**State of North Carolina**
**Department of Environment and Natural Resources**
**Division of Water Resources**

**Animal Waste Management Systems**
Request for Certificate of Coverage
Facility Currently Covered by an Expiring State Non-Discharge General Permit

On September 30, 2014, the North Carolina State Non-Discharge General Permits for Animal Waste Management Systems will expire. As required by these permits, facilities that have been issued Certificates of Coverage to operate under these State Non-Discharge General Permits must apply for renewal at least 180 days prior to their expiration date. Therefore, all applications must be received by the Division of Water Resources by no later than **April 1, 2014**.

***Please do not leave any question unanswered. Please verify all information and make any necessary corrections below.***

***Application must be signed and dated by the Permittee.***

RECEIVED/DENR/DWR
MAR 31 2014
Water Quality Regional Operations Section

1. Facility Number: 310064 and Certificate of Coverage Number: AWS310064
2. Facility Name: Brad Brinson Farm
3. Landowner's name (same as on the Waste Management Plan): Hobart Brinson
4. Landowner's mailing address: PO Box 131
   City/State: Chinquapin NC Zip: 285210131
   Telephone Number (include area code): (910)285-2973 **E-mail:**
5. **Facility's physical address:** 1816 Maready Rd
   **City**: Chinquapin **State**: NC **Zip:** 28521
6. County where facility is located: Duplin
7. Farm Manager's name (If different than the Landowner): Hobart Brinson
8. Farm Manager's telephone number (include area code): 910-285-2973
9. Integrator's name (if there is not an integrator write "None"): Murphy-Brown LLC
10. Operator in Charge (OIC) name: Hobart Brinson Telephone Number 910-285-2973 OIC # 26035
11. Lessee's name (if there is not a lessee write "None"): NONE
12. Indicate animal operation type and number:

**Swine**
Wean to Finish
Wean to Feeder
Farrow to Finish
Feeder to Finish **5496**
Farrow to Wean
Farrow to Feeder
Boar/Stud
Gilts
Other

Horses - Horses
Horses - Other

**Cattle**
Dairy Calf
Dairy Heifer
Milk Cow
Dry Cow
Beef Stocker Calf
Beef Feeder
Beef Brood Cow
Other

Sheep - Sheep
Sheep - Other

**Dry Poultry**
Non Laying Chickens
Laying Chickens
Turkeys
Other
Pullets
Turkey Poults

**Wet Poultry**
Non Laying Pullets
Layers

**Mail one (1) copy of the most recent Waste Utilization Plan (WUP) along with the field maps for this facility with this completed and signed application as required by NC General Statures 143-215.10C(d) to the address below. The WUP must be signed by the owner and a certified technical specialist.**

**As a second option to mailing paper copies of the application package, you can scan and email one signed copy of the application and the WUP to: animalpermits@ncdenr.gov**

I attest that this application has been reviewed by me and is accurate and complete to the best of my knowledge. I understand that, if all required parts of this application are not completed and that if all required supporting information and attachments are not included, this application package will be returned to me as incomplete. **Note**: In accordance with NC General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application may be subject to civil penalties up to $25,000 per violation. (18 U.S.C. Section 1001 provides a punishment by a fine of not more than $10,000 or imprisonment of not more than 5 years, or both for a similar offense.)

Printed Name of Signing Official (Landowner, or if multiple Landowners all landowners should sign. If Landowner is a corporation, signature should be by a principal executive officer of the corporation):

Name: Hobart Bradley Brinson Title: Owner

Signature: Hobart Bradley Brinson Date: March 14, 2014

Name: _____ Title: _____

Signature: _____ Date: _____

Name: _____ Title: _____

Signature: _____ Date: _____

THE COMPLETED APPLICATION SHOULD BE SENT TO THE FOLLOWING ADDRESS:

**NCDENR–DWR**
**Animal Feeding Operations Branch**
**1636 Mail Service Center**
**Raleigh, North Carolina 27699-1636**

**Telephone number: (919) 807-6464**
**E-mail: animalpermits@ncdenr.gov**

**Murphy-Brown, LLC**

4/30/2007

2822 Hwy 24 West
P.O. Box 856
Warsaw, NC 28398

# NUTRIENT UTILIZATION PLAN

| | |
|---|---|
| Grower(s): | Bradley Brinson |
| Farm Name: | Brad Brinson Farm |
| County: | Duplin |
| Farm Capacity: | |
| Farrow to Wean | |
| Farrow to Feeder | |
| Farrow to Finish | |
| Wean to Feeder | |
| Feeder to Finish | 5496 |
| Storage Structure: | Anaerobic Lagoon |
| Storage Period: | >180 days |
| Application Method: | Irrigation |

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MAR 31 2014

Water Quality Regional
Operations Section

The waste from your animal facility must be land applied at a specified rate to prevent pollution of surface water and/or groundwater. The plant nutrients in the animal waste should be used to reduce the amount of commercial fertilizer required for the crops in the fields where the waste is to be applied.

This waste utilization plan uses nitrogen as the limiting nutrient. Waste should be analyzed before each application cycle. Annual soil tests are strongly encouraged so that all plant nutrients can be balanced for realistic yields of the crop to be grown.

Several factors are important in implementing your waste utilization plan in order to maximize the fertilizer value of the waste and to ensure that it is applied in an environmentally safe manner:

1. Always apply waste based on the needs of the crop to be grown and the nutrient content of the waste. Do not apply more nitrogen than the crop can utilize.

