

GREEN CLASS COMMUNITY



Illinois Institute of Technology
iPro 358

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Introduction to iPro 358

EnPRO: Zero Community Part 2: The Oak Park Project

iPro 358 is a continuation of iPro 323, a theoretical housing project in the Oak Park area. They had successfully designed a townhouse like community that required minimal offsite energy and greatly reduced the carbon footprint of the development. We were given a plot of land on the corner of Dodge and Greenleaf in Evanston Illinois to propose a new development. Our research began studying iPro 323 as a precedent and discovering areas for improvement. One of the big driving factors for our solution was our desire to not simply remain a theoretical project but to create a feasible solution that could then be marketed or sold to interested parties. By conducting thorough research about building and operating technologies we have replicated and even improved our energy usage in comparison to our precedent. We developed 3D models to test all facets of the building to make sure it was performing at its greatest ability. In the pursuit of affordability we did away with the onsite power generation because we found it too inefficient and it failed to impact the project in any significant way. We then created a marketable business model that would allow success in Evanston's housing market and guarantee return to investors. The pages that follow are the evidence of this research.

- This IPRO is a continuation of IPRO 323 (Zero Community). Currently we do not have an official sponsor, However, we will continue with our project plan regardless of this fact. The site location being considered is in the City of Evanston, and for this reason we will consider them our Customers for the duration of this project.
 - We plan on presenting our research and ideas to individuals in the Planning Department of Evanston in hopes of influencing their approach to community planning and development.
 - We will highlight to the City of Evanston the superiority of our design through its cost, efficiency and overall aesthetics.
- b. User problems
- A large part of the struggle in the design of this model community will be trying to reduce the amount of energy and resources consumed not only in the construction of the community, but also in the daily life of the future residents. Minimizing the cost while maximizing efficiency of the model appears to be the main issue of the project. This may require pushing the envelope of commonly accepted ideas about the way communities are planned and inhabited, as well as challenging common ideas about life in an American suburban home.
- c. Science and technology
- The technologies can be divided into two categories. The first is passive systems, which include designing around proper solar orientation, the use of cross ventilation, the use of sustainable materials, etc. The next category, active systems, involves the use of technologies such as geothermal heat pumps, solar collectors, etc. We would like to confront this project by implementing various sustainable technologies available to develop sustainable lifestyles while maintaining the current quality of life.
- d. Historical precedents
- There are several communities which have been designed to be environmentally-friendly. The previous iPro 323 created a model that worked very well to create the net zero community but, being theoretical, did not delve deep enough into the financial aspect of today's housing market. We will continue their research while also looking at completed communities such as Dockside Green in Victoria, British Columbia, Canada as well as a new development, Geos Neighborhood, currently in the design and marketing stage in between Denver and Boulder Colorado.
- e. Ethical issues
- By designing a community, which is not dependent on the grid/conventional systems for its energy and comfort needs, we might hurt some public companies such as ComEd or General Electric.

Achieving complete independence from the typical services a city applies might allow for too much power within individual communities.

- By adding additional housing, we will be creating more traffic in the area and noise, which may disturb residents. Also construction traffic and noise may be an issue to the residents.
- f. Business or societal costs
- If our solution for an energy-conscious community were to be built, its members might have to invest in the initial costs for the systems it will be using. The government has been able to provide credits to homeowners willing to go green and this is an added incentive to the buyer we are targeting. Still, it can be a considerable investment, but this will pay off in the long run and the customers can expect to be compensated by the money they save as they opt for these systems over traditional ones.
- g. Implementation outline for solutions
- Our findings and conclusions will be presented to village of Evanston in hopes that they will be influenced to implement our community or change some of their design and planning practices for the betterment of the environment, both built and natural.
4. **Team Values statement**
- a. Desired behaviors
- All members of the iPro group should be dedicated to the progress of the project and the part they play within the team. This means all team members should respect the need for punctuality, attendance, cooperation, and meeting deadlines. Innovation will also be required to solve the proposed problems.
 - All requests, questions, or complaints should be directed properly through the hierarchy of the group's organizational system. That is to say beginning with sub-group leaders, when need be to multiple sub-groups leaders, and finally to the group leader.
 - All research should be thoroughly documented and available for all members of the team.
 - Sub-groups should regularly share information and act as 'consultants' for other sub-groups when needed; particularly the Planning sub-group.
 - When information is needed a formal request should be made to the leader of the appropriate sub-group. The sub-group leader should then provide this information and/or assign this topic of research to one of his/her group-mates who will then provide this information when it is available.
 - Sub-group leaders should be responsible for assigning tasks to its members, collecting and organizing data, making this data available to other groups, and coordinating their sub-groups efforts with the needs of the overall group. The team leader will facilitate this process.
 - The team leader should remain informed about the actions of all sub-groups and regularly communicate with sub-group leaders. The group

leader will insure all sub-groups remain focused to the overall goals of the group and assist one another as much as possible.

