

STATE OF UTAH  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
DIVISION OF WATER QUALITY  
WATER QUALITY BOARD  
P.O. BOX 144870  
SALT LAKE CITY, UTAH 84114-4870

**Ground Water Discharge and Construction Permit  
Permit No. UGW170004**

In compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 1953, as amended, the Act,

**Jade Dalton**  
Dalton Finisher Farm  
2.6 miles south of Circleville  
Garfield County, Utah

Hereafter after referred to as Permittee, is granted a Ground Water Discharge and Construction Permit for the operation of a 3.7 million gallon containment basin at a Concentrated Animal Feeding Operation (CAFO). The containment basin is located on a tract of land encompassed in Sections 11 & 12, Township 31 South, Range 4 West, Salt Lake Base and Meridian, Garfield County, Utah.

This permit is based on representation made by the Permittee and other information contained in the administrative record. It is the responsibility of the Permittee to read and understand all provisions of this permit.

The facility shall be maintained and operated in accordance with conditions set forth in the permit and the Utah Administrative Rules for Ground Water Quality Protection (R317-6).

This permit shall become effective on April 1, 2018

This permit and authorization to operate shall expire at midnight March 31, 2023.

Signed this 20<sup>th</sup> day of March, 2018.



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Erica Brown Gaddis, PhD  
Director

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Applicable Documents for this permit include but are not limited to:  
 Water Quality Sampling, Handling, and Analysis Plan v. October 2016

**PART I CONSTRUCTION PERMIT ISSUANCE**

**A. AUTHORIZED CONSTRUCTION**

As part of this ground water discharge permit, a construction permit is hereby issued to Dalton Finisher Farm as summarized below and detailed in Appendix A. Construction for this project will consist of four barns piped to a single 3.7 million gallon basin.

**B. DESIGN AND CONSTRUCTION**

Under authority of the Utah Water Quality Act, Section 19-5-108(1) Utah Code Ann. 1953, as amended and Utah Administrative Code R317-1, the authorized facilities will be constructed in accordance with the engineering design plans and specifications attached as Appendix A.

Construction of the farm site containment basin- The containment basin will be adjacent to the swine barn facilities will have an operating volume of 3.7 million gallons.

Approved construction elements include:

- Construction of 4 finisher barns that could contain a total of 8800 pigs sized from approximately 15 to 270 lbs.
- Construction of a 3.7 million gallon wastewater treatment containment basin at the farm site.
- The Containment basin will be lined with a Flexible Membrane Liner (FML)(60 mil High-Density Polyethylene HDPE).
- All construction will be completed and tested in accordance with industry standard Construction Quality Assurance and Quality Control (CQA/QC) standards.

BAT Performance Monitoring - Best available technology monitoring will include minimum vertical freeboard.

- Minimum Vertical Freeboard – a minimum of 2 feet of vertical freeboard shall be maintained to ensure total containment.

Spill Containment - The permittee shall design, maintain and construct all pipelines and pumping facilities with a spill containment system that shall:

- Prevent any spills or leakage from any contact with the ground surface or ground water.

Any spill that does come into contact with the ground water that causes pollution or has the potential to cause pollution to waters of the state shall be reported in accordance with Part III.I.

- DWQ must approve the location of the monitoring wells to be installed near the containment basins.

**PART II SPECIFIC CONDITIONS**

A. GROUND WATER CLASSIFICATION

Ground water at the CAFO site is initially classified as Class I Pristine Ground Water. This determination may be changed when subsequent compliance monitoring determines the ground water quality at the containment basin site.

B. BACKGROUND GROUND WATER QUALITY

Based on regional groundwater quality conditions observed in the Upper Sevier portion of Utah from the United States Geological Survey Groundwater Conditions in Utah for Spring 2016, total dissolved solids (TDS) concentrations in the general area range from 187 to 281 milligrams per liter (mg/l) and no parameters are above Utah Ground Water Quality Standards.

**Table 1: Range of Background Ground Water Quality of shallow aquifer in the Sevier Desert south of Delta, UT**

Parameter	(mg/l)
pH (units)	6.5 – 8.5
Total Dissolved Solids	187 – 281
Chloride	9.5 – 26.4
Nitrate as N	1.0-2.62
Sulfate	8.5 – 16.7
Potassium	3.27 – 5.89
Sodium	14.5 – 17

C. GROUND WATER PROTECTION LEVELS

Table 2 provides interim ground water protection levels for containment basin compliance monitoring wells. After completion of the accelerated background monitoring program in accordance with Part II.F.I of this permit, ground water protection levels will be established for the site utilizing the provisions outlined in UAC R317-6-4 for the parameters listed in Table 2. The interim protection levels of Table 2 will be modified if necessary. No degradation of ground water greater than existing levels found in monitoring well(s) upgradient of the containment basin will be allowed.

**Table 2: Interim Ground Water Protection Levels**

Parameter	Protection Level (mg/l)
pH (units) <sup>(a)</sup>	6.5 - 8.5
Total Dissolved Solids	351
Chloride <sup>(c)</sup>	250
Ammonia as N <sup>(b)</sup>	7.5
Nitrate + Nitrite as N <sup>(b)</sup>	2.5

- (a) Equals Ground Water Quality Standard
- (b) Equals 0.25 x Ground Water Quality Standard.
- (c) EPA Secondary Drinking Water Standard is 250 mg/l

D. BEST AVAILABLE TECHNOLOGY (BAT) STANDARD

The administration of this permit is founded on the use of Best Available Technology (BAT), in accordance with the requirements of UAC R317-6-1.3. The construction permit (PART I) issued with this discharge permit describes construction standards for the wastewater treatment containment basins. Compliance with the requirements for use of BAT will be demonstrated by construction, operation and maintenance of the

containment basin according to the construction permit.  
Achievement of these performance standards will be demonstrated by:

- 1) Only swine wastes may be disposed of in the containment basin.
- 2) No ground water degradation beyond permit limits established in Table 2 as measured by compliance monitoring wells.
- 3) Permitted Facilities. The facilities and equipment authorized under this permit are listed in Table 3.

**TABLE 3: Permitted Facility and Components**

Facility	Discharge Control Technology	Latitude	Longitude
Containment basin Cell 1	60-mil HDPE liner	N 38° 8' 2.86"	W 112° 15' 58.84"
Monitoring Wells	-	variable <sup>a</sup>	variable <sup>a</sup>

<sup>a</sup> = pending completion of drilling and construction

4. Compliance Monitoring Wells - The Permittee will monitor one upgradient and one downgradient compliance monitoring wells at the containment basin. Information on these wells is provided in Table 3.
5. Protection of Monitoring Wells - All compliance monitoring wells must be protected from damage due to surface vehicular traffic or contamination due to surface spills, and shall be maintained in full operational condition for the life of this permit. Any compliance monitoring well that becomes damaged beyond repair or is rendered unusable for any reason will be replaced by the Permittee within 90 days or as directed by the Director.

**E. BEST MANAGEMENT PRACTICES**

- 1) The Permittee shall operate the facility such that the ground water quality standards (UAC R317-6-2) and ground water protection levels in Table 2 that were developed for this permit are not exceeded in the unconfined aquifer underlying the site, or other aquifers that may be impacted by facility operations. Utah ground water regulations also contain standards for contaminants such as metals, pesticides and volatile organic compounds. Accordingly, the Permittee must not discharge these or any other contaminants that could impair beneficial uses of the ground water.
- 2) Permittee shall ensure proper handling of plant wastewater, prompt cleanup of any releases, and an ongoing operation, inspection, and maintenance program for ancillary facilities associated with this permit.
- 3) Land application of containment basin wastes shall be managed in accordance with a Comprehensive Nutrient Management Plan (CNMP) developed by a certified nutrient management planner.

F. COMPLIANCE MONITORING REQUIREMENTS

1. General Provisions

- a) *Future Modification of the Monitoring Program* - If at any time the Director determines the monitoring program to be inadequate, Permittee shall submit within 30 days of receipt of written notice from the Director a modified monitoring plan that addresses the inadequacies noted by the Director.
- b) *Compliance Monitoring Period* - Monitoring shall continue upon issuance of this permit and throughout the term of this permit. For facilities that are constructed during the term of this permit, monitoring shall commence upon initiation of operation of the new facility.
- c) *Laboratory Approval* - All water quality analyses shall be performed by a laboratory certified by the State of Utah to perform such analysis.
- d) *Water Level Measurement* - In association with each well sampling event, water level measurements shall be made in each monitoring well prior to removal of any water from the well casing. These measurements will be made from a surveyed permanent single reference point clearly marked on the top of the well or surface casing. Measurements will be made to the nearest 0.01 foot.
- e) *Sampling Protocol* - Water quality samples will be collected, handled and analyzed in conformance with the current approved version of the *Sampling and Analysis Plan*. The results of ground water monitoring shall be reported in accordance with the schedule in Part II Section H.
- f) **Ground Water Analyses** - The following analysis shall be performed on all water samples collected from each **monitoring well**:
  - i) **Field Measurements**: pH, specific conductance, temperature
  - ii) **Laboratory Analysis**:
    - Ammonia as nitrogen, chloride, nitrate + nitrite as nitrogen
    - Total Dissolved Solids (TDS)
  - g) **Wastewater Analyses** - The containment basin waste water shall be sampled annually prior to land application activity. The following analyses shall be performed on a representative wastewater sample from each **containment basin**:
    - i) **Field Measurements**: pH, specific conductance, temperature
    - ii) **Laboratory Analysis**:
      - Total Kjeldahl Nitrogen (TKN), ammonia (NH<sub>3</sub>-N), nitrate+nitrite (Total) sulfate, chloride, Total Dissolved Solids (TDS), sodium, potassium, calcium, magnesium, bicarbonate, phosphorus (Total as P).

- h) *Monitoring Frequency* - After installation, any new compliance monitoring well that may be required by the Division of Water Quality will be sampled quarterly until a minimum of eight (8) events have been completed to establish baseline ground water quality. Sampling events will then change to a semi-annual compliance monitoring frequency.

Sample collection, handling, and analysis shall be conducted in accordance with the most recently revised and approved version of *Water Quality Sampling, Handling, and Analysis Plan*. Analyses for nitrogen species shall be conducted at the same laboratory. Results of the containment basin wastewater performance monitoring accompanied by any supporting raw data shall be submitted to the Division of Water Quality with the next Ground Water Quality Monitoring Report.

- i) *Certified Laboratory* - All laboratory analyses shall be performed by a laboratory certified by the State of Utah in accordance with UAC R317-6-6.3.L.

2. **Damage to Monitoring Wells**

If a monitoring well is damaged, is otherwise rendered inadequate for its intended purpose, or if a previous hydraulic gradient between two monitor wells is reversed, the Director shall be notified in writing within five days of the Permittee becoming aware of the condition.

3. **BAT Performance Monitoring Program**

Permittee shall conduct a containment basin inspection and maintenance program. Documentation of compliance with this program shall be maintained on site for review by representatives of the Division.

G. NON-COMPLIANCE STATUS

1. **Probable Out-of-Compliance Status** - The permittee shall evaluate results of each ground water sampling event to determine any exceedence of the Ground Water Protection Levels found in Table 2 above. Upon determination that a Ground Water Protection Level has been exceeded in the ground water, the permittee shall:
- a. Immediately re-sample the monitoring well found to be in probable out-of-compliance status for laboratory analysis of the exceeded protection level parameter(s). Submit the analytical results thereof, and notify the Director of the probable out-of-compliance status within 30 days of the initial detection.
  - b. Upon exceedence of any one parameter listed in Table 2 for two consecutive sampling events, immediately implement an accelerated schedule of monthly sampling analysis, consistent with the requirements of this permit. This monthly sampling will continue for at least two months or until the compliance status can be determined by the Director. Reports of the results of this sampling will be submitted to the Director as soon as they are available, but not later than 30 days from each date of sampling.

2. Out-of-Compliance Status Based on Confirmed Exceedance of Permit Ground Water Protection Levels
  - a. Out of Compliance Status shall be defined as follows:

For parameters that have been defined as detectable in the background and for which protection levels have been established, out-of-compliance shall be defined as two consecutive samples exceeding the protection level and the mean background concentration by two standard deviations.
  - b. Notification and Accelerated Monitoring - upon determination by the permittee or the Director, in accordance with UAC R317-6-6.17, that an out-of-compliance status exists, the permittee shall:
    - i) Verbally notify the Director of the out-of-compliance status or acknowledge Director that such a status exists within 24 hours of receipt of data, and
    - ii) Provide written notice within 5 days of the determination, and
    - iii) Continue an accelerated schedule of monthly ground water monitoring for at least two months and continue monthly monitoring until the facility is brought into compliance as determined by the Director.
  - c. Source and Contamination Assessment Study Plan - within 30 days after the written notice to the Director required in Part II.G. 2.b.ii above, the permittee shall submit an assessment study plan and compliance schedule for:
    - i) Assessment of the source or cause of the contamination, and determination of steps necessary to correct the source.
    - ii) Assessment of the extent of the ground water contamination and any potential dispersion.
    - iii) Evaluation of potential remedial actions to restore and maintain ground water quality, and ensure that the ground water standards will not be exceeded at the compliance monitoring locations.
3. Out-of-Compliance Status Based Upon Failure To Maintain Best Available Technology - In the event that BAT monitoring indicates a violation of any of the technology or performance management standards outlined in Part II .D and E of this permit, the permittee shall submit to the Director a notification and description of the violation in accordance with Part II.G of this permit.

H. REPORTING REQUIREMENTS

1. **Water Monitoring** - monitoring required in Part II.F above shall be reported according to the schedule in Table 4 below, unless modified by the Director:

**Table 4: Compliance Monitoring Report Schedule**

<u>Monitoring Period</u>	<u>Report Due Date</u>
January through June	August 1
July thru December	February 1

2. **Ground Water Quality Sampling** - reporting will include:
  - a. **Field Data Sheets** - or copies thereof, including the field measurements and other pertinent field data, such as: sampling location name/number, date and time, names of sampling crew, type of sampling: pump or grab, volume of water purged before sampling.
  - b. **Water Level Measurements** - water level measurements from ground water monitoring wells will be reported as measured depth to ground water from the surveyed casing measuring point, and ground water elevations as converted by casing measuring point elevations.
  - c. **Laboratory Analytical Results** - including date sampled, date received; and the results of analysis for each parameter, including: value or concentration, units of measurement, reporting limit (minimum detection limit for the examination), analytical method, and the date of the analysis.
3. **Electronic Filing Requirements** - The permittee will submit the required ground water monitoring data in the electronic format specified by the Director. The data may be submitted by electronic transfer, e-mail, PDF, compact disc, or other approved transmittal mechanism. In addition, a submittal of the hard copy data may be made if the Permittee prefers.
4. **Monitoring Well As-Built Report** - For each new well constructed the permittee shall submit diagrams and descriptions of the final completion of the monitoring wells. The report will be submitted in the next Groundwater sampling report after the well is completed. The report shall include:
  - a. **Casing**: depth, diameter, and type of material.
  - b. **Screen**: length, depth interval, diameter, material type, slot size.
  - c. **Sand Pack**: depth interval, material type and grain size.
  - d. **Annular Seals**: depth interval, material type.
  - e. **Surface Casing and Cap**: depth, diameter, material type, protection measures constructed.
  - f. **Elevation and Location**: ground surface elevation, elevation of water level measuring point, latitude and longitude in hours, minutes and seconds.
  - g. **Well construction description**, well completion description, results of well pump tests or slug tests.

I. COMPLIANCE SCHEDULE

1. Permit Compliance Schedule Item #1 Comprehensive Nutrient Management Plan or Nutrient Management Plan" (CNMP/NMP): means a plan to properly store, handle, and spread manure and other agriculture byproducts to protect the environment and provide nutrients for the production of crops (plants). The permittee shall obtain a certified plan (CNMP/NMP) and submit a copy to DWQ for review prior to discharge of containment basin manure to land application areas.
2. Permit Compliance Schedule Item #2 The Permittee shall install ground water monitoring wells completed in the shallow aquifer at each containment basin. One up-gradient and one downgradient well will serve as one compliance mechanism for monitoring any containment basin discharge. The wells shall be sampled at least once prior to placing the containment basins into service. DWQ will approve final location of monitoring wells prior to installation.
3. Permit Compliance Schedule Item #3 Final Closure Plan. In the event that the permittee decides to discontinue its operations at the facility the permittee shall notify the Director of such a decision and submit a Final Closure Plan. The Final Closure Plan shall be submitted no later than 180 days prior to the closure of the facility. The permittee shall resubmit Final Closure Plans within 60 days of receipt of written notice of deficiencies therein. Any material changes made to this plan shall require final approval of the Director.

**PART III MONITORING, RECORDING AND REPORTING REQUIREMENTS**

A. REPRESENTATIVE SAMPLING

Samples taken in compliance with the monitoring requirements established under Part II shall be representative of the monitored activity.

B. ANALYTICAL PROCEDURES

Water sample analysis must be conducted according to test procedures specified under UAC R317-6-6.3.L, unless other test procedures have been specified in this permit.

C. PENALTIES FOR TAMPERING

The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. REPORTING OF MONITORING RESULTS

Monitoring results obtained during each reporting period specified in the permit, shall be submitted to the Director, Utah Division of Water Quality at the following address no later than the 15th day of the month following the completed reporting period:

State of Utah  
Division of Water Quality  
P.O. Box 144870  
Salt Lake City, Utah 84114-4870  
Attention: Ground Water Protection Section

Electronic document submission:

<http://deq.utah.gov/ProgramsServices/services/submissions/>

E. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. ADDITIONAL MONITORING BY THE PERMITTEE

If the permittee monitors any pollutant more frequently than required by this permit, using approved test procedures as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted. Such increased frequency shall also be indicated.

G. RECORDS CONTENTS

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The individual(s) who performed the sampling or measurements;
3. The date(s) and time(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

H. RETENTION OF RECORDS

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this permit, and records of

all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

I. TWENTY-FOUR HOUR NOTICE OF NONCOMPLIANCE REPORTING

1. The permittee shall verbally report any noncompliance which may endanger public health or the environment as soon as possible, but no later than 24 hours from the time the permittee first became aware of the circumstances. The report shall be made to the Utah Department of Environmental Quality 24 hour number, (801) 536-4123, or to the Division of Water Quality, Ground Water Protection Section at (801) 536-4300, during normal business hours (Monday through Friday 8:00 am - 5:00 pm Mountain Time).
2. A written submission shall also be provided to the Director within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:
  - a. A description of the noncompliance and its cause;
  - b. The period of noncompliance, including exact dates and times;
  - c. The estimated time noncompliance is expected to continue if it has not been corrected; and,
  - d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
3. Reports shall be submitted to the addresses in Part III.D, Reporting of Monitoring Results.

J. OTHER NONCOMPLIANCE REPORTING

Instances of noncompliance not required to be reported within 24 hours, shall be reported at the time that monitoring reports for Part II.H are submitted.

K. INSPECTION AND ENTRY

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,
4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

**PART IV COMPLIANCE RESPONSIBILITIES**

A. DUTY TO COMPLY

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates permit conditions is subject to a fine not exceeding \$25,000 per day of violation. Any person convicted under Section 19-5-115(2) of the Act a second time shall be punished by a fine not exceeding \$50,000 per day. Nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. PROPER OPERATION AND MAINTENANCE

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

**PART V GENERAL REQUIREMENTS**

- A. PLANNED CHANGES  
The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.
- B. ANTICIPATED NONCOMPLIANCE  
The permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
- C. PERMIT ACTIONS  
This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
- D. DUTY TO REAPPLY  
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a permit renewal or extension. The application should be submitted at least 180 days before the expiration date of this permit.
- E. DUTY TO PROVIDE INFORMATION  
The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.
- F. OTHER INFORMATION  
When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.
- G. SIGNATORY REQUIREMENTS  
All applications, reports or information submitted to the Director shall be signed and certified.
1. All permit applications shall be signed as follows:
    - a. For a corporation: by a responsible corporate officer;
    - b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.
    - c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
  - a. The authorization is made in writing by a person described above and submitted to the Director, and,
  - b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
3. Changes to Authorization. If an authorization under Part V.G.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part V.G.2 must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.
4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. PENALTIES FOR FALSIFICATION OF REPORTS

The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. AVAILABILITY OF REPORTS

Except for data determined to be confidential by the permittee, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits, effluent data, and ground water quality data shall not be considered confidential.

J. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

K. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

L. TRANSFERS

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;
2. The notice includes a written agreement between the existing and new permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,
3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

M. STATE LAWS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, penalties established pursuant to any applicable state law or regulation under authority preserved by Section 19-5-117 of the Act.

N. REOPENER PROVISION

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate limitations and compliance schedule, if necessary, if one or more of the following events occurs:

1. If new ground water standards are adopted by the Board, the permit may be reopened and modified to extend the terms of the permit or to include pollutants covered by new standards. The permittee may apply for a variance under the conditions outlined in R317-6-6.4.D.
2. If alternative compliance mechanisms are required.
3. If subsequent ground water monitoring data reveals the background water quality values in Part II Table 1 are not accurate.

APPENDIX A  
CONSTRUCTION PERMIT  
PLANS AND SPECIFICATIONS

Jade Dalton  
Dalton Finisher Farm Sites  
Dalton Hay Company, LLC.  
P.O. Box 189  
Circleville, UT 84723

Dear Mr. Web:

**Subject: Construction Permit** for Dalton Finisher Farm Sites

On November 29, 2017, the Division of Water Quality (DWQ) received submission of the Utah Groundwater Discharge Permit Application for the Dalton Finisher Farm Sites. This submission included the engineering plans and specifications for the Construction Permit. This submission was prepared by GEM Engineering, Inc. and signed by Joel A. Myers, P.E.

The review of the engineering plans and specifications indicated that a few minor comments or changes that would be required before the Construction Permit could be issued. These were communicated by Woodrow Campbell to Joel Myers by phone on December 15, 2017. In response Addendum # 1 was submitted by Mr. Myers on December 18, 2017. This Addendum has been reviewed and found to answer all the minor comments and the submittal for the Construction Permit is now complete.

