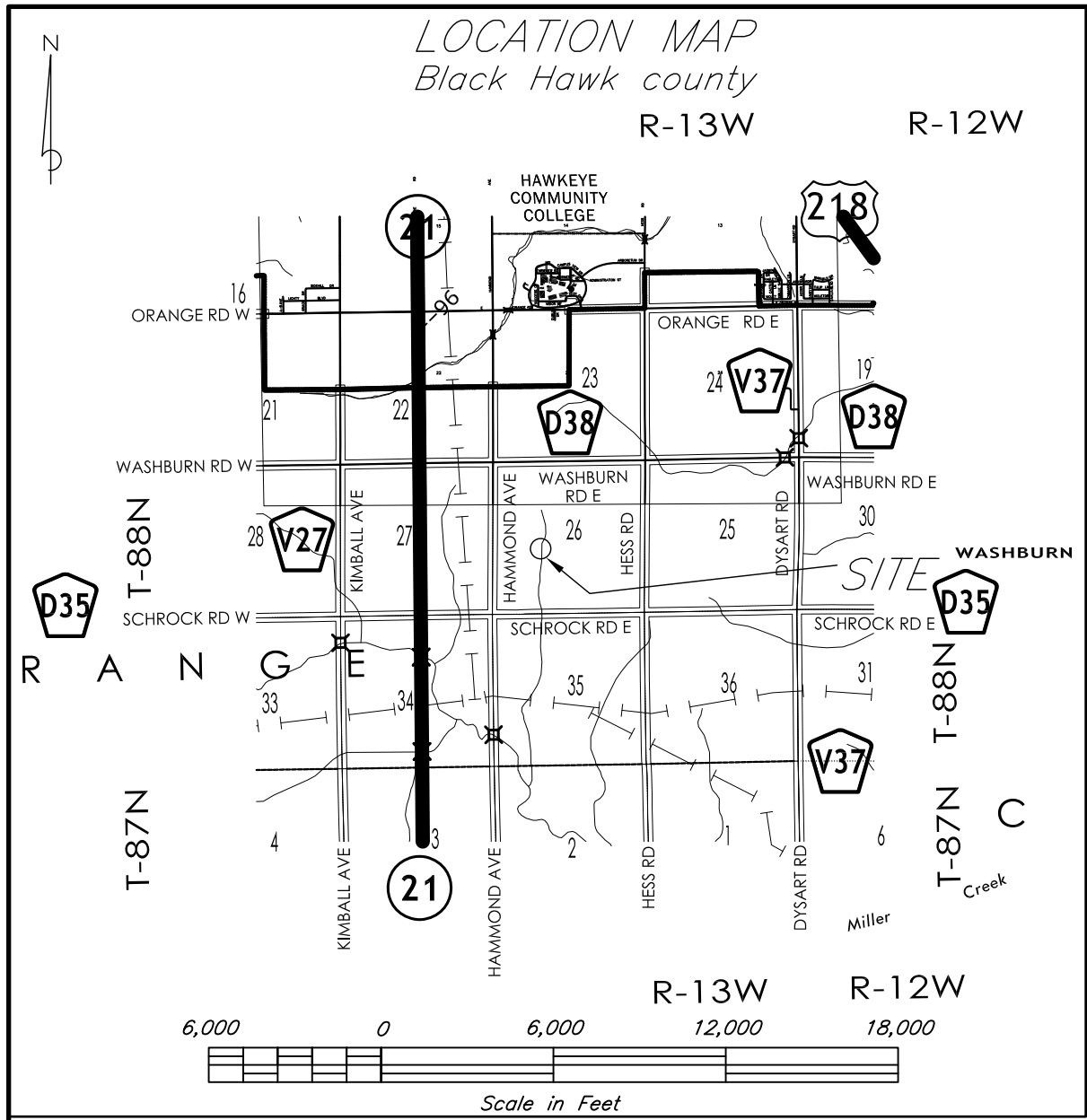
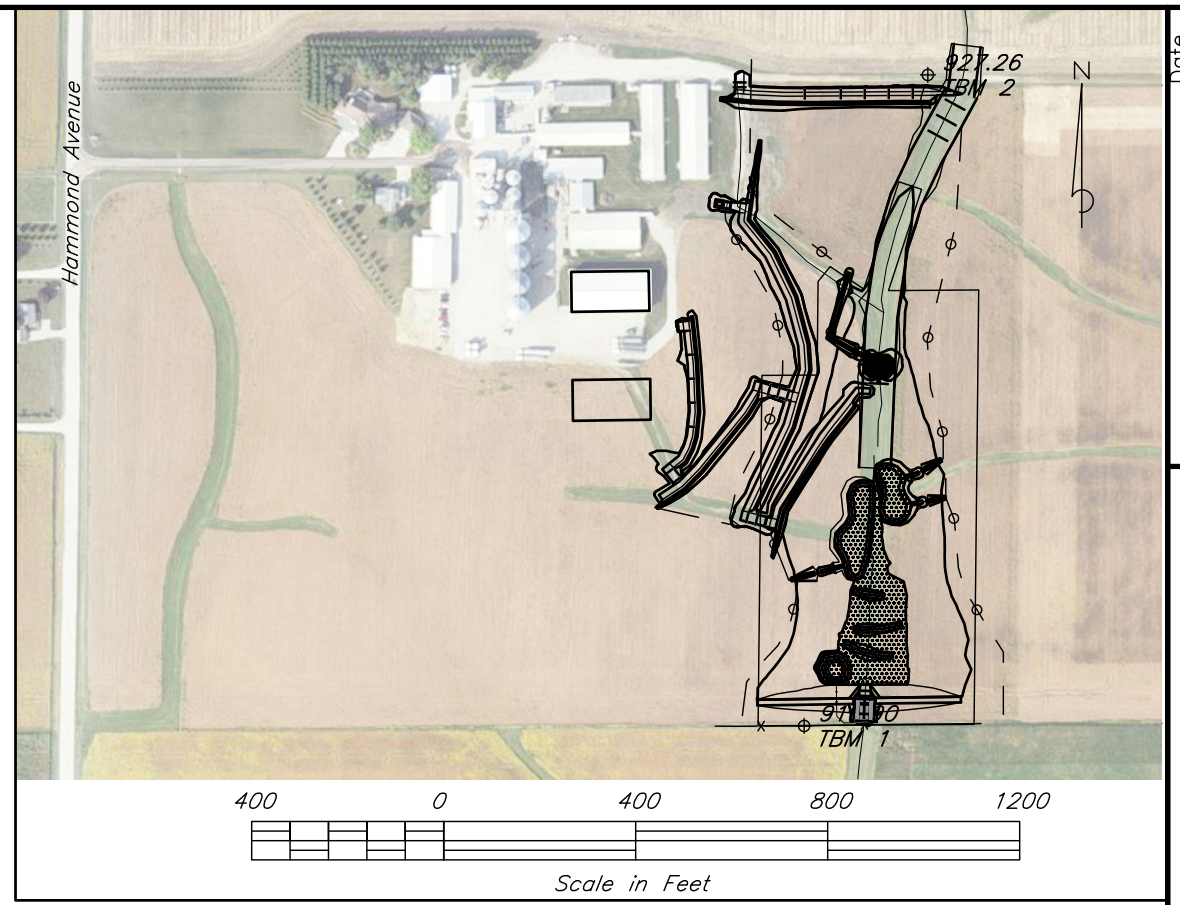
LOCATION MAP
Black Hawk county





BENCH MARK		
NO.	ELEV.	DESCRIPTION
TBM 1	916.90	Top of steel rerod with yellow 'NRCS survey' cap located by south property line fence 123' west of ℄ main channel and south of planned dike.
TBM 2	927.26	Top of steel rerod with yellow 'NRCS survey' cap located on north side of field drive 400 feet east of farmstead and west of MAIN waterway.

ENGINEERING JOB CLASS III

If a cultural resource is identified during construction, stop immediately and notify the local Natural Resources Conservation Service office.

Contractor is required to follow Iowa One Call law.
IowaOneCall.com or Call 811
Ticket # _____

Construction Specifications

IA–5	Pollution Control
IA–6	Seeding and Mulching
IA–9	Subsurface Drain Investigation, Removal, and Repair
IA–21	Excavation
IA–23	Earthfill
IA–45	Plastic (PVC, PE) Pipe
IA–46	Tile Drains for Land Drainage
IA–61	Loose Rock Riprap
IA–95	Geotextile
IA–412	Grassed Waterway

PLAN CONTENTS

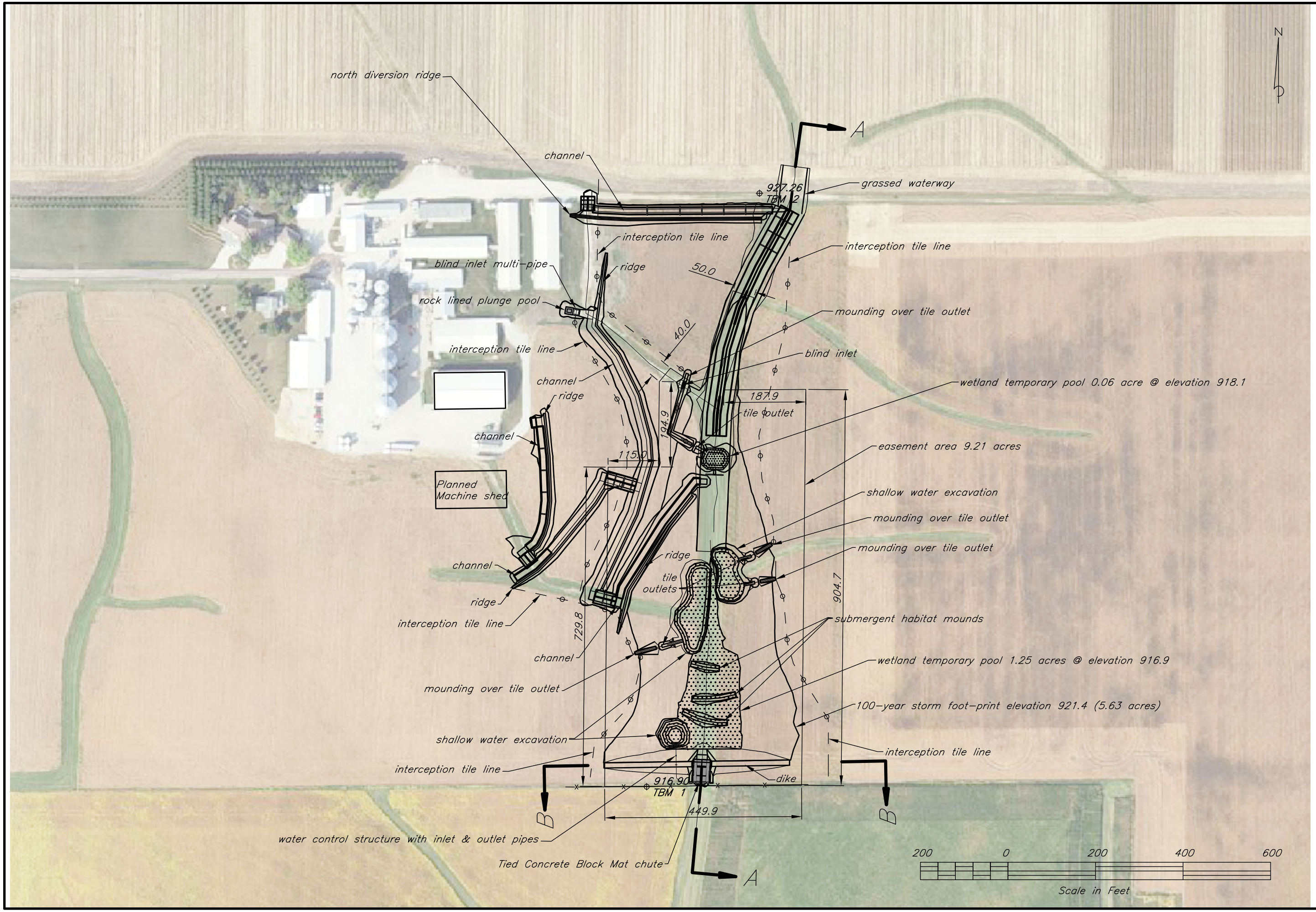
Date
Designed Jeff A. Lutz 7/2022
Drawn Jeff A. Lutz 10/2022
Checked . .
Approved . .

Thunderbridge Farms LLC t8452
Dike, Wetland for treatment day–lighted tile
PLAN VIEW & LOCATION MAP
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK HAWK.dwg
Drawing No. .

Sheet 1 of .



Designed Jeff A. Lutz 9/2022
Drawn Jeff A. Lutz 9/2022
Checked . .
Approved . .

Thunderbridge Farms LLC t8452
DIKE WETLAND WATERWAYS STRUCTURE

SITE PLAN

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK HAWK.dwg

Drawing No. .

Sheet 2 of .

easement boundary

5" HDPE non-perforated plastic tubing Interception Line

submergent Habitat Mound 1 north

6:1

1.0

6:1

temporary pool elev. 916.9

submergent Habitat Mound 3 south

submergent Habitat Mound 2 middle

1.0

water control structure

C

shallow water excavation bottom elev. 913.2

1.0

6:1

6:1

6:1

inlet

1.0

6:1

flat section elevation 917.9

5" HDPE perforated plastic tubing Interception Line

N

10:1

40.0

24.0

6:1

6:1

dike top elevation 921.4

1.0

20.0

50.0

anti-seep collar

3:1

3:1

3:1

15.0

22.0

50.6

13.6

36.0 outlet

12" PVC schedule 40 pipe

6.0

916.90 TBM 1

30.0

Tied Concrete Block Mat chute outlet elevation 912.4

Rock Riprap filled trench 3' wide x 3' depth' x 36' length

449.9

C

40 0 40 80 120

Scale in Feet

Designed Jeff A. Lutz 9/2022

Drawn Jeff A. Lutz 9/2022

Checked .

Approved .

Thunderbridge Farms LLC t8452

DIKE WETLAND GRADE STABILIZATION STRUCTURE

Detailed PLAN VIEW Dike & lower portion of site

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

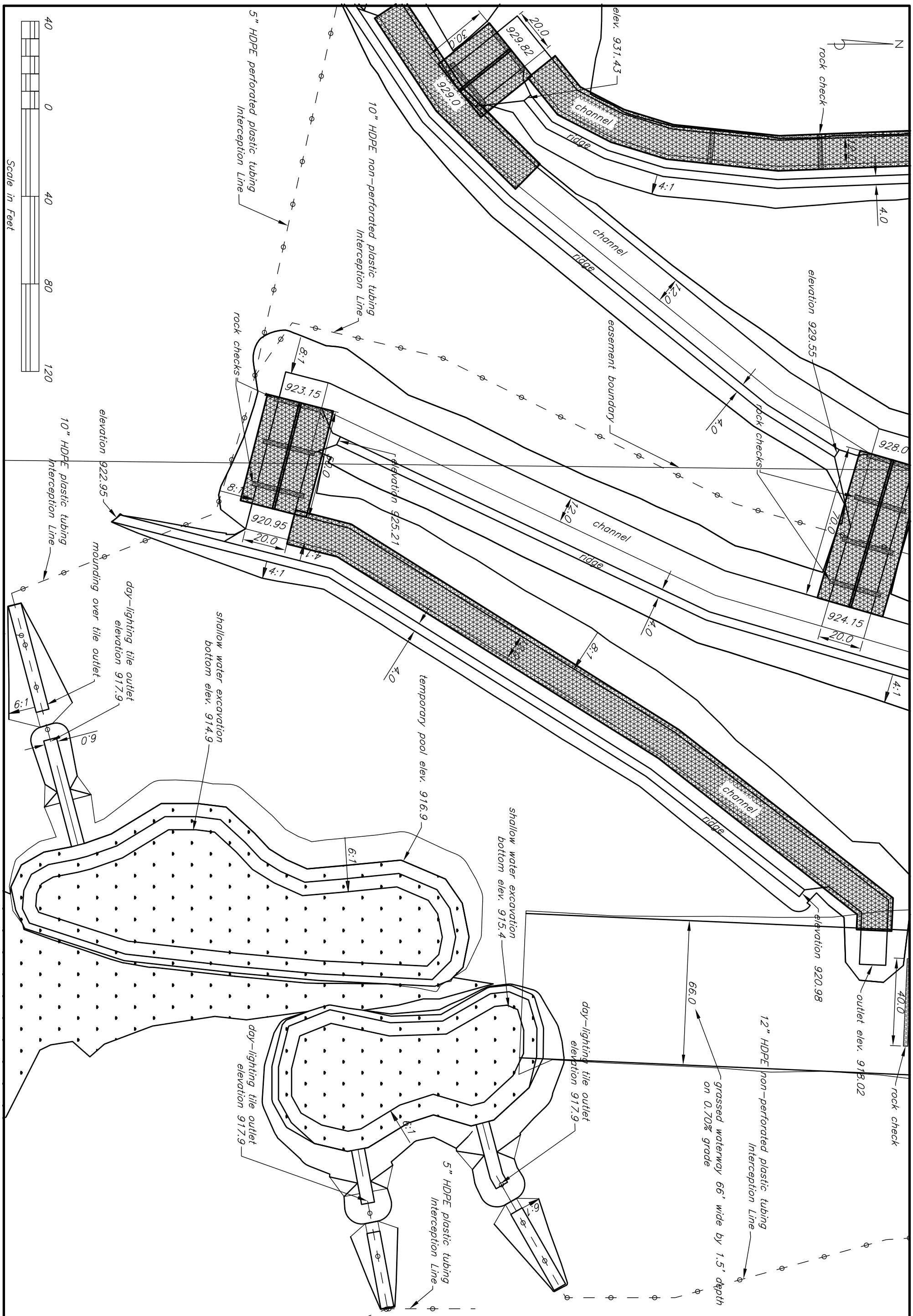
United States Department of Agriculture

Natural Resources Conservation Service

File No. Blake Hollis t10992 ww

Drawing No. BLACK HAWK.dwg

Sheet 3 of .



United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww
Drawing No. BLACK

Thunderbridge Farms LLC t8452
DIKE WETLAND WATERWAYS DIVERSIONS

Detailed PLAN VIEW SWEs & FS ww meandered

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

		Date
Designed	Jeff A. Lutz	9/2022
Drawn	Jeff A. Lutz	9/2022
Checked	.	.
Approved	.	.

Sheet 4 of .

N

40 0 40 80 120

Scale in Feet

plunge pool

blind inlet multi-pipe

15.0

924.97

20.0

8:1

4:1

4:1

5" HDPE perforated plastic tubing Interception Line

8" HDPE non-perforated plastic tubing Interception Line

top elevation 922.9

blind inlet

12.0

18.0

6:1

mounding over tile outlet

grassed waterway 68' wide by 1.6' depth on 1.10% grade

68.0

12" HDPE non-perforated plastic tubing Interception Line

grassed waterway 66' wide by 1.5' depth on 0.70% grade

10" HDPE perforated plastic tubing Interception Line

channel

ridge

4.0

12.0

elevation 935.7

12.0

24.0

20.0

934.2

rock check

4:1

8:1

4.0

16.0

12.0

channel

ridge

easement boundary

70.0

20.0

928.0

elevation 929.55

rock check

924.15

6.0

6:1

top elevation 922.5

day-lighting tile outlet elevation 919.0

temporary pool elev. 918.1

shallow water excavation bottom elev. 916.4

rock check

40.0

8:1

outlet elev. 918.02

		Date
Designed	Jeff A. Lutz	9/2022
Drawn	Jeff A. Lutz	9/2022
Checked	.	.
Approved	.	.

Thunderbridge Farms LLC t8452

DIKE WETLAND WATERWAYS DIVERSIONS

Detailed PLAN VIEW SWEs & FS ww meandered

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture

Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK HAWK.dwg

Drawing No. .

Sheet 5 of .

N

40 0 40 80 120

Scale in Feet

grassed waterway 56' wide by 1.3' depth on 0.80% grade

927.26 TBM 2

18.0

elevation 932.66

10.0

12:1

rock check

75.0

50.0

8.0

56.0

D

D

elevation 931.02

FLAT

channel

1.9

2.2

924.7

elev. 933.3

2.7

ridge

3:1

6.1

6.0

rock checks

elevation 926.97

rock check

37.0

4" HDPE perforated plastic tubing Interception Line

grassed waterway 68' x 1.3' on 2.00% grade

easement boundary

12" HDPE non-perforated plastic tubing Interception Line

17.5

4:1

16.0

925.0

15.0

924.97

1:8

8:1

1:4

8.0

15.0

plunge pool

blind inlet multi-pipe

5" HDPE perforated plastic tubing Interception Line

grassed waterway 68' wide by 1.6' depth on 1.10% grade

1:4

4:1

ridge

8:1

channel

12.0

4.0

8" HDPE non-perforated plastic tubing Interception Line

grassed waterway 66' wide by 1.5' depth on 0.70% grade

10" HDPE perforated plastic tubing Interception Line

Date

Designed Jeff A. Lutz 9/2022

Drawn Jeff A. Lutz 9/2022

Checked .

Approved .

Thunderbridge Farms LLC t8452

DIKE WETLAND WATERWAYS DIVERSIONS

Detailed PLAN VIEW Grassed ww & north diversion

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture

Natural Resources Conservation Service

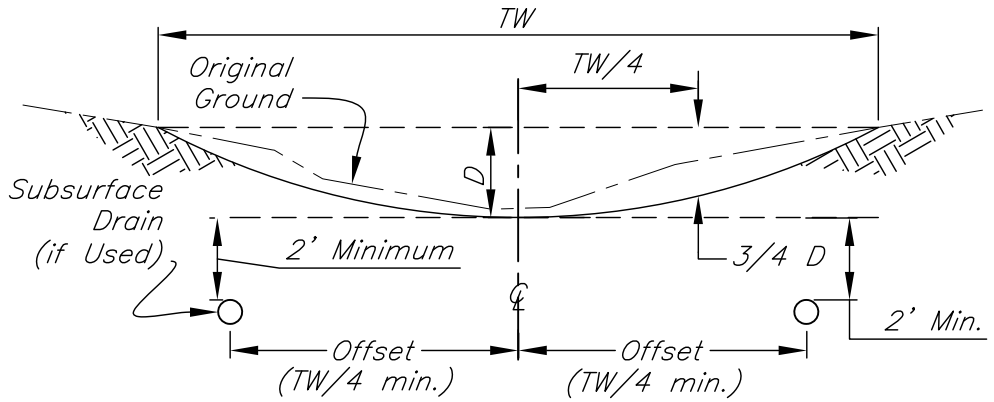
File No. Blake Hollis t10992 ww BLACK HAWK.dwg

Drawing No. .

Sheet 6 of .

DESIGN DATA

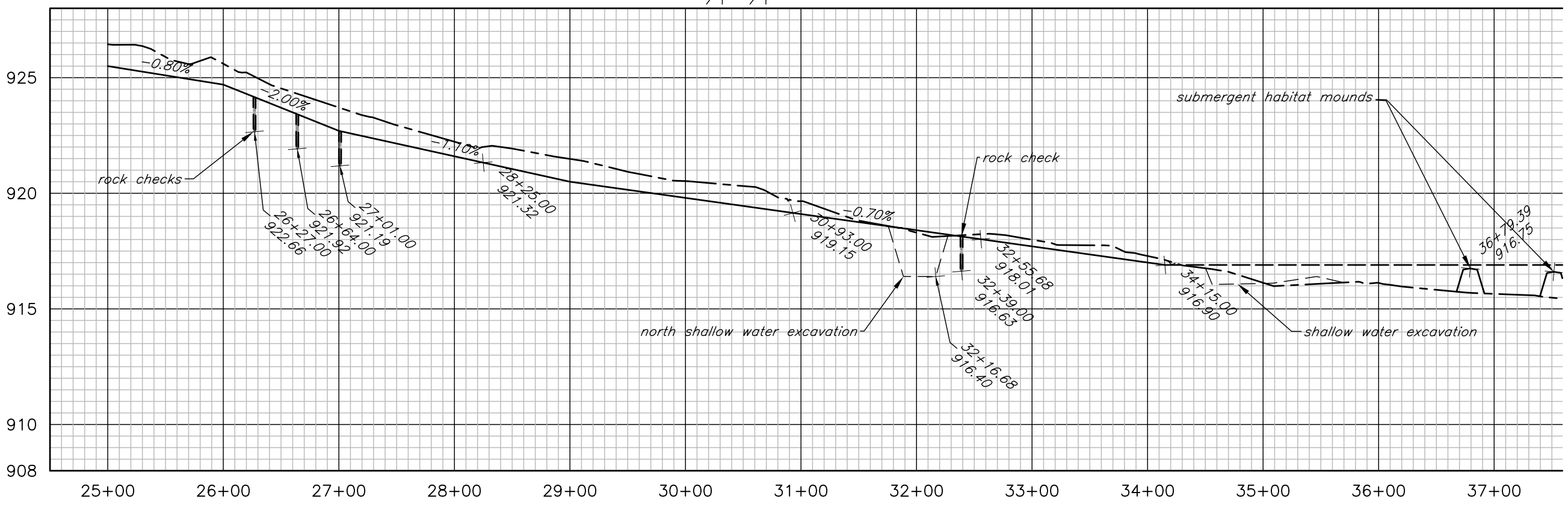
WW ID	Centerline Data		Cut or Fill at ℄ from		Reach Length	Grade	Design Top Width (TW)	Design Depth (D)	¼ Top Width (TW/4)	¾ Depth (¾D)
	Station	Design Elev.	C/F	feet	feet	%	feet	feet	feet	feet
MAIN	34+15	916.9			515'	0.70	66	1.5	16.5'	1.1'
MAIN	29+00	920.5			200'	1.10	68	1.6	17'	1.2
MAIN	27+00	922.7			100'	2.00	68'	1.3'	17'	1.0'
MAIN	26+00	924.7			100'	0.80	56'	1.3'	14'	1.0'
MAIN	25+00	925.5								



TYPICAL PARABOLIC CROSS SECTION

Notes:

A—A



MAIN waterway PROFILE

Thunderbridge Farms LLC t8452
GRASSED WATERWAY & DIKE WETLAND
PROFILE MAIN CHANNEL
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

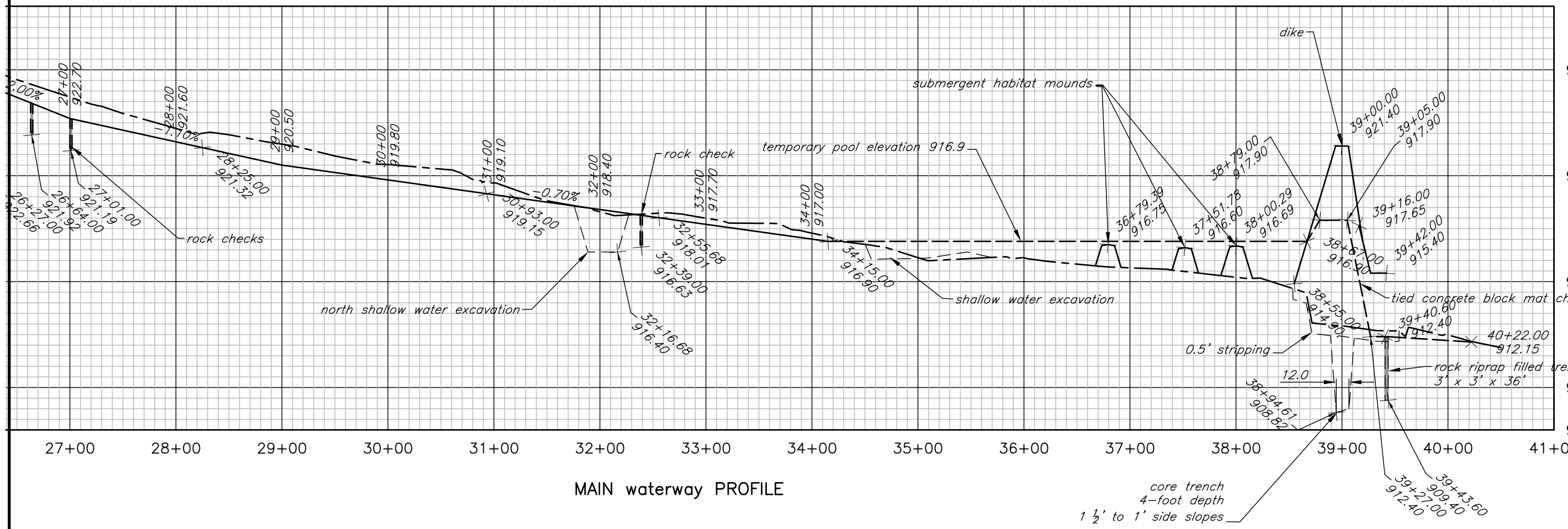
		Date
Designed	Jeff A. Lutz	9/2022
Drawn	Jeff A. Lutz	9/2022
Checked	.	.
Approved	.	.

United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK
Drawing No. WWMAIN.dwg

Sheet 7 of .

A–A



MAIN waterway PROFILE

		Date
Designed	Jeff A. Lutz	9/2022
Drawn	Jeff A. Lutz	9/2022
Checked	.	.
Approved	.	.