2. Soil types are important as they have different infiltration rates, leaching potentials, cation exchange capacities, and available water holding capacities.

3. Normally waste shall be applied to land eroding at less than 5 tons per acre per year. Waste may be applied to land eroding at 5 or more tons per acre annually, but less than 10 tons per acre per year providing that adequate filter strips are established.

4. Do not apply waste on saturated soils, when it is raining, or when the surface is frozen. Either of these conditions may result in runoff to surface waters which is not allowed under DWQ regulations.

5. Wind conditions should also be considered to avoid drift and downwind odor problems.

6. To maximize the value of the nutrients for crop production and to reduce the potential for pollution, the waste should be applied to a growing crop or applied not more than 30 days prior to planting a crop or forages breaking dormancy. Injecting the waste or disking will conserve nutrients and reduce odor problems.

This plan is based on the waste application method shown above. If you choose to change methods in the future, you need to revise this plan. Nutrient levels for different application methods are not the same.

The estimated acres needed to apply the animal waste is based on typical nutrient content for this type of facility. In some cases you may want to have plant analysis made, which could allow additional waste to be applied. Provisions shall be made for the area receiving waste to be flexible so as to accommodate changing waste analysis content and crop type. Lime must be applied to maintain pH in the optimum range for specific crop production.

This waste utilization plan, if carried out, meets the requirements for compliance with 15A NCAC 2H .0217 adopted by the Environmental Management Commission.

**AMOUNT OF WASTE PRODUCED PER YEAR ( gallons, $ft^3$, tons, etc.):**

| Capacity | Type | Waste Produced per Animal | Total |
|---|---|---|---|
| | Farrow to Wean | 3212 gal/yr | gal/yr |
| | Farrow to Feeder | 4015 gal/yr | gal/yr |
| | Farrow to Finish | 10585 gal/yr | gal/yr |
| | Wean to Feeder | 223 gal/yr | gal/yr |
| 5496 | Feeder to Finish | 986 gal/yr | 5,419,056 gal/yr |
| | | **Total** | **5,419,056 gal/yr** |

**AMOUNT OF PLANT AVAILABLE NITROGEN PRODUCED PER YEAR (lbs):**

| Capacity | Type | Nitrogen Produced per Animal | Total |
|---|---|---|---|
| | Farrow to Wean | 5.4 lbs/yr | lbs/yr |
| | Farrow to Feeder | 6.5 lbs/yr | lbs/yr |
| | Farrow to Finish | 26 lbs/yr | lbs/yr |
| | Wean to Feeder | 0.48 lbs/yr | lbs/yr |
| 5496 | Feeder to Finish | 1.14 lbs/yr | 6,270 lbs/yr |
| | | **Total** | **6,270 lbs/yr** |

Applying the above amount of waste is a big job. You should plan time and have appropriate equipment to apply the waste in a timely manner.

**LAND UTILIZATION SUMMARY**

The following table describes the nutrient balance and land utilization rate for this facility
Note that the Nitrogen Balance for Crops indicates the ratio of the amount of nitrogen produced on this facility to the amount of nitrogen that the crops under irrigation may uptake and utilize in the normal growing season.

| | |
|---|---|
| **Total Irrigated Acreage:** | **38.72** |
| **Total N Required 1st Year:** | **7289.35** |
| **Total N Required 2nd Year:** | **0** |

| | |
|---|---|
| **Average Annual Nitrogen Requirement of Crops:** | **7,289.35** |
| **Total Nitrogen Produced by Farm:** | **6,270.00** |
| **Nitrogen Balance for Crops:** | **(1,019.35)** |

The following table describes the specifications of the hydrants and fields that contain the crops designated for utilization of the nitrogen produced on this facility. This chart describes the size, soil characteristics, and uptake rate for each crop in the specified crop rotation schedule for this facility.

## Reception Area Specifications

| Tract | Field | Irrigated Acreage | Soil Type | 1st Crop Code | Time to Apply | 1st Crop Yield | 1st Crop lbs N/Unit | Lbs N/Ac Residual | Lbs N /Ac | Total lbs N Utilized | 2nd Crop Code | Time to Apply | 2nd Crop Yield | 2nd Crop lbs N/Unit | Lbs N/Ac Residual | Lbs N /Ac | Total lbs N Utilized | Total Lbs N/Ac | Total lbs N Utilized |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6884 | 1 | 8.92 | NoB | C | March-Sept | 6.1 | 50 | 0 | 305 | 2720.6 | K | Sept-April | 1 | 50 | 0 | 50 | 446 | 355 | 3166.6 |
| 6884 | 2A | 3.01 | AuB | C | March-Sept | 5.5 | 50 | 0 | 275 | 827.75 | K | Sept-April | 1 | 50 | 0 | 50 | 150.5 | 325 | 978.25 |
| 6884 | 2B | 3.01 | AuB | G | Aug-July | 3.0 | 50 | 0 | 150 | 451.5 | | | | | | 0 | 0 | 150 | 451.5 |
| 6884 | 3 | 13.19 | Pa | G | Aug-July | 3.0 | 50 | 0 | 150 | 1978.5 | | | | | | 0 | 0 | 150 | 1978.5 |
| 7785* | 4 | 7.95 | AuB | C | March-Sept | 5.5 | 50 | 0 | 275 | 2186.25 | K | Sept-April | 1 | 50 | 0 | 50 | 397.5 | 325 | 0 |
| 6884 | 5 | 0.82 | NoB | G | Aug-July | 3.0 | 50 | 0 | 150 | 123 | | | | | | 0 | 0 | 150 | 123 |
| 6884 | 6 | 1.82 | AuB | C | March-Sept | 5.5 | 50 | 0 | 275 | 500.5 | K | Sept-April | 1 | 50 | 0 | 50 | 91 | 325 | 591.5 |
| | | *leased land, optional for use | | | | | | | | | | | | | | | | | |
| ***Totals:*** | | ***38.72*** | | | | | | | | ***8788.1*** | | | | | | | ***1085*** | | ***7289.35*** |

