

# PLANNING COMMISSION CITY OF LEXINGTON

## DETERMINATION FORM

On **April 4, 2012**, the Lexington, Nebraska Planning Commission, at its regular meeting, recommended **Approval** (Approval/Disapproval) of a **Special Use Permit Application** (Rezoning, Special Use, Subdivision, Variance, Zoning, Zone Appeal, Etc.) Request located at **43540 Road 756** (Location) for **Bruce and Theresa Stuart dba Stuart Cattle Co. Inc.** (Name).

The Lexington Planning Commission made the following motion:

Motion by: **Steve Smith**

Seconded by: **Cathy Fagot**

Motion: **Recommend approval of the special use permit application to the City Council as presented.**

Roll Call. **Voting "aye" were Bennett, Evans, Vivas, Fagot, Smith, McFarland.**  
**Motion carried.**

Pamela Berke  
Planning Secretary

Administrative Use Only

Date Submitted 3-22-2012  
Filing Fee - \$100.00 Date Paid - \_\_\_\_\_  
Date Advertised \_\_\_\_\_

Case Number \_\_\_\_\_  
Accepted By \_\_\_\_\_  
Date Property Posted \_\_\_\_\_

SPECIAL USE PERMIT APPLICATION

CITY OF LEXINGTON

1. Applicant's Name Bruce and Theresa Stuart  
d.b.a. Stuart Cattle Co. Inc.
2. Applicant's Address 43540 Road 756 Lexington, NE
3. Applicant's Telephone Number 308-324-2655
4. Owner's Name Bruce and Theresa Stuart
5. Owner's Address 43540 Road 756 Lexington NE 68850
6. Owner's Telephone Number 308-324-2655
7. Purpose of Special Use Permit intensive livestock expansion, waste water collection and land application
8. Present Zoning A-1
9. Within City Limits No Within Zoning Jurisdiction Yes
10. Legal Description NW Qtr Section 3 9-N 21-W of 6th P.M.
11. Street Address of Property or Approximate Location 43540 Road 756,  
one mile E of Lexington on 13th Street, and SE of inter-  
section of Roads 756, and 435.
12. Site Plan (if applicable) \_\_\_\_\_

I/We the undersigned do hereby acknowledge that I/We do fully understand and agree to comply with the provisions and requirements for an application for a special use permit as described above. I/We the undersigned do hereby agree to allow City of Lexington employees or agents working for the City of Lexington, to enter the above referenced property as it pertains to this application.

Bruce Stuart, Pres.  
of Stuart Cattle Co., Inc.  
Signature of Owner

Bruce Stuart  
Signature of Applicant

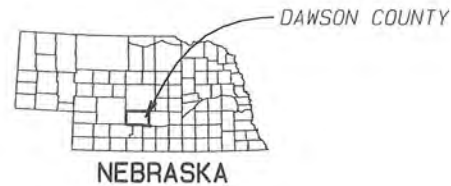




# STUART CATTLE CO., INC.

## LIVESTOCK WASTE CONTROL FACILITY Dawson County, NE

DESIGNED BY: NATURAL RESOURCES CONSERVATION SERVICE  
NORFOLK, NEBRASKA

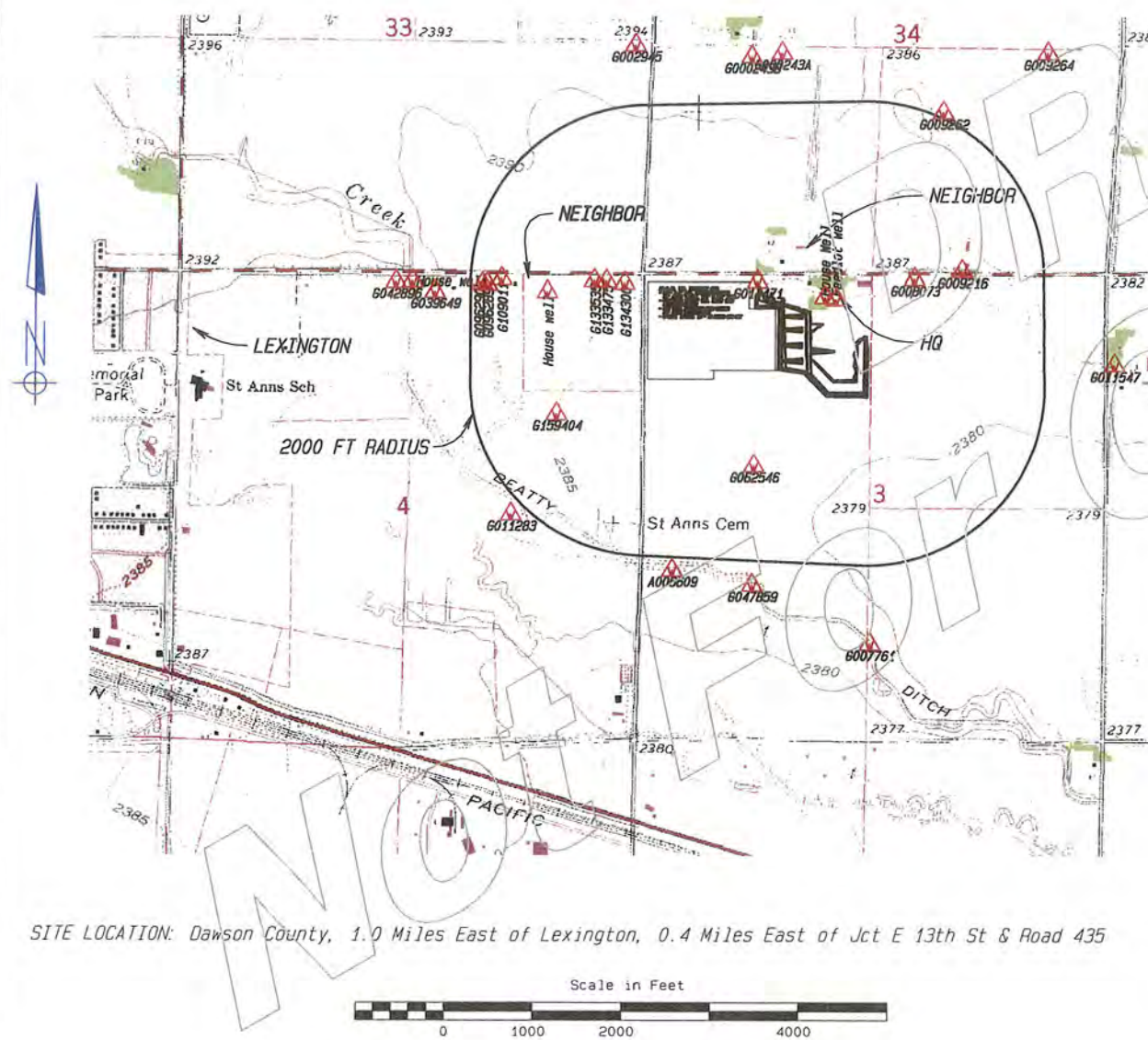


### TABLE OF ESTIMATED QUANTITIES

### SHEET INDEX

ITEM	UNIT	QUANTITY	AS-BUILT
Sediment Basin (350)			
Excavation, Stripping Under Fills	CY	X, XXX	
Excavation	CY	XX, XXX	
Earthfill, Stripping Backfill	CY	X, XXX	
Earthfill, Class C	CY	XX, XXX	
Concrete Flatwork, Riser Sump	CY	XX	
Basin Lift Station (634)			
10" Dia. 125 psi PVC w/ Appurt.	LF	XX	
Irrigation Inline Filter	LF	XX	
18" Dia. Perf. PVC Riser, 6' Long	EA	X	
(2.25" Dia. Holes on 5" Centers)			
12" Dia. 100 psi PVC w/ Appurt.	LF	XX	
Vert. Turbine Pump/Motor w/ Appurt.	EA	X	
36" Dia. RCP Sump	LF	XX	
Concrete Flatwork	CY	X	
Treated Lumber, Trash Screen	BFT	XX	
Galvanized Mesh Hardware Cloth (1/2" Mesh)	SF	XXX	
Sand for Pipe Bedding/haunching	CY	X	
VTA (635)			
Seeding	AC	X	
2.5" Dia. PVC w/appurtances	LF	XX	
1 1/2" Dia PE Pipe	LF	X	
K-Line Pods w/ 5/32" nozzles	EA	XX	

SHEET NO.	SHEET TITLE
1	COVER SHEET
2	DATA SHEET
3	DATA SHEET
4	FACILITY PLAN VIEW
5	PHOTO SITE PLAN VIEW W/ DRAINAGE AREAS
6	PHOTO AREA PLAN VIEW
7	BASIN CHANNEL PROFILES
8	CROSS-SECTIONS
9	PIPE PROFILES
10	BASIN PUMP DETAILS
11	BASIN RISER/TRASH SCREEN DETAILS
12	STAFF GAUGE/BASIN LEVEL DETAILS
13	CONSTRUCTION LAYOUT DATA



NOTE: EARTHFILL IS SUBSIDIARY TO EXCAVATION FOR PAYMENT  
WATER FOR COMPACTION IS NOT INCLUDED AS A PAY ITEM  
SEE NOTES 4 & 10 ON SHEET 2 FOR FURTHER CLARIFICATION

