Cornell University
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Cornell Vegetable Program

The "Ideal" Wash & Pack Facility Layout

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Background Information:
The goal of this document is to provide more detail on setting up an efficient wash/pack facility with a focus on farm food safety and maintaining post-harvest quality. Of course, each farm will have unique circumstances and need different pieces of equipment. The idea here is think about the way to use a space to your best advantage. A facility should be set up to wash and move produce efficiently while getting the job done effectively. Whether you are adapting a currently existing space or starting from scratch, you can use this document to plan as close to the ideal situation as possible. You can customize to your specific situation, budget and needs.

How to use this diagram:
This site can be an actual building with four walls and a roof or can be as simple as an outdoor area with canopies for cover (four sticks and a lid). Whatever the setup, having a design of where the wash/pack takes place, room to move, adequate protected storage for packing containers, methods of cleaning and keeping things clean during as well as between use are all necessary. Food safety principles of reducing microbial risk can fit any situation. To make the discussion simple, the term "facility" will be used.

The **arrows** indicate the flow of produce into a facility, from one area to another, and out ready for transport to market. There are two basic color hues. Red and green shades. **Red designates where unwashed produce begins the post-harvest wash/pack steps in the "dirty" area. The green indicates where the washed produce is, ("clean" side) as it advances through the wash cycle then to the pack – store – ship activities.** The concept here is to minimize cross-contamination from the dirty to clean areas.

Ideally, wash water, whether it is in dunk tanks, basins, and tubs, or run through nozzles in wash equipment, should have sanitizer in it. Sanitizers are used to reduce possible food borne pathogens that might be on some produce from contaminating the rest of the produce by being spread in the water. Sanitizers keep the wash water "clean" but does not clean the produce.

Listeria *monocytogenes* is a food borne pathogen that survives and multiplies in drains, standing water, on unclean equipment, in coolers, in the soil, and in other wet areas. Thorough cleaning of food contact surfaces is critical. Cleaning floors, drains, and other areas that regularly get wet is important.

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USDA
United States Department of Agriculture
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Floors and drainage
If your facility is outdoors, having a well-drained floor is essential. Crushed gravel several inches deep to allow water to drain down without pooling underfoot is strongly suggested. Siting the location for an outdoor wash/pack area might be better on slightly sloping ground. With the gravel in place, heavy water usage could drain away from the site. Landscape fabric over bare ground can also be used as long as a gravel filled furrow is in place to catch water coming off the wash line or under other equipment. One problem with landscape fabric on bare ground is that if the ground becomes compacted, water will have a difficult time percolating through. This will cause muddy spots to develop and seep upwards through the fabric. Indoors, having cleanable floor drains is highly desirable. Circular floor drains are fine if they can be cleaned. Soil and debris can accumulate inside. Listeria can survive and multiply in grains. Grate-type drains that are open for several feet are a good option. Water can be squeegeed into them along with soil. These drains can be slanted to allow for water to flow out of the facility to a drainage area. Grating drains can be cleaned easier.

Walls
If the structure has walls, wall paneling material is of concern. Having washable walls makes the task of cleaning up after washing and packing produce a whole lot easier. As seen in the diagram, keeping space between objects and the walls not only alleviates hiding places for rodents it also makes cleaning more efficient. Walls could be covered with a water resistant paneling, such as fiberglass reinforced panels (RFP). These panels provide a smooth surface that is impermeable to water and easy to wash stuck material off without ruining the surface (unless you use steel wool or something really abrasive).

Lighting
Having good lighting is important. Generally most repurposed barns and sheds are lacking in good lighting. Ideally, there needs to be enough light for workers to sort and cull easily, wash effectively (making sure debris is off produce or to correctly read SOPs or labels on sanitizers or cleaners, and end of the day equipment cleaning. Light fixtures need to have bulbs covered to prevent any glass from dropping onto the produce if broken. The fixtures should to be positioned to give adequate light for workers and not cast shadows in the wrong places.

Unloading ramp/dock
Produce comes out of the field and heads to the wash/pack area. Ideally, trucks or carts do not enter the actual facility space. An unloading dock set at a height that is ergonomically appropriate will make work more efficient. At the other end of the process, the clean and packaged produce can more easily be loaded on a dock where the height of the truck matches the loading dock. Pallet jacks, forklift, or hand-truck can simply move a load onto the truck bed.

