

**university of minnesota  
office of physical planning  
november 1981**

**livestock laboratory  
holding facility**

**waseca campus**

Livestock Laboratory  
Holding Facility  
University of Minnesota  
Waseca

Facilities Program

November 1981

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Facility Program  
Livestock Laboratory and Holding Facility

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**I. introduction**

**II. academic brief**

INTRODUCTION  
ANIMAL LABORATORY AND HOLDING FACILITY  
BUILDING PROGRAM CONTENT

1. Introduction

A. Historical and General Background

The University of Minnesota Technical College, Waseca (UMW) is a coordinate campus of the University of Minnesota. The college has a single mission--to prepare students for semi-professional, midmanagement positions in the broad fields related to agriculture. The college identifies agriculture as the input industries of feed, seed, fertilizer, machinery, buildings, veterinary assistants; the output industries of processing, marketing, and distributing; farming; and services to rural homes and communities.

The college was mandated by the Minnesota State Legislature in 1969. The first students were accepted in the fall of 1971. Since that time, the college has grown from the initial fall enrollment of 131 students to 1,123 for fall quarter, 1980.

Students at UMW may enroll in one of seven programmatic areas. These include: Agricultural Business, Agricultural Industries and Services, Agricultural Production, Animal Health Technology, Food Industry and Technology, Home and Family Services, and Horticultural Technology. These programs are two or more but fewer than four years in length.

The course work includes approximately one-third related education courses, such as communications, mathematics, social science, and basic sciences, and two-thirds technical education.

Students completing degree requirements receive an Associate in Applied Science degree.

Based on student interest in the programs and industry acceptance of its graduates, UMW is meeting a real need in the agricultural industry.

B. Current Status and Needs Statement

The original buildings on the UMW campus were designed to fit the needs of the Southern School of Agriculture--a four year residential high school which began in 1954. The high school was phased out between 1969 and 1973. The college began in 1971. The Related Education wing and a horticulture testing complex with greenhouses were added in 1971. Since that time, a Learning Resources Center, three apartment complexes, a Light Horse Management facility, and in addition greenhouses have been added. In the fall (1980) a new classroom laboratory and a special purposes laboratory were completed. All of the buildings are linked except for the Physical Education Building, the Light Horse Management facility, and the new student apartment complexes.

The proposed Livestock Laboratory and Holding Facility will be a much needed addition to these core facilities.

Since the college began, administrators, instructors and students have recognized the need for a livestock holding facility, laboratory, and demonstration area for teaching courses in beef cattle, swine, and sheep production, and veterinary practices. The North Central Accreditation Association evaluation conducted in September 1977 pointed out that the lack of this key facility was a serious handicap to the Animal Science classes and to selected classes in Animal Health

Technology and Agricultural Business. In addition, the Agricultural Production Advisory Committee identified the problem in their recommendation to the Curriculum Committee.

Previous attempts have been made to fund the building through legislative appropriations. In 1980, the college submitted a request for \$748,000 to build the facility. The building has been approved for the 1981 bonding bill in the amount of \$551,000.

In 1979, the Agricultural Production Division submitted a request to NSF, Comprehensive Assistance to Undergraduate Science Education, (CAUSE) to fund a part of the facility. This request was granted in 1980, in the amount of \$119,605 (\$96,000 for construction.) This funding was held pending approval of the request by the 1981 legislature.

## II. Academic Brief

### A. Academic Program

The largest user of the proposed facility will be the Ag Production Division. This division has the largest enrollment of the seven programmatic areas. Ag Production students may major in livestock production, crop production, or a combination of the two called diversified agriculture. They may also major in light horse management. The livestock production majors may select an area of emphasis such as beef, dairy, poultry, swine or sheep management.

The proposed facility will be used for these courses, plus other courses in Animal Health Technology and Agricultural Business. (See Chart for listing of courses and enrollment). Approximately 25 instructors will use the facilities.

### B. Continuing Education

There are no aspects of the Continuing Education Program which will affect the function or design of the proposed facility.

### C. Research

Educational concepts will be developed but production research will not be conducted in this facility. Small comparison projects which will demonstrate major educational concepts will not be conducted in this facility.

### **III. facility requirements**

### III. Facility Requirements

#### A. Introduction and Overview Comments

##### 1. Description of Activity

The livestock laboratory and holding facility will be utilized by various courses in Animal Science, Animal Health, Food Technology, Microbiology, and Chemistry. A look at the scientific and educational content with respect to subject matter will be discussed. A list of the courses that would utilize the facility and their descriptions is attached in the Appendix.

Specific areas of instruction would include:

- a. The use of and care for equipment used in the handling of major livestock species such as tilt table, chutes, and restraint equipment.
- b. The basic techniques will be taught and practiced such as dehorning, castrating, branding, docking, hoof trimming, injections, and drenching.
- c. Pregnancy testing of all major livestock species will be conducted.
- d. Artificial insemination has become one of the most important tools in producing genetically superior animals. The lab facility will be used for the practice of artificial insemination as well as for such techniques as ova transplants in the future.
- e. Digestion trials will be conducted in the facility. These trials will enable students to learn more about what affects

the digestibility of ration in a specific species. Basic organic chemistry will play a very important part in such trials as the feed and fecal samples will be analyzed for nutrient components. Such experiments will greatly enhance classroom lectures on such topics as digestive physiology of different species.

- f. Through the cooperation with the veterinarians on the UMW staff, we will be able to prepare and maintain animals with rumen can- nula. This will enable us to obtain access to the rumen at any time. The educational advantages of this are many, including:
1. A better understanding of the digestive physiology of rumi- nants and comparison with monogastrics.
  2. In vitro rumen digestion experiments by students to obtain basic scientific information on the conditions in the rumen and how they affect the well-being of the animal.
  3. Access to rumen fluid to use in microbiology classes to demonstrate the tremendous role micro-organisms play in the ruminant. An example would be the effect of abrupt ration on rumen microbial populations in the rumen and how these relate to metabolic disorders such as D-lactic acid- osis in ruminants.
  4. The chemical analysis of rumen fluid and how it relates to the well-being of the animal. Chemical analysis for para- meters such as lactic acid and volatile fatty acids will enable our students to have a "front row seat" to the workings of the rumen.

- g. Nutrition studies conducted by students will enable them to become familiar with nutrient deficiencies, factors affecting palatability and intake as well as a chance to formulate, mix and feed a ration they develop themselves.
- h. The effects of feed additives will be demonstrated. Examples are as follows:
  - 1. How low level feeding of antibiotics affects growth rate and feed efficiency.
  - 2. The use of buffers and their effect on animal growth and production.
  - 3. Rumen additives such as "Rumensin" and how they affect the chemical changes in the rumen.