Design By: REEDY 11/21/11	Signature: _____ CIVIL ENGINEER TITLE	THIS PROJECT IS JOB CLASS <u> V </u>	LEGAL DESCRIPTION OF PROJECT: NW 1/4 SECTION 3, T 9 N, R 21 W
Checked By: CHECKED CHECKED DATE	REVIEWED BY: _____		SHEET NO. 1
SPECIFICATION AND DRAWINGS APPROVED FOR CONSTRUCTION	Signature: _____ CIVIL ENGINEER TITLE		TOTAL SHEETS 13
	APPROVED BY: JAMES A. REEDY		



# ANIMAL ATA

ANIMAL TYPE	TOTAL HEAD
BEEF FEEDERS - EXISTING (IN LOTS)	1,600
BEEF FEEDERS - PROPOSED (IN LOTS)	900
TOTAL HEAD FOR DESIGN	2,500

Designed	REEDY	11/21/11
Drawn	REEDY	11/21/11
Checked	CHECKER	CHECKED
Approved	APPROVER	APPROVED

## CONSTRUCTION NOTES

- 1) THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE NEBRASKA DIGGERS HOTLINE (<http://www.ne-diggers.com>) BEFORE CONSTRUCTION ACTIVITIES BEGIN. The contractor will use extra safety precautions when working near or around pipelines, power lines, power poles, underground cables, or other utility installations. DIGGERS HOTLINE: 1-800-331-5666
- 2) Clearing areas, clearing and grubbing areas, and construction work limits are generally bounded by the toes of the embankment and borrow areas as shown on the drawings. Exact location of the work limits will be staked by the NRCS inspector before construction begins.
- 3) Waste materials, material unsuitable for earthfill, trees, etc. within the work limits will be disposed of in accordance with specifications NE-1 and NE-21.
- 4) Certification for payment for earthwork quantities will be based on neat-line measurements. For this project, excavation is subsidiary to earthfill, with approximately 1,000 cubic yards of borrow required.
- 5) Fences within the construction work limits will be removed by others before construction begins.
- 6) Stripping of earthfill areas will be in accordance with specifications NE-1 and NE-23. Strippings will be stockpiled and used as topsoil on finished embankments and borrow areas.
- 7) Stripping limits will be approved by the NRCS inspector prior to beginning placement of earthfill.
- 8) Placement of pipes, risers, pumps and clay liner will take place in the presence of the NRCS inspector.
- 9) Water needed for moisture control is not included as a definite quantity or pay item for this project, simply because of changes in moisture conditions from the time the geologic investigation was completed to the time construction begins. The contractor is responsible for determining if site conditions will require additional water and for providing water, if needed.
- 10) The NRCS inspector must be allowed to inspect all placed reinforcing steel forms, embedded materials and subgrade prior to placement of concrete.
- 11) Concrete cannot be placed unless the NRCS inspector is present during the pouring operation. Contractor must provide adequate work site location for use by the NRCS inspector for testing the concrete mix.
- 12) Concrete shall be 3500 psi minimum and shall conform to Nebraska construction specification 32.
- 13) Reinforcing steel shall be Grade 40 minimum deformed steel bars of the diameter required in these plans and shall conform to Nebraska construction specification 34.

- 14) All materials used in construction (aggregate, waterstops, admixtures, etc.) shall conform to the appropriate material specification referenced in the construction specification.
- 15) All embankments and disturbed areas outside of the feedlot, and dike sideslopes of the sediment basin will be seeded according to construction specification NE-6 and form NE-CPA-8.
- 16) New fence shall be installed in consultation with the landowner.
- 17) All proposed changes to design configurations, pipe/riser configurations, etc. must be approved in writing by the design engineer prior to placing. Contractor may be required to provide shop drawings for review.
- 18) Payment for lift station and riser installations will be on an EACH basis. All appurtenances, fittings, valves, screens, etc. will be considered as part of the lift station installation for payment.
- 19) Payment for pipe installations will be on a Linear Feet basis. All appurtenances and fittings will be considered as part of the pipe installation for payment.

## GENERAL NOTES

- 1) The facility owner is responsible for complying with all federal, state and local requirements, including but not limited to stormwater discharge requirements, floodplain permit requirements, Corps of Engineers Section 404 requirements, etc.
- 2) The contractor shall provide and maintain work environments and procedures which will safeguard public and government personnel, property, materials, supplies and equipment in accordance with current OSHA regulations.
- 3) If the NRCS inspector becomes aware of any condition that poses a serious or imminent danger to the health or safety of the public or government personnel, he/she will immediately notify the facility owner. If the owner and/or contractor fail or refuse to promptly take corrective action, NRCS technical and financial assistance may ultimately be withdrawn.
- 4) During construction, the contractor shall keep the work site, areas adjacent to the work site and access roads in a safe and orderly condition. After construction is completed, the contractor shall remove all debris and leave the work site in a well-drained and orderly condition.

## LEGEND AND SYMBOLS

TBM	
PINS	
INSTRUMENT PINS	
EXISTING FENCE	
TO BE REMOVED	
NEW FENCE	
FLOWLINE	
CENTERLINE	
POWERPOLE	
TEST HOLE	
DRAINAGE ARROW	

## ABBREVIATIONS:

TBM = Temporary Bench Mark  
 TH = Test Hole for Soil Mechanics Analysis  
 CP = Control Point for Survey Layout  
 CY = Cubic Yard  
 LF = Linear Feet  
 LB = Pounds  
 BFT = Board Feet  
 AC = Acre  
 MOL = Maximum Operating Level  
 UGO = Underground Outlet

DATA SHEET  
 STUART CATTLE CO., INC. LWCF  
 DAWSON COUNTY, NEBRASKA



File No.

Drawing No.

## DESIGN DATA FOR BASINS

ITEM	BASIN				ELEVATION	Value Cumul.
	MINIMUM VOLUME REQUIRED (Ft <sup>3</sup> )	ACTUAL VOLUME PROVIDED (Ft <sup>3</sup> )	DEPTH (Ft)			
Bottom of Sediment Basin	0	0	0		2379.0	
Total Solids Volume to be Stored (0.5 in. per acre of lot area)	26,318	33,179	0.8		2379.8	
25-Year Storm Runoff	292,034	306,050	1.8		2381.6	Top of 25-Year Storm Event
		339,229	2.6			
Freeboard	-----	684,142	0.9		2382.5	Settled Top of Embankment
Settlement	-----	-----	0.0		2382.5	Constructed Top of Embankment
			3.5			

### RCN Values Used in Design:

Paved Lots - 97  
 Unpaved Lots - 90  
 Cont Non-Lot Area - \_\_\_\_\_

Lot Area for Solids Volume = 14.5 Acres  
 (0.0 Paved, 14.5 Unpaved)  
 Contributing Non-Lot Area = 13.5 Acres  
 Total Area for Runoff Volume = 28.0 Acres  
 25-year storm runoff released in 36 hours

See Table of Quantities for dimensions and materials of underground outlets and risers

See Underground Outlet details for riser hole/slot configurations and invert elevations

## DESIGN DATA FOR VEGATATIVE TREATMENT AREA

The soil types in the 33.0 acre VTA are primarily Rusco Silt Loams. This soil is NE Irrigation Design Group 4 with an infiltration rate of 0.5 inches per hour and 4.9 inches of Available Water Holding Capacity in the top 2 foot depth. The feedlot effluent runoff from the sediment basin will be applied to the VTA with K-Line sprinklers at a rate to uniformly infiltrate into the soil profile. At 1100 GPM the application rate will be limited to 0.2 inches per hour preventing effluent runoff from the VTA.