Thunderbridge Farms LLC t8452

DIKE WETLAND & GRADE STAB STRUCTURE

PROFILE MAIN CHANNEL

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

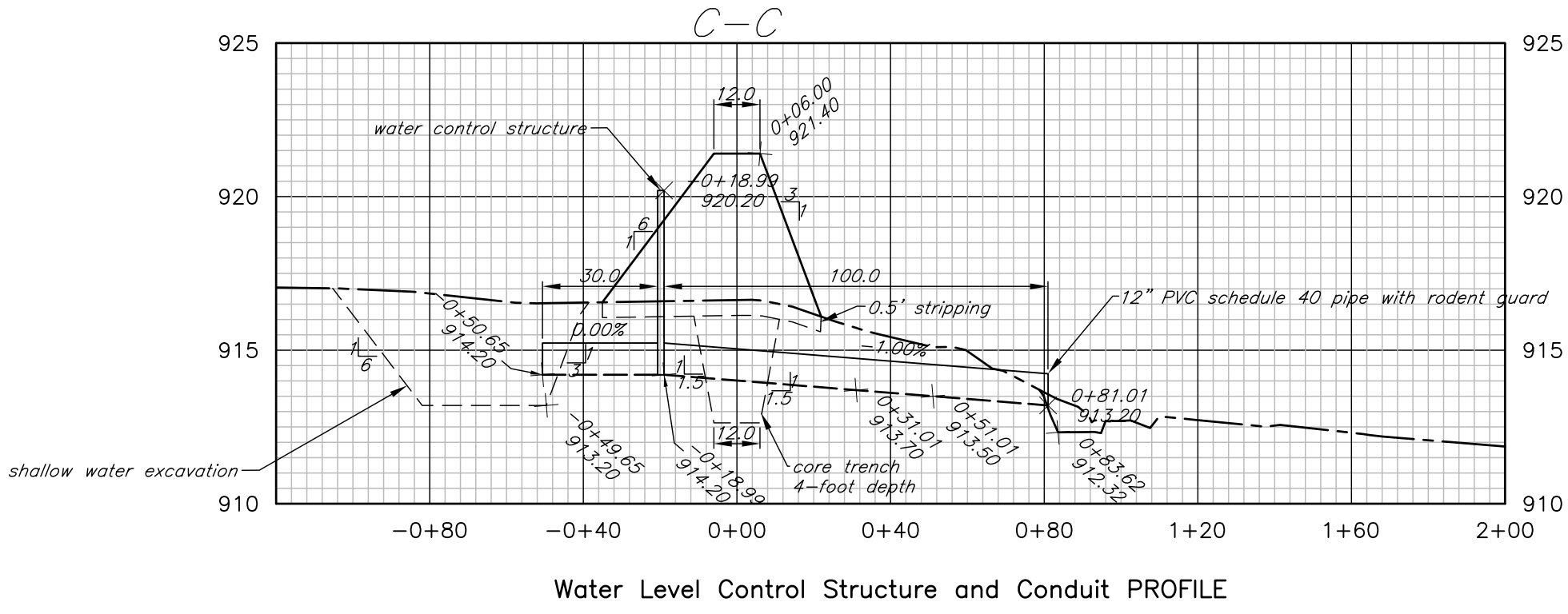
United States Department of Agriculture

Natural Resources Conservation Service

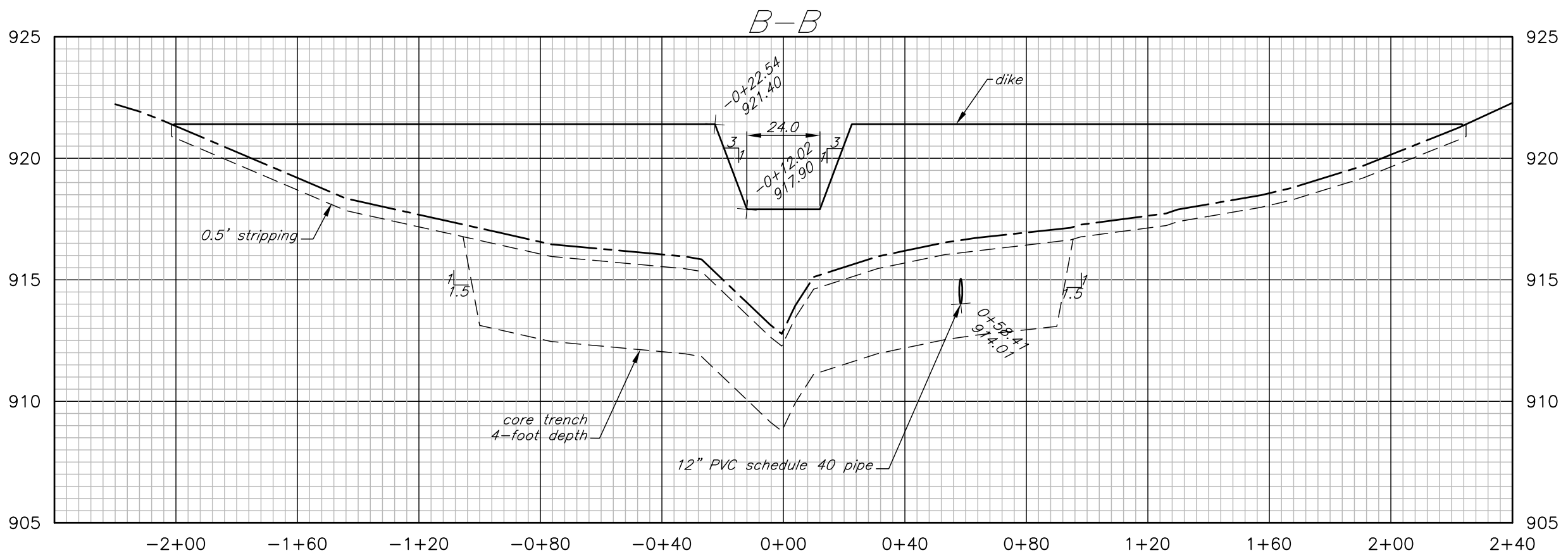
File No. Blake Hollis t10992 ww BLACK HAWK.dwg

Drawing No. .

Sheet 8 of .



Water Level Control Structure and Conduit PROFILE



Section Centerline Dike PROFILE

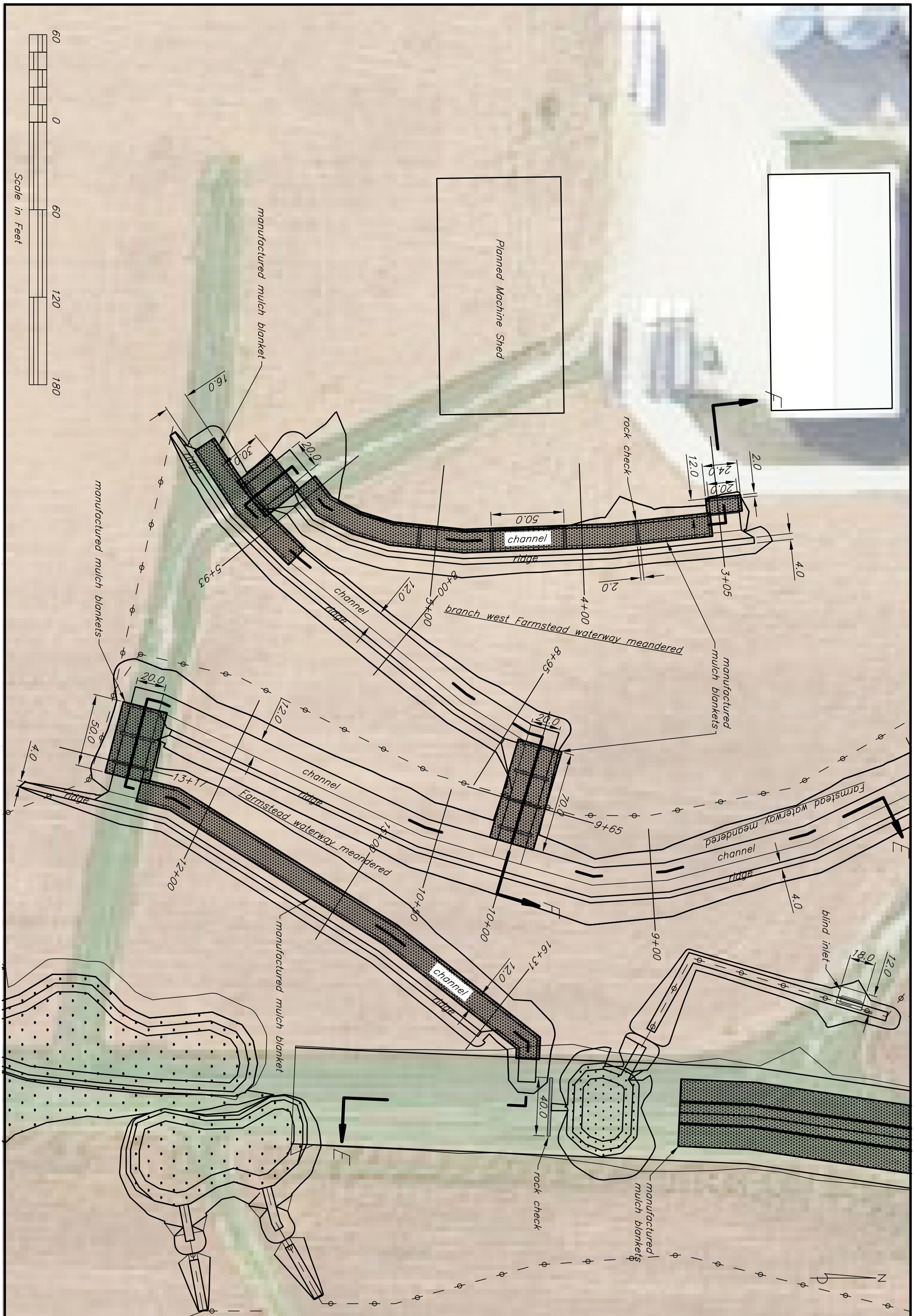
Thunderbridge Farms LLC t8452
DIKE WETLAND WATERWAYS DIVERSIONS
PROFILE WCS & Section ℄ Dike
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

		Date
Designed	Jeff A. Lutz	9/2022
Drawn	Jeff A. Lutz	9/2022
Checked	.	.
Approved	.	.

United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK HAWK.dwg
Drawing No. .

Sheet 9 of .



Sheet 10 of .

File No. Blake Hollis t10992 ww
Drawing No. BLACK
Tracing No.

United States Department of Agriculture
Natural Resources Conservation Service

Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland
PLAN VIEW Farmstead meandered waterways

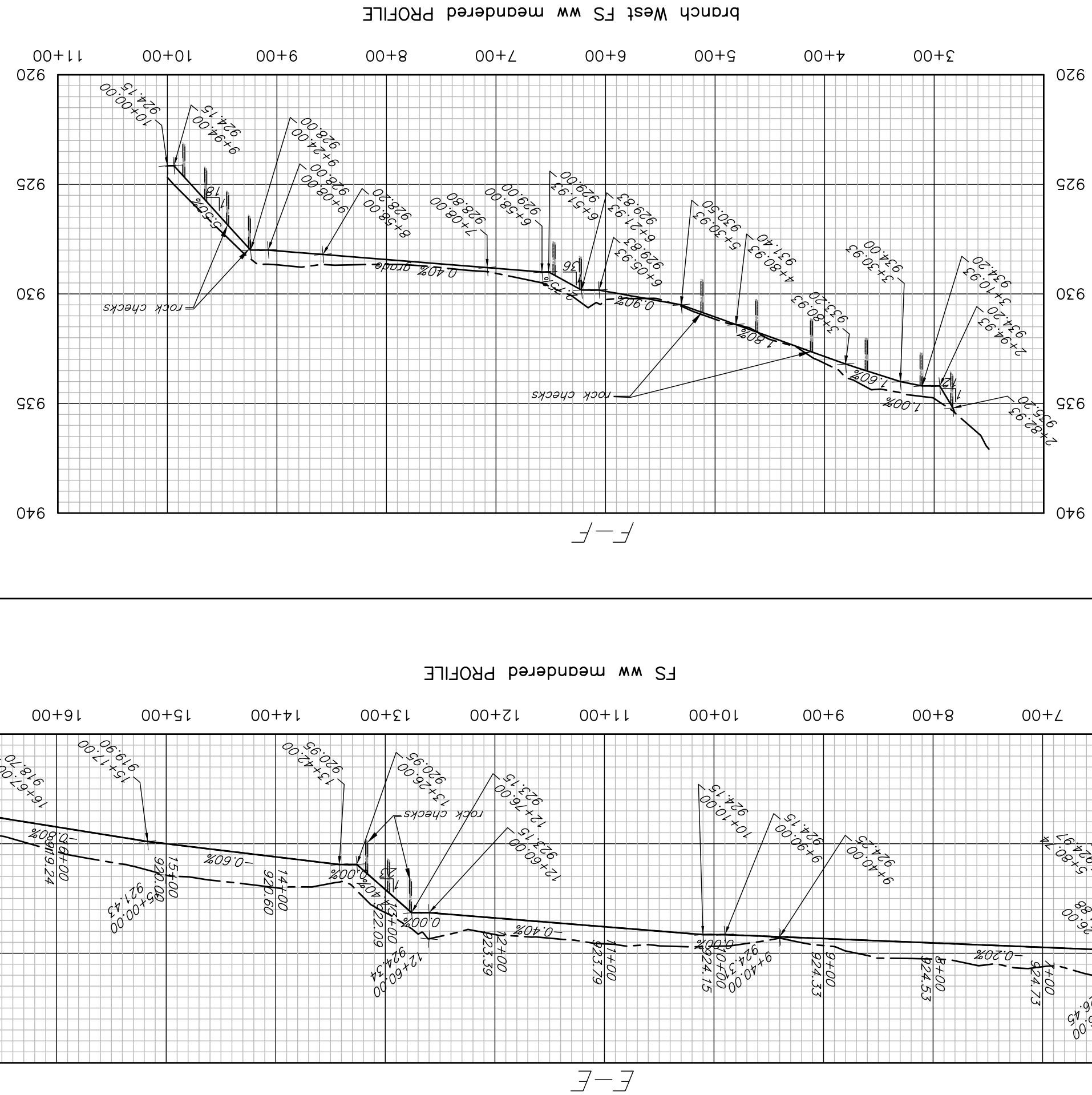
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

		Date
Designed	Jeff A. Lutz	9/2022
Drawn	Jeff A. Lutz	9/2022
Checked	.	.
Approved	.	.

Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland

PROFILE Farmstead waterways meandered

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA



Designed	Jeff A. Lutz	Date 9/2022
Drawn	Jeff A. Lutz	9/2022
Checked	.	.
Approved	.	.

Natural Resources Conservation Service

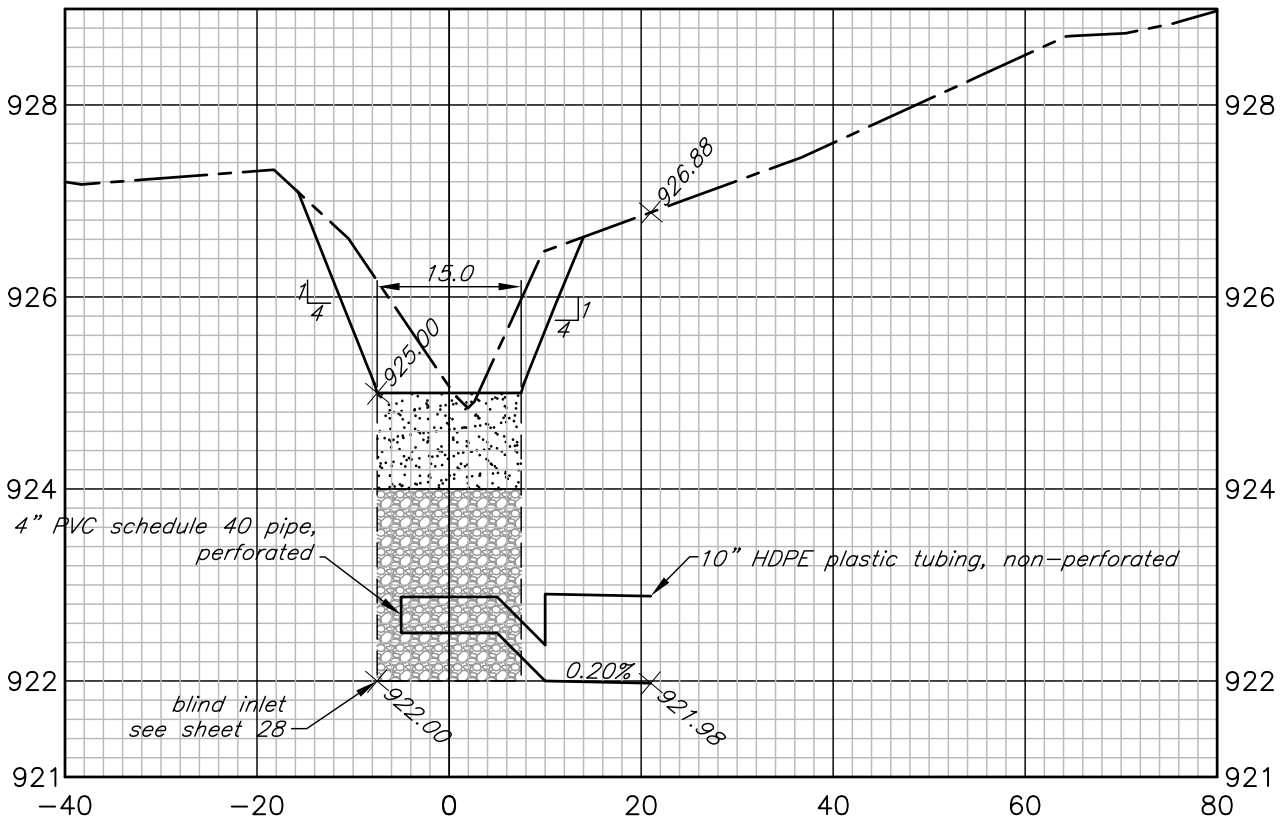
United States Department of Agriculture

File No. Blake Hollis t10992 ww BLACK

Drawing: .dwg

Sheet 11 of .

5+37.24



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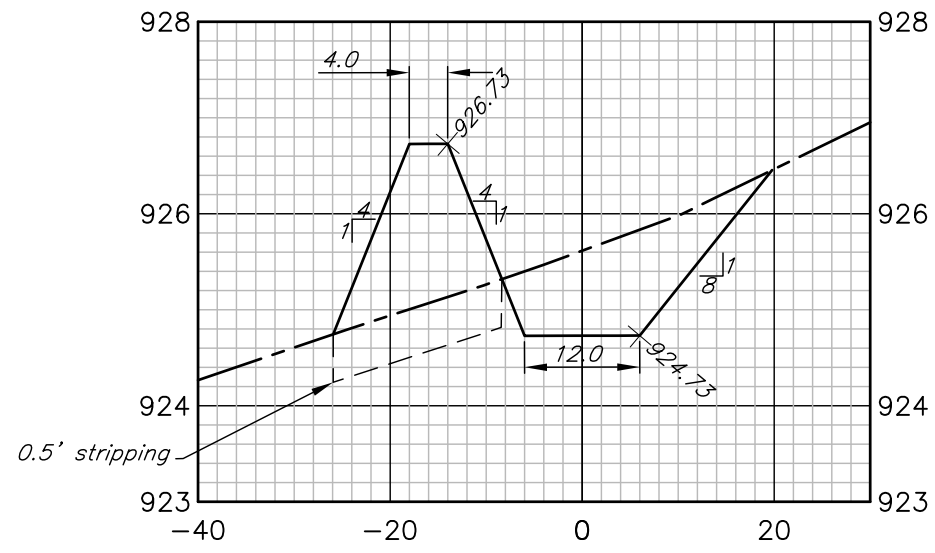

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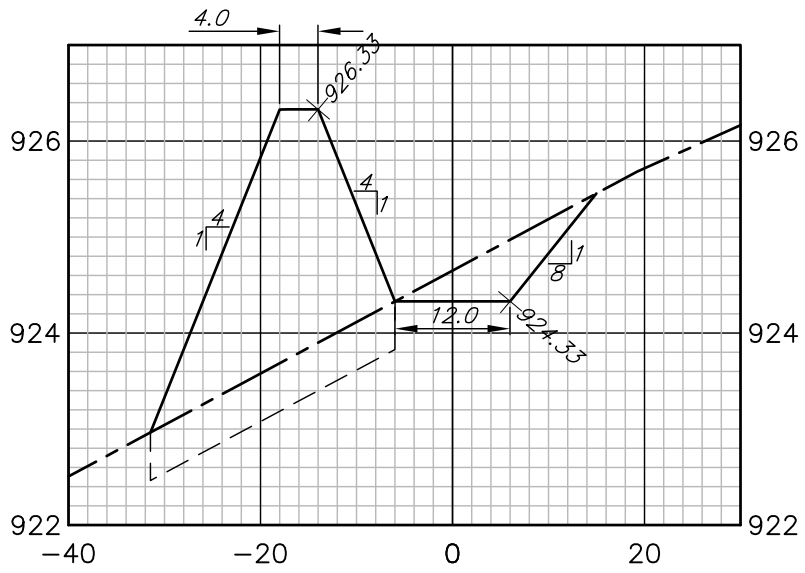

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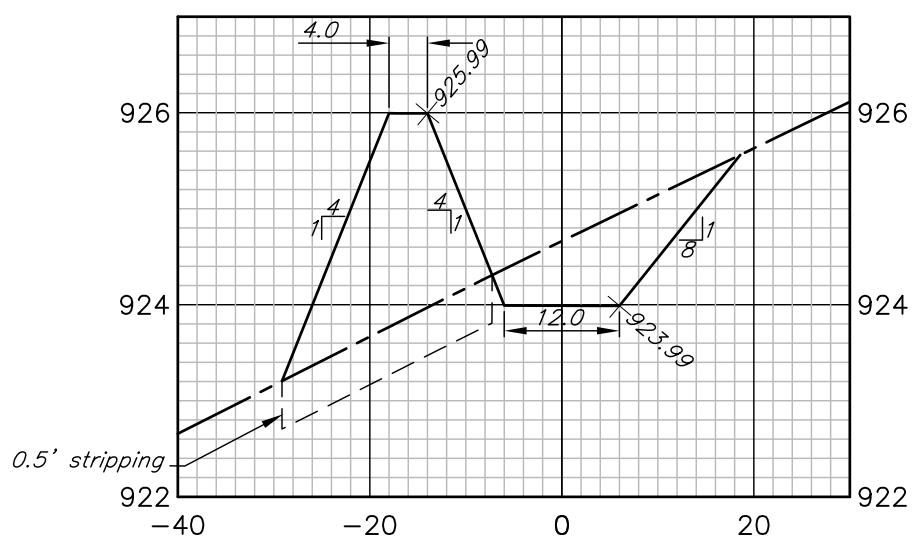

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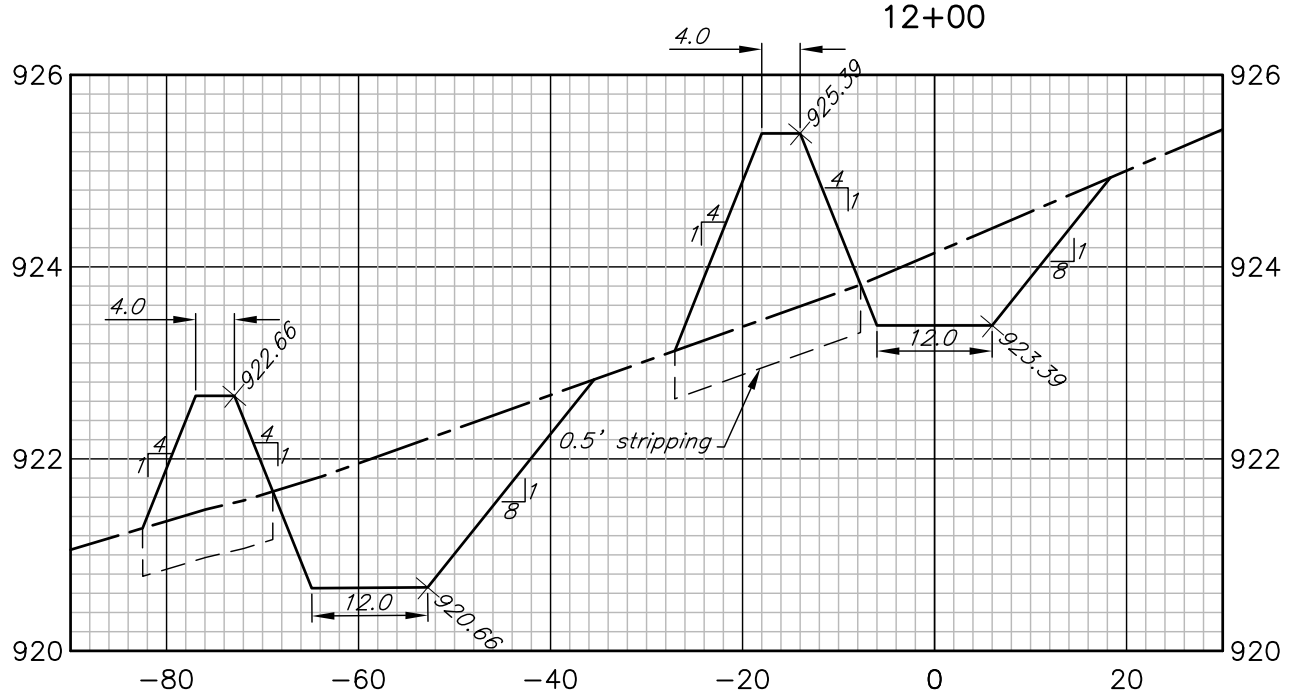


Date
Designed Jeff A. Lutz 9/2022
Drawn Jeff A. Lutz 9/2022
Checked . .
Approved . .

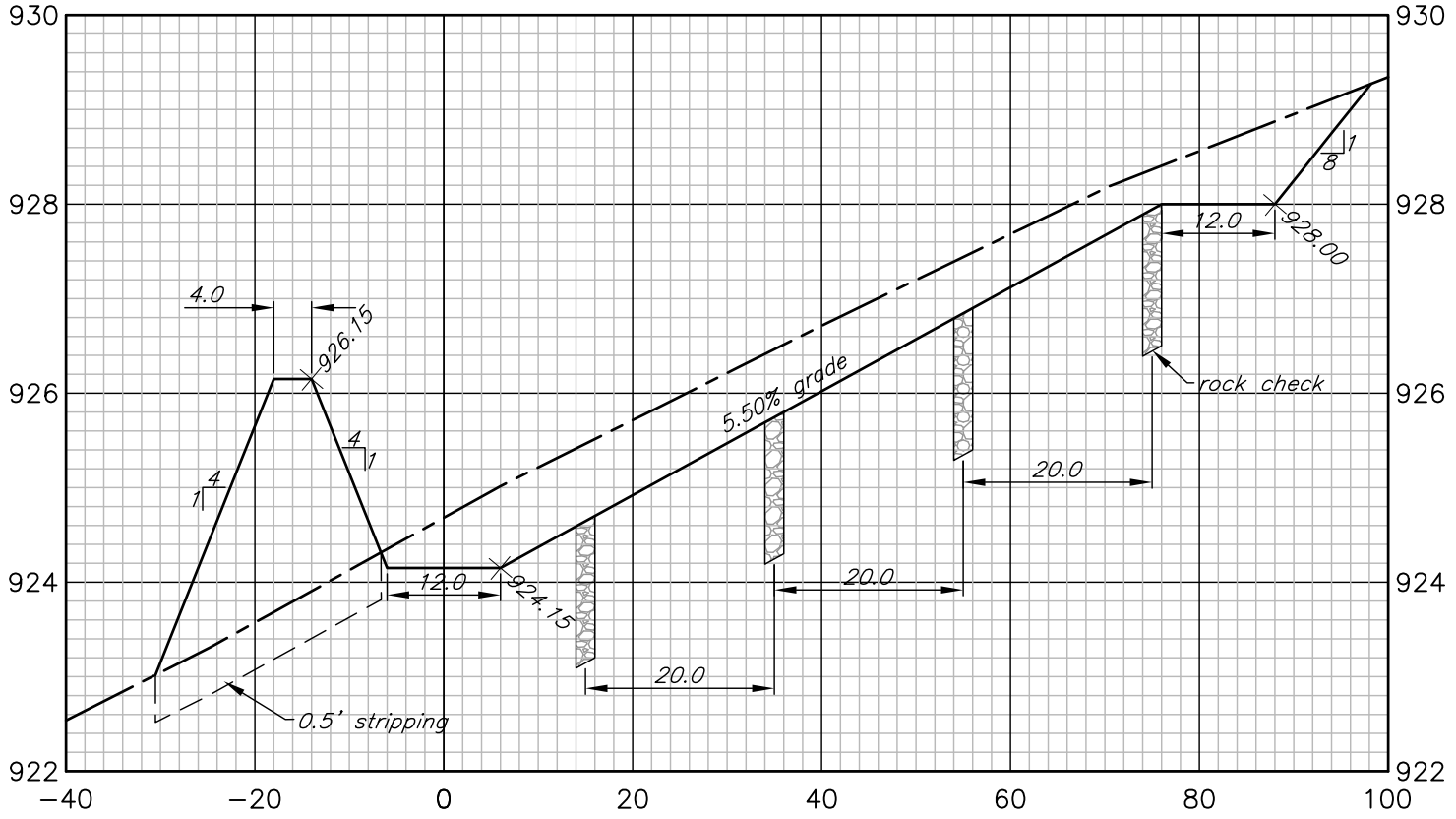
Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland
CROSS SECTION FS waterway meandered
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Blake Hollis
t10992 ww
BLACK
Drawing No.

Sheet 12 of .

