

Biosecurity Guide for Light and Heavy Industrial Operations



Best practices to prevent the spread of invasive weed and pest species



This guide was prepared by Strathcona County's Transportation and Agriculture Department.

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2001 Sherwood Drive

Sherwood Park AB T8A 3W7

Phone: (780) 417-7100

Email: transportationandagriculture@strathcona.ca

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Risks to Agriculture and the Environment

Alberta is home to several ecosystem varieties including sensitive wetlands, prime agricultural land, two types of forests and recreationally used lakes. Invasive plants, animals, and pathogens pose a significant risk to the environments they invade and are costly to control and remove. The World Conservation Union states that invasive alien species are the second most significant threat to biodiversity after habitat loss (Government of Canada, 2017). Harmful effects of invasive species are vast and can also include decreased property values and area aesthetics, hazards to human health and loss of productivity to crop and/or forage.

The best strategy to minimize the spread of disease and invasive species is to implement practices that reduce transfer, also known as biosecurity. The CFIA (Canadian Food Inspection Agency) defines biosecurity as a set of practices used to minimize the transmission of pathogens and pests in animal and plant populations including their introduction, spread, and release. The measures may include an environmental barrier such as a shelterbelt or mechanical cleaning after tilling a field. Though these steps may seem impractical, long-term savings of both time and money are significant.



<https://www.strathcona.ca/agriculture-environment/agriculture/>

With refineries and associated infrastructure located near large plots of agricultural land, Strathcona County's exposure to disease and pest transfer is increased. Soil harbours pathogens such as clubroot as well as seeds and plant propagules from weeds, which are easily spread on equipment. Information from the Government of Manitoba states that Canada thistle infestations can cause "yield losses as high as 60% in cereals" (2018).

In addition to weed species, clubroot (*Plasmodiophora brassicae*), a soil-borne pathogen, is rapidly growing in both prevalence and severity in Strathcona County. Clubroot in canola is estimated to reduce yield upwards of 75% over a 12 year period, in cases where severe infestations are found and close rotations are practiced (Government of Alberta, 2015). Given that canola contributes nearly \$27 billion to the Canadian economy annually, there is the possibility of serious damage to the agricultural economy, together with significant employment and wage losses (Canola Council of Canada, 2017). The pervasiveness of this pathogen is set only to increase, particularly in areas where new, more virulent strains of clubroot are infecting previously resistant varieties of canola. Information regarding common agricultural pest and weed species in Strathcona County can be found in Appendix C.

Biosecurity is not a new concept. The need has always existed and it continues to grow in importance with increasing global trade and new market opportunities. Diligent washing, sanitization, and strict access measures will help prevent the spread of invasive species and communicable pathogens.

Implementing Biosecurity On-Site

Heavy Industry

The prevalence of industrial development in Strathcona County requires that all involved stakeholders be aware of soil contamination, as many of these projects are located on or near agricultural lands. The movement of drilling rigs, mobile buildings and other infrastructure over long distances can readily contribute to the spread of invasives and pest species. Company owners and employees must recognize that any task on a site with exposed soil does carry the risk for transmission, regardless of project scale or timeframe.

It is recommended that all sites be prepared for the eventuality of soil movement, even if not considered a major project component. The risk level associated with each site area should be determined before work begins. Low risk would include where soil movement or contact will not occur and high risk, where soil contact and movement is common. Locations assigned as medium risk are typically areas of transition, where high and low risk zones meet. Designated areas that allow for the washing and disinfecting of vehicles and equipment should be available and easy to operate for all employees. Signage for parking and directing visitors is most effective if visible at entry points. A gate or fence can be installed to keep any unauthorized equipment or individuals away from high risk zones. Implementing a check-in and check-out system will provide another opportunity to outline prohibited areas and site biosecurity rules. When projects are being finalized, time should be taken to thoroughly sweep any adjacent roadways if soils have accumulated at or near the entrance. This can be completed manually or by using sweeping machinery. Depending on the project being undertaken, specific management practices should be taken into consideration.