- b. Addressing problems
 - Any concerns within a sub-group should be addressed with the sub-group leader.
 - Any concerns involving multiple sub-groups should be addressed to the group leader.
 - Any concerns involving the group leader should be addressed to the group leader directly, or if necessary to the Professor, who will then approach the group leader.
 - Any personal conflicts should be kept as confidential as possible and should be mitigated by the appropriate party within the group hierarchy.
 - Any concerns about the overall progress or function of the group (especially those involving members of multiple sub-groups) should be addressed in a meeting of all sub-group leaders, the group leader, and the Professor.

II. Project Methodology

1. Work Breakdown Structure

a. Problem Solving

- We will begin by studying the previous semester's work and existing sustainable communities and applying methods and technologies that have been proven successful. This will serve as a guideline for our own research and an example for available strategies.
- A data pool will be collected and analyzed about the average Evanston household based on demographic information. This pool will establish the baseline from which we will determine where improvements can be made. We intend to determine and catalogue the needs of an average household, not only in resources and energy, but also space and comfort.
- Using this baseline data pool we will research technologies and methods to reduce the consumption of resources without infringing on the needs of future inhabitants. (i.e. How much energy can be saved on heating bills/natural gas consumed by using a better insulation?).
- After gathering information on effective technologies and methods we will determine which technologies are most effective and affordable by analyzing things such as the cost of the product, its life-span, the expected payback period (money saved over time), etc. This information will be catalogued and the best materials, methods, and technologies will be selected.
- Potential solutions should be analyzed for viability in regards to budget, environmental impact, marketability, and legality (or conformation to codes and regulations).
- Solutions will be implemented in the design of a cost effective, energy efficient community.

- A minute-keeper will document all items of discussion throughout the project so we can look back and study the exact path of logic.
- b. Team Structure
 - The team will have a group leader who is responsible for coordinating the efforts of the sub-groups.
 - Group Leader: Bryon Krebs
 - There shall be four initial sub-groups, which may change as the project warrants. Each sub-group will be focused to a specific area of research and development. The four initial sub-groups and their members are as follows.
 - Opportunity Assessment: Danny Varghese (Leader), Moses Cho, Bryon Krebs
 - Building Systems: Indira Oraziman (Leader), Moses Cho, Tianshu Qi
 - Construction Methods: Justin Eshleman (Leader), Hazem Shehada, Paul Skopek, Tianshu Qi
 - Planning (Design): Michael Warnes (Leader), Hazem Shehada, Paul Skopek, Bryon Krebs, Indira Oraziman
 - Each sub-group will contain members interested in their task. Members may and are encouraged to participate among multiple groups.
- c. Work Breakdown
 - The research of various topics will be the responsibility of the members of the corresponding sub-group. Each sub-group will be responsible for overseeing and advising in the implementation of their findings by the Planning sub-group.
 - A master list will be composed including all baseline data regarding the average household that is to be improved. All technologies, methods, and materials will be included in this master list as well as their benefits, costs, etc. These technologies, methods, and materials will be chosen for their merits and the influence on the 'baseline' statistics will be catalogued for comparison purposes.
 - The Planning sub-group will implement the research done by other sub-groups into a design for the Green Class Community.

2. Expected Results

- a. Expected Activities
 - The project will require a great deal of research from all of the subgroups
 - Collaboration amongst group members and sub-groups.
 - Meeting with potential clients and discussing progress and future goals

- b. Expected Data
 - We will catalogue the costs and benefits of all technologies, methods, and materials we research and compare the benefits of their implementation to the average household.
 - Reduce construction costs to maintain market viability.
 - We will target buyers who prefer to purchase sustainable buildings as their homes since we have an actual site in Chicago to work on.
- c. Potential Products
 - We will be employing already existing technologies such as, but not limited to, solar arrays, geothermal heat pumps, and advanced building materials, however, we hope to implement these in novel ways.
- d. Potential Outputs
 - A large array of highly useful data comparing existing sustainable technologies will be produced
 - A marketable and sustainable solution to medium density housing.
- e. Deliverables
 - Develop a series of prototype housing units to compose a small community
 - Feedback from interested clients in Evanston, IL
 - CAD drawing of the living space and any systems implemented in the project
 - Develop detailed design of an energy-efficient building envelope
 - Generate construction cost estimate of the project and create a marketing guide for the future
 - A small-scale model of the community
- f. Challenges, Risks, and Assumptions
 - The primary challenge of this project will be to assemble enough useful data on existing sustainable technologies, methods, and materials to make informed decisions on which ones to implement and how. It will be extremely difficult to accurately calculate the impact of implementing our solutions. However we aim to create a solution that will be feasible and economically viable. If we can achieve this goal we will then be challenged with convincing Chicago-area municipalities to potentially re-consider some of their existing (often arbitrary) regulations and their ideas about what a housing community ought to be. In addition, marketing is also a big challenge for us, since majority people are not quite familiar with those sustainable technologies. Questions such as how to operate and maintain will be raised for long-term consideration. The marketing challenge will be to convince the buyers that our sustainable building is worth to own and it saves both energy and money.
 - There is a substantial risk of the research phase being an incredibly involved and weighty experience. We must find ways to make progress

