

**Faculty of Agricultural and Food
Sciences
Biosecurity Protocol
University of Manitoba**

**Amended and approved for release by the
Faculty of Agricultural and Food Sciences Executive Committee
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Purpose of this Agricultural Biosecurity Protocol

The purpose of this document is to ensure individuals conducting research and delivering academic and outreach programs in the Faculty of Agricultural and Food Sciences at the University of Manitoba understand agricultural biosecurity principles and procedures as defined in this Protocol to minimize the spread of plant and animal pests and/or harmful biological entities. The scope of this protocol includes University of Manitoba research facilities as well as non-university research sites. Under conditions of heightened biosecurity risk, any resulting heightened biosecurity measures will supersede this Protocol.

The information contained within this document has been adapted from the Canadian Food Inspection Agency's Biosecurity Planning Guide and Manitoba Agriculture Guidelines for Reducing Clubroot Risks Associated with Field Research (Appendix A). This document will be reviewed and updated on an annual basis.

This Agricultural Biosecurity Protocol is comprised of the following sub-protocols:

1. Field Biosecurity
2. Ian N. Morrison Research Farm (INMRF)
3. Controlled Growth Environments
4. Animal Science/TK Cheung Livestock Research Facility Biosecurity
5. Glenlea Research Station Biosecurity
6. Field Trips/Tours Biosecurity

This Protocol is distinct and does not deal with Biosafety related items. For further information regarding biosafety at the University of Manitoba, please visit the [University of Manitoba Biosafety](#) page.

Who is Responsible for Faculty of Agricultural and Food Sciences Biosecurity?

All staff, researchers, students and visitors that enter University of Manitoba field, livestock and greenhouse/growth research areas managed by University of Manitoba personnel, whether located on or off university property, have the responsibility to protect these locations. Each research facility and/or research project will have an assigned lead responsible for ensuring established biosecurity protocols are followed. Everyone entering a research facility/site is expected to cooperate in following established protocols, but ultimately, the manager responsible must be willing to do what is necessary to ensure that staff and visitors follow protocols.

How will this FAFS Biosecurity Protocol be communicated?

The FAFS Biosecurity protocol will be part of the orientation package supplied to each new staff member, graduate student or undergraduate student employed within the Faculty. Staff and students must sign off that they have read and agree to follow the FAFS Biosecurity Protocol. Tour guests and visitors will be notified of the site-specific biosecurity protocols prior to any event. The Protocol will be **reviewed and updated on an annual basis** by the Faculty Biosecurity Committee and submitted to Faculty Executive for approval by February 15th of each year. The most recent date-stamped version of the Protocol will be posted on the FAFS Biosecurity Protocol [webpage](#) and will be circulated through the "agriculture-all" email list whenever a change has been made.

How will this FAFS Biosecurity Protocol be enforced?

The Faculty of Agricultural and Food Sciences Executive Committee will be responsible for defining and communicating mechanism(s) for enforcement of the faculty biosecurity protocol and for ensuring the protocols are updated regularly. Currently, these mechanism(s) are not in place and Faculty Executive has the responsibility for filling that gap. While the Protocol will be communicated generally to all staff and students, researchers in the faculty have responsibility for the conduct of personnel on their research teams including adherence to biosecurity protocols.

Background

"Biosecurity" is a general description for a set of measures designed to protect Canada's agricultural resources from biological pests at the national, regional, and individual farm/organizational levels. A biological pest is considered any thing that is injurious or potentially injurious, whether directly or indirectly, to plants, animals, products or by-products of plants/animals, or food. This includes pests not established in Canada, pests established in limited areas of Canada, and pests widely distributed that can spread from farm to farm.

A wide variety of organisms can be injurious to plants, animals and agricultural production. Depending on their biological nature, introduction of these pests into an agricultural or research setting can occur through a wide range of pathways. Knowing the pests of concern for your research location and identifying the pathways by which they are introduced and spread are key elements of any biosecurity plan.

Possible pathways of introducing plant pests to fields include the following:

- seeds and plant materials;
- vehicles and transportation;
- equipment;
- staff and visitors;
- agricultural inputs;
- irrigation water;
- soil, compost, manure;
- research materials (e.g. industrial/bio-industrial waste);
- insects and other pests;
- birds, wildlife, pets and other animals;
- wind and blown dust;
- food and feed products.

Possible pathways for introducing and transmitting pests in controlled growth environments include the following:

- field research plant material and soil via humans (e.g., field research staff) and equipment;
- transfer among greenhouses, separate rooms within each greenhouse, growth chambers and work areas within each growth area complex via people and tools;
- outside pests via human and equipment vectors, including general public traffic, students, service personnel and caretakers;
- delivery of infected seed or growth mediums (e.g., soil, sand, compost, etc.);
- introduction of plant pathogens used for research;
- improper disposal of infected organic material.

Possible sources or vectors for introducing animal diseases include the following:

- live animals (especially sick or recently recovered);
- dead or sick animals;
- animal products;
- staff and visitors;
- equipment;
- vehicles and transportation;
- feed, soil and water;
- feces and urine;
- birds, wildlife, and other animals;
- insects and other disease vectors;
- air (aerosols or particulates);
- food products.

Field Biosecurity refers to a series of practices designed to prevent, minimize, and control the introduction, spread, and release of plant pests, which include insects, nematodes, weeds, molluscs,

phytoplasma, bacteria, fungi, and viruses into fields. Biosecurity risks in field crops can be categorized as soil-borne pests (e.g., clubroot, verticillium, soybean cyst nematode), diseases associated with plant material, weed seeds, and insects introduced to a farm and moved within a farm enterprise.

Animal Biosecurity refers to a series of practices designed to prevent, minimize, and control the introduction and spread of animal diseases. Disease may result from a number of factors, including, but not limited to, infectious organisms; toxins; trauma or damage to a tissue or organ; and metabolic, nutritional, and degenerative conditions. However, a primary cause is infection from pathogens, namely viruses, bacteria, fungi, and parasites.

Why is Agricultural Biosecurity Important?

Maintenance of the highest possible plant, soil and animal health, as well as food safety is vitally important to the sustainability and profitability of the Canadian agricultural sector. The success of Canada's agricultural exports is linked to the excellent sanitary status of our plant and animal products. Access to existing markets and to new and emerging markets will increasingly depend on our ability to demonstrate the minimal biosecurity risk that Canadian products pose to our trading partners. Continual improvement of biosecurity standards may be needed to meet processor requirements, achieve/retain quality assurance certification and market access, to ensure market competitiveness for Canada's agricultural products and to maintain public trust.

Pests can reduce productivity, affect farm income and animal welfare, increase labour and other operational costs, reduce the value of farmland, close export markets, affect domestic consumption and reduce prices that producers receive for their animals, plants and other agricultural products. In addition to adverse effects on the agricultural economy, there can be negative effects on the environment and human health.

Considerations as to why someone may want to implement biosecurity measures within an operation include:

- achieving research standards and production objectives;
- external demand for biosecurity practices and protocols;
- decreased production losses;
- avoiding the introduction of pests that are currently not present;
- the desire to contain and minimize pests that are already present; and
- responsibilities to neighbours and industry to ensure that biosecurity risks are not introduced to someone else.

The capacity of the agricultural sector to withstand an outbreak rests not only on the collective efforts of the sector, but also on individual biosecurity plans and their effective implementation. Quick and simple measures built into your everyday management practices will go a long way toward protecting your research, production and resources from the costly consequences of pests.

Definitions

Biosecurity zone: an area with defined boundaries where biosecurity measures are to be implemented to control entry, exit, and movement to prevent the introduction and spread of pests (e.g., a field, greenhouse, animal handling area, or storage area). Also referred to as controlled and restricted access zones:

- a. **Controlled access zone (CAZ):** The area of land, buildings and/or spaces constituting the production or work area of the premises that is accessible through a defined access point.
- b. **Restricted access zone (RAZ):** An area inside the CAZ where personnel and equipment access is more restricted than in the CAZ.
- c. **Controlled access point (CAP):** A visually defined entry point(s) through which staff, students, visitors, and if applicable, residents, will enter the CAZ and/or the RAZ.

Controlled growth environment: a research area within the Faculty of Agricultural and Food Sciences that includes greenhouses, growth rooms, growth chambers and growth cabinets

Crop: throughout this document, "crop" is used in a widely inclusive sense to include plants, plant products, and other products that may be generated by a grower, producer, or operator for profit, including annual and perennial crops, fruit, vegetables, horticultural plants, trees and mushrooms

Farm: a tract of land held for the purposes of cultivation, crop production, and/or the rearing of certain animals. Throughout this document, "farm" is used to denote a physical location that generates crops, animals, plant products, and other products, and it includes barns, nurseries, greenhouses, and plant propagators. A field research facility is also considered a farm by this definition.

Field: an individual block or piece of land contained within a research location (e.g., field 8E at the Ian N. Morrison Research Farm or block 6 at the Point Research Station).

Livestock and poultry: food production animals used for research, education or outreach that are housed individually or in groups in cages, pens or stalls surrounded by a building structure or fence.

Location: a research location composed of multiple fields (e.g., Ian N. Morrison Research Farm, Point Research Station or a farmer's commercial field).

Pest: according to the Plant Protection Act, any thing that is injurious or potentially injurious, whether directly or indirectly, to plants, animals, or to products or by-products of plants and animals, and including any plant prescribed as a pest.

Producer: one who owns, leases, or rents land for cultivation, crop production, and/or the rearing of certain animals.

Research facility: a research site composed of multiple fields (e.g., Ian N. Morrison Research Farm, the Point Research Station, Glenlea Research Station), livestock facilities or livestock supporting buildings.

Residents/tenants: a person or group that is renting a field or research area within or outside of a FAFS research facility. This can include members of the FAFS or non-FAFS personnel.

Standard Operating Procedure (SOP): a set of written instructions that documents a routine or repetitive activity followed in a research area.

Safe Work Procedure (SWP): a set of procedures that describes how to perform a task safely, the potential hazards, the necessary protective equipment and required training.

Visitors: any personnel who normally do not work in the area/building who arrive at a research area (e.g., sales representatives, inspectors, delivery people, contractors, tour guests, attendees at workshops, etc.).

FIELD BIOSECURITY

Information from Manitoba Agriculture and the Canadian Food Inspection Agency has been incorporated in order that this protocol meets both provincial and national standards for field biosecurity.

Background The **FAFS Field Biosecurity Protocol** provides specific guidance on the practices required to reduce the risk of spreading pests when conducting field research, including communication strategies, crop input considerations and sanitation of humans, vehicles, trailers, equipment and small tools involved in field research. Precautions must be taken to minimize the transfer of soil and to disinfect footwear, vehicles and equipment by which soil can be transferred in order to reduce the risk of transferring pests from one location to another. This protocol must be used along with standard operating procedures (SOPs) and safe work procedures (SWPs).