10+00



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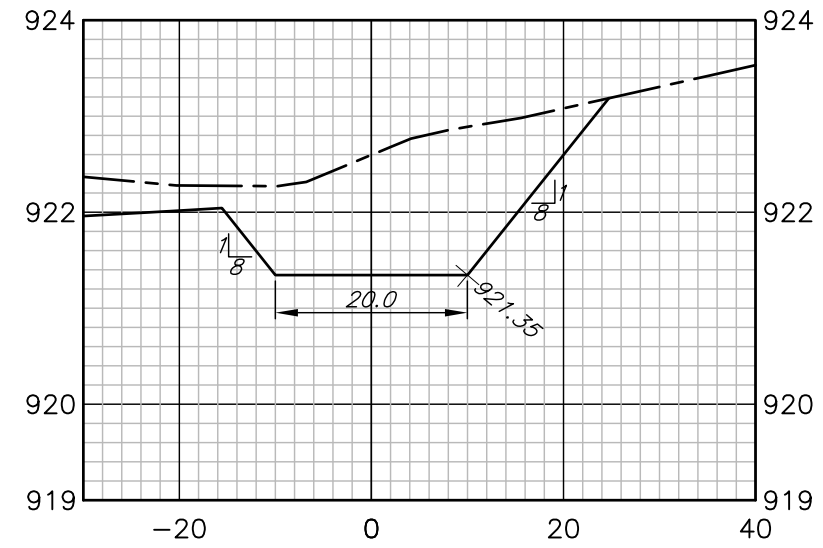

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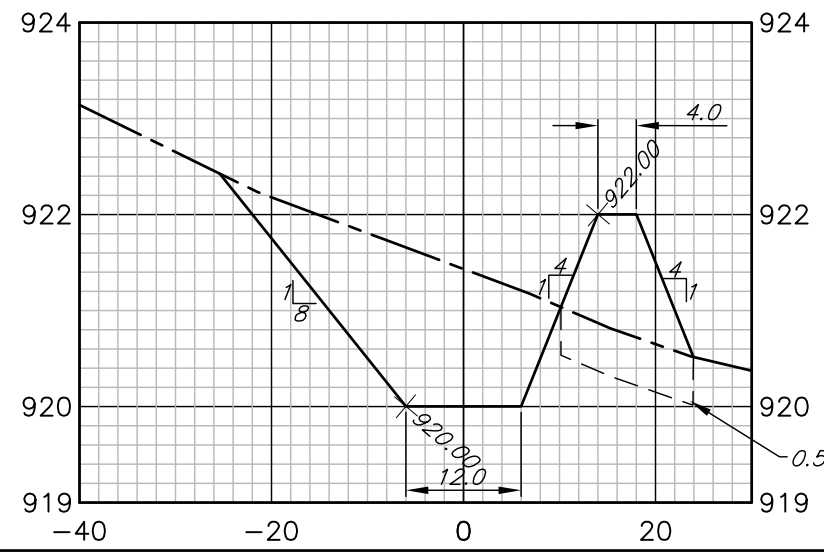

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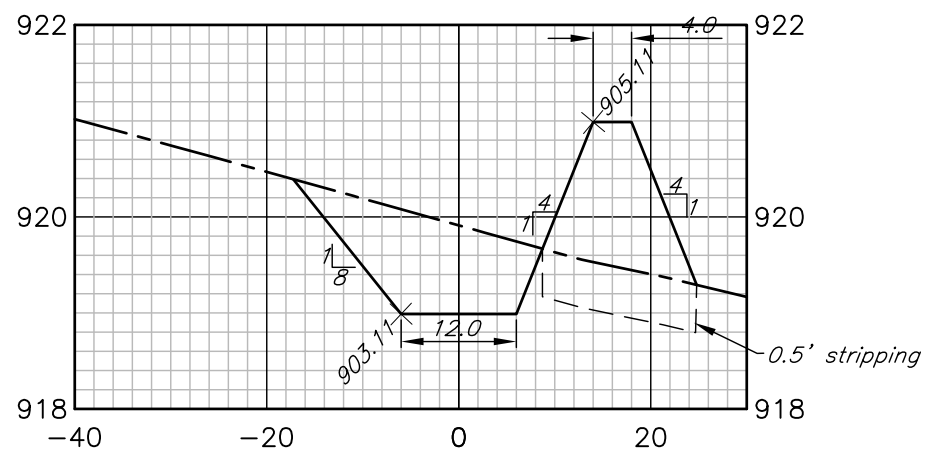


		Date
Designed	Jeff A. Lutz	9/2022
Drawn	Jeff A. Lutz	9/2022
Checked	.	.
Approved	.	.

Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland
CROSS SECTION FS waterway meandered

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

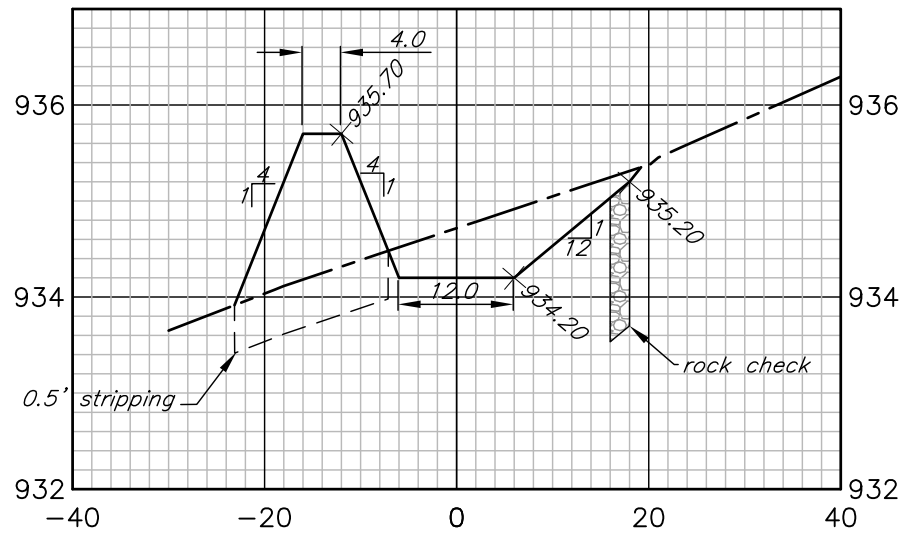
United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK HAWK.dwg

Drawing No. .

Sheet 13 of .

3+05



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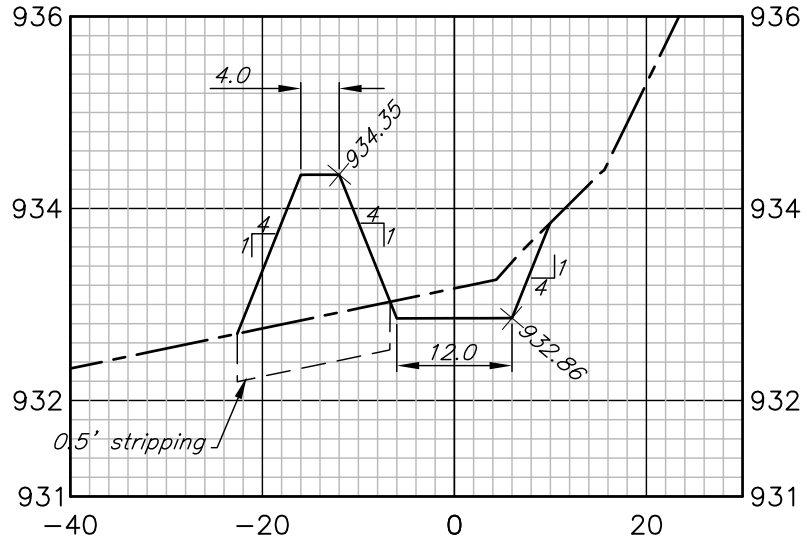

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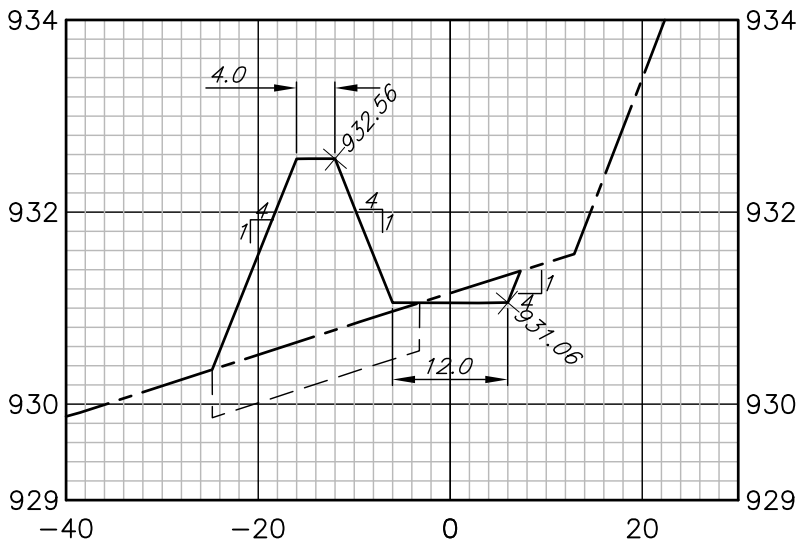

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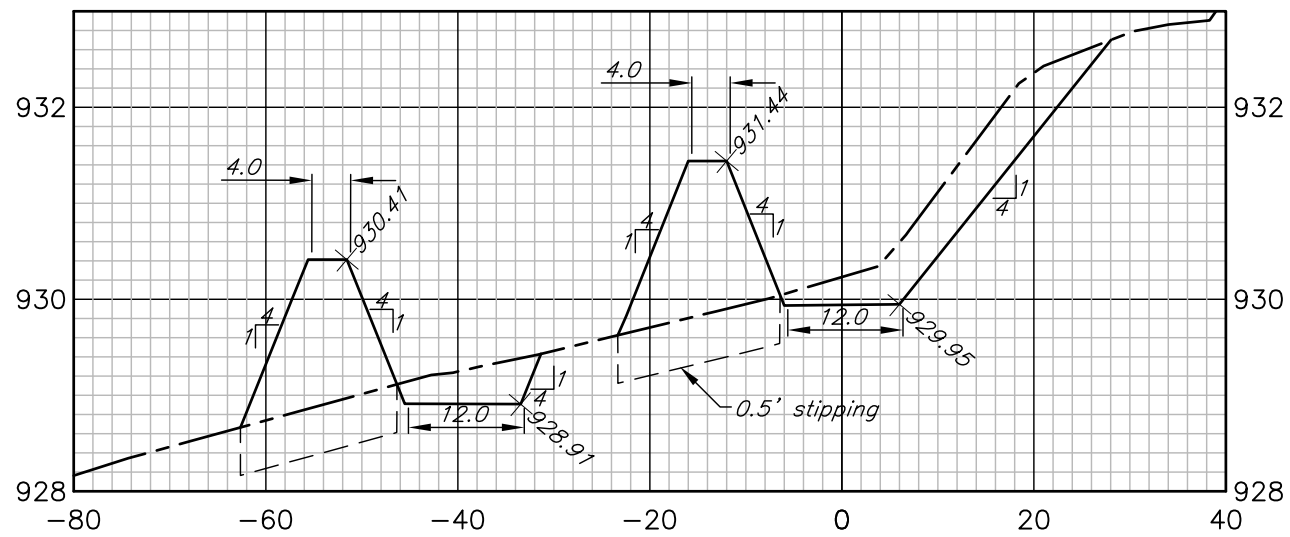

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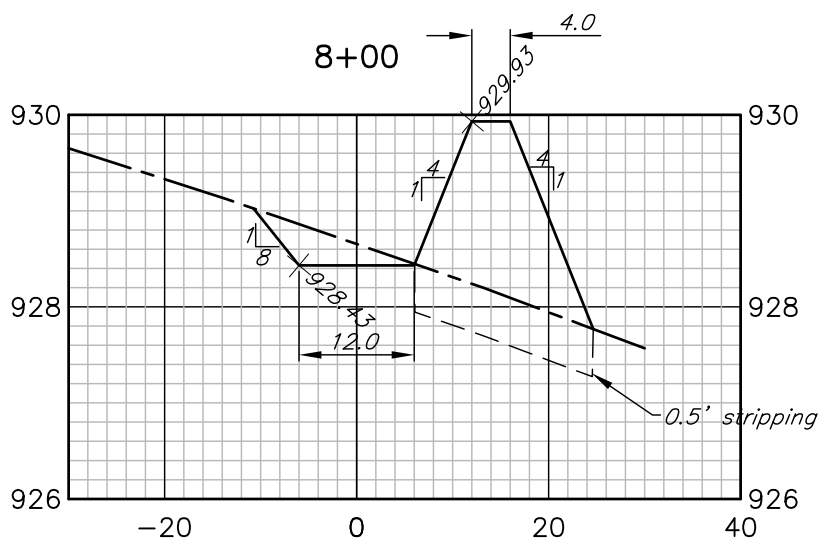

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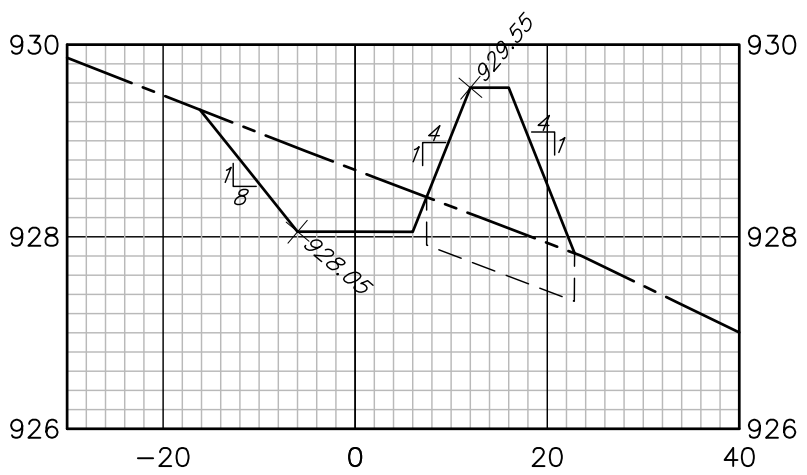

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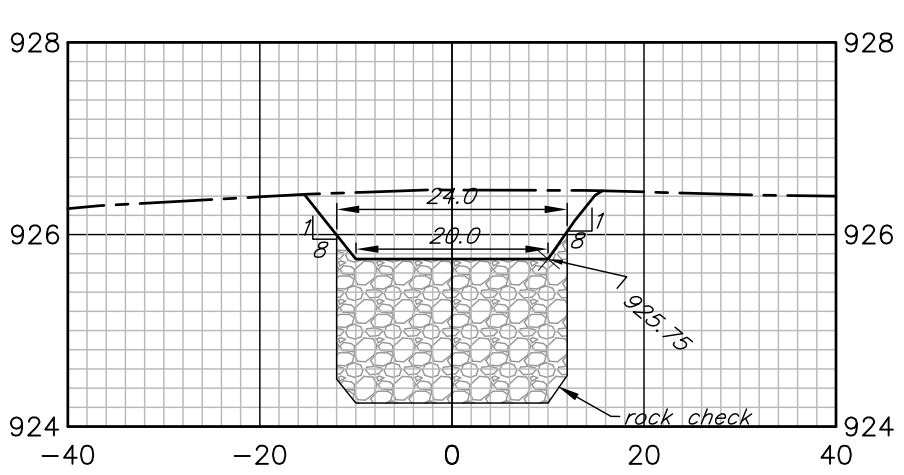


Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland
CROSS SECTIONS branch WEST Farmstead waterway meandered
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

Date
Designed Jeff A. Lutz 9/2022
Drawn Jeff A. Lutz 9/2022
Checked .
Approved .

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Blake Hollis
t10992 ww
BLACK
Drawing No. ww.dwg

Sheet 14 of .

185' length 5" HDPE perforated plastic tubing

junctions interception lines

215' length 10" HDPE non-perforated plastic tubing

easement boundary

60 0 60 120 180

Scale in Feet

5" HDPE non-perforated plastic tubing

70.0

sub SW interception line

6.0

junction interception lines

mounding

916.90

TBM 1

185.0

West interception line

sub North West interception line

outlet; 20' length 6" CMP or PVC pipe with rodent guard

outlet; 20' length 12" CMP or PVC pipe with rodent guard

mounding

40.0

6.0

5" HDPE non-perforated plastic tubing sub SE interception line

junction interception lines

5" HDPE non-perforated plastic tubing

easement boundary

SE interception line

130.0

N

Sheet 15 of .

Drawing No. BLACK

File No. Blake Hollis t10992 ww

United States Department of Agriculture

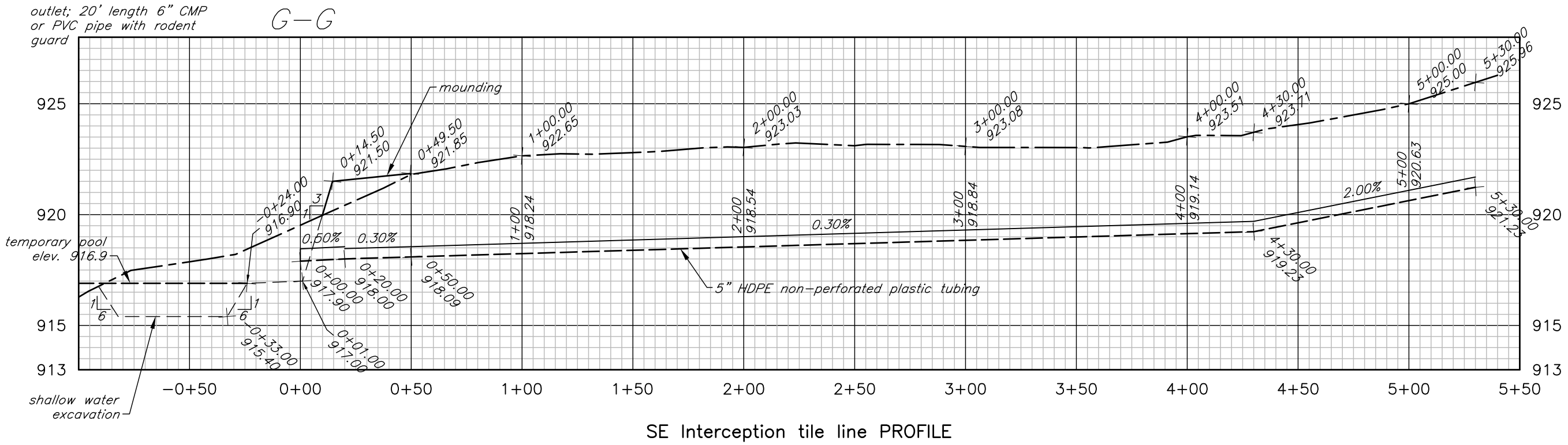
Natural Resources Conservation Service

Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland

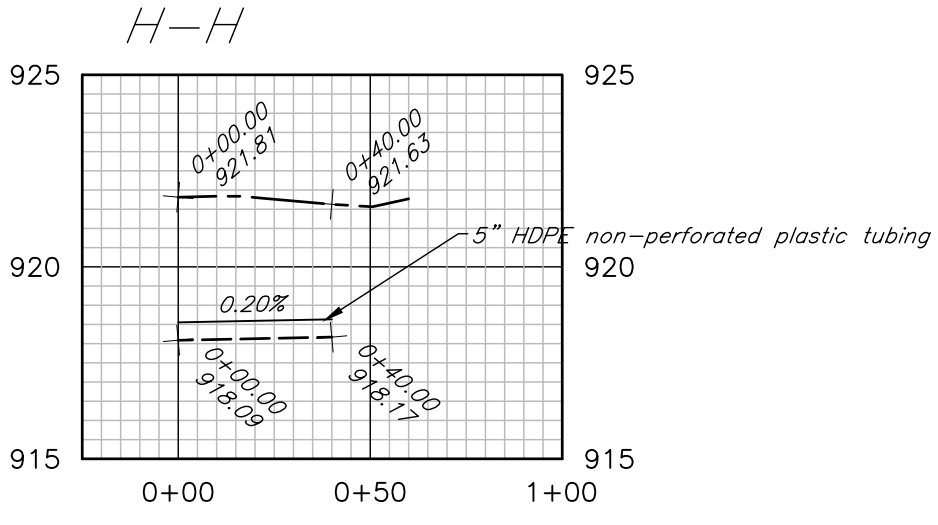
PLAN VIEW Day-Lighted Tile Lines south

SW¼ sec. 26 T.88N.-R.13W. Orange twp. Black Hawk County, IA

		Date
Designed	Jeff A. Lutz	10/2022
Drawn	Jeff A. Lutz	10/2022
Checked	.	.
Approved	.	.



SE Interception tile line PROFILE



sub SE Interception line PROFILE

Designed Jeff A. Lutz Date 10/2022
Drawn Jeff A. Lutz 10/2022
Checked .
Approved .

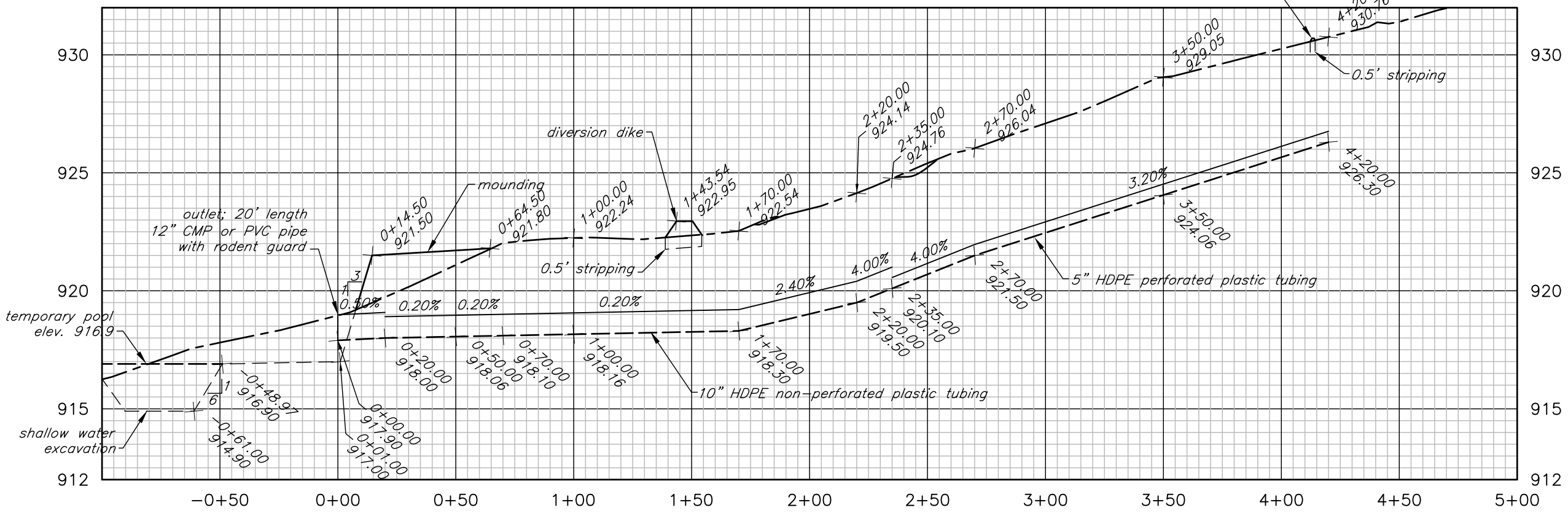
Thunderbridge Farms LLC t8452
Grassed ww's & Grade Stab Structure
PROFILES DAY-LIGHTED INTERCEPTION LINES
SW¼ sec. 26 T.88N.-R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK HAWK.dwg
Drawing No. .

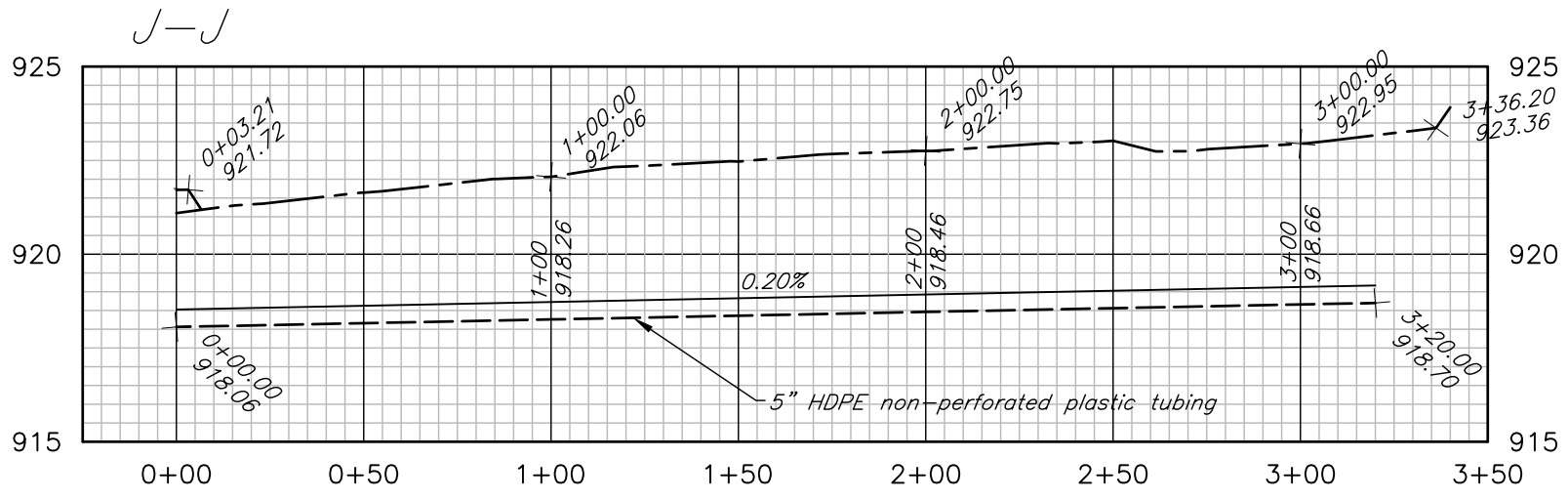
Sheet 16 of .

/—/



West Interception tile line PROFILE

J—J



sub SW Interception tile line PROFILE

Thunderbridge Farms LLC t8452
Grassed ww's & Grade Stab Structure
PROFILES DAY−LIGHTED INTERCEPTION LINES
SW¼ sec. 26 T.88N.−R.13W. Orange twp. Black Hawk County, IA

Date
Designed Jeff A. Lutz 10/2022
Drawn Jeff A. Lutz 10/2022
Checked . .
Approved . .

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Blake Hollis
t10992 ww
BLACK HAWK.dwg

Drawing No. .

Sheet 17 of .

150' length 4" HDPE perforated plastic tubing

927.26
TBM 2

Station 26+00

Station 27+50

250' length 5" HDPE perforated plastic tubing

rock riprap lined plunge pool

330' length 8" HDPE
non-perforated plastic tubing

200.0

blind inlet multi-pipe

North interception line

Station 29+50

Area upstream of blind inlet will have fill material placed in channel as directed by NRCS engineer. (< 18 inches thickness)

NE interception line

blind inlet

10" HDPE nonperforated plastic tubing

6.0

easement boundary

Station 31+00

mounding

outlet; 20' length 10" CMP or PVC pipe with rodent guard

32+39

Planned Machine Shed

12" HDPE non-perforated plastic tubing

mounding

6.0

sub North West interception line

34+15

outlet; 20' length 15" CMP pipe with rodent guard

juction interception lines

100 0 100 200 300

Scale in Feet

Date
Designed Jeff A. Lutz 10/2022
Drawn Jeff A. Lutz 10/2022
Checked . .
Approved . .

Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland

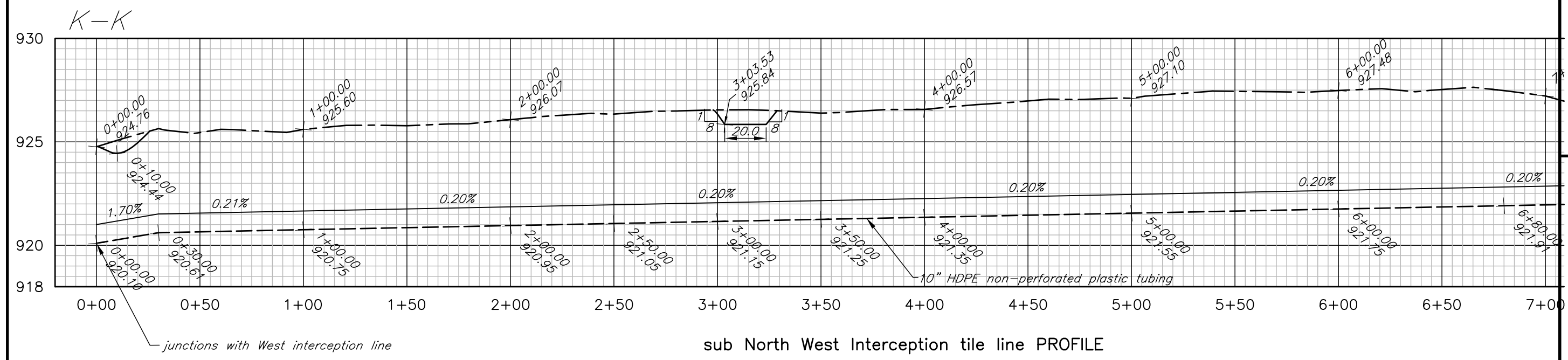
PLAN VIEW Day-Lighted Tile Lines north

SW¼ sec. 26 T.88N.-R.13W. Orange twp. Black Hawk County, IA

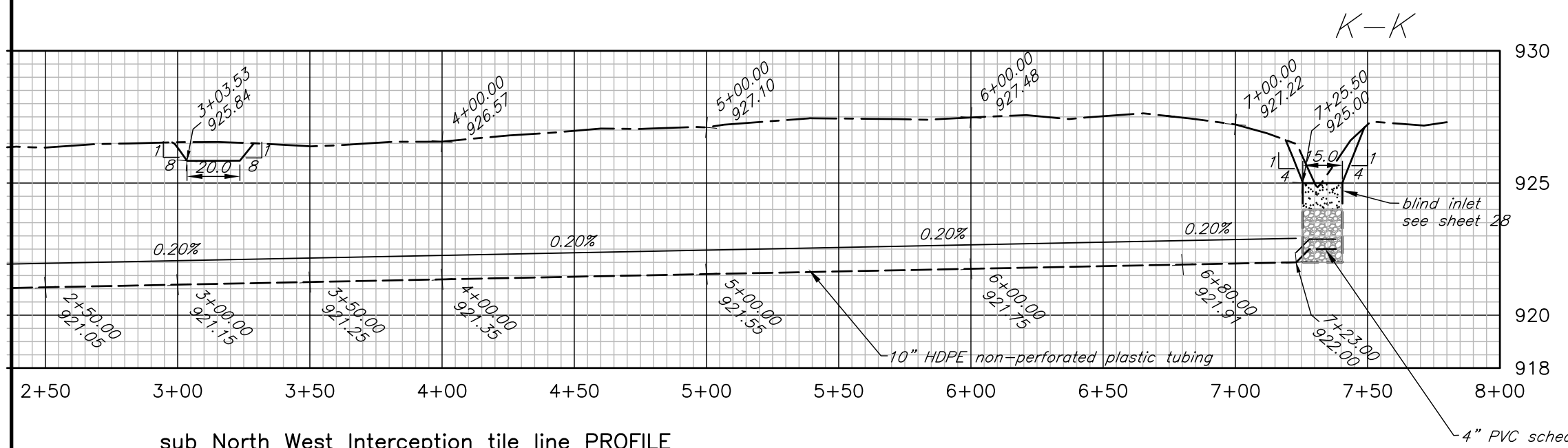
United States Department of Agriculture
Natural Resources Conservation Service

File No.
Blake Hollis
t10992 ww
BLACK
Drawing No. ww3.dwg

Sheet 18 of .



sub North West Interception tile line PROFILE



sub North West Interception tile line PROFILE

Date
Designed Jeff A. Lutz 10/2022
Drawn Jeff A. Lutz 10/2022
Checked . .
Approved . .