while research is underway and to incorporate new research into our scheme without returning to the drawing board entirely. We also run the risk of making a scheme that is too challenging or daunting to our potential clients, so we must continually consult with potential clients to ensure we are not going so far as to alienate them. In addition, the damages of mechanical system caused by misuse will result in a relatively high maintenance cost and should be considered as a risk. The system should be designed as straightforward as possible to use.

- We assume that there is a better way for homes to be built and for communities to be structured. We believe we can create a community of homes that will be attractive and economically viable for potential consumers while pushing the envelope of existing sustainable practices to a new level. We believe there is room for many improvements in the way average communities are developed and that we can challenge the preconceptions of Chicago-area municipalities. We believe most of the people would love to live a sustainable life to save energy and money in a long-term consideration. These communities will, in turn, impose more informed and rigorous standards on future communities, and therefore cause a real change in the way we live.

3. **Project Budget**

- a. Our estimated budget is approximately \$460. With this money we hope to be able to continue our research on green technologies at the Chicago Center for Green Technology, also continue our correspondence with the village of Evanston both in telecommunication and physical visits. The majority of our proposed funds will be used on construction of models both of our individual solutions, the community as a whole and some of the more complex systems incorporated into our project.

4. **Designation of Roles**

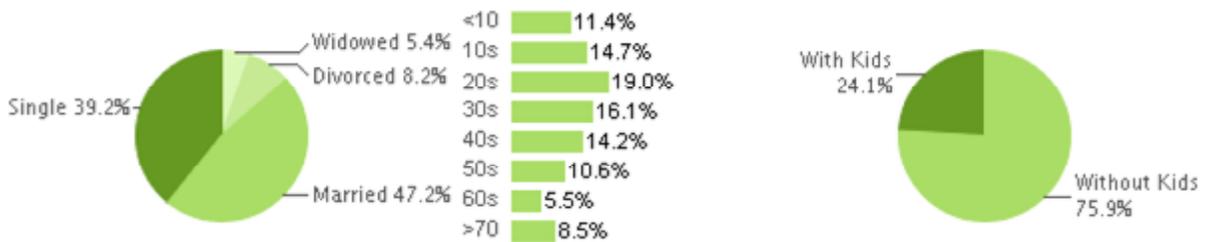
- **Minute Taker: Tianshu Qi**
- **Time Keeper: Danny Varghese**
- **iGroups Moderator: Bryon Krebs**

Evanston Market

Demographics

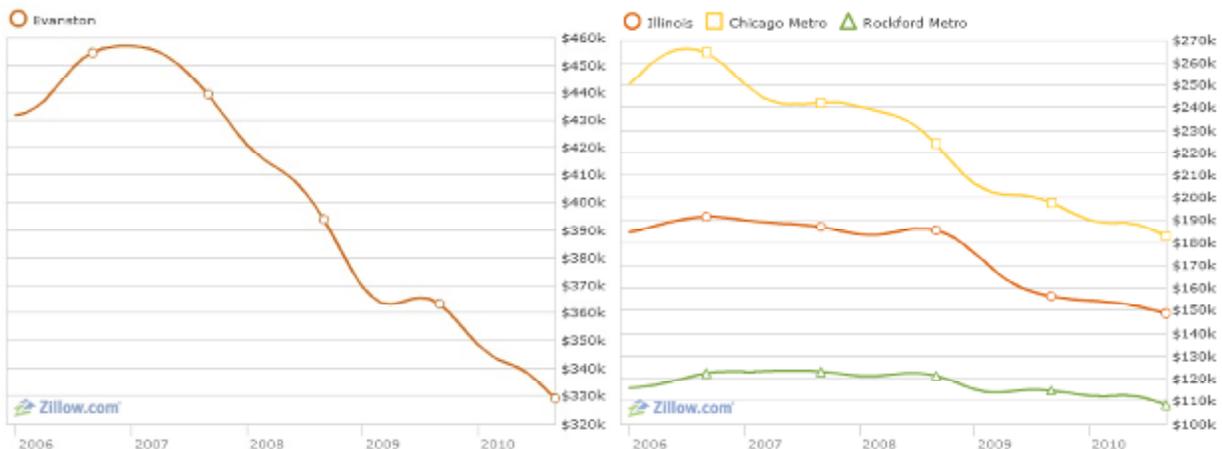
The Evanston market is very diverse and it consists of people from every age group but there is a slightly higher concentration of people in their 10's – 40's. This would mean that the neighborhood is urban and urban styles are preferred over traditional styles.