The following is a summary of the proposed major construction projects:

- Construction of 4 Barns. Each Barn will contain two buildings and each building will contain 1100 Hogs. Therefore, each Barn will contain 2200 Hogs for a total of 8800 Hogs.
- Construction of a 3.7 million waste containment basin located in the center of the 4 Barns.
- The waste water in the basin will then be land applied to the fields that are part of Dalton Farm.

The plans and specifications, as submitted, comply with *the Utah Water Quality Rules, (R317, Utah Administrative Code)*. A **Construction Permit** is hereby issued as constituted by this letter, subject to the following conditions:

1. *Any revisions or modifications to the approved plans and specifications must be submitted to DWQ for review and approval, before construction or implementation thereof. Please submit any changes for review and approval directly to Woodrow Campbell, P.E., of the DWQ Ground Water Protection Section.*
2. *A written operations and maintenance manual, containing a description of the functioning of the facilities, an outline of routine maintenance procedures, and all checklists and maintenance logs needed for proper operation of the system, must be submitted and approved before the final inspection and operation of the system.*
3. *The approved facilities must not be placed in service unless DWQ has conducted a final inspection, reviewed and approved the As-Built Construction Certification Report, and provided written authorization to place the constructed facilities in service.*

*Construction activities that disturb one acre or more are required to obtain coverage under the Utah Pollutant Discharge Elimination System (UPDES) Storm Water General Permit for Construction Activities. The permit requires the development of a storm water pollution prevention plan (SWPPP) to be implemented and updated from the commencement of any soil disturbing activities at the site until final stabilization of the project. For more information, or to obtain permit coverage on-line, please go to: <http://www.waterquality.utah.gov/UPDES/stormwater.Htm>*

The plans and specifications for this project have been stamped and signed by a Professional Engineer currently licensed to practice in the state of Utah. The construction design, inspection supervision, and written construction certification of all work associated with this Construction Permit must be performed by a Professional Engineer licensed to practice in the state of Utah.

This Construction Permit will expire one year from the date of its issuance, as evidenced by the date of this letter, unless substantial progress is made in constructing the approved facilities or the plans and specifications have been resubmitted and the construction permit is reissued. This permit does not relieve you, in any way, of your obligations to comply with other applicable local requirements. You may contact Southwest Utah Public Health Department at (435-673-3528) or Paul Wright Southwest District Engineer at (435-986-2562) for further assistance regarding local matters.

Because of the inherent hazard potential at lagoons and ponds, warning signs should be posted at these facilities to state the dangers of drowning and asphyxiation.

Please contact Mr. Campbell at the beginning of construction to allow periodic inspections to be scheduled.

Upon completion of the project, a final inspection and approval of the As-Built Construction Certification Report is required before the approval to operate the completed facilities can be issued. Please remain in contact with Mr. Campbell to schedule the final inspection. The Construction Certification Report with final as-built drawings must include test results for the following construction quality assurance and quality control (CQA/QC) elements:

Soil Subgrade

- Proctor Curves,
- Soil Classification,
- Field Compaction Testing, and
- Subgrade Acceptance Certification.

Concrete

- Concrete Mix Verification,
- Concrete ASTM Testing Method, Frequency, and Results,
- Concrete Testing Pass/Fail Criteria, and
- Crack Inspection and Repair.

Flexible Membrane Liner

- Panel Placement Log,
- Trial Seam Test Log,
- Seaming Record,
- Seam Test Record,
- Repair Log,

- As-Built Drawing,
- Manufactures Certification including QA/QC Testing of the Rolls, and
- Professional Engineer Certification.

If we can be of further assistance, please contact Mr. Woodrow Campbell at [wwcampbell@utah.gov](mailto:wwcampbell@utah.gov) or (801) 536-4353.

Sincerely,

Erica Brown Gaddis, PhD  
Director

Attachment

EBG/WWC/DJH:

cc: Southwest Utah Public Health Department (via email w/o attachment)  
Paul Wright Southwest District Engineer (via email w/o attachment)  
Joel Myers, Gem Engineering, Inc., (via email w/o attachment [joel@gemengineeringinc.com](mailto:joel@gemengineeringinc.com))

DWQ-2018-000301

## STATEMENT OF BASIS

### GROUND WATER DISCHARGE PERMIT UGW170004

Dalton Finisher Farm  
2.6 miles South of Circleville  
Garfield County, Utah

March 2017

#### Introduction

The Division of Water Quality (DWQ) under the authority of the Utah Ground Water Quality Protection Rules<sup>1</sup> (Ground Water Rules) issues ground water discharge permits to facilities which have a potential to discharge contaminants to ground water<sup>2</sup>. As defined by the Ground Water Rules, such facilities include mining operations.<sup>3</sup> The Ground Water Rules are based on an anti-degradation strategy for ground water protection as opposed to non-degradation; therefore, discharge of contaminants to ground water may be allowed provided that current and future beneficial uses of the ground water are not impaired and the other requirements of Rule 317-6-6.4.A are met.<sup>4</sup> Following this strategy, ground water is divided into classes based on its quality<sup>5</sup>; and higher-quality ground water is given greater protection<sup>6</sup> due to the greater potential for beneficial uses.

Under Rule 317-6, Dalton Finishing Farm has requested a ground water discharge permit (Permit). DWQ has developed permit conditions consistent with R317-6 and appropriate to the nature of the operations, maintenance, best available technology<sup>7</sup> (BAT) and the hydrogeologic and climatic conditions of the site, to insure that the operation would not contaminate ground water.

#### Basis for Permit Issuance

Under Rule 317-6-6.4A, DWQ may issue a ground water discharge permit if:

- 1) The applicant demonstrates that the applicable class TDS limits, ground water quality standards protection levels and permit limits established under R317-6-6.4E will be met;
- 2) The monitoring plan, sampling and reporting requirements are adequate to determine compliance with applicable requirements;
- 3) The applicant is using best available technology to minimize the discharge of any pollutant; and
- 4) There is no impairment of present and future beneficial uses of ground water.

---

<sup>1</sup> Utah Admin. Code Rule 317-6

<sup>2</sup> [https://deq.utah.gov/ProgramsServices/programs/water/groundwater/docs/2008/08Aug/GWQP\\_PermitInfo.pdf](https://deq.utah.gov/ProgramsServices/programs/water/groundwater/docs/2008/08Aug/GWQP_PermitInfo.pdf)

<sup>3</sup> Utah Admin Code Rule 317-6-6.1A

<sup>4</sup> Preamble to the Ground Water Quality Protection Regulations of the State of Utah, sec. 2.1, August, 1989

<sup>5</sup> Utah Admin. Code Rule 317-6-3

<sup>6</sup> Utah Admin. Code Rule 317-6-4

<sup>7</sup> Utah Admin. Code Rule 317-6-1(1.3)

## **Purpose**

Dalton Finisher Farm will construct and operate one farm site comprised of 4 barns with 8800 total hogs and a single, 3.7 million gallon containment basin for the barns South of Circleville in Garfield County, UT. The containment basin will receive waste water from swine production operations and is sized to hold accumulated discharge from barn operations temporarily. Manure will be removed annually from the containment basins and used for land application and fertilization of nearby agricultural acreage.

The Dalton Finisher Farm has been granted a construction permit and a ground water discharge permit for operation of the containment basin. This Ground Water Discharge Permit will require ground water and process water compliance monitoring. The water must be land applied in accordance with a comprehensive nutrient management plan (CNMP)

## **Potential Impacts to Ground Water**

The containment basins will be constructed with an HDPE liner to minimize discharge to the subsurface. Ground water quality monitoring of the shallow aquifer downgradient of the basins will be conducted to determine if ground water quality has been impacted by basin discharges.

## **Hydrogeology**

The basin is located in the Upper Sevier River Valley with the nearby Tushar Mountains approximately 3.5 miles to the west. Rocks in the area range in age from Triassic, Jurassic, Cretaceous, Tertiary and Quaternary. The valley fill material of Circle Valley consists of alluvial deposits of silt, clay, sand and gravel size materials. The thickness of valley fill deposits may be up to 680 feet in thickness in the vicinity of the farm site. Ground water in the Circle Valley occurs in mostly unconsolidated and semi-consolidated alluvial deposit and flows to the northwest generally in the direction of the Sevier River which is approximately 7500 feet to the northwest from the proposed site.

## **Ground Water Quality**

The site is likely situated over Class IA Pristine Ground Water. Class I Pristine Ground Water has the following characteristics: 1) total dissolved solids concentrations less than 500 mg/L; and 2) No contaminants that exceed Utah ground water quality standards.

Class I ground water will be protected to the maximum extent feasible from degradation due to facilities that discharge or would probably discharge to ground water. Up-gradient and down-gradient monitoring wells will be installed and sampled prior to operation and for a final determination of site specific ground water quality and classification.

## **Compliance Monitoring Program**

A compliance groundwater monitoring program will commence when the containment basin are constructed. Up-gradient and downgradient monitoring wells will be installed prior to operation of the basins. Background conditions will be determined from the up-gradient well in accordance with R317-6-6.10 and compliance limits for the downgradient wells will be set according to R317-6-4.

The following key parameters were selected for compliance ground water monitoring based on their concentrations in the process water compared to concentrations in shallow ground water:

- TDS
- Chloride
- Nitrate + Nitrite
- Ammonia as N
- Bicarbonate

Following collection, evaluation, and statistical analysis of eight quarterly ground water samples, the interim compliance limits in Table 2 of permit UGW170004 will be modified.

**Best Available Technology**

The containment basin will be lined with a single, 60 mil HDPE flexible membrane installed and constructed in accordance with the concurrently issued ground water permit.

DWQ-2018-000648

Dalton Finisher Farm

Ground Water Discharge Permit No. UGW170004

Comment Response Summary

Utah Division of Water Quality

March 2018

## DWQ Response to Comments

**The text of the comments are restated verbatim in italics.**

**Response to comments received on Public Notice of Issuance of Ground Water Discharge Permit No. UGW170004:**

A single statement was submitted via email by Ms. Lisa D. Hendrickson dated Monday March 5, 2018 at 16:58. DWQ has taken the liberty of separating the statement into three different comments to focus on each of the details.

### **Comment 1**

*I am protesting the permit to discharge wastewater from a finishing hog operation at Dalton Farms in Circleville. That groundwater is currently classified "pristine."*

#### **1.1 DWQ Response**

As described in the Statement of Basis ("SOB") for this ground water permit, UGW170004 ("Permit"), the Permit was developed in accordance with UAC R317-6 ("Rules"). Accordingly, based on the available information (Table 1 of the Permit) and consistent with R317-6-3(3.2) the ground water in the vicinity of the Dalton Farm ("Farm") has been classified as Class IA Pristine Ground Water; such a classification requires total dissolved solids ("TDS") less than 500 mg/L and no other contaminant which exceeds those listed in Table 1 of R317-6-2(2.1). As required for this classification, the corresponding protection levels have been applied in accordance with R317-4(4.2) and are specified in Part II(C) Table 2 of UGW170004 ("Permit"). The protection levels in Table 2 of the Permit are one quarter of the standards listed in Table 1 of the Rules for known contaminants and within currently known fluctuations of the existing background quality for TDS.

Importantly, as it relates to the protection of the ground water and the attendant beneficial uses including, but not limited to, use as a source of high quality drinking water, the values listed in Table 2 of the Permit are both conservative and protective. These protection levels determine if potential or actual *out of compliance* status (Part II G(1&2) of the Permit) exists well before the limits of the ground water standards are exceeded. The standards in Table 1 of the Rules are primarily adopted from the US EPA federal drinking water standards. Exceedance of the protection levels requires the implementation of actions as described in Part II G(2)(b&c) for notification, investigation and remediation.

Based on the properly established protection levels described above, in combination with the approved construction of Best Available Technology (BAT) and monitoring (described in responses below), the Division of Water Quality ("Division") is satisfied that requirements and criteria of R317-6-6.4(1&4) have been met.

Permit Action: None

### **Comment 2**

*The hog operations in the Milford Valley polluted groundwater 20 years ago and people close to the barns still say they don't drink the well water.*

#### **2.1 DWQ Response**

Part I of the Permit describes the engineering basis for the design and construction of Best Available Technology (BAT) in accordance with the definition in R317-6-1. Appendix A is the Construction Permit (CP) which is being issued along with the Permit. Specifically for this permit and Farm, a 60 mil Flexible Membrane Liner (FML) will be constructed out of High Density Polyethylene (HDPE). The

BAT for the Farm includes a minimum vertical freeboard which must be maintained to ensure total containment and prevent spills.

The CP in Appendix A contains the necessary engineering plans and specifications as well as Quality Assurance and Control criteria to verify that the BAT is constructed properly and performs as intended. The CP is being issued in accordance with UAC R317-1 and UCA 19-5-108(1) and the associated documents are developed, stamped and signed by a Utah Certified and Licensed Professional Engineer (PE).

The use of an FML as BAT provides a substantially higher level of control and performance relative to clay liners which may be appropriate in some circumstances. In particular, a properly installed FML has an effective hydraulic conductivity (all other things being equal has a direct linear relationship to the leakage rate where lower conductivity is less leakage) that is typically rated at least 4 orders of magnitude, one ten thousandth, of the conductivity of the highest performing clay liner and one one hundred thousandth of the conductivity of liners typically used for a municipal waste water lagoon. The BAT requirement of an FML and the significantly greater protection is commensurate with the Class I water Quality classification and proper protection of the attendant beneficial uses.

In addition to BAT and the CP, Part II (F) of the Permit specifies all of the Compliance Monitoring requirements including the installation and sampling of monitoring wells (monitoring plan) to determine compliance with the protection levels in Table 2. For these reasons the Division is satisfied the requirements of R317-6-6.4(A)(2&3) have been met.

Permit Action: None.

### **Comment 3**

*Hydrologists back in the 90's warned there was not enough water to sustain the level of hog production, and now 20 years later, the state is no longer issuing groundwater permits in Area 71 because the aquifer is too low.*

### **3.1 DWQ Response**

As described in the SOB this permit was developed in accordance with the R317-6 and the Utah Water Quality Act, UCA 19-5. Issues related to water rights, use, allocation and sustainability likely fall under the purview of the State Engineer and in any event are beyond the scope of this permit and the applicable regulations.

Permit Action: No action.

### **Comment 4**

*Please read this article and consider holding a public hearing before allowing hog production to expand onto virgin aquifers.*

### **4.1 DWQ Response**

The Notice of the Division's intent to issue the Permit and solicitation of comment states that a public hearing may be held if written requests are received in the first 15 days of the comment period and the requests demonstrate significant public interest and substantive issues. A single comment and request was received on the final day of the comment period. While the comment received does raise important issues, the Division believes that the response summary adequately addresses the comments made.

However, the Division will be presenting information on ground water permitting to the Beaver County Planning and Zoning Commission at their request, Wednesday, March 21<sup>st</sup> at 7:00 pm. The meeting will be held in the County Commission Chambers on the second floor of the Beaver County Administration Building, 105 E Center Street.

Permit Action: No action.

**Comment 5**

*Dalton Farms is just up from the Sevier River which waters a whole lot of territory including critical habitat for waterfowl like Gunnison Bend Reservoir where the snow geese just passed. If that gets polluted, it would be a disaster.*

*This is the news story out of Illinois where the contract farmer polluted a waterway then declared bankruptcy and left the neighbor uncompensated and the state paying for cleanup.*

*We might need to have any new ordinance ask for the parent company of these contractors to put up an environmental bond just like mining companies have to do. The laws need to catch up w these new ways of farming.*

<http://www.chicagotribune.com/news/watchdog/pork/ct-pig-farms-pollution-met-20160802-story.html>

**5.1 DWQ Response**

The comment includes a Chicago Tribune article dated March 5, 2016 as an example of concerns for future environmental damages attributed to waste production facilities. While the article exhibits several examples of negligence and “willful” pollution, DWQ does not have any reason to believe that these conditions will occur as a function of this permit.

There is not a perennial water body within at least a one-mile radius of the study area and the Sevier River is at least 1.5 miles away with higher elevations between the site and the river. Therefore, potential contaminant spills are unlikely to affect regional waterbodies. In fact, DWQ has not recorded a contaminant spill causing any type of fish kill from a facility permitted through the ground water program.

As noted above, the design and construction criteria for this lagoon specifically require a minimum of 2 feet of free board in addition to sufficient capacity to hold all wastes. The arid climate of Utah makes the ability to hold these wastes much more likely than sites farther east which have much higher precipitation rates and the attendant likelihood of prolonged heavy precipitation thus causing a large uncontrolled release.

Part II E(3) of the Permit requires the permittee to develop and utilize a comprehensive nutrient management plan (CNMP) by a certified nutrient management planner for the proper and protective land application of wastes at agronomic rates for the crops being farmed. In addition, although R317-6 does not provide authority for the Division to require or determine a bond, Smithfield has stated that it will require the Dalton farm to have insurance for environmental issues.

Unlike Illinois, the Division of Water Quality within the Utah Department of Environmental Quality, administers all ground water discharge and construction permits; not the Department of Agriculture as described in the article.

DWQ-2018-002506

Woody

**GEM ENGINEERING, INC.**

485 North Aviation Way ♦ Cedar City, UT 84721  
Phone (435) 867-6478 ♦ Fax (435) 867-4372  
www.gemengineeringinc.com

December 18, 2017

**Division of Water Quality**  
Utah Department of Environmental Quality  
Salt Lake City, Utah 84114-4870

CONSTRUCTION PERMIT ISSUED BY  
Utah Department of Environmental Quality  
Utah Division of Water Quality

Date: 3/20/18

Review Engineer: WVC

Director: E. Sadi

**Attention: Mr. Woody Campbell, P.E.**

Subject: Addendum # 1  
Groundwater Discharge Permit Application and Report  
Dated November 29, 2017  
Dalton Finisher Farm Sites  
Garfield County, Utah

Dear Mr. Campbell:

At your request, GEM Engineering, Inc. has prepared this addendum to address comments made via phone conversation on December 15, 2017, from Woodrow Campbell of state of Utah Division of Water Quality. The responses below are considered incorporated into the permit application and will be implemented during the construction of the facilities at the Dalton Finisher site. The following are responses made to address Mr. Campbell's review of the subject groundwater discharge permit application state of Utah Division of Water Quality:

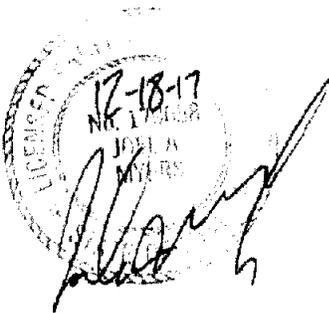
- Basin dikes shall be constructed in 6-inch compacted lifts to obtain proper compaction. For building pad, digester dike construction and lagoon subgrade, the soil shall be moistened and compacted to 90% of maximum dry density, as defined by AASHTO T-99. Moisture will be added to the soil during compaction to target 0 to 4% above the optimum moisture. Previously the permit application sated to target 2% above optimum moisture content.
- When vacuum testing the seam on HDPE - FML liner, Obtain a minimum pressure of -5.0 psi for a minimum period of 10 seconds to observe through the viewing glass the presents of soap bubbles forming.

December 18, 2017

- When performing air pressure tests on double welded seams, energize the air pump to a minimum pressure between 30 psi and read pressure gauge inserted into the chamber. Allow the pressure to stabilize and if necessary, re-pressurize to a minimum of 30 psi then record the pressure. The pressure must not fall more than 3 psi in 5 minutes to pass the test. If the pressure falls more than 3 psi in 5 minutes, repairs shall be made to the seam and the seam must be retested.
- Upon completion of all readings, open the opposite end of the seam with a needle or by cutting with a knife. The escaping air will confirm that the entire length of the seam was pressurized and therefore tested.
- When cutting destructive tests in the FML liner, cut the sample for the destructive test in anchor trench when possible to minimize cutting the liner in the submerged area of the basin. There must still be enough destructive seam tests to account for a tests for every 750 feet of seam for the entire liner.

Should you have any questions regarding this report please contact us at your convenience.

Respectfully submitted,  
GEM Engineering, Inc.,

A circular professional engineer seal for Joel A. Myers, No. 17-18-17. The seal contains the text "LICENSED PROFESSIONAL ENGINEER" around the perimeter and "JOEL A. MYERS" in the center. A handwritten signature is written over the seal.

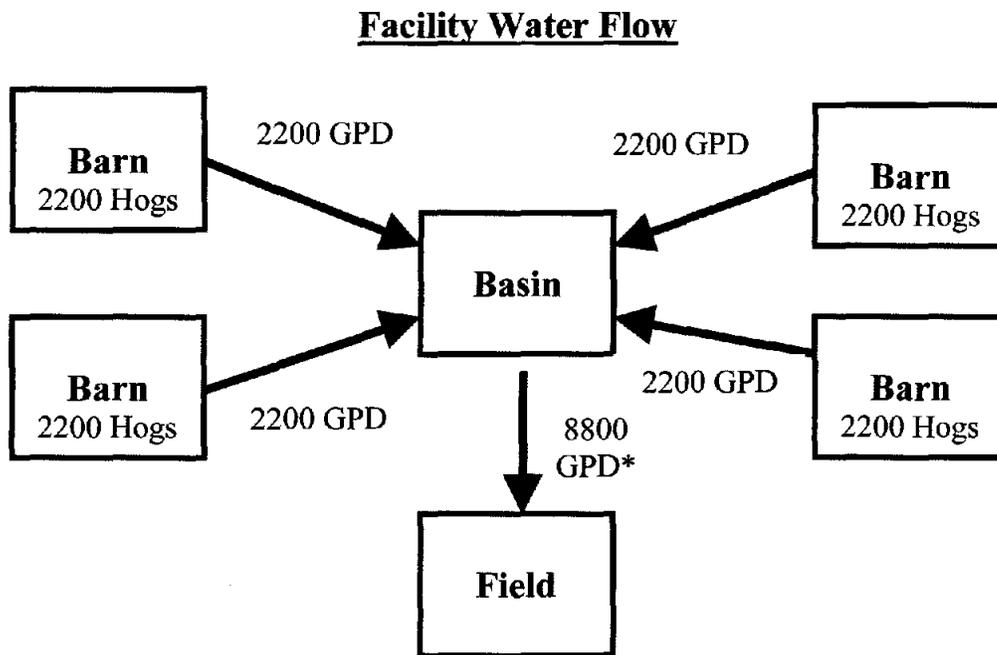
Joel A. Myers, P.E.  
President

## SECTION 4: GROUNDWATER DISCHARGE CONTROL PLAN

The finisher farm is designed as a closed system and therefore with the exception of the Septic system which will be designed and approved through the local health department no wastewater will be discharged to the surrounding soil.