## Reception Area Specifications

| Tract | Field | Irrigated Acreage | Soil Type | 1st Crop Code | Time to Apply | 1st Crop Yield | 1st Crop lbs N/Unit | Lbs N/Ac Residual | Lbs N /Ac | Total lbs N Utilized | 2nd Crop Code | Time to Apply | 2nd Crop Yield | 2nd Crop lbs N/Unit | Lbs N/Ac Residual | Lbs N /Ac | Total lbs N Utilized | Total Lbs N/Ac | Total lbs N Utilized |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| *Totals:* | | *0* | | | | | | | | *0* | | | | | | | *0* | | *0* |

This plan does not include commercial fertilizer. The farm should produce adequate plant available nitrogen to satisfy the requirements of the crops listed above.

The applicator is cautioned that P and K may be over applied while meeting the N requirements. In the future, regulations may require farmers in some parts of North Carolina to have a nutrient management plan that addresses all nutrients. This plan only addresses nitrogen.

In interplanted fields ( i.e. small grain, etc, interseeded in bermuda), forage must be removed through grazing, hay, and/or silage. Where grazing, plants should be grazed when they reach a height of six to nine inches. Cattle should be removed when plants are grazed to a height of four inches. In fields where small grain, etc, is to be removed for hay or silage, care should be exercised not to let small grain reach maturity, especially late in the season (i.e. April or May). Shading may result if small grain gets too high and this will definately interfere with stand of bermudagrass. This loss of stand will result in reduced yields and less nitrogen being utilized. Rather than cutting small grain for hay or silage just before heading as is the normal situation, you are encouraged to cut the small grain earlier. You may want to consider harvesting hay or silage two to three times during the season, depending on the time small grain is planted in the fall.

The ideal time to interplant small grain, etc, is late September or early October. Drilling is recommended over broadcasting. Bermudagrass should be grazed or cut to a height of about two inches before drilling for best results.

**CROP CODE LEGEND**

| Crop Code | Crop | Lbs N utilized / unit yield |
|---|---|---|
| A | Barley | 1.6 lbs N / bushel |
| B | Hybrid Bermudagrass - Grazed | 50 lbs N / ton |
| C | Hybrid Bermudagrass - Hay | 50 lbs N / ton |
| D | Corn - Grain | 1.25 lbs N / bushel |
| E | Corn - Silage | 12 lbs N / ton |
| F | Cotton | 0.12 lbs N / lbs lint |
| G | Fescue - Grazed | 50 lbs N / ton |
| H | Fescue - Hay | 50 lbs N / ton |
| I | Oats | 1.3 lbs N / bushel |
| J | Rye | 2.4 lbs N / bushel |
| K | Small Grain - Grazed | 50 lbs N / acre |
| L | Small Grain - Hay | 50 lbs N / acre |
| M | Grain Sorghum | 2.5 lbs N / cwt |
| N | Wheat | 2.4 lbs N / bushel |
| O | Soybean | 4.0 lbs N / bushel |
| P | Pine Trees | 40 lbs N / acre / yr |

Acres shown in the preceding table are considered to be the usable acres excluding required buffers, filter strips along ditches, odd areas unable to be irrigated, and perimeter areas not receiving full application rates due to equipment limitations. Actual total acres in the fields listed may, and most likely will be, more than the acres shown in the tables.

See attached map showing the fields to be used for the utilization of animal waste.

**SLUDGE APPLICATION:**

The following table describes the annual nitrogen accumulation rate per animal in the lagoon sludge

| | Farm Specifications | PAN/yr/animal | Farm Total/yr |
|---|---|---|---|
| | Farrow to Wean | 0.84 | |
| | Farrow to Feeder | 1 | |
| | Farrow to Finish | 4.1 | |
| | Wean to Feeder | 0.072 | |
| 5496 | Feeder to Finish | 0.36 | 1978.56 |

The waste utilization plan must contain provisions for periodic land application of sludge at agronomic rates. The sludge will be nutrient rich and will require precautionary measures to prevent over application of nutrients or other elements. Your production facility will produce approximately 1978.56 pounds of plant available nitrogen per year will accumulate in the lagoon sludge based on the rates of accumulation listed above.

If you remove the sludge every 5 years, you will have approximately 9892.8 pounds of plant available nitrogen to utilize. Assuming you apply this PAN to hybrid bermuda grass hayland at the rate of 300 pounds of nitrogen per acre, you will need 32 acreas of land. If you apply the sludge to corn at a rate of 125 pounds per acre, you will need 79.1424 acres of land. Please note that these are only estimates of the PAN produced and the land required to utilize that PAN. Actual values may only be determined by sampling the sludge for plant available nitrogen content prior to application Actual utilization rates will vary with soil type, crop, and realistic yield expectations for the specific application fields designated for sludge application at time of removal.