People who are married constitute about 47.2% of the population and single people are 39.2%. Divorced and Widowed people share the rest of the pie with about 8.2% and 5.4%.

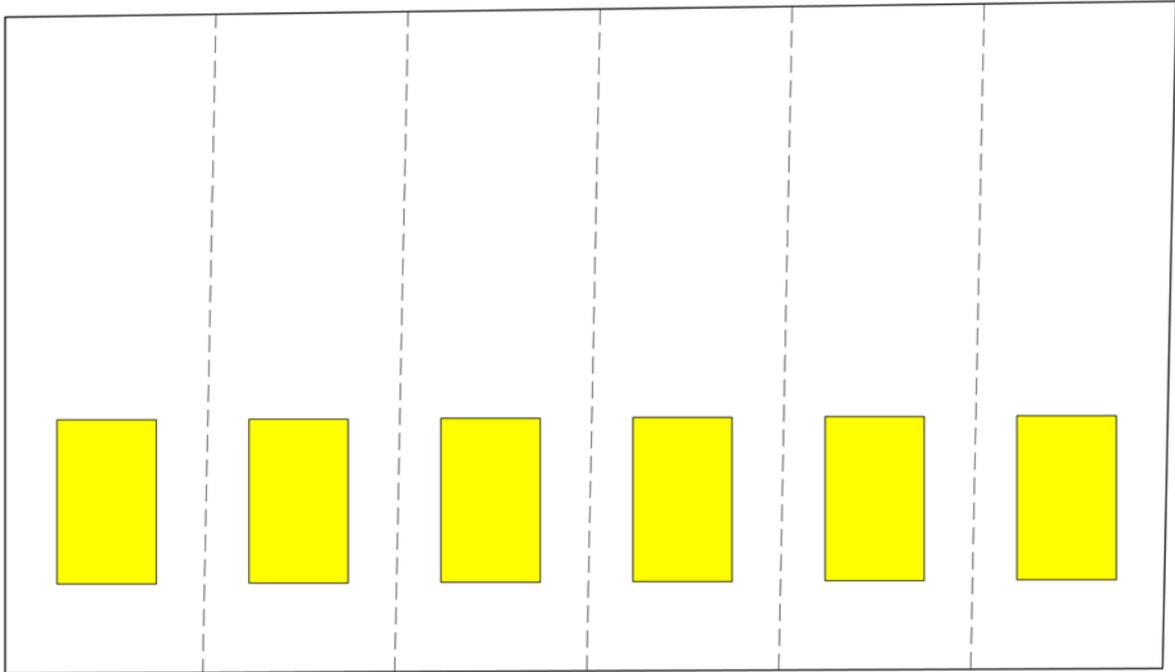


Home Values

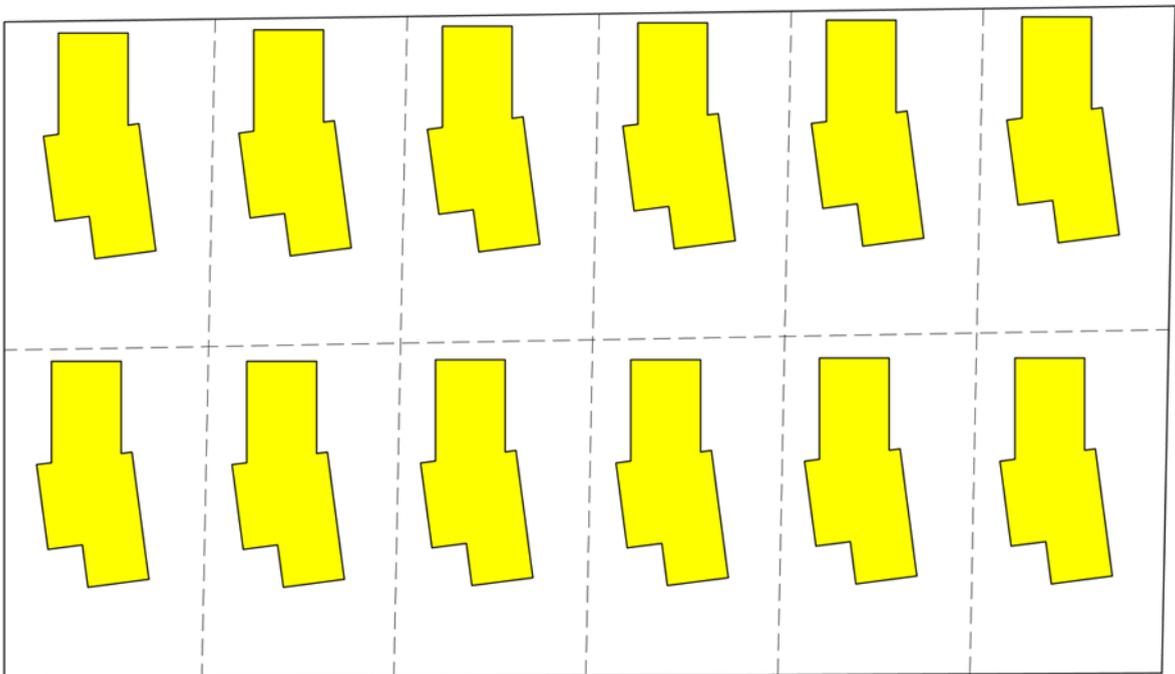
Home Values in the Evanston area has been on a decline since recent years but the graphs (prices reflect 3 bedroom houses) clearly shows that the Evanston Market has considerably higher value than the rest of the state and this is encouraging. The average value of an Evanston House with 3 bedrooms is \$329,100 which is 9% below compared to last year. The economy is edging out of the recession and the home values are expected to go up.



