorporation into the soil during freezing and thawing.
  - » Frost seeding is likely to be more successful if existing stand is weak and less than 50 percent of the ground is covered with live vegetation.

# F. Inoculation

- 1. Legume seed shall be inoculated and the inoculant shall be specific to the legume seeded.
- 2. When more than one legume species is used, each species shall be inoculated separately.

# G. Seed Quality

- 1. All seed shall be of high quality and comply with Iowa Seed and Weed Laws.
- 2. Cool season (introduced) grass and legume seeding rates are expressed in bulk pounds/acre. Seed quality shall not drop below 80% Pure Live Seed (PLS) where PLS = (% germination + dormant seed) X % purity).
- 3. Native grass species seeding rates are expressed in PLS pounds/acre.

# H. Management during the Establishment Year

Plant species and cultivars shall be selected based upon:

- 1. Climatic conditions such as annual rainfall, seasonal rainfall, growing season length, humidity levels, temperature extremes and the USDA Plant Hardiness Zones.
- 2. Soil condition and position attributes such as pH, percent slope, available water holding capacity, aspect, drainage class, inherent fertility, flooding and ponding, and levels of salinity and alkalinity.
- 3. Plant characteristics such as season of growth, vigor, ease of establishment, longevity of the species, growth habit, adaptation to soil conditions, and conservation value.
- 4. Resistance to diseases and insects common to the site or location.
- 5. Compatibility with other plant species and their selected cultivars in rate of establishment and growth habit when seeded together as a mixture.
- 6. Seeding Rates

The pure stand rates in table 2 of this standard are the minimum rates for planting a single species stand into well-prepared seedbed at the proper placement. The pure stand rates are decreased to a percentage of the desired stand when used to calculate a mixture of two or more species. Select combinations of plant species and cultivars best adapted to site conditions.

7. When frost seeding is used, the seeding rate shown in table 2 and table 3 shall be multiplied by 1.5.

- » Approved introduced plant species, allowable mixture composition and the pure stand seeding rate are shown in Table 2.
- » A designed seeding mixture shall meet criteria specified in table 2 as to species composition and seeding rate.
- » For critical area seeding used for erosion control, at least 50% of mixture shall be composed of grasses.
- » Tall Fescue shall not compose more than 10% of the mixture if the secondary purpose is for wildlife.
- » Mixtures may include up to 20% native grasses. Use the criteria for the predominant species in the mixture for stand establishment.
- 9. Native Species
  - » Approved native plant species, allowable mixture composition and a pure stand seeding rate are shown in Table 3.
  - » A designed seeding mixture shall meet criteria specified in table 3 as to species composition and seeding rate. At least 50% of the mixture shall be composed of grasses. For seeding mixtures with the secondary purpose of wildlife not more than 20% of the mixture will be composed of switchgrass.
  - » When developing seeding mixtures, except eastern gamma grass, use 60 seeds/sq. ft. for grass stands.
  - » Mixtures may include up to 20% introduced legumes. Use the criteria for the predominant species in the mixture for stand establishment.

# I. Weed Control During the Establishment Year

Weed control during the establishment year shall be provided to ensure survival of the new permanent seeding.

- 1. To manage severe weed competition, native species may be mowed no closer than 8 inches and introduced species no closer than 4 inches.
- 2. Approved herbicides may be used on both introduced and native plantings to control weed species.

# J. Establishment of Temporary Cover

Temporary cover may be required to reduce potential weed and erosion problems where one of the following conditions exists.

- 1. Fields with herbicide carry over.
- 2. Where planting is delayed due to unavailability of

8. Introduced Species

seed.

3. The normal planting period has passed.

Temporary cover or mulching will be established on sites where construction delays or shutdowns occur if the delay or shutdown will last more than 30 days.

4. The temporary cover shall be seeded as specified in Table 4.

# K. Site Protection and Access Control

Grazing animal access to planted areas will be controlled for a minimum of two growing seasons during the establishment period.

All areas to be grazed will have a grazing plan that meets the criteria in the Iowa Field Office Technical Guide.