Students in Animal Health Technology would benefit from the facilities in the following areas of study:

- i. Physiology
  - 1. Hematology studies in various species regarding such things as complete blood counts, differential blood counts, sedimentation rates and packed cell volume.
  - 2. Blood chemistry studies regarding parameters such as blood glucose, Urea nitrogen content and electrolyte content.
  - 3. Urinalysis - Parameters in various species such as specific gravity pH protein, ketone, glucose and hemoglobin content.
  - 4. Reproduction - Study normal and abnormal reproductive physiology, semen evaluation, and practice rectal palpation.

5. Normal and abnormal cardiovascular action through use of stethoscope and EKG.
- j. Parasitology
1. Microscopic study of fecal material to detect eggs of internal parasites.
  2. External parasite recognition.
  3. Parasitic treatments, external and internal.
- k. Microbiology
- From common infections such as mastitis or metritis, the student will be able to culture organisms, identify microorganisms, run sensitivity tests and treat animals for infections.
- l. Pharmacology
- Observe action of drugs and pharmaceuticals common to veterinary medicine.
- m. Techniques
1. Parenteral routes of drug administration such as intravenous, intramuscular, subcutaneous and intraparteoneal.
  2. Restraint of any species.
  3. Normal handling procedures.
- n. Surgical Assisting
1. Student will be able to assist in surgery as caesarean section and rumen fistulation.
  2. Students will perform minor surgery under supervision such as castration and dehorning.

Students in Food Science Technology will benefit from the facilities in the following ways:

- o. Students will demonstrate how nutrition or improper handling can cause reduction in value of dairy products or in the shelf life of dairy products.
- p. They will be able to demonstrate the effect of diet on fat composition and other carcass characteristics in farm animals.

B. Priority of Activities

This facility must be designed to insure that students will receive maximum hands on experience with animals and equipment.

Groups of students numbering up to 24 will be working in all areas of the facilities at different periods, thus attention should be given to aisleways etc.

C. Special Considerations

1. Provide for closed circuit television to be added at a later date.  
These circuits should be in the following areas:
  - a. Teaching laboratory
  - b. Arena
2. Adequate considerations for the control of flies and other insects should be given.
3. Parking space for 20 vehicles will be necessary on a regular basis.
4. Overflow parking space will be needed for special events.
5. Provide the most desirable locking system to achieve maximum security and ease of use. Visitors to the facility should have access to the arena and lavatories but should not be able to enter animal housing areas or the teaching-laboratory portions of the facility.
6. Because of daily use of livestock in housing areas by instructors and students, a minimum of 45°F in all animal housing facilities is necessary.

D. Key for Rooms in Teaching Laboratory Facilities

<u>Room #</u>	<u>Description</u>	<u>Sq. Ft.</u>
1A	Teaching Laboratory Classroom	1200
1B	Laboratory Storage--Instructor Preparation	300
1C	Weighing Room	75
2A	Student Locker Room--Sanitation Area	360
2B	Female Lavatory--Shower	120
2C	Male Lavatory--Shower	120
3A	Arena--Livestock Working Area	7000
4A	Swine Farrowing Area	540
4B	Swine Nursery and Finishing Area	630
4C	Sheep - Beef Housing Area	3500
4D	Temporary Animal Holding; General Storage	1000
4E	Poultry Housing Area	700
5A	Feed Mixing and Storage Room	540
6A	Technician Office	110
6B	Animal Supply Storage	110
		<u>16,305</u> sq. ft.

CORRECTION ON SQUARE FOOTAGE FOR LIVESTOCK HOLDING FACILITY (UMW)

<u>DESCRIPTION</u>	<u>LEGISLATIVE REQUEST</u>	<u>ROUGH DRAFT</u>	<u>REVISED DRAFT</u>
Teaching Lab-Classroom	1,200	1,200	1,200
Lab Storage, Instructor Preparation	450	300	300
Weighing Room	0	75	75
Student Locker Room	600	360	360
Female Lavatory		120	120
Male Lavatory		120	120
Arena	7,000	5,600	7,000
Swine Farrowing	8,000	540	540
Swine Nursery-Finishing		630	630
Sheep-Beef		3,500	3,500
Temporary Animal Holding <sup>g</sup>		1,400	1,000
Poultry Housing		700	700
Feed Storage, Mixing	500	540	540
Technician's Office	150	110	110
Animal Health - Storage	<u>0</u>	<u>110</u>	<u>110</u>
TOTAL	17,900	15,305	16,305
	Gross Sq. Ft.	Gross Sq. Ft.	Gross Sq. Ft.

NOTE: Square footage in the revised draft reflects a 10% margin for mechanical room, hallways, etc. Alleyway in the animal holding facilities are included in the footage listed.

E. Detailed Facilities Descriptions

1A TEACHING LABORATORY-CLASSROOM

Needs Statement

This room will be utilized as a teaching laboratory for courses previously listed. This will be the instructional center for the entire facility and will have to be a versatile laboratory. Consideration should be given for ease of cleaning and maintenance. This room will also serve as a lecture facility related to laboratory exercises.

Facility Requirements

- Assignable Area                      - The assignable square feet should be 1200. The laboratory classroom capacity should be 24. Because of the amount of equipment required and the variety of uses for the laboratory classroom, the assignable square footage of 50 square feet per student should be used.
- Seating Arrangement - Seating in this room should be fixed laboratory stations consisting of six student stations with four students per station and one instructor station.
- Movable Equipment

The movable equipment listed below will require permanent counter top space with additional working area provided.

Equipment	LFT Counter /Wall Space Required	Electrical Needs	To Be Purchased	Existing Equipment	Venting Required	Water & Drain Required
Drying Oven	4	110	X	-	-	-
Water Bath	5	220	-	X	-	X
Protein Analyzer	10	110	-	X	-	-
Crude Fiber Analysis	4	110	X	-	-	X
Physiograph	5	110	-	X	-	-
Gas Chromatograph	10	110	X	-	-	-
Muffed furnace	4	220	X	-	X	-
Centrifuge	4	110	X	-	-	-
Glassware Dryer	3	110	X	-	-	-

1A TEACHING LABORATORY CLASSROOM  
page 2

Equipment	Equipment Size (ft)	Electrical Needs	To Be Purchased	Existing Equipment	Venting Reduired	Water & Drain Required
Ether Extract Analyzer	4	110	-	X	X(Fume* Hood)	Cold H <sub>2</sub> O Drain
Sample Grinder	2	110	-	X	X(Fume* Hood)	-
Micro Kjedah1	2	110	-	X	X(Fume* Hood)	Cold H <sub>2</sub> O Drain
Titration Unit	2		X	-	-	-

\*These three items can be utilized in the same fume hood.

1A TEACHING LABORATORY CLASSROOM

page 3

- Other Movable Equipment

Room will require two portable carts on casters capable of being moved around the lab. Approximate size should be 2.5 ft. by 4 ft. with two adjustable shelves. Carts should have caster locks and acid, alkali resistant tops.

One portable folding table on casters which folds in the center for storage, but in use, is 2.5 x 12 ft. Table should have caster locks and acid, alkali resistant top.