### 4.1 Finisher Waste Management Description

A diagram of the overall operation of the finisher facility is found in **Figure 4-1**



\* Flow from Basin to Field will be on an as needed basis with an average flow of 8800 GPD\*

**Figure 4-1 Finisher Flow Diagram**

#### 4.1.1 Waste Flow Description

The sewage collected from the individual finisher buildings will drain into the waste containment basin. The waste will not be treated but will be pumped to agricultural fields at an agronomic rate to be utilized as fertilizer. The level of fluid in the containment will be strictly monitored and controlled. The basin is

designed to hold approximately 425 days of waste produced by the hogs in the barn at full capacity.

#### 4.1.2 Soil Information

The soil and water table around the site were investigated by reviewing the well logs for the wells which are near the facilities:

Well # 1 – WIN#: 22343: S 15 ft, W 660 ft from NE corner of Section  
2,  
T 31S, R 4W, SL B&M

Well # 2 – WIN#: 429786: N 28 ft, W 78 ft from SE corner of Section  
35,  
T 30S, R 4W, SL B&M

Soil logs for the locations listed above are located in **Attachment B**. Information was obtained from Utah Division of Water Rights.

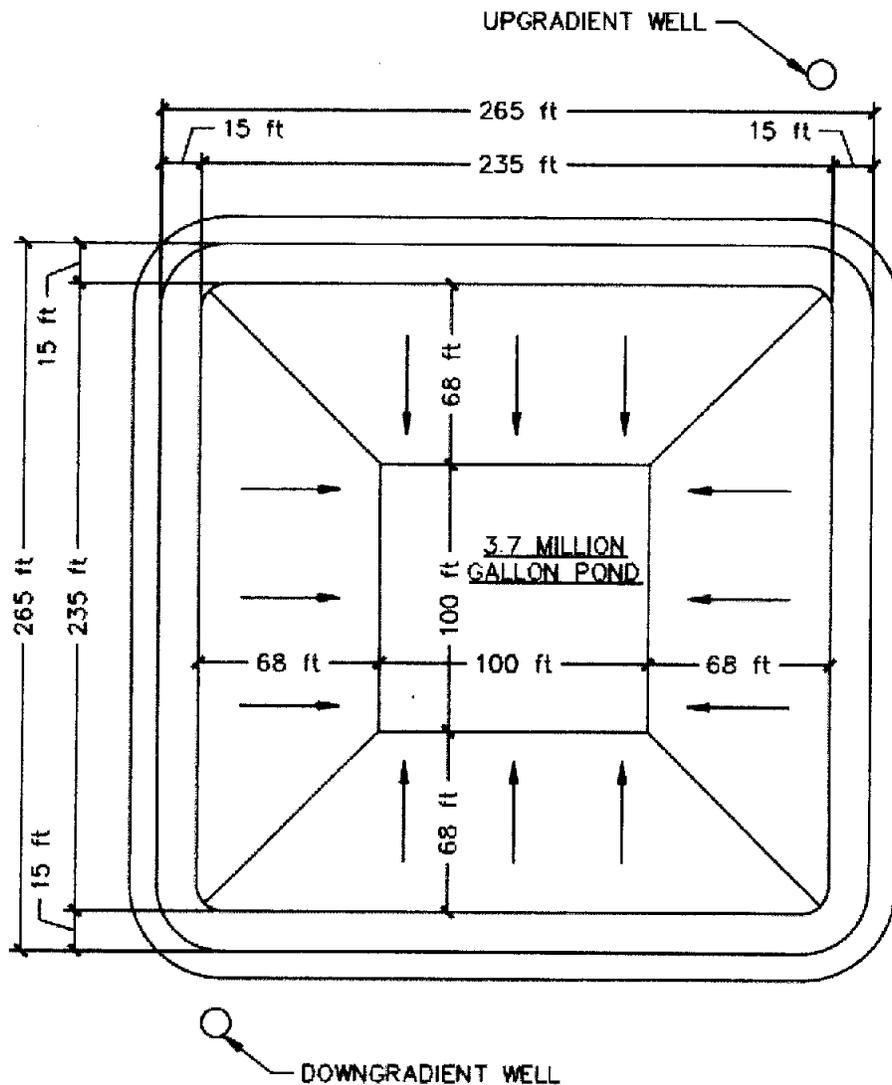
The shallowest groundwater in the surrounding borings was located roughly 43 feet below existing grade at Well # 1 which is closest to the facility site. An excavation was made at the site and the groundwater is estimated to be about 60 feet below the ground surface.

In order to meet DEQ criteria for Containment Basin construction, the seasonal high water table elevation must be at least 2 feet below the floor of the containment basin in hydrogeologically stable soil strata. At the facility location, the seasonal high water table will be more than 2 feet below the bottom of the proposed containment basin. Also, the soil strata underlying the facility site appear to be hydrogeologically stable. It appears that the proposed site will meet this criteria.

### 4.1.3 Containment Basin Overview

The owner of this facility will follow the previously accepted design criteria in developing containment basins for this facility. No digestion of the waste is necessary, because the hog manure will be utilized as fertilizer on an agricultural field.

A plan view of the containment basin is shown in **Figure 4-3**



**Figure 4-3** Containment Basin Detail and Monitoring Well Location

#### **4.1.4 Waste Conveyance System**

Waste shall be conveyed from the farm sites to the containment basin through either HDPE SDR 35 or PVC Schedule 40 sewer pipe, as shown in the Composite Location & Plot Map included in **Attachment A**. The waste will gravity flow from the barns to the waste containment basins. The containment basin will be lined with a Flexible Membrane Liner (FML).

#### **4.1.5 Containment Basin Management Plan**

As previously described, the waste flows from the barn to containment basin and then is pumped to the fields at an agronomic rate. Should problems be encountered either in the liner or piping, the flow of sewage from the individual farm sites can be shut off and the contents of the basin(s) can be pumped to the existing field or containment basin so that repairs can be made and the containment basin be put back into use.

## **SECTION 6: CONTAINMENT BASIN SYSTEM LOCATION AND DESIGN**

### **6.1 Containment Basin Description**

A containment basin will be used at each finisher site to store the swine manure produced at the finisher sites. Effluent will be collected from the production building in Containment Basin where the effluent will be stored allowed to evaporate. The Containment Basin will be lined. The liners will consist of a Flexible Membrane Liner (FML). The waste contained in the containment basin will be pumped and utilized as fertilizer in the near by fields.

### **6.2 Containment Basin Site Soils Investigation**

A soil and water table investigation will be performed near the proposed Containment Basin locations before construction. The soil investigations consisted of 2 backhoe trenches approximately 12 feet in depth near the proposed farm sites. The groundwater underlying the Containment Basin must be at least 8 feet below the existing ground level. In order to meet DEQ criteria for Containment Basin construction, the seasonal high water table elevation must be at least 2 feet below the floor of the Containment Basin in hydrogeologically stable soil strata. At the proposed farm site the seasonal high water table was more than 2 feet below the bottom of the proposed Containment Basin based on the hydrogeological information available. Also, the soil strata underlying the Containment Basins appear to be hydrogeologically stable. It is proposed that bottom of containment basin be placed approximately 15 feet below the ground surface at these farm site locations. It is estimated that the groundwater is approximately 60 feet below the ground surface at the proposed site location.

### **6.3 Containment Basin Design**

The containment basins will be constructed with 60 mil HDPE liners as described in section 7 of this report and in accordance with the State of Utah Department of Environmental Quality regulations. A plan view and cross section of the containment basin can be found in Attachment D.

#### **6.4 Waste Transfer System**

Waste from the barns is transferred to the containment basin through either 12" SDR 32.5 HDPE or 12" SDR 35 PVC sewer pipe, installed at a 0.5% minimum slope. The effluent pipe and Containment Basin elevations allow the waste to gravity flow from the pits to the Containment Basin. The waste will then be pumped to the agricultural field for use as fertilizer at an agronomic rate.

#### **6.5 Containment Basin Safety System Considerations**

Access to the Containment Basins by humans and animals will be controlled by fencing. The fences will help to prevent damage to the Flexible Membrane Liners (FMLs) in the instances where they are used. Only authorized personnel will have access to the Containment Basin areas to prevent damage to the FMLs. Additionally, safety-warning signs will be posted near the Containment Basins.

#### **6.6 Containment Basin Management Plan**

The Containment Basin will be managed as a fertilizer producing system. The Containment Basin is designed to contain all of the waste produced by the hogs for 425 days. The waste will be pumped to the fields at an agronomic rate. Since the prevailing climatological conditions result in more evaporation than precipitation no excess volume will be provided other than the free board of 1.5 feet as show on the lagoon cross section in Attachment D. However, should unforeseen precipitation events occur, excess effluent could be land applied at agronomic rates at any time. The effluent will be applied according to soil and plant nutrient uptake rates. In this case, the effluent will be applied in a manner such as to avoid any contamination of surface waters, drinking wells, springs or pipelines.

## **SECTION 7: LAGOON AND CONTAINMENT BASIN CONSTRUCTION**

### **7.1 Containment Basin Construction**

Construction of the Barns and Containment Basin shall be done in accordance with design drawings and specifications. Earthwork and liner construction shall be tested and inspected by qualified independent geotechnical and/or engineering firms. At the completion of construction, and prior to operation of the facility, an independent performance certification document will be completed by a qualified professional engineer licensed in the State of Utah containing test information and certification that basin and liner construction meets requirements of the project design documents and the requirements contained within this report.

#### **7.1.1 General Earthwork Construction**

Earthwork and dike construction for excavation of digesters and equalization basins shall be done as follows:

- A. The area scheduled for construction of basins and building pads shall be cleared and grubbed to remove topsoil and surface vegetation from the digester/basin areas.
- B. Soil shall be excavated from the basin area and be used to construct building pads or dikes.
- C. Basin dikes shall be constructed in 6-inch compacted lifts to obtain proper compaction. For building pad and digester dike construction, the soil shall be moistened and compacted to 90% of maximum dry density, as defined by AASHTO T-99. Moisture will be added to the soil during compaction to target 2% above the optimum moisture.
- D. The dikes will be constructed of relatively impermeable compacted native material.
- E. A qualified inspector will perform the moisture content and dry density testing per every two feet of lift at random locations once every 400 feet along the Containment Basin dikes.

## **7.2 Flexible Membrane Liner**

Specifications for manufacture, delivery, subgrade preparation, installation, and testing for FML liner installation are included in **Attachment E**. The QA/QC plan is also included in this attachment. The specifications were adapted from requirements set forth in previous projects and permit applications. Moreover, an industry standard known as the GRI standard GM13 which covers smooth and textured geosynthetics has been developed with the intent of forming an industry standard for manufacture and testing of geosynthetic liner material. This standard was developed by the Geosynthetic Research Institute at Drexel University, Philadelphia, PA. As stated in the specifications, the requirements of latest revision of the GRI standard will be applicable.

If the basins are to remain empty for an extended period of time they shall be properly ballasted using ultraviolet ray resistant sand bags with nylon ties. The minimum specification for ballasting liner is 30-lb. sand bags spaced 5-feet apart along the entire toe of dike in containment basins. Sand-filled HDPE tube or pipe may also be used as long as an equivalent amount of ballasting per lineal foot (6 lbs./ln.-ft.) is maintained.

On occasion, repairs may have to be made to liners if damage occurs out of the norm, or modifications need to be made. All repairs made to liner seams, or incident holes found in the liner shall be vacuum/bubble tested, documented and sent to the State DEQ for informational purposes and approval of the repairs. Unless significant modifications to the liner are made, such repairs shall be made without any requirements for approval from the State DEQ.

### **7.2.1 Flexible Membrane Liner Installation**

The Containment Basins at the finishing farms may be lined with a Flexible Membrane Liner (FML) constructed of a High Density Polyethylene (HPDE). The subgrade will conform to the FML specifications of the Manufacture and the previously stated most recent GRI standards. The installation of the FML will also comply with the Quality Assurance/Quality Control (QA/QC) found in Attachment E. In Addition to the FML specifications and QA/QC, detailed drawings of typical liner anchoring methods, pipe penetrations, air vents and

water level markings of liners are found in attachment E. The following procedures will be used for installation of liners for the Containment Basins at the farm sites.

The Subgrade will be constructed according to the specifications as detailed below:

1. The subgrade material will come from either on-site material or approved stockpiles.
2. The earthwork for the anaerobic Containment Basins will be free of any foreign material such as stones greater than 3/8 inch in diameter, vegetation, brush, roots or similar material which could damage the FML.
3. The subgrade material shall be classified as either CH, CL, CL-ML, ML, SM, SC, SW or SP by the USCS Classification System.
4. A Moisture density curve will be developed for the subgrade material.
5. The minimum compacted thickness of the subgrade layer shall be 8 inches.
6. The subgrade will be compacted and graded to meet the FML contractor's specifications so as to avoid any ruts, irregularities or soft areas. The subgrade will be thoroughly compacted to provide support for the FML.
7. The subgrade will be compacted to a minimum of 90% maximum dry density as defined by AASHTO T-99. For proper compaction, moisture will be added to the soil during compaction to target 2% above the optimum moisture.
8. Installed density shall be confirmed by field test methods at a frequency of one test per 100'x100' grid square at the surface of the subgrade.

A 60-mil HDPE will be installed over the compacted subgrade. The HDPE material will meet the specifications indicated in the most recent GRI standard and in the QA/QC references in Attachment E. The drawings in Attachment E show typical liner anchoring methods and pipe penetrations of the liner material.

The HDPE liner will be installed according to the following procedure:

1. The earthwork for the anaerobic Containment Basins will be constructed so the subgrade will be free of any foreign material such as stones greater than 3/8 inch in diameter, vegetation, brush, roots or other similar materials which could damage the FML.
2. The earthwork will be compacted and graded to meet the FML contractor's specifications so as to avoid any ruts, irregularities or soft areas. The subgrade will be thoroughly compacted to provide support for the FML.
3. An anchor trench will be constructed along the crest of the berms for the purpose of securing the FML.
4. The FML will be assembled, seamed, tested and installed by the methods specified by a liner material recognized by the NSF (National Sanitation Foundation, Standard 54).
5. The FML will be certified as "holiday free" by electrical potentiometric means (spark tested) during manufacture.
6. Adequate slack will be maintained in the liner material during assembly and installation to minimize stresses due to variations in ambient temperature and incident radiation.
7. Heavily creased or otherwise defective liner material must be rejected.
8. Testing of coupons (strips of material) before seaming, stress cracks and all seams must be done in accordance with the manufacture's requirements.

9. Installation of the FML will ideally take place in temperatures ranging from 40 degrees Fahrenheit to 110 degrees Fahrenheit. In the event that the FML is installed during colder conditions (between 20 degrees Fahrenheit and 40 degrees Fahrenheit) the cold weather seaming procedures detailed in FML QA/QC, Attachment E, shall be followed.
10. Air Vents will be installed on all four sides of the Containment Basin as detailed in Attachment E and Compaction of the anchor trench backfill will provide a firm unyielding surface to secure the FML along the berms.

#### **SECTION 8: FACILITY CLOSURE AND POST CLOSURE**

Should facility operation terminate the liquid and sludge will be removed and land applied at agronomic rates unless alternative technologies are developed. The sludge and Containment Basin liquid will be land applied in such a way as to avoid ground water pollution as well as contamination of surface waters, drinking wells, springs or pipelines. Additionally, the parameters and constituents of the water in the monitoring wells detailed in Sections 5.1.1 and 5.1.2 will be observed for 5 years thereafter. The actual duration of post operation monitoring may be less, if justified by long term operation and a history of compliance.

**Attachment D – Specifications and QA / QC for HDPE Liners**

## Specifications and QA / QC for HDPE Liners

### 1.0 SCOPE

- 1.1 These specifications describe High Density Polyethylene (HDPE) Lining Membranes. The supply and installation of these materials shall be in strict accordance with the Engineer's specifications and engineering drawings and be subject to the terms and conditions of the contract. The subgrade and the HDPE material will meet the specifications contained herein and in the GRI Test Method GM13.

### 2.0 MATERIAL

#### 2.1 Physical Properties:

- A. The HDPE liner material used in this project shall be a minimum of 60 mil in thickness and have the properties as called out in Table 1(a) of GRI Test Method GM13 (Attachment G).
- B. Raw material shall be first quality polyethylene resin containing no more than 2% clean recycled polymer by weight.
- C. Melt Index (ASTM D1238 Condition 190/2.16):  $\leq 1.0$  g / 10 min.
- D. Dimensional stability in each direction at +/- 2% max (ASTM D 1204 - 100°C 1 hr).
- E. Environmental stress crack resistance of 1500 hrs min (ASTM D 1693 Condition B).
- F. The new membrane liner shall comprise HDPE material manufactured of new, first-quality products designed and manufactured specifically for the purpose of liquid containment in hydraulic structures.
- G. The lining material shall be manufactured a minimum of 22.5 feet seamless widths. Labels on the roll shall identify the thickness, length and manufacturer's roll number. There shall be no factory seams.
- H. The liner material shall be so produced as to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter. Any such defect shall be repaired using the extrusion fusion welding technique in accordance with the manufacturer's recommendations.
- I. The contractor shall, at the time of bidding, submit a certification from the manufacturer of the sheeting, stating that the sheeting meets physical property requirements for the intended application. FML rolls will not be installed, if any tested property is below the National Sanitation Foundation (NSF 54) minimum standard.

#### 2.2 Handling:

- A. Delivery: Transportation of the geomembrane shall be performed by the geomembrane manufacturer through an independent trucking firm or other party as agreed by the owner.

## Specifications and QA / QC for HDPE Liners

- B. Offloading: Geomembrane, when off-loaded, shall be placed on a smooth well drained surface, free of rocks or any other protrusions which may damage the material. No special covering is necessary for geomembrane. The following should be verified prior to off-loading the geomembrane:
  - 1. Handling equipment used on the site is adequate and does not pose any risk of damage to the geomembrane.
  - 2. Personnel informed of proper handling techniques and will do so with care.
- C. Any welding rod delivered to the site prior to the geomembrane installation contractor's arrival should be kept covered and dry or placed in a storage facility.
- D. Upon arrival at the site the geomembrane installation contractor shall conduct a surface observation of all rolls for defects and for damage. This inspection shall be conducted without unrolling rolls unless defects are found or suspected. The geomembrane installation contractor shall indicate any damage to the Project Manager / Owner.
- E. Storage: The Project Manager / Owner shall provide storage space in a location(s) such that on-site transportation and handling are minimized. Storage space should be protected from theft, vandalism, passage of vehicles, and be adjacent to the area to be lined.

### 3.0 MANUFACTURER

**3.1 Experience:** The manufacturer of the lining material specified in the previous section shall have previously demonstrated the ability to produce this membrane by having successfully manufactured a minimum of ten million square feet of similar liner material for hydraulic lining installations. The liner material provided by the manufacturer must be listed by the NSF (National Sanitation Foundation) Standard 54.

#### 3.2 Factory Quality Assurance and Control

- A. Quality Assurance testing shall be carried out by the geomembrane manufacturer to demonstrate that the product meets this specification.
- B. Raw Material: All compound ingredients of the HDPE materials shall be randomly sampled on delivery to the HDPE manufacturing plant to ensure compliance with specifications. Tests to be carried out shall include Density ASTM D1505 and Melt Index ASTM D1238, Condition E.
- C. Manufactured Roll Goods: Samples of the production run shall be taken and tested according to ASTM D638 to ensure that tensile strength at yield and break, elongation at yield and break meet the minimum specifications. A quality control certificate shall be issued with the material.
- D. All welding material shall be of a type supplied by the manufacturer.

## Specifications and QA / QC for HDPE Liners

E. All FML material shall be certified as “holiday free” by electrical potentiometric means (spark tested) or other equivalent approved means, during manufacture.

**3.3 Submittals:** The geomembrane manufacturer shall submit the following information to the Project Manager / Owner:

- A. The origin (resin supplier’s name, resin production plant), identification (brand name, number) and production date of resin.
- B. A copy of the quality control certificates issued by the resin supplier noting results of density and melt index.
- C. Reports on the tests conducted by the geomembrane manufacturer to verify the quality of the resin used to manufacture the geomembrane rolls assigned to the considered facility (these tests should include specific gravity [ASTM D792 Method A or ASTM 1505 and melt index ASTM D1238 Condition 1902.16]).
- D. Reports on these tests conducted by the geomembrane manufacturer to verify the quality of the sheet.
- E. A properties sheet including, at a minimum, all specified properties, measured using test methods indicated in the specifications or equivalent.
- F. After receipt of material, the geomembrane manufacturer shall provide the Project Manager / Owner with one quality control certificate for every roll of FML provided. The quality control certificate shall be signed by a responsible party. The quality control certificate shall include: roll numbers, identification and results of quality control tests. As a minimum, the quality control certificates shall include the results of the geomembrane properties tested by the method and at the frequency shown in the table below.