**APPLICATION OF WASTE BY IRRIGATION:**

The irrigation application rate should not exceed the intake rate of the soil at the time of irrigation such that runoff or ponding occurs. This rate is limited by initial soil moisture content, soil structure, soil texture, water droplet size, and organic solids. The application amount should not exceed the available water holding capacity of the soil at the time of irrigation nor should the plant available nitrogen applied exceed the nitrogen needs of the crop.

If surface irrigation is the method of land application for this plan, it is the responsibility of the producer and irrigation designer to ensure that an irrigation system is installed to properly irrigate the acres shown in the preceding table. Failure to apply the recommended rates and amounts of nitrogen shown in the tables may make this plan invalid.

*This is the maximum application amount allowed for the soil assuming the amount of nitrogen allowed for the crop is not over applied. In many situations, the application amount shown cannot be applied because of the nitrogen limitation. The maximum application amount shown can be applied under optimum soil conditions.

Your facility is designed for >180 days of temporary storage and the temporary storage must be removed on the average of once every 6 months. In no instance should the volume of the waste stored in your structure be within the 25 year 24 hour storm storage or one foot of freeboard except in the event of the 25 year 24 hour storm.

It is the responsibility of the producer and waste applicator to ensure that the spreader equipment is operated properly to apply the correct rates to the acres shown in the tables. Failure to apply the recommended rates and amounts of nitrogen shown in the tables may make this plan invalid.

Call your technical specialist after you receive the waste analysis report for assistance in determining the amount of waste per acre and the proper application prior to applying the waste.

## Application Rate Guide

The following is provided as a guide for establishing application rates and amounts.

| Tract | Hydrant | Soil Type | Crop | Application Rate in/hr | Application Amount * inches |
|---|---|---|---|---|---|
| 6884 | 1 | NoB | C | 0.5 | 1 |
| 6884 | 2A | AuB | C | 0.6 | 1 |
| 6884 | 2B | AuB | G | 0.6 | 1 |
| 6884 | 3 | Pa | G | 0.45 | 1 |
| 7785* | 4 | AuB | C | 0.6 | 1 |
| 6884 | 5 | NoB | G | 0.5 | 1 |
| 6884 | 6 | AuB | C | 0.6 | 1 |

## Additional Comments:

Acres shown reflect 'wetted' acreage with the addition of two pivot points to replace existing traveller pulls on fields 2 and 3.

All bermuda will be cut for hay, with overseeded small grain to be either grazed or cut for hay. Fescue may be grazed.

Fescue in field 3, pivot point 2, may be cut for hay. If this is done (no cows year round) producer may apply up to 200 lbs. PAN per acre to the fescue **crop grown.**

# NUTRIENT UTILIZATION PLAN CERTIFICATION

**Name of Farm:** **Brad Brinson Farm**
**Owner:** **Bradley Brinson**
**Manager:**

**Owner/Manager Agreement:**

I/we understand and will follow and implement the specifications and the operation and maintenance procedures established in the approved animal waste nutrient management plan for the farm named above. I/we know that any expansion to the existing design capacity of the waste treatment and/or storage system, or construction of new facilities, will require a new nutrient management plan and a new certification to be submitted to DWQ before the new animals are stocked.

I/we understand that I must own or have access to equipment, primarily irrigation equipment, to land apply the animal waste described in this nutrient management plan. This equipment must be available at the appropriate pumping time such that no discharge occurs from the lagoon in the event of a 25 year 24 hour storm. I also certify that the waste will be applied on the land according to this plan at the appropriate times and at rates which produce no runoff.

This plan will be filed on site at the farm office and at the office of the local Soil and Water Conservation District and will be available for review by NCDWQ upon request.

**Name of Facility Owner:** **Bradley Brinson**

**Signature:** _____ 4/30/07
Date

**Name of Manager (if different from owner):** _____

**Signature:** _____
Date

**Name of Technical Specialist:** _____
**Affiliation:** **Murphy-Brown, LLC.**
**Address:** **2822 Hwy 24 West, PO Drawer 856**
**Warsaw, NC 28398**
**Telephone:** **(910) 293-3434**

**Signature:** _____ 4/30/07
Date

# ON-FARM RECORDS
# 2004-2005-2006
# Brad Brinson Farm

| Pull | 2004 | 2005 | 2006 |
|---|---|---|---|
| 1 | 906,360 | 764,400 | 668,850 |
| 2 | 996,380 | 734,370 | 586,950 |
| 3 | 117,390 | - | 51,870 |
| 4 | 43,680 | - | - |
| 5 | - | - | - |
| 6 | 395,850 | 313,950 | 256,620 |
| 7 | 477,750 | 414,900 | 354,900 |
| 8 | 264,810 | 109,200 | 221,130 |
| 9 | 586,950 | 668,850 | 769,860 |
| 10 | 518,700 | 496,860 | 666,120 |
| 11 | - | - | - |
| 12 | - | 27,300 | - |
| **Total** | **4,307,870** | **3,529,830** | **3,576,300** |
| Average annual volume applied | | | **3,804,667** |