Pipeline Construction and Operation

The majority of pipeline construction sites cross over rural roadways. This design increases the risk of soil movement by all passing vehicles. Special care should be taken to minimize the amount of soil transferred from one side of the road to the other, particularly if adjacent landowners have different requirements for sanitation. In addition, continuous management and monitoring of stockpiled topsoil adjacent to the dig is recommended. This includes proper initial storage methods such as seeding with an approved mix or covering with a synthetic material to limit growth and seed production of noxious weed species. Routine integrity digs completed throughout the life of the pipeline must also be completed with careful consideration to soil movement, with all cleaning and disinfecting methods still applicable.



http://www.kinnanengineering.com/yahoo_site_admin/assets/images/DS_C00024.212223522_large.JPG

Facility and Well Site Construction and Operation

The construction of oil and gas facilities and well sites involves movement of large quantities of soil. This not only increases transmission risk on equipment and personnel, but also increases the likelihood of environmental factors such as wind and rain contributing to soil movement over large, open spaces. Secure storage of topsoil must be maintained throughout the life of any construction project, until such time as it is replaced on the same site or moved off-site.

Once construction is completed, routine access to wellsites should continue in a way such that biosanitation measures are incorporated. When accessing a site on gravel roads, remain on the gravel, including when parked. Placing even two wheels off-road on a muddy patch can transmit soils, particularly when deposited on wheel wells and in tire treads. If the area is accessible only from dirt or unpacked roadways, avoid if possible in very wet conditions.

Land Spray

Detailed information regarding the application of drilling mud (liquid bentonite clay mixtures) to agricultural lands can be seen in Appendix 1b of *The Strathcona County Protocol for Seismic Surveying, Drilling, Construction and Operation of Oil and Gas Facilities (2017)*. Similar methods of bentonite placement include land spread, which involves solids being distributed along the surface and mixed bury cover, with pits that are excavated and then covered once filled with drilling mud. Regardless of methods used, prior to entering and exiting any field, equipment used to deposit materials must be clean and sanitized. The truck operator should take care not to drive on existing adjacent crops or in areas the landowner does not permit. Land spray (or equivalent) activities should not be completed during wet conditions or when excessive soils can adhere to the vehicle.

Land Development

Creating new subdivisions, public facilities and other municipal structures present unique challenges in terms of ensuring biosecurity. Specifically, stripping and selling large volumes of topsoil can spread both clubroot spores and weed materials over large distances. Transferring contaminated soil where further propagation may occur is in contravention of the Alberta Soil Conservation Act and the Alberta Agricultural Pests Act. Soil sampling is strongly encouraged to test for the presence of clubroot spores prior to movement from the original parcel. Those who purchase soils for any type of project must be provided with, from an accredited laboratory, confirmation of no disease presence.

If soil is determined to contain clubroot spores, disposal in a class 1 landfill is required. With the approval of Strathcona County, contaminated soils *may* be moved to areas where there is zero risk of disease spread, provided secured transportation methods are used. This includes urban developments where soils will be covered completely by a material such as grass or landscape fabric. Soil stored on originating lands must be kept properly secured and covered, meaning no contact between contaminated and non-contaminated materials is permitted. It remains the responsibility of the company undertaking work to ensure any possible contamination is avoided throughout the term of the project.

Light Industry

Examples of light industry in Strathcona County include surveying, road construction and storage facilities, most of which have some degree of interaction with private lands. Though the scale of these projects is generally less than those outlined above, there remains the potential of dispersing soil-based disease and weed seeds. It is necessary that portable sanitation stations be available for use before and after site access if permanent worksites are unavailable. The use of disposable biosanitation gear, such as nitrile gloves, tall boot covers and disinfectant will eliminate the need for more complex cleaning methods if only personnel and small equipment are accessing agricultural fields. In terms of roadway cleanup, similar suggestions apply for light industry projects as were recommended for heavy industry.