SITE UTILIZATION



TYPICAL LAND USE



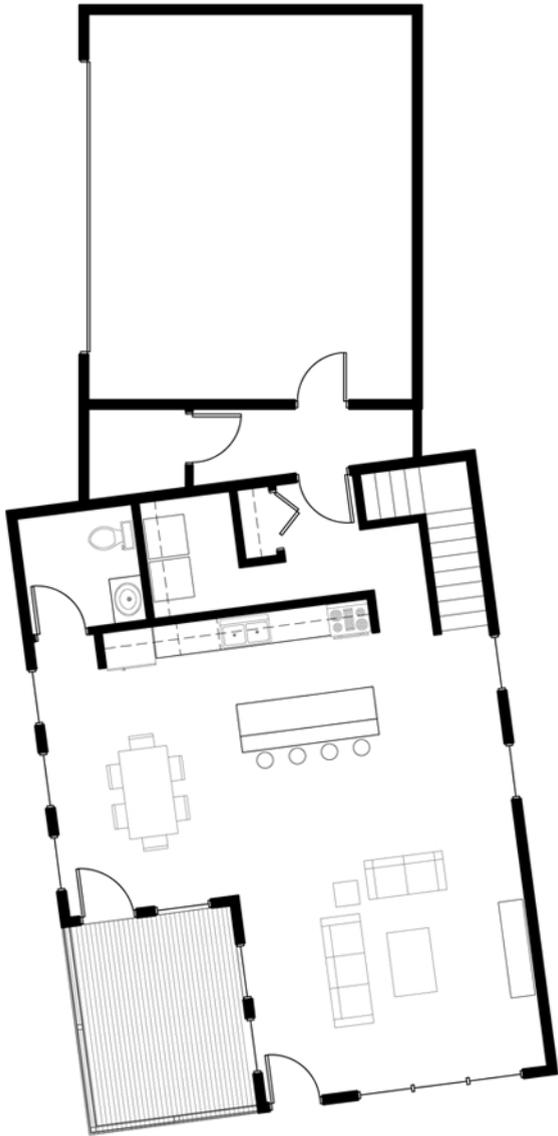
PROPOSED LAND USE

Engineering and Architectural Drawings

Contents

- Landscape
- Floor plans
- Elevations
- Electrical Plan