Scope The Field Biosecurity Protocol pertains to field research locations on land owned and operated by the University of Manitoba (i.e., Ian N. Morrison Research Farm, Glenlea Research Station Point Field Research Laboratory, the Bison research location and the Arboretum research location), as well as non-University of Manitoba locations used by Faculty of Agricultural and Food Sciences staff for field research. The protocol applies to all faculty, staff, research collaborators, visitors and vendors/service providers accessing the field research locations. Individuals/entities leasing cropland at the Glenlea Research Station are required to follow the “Biosecurity and Reduction of Pest Movement Strategies for Producers” Schedule that accompanies their legal agreement (Appendix B).

Contact The manager at each field research location represents the contact for that location.

Communication and Documentation

- This protocol will be communicated to Faculty of Agricultural and Food Sciences staff via email and to FAFS staff and students during the spring safety training and orientation each year. This protocol will also be sent to Principal Investigators (PIs) and technicians in the departments, Faculty, and all other units or organizations at the time of initiating a land request for the Carman, Glenlea and Point research farms.
- PIs must discuss this protocol with their staff and students and work with them to develop the SOPs and SWPs that meet the needs of their specific research programs. PIs will be responsible for the conduct of the personnel in their research programs.
- This protocol should be discussed with any land owner, or non-University of Manitoba research farm prior to conducting research on their land. In addition to the FAFS Field Biosecurity Protocol, site-specific biosecurity protocols for these non-UofM research facilities or farms must be followed as required.
- It is mandatory to use the Manitoba Agriculture Field Biosecurity Checklist (Appendix C) to document the biosecurity measures that have taken place, and that these records be kept on file for five years. These documents will be stored in each vehicle and filled out following each field visit. If needed, the documentation for cleaned vehicles, equipment and small tools will be used as evidence that protocols were followed at each location. Each PI will be responsible for managing these documents for their research projects.
- This protocol will be provided to any producer, research collaborator or research funding agency that requests this information.
- This protocol can be utilized along with agreements for use of producer fields for research purposes. PIs may want to include a waiver in regards to biosecurity from producers as part of an agreement for access to their land. The landowner should be made aware of this protocol prior to signing the land lease.

Crop Inputs

At all field research locations, all members of the research team will use only clean, pest-free inputs prior to entering the field.

- Use certified seed whenever possible.
- Use seed treatments and coatings where appropriate and cropping/research project conditions warrant.
- When possible, source materials from suppliers and transporters known to implement a biosecurity risk management protocol.
- Inoculation of plant pathogens for research purposes should be restricted to the intended field treatment area. Surplus inoculum should be inactivated before disposal and infected plant material should be removed and properly disposed of at the end of the trial.
- Test manure for potential pests (e.g., invasive weeds, pathogens, etc.) and comply with existing local, municipal, provincial, and/or federal regulations pertaining to the application of manure to farmland.
- Evaluate components of industrial/bio-industrial waste to identify any potential biosecurity risk and refrain from using the waste if it contains contaminants deemed a biosecurity risk or if the biosecurity risk is undetermined.

Human Sanitation

- Complete the Field Biosecurity Checklist (Appendix C) following each field visit.
- Try to reduce field visits when field conditions are muddy.
- Use disposable footwear coverings prior to entering the field. These can be removed at the field edge immediately after leaving the field and placed in a garbage bag for disposal.
- All non-disposable footwear should be scraped clean of visible soil and washed before the next location. Use an approved disinfectant (Appendix D) between locations.
- Hands (and any other body parts) or clothing that may be covered with soil should be washed or cleaned off before leaving the location. The use of disposable gloves and/or coveralls is also recommended when working directly with the soil.

Vehicle, Trailer and Equipment Sanitation

- Maintain copies of the Field Biosecurity Checklist (Appendix C) in vehicles and equipment used in the field. Complete the Field Bio-Security Checklist following each field visit.
- Whenever possible, field visits should be done on foot.
- Vehicles (trucks and trailers) should be parked on roads, grassed areas, or in the approach and not in fields.
- Try to reduce field visits when the field is muddy.
- All vehicles and wheeled equipment (tractors, quads, trailers, implements and sprayers, etc.) entering any field must be cleaned after use. Upon leaving the field you should:
 1. Rough clean, which includes knocking or scraping off soil clumps in the field. Within Faculty research locations at Ian N. Morrison Research Farm, Glenlea Research Stations and the Point Research Station, a rough cleaning is required when moving equipment from field to field.
 2. Fine clean, (i) using compressed air to blow off remaining soil (for light texture soil and dry soil), or (ii) pressure-washing off remaining soil (for loams, clays and wet soil). It is preferred that this be done at the research station washing pad, or a nearby carwash (tires, wheels and undercarriage, especially wheel wells and anywhere else soil may have stuck). A fine cleaning is required when leaving a location after leaving a field or a muddy location.

Small Tool Sanitation

- All small tools (augers, shovels, trowels, etc.) entering any field must be cleaned after use. Upon leaving the field you should:
 1. Rough clean, which includes knocking or scraping off soil clumps in the field. Within Faculty research locations at Ian N. Morrison Research Farm, Glenlea Research Stations and the Point Research Station, a rough cleaning is required when moving equipment/tools from field to field.

2. Fine clean, (i) using compressed air to blow off remaining soil (for light texture soil and dry soil) or (ii) washing as described above (for loams and clays and wet soil). Spray down the equipment with an approved disinfectant. A fine cleaning is required when leaving a location.

IAN N. MORRISON RESEARCH FARM (INMRF) BIOSECURITY

Background	The INMRF Biosecurity Protocol provides specific guidance on the principles and practices required to reduce the risk of spreading pests when conducting field research, including the sanitation of humans, vehicles, trailers, equipment and tools involved in field research and communication. Precautions must be taken to minimize the transfer of soil and to disinfect footwear, vehicles and equipment by which soil can be transferred in order to reduce the risk of transferring pests from one location to another. This protocol must be used along with standard operating procedures (SOPs) and safe work procedures (SWPs).
Scope	The INMRF Biosecurity Protocol pertains to the land, buildings and facilities of the Ian N. Morrison Research Farm. The protocol applies to all staff, collaborators, visitors and vendors accessing the farm. See site maps and images for INMRF - Appendix E
Contact	Manager Alvin Iverson or designate. Office: 204.745.3944; Mobile: 204.745.8642; Email: Alvin.Iverson@umanitoba.ca

Communication and Documentation

- This protocol will be communicated to Faculty of Agricultural and Food Sciences staff via email and to FAFS staff and students during the spring safety training and orientation each year. This protocol will also be sent to Principal Investigators (PIs) and technicians in the departments, Faculty, and all other units or organizations at the time of initiating a land request for the INMRF.
- PIs must discuss this protocol with their staff and students and work with them to develop the SOPs and SWPs that meet the needs of their specific research programs. PIs will be responsible for the conduct of personnel in their research programs.

Visitors

- All visitors are to park in the public parking lot south of the main building and report to the main office prior to travelling to the field.
- All visitors are to sign in/out in the guest log book
- Visitors will be informed of biosecurity protocols in place, and disinfectant foot dip and or boot coverings will be made available to visitors if they do not have their own.
- There is a foot bath with a bleach solution available for visitors who have been to the field and are leaving located by the staff entrance door or by the main entrance when large field tours occur.

Handling and Disposal of Materials

- Whenever possible harvested material (seed, plant tissue, soil, compost and water) are to be processed and disposed of at the site where sampling occurred. Offsite harvested materials are to be disposed of in an approved manner such as: returned to the site of sampling, a land fill, autoclaving, or incineration.
- When harvested materials and samples need to be brought to the INMRF for further processing, biosecurity protocols are to be used to prevent transfer of unknown and known pests.
- When working with these samples at INMRF the following protocols must be followed:
- Samples are to be labeled as offsite samples
- Use proper containment on work surfaces and scales for easy cleanup and disposal.
- All material that is brought in needs to be disposed of in an approved manner
- Equipment used to process external samples needs to be cleaned of plant tissue, seeds and soil.
 - Materials (paper bags, plastic totes, etc.) used to handle the external samples need to be disinfected or disposed of in an approved manner.
- Disposal of plant material, grain and soil materials brought to the INMRS for processing are to:
 - Be labeled as off station material and kept separate from other material.
 - Bagged separately from regular garbage and taken off station to the dump for disposal.

Human Sanitation

- Use disposable foot coverings whenever possible.
- Prior to arriving at INMRF: footwear is to be cleaned of loose soil and plant debris, washed clean and disinfected using Virkon or a bleach solution (Appendix D) prior to arrival.
- Prior to leaving INMRF farm land: footwear is to be pre-cleaned in the field of soil and debris, washed prior to leaving the farm, and disinfected before they are used at another farm or agricultural research location.
- A foot scraper and boot washing station are located by the staff entrance door of the main building.

Vehicle, Trailer and Equipment Sanitation

- Prior to arriving at INMRF: Vehicles, farm/research equipment and tools that have been on an off-site farm field or agricultural research station are to be cleaned of loose soil and plant debris, washed clean prior to arrival at the INMRF. This includes disinfecting tires and parts that come in contact with the soil using an approved disinfectant (Appendix D).
- Prior to leaving INMRF farm land: Vehicles, farm/research equipment, and tools that come in contact with soil of the INMRF are to be pre-cleaned, pressure washed and tires and parts that come in contact with the soil are to be disinfected as follows:
- Tires/equipment and footwear that contact the soil are to be pre-cleaned of loose soil and debris onsite where equipment is being used.
- A final cleaning is then completed at the outside designated biosecurity gravelled area that is on the east side of building #4. At this location, there is access to:
 - An air compressor to blow loose soil off equipment.
 - Water and a pressure washer for cleaning.
 - A hand sprayer and disinfectant.
 - A wash station log book for use of the cleaning area and disinfectant.
 - A can for garbage and disposable footwear coverings.

