

## **SECTION 4**

### ***Manure and Wastewater Handling and Storage Component***

This report was prepared based on spreadsheets that calculate manure and wastewater production for this operation. Spreadsheet calculations are included at the end of this section.

#### **Existing Facility Description**

(Description only of existing)

Cold Springs Farm cattle feeding and backgrounding operation is composed of the Brick House and Stone House areas.

#### **Brick House location**

The Brick House location of Cold Springs Farm currently averages 2300 head of beef cattle with a capacity for 2380 head. The cattle housed in the brick house area are currently penned in seven different lot arrangements: Brick House concrete lots 1-4, the 50s, 60s, 100s, 200s, 400s, and Temporary pens 1 - 4.

	Animal	Animal Numbers		Animal Weights	
Lot's	Type	Average	Capacity	AVG	Finish
Brick House Lots	Beef Feeder	548	560	1000	1200
50's	Beef Feeder	280	300	1000	1200
60's	Beef Feeder	452	480	1000	1200
100'S	Beef Feeder	525	560	1000	1200
200'S	Beef Feeder	364	320	1000	1200
400'S	Beef Feeder	131	160	1000	1200
Temporary Pens 1-4	Beef Feeder	0	0	0	0
Total		2300	2380		

#### **E7A-D (Brick House Concrete Lots 1-4)**

The Brick House lots 1-4 are concrete surfaced and each have dimensions 140' x 60'. An additional 60' x 60' portion at the north end of each lot is roofed. The uncovered portions of the lots have concrete curbing that prevents manure runoff. Each of the lots have wall openings that are connected to a concrete scrape alley. The scrape alley flows to the settling basin E19 south of the lots. The concrete settling basin has dimensions 190' x 30' x 4' deep with an inside 10:1 ramp and serves as a runoff and sediment control structure for runoff from the concrete lots. The liquid from settling basin E19 is transferred via gravity flow sewer pipe to earthen storage pond E10. The concrete lots are scraped and hauled on a weekly basis.

#### **E5A-E (50s Lots )**

Lots 51-54 are earthen, each with dimensions of 240' x 50'. A feed drive runs along the east side of the lots. The manure transfer alley lies to the west of the

earthen lots. Runoff from these lots is collected in earthen storage pond E13. The lots are scraped and hauled between groups.

#### **E6A-D (60s Lots)**

Lots 61-64 are earthen with dimensions 290' x 190', 265' x 180', 240' x 180', and 220' x 190' respectively. A feed drive runs along the west side of the pens and a manure transfer alley along the east side. Runoff from these lots is collected in earthen storage ponds E14 and E15. The lots are scraped and hauled between groups.

#### **E1A-H (100s Lots)**

Lots 111 -119 are earthen, each with dimensions 240' x 50'. There are four pens on each side of a center feed drive. There are manure transfer alleys at the north and south ends of the lots. Runoff from these lots is collected in earthen storage ponds E11 and E12. The lots are scraped and hauled between groups.

#### **E2A-D (200s Lots)**

Lots 201 - 204 are pasture paddocks with dimensions 630' x 480', 580' x 540', 640' x 550', and 1050' x 560' respectively. A feed drive runs along the west side of the paddocks. Runoff from these paddocks is not detained. The 200s lots are not scraped or hauled.

#### **E4A-B (400s Lots)**

Lot 4012 is the combination of lots 401 and 402. The earthen lot has dimensions 500' x 250'. A feed drive lies on the east side of the pen and a manure transfer alley lies on the west side. Runoff from these lots is not detained. The lots are scraped and hauled between groups.

#### **E8A-B (Temporary Pens 1 & 2)**

(E8A: 80' x 50' and E8B: 80' x 50'). These concrete lots have concrete curbing to prevent manure runoff as well as an opening on the north end that is connected to the scrape alley. The scrape alley connects to a gravity flow sewer pipe at the northwest corner of temporary pen 1 and flows to earthen storage basin E10.

There is no runoff/sediment control structure for the runoff from these concrete lots. The concrete lots are scraped and hauled on an as needed basis.

