MO–FLEX NURSERY BUILDING PLAN
PREPARED FOR: MISSOURI PLAN SERVICE
PLAN NUMBER: MO4–726–94C1

DEVELOPED BY:
JOSEPH M. ZULOVICH, Ph.D., P.E.
COMMERCIAL AGRICULTURAL ENGINEER
ANIMAL STRUCTURES SPECIALIST
COMMERCIAL AGRICULTURE PROGRAM
UNIVERSITY EXTENSION
AGRICULTURAL ENGINEERING DEPARTMENT
UNIVERSITY OF MISSOURI – COLUMBIA

INDEX OF DRAWINGS

<table>
<thead>
<tr>
<th>SHEET NUMBER</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 of 20</td>
<td>1</td>
</tr>
<tr>
<td>2 of 20</td>
<td>2</td>
</tr>
<tr>
<td>3 of 20</td>
<td>F1</td>
</tr>
<tr>
<td>4 of 20</td>
<td>F2</td>
</tr>
<tr>
<td>5 of 20</td>
<td>F3</td>
</tr>
<tr>
<td>6 of 20</td>
<td>F4</td>
</tr>
<tr>
<td>7 of 20</td>
<td>F5</td>
</tr>
<tr>
<td>8 of 20</td>
<td>F6</td>
</tr>
<tr>
<td>9 of 20</td>
<td>F7</td>
</tr>
<tr>
<td>10 of 20</td>
<td>F8</td>
</tr>
<tr>
<td>11 of 20</td>
<td>F9</td>
</tr>
<tr>
<td>12 of 20</td>
<td>F10</td>
</tr>
<tr>
<td>13 of 20</td>
<td>P1</td>
</tr>
<tr>
<td>14 of 20</td>
<td>P2</td>
</tr>
<tr>
<td>15 of 20</td>
<td>P3</td>
</tr>
<tr>
<td>16 of 20</td>
<td>H1</td>
</tr>
<tr>
<td>17 of 20</td>
<td>H2</td>
</tr>
<tr>
<td>18 of 20</td>
<td>H3</td>
</tr>
<tr>
<td>19 of 20</td>
<td>S1</td>
</tr>
<tr>
<td>20 of 20</td>
<td>S2</td>
</tr>
</tbody>
</table>

TITLE SHEET
NURSERY ROOM FLOOR PLAN OPTIONS
FLOOR PLAN USING FLUSH AND MO SIPHON TANKS
FLUSH BUILDING CROSS SECTION
FLUSH GUTTER CONCRETE CROSS SECTION
MO SIPHON FLUSH TANK DETAIL
TANK AND SUMP LONGITUDINAL SECTION (PART 1)
TANK AND SUMP LONGITUDINAL SECTION (PART 2)
TANK AND SUMP CROSS SECTION (PART 1)
TANK AND SUMP CROSS SECTION (PART 2)
CATCH BASIN END DETAIL
CATCH BASIN CROSS SECTION
FLOOR PLAN USING PIT RECHARGE MANURE SYSTEM
PIT RECHARGE BUILDING CROSS SECTION
PIT RECHARGE CONCRETE CROSS SECTION
FLOOR PLAN USING HAIRPIN GUTTER LIQUID MANURE SYSTEM
HAIRPIN GUTTER BUILDING CROSS SECTION
HAIRPIN GUTTER CONCRETE CROSS SECTION
POST FRAME STRUCTURAL DETAILS
POST FRAME STEEL BRACKET

WARRANTY DISCLAIMER:
The plan contains herein provides drawings and recommendations for the specific building only. The drawings and recommendations are for a building based on your Missouri structural requirements. Neither the University of Missouri, University Extension nor the Cooperative Extension Service, nor their respective agents or employees, have made, and do not hereby make, any representation, warranty, or covenant with respect to the drawings or recommendations herein.

Additional professional services will be required to tailor the plan to your situation, including but not limited to:
- Adequacy of compliance with local codes and regulations;
- Development and/or review of specifications for materials and equipment;
- Selection of proper site preparation and natural resource bases;
- Supervision of site preparation, soil testing and construction;
- Development of a manure storage system and manure management plans,
- Provisions for utilities, drains and/or other access.
MO-FLEX NURSERY BUILDING
FLUSH SYSTEM USING MO SIPHON TANKS

SITE SELECTION AND PREPARATION INFORMATION
1. Soil building pad should be about 12" to 20" longer and 10" wider than building.
2. Soil building pad should slope 2% from tank end to basin end for good flushing performance.
3. No slope across width of soil building pad should exist.
4. Building proximity to other swine buildings impacts pig performance and should be considered.

