2015 Southeast Alaska Commercial Grower's Conference
~ Petersburg, Alaska ~ 28 February 2015~

My High Tunnel Odyssey: Lessons Learned Assembling a NRCS High Tunnel *by Joe Orsi*

Presentation Outline:

- My "**gardening roots**" and what got me thinking about building a high tunnel (**HT**)
- **HT** selection criteria: design & dimensions
- **HT** site prep, time line, & labor involved
- **HT** photo gallery: start to finish
- **HT** project costs & NRCS reimbursement
- Recommendations to future **HT** builders
- Conclusions after my **HT** odyssey

My gardening roots…

- **1970s**…grew up in California, gardened as a youth, small scale home garden
- **1980s**…moved to Alaska, school, wife, kids, gardened in Juneau's Mendenhall Valley
- **1990s**…relocated "out the road", more land, grew **A**pples-**Z**ucchinis, active in SE Master Gardeners, Juneau Community Garden
- **2000s**...increased vegetable production, row crops, apple grafting, garlic variety trials…

My gardening roots (cont.)…

- **2008**…participated in Juneau's first "Farmer's Market" & sold out! Donated profit to "The Glory Hole" our local soup kitchen
- **2009**…started *Orsi Organic Produce*, used more fleece row covers, low tunnels, foliar sprays, IRT plastic, permatex ground fabric, & now I do 4-5 farmers markets/yr & sales
- **2013**…thought I should apply for a NRCS high tunnel grant after observing how well low tunnels worked for me & after visiting a couple SEAK growers using high tunnels

My High Tunnel selection criteria:

1) Needed to pass NRCS minimum standards

2) Desired a freestanding HT that could winter

3) Sought out a decent size (≥1,000 sq feet)

4) Wanted to get a kit from a reputable vendor

5) Ideally, get a HT model that had stood the test of time in SEAK

Omni Structures International Inc.

18 Seapark Dr., Unit 4,
St. Catharines, Ontario L2M 6S6
Tel: 905-687-9011
Fax: 905-687-4131
Toll Free: 1-800-991-0600 USA/Canada
Email: sales@omincanada.com

OMNI Structures International

- It exceeded NRCS standards, the 4’ o/c ribs were a truss design able to withstand heavy snow loading, roof peak of a 24’×48’ ht is 14’
- The design has proven itself overwintering a number of snowy years in Juneau w/o having removing a 6×6 mil greenhouse film (Hagens)
- It’s a commercial company, offering many options: sizes, package grades, ploycarb end walls, door configurations, etc. (1000 sq’ entry level)
- Downside…it took awhile to fill my order, shipping was from Ontario, Canada, & it was a pretty “rough” kit with limited instructions

Garden area and Hoop Tunnel site

Property (1.25 acres)

The Hoophouse Handbook, 2nd edition (2014)
Ed. by Lynn Byczynski, *Growing for Market*

The rule of thumb for orienting the house to capture the most light in winter is that the greenhouse should be oriented with the ridge running east to west for locations north of 40° latitude and north to south for those located south of 40° latitude.

Research done in England, at **50°N latitude**, showed that the percent light transmission in midwinter was 71% in an east-west greenhouse, and only 48% in a north-south greenhouse.