Thunderbridge Farms LLC t8452
Grassed ww's & Grade Stab Structure

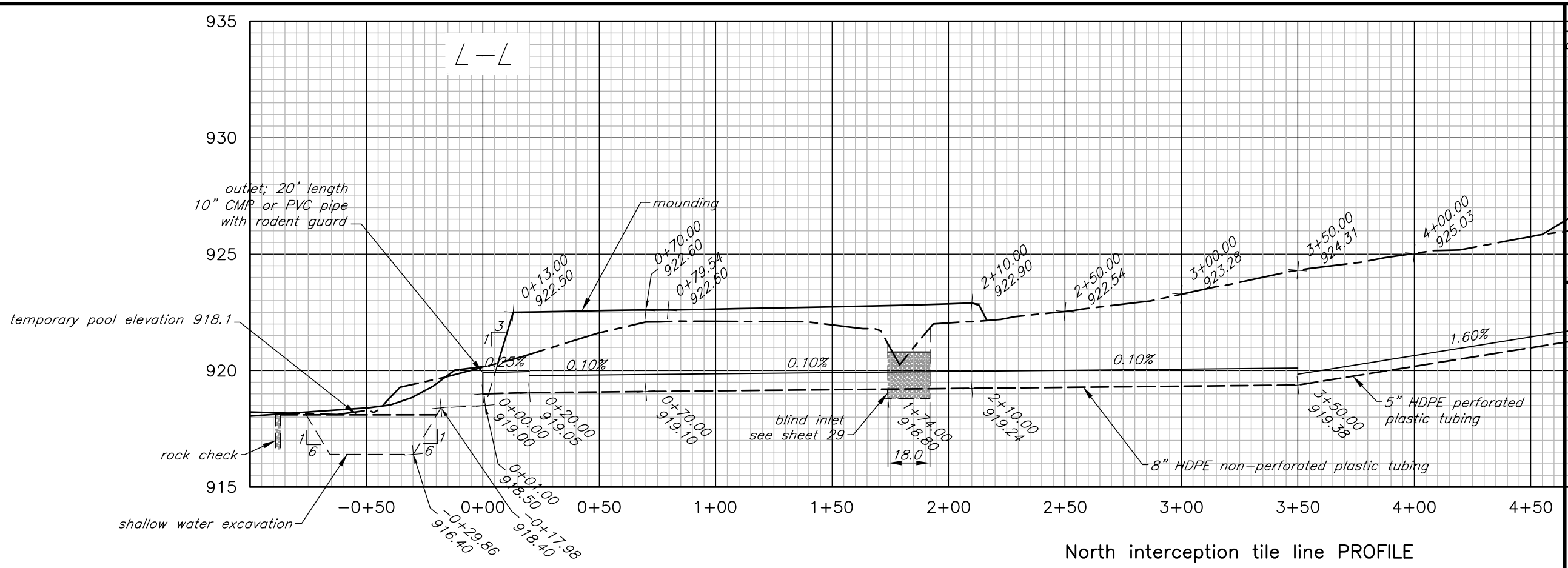
PROFILES DAY–LIGHTED INTERCEPTION LINE north

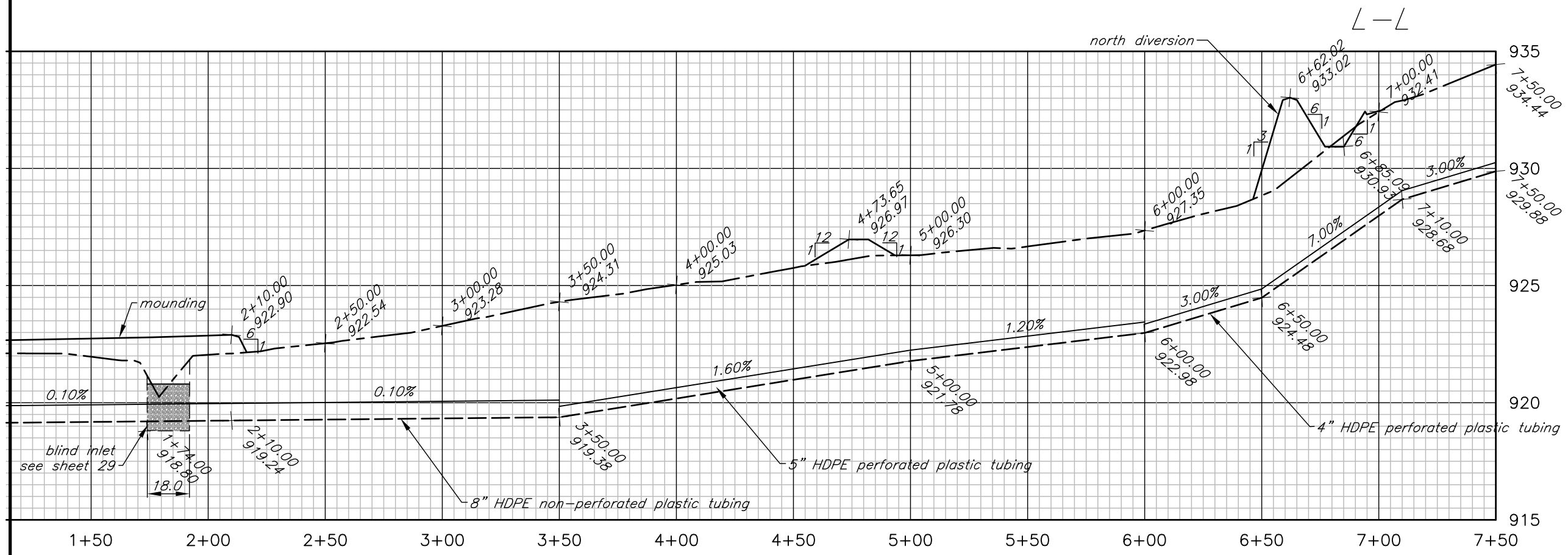
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK
Drawing No. ww5.dwg

Sheet 19 of .





Date
Designed Jeff A. Lutz 10/2022
Drawn Jeff A. Lutz 10/2022
Checked .
Approved .

Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland

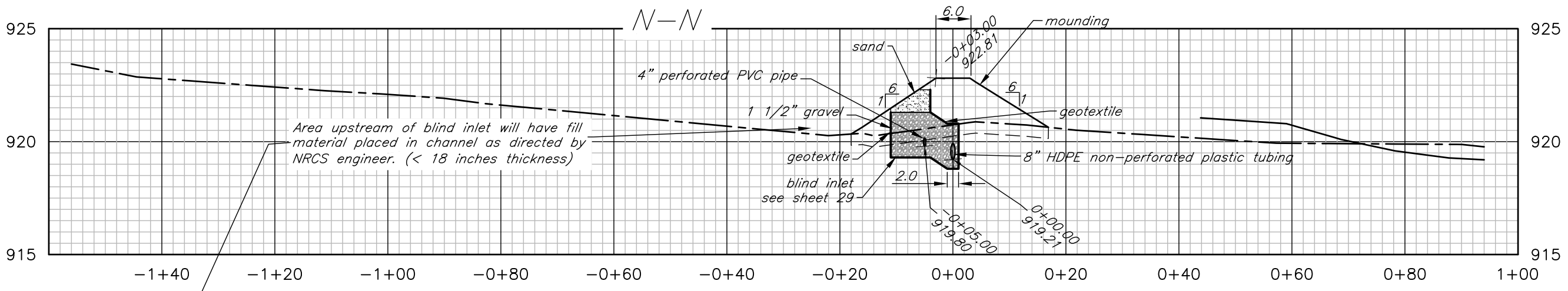
PROFILES DAY-LIGHTED INTERCEPTION LINES north

SW¼ sec. 26 T.88N.-R.13W. Orange twp. Black Hawk County, IA

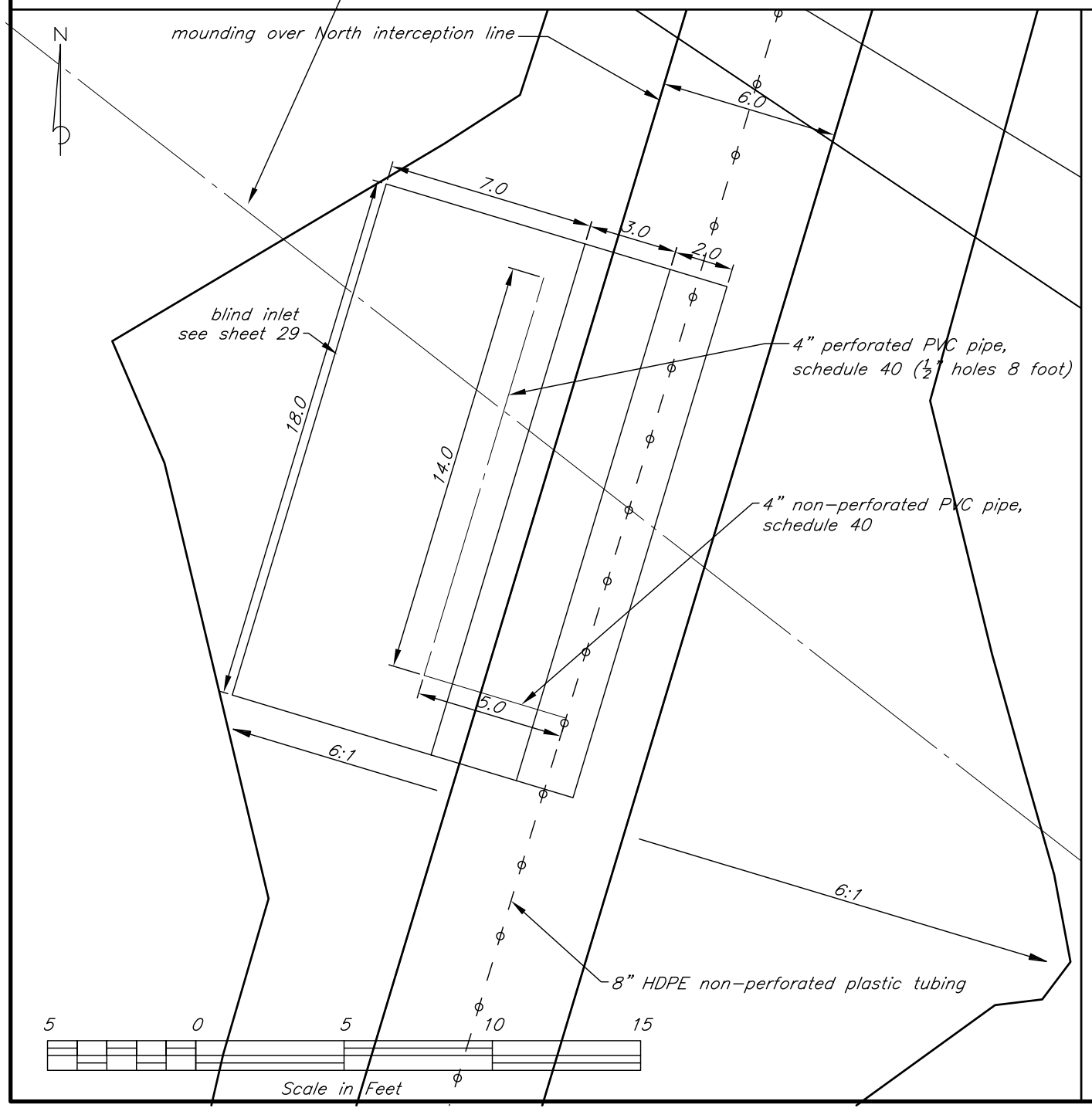
United States Department of Agriculture
Natural Resources Conservation Service

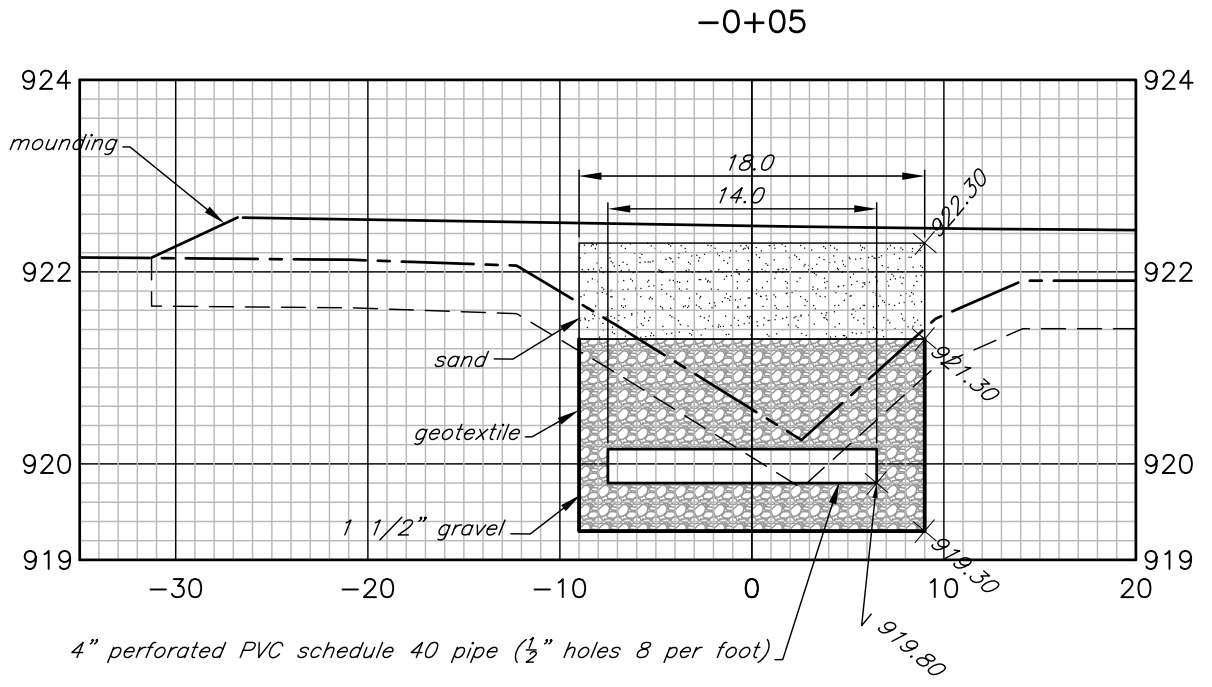
File No. Blake Hollis t10992 ww BLACK
Drawing No. HAWK.dwg

Sheet 20 of .



blind inlet for North interception line PROFILE





NOTE: ½" holes will be field drilled at 8 per foot in 8" HDPE line that was installed as non–perforated. This reach of pipe is within the blind inlet for 16 feet of length. Leave 1 foot on each end as is, no holes.

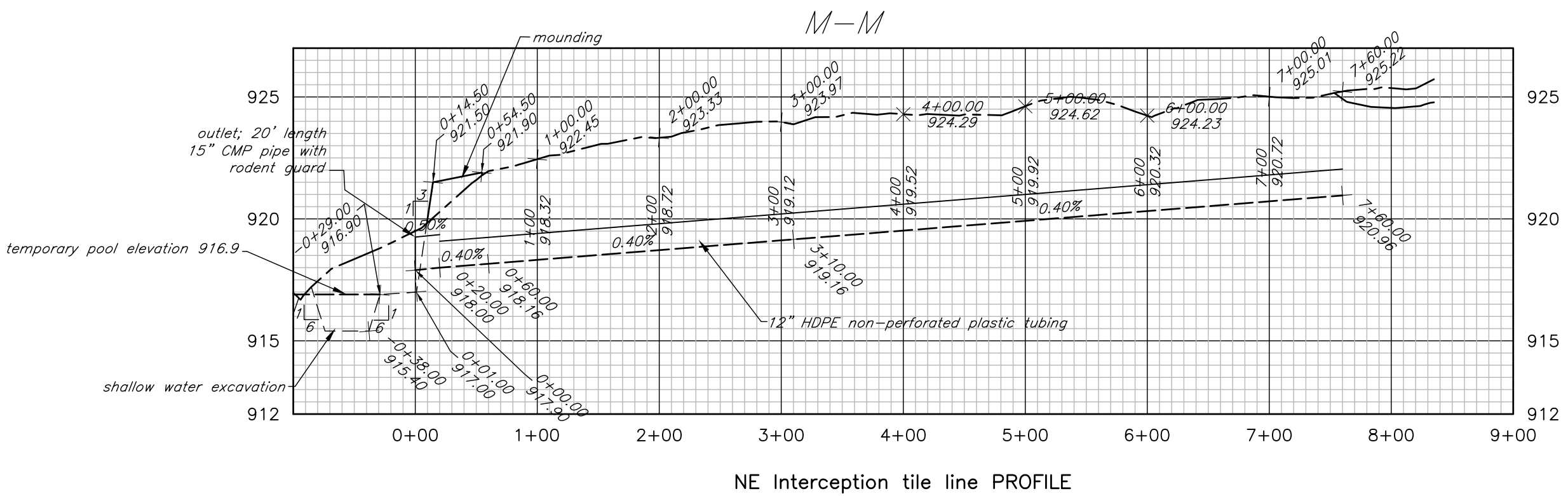
Date
Designed Jeff A. Lutz 10/2022
Drawn Jeff A. Lutz 10/2022
Checked .
Approved .

Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland
PROFILE PLAN VIEW Blind Inlet North Interception line
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Blake Hollis
t10992 ww
BLACK
Drawing No. WWG.dwg

Sheet 21 of .



NE Interception tile line PROFILE

Date
Designed Jeff A. Lutz 10/2022
Drawn Jeff A. Lutz 10/2022
Checked . .
Approved . .

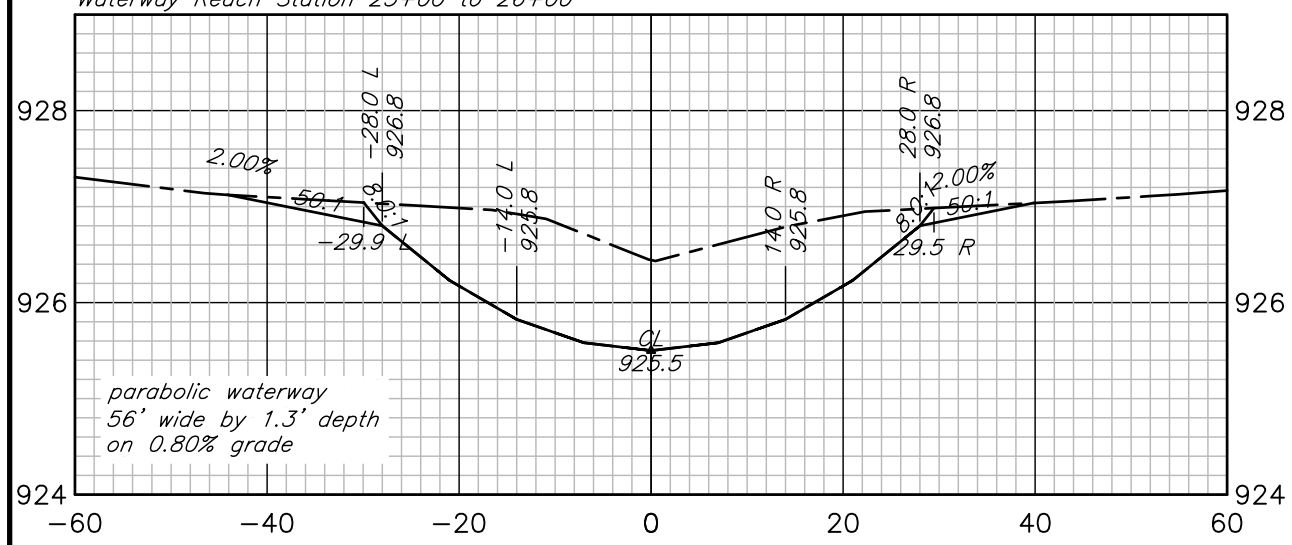
Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland
PROFILES DAY-LIGHTED INTERCEPTION LINES north
SW¼ sec. 26 T.88N.-R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

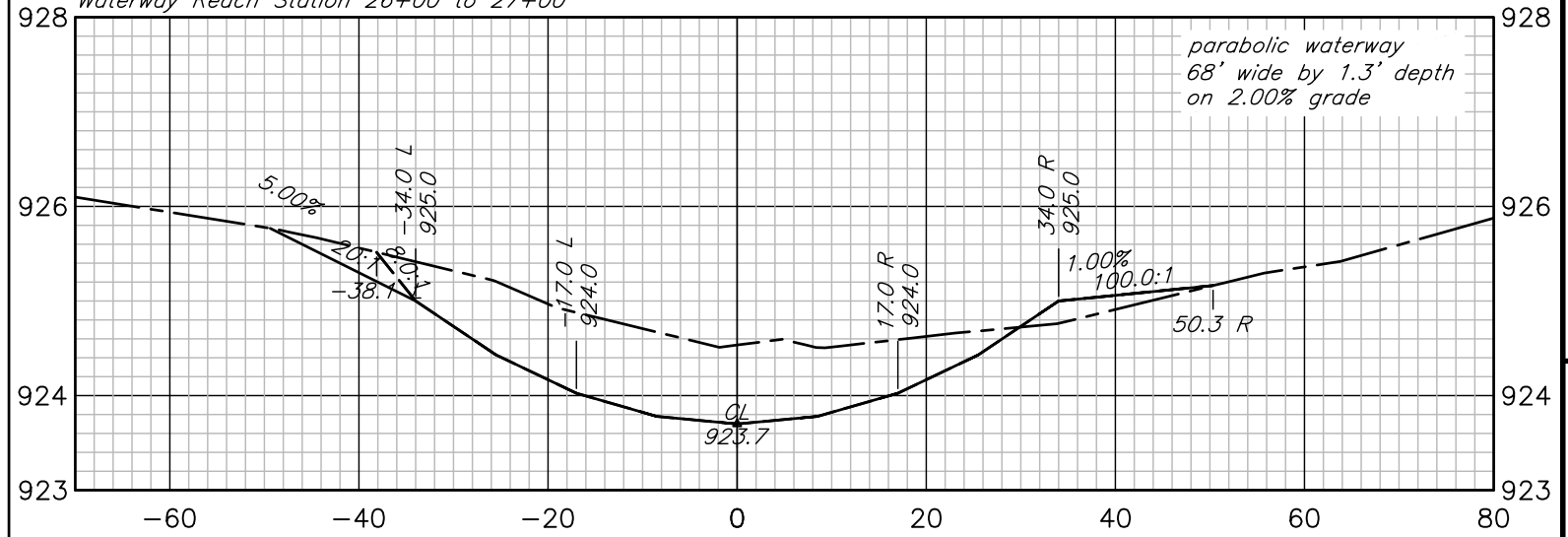
File No.
Blake Hollis
t10992 ww
BLACK
Drawing No.

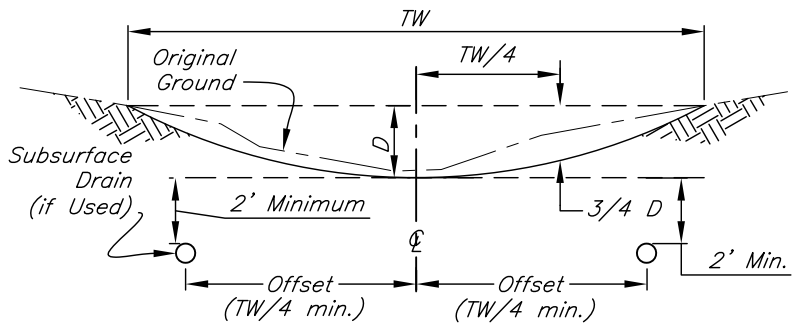
Sheet 22 of .

25+00



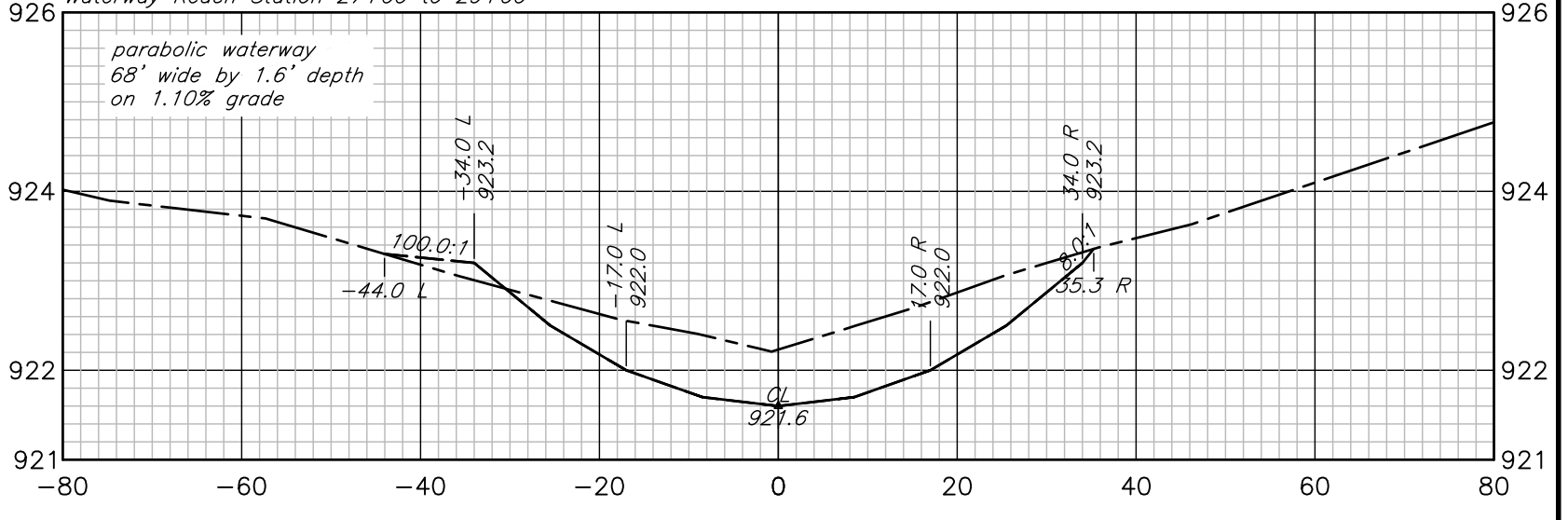
26+50



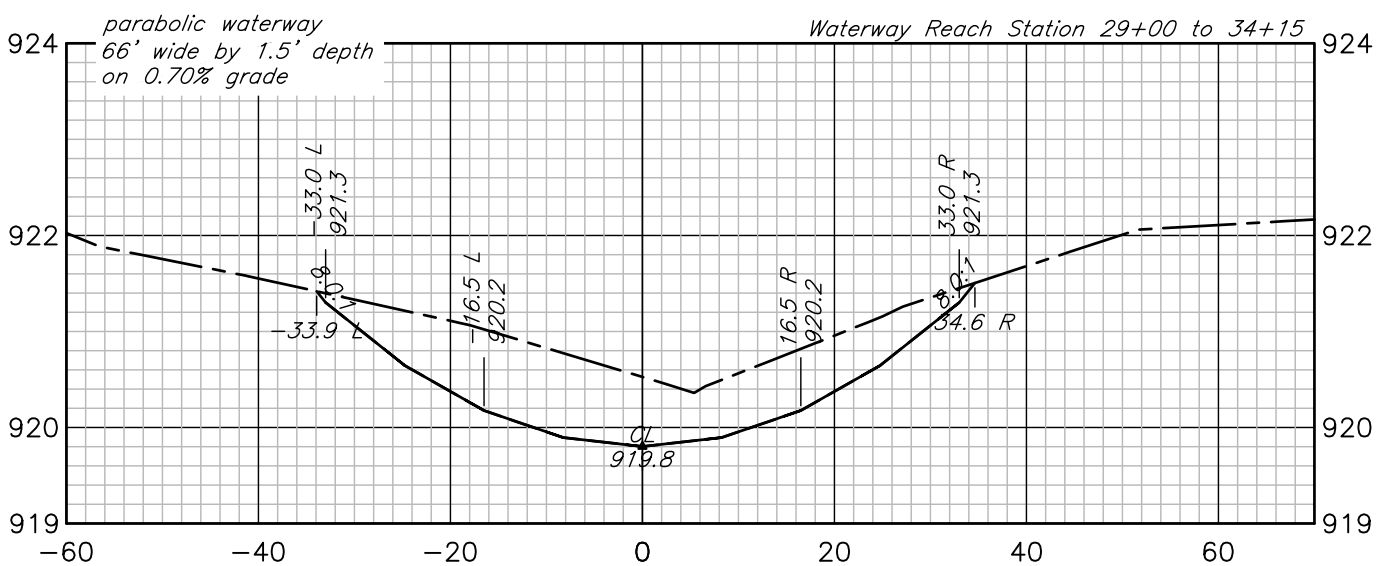


TYPICAL PARABOLIC CROSS SECTION

28+00



30+00



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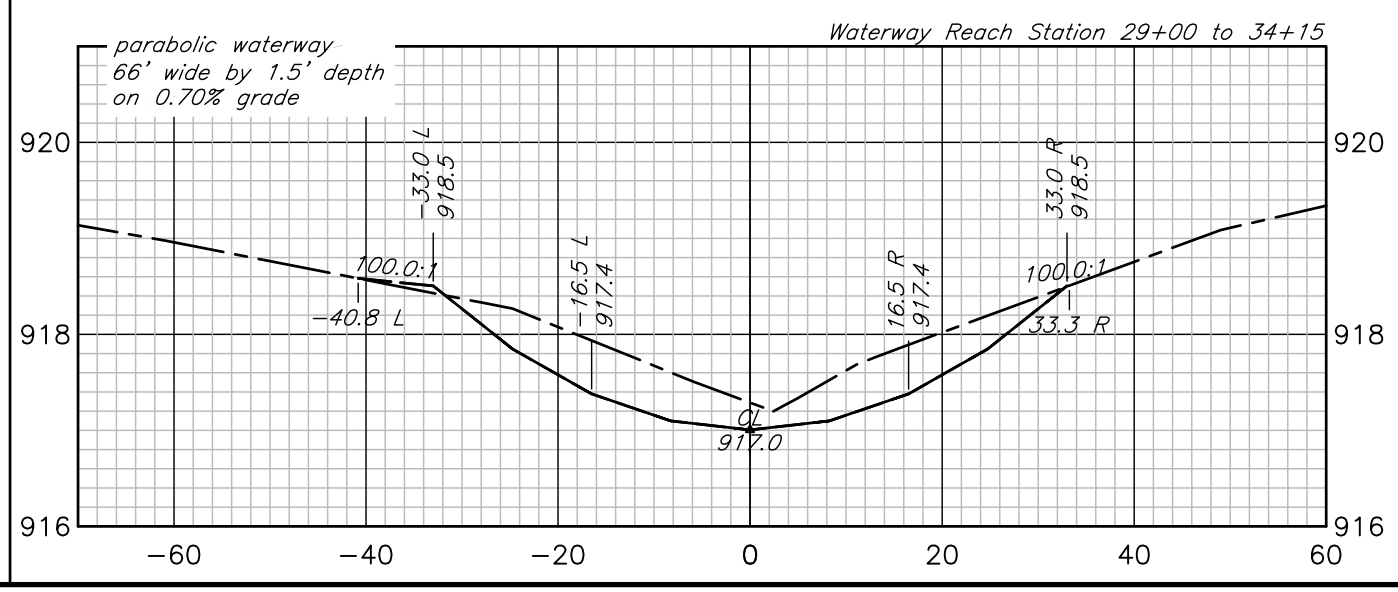


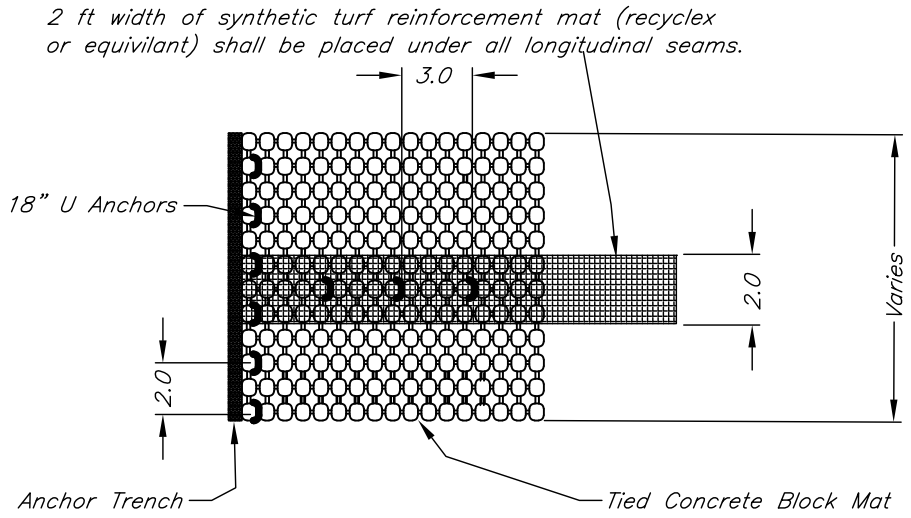
Thunderbridge Farms LLC t8452
MAIN Grassed waterway
CROSS SECTION MAIN WATERWAY
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

Designed Jeff A. Lutz 10/2022
Drawn Jeff A. Lutz 10/2022
Checked . .
Approved . .