<b>Property</b>	<b>Test Method</b>	<b>Frequency</b>
Thickness	ASTM D 751	Every Roll
Density	ASTM D 792/1505	Every 5 <sup>th</sup> Roll
Tensile Yield Strength	ASTM D 638	Every Roll
Yield Elongation	ASTM D 638	Every Roll
Tensile Break Strength	ASTM D 638	Every Roll
Break Elongation	ASTM D 638	Every Roll
Dimensional Stability	ASTM 1204	Every Roll
Tear Resistance	ASTM D 1004	Every Roll
Puncture Resistance	FRMS 101C-2065	Every Roll
Environmental Stress Crack Resistance	ASTM D 1693B	Every Roll
Carbon Black Content	ASTM D-1603	Every 5 <sup>th</sup> Roll
Carbon Black Dispersion	ASTM D-3015	Every Resin Lot

## Specifications and QA / QC for HDPE Liners

### 4.0 INSTALLATION

**4.1 Area Subgrade Preparation:** The earthwork contractor shall be responsible for preparing the subgrade according to the basin's design and in accordance with the following specifications. If there is a discrepancy between the project design drawings and the following specifications the more stringent requirements shall apply.

- A. The earthwork shall be smooth and free of all rocks, stones, sticks roots, sharp objects, or debris of any kind. No stones or other hard objects that will not pass through a 3/8" screen shall be present in the top 1" of the surfaces to be covered. No vegetation, brush roots or other foreign material shall be present on the surfaces to be lined.
- B. The surface should be compacted so as to provide a firm, unyielding foundation for the membrane with no sudden, sharp or abrupt changes or break in grade. No ruts, irregularities or soft areas will be present on the surfaces to be lined. The subgrade shall be thoroughly compacted.
- C. No standing water or excessive moisture shall be allowed.
- D. An anchor trench shall be constructed in a square in accordance with detail DF3 / C.DF3 to secure the FML along the berm of the containment structure to be covered. See attached drawings at end of this specification for anchor and cover details.
- E. The installation contractor shall certify in writing that the surface on which the membrane is to be installed is acceptable before commencing work. The FML will be assembled, seamed, tested and installed by the methods specified by a manufacturer recognized by the National Sanitation Foundation, Standard 54.
- F. The subgrade shall be constructed so as to meet the following:
  - 1. The subgrade material will come from either on-site or from approved stockpiles.
  - 2. The earthwork for the anaerobic digesters and the equalization basins will be constructed so the subgrade will be free of any foreign material such as stones greater than 3/8 inch in diameter, vegetation, brush, roots or similar material which could damage the FML.
  - 3. The subgrade material will be classified as CH, CL, CL-ML, ML, SM, SC, SW or SP by the USCS Classification System.
  - 4. A moisture/density curve will be developed for the subgrade material.
  - 5. The minimum compacted thickness of the subgrade layer shall be 8".
  - 6. The subgrade will be compacted and graded to meet the installation contractor's specifications so as to avoid any ruts, irregularities and soft areas. The subgrade will be thoroughly compacted to provide support for the FML.

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7. The subgrade will be compacted to a minimum of 90% dry density. For proper compaction, moisture will be added to the soil in quantities comparable to the OMC.
8. Installed density shall be confirmed by field test methods at a frequency of one test per 200' x 200' grid square.
9. A written statement by an independent professional engineer regarding the subgrade's structural integrity, along with supporting data will be submitted with the liner certification packet.

### **4.2 Dike Construction:** The earthwork contractor shall be responsible for constructing dikes according to the following specifications:

- A. The dike will be constructed of relatively impermeable material.
- B. Each lift shall not exceed 6 inches in depth.
- C. A geotechnical inspector will conduct compaction testing for each two vertical foot intervals at a frequency of 1 per every 400 linear feet.
- D. A written statement by an independent professional engineer regarding the dike's structural integrity, along with supporting data will be submitted with the liner certification packet.

### **4.3 Anchor Trench:**

- A. The attached schematic detail DF3 / C.DF3 at the end of this specification indicates the anchor trench installation. Deviations from this design must be approved by the design engineer prior to use.
- B. Compaction of the anchor trench backfilling will be done promptly after installation of the FML.
- C. Compaction of the trench backfill shall include moisture added to the top 6 inches, with compaction done by a vibratory roller or tamper to firm unyielding surface.
- D. Final grading will be implemented to produce a smooth uniform finish that slopes away from the digester and basins.
- E. A client approved quality control technician shall inspect the anchor trench upon completion. Any portion of the anchor trench inadequately constructed will be re-dug and repaired in accordance with the specifications above.

### **4.4 Geomembrane Placement:**

- A. The installation of the HDPE must be done by the manufacturer, or a manufacturer's authorized distributor, using the manufacturer's extrusion or hot wedge welding equipment and installation methods. All supervisors overseeing the liner installation must

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have five million square feet of supervisory liner experience. All field technicians must have one million square feet of seaming experience.

B. Field Panel identification: A field panel is the unit area of polyethylene which is to be seamed in the field, i.e., a field panel may be a complete roll or partial roll cut in the field. Smaller units used in the lining systems such as repairs, tabs, extensions, etc. need not be documented in the same manner as a field panel.

1. The installer will be responsible for marking each panel with the identification number and the appropriate manufacturer's roll number. It is suggested that the panel number be marked on each end of the panel, after each panel is placed, for ease of reference.

C. Field Panel Placement:

1. Placement Plan: Panel placement should take into account: site drainage (including sump or low point considerations), prevailing wind direction, subgrade construction, access to the site and the production schedule of the project. Adequate slack will be maintained in the liner material during assembly and after installation to minimize stress due to variations in ambient temperature and incident radiation.
2. Installation Sequence: Field deployed panels should be seamed as soon as possible after deployment to minimize the risk of wind or water damage.
3. Weather Conditions: Geomembrane panel deployment shall not proceed when ambient air temperature or adverse weather conditions exist which will jeopardize the integrity of the liner installation. Typically, installation shall not proceed when the ambient temperature is below 20°F or above 110°F. Special low temperature welding techniques may be required in conditions of ambient temperatures between 20°F and 40°F.
4. Geomembrane panel deployment shall not proceed if subgrade conditions have deteriorated due to moisture, or in the presence of high winds which might cause damage to the liner material. Deployed panels should be adequately ballasted at all times to limit the risk of wind damage.
5. Method of Deployment: The FML installation contractor shall proceed with deployment provided the following conditions are met. If the conditions below are not met the FML installation contractor shall cease deployment and resolve the problems with the Project Manager / Owner.
  - Any equipment used does not damage the subgrade.
  - The subgrade conditions have not deteriorated.
  - The subgrade is free of loose rocks, debris, ruts, etc.
  - The personnel who are in contact with the liner do not smoke wear damaging shoes or engage in other activities which risk damage to the liner.

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- Adequate sandbags are present to weight the edges of the liner to avoid wind uplifting.
  - Excessive traffic across the liner is avoided.
6. Damage: The FML installation manager and quality assurance technical shall visually inspect each panel, as soon as possible after deployment, for damage or areas needing repair. Appropriate marks indicating a need for repairs shall be done during the inspection. Heavily creased or otherwise defective material shall be rejected.

### 4.5 Field Seaming & Layout:

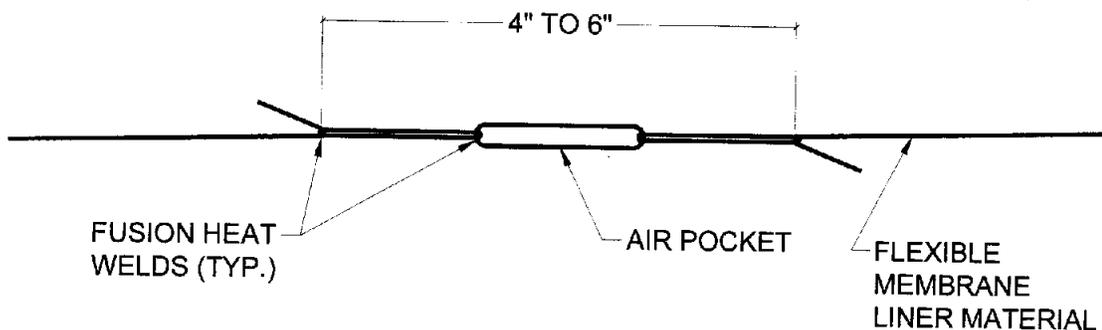
- A. Individual panels of liner material shall be laid out and overlapped by a maximum of four inches (101 millimeters) for extrusion weld prior to welding or five inches (127 millimeters) for hot wedge weld prior to welding. Extreme care shall be taken by the installer in the preparation of the areas to be welded.

All sheeting shall be welded together by means of integration of the extrudate bead with the lining material. The composition of the extrudate shall be identical to the lining material, or all sheeting shall be welded together using the hot wedge welding system.

- B. Seam Layout: In general, seams shall be oriented parallel to the plane of maximum slope, i.e., oriented along, not across the slope. In corners and odd shaped geometric locations the number of seams should be minimized. No horizontal seams should occur on a panel less than 5 lineal feet from the top of the slope. On slopes of less than 10% (6:1) this rule shall not apply. Seams will be installed at least four feet into the anchor trench.
1. A seam is considered a separate entity if it joins two panels. Repairs are not considered seams in this context.
  2. A seam numbering system can be used to identify the seams. It is suggested that a simple numerical system be used or adjacent panel numbers can be utilized to identify the seam.
  3. Seams will be welded to at least four feet into the anchor trench.
- C. Seaming Equipment and Products: Approved processes for field seaming and repairing are extrusion welding and fusion welding. All welding equipment should have accurate temperature monitoring devices installed and working to ensure proper measurement of the fusion welding wedge temperature or the extrusion barrel temperature.
- D. Extrusion Welding Process: This process shall be used primarily for repairs, patching and special detail fabrication and can also be used for seaming.
1. The extrusion welding apparatus (Handwelder) shall be equipped with gauges or other temperature monitoring devices to indicate temperature of the extrudate (resin) as well as the applicable pre-heat settings.
  2. The FML installation contractor shall verify the following:

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- a. Equipment in use is functioning properly.
  - b. Welding personnel are purging the machine of heat-degraded extrudate prior to actual use.
  - c. All work by the personnel is performed on clean surfaces and done in a professional manner.
  - d. No seaming is done in adverse weather conditions.
- E. **Fusion Welding Process:** This process shall be used for seaming panels together and is not generally used for patching or detail work.
1. The apparatus may be of a hot wedge type and shall be equipped with a “split wedge”, used for pressure type seam testing.
  2. Fusion welding equipment shall be self-propelled devices and shall be equipped with functioning speed controllers and monitors to assure proper control by the welding technician. The welding equipment used shall be capable of continuously monitoring and controlling the temperatures in the zone of contact where the machine is actually fusing the lining material so as to ensure that changes in environmental conditions will not affect the integrity of the weld.
  3. The FML installation contractor shall verify the following:
    - a. Equipment in use is functioning properly.
    - b. Welding personnel are performing seaming in a professional manner and are attentive to their duties.
  4. **Figure F-1** below is a schematic detail which indicates acceptable fusion weld. Deviations from these must be approved by the design engineer prior to use.



**Figure F-1 – Typical Fusion Weld**

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- F. Seam Preparation: The area to be welded shall be cleaned and prepared in accordance with this specification and the recommendations of the material manufacturer. The welding technician shall verify the following:
1. Prior to seaming the seam area shall be free of moisture, dust, dirt, sand or debris of any nature.
  2. Seam is overlapped for fusion welding.
  3. Seam is overlapped or extended beyond damaged areas at least 4" when extrusion welding.
  4. Seam is properly heat tacked and abraded when the extrusion welding is done.
  5. Seams are performed with the fewest number of unmatched wrinkles or "fish mouths".
- G. Fish Mouths: No "fish mouths" shall be allowed within the seam area. Where "fish mouths" occur the material shall be cut, overlapped and an overlap extrusion weld shall be applied.
- H. Slack: Adequate slack will be maintained in the liner during assembly and after installation to minimize stresses due to variations in ambient temperature and incident radiation.
- I. Defective Material: Heavily creased or otherwise defective liner material will be rejected.
- J. Weather Conditions for Seaming: No seaming shall be performed in ambient air temperatures or adverse weather conditions which will jeopardize the integrity of the liner installation. Ambient air temperatures shall not exceed 110°F nor be below 20°F during seaming. Additionally, seaming shall not proceed in conditions in which the liner is subject to dew or other condensation, rain, snow, frost or frozen subgrade.
- K. Low Temperature Welding Procedures: The most important criteria for performing welding when the ambient temperature is between 20°F to 40°F is the condition of the trial weld. All trial welds should be made in conditions duplicating the actual welding environment. The following procedures should be used to maintain the quality of the weld in low temperature ambient conditions (20°F to 40°F).
1. Conduct additional trial welds when a welding machine has been shut off, or after a major change in ambient conditions. A major change in ambient conditions would include but is not limited to the following:
    - a. Change in temperature of more than 20°F
    - b. Change in wind speed of more than 10 mph.
    - c. Change in the amount of sunshine on the liner.

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2. The geomembrane and extrudate material must be dry and free from frost, dew, condensation or other moisture.
  3. Hot wedge set temperatures may be increased up to 700°F in 10°F increments as necessary.
  4. The hot wedge rate of travel should be slowed as necessary.
  5. Length of trial weld seams should be increased to 5 ft for extrusion welds and 24 ft for fusion welds.
  6. Clean the seam area immediately in front of the welding apparatus with a clean dry cloth.
  7. Destructively test one specimen, no greater than 6" from the end of each seam to confirm the quality of the seam.
  8. Increase handwelder (extrusion welder) pre-heat temperature up to 600°F in 20°F increments as necessary.
  9. Increase handwelder extrudate temperature up to 530°F in 10°F increments as necessary.
  10. If additional measures are needed to produce acceptable welds the following additional measures may be implemented:
    - a. Install an insulating material such as a geotextile cushion beneath the seam being welded.
    - b. Use hot air pre-heat (additional pre-heat for extrusion welding) 6" to 12" in front of the welding apparatus (both fusion and extrusion welders). Verify weld quality by means of a trial weld.
  11. If trial welds still indicate that a quality weld cannot be produced by the above steps, a wind shield or an enclosure may be placed over the area to be welded. In the case of an enclosure, the enclosed area shall be heated by forced air or radiant means to an air temperature at or above 40°F.
  12. All trial welds will be documented with samples (failures and approved) recorded, retained with samples attached to completion submittal records.
- L. Temporary Bonding: The FML installation contractor shall verify that no solvents or adhesives are used in the seaming area. Tape or heat tacking is permissible for temporarily holding patches but is not a substitute for welding.
- M. Trial seams / Welds: Trial seams / welds shall be made on appropriate sized pieces of geomembrane material to verify that seaming conditions are adequate.

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1. Trial seams / welds shall be performed for each welder to be used and by each operator of extrusion welders, and by the primary operator of the fusion welder.
2. A passing trial seam / weld shall be made prior to seaming each day. If the apparatus is cooled down after use and additional trial seam may be required.
3. Fusion welded trial seams shall be approximately 5 foot long by 1 foot wide with the seam centered lengthwise. For extrusion welding the trial seam sample size shall be approximately 3 feet long by 1 foot wide with the seam centered lengthwise.
4. Test welds shall be marked with date, ambient temperature and welding machine number. All test weld samples will be retained and submitted with approved inspection reports.
5. Samples of weld ¼" to ½" wide shall be cut from the test weld and pulled by hand in peel. The weld should not peel.
6. Refer to Quality Assurance and Quality Control Section 5.2.B for testing requirements.
7. The geomembrane installation contractor shall assign each trial seam / weld sample a number and record the test results in the appropriate log.
8. Upon passing, unless otherwise specified, all trial seam / weld specimens must be retained and submitted with approval inspection reports.

### 4.6 Defects and Repairs

- A. Once defective or areas requiring repair are identified as called out in Section 5.3. Each area shall be repaired in accordance with this section and non-destructively tested.
- B. Repair Procedures: Any portion of the polyethylene lining system exhibiting a defect which has been marked for repair shall be repaired with one or more of the following appropriate procedures:
  1. Repair Methods:
    - Patching: Used to repair holes, tears, un-dispersed raw materials in the sheet.
    - Grind and Re-Weld: Used to repair small section of extruded seams.
    - Spot Welding: Used to repair small, minor, localized flaws.
    - Flap Welding: Used to extrusion weld the flap of fusion weld in lieu of a full cap.
    - Capping: Used to repair failed seams.
    - Topping: Application of extrudate bead directly to existing seams.
  2. The following conditions shall apply to all of the above methods:
    - a. Surfaces of the polyethylene which are to be repaired shall be abraded.

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- b. All surfaces must be clean and dry at the time of the repair.
  - c. All seaming equipment and personnel used in repairing procedures shall be qualified and documented by the client's third party inspector.
  - d. All patches and caps shall extend at least 4" beyond the edge of the defect and all patches shall have rounded corners.
- C. Large Wrinkles: Large wrinkles that remain in the sheet as a result of temperature expansion or uneven surface preparation may need removal in consideration of applied dead loads on the wrinkle, etc. Should the wrinkle need removing, the lower down slope edge of the wrinkle shall be cut, overlapped and repaired as described above. Both ends of the wrinkle repair shall be patched. Caution must be taken in removing any wrinkles. Wrinkles are needed to allow for future contraction of the geomembrane, especially in cold weather.

### 4.7 Liner Vents

- A. The attached schematic detail DF4A / C.DF4 depicts a typical vent. Vents shall be installed in accordance with manufacturer's recommendations as well as requirements and recommendations indicated on project design drawings.

### 4.8 Pipe Penetrations

- A. The attached schematic detail DF4B / C.DF4 depicts a pipe penetration. Pipe penetrations shall be installed in accordance with manufacturer's recommendations as well as requirements and recommendations indicated on project design drawings.

### 4.9 Final Earthwork, Backfilling and Equipment

- A. Backfilling of Anchor Trench: Promptly after installation of the FML, the anchor trench shall be backfilled by the earthwork contractor or the installer, as specified in the contract. Backfilling should occur when the geomembrane is in its most contracted (taut) state. Care must be taken when backfilling to avoid damage to the FML.
- B. Construction Equipment: Construction equipment or vehicles with steel tracks shall not be permitted directly on the geomembrane liner. Vehicles with rubber tires, without a tugged tread and with a loading of less than 6.0 lbs / in<sup>2</sup> weight are allowed, provided proper care is taken when operating the vehicle to avoid stressing the geomembrane. Other equipment such as portable generators shall be permitted if the support apparatus for the equipment protects the liner from being damaged.

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### 5.0 QUALITY ASSURANCE AND QUALITY CONTROL

#### 5.1 Materials:

- A. The FML installation contractor or quality control technician shall verify that the property values certified by the geomembrane manufacturer meet all of the specifications; that the measurements of properties by the geomembrane manufacturer are properly documented; and that the test methods used are acceptable.

#### 5.2 Field Seam Testing / Quality Control

- A. The end user company, or their designated representative, reserves the right of access for inspection of any or all phases of this installation at their expense.
- B. Qualifications of personnel: All personnel performing seaming operations shall be qualified by experience. At least one welder (Master Welder) shall be on site at all times during the seal welding process and have experience seaming a minimum of 5,000,000 ft<sup>2</sup> of geomembrane. The "Master Welder" shall provide supervision of the less experienced welding technicians during seaming, patching and testing operations.
- C. Testing of coupons (strips of material) before seaming, stress cracks and all seams must be done in accordance with the FML manufacture's requirements.
- D. Trial Welds / Seams:
  1. Four specimens, each 1" wide and 6" apart from each other shall be cut from the trial seam. Two of the specimens shall be tested in shear and two specimens tested in peel. Both shear and peel tests shall be conducted to the yield point of the geomembrane. When testing a fusion welded seam the outside (top) weld of a split-wedge weld should be considered the primary weld and shall be the weld tested in peel. The specimen must exhibit the following properties to pass:
    - a. Shear Test: Both specimens must meet or exceed the bonded seam strength values in shear of both specimens shall exhibit a bonded seam strength in shear that is greater than 90% of the minimum yield tensile strength of the parent material.
    - b. Peel Test: Both specimens must exhibit failure of the parent material or meet or exceed the bonded seam strength values in peel, or strength values shall be greater than 70% of the minimum yield tensile strength of the parent material.
  2. General seaming operations may proceed prior to the test being complete. Should a trial seam fail, a sample shall be removed 3 lineal feet from the start of the seaming operations and tested per the above. This procedure will be repeated and followed until a passing sample is located. All work preceding the passing sample shall be repaired.

## Specifications and QA / QC for HDPE Liners

### E. Non-Destructive Seam Continuity Testing

1. Concept: The FML installation contractor shall non-destructively test and document all field seams over their full length using an air pressure test or vacuum test. The purpose of non-destructive tests is to check the continuity of the seams.
2. The FML installation contractor shall:
  - a. Schedule all non-destructive testing operations.
  - b. Instruct the testing personnel regarding marking of repairs needed, leaks and sign-off marks on seams and repairs.
  - c. Monitor the operations of testing personnel to ensure that procedures for testing are followed.
3. On seams that cannot be non-destructively tested by vacuum or air-pressure methods due to physical constraints, (i.e. a boot detail) the seam shall be tested using other approved methods.
4. Vacuum Testing:
  - a. Equipment:
    - Vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft gasketing material attached to the bottom, a valve assembly and a certified vacuum gauge.
    - Vacuum pumping device. Including back-up device
    - Foaming agent in solution.
    - Equipment suitable for applying the foaming agent.
  - b. Procedure:
    - Wet the section of the seam with foaming agent.
    - Place the vacuum box over the wetted area.
    - Energize the pumping apparatus.
    - Obtain a minimum pressure of -5.0 psi.
    - For a period of approximately 10 seconds, observe, through the viewing window, for the presence of soap bubbles.
    - If no bubbles are observed, reposition the box on the next area for testing.
    - If bubbles are detected, mark and document location of the leak so repairs can be made.
5. Air Pressure Testing: The following procedures are applicable for seams produced by a double-fusion welding apparatus.

## Specifications and QA / QC for HDPE Liners

### a. Equipment:

- Air pump or air tank equipped with pressure gage and capable of producing pressures between 25 to 30 psi.
- Sharp hollow needle to insert the air into the air chamber of the seam.