Field pallets
Pallets used for field harvest for stacking harvest bins or boxes/totes. Field soil and debris can get stuck to the bottom. Try to keep these from spreading contaminated soil into “clean” area.

Water hoses
If there is a rinse table outside of the wash/pack facility, having access to water and a hose to spray off extra dirty or muddy produce is a good idea. It saves from bringing in more dirt than necessary into the facility. Hoses and spray

Shelving
Wash brushes, goggles, eye wash station, first aid kit, thermometers, monitoring strips, gloves, measuring cups/spoons or dosers, and other materials needed for the wash process can be store close by but out of the way. A separate shelf should be used for storing sanitizers and cleaners. Do not keep non-food grade lubricants, pesticides, fertilizers, or other products that might pose a hazard near the wash/pack area. These products should be kept in a separate area of the building or in another supply room.

Wash and Pack Facility Layout Diagram: See key on following page

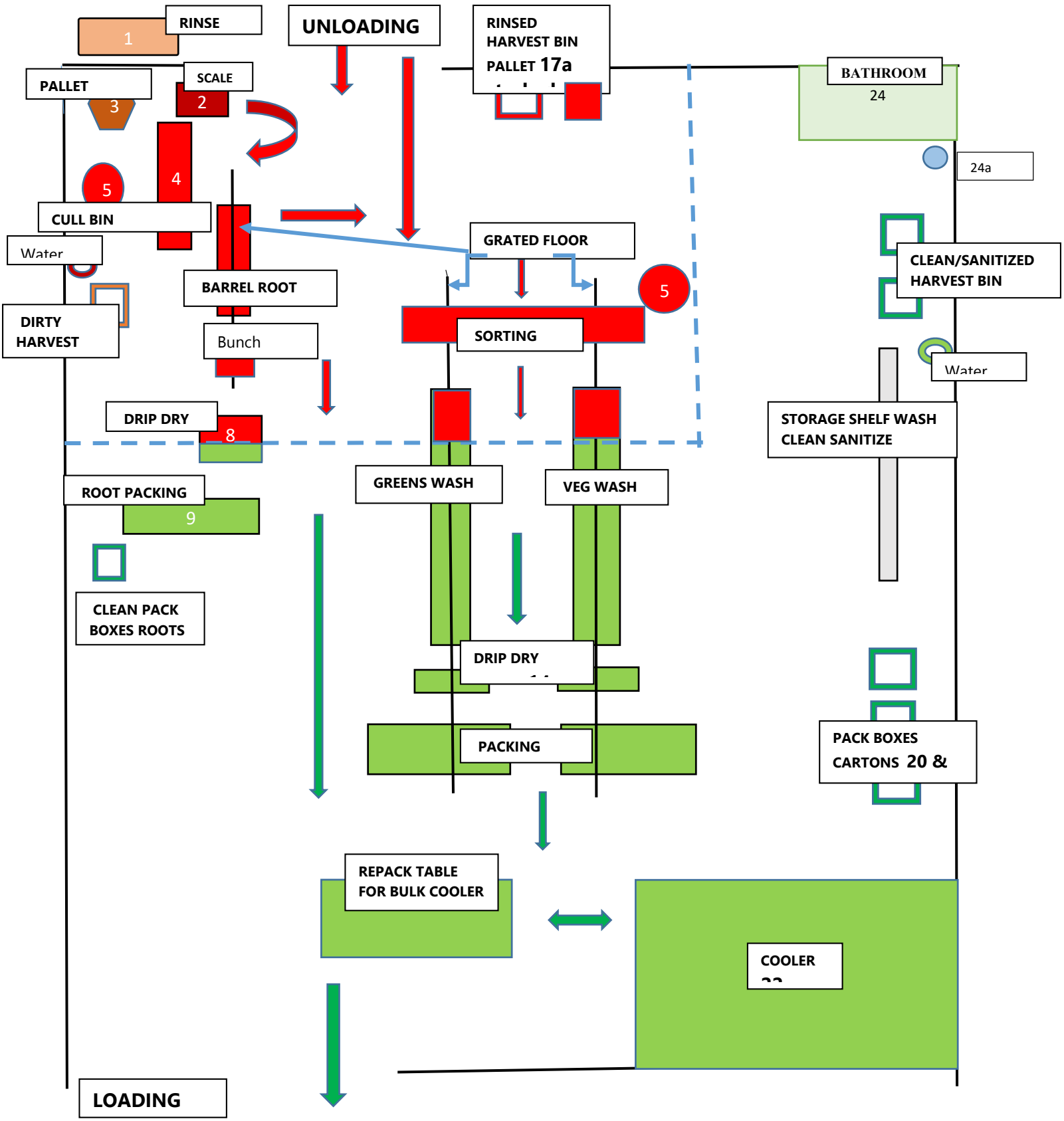

Diagram Key

1. Rinse area. Table set up with access to hose for rinsing off extra-dirty produce prior to bringing into wash area.
2. Scale. Produce then can move into the facility where it can be weighed and recorded in a harvest log if that information is important to your operation
3. Pallet jack/cart. To move product into facility if heavy or cumbersome, having this type of equipment makes the job more efficient
4. Sorting table. Area for loading harvest bins of roots or other soil-laden produce. Can do a sorting to pull out inferior roots or to set by size.
5. Cull bins. Cull bins should be emptied daily to reduce attraction of pests. Should be cleaned as needed to reduce attraction of flies etc.
6. Root barrel washer. Connected to potable water source. Can include injector into the water line for using sanitizer.
7. Root bunch washer.
8. Drip/dry table. After removing roots from barrel washer, roots can be piled on a table with adequate spaces to allow water to drip off before moving to pack table.
9. Root pack table.
10. Pallets for clean pack boxes for roots
11. Sorting table for wash line. Sorting of produce prior to washing. Inspect for inferior or contaminated produce.
12. Wash line for greens
13. Wash line for other vegetables
14. Drip dry table for wash line produce
15. Packing tables. Grade and pack.