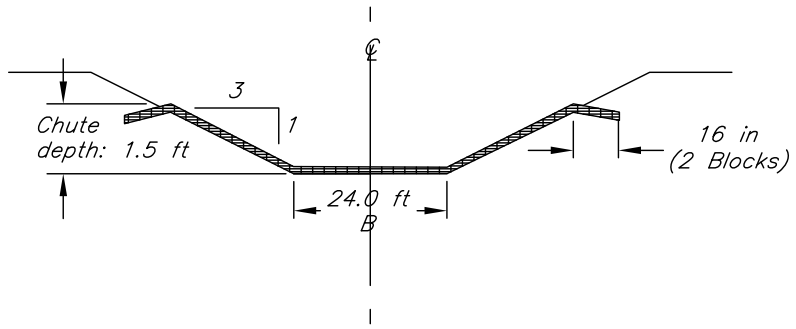
United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK
Drawing No. MAIN.dwg

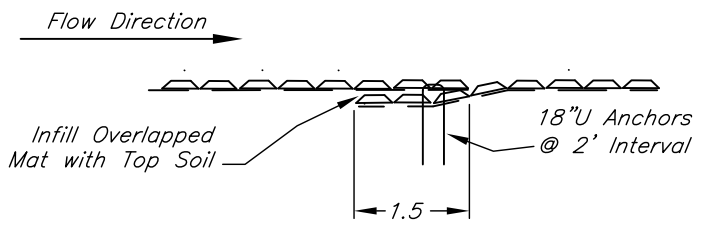
Sheet 23 of .



PLAN VIEW (LONGITUDINAL SEAM)



TYPICAL CROSS SECTION



PROFILE VIEW (PERPENDICULAR OVERLAP)

NOTES:

1. *The maximum chute slope in the direction of flow shall be 3:1. The maximum side slopes of the chute shall be 2:1.*
2. *The outlet section shall be flat (0% grade).*
3. *Apply seed and fertilizer prior to placing Tied Concrete Block Mat (TCBM), and after TCBM is placed.*
4. *Longitudinal seams shall be anchored every 3 ft.*
5. *2 ft width of synthetic turf reinforcement mat (recyclex or equivilant) shall be placed under all longitudinal seams.*
6. *Anchor leading and downstream edge of TCBM in a minimum 16" deep (sized for two rows of blocks) trench. Trench should be backfilled with suitable material and compacted.*

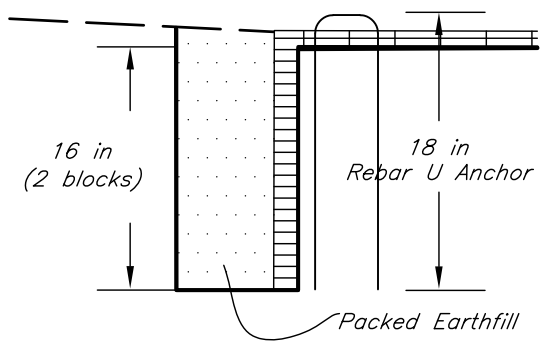
TABLE OF QUANTITIES		
Item	Quantity	Unit
Tied Concrete Block Mat	*2120*	*sq.ft.*
Underlayment	*200*	*sq.ft.*
Excavation	*50*	*cu.yd.*
Earthfill	*1848*	*cu.yd.*
Seeding	*0.5*	*acres*
Rebar Anchors	*88*	*No.*

NOTES Cont.:

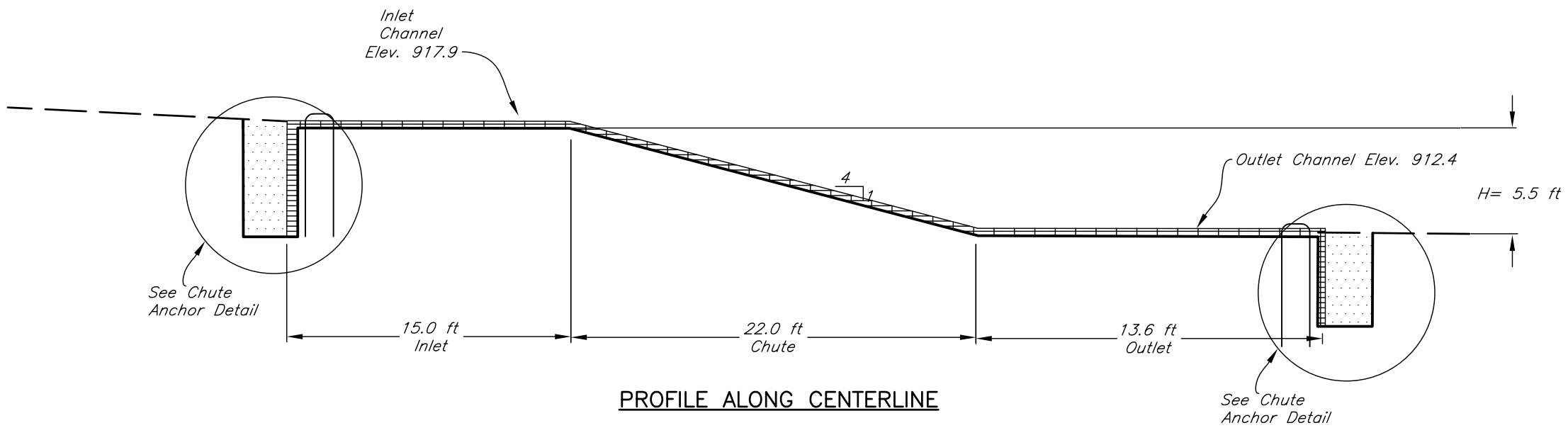
7. *Recess two outside blocks 16" into subgrade along each edge of structure.*
8. *On perpendicular lap, and at anchor trenches, 18" U anchors are installed in 2' increments across overlap seam. Install anchor behind first row of blocks so that anchor is tight with subgrade.*
9. *Downstream rolls of TCBM and underlayment are shingled under upstream roll.*

Dike site – *S½ SW¼ NE¼ SW¼ sec. 26*
Orange twp. Black Hawk county

NOT TO SCALE



CHUTE ANCHOR DETAIL



PROFILE ALONG CENTERLINE

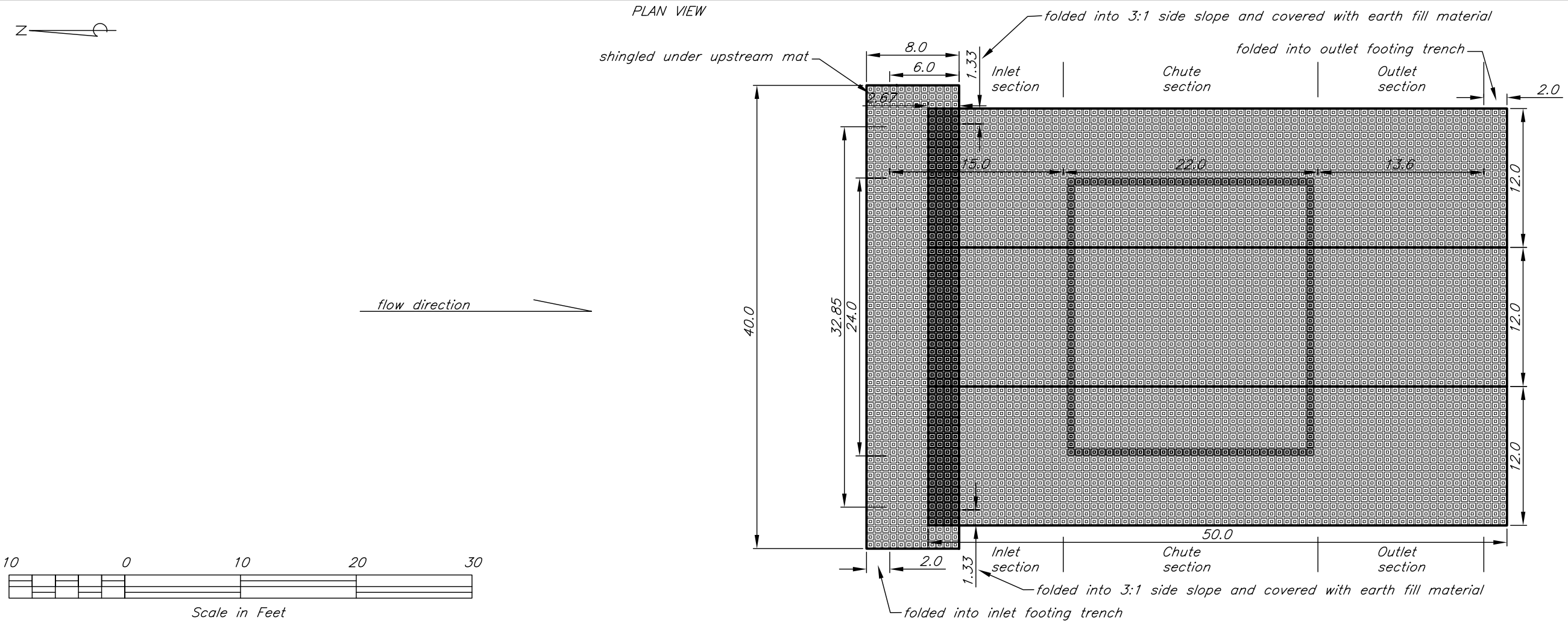
Date 1/2020
Designed N. Klingenberg 1/2020
Drawn N. Klingenberg
Checked
Approved

TIED CONCRETE BLOCK MAT
CHUTE DETAILS
Thunderbridge Farms t8452 wetlands structure

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Drawing No.
Sheet 24 of 39

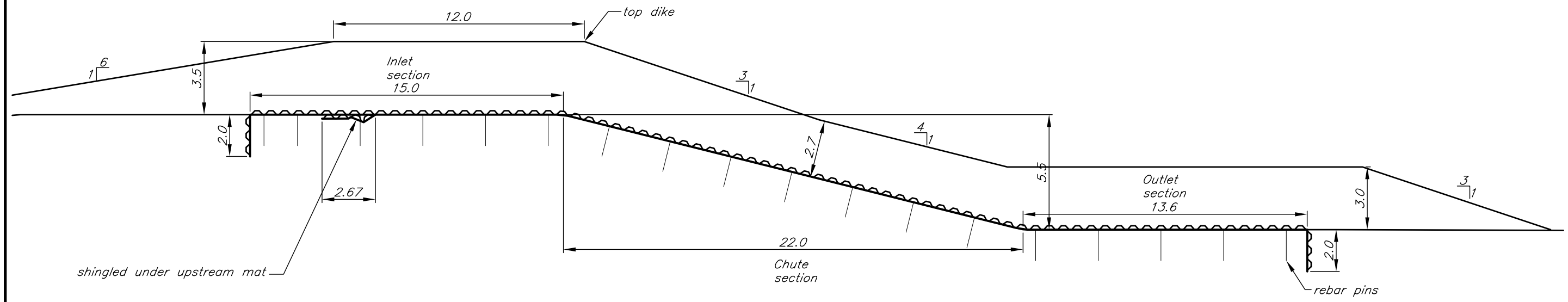
PLAN VIEW



10 0 10 20 30

Scale in Feet

PROFILE



5 0 5 10 15

Scale in Feet

Date	
Designed Jeff A. Lutz	10-2022
Drawn Jeff A. Lutz	10-2022
Checked .	.
Approved .	.

Thunderbridge Farms LLC t8452
Tied Concrete Block Mat chute

PLAN VIEW - PROFILE - SECTION

SW¼ sec. 26 T.88N.-R.13W. Orange twp. Black Hawk County, IA

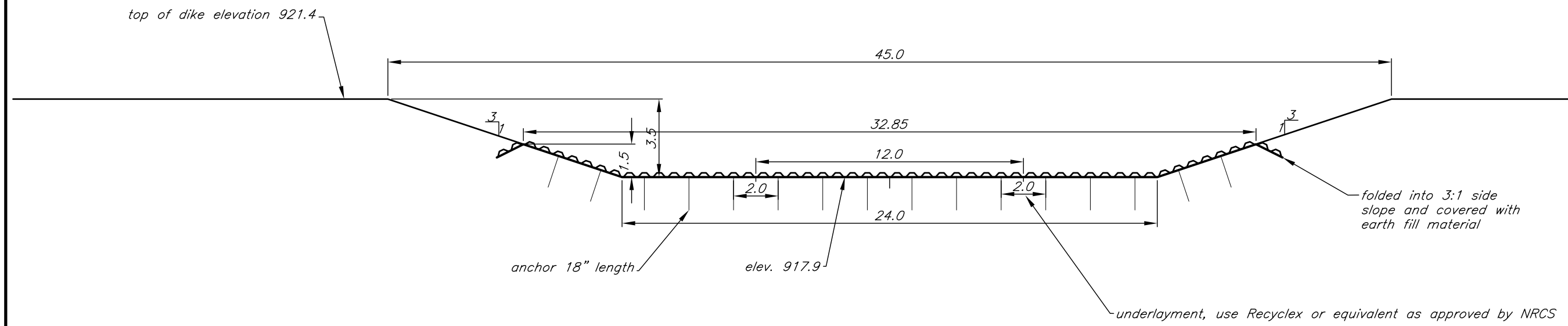
United States Department of Agriculture
Natural Resources Conservation Service

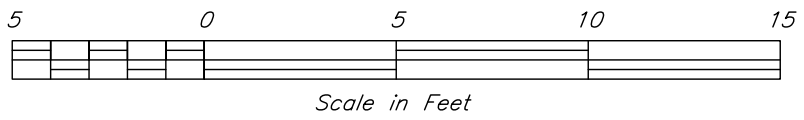
File No.
Blake Hollis
t10992 ww
BLACK
HAWK.dwg

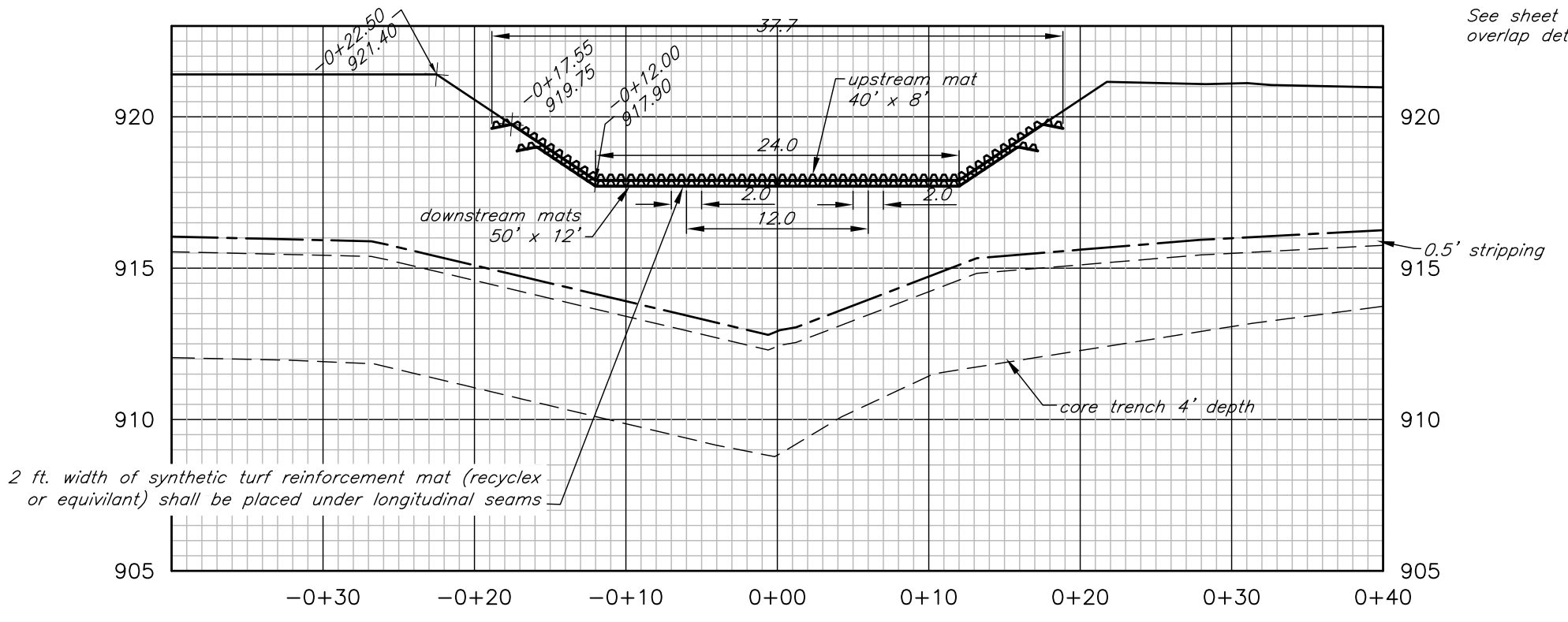
Drawing No.

Sheet 25 of .

SECTION VIEW







See sheet 24 for perpendicular overlap detail.

Section TCBM inlet Station 38+94 PROFILE

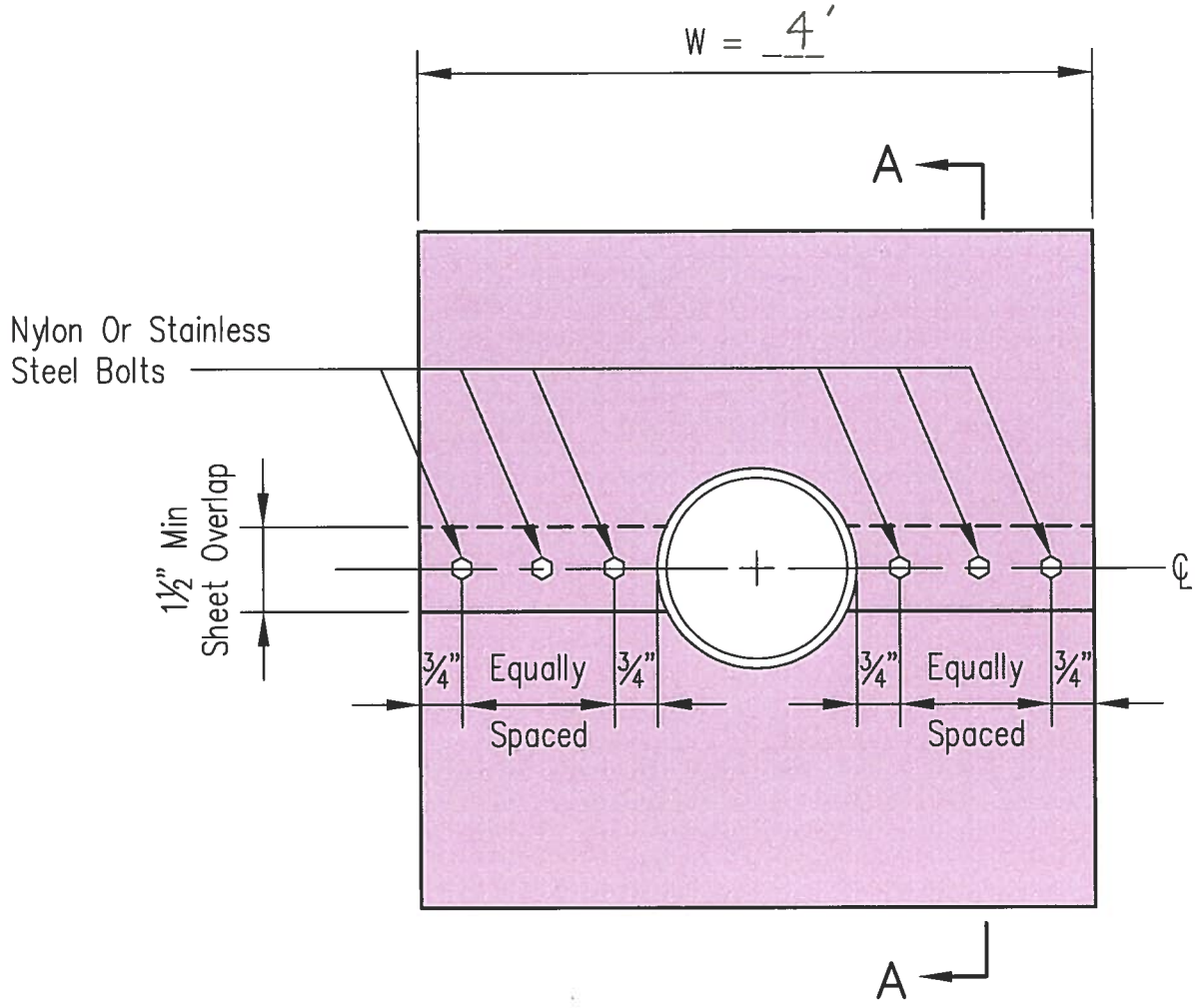
Date
Designed Jeff A. Lutz 10-2022
Drawn Jeff A. Lutz 10-2022
Checked . .
Approved . .

Thunderbridge Farms LLC t8452
Tied Concrete Block Mat chute
PLAN VIEW - PROFILE - SECTIONS
SW¼ sec. 26 T.88N.-R.13W. Orange twp. Black Hawk County, IA

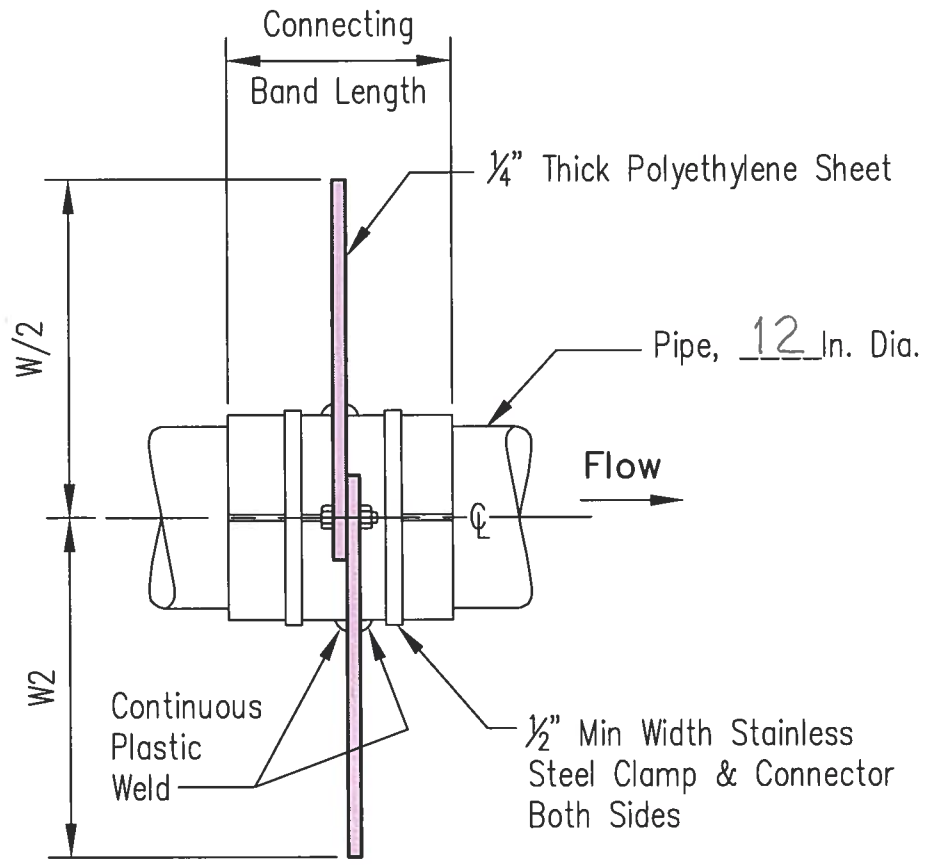
United States Department of Agriculture
Natural Resources Conservation Service

File No.
Blake Hollis
t10992 ww
BLACK
HAWK.dwg
Drawing No.

Sheet 26 of .



ELEVATION



SECTION A–A

Independent

NOTES:

1. Pipe, connecting band and seam coating can be either silicon caulk (recommended), or mastic (asphalt or tar based)
2. Apply silicon caulk, tar or mastic to bottom half of connecting band and lay pipe on connecting band.
   Apply silicon caulk or mastic to top half of collar and set in place, lining up bolt holes.
3. Install clamps on split halves of collar and tighten bolts and clamps.
4. Apply silicon caulk, tar or mastic on seams as needed to insure a good seal so that completed installation is watertight.
5. Backfill and hand tamp soil around completed installation.
6. Polyethylene antiseep collars can be used on corrugated and smooth PVC plastic, smooth steel and galvanized pipes.