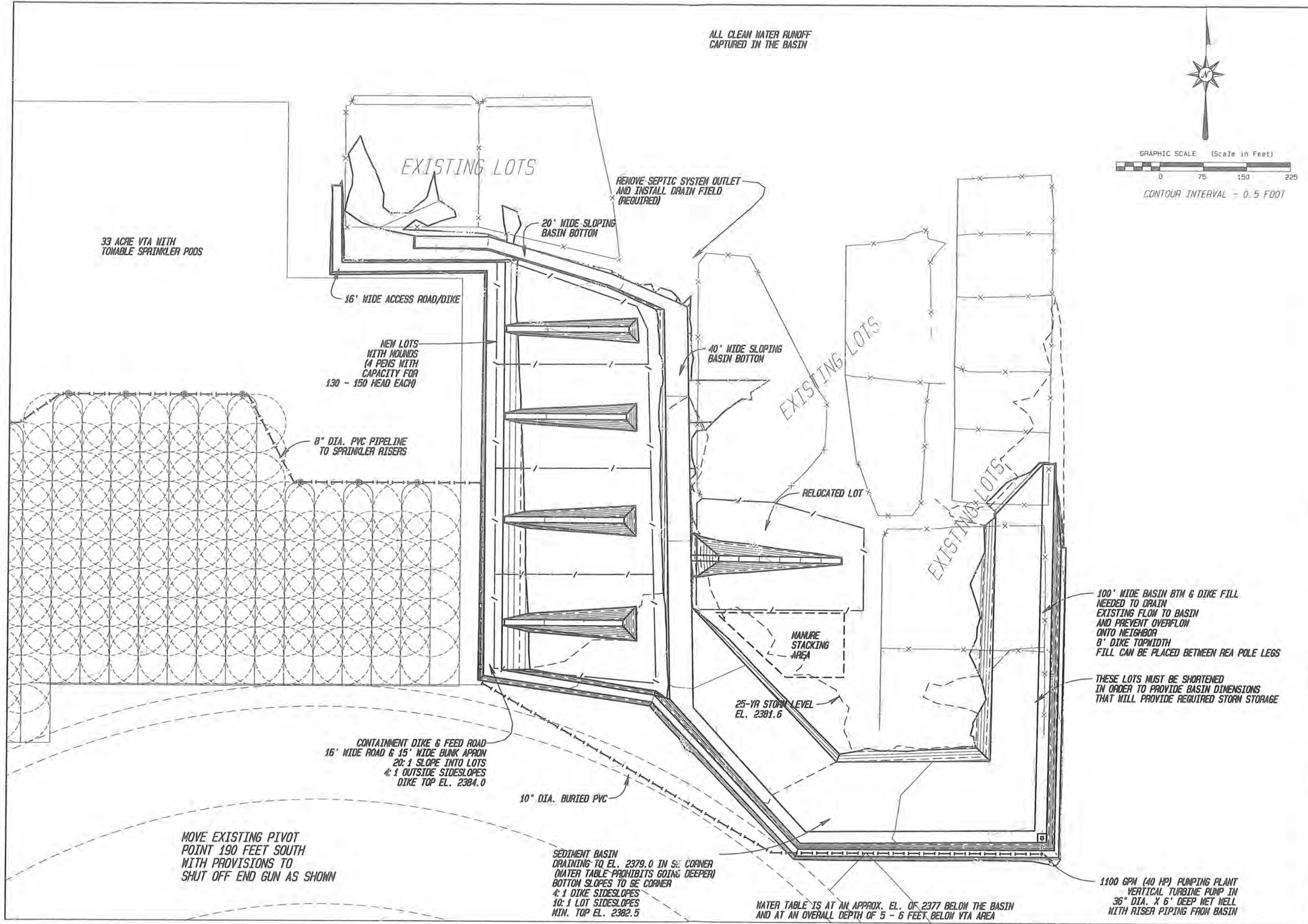
The 25-yr runoff from the feedlot is 80.45 ac-in and can be stored within 50% of the AWC of the VTA. Annual runoff from the feedlot averages 16.36 ac-ft or 6.0" of effluent application on the VTA. The grass vegetation planned for the VTA will consume all the effluent infiltration, except for very wet years.

Date 11/21/11  
 Designed REEDY  
 Drawn REEDY  
 Checked CHECKER  
 Approved APPROVER

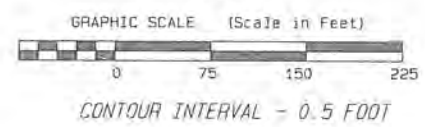
DATA SHEET  
 STUART CATTLE CO., INC. LWC  
 DAWSON COUNTY, NEBRASKA



File No.  
 Drawing No.  
 Sheet 3 of 13



ALL CLEAN WATER RUNOFF CAPTURED IN THE BASIN



Date	11/21/11
Designed	REEDY
Drawn	REEDY
Checked	CHECKER
Approved	APPROVER

FACILITY PLAN VIEW  
 STUART CATTLE CO., INC. LWCF  
 DAWSON COUNTY, NEBRASKA



100' WIDE BASIN BTM & DIKE FILL NEEDED TO DRAIN EXISTING FLOW TO BASIN AND PREVENT OVERFLOW ONTO NEIGHBOR 8' DIKE TOPWIDTH FILL CAN BE PLACED BETWEEN REA POLE LEGS

THESE LOTS MUST BE SHORTENED IN ORDER TO PROVIDE BASIN DIMENSIONS THAT WILL PROVIDE REQUIRED STORM STORAGE

1100 GPM (40 HP) PUMPING PLANT VERTICAL TURBINE PUMP IN 36" DIA. X 6' DEEP WET WELL WITH RISER PIPING FROM BASIN

WATER TABLE IS AT AN APPROX. EL. OF 2377 BELOW THE BASIN AND AT AN OVERALL DEPTH OF 5 - 6 FEET BELOW VTA AREA

SEDIMENT BASIN DRAINING TO EL. 2379.0 IN SE CORNER (WATER TABLE PROHIBITS GOING DEEPER) BOTTOM SLOPES TO SE CORNER 4:1 DIKE SIDESLOPES 10:1 LOT SIDESLOPES MIN. TOP EL. 2382.5

CONTAINMENT DIKE & FEED ROAD 16" WIDE ROAD & 15" WIDE BUNK APRON 20:1 SLOPE INTO LOTS 4:1 OUTSIDE SIDESLOPES DIKE TOP EL. 2384.0

MOVE EXISTING PIVOT POINT 190 FEET SOUTH WITH PROVISIONS TO SHUT OFF END GUN AS SHOWN

NEW LOTS WITH MOUNDS (4 PENS WITH CAPACITY FOR 130 - 150 HEAD EACH)

33 ACRE VTA WITH TONABLE SPRINKLER POOLS



- 33.0 AC. VEG. TREATMENT AREA
- 28 - 1.5" DIA. PIPELINES SPACED 50' APART - 550', 500' & 350' LONG
  - CONNECTED TO 2.5" DIA. RISER TEES ON MAIN PIPELINE
  - 248 TOTAL SPRINKLER PODS SPACED 50' APART ON EACH LINE
  - 2 SETS, APPROX. 16 - 18 HOURS PER SET

TOTAL DA = 28 ac  
 (Feedlot 14.5)  
 (Contributing 13.5)

25-YR STORM LEVEL  
 EL. 2381.6  
 (0.9 FEET BELOW DIKE TOP)

END GUN SHUTS OFF AT THESE LOCATIONS

Scale in Feet



Date	11/21/11
Designed	REEDY
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Checked	CHECKER
Approved	APPROVER
	CHECKED
	APPROVED

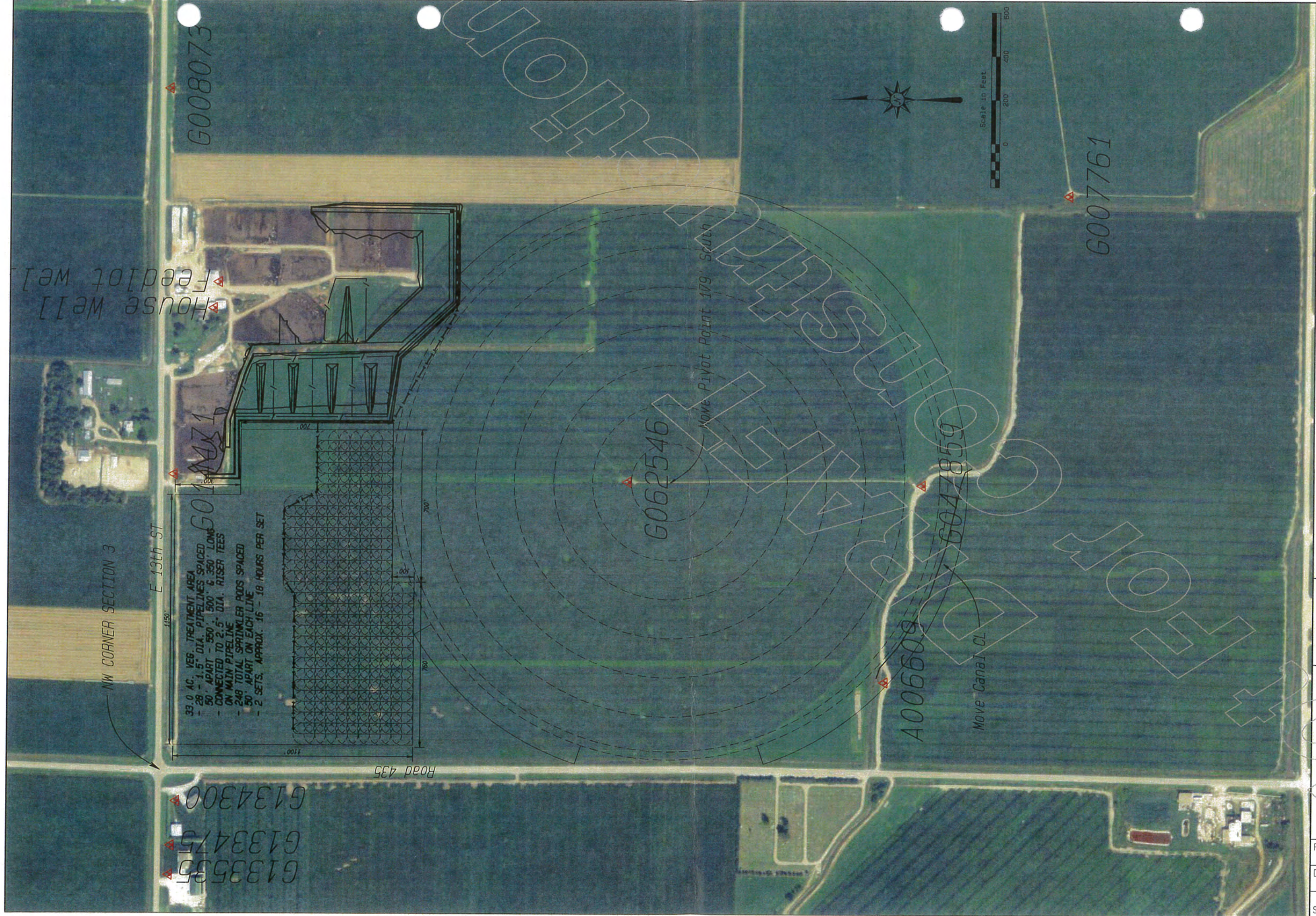
PHOTO SITE PLAN VIEW  
 STUART CATTLE CO., INC. LWCF  
 DAWSON COUNTY, NEBRASKA



File No.