16. Floor drains. Floor drains are critical for reducing the issue of standing water. Long grates are preferable. Construct them so the grating is easily removed to clean out drainage troughs. Have the waste water move out of the building into a grassy/vegetative area for water to penetrate the ground (not into ditches or waterways) but not be in the way of traffic.
17. 17a Pallet for rinsed harvest bins. Rinse harvest bins that need it before going back into field. Stack bins on pallet off the floor.
    17b stack of rinsed pallet from field harvest.
18. Pallet for cleaned harvest bins. Before cleaning wash line, can clean harvest bins thoroughly and stack on pallets of the floor. After bins are cleaned, clean wash lines.
19. Storage shelf. Designated area for sanitizer, measuring devices, associated tools, cleaners/detergents, first aid, goggles, gloves. Can set up two separate shelving units with one for the wash line chemicals, the other for dry goods.
20. Pallets for pack boxes, packing cartons, other packaging. Keep off floor. Also clean pallets for packing produce boxes on for going into cooler or onto delivery truck. Keep separated from field pallets. Can color code pallets for example red pallets only for field harvest bins/buckets/boxes. Packing pallets can be spray painted green for “clean” only. Harvest bins can be painted red while packing bins after wash can be green.
21. Repack table for bulk storage items. Bulk items stored in the cooler need a place to repack for market.
22. Cooler. Have a cooler that will provide suitable storage temperatures to meet specific needs of produce. Correct temperatures and humidity levels will maintain shelf life and quality. Inspect cooler for rodent activity. Actively maintain gaskets and block up any holes where rodents can get in. inspect for standing water on the floor, dripping water from refrigeration unit, or from condensation.
23. Loading dock. Ideally best to have a loading dock where boxes or pallets can be easily moved into trucks without having trucks enter in facility.
24. Bathroom facility. Clean and fully stock restrooms for employees complete with bar soap, sink, and paper towels.

24a. Trash can. Can keep trash can for paper towels just outside of door in order to monitor employees washing hands.

25. Water hose. Garden type hose for use in cleaning harvest bins, wash lines, tables, other food contact surfaces, and floors etc. Keep hose on a reel and can have the hose rigged to not be on the floor.