- Plumbing Risers





FIRST FLOOR PLAN

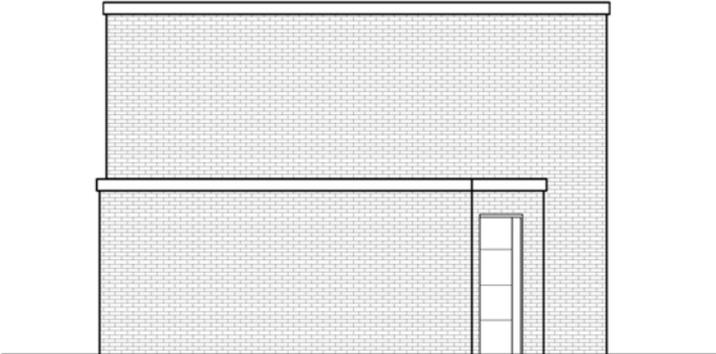


SECOND FLOOR PLAN

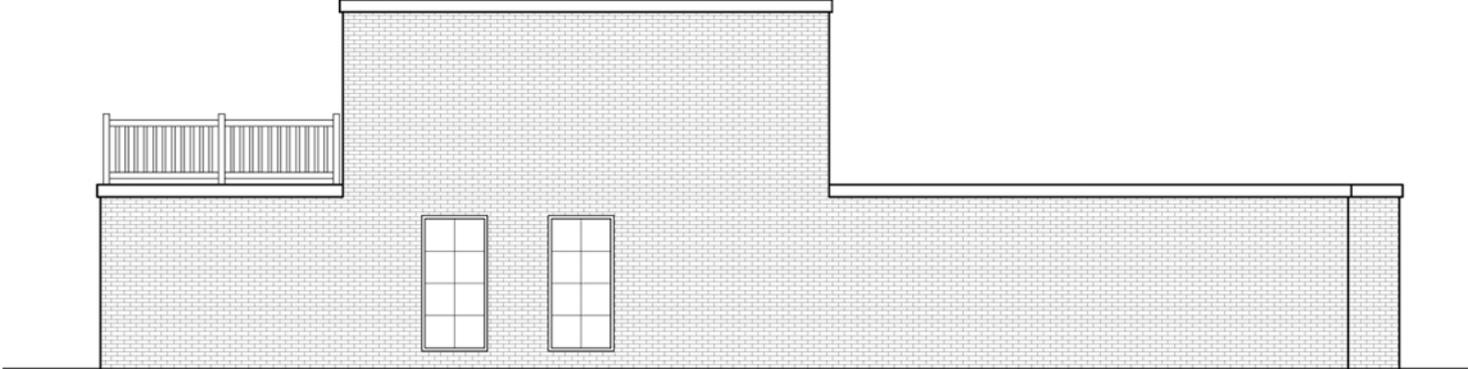
ELEVATIONS



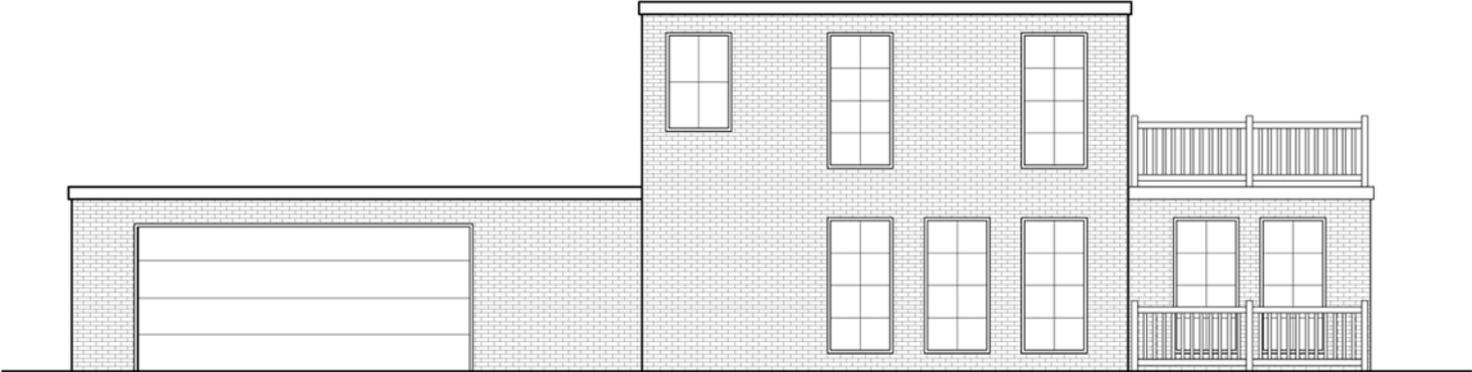