#### **E8C (Temporary Pens 3 & 4)**

(E8C: 200' x 70'). These earthen lots have earthen diversions to prevent manure runoff and drain south to a scrape alley along the north side of E8A & E8B. The scrape alley connects to a gravity flow sewer pipe at the northwest corner of temporary pen 1 and flows to earthen storage basin E10. There is no runoff/sediment control structure for the runoff from these earthen lots. The earthen lots are scraped and hauled on an as needed basis.

### **Stone House location**

The Stone House location of Cold Springs Farm currently averages 570 head of beef cattle with a capacity of 625 head. The cattle housed in the Stone House area are currently divided amongst two penning lot arrangements: Stone House concrete lots 5, 6, 8, and 9 as well as the 300s.

Lot's	Animal	Animal Numbers		Animal Weights	
	Type	Average	Capacity	AVG	Finish
Stone House lots	Beef Feeder	448	490	1000	1200
300'S	Beef Feeder	122	135	1000	1200
Total		570	625		

#### **E9A-H (Stone House Concrete Lots: 5, 6, 8, and 9)**

The Stone House lots 5,6,8,9 are concrete surfaced and each have dimensions 200' x 50'. An additional 50' x 30' portion of the north end of the lots is roofed. The lot perimeter has concrete curbing to prevent manure runoff. Each of the lots has an opening to the scrape alley at the south end of the lots. The scrape alley flows to settling basin E18 at the south end of the lots. The concrete settling basin has dimensions 115' x 30' x 4' deep with an inside 10:1 ramp and serves as a runoff and sediment control structure for runoff from the concrete lots. The liquid from the settling basin is transferred via gravity flow sewer pipe to earthen storage ponds E16 and E17. The concrete lots are scraped and hauled on a weekly basis.

#### **E3A-B (300s Lots)**

Lots 301 and 302 are earthen and have dimensions 285' x 200' and 230' x 220' respectively. A feed alley runs along the east side of the lots and manure transfer alley at the west side. The runoff from these lots is not detained. The lots are scraped and hauled between groups.

## **Resource Concerns (Water Quality, Soil Erosion, etc)**

(Description of how all water quality issues will be resolved)

The following water quality issues have been addressed in this section of the Comprehensive Nutrient Management Plan.

### **Brick House Site**

#### **Stormwater Runoff from Roofed Areas around Feed Storage**

To divert clean roof runoff from entering the manure/wastewater storage systems a roof runoff management system consisting of new gutters, down spouts, and underground outlets shall be installed.

#### **Wastewater/Runoff from Feed Storage Areas**

A concrete curb shall be installed around the and along the concrete feed storage area to contain and transfer leachate and wastewater runoff (up to a 25yr, 24hr event) from the feed storage area to earthen basin P3. Concrete repairs shall be made to the feed storage area bunker walls to contain leachate from silage and feed additives.

#### **Stormwater Runoff entering concrete scrape alleys**

Mountable concrete curbing shall be installed along scrape alleys extending from the concrete lots to the settling basins to prevent manure and wastewater runoff from the lots and to divert clean water from entering the manure and wastewater collection system.

#### **Stormwater runoff entering concrete settling basins**

Mountable curbing shall be installed at the entrances to settling basins to contain manure and wastewater runoff from the concrete lots and divert clean water from entering the manure and wastewater collection system.

#### **Manure / wastewater / stormwater runoff from earthen lots**

To divert clean surface runoff from entering earthen lots and to prevent manure and wastewater runoff from the lots, earthen diversions or swales shall be installed where necessary.

### **Stone House Site**

#### **Stormwater runoff entering concrete scrape alleys**

Mountable concrete curbing shall be installed along scrape alleys extending from the concrete lots to the settling basins to prevent manure and wastewater runoff from the lots and to divert clean water from entering the manure and wastewater collection system.

#### **Stormwater runoff entering concrete settling basins**

Mountable curbing shall be installed at the ramp entrances to settling basins to contain manure and wastewater runoff from the concrete lots and divert clean water from entering the manure and wastewater collection system.