CONTROLLED GROWTH ENVIRONMENTS BIOSECURITY

Background	The implementation of biosecurity measures to the Controlled Growth Environments will mitigate the introduction and spread of diseases and pests within and among the contained research growth environments. This involves proactive measures that integrate physical, cultural, environmental, biological and chemical control methods into a systematic approach.
Scope	The Controlled Growth Environment Biosecurity protocol pertains to greenhouses/ growth areas operated by the Department of Plant Science (i.e., in the Agriculture Building, The Point Field Research Laboratory and the Crop Technology Centre) and the Department of Soil Science (in the Soil Science Shed). The protocol applies to all faculty, staff, research collaborators, visitors and vendors/service providers accessing these greenhouses/growth areas.
Contact	Plant Science Greenhouse Manager Rob Visser or designate. Phone: 204.474.6065; Email: Robert.Visser@umanitoba.ca Soil Science Technician Bo Pan. Phone: 204.474.7884; Email: Bo.Pan@umanitoba.ca Soil Science Technician Trevor Fraser. Phone: 204.474.8014; Email: Trevor.Fraser@umanitoba.ca

Department of Plant Science Facilities

Biosecurity Control Zones for Managing Pests and Pest Vectors

See greenhouse building layout – Appendix E

1. Support and containment zones:

There are four support and containment zones:

- i. Agriculture Building: west garage door area (rooms 188 – 193)
 - Receives soil and other samples to be stored in the fridge or freezer; receives and store bales of soilless mix when necessary as well as other shipments; houses care-taking supplies and greenhouse tools and inventory.
 - All plant material, soil and samples must be logged (name, date, description and source location) to help track sources of infection.
 - All samples containing soil must be processed in this containment area and are not permitted to enter the restricted zone.
- ii. Agriculture Building: east garage door area (room 179)
 - Receives all outside plant material where it will be contained until it has been inspected and/or treated by staff for pests.
 - Receives soil and sand deliveries.
 - All arrivals must be logged (name, date, description and source location) to help track sources of infection.
- iii. Crop Technology Centre (CTC): east garage door area
 - Receives soilless mix and living plant material.
 - All arrivals must be logged (name, date, description and source location) to help track sources of infection.
 - This is a shared entry with the Department of Biological Sciences so all material should be inspected, cleaned and/or treated before it enters the zone.

Research vehicles and equipment arriving from fields or other research facilities on and off campus to one of these containment and support areas will be required to follow the Field Biosecurity Protocol, including cleaning/washing of vehicles, equipment and personal items.

Larger shipments (compressed bales on pallets) of soilless mix will be delivered to the Plant Science Field Station (The Point) and stored outside. Bales will be cleaned and

moved to The Point, CTC and the east and west end Ag Building growth support/containment zones as needed.

2. Controlled access zones (CAZ):

The Conservatory greenhouse, adjoining hallway, potting room, staff office and lunch room (176 A – 178 F and corridors, 277, 278) and the CTC corridor and the adjoining West and Mid Greenhouse will serve as the Controlled Access Zone (CAZ). Students with class material, external and internal researchers as well as necessary service personnel will enter through the single door adjacent to the Plant Science atrium (Ag Building). At CTC, entrance is possible through the west door. The east door is locked. Biosecurity signs are in place.

Dedicated outerwear (lab coat) will be worn by all researchers in their greenhouse at CTC. Footbaths will be located inside each entrance door.

Off-site soil is permitted in the CAZ but all pots and containers must be placed in a secondary catchment container.

All personnel with material in the CAZ will attend a greenhouse orientation before the commencement of their work

Growth rooms 1 – 6 (Ag Building) are in the controlled area. Entry will only be permitted by researchers involved in the care of plants in these growth rooms. Lab coats are to be put on and taken off upon entry and exit of the room.

All bench work in the CAZ must take place in the zone in which the plant material is located. At CTC, bench work (potting etc.) may take place on the bench designated for the west or mid greenhouse. Bench work for GR 1 – 6 should occur in the rooms if possible (pathogen inoculation must occur in the rooms).

All visitors will need to report to room 222 (Plant Science general office) before *being accompanied* into any zone. Everyone will be required to sign a guestbook (name, date and time of entry and last growth area facility visited) and will be able to only access areas that are necessary for their activities.

Disinfectant foot bath stations situated at the entrance and exit of production areas are to be used.

Movement of plant material will not be permitted from the controlled to the restricted zone with the exception of pest-free plant material (inspected and treated if necessary) grown in growth rooms (GR 1 – 6) that mature in the greenhouses of the restricted zone (GHs 1 – 4). Plants should be transported in a covered cart to the greenhouse or growth chamber in the RAZ.

Plant, soil and other organic material used in the RAZ will be delivered pest and disease free through the Atrium door or mid overhead garage door area. The material will be logged before entry (name, date, description and source location).

3. Restricted access zones (RAZ):

Agriculture Building: Greenhouses 1, 2, 3, 4 (180A – 186D), growth chambers and incubators #1 – #20 in rooms 172 and 173 are the **Restricted Access Zone**. The west bi-fold doors are locked to block public access and the east and mid bi-fold door entrances will be locally alarmed and act as fire exit doors only. Biosecurity signs are in place. Additional signs will ask visitors to report to the Plant Science Office for guest book sign in and assisted entry.

Only researchers with plant material in these growth areas as well as necessary service personnel will be provided a disarming code and permitted to enter. The lock of the doors to each greenhouse will be changed to coded entry. Only researchers with plant material in greenhouses 1 to 4 will be given the code to their greenhouse.

All personnel with material in the RAZ will attend a greenhouse orientation before the commencement of their work.

The use of off-site soil is not permitted in the RAZ.

All bench work in the RAZ must take place in the zone in which the plant material is located.

Dedicated outerwear (lab coat) will be worn by all researchers in their greenhouse within the RAZ. Footbath mats will be located inside each entrance door to the RAZ.

Plant, soil and other organic material used in the RAZ will be delivered pest and disease free to the far west bi-fold door area. The material will be logged before entry (name, date, description and source location).

All rooms and areas in the RAZ will have a covered organic disposal containers as well as designated brooms and dust pans.

Communication and Documentation

- All users are required to review and attend an orientation that covers the Plant Science Growth Area handbook.

Handling of Materials, Cleanliness and Disposal

- All users of the growth areas are expected to follow the healthy plant growth, cleaning and disposal requirements as explained the Dept. of Plant Science Growth Area handbook.
- Additional practices follow:
 - All organic material (in both restricted and controlled zones) is to be disposed of in the dump trailer generally located inside or just outside the east garage door area (179) and taken to Physical Plant's (PP) holding site. There are large disposal buckets at The Point and CTC complex that are removed by PP when they are full. They too are dumped at PP's holding site. Organic material is then used for back fill in new construction areas.
 - Disposal of pathogen inoculated material and plants with novel traits will be done according to the SOPs approved by the Department of Plant Science.
 - All pots, trays and liners will be washed before they are put away and then washed and bleached before re-use. New pots, trays and liners do not need to be washed.
 - Each greenhouse room and growth chamber/room area will have designated cleaning tools that must remain in the assigned area.
 - All rooms and areas in the RAZ and CAZ will have covered organic disposal containers with lids as well as designated brooms and dust pans.
 - One recycling container and one garbage container with a full lid will be placed in each zone. Full containers will be placed in the support zone for removal by PP. Replacement containers are washed before entry.
 - All harvested plant material, samples and tools and equipment used/stored in a growth zone must be stored in mice and pest proof containers.
- Soil pasteurizing can be used to eliminate harmful pests while preserving beneficial organisms. Users are encouraged to use them for pre-planting and disposal of media. Safe work procedures have been developed. Consult greenhouse staff for safe operation and disposal of contents.
- Unless seed is guaranteed to be free of disease and pests it should be treated with an appropriate seed treatment prior to planting in the RAZ and CAZ. Please follow SWP specific to your lab and read chemical label instructions when treating seed.

Monitoring

- Pest and disease activity is monitored and recorded to detect pests before an infestation begins and monitors the success of different control procedures. It includes visual inspections and number counts for the type and number of pests with the aid of monitoring cards that trap pests.

Department of Soil Science Facilities

The Soil Science Shed contains facilities primarily for processing and storage of soil, plant and manure samples. The growth rooms and incubators in the soil science shed are appropriately sized for individual finite duration projects. As there is very little material within the soil science shed that can become infected and susceptible projects are isolated within a particular growth chamber or incubator for a finite period of time the soil science controlled growth environment biosecurity protocols are primarily aimed at containing and preventing the distribution of potentially contaminated materials. This protocol must be used along with standard operating procedures (SOPs) and safe work procedures (SWPs).

Biosecurity Control Zones for Managing Pests and Pest Vectors

See soil science shed layout – Appendix E

1. Support and containment zones:

The pad immediately south and east of the soil science shed is used for sample delivery, trip staging and vehicle/trailer parking.

This area is accessible to anyone and, when unattended, is to remain clean and free of field soil and research materials.

2. Controlled access zones (CAZ):

The interior of the soil science shed, excluding growth rooms and incubators, will serve as the **Controlled Access Zone**.

All personnel who will be working in the soil science shed are required to attend a shed orientation before working within the shed.

Soil and plant tissue processing are to occur in area 101. This area shall remain clean and free of soil and plant tissue when not in use.

Manure samples are to be processed within the canopy in area 102. This area is to be cleaned and sanitized after use.

Growth media are to be prepared in area 102. This area is to be cleaned and sanitized after use.

See the Soil Science Shed Biosecurity protocol for more information on sample handling and disposal from the CAZ.

3. Restricted access zones (RAZ):

Soil Science growth rooms and incubators are located at 104A, 102 and 102A. These areas are the **Restricted Access Zone** implemented to contain and/or limit the movement of pathogens and pests.

Only researchers with materials in these areas and service personnel are permitted in the RAZ. Doors will be locked if these areas contain hazardous materials or known pathogens.

Each growth chamber and incubator is to be managed independently. No materials are to be transferred between growth rooms or incubators without approval.

Any pathogens intentionally introduced as part of a research project must be pre-approved, have developed and approved SOP's and be worked with exclusively within the approved growth room or incubator.

The level of biosecurity control required for each growth chamber or incubator should be discussed and decided on before beginning a project. Control measures may range from simply restricting access to growth rooms with signage to locking doors and requiring gloves, footbaths, etc.

Growth rooms and incubators are to be cleaned and sanitized at the end of each use.

Communication and Documentation

- All users are required to attend the soil science orientation, and the shed orientation and must review the soil science orientation handbook. Additional biosecurity measures for the soil science shed are described in the Soil Science Shed Biosecurity Protocol.
- Principal Investigators (PIs) must discuss this protocol with their staff and students and work with them to develop the SOPs and SWPs that meet the needs of their specific research programs. PIs will be responsible for the conduct of personnel in their research programs.

Handling of Materials, Cleanliness and Disposal

- Research materials (seed, plant tissue, soil, compost, manure, water, etc.) are to be disposed of in an approved manner such as: land fill, autoclaving, or incineration.
- Growth rooms and incubators are to be cleaned and sanitized at the end of each use.
- All pots, containers, buckets should be cleaned and sanitized before returning them to the supplies.

Monitoring

- Growth rooms and incubators should be monitored by the researcher for any pests or diseases that may appear. Occurrences should then be reported to the PI and one of the soil science technical contacts so that an appropriate control measure can be implemented.

