High Tunnel System Implementation Requirements

Description
A High Tunnel System (HTS) is an enclosed plastic, polyethylene, fabric, or polycarbonate (end walls only) covered structure that protects crops from sun, wind, excessive rainfall, and/or cold.

Improved Plant Productivity and Health
High tunnel systems extend the growing season by increasing soil and air temperatures, protecting crops against freezes and promoting vegetative growth. A HTS can extend the growing season to year-round production by modifying the growing environment. The grower can control temperature, moisture, and wind/sun exposure in high tunnel systems to minimize plant stress and maximize plant productivity.

Requirements
- Crops must be grown in the natural soil profile, or in raised beds up to 12 inches in height.
- This practice does not apply to crops grown outside of the natural soil profile (on tables/benches, portable pots, hydroponics, etc.).
- Install high tunnels according to manufacturers’ instructions.
- End walls must be constructed. Local building materials or a manufactured kit may be used.
- The HTS frame must be at least 6 feet in height at the peak of the structure. It should be tall enough to accommodate typical operations.
- The covering must have a min. 4-year lifespan. Use a minimum of 6 millimeter greenhouse grade, UV-resistant material for polyethylene covers.
- Seed all disturbed areas to control erosion.
- HTS are not greenhouses or low tunnel systems.
- HTS cannot be used to provide shelter/housing for livestock or to store supplies or equipment.

Site Selection:
- Lay out the structure location according to the site plan. The orientation of the tunnel is dependent on location, season and crops that will be grown. East-west orientation will optimize sun exposure and is beneficial in areas north of 400 latitude. In locations south of 400 latitude, consider north-south orientation for maximum ventilation during the summer.
- The natural slope should be less than 5%.
- Locate the structure near a viable water source for irrigation.
- High tunnels can create drainage and ponding issues under certain soil and/or landscape conditions. When needed, direct runoff away from the HTS by installing water management structures such as gutters, rock trenches, underground outlets or diversions.
Concentrated flow from the HTS may be captured and used for irrigation although this should not be the only source of irrigation water.

To control the intensity or duration of sunlight, shade cloth may be used in place of, or in addition to, the installed cover.

Provide a detention basin, storage reservoir, or stable outlet when runoff from tunnel covers empties onto the ground surface with potential to cause erosion.

If tunnels are placed side to side, consider a minimum clearance of 10 to 20 feet for snow removal and cover installation.

Purchase a structure capable of withstanding the local snow and wind conditions and follow manufacturers’ recommendations on removal or management of the tunnel cover. A supplemental manufacturer’s kit may be needed to provide additional structural support.

Considerations

- Baseboards and hip boards should be treated lumber or rot-resistant wood. (Note: Check your organic system plan for acceptable materials.)
- Ventilation is important to moderate temperature and humidity within the tunnel. Remove or manipulate side covers to control internal temperatures and humidity. Installation of vents, fans, and/or temperature gauges should be considered and included in the manufacturer’s design and recommendations.
- Refer to the Indiana High Tunnel Handbook (pages 8-14) for considerations when determining the best HTS for an operation.

Management

- Consider managing the high tunnel system to maintain or improve soil health by following a soil health management system that creates a favorable habitat for soil microbes by:
  * Maximizing plant diversity;
  * Minimizing soil disturbance;
  * Keeping living roots growing year round;
  * Keeping soil covered with mulches and growing plants.

- Adequate crop rotation is important to prevent disease and pest pressure. Consider a movable HTS or multiple smaller tunnels.

Operation and Maintenance

- Managing a tunnel requires intensive and vigilant attention.
- High tunnels are seasonal structures. Remove the cover prior to the “snow season” unless the structure has been designed for expected snow loads. At a minimum, snow should be removed to avoid weakening or collapsing the HTS.
- If gutters are installed, remove them prior to snow, ice or high wind events to prevent potential damage to the structure.
- Perform soil and water tests regularly to monitor nutrients and salt build-up.
- To prevent nutrient and/or salt buildup, occasionally remove the cover or move the tunnel to allow for seasonal flushing with rainfall.
- Periodically inspect the high tunnel and repair, reinstall, or replace components as needed to accomplish the intended purpose.
- Surface and subsurface drainage and other associated conservation practices must be maintained. Any drainage problems near the tunnel will be corrected.

Additional Resources

- Crops – Greenhouse and Indoor Production Resources, Purdue Extension Service.
- High Tunnels: Scheduling Fall & Winter Vegetable Production, Purdue CES, HO-330, March 2022
- “Rainwater Catchment from a High Tunnel for Irrigation Use” video from Iowa State Extension www.youtube.com/watch?v=XsxRZQR_7VU
High Tunnel System Information

Manufacturer(s) ____________________________________________

Height (min 6') _______ Width _______ Length _______ Total Square Feet ________

Cover material (if polyethylene, use a minimum 6-mil greenhouse grade, UV-resistant material): ____________________________

Crop Rotation

A planned crop rotation should be followed to reduce the risk of pests and diseases. Crop rotation is not required but, at a minimum, a conservation crop rotation must be discussed with the producer and recorded.

Year 1:  
Spring ___________  Summer ___________  Fall ___________  Winter ___________

Year 2:  
Spring ___________  Summer ___________  Fall ___________  Winter ___________

Year 3:  
Spring ___________  Summer ___________  Fall ___________  Winter ___________

Year 4:  
Spring ___________  Summer ___________  Fall ___________  Winter ___________

Planned Optional Systems

_____ Supplemental Heating System  _____ Electrical System  _____ Mechanical Ventilation System

Planned Associated Conservation Practices

Such as but not limited to:

- Cover Crop (340)
- Mulching (484)
- Low tunnel system (821)
- Soil Carbon Amendment (336)
- Microirrigation (441)
- Irrigation Reservoir (436)
- Roof Runoff Structure (558)
- Diversion (362)

- Pollinator Planting (420)
- Critical Area Planting (342)
- Crop Rotation (328)
- Nutrient Management (590)

Required

- All erosion due to HTS construction must be controlled. If applicable, see attached seeding specification sheet.
- High Tunnels funded through EQIP must be operated and maintained for the practice lifespan of five years.
- Attach a site plan map.

Certification

This structure was constructed and installed using manufacturer’s recommendations. I have read and understand the operation and maintenance requirements associated with this practice.

Participant: ____________________________  Date: ____________________________
Attach a Site Map