

# Solar Green House

Using Tanana River Rock as a  
Heat Retention Source

Designed by –  
Marji & Ron Illingworth

Constructed by –  
Dan Kaduce

# Site Selection

- Tanana River Valley, approximately 1 mile from river via 4 wheeler trail
- South Face
- Abuts south wall of insulated, heated barn
- Existing raised gravel pad expanded and compacted

- Length – 24 feet
- Width – 16 feet
- Height – 11 feet
  
- Cost – \$12,071.12
- Grant – \$5,000

# Foundation

- Compacted gravel pad
- 10 x10 treated wood base – Northland Wood
- Notched and secured with large pins
- Leveled









# Framing

- Steel frame
- Steel trusses
- Supplied by AllSteel









# Glazing

- Polycarbonate – Farm Tek
  - Double wall
- Secured with screws with grommets
- Sealed with clear silicone
- End peaks, insulated steel sheeting
- Local suppliers















# Exhaust System

- Attic exhaust fan – Home Depot
- Thermostatically controlled – local electric supply company
- Storm doors at each end with self storing screens – Home Depot











# Hot air repository

- Structure placed 14” from barn wall
- Ends sealed with sheet steel
- Black Tyvec stretched and attached to barn wall and ends and back edge of greenhouse
- Sprayed with aerosol sealant to lessen air loss











# Air Exchange

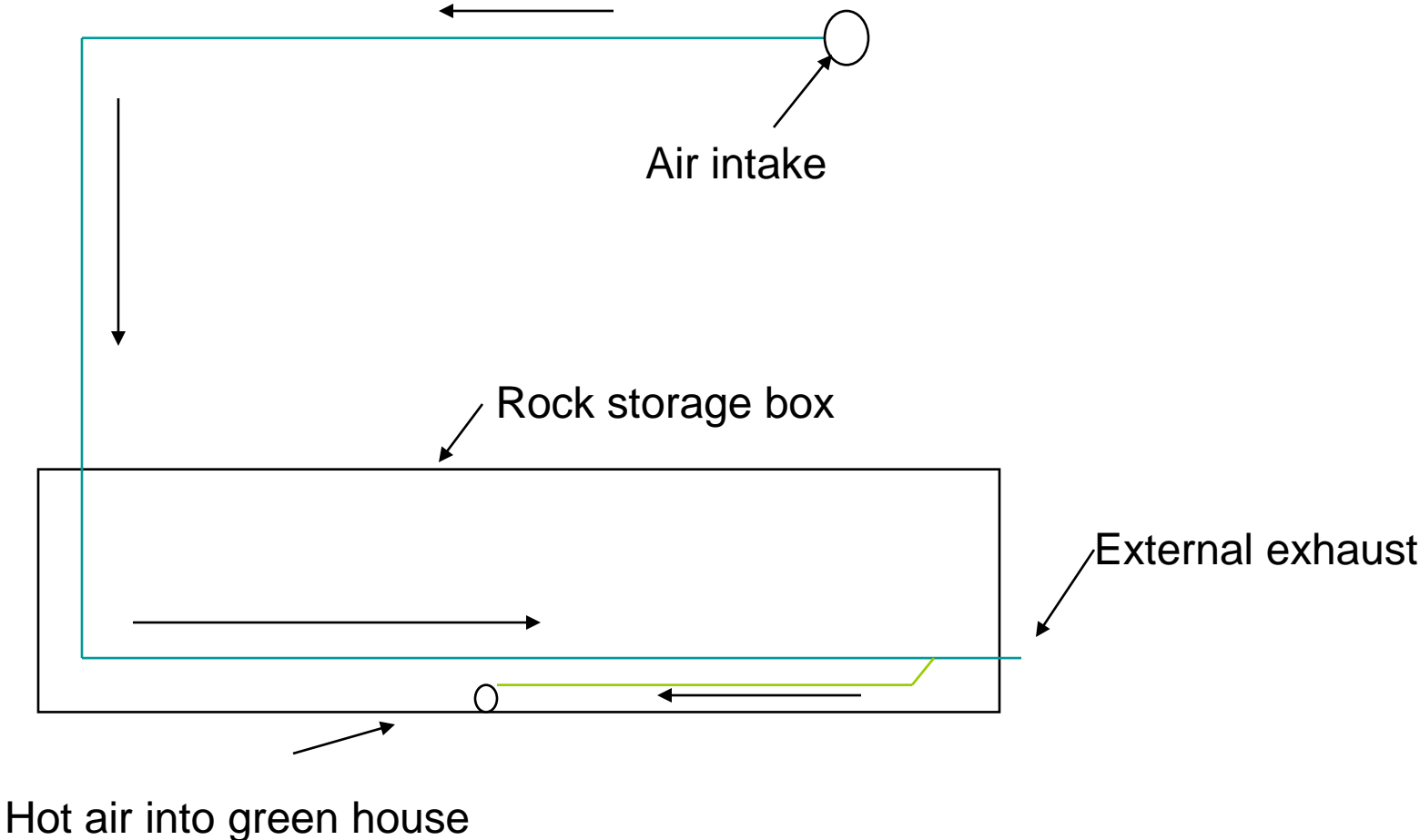
- Squirrel cage fan mounted in top corner of green house to evacuate hot air into air storage area
- PCV pipe from top of hot air storage facility into rock box.
- Hot air moved through rock box
- Hot days, excess air vents to outside
- Cool nights (days) outside vent capped and air forced into green house