### b. Testing Procedure:

- Installer will provide for approval a detailed seam testing map prior to the starting of seal tests.
- Seal both ends of the air channel in the seam to be tested.
- Insert the hollow needle into the air chamber at either end of the seam to be tested.
- Energize the air pump to a pressure between 25 and 30 psi and read pressure inserted into the chamber. Allow the pressure to stabilize and if necessary, re-pressurize to between 25 and 30 psi. Then record the pressure.
- Wait for a minimum of 5 minutes and then record the air pressure again.
- If the difference between the initial and the final pressure is greater than 4 psi the seam failed. Documentation required on all failed tests.
- Upon completion of all readings, open the opposite end of the seam with a needle. The escaping air will confirm that the entire length of the seam was pressurized and therefore tested.
- Upon passing the air pressure test, the seam shall be marked and documented.
- All Seam tests shall be witnessed by client or clients inspector.

### c. Procedure for Air Pressure Test Failure:

- While the seam air-channel is under pressure, traverse the length of the seam and listen for the leak. Once the area of the leak has been narrowed down, apply a soapy solution to the seam edge (do not trim excess material from edge of seam) and observe for bubbles formed by escaping air.
- As an alternative to the step above the seam may be re-tested in progressively smaller increments, until the area of leakage is identified.
- Repair the identified leaking area by extrusion welding the excess material at the edge of the seam and then vacuum test.
- In areas where the air channel is closed and the integrity of the weld is not suspect, vacuum testing is acceptable.

## F. Destructive Seam Testing

1. Concept: Destructive seam tests shall be performed at locations selected by client's inspectors. The purpose of these tests is to evaluate bonded seam strength. Seam strength testing shall be performed and documented as work progresses.
2. Location and Frequency: The minimum frequency of sample removal shall be one sample per 750 ft of seam. The location of the test sample will be taken no greater than 6" from the end of the seam. Additional test samples removal as requested by the client or client's inspector.

## Specifications and QA / QC for HDPE Liners

3. Size of Samples: The size of the sample for independent testing shall be 12" by minimal length with the seam centered lengthwise. The sample shall be cut into the following segments and distributed as follows:
  - a. The first segment cut shall be 12" x 12" marked with the appropriate D/S number and given to the AQ technician for testing.
  - b. The second segment, 12" x requested length (18" max) shall be marked with the appropriate D/S number and transmitted at the contractors cost to the independent testing laboratory or the quality assurance technician personnel for their dispersal.
4. Field Testing: The segments given to the quality assurance technician shall be tested in peel and in sheer using the following criteria:
  - a. Ten specimens of 1" width shall be cut from the segment.
  - b. Five of the specimens shall be tested in a peel configuration. The outside (top) weld of a split wedge weld shall be considered the primary weld and shall be the weld tested in peel.
  - c. Five of the specimens shall be tested in a shear configuration.
  - d. The geomembrane manufacturer shall supply a field tensiometer equipped with a drive / pull apparatus adjusted to a pull rate of 2"/min to 20"/ min and a means of measuring the strength of the sample.
  - e. Pass Fail Criteria: The installers sample will pass when:
    - The peel specimens exhibit failure of the parent material.
    - The bonded strength peel values shall be greater than or equal to 70% of the minimum yield tensile strength of the parent material.
    - The shear specimens display parent material failure.
    - If the bonded seam strength in shear values is not listed, the shear values shall be greater than or equal to 90% of the minimum yield tensile strength of the parent material.

Note: Locus of break determinations is to be in accordance with ANSI/NSF 54

    - Four out of five specimens meeting the above criteria constitute a passing test.
  - f. Procedure for Failing Tests:
    - Two samples of the same size shall be removed from the failed seam. The first sample shall be removed 10 lineal feet in front of the failed sample and the second shall be removed from behind the failed sample.
    - Label the samples A and B and test in accordance with procedures listed above.

## Specifications and QA / QC for HDPE Liners

- If both samples A and B pass, seam between the location of samples A and B shall have the flap extrusion welded or be capped and non-destructively tested accordingly.
- If either sample A or B fails, additional samples shall be taken a minimum distance of 10 feet away from the failed test location. Testing shall continue as outlined above until the area of incorrect seam is isolated.
- In lieu of taking an excessive number of samples, the installer may opt at their cost to extrusion weld the flap or cap for the entire length of the seam then non-destructively test the seam.
- All failing tests shall be documented and forwarded to the client or client's representative within 24 hours, along with recommendation of correction

### 5.3 Defects and Repairs

- A. Identification: All seams and non-seam areas of the polyethylene lining system shall be examined for defects in the seam or sheet.
- B. Identification of the defect may be made by marking on the sheet/seam with paint or other marks. The following procedure shall be followed:
  1. For any defect in the seam or sheet that is an actual breach (hole) larger than ¼" in the liner system, the installer personnel shall circle the defect and mark the letter "P" inside the circle. The letter "P" indicates that a patch is required.
  2. For any defect in the seam or sheet that is less than a ¼" hole, the installer personnel shall only circle the defect indicating that the repair method may be only an extruded bead and a patch may not necessarily be required. Repair methods will be at the sole discretion of the client and the client's qualified inspection representative.
- C. Unless otherwise specified, only the geomembrane installation contractor or quality assurance technician shall be permitted to mark on the liner system. The quality assurance technician shall use markings that are distinguishable from the geomembrane installation contractor markings.
- D. Verification of Repairs: Each repair shall be non-destructively tested in accordance with requirements of these specifications and manufacturer's recommendations. Once passing tests are achieved a marking shall be placed on the repair, indicating the test is complete and the area has passed the test. If defects remain, appropriate markings shall be made to clearly indicate that additional repairs are required.

### 5.4 Final Approval

- A. A final inspection of the completed liner will be conducted by the FML installation contractor, quality assurance technician and project manager / owner. This careful evaluation will occur before the Division of Water Quality is asked to approve the use of the lined lagoon. The purpose of the inspections is to verify the following:
  1. All repairs have been appropriately performed.

## Specifications and QA / QC for HDPE Liners

2. All test results are positive.
  3. Area is free of scrap, trash and debris.
  4. Anchor trench has been properly backfilled.
  5. Liner has been installed according to the requirements of these specifications, the project documents and the manufacturer's recommendations.
  6. Four (4) copies in three ring binders of all installation record documents will be required prior to final acceptance.
- B. Each liner material test, construction inspection checklist, data sheet, or narrative report will be preserved for inspection by the Division of Water Quality. Waste shall not be discharged into the digesters or equalization basins prior to the approval of the Division of Water Quality.

### 6.0 Warranty and Guarantee

- 6.1 The manufacture / Installer shall provide a written warranty in accordance with the requirements specified by the owner and / or design engineer.

CONSTRUCTION PERMIT ISSUED BY  
Utah Department of Environmental Quality  
Utah Division of Water Quality

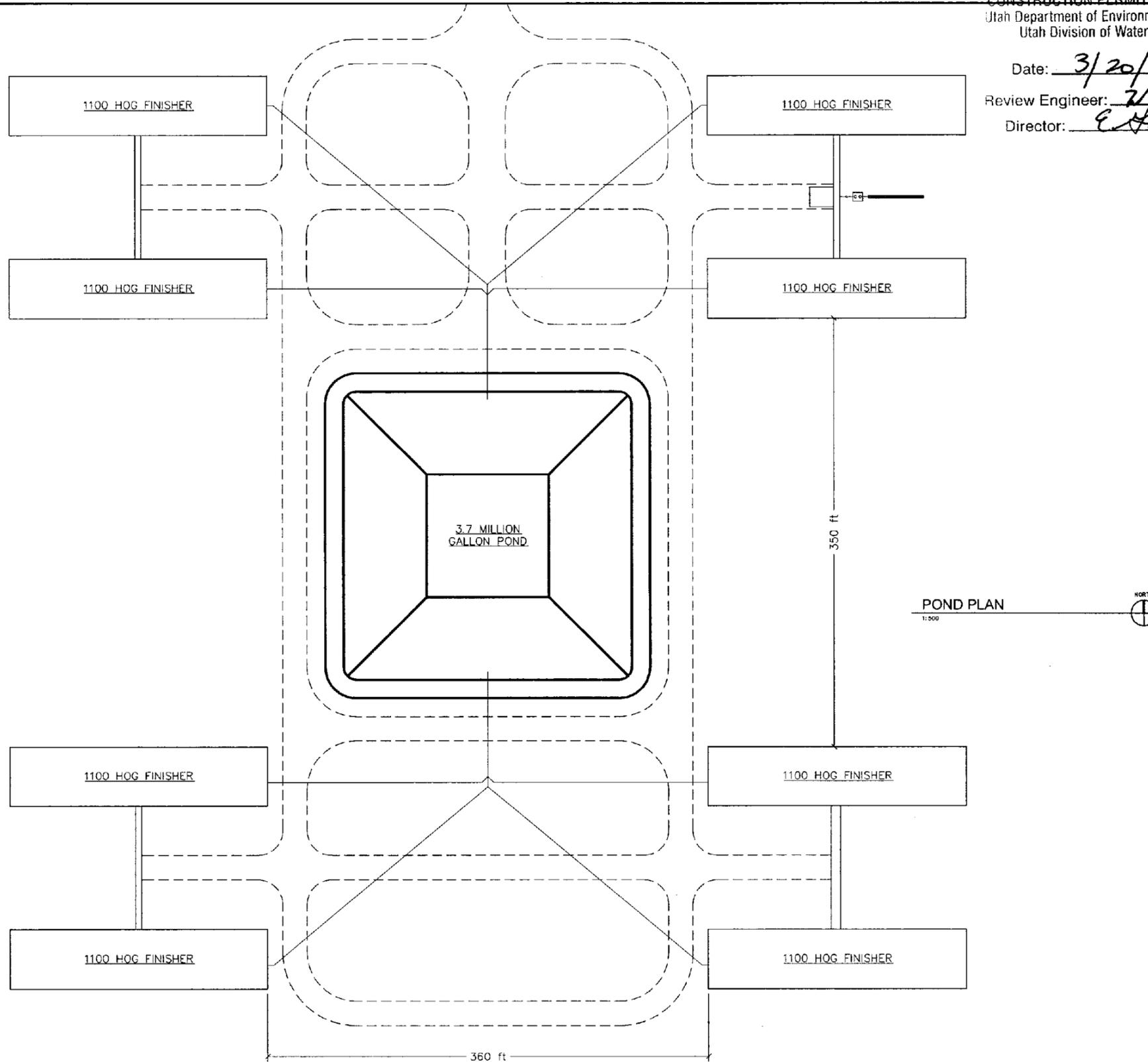
Date: 3/20/18

Review Engineer: RWC

Director: E. Haddis

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www.gemengineeringinc.com



TITLE  
**DALTON FINISHER SITE**

LOCATION:  
GARFIELD COUNTY, UTAH

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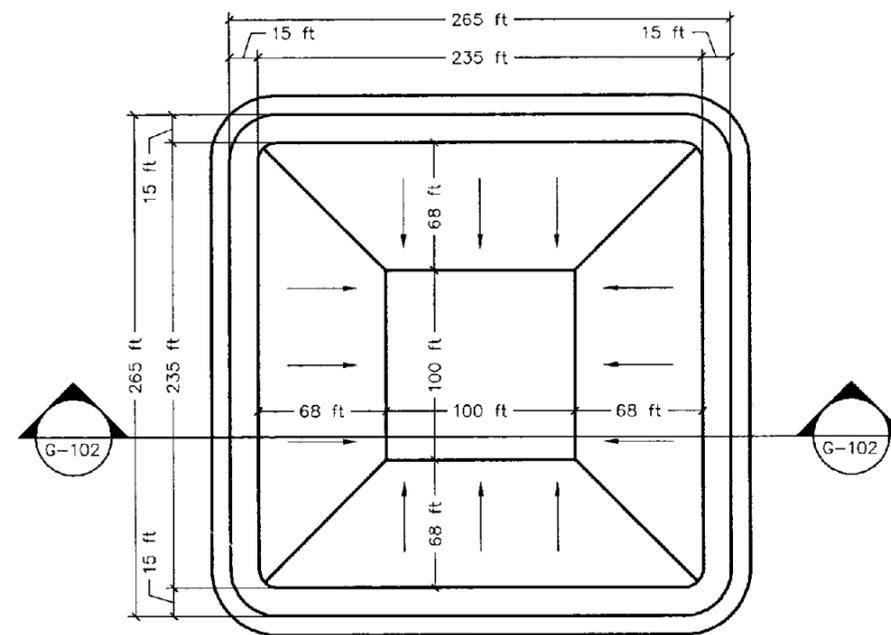
ISSUED REV NO.	DATE	DESCRIPTION

PROJ. MGR.:  
DESIGNER: RWC  
DRAWN BY: RWC

SCALE: REFER TO PLAN  
JOB NO.:

DRAWING TITLE:  
SITE PLAN

SHEET NO.  
G-001



POND PLAN  
1:400



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LOCATION  
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ISSUED REV. NO.	DATE	DESCRIPTION

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DESIGNER: RWC  
DRAWN BY: RWC

SCALE REFER TO PLAN

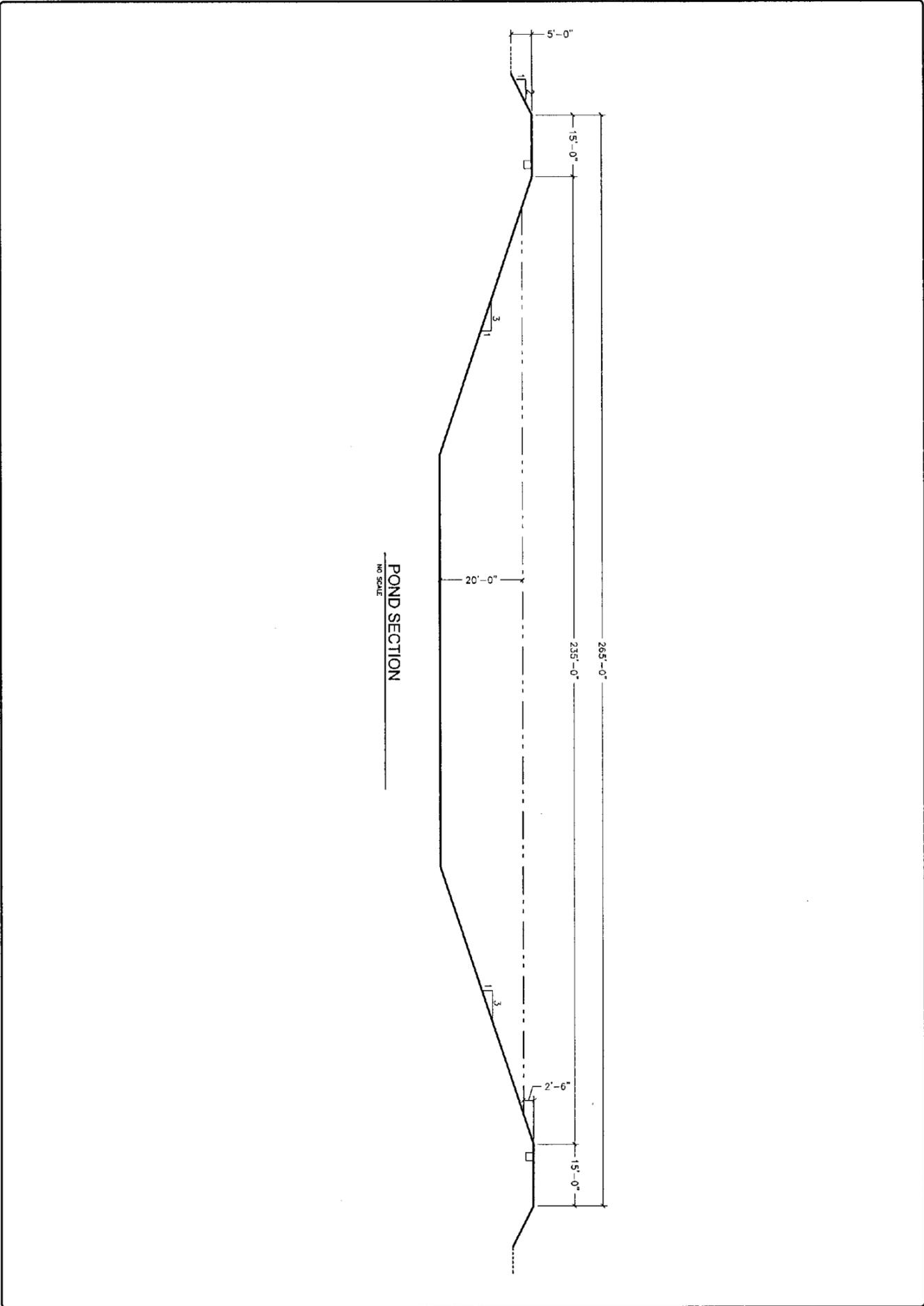
JOB NO. \_\_\_\_\_  
DRAWING TITLE  
POND PLAN AND  
MONITORING WELLS

SHEET NO.  
G-101

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LOCATION:  
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POND SECTION  
 NO SCALE

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ISSUED	DATE	DESCRIPTION

DESIGNED BY: BEER TOPLAN  
 DRAWN BY: BWC  
 SCALE: AS SHOWN  
 SHEET NO. G-102

MATERIAL LIST			
<p>THE SYMBOLS AND THE MATERIAL LIST ARE FOR THE CONVENIENCE OF THE CONTRACTOR. EACH CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF QUANTITIES AND SHALL FURNISH ALL MATERIAL REQUIRED, WHETHER SPECIFIED OR NOT, TO PROVIDE A SATISFACTORY WORKING SYSTEM.</p> <p>QUANTITY NUMBERS SHALL NOT BE CONSIDERED QUANTITIES, BUT ARE GIVEN ONLY TO AID THE CONTRACTOR IN THE SELECTION OF MATERIAL. NO MATERIAL SHALL BE ORDERED BY MANUFACTURER AND CALLED NUMBER ONLY. EACH CONTRACTOR SHALL FIRST READ THE COMPLETE DESCRIPTION OF THE MATERIAL ON THE QUANTITIES AND SPECIFICATIONS. THE FIRST NUMBER REFERRED TO IS THE TYPE OF COVER. THROUGH HOLES INDICATES FACTORY FINISH COLORS AVAILABLE AT NO ADDITIONAL CHARGE.</p> <p>WHERE SEVERAL DEVICES ARE CALLED TOGETHER, THE PART SHALL BE OF THE CALLED STYLE FOR THE NUMBER OF DEVICES SHOWN.</p>			
ITEM	SYMBOL	DESCRIPTION	APPROVED MFG.
1	CONDUIT	ALL CONDUIT SHALL BE RIGID PVC SCHEDULE 40 UNLESS OTHERWISE NOTED. ELECTRICAL CONTRACTOR SHALL ALLOW FOR EXPANSION AND CONTRACTION.	
2	D	PANEL BOARD SURFACE MOUNT, 120/240 VOLT, 1 PHASE, 3 WIRE, 5/8" GROUND BUS PLUG-IN BREAKERS, COPPER BUS N.E.M.A. 3R ENCLOSURE. SEE ONE-LINE DIAGRAM AND PANEL SCHEDULE.	SQUARE D 00
3	PANEL B1, B2, B3, B4	PANEL BOARD SURFACE MOUNT 120/240 VOLT, 1 PHASE, 3 WIRE, 5/8" GROUND BUS PLUG-IN BREAKERS, COPPER BUS N.E.M.A. 3R ENCLOSURE. SEE ONE-LINE DIAGRAM AND PANEL SCHEDULE. 1/4" 42 SPACE PANEL.	SQUARE D 00
4	50	SWITCH TOGGLE HANDLE, MAINTAINED CONTACT, SINGLE POLE, SINGLE THROW, SPECIFICATION GRADE SIDE AND BACK WIRE, 20 AMP, 120/277 VOLT, UL LISTED.	
5	55	SWITCH DOUBLE TOGGLE HANDLE, MAINTAINED CONTACT, SINGLE POLE, SINGLE THROW SPECIFICATION GRADE SIDE AND BACK WIRE, 20 AMP, 120/277 VOLT, UL LISTED, COMPLETE WITH A WEATHERPROOF DEVICE COVER.	
6		RECEPTACLE, DUPLEX, 125 VOLT, 20 AMP, 3 WIRE GROUNDING TYPE, NYLON OR POLYCARBONATE FACE, STRAIGHT BLADE, N.E.M.A. 5-20R, U.L. LISTED. COMPLETE WITH WEATHERPROOF DEVICE COVER AND MOUNTED IN A 15 PVC BOX. COMPLETE WITH PVC SINGLE GANG N.E.M.A. 3R IN USE COVER.	EAGLE LEVITON #C581-20 PASS & SEYMOUR BRYANT #15000 OR EQUAL
7		RECEPTACLE, SIMPLEX, 125 VOLT, 15 AMP, 3 WIRE GROUNDING TYPE, NYLON OR POLYCARBONATE FACE, STRAIGHT BLADE, N.E.M.A. 5-15R, U.L. LISTED. COMPLETE WITH WEATHERPROOF DEVICE COVER AND MOUNTED IN A 15 PVC BOX. COMPLETE WITH PVC SINGLE GANG N.E.M.A. 3R IN USE COVER.	EAGLE LEVITON #E581-15 PASS & SEYMOUR BRYANT #15005 OR EQUAL
8		RECEPTACLE, SIMPLEX, 250 VOLT, 50 AMP, SPECIFICATION GRADE, 2 POLE, 3 WIRE GROUNDING TYPE, BROWN NYLON OR POLYCARBONATE FACE, STRAIGHT BLADE, N.E.M.A. 6-50R, U.L. LISTED. COMPLETE WITH WEATHERPROOF DEVICE COVER AND MOUNTED IN A 15 PVC BOX. COMPLETE WITH PVC N.E.M.A. 3R IN USE COVER.	HUBBELL #5861 BRYANT EAGLE LEVITON #5861-50 PASS & SEYMOUR BRYANT #15000 OR EQUAL
9		FUSED ELECTRICAL DISCONNECT SWITCH, ON/OFF OPERATOR, CORROSION-RESISTANT PVC ENCLOSURE, WEATHERPROOF AND WATERPROOF RATED FOR 1 HP AT 240 VOLTS SCREW IN TYPE PLUG FUSE. SIZE FUSES PER MOTOR FULL LOAD AMPS.	FARITEK #E2400 OR EQUAL
10	VDP	PANELBOARD SURFACE MOUNT, 120/240 VOLT, 1 PHASE, 3 WIRE, 5/8" GROUND BUS 400 AMP BOLT-ON BREAKERS N.E.M.A. 3R ENCLOSURE, SURFACE MOUNT, SEE ONE LINE DIAGRAM.	CUTLER HAMMER
11		RECEPTACLE, DUPLEX, 125 VOLT, 20 AMP, 3 WIRE GROUNDING TYPE, NYLON OR POLYCARBONATE FACE, STRAIGHT BLADE, N.E.M.A. 5-20R, U.L. LISTED, INSTALL IN SINGLE GANG BOX AND COVER.	LEVITON #C581-20 PASS & SEYMOUR BRYANT EAGLE
12		RECEPTACLE, DOUBLE DUPLEX, 125 VOLT, 20 AMP, 3 WIRE GROUNDING TYPE, NYLON OR POLYCARBONATE FACE, STRAIGHT BLADE, N.E.M.A. 5-20R, U.L. LISTED, INSTALL IN COMMON SURFACE MOUNTED BOX COVER.	LEVITON #C620 PASS & SEYMOUR BRYANT EAGLE
13		RECEPTACLE, DUPLEX, 250 VOLT, 50 AMP, 2 POLE, 3 WIRE GROUNDING TYPE, BROWN NYLON OR POLYCARBONATE FACE, STRAIGHT BLADE, N.E.M.A. 6-50R, U.L. LISTED, COMPLETE WITH BOX AND COVER.	HUBBELL #5861 BRYANT EAGLE LEVITON #5861-50 PASS & SEYMOUR
14		THERMOSTATIC SWITCH FOR SPLIT CURTAIN CONTROL.	*
15		JUNCTION BOX 12" x 12" x 6"	* (OPTIONAL MATERIAL)
16		GRADE LEVEL MANUAL TRANSFER SWITCH, 400 AMP MAIN CONTACTS AND 400 AMP AUXILIARY CONTACTS 600 VOLT, 3 POLE FOR SWITCHING OF NEUTRAL (THREE PHASE DOUBLE THROW, RATED FOR USE OUTDOORS (ONLY REQUIRED FOR SITES WITH EMERGENCY POWER))	ROHM #7808 OR EQUAL EMERGENCY POWER
17		FORWARD/REVERSE SWITCH FOR SCRAPER MOTOR.	*
18		TIME CLOCK (5 MINUTE) FOR SCRAPER	*
19		TWO SOLENOID VALVES	*
20		DISCONNECT SWITCH, FUSED, 240 VOLT, 2 POLE, 400 AMP, SOLID NEUTRAL, GROUND LUG, N.E.M.A. 3R, INSTALL 2-350 AMP RK-1 FUSE, N.E.M.A. 3R, INSTALL 2-350 AMP RK-1 FUSE.	SQUARE D #2250R SIEMENS CUTLER HAMMER
21		LIQUID LEVEL SENSOR	