SOIL SCIENCE SHED BIOSECURITY

Background	The Soil Science Shed contains facilities for processing and storage of soil, plant and manure samples as well as growth rooms and incubators that are appropriately sized for individual finite duration projects. As there is very little material within the soil science shed that can become infected, the soil science shed biosecurity protocols are primarily aimed at preventing the distribution of potentially contaminated materials. The Soil Science Facilities section of the Controlled Growth Environment Biosecurity Protocol deals with preventing contamination in growth rooms and incubators and/or containing known pathogens or pests. This protocol must be used along with standard operating procedures (SOPs) and safe work procedures (SWPs).
Scope	<p>The Soil Science Shed Biosecurity Protocol applies to the soil science shed and the parking pads directly to the south and east sides of the shed. This protocol applies to all staff, students, visitors and service personnel within the shed.</p> <p>See site maps and images for the soil science shed - Appendix E</p>
Contact	Soil Science Field and Equipment Technician Trevor Fraser. Office: 204.474.8014; Mobile: 204.470.5855; Email: Trevor.Fraser@umanitoba.ca

Communication and Documentation

- This protocol will be communicated to Faculty of Agricultural and Food Sciences (FAFS) staff via email and to FAFS staff and students during the spring safety training and orientation each year. This protocol will also be sent to all additional users of the soil science shed facilities.
- All users are required to attend the soil science orientation, the shed orientation and review the soil science orientation handbook.
- Principal Investigators (PIs) must discuss this protocol with their staff and students and work with them to develop the SOPs and SWPs that meet the needs of their specific research programs. PIs will be responsible for the conduct of personnel in their research programs.

Visitors

- All doors are to remain locked when the shed is not in use. Visitors are required to contact the soil science office to request entry and may be required to be accompanied by personnel that have completed the shed orientation when within the building.

Handling of Materials and Disposal

- Whenever possible, research materials (seed, plant tissue, soil, compost, manure, water, etc.) are to be processed and/or reduced at the site where sampling occurred. Research materials are to be disposed of in an approved manner such as: land fill, autoclaving, or incineration.
- With the exception of commercial seed and fertilizer, returning research materials from the soil shed to the field (including the site of collection) is discouraged as materials may have become contaminated in the soil shed.
- Samples are to be labeled appropriately, including a Date, PI, Researcher, Project, Location, etc.
- Stored research materials must be in sealed plastic mouse-resistant containers.
- Use proper containment on work surfaces and scales for ease of cleanup and disposal.
- Work surfaces and floors should be cleaned before leaving.
- Unless otherwise approved, soil and plant tissue processing are to occur in area 101. These areas including the grinder rooms (101A and 101B) are to remain clean and free of soil and plant tissue when not in use.
- Manure samples are to be processed within the manure canopy in area 102. Work surfaces, equipment and any additional surfaces that may have come into contact with manure are to be cleaned and sanitized when finished.
- Unless otherwise approved, growth media preparation is to occur in area 102. This area must be cleaned and sanitized after use.

Vehicle, Trailer and Equipment Sanitation

- The pads immediately south and east of the soil science shed are used for sample delivery, trip staging and vehicle/trailer parking. This area is accessible to anyone and, when unattended, is to be kept clean and free of research materials.
- The areas in front of overhead doors are to be kept free of vehicles and clean. This will help minimize the amount of soil that is transferred during short-term parking at the shed.
- Each vehicle has an assigned parking space. It is the user's responsibility to ensure that each vehicle and its parking space remain clean to avoid transporting soil. When visiting field sites users are required to follow the Field Biosecurity Protocol as well as all other site specific biosecurity protocols.
- Whenever possible, vehicles and equipment should be cleaned in the marked wash area near the south-west door. A pressure washer is available for this purpose. After washing, the wash area itself should also be cleaned. Bulk soil can be scraped and discarded in the garbage before pressure washing the pad.

ANIMAL SCIENCE (T.K. CHEUNG CENTRE) RESEARCH FACILITY BIOSECURITY

Background	T.K. CHEUNG CENTRE provides capacity for the housing of beef and dairy cattle, sheep and swine. The building is divided into 2 wings with the feed storage and handling area in the Centre. The south wing is used primarily for swine research in the areas of nutrition, immunology, behavior and welfare, reproduction, and manure management. The animal rooms are environmentally controlled, and contain flexible penning that can be removed to accommodate metabolism crates. The north wing contains animal rooms that are designed to handle cattle, complete with metabolism stalls. Flexible space that can be configured for metabolism trials with swine or can be set up with individual pens is also available. The animal and procedures rooms in the north wing have been modified to accommodate studies with Risk Category Level II organisms. This new capacity allows researchers to acquire knowledge pertaining to how diet and management interact to influence microbial populations, including pathogenic organisms, in ruminant and non-ruminant digestive tracts. This protocol must be used along with standard operating procedures (SOPs) and safe work procedures (SWPs).
Scope	T.K. CHEUNG CENTRE is used extensively for teaching and training of undergraduate and graduate students and for visiting scientists. The modern and flexible facilities are used to facilitate laboratory classes, individual training programs, and institutional animal care training programs. Additionally, it is used to facilitate the extension and outreach activities of the Department of Animal Science and the FAFS. Students from local and visiting elementary and high schools visit the Centre to gain an appreciation of the importance of research to healthy, safe food and to animal health & welfare. The protocol applies to staff, academics, researchers, students, visitors, volunteers, suppliers, workshop attendees and vendors entering the Control Zones.
Contacts	Facility Director Martin Nyachoti. Phone 204.474.7323; Email: Martin.Nyachoti@umanitoba.ca Animal Care Attendant Robert Stuski. Phone 204.474.9422

Biosecurity Control Zones

See TK Cheung building layout – Appendix E

1. Controlled access zone (CAZ):
 - At TK Cheung West the CAZ is the area immediately inside the public entrance and includes the foyer, lunchroom, facility office and the two washrooms. surrounding a facility. Traffic, both human and vehicle, is minimized or avoided. On the East side it includes all areas surrounding the building within the fenced compound.
2. Restricted access zone (RAZ):
 - The RAZ is the area housing animals east of the CAZ and accessed through the combination locked door. All hallways adjacent to the animal rooms as well as feed storage and preparation areas are included.
 - Only those having business with individuals working in TK Cheung or working with animals within should enter the West CAZ. Likewise those entering the east CAZ shall do so only after receiving permission to enter and had the gates opened for them by a TK Cheung staff member or other designated individual.

Communication and Documentation

- This protocol will be communicated to Faculty of Agricultural and Food Sciences staff, principal investigators (PIs) and tenants, via email and to vendors and authorized visitors through normal business communication.
- Biosecurity protocols are discussed with new employees as part of the T.K. CHEUNG CENTRE

Orientation process. The Orientation is extended to PI's who have active research protocols involving the animal facilities.

- PIs must discuss this protocol with their staff and students and work with them to develop the SOPs and SWPs that meet the needs of their specific research programs and communicate these to the Facility Director and Animal Care Attendant prior to starting work. PIs will be responsible for the conduct of personnel in their research programs. Biosecurity information is included in all agreements, tenders or contracts where the vendor may need access to the CAZ or RAZ.

Visitors

- All UM visitors/volunteers/students to the Animal facilities are required to read and sign a policy statement confirming they have read and understand the protocol and will adhere to the policy/SOPs/SWPs of the facility.

Handling and Disposal of Materials

- Feces - Swine feces are washed and delivered to sewer system and cattle feces are put in the bins and sent to either Glenlea Research Centre or Brady landfill.
- Normal garbage – Normal garbage is sent to physical plants.
- Animal Carcass – Animal carcasses are put in the plastic bags and brought to Brady landfill (Carcass and materials from *E.coli* challenge experiment should be disinfected and labelled as biohazard before they are discarded).

Sourcing of Animals

- All animals entering the facility shall be sourced from Glenlea swine or ruminant units or be approved to enter by one of the University of Manitoba Veterinarians.

Human Sanitation

- CAZ: Those entering the TK Cheung unit CAZ must not be wearing clothing or footwear that has been in other locations where swine are housed with the exception of Glenlea Swine.
 - RAZ: Those entering the RAZ should not have been in swine units other than Glenlea Swine within the last 48 hours. They must have showered since their last visit to that swine unit and not be wearing clothing or footwear that has been on other locations housing swine. It is recommended that those individuals working with swine should change from their streetwear into other clothing and then move into the RAZ and don facility specific coveralls and footwear. Upon leaving the RAZ coveralls and footwear should be removed.
- Individuals who have been on farm premises outside of Canada within the last 5 days shall be required to obtain Veterinary Permission prior to entering the premises.

Vehicle, Trailer and Equipment/Tool Sanitation

- Any equipment/tools intended for use within a CAZ or RAZ must have prior authorization and must be sanitized prior to arriving on-site.
- Vehicles entering the compound (East CAZ) or making deliveries to the outside doors on the west end must not have previously been on premises holding swine or swine carcasses without having undergone a complete wash including undercarriage, disinfection with an appropriate agent known to be effective against PED and PRRS and drying.

GLENLEA RESEARCH STATION LIVESTOCK AND POULTRY BIOSECURITY

Information from Manitoba Agriculture and the Canadian Food Inspection Agency has been incorporated in order that this protocol meets both provincial and national standards for biosecurity to reduce the risk of disease transmission to livestock located at GRS and to the poultry unit located at the Fort Garry Campus.