| Month | Year | P1 PAN | P2 PAN | P3 |
|---|---|---|---|---|
| September | 2003 | 1.5 | 1.6 | 1.2 |
| March | 2004 | 1.9 | 1.5 | 2.2 |
| May | 2004 | 1.5 | 2 | 3.1 |
| July | 2004 | 1.2 | 1.6 | 1.6 |
| October | 2004 | 0.9 | 1.2 | 1.4 |
| February | 2005 | 1.2 | 2 | 2.5 |
| April | 2005 | 1.7 | 2 | 2.3 |
| July | 2005 | 1.4 | 1.6 | 1.8 |
| November | 2005 | 0.5 | 0.79 | 0.39 |
| January | 2006 | 1.9 | 1.9 | 1.7 |
| May | 2006 | 1.7 | 2.2 | 2.1 |
| August | 2006 | 0.8 | 1.1 | 1 |
| December | 2006 | 1.3 | 1.2 | 1.4 |
| March | 2007 | 2.3 | 2.1 | 2.1 |
| **Farm Averages** | | 1.4 | 1.6 | 1.8 |
| **Farm Average** | | **1.61** | | |

| Month | Year | P1 PAN | P2 PAN | P3 |
|---|---|---|---|---|
| September | 2003 | 1.5 | 1.6 | 1.2 |
| March | 2004 | 1.9 | 1.5 | 2.2 |
| May | 2004 | 1.5 | 2 | |
| July | 2004 | 1.2 | 1.6 | 1.6 |
| October | 2004 | 0.9 | 1.2 | 1.4 |
| February | 2005 | 1.2 | 2 | |
| April | 2005 | 1.7 | 2 | 2.3 |
| July | 2005 | 1.4 | 1.6 | 1.8 |
| November | 2005 | | | |
| January | 2006 | 1.9 | 1.9 | 1.7 |
| May | 2006 | 1.7 | 2.2 | 2.1 |
| August | 2006 | | 1.1 | 1 |
| December | 2006 | 1.3 | 1.2 | 1.4 |
| March | 2007 | 2.3 | 2.1 | 2.1 |
| **Farm Averages** | | 1.5 | 1.7 | 1.7 |
| **Farm Average** | | **1.65** | | |

**Standard Deviation for waste analysis** **.48 *** **0.77**

**Range of values included in average =**

**Total Lb. PAN/Year =** **6,270**

# IRRIGATION SYSTEM DESIGN PARAMETERS

Landowner/Operator Name: Brad Brinson
Address: PO Box 131
Chinquapin, NC 28521
Telephone: (910) 285 2973

County: Duplin

Date: 4/11/2007

**Table 1 - Field Specifications**

| Field Number | Approximate Maximum Useable Size of Field (acres) | Soil Type | Slope % | Crop(s) | Maximum Application Rate (In/hr) | Maximum Application per Irrigation Cycle (inches) | Comments |
|---|---|---|---|---|---|---|---|
| 1 | 8.92 | NoB | <5 | Bermuda | 0.5 | .5-1 | Pulls 1,2 |
| 2 | 6.02 | AuB | <5 | Bermuda | 0.6 | .5-1 | Pulls 3-5 |
| 3 | 13.19 | Pa | <5 | Fescue | 0.4 | .5-1 | Pulls 6-8 |
| 4 | 7.95 | AuB | <5 | Bermuda | 0.6 | .5-1 | Pulls 9,10 |
| 5 | 0.82 | NoB | <5 | Fescue | 0.5 | .5-1 | Pull 11 |
| 6 | 1.82 | AuB | <5 | Bermuda | 0.6 | .5-1 | Pull 12 |
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**TABLE 2 - Travelling Irrigation Gun Settings**

Make, Model and Type of Equipment: 3" ABI Travellers

| Field No. and Hydrant No. | Travel Speed (ft/min) | Application Rate (in/hr.) | TRAVEL LANE Effective Width(ft.) | TRAVEL LANE Effective Length(ft) | Wetted Diameter (feet) | Nozzle Diameter (Inches) | Operating Pressure at Gun(psi) | Operating Pressure at reel(psi) | Arc Pattern |
|---|---|---|---|---|---|---|---|---|---|
| F1,H1 | 2.12 | 0.5 | 195 | 850 | 300 | 1.08 | 60 | 95 | 220 |
| F1,H2 | 2.12 | 0.5 | 175 | 850 | 300 | 1.08 | 60 | 95 | 220 |
| F2,CP1 | *see manufacturer's information | | | 250 | | | | | |
| F3,CP2 | *see manufacturer's information | | | 535 | | | | | |
| F4,H9 | 1.77 | 0.37 | 270 | 580 | 300 | 1.08 | 60 | 95 | 330 |
| F4,H10 | 1.77 | 0.37 | 270 | 350 | 300 | 1.08 | 60 | 95 | 330 |
| F5,H11 | 3.54 | 0.61 | 135 | 70 | 300 | 1.08 | 60 | 95 | 180 |
| F5, H12 | 1.77 | 0.37 | 270 | 98 | 300 | 1.08 | 60 | 95 | 330 |
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| Comments - Acres per pull |
|---|
| 4.50 |
| 4.42 |
| 6.02 |
| 13.19 |
| 4.57 |
| 3.38 |
| 0.82 |
| 1.82 |
| |
| 38.72 |
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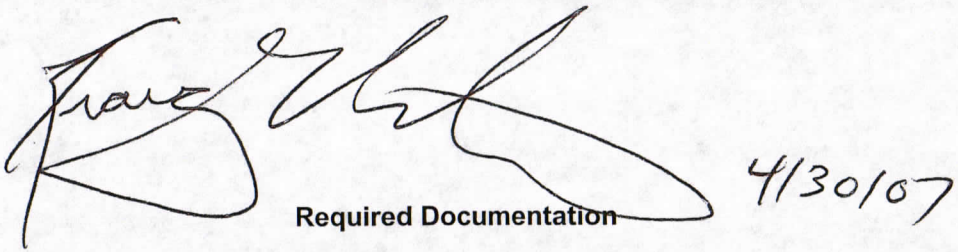
## IRRIGATION SYSTEM DESIGNER