- Fixed Equipment

Student stations to accommodate four students each. Each station will require acid, alkali resistant counter tops, one sink per station, hot and cold water, two gas outlets, one compressed air outlet and 110 electrical service providing four outlets.

Instructor station must have acid, alkali resistant counter top, one sink, hot and cold water, one gas outlet, one compressed air outlet and 110 electrical service for four outlets. This station will require under the counter storage with drawers and shelves. Instructor should be able to control lights in the laboratory from this station.

Counter top with storage below should be provided wherever possible. This counter top should be acid alkali resistant. Storage cabinets can be conventional.

This room will require two sinks mounted in perimeter base cabinets with hot and cold water and drying racks located above sinks.

De-ionized water will be required at one sink.

Wall mounted cabinets with see-through doors be provided above base cabinets wherever possible. All cabinets shall be equipped with master Best key locks.

This room will require 80 square feet of chalkboard.

This room will require 40-50 square feet of bulletin boards.

This room will require overhead projector screen--retractable.

One wall clock.

Emergency shower and eye wash must be provided in laboratory.

Five feet of floor space for Kjeldahl analysis with five linear feet of acid, alkali resistant counter top on either side must be provided. Kjeldahl will require 220 volt electrical service. This equipment will be purchased with National Science Foundation funds.

1A TEACHING LABORATORY CLASSROOM  
page 4

- Ventilation

General ventilation for teaching laboratory should be provided.

Special ventilation will be necessary for Kjeldahl analyzer and other equipment as noted in movable equipment section.

- Electrical\*\*

Both 110 and 220 electrical service will be required for connecting the equipment as listed. Provide additional 110 outlets for service use.

This room should be provided with telephone and closed television systems.

- Relationship to other activities or space

This room must have close proximity to 1B and 1C.

\*\*One enclosed explosion proof fume hood for micro Kjeldahl and ether extractor.

1B LABORATORY STORAGE - INSTRUCTOR PREPARATION AREA

Needs Statement

This room will be used for storage and instructor preparation.

Facility Requirements

- Assignable Area

The assignable square feet should be 300.

- Movable Equipment

Room will require a double door refrigerator-freezer with lock---16 cubic ft.

Room will require a walk in freezer with storage shelves on two walls. This freezer should contain approximately 40 square feet of floor area.

- Fixed Equipment

Room will require an instructor preparation area with alkali, acid resistant counter top. Area should have one sink, hot and cold water, one gas outlet, one compressed air outlet and 110 electrical service outlet. This station will require under the counter storage with drawers and shelves.

Cabinets - fifteen linear feet of acid, alkali resistant counter top with below counter storage should be provided. Above counter storage with locking sliding glass doors will be necessary.

Additional 15 LFT of wall storage, explosion-proof, vented safety cabinets for equipment and chemicals. Shelves should be adjustable and removable. Doors should have glass front and locking.

Cabinet storage for 20 microscopes. This cabinet must be a locking type.

10 square feet of bulletin boards.

10 square feet of chalkboard.

One wall clock.

- Electrical

110 Service outlets on all open walls.

Proper electrical circuits for walk-in freezer.

- Relationship to other activities or space.

This room must have close proximity to 1A.

Door between 1A and 1B must be large enough to freely move equipment and movable carts.

1C WEIGHING ROOM

Needs Statement

This room will be utilized to precisely weigh out samples to be used in the laboratory.

Facility Requirements

- Assignable Area

The assignable square feet should be 75.

- Fixed Equipment:

Minimum of 12 feet of counter area 30 inches deep, 28 inches off the floor, should be provided as a surface on which to place balances. This counter may have conventional surface with leg room below.

- Ventilation:

No special ventilation will be necessary. Room should be free from drafts.

- Electrical:

110 outlets should be provided above counter area every 6 feet.

Room should be well lighted.

- Relationship to other activities and space:

This room must have close proximity to 1A and 1B.

2A STUDENT LOCKER ROOM - SANITATION AREA

Needs Statement

This room will be utilized by students preparing to work with livestock. This room will also be used for students and staff for sanitation of boots and equipment.

Facility Requirement

- Assignable Area

The assignable square feet should be 360.

- Movable Equipment:

Room will require 100 small baskets capable of being locked used for storing coveralls, boots and other personal gear of students. These may be in a rack which allows stacking of four or five baskets high. Bottom baskets should be high enough so that the room could be hosed out without getting items in baskets wet.

Room will contain benches for students to sit on while changing boots, etc. Enough space for 25 students at one time.

- Ventilation:

Adequate for this type of room.

- Electrical:

Provides 110 service outlets along walls.

- Plumbing:

This room must be equipped with a floor drain, hot and cold water and hose bib sanitation station.

- Fixed Equipment: (should be of moisture resistant construction)

half circle, industrial type sink  
wall mirror  
2 hand dryers (blower type)  
wall mounted hooks for hanging coats etc. (50)  
hot and cold faucets to connect hose for sanitation  
wall mounted hose reel  
32 square feet of chalkboard  
32 square feet of bulletin board  
one six foot wall hanging cabinet with solid doors with locks  
flooring - sealed concrete will be adequate

2B FEMALE LAVATORY - SHOWER AND 2C MALE LAVATORY - SHOWER

Needs Statement

To be used for shower-changing area, bench seating area.

Facility Requirements

- Assignable Area; sized for 24 students, plus three staff people.

The assignable square feet should be 120 including standard sized enclosed showers, each.

- Fixed Equipment:

wall mirror  
hand dryer (blower type)  
wall mounted soap dispenser  
ceramic tile shower  
add two urinals for 2C

Please note both drains in locker room and shower stall should be 4" drains with easy access to clean out. Additional settling tank should be tied into this drain system that can be pumped as necessary.

- Ventilation:

Provide adequate ventilation.

- Electrical:

1 - 110 electrical outlet

- Relationship to other activities and space:

- Utilities:

Back to back plumbing service for areas 2B and 2C.

Access from areas (1) and (2).

### 3A ARENA - LIVESTOCK WORKING AREA

#### Needs Statement

This area will be used for hands on teaching in the following areas.

- A. Livestock management techniques such as castration, dehorning, injections and hoof trimming.
- B. Large animal restraint and handling.
- C. Large animal surgery.
- D. Selection and livestock evaluation.
- E. Fitting and grooming of show animals.
- F. Area at times may contain portable metabolism stalls.
- G. Area may contain portable maternity pens.
- H. Artificial insemination of livestock.
- I. Wool evaluation.
- J. Forage analysis - silage, hay, haylage

This arena may be utilized for 4-H, FFA and other community events

#### Facility Requirements

##### - Assignable Area:

The assignable square footage should be 7,000 with a min. ceiling hgt. of 16'.

##### - Seating Arrangement:

Expando bleachers (pull out) capable of seating at least 250 people. Additional seating up to 500 desirable. These will be on concrete.