- Background** The Glenlea Research Station (GRS) is located 20 minutes south of the University of Manitoba Fort Garry Campus, east offside of Highway #75. The GRS consists of livestock (dairy, beef, swine) and crop research infrastructure on site as well as the Poultry Facility located at Fort Garry campus for research, education and outreach. The facilities support 117 dairy animals (55-head milking herd), 11-head sow farrow to wean, a 2500 broiler birds and 4400 laying hens. Additional GRS facilities are the Bruce D. Campbell Farm and Food Discovery Centre (FFDC) delivering outreach, a by-products processing facility, and a feed mill
- The **GRS Biosecurity Protocol** provides specific guidance on the principles and practices required to reduce the risk of disease transmission to the livestock housed at GRS and the poultry at Fort Garry campus. This protocol must be followed along with standard operating procedures (SOPs) and safe work procedures (SWPs) associated with each facility. The GRS management and staff recognize and follow the FAFS Field Biosecurity protocol for operation of the GRS field locations situated on the west side of Highway #75.
- Scope** The GRS Biosecurity Protocol encompasses the land, buildings and facilities enclosed by the dike including the on-site-emergency-response residences, FFDC and livestock-production area on the east side of Highway 75 and the poultry facility, land and buildings located on the Fort Garry Campus. The protocol applies to staff, academics, researchers, students, visitors, volunteers, tenants, suppliers, workshop attendees and vendors entering the Control Zones.
- Contact** Glenlea Research Station Operations Manager Tracy Gilson or designate. Mobile: 204. 293.4625 Email: Tracy.Gilson@umanitoba.ca or general email: Glenlea@umanitoba.ca

Biosecurity Controls

Glenlea Research Station Access Zones

1. **GRS Controlled Access Point (CAP):**
The GRS is accessible through defined points crossing a dike surrounding the on-site emergency response residences, FFDC, the livestock-production facilities, and supporting buildings which include the feedmill, by-products processing unit and a variety of storage sheds. There are two access points to GRS and all vehicular traffic must enter via one of the two designated CAPs:
 - i. Main road (Research road) – provides access to staff, students, volunteers, visitors, house tenants, tenants’ visitors, and general public leading to the FFDC and residences; or
 - ii. Farm Service Road – staff, students, equipment, feed trucks, livestock haulers, vendors, and other authorized vehicles leading to the livestock facilities. Generally, those entering via the Farm Service Road have been granted prior authorization during conversations leading up to their visit.
 - Both CAPs have gates installed at the highway and these are closed at the end of business each day (closed 7:30PM - 7AM).
2. **GRS Controlled Access Zone (CAZ):**
The CAZ is the area immediately surrounding or in the front area of a facility and is accessed via the Farm Service Road following authorization. Traffic to the CAZ, both human and vehicular, is minimized or avoided. Entering the CAZ increases risk to the facility and at times of high disease threat, traffic may be restricted to all but the facility staff.
 - i. Swine Facility CAZ is the 30 feet in front of the building on the north side, during times of

- disease outbreak in the region or heightened disease pressure this area can be restricted to staff only. The sides of the facility are restricted and are not accessible by vehicular traffic and foot traffic is limited to GRS employees only. All vehicles entering this area must be clean and if they are coming from another swine facility the vehicle, its tires and undercarriage must be washed prior to entering the Farm Service Road and the tires must be disinfected using approved disinfectant (Appendix D) prior to reaching the CAZ
- ii. Ruminant Facilities are located in the northeast quadrant of the GRS and only authorized traffic is given access to this region (e.g., milk truck, cattle or hay hauler, feed truck). The dairy CAZ is located to the east side of the Dairy facility and vehicles entering this area must follow the protocol for the swine facility CAZ as they will be passing past the swine CAZ on their way to the dairy facility.
3. **GRS Restricted Access Zone (RAZ):**
An area inside the CAZ that is used, or intended to be used, to house livestock, and where personnel and equipment access is more restricted than in the CAZ. Once authorization is granted to enter the RAZ, unrestricted movement may occur inside. The RAZ is sometimes referred to as the "production area" or "restricted area" and all beef, dairy, swine and poultry facilities have a RAZ. Additional steps may be required prior to entering the RAZ and these be stipulated when authorization to enter is granted, in accordance with the facility's internal SOPs and SWPs.
- i. Swine Facility RAZ access: Before coming to GRS to visit the swine facility prior authorization is required. The swine facility is a "shower-in-shower-out" facility and individuals requesting access must be 2-days pig/poultry free to enter, that is, they must not have been inside a swine or poultry facility or in contact with swine/poultry for 2 full days (48 hours). In addition, visitors coming from another country must be 7-days pig/poultry free. The visitor will enter the internal CAZ, which is a small foyer outside the RAZ, and will be asked to declare and sign they are a full 2 or 7 days pig/poultry free, if they are not or refuse to sign they will be denied access. The RAZ is permanently locked and only staff can unlock the doors. Once showered in to the facility the visitor (anyone other than the swine facility staff is considered a visitor) is free to move around while accompanied by a staff member. Any materials not going through the shower such as tools, etc. need to be disinfected.
 - ii. Ruminant Facility RAZ access: Before entering the RAZ of the dairy facility visitors will be asked to walk through a foot bath containing sanitizer. Visitors may also be asked to wear "booties" (strong plastic disposable boot covers) prior to proceeding to the sign-in area. Once signed in the visitor is free to move around the facility while accompanied by a staff member. Access to the feedlot facilities is restricted and accessed only with a staff member. Prior to entering the feedlot RAZ proper footwear is required.

Fort Garry Campus Poultry Facility Access Zones

GRS Biosecurity Protocol applies to the UM property housing the Poultry Facility located on the UM Fort Garry Campus. The Poultry Facility consists of a layer unit and a broiler unit housed in separate facilities and is not open to anyone other than poultry facility staff - all others are considered visitors.

1. Controlled Access Point (CAP):
The Poultry facility is located on the UM Fort Garry Campus and access to the facility is via Rh Way road; entry to the facility is by authorization only.
2. Controlled access zone (CAZ):
The Poultry facility is surrounded by an 8-foot chain-link fence with locking gates. The gates are always kept closed but are only locked outside of business hours (4:30PM-8:30AM) and there is signage at the facility indicating authorization is required for entry. Traffic, both human and vehicular, is minimized or avoided as the facility's location is not widely publicized. Vehicles given authorization include facility staff and specific vendors, such as the manure disposal supplier.

3. Restricted access zone (RAZ):

The CAZ extends to a foyer inside the facility where visitor access is restricted. The visitor must read a short policy statement outlining the biosecurity protocol for the facility and self-declare they are not knowingly bringing disease into the facility and are 48 hours poultry/pig free within Canada (i.e. they must not have been in contact with poultry or swine for 48 hours and must have clean outer wear before entering the RAZ). If outside of Canada visitors require 7 days downtime to gain access. Once authorization is granted to enter the RAZ, disposable coveralls and “booties” are worn and unrestricted movement may occur while accompanied by a facility staff member. Visitors to the facility are limited to livestock housing areas with an approved research protocol and tours as part of the teaching programs.

Communication and Documentation

- This protocol will be communicated to Faculty of Agricultural and Food Sciences staff, principal investigators (PIs) and tenants, via email and to vendors and authorized visitors through normal business communication.
- Biosecurity protocols are discussed with new employees as part of the GRS Orientation process. The Orientation is extended to PI's who have active research protocols involving the livestock and poultry facilities.
- PIs must discuss this protocol with their staff and students and work with them to develop the SOPs and SWPs that meet the needs of their specific research programs and communicate these to the GRS Operations Manager, the Livestock Research Coordinator and Facility Supervisors prior to starting work. PIs will be responsible for the conduct of personnel in their research programs.
- CAPs feature biosecurity signage and gates.
- Biosecurity information is included in all agreements, tenders or contracts where the vendor may need access to the CAZ or RAZ.

Visitors

- UM visitors (any staff not reporting to GRS) and the general public are allowed access by authorization only.
- All UM visitors/volunteers/students to the livestock and poultry facilities are required to read and sign a visitor log book which is a statement confirming they have read and understand the protocol and will adhere to the policy/SOPs/SWPs of the facility.
- Access by UM visitors can be granted by the facility supervisor, livestock research coordinator, or the operations manager if an approved research protocol is in place or as part of a teaching program.
- The general public can receive authorization if they register with the FFDC as part of the general public outreach program

Handling and Disposal of Materials

- Products of eggs, milk and live hogs, cattle or broilers are transported by commercial providers with documented biosecurity program supported by the appropriate commodity association. If disease pressure warrants tire disinfecting takes place prior to entering the facility CAZ.
- Dead stock are transported either immediately (larger animals) to the Vet Diagnostic Lab or Brady Landfill using the GRS vehicle appropriate for the animal size (and number). The vehicle is washed and tires disinfected prior to returning to the station. Small animals may be held in frozen storage for a duration prior to being taken to Brady Landfill. Same procedure prior to return.
- Mass disposal of spent fowl is managed by a commercial provider with a documented and commodity association supported biosecurity program.
- Manure and old feed (mixed with manure) are transported and applied to the GRS fields to provide nutrients for crop growth. The manure application rate is determined by a third party following soil sampling and crop rotation information. The loading, hauling and spreading is done using a commercial provider with documented biosecurity program.

- Staff and facility garbage is collected and taken to the St. Adolphe community dump with a GRS vehicle, which is washed and tires disinfected prior to return to the Station.

Human Sanitation

- Human foot traffic is by authorization only; a request must be made to the Operations Manager or the Facility Supervisor prior to entering the GRS or Poultry Facility CAZ.
- During times of high disease pressure, or as requested by management, all external foot traffic must wear appropriate foot coverings, use all foot baths, and have freshly laundered clothing and outer wear, such as coveralls. FFDC tour participants might be asked to use booties when entering a facility. Student tour participants may be required to wear disposable coveralls in addition to booties.
- Visitors/volunteers to the facilities will be accompanied by an attendant to ensure the biosecurity SOP are followed
- Individuals may be denied access to a livestock facility if they are coming from another farm or out of country within a specific window of time, depending on the type of livestock/poultry they have been in contact.
- Individuals will be asked to sign their status regarding prior contact with animals.

Vehicle, Trailer and Equipment/Tool Sanitation

- All non-University vehicle traffic must wash the vehicle, tires and undercarriage prior to coming through the Farm Service Road CAP if they are coming from another livestock housing area or auction mart must be sanitized before entering through the CAP and must not enter the swine CAZ using approved disinfectants (Appendix D).
- All vehicle, trailer and equipment must be clean before passing through the CAP onto GRS East.
- Any equipment/tools intended for use within a CAZ or RAZ must have prior authorization and must be sanitized prior to entering CAZ and again prior to entering the RAZ.
- University vehicles, trailers and equipment entering via the farm service road must be free of debris and if the aforementioned transport has been on a farm, livestock housing area, petting zoo or other area where animals are kept, the tires, wheel wells and under carriage must be washed and disinfected prior to entering the CAZ.
- Any University vehicles, trailers or wheeled equipment returning from a livestock housing area, collection area (e.g., auction marts) or other area where the equipment could come in contact with disease (e.g., Vet lab, Brady landfill) must be thoroughly washed and all tires disinfected and undercarriage cleaned prior to travelling through the CAP.. If this is not possible to complete before the end of business day, the vehicle and additional equipment must not enter the property (must not travel through the CAP), but be stored at the Astronomy site or Farm and Food Dioscovery Centre parking lot until it can be properly cleaned and disinfected.
- Only reputable livestock haulers or vendors are permitted entry and will be granted authorization from a designated staff member when the appointment is being made. For the dairy/swine and poultry facilities staff will disinfect vehicle tires prior to entering the CAZ or depending on the disease pressure within the region the disinfecting may occur outside the CAP at the highway or main intersection.
- Vendors entering the CAZ are expected to follow the FAFS Biosecurity protocol and this is a requirement of any tendering process.