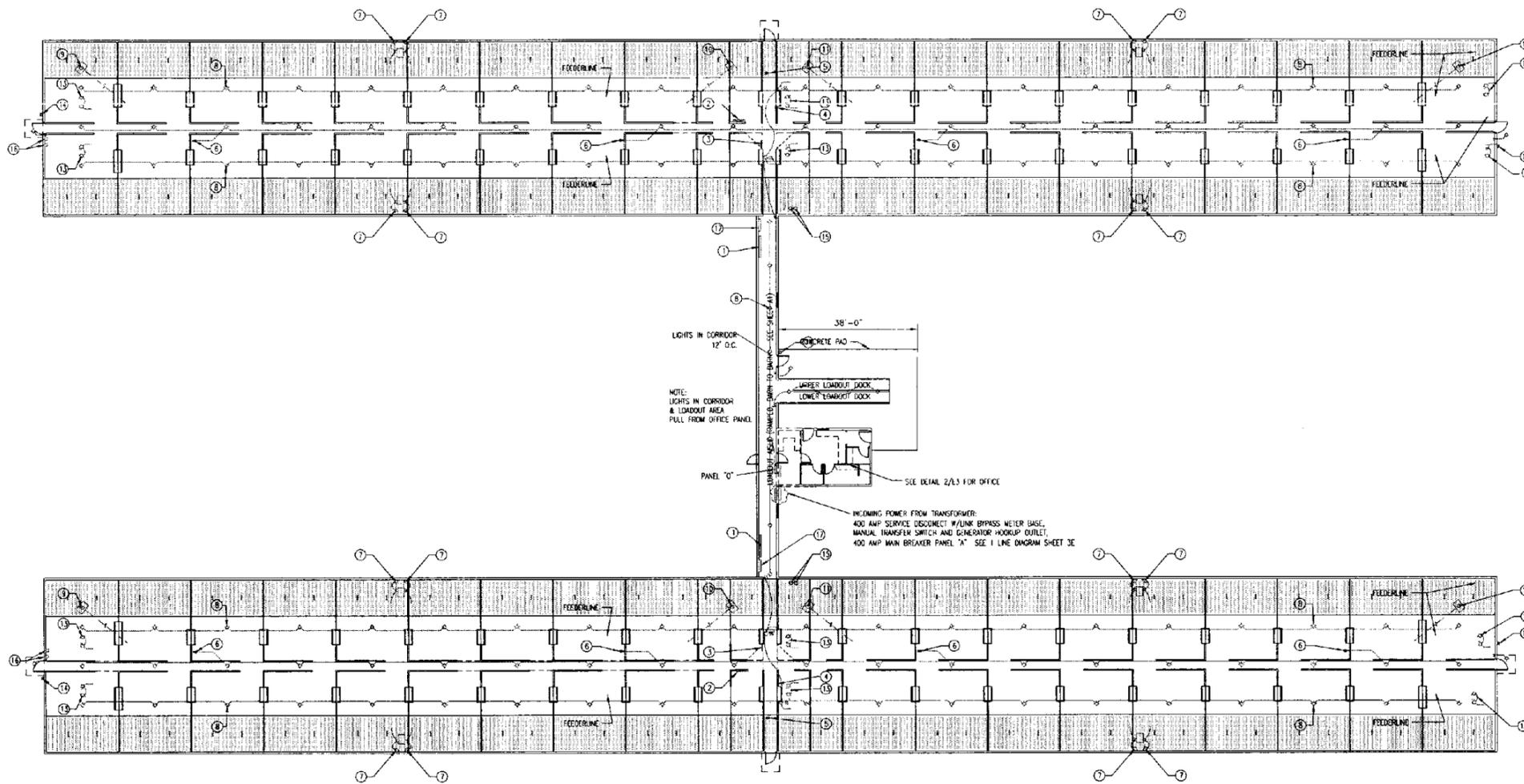
ELECTRICAL INSTALLATION KEY	
1. (1/2000)	INDICATES DETAIL NUMBER/SHEET NUMBER.
2. (05/1)	INDICATES MATERIAL LIST ITEM IN KEY SYMBOL.
3. ( )	INDICATES KEY NOTE USED TO DESCRIBE ADDITIONAL INFORMATION OF WORK REQUIRED. SPECIFIC TO THE SHEET IT IS SHOWN ON.
4.	SHARDED FEATURE INDICATES NIGHT LIGHT WITH CONNECTION TO EMERGENCY CIRCUIT.
5.	ALL ELECTRICAL CONDUCTORS SHALL BE COPPER UNLESS OTHERWISE NOTED.
6.	INDICATES NUMBER OF WIRES IN CONDUIT. (Ground, Neutral, Phase)
7.	SUBSCRIPT KEY: a. RECEPTACLES b. MOUNTED FACE DOWN ON BOTTOM CHORD OF ROOF TRUSS c. RECEPTACLES INSTALLED INSIDE OFFICE ONLY d. REFER TO MATERIAL LIST AND FOR FULL DESCRIPTIONS AND MANUFACTURERS OF ALL DEVICES.
8.	ABBREVIATION KEY: EC ELECTRICAL CONTRACTOR GC GENERAL CONTRACTOR MC MECHANICAL CONTRACTOR AFF ABOVE FINISH FLOOR C CONDUIT N/C NOT IN CONTRACT TYP TYPICAL UG UNDERGROUND MOUNTING HEIGHT FROM FINISHED FLOOR TO CENTERLINE E.C. ELECTRICAL CONTRACTOR MTC MOUNTING MTR MOTOR
<p>NEW WORK BY THIS CONTRACTOR (DARK SOLID LINE)</p> <p>NEW WORK UNDERFLOOR OR UNDERGROUND BY THIS CONTRACTOR (DARK LONG DASHED LINE)</p> <p>NEW WORK BY OTHERS (LIGHT SOLID LINE)</p> <p>INDICATES DEVICE ENCLOSURE</p>	

ELECTRICAL INSTALLATION NOTES	
1.	CONTRACTOR SHALL COORDINATE INSTALLATION LOCATION OF CONDUIT, WIRING, AND ELECTRICAL EQUIPMENT LOCATION WITH OTHER TRADES.
2.	ALL WIRING INSIDE BUILDING SHALL BE THIN COPPER. ALL FEEDER WIRING AND INCOMING SERVICE SHALL BE ALUMINUM UNDERGROUND SERVICE ENTRANCE (USE) WITH XLP INSULATION.
3.	THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPERATURE CONTROL WIRING AND TERMINATIONS.
4.	ALL RACEWAY INSIDE THE FINISH BUILDINGS SHALL BE IN PVC SCHEDULE 40 CONDUIT UNLESS NOTED OTHERWISE.
5.	ALL WIRING SHALL BE LABELED WITH WIRE MARKERS AT ALL SERVICE LOCATIONS (I.E. JUNCTION BOXES, PANELS, DISCONNECT SWITCHES, UNIDIC SWITCHES). UNIQUE NUMBERS SHALL BE ASSIGNED FOR EACH DEVICE AND UTILIZED FOR ALL BUILDINGS.
6.	ALL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE. ALL INSTRUCTIONS ARE MEANT AS A GUIDE AND IS NOT MEANT TO REPLACE THE NATIONAL ELECTRICAL CODE.
7.	ELECTRICAL EQUIPMENT AND INSTALLATION OF ALL ELECTRICAL MATERIAL, INSIDE THE FINISH BUILDINGS, SHALL BE WEATHERPROOF. CONDUIT, FITTINGS, BOXES, COVERS, SEAL JOINTS, ETC. SHALL BE INSTALLED SO THAT WATER CAN NOT PENETRATE INTERIORS DURING WASH DOWN AND WATER SPRAY APPLICATIONS. WEATHER TIGHT CONNECTORS ON COMMUNICATIONS DEVICES SHALL BE TIGHTENED TO PREVENT MOISTURE PENETRATION.
8.	THE ENTIRE INSTALLATION SHALL BE GUARANTEED BY THIS CONTRACTOR.
9.	ALL ELECTRICAL EQUIPMENT SHALL BE SURFACE MOUNTED.
10.	A GREEN INSULATED GROUND CONDUCTOR SHALL BE INSTALLED IN ALL CIRCUITS TO ALL DEVICES INSIDE BUILDINGS.
11.	ALL WALL MOUNTED SWITCHES AND RECEPTACLES SHALL BE INSTALLED AS NOTED.
12.	ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN WALLS, OPENINGS SHALL BE SEALED.
13.	ELECTRICAL CONTRACTOR SHALL PROVIDE A PERMANENT CIRCUIT DIRECTORY FOR EACH PANEL.
14.	THE CONTRACTOR SHALL SELECT AND PURCHASE THE SAME NAME BRAND MATERIAL FOR ALL BUILDINGS AT ALL SITES.
15.	CIRCUIT NUMBERS ARE SHOWN FOR CIRCUIT IDENTIFICATION. CIRCUITING SHALL AGREE WITH NUMBERING ON THE PANEL PROVIDED.

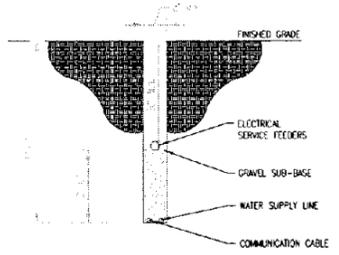
SPECIFICATIONS - ELECTRICAL	
1.	PROVIDE ALL MATERIALS AND LABOR AS REQUIRED FOR A COMPLETE INSTALLATION.
2.	PROVIDE UNDERGROUND SERVICE FROM METER TO OFFICE.
3.	PROVIDE UNDERGROUND SERVICE FROM OFFICE TO BARNS W/ 200 AMP PANEL.
4.	PROVIDE ALL LIGHTS INCLUDING EXTERIOR LIGHTING, MOTOR WIRING, CHIMNEY ACTUATOR WIRING, CURTAIN OPERATOR WIRING, HEATER CONNECTIONS, OUTLETS, CONTROLLER POWER, INSTALLATION OF LOW VOLTAGE WIRING (SEPARATE MIN. 12" IF PLACED IN SAME TRUNCH AS POWER CABLE) MOUNT & ALARM. PLACEMENT OF CONTROLLER SENSORS, AUTOMATIC CURTAIN DRAIN TUBULET AND ALL OTHER ITEMS SHOWN ON DRAWINGS FOR A COMPLETE INSTALLATION.
5.	BACKFILL ALL TRENCHES AND COMPACT PRIOR TO LEAVING SITE.
6.	1-800-CALL CONTRACTOR IS RESPONSIBLE TO CONTACT THE PUBLIC UTILITIES TO ASCERTAIN THE LOCATION OF ANY PUBLIC UTILITY LINES INCLUDING PIPELINES, ELECTRICAL LINES, WATER LINES, TILE LINES, TELEPHONE LINES, AND SEWER LINES PRIOR TO TRENCHING.
7.	CONTRACTOR IS RESPONSIBLE FOR THE COST OF REPAIR TO ANY UTILITY LINES INCLUDING PIPELINES, ELECTRICAL LINES, WATER LINES, TILE LINES, TELEPHONE LINES, AND SEWER LINES IF DAMAGED WHEN TRENCHING.
8.	CONTRACTOR TO FURNISH TO CUSTOMER PROOF OF GENERAL LIABILITY AND WORKMAN'S COMPENSATION CLEARANCE PRIOR TO COMMENCING WORK.
9.	COMPLETELY CLEAN UP SITE OF ITEMS AND DEBRIS RELATED TO YOUR WORK. ALL WORK TO BE DONE IN A WORKMAN LIKE MANNER AND SITE KEPT FREE OF TRASH, DEBRIS AND HAZARDOUS FLUIDS SUCH AS DIESEL, HYDRAULIC, MOTOR OIL, ETC.
10.	CONTRACTOR RESPONSIBLE FOR WEATHER RELATED PROTECTION.

LIGHTING FIXTURE SCHEDULE									
MOUNTING (MTC) KEY: RE - RECESSED SP - SUSPENDED CL - CEILING SURFACE NL - WALL UC - UNDERCABINET CV - COVE PL - POLE O - OTHER (SEE REMARKS)	LAMP TYPE KEY: CF - COMPACT FLUORESCENT IN - INCANDESCENT HS - HIGH PRESSURE SODIUM MH - METAL HALIDE MV - MERCURY VAPOR LV - LOW VOLTAGE O - OTHER (SEE REMARKS)	MOUNTING (MTC) KEY: RE - RECESSED B - BLACK MILLIGROOVE C - CLEAR ALUMINUM D - PARABOLIC E - COLD ALUMINUM F - FRESHWELL	LENS/COVER (L/L) KEY: A - 125' ACRYLIC G - TEMPERED GLASS H - WALL WASHER N - NONE O - OTHER SEE REMARKS						
CATALOG NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND CATALOG NUMBER ONLY. FIRST READ THE COMPLETE DESCRIPTION, NOTES AND REMARKS AND THE SPECIFICATION IN COORDINATION WITH CATALOG NUMBER TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED.									
ALL LAMPS FOR THIS PROJECT SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED.									
REFER TO SPECIFICATION SECTION 16510 FOR LAMP AND BALLAST REQUIREMENTS, SHOP DRAWING SUBMITTAL REQUIREMENTS, AND ADDITIONAL INFORMATION.									
FIXT. NO.	DESCRIPTION	FIXT. SIZE	MTC	TYPE	QUANTITY AND SIZE	VOLT	L/L	MANUFACTURER	REMARKS
F2	GLASS GLOBE FRUIT JAR TYPE	5"	CL/NL	BASE UP	1-15W A-LAMP	120		CARLON #E6000B E6000LB OR EQUAL	COMPLETE WITH GLASS GLOBE MOUNTING BOX
F3	OUTDOOR		CL/NL	BASE UP	2-PAR 38	120		CARLON #P810D OR EQUAL	COMPLETE WITH LAMPS

No.	Revisions	Date	By	No.	Revisions	Date	By	Reference Dwg.	Smithfield Hog Prod. 341 South Main Milford, UT 84752 Phone: (435) 387-2107	Project Title: 4400 HEAD H BARN	Project Location:	Drawn By: T. BLACKNER	Scale:
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1 ELECTRICAL FLOOR PLAN  
 E2 SCALE: 1/16" = 1'-0" NORTH



2 UTILITY TRENCH DRAIN (TYPICAL)  
 E2 SCALE: 1/2" = 1'-0"

- PLAN DETAIL NOTES**
- 1 EDGE VENTILATION CONTROL PANEL @ 60" A.F.F. SEE SHEET #1
  - 2 GAS CONTROL PANEL
  - 3 WEST LINEAR ACTUATOR FOR CHIMNEY DAMPER, 120V 15A 1/2" LOCATED ON EAST SIDE OF RAFTER #77 - NOTE FULL OPEN OR FULL CLOSE LINEAR ACTUATOR TRAVEL TIMES MUST BE 45 SECONDS
  - 4 EAST LINEAR ACTUATOR FOR CHIMNEY DAMPER, 120V 15A 1/2" LOCATED ON WEST SIDE OF RAFTER #77 - NOTE FULL OPEN OR FULL CLOSE LINEAR ACTUATOR TRAVEL TIMES MUST BE 45 SECONDS
  - 5 CURT-O-MATIC OUTLET 115V
  - 6 120V, 15A SIMPLEX OUTLET
  - 7 CURTAIN MOTOR AND DISCONNECT, REFER TO CURTAIN MACHINE DETAIL 1/53
  - 8 WEATHERPROOF LIGHT FIXTURE, 100W INCANDESCENT (TYP.)
  - 9 120V, 15A UNIT HEATER, LOCATE ON EACH RAFTER RESPECTIVELY - SEE NOTE 2
  - 10 240V, 20A FEEDLINE MOTOR - SEE NOTE 4
  - 11 250V, 50A SIMPLEX OUTLET FOR POWER WASHER
  - 12 WATER SOLENOIDS: 1 - SPRAY COOL, 2 - WASH DOWN
  - 13 SCRAPER - SEE NOTE 5 AND DETAIL 4/13
  - 14 PANEL B1 - SEE DETAIL 2/14

- ELECTRICAL SHEET**
1. AIR SENSORS ARE TO BE LOCATED ALONG THE CENTER LINE OF THE 14th & 38th TRUSS IN FROM EACH END OF WALL, ON BOTH SIDES OF CENTER ISLE. THE SENSORS SHOULD BE INSTALLED APPROXIMATELY 8'-0" IN FROM ISLE BURN WALL AND SHOULD EXTEND 18" DOWN FROM THE BOTTOM OF THE LOWER ROOF TRUSS CHORD. AIR SENSORS SHALL BE INSTALLED A MINIMUM OF 24" FROM LIGHTING FIXTURES.
  2. HEATERS ARE TO BE PLACED IN FROM THE END WALL BETWEEN THIRD AND FOURTH AND FOURTY-FOURTH AND FOURTY-NINTH RAFTERS. INSTALL RECEPTACLE FOR UNIT HEATER ON RAFTER CHORD. (HEATER INTERNAL THERMOSTAT WIRES MAY BE TIED TOGETHER TO OPERATE.)
  3. FASTEN THE OUTSIDE SENSOR TO SOFFIT SCREEN, AND PROTECT FROM BIRDS.
  4. ABSOLUTE DISCONNECT FOR THE FEED MOTORS TO BE MOUNTED ON THE RAFTER CHORD.
  5. MASTER P1 ELECTRICAL BOARD IN EACH BUILDING LOCATED AT THE NEAREST END TO THE SLURRYSTORE SCRAPER CONTROL CIRCUIT TO INCLUDE RECEPTION PIT TIME CLOCK, FORWARD/REVERSE CONTROLLER AND PUMP SWITCHES. RECEPTION PIT SWITCHES MOUNTED ON 1 BOARD ONLY CLOSEST TO THE RECEPTION PIT AREA.
  6. ABSOLUTE DISCONNECT SWITCH FOR ACTUATORS TO BE MOUNTED ON RAFTER CHORD.
  7. ALL ARROW LEADERS POINTING TO NOTHING INDICATE THE DIRECTION OF THE WIRE HANGING.
  8. THE POWER WASHER AND THE SCRAPER SHALL BE HOOKED UP DIRECT TO PANEL "B1" AND NOT THRU THE CONTROL PANEL.
  9. RECEPTACLES NOTED WITH "B" MOUNTED FACE DOWN ON BOTTOM CHORD OF ROOF TRUSS. RECEPTACLES NOTED WITH "O" INSTALLED INSIDE OFFICE ONLY. REFER TO DWG. #2266-1-96 FOR DESCRIPTIONS AND MANUFACTURERS OF ALL DEVICES.
  10. COMMUNICATIONS CABLE MUST BE RUN SEPARATED FROM LINE VOLTAGE CABLES BY 24" MINIMUM. CROSS ALL LINE VOLTAGE CABLES AT 90°.
  11. CURTAIN DROP AND HEATERS MAY NOT SHARE THE SAME OUTLET.
  12. ALL MOTOR DISCONNECTS MUST BE THE CORRECT POLE TO ENSURE COMPLETE SHUT OFF OF ALL POWER TO MOTORS.