Drawing No.





NW CORNER SECTION 3

E 13th ST

- 33.0 AC. VEG. TREATMENT AREA
- 28 - 1.5" DIA. PIPELINES SPACED 50' APART - 550' x 500' & 350' LONG
- CONNECTED TO 2.5" DIA. RISER TEES ON MAIN PIPELINE
- 248 TOTAL SPRINKLER PODS SPACED 50' APART ON EACH LINE
- 2 SETS, APPROX. 16 - 18 HOURS PER SET

G008073

G133535  
 G133475  
 G134300

G062546

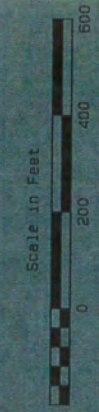
Move Pivot Point 179' South


A006609

G047859

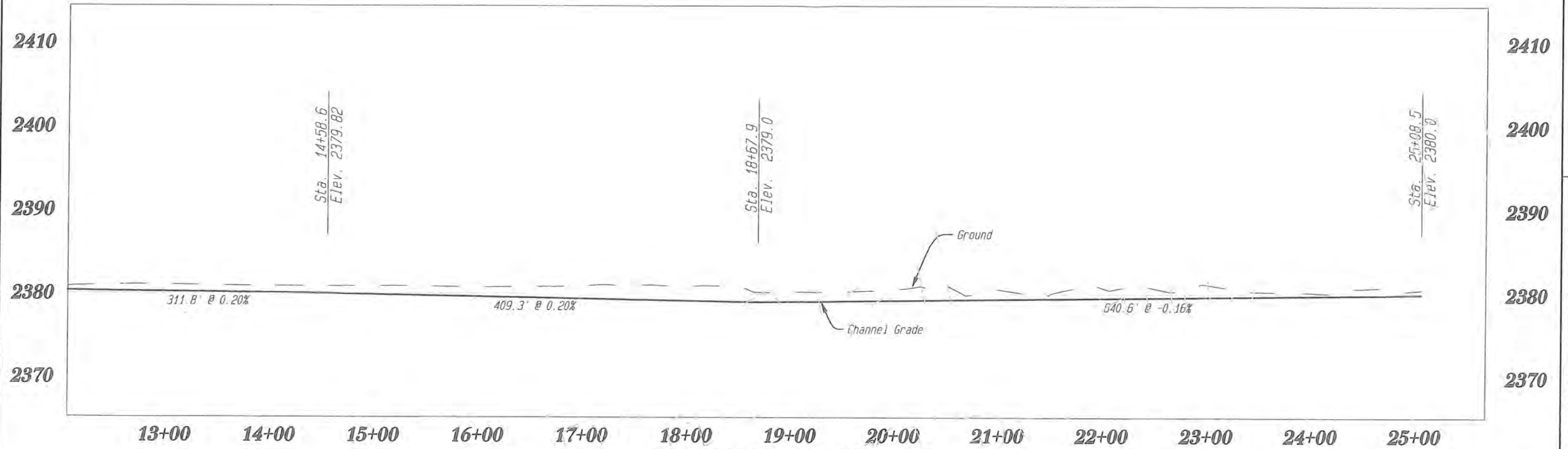
Move Canal CL

G007761

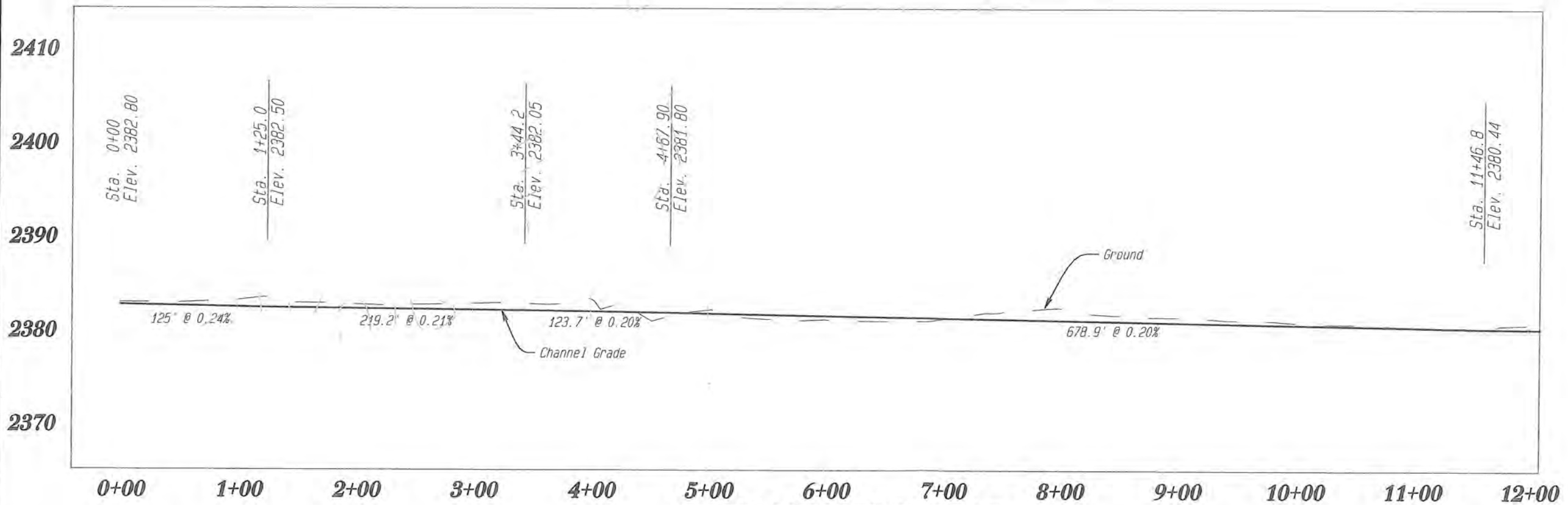


 Natural Resources Conservation Service	File No.	PHOTO AREA PLAN VIEW	Designed	REEDY	Date	11/21/11
	Drawing No.	STUART CATTLE CO., INC. LWCF	Drawn	REEDY	Checked	REEDY
	Sheet 6 of 13	DAWSON COUNTY, NEBRASKA	Checked	CHECKER	Approved	CHECKED
				Approved	APPROVER	APPROVED





**BASIN CHANNEL PROFILE**



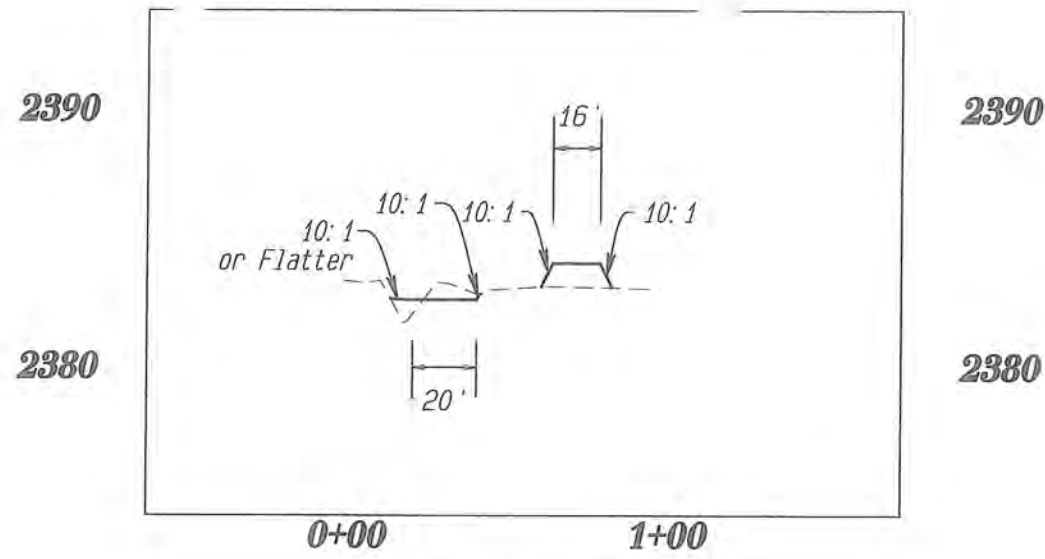
**BASIN CHANNEL PROFILE**

Date	Designed	Drawn	Checked	Approved
11/21/11	REEDY	REEDY	CHECKER	APPROVER
11/21/11			CHECKED	APPROVED