TABLE OF QUANTITIES

W FEET	Polyethylene Sheet Sq. Ft.	Stainless Steel Clamp & Connector	Connecting Band Min Length	Bolts & Nuts ⅜"x 1"	No. Of Collars
3	9.5	2	6"	6	—
4	16.7	2	6"	6	1
5	25.8	2	8"	6	—
6	37.0	2	8"	6	—
Totals					1

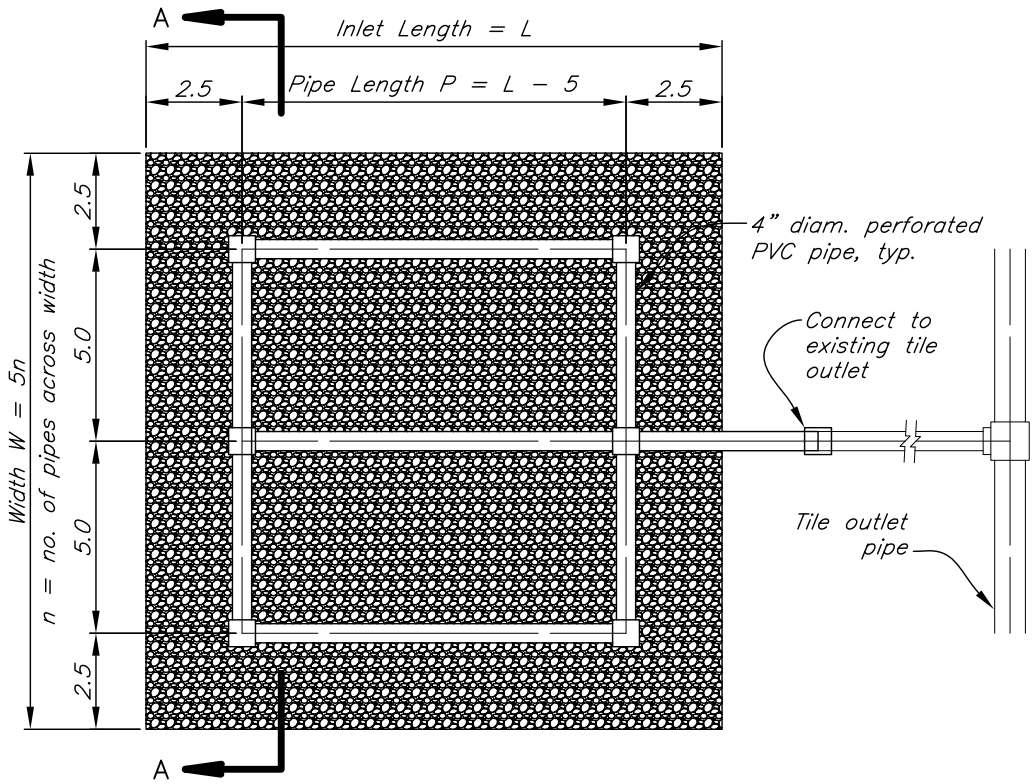
Adapted From Wisconsin Standard Drawing WI–246

Designed Jeff A. Lutz 10/2022
Drawn M. QUINONES 11/1/13
Checked
Approved

POLYETHYLENE SHEET ANTISEEP COLLAR
FOR 4" TO 24" DIAMETER PIPE
Thunderbridge Farms LLC +8452 Black Hawk county Iowa

NRCS
Natural Resource Conservation Service
United States Department of Agriculture

File No. IL–ENG–215
Drawing No.
Page 1 of 1
Sheet 27 of



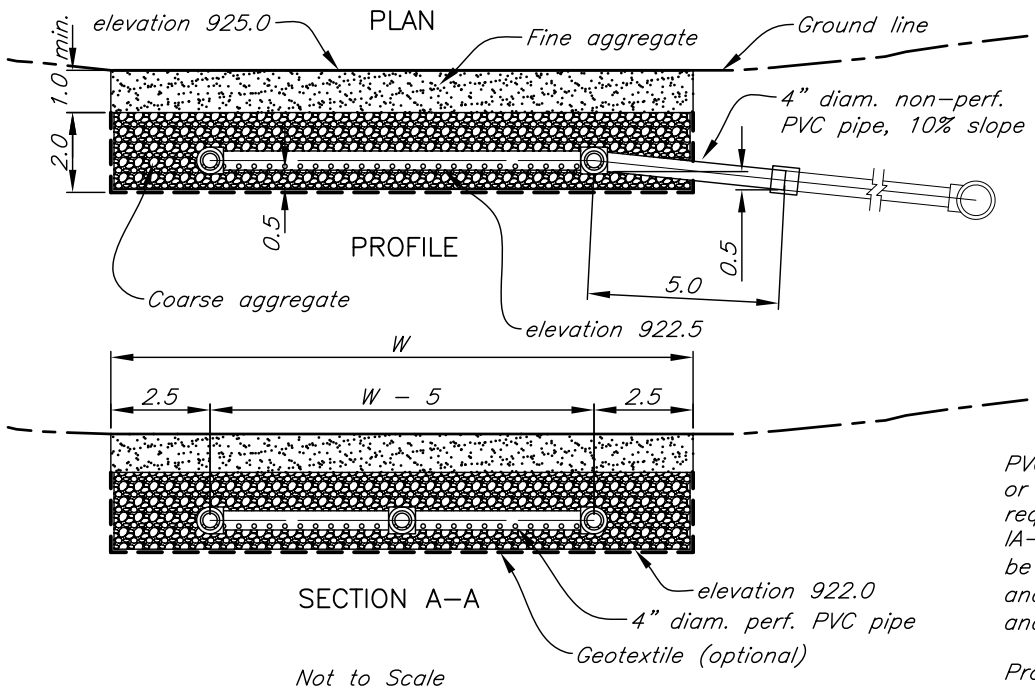
AGGREGATE GRADATION REQUIREMENTS

Coarse Aggregate

U.S. Sieve Designation	% 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 Aggregate

U.S. Sieve Designation	% 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



Not to Scale

INLET SIZING

P = 15 ft.
n = 3 pipes
L = 15 ft.
W = 15 ft.

Maximum P = 20 ft.
Maximum n = 5 pipes

Design Flow Rate
Q = 0.75 cfs

NOTES:

PVC pipe shall be Schedule 40 or thicker and shall meet the requirements of Specification IA−45. Perforation size shall be 3/8", positioned at 4:30 and 7:30 o'clock (90° apart), and spaced every 3".

Provide geotextile if site soils are known to be highly erosive or dispersive, or if needed for separation due to conditions during installation.

The ability of the blind inlet to remove water at the design flow rate is dependent on an appropriately sized outlet system and maintenance of a clean sand surface.

QUANTITIES

Excavation	25	Cu. Yd.
Geotextile	40	Sq. Yd.
Coarse Aggregate	17	Cu. Yd.
Fine Aggregate	8	Cu. Yd.
4" diam. perf. PVC pipe	50	Lin. Ft.
4" diam. non−perf. PVC pipe	5	Lin. Ft.

STANDARD DWG. IA−1550

DATE June 2013 | PAGE 1 OF 1

United States Department of Agriculture
Natural Resources Conservation Service

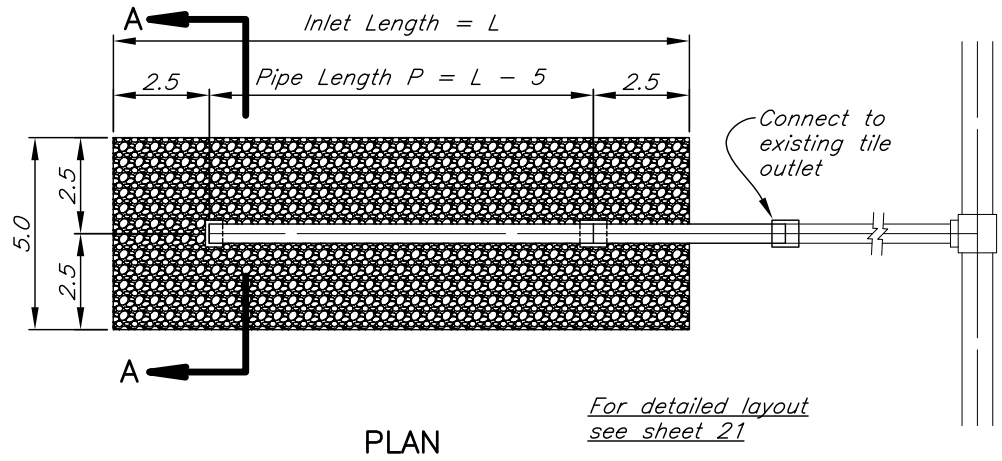
BLIND INLET Multi−Pipe Layout

Owner: Thunderbridge Farms LLC t8452

Location: Sec 26, T 88 N, R 13 W
Black Hawk County, Iowa

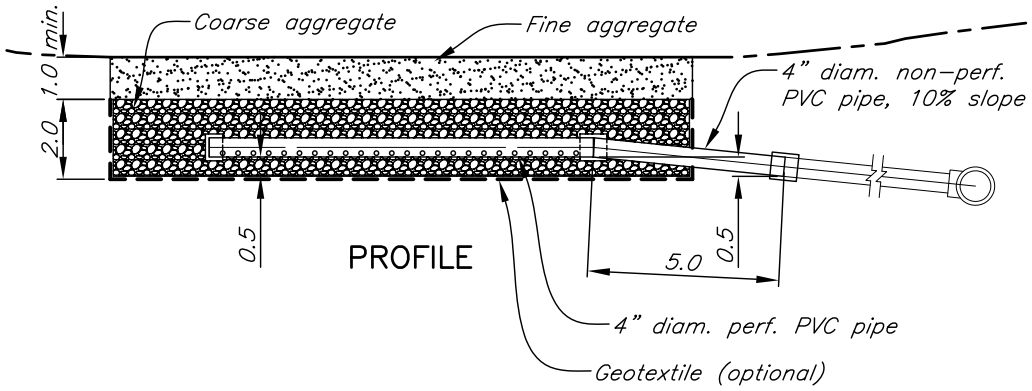
Designed Jeff A. Lutz 10/22 (Date)
Drawn Jeff A. Lutz 10/22
Checked
Approved

File Name
Drawing Name
Sheet 28 of 39

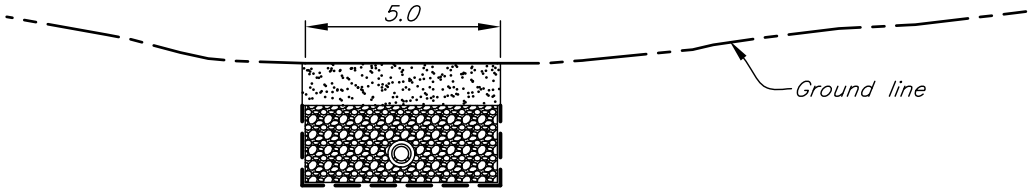


PLAN

For detailed layout see sheet 21



PROFILE



SECTION A−A

Not to Scale

AGGREGATE GRADATION REQUIREMENTS

Coarse Aggregate

U.S. Sieve Designation	% 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 Aggregate

U.S. Sieve Designation	% 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

P = 14 ft.
L = 18 ft.
Maximum L = 40 ft.

Design Flow Rate
Q = 0.33 cfs

QUANTITIES

Excavation	20	Cu. Yd.
Geotextile	52	Sq. Yd.
Coarse Aggregate	16	Cu. Yd.
Fine Aggregate	3.3	Cu. Yd.
4" diam. perf. PVC pipe	14	Lin. Ft.
4" diam. non−perf. PVC pipe	5	Lin. Ft.

NOTES:

PVC pipe shall be Schedule 40 or thicker and shall meet the requirements of Specification IA−45. Perforation size shall be 3/8", positioned at 4:30 and 7:30 o'clock (90° apart), and spaced every 3".

Provide geotextile if site soils are known to be highly erosive or dispersive, or if needed for separation due to conditions during installation.

The ability of the blind inlet to remove water at the design flow rate is dependent on an appropriately sized outlet system and maintenance of a clean sand surface.

STANDARD DWG. IA−1551

DATE June 2013 | PAGE 1 OF 1

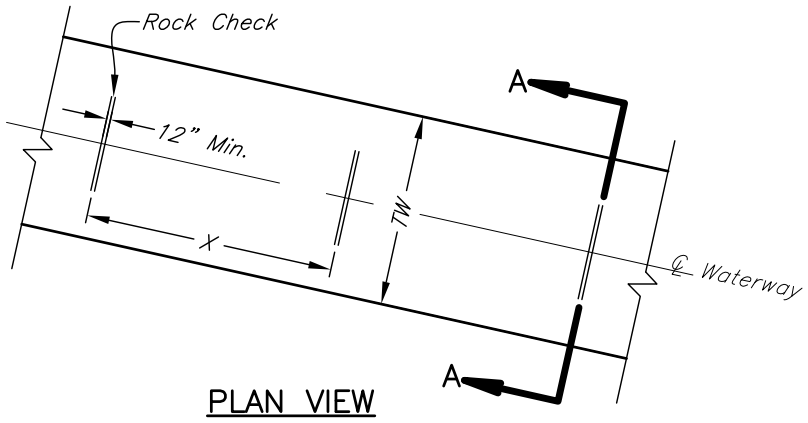
United States Department of Agriculture
Natural Resources Conservation Service

BLIND INLET
Single Pipe Layout

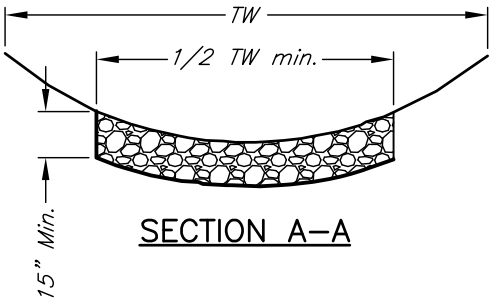
Owner: Thunderbridge Farms LLC t8452
Location: Sec 26, T 88 N, R 13 W
Black Hawk County, Iowa

Designed Jeff A. Lutz 10/22 (Date)
Drawn Jeff A. Lutz 10/22
Checked
Approved

File Name
Drawing Name
Sheet 29 of 39



PLAN VIEW



SECTION A–A

Notes:

1. *Excavate trench a minimum 12 inches wide (thickness), not to exceed 18 inches.*
2. *Rock shall be graded according to the table shown.*
3. *Compact rock backfill by rolling with construction equipment.*
4. *Finished rock surface will be flush with the ground surface.*

ROCK GRADATION: D50=3"–4"	
Size	% Passing By Weight
50 lb.	100
10 lb.	30–70
1 lb.	0–16

[½TW min. _____ft X THICKNESS_____in/12 X TRENCH DEPTH _____in/12] / [27 cu ft/cu yd] X 1.6 tons/cu yd = _____ tons per rock check

Rock Check Data								
Waterway Number	Start Station	End Station	Check Spacing (X)	No. of Checks	Check Width (Section A–A)	Thickness (in)	Depth (in)	Total (Ton)
MAIN	26+27	27+01	37	3	46	24	18	24.5
MAIN	32+39	---	---	1	40	24	18	7.1
							Totals:	31.6

Waterway Grade	Maximum Spacing between Checks
0 to 1.5 percent	100 Feet
1.5 to 3.0 percent	75 Feet
Greater than 3 percent	50 Feet

IOWA STANDARD DWG. NO. 1509

DATE Sept. 2009 | Page 1 OF 1

USDA United States Department of Agriculture

Natural Resources Conservation Service

PARABOLIC ROCK CHECK DETAIL

Owner: Thunderbridge Farms LLC t8452

Location: Sec. 26, T 88 N, R 13 W

Orange Township

Black Hawk, County, Iowa

Designed Jeff A. Lutz 7/2022 Date

Drawn Jeff A. Lutz 7/2022

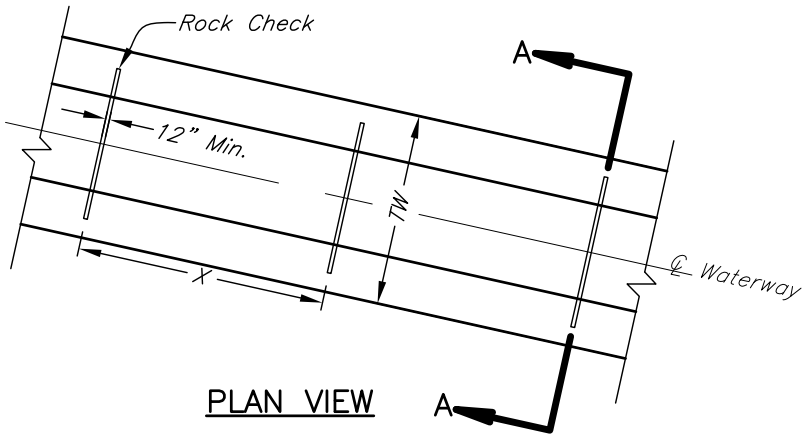
Checked

Approved

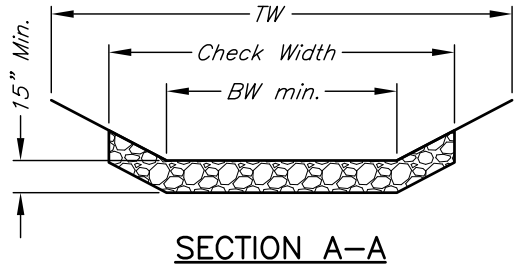
File Name

Drawing Name

Sheet 30 of 39



PLAN VIEW



SECTION A–A

Notes:
1. *Excavate trench a minimum 12 inches wide (thickness), not to exceed 18 inches.*
2. *Rock shall be graded according to the table shown.*
3. *Compact rock backfill by rolling with construction equipment.*
4. *Finished rock surface will be flush with the ground surface.*

ROCK GRADATION: D50=3"–4"	
Size	% Passing By Weight
50 lb.	100
10 lb.	30–70
1 lb.	0–16

[BW _____ft X THICKNESS_____in/12 X TRENCH DEPTH _____in/12] / [27 cu ft/cu yd] X 1.6 tons/cu yd = _____ tons per rock check

Rock Check Data								
Waterway Number	Start Station	End Station	Check Spacing (X)	No. of Checks	Check Width (Section A–A)	Thickness (in)	Depth (in)	Total (Ton)
FS ww Me	12+77	13+17	20'	3	24'	24	18	12.8
bW FS ww	2+84	---	---	1	24'	24	18	4.3
bW FS ww	3+12	5+12	50'	5	16'	24	18	14.2
bW FS ww	6+23	6+47	24'	2	24'	24	18	8.5
bW FS ww	9+25	9+85	20'	4	24'	24	18	17.1
							Totals:	56.9

Waterway Grade	Maximum Spacing between Checks
0 to 1.5 percent	100 Feet
1.5 to 3.0 percent	75 Feet
Greater than 3 percent	50 Feet

IOWA STANDARD DWG. NO. 1507

DATE Sept. 2009 | PAGE 1 OF 1

USDA United States Department of Agriculture

Natural Resources Conservation Service

TRAPEZOIDAL ROCK CHECK DETAIL

Owner: Thunderbridge Farms LLC t8452

Location: Sec. 26, T 88 N, R 13 W

Orange Township

Black Hawk County, Iowa

Designed Jeff A. Lutz 7/2022 Date

Drawn Jeff A. Lutz 7/2022

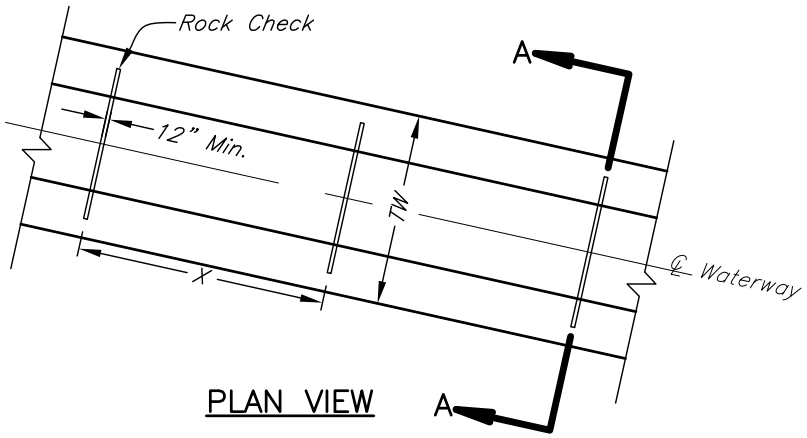
Checked

Approved

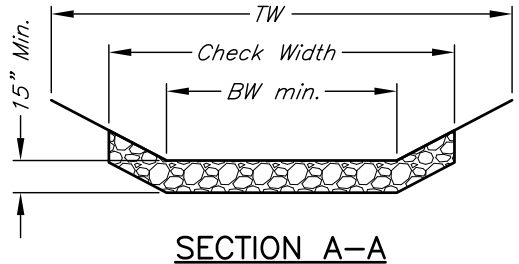
File Name

Drawing Name

Sheet 31 of 39



PLAN VIEW



SECTION A–A

Notes:

1. *Excavate trench a minimum 12 inches wide (thickness), not to exceed 18 inches.*
2. *Rock shall be graded according to the table shown.*
3. *Compact rock backfill by rolling with construction equipment.*
4. *Finished rock surface will be flush with the ground surface.*

ROCK GRADATION: D50=3"–4"	
Size	% Passing By Weight
50 lb.	100
10 lb.	30–70
1 lb.	0–16

[BW _____ft X THICKNESS_____in/12 X TRENCH DEPTH _____in/12] / [27 cu ft/cu yd] X 1.6 tons/cu yd = _____ tons per rock check

Rock Check Data								
Waterway Number	Start Station	End Station	Check Spacing (X)	No. of Checks	Check Width (Section A–A)	Thickness (in)	Depth (in)	Total (Ton)
Div ww N	10+23.3	10+33.3	10'	2	26'	24	18	9.2
Dlv ww N	11+74	12+49	75'	2	20'	24	18	7.1
Div ww N	12+99	13+99	50'	3	20'	24	18	10.7
							Totals:	27.0

Waterway Grade	Maximum Spacing between Checks
0 to 1.5 percent	100 Feet
1.5 to 3.0 percent	75 Feet
Greater than 3 percent	50 Feet

IOWA STANDARD DWG. NO. 1507

DATE Sept. 2009 | PAGE 1 OF 1

USDA United States Department of Agriculture

Natural Resources Conservation Service

TRAPEZOIDAL ROCK CHECK DETAIL

Owner: Thunderbridge Farms LLC t8452

Location: Sec. 26, T 88 N, R 13 W

Orange Township

Black Hawk County, Iowa

Designed Jeff A. Lutz 7/2022 Date

Drawn Jeff A. Lutz 7/2022

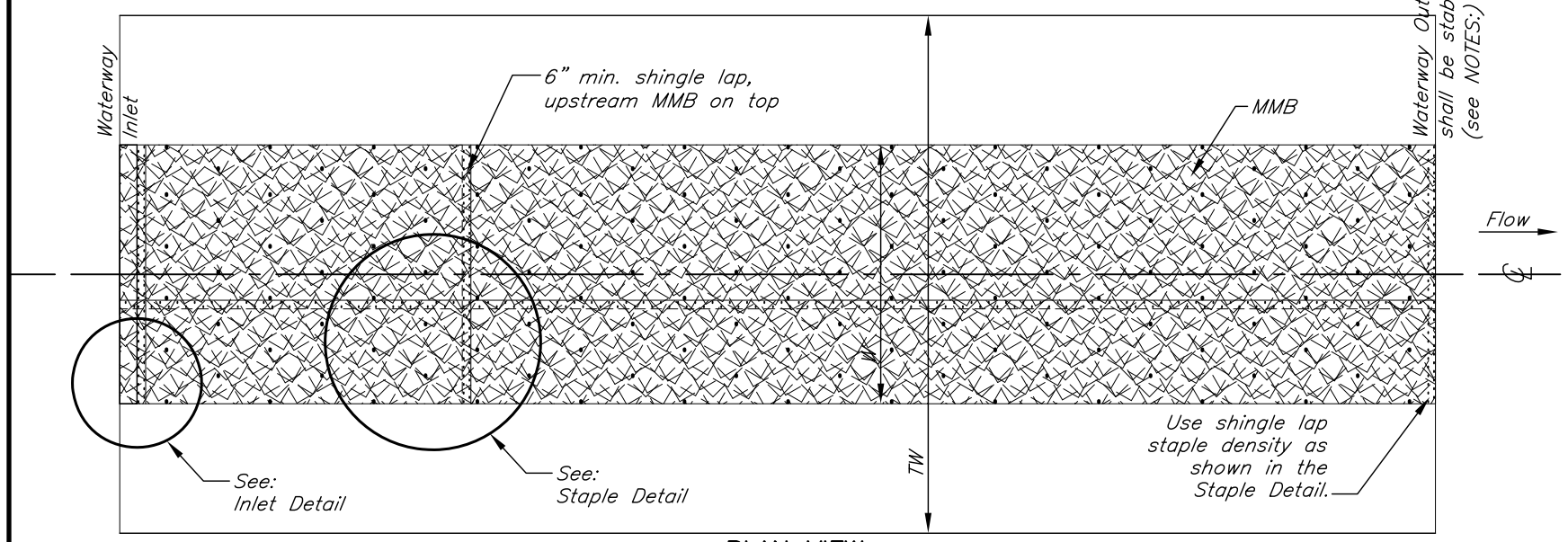
Checked

Approved

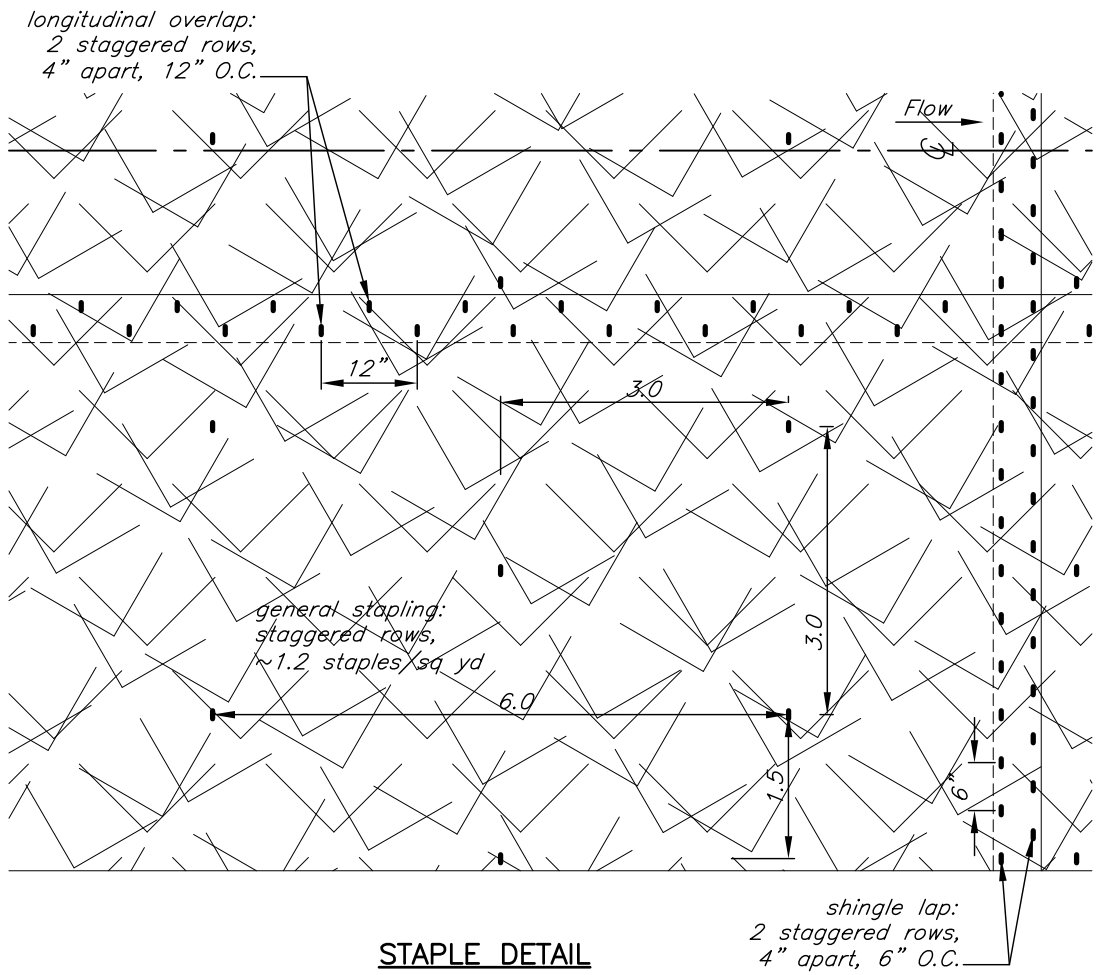
File Name

Drawing Name

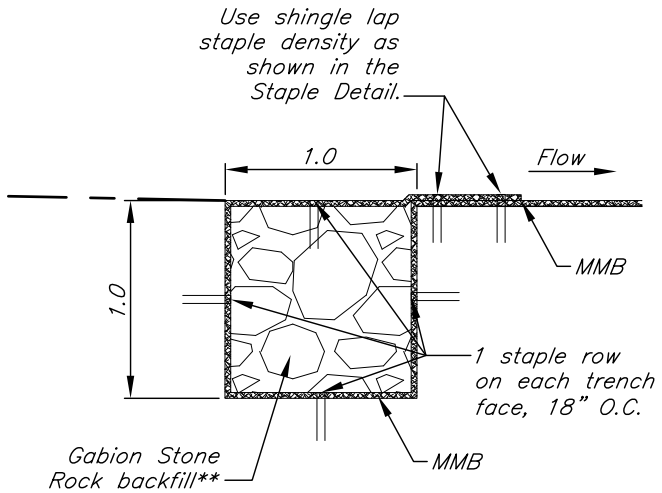
Sheet 32 of 39



PLAN VIEW

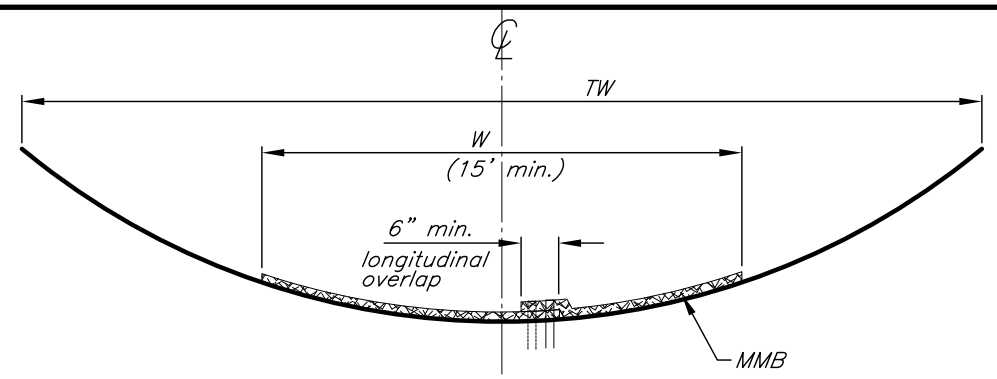


STAPLE DETAIL



** See Note 9 for earthfill option

INLET DETAIL



TYPICAL SECTION

NOTES:

1. Products available for manufactured mulch blanket applications are commercially referred to as: ECB – Erosion Control Blanket or RECP – Rolled Erosion Control Product
2. This Standard Drawing complies with NRCS Conservation Practice Standard, 484 Mulching. It shall not be used with NRCS Conservation Practice Standard, 468 Lined Waterway or Outlet.
3. The manufactured mulch blanket (MMB) shall be double netted (top and bottom) with a mulch medium between the nets comprised of one of the following:

   Straw Coconut Fiber Straw/Coconut Fiber Wood Excelsior other:

4. Minimum dry weight per surface area requirements (ASTM D6475) shall be 0.5 lb/sq yd or meet criteria of FHWA FP-03, Rolled Erosion Control Product Type 2.D, short-term double-net erosion control blankets.
5. All constructed finished grades, seedbed preparation, fertilizing, and seeding shall be approved by NRCS before installation of the MMB.
6. MMB shall be laid parallel to the direction of flow. Spread evenly without stretching to allow maximum contact with the soil.
7. U-Staples or Round Top-Single Stem-Wire Staples may be used as directed by the Engineer. U-Staples are to have a 1" crown and be 11 gauge or heavier wire (see Required Staple Length table below for lengths related to soil conditions). Round Top Staples may only be available in 6 inch lengths and not suitable for all soil conditions. Indicate staple to be used:

   U-Staple Round Top-Single Stem Staple

8. Staples shall be inset 1" min. from all blanket edges.
9. Rock backfill shall meet the quality and gradation found in Iowa DOT Standard Specification Section 4130, GABION STONE.