- SITE ELECTRICAL NOTES**
1. NORTH ORIENTATION OF SITE AND BUILDING NUMBERING MAY VARY.
  2. SEE SHEET E2 FOR WIRE SIZE REQUIREMENTS.
  3. SEE SHEET E2 FOR GROUNDING PROCEDURES.
  4. ALL FINISHING BUILDINGS ARE 48'-6" x 40'-0". THE CONTROL PANELS ARE LOCATED IN THE APPROXIMATE CENTER OF EACH BUILDING.
  5. THE MINIMUM DISTANCE BETWEEN BURIED COMMUNICATION CABLE AND ELECTRICAL LINES IS 24". THE PREFERRED METHOD OF PLACING THE COMMUNICATION CABLE IS IN UNDISTURBED SOIL, BACK FILLING SHOULD BE WITHOUT ROCK AND GARBAGE CLODS.
  6. PROVISIONS MUST BE MADE TO ALLOW FOR ENOUGH CABLE TO EXTEND UNBURIED TO THE CENTER OF THE BUILDING PLUS A 4'-0" MINIMUM SURPLUS LOOP. ALLOWABLE FOOTAGE MUST INCLUDE EXTENDING UP THE WALL AND ACROSS BUILDING AND DOWN TO THE JUNCTION BOX, PLUS SURPLUS.
  7. ALL ELECTRIC IS MOUNTED MIN. 5'-0" ABOVE FLOOR.

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Project Title: 4400 HEAD H BARN

Project Location:

Sheet Title: ELECTRICAL FLOOR PLAN

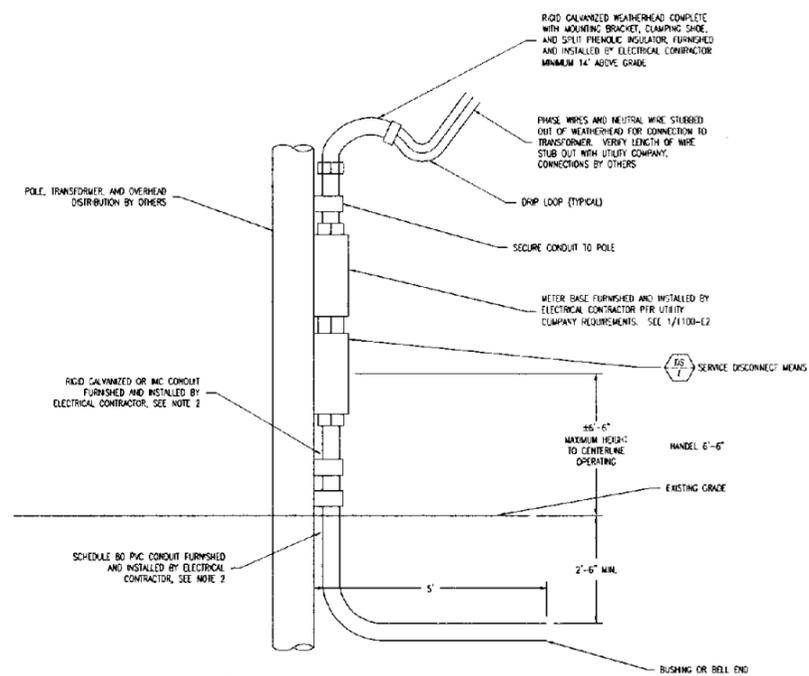
Sheet Group: E2

Drawn By: T. BLACKNER

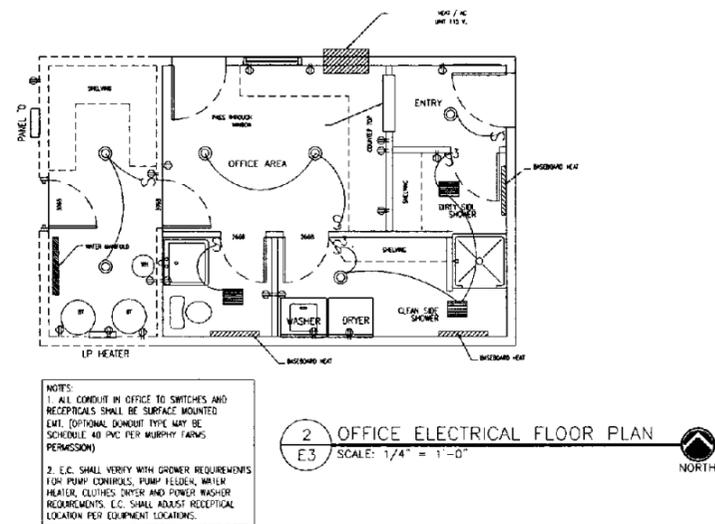
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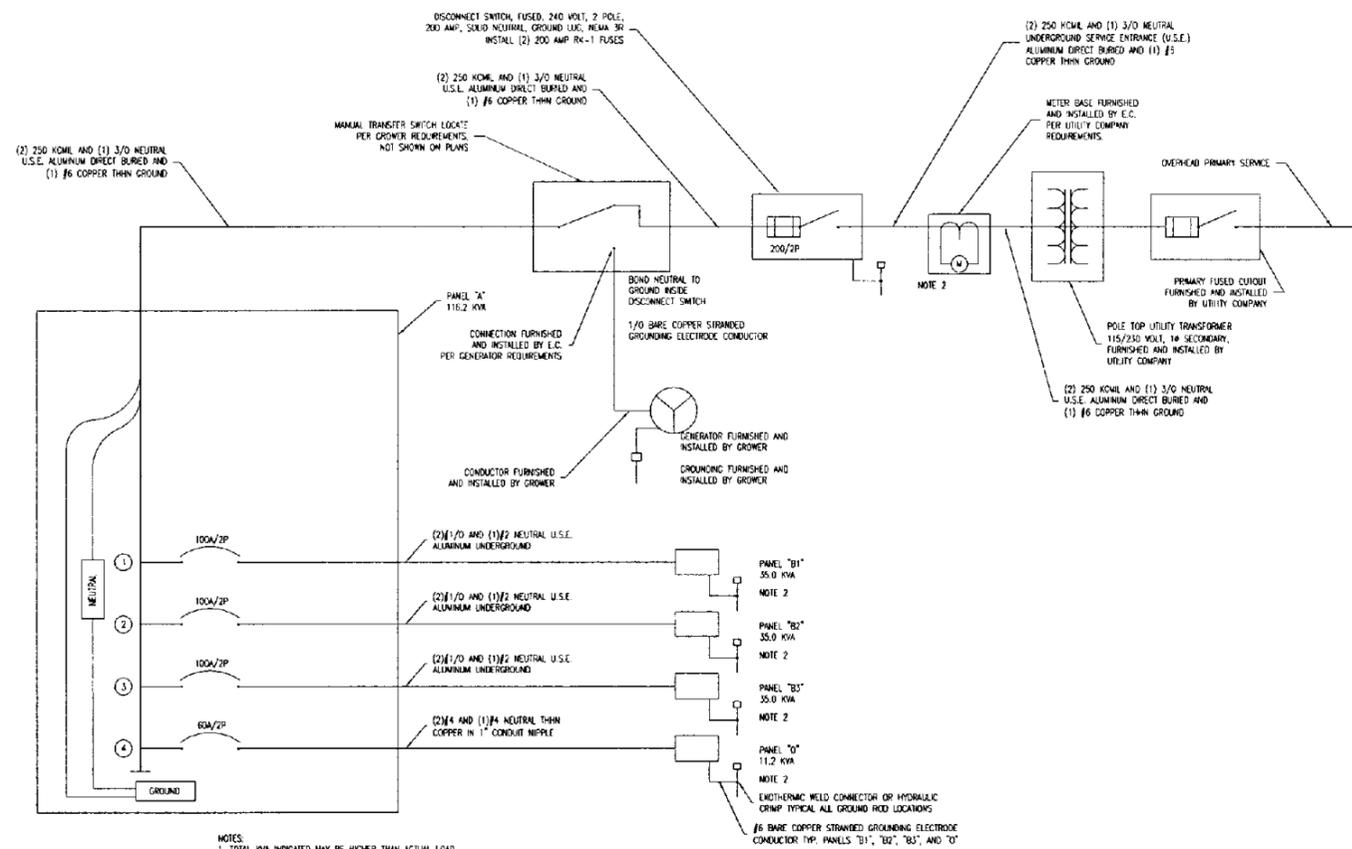
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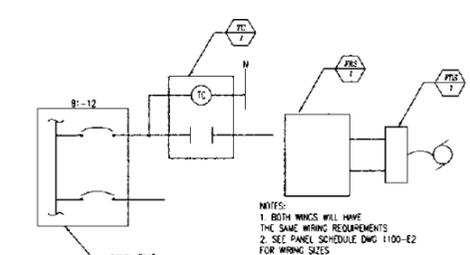
1 TYPICAL POLE TOP WEATHER HEAD  
E3 SCALE: N.T.S.



2 OFFICE ELECTRICAL FLOOR PLAN  
E3 SCALE: 1/4" = 1'-0"



3 ONE LINE DIAGRAM  
E3 SCALE: N.T.S.



4 SCRAPER MOTOR WIRING DIAGRAM  
E3 SCALE: N.T.S.

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Project Title:  
**4400 HEAD H BARN**

Sheet Title:  
**ELECTRICAL POWER SCHEMATICS**

Project Location:  
**2651 E3**

Sheet Group:  
**2651 E3**

Drawn By:  
**T. BLACKNER**

Checked By:

Date Drawn:

Scale:  
**of**

Sheet #:

Site Name: Pinnacle 9200 Head Ste 9-6 2017

Expansion box # Barn 1

Note: Cards in box will likely need to be moved to match this layout

Type of expansion box: 6 slots

Notes: West Zone (New Card)

Notes: Middle Zone (New Card)

Notes: East Zone (New Card)

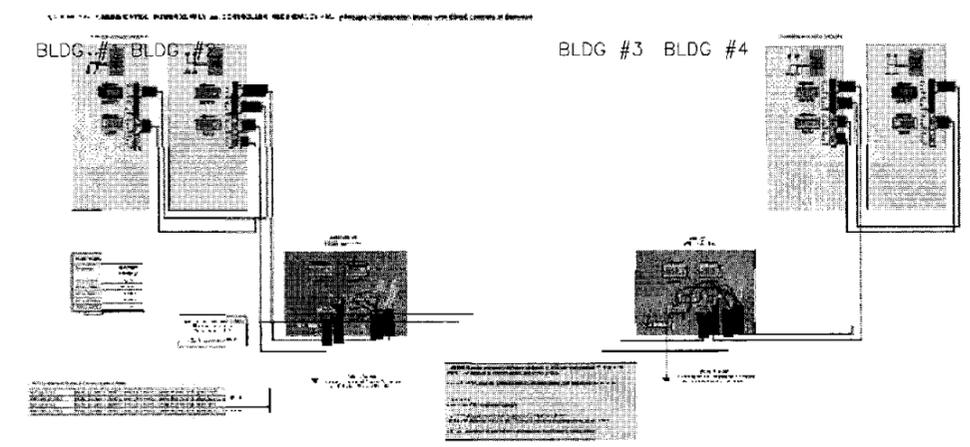
Notes: Empty

Notes: Empty

Notes: Empty

Slot #1		Slot #2		Slot #3		Slot #4		Slot #5		Slot #6	
4 inputs, 8 relays FAILSAFE (type H)		4 inputs, 8 relays FAILSAFE (type H)		4 inputs, 8 relays FAILSAFE (type H)		4 inputs, 8 relays (1 type AI)		Empty		Empty	
IN 1	Room Probe 1 (NW)	IN 1	Room Probe 2 (NW)	IN 1	Room Probe 3 (NE)	IN 1	Brooder 1 Probe 1				
IN 2	Room Probe 4 (SW)	IN 2	Room Probe 5 (SM)	IN 2	Room Probe 6 (SE)	IN 2	Brooder 2 Probe 1				
IN 3	Water Meter	IN 3		IN 3		IN 3					
IN 4	Outside Probe	IN 4		IN 4		IN 4					
R 1 NC		R 1 NC		R 1 NC	Curtain 3 (NE) -- Open	R 1	Brooder 1 -- Low Fire				
R 1 NO	Curtain 1 (NW) -- Open	R 1 NO	Curtain 2 (NW) -- Open	R 1 NO	Curtain 3 (NE) -- Close	R 2	Brooder 1 -- High Fire				
R 2 NO	Curtain 1 (NW) -- Close	R 2 NO	Curtain 2 (NW) -- Close	R 2 NO	Curtain 3 (NE) -- Close	R 3	Brooder 2 -- Low Fire				
R 2 NC		R 2 NC		R 2 NC		R 4	Brooder 2 -- High Fire				
R 3 NC		R 3 NC	Chimney 1 (C) -- Open	R 3 NC		R 5	Soaker				
R 3 NO	Chimney 1 (W) -- Open	R 3 NO	Chimney 2 (C) -- Close	R 3 NO	Chimney 3 (E) -- Open	R 6	Mist				
R 4 NO	Chimney 1 (W) -- Close	R 4 NO	Chimney 2 (C) -- Close	R 4 NO	Chimney 3 (E) -- Close	R 7	Night Lights				
R 4 NC		R 4 NC		R 4 NC		R 8	Heater 4				
R 5 NC	Curtain 4 (SW) -- Open	R 5 NC		R 5 NC							
R 5 NO		R 5 NO	Curtain 5 (SC) -- Open	R 5 NO	Curtain 6 (SE) -- Open						
R 6 NO	Curtain 4 (SW) -- Close	R 6 NO	Curtain 5 (SC) -- Close	R 6 NO	Curtain 6 (SE) -- Close						
R 6 NC		R 6 NC		R 6 NC							
R 7 NC		R 7 NC		R 7 NC							
R 7 NO		R 7 NO		R 7 NO							
R 8 NO	Heater 1	R 8 NO	Heater 2	R 8 NO	Heater 3						
R 8 NC		R 8 NC		R 8 NC							

1 EXPANSION BOX SCH. (TYP. EACH BARN)  
SCALE: N.T.S.



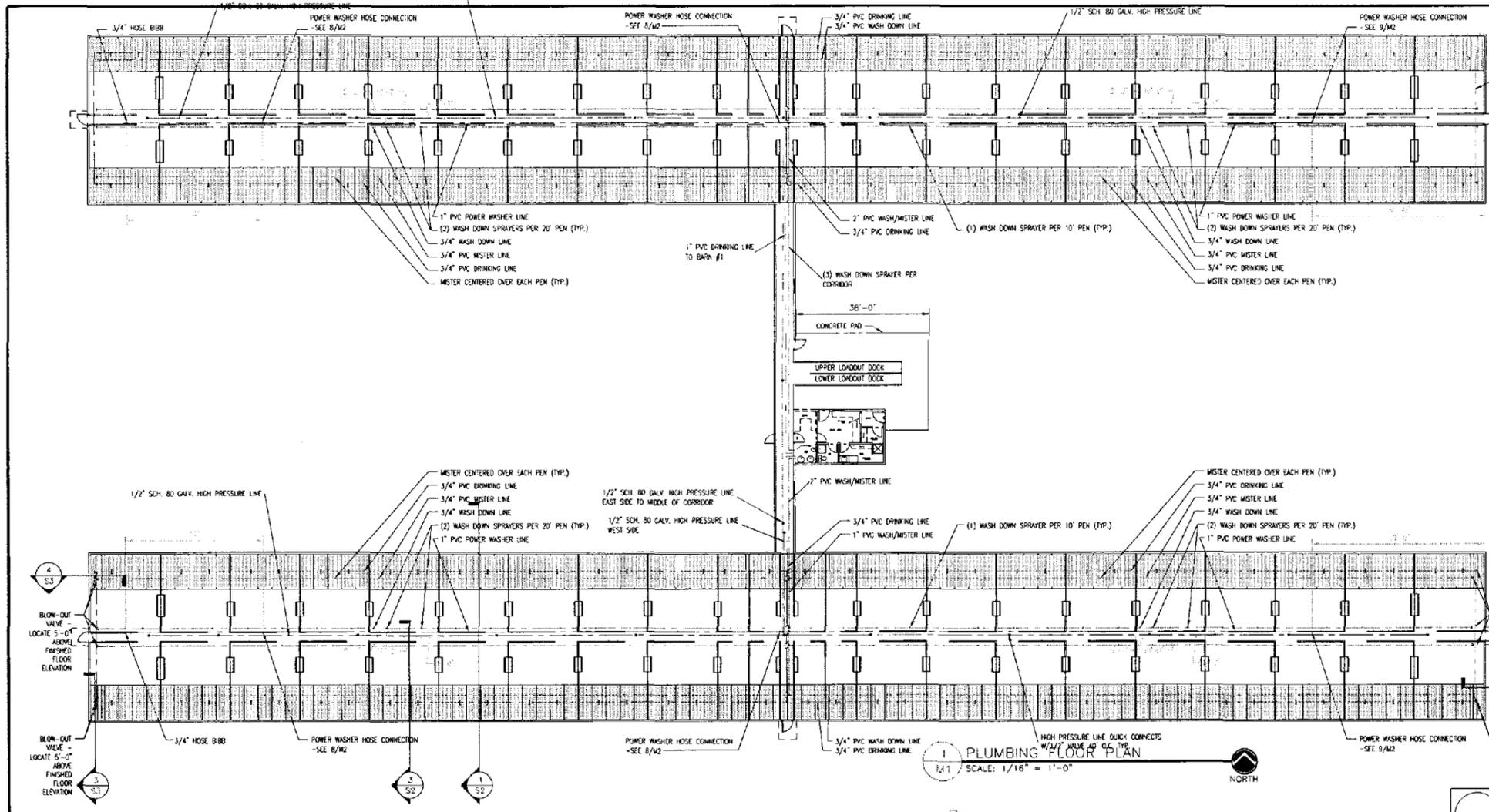
3 RS 42 CABLE WIRE DIAGRAM  
SCALE: N.T.S.

PANEL "B1" TYP. SURFACE MOUNT 120/208 VAC 3PH 4W. 225A. ML.

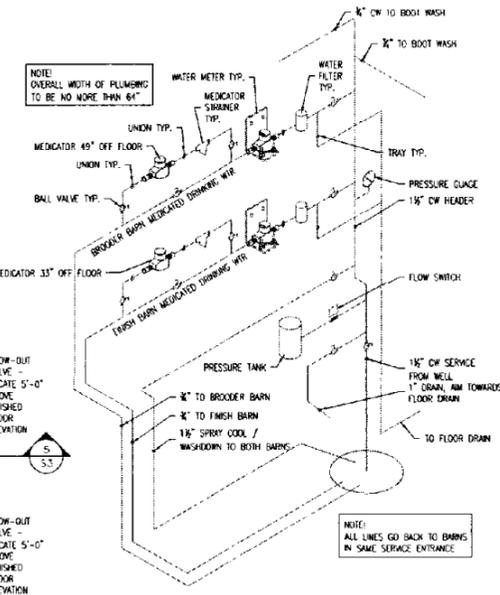
CKT NO.	LOAD V.A.	LOAD TYPE	LOAD DESCRIPTION	WIRE SIZE	P	AMP SIZE	PH	AMP SIZE	P	SIZE	LOAD DESCRIPTION	LOAD TYPE	LOAD V.A.	CKT NO.
1	450	LTS	FEED MOTORS	12	1	20	A	20	1	12	LIGHTS ROOM #2	LTS	450	2
3	450	LTS	NORTH LINE	12	1	20	B	20	1	12	LIGHTS ROOM #2	LTS	450	4
5	500		FEED MOTORS	12	1	15	C	-	-	-	SPARE	-	-	6
7	850	MTR	SOUTH LINE	12	2	15	A	15	2	12	2-24" FANS	MTR	850	8
9	850		FEED MOTORS	-	-	-	B	-	-	-	ROOM #2		850	10
11	850	MTR	INCOMING	12	2	15	C	15	2	12	2-18" FANS	MTR	700	12
13	850		SW & SM CURTAIN MACHINE	-	-	-	A	-	-	-	ROOM #2		700	14
15	700	MTR	2-18" FANS	12	2	15	B	15	2	12	2-18" FANS	MTR	700	16
17	700		ROOM #1	-	-	-	C	-	-	-	ROOM #1 & #2		700	18
19	1000	MTR	HEATER ROOM #1	12	1	20	A	20	1	12	HEATER ROOM #2	MTR	1000	20
21	1000	MTR	PRE-HEAT HEATERS #1&#3	12	1	15	B	20	1	12	HALLWAY CONV. RECEPT.	RECP	1000	22
23	1000	MTR	PRE-HEAT HEATER #2	12	1	15	C	20	1	12	PRE-HEAT LIGHTS	LTS	1000	24
25			SPARE	1	1	20	A	20	1	12	SPARE			26
27	1100	LTS	HEAT LAMPS RM1-R1	12	1	20	B	20	1	12	HEAT LAMPS RM2-R1	LTS	1100	28
29	1100	LTS	HEAT LAMPS RM1-R2	12	1	20	C	20	1	12	HEAT LAMPS RM2-R2	LTS	1100	30
31	1100	LTS	HEAT LAMPS RM1-R3	12	1	20	A	20	1	12	HEAT LAMPS RM2-R3	LTS	1100	32
33	1100	LTS	HEAT LAMPS RM1-R4	12	1	20	B	20	1	12	HEAT LAMPS RM2-R4	LTS	1100	34
35	1100	LTS	HEAT LAMPS RM1-R5	12	1	20	C	20	1	12	HEAT LAMPS RM2-R5	LTS	1100	36
37	1100	LTS	HEAT LAMPS RM1-R6	12	1	20	A	20	1	12	HEAT LAMPS RM2-R6	LTS	1100	38
39			SPARE	1	1	20	B	20	1		SPARE			40
41			SPARE	1	1	20	C	20	1		SPARE			42