Surveying

If travelling on private fields either by foot or with a passenger vehicle for surveying purposes, biosecurity protocols must still be followed. It is important to confirm with landowners if any additional biosanitation measures are necessary before entering. Items that will be of importance include boot covers and a disinfectant spray if entering on foot. Taking an extra pair of boot covers will ensure protection if a pair becomes damaged while on a property. Disinfectant sprays should be liberally applied onto boots and any small surveying equipment once off private property and before accessing another parcel. It is recommended that only personnel with hand-held equipment access private land, leaving trucks on roadways, if possible. If passenger vehicles must enter, sufficient disinfectants must be stored to thoroughly cover tires, wheel wells and the lower vehicle panels.

Road Construction

Parking paving equipment in field approaches should be avoided wherever possible, particularly if the field is not dry. Challenges are faced by construction crews, compared to other industries, as larger pieces of equipment may still require sanitation but are challenged due to a lack of dedicated space. In this case, mobile sanitation units (Appendix B) may be helpful to clean larger items if there is contact with topsoil at any point. With larger numbers of employees, boot cleaning stations can be utilized to increase cleaning efficiency.



http://www.wheelwash.com/_images/products/wheelwash_bootwash_sml.jpg

Storage Facilities

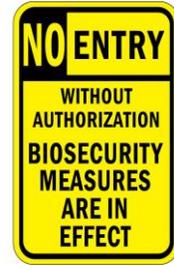
The appropriate design and operation of storage facilities, such as those for recreational vehicles, can greatly reduce contaminated soil transfer. Recreational vehicles travelling over long distances have the capability to introduce pest species from greater distances than other locally operated machinery.

To limit this risk, facility owners should maintain a dedicated stall for all pieces of equipment that enter. Trailers should be inspected upon entrance to keep large quantities of soil off the property. Established groundcover such as grass or gravel should be installed at all storage facilities. A sanitation station may also be worthwhile to install at entrance gates, as an added layer of security against the harbouring of

soil disease and noxious species. If sanitation is offered as a service on site, wash water and disinfectants must not be directed towards any natural water bodies in the area.

General recommendations when implementing biosecurity measures include

- utilizing only one entrance to minimize traffic,
- having gates and fences set up around property,
- avoiding area if possible when raining or muddy conditions persist,
- identifying locations where low, medium and high risk exist, and
- having appropriate sanitation stations available.



<http://i.ebayimg.com/images/i/322148284678-0-1/s-11000.jpg>

Clubroot Management Plans

If work is to be completed on lands deemed clubroot positive, a clubroot management plan is required and will be reviewed by Strathcona County Agriculture Services. This document is typically a few pages in length and serves to outline the steps being taken to ensure no further spread of soil pathogens. A specific outline of what is required can be found in Appendix D.

Clarification should be included on how workers and contractors with access to the site will be informed of the risk of disease spread. Separate methods of communication should be outlined for these groups, as it is imperative all individuals are informed. Erosion control must also be documented; this includes detailing how and where the topsoil will be stripped from and stored on the property. Length of time stored and methods used to control any invasive seed spread should also be noted.

Detailed Guide to Cleaning Equipment and PPE

Standard of Sanitation

Risk Level	Location	Standard of Cleaning
Low	An observational area where no contact is made with potentially contaminated surfaces.	No measures taken. Be aware of possible contamination transfer.
Medium	Transition area connecting high and low risk locations. Can include offices, equipment and vehicle storage and holding areas.	If working in or travelling through a transition area, equipment must be disinfected before leaving.
High	Activity is taking place on topsoil. Includes moving topsoil with machinery and/or driving and walking over soils to reach other work sites.	All equipment and tools must be disinfected before entering and before leaving. Personnel must also clean and disinfect PPE and clothing items.

Table 1: Preferred cleaning methods associated with specific risk areas. If the risk level is not definitive, assume higher risk when determining necessary cleaning methods.