Grazing shall be permanently excluded on high hazard areas, such as cut banks, areas of seepage, or other potentially unstable areas.

# L. Re-vegetate Degraded Sites that Cannot Be Stabilized Through Normal Farming Practices

If gullies or deep rills are present, they will be filled and leveled as necessary to allow equipment operation and ensure proper site and seedbed preparation.

Based on a soil test and other appropriate site evaluations, soil amendments will be added as necessary to ameliorate or eliminate physical or chemical conditions that inhibit plant establishment and growth.

# Table 1. Seeding dates for introduced and native species

Type of Seeding	Introduced Species <sup>2</sup> (Grasses and Legumes)	Native Species <sup>3</sup>
Spring	March 1 - May 15	April 1 - July 1
Late Summer	August 1 - September 15	Not Recommended
Dormant <sup>1</sup>	November 15 - Freeze	November 15 - Freeze
Frost <sup>1</sup>	February 1 - March 15	February 1 - March 15

1. Refer to Table 2 and 3 for applicable plant species.

2. Includes all species generally considered introduced.

3. Includes all warm and cool season natives planted in mixture.

# Table 2. Seeding chart for introduced plant species

	% of Mixture (F	ange Allowed)	
Plant Species	Critical Areas Grassland <sup>3/</sup>	Trees, Shrubs & Wildlife	Seeding Rate PLS/acre
Smooth bromegrass <sup>1</sup>	0-100	0-25	25
Kentucky bluegrass <sup>1</sup>	0-80	0-10	25
Orchardgrass <sup>2</sup>	0-25	0-100	10
Timothy <sup>2</sup>	0-25	0-100	10
Alfalfa <sup>2</sup>	0-50	0-50	20
Red clover <sup>2</sup>	0-50	0-50	16
Birdsfoot trefoil <sup>2</sup>	0-50	0-25	16

	% of Mixture (F	Range Allowed)	
Plant Species	Critical Areas Grassland <sup>3/</sup>	Trees, Shrubs & Wildlife	Seeding Rate PLS/acre
Reed Canarygrass⁵	0-25	0	16
Perennial rye	0-50	0-50	25
Ladino clover <sup>2</sup>	0-50	0-50	8
Red top	0-50	0-80	10
Alsike clover <sup>2</sup>	0-50	0-50	8
Tall Fescue <sup>1</sup>	0-50	0-10	16
Sweetclover <sup>2,4</sup>	0-20	0-20	10

Table 2. Seeding chart for introduced plant species cont...

1. For critical area seeding used for erosion control, at least 50% from the grassland or wildlife seeding mixture shall be composed of sod forming grasses. (Tall Fescue should not consist of more than 10% of the mix if primary or secondary purpose is for wildlife.)

- 2. Species suitable for frost seeding, increase seeding rate by a factor of 1.5.
- 3. Mixtures may include up to 20% native grasses. See Table 3 for seeding rates. Use the criteria for the predominate species in the mixture for establishment. 4 Sweet clover is to be used in mixtures only.
- 4. Sweet clover is to be used in mixtures only.
- 5. Reed Canary grass is to be used only for very wet sites with high nutrient load anywhere it Reed Canary grass is already present downstream of the practice.

#### Table 3. Seeding chart for native plant species

Grasses <sup>1</sup>	% of Mixture (Range Allowed)	Pure Stand Seeding Rate PLS lbs./acre	Seeds/ sq. ft.	Seeds/ Ib.
Big bluestem, Andropogon gerardi	0-100	16	60	165,000
Blue grama, Bouteleloua gracilis	0-20	4	75	825,000
Buffalograss, Buchloe dactyloides	0-20	65	60	40,000
Canada wildrye, Elymus canadensis	0-20	22	61	121,000
Eastern gamagrass, Tripsacum dactyloides	0-100	20	4	7,500
Indiangrass, Sorghastrum nutans	0-100	15	60	175,000
Little bluestem, Schizachyrium scoparium	0-20	11	60	240,000
Sideoats gramma, Bouteloua curtipendula	0-20	14	61	191,000
Switchgrass, Panicum virgatum <sup>2</sup>	0-100	7	62	389,000
Virgina Wildrye, Elymus virginicus	0-20	27	60	96,000
Western wheatgrass, Agropyroni smithi	0-20	24	61	110,000

1. When developing seed mixtures, except eastern gamagrass, use 60 seeds/sq. ft. for grass stands. Grass and forb/legume mixtures are 40 seeds/sq. ft. for the grass component and minimum of 20 seeds/sq. ft. for forb/legume component.