2 ELEC. BREAKER PANEL (TYP.)  
SCALE: N.T.S.

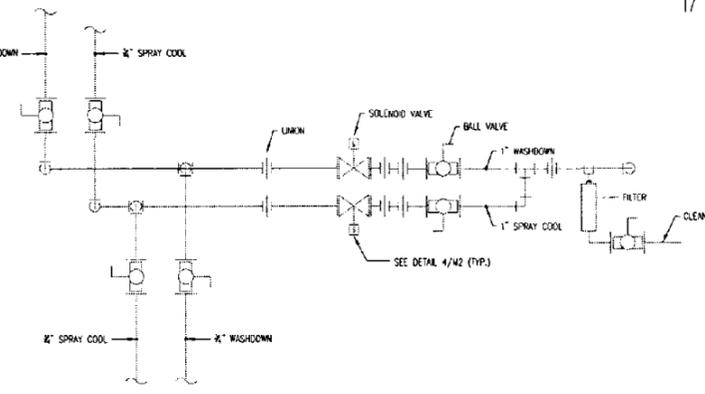
Revisions				Revisions				Reference Dwg.	Smithfield Hog Prod. 341 South Main Milford, UT 84752 Phone: (435) 387-2107	Project Title: 4400 HEAD H BARN	Project Location:	Drawn By: T. BLACKNER	Scale:
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											Date Drawn:		



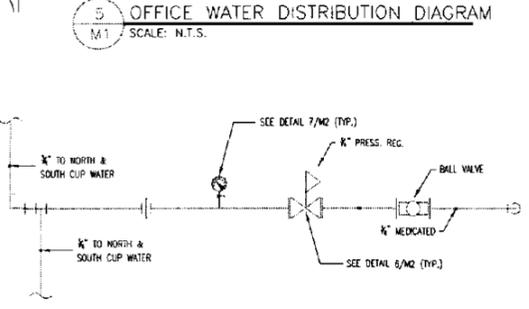
- PLUMBING SPECIFICATIONS**
1. CRITICAL - INSTALL BALL VALVES & COMPLETELY FLUSH ALL LINES.
  2. PROVIDE LABOR AS REQUIRED.
  3. PROVIDE ALL PLUMBING INSIDE THE BARN INCLUDING BOTH WASH DOWN LINES AND FITTINGS, BOTH DRINKER LINES INCLUDING FITTINGS, HOSE AND CUP WATERERS, BOTH SPRAY COOL LINES AND FITTINGS, PRESSURE REGULATORS, PRESSURE GAUGES, ELECTRIC SOLLENOID VALVES, PRESSURE WASHER CONNECTIONS AND OTHER ITEMS AS REQUIRED FOR A COMPLETE INSTALLATION.
  4. MAKE CERTAIN THAT ALL SADDLE SHUT-OFF VALVES ARE ORIENTED WITH OFF POSITION TOWARDS THE LOAD-OUT DOOR OF BARN. INSTALL SADDLE SHUT-OFF VALVES ON ALL WASH DOWN AND SPRAY COOL LINES.
  5. BE CERTAIN TO FLUSH ALL WATER LINES PRIOR TO USE AS FOLLOWS: SHUT OFF ALL SADDLE VALVES, CHARGE LINES AND FLUSH COMPLETELY SHUT OFF WATER AND GUEE CAPS ON END OF WATER LINE. CHARGE SYSTEM AGAIN AND CHECK FOR LEAKS AT ANY AND ALL FITTINGS.
  6. INSTALL WATER SPOUT IN THE BARN AT END NEAR EAST SLURRY STORE TANK.
  7. CONTRACTOR TO FURNISH TO GENERAL CONTRACTOR PROOF OF GENERAL LIABILITY AND WORKMAN'S COMPENSATION INSURANCE PRIOR TO COMMENCING WORK.
  8. COMPLETELY CLEANUP SITE OF ITEMS AND REFUSE RELATED TO YOUR WORK. ALL WORK TO BE DONE IN A WORKMAN LIKE MANNER AND SITE KEPT FREE OF TRASH, DEBRIS AND HAZARDOUS FLUIDS SUCH AS DIESEL, HYDRAULIC, MOTOR OIL, ETC.
  9. CONTRACTOR RESPONSIBLE FOR WEATHER RELATED PROTECTION.
  10. PERMANENTLY LABEL INDIVIDUAL WATER LINES AT MEDICATORS TO CORRESPONDING BARN.
  11. MAXIMUM SLOPE FOR 6" WATER LINE IS 1%.



**1 PLUMBING FLOOR PLAN**  
SCALE: 1/16" = 1'-0"



**4 MISTER / WASHDOWN DIAGRAM**  
SCALE: N.T.S.



**6 MEDICATED WATER DIAGRAM**  
SCALE: N.T.S.

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Project Title: **4400 HEAD H BARN**

Sheet Title: **PLUMBING PLANS & DIAGRAMS**

Project Location: \_\_\_\_\_

Sheet Group: **2651 M1**

Drawn By: **T BLACKNER**

Checked By: \_\_\_\_\_

Date Drawn: \_\_\_\_\_

Scale: \_\_\_\_\_

Sheet #: **of**

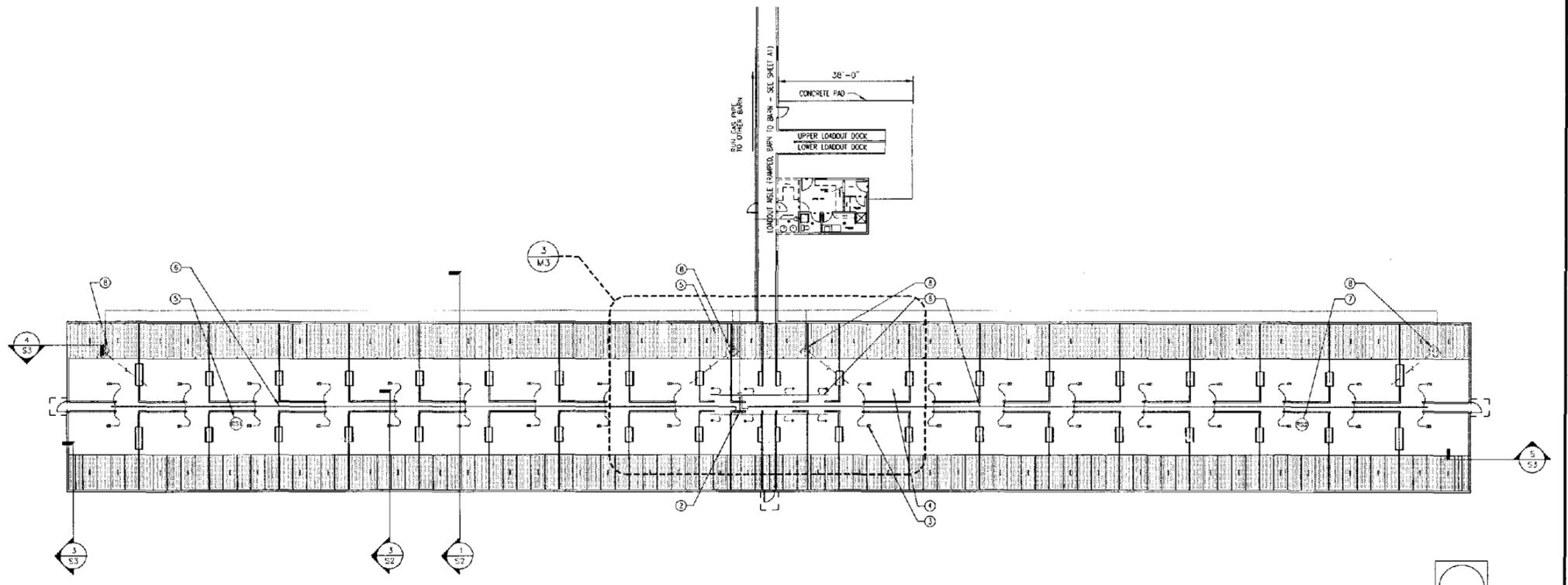
**PLAN DETAIL NOTES**

- ② GAS HEATER REGULATOR PANEL (GAS PANEL) SHALL ALWAYS BE PLACED NEXT TO THE VENTILATION CONTROL PANEL - SEE SHEET V1
- ③ RADIANT HEATER (17,200 BTU) HOSE ASSEMBLY (TYP. PER 20' PEN) - SEE DETAIL 2/M3
- ④ RADIANT HEATER (5,500 BTU) SUPPLIED BY SINGLE AUTO/MANUAL REGULATOR ON GAS PANEL (TYP. PER 10' PEN)
- ⑤ RADIANT HEATER GAS SERVICE ENTRANCE, 3/4" BLACK IRON PIPE. THIS GAS SERVICE REQUIRES A REGULATOR WHICH IS INDEPENDENT FROM THE REGULATOR FOR ALL OTHER GAS APPLIANCES WITHIN THE BUILDING. - SEE DETAIL 1/S2
- ⑥ GAS LINE HOME RUN, 3/4" BLACK IRON PIPE
- ⑦ HEATER BRACKET RADIANT SENSOR MOUNTED IN THIRD PEN FROM BUILDING END AS INDICATED. - SEE DETAIL 3/M3
- ⑧ FORCED AIR HEATER

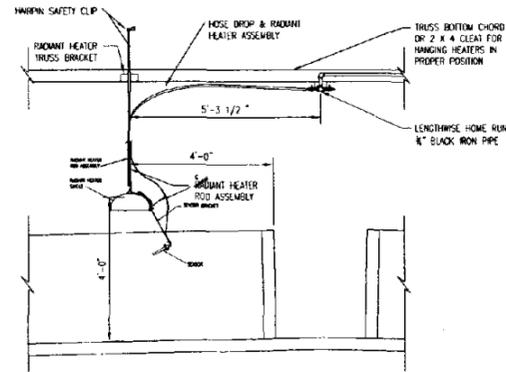
**ATTENTION**

THIS DRAWING IS PRODUCED AS AN EXAMPLE ON HOW TO CONFIGURE THE GAS HEATER SYSTEM. IT IS THE RESPONSIBILITY OF THE GAS INSTALLER TO MAKE NECESSARY CHANGES TO COMPLY WITH ALL CURRENT LOCAL AND NATIONAL GAS CODES. RAYDOR IS NOT RESPONSIBLE FOR ANY LIABILITY RESULTING FROM THE USE/MISUSE OF THIS DOCUMENT.

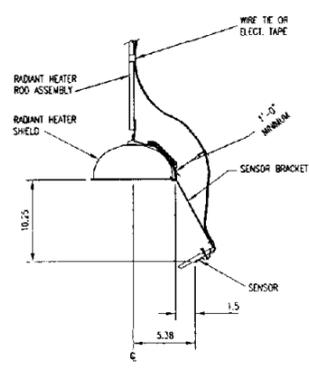
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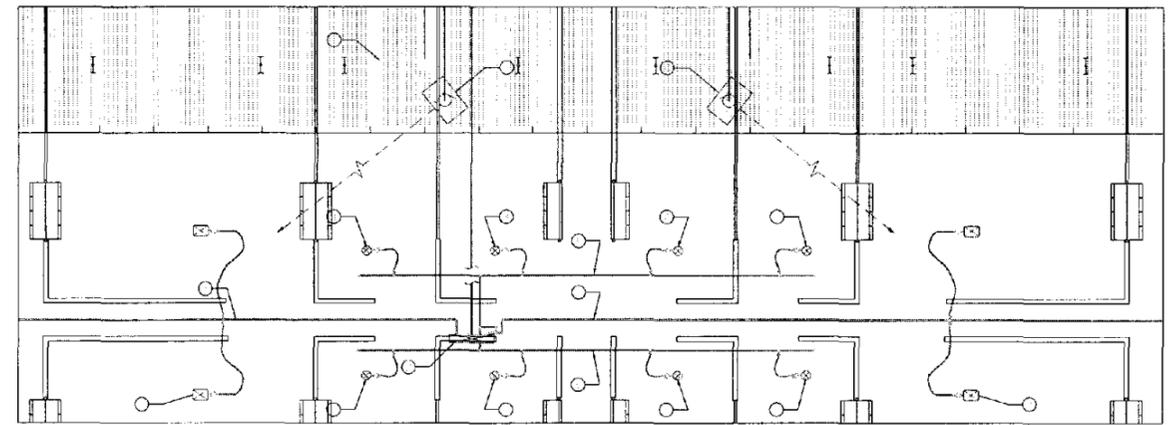
**1 HEATING FLOOR PLAN**  
SCALE: 1/16" = 1'-0"  
M3



**2 RADIANT HEATER ASSEMBLY**  
SCALE: N.T.S.  
M3



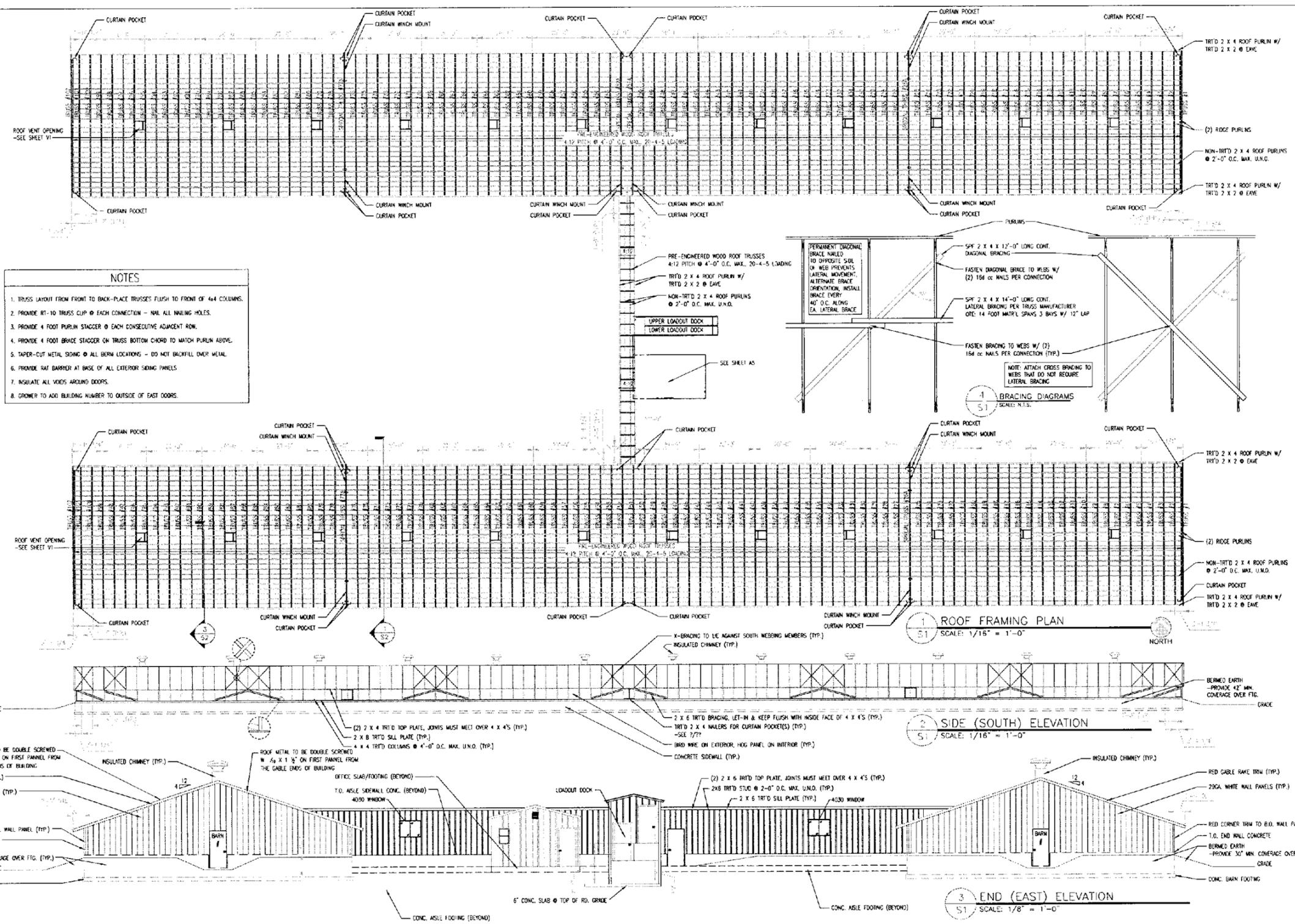
**3 RADIANT HEATER SENSOR ASSEMBLY**  
SCALE: N.T.S.  
M3



**4 BROODER BARN HEATING PLAN**  
SCALE: 3/16" = 1'-0"  
M3

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**NOTES**

1. TRUSS LAYOUT FROM FRONT TO BACK-PLACE TRUSSES FLUSH TO FRONT OF 4x4 COLUMNS.
2. PROVIDE RT-10 TRUSS CLIP @ EACH CONNECTION - NAIL ALL NAILING HOLES.
3. PROVIDE 4 FOOT PURLIN STAGGER @ EACH CONSECUTIVE ADJACENT ROW.
4. PROVIDE 4 FOOT BRACE STAGGER ON TRUSS BOTTOM CHORD TO MATCH PURLIN ABOVE.
5. TAPER-CUT METAL SIDING @ ALL BORN LOCATIONS - DO NOT BACKFILL OVER METAL.
6. PROVIDE RAT BARRIER AT BASE OF ALL EXTERIOR SIDING PANELS
7. INSULATE ALL VOIDS AROUND DOORS.
8. CROWNER TO ADD BUILDING NUMBER TO OUTSIDE OF EAST DOORS.

**BRACING DIAGRAMS**  
SCALE: N.T.S.

**1 ROOF FRAMING PLAN**  
SCALE: 1/16" = 1'-0"

**2 SIDE (SOUTH) ELEVATION**  
SCALE: 1/16" = 1'-0"

**3 END (EAST) ELEVATION**  
SCALE: 1/8" = 1'-0"

No.	Revisions	Date	By	No.	Revisions	Date	By	Reference Dwg.

**Smithfield Hog Prod.**  
341 South Main  
Milford, UT 84752  
Phone (435) 387-2107

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Project Title : 4400 HEAD H BARN

Sheet Title : ROOF FRAMING PLAN & ELEVATIONS

Project Location :

Sheet Group : S1

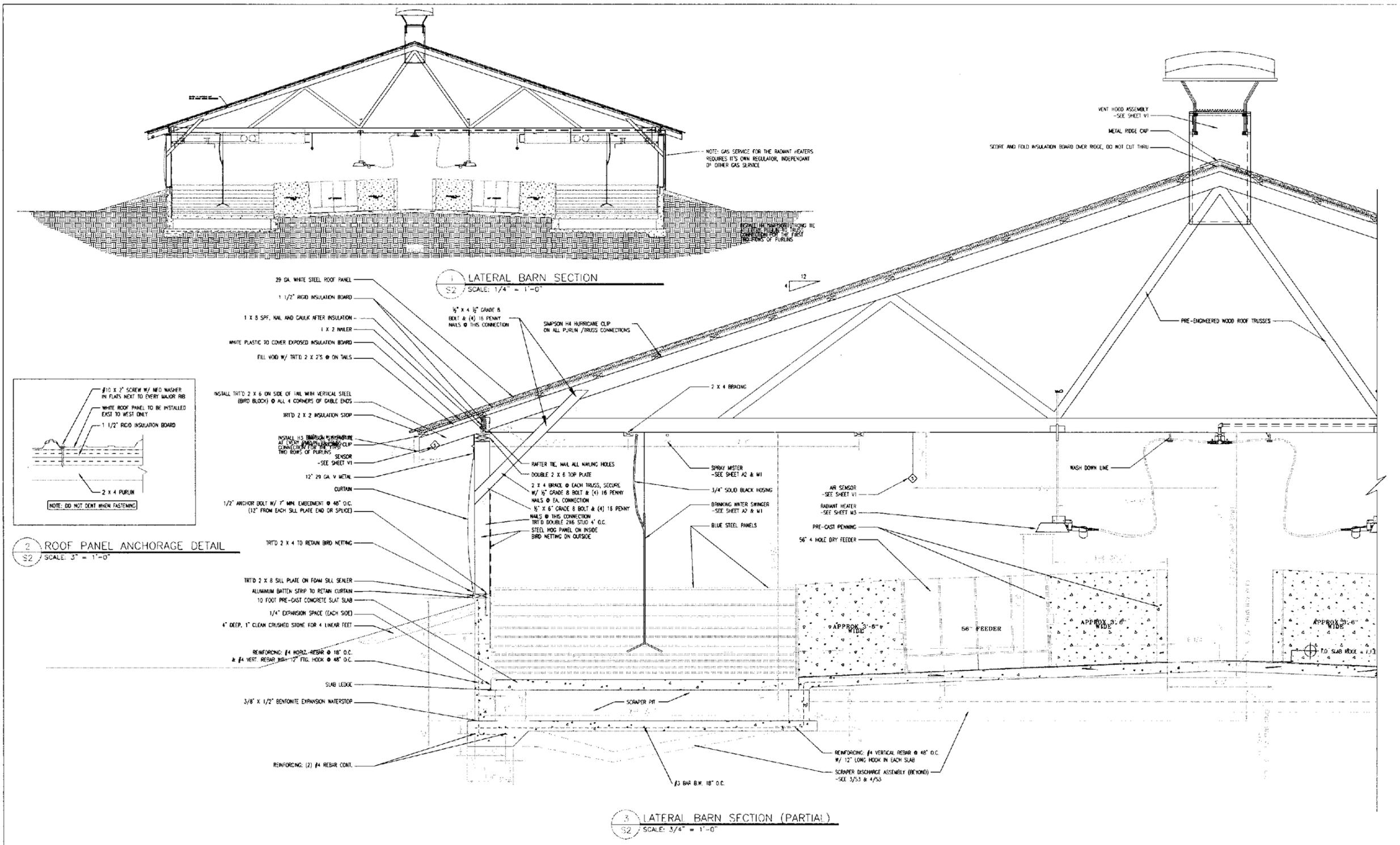
Drawn By : T BLACKNER

Checked By :

Date Drawn :

Scale :

Sheet # : of



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Project Title: 4400 HEAD H BARN

Sheet Title: LATERAL SECTIONS & DETAILS

Project Location:

Sheet Group: S2

Drawn By: T BLACKNER

Checked By:

Date Drawn:

Scale:

Sheet #:

**of**