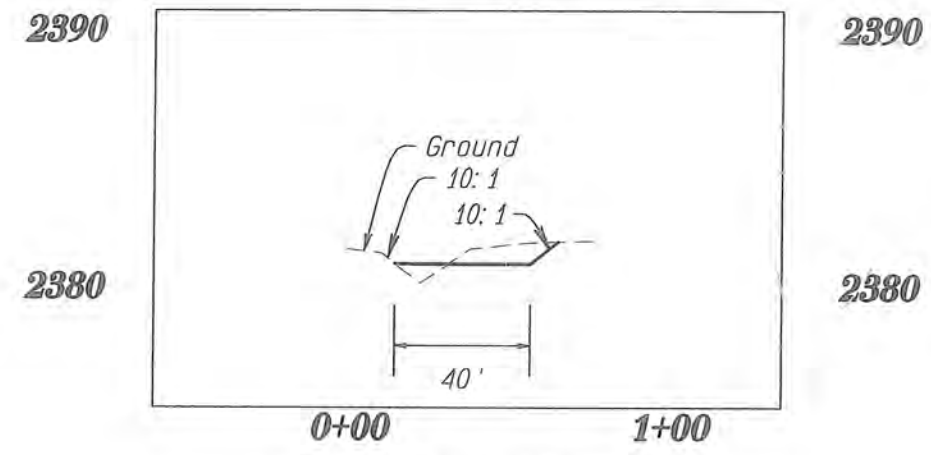
BASIN CHANNEL PROFILES  
 STUART CATTLE CO., INC. LWCF  
 DAWSON COUNTY, NEBRASKA