2. Species suitable for frost seeding, multiply seeding rate by factor of 1.5.

# Table 4. Temporary Seeding Recommendations

Fields with atrazine <sup>1</sup> carryover, lack of suitable seed o	r late planting date	
Sudangrass	20 lbs./acre	
Sorghum-Sudangrass hybrid	20 lbs./acre	
Corn	2 bushels/acre	
Fields where planting is delayed, due to lack of suitable seeding or late planting date		
Fields where planting is delayed, due to lack of suitak	ble seeding or late planting date	
<b>Fields where planting is delayed, due to lack of suitab</b> Oats	ole seeding or late planting date 3 bushels/acre	
Fields where planting is delayed, due to lack of suitable Oats Winter rye	le seeding or late planting date 3 bushels/acre 2 bushels/acre	

1. For other herbicide carryover problems, check with the area office.

# Table 5. Critical Area Seedbed Mixtures for Specific Site Conditions

Site Conditions	Seeding Mixture	Rate lbs./acre
	Alfalfa Red clover Smooth bromegrass	3 2 15
Moderately to well drained, limed or non-acid, fertile soils	Alfalfa Timothy Smooth bromegrass Or Orchardgrass	6 2 15 Or 8
Imperfectly drained soils	Red clover Ladino clover Orchardgrass	4 1 8
	Birdsfoot trefoil Smooth bromegrass Timothy	5 12 3
	Big bluestem Switchgrass	14 2
Poorly drained soils	Birdsfoot trefoil Timothy Or Orchardgrass	4 8 Or 12
	Alsike clover Ladino clover Tall fescue Or Timothy	2 3 8 Or 5

Table 5. Critical Area Seedbed Mixtures for Specific Site Conditions cont...

Site Conditions	Seeding Mixture	Rate lbs./acre
Very wet sites with high nutrient loading (i.e. animal waste filter strips)	Reed canary grass	16
	Tall fescue	16
	Switchgrass	7
Medium acid to strongly acid (6.0-5.1) with well drained to poorly drained soil that has a high clay content	Birdsfoot trefoil Tall fescue Bromegrass	7 5 8
Medium to strongly acid (pH 6.0-5.1) shallow (20 in.) with poorly drained soils with low fertility and low level management	Birdsfoot trefoil Tall Fescue Red top Switchgrass	4 4 3 2
Deep or coarse sands, droughty, usually acid (pH 6.0)	Sand lovegrass Switchgrass Prairie sandreed grass	2 5 4
Reclaimed acid mine spoil (pH 4.0)	Birdsfoot trefoil Red clover Crown vetch Tall fescue	4 4 4 4
Reclaimed acid mine spoil, deep coarse sands, droughty, low fertility (pH 4.0)	Switchgrass Big bluestem Indiangrass Little bluestem	2 4 4 3
Alkalina mina spail (pH 7.4)	Bromegrass Alfalfa	12 10
	Bromegrass Timothy	14 5



#### Construction Specification 000 IA-31 Concrete

# 1. SCOPE

The work shall consist of furnishing, forming, placing, finishing, and curing Portland cement concrete including steel reinforcement.

### 2. MATERIALS

Portland Cement shall conform to ASTM C 150 and shall be Type I or Type II.

Fine Aggregates shall conform to ASTM C 33 and shall be composed of clean, uncoated grains of material.

Coarse Aggregates shall be gravel or crushed stone conforming to ASTM C 33 and shall be clean, hard, durable and free from clay or coating of any character. The maximum size of coarse aggregate shall be 1 1/2 inches or as shown on the drawings.

Water shall be clean and free from injurious amounts of oil, acid, salt, alkali, organic matter, or other deleterious substances.