##### - Movable Equipment:

Movable animal working panels  
Squeeze chute  
Holding pen  
Large animal tilt table  
Metabolism crates  
Maternity pens  
Portable chalk board - 32 square feet

##### - Fixed Equipment:

Protective - retainer for purpose of protecting walls.  
A door on an outside wall shall be 14' wide and extend in height to the ceiling.  
Main entrance to building should enter into this area and have the capability to be opened for the whole ceiling height.  
One wall clock.  
One overhead projector screen, retractable (8 x 10 ft.).  
Two bulletin boards 4 x 8 ft.

3A ARENA - LIVESTOCK WORKING AREA

page 2

- Quality of Space:

Arena (other than concrete mentioned above) shall be of clay-soil base.

- Heating:

We desire to maintain a minimum temperature of 45°F with capabilities of spot heating in the working area at a minimum of 60°F.

- Venting:

Adequate air exchange is necessary for prevention of build up of odors from animals in this area.

- Plumbing:

1" cold water supply with hose bib and one mixing station (cold and hot) for hose attachment

Drinking fountain

1" faucet cold water for wetting arena and other special purposes.

- Electrical - Adequate 110 volt outlets on exterior and interior walls of arena.

Overhead 110 outlets (installed in ceiling of arena) with 6" electrical pigtailed. Four in length of arena.

1 - 220 volt outlet available for arc welder.

Adequate lighting for teaching area and special events.

- Relationship to other activities and space:

Arena must be centrally located in the complex with one wall being an exterior wall with large door.

Accessible from animal holding areas with doors to laboratory complex circulation area.

Viewing window to farrowing unit.

#### 4A Swine Farrowing Area

##### Needs Statement

This area will be utilized for farrowing five sows at one time, a maximum of four farrowings per year. Sows and piglets will be in this area a maximum of six weeks per farrow. Consideration should be given for ease of cleaning and maximum sanitation. Consideration should be given to the fact that small groups of students (16) will be in this area thus it will need to be larger than a conventional farrowing facility.

##### Facility Requirements

###### - Assignable Area:

This unit should contain 540 square feet.

###### - Movable Equipment:

Five portable farrowing crates with flush pans, pan risers, coated pads and P.V.C. tubing with valves on waste system.

Ten heat lamps for spot heating of young pigs.

###### - Fixed Equipment:

Adequate shelving for temporary storage of equipment, drugs and farrowing records.

Viewing window between farrowing unit and arena walkway. Window should be approximately 6'wide by 3'high.

Ceiling height in this area should be conventional height (approximately 8').

One wall clock.

One small sink with hot and cold water. Trap with clean out.

Door between farrowing unit and swine gestation and finishing unit should be five feet in width to ensure easy passage of crates, feeding equipment.

One 4 x 4 ft. chalkboard and one 4 x 4 ft. bulletin board.

###### - Heating:

Must have the ability to heat this room up to 80°.

###### - Ventilation:

Adequate ventilation for swine farrowing unit.

Odors from swine areas must be contained so they do not reach other areas of this facility.

4A SWINE FARROWING AREA

page 2

- Electrical:

Will require 110 volts on walls and ceiling outlets for heat lamps over each farrowing unit. Ten 2' pigtails for ceiling outlets.

Outlet for wall clock.

- Plumbing:

Waste system will require floor drain (4") that will connect to the 4" P.V.C. drain system on the nursery and finishing pens. In addition, a floor drain located in the center of the room will be necessary for normal washdown and sanitation. This drain system must carry solid and liquid wastes to an underground storage facility that must handle the waste from this unit and the nursery-finishing unit.

Must have hot and cold water available for washdown and sanitation.

Adequate plumbing to supply cold water to each animal unit.

- Relationship to other activities and space:

This room must be next to 4B and have access to the outside and laboratory complex.

#### 4B SWINE NURSERY-FINISHING AREA

##### NEEDS STATEMENT

This area will be utilized for growing out weaned pigs from the farrowing unit.

##### Facility Requirements

###### - Assignable Area:

This unit should contain 630 square feet.

###### - Movable Equipment:

Four mini-nursery units (3' x 7') with flush pans, pan risers, coated pads and P.V.C. tubing with valves on waste system (see brochure.)

###### - Fixed Equipment:

Shelving for temporary storage of equipment, drugs and nursery-finishing records.

Portable scale for weighing pigs (3' x 6').

Viewing windows (2) between this room and the arena walkway. Windows should be approximately 4' wide and 2' high.

Must have door leading to arena from this room. Door must be adequate for animal and equipment passage.

Must have door leading to outside area and loading chute for swine. Door must be adequate for animal and equipment passage.

Must have a large door (5') leading to the feed mixing and storage room.

###### - Heating:

Same as farrowing area.

###### - Ventilation:

Same as farrowing area.

###### - Electrical:

110 volt wall outlets.

###### - Plumbing:

Waste system will require floor drain (4") that will connect to the 4" P.V.C. drain system on the farrowing pens. In addition, a floor drain located in the center of the room will be necessary for normal washdown

4B SWINE NURSERY-FINISHING AREA

page 2

and sanitation. This drain system must carry solid and liquid wastes to an underground storage facility that must handle the waste from this unit and the farrowing unit.

Must have hot and cold water available for washdown and sanitation.

Adequate plumbing to supply cold water to each animal unit.

- Relationship to other activities and space:

This room must be next to 4A.

4C BEEF AND SHEEP HOUSING AREA

Needs Statement

This area will contain group housing for beef and sheep with separate areas for each species. Livestock in this area will not be at UMW on a permanent basis but will be brought in and utilized as the class schedule demands. Estimated usage would be 30 ewes for 200 days per year and 10 cows for 300 days per year. This area will also contain individual pens for sheep and cattle. Class instruction will be frequent in these areas.

Facility Requirements

- Assignable Area:

The total square feet in this combined area should be 3500 square feet.

Five individual sheep pens, each containing 30 square feet.	150
Three cattle maternity pens, each containing 90 square feet.	270
Primary sheep holding area with 576 square feet (24' x 24') with the capability of subdividing into two 12' x 24' or four 12' x 12' units.	576
Primary beef holding area with 864 square feet, 24' x 36' with the capability of subdividing into three 12' x 24' units.	864
Special consideration should be given to large alleyways to allow for student participation and easy movement of animals.	1640
	Total Square Feet <u>3500</u>

- Moveable Equipment:

Animals in this area will be fed with a portable feed cart of appropriate size.

Steel panels of appropriate size to subdivide animal pens when necessary

- Fixed Equipment:

Appropriate steel panels and gates to construct permanent animal holding pens.

Adequate feed bunk space for animals. These bunks must be accessible from the alleyways as feeding will be done with feed cart.

Adequate shelving for temporary storage of equipment, drugs and livestock records.

One wall clock.

1 4x4 ft. chalkboard and 14x4 ft. bulletin board.

Must have animal passage door leading to arena from this area.