   Compacted earthfill may be used as directed by the Engineer. Earthfill shall be compacted in lifts no greater than 4 inches to a density equivalent to that of the surrounding native soil. Care should be taken to not tear the MMB. Add 1 additional staple row to the top face of the trench backfill, 18" O.C.
10. Lateral waterways with MMB shall be shingle lapped over the Main waterway MMB. Lateral waterways without MMB shall use a shingle lap staple density on the Main waterway MMB edge for a distance equal to the width of the Lateral waterway entering the Main waterway.
11. The Waterway Outlet staple pattern is only allowed for stable outlet conditions (i.e. Lateral into a Main). A waterway requiring a grade stabilization structure shall have the MMB outlet termination anchoring incorporated into the inlet portion of the grade stabilization structure.

Manufactured Mulch Blanket Data

Waterway Number	Start Station	End Station	Staple Length: L (in)	MMB Width: W (ft)	MMB Length (ft)	MMB Plan Area (sq yd)	Staple Quantity (no.)	Rock Quantity (ton)
MAIN	26+00	31+50	6	48'	550'	3000	8400	0
					TOTALS:	3000	8400	0

Required Staple Length

Soil Condition	L (in)
Highly compacted soils	6
Friable soils	8
Loose or Sandy soils	10

NOT TO SCALE

STANDARD DWG. IA-1520

DATE: March 2019 | SHEET 1 OF 1

Designed Jeff A. Lutz 7/2022
Drawn Jeff A. Lutz 7/2022
Checked
Approved

Manufactured Mulch Blanket (MMB) for Parabolic Grassed Waterways

Thunderbridge Farms LLC t8452

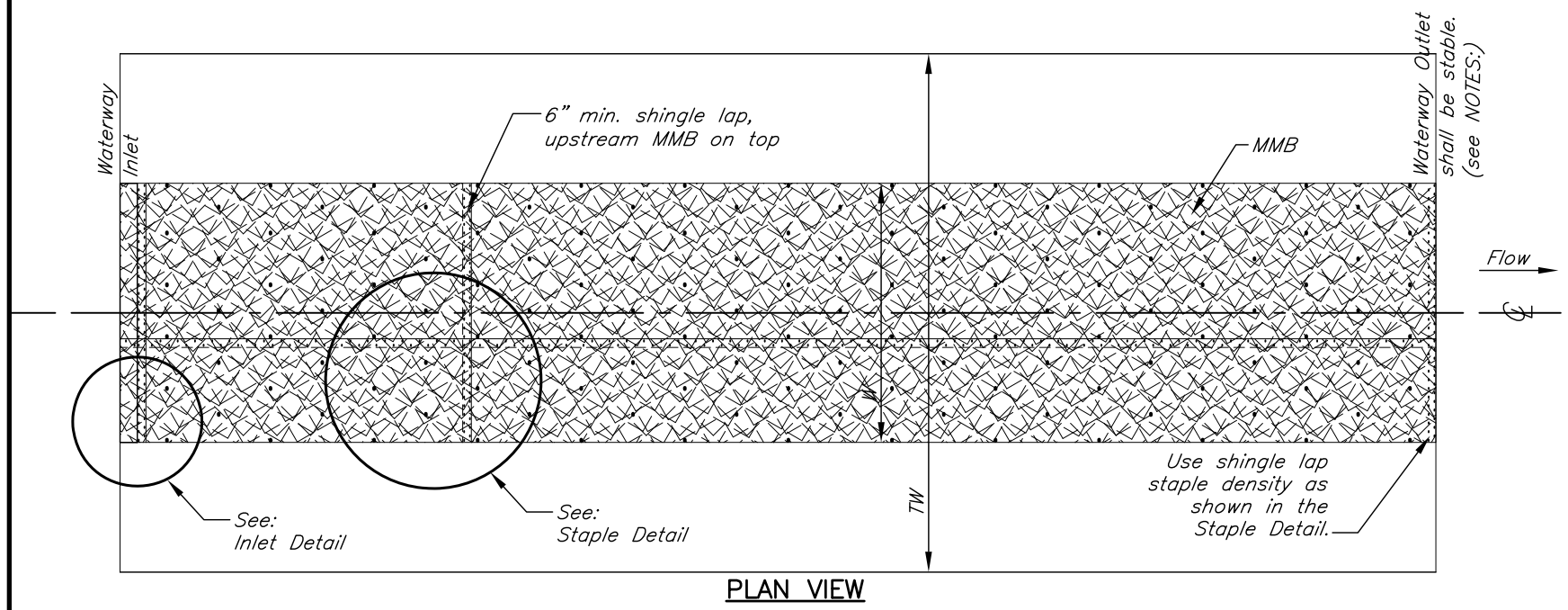
Black Hawk County, Iowa

United States Department of Agriculture
Natural Resources Conservation Service

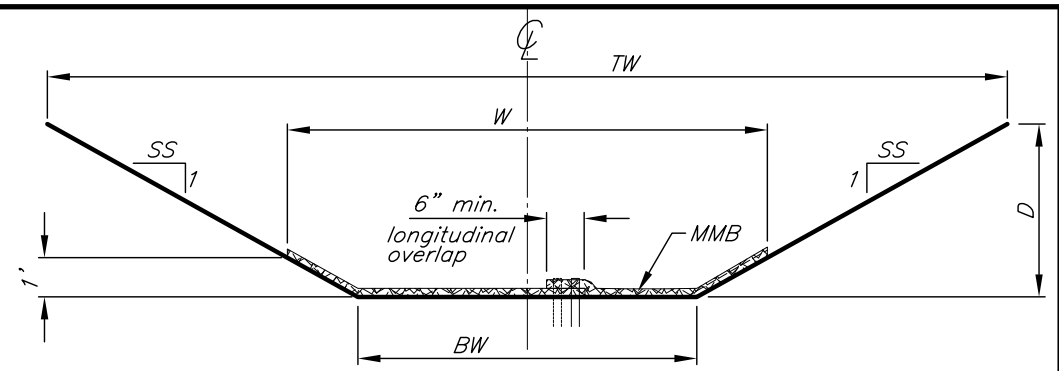
File No.

Drawing No.

Sheet 33 of 39



PLAN VIEW



TYPICAL SECTION

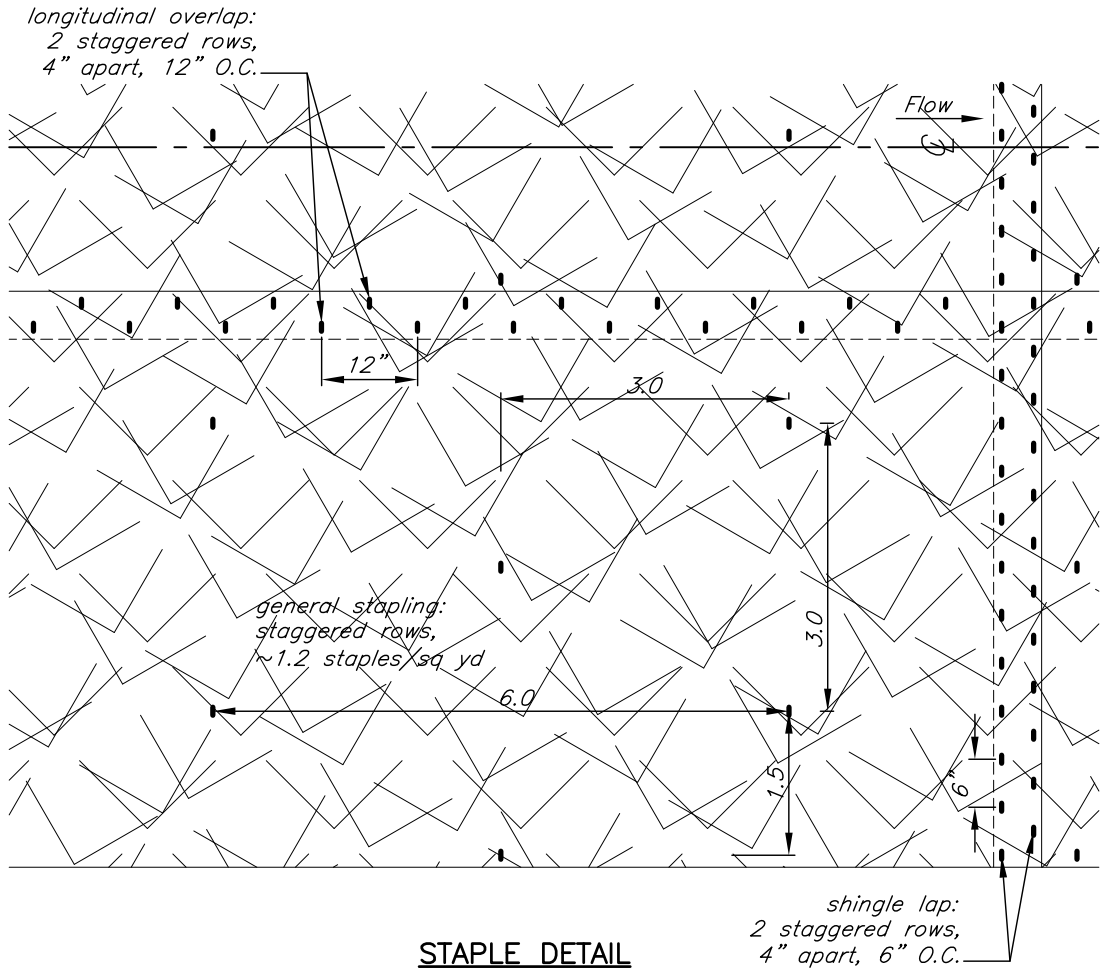
NOTES:

1. Products available for manufactured mulch blanket applications are commercially referred to as: ECB – Erosion Control Blanket or RECP – Rolled Erosion Control Product
2. This Standard Drawing complies with NRCS Conservation Practice Standard, 484 Mulching. It shall not be used with NRCS Conservation Practice Standard, 468 Lined Waterway or Outlet.
3. The manufactured mulch blanket (MMB) shall be double netted (top and bottom) with a mulch medium between the nets comprised of one of the following:

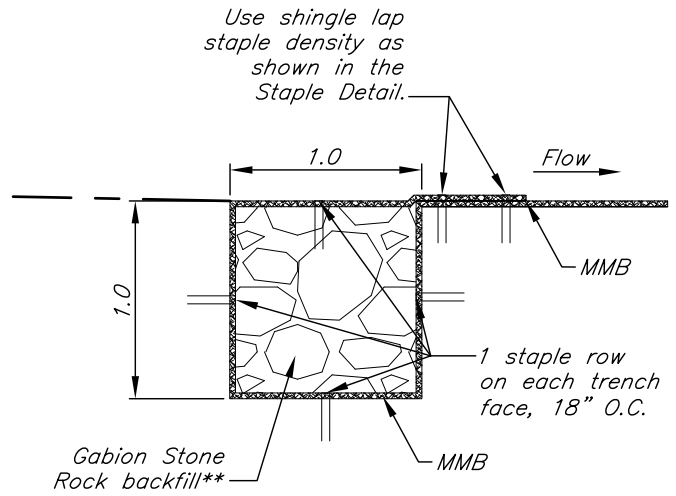
   Straw Coconut Fiber Straw/Coconut Fiber Wood Excelsior other:
4. Minimum dry weight per surface area requirements (ASTM D6475) shall be 0.5 lb/sq yd or meet criteria of FHWA FP–03, Rolled Erosion Control Product Type 2.D, short–term double–net erosion control blankets.
5. All constructed finished grades, seedbed preparation, fertilizing, and seeding shall be approved by NRCS before installation of the MMB.
6. MMB shall be laid parallel to the direction of flow. Spread evenly without stretching to allow maximum contact with the soil.
7. U–Staples or Round Top–Single Stem–Wire Staples may be used as directed by the Engineer. U–Staples are to have a 1" crown and be 11 gauge or heavier wire (see Required Staple Length table below for lengths related to soil conditions). Round Top Staples may only be available in 6 inch lengths and not suitable for all soil conditions. Indicate staple to be used:

   U–Staple Round Top–Single Stem Staple
8. Staples shall be inset 1" min. from all blanket edges.
9. Rock backfill shall meet the quality and gradation found in Iowa DOT Standard Specification Section 4130, GABION STONE.

   Compacted earthfill may be used as directed by the Engineer. Earthfill shall be compacted in lifts no greater than 4 inches to a density equivalent to that of the surrounding native soil. Care should be taken to not tear the MMB. Add 1 additional staple row to the top face of the trench backfill, 18" O.C.
10. Lateral waterways with MMB shall be shingle lapped over the Main waterway MMB. Lateral waterways without MMB shall use a shingle lap staple density on the Main waterway MMB edge for a distance equal to the width of the Lateral waterway entering the Main waterway.
11. The Waterway Outlet staple pattern is only allowed for stable outlet conditions (i.e. Lateral into a Main). A waterway requiring a grade stabilization structure shall have the MMB outlet termination anchoring incorporated into the inlet portion of the grade stabilization structure.



STAPLE DETAIL



** See Note 9 for earthfill option

INLET DETAIL

* This covers 50' stub length to junction @ Station 6+58

Required Staple Length	
Soil Condition	L (in)
Highly compacted soils	6
Friable soils	8
Loose or Sandy soils	10

Manufactured Mulch Blanket Data

	Waterway Number	Start Station	End Station	Staple Length: L (in)	MMB Width: W (ft)	MMB Length (ft)	MMB Plan Area (sq yd)	Staple Quantity (no.)	Rock Quantity (ton)
	FS ww Me	12+76	13+26	6	32'	55'	196	550	0
	FS ww Me	13+42	16+73	6	16'	336'	598	1680	0
	bW FS ww	2+82.9	2+93.9	6	24'	11'	43	120	0
	bW FS ww	3+10.9	6+00.9	6	16'	295'	525	1470	0
	bW FS ww	6+21.9	6+51.9	6	32'	35'	125	350	0
*–	bW FS ww	6+08	7+08	6	16'	105'	187	530	0
	bW FS ww	9+24	9+94	6	32'	75'	267	750	0
						TOTALS:	1941	5450	0

NOT TO SCALE

STANDARD DWG. IA–1521

DATE: June 2019 | SHEET 1 OF 1

Date 7/2022
Designed Jeff A. Lutz
Drawn Jeff A. Lutz 7/2022
Checked
Approved

Manufactured Mulch Blanket (MMB) for Trapezoidal Grassed Waterways

Black Hawk County, Iowa

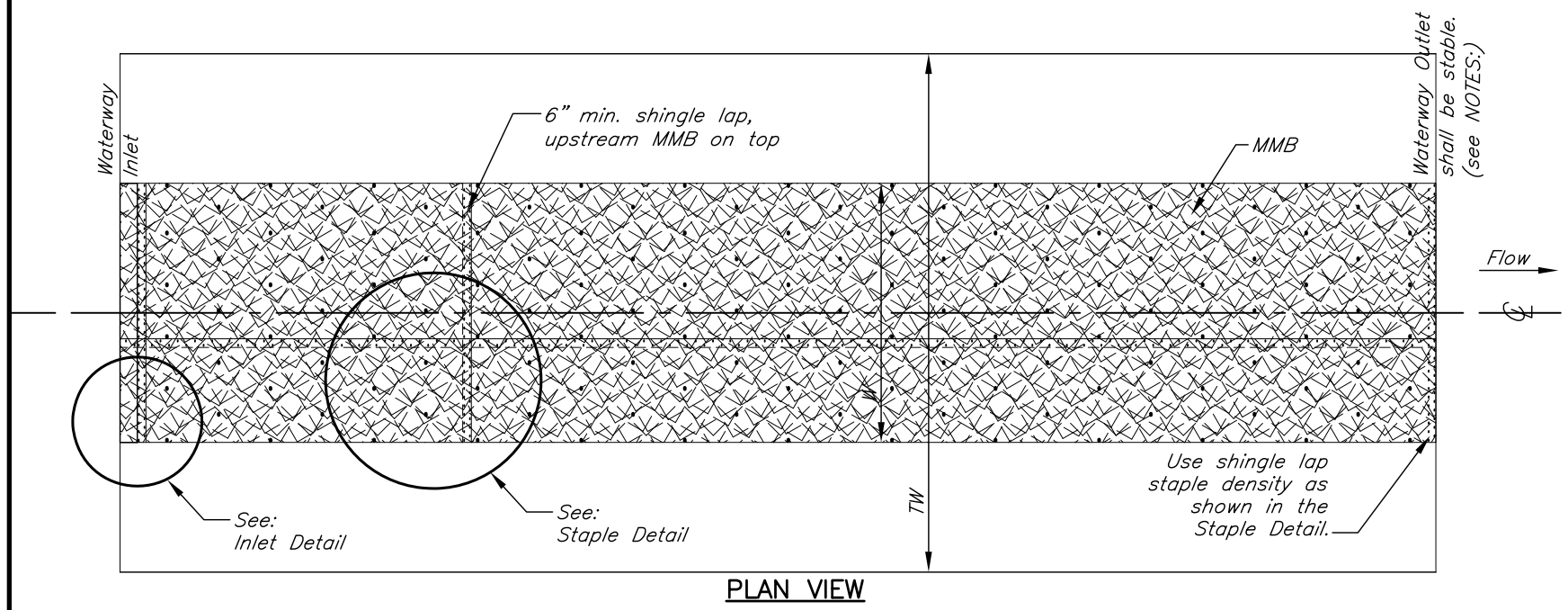
Thunderbridge Farms LLC t8452

United States Department of Agriculture
Natural Resources Conservation Service

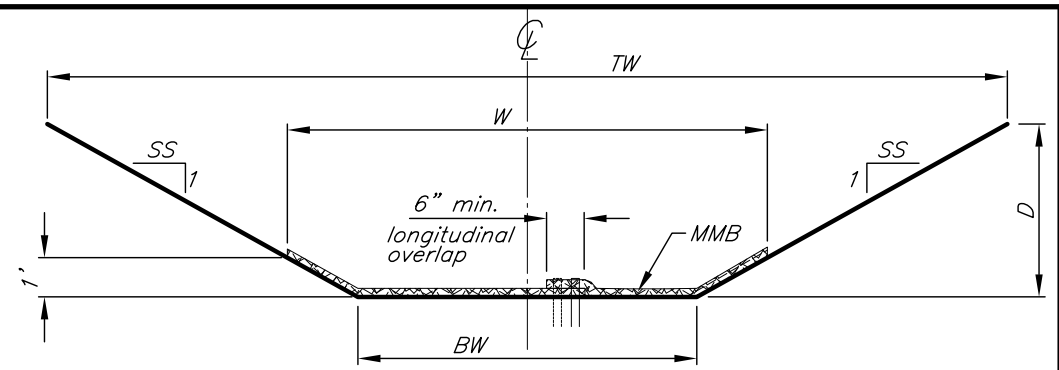
File No.

Drawing No.

Sheet 34 of 39



PLAN VIEW



TYPICAL SECTION

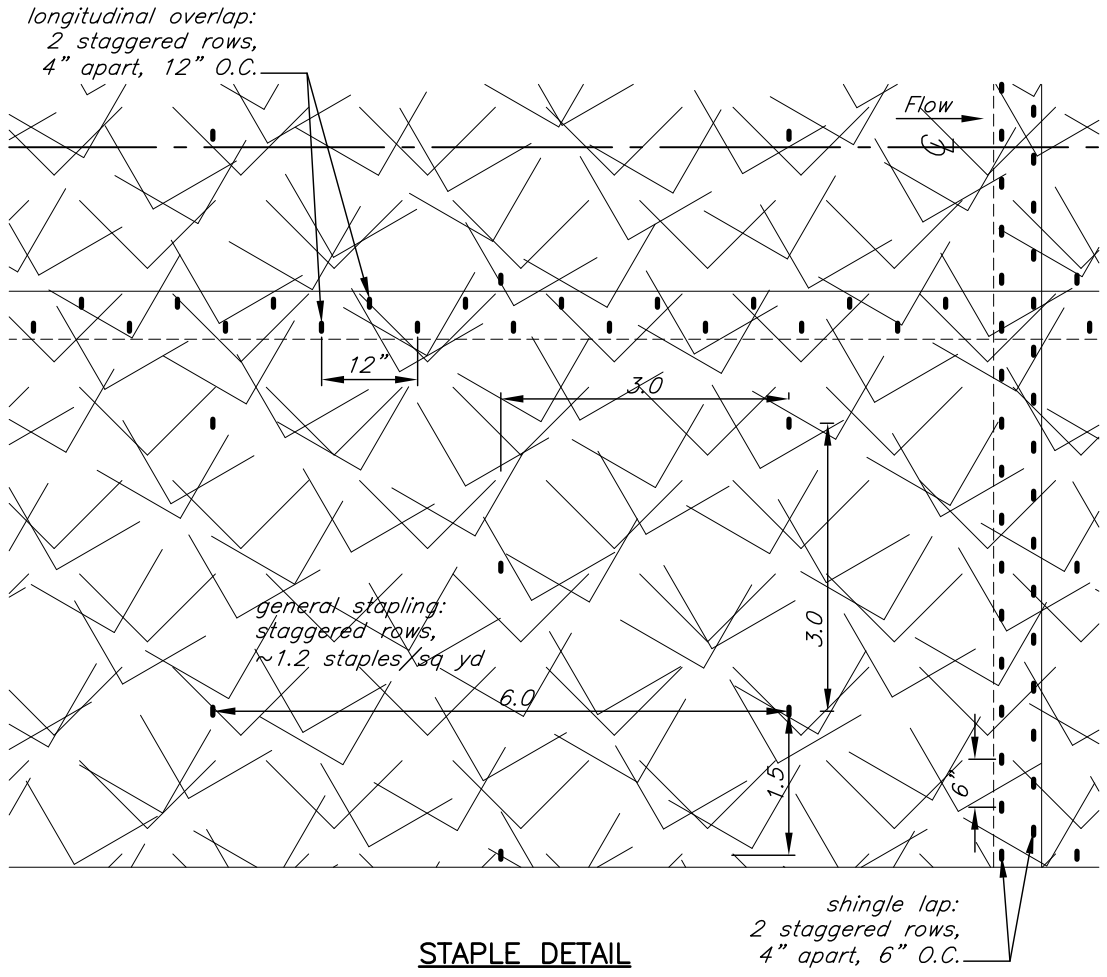
NOTES:

1. Products available for manufactured mulch blanket applications are commercially referred to as: ECB – Erosion Control Blanket or RECP – Rolled Erosion Control Product
2. This Standard Drawing complies with NRCS Conservation Practice Standard, 484 Mulching. It shall not be used with NRCS Conservation Practice Standard, 468 Lined Waterway or Outlet.
3. The manufactured mulch blanket (MMB) shall be double netted (top and bottom) with a mulch medium between the nets comprised of one of the following:

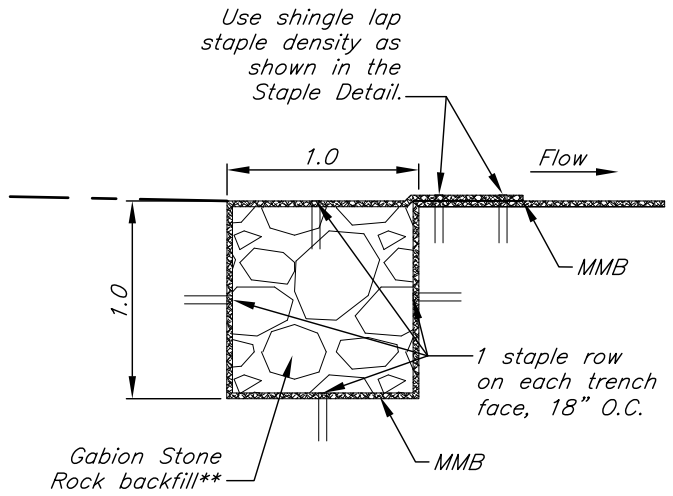
   Straw Coconut Fiber Straw/Coconut Fiber Wood Excelsior other:
4. Minimum dry weight per surface area requirements (ASTM D6475) shall be 0.5 lb/sq yd or meet criteria of FHWA FP-03, Rolled Erosion Control Product Type 2.D, short-term double-net erosion control blankets.
5. All constructed finished grades, seedbed preparation, fertilizing, and seeding shall be approved by NRCS before installation of the MMB.
6. MMB shall be laid parallel to the direction of flow. Spread evenly without stretching to allow maximum contact with the soil.
7. U-Staples or Round Top-Single Stem-Wire Staples may be used as directed by the Engineer. U-Staples are to have a 1" crown and be 11 gauge or heavier wire (see Required Staple Length table below for lengths related to soil conditions). Round Top Staples may only be available in 6 inch lengths and not suitable for all soil conditions. Indicate staple to be used:

   U-Staple Round Top-Single Stem Staple
8. Staples shall be inset 1" min. from all blanket edges.
9. Rock backfill shall meet the quality and gradation found in Iowa DOT Standard Specification Section 4130, GABION STONE.

   Compacted earthfill may be used as directed by the Engineer. Earthfill shall be compacted in lifts no greater than 4 inches to a density equivalent to that of the surrounding native soil. Care should be taken to not tear the MMB. Add 1 additional staple row to the top face of the trench backfill, 18" O.C.
10. Lateral waterways with MMB shall be shingle lapped over the Main waterway MMB. Lateral waterways without MMB shall use a shingle lap staple density on the Main waterway MMB edge for a distance equal to the width of the Lateral waterway entering the Main waterway.
11. The Waterway Outlet staple pattern is only allowed for stable outlet conditions (i.e. Lateral into a Main). A waterway requiring a grade stabilization structure shall have the MMB outlet termination anchoring incorporated into the inlet portion of the grade stabilization structure.



STAPLE DETAIL



** See Note 9 for earthfill option

INLET DETAIL

Manufactured Mulch Blanket Data

Waterway Number	Start Station	End Station	Staple Length: L (in)	MMB Width: W (ft)	MMB Length (ft)	MMB Plan Area (sq yd)	Staple Quantity (no.)	Rock Quantity (ton)
Div ww N	10+15	10+47	6	32'	37'	132	400	0
Div ww N	10+50	14+60	6	16'	415'	738	2100	0
					TOTALS:	870	2500	0

Required Staple Length

Soil Condition	L (in)
Highly compacted soils	6
Friable soils	8
Loose or Sandy soils	10

NOT TO SCALE

STANDARD DWG. IA-1521

DATE: June 2019 | SHEET 1 OF 1

Designed Jeff A. Lutz 7/2022
Drawn Jeff A. Lutz 7/2022
Checked
Approved

Manufactured Mulch Blanket (MMB) for Trapezoidal Grassed Waterways

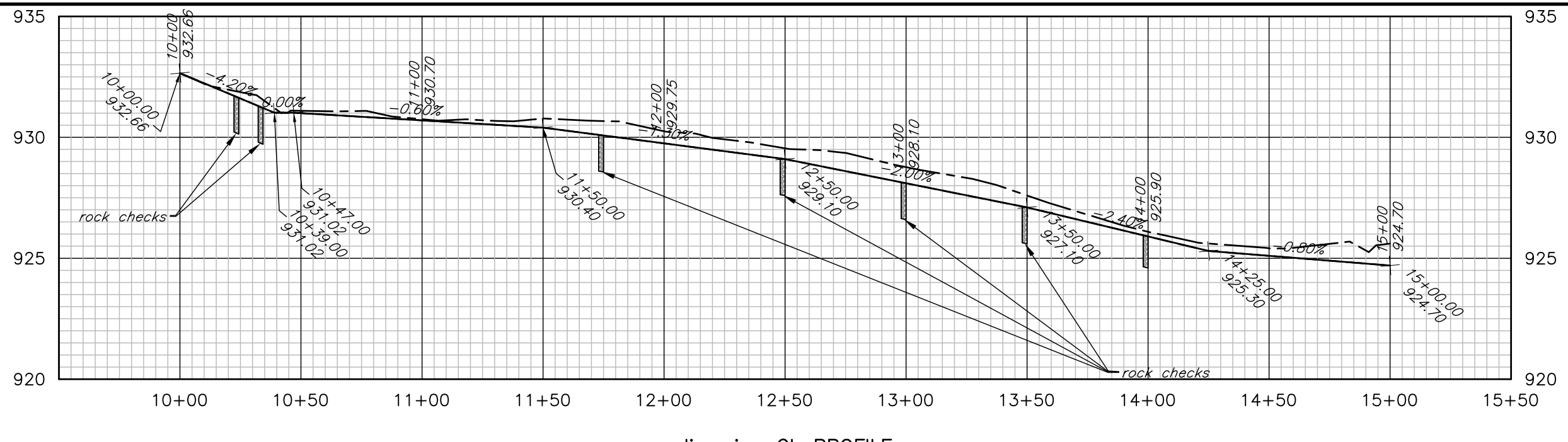
Black Hawk County, Iowa

Thunderbridge Farms LLC t8452

United States Department of Agriculture
Natural Resources Conservation Service

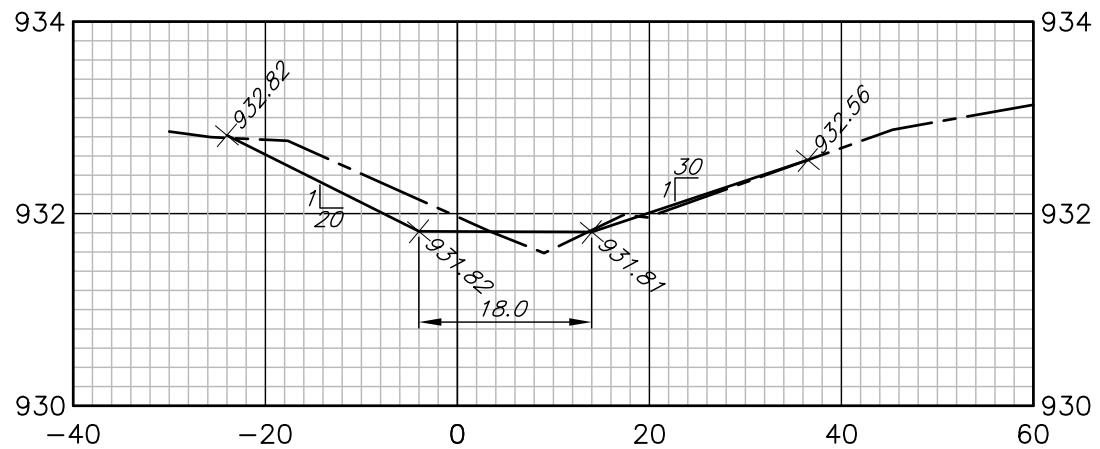
File No.