Air entraining agent shall conform to ASTM C 260.

Fly ash may be used as a partial substitution for Portland cement and shall be in strict compliance with ASTM C 618, Class F or C. The loss by ignition shall not exceed 4.0 percent.

Blast-furnace slag may be used as a partial substitution for Portland cement and shall be in conformance with ASTM C 989 for ground granulated blast-furnace slag (GGBF slag).

Water-reducing admixtures shall conform to ASTM C 494 and may be the following types:

- 1. Type A Water-reducing admixture
- 2. Type D Water-reducing and retarding admixture
- 3. Type F Water-reducing, high range admixture (superplasticizer).
- 4. Type G water-reducing, high range, and retarding admixture (superplasticizer).

Type D or G admixture may be used when the air temperature is over 80 degrees F. at the time of mixing and/or placement.

Calcium Chloride or other antifreeze compounds or accelerators will not be allowed.

Preformed expansion joint filler shall be a commercially available product made of bituminous, sponge rubber or closed cell foam materials with a minimum thickness of 1/2 inch.

Reinforcing steel shall be free from loose rust, oil, grease, paint, or other deleterious matter. Reinforcing steel shall conform to one or more of the following:

- 1. Reinforcing Bars ASTM A 615 or A 996 , Grade 40 or greater, deformed.
- 2. Welded Wire Fabric ASTM A 185 or A 497.

Waterstops shall be either metallic or nonmetallic. Metallic waterstops shall be fabricated from sheets of copper or galvanized steel. Nonmetallic waterstops shall be made of natural or synthetic rubber or vinyl chloride polymer or copolymer. Rubber, polymer and copolymer waterstops shall have ribbed or bulb-type anchor flanges and a hollow tubular center bulb, unless otherwise shown on the drawings. All waterstops shall be of the sizes shown on the drawings.

Curing compound shall be a liquid membrane-forming compound suitable for spraying on the concrete surface. The curing compound shall meet the requirements of ASTM C 309 Type 2 (white pigmented).

#### 3. CONCRETE DESIGN MIX

The contractor will be responsible for the determining the design mix proportions in accordance with the requirements included in this paragraph and shall provide a copy of the mix to the NRCS Engineer at

least 3 days prior to placing any concrete. The concrete mix shall be of such proportions as to provide a minimum strength of 3500 p.s.i. in 28 days, unless otherwise shown on the drawings. The air content shall be 4 to 8 percent of the volume of the concrete at the time of placement. The slump shall be 2 to 5 inches except when superplasticizer is used. The slump shall be 3 inches or less prior to the addition of superplasticizer admixture and shall not exceed 7 1/2 inches following addition and mixing. The fine aggregate shall be 30-50 percent of the total combined aggregate based on oven dry weights. The contractor shall provide tests to verify that the design mix meets the requirements. In lieu of this, one of the following mix proportions per cubic yard may be used:

	Minimum Cement,		GGBF	Maximum ** Water,
<u>Mix Number</u>	Pounds	Fly Ash, <u>Pounds</u>	Slag, <u>Pounds</u>	Gallons
1	564	0	0	33
2	470	45-90	0	31-34
3	517	129	0	31 *
4	366	114	91	31 *
5	259	103	155	31 *

\*\* Total of available aggregate moisture, mixing water added at the plant and mixing water added at the job site (one gallon equals 8.33 pounds).

\* Requires water reducing admixture.

# 4. MIXTURES AND MIXING

Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C 94. Concrete shall be uniform and thoroughly mixed when delivered to the forms. No mixing water in excess of the amount shown for the design mix or in an amount that would cause the maximum slump to be exceeded shall be added to the concrete during mixing, hauling or after arrival at the point of delivery. The concrete shall be batched and mixed so that the temperature of the concrete at the time of placing shall be between 50 and 90 degrees F.

# 5. BATCH TICKET

The contractor shall obtain from the supplier a delivery ticket for each batch of concrete before unloading at the site. The following information shall be included on the ticket: name of concrete supplier, job name or location, date, truck number, amount of concrete, time loaded or time of first mixing cement, aggregate, and mixing water added at the plant, type and amount of cement, type and amount of admixtures, oven dry weights of fine and coarse aggregate, and moisture content(%) or weight of water contained in the aggregates.