Must have door leading to outside and loading chute for sheep and beef.

Must have large door (5 ft.) leading to feed storage and mixing room.

4C BEEF AND SHEEP HOUSING AREA  
page 2

- Heating:

Must have the ability to heat and hold this area at 45° F.

- Ventilation:

Adequate ventilation for animal holding area. Odors from this area must be contained so they do not reach other areas of the facility.

- Electrical:

Meet Minnesota code requirements. Will require 110 volt outlets on walls.

One outlet for wall clock.

Ceiling outlets over large animal holding pens with 6' pigtailed from ceiling outlets.

- Animal Waste:

Will be cleaned by electric driven gutter cleaners so adequate wiring must be supplied.

- Plumbing - Animal Waste:

Waste system will be handled by one loop of gutter chain passing through this area. Waste will be stored in an underground storage facility which must be of such size to allow for one full years storage. System should be such that general washdown could occur in individual or entire unit(s).

Sufficient cold water must be available for washdown of facility.

Adequate plumbing to supply water to each animal unit.

- Relationship to other activities and space:

This area must be in close proximity to 3A and 5A.

#### 4D TEMPORARY ANIMAL HOLDING: GENERAL STORAGE AREA

##### Needs Statement

This area will be utilized for the following:

1. To hold on a short term basis (few days only) animals which we wish to keep isolated from more permanent stock. Such a case might be a judging event or workshop.
2. Area would be used to store bulky materials such as hay and bedding.
3. Area will be used to store steel panels and other large equipment used in the facility.

##### Facility Requirements

###### - Assignable Area:

The total square feet of this area should be 1000 square feet.

All animal holding panels, waters, and feeding equipment in this area should be portable in nature to allow for total flexibility.

Flooring in this area should be concrete, designed such that portable panels may be secured and of sufficient strength to support heavy equipment such as trucks unloading hay or medium sized tractors.

###### - Movable equipment:

Appropriate steel panels and gates for a maximum of three holding pens with approximately 275 square feet in each. These panels must be of a type that can be secured in concrete floor.

Three portable feed bunks for use in above pens.

Three portable water containers for use in above pens.

###### - Fixed equipment:

Three overhead doors to outside area for loading and unloading equipment, hay, bedding or animals. These doors should be of such height to capitalize on the ceiling.

One small 4 ft. door leading to outside

Area must have large door (5 ft.) leading to the beef-sheep holding area.

Area must have large door (5 ft.) leading to the arena.

###### - Heating:

This area will not require heating.

4D TEMPORARY ANIMAL HOLDING: GENERAL STORAGE AREA  
page 2

- Electrical:

Area will require 110 volt outlets on walls.

1 - 220 outlet for a 300 amp welder.

- Plumbing and Animal Waste:

This area should be designed with the capability to wash and collect into the sheep-beef animal waste system.

Cold water with frost protection will be necessary for wash down and animal drinking water.

4E POULTRY HOUSING AREA

Needs Statement

This room will be utilized for poultry housing and hands-on instruction with various poultry species.

Facility Requirements

- Assignable Area:

This area should have 700 square feet.

- Moveable Equipment:

- 25 portable cages which can house individual chickens.
- 10 portable cages which can house groups of five chickens.
- 10 portable cages which can house individual turkeys.
- 5 portable cages which can house groups of five turkeys.
- 10 portable cages which can house of ten Japanese Quail.

- Fixed Equipment:

Should have capability to inject medication in water.

5' exterior door.

Countertop with storage below and above should be provided. Location should be near sink.

- Heating:

Must be capable of heating between 45°-90° floor temperature. Some spot heat with heat lamps may be required.

- Ventilation:

Proper ventilation - air exchange is crucial to this room.

- Electrical:

Ceiling outlets with 3' pigtails for spot heating.

Variable control for overhead lights with seven-day automatic timer.

110 volt electrical wall outlets.

- Plumbing:

Water supply for birds - overhead.

Sanitary station near outside entrance with cold and hot water and proper drainage.

4E POULTRY HOUSING AREA  
page 2

Floor drainage provided in center of room for adequate wash down of liquids. Drain to be connected to central storage of waste products.

- Relationship to other activities and space:

Because of disease concerns, special consideration for capability of quarantining this poultry facility is essential.

Access directly from outside and Laboratory Complex.

5A FEED MIXING AND STORAGE ROOM

Needs Statement.

This room will be utilized to mix diets for all animals in the entire facility. Will also store mixed feeds, supplements and any commercial feeds that may be purchased.

Facility Requirements:

- Assignable Area:

This unit should contain 540 square feet.

- Movable Equipment:

Portable feed cart to deliver feed to all animal units in the facility. Capacity of this cart should be 15-20 cubic feet.

One heavy-duty hand truck.

Portable scales (1,000 lb. maximum) for weighing sacked feed.

- Fixed Equipment:

Two outside feed storage units with capacity of 100 bushels each. These units must have capabilities of delivering contents into the mixing room.

Mixer to mix feeds. This will not need to be a large volume unit. Desire to have a built-in scale in unit.

Nine foot wide overhead door to outside. Used to deliver supplements and premixed feeds.

Door to nursery-finishing area as described in 4B.

Door leading to other animal holding areas shall be 5' in width.

- Ventilation:

Adequate air flow to meet OSHA regulations for feed mixing area.

- Heating:

Capable of heating this unit to 55°.

- Electrical:

Both 110 and 220 volt service to run equipment in this area and outside feed storage units.

- Relationship to other activities and space:

This room must be in close proximity to 4B and 4C for direct access with carts.

6A TECHNICIAN OFFICE

Needs Statement

This room will be used by the technician responsible for this facility. Room will contain records of facility activities.

Facility Requirements

- Assignable Area:

This office should contain 110 square feet.

- Moveable Equipment:

One desk, with chair  
Two four-drawer filing cabinets  
Two additional chairs

- Fixed Equipment:

Proper access to arena and animal holding facilities and animal supply room.

One 4' x 4' chalk board.  
One 4' x 4' bulletin board.  
One wall clock.  
Wall shelving 6 LFT.

- Ventilation:

Normal

- Heating:

Normal

- Electrical:

110 volt to Minnesota Code.

- Relationship to other activities and space:

This room must be next to 6B.

## 6B ANIMAL SUPPLY STORAGE

### Needs Statement

This room will be used for storing small equipment, supplies and medicines used in this facility.

### Facility Requirements

#### - Assignable Area:

This room should contain 110 square feet.

#### - Moveable Equipment:

One upright refrigerator/freezer combination - 18 cubic feet.

#### - Fixed equipment:

8 ft. countertop with storage above and below. All storage should be lockable.

One double sink with hot and cold water.

One 4'x4' chalk board.

One door entering technician's office.

One door entering animal housing area.

48 cubic feet of additional lockable storage (floor to ceiling) for equipment. This unit should have a depth of about 18".

