

# Sattin Hill Farm Course

## Module 18: Wash Pack Station

### Introduction

This module discusses the importance of an efficient wash pack station, plumbing, water source, Josh's personal setup, workflow, refrigeration, and more. There are specific elements required for the infrastructure of a wash pack station. Configuring a streamlined layout for an efficient flow of operations is ultimately more important than what kind of equipment you have.

Market farmers spend 50-70% of their time washing and packing vegetables. Any efforts to make this part of the process more efficient will save you time and energy to put into other tasks.

### Design

When designing your wash pack station, consider efficiency and flow. How will workers move through the space? How will the product flow through the space? Visualizing all of the required steps in the process is vital when creating your design.

The size and layout of your space will largely contribute to its design. For Josh, he was working within the constraints of a two-car garage, and he knew he would be typically working alone. However, if you have a crew or might have a crew down the road, it is in your best interest to design your wash pack station accordingly.

### First Things First

A common mistake for new farmers is jumping right into it, throwing together a last-minute wash pack area when the need arises after the first harvest. Many new farmers will enthusiastically begin with building tunnels, beds, and planting. Then as the season starts rolling forward, they realize the crops coming in off the field will need to be washed and packed somehow. Planning ahead will avoid this all too common stressful scenario.

At Raleigh City Farm, even before the crop plan for the coming season, Josh prioritized the design and construction of the wash pack station. Once the season is underway and harvesting has begun, there is no time to work on constructing a wash pack station.

## **Climate Control**

While an outdoor shaded open-air wash pack station is nice in the summer, if you plan on growing year-round, you will need to factor in a climate-controlled space to make this possible.

Josh's built-out garage has a small window air conditioning unit that keeps his wash pack area cool in the summertime and a small space heater that keeps it warm in the winter. These extra measures can go a long way for your comfort and anyone else who may be working with you. Washing vegetables in extreme cold can be miserable, and extreme heat can not only be hard on the body but also really hard on the vegetables.

## **Lighting**

Lighting is also an essential element in your wash pack station design. Being able to see if the surfaces and equipment are dirty or clean is a must. Josh uses fluorescent strip lights to ensure plenty of visibility in his wash pack area. He also has lights mounted above his drying screen. The drying screen is the last step for greens just before being bagged. High visibility is important for that final assessment—to ensure the greens are adequately dry and that there are no damaged leaves that should be discarded.

## **Water**

A high quality, high pressure, potable water source is a fundamental necessity in the wash pack station. When it comes to the water used to wash produce, the quality requirements are much higher than water used for irrigation in the field. For washing vegetables sold to the public, the water must meet the same requirements as drinking water.

The water plumbed into Josh's wash station in his garage is the same water that services his house. It passes through not only a sediment filter but also a carbon filter to filter out even more impurities. The water that services the irrigation in his growing space comes from the same well but only passes through a sediment filter, not an additional carbon filter.

Another benefit of Josh's well system is that the water stays cool year-round. In North Carolina, the city water in the summertime can get up to 85°F. However, the water from Josh's well is at most 50-55° F, which is ideal for washing vegetables.

Growers in high-temperature regions will even add ice to their greens bubbler to cool produce as it comes in off of the field. This practice is called hydro cooling. Bringing down the temperature of the field heat with cold water will increase the shelf life of your produce considerably.

## Plumbing

A lot of the plumbing for the wash station is fairly straightforward, but if you are not comfortable with plumbing, consider hiring a plumber. The overarching plan must include determining how and where water comes in, directing it to different pieces of equipment, and eventually how and where it drains.

**Water Flow:** In Josh's setup, he has  $\frac{3}{4}$ " water lines that run throughout his house. Josh ran a dedicated line directly from the source (just after filtration) to his garage space to ensure plenty of flow for his wash station. Filling up a 100-gallon greens bubbler can take a long time and create a bottleneck in your workflow if you have low water flow. Root washing will also put a high demand on the flow, so if possible, design your space with water coming in at both high pressure and high volume.

**Electrical:** You need electricity in your wash station; install outlets equipped with GFI's for safety when in proximity to water.

**Manifolds:** Josh has a water manifold installed right after the source coming into his garage. One line goes to his greens bubbler, one to his sprayer, one to a utility sink, and another to a dedicated sprayer for the greens bubbler.

**Dedicated Hoses:** Having dedicated hoses and sprayers in different spaces for dedicated tasks helps increase your efficiency. Josh started with just one multipurpose hose for his whole wash station. He quickly realized multiple dedicated hoses worked better and allowed people to work simultaneously when needed.