Where to Clean

A designated area to clean clothing and equipment used by personnel should be placed at every site. Possible locations include transition points where the risk of spreading pathogens shifts from high to low, or vice versa. The likelihood of spreading any invasive materials from the wash location should be negligible. The area should not contain any mud (whether on the surface or dropped from other vehicles) and is most effective when covered with grass, gravel or another hard surface. Additional stations for cleaning smaller items such as boots, clothing and tools can be situated in areas around the worksite that do not interfere with the cleaning of larger equipment.

This cleaning area should not be located where overland flow can result in contamination of nearby waterways. Temporary drip pans or the utilization of vacuum trucks would likely be necessary in cases where high volumes of wash water and disinfectant are utilized.

When to Clean

Cleaning should occur when there is contact made with medium or high risk areas, as described above. This includes any vehicles that will be on the physical site where exposed soil is present. If equipment or vehicles will be contacting neighbouring parcels, or if any equipment will be leaving the site, cleaning must also be completed. As snow packs and frozen ground only provide a limited amount of protection from soil tracking (especially with repeated traffic), at minimum, visual inspections should be completed when exiting fields in colder months to ensure no soil or weed materials are at risk for transfer.

If a piece of machinery or vehicle remains on a packed roadway adjacent to the work area, there is little to no risk for disease transmission, therefore cleaning is not required.

Personnel

Materials required for cleaning and disinfection include

- a stiff bristle hand-held brush with metal hook,
- large brush for clothing and PPE,
- mounted boot brush,
- pressurized sprayer,
- disinfecting wipes, and
- garbage receptacle.

Start by scraping loose mud and debris from bottom and sides of boots; proceed to push boots through a mounted brush. Use a small brush to agitate additional soil from footwear that scraping did not remove. Utilize the metal pick on the back of a boot brush to clean between treads. Ensure clothing is free from large pieces of soil and any weed seeds, some of which may stick to clothing fibers. When boots are sufficiently brushed off, spray with disinfectant. Ensure all brushes and implements used to clean footwear and clothing are also disinfected. Dispose of all single-use biosanitation equipment in a receptacle, being cautious not to dislodge excess seeds or soils during disposal.

Vehicles and Equipment

Materials required for cleaning and disinfection include

- a stiff brush, broom and shovel;
- pressure washer or pump with a high pressure hose;
- vacuum or air blower, and
- pressurized sprayer for disinfectant.

With the unique nature of each piece of equipment, a visual inspection should take place prior to cleaning to determine where large quantities of soil are present. Beginning with the interior, scrape pedals to loosen any adhered soil, remove floor mats and sweep out remaining loose debris from the foot well. Vacuum on and around seats, using compressed air to dislodge pieces not easily removed. Clean the floor mats with water and ensure no soil remains.

The extent of exterior cleaning is dependent on the type of equipment. The most heavily soiled areas should be addressed first, such as buckets, drills, rippers and tires. It is not recommended to use water to clean at the first stage of manual cleaning, as water may further bond soil to surfaces. If soil cannot be loosened after the manual removal stage, water may then be used to help loosen any pieces remaining. With excess soil and vegetation removed, disinfectant should be applied in an orderly manner (top to bottom, front to back) to ensure no panels are missed.

Further Information & Acknowledgments

Resources and Relevant Acts:

Alberta Agriculture and Forestry – Clubroot Management Plan →

[http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/agdex11519](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/agdex11519)

Canadian Association of Petroleum Producers – Clubroot Disease Management BMP →

<https://www.capp.ca/publications-and-statistics/publications/139848>

Canola Council of Canada → <https://www.canolacouncil.org/>

Alberta Invasive Species Council → <https://abinvasives.ca/>

Alberta Agricultural Pests Act and Regulations →

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/acts6008](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts6008)

Alberta Weed Control Act and Regulations →

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/acts6156](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/acts6156)

Acknowledgements and Sources:

Detailed information on common invasive weed and pest species (Appendix C) provided by the Alberta Invasive Species Council.

Disinfectant table (Appendix E) provided with permission from the Alberta Veterinary Medical Association.

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<https://www.gov.mb.ca/agriculture/crops/weeds/canada-thistle.html>

Howard, R. (2013) *Highlights of 10 Years of Clubroot Research in Western Canada [PowerPoint slides]*.