FIELD TRIPS/TOURS BIOSECURITY

Scope The Field Trips/Tours Biosecurity Protocol applies to field trips and tours of FAFS and external sites (field, livestock, greenhouse, food processing etc.). These protocols apply to field trips/tours associated with credit/non-credit courses, workshops and tours.

The Field Trip/Tour Coordinator is responsible for:

- Discussing biosecurity protocols with all hosts of the field trips and developing site-specific requirements.
- Informing of any risks identified that are not addressed in the FAFS biosecurity protocols so that they can assist in developing any site-specific requirements.
- Informing participants of the FAFS biosecurity protocols and any site-specific requirements.
- Arranging for equipment and supplies for participants for compliance with the protocols and site-specific requirements.
- Communicating biosecurity protocols/requirements for the field trip/tour to all participants.
- Preparing and distributing *Declarations of Compliance* (Appendix F) to all participants and hosts.
- Communicating biosecurity protocols and site-specific requirements related to vehicle transport to transport service providers and incorporating these into service quotes.

Tour Hosts are responsible for:

- Notifying the Field Trip/Tour Coordinator of biosecurity risk factors associated with their site.
- Complying with the FAFS biosecurity protocols and any site-specific requirements established for the Field Trip/Tour.
- Submitting a signed *Declaration of Compliance* before hosting the Field Trip/Tour.

Tour Participants are responsible for:

- Complying with the FAFS biosecurity protocols and any site-specific requirements established for the Field Trip/Tour.
- Submitting a signed *Declaration of Compliance* before participating.

APPENDIX A – Origin of Biosecurity Protocol Content

Field

The Canadian Food Inspection Agency (CFIA) has articulated Crop Biosecurity Standards and Guidelines, most recently updated 2016-03-08 (<http://www.inspection.gc.ca/plants/plant-pests-invasive-species/biosecurity/eng/1323475203667/1323475279124>). These were developed in collaboration with Agriculture and Agri-Food Canada (AAFC) and the Canada Grains Council, who identified and established a Grains and Oilseeds Biosecurity Advisory Group (including members of AAFC, Canadian Grain Commission, provincial governments, grains and oilseeds industry organizations and farmers). The documents include a National Farm-Level Biosecurity Standard for the Grains and Oilseeds Sector, most recently updated 2013-02-02 (<http://www.inspection.gc.ca/plants/grains-and-field-crops/biosecurity/national-voluntary-farm-level-biosecurity-standard/eng/1354649087792/1355168633095>). It is important to note that this is a “voluntary standard” which identifies a series of desired outcomes in the pursuit of minimizing biosecurity risks for farms and the broader agricultural community. A separate Producer Guide to the National Voluntary Farm-Level Biosecurity Standard for the Grains and Oilseeds Industry has also been developed to provide a series of farm-management approaches that may be considered to achieve the desired outcome described in the Standard.

Livestock

The protocol regarding livestock is based on the CFIA biosecurity requirements to reduce the risk of disease transmission to livestock. The link below provides details, background and suggestions for maintaining a biosecure location. <http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/standards-and-principles/eng/1344707905203/1344707981478>

APPENDIX B – Biosecurity for Rental Agreements

Schedule A accompanying land lease agreements between the University of Manitoba and the lessee of Glenlea Research Station cropland:

Biosecurity and Reduction of Pest Movement Strategies for Producers

As Manitoba farmers grow more diverse crops and tighten rotations for economical gain, the chances of the introduction of new pests or increased pest levels exist. Being aware of potential pest risks and making choices to use sustainable agricultural practices such as extending crop rotations, cleaning your equipment and using genetic resistance where available can assist in reduction of pest movement and multiplication.

Fields infested with unknown pests experience economic losses through the reduction of crop yields and seed quality. New pests, such as clubroot, soybean cyst nematode are long-lived and can be spread easily by soil or by field equipment. Prevention and management are the best tools as there may be limited options available once a field has been infected.

Best Management Practices and Recommendations for Producers

1. Learn more about new pests that have been found in Manitoba, or are suspected to be a concern in the future, including:
 - a. Clubroot in canola
 - b. Soybean Cyst Nematode in Soybean
 - c. Verticillium wilt in Canola
 - d. Glyphosate tolerant kochia
2. Scout fields regularly and identify causes of wilting, stunting, yellowing and premature ripening.
3. Use varieties with genetic resistance in fields known to have pest.
4. Use longer crop rotations (3+ years) between crops to reduce disease severity and reduce other pests. Fields with confirmed diseases, should use resistant varieties and follow crop rotation practices of one crop every four years.
5. Control volunteer crops and host weeds to reduce pest multiplication.
6. Clean and sanitize equipment, vehicles and machinery to restrict the movement of contaminated soil.
7. Implement soil conservation practices including minimizing tillage and using direct seeding as spores can move with wind and soil erosion.
8. Minimize traffic in fields, especially during wet conditions. Discourage recreational vehicles from crossing land with signage, fencing and gates.
9. Avoid common untreated seed as earth tag may carry clubroot spores, seed may be contaminated with weed seeds and other diseases not known

Cleaning Equipment

Transporting contaminated soil on field equipment poses the highest risk to introducing clubroot into a field. Diligent cleaning and sanitation practices can reduce the risk of introducing clubroot to a clean field or moving spores from an infested field.

1. 1. Kick, knock or scrape off soil and plant debris. Sweep off any loose soil.
2. Use pressure washer or compressed air to remove residual soil and debris.
3. Apply a disinfectant (1 - 2% active ingredient bleach solution) to the clean surface.

The Canola Council of Canada has additional information on equipment sanitation, which can be found at:

http://www.canolawatch.org/wp-content/uploads/2011/12/11_CCC2791-ClubrootSanitation-Guide_r3_LR.pdf

Working with Others Accessing Your Land

Landowners can reduce the risk of pest spread to their land by communicating with others who are entering their land for purposes of transporting inputs, custom work or other industries travelling on your land, i.e. oil and gas companies and their contractors, utility companies, municipal government workers. Biosecurity activities undertaken by the companies to reduce pest spread may include developing protocols for field staff and contractors, cleaning equipment and avoiding traffic during wet conditions.

Oil and gas companies are encouraged to prepare and follow biosecurity protocols for staff and contractors. An example is the management objectives for clubroot management, outlined by the Canadian Association of Petroleum Producers in the published Best Management Practices, which can be found at:

<http://www.capp.ca/getdoc.aspx?DocId=139848&DT=PDF>

APPENDIX C - Field Biosecurity Checklist

FIELD BIOSECURITY CHECKLIST						
Name(s): _____			Date of field visit: (DD/MM/YY): ____ / ____ / ____			
Reason for visit: _____						
FIELD INFORMATION:						
Legal location or GPS: _____			Producer / landowner: _____			
Crop: _____			Phone number: _____			
Producer/landowner was consulted and agreed to biosecurity protocol? <input type="checkbox"/> Yes <input type="checkbox"/> No						
SANITATION PROCEDURES						
Indicate the steps taken to prevent transfer of soil/organisms to or from the field via your person, vehicle or equipment. Check off all boxes that apply and/or indicate other methods in the comments. Refer to protocol for definitions and procedures.					<div style="display: flex; justify-content: space-around;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">BEFORE ENTRY</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">ON EXIT</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">BETWEEN SITES</div> </div>	
FOOTWEAR		No action				
<input type="checkbox"/> Used disposable booties		Rough cleaned				
<input type="checkbox"/> Properly disposed of items		Fine cleaned				
<input type="checkbox"/> Work/rubber boots - fill out →		Disinfected				
HANDS / EXPOSED SKIN						
<input type="checkbox"/> Used disposable gloves		No action				
<input type="checkbox"/> Used disposable coveralls		Rough cleaned				
<input type="checkbox"/> Properly disposed of items		Fine cleaned				
<input type="checkbox"/> Did not use disposable items →		Disinfected				
VEHICLE		No action				
<input type="checkbox"/> Remained on main road		Rough cleaned				
<input type="checkbox"/> Remained on field road/approach		Fine cleaned				
<input type="checkbox"/> Entered field →		Disinfected				
FIELD EQUIPMENT including hand tools, tractors, machinery, etc. Specify items in left-hand column.						
1.		No action				
		Rough cleaned				
		Fine cleaned				
		Disinfected				
2.		No action				
		Rough cleaned				
		Fine cleaned				
		Disinfected				
3.		No action				
		Rough cleaned				
		Fine cleaned				
		Disinfected				
4.		No action				
		Rough cleaned				
		Fine cleaned				
		Disinfected				
Were field conditions wet/muddy? <input type="checkbox"/> Yes <input type="checkbox"/> No						
Specify which disinfectant was used: _____						

APPENDIX D - Disinfectants

Potential disinfectants for small tools include:

Virkon

- 2% concentration of Virkon (i.e., 40 g dry product in 2 litres of water)
- Virkon solution should be mixed fresh prior to use every three days and placed in a labelled container.
- Do not use Virkon solution that is more than 3 days old as a disinfectant.

Example Label:

2% Virkon Solution

Discard by end of Shift Day 3 as domestic waste.

Prepared by: _____

Preparation Date: _____

Expiry Date: _____

Bleach

- 2% bleach solution (i.e. 40 mL of household bleach (5.25% sodium hypochlorite) in 2 litres of water)
- Bleach solutions should be mixed fresh daily when used as a disinfectant
- Bleach solutions must be labelled appropriately
- Warning: Bleach can stain clothing and footwear

Example Label:

2% Bleach Solution

Discard daily as domestic waste.