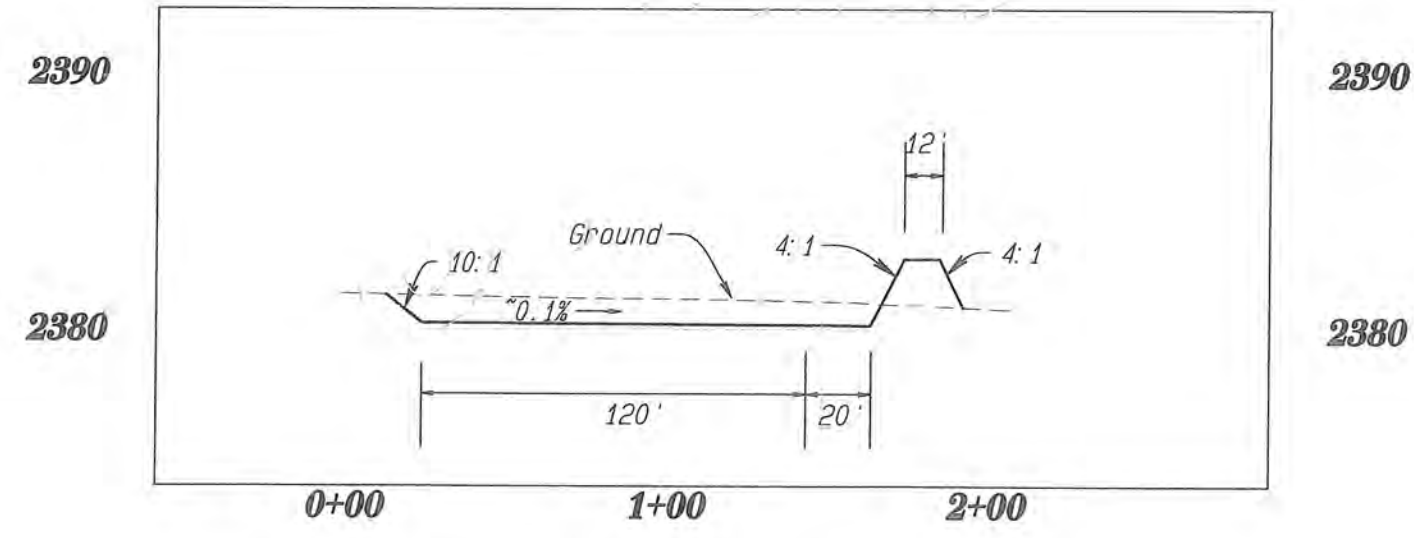




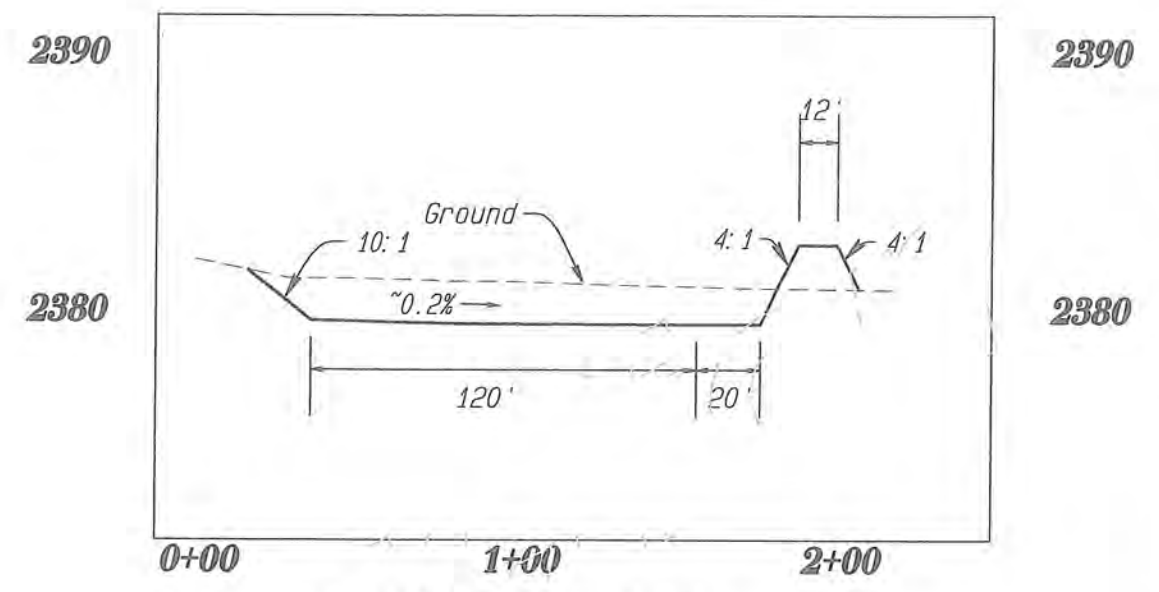
**SECTION E-E**



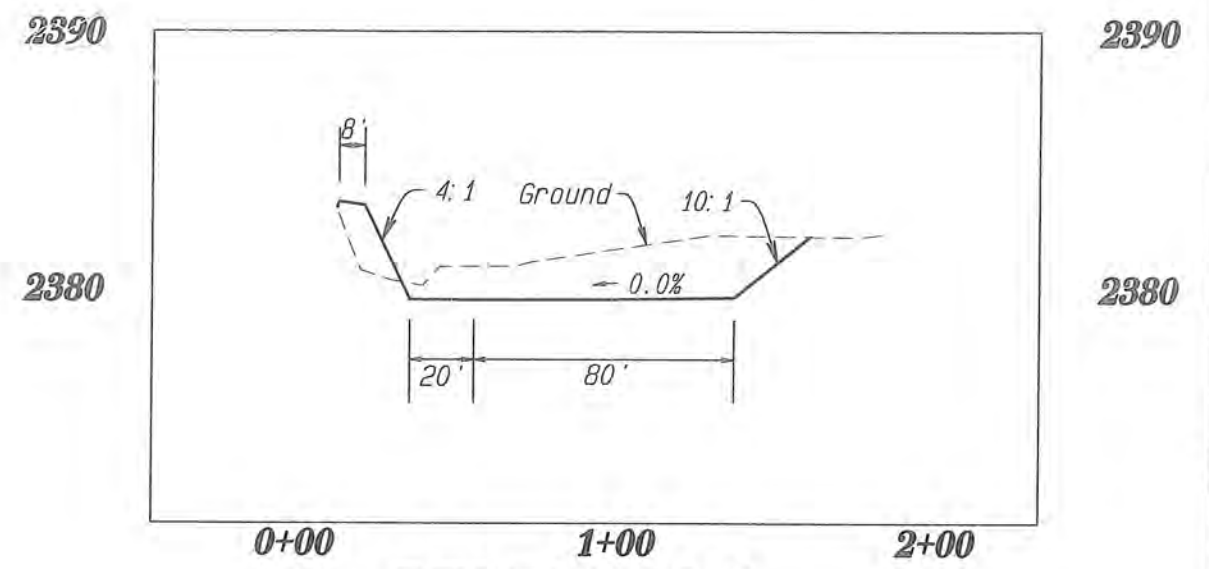
**SECTION D-D**



**SECTION C-C**



**SECTION B-B**



**SECTION A-A**

Date	11/21/11
Designed	REEDY
Drawn	REEDY
Checked	CHECKER
Approved	APPROVER

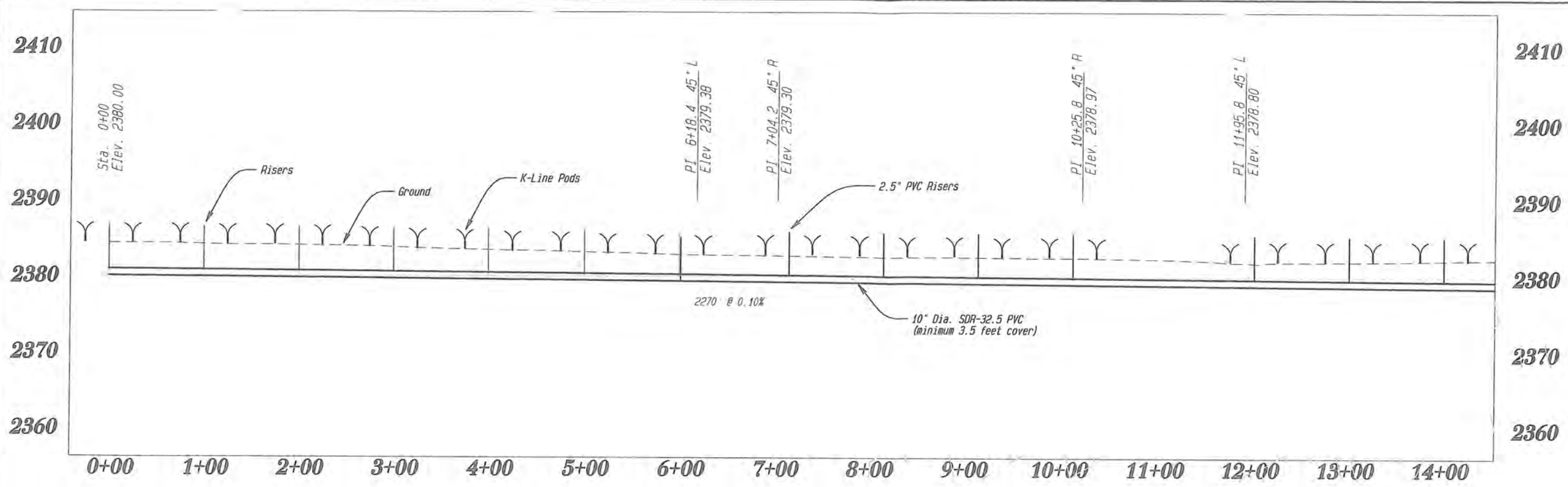
BASIN CROSS-SECTIONS  
 STUART CATTLE CO., INC. LWCF  
 DAWSON COUNTY, NEBRASKA



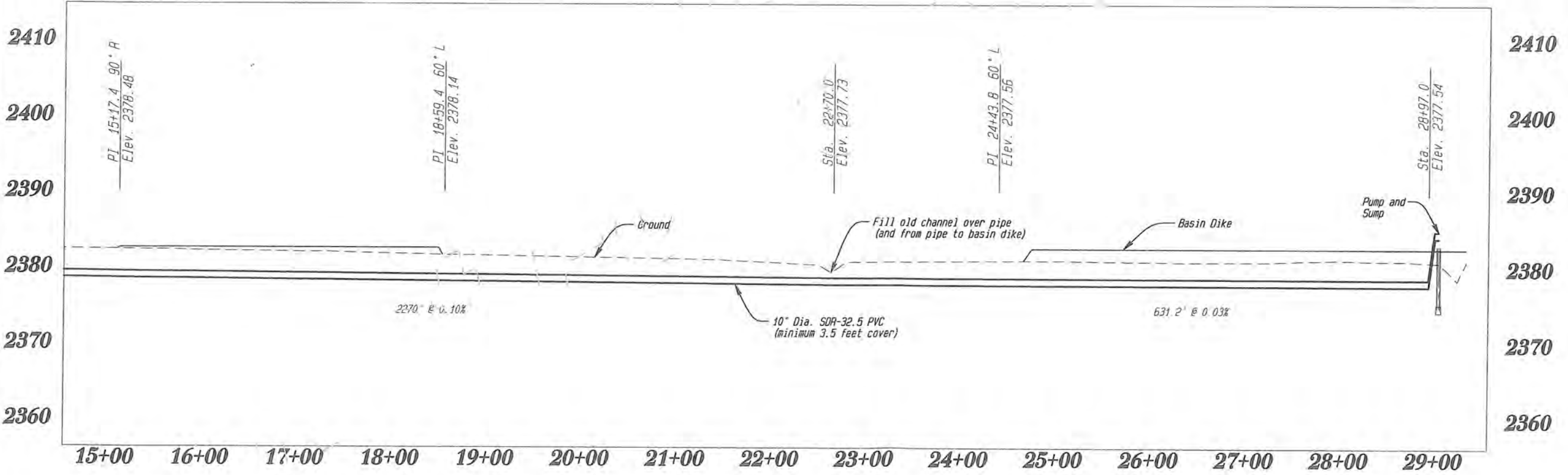
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Drawing No.





**PIPE PROFILE**



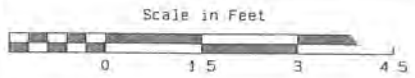
**PIPE PROFILE**

Date	11/21/11
Designed	REEDY
Drawn	REEDY
Checked	CHECKER
Approved	APPROVER

PIPE PROFILE  
 STUART CATTLE CO., INC. LWCF  
 DAWSON COUNTY, NEBRASKA







4" NOM. DIA. PRESSURE RELIEF VALVE SET TO 40% OF PUMP OUTPUT (APPROX. 15 PSI CRACK-OPEN)

MAX. 45 HP ELECTRIC MOTOR NOT-TO-EXCEED 105% OF HP RATING

2" NOM. DIA. AIR/VAC RELIEF VALVE

CHECK VALVE

INLINE FILTER

WATERPROOF, VENTED ELECTRICAL PUMP CONTROLS

POWER CONDUIT

TOP OF LIFT STATION 2383.7

BASIN DIKE TOP 2382.5

SHUTOFF VALVE W/ EXTENSION

CONCRETE PAD 6' x 6' x 8" THICK

PROVIDE 2" DIA. NIPPLE AND VALVE TO 2" DIA. DRAIN LINE BACK TO SUMP

8" DIA. COLUMN W/ OIL-LUBRICATED LINE SHAFT (1.25" DIA. SHAFT)

36" DIA. RCP 8' LONG

12" PVC PIPE

PUMP OFF 2377.0

MIN. LIQUID LEVEL

21" MIN.

PUMP BOTTOM EL. 2375.3

ELECTRONIC WATER LEVEL SENSOR/FLOAT

BOTTOM EL. 2374.8

PIPE INVERT EL. 2375.8

SINGLE STAGE VERTICAL TURBINE PUMP (10" BOWL) 6' COLUMN LENGTH, 8" COLUMN DIAMETER DO NOT USE STRAINER (SEE NOTE)

**PUMP NOTES:**

- PUMP SHALL MEET THE FOLLOWING PARAMETERS:  
 MIN. PUMP TDH OF 127 FT @ 1100 GPM  
 MIN. PUMP IMPELLER EFFICIENCY OF 80% (SEMI-OPEN, IMPELLER)  
 MAX. HP DRAW OF 45 HP
- PUMP SHALL BE INGERSOLL-DRESSER (FLOWSERVE) 10M41 SINGLE STAGE (TRIMMED) OR EQUIVALENT.
- PUMP SHALL BE PROVIDED WITH KILL SWITCHES:  
 - LOW PIPELINE PRESSURE (50 PSI)  
 - COUNT DOWN TIMER  
 - LOW OIL PRESSURE

10M41 Pump  
 8" Column  
 128 TDH  
 80% Eff.  
 45 BHP  
 7.39" Imp.

**GENERAL NOTES:**

- CHECK VALVE AND DRAIN LINE ARE REQUIRED TO PREVENT BACK-DRAINING AND FROST FREE OPERATION.
- INLINE FILTER SHALL SELF DRAINING WITH THE FLUSH WATER DIRECTED BACK INTO THE BASIN. THE FILTER SHALL BE CAPABLE OF REMOVING PARTICLES LARGER THAN 0.06" AT 1100 GPM. AMIAD 10" INLINE STEEL, MORRILLIND TORNADO 908SW24, OR EQUIVALENT.

**LIFT STATION DETAIL**

Designed	REEDY	Date	11/21/11
Drawn	REEDY	Checked	CHECKER
Checked	CHECKER	Approved	APPROVER
			APPROVED