**Lack of manure / wastewater / stormwater runoff storage**

Repairs shall be made to the west berm of earthen storage pond E17 to divert clean surface runoff from entering the manure/wastewater storage system

**50's Lots**

**Manure / wastewater / stormwater runoff from earthen lots**

To divert clean surface runoff from entering the lots, earthen diversions or swales shall be installed where necessary.

**Operation and Maintenance of Waste Storage Pond**

An agitation/pump out ramp with staff gauge shall be installed to dewater pond E13 without damaging berms and pond bottom.

**60's Lots**

**Lack of manure / wastewater / stormwater runoff storage**

Waste storage pond E15 shall be cleaned out to original design depth.

**Operation and Maintenance of Waste Storage Pond**

An agitation/pump out ramp with staff gauge shall be installed to dewater pond E15 without damaging berms and pond bottom.

**100's Lots**

**Operation and Maintenance of Waste Storage Pond**

An agitation/pump out ramp with staff gauge shall be installed to dewater pond E10-11 without damaging berms and pond bottom.

**Lack of manure / wastewater / stormwater runoff storage**

Waste storage ponds E10-11 shall be cleaned out to original design depths.

**Manure / wastewater / stormwater runoff from earthen lots**

To divert clean surface runoff from entering the lots, earthen diversions or swales shall be installed where necessary.

**200's Lots**

**Manure / stormwater runoff from pasture paddocks and transfer alley.**

To divert clean surface runoff from entering the lots, earthen diversions or swales shall be installed to outlet storm runoff with out causing erosion.

Lots shall be depopulated, vegetation reestablished, and area maintained as pasture paddocks.

**300's Lots**

**Manure / wastewater / stormwater runoff from earthen lots**

These lots will be depopulated and decommissioned. Manure solids will be removed from all lots and applied at agronomic rates. Fences will be removed and area will be returned to row crop production.

**Lack of manure / wastewater / stormwater runoff storage**

These lots will be depopulated and decommissioned. Manure solids will be removed from all lots and applied at agronomic rates. Fences will be removed and area will be returned to row crop production.

**400's Lots**

**Manure / wastewater / stormwater runoff from earthen lots**

These lots will be depopulated and decommissioned. Manure solids will be removed from all lots and applied at agronomic rates. Fences will be removed and area will be returned to row crop production.

**Lack of manure / wastewater / stormwater runoff storage**

These lots will be depopulated and decommissioned. Manure solids will be removed from all lots and applied at agronomic rates. Fences will be removed and area will be returned to row crop production.

## Proposed System Summary

(Narrative describing the proposed components and how they fit together for the system)

### Brick House site

	Animal	Manure / Wastewater Volumes		
		Liquids (1000 gal)		Solids (Ton)
Lot's	Type	Average	Extreme	Average
Brick House Lots	Beef Feeder	850	1100	6018
50's	Beef Feeder	1200	1600	811
60's	Beef Feeder	3200	4300	867
100'S	Beef Feeder	2100	3100	1323
200'S	Beef Feeder	0	0	0
400'S	Beef Feeder	0	0	0
Total		7350	10100	9019

### Stone House site

	Animal	Manure / Wastewater Volumes		
		Liquids (1000 gal)		Solids (Ton)
Lot's	Type	Average	Extreme	Average
Stone House lots	Beef Feeder	2100	2540	2681
300'S	Beef Feeder	0	0	0
Total		2100	2540	2681

Based on estimated volumes above and the producer's application records, 8,000 tons of solids are transferred off-site and 7 million gallons of liquid may be lost in the earthen storages based on an estimated seepage rate of  $1.5 \times 10^{-6}$  cm/sec.

The following pages list proposed practices, and operation and maintenance procedures that should be adhered to for this facility.

### **Manure Transfer (634) (See Section 6 for Quantities)**

Stone House lots - A new manure transfer system is proposed to be installed along concrete scrape alley E20 and at the entrances to settling basin E18 to address the water quality concern of manure lot runoff. The system will be comprised of mountable curbs (18" wide x 13" high) to divert clean stormwater runoff from entering the scrape alleys.