#### - Ventilation:

Normal

#### - Heating:

Normal

#### - Electrical:

110 outlets above countertop and on free walls.

#### - Plumbing:

Adequate for sink.

#### - Relationship to other activities and space.

This room must be next to 6A.

F. Facilities Priorities

1. List-Ranking

- a. Educational teaching laboratory. Most vital for practical, hands-on experiences.
- b. Laboratory-Storage-Instructor Preparation. This area is essential. Walk-in freezer could be replaced with a conventional freezer.
- c. All livestock housing areas that are built in the facilities are vital. Temporary animal holding area is of less importance. Adequate general storage is essential.
- d. Feed mixing and feed storage are necessary.
- e. Arena and livestock working area essential. Square footage could be reduced, if necessary.
- f. Student lockers, sanitary area and lavatories are essential. Showers could be eliminated, if necessary.
- g. Technical office and animal supply storage could be combined.
- h. Weighing room is desirable but not essential.

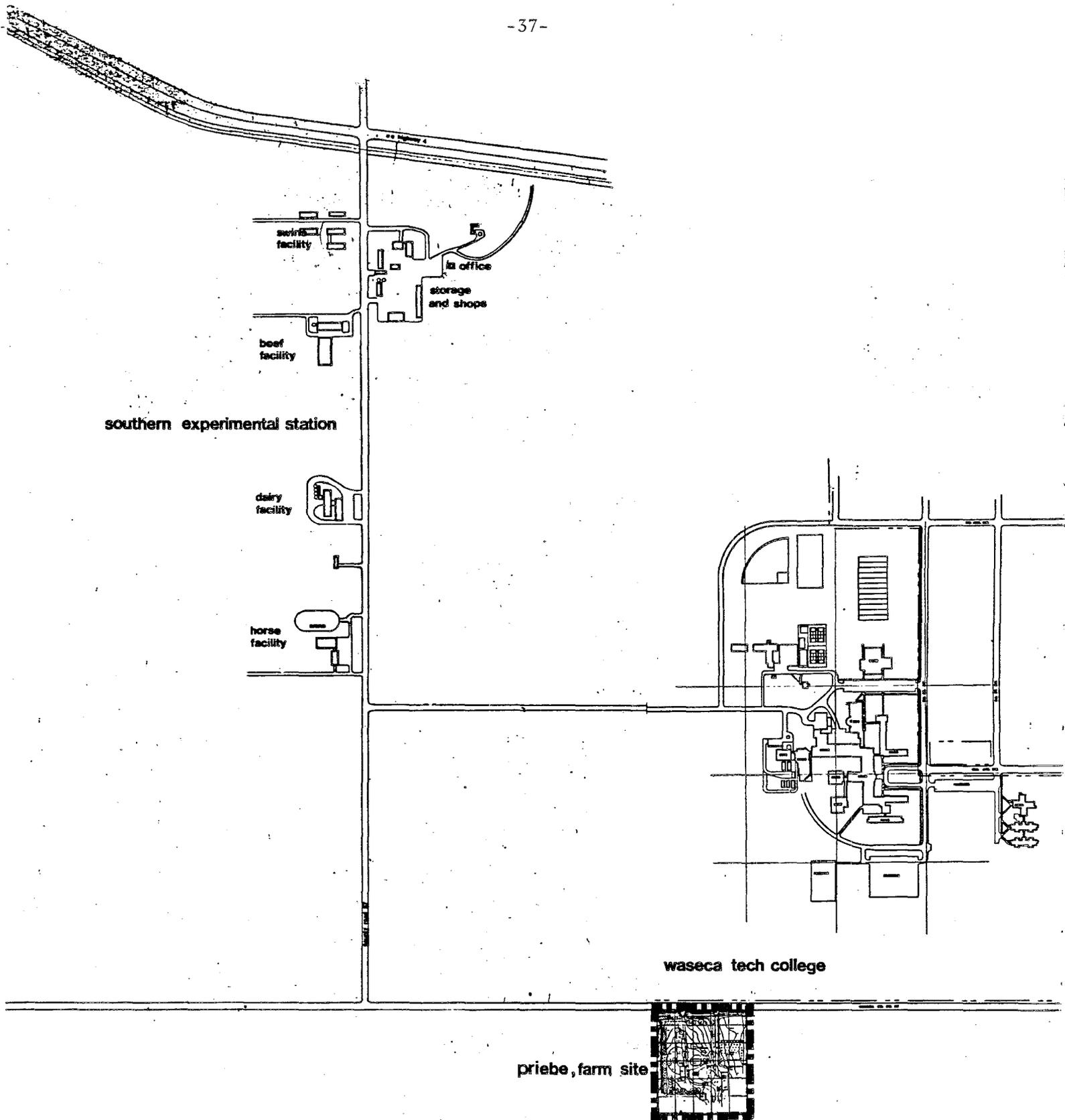
#### IV. Site Selection Study

The site will be on the Southern Experiment Station on a track of land (on the farmstead south of County 57) to be made available for management by the University of Minnesota Technical College, Waseca. The site selected was chosen because of its location outside of the city limits of Waseca, which does not permit extended livestock holding facilities. This site is desirable because of its close proximity to the existing University of Minnesota Technical College campus in Waseca (see page 37).

Since the Schematic Design stage will position the building in a more precise manner, a determination will be made at that time as what existing farm buildings will be removed, above and below grade, for the new facility (see page 38).

#### Utilities:

1. Steam: Not available.
2. Gas: Will have to run a line from the campus to the Priebe Farm site.
3. Water: A well exists on the site.
4. Electric: Electric service will be provided from lines which run on County Road 57.
5. Sanitary Sewer: Not available.
6. Storm Sewer: Not available.