BASIN PUMP DETAILS  
 STUART CATTLE CO., INC. LWCF  
 DAWSON COUNTY, NEBRASKA

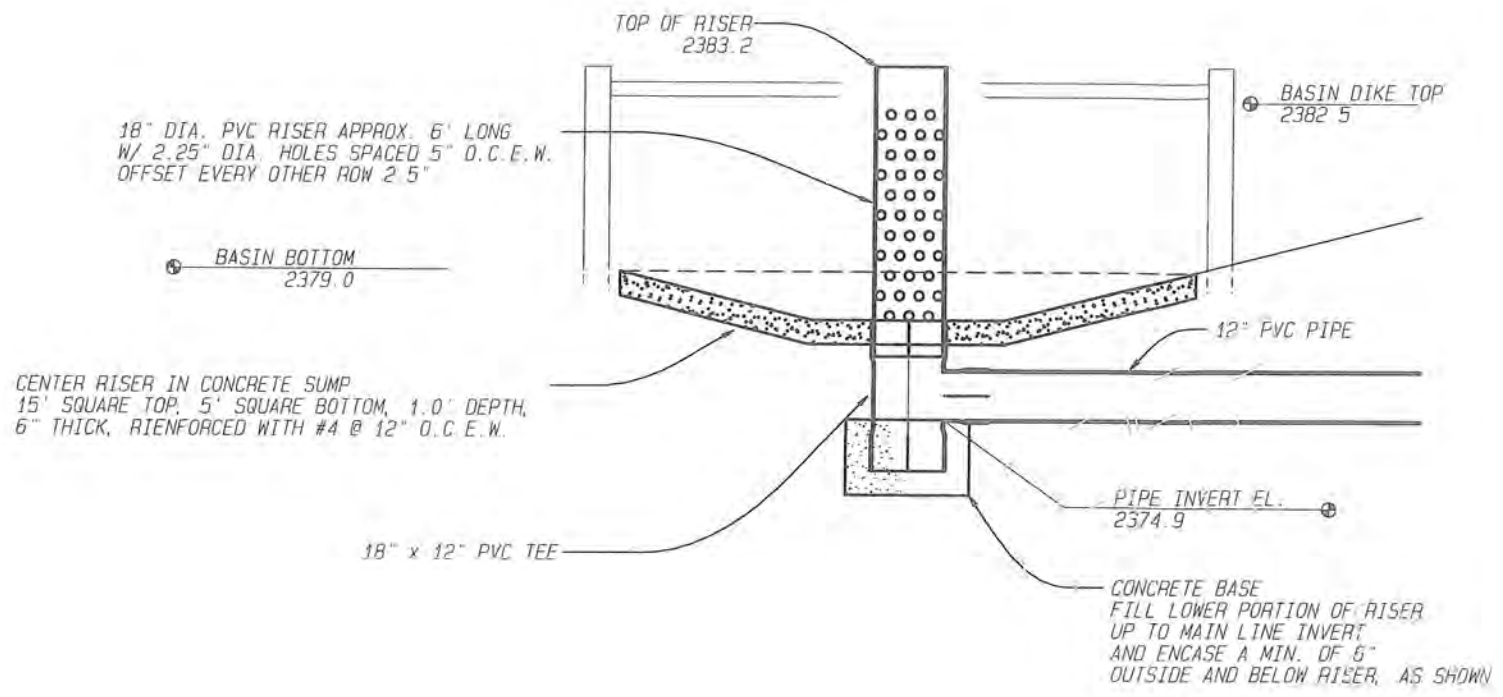


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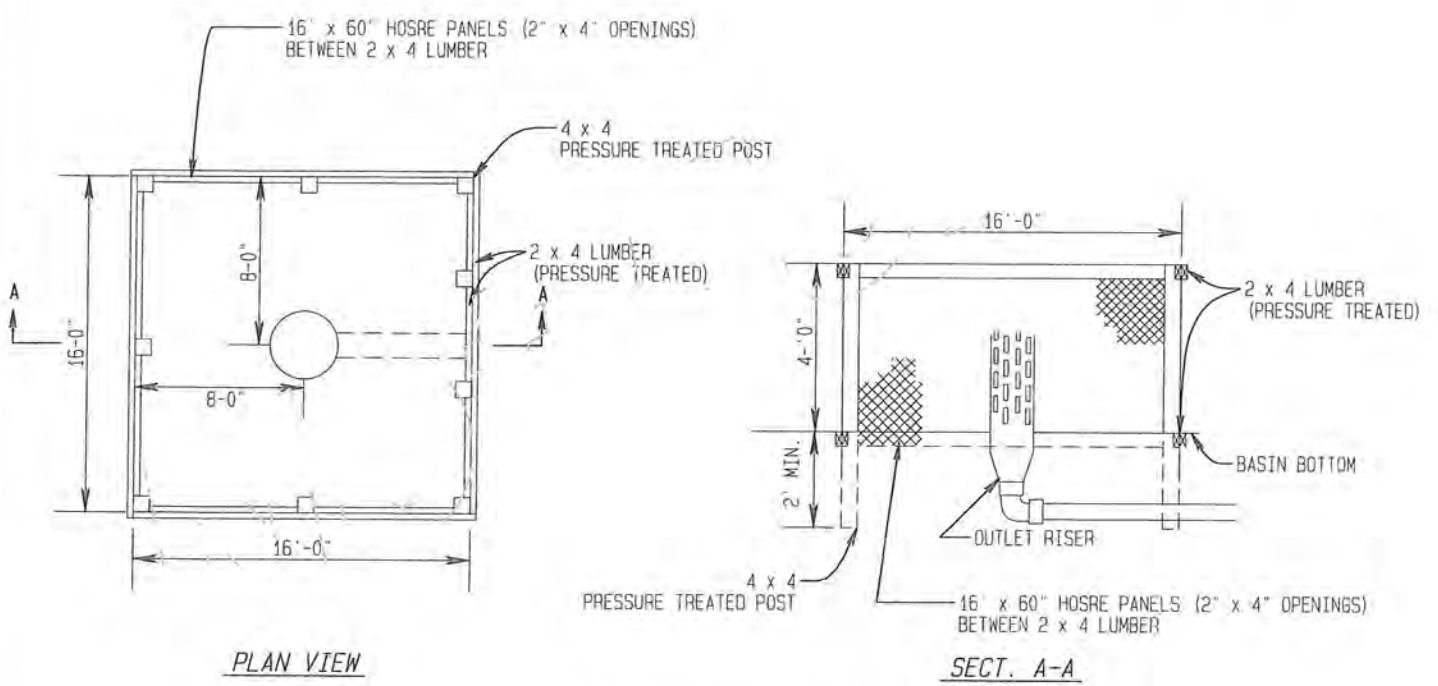
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Sheet 10 of 13

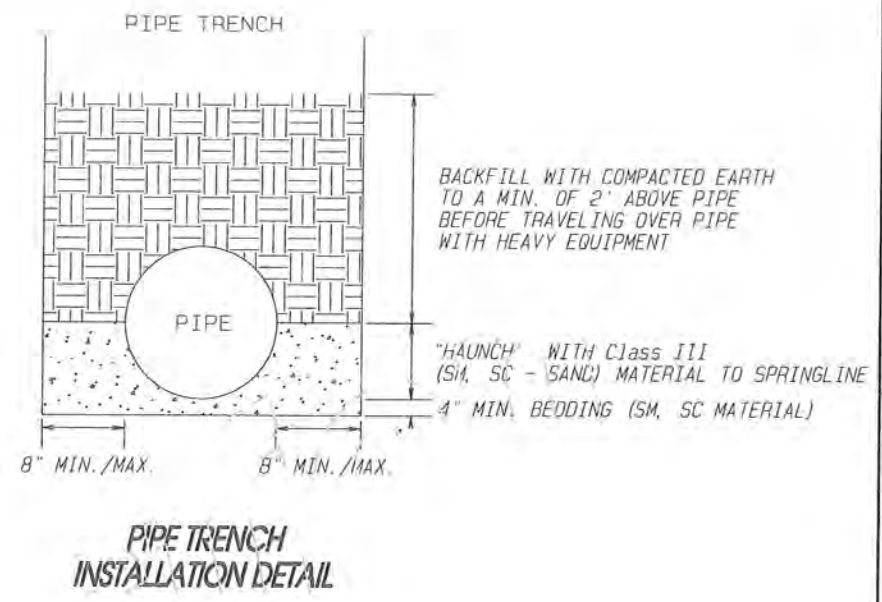




**BASIN LIFT STATION RISER DETAIL**  
(Not to Scale)



**RISER INLET TRASH SCREEN DETAIL**  
(Not to Scale)



**PIPE TRENCH  
INSTALLATION DETAIL**

Date	11/21/11
Designed	REEDY
Drawn	REEDY
Checked	CHECKER
Approved	APPROVER

WEST BASIN RAMP/PIPING DETAILS  
STUART CATTLE CO., INC. LWCF  
DAWSON COUNTY, NEBRASKA





NOTE:

TWO OPTIONS MAY BE UTILIZED FOR MEASURING THE VOLUME IN THE BASIN TO BE IRRIGATED TO VTA. BOTH OPTIONS MEASURE THE BASIN DEPTH AT THE SUMP:

1. FABRICATE A STAFF GAGE TO READ DIRECTLY IN ACRE INCHES USING THE LABELS AND DIMENSIONS FROM THE LEFT TABLE, BELOW.
2. PURCHASE A PREMANUFACTURED TAPE THAT MEASURES IN FEET AND TENTHS OF A FOOT. READ THE VOLUME OF THE MEASURED DEPTH FROM THE TABLE ON THE RIGHT.