FRONT ELEVATION



REAR ELEVATION



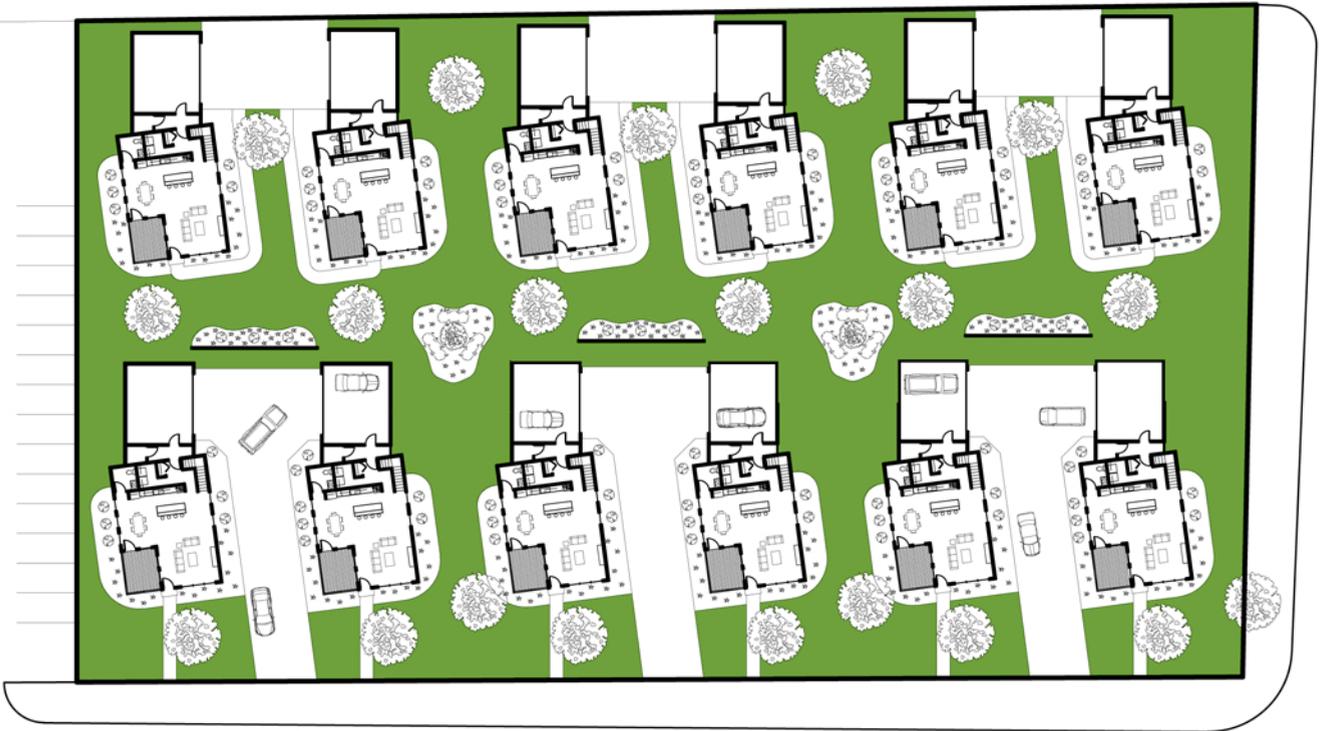
RIGHT ELEVATION



LEFT ELEVATION

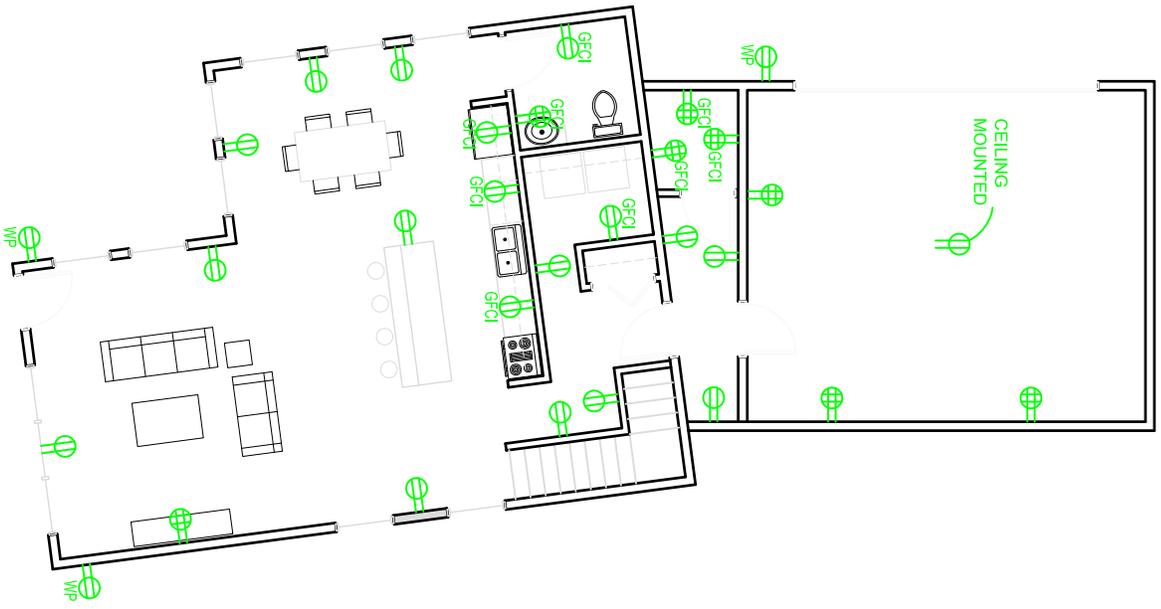
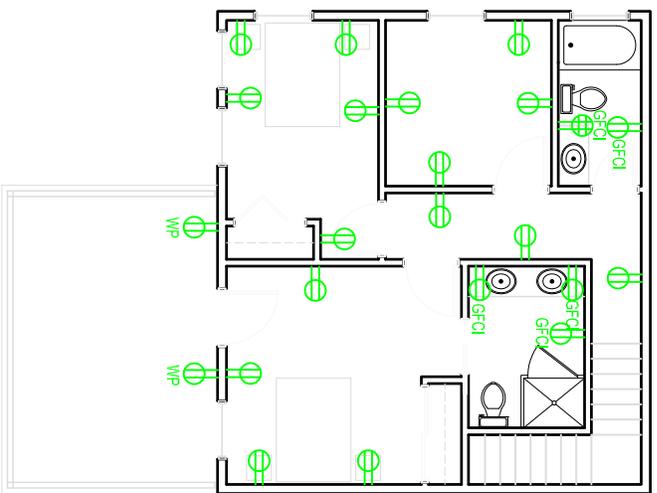
SOLAR ORIENTATION