The following information shall be added to the batch ticket on site: mixing water added on site, time concrete arrived on site and time concrete was unloaded.

Upon completion of the concrete placement, copies of all batch tickets shall be provided to NRCS.

#### 6. REINFORCING STEEL

Before reinforcement is placed, the surfaces of the bars or mesh shall be cleaned to remove any loose, flaky rust, mill scale, oil, grease, or other foreign substances. After placement, the reinforcement shall be maintained in a clean condition until it is completely embedded in the concrete.

Reinforcing bars shall be cut and bent according to ACI Standard 315.

Tack welding of bars shall not be permitted. Reinforcement shall be accurately placed as shown on the drawings and secured in position in a manner that will prevent its displacement during placement of concrete. Metal chairs, metal hangers, metal spacers or concrete chairs shall be used to support reinforcement. Precast concrete chairs shall be manufactured from concrete equal in quality to the concrete being placed. Precast concrete chairs shall be moist at the time concrete is placed

Splices of reinforcing bars shall be made only at the locations shown on the drawings, unless other wise approved by the NRCS Engineer. All reinforcing splices and placement shall be in accordance with ACI 318 and shown on the drawings.

After placement of the reinforcement, concrete shall not be placed until the reinforcement has been inspected and approved by NRCS.

# 7. PREPARATION OF FORMS AND SUBGRADE

Prior to placement of concrete, the forms and subgrade shall be free of woodchips, sawdust, debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings. Any oil on the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed. All surfaces shall be firm and damp prior to placing concrete. Placement of concrete on mud, dried earth, uncompacted fill, or frozen subgrade will not be permitted.

The forms and associated false-work shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and elevations. Forms will be mortar tight. Forms with torn surfaces, worn edges, dents or other defects will not be used. Forms shall be coated with a nonstaining form release agent before being set into place. Excess form coating material shall not stand in puddles in the forms or come in contact with the steel reinforcement or hardened concrete against which fresh concrete is to be placed.

Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be of a commercially manufactured type. Non fabricated wire shall not be used. Form ties shall be constructed so that the ends or end fasteners can be removed without causing spalling at the surface of the concrete.

Metal form ties used within the forms on structures with a total volume of concrete exceeding fifteen cubic yards shall be equipped with cones or other devices that permit their removal to a depth of at least one inch without damage to the concrete. The holes resulting from cones and other devices shall be patched in accordance with Section 9.

Form ties except those specifically covered by the preceding paragraph shall be broken off flush with the formed surface. Any surface areas which have been spalled or otherwise damaged shall be repaired in accordance with Section 9.

Steel tying and form construction adjacent to new concrete shall not be started until concrete has cured at least 12 hours.

Concrete joints shall be of the type and at the locations shown on the drawings.

Splices in metal waterstops shall be brazed, welded or overlapped and bolted. Splices in nonmetallic waterstops shall be cemented or joined as recommended by the manufacturer.

# 8. PLACING CONCRETE

Concrete shall not be placed until the subgrade, forms, and steel reinforcement have been inspected and approved by the NRCS Inspector. Any deficiencies are to be corrected before the concrete is delivered for placement.

Concrete shall be delivered to the site and discharged into the forms within 1 1/2 hours after the introduction of the cement to the aggregates. When a superplasticizer is used, the concrete shall be discharged within the manufacturer's recommended time limit for discharge after addition of the admixture. In hot weather or under conditions contributing to quick setup of the concrete, discharge of the concrete shall be accomplished in 45 minutes unless a set-retarding admixture is used, in which case the manufacturer's recommended time limit will apply.

Addition of water at the job site may be done at the beginning of placement of each load of concrete in order to obtain allowable slump, provided that the maximum water content and water/cement ratio in the design mix is not exceeded. Addition of water will not be permitted after placement of the load has started.