Retrieved from:

<http://www.synergialbertaregistration.ca/conference/2013/downloads/presentations/ClubrootResearchRHHoward.pdf>

Strathcona County (2017). *The Strathcona County Protocol for Seismic Surveying, Drilling, Construction and Operation of Oil and Gas Facilities in Strathcona County*. Retrieved from:

<https://www.strathcona.ca/files/files/at-pds-strathcoprotocol2017.pdf>

Cover Images:

- Clubroot (top) – <http://fieldcropnews.com/wp-content/uploads/2017/01/moderate-clubroot-MB-gov.jpg>
- Canada thistle (middle) – http://courses.missouristate.edu/pbtrewatha/Canada_Thistle6.JPG
- Phragmites (bottom) - <https://glenlake.files.wordpress.com/2009/05/phragmites2.jpg>

Appendix C Images:

- Scentless chamomile
 - Top: <https://www.albertafarmexpress.ca/2016/06/02/noxious-weed-scentless-chamomile-prolific-and-problematic/>
 - Left: http://www.gov.edmonton.ab.ca/programs_services/documents/Images/ScentlessChamomile_500.jpg
 - Right: http://www.weedinfo.ca/media/jpg/matmg_seedlingsized_thumb_410.jpg
- Canada thistle
 - Top: https://www.edmonton.ca/programs_services/documents/CanadaThistle_687X260.jpg
 - Left: https://oregonstate.edu/dept/nursery-weeds/feature_articles/thistles/ct_seed_750.jpg
 - Right: http://uspest.org/mint/images/canthistleseed_l.jpg
- Field scabious
 - Top: https://www.edmonton.ca/city_government/documents/Images/Field_Scabious_flower_687X260_NK.jpg
 - Left: <http://www.luontoportti.com/suomi/images/18918.jpg>
 - Right: http://www.aphotoflora.com/images/dipsacaceae/knautia_arvensis_field_scabious_leaf_02-07-04.jpg
- White cockle
 - Top: https://static.agcanada.com/wp-content/uploads/sites/3/2016/07/white-cockle-supplied_cmyk.jpg
 - Left: https://www.edmonton.ca/programs_services/documents/Images/WhiteCockle2_500.jpg
 - Right: <https://extension.umass.edu/landscape/sites/landscape/files/weeds/leaves/melal3720w.jpg>
- Perennial sow thistle
 - Top: <http://www.northernrockies.ca/assets/Residents/Sow%20Thistle.jpg>
 - Left: https://www.edmonton.ca/programs_services/documents/Images/PerennialSowThistle3_500.jpg
 - Right: <https://www.canr.msu.edu/pestid/uploads/images/Perennial-sowthistle-milky-sap.jpg>
- Clubroot
 - Top: <https://www.strathcona.ca/files/images/tas-medium-clubroot-660x396.jpg>
 - Left: https://cpb-us-w2.wpmucdn.com/u.osu.edu/dist/8/3691/files/2015/12/Turnip---Club-Root-2_50Quality-1p73shs.jpg
 - Right: [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/ba3468a2a8681f69872569d60073fde1/83d8f3ce22f85e8487256e9f006f0d09/Information/13.47C8!OpenElement&FieldElemFormat=jpg](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/ba3468a2a8681f69872569d60073fde1/83d8f3ce22f85e8487256e9f006f0d09/Information/13.47C8!OpenElement&FieldElemFormat=jpg)

Appendix A – Equipment Cleaning

Regardless of equipment type, the **interior** components must be clean prior to entry and exit of all sites containing exposed topsoil.

- Cabin floor, removable mats, seats and the pedals.

Exterior cleaning processes will vary depending on equipment type, but many components are present with all types of vehicles.

- Front and rear tires and rims, axles, wheel wells, undercarriage as well as steps and ladders to the cabin.