southern experimental station

swine facility

beef facility

dairy facility

horse facility

lab office  
storage and shops

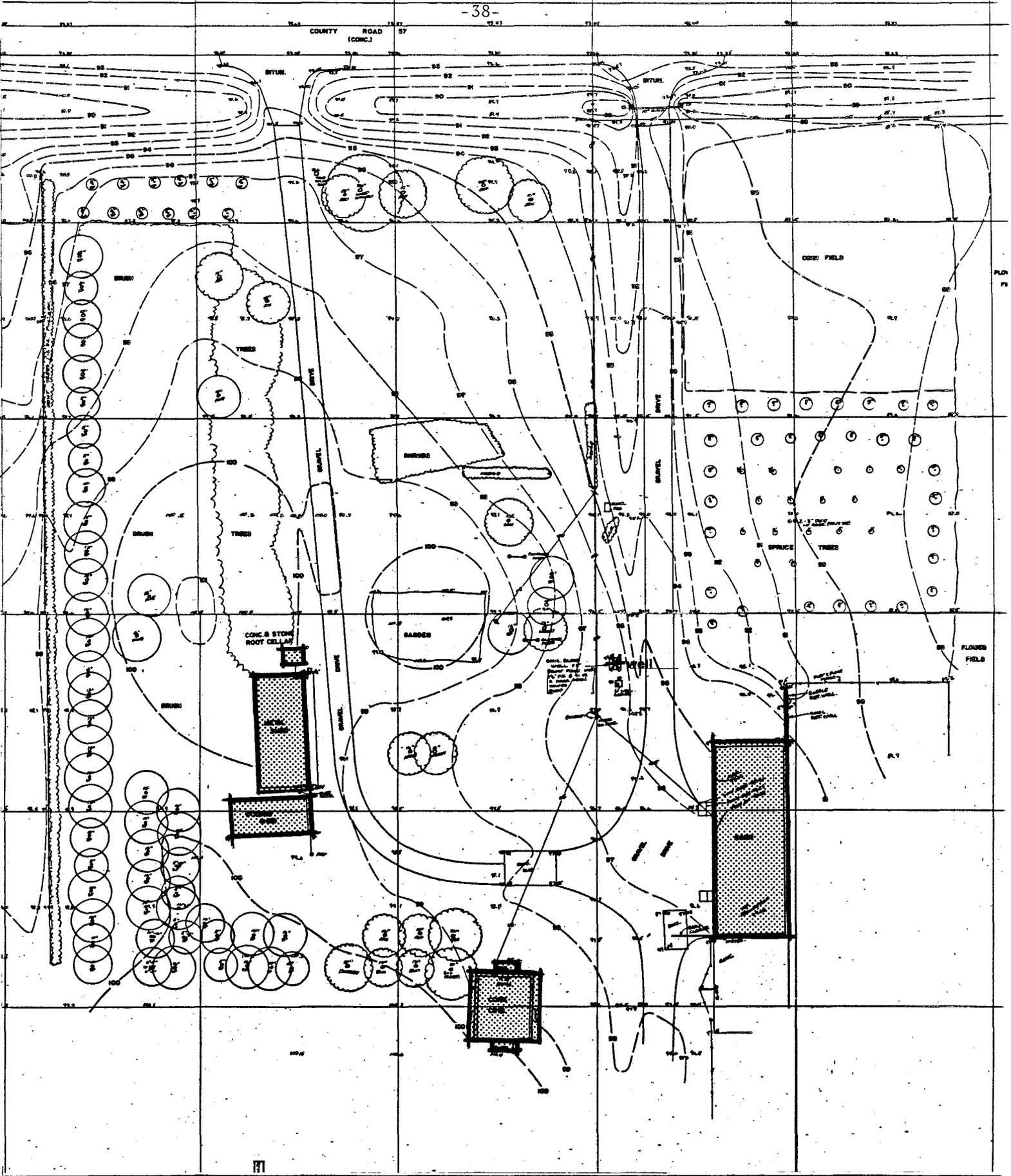
waseca tech college

priebe, farm site

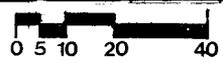


university of minnesota  
waseca





university of minnesota  
 waseca priebe, farm site



## **V. general requirements**

V. General Requirements

A. Building Requirements and Codes

The facility is to be designed and constructed in conformance with the latest amended edition of the Minnesota State Building Code. The architect/engineer is expected to ascertain and comply with the applicable codes and regulations, such as OSHA and handicapped access requirements. The architect/engineer is to comply with the latest edition of the "U of M Manual of Construction Standards." If programmed requirements or other University standards are at variance with codes or regulations, the architect/engineer shall notify the University Physical Planning Office.

B. Long Range Development Plan

The long range plans for the Animal Science discipline call for the development of a "hands on" teaching facility that will enable the students of UMW the opportunity to develop skills necessary for employment in midmanagement positions in the livestock industry.

The facilities must include a teaching laboratory classroom, livestock working-housing area, as well as supporting facilities. The proposed facility will be sufficient to meet present needs, plus an allowance for future needs.

C. University Construction Standards

To be developed by Physical Planning of the University of Minnesota.

D. Conservation of Resources

Recognizing the University's social and economic responsibility and impact, it is a specific policy of the University that physical facilities be designed with the objective of conserving natural resources, both in initial construction and in operation. Adherence to State of Minnesota and Federal laws, regulations and guidelines relative to conservation of natural resources, conservation of energy, and water and air pollution standards is required in the design, construction, and operation of facilities of the University. Particularly, it is required that systems and materials of construction be selected to minimize consumption of energy resources. The effect of this policy is to require careful analysis and design of all construction components and systems relative to effective use of resources and to initial versus operating and maintenance costs. It is evident that achieving these goals will often involve greater initial expenditure; and realization of a reasonable balance of these factors, within fixed requirements will be required.

E. Project Schedule

Appropriation	May 1981
Building Program Complete	November 1981
Schematics Complete	December 1981
Regents and Legislative Approval	January 1982
Construction Drawings Complete	February 1982
Review Bid and Award	April 1982
Construction Start	May 1982
Mid Construction Date	July 1982
Construction Completed	October 1982

F. Budget Summary

Construction		\$485,250
Laboratory-Classroom Complex	\$208,850	
Animal Housing and Arena	276,400	
Non-Building Costs		
Consultants	\$45,300	\$161,750
Equipment and Furnishings	51,700	
Site Work	35,580	
Other	29,170	
Total Project Cost		\$647,000

## **VI. appendices**

VI. APPENDIX

1. LIST OF COURSES USING LIVESTOCK LABORATORY AND HOLDING FACILITIES

DESCRIPTION OF COURSES

Agricultural Science (AgSc)

1059. Special Problems in Agriculture. (1-3 cr; hrs. per wk)  
Individual study in some field of agriculture, directed and adapted to any program area by appropriate members of the faculty.
- 1554w,s Research Techniques (4 cr; 5 hrs. per wk)  
Designed to prepare students for careers in research; basic terminology used by research personnel, experimental design, data collection, and simple statistical analyses. Each student must design and execute his or her own experiment, summarizing the data in the form of a technical paper.
- 1395w,s Clinical Anatomy and Physiology. (5 cr; prereq BiSc 1105, Chem 1105, 1224 or consent; 7 hrs. per week)  
Comparative veterinary anatomy and physiology. Body systems and functions examined in their relationship to clinical medicine and surgery.
- 1424s,su Surgical Nursing and Anesthesiology. (4 cr; prereq 1395; 6 hrs. per wk)  
Presurgical preparation and postsurgical care of animals. Techniques involved in animal surgery, anesthesiology, euthanasia, dentistry and equipment sterilization.
- 1442s,su Animal Parasitology (2 cr; prereq BiSc 1105, 1205, Chem 1105, 1224 or consent; 3 hrs. per wk)  
Classification of the common internal and external parasites of dogs, cats, cattle, sheep, swine, and horses. Laboratory procedures used for their identification. Drugs used in treatment.
- 1443s,su Pathogenic Microbiology. (3 cr; prereq BiSc 1255; 5 hrs. per wk)  
Laboratory procedures and techniques used to isolate and identify pathogenic micro-organisms from tissue, body fluids, and milk.
- 1454f,w Clinical Laboratory II. (4 cr; prereq BiSc 1105; 6 hrs. per wk)  
Fundamentals of blood morphology and laboratory techniques concerned with the solid components of the blood.
- 1554w,s Clinical Laboratory II. (4 cr; prereq 1454; 6 hrs. per wk)  
Detailed study of urinalysis, blood analysis and blood chemistry with emphasis on colorimetric methods and techniques of kidney, liver and other organ function tests. Record keeping and preparation of clinical laboratory specimens. Pregnancy and estrus determination. Semen evaluation.
- 1555f,su Animal Diseases and Pharmacology (5 cr; prereq 1443, 1454, 1554, Chem 1224 or consent; 7 hrs. per wk)  
The use of drugs and biologicals in the prevention and treatment of animal diseases. The organization of the veterinary pharmacy and dispensing of drugs in veterinary practice.