Name:
Company:
Address:
Phone:




### Required Documentation

The following details of design and materials must accompany all irrigation designs:

1. A scale drawing of the proposed irrigation system which includes hydrant locations, pipelines, thrust block locations and buffer areas where applicable.
2. Assumptions and computations for determining total dynamic head and horsepower requirements.
3. Computations used to determine all mainline and lateral pipe sizes.
4. Sources and/or calculations used for determining application rates.
5. Computations used to determine the size of thrust blocks and illustrations of all thrust block configurations required in the system
6. Manufacturer's specifications for the irrigation pump, traveler and sprinkler(s).
7. Manufacturer's specifications for the irrigation pipe and/or USDA-NRCS standard for IRRIGATION WATER CONVEYANCE.
8. The information required by this form are the minimum requirements. It is the responsibility of the designer to consider all relevant factors at a particular site and address them as appropriate.
9. Irrigation pipes should not be installed in lagoon or storage pond embankments without the approval of the designer.

NOTE: A buffer strip of 25' or wider must be maintained between the limits of the irrigation system and all perennial streams and surface waters per NC Statutes.

# CALCULATIONS

## Sprinkler Specifications

| | | |
|---|---|---|
| Sprinkler Type: | Nelson 150 | |
| Nozzle Size: | 1.08 | inches |
| Sprinkler Pressure: | 60 | psi |
| Flowrate(GPM): | 182 | gpm |
| Wetted Diameter: | 300 | feet |

## Lane Spacings

| | | | |
|---|---|---|---|
| Desired Spacing (%): | 70 | % | |
| Design Spacing(feet): | 210 | *PVC irrigation pipe normally comes in 20' pieces, so round to the nearest multiple of 20. | |
| Actual Spacing (feet): | 220 | feet | 200 |
| Actual Spacing (%): | 73 | % | 67 |

## Application Rate

Application Rate = (96.3xFlowrate)/(3.1415x(.9xradius)squared)

| | | |
|---|---|---|
| Design App. Rate = | 0.31 | in/hr |
| 300 degree arc = | 0.37 | in/hr |
| 220 degree arc = | 0.50 | in/hr |
| 180 degree arc = | 0.61 | in/hr |

## Traveller Speed

Travel speed = 1.605 x Flowrate / Desired application amount x Lane Spacing

| | | |
|---|---|---|
| Desired app. (in.) = | 0.75 | inches |
| 300 degree arc = | 1.77 | ft/min |
| 220 degree arc = | 2.12 | ft/min |
| 180 degree arc = | 3.54 | ft/min |

## Mainline Velocity

Velocity = .408 x Flowrate / pipe diameter squared feet/sec.**
**For buried pipelines, velocity should be below 5 feet per second

| | | |
|---|---|---|
| Pipe size: | | inches |
| Velocity= | #DIV/0! | ft/sec. |

ACREAGE CALCULATION

BRAD BRINSON FARM

6/21/2001

| Pull # | Width | Length | Start End | Stop End | Total Acres | Field # |
|---|---|---|---|---|---|---|
| | | Reel Pulls | | | | |
| 1 | 195 | 850 | 0.4 | 0.29 | 4.50 | |
| 2 | 175 | 850 | 0.72 | 0.29 | 4.42 | |
| 9 | 270 | 580 | 0.42 | 0.55 | 4.57 | |
| 10 | 270 | 350 | 0.66 | 0.55 | 3.38 | |
| 11 | 135 | 70 | 0.33 | 0.27 | 0.82 | |
| 12 | 270 | 98 | 0.66 | 0.55 | 1.82 | |
| | | | TOTAL ACREAGE = | | 19.50 | |