# Diagram of Air Circulation System



# Rock Box

- 3' x 3' x 23'
- 2" x 4" frame
- 5/8" Plywood
- 2" rigid blue insulating foam
- 4" PCV pipe air handling pipe

**Rock collecting crew ! !**



# River Rock

- Gathered from Tanana River via 4 wheeler and trailer and pick-ups
- Rock size varies from softball to football sized
- Larger rocks on bottom with mid and small sized rocks above
- Irregular rock size assures space for air circulation











# Completed Greenhouse

- Finish date – September 15
- Potted plants moved from temporary visquene structure in early September
- Harvesting continued through mid-October
  - Cherry tomatoes
  - Ground cherries
  - Sweet and hot peppers
  - Egg plant







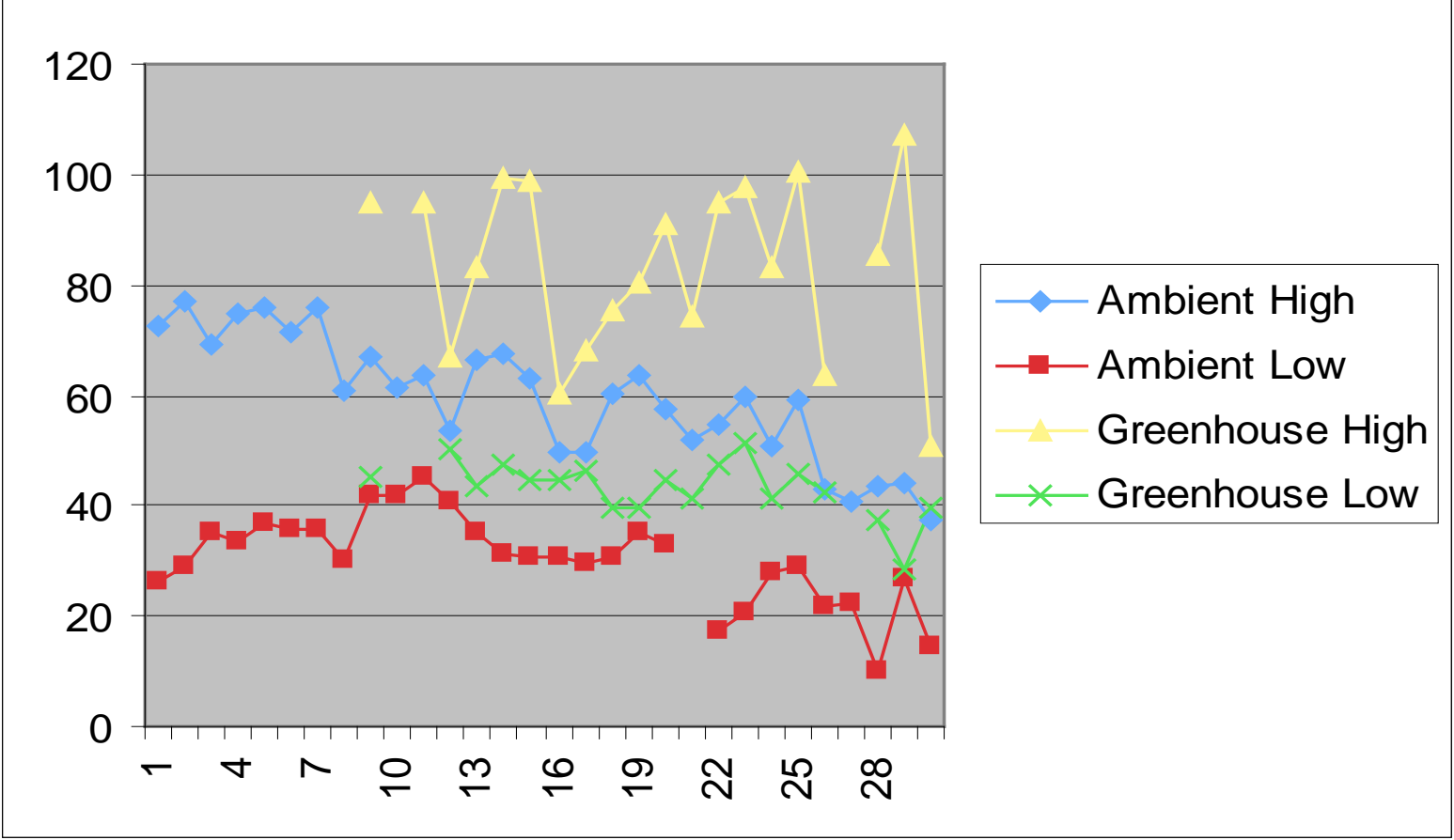




Really warm for late September -

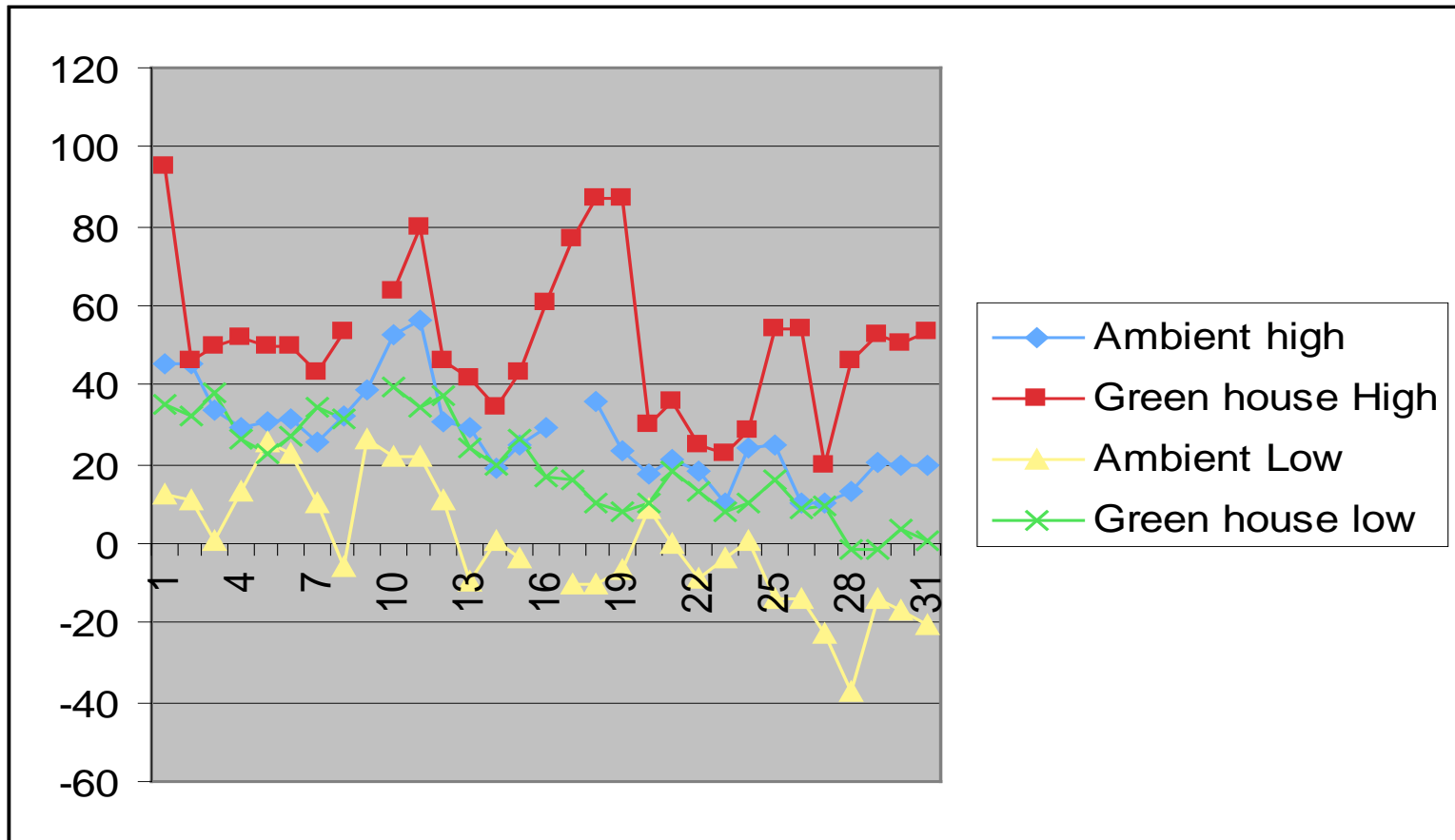