The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into corners and around reinforcement and other embedded items in a manner which prevents segregation. Formed concrete shall be deposited in layers 24 inches or less in depth and shall be continuously deposited so that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of "cold joints". Concrete containing superplasticizer shall be placed in lifts not exceeding 5 feet in depth. If the surface layer of concrete sets during placement to the degree that it will not flow and merge with the succeeding layer when tamped or vibrated, the contractor shall discontinue placing concrete and install a construction joint. Construction joints shall be completed as shown on the drawings or by one of the following methods:

- 1. The joint shall be constructed using a 6 inch wide by 1/4 inch steel plate. The surfaces of the construction joint shall be prepared by washing and scrubbing with a wire brush or wire broom to expose coarse aggregate. The steel plate shall be embedded 3" in the concrete.
- 2. The joint surface shall be cleaned to expose coarse aggregate by sandblasting or air-water cutting after the concrete has gained sufficient strength to prevent displacement of the coarse aggregate or cement fines. The surface of the concrete shall not be cut so deep as to undercut the coarse aggregate. The joint shall be washed to remove all loose material after cutting.

The surfaces of all construction joints shall be kept continuously moist for at least 1 hour prior to placement of the new concrete. The new concrete shall be placed directly on the cleaned and washed surface. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

Concrete shall not be dropped more than 5 feet vertically unless suitable equipment is used to prevent segregation. Concrete containing superplasticizer shall not be dropped more than 12 feet vertically.

Immediately after the concrete is placed in the forms, it shall be consolidated by vibration, spading or hand tamping as necessary to insure smooth surfaces and dense concrete. Care should be taken not to over-vibrate concrete containing superplasticizer. Vibration shall not be supplied directly to the reinforcing steel, the forms or concrete which has hardened to the degree that it does not insure a monolithic bond with the preceding layer, The use of vibrators to transport concrete in the forms or conveying equipment will not be permitted.

# 9. FORM REMOVAL AND FINISHING

Forms shall be left in place for at least 24 hours after placing concrete. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit concrete to take the stresses due to its own weight uniformly and gradually.

Immediately after removal of the forms, concrete which is honey combed, damaged or otherwise defective shall be repaired or replaced. All cavities or depressions resulting from form tie removal shall be patched with a non-shrink grout, mortar mix or epoxy-type sealer. Non-shrink grout consists of 1 part cement and 2-1/2 parts sand that will pass a No. 16 sieve. Only enough water shall be added to produce a filling which is at the point of becoming rubbery when the material is solidly packed.

All repaired and patched areas shall be cured as required in Section 10.

#### **10. CURING**

Concrete shall be cured for a period of not less than 7 consecutive days by one of the following approved methods:

1. Membrane Curing: Concrete shall be cured with white pigmented curing compound. The compound shall be sprayed on moist concrete as soon as free water has disappeared, but shall not be applied to any surface until patching, repairs and finishing of that surface are completed. Curing compound shall not be applied to surfaces requiring bond to subsequently placed concrete, such as construction joints, shear plates, reinforcing steel, and other embedded items. Surfaces subjected to heavy rainfall or running water within 3 hours after curing compound has been applied or surfaces damaged by subsequent construction operations during the curing period, shall be reapplied in the same manner as the original application.

- 2. Moist Curing: Concrete shall be cured by maintaining all surfaces continuously wet for the entire curing period.
- 3. Cover: Adequately cover an exposed structure with burlap mats, or other material and continually soak with water.

# 11. BACKFILLING

Backfilling may begin when the curing period has ended. Backfill against the structure will be placed in no more than 4-inch layers and compacted by hand tamping or with manually directed power tampers or plate vibrators. Layers compacted in this manner shall extend not less than 2 feet from any part of the concrete structure.

# **12. HOT AND COLD WEATHER CONCRETING**

When the atmospheric temperature may be expected to drop below 400 F. at the time concrete is delivered to the work site , during placement, or at any time during curing period, concrete shall be mixed, placed and protected in accordance with ACI Standard 306, "Recommended Practice for Cold Weather Concreting."

When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 900 F. at the time of delivery to the work site, during placement or during the first 24 hours after placement, concrete shall be mixed, placed and protected in accordance with ACI Standard 305, "Recommended Practice for Hot Weather Concreting."