Brick House lots - A new manure transfer system is proposed to be installed along concrete scrape alley E21 and at the entrance to settling basin E19 to address the water quality concern of manure lot runoff. The system will be comprised of mountable curbs (18" wide x 13" high) to divert clean stormwater runoff from entering the scrape alleys.

Feed storage Area - A new manure transfer system is proposed to be installed along the south edge E26 TO address the water quality concern of silage leachate runoff. The system will be comprised of mountable curbs (18" wide x 13" high) at the entrance to E26 to divert clean stormwater runoff from entering the feed storage area and a curb along the south edge of E26 (12" wide x 12" high) to divert silage leachate to a reception box with riser. The reception box will drain to proposed waste storage pond P3.

### **Waste Storage Facility (313) (See Section 6 for Quantities)**

Brick House Lots- A new staff gauge and concrete agitation/pump out ramp shall be installed in holding pond E10 and the pond shall be cleaned out to original design depth to address the water quality concern of lack of storage.

Stone House Lots – New staff gauges and concrete agitation/pump out ramp shall be installed in holding ponds E16 & E17 and the ponds shall be cleaned out to original design depth to address the water quality concern of lack of storage.

50's - A new staff gauge and concrete agitation/pump out ramp shall be installed in holding pond E13 and the pond shall be cleaned out to original design depth to address the water quality concern of lack of storage.

60's - A new staff gauge and concrete agitation/pump out ramp shall be installed in holding pond E15 and the pond shall be cleaned out to original design depth to address the water quality concern of lack of storage.

100's - New staff gauges and concrete agitation/pump out ramps shall be installed in holding pond E11 & E12 and the ponds shall be cleaned out to original design depth to address the water quality concern of lack of storage.



Feed Storage Area – A new waste storage pond (P3) will be constructed below the feed storage area and will accommodate runoff from at least the 25 year storm. The pond will be regularly pumped. In winter months, liquids may be transferred to pond E13.

#### **Roof Runoff Management (558) (See Section 6 for Quantities)**

Feed Storage Area - A new roof runoff management system is proposed for installation on the feed storage building adjacent to feed storage area to address the concerns related to stormwater runoff. The system will be comprised of new gutters, downspouts, and underground outlet piping.

#### **Diversion (362) (See Section 6 for Quantities)**

60's - New diversions are proposed to be installed around the 60's earthen lots (E6A-D) to address the water quality concern of manure lot runoff. The system will be comprised of earthen diversion berms and mountable curbs to divert clean stormwater runoff from entering the lots.

100's - New diversions are proposed to be installed around the 100's earthen lots (E1A-H) to address the water quality concern of manure lot runoff. The system will be comprised of earthen diversion berms and mountable curbs to divert clean stormwater runoff from entering the lots.

200's - New diversions are proposed to be installed around the 200's pasture paddocks (E2A-D) to address the water quality concern of erosion from stormwater runoff. The system will be comprised of earthen diversion berms, risers, and under ground outlets to divert clean stormwater runoff.

#### **Pasture & Hay Planting (512) (See Section 6 for Quantities)**

200's - Seeding permanent grass and mulching will be required in disturbed areas and cattle transfer lane, etc. in order to stabilize soils and control erosion.

#### **Critical Area Seeding/Mulching (342) (See Section 6 for Quantities)**

60's - Seeding permanent grass and mulching will be required in disturbed areas and around settling basin, gravity sewer trench, etc. in order to stabilize soils and control erosion.

100's - Seeding permanent grass and mulching will be required in disturbed areas and around settling basin, gravity sewer trench, etc. in order to stabilize soils and control erosion.

### **Manure Transfer to Fields (634) (See Section 6 for Quantities)**

Manure pack will be removed and field applied at least every six months. Presently, the operator owns one 625 cu-ft (500 Bu) box spreader, two (2) 435 cu-ft (300 Bu) Flail type side slinger spreader. Assuming six loads per hour and eight hours/day approximately 40 days will be required to transfer one year of manure, bedding, and wastewater to fields for utilization.