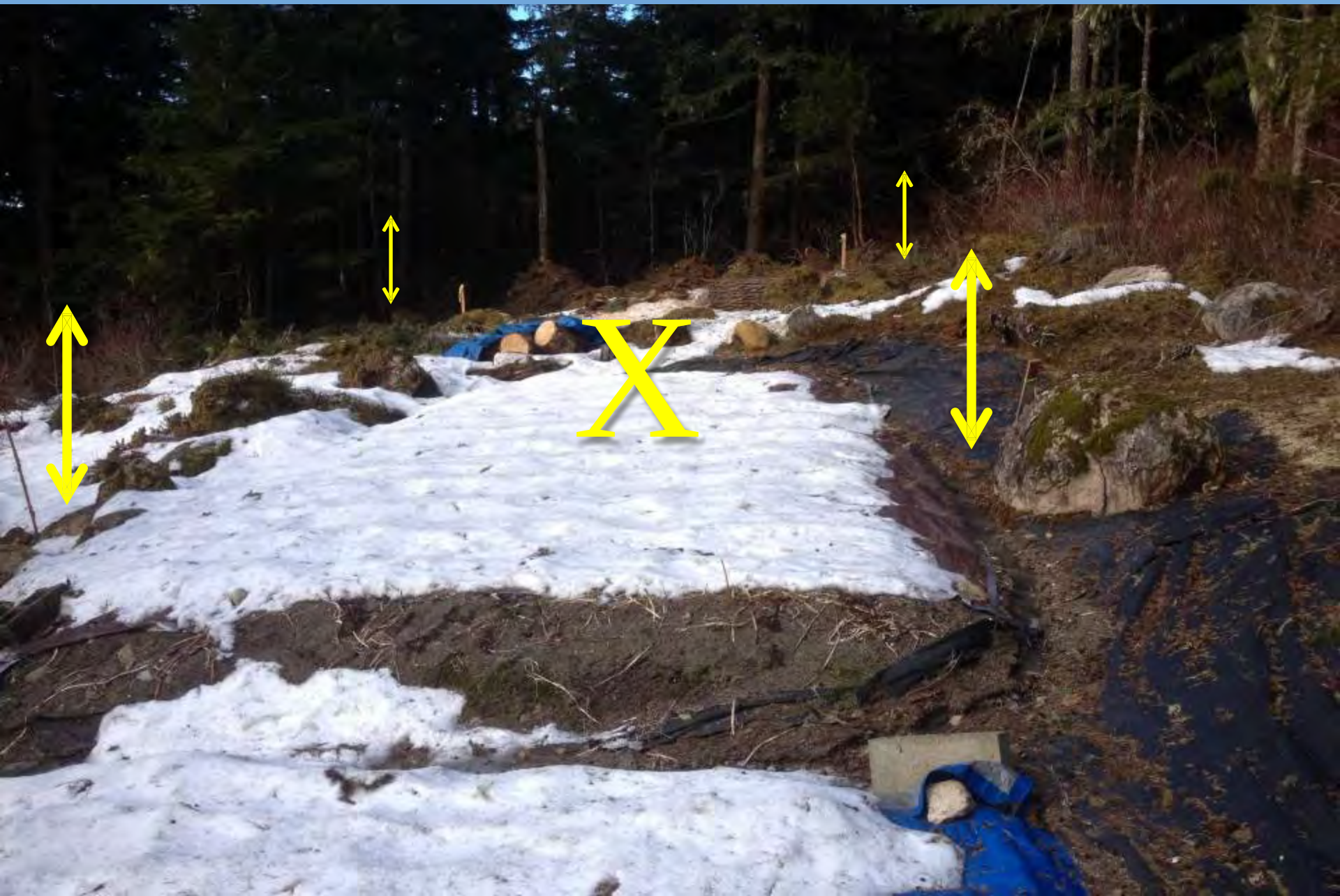
High tunnel site (summer 2013)
Looking southeasterly