FLUSH BUILDING FLOOR PLAN

SCALE: 1" = 10'-0"

3 ROOMS WITH 10 - 4'-0" x 12'-0" PENS
MO SIPHON FLUSH TANK DETAIL

NOTE: ALLEY CONCRETE FLOORS AND LIVESTOCK EQUIPMENT ARE NOT SHOWN TO ALLOW CONCRETE FLUSH GUTTER DETAILS TO BE SHOWN.

<table>
<thead>
<tr>
<th>GUTTER LENGTH</th>
<th>TANK LENGTH D1</th>
<th>DIST. FROM GUTTER TO SUMP D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP TO 160'</td>
<td>4' 0&quot;</td>
<td>14&quot;</td>
</tr>
<tr>
<td>160' - 200'</td>
<td>5' 0&quot;</td>
<td>26&quot;</td>
</tr>
<tr>
<td>201' - 240'</td>
<td>6' 0&quot;</td>
<td>38&quot;</td>
</tr>
<tr>
<td>241' - 280'</td>
<td>7' 0&quot;</td>
<td>50&quot;</td>
</tr>
</tbody>
</table>
STEEL DETAILS AROUND PIPING

SIPHON FLUSH TANK SECTION

TANK BELL CONSTRUCTION DETAILS

© 1994 UNIVERSITY OF MISSOURI
MO SIPHON FLUSH TANK SECTION (CONCRETE DETAILS)

CUTTER LENGTH | TANK LENGTH D1 | DIST. FROM FOOTER TO SUMP D2
--- | --- | ---
UP TO 180' | 4"-0" | 14"
191'-200' | 5"-0" | 26" 
201'-240' | 6"-0" | 38" 
241'-280' | 7"-0" | 50"

NOTE:
CUTTER LENGTH IS THE DISTANCE FROM THE FRONT OF THE TANK TO THE FAR END WALL.
GENERAL NOTES

SEWER INFORMATION:
1. SEWER LINE SLOPE - 2%.
2. SEWER LINE CAN BE LOCATED ANYWHERE IN CATCH BASIN TO SIMPLIFY RETURN TO LAGOON.

<table>
<thead>
<tr>
<th>SEWER LINE</th>
<th>GUTTER LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>1' TO 200'</td>
</tr>
<tr>
<td>10&quot;</td>
<td>201' TO 240'</td>
</tr>
<tr>
<td>12&quot;</td>
<td>241' TO 280'</td>
</tr>
</tbody>
</table>

CATCH BASIN:
1. SLOPE BASIN FLOOR TO SEWER LINE A MINIMUM OF 1/94/711.
2. MAXIMUM BASIN DEPTH IS 24".

NOTE: ALLEY CONCRETE FLOORS AND LIVESTOCK EQUIPMENT ARE NOT SHOWN TO ALLOW FLUSH GUTTER CONCRETE DETAILS TO BE SHOWN.

CATCH BASIN DETAIL

SCALE: 1/4" = 1'-0"

© 1994 UNIVERSITY OF MISSOURI
CATCH BASIN CROSS SECTION

2 - #4 rebars in bottom and top of beam (4 total)

11-1/4" or 12" depending upon forms used

2" gravel layer recommended (3/4" to 1" maximum)

#4 rebar 18" o.c.

#4 rebar 12" o.c.

#4 rebar 12" o.c.

vertical steel

#4 rebar 18" o.c.

final grade line

#4 dowels with 1-1/2" bending radius

original grade line

original grade line

NURSERY PEN
FLOORING AND SUPPORTS

2" thick RIGID WATER RESISTANT INSULATION

VERTICAL STEEL

#4 rebar 18" o.c.

HORIZONTAL STEEL

#4 rebar 12" o.c.

insert 1" weep holes to allow any water to drain from gravel into basin. place weep holes 5'-0" o.c. along length of catch basin.

© 1994 UNIVERSITY OF MISSOURI

CATCH BASIN CROSS SECTION

MO-FLEX NURSERY BUILDING PLAN

SCALE: 1" = 1'-0"
MO-FLEX NURSERY BUILDING
PIT RECHARGE MANURE SYSTEM

REVIEW ACCOMPANYING MANUAL FOR DISCUSSION ON MODIFYING BUILDING SIZE AND HOW TO INCLUDE MULTIPLE ROOMS

4'-0" x 12'-0" PENS (TYP.)
BUILDING CROSS SECTION
SEE DWG. P2

STANDPIPE (TYP.)

SEWER LINE TO LAGOON

FENCING FEEDERS (TYP.)