Acc Vol (Ac In)	Elev	Depth (ft)
0	2379.00	0.00
5	2379.60	0.60
10	2379.83	0.83
15	2380.01	1.01
20	2380.15	1.15
25	2380.29	1.29
30	2380.42	1.42
35	2380.54	1.54
40	2380.65	1.65
45	2380.75	1.75
50	2380.85	1.85
55	2380.95	1.95
60	2381.05	2.05
65	2381.14	2.14
70	2381.23	2.23
75	2381.32	2.32
80	2381.40	2.40
85	2381.48	2.48
90	2381.55	2.55
95	2381.62	2.62
100	2381.68	2.68
120	2381.91	2.91
140	2382.11	3.11
160	2382.28	3.28
180	2382.44	3.44

Elev	Depth (ft)	Acc Vol (Ac In)
2379.0	0.0	0.00
2379.1	0.1	0.07
2379.2	0.2	0.35
2379.3	0.3	0.96
2379.4	0.4	1.93
2379.5	0.5	3.25
2379.6	0.6	4.90
2379.7	0.7	6.89
2379.8	0.8	9.21
2379.9	0.9	11.85
2380.0	1.0	14.83
2380.1	1.1	18.10
2380.2	1.2	21.59
2380.3	1.3	25.30
2380.4	1.4	29.25
2380.5	1.5	33.43
2380.6	1.6	37.85
2380.7	1.7	42.48
2380.8	1.8	47.28
2380.9	1.9	52.24
2381.0	2.0	57.35
2381.1	2.1	62.66
2381.2	2.2	68.16
2381.3	2.3	73.91
2381.4	2.4	79.98
2381.5	2.5	86.47
2381.6	2.6	93.52
2381.7	2.7	101.27
2381.8	2.8	109.71
2381.9	2.9	118.82
2382.0	3.0	128.64
2382.1	3.1	139.24
2382.2	3.2	150.54
2382.3	3.3	162.47
2382.4	3.4	175.13
2382.5	3.5	188.54



STAFF GAUGE/BASIN LEVEL DETAILS  
 STUART CATTLE CO., INC. LWCF  
 DAWSON COUNTY, NEBRASKA

Date	11/21/11
Designed	REEDY
Drawn	REEDY
Checked	CHECKER
Approved	APPROVER



## Alternative Manure Treatment Technologies

Runoff from livestock barnyards and feedlots can kill fish and cause algae blooms in lakes, ponds and streams. The pond containment and spray field system has been the conventional system for managing livestock manures for the last 40 years. The University of Nebraska has developed resources for the following alternative treatment technologies: **Vegetative Treatment Systems** and **Anaerobic Digesters**.

### About conventional systems

In most cases, animal manures are handled as a solid or concentrated liquid (semi-slurry) from a holding pond. Animal manures are almost always land applied to cropland as fertilizer. Unlike human waste, most animal manures are not diluted. Because of the concentrated nature of animal manures, and the proximity of livestock facilities to cropland, the feasibility of further treating manure is typically not justified. Additional treatment or processing to meet water quality standards of animal manures is typically not justifiable because regulations do not allow regular discharging of the treated manure to the environment, like municipal and industrial treatment plants. This is the primary reason it is rare to see the same treatment technology used for human and industrial waste used on a livestock operation.

### Vegetative Treatment Systems for Beef Operations

A Vegetative Treatment System can be an economical alternative to traditional retention (holding) ponds for controlling runoff from a livestock waste facility. A Vegetative Treatment System refers to a combination of treatment steps for managing runoff. It treats runoff by settling, infiltration, and nutrient use. These individual components when put together are called a Vegetative Treatment System (VTS):

- a settling structure,
- an outlet structure,
- a distribution system, and
- a vegetative treatment area.



The University of Nebraska Extension has a program focused on the development and demonstration Vegetative Treatment Systems for open lots. The [small AFO program](#) demonstrates VTS technology on the less than 1,000 head size beef feedlot and cow-calf operations. UNL has been key in the development of a [guidance document for the design of VTS systems](#), factsheets; and the resources on [e-Xtension](#) and the [Heartland Water Quality Initiative](#). UNL is also involved with demonstration and research on large CAFO VTS systems.



## Why consider a vegetative treatment system

VTS can offer several environmental and economic benefits over a conventional holding pond and irrigation system. Some of the more common benefits include:

- Reduced capital and operating costs for some systems involving vegetative treatment options (sec. 3).
- Reduced odor and other air emissions from most systems involving vegetative treatment options as opposed to a holding pond and sprinkler irrigation system. Visually, a VTS is also more aesthetically acceptable than a holding pond.
- Little or no long-term storage of runoff in earthen ponds, resulting in less ground water risk for most systems involving vegetative treatment options.
- Lower risk of system catastrophic failures due to poor design, management, or unplanned weather events.
- Reliance on cropping systems based upon forages or grasses, as opposed to row crops (corn and soybeans). These crops provide a longer season for nutrient removal and water evapotranspiration, reducing the risk of land application of runoff early in spring and late in fall. If managed properly, these crops provide thick, dormant vegetation that also reduces environmental risk of land application of runoff during the winter. Because of the use of perennial vegetation, surface water risks should be a minor issue for well-managed systems.

From the above list, why would any producer not select a VTS for managing runoff? The design and management of a VTS include some challenges that must be recognized when this option is selected. Some of the more critical considerations include:

- Many VTS will only be accepted under the Voluntary Alternative Performance Standards set by the CAFO regulations. The burden of proof is currently placed on the producer to document that a VTS will perform equally or better than baseline technology (pond and irrigation system). Additional costs will be incurred in obtaining an NPDES permit at the time this publication was prepared.
- Improper design or management of a VTS has a risk of surface water discharge. Planner or producer mistakes could place a producer at a greater risk of violation of environmental regula-

tions. Until VTS becomes an accepted technology by the regulatory community, a producer must accept that the permitting authority for the NPDES program could require livestock operations to replace poor performing VTS with conventional systems to maintain the NPDES permit.

- A well-managed VTS will not distribute nutrients as uniformly as a pivot irrigation system. The potential for nitrate contamination of ground water due to excess nutrients in the headlands of a vegetative treatment area (VTA) must constantly be monitored. Monitoring of VTA soil nutrient status and maintenance of uniform distribution of runoff will require a greater investment of time and financial resources than a conventional system.



## Perfect Pasture Irrigation

### Management is the key to maximizing forage potential

You manage your seed/forage/plant content (managing a balanced mixture of grasses and legumes).

You manage your nutrients/fertilizers.

You manage your herd's grazing rotation.

**Let K-Line Irrigation help you manage water application most efficiently.**

The correct amount of water at the correct time is essential to the success of a forage producer and K-Line Irrigation is the ultimate tool in your management arsenal.

**K-Line Irrigation is a revolutionary, specially formulated, flexible tubing line and pod sprinkler system designed to reduce the time and money you spend on irrigation installation, operation and repairs.**

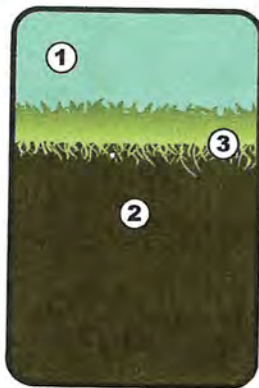
K-Line Irrigation is a low pressure system designed to distribute water with a slow, efficient absorption method that eliminates the need to shift irrigation several times a day - saving time, labor and water resources. K-Line Irrigation uses less water more effectively.



The heart of the system is a series of extremely durable pods that protect a sprinkler that is firmly attached to the exceptionally strong and flexible polyethylene tubing that withstands kinking, abrasive soils, freezing, UV light and the stresses of moving the K-Line.

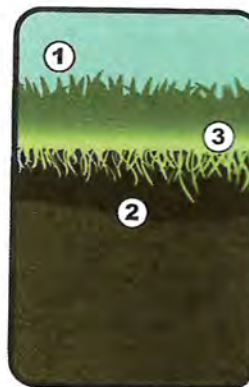
K-Lines can be shifted with a 4-wheel drive ATV, Gator or similar tow vehicle in minutes, efficiently irrigating 2, 20, or 2,000+ acres. K-Line adapts and grows with your needs.

## Different Application Methods, Different Results



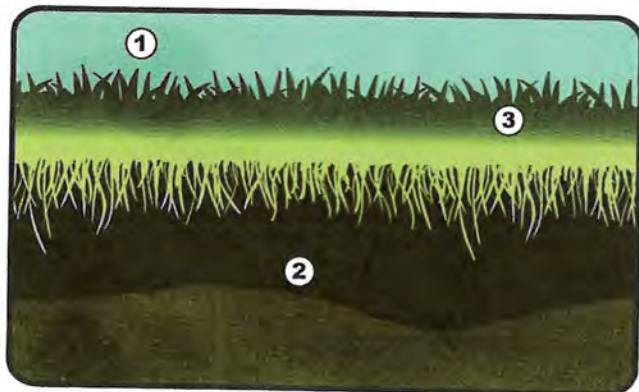
### Unirrigated Pasture/Soils

- ① Rain can be sporadic or poorly timed, with highly variable amounts of rainfall which rarely matches plant needs.
- ② When water becomes available after a long dry period, dry soils are very hard packed and difficult for water to penetrate - resulting in a slick surface where water pools, evaporates away or runs off into undesired areas.
- ③ Root growth is minimal, plants fail to flourish and will quickly go to seed and enter dormancy. Once dormant, even adequate rains will not restore a plant to acceptable levels of new growth.



### Standard Irrigation

- ① Soil is flooded with water faster than it can be absorbed - allowing water and nutrients to pool in low areas, evaporate away, and run off into waterways.
- ② Water and nutrient penetration into the soil is shallow, resulting in stunted root growth.
- ③ Plants fail to produce extensive root systems and are often less healthy with slower regrowth.



### K-Line's Soft Rain Irrigation

K-Line Irrigation results in better water penetration, virtually no water run-off, and increased root mass. K-Line's gentle water application dissolves fertilizers and better disperses nutrients into the soil profile.

- ① Water application rates match that of soil absorption rates, keeping water and nutrients from running off or evaporating. Water settles into and fills the soil profile, maintaining moisture in the root zone for a much longer period of time.
- ② Slow root zone penetration permits moisture and nutrient distribution without washing them out of the plants soil profile.
- ③ Plants develop stronger, deeper, more extensive root systems capable of utilizing more water and nutrients - promoting a stronger and healthier plant that is capable of quicker, more efficient growth.