High tunnel site (summer 2013)
Looking northwesterly

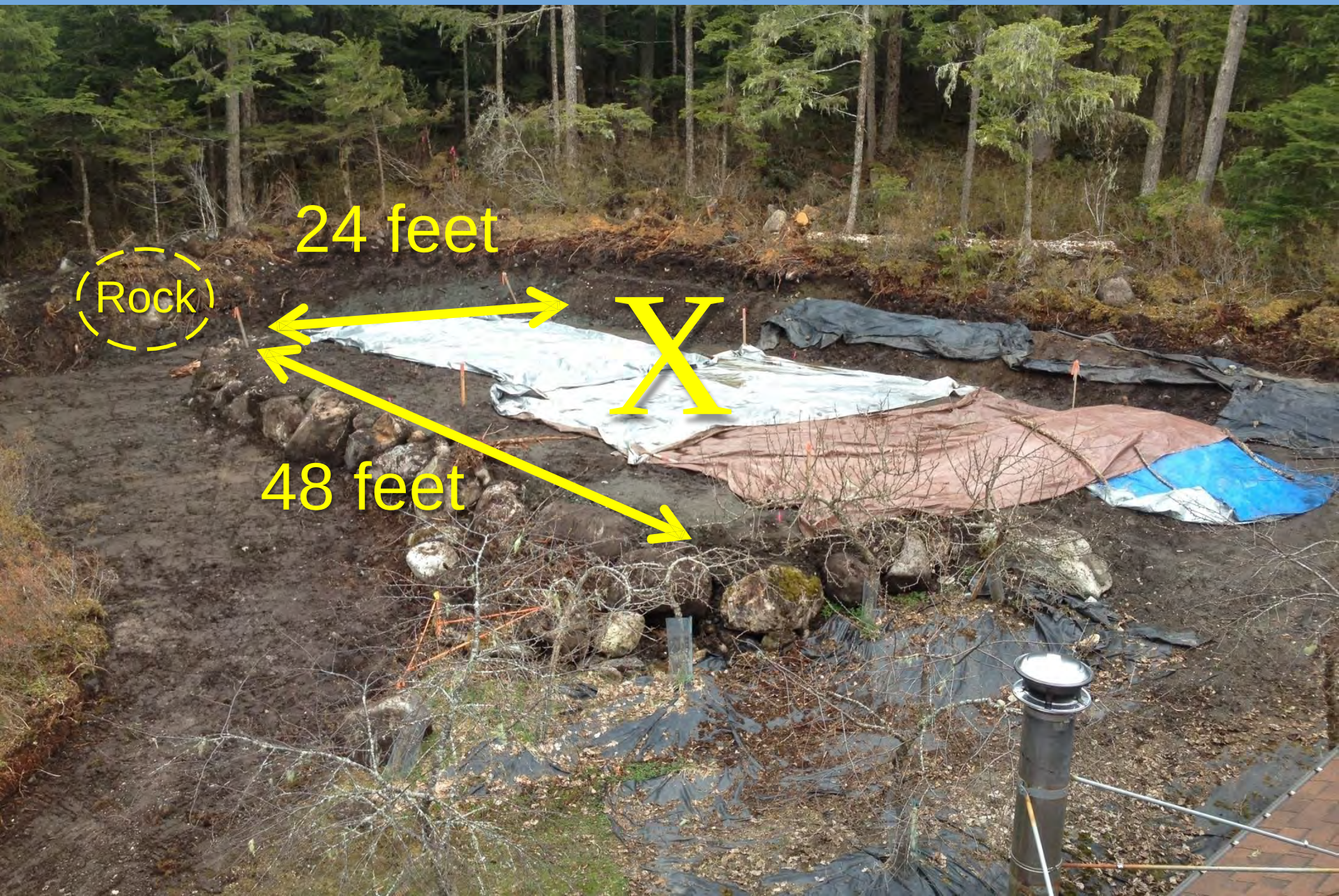
High Tunnel project time line

- Mid-June 2013: Applied to NRCS for a high tunnel grant with Samia Savell in Juneau
- Early 2014: Grant contract accepted, but $ not available due to Federal Budget issues
- April 2014: Obtained a waiver to proceed before program funding, but decided to wait until reimbursement in place
- Mid-April 2014: Began the 24’ X 48’ site prep
- Mid-July 2014: Program funded! Ordered 24’X48’ HT from OMNI Int., Ontario CANADA

High tunnel site (winter 2013/14)



High tunnel site (spring 2014)



High tunnel site (summer 2014)

High Tunnel project time line

- Mid-July 2014: Mowed down cover crop, and tarped over site, rainy season begins…
- Mid-August 2014: materials from OMNI arrive on site (Palette size 48” x 180” x 42”, 1.5 tons)
- Early September 2014: Began layout/setting 26 foundation tubes, stake driver, concrete
- Mid-November 2014: Finished & inspected (**Estimated labor: 120-240 hrs over 2 mo**)
- Early December 2014: NRCS payment was received (**1.5 year process – start to finish**)

Cordless power tools….Amen!