41'-6"
40'-2"
INSIDE

3'-0"
ROOM LENGTH

30'-4"
ROOM LENGTH

120'-0"
BUILDING LENGTH

10% SLOPE
FOR BUILDING AND ORIFICAL GRADE

VENTILATION
1. SEE DWG. 6 FOR LAYOUT RECOMMENDATION OF VENTILATION SYSTEM.
2. SEE MANUAL FOR VENTILATION SYSTEM PERFORMANCE RECOMMENDATIONS USING PIT RECHARGE SYSTEM

PIT RECHARGE BUILDING FLOOR PLAN
SCALE: 1" = 10'-0"

SITE SELECTION AND PREPARATION INFORMATION
1. SOIL BUILDING PAD SHOULD BE ABOUT 12'-0" TO 20'-0" LONGER AND 10'-0" WIDER THAN BUILDING.
2. NO SLOPE ACROSS WIDTH OR LENGTH OF SOIL BUILDING PAD SHOULD EXIST.
3. BUILDING PROXIMITY TO OTHER SWINE BUILDINGS IMPACTS PIG PERFORMANCE AND SHOULD BE CONSIDERED.

LIVESTOCK EQUIPMENT
3 ROOMS WITH 18 - 4'-0" x 12'-0" PENS

© 1994 UNIVERSITY OF MISSOURI

FLOOR PLAN USING PIT RECHARGE MANURE SYSTEM
MO-FLEX NURSERY BUILDING PLAN

COOPERATIVE EXTENSION SERVICE
AGRICULTURAL ENGINEERING DEPARTMENT-UNIVERSITY OF MISSOURI-COLUMBIA
UNIVERSITY EXTENSION - COMMERCIAL AGRICULTURE PROGRAM
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

DRAWN BY: AMZ
SUPERVISED BY: TDY/CMA
CHECKED BY: AMZ

PLAN NO: MO-726-94C
DATE: 6/94
SCALE: 1" = 10'-0"
PI: 13 OF 20
PIT RECHARGE CONCRETE CROSS SECTION

SCALE: 1/4" = 1'-0"

PIT RECHARGE CONCRETE CROSS SECTION

SCALE: 1/4" = 1'-0"

SIDEWALL AND RECHARGE PIT DETAILS

SCALE: 1/2" = 1'-0"

NOTE: 3-1/2" wide Hall drain trough slopeds to 2" drain pipe which transfer water from Hallway to recharge pit. Drain pipes have p-traps and are spaced no more than 20' apart.
MO-FLEX NURSERY BUILDING
HAIRPIN GUTTER MANURE SYSTEM

SITE SELECTION AND PREPARATION INFORMATION

1. Soil building pad should be about 12'-0" to 20'-0" longer and 10'-0" wider than building.
2. No slope across width or length of soil building pad should exist.
3. Building proximity to other swine buildings impacts pig performance and should be considered.

HAIRPIN GUTTER BUILDING FLOOR PLAN

SCALE: 1" = 10'-0"

VENTILATION
1. See Fig. 2 for layout recommendation of ventilation system.
2. See manual for ventilation system performance recommendations using hairpin gutter system.

LIVESTOCK EQUIPMENT
3 rooms with 18 - 4'-0" x 12'-0" pens

© 1994 UNIVERSITY OF MISSOURI
HAIRPIN GUTTER CONCRETE CROSS SECTION

SCALE: 1" = 1'-0"

HAIRPIN GUTTER CONCRETE CROSS SECTION

SCALE: 1/2" = 1'-0"

NOTE: 3-1/2" WIDE HALL DRAIN THROUGH SLOPES TO 2" DRAIN PIPES WHICH TRANSFER WATER FROM HALLWAY TO HAIRPIN GUTTER. DRAIN PIPES HAVE P-TRAPS AND ARE SPACED NO MORE THAN 20' APART.

© 1994 UNIVERSITY OF MISSOURI

HAIRPIN GUTTER CONCRETE CROSS SECTION

MO-FLEX NURSERY BUILDING PLAN

COOPERATIVE EXTENSION SERVICE
AGRICULTURAL ENGINEERING DEPARTMENT-UNIVERSITY OF MISSOURI-COLUMBIA
UNIVERSITY EXTENSION - COMMERCIAL AGRICULTURE PROGRAM
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING
GENERAL NOTES
1. BOTTOM STEEL PLATE = 1/4" x 7" FLAT PLATE A36 STEEL
2. VERTICAL STEEL PIECE = 1/4" x 4" FLAT PLATE A36 STEEL
3. 1/4" FILLET WELDS USING E 60 XX ELECTRODES

POST FRAME STEEL BRACKET
MO-FLEX NURSERY BUILDING PLAN

COOPERATIVE EXTENSION SERVICE
AGRICULTURAL ENGINEERING DEPARTMENT-UNIVERSITY OF MISSOURI-COLUMBIA
UNIVERSITY EXTENSION - COMMERCIAL AGRICULTURE PROGRAM
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

© 1994 UNIVERSITY OF MISSOURI