Liquid Manure will be removed and field applied at least every six months. Presently, the operator contracts to a private applicator for applying the liquid manure but owns a 1200 gallon tank and a 6" Dry Hill agitation pump with 500 feet of 6" hose to pump down and transfer liquid manure in an emergency. Assuming a 600 GPM pump and eight hours/day approximately 40 days will be required to transfer one year of liquid manure, wastewater, and stormwater to fields for utilization. The operator shall purchase more/larger solids spreading equipment in order to minimize the required window for transporting manure, bedding, and wastewater to fields for utilization.

### **Mortality Management:**

Off-site Rendering – Mortalities shall be hauled away and disposed of by Five Star Enterprises.

### **Manure and Wastewater Storage and Handling - Record Keeping (See Record Keeping – Appendix E)**

{Insert permitting documents if applicable}

Any changes in animal numbers, average weights, or manure storages will require this plan to be updated.
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## Alternatives Discussed:

Lot Area	Concerns	Alternative Solutions
Brick House Concrete Lots E7A thru E7D	The manure and waste water storage pond (E10) may not have adequate storage. The Staff gauge at Pond E10 is not adequately marked	Option 1: <ul style="list-style-type: none"> <li>Check and/or clean out pond to dimensions 80' x 220' x 12' deep.</li> <li>Install an adequate staff gauge.</li> <li>Dewater pond to stop pump elevation on the staff gauge.</li> </ul>
50's Lots – E5A thru D and E5F	Runoff from lot E5F is not contained.	Option 1: <ul style="list-style-type: none"> <li>Check and/or clean out pond E13 to dimensions 260' x 450' x 10' deep.</li> <li>Install an adequate staff gauge in pond E13.</li> <li>Dewater pond to stop pump elevation on staff gauge.</li> </ul> Option 2: <ul style="list-style-type: none"> <li>Construct a waste storage pond below lot E5F and divert all runoff into same</li> </ul> Option 3: <ul style="list-style-type: none"> <li>Construct a basin/reception tank and pump runoff to large pond E13.</li> </ul> Option 4: <ul style="list-style-type: none"> <li>Abandon Lot E5F.</li> </ul>
60's Lots – E6a thru E6D	The storage ponds E14 and E15 may not have adequate storage.	Option 1: <ul style="list-style-type: none"> <li>Check and/or clean out pond E15 to dimensions 280' x 60' x 10' deep.</li> <li>Install an adequate staff gauge in pond E15.</li> <li>Dewater pond to stop pump elevation on staff gauge.</li> </ul> Option 2: <ul style="list-style-type: none"> <li>Construct a settling basin at location of pond E14.</li> <li>Pipe water from basin to pond E15, eliminating need to store fresh water running off between E14 and E15.</li> </ul>
100's Lots – Lots E1A thru E1H.	There are no settling basins in front of ponds E11 and E12 and sludge storage reduces the working storage volume in the ponds.  Staff gauges in ponds E11 and E12 are inadequate.  Damage to berm at south end of pond E12 by hauling equipment has reduced the working storage volume.	Option 1: <ul style="list-style-type: none"> <li>Check and/or clean out ponds E11 and E12 to dimensions 345' x 110' x 10' deep – each.</li> <li>Install adequate staff gauges in ponds E11 and E12.</li> <li>Dewater pond to stop pump elevation on staff gauge.</li> </ul> Option 2: <ul style="list-style-type: none"> <li>Construct settling basins at locations upstream of ponds E11 &amp; E12.</li> <li>Concrete the alleys to north and south of lots and install curbs for settling solids.</li> <li>Repair damaged berm. Construct a surfaced (rock?) access to the pond for pumping</li> </ul>