Equipment & Accessories

Excavator for site prep

8’ orchard ladder

Corner
level & sleeve

10’ step ladder

Permatex
landscape
fabric & staples

Stake driver & breaker bar
(5’ long 14 lbs)

High tunnel site preparation overview

1) Cleared & leveled a site larger that my HT

2) Amended it, cover cropped, mowed, tarped

3) Set cornerstone post tube in concrete, and laser leveled tops of corner post tubes

4) Measured diagonals for “squareness” 

5) Set 22 more post tubes plumb in concrete on 4’ centers (corner leveled each tube)

Before site preparation

After site preparation

Planted cover crop, fleeced over

Cover crop sprouting, best soil tarped

Cover crop filling out, spread soil over

Cover crop going “nuts”

Cover crop mowed down

Tarped over c-crop, set two rows of 13 foundation tubes, corners and every 12’ set 8” s-tubes with concrete

The high tunnel “kit”

What have I done?

3,040 lbs of materials!


←------laser level

Swinging up each arch required 3 people, ladders and forked poles. Arrest line was attached to arch top and back through stake driver handle

Setting arches in place: cross braced end arches


Ridge support (full length)
Diagonal cross bracing
Perlon (every 4’)

Starting to see “light at the end of the tunnel”

Squared up both gable end frames, then I worked towards the center, had to shorten some perlons


Note two aluminum baseboards that “wiggle” wires snap into

Sick of getting rained on!

Put up the two 6 mil greenhouse films (with help) before I started thd end walls

Framing end walls

Cutting and inserting polycarbonate sheeting (correct side out) on each end wall

Note permatex sheet (w/plastic underneath) wiggle wired into lower aluminum baseboard

Hung a string of florescent lights for working the “night shift”

Installed two 4’× 8’ slider doors on tracks inside of high tunnel gable end walls

High tunnel (fall 2014)

High tunnel (winter 2014/15)

Cost of my High Tunnel project?

- **Cost** of 24’ X 48’ high tunnel and shipping from Canada to Juneau = **$11.6 K**
- **Reimbursement** from NRCS = $5.74/sq’
  So @ 1,152 sq’ = **$6.6 K (52%)**
  not counting labor(3-6 wk) & other expenses
- **Extra expenses (~$2.5 K**):
  - ground prep (leveling, rocking) $1.0 K
  - tools (laser level, cordless tools) $0.7 K
  - soil, sand, concrete $0.5 K
  - permatex, visqueen, aluminum,etc. $0.3 K