Center Pivot

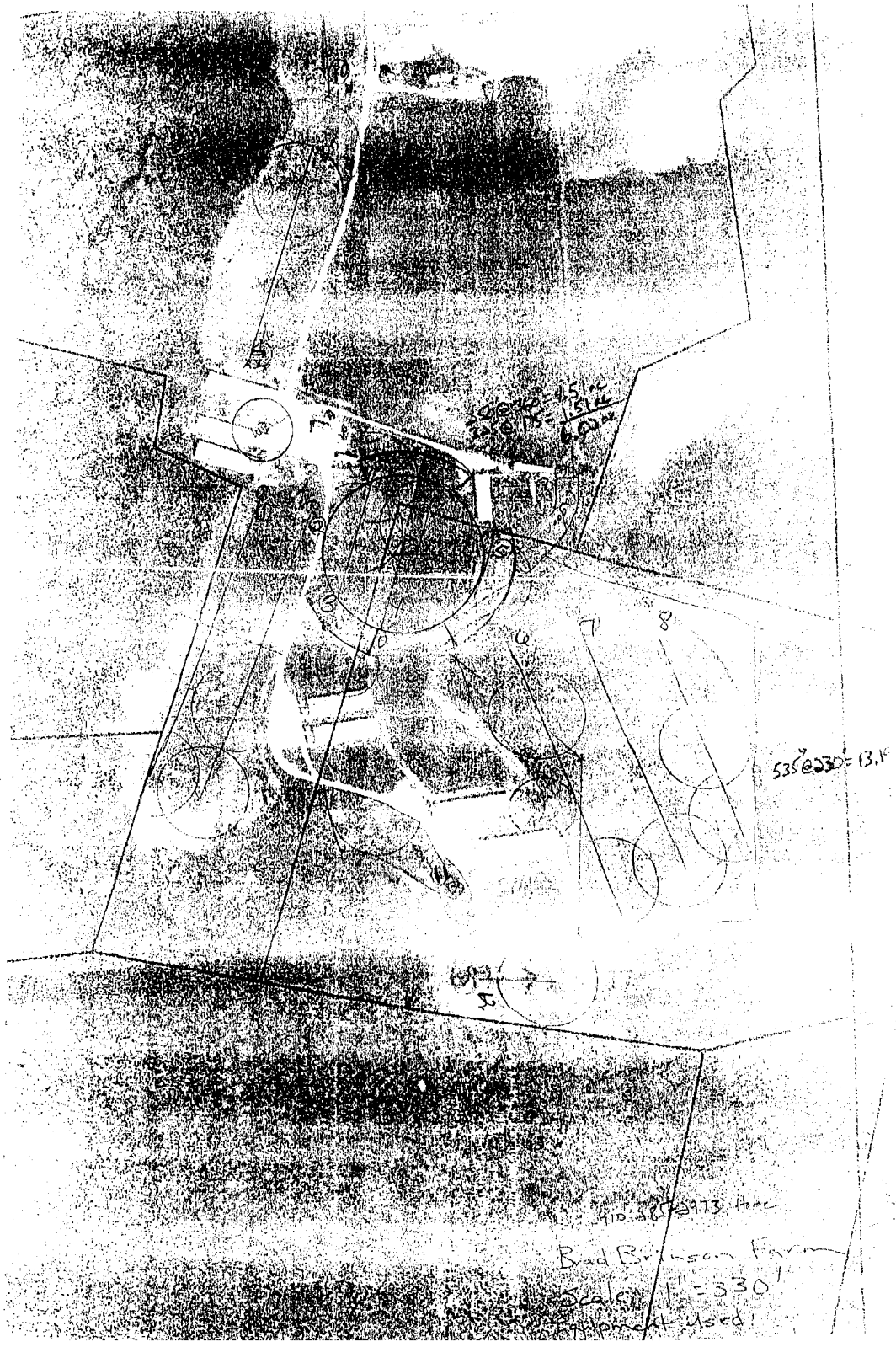
Center Pivot #1 - 250' length w/o end gun , 325' length with endgun

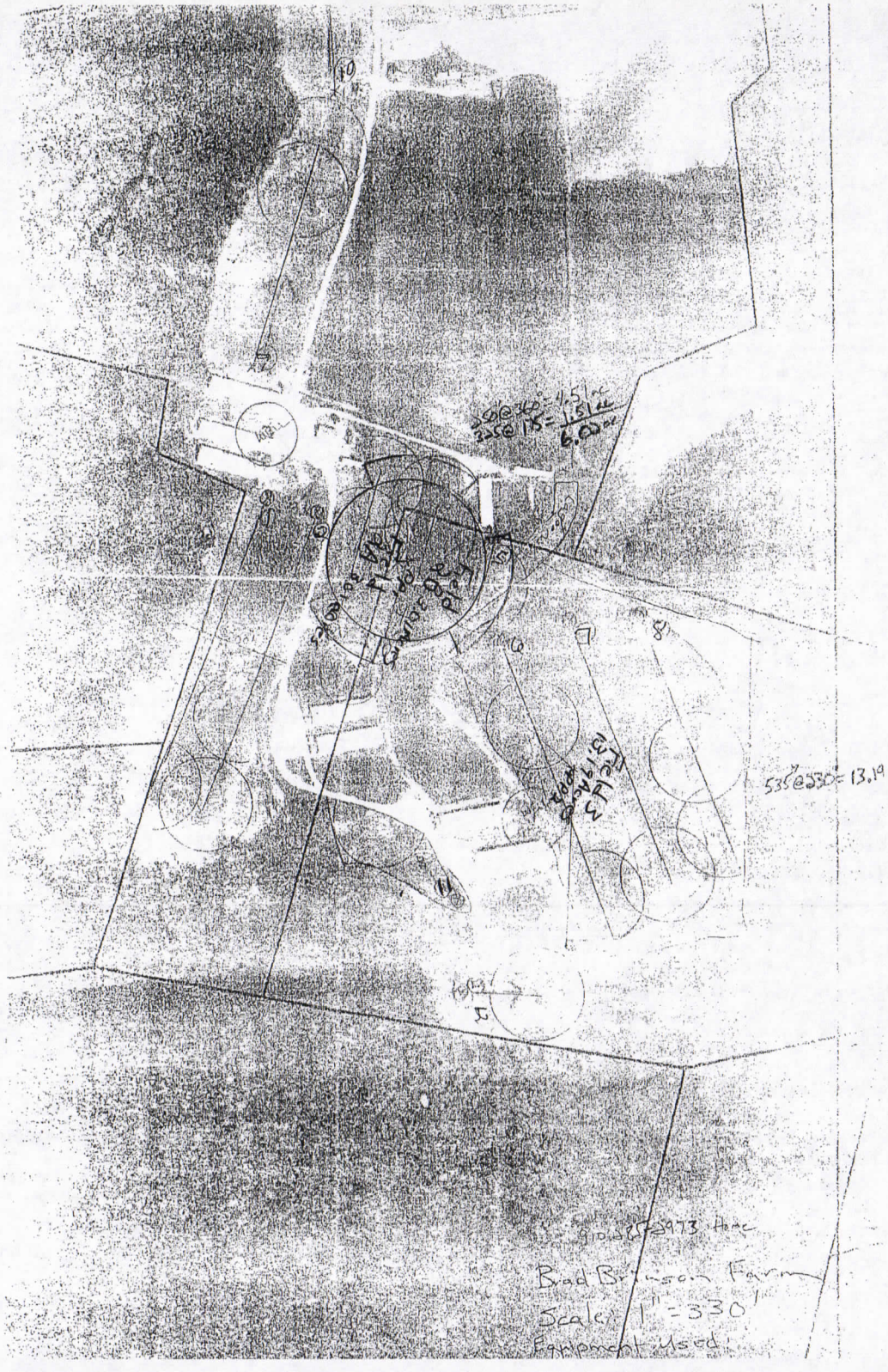
Endgun 'on' 175 degrees, 'off' 185 degrees