Specific Vehicle and Equipment Lists

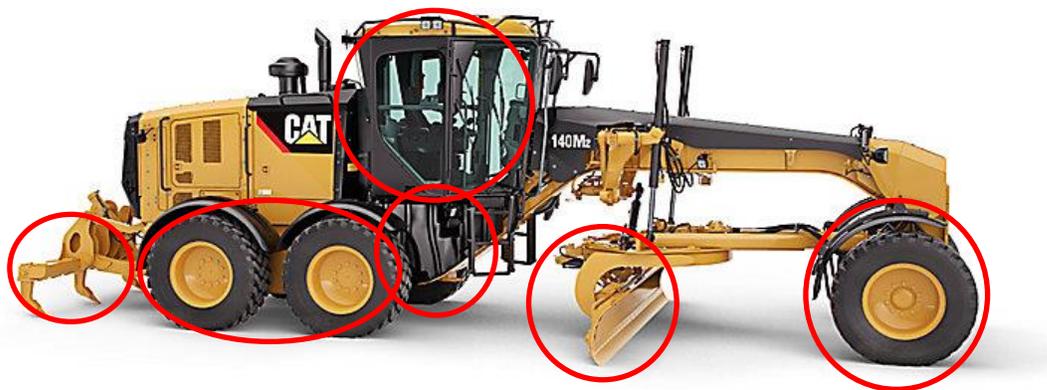
Heavy Machinery: Implements such as blades, arms, buckets.

Passenger Truck: Push bars, running boards, radiator, floor mats and the cargo box.

Trailers: Hitch components, steps and ramps leading up to trailer bed.

Highlighted below are areas which collect the greatest quantity of soil after use. Inspections and thorough cleaning should occur when entering and leaving properties.

Grader



[http://s7d2.scene7.com/is/image/Caterpillar/C832990?\\$cc-g\\$](http://s7d2.scene7.com/is/image/Caterpillar/C832990?$cc-g$)

Tractor



https://www.deere.ca/common/media/images/product/material_handling/ag_tractor_loaders/843/843_ag_tractor_loader_416721_642x462.jpg

Skid Steer



<http://s7d2.scene7.com/is/image/Caterpillar/C772072>

ATV/UTV



http://www.atvsource.com/images/article-images/manufacturers/honda/2003/foreman_es_red.jpg

Truck



<https://www.cstatic-images.com/car-pictures/xl/USC50FOT13DA021001.png>

Bulldozer



http://pngimg.com/upload/bulldozer_PNG16431.png

Trailers



<https://www.fthr.com/-/media/FeatherliteCMS/Images/Rotator%20Images/Commercial%20And%20Utility/Cargo%20Utility/1610/utility-trailer-1610-BC117811-cr.jpg>

Appendix B – Alternative Washing and Disinfecting Options

Option 1: Portable Pressure Washer and Tank

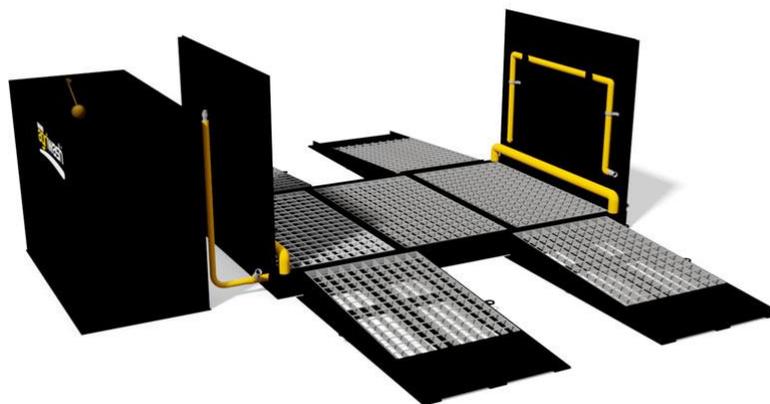
- Tanks can be filled with fresh water and transported to site. Units can be purchased either with stock components or custom-designed to better suit project or company needs. If permission is granted to use a natural water source near the site, a hose/pump may be used as methods of water retrieval, for use with any pressure washer.