Prepared by: _____

Preparation Date: _____

Expiry Date: _____

Quat Plus M5 http://www.dustbane.ca/product_page-m5_quat-plus.html

F10 <http://www.northernparrots.com/f10-super-concentrate-disinfectant-prod6501a/>

Synergize

(for tire sanitizing)

- Active ingredient alkyl dimethylbenzylammoniumchloride (26%) and Glutaraldehyde (7%)
- Mix 4ml/L water
- Hold for 1 week only
- Follow all precautions

Example Label:

0.4% Synergize Solution

Prepared by: _____

Preparation Date: _____

Expiry Date: _____








Testing for soil Pathogens

Potential testing locations include:

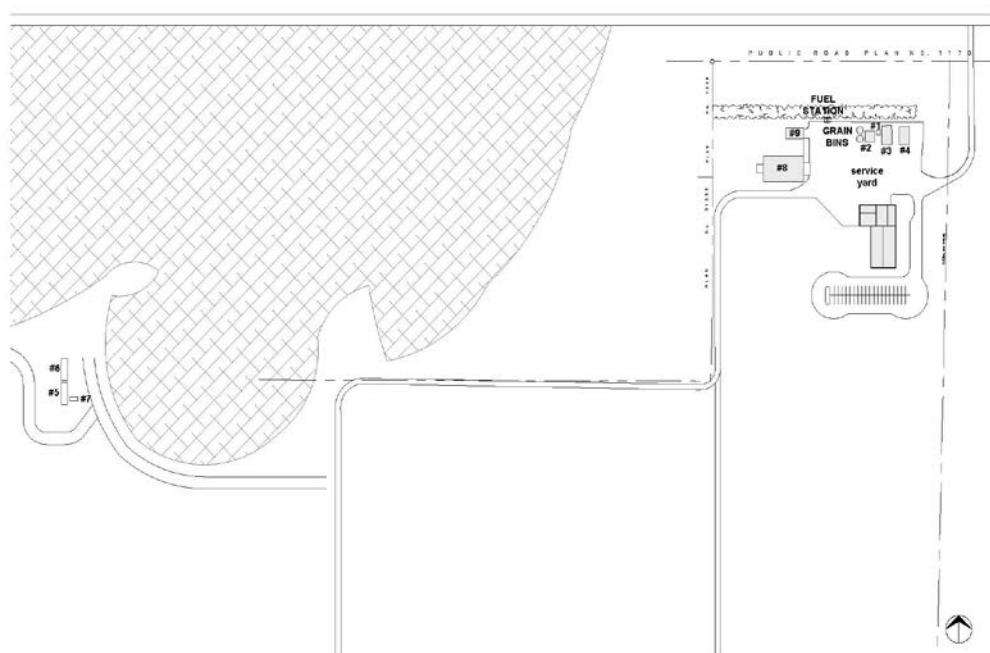
- 2020 Seed Labs Inc. - <http://www.2020seedlabs.ca/contact>
- Pest Surveillance Initiative - <http://www.mbpestlab.ca/field-testing/>

APPENDIX E – Facility Maps and Images

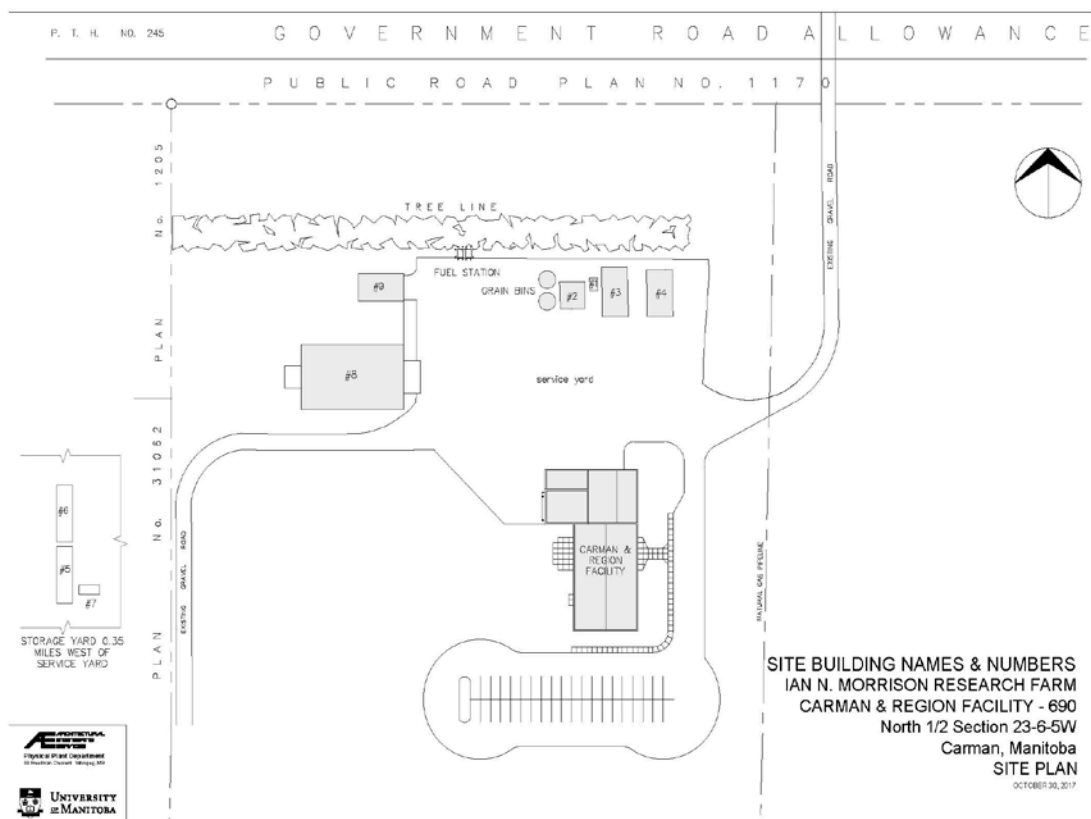
IAN N. MORRISON RESEARCH FARM – PAGE 1/2

		
Figure 1. Biosecurity wash area east side building #4.		Figure 1. Air compressor building #4.
		
Figure 3. Air compressor hose and power ground fault plug building #4.		Figure 4. Foot scraper.
		
Figure 5. Footwear wash station.		Figure 6. INMF Yard site map public visitor entrance parking in red.
		Figure 7. INMRF biosecurity area map: Red: public area Black: biosecurity area Blue: adjoining leased biosecurity land area

IAN N. MORRISON RESEARCH FARM – PAGE 2/2

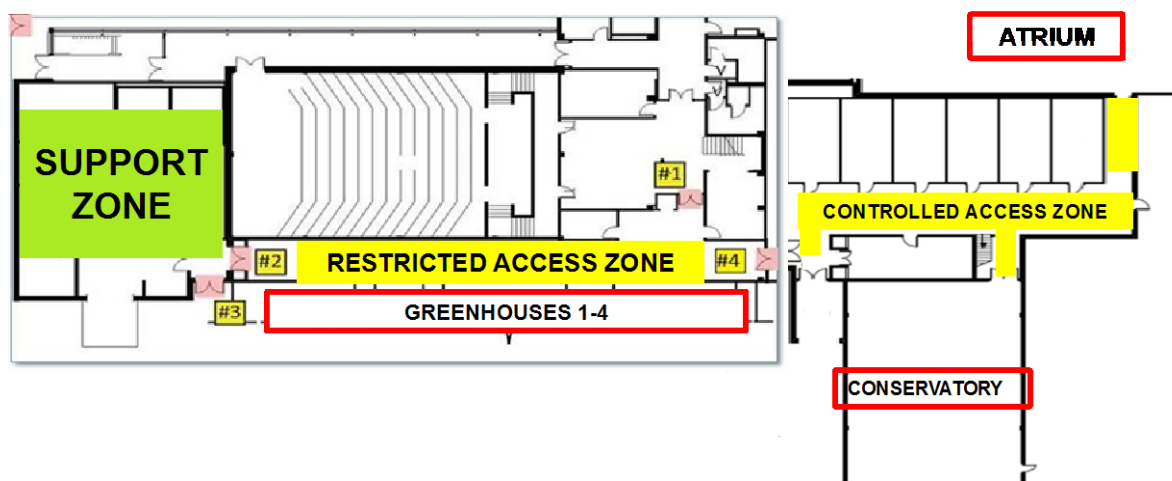


SITE BUILDING NAMES & NUMBERS
 IAN N. MORRISON RESEARCH FARM
 CARMAN & REGION FACILITY - 690
 North 1/2 Section 23-6-5W
 Carman, Manitoba
 SITE PLAN
 OCTOBER 30, 2017

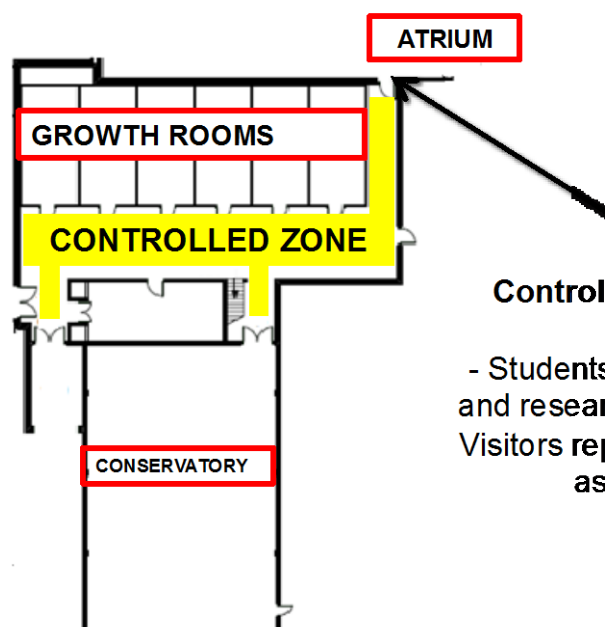


SITE BUILDING NAMES & NUMBERS
 IAN N. MORRISON RESEARCH FARM
 CARMAN & REGION FACILITY - 690
 North 1/2 Section 23-6-5W
 Carman, Manitoba
 SITE PLAN
 OCTOBER 30, 2017

Biosecurity Access Zones



Controlled Access Zone (CAZ)

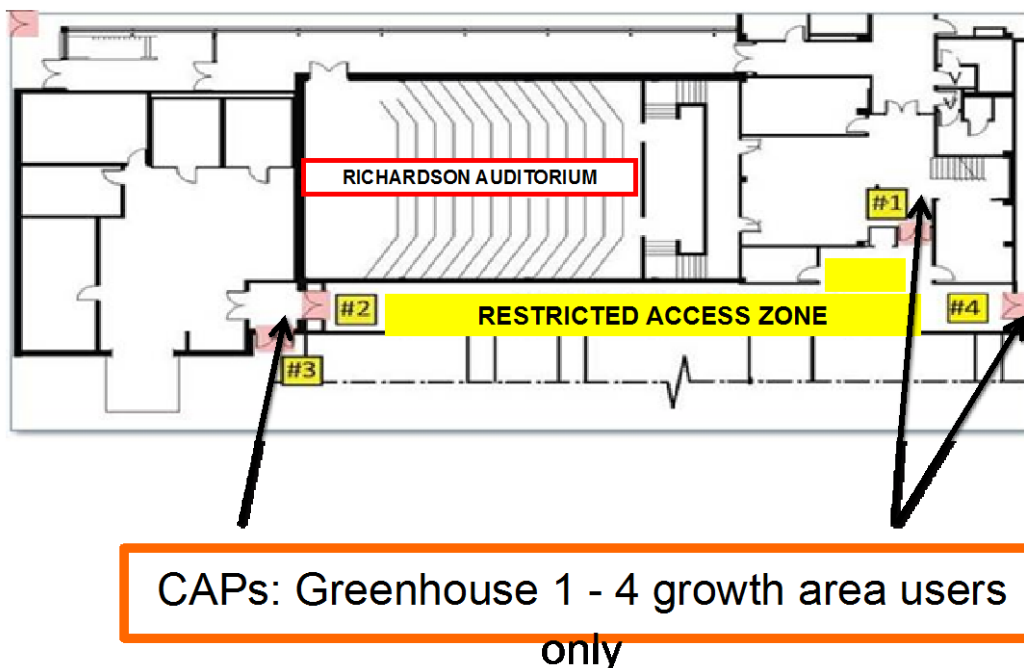


Controlled Access Point (CAP)