200's Lots E2A thru E2D	Runoff from lots is not contained and filter areas below lots does not eliminate concentrated flow.	<p>Option 1:</p> <ul style="list-style-type: none"> <li>• These lots are too large to treat like traditional feedlots.</li> <li>• Abandon lots * (as feedlots) all together.</li> </ul> <p>Option 2:</p> <ul style="list-style-type: none"> <li>• Reduce size of actual feedlots.</li> <li>• Place smaller lots adjacent each other in northwest corners and southwest corners.</li> <li>• Assume each of the 4 lots are 200' x 200'.</li> <li>• Construct settling basins and a waste storage pond for each pair of lots – to the east</li> <li>• Between the lots and the waterway. Construct diversions as necessary to direct runoff to basins.</li> <li>• Ponds (2) would need to be about 300' x 100' by 8' deep.</li> <li>• Re-establish pastures in larger portions of each old lot and use according to a pasture management plan.</li> </ul>
300's Lots E3A and E3B	Runoff from lots is not contained and filter areas below lots does not eliminate concentrated flow.	<p>Option 1:</p> <ul style="list-style-type: none"> <li>• Construct a settling basin/reception pit below 2 lots.</li> <li>• Construct diversions as necessary to direct runoff to basin.</li> <li>• Pump runoff from 300's lots to holding ponds just east of lots (E16 and E17), or:</li> </ul> <p>Option 2:</p> <ul style="list-style-type: none"> <li>• Construct a holding pond for runoff from 300's lots. Pond would need to be approximately 100' x 300' x 8' deep.</li> </ul> <p>Option 3:</p> <ul style="list-style-type: none"> <li>• Another alternative would be to abandon lots *.</li> </ul>
400's Lots E4A and E4B	Runoff from lots is not contained and filter areas below lots does not eliminate concentrated flow.	<p>Option 1:</p> <ul style="list-style-type: none"> <li>• Construct a settling basin/reception pit below 2 lots.</li> <li>• Construct diversions as necessary to direct runoff to basin.</li> </ul> <p>Option 2:</p> <ul style="list-style-type: none"> <li>• Construct a holding pond for runoff from 400's lots.</li> <li>• Pond would need to be approximately 150' x 300' x 8' deep.</li> </ul> <p>Option 3:</p> <ul style="list-style-type: none"> <li>• An alternative would be to abandon lots *.</li> </ul>
Stone House Concrete Lots E9A thru E9H	<p>Curbs on scrape alleys may not be adequate.</p> <p>Adequate staff gauges not installed in ponds E16 and E17.</p>	<p>Option 1:</p> <ul style="list-style-type: none"> <li>• Check and/or clean out pond E16 to dimensions 150' x 265' x 10' deep and E17 to 125' x 330' x 10' deep.</li> <li>• Construct new curbing if necessary to divert runoff.</li> <li>• Install adequate staff gauges in E16 and E17.</li> <li>• Dewater ponds to stop pump elevation on the staff gauges.</li> </ul>

Temporary Pens E8A thru E8C	??	??
Feed Storage Area	Runoff and leachate is not contained  Cracks in feed storage bunker wall allow leachate to escape.	Option 1: <ul style="list-style-type: none"> <li>• Repair cracked concrete.</li> <li>• Construct a catch basin for runoff and leachate – pipe or pump to basins E11 and E12</li> </ul> Option 2: <ul style="list-style-type: none"> <li>• Construct roofs/covers over feed storage.</li> </ul>
Composting Area	Fresh water runoff flows over composting area and runoff is not contained.	Option 1: <ul style="list-style-type: none"> <li>• Construct a diversion above the composting area to preclude fresh water runoff.</li> <li>• Construct a catch basin for runoff and pipe or pump to basins E14 and E15 or construct a small storage pond, or:</li> </ul> Option 2: <ul style="list-style-type: none"> <li>• Construct a roof over composting area or cover piles (along with fresh water diversion).</li> </ul>
Wood Chips Storage and Mortality Management Areas + Fuel Storage Area + Others	??	Option 1: <ul style="list-style-type: none"> <li>• Gutters on all buildings adjacent lots.</li> <li>• Spill Prevention Control and Countermeasures (SPCC) plan for fuel storage area.</li> </ul>

\* If E5F in 50's Lots, 200's, 300's and 400's Lots were abandoned, all those animals could be housed in one new building and the large amount of pasture between the Brick House and the Stone House could be managed as a rotational grazing system.