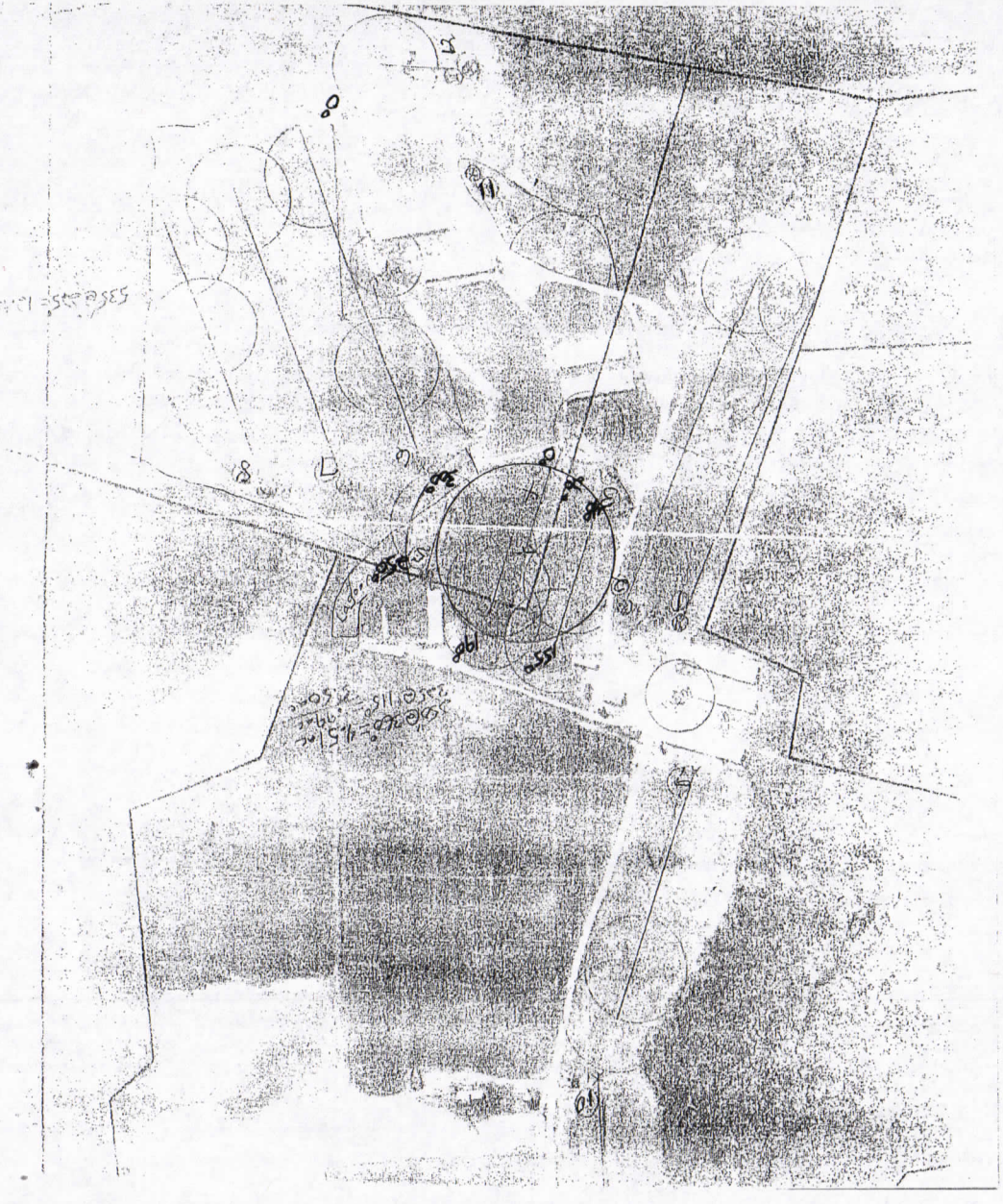
Acreage covered - 6.02 acres

Center Pivot #2 - 535', operating 230 degrees

Acreage covered - 13.19 acres


535 @ 230 = 13.1
Brad Brinson Farm
Scale: 1" = 330'
Equipment Used


Brad Bryson Farm
Scale 1" = 330'
Equipment used:



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