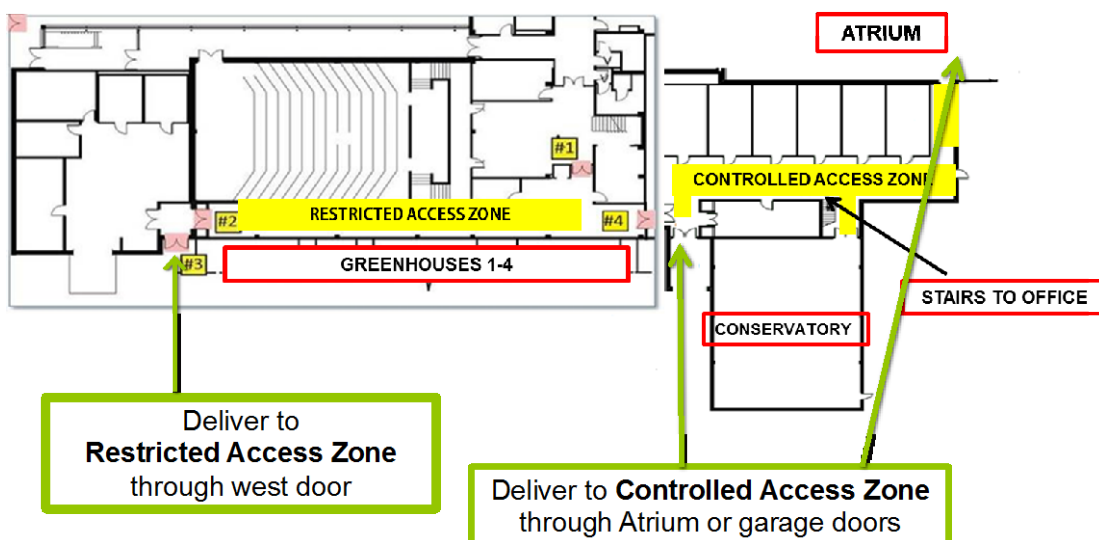
- Students with class material and researchers are permitted. Visitors report to Room 222 for assisted entry.

CONTROLLED GROWTH ENVIRONMENTS – PAGE 2/2

Restricted Access Zone (RAZ)

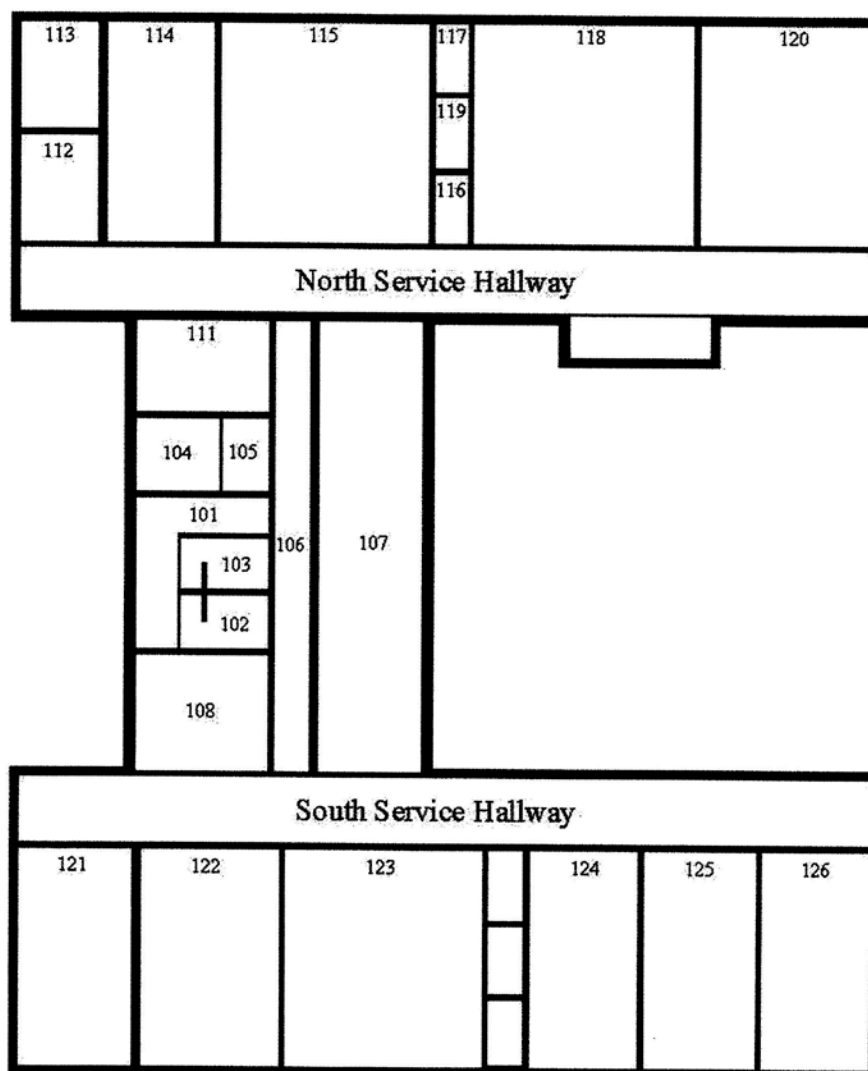


Delivering Plants to Greenhouse



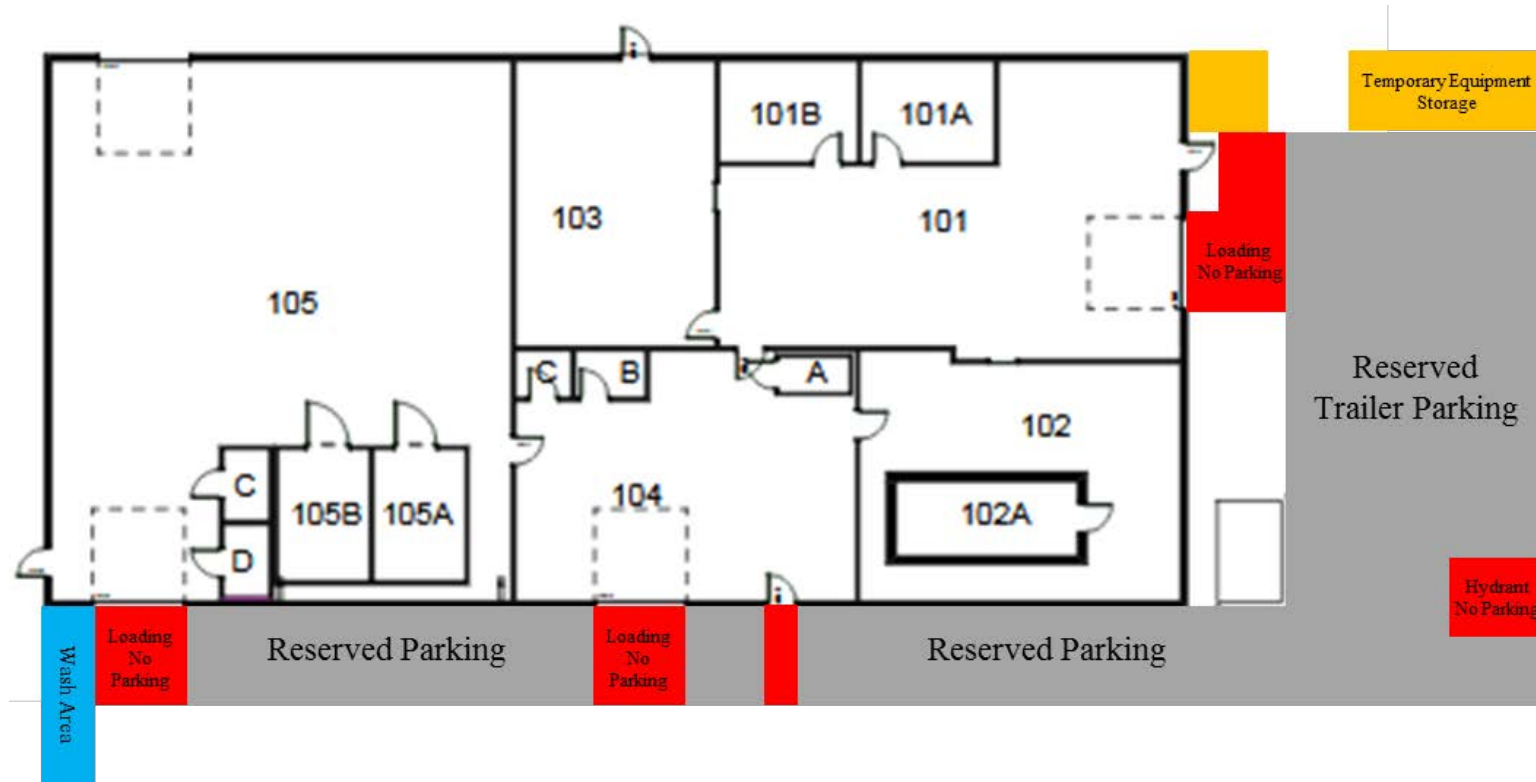
ANIMAL SCIENCE (T.K. CHEUNG CENTRE) RESEARCH FACILITY – PAGE 1/1

Animal Science Research Unit



Floor plan for the T.K. Cheung Centre for Animal Science Research at the University of Manitoba (formerly known as ASRU)

SOIL SCIENCE SHED – PAGE 1/1



- 101 Soil and Plant Tissue Processing
 Long Term Storage
 A) Plant Tissue Grinding
 B) Soil Grinding
- 102 Utility Sink
 Manure Sample Processing Canopy
 2 Growth Rooms
 A) Growth Room
- 103 Drying Room

- 104 Receiving
 Long Term Storage
 Fertilizer Processing
 A) Incubator
- 105 Receiving
 Long and Short Term Storage
 A) Freezer
 B) Fridge

APPENDIX F - Declaration of Compliance

Declaration of Compliance

I acknowledge that I have read, have complied and will comply with all of the rules, regulations, terms and conditions set forth in the [\[insert appropriate link here\]](#)

Signature: _____

Date: _____

Full Name (please print): _____

Witness Signature: _____

Date: _____

Full Name (please print): _____