**Drainage:** In Josh's space (primarily designed for washing greens), he has three elements that require drainage: a greens bubbler, a salad spinner, and a utility sink. All three of these are tied to a common drain system using 2" PVC drain pipe. The wider the drain pipe, the faster it drains, and it's less likely to get clogged. The 2" pipe allows the greens bubbler to drain very quickly, then it can then be refilled faster without creating a bottleneck.

Josh also added a vent to his drain system. The vent has a simple T fitting and an open pipe that extends upward, allowing water to flow quickly and smoothly for the best drainage.

Josh's garage has no floor drain; he didn't want to put a hole in the wall or the garage door for the drainage pipe. It required a creative work-around to figure out a way to send out water and direct it to an intentional draining area. Initially, he used a flat lay hose that opened up when it filled and ran under the garage door. It worked okay but would often require finessing. He wanted a more robust drain system to drain faster. He knew he should figure out a way to direct the drainage water elsewhere and eliminate flooding his driveway.

Josh solved this issue with a short segment of 2" PVC drain pipe with threaded unions on each side. When using his wash station, he opens the garage door just enough for the drain pipe to fit under and then screws in the connector segment. One end screws into the drain pipe at the end of his wash station. The other end screws into a drain pipe that runs along the front of the house under his front porch, moving out to a sloped area on the other side of the house. After use, he unscrews the connector and closes the garage door.

Josh doesn't claim it's the best solution, but it has definitely worked for his context. One issue he has is that much of his cool air escapes through the cracked garage door in the summer heat. He considered using some foam blocks to fill the space and keep the cool air in. Regardless, the system works well enough and allows him to accomplish his tasks.

## **Flow of Operations**

Josh's general flow of operations for washing his greens just after freshly harvesting:

1. Fill the greens bubbler with water
2. Add the greens and bubble them for a few minutes
3. Transfer the greens to the salad spinner
4. Transfer them onto the drying screen to be packed.

## **Greens Bubbler**

Traditionally small farms and market gardens would wash greens using the triple rinse technique. This includes three basins of fresh water. You place the greens into the first basin, transfer them to the second, and finally into the third. With each transfer, the greens get cleaner. You've probably seen "triple washed" labels on bags in the supermarket. This is the source of that method.

The innovation of the greens bubbler allows you to get the same results as the triple rinse, but in one step, making it a huge time saver. Josh currently uses a 110-gallon tank for his greens bubbler. The first tank he built was a 70-gallon, but now he prefers having the higher volume to wash more greens at once.

The greens bubbler comprises a holding tank, an air blower, and a pipe manifold with holes in the bottom of the tank, into which the air is blown. There is also a drain in the bottom of the tank and a fill valve to bring in water.

**Manifold & Air Blower:** The manifold is a combination of PVC and vinyl tubing with holes in it. It takes experimentation to get the right number of holes and the perfect sizing for your best airflow. All of the pipes are loose fit to come apart for easy cleaning.

Most designs have the air blower and manifold coming in from the top, but Josh's design currently has it coming in from the bottom. Though there is the issue of working around the blower when situated above the tank, Josh prefers this over it coming in from the bottom, as it's a less complicated design. Both will work.

**Hudson Float Valve:** The water filling the tank comes through a Hudson float valve. The beauty of the Hudson float valve design is that it automatically shuts off when the tank is full. You can position the valve to shut off at whatever water level you desire. Once in place, you will get a consistent fill each time and can even walk away to do other tasks while it is filling without worrying about it overflowing. Josh attributes the Hudson float valve to saving him many times from overflows and highly recommends them.

**Drain:** Currently, the drain Josh installed has a small lip that slightly elevates it from the bottom surface of the tank. This lip makes it challenging to get the last of the dirt and debris rinsed down the drain. He has yet to find a good solution and is still looking for a flush-mounted drain with no lip.

**Fry Basket:** Josh uses a fry basket to scoop the rinsed greens out of the bubbler and transfer them to the salad spinner. Other options include fish nets or pool cleaning nets with finer mesh.

**Wooden Stand:** Josh built a simple wooden stand for the tank to rest on and elevated it to a comfortable height. It also provides space under the tank to install the drainage. Make sure your stand is sturdy; a 110-gallon tank of water is very heavy.

## Salad Spinner

Josh uses a modified washing machine salad spinner. He created a full video tutorial on the conversion, which you can find on his YouTube channel. All unnecessary components are stripped out of the washing machine, and it runs on the spin cycle only. The machine has a timer and a drain tied into the 2" drain line previously mentioned. Josh sets his timer for 6-7 minutes which spins most of the water out. The timer is mounted on a post to the back right of the unit, so it sits safely away from the spinner's overspray.