Drawing No.

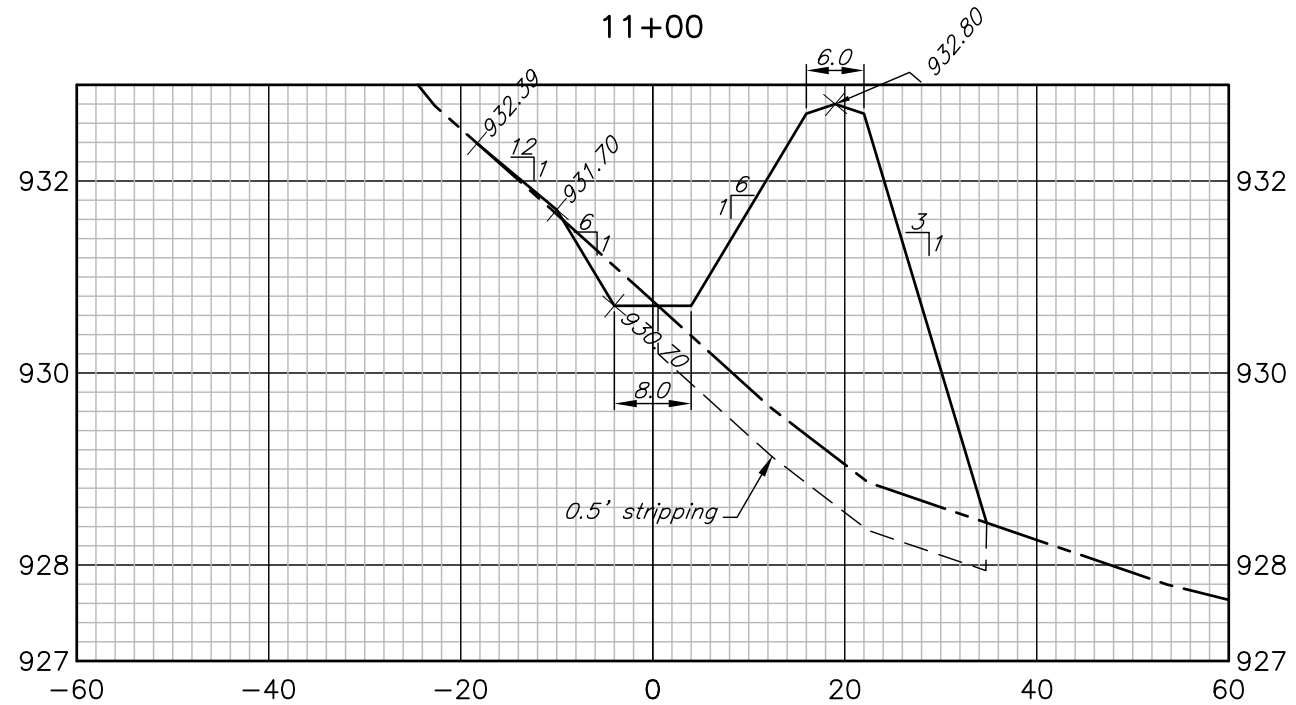


diversion CL PROFILE

10+20



11+00



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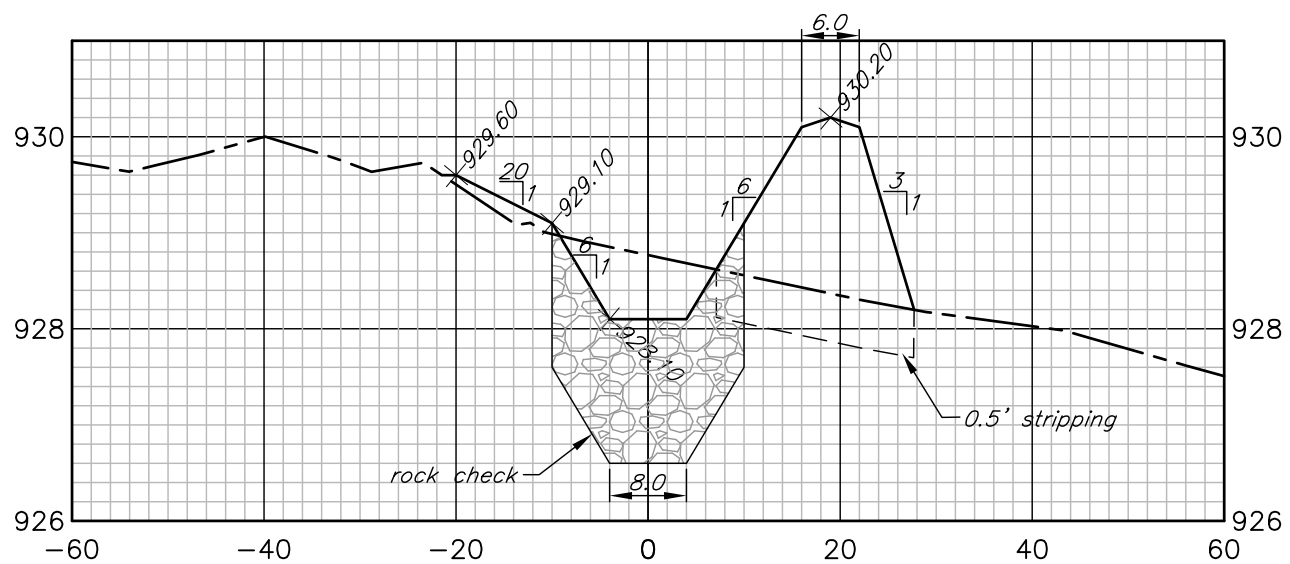
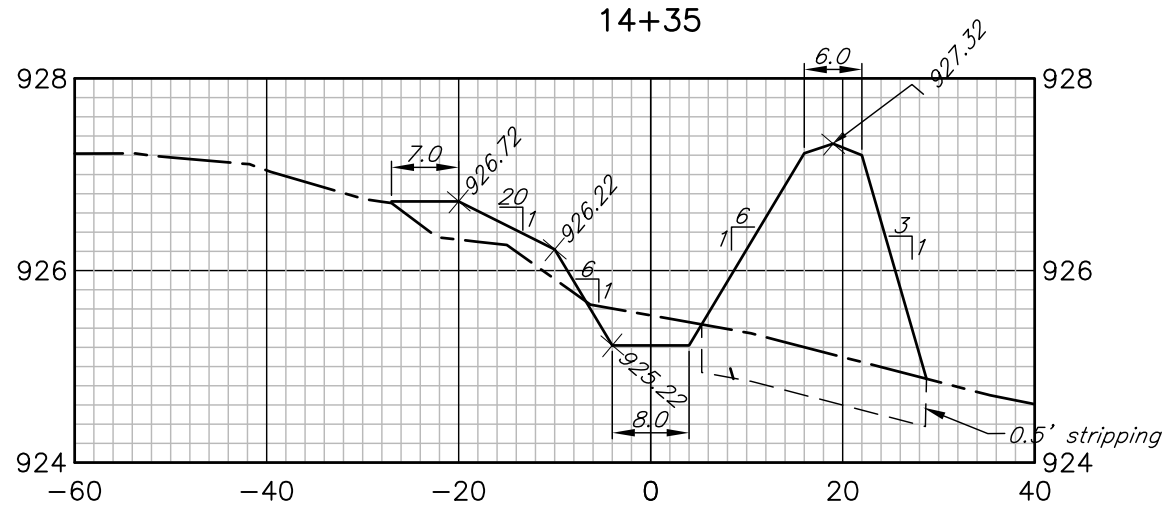


14+35



		Date
Designed	Jeff A. Lutz	10/2022
Drawn	Jeff A. Lutz	10/2022
Checked	.	.
Approved	.	.

Thunderbridge Farms LLC t8452
Grassed ww's & Dike Wetland

PROFILE & CROSS SECTIONS Diversion Waterway North

SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww BLACK
Drawing Name: ww3.dwg

Sheet 36 of .

927.26
TBM 2

easement boundary 9.21 acres

upland seeding area
445,358 sq. ft ~ 10.22 acres

187.9

wetland temporary pool 0.06 acre @ elevation 918.1

115.0

904.7

729.8

wet seeding area 164,178 sq. ft. ~ 3.77 acres

wetland temporary pool 1.25 acres @ elevation 916.9

916.90
TBM 1

N

140 0 140 280 420
Scale in Feet

Designed Jeff A. Lutz 11-1-2018
Drawn Jeff A. Lutz 10-2022
Checked .
Approved .

Thunderbridge Farms LLC t10992
Grassed ww's & Dike Wetland Day-lighted Tile
PLAN VIEW Seeding Areas
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Blake Hollis
t10992 ww
BLACK HAWK.dwg

Drawing No.

Sheet 7A of .

USDA NRCS
Natural Resources Conservation Service

IA - CPA - 4 REV.
September 2022
(File Code 180-12-12)

Seeding Plan

Name **Hollis 2022 RCPP 30:10 Mesic (Wetland Buffer)** Date **10/24/2022**
Prepared by **Chad Gilles** Tract No. **8452**
Field No. **Wetland Buffer**
Program: RCPP Acres: 10.20 Contract No.
Moisture Regime

Seeding Mix Summary

Grasses	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total
1	*Andropogon gerardii*	Big Bluestem	6.244	1.700	17.34
2	*Sorghastrum nutans*	Indiangrass	6.612	1.500	15.30
3	*Elymus virginicus*	Virginia Wildrye	1.543	1.000	10.20
4	*Panicum virgatum*	Switchgrass	3.960	0.770	7.85
5	*Sporobolus compositus*	Rough Dropseed	7.934	0.720	7.34
6	*Sporobolus heterolepis*	Prairie Dropseed	0.059	0.010	0.10
7	*Carex vulpinoidea*	Fox Sedge	3.673	0.100	1.02
		SUBTOTAL GRASSES	**30.024**	**5.800**	**59.160**

Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total
1	*Rudbeckia hirta*	Black-eyed Susan	1.859	0.055	0.56
2	*Ratibida pinnata*	Gray-headed Coneflower	0.937	0.085	0.87
3	*Helenium autumnale*	Sneezeweed	2.865	0.060	0.61
4	*Liatris pycnostachya*	Prairie Blazing Star	0.040	0.010	0.10
5	*Silphium terebinthinaceum*	Prairie Rosinweed	0.002	0.005	0.051
6	*Pycnanthemum virginianum*	Virginia Mountain Mint	0.404	0.005	0.051
7	*Bidens cernua*	Nodding Bur Marigold	0.039	0.005	0.051
8	*Silphium perfoliatum*	Cup Plant	0.003	0.005	0.051
9	*Hypericum ascyron*	Great St. John's Wort	2.094	0.030	0.31
10	*Zizia aurea*	Golden Alexander's	0.202	0.050	0.51
11	*Penstemon digitalis*	Foxglove Beardtongue	0.955	0.020	0.20
12	*Parthenium integrifolium*	Wild Quinine	0.026	0.010	0.10
13	*Eryngium yuccifolium*	Rattlesnake Master	0.028	0.010	0.10
14	*Coreopsis tripteris*	Tall Coreopsis	0.026	0.005	0.051
15	*Gentiana andrewsii*	Bottle Gentian, Closed Gentian	0.103	0.001	0.010
16	*Gentiana alba*	Cream Gentian	0.257	0.005	0.051
17	*Asclepias incarnata*	Swamp Milkweed	0.018	0.010	0.10
18	*Vernonia fasciculata*	Ironweed	0.176	0.020	0.20
		SUBTOTAL FORBS	**10.031**	**0.391**	**3.988**

Woody	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total
		SUBTOTAL VINES/WOODY	**0.000**	**0.000**	**0.000**
		TOTAL	**40.055**	**6.191**	**63.148**

Estimated Cost/Acre _____ **Estimated Total Cost** $0.00

	Soil Test Information	Total Needed lbs
Lime (ECCE) (Actual Lime)		
Nitrogen		
Phosphate (P205)		
Potash (K20)		

Seeding Dates: _____

Additional Seeding Criteria: _____

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

_____ _____
(Producer's Signature) (Date)

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

When seeding is completed, return seeding plan to the Natural Resources Conservation Services.
For CRP cost-share, return receipts to Farm Service Agency.
For all other cost-share projects, attach seed tags and receipts for seed, fertilizer, lime, etc.

Iowa NRCS
Supplement to Seeding Plan (IA-CPA-4)
Conservation Cover (327) Native Plant Seeding

Name: Hollis Farms RCPP Wetland County: Black Hawk

Field Number(s): Wetland Buffer Acres: 10.2 Tract: 8452

The client is responsible to ensure the seeding mix meets the conservation practice standard and conservation program requirements (if applicable). If the seeding mix is changed in any way, the client is responsible to ensure the updated seeding mix is approved by an NRCS Planner. Seeding mixes can be emailed to the conservation planner listed below. Clients are encouraged to work with their seed dealer to use the Iowa Native Seeding Calculator to make the approval process more efficient. The Iowa Native Seeding Calculator can be found at https://bit.ly/IANRCSNativeSeedingCalculator. Seeding a mixture that is not approved and does not meet conservation and/or program requirements could be denied financial assistance (cost share) and may result in a conservation program violation.

By signing, you are acknowledging:

a. **I received a seeding plan from NRCS.**
b. **I understand if changes to the plan are made, the changes need to be approved by an NRCS planner prior to purchase.**
c. **Updated seeding mixes can be sent by you or your seed dealer to the NRCS planner below.**
d. **If an unapproved seeding mix is planted, eligible cost share assistance may be denied.**

Client Signature _____ **Date** _____

Conservation Program (if applicable): RCPP

Contract # (if applicable): _____

CRP Practice (if applicable): _____

Seeding Purpose(s): Wetland Buffer Wildlife

Moisture Regime: Mesic Local Ecotype Required*: _____

***As defined by Iowa Agronomy Technical Note #28**

Nurse Crop Required: _____ Full Seeding or Interseeding: Full Seeding

Seeding Rate (seeds/sq. ft.): 40 Grass to Forb Ratio (seeds/sq. ft.): 30:10

Minimum Number of Forb Species: _____ Non-Native Forbs Allowed: _____

Minimum Number of Grass Species: _____ Preferred Growth Form: _____

Planned Seeding Date: _____

Seeding Dates for Native Species

Spring	April 1 - July 1
Dormant	November 15 - March 31
Frost*	February 1 - March 31

*Debearded or smooth seed required for frost seeding.

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Version Date: September 2022

USDA NRCS
Natural Resources Conservation Service

IA - CPA - 4 REV.
September 2022
(File Code 180-12-12)

Seeding Plan

Name Prepared by: **Hollis 2022 RCPP 30:10 Hydric Mix** / **Chad Gilles**

Program: RCPP

Acres: 2.50

Date: **10/24/2022**
Tract No.: **8452**
Field No.: **Around Pools**
Contract No.:
Moisture Regime:

Seeding Mix Summary

Grasses	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total
1	*Andropogon gerardii*	Big Bluestem	4.040	1.100	2.75
2	*Elymus virginicus*	Virginia Wildrye	1.543	1.000	2.50
3	*Carex hystericina*	Porcupine Sedge	0.110	0.010	0.025
4	*Carex bebbii*	Bebb's Sedge	0.125	0.010	0.025
5	*Carex annectens*	Yellow Fox Sedge	0.661	0.020	0.050
6	*Carex lurida*	Lurid Sedge	0.044	0.010	0.025
7	*Carex vulpinoidea*	Fox Sedge	5.326	0.145	0.36
8	*Poa palustris*	Fowl Bluegrass	2.388	0.050	0.13
9	*Glyceria striata*	Fowl Mannagrass	0.588	0.010	0.025
10	*Leersia oryzoides*	Rice Cutgrass	0.062	0.005	0.013
11	*Spartina pectinata*	Prairie Cordgrass	0.073	0.030	0.075
12	*Scirpus atrovirens*	Dark Green Bulrush	7.603	0.045	0.11
13	*Scirpus cyperinus*	Woolgrass	6.244	0.010	0.025
14	*Sorghastrum nutans*	Indiangrass	1.322	0.300	0.75
		SUBTOTAL GRASSES	**30.130**	**2.745**	**6.863**

Forbs/Legumes	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total
1	*Verbena hastata*	Blue Vervain	0.342	0.010	0.025
2	*Helenium autumnale*	Sneezeweed	0.955	0.020	0.050
3	*Lobelia cardinalis*	Cardinal Flower	0.441	0.003	0.0075
4	*Ludwigia alternifolia*	Seedbox	2.388	0.005	0.013
5	*Silphium perfoliatum*	Cup Plant	0.005	0.010	0.025
6	*Lythrum alatum*	Winged Loosestrife	2.204	0.002	0.0050
7	*Hypericum ascyron*	Great St. John's Wort	1.047	0.015	0.038
8	*Lobelia siphilitica*	Great Blue Lobelia	0.735	0.004	0.010
9	*Bidens cernua*	Nodding Bur Marigold	0.039	0.005	0.013
10	*Mimulus ringens*	Square-stemmed Monkeyflower	0.845	0.001	0.0025
11	*Vernonia fasciculata*	Ironweed	0.220	0.025	0.063
12	*Symphyotrichum novae-angliae*	New England Aster	0.121	0.005	0.013
13	*Oligoneuron riddellii*	Riddell's Goldenrod	0.171	0.005	0.013
14	*Eupatorium perfoliatum*	Boneset	0.294	0.005	0.013
15	*Helianthus grosseserratus*	Saw-tooth Sunflower	0.028	0.005	0.013
16	*Iris shrevei*	Blue Flag Iris	0.004	0.010	0.025
17	*Eutrochium maculatum*	Spotted Joe Pye Weed	0.174	0.005	0.013
18	*Asclepias incarnata*	Swamp Milkweed	0.018	0.010	0.025
		SUBTOTAL FORBS	**10.028**	**0.145**	**0.363**

Woody	Scientific Name	Common Name	Seeds/Ft^2	PLS Lbs/Acre	PLS Lbs Total
		SUBTOTAL VINES/WOODY	**0.000**	**0.000**	**0.000**
		TOTAL	**40.158**	**2.890**	**7.225**

Estimated Cost/Acre [ ] **Estimated Total Cost** [$0.00]

		Total Needed

	Soil Test Information	lbs
Lime (ECCE) (Actual Lime)		
Nitrogen		
Phosphate (P205)		
Potash (K20)		

Seeding Dates: _____

Additional Seeding Criteria: _____

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

_____ (Producer's Signature)

_____ (Date)

Field Office _____

Certified by _____ (NRCS Representative)

When seeding is completed, return seeding plan to the Natural Resources Conservation Services.
For CRP cost-share, return receipts to Farm Service Agency.
For all other cost-share projects, attach seed tags and receipts for seed, fertilizer, lime, etc.

Requirements for all seedings:

- Minimum full seeding rate for native plants is 40 seeds/sq. ft.
- Minimum of 10 seeds/sq. ft. of the mixture must be grass.
- Maximum of 4 switchgrass and 8 canada wildrye seeds/sq. ft. unless otherwise specified.
- When allowed, mixtures may include up to 20% introduced forbs, which no one species will comprise more that 10% of the total mix.
- Introduced forbs are not recommended for prairie restoration efforts.
- Maximum of 20% of the forb component may be annual/biennial forbs.

Select Additional Requirement(s) (if applicable):

Additional Seeding Plan Information:

Conservation Planner: _____ Date: **10/24/2022**

Iowa NRCS

Supplement to Seeding Plan (IA-CPA-4)

Conservation Cover (327) Native Plant Seeding

Name: Hollis Farms RCPP Wetland County: Black Hawk

Field Number(s): Hydric Mix Around Pool Areas Acres: 2.5 Tract: 8452

The client is responsible to ensure the seeding mix meets the conservation practice standard and conservation program requirements (if applicable). If the seeding mix is changed in any way, the client is responsible to ensure the updated seeding mix is approved by an NRCS Planner. Seeding mixes can be emailed to the conservation planner listed below. Clients are encouraged to work with their seed dealer to use the Iowa Native Seeding Calculator to make the approval process more efficient. The Iowa Native Seeding Calculator can be found at https://bit.ly/IANRCSNativeSeedingCalculator. Seeding a mixture that is not approved and does not meet conservation and/or program requirements could be denied financial assistance (cost share) and may result in a conservation program violation.

By signing, you are acknowledging:

a. **I received a seeding plan from NRCS.**
b. **I understand if changes to the plan are made, the changes need to be approved by an NRCS planner prior to purchase.**
c. **Updated seeding mixes can be sent by you or your seed dealer to the NRCS planner below.**
d. **If an unapproved seeding mix is planted, eligible cost share assistance may be denied.**

Client Signature **Date**

Conservation Program (if applicable): RCPP

Contract # (if applicable):

CRP Practice (if applicable):

Seeding Purpose(s): Wetland Cover Wildlife

Moisture Regime: Wet Local Ecotype Required*:

***As defined by Iowa Agronomy Technical Note #28**

Nurse Crop Required: Full Seeding or Interseeding: Full Seeding

Seeding Rate (seeds/sq. ft.): 40 Grass to Forb Ratio (seeds/sq. ft.): 30:10

Minimum Number of Forb Species: Non-Native Forbs Allowed:

Minimum Number of Grass Species: Preferred Growth Form:

Planned Seeding Date:

Seeding Dates for Native Species

Spring	April 1 - July 1
Dormant	November 15 - March 31
Frost*	February 1 - March 31

*Debearded or smooth seed required for frost seeding.

Sheet 38B of 39

Requirements for all seedings:

- Minimum full seeding rate for native plants is 40 seeds/sq. ft.
- Minimum of 10 seeds/sq. ft. of the mixture must be grass.
- Maximum of 4 switchgrass and 8 canada wildrye seeds/sq. ft. unless otherwise specified.
- When allowed, mixtures may include up to 20% introduced forbs, which no one species will comprise more that 10% of the total mix.
- Introduced forbs are not recommended for prairie restoration efforts.
- Maximum of 20% of the forb component may be annual/biennial forbs.

Select Additional Requirement(s) (if applicable):

Additional Seeding Plan Information:

Conservation Planner: _____ Date: **10/24/2022**

Materials Lists

Earthwork

Dike earthfill – FILL 1848 cubic yards (see sheets 2 & 9)
submergent Habitat Mounds 1 thru 3 earthfill – FILL 116 cubic yards (see sheets 3 & 8)
Farmstead waterway meandered earthfill – FILL 824 cubic yards (see sheets 4, 5, 6, 10, 11, 12, & 13)
branch west Farmstead waterway meandered earthfill – FILL 411 cubic yards (see sheets 4, 5, 10, 11, & 14)
MAIN waterway earthfill – FILL 37 cubic yards
Diversion waterway north earthfill – FILL 667 cubic yards (see sheets 6 & 36)
Mounding over Southeast Interception line earthfill – FILL 12 cubic yards (see sheets 4, 15, & 16)
Mounding over Northeast Interception line earthfill – FILL 16 cubic yards (see sheets 4, 18, & 22)
Mounding over North Interception line earthfill – FILL 98 cubic yards (see sheets 5, 18, & 20)
Mounding over West Interception line earthfill – FILL 31 cubic yards (see sheets 4, 15, & 17)

TOTAL FILL Yardage 4060 cubic yards

outlet Tied Concrete Block Mat chute channel excavation – CUT 50 cubic yards
Shallow Water Excavation for Inlet Water Control Structure excavation – CUT 293 cubic yards
West Shallow Water excavation – CUT 1060 cubic yards (see sheet 4)
East Shallow Water excavation – CUT 643 cubic yards (see sheet 4)
North Shallow Water excavation – CUT 235 cubic yards (see sheets 5 & 7)
MAIN waterway excavation – CUT 1260 cubic yards (see sheets 2, 5, 6, 7, & 23)
Farmstead waterway meandered excavation – CUT 794 cubic yards
Blind Inlet (sub NW Interception line) excavation – CUT 25 cubic yards (see sheets 6, 12, 18, & 19)
Rock Lined Plunge Pool (sub NW Interception line) excavation – CUT 21 cubic yards (see sheets 6 & 11)
Blind Inlet (North Interception line) excavation – CUT 20 cubic yards (see sheets 20, 21, & 29)
branch west Farmstead waterway meandered excavation – CUT 396 cubic yards
Diversion waterway north excavation – CUT 101 cubic yards

TOTAL CUT Yardage 4898 cubic yards

Stripping 0.5' under foot-print dike – CUT 384 cubic yards
Stripping 0.5' under foot-print Farmstead waterway meandered – CUT 395 cubic yards
Stripping 0.5' under foot-print branch West Farmstead waterway meandered – CUT 216 cubic yards
Stripping 0.5' under partial foot-print Mounding North Interception line – CUT 24 cubic yards
Stripping 0.5' under foot-print Diversion waterway dike – CUT 208 cubic yards
Core trench under dike – CUT 434 cubic yards (see sheets 8 & 9)

TOTAL CUT Yardage 1661 cubic yards
(will be have compacted fill replaced here)

Seeding & Mulching 12.7 acres (see sheet 37, 38A, & 38B)

Subsurface Drains (sheets 15, 16, 17, 18, 19, 20, & 22)

740 feet – 12" HDPE non-perforated plastic tubing
938 feet – 10" HDPE non-perforated plastic tubing
330 feet – 8" HDPE non-perforated plastic tubing
870 feet – 5" HDPE non-perforated plastic tubing
435 feet – 5" HDPE perforated plastic tubing
150 feet – 4" HDPE perforated plastic tubing
20 feet – 15" outlet tube Corrugated Metal Pipe galvanized with rodent guard
20 feet – 12" outlet tube Corrugated Metal Pipe or PVC schedule 40 pipe or Dual-walled HDPE pipe with rodent guard
20 feet – 10" outlet tube Corrugated Metal Pipe or PVC schedule 40 pipe or Dual-walled HDPE pipe with rodent guard
20 feet – 6" outlet tube Corrugated Metal Pipe or PVC schedule 40 pipe or Dual-walled HDPE pipe with rodent guard
8 hours – machine time: excavator/backhoe to investigate and remove existing subsurface drainage

Blind Inlets (see sheets 21, 28, & 29)

64 feet – 4" PVC schedule 40 perforated (½ holes 8 per foot) pipe
10 feet – 4" PVC schedule 40 non-perforated pipe
elbows, tees, caps, connections 4" as needed (see sheets 21, 28, & 29)
54 tons – 1 ½" gravel, clean (see sheets 21, 28, & 29)
17 tons – sand (see sheets 21, 28, & 29)
92 square yards – geotextile, class 3 (see sheets 21, 28, & 29)

Rock Lined Plunge Pool (see sheets 6 & 11)

34 tons – 8" rock riprap stone (see sheets 6 & 11)
50 square yards – geotextile, class 3 (see sheets 6 & 11)

Prinicipal Spillway (see sheets 3, 24, 25, & 26)

2120 square feet – tied concrete block mats (three 12'x50' and one 8'x40')
200 square feet – underlayment seam material (two 2'x50' pieces)
64 number – 18" rebar 'U' #3 rebar anchors
1687 square feet – seeding area under TCBM chute (0.04 acre)

Water Level Control Structure & Conduit (see sheets 3 & 9)

1 number – water control structure 16"x20" box 6' height with stubs 12" pipe size
130 feet – 12" PVC schedule 40 pipe with trash guard (inlet) & rodent guard (outlet)
2 number – 45 degrees elbow 12" PVC schedule 40
1 number – 48"x48" polyethylene sheet anti-seep collar (see sheet 27)

Rock Riprap Outlet Trench (see sheets 3 & 8)

47 square yards – Non-woven Geotextile, Class 1 (one 10'x42' piece) lining trench
18 tons – D50 12" rock riprap (class D Iowa DOT revetment); trench 3' depth x 3' width x 36' length

Structure Components for Grassed Waterways

116 tons – 4" to 8" rock size for 26 rock checks (see sheets 30, 31, & 32)
650 feet – length of 18" deep by 24" wide trench for rock check placement (see sheets 30, 31, 32)
6000 square yards – manufactured mulch blanket; 16' x 562.5 roll size (see sheets 33, 34, & 35)
16,350 staples – 6" U-staple or round top-single stem staple (see sheets 33, 34, & 35)
258 feet – length of 12" by 12" trench to bury lead edge of MMB (see sheets 33, 34, & 35)

Designed Jeff A. Lutz 10/2022
Drawn Jeff A. Lutz 10/2022
Checked . .
Approved . .

Thunderbridge Farms LLS t8452
Grassed ww's & Dike Wetland
Materials Lists
SW¼ sec. 26 T.88N.–R.13W. Orange twp. Black Hawk County, IA

United States Department of Agriculture
Natural Resources Conservation Service

File No. Blake Hollis t10992 ww
Drawing No. BLACK_HAWK.dwg

Sheet 39 of .