# September Temperature Data





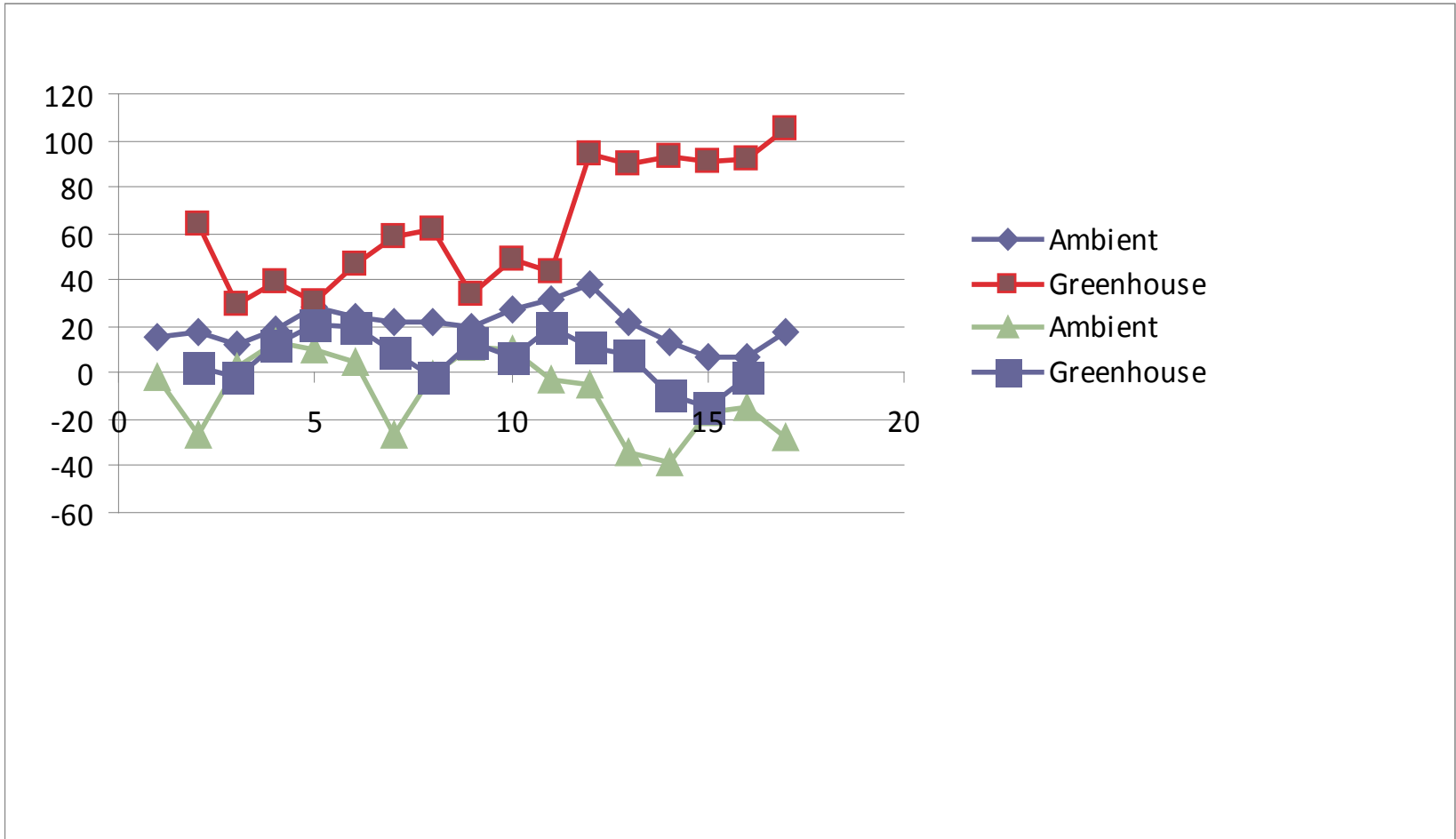
# October Temperature Data



# Opening Greenhouse

- Circulating fan turned on March 6<sup>th</sup>
- Strong solar gain has heated interior to 75 – 90 degrees
- Hot air heating rock
- March 15<sup>th</sup> morning ambient temperature was -40. Green house temperature was -11
- Anticipated opening third week in March

# March Temperature Data



# Seedlings and Transplants

- Start in pond room beginning in March and continuing through May
- Moved to greenhouse shelves in beginning in March – May.
  - Flower plants
  - Vegetables plants
  - Herbs plants
- Ready for Market or transplant into the fields in late May and June

# Hanging Baskets

- Seeds planted first week in March
- Planting of baskets planned for 3<sup>rd</sup> week in March