By rotating the houses 172.5 degrees and having large south facing windows, we were able to take full advantage of solar gain in all the living spaces.

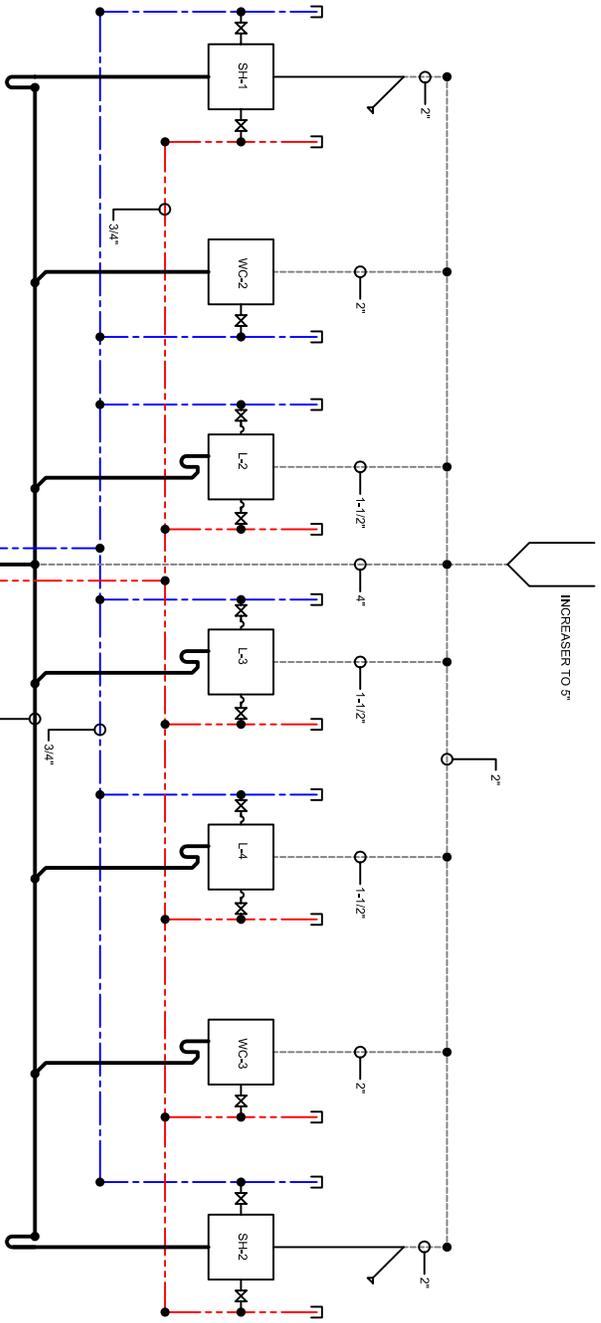
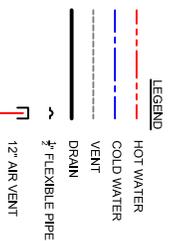


ELECTRICAL DIAGRAM