<http://www.steam-brite.com/images/Karcher-Shark-TRS-2500-Pressure-Washer-Trailer.jpg>

Option 2: Touchless Disinfection

- It is important to note that this type of machinery can be used only after manual removal of large pieces of soil. This system is best suited for sites where vehicles and large equipment must be washed more often, as this process is significantly faster than manually spraying vehicle panels.



http://www.agriwash.com/_images/products/agriwash-enforcer-lg.jpg

Appendix C – Common Agricultural Pests and Weed Species



Scentless Chamomile

Tripleurospermum perforatum syn. *T. inodorum*

Flowers: Yellow disc surrounded by white petals which overlap each other.

Leaves: Alternate arrangement, short fine pieces (resembles dill leaves).

Stems: Highly branched, may have red colouration, 1m tall maximum height.

Seeds: Dark brown, ribbed and about 2mm in size. Become viable quickly after maturity.

Habitat: Heavy clay soils; dominates on disturbed sites. It is tolerant of periodic flooding and dry areas.

Canada Thistle

Cirsium arvense

Flowers: Pink, purple or white flowers with spikeless bracts beneath.

Leaves: Darker green leaves, lance-shaped with sharp spines along edges.

Stems: Hollow and woody stems stand upright and can reach up to 1.5m tall.

Seeds: Tufted achenes with most germinating within a year. Dormant seeds can remain viable for up to 20 years.

Habitat: Does not withstand waterlogged soils. Thrives in disturbed areas and where pasture has been overgrazed.





Field Scabious



Field Scabious

Knautia arvensis

Flowers: Blue-purple florets clustered into a single head at the end of the stem. Green bracts are present below the flower head.

Leaves: Hairy and oppositely arranged, with a large variation in lobe formation.

Stems: Also hairy, sparsely branched and up to 1.5m in height.

Seeds: Nut-like, 5-6mm in size. The seeds tend to drop near parent plants, remaining viable for long periods.

Habitat: Nutrient-rich and well-drained soils, typically found in grass/pasture areas.

White Cockle

Lychnis alba syn. Silene alba S. latifolia

Flowers: Five deeply-notched petals, white in colour. Distinctive “inflated” calyx situated beneath petals.

Leaves: Lance to narrow oval shape with pointed tips. Hairs are present on the oppositely-arranged leaves.

Stems: Swollen at nodes, hairy and can reach heights of 120cm.

Seeds: Calyx will mature into fruit that contains large numbers of seeds.

Habitat: Hayfields are common locations for this species, as it prefers full sun and well-drained soils.



White Cockle





Perennial Sow Thistle

Sonchus arvensis

Flowers: Similar appearance to dandelion with flowers clustered at the end of stems.

Leaves: Can be up to 20cm long and have weakly prickled edges; they are seen in varied shades of green.

Stems: Grow upright and exude milky substance when cut or broken.

Seeds: Tufted for wind dispersal and relatively short-lived compared to others.

Habitat: Capable of growing in various conditions and soil types. Well adapted to moist, full-sun conditions.

Clubroot

Plasmodiophora brassicae

Found in members of the *Brassicaceae* family, which includes canola, stock and several vegetable varieties.

Infection caused by soil-borne pathogen, causing large galls to form on roots which adversely affects nutrient and water uptake.

Galls begin with a firm texture and light colouring (top, left image) but continue to degrade over the growing season and eventually become softer and darker in colour with decay (right image).



Appendix D – Clubroot Management Plan

Title Page - Company or companies involved, and the legal land location(s).

Introduction

- Explain the purpose of the plan and how it interacts with the work to be carried out.
- Introduce clubroot to show an understanding of the disease and its impacts.
- Where is clubroot present in Alberta and how it is distributed?
- What responsibilities do the company and its employees have?

Clubroot Mitigation

- Include best management practices to be adopted by the employees.
- Explain (for both equipment and personnel): who will clean, what will be cleaned, where it will be cleaned, when it will be cleaned, and how it will be cleaned.
- Describe the cleaning station(s) and what methods of cleaning will be made available.
- Describe how the cleaning process will be documented throughout the project. Include photos and methods used to complete and the dates/times protocol was completed.