- Baskets will hang from the rods in upper greenhouse.
- Should be ready for Market in May

# Lettuces

- Seed starts third week in March
- Transplants to green house second week in April
  - Leaf lettuces
  - Romaine lettuces
  - Butter head lettuces
- Leaf lettuces ready for Farmers Market in May, Romaine and Butterheads soon after
- Late plant for fall harvests in late July

# Herbs

- Seed starts in mid-March
- Transplant to greenhouse mid-April
  - Basil, thyme, mint
  - Marjoram, oregano
  - Cilantro, parsley, sage
- Early harvest should be ready for May Market
- Final harvest anticipated in September

# Peppers, Egg Plant, Tomatoes

- Seed starts third week in March
- Transplanted to pots in greenhouse in early April
  - Slicing tomatoes
  - Cherry tomatoes
  - Sweet peppers and hot peppers
  - Oriental style eggplant
- Anticipated harvest in June or July
- Harvest should continue through September



# Melons

- Seed starts in mid-March
- Transplant to greenhouse mid-April
  - Cantaloupe
  - Watermelon
- Harvest anticipated in August and September

# Anticipated Season Extension

- Earlier seedling starts with better growing conditions than in the garage with grow lights
- Produce available for May and June Markets
- Produce still available for September Market for jellies and canning

# Cost Savings and Additional Income

- No need for grow lights (120 dual light shop lights) 10 – 11 weeks
- Early produce – lettuce, herbs – in May
- Tomatoes, peppers, eggplant, melons for mid-season market
- Late season produce for market after frost

For more information contact

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