- 1623f,w Radiologic Techniques. (3 cr; prereq BiSc 1105; 4 hrs. per wk)  
Physical principles of the X-ray. Identification of equipment including X-ray machine, film holders, cassettes, etc. Methods of developing, fixing, and drying radiographs. Positioning of the patient. Methods of film storage. Record keeping. Safety methods.
- 1723f,w Large Animal Assisting. (3 cr; 5 hrs. per wk)  
Restraint methods for large animals. Techniques involved in assisting the large animal veterinarian with vaccination, surgery, X-ray, and medical treatment procedures. Record keeping in large animal practice.
- 1772s,su Radiographic Anatomy. (2 cr; prereq 1623; 3 hrs. per wk)  
Study of the anatomy of large and small animals radiographically. Detailed study of skeletal and soft tissue.

Animal Science

- 10531f,w,s,su Introduction to Animal Science (3 cr; 4 hrs. per wk)  
The animal industry with emphasis on consumption and production patterns; livestock; and fundamental concepts of animal nutrition, animal breeding, and livestock management. Will cover dairy and beef cattle, swine, sheep, horses, turkeys, and broiler and laying chickens.
- 1122f,s Livestock Evaluation (2 cr; 4 hrs. per wk)  
Comparative judging, grading and selection of market and breeding classes of beef cattle, sheep, and swine. Type and performance testing stressed.
- 1332lw,s,su Artificial Insemination (2 cr; block course between qtrs of 3 hrs. per wk)  
Theory and practice of artificial breeding. Includes management, nutritional, physiological and genetic information necessary for a successful artificial insemination program.
- 1353f,w,s Animal Nutrition I--Basic Nutrition. (3 cr; 4 hrs. per wk)  
Classification of and methods used to analyze major nutrients. Digestion, absorption, and metabolism of nutrients as they relate to maintenance, growth, reproduction, and production. Digestive systems of avian, monogastric, and ruminant animals used in agricultural operations.
- 1364w,s Principles of Animal Breeding. (4 cr; prereq BiSc 1205; 5 hrs. per wk)  
Application of genetic principles to animal improvement. Selection and system of mating farm and laboratory animals. Use and value of performance testing and management of the breeding program.
- 1383f,su Animal Nutrition II--Applied Nutrition. (3 cr; prereq 1353 or consent; 4 hrs. per wk)  
Identification, classification and simple use of feed nutrients; methods of preparing feed; relative values of common feeds, by-products, and feed additives for various classes of livestock.

- 1471f,s Dairy Cattle Evaluation. (2 cr; 2 hrs. per wk)  
Advanced techniques in selecting and evaluating dairy cattle; practical applications and integration of evaluative techniques with economical dairy management.
- 1473f,s Beef Production and Management. (3 cr; prereq 1053 or consent; 4 hrs. per wk)  
Production fundamentals and skills essential in the organization, operation, and management of beef cattle enterprises. Principles of breeding, reproduction, feeding, marketing, and building and equipment requirement stressed.
- 1483w,su Meat and Livestock Products. (3 cr; 5 hrs. per wk)  
Processes in evaluating and preparing meat and meat products. Marketing, humane slaughter, fabricating carcasses, and identifying retail meat cuts.
- 1491s,su Horse Evaluation. (1 cr; prereq 1193 or consent; 3 hrs. per wk)  
Evaluation of common breeds of horses based on conformation and performance. Proper presentation of reasons for evaluation.
- 1513f,w Dairy Cattle Production and Management. (3 cr; prereq 1053 or consent; 4 hrs. per wk)  
Production fundamentals of skills essential in the organization, operation, and management of dairy enterprises. Principles of breeding, reproduction, feeding, marketing, and building and equipment requirements stressed.
- 1523w,su Introduction To animal Diseases. (3 cr; 4 hrs. per wk)  
Cause of animal diseases; their prevention and control. The relationship of animal health to human health, and the role of regulating agencies.
- 1573w,su Milk and Dairy Products. (3 cr; 5 hrs. per wk)  
Processes in evaluating and preparing milk and dairy products. Marketing and pricing systems of the milk industry. Factors affecting grade, yield, and prices of dairy products.
- 1583s Sheep Production and Management. (3 cr; prereq 1053 or consent; 5 hrs. per wk)  
Production fundamentals and skills essential in the organization, operation and management of sheep enterprises. Principles of breeding, reproduction, feeding, marketing, and building and equipment requirements stressed.
- 1623f,w,s,s Livestock Management Techniques. (3 cr; prereq 1053 or consent; 5 hrs. per wk)  
Management skills used in dairy and beef cattle, sheep and swine production. Techniques include dehorning, docking, castration, vaccination, and back fat probing. Identification methods discussed, demonstrated, and practiced.

Biological Sciences (BiSc)

- 1105f,w,su Animal Biology I. (5 cr; 3 hrs. per wk)  
Fundamental principles of animal biology; taxonomy and biology of the animal kingdom and the physiology and anatomy of animals, emphasizing those of agricultural importance.
- 1205f,w,s Animal Biology II. (5 cr; prereq 1105; 7 hrs. per wk)  
Fundamental principles of animal biology; animal genetics, development and ecology of the animal kingdom.
- 1255s,w Microbiology. (5 cr; prereq 4 cr of biology; 7 hrs. per wk)  
The basic structure and function of micro-organisms, including physiology, reproduction, classification, and control. Laboratory work includes staining, culturing, and identification procedures.

Chemistry (Chem)

- 1224w,s Organic and Biochemistry. (4 cr; prereq 1105; 6 hrs. per wk)  
Common classes of carbon compounds and the role of proteins, carbohydrates, enzymes, lipids, nucleic acids, and vitamins in living systems.
- 1374s Methods of Chemical Analysis. (5 cr; prereq 1104 or equiv; 6 hrs. per wk)  
Fundamental principles involved in sampling techniques, qualitative analysis quantitative analysis, and instrumental methods of analysis. Laboratory work involves analyses commonly performed in agricultural, biological, and food laboratories.