Erosion Control

- Outline methods for storing topsoil during construction including: location of storage, estimated time of storage and method of removing, covering and restoring the soil.

Closing

- Statement summarizing the understanding of the practices and responsibilities outlined.

Appendices

- Consultation Table
 - Who or what was consulted to write the correct procedure?
- Cleaning Protocol Table
 - What is the cleaning protocol that is to be followed by personnel on-site? This protocol will include methods of cleaning equipment, personnel and tools.
- Site Plan
 - Include a site drawing with entry/exit points, cleaning locations, topsoil storage.
- Cleaning Documentation
 - Include a schedule, and written and visual documentation of the cleaning to occur on-site.

Appendix E – Disinfectant Options

Type	Products	Uses	Advantages	Disadvantages	Cautions
Alcohols	AlphaDyne Plus (Chemi3) Relyon Disinfectant Spray (DuPont)	Disinfecting	Rapid action, evaporate with little residue; good for disinfecting clean hands.	Fast evaporation reduces available contact time; reduced activity in the presence of organic matter.	
Aldehydes: Formaldehyde/ Gluteraldehyde	Formaline (Vetoquinol), Profilm (Pfizer), Virocid (Merial)	Vapor-phase surface disinfecting fumigant.			Eye and skin irritant. Poisonous if inhaled.
Hypochlorites	BioSentry Chlor-A-Foam (Pfizer), Javex (Colgate-Palmolive)	For the cleaning and disinfection of hard non-porous environment surfaces.	Viricidal Biodegradable	Do not mix with other disinfectants. Do not use with acid cleaner.	Keep out of reach of children. The powder is irritating to eyes, skin, and mucous membranes.
Iodophors	Biodine, Mikroklene, Barn-Storm Iodine Cleaner Sanitizer	Cleaning and disinfecting buildings, crates and trucks.	Not affected by water hardness or temperature. Inexpensive, many are biodegradable with long storage life.	No residual activity. Stains some surfaces; Rapidly inactivated in organic material; effectiveness decreased in basic pH (>7).	May cause burns to the skin and eyes; vapour is harmful if inhaled.
Oxidizing Agents	Virkon (Vetoquinol), Hyperox (Vetoquinol)	Cleaning and disinfection of surfaces and equipment, aerial disinfection, sanitizing drinking water systems.	Biodegradable	Do not exceed thirty minutes exposure for metal objects. Handle to minimize dust release.	Powder irritating to eyes, skin and mucous membranes. Poison, keep out of reach of children.
Phenols	1-Stroke Environ (Steris), Multi-Phenolic Disinfectant (Bio Agri-Mix), Environ LPH	Simultaneous cleaning, disinfecting and deodorization.	Not affected by hard water and has good storage life. Effective in presence of some organic material. Compatible with many soaps and detergents, does not stain.	Concentrate is a corrosive material.	Causes eye and skin damage. Do not get in eyes, on skin, or clothing.
Quaternary Ammonium	BioSentry 904 (Pfizer), Clinicide (Bimeda-MTC), Proquat (Pfizer), Quatsyl-D Plus (Pfizer), Rocco (Vetoquinol)	Cleaning and disinfection of vehicles, animal buildings and equipment.	Effective at high pH and temperature with good storage life. Many are biodegradable and effective over wide pH ranges. Detergent activity, residual activity	Deactivated in organic matter, hard water and by many soaps and detergents.	Corrosive to eyes. Wear goggles or face shield, protective clothing and rubber gloves when handling.
Peroxide	Peroxigard (Bayer), accelerated hydrogen peroxide	Sanitizing and disinfecting in veterinary hospitals and animal care facilities.		Corrosive material, may dry with a residue that requires rinsing. Do not mix with other cleaning or disinfecting products.	May cause burns; avoid contact with eyes and skin. Do not store in food processing areas or in high temperatures.