Josh uses a fish basket (purchased from Agrisupply) that fits perfectly into the washing machine. He recommends having at least two or more on hand. Once the greens finish the spin cycle, the fish basket is lifted out of the machine, ready to be dumped onto a drying screen.

You can use a standard hand crank industrial salad spinner when you're starting out, but if you scale up even a little, a washing machine conversion is well worth the time and investment. Josh only spent a few hundred dollars on his washing machine unit.

## **Drying Screen**

The drying screen is made from a simple 2'x4' wooden frame with ¼" hardware cloth mounted on the bottom for the greens. Above the screen is another 2'x4' frame that holds three box fans. The fans face downward to blow air through the greens. The bottom frame holding the greens is designed to pivot. By rotating it forward and patting the underside of the screen, you can easily dump any remaining crop debris or bits of greens that may have stuck to the screen. A simple nut and bolt go through the center of both 2' sides of the frame; each is mounted to the stand so it can pivot. This design allows you to clean the screen and prepare it for the next use.

The drying screen serves two purposes: 1) it provides a space for the greens to dry out from any remaining water that wasn't removed in the spinner (greatly extending shelf life), and 2) it provides a space for sorting and quality control. Once the greens are all laid out, you can easily spot any material that looks subpar and remove it.

## **Packing Table**

You will need a table to package your final product. Josh uses a small industrial stainless steel table because stainless steel is easy to sanitize and long-lasting. Any table will work as long as you can keep it clean.

A digital scale is necessary for weighing the produce on your packing table. Josh uses one made by Torrey. Investing in a high-quality scale is worth it. Ensuring your customers have consistently accurate quantities paves the way for good long-term business relationships.

Josh has streamlined his system down to using only one bag for packaging. Now that he only sells to restaurants, he packages bulk quantities. He buys his bags from Uline. They are sealed with a rubber band, and the quantity is labeled on the bag with a Sharpie marker.

## **Utility Sink**

The last component of Josh's wash station is a double-wide laundry sink purchased from Lowes. It ties into the 2" drainage system like the other wash elements. It has a dedicated hose and sprayer and a ball valve to turn it on and off. This sink is primarily used to wash root vegetables like carrots and beets. After they are sprayed off in the sink, they are transferred to the drying screen.

This sink is also for cleaning harvest totes and other containers. A general-purpose utility sink is quite handy on a small farm. Some farmers spray off their root crops outside on a table with a screen, allowing the water to pass through. This can work, but Josh prefers the plumbed sink indoors for climate control and comfort while working.

## **Refrigeration**

Once your product is washed and packaged, you will preserve it in a refrigerator until delivery. Compared to other pieces of your infrastructure, this is a significant investment.

Josh recommends a walk-in cooler of some sort. You can use a DIY insulated room with a cooling unit or purchase an industrial walk-in cooler. Many farmers use a Coolbot, a handy device wired into a standard window AC unit. It tricks the unit into maintaining a consistent refrigerator temperature. These devices are used for DIY insulated rooms or in small insulated box trailers. It is possible to find an old commercial walk-in refrigerator with a dead compressor and retrofit it with a Coolbot/AC unit instead.

Josh uses a secondhand commercial walk-in cooler he found locally for a good deal. It isn't the most ideal option, but it works well enough for his scale. He typically turns it on one day a week during harvesting. The next morning he loads his coolers for delivery and turns off the walk-in. On occasion, he runs it a little more often, but for the most part, it's once a week—which saves a lot of electricity.

The walk-in cooler is more than storage for finished products ready for delivery—when Josh is harvesting, he brings everything in from the field and puts his harvest totes in the walk-in cooler to start lowering the produce temperature. After harvesting, he can quickly transition to washing. It gets crowded sometimes, but he claims the system is still working at this point. Consider investing in a larger walk-in if you are regularly crammed in your refrigerated space. Eliminating a consistent bottleneck helps your business.

## **Rolling Wire Rack**

Wire racks on caster wheels are extremely helpful in the wash pack area. Josh has a rolling rack that he used to use for microgreens and seed starts. Now it serves as an overflow space for drying root crops while the drying screens are occupied with greens. The rack is easily rolled around according to where you need it and provides a lot of flexibility for more drying space.

## **Conclusion**

Hopefully, this module provided helpful ideas for building a new wash station or adding improvements to the workflow and efficiency in your current wash station.