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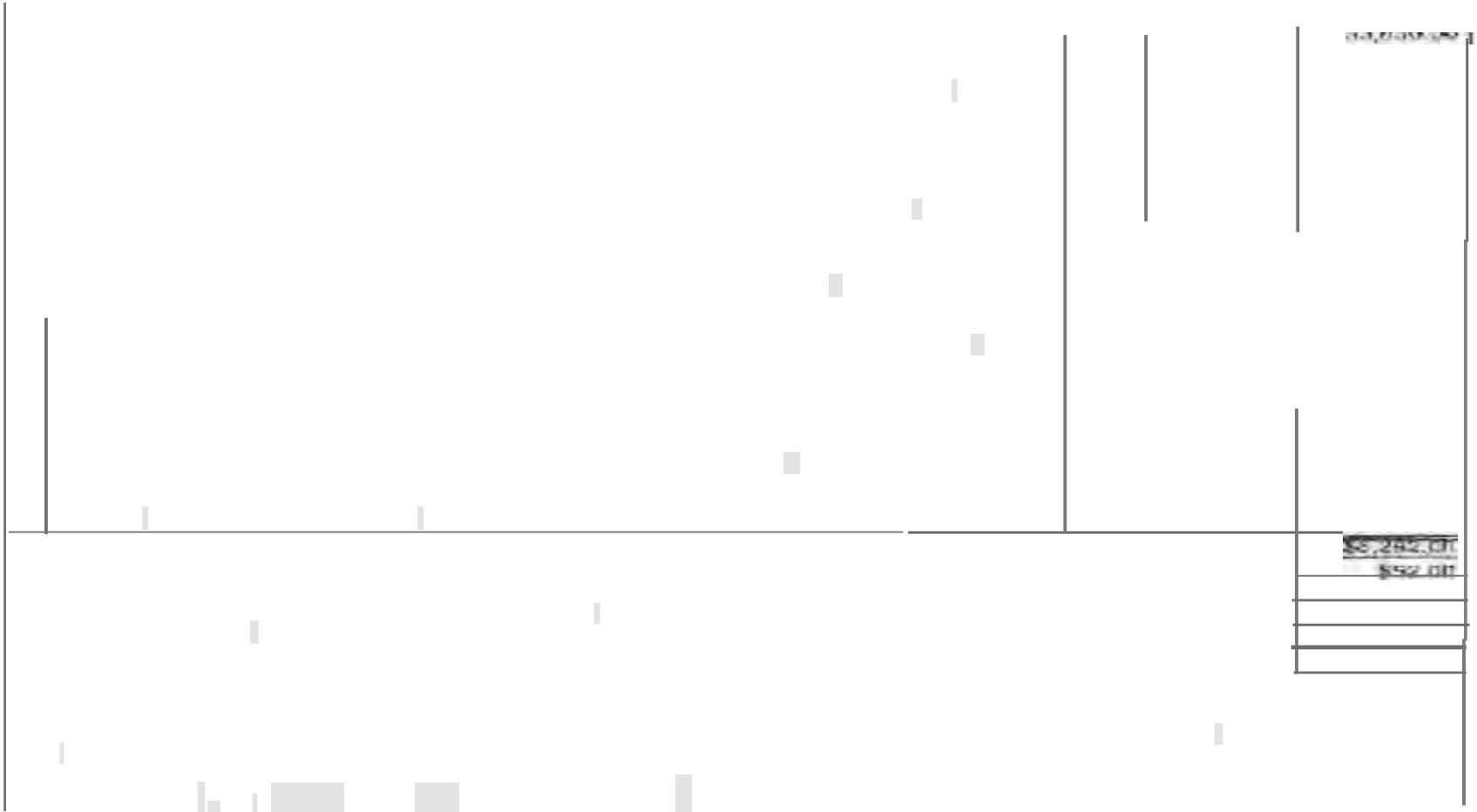
$5,282.00
$52.00

What took me the most time?

- Preparing the site: brushing, logging, burning, ditching, rocking, adding soil and amendments, cover cropping, tarping…
- Foundation tube layout: setting them out square and level, mostly in concrete
- Polycarbonate end walls: framing, cutting, grinding, screwing, and fitting (needed to make out cardboard templates for each cut pattern). Two 4X8’ slider doors each end.

In retrospect, what would have saved me the most time?

- **Pouring some HT ribbon foundations**

  Two ribbon foundations on each 48’ side could have been in place ahead of time (form cross section - 6”X18” w/3 rebar)

  Extra cost of concrete < 3 yds, 2X6 forms, stakes, rebar, etc. probably $600 w/o labor

  Omni makes and sells tubed flanges for this purpose, they cost $116 for 26.

Recommendations…

- Network with experienced “high tunnelers” for encouragement and insight when you get “stuck”. You also need help with the big things like setting the arches and pulling the greenhouse films over the framework
- Keep the tunnel dry: elevate site & tuck a strip of permatex & plastic on the long sides inside the lower baseboard w/wiggle wire
- Use cordless power tools for efficiency/safety!
- Pray for some good, dry weather!

Conclusions…

- My high tunnel experience turned out to be a long, labor intensive process (**1.5 yrs total**, **2 mo labor after materials on site**, **$7.5K net cost** for a 24'X48' HT = 1,150 sq' - $6.50/sq')
- Do not start a high tunnel set up in late fall w/o a lot of help & a preset foundation!
- Networking with friends was invaluable during the process: Dave/Nikki, Pete/Sarah, JT, & Ed gave me a lot of helpful advice
- I was a challenging endeavor, but I am hoping it will pay off in tomatoes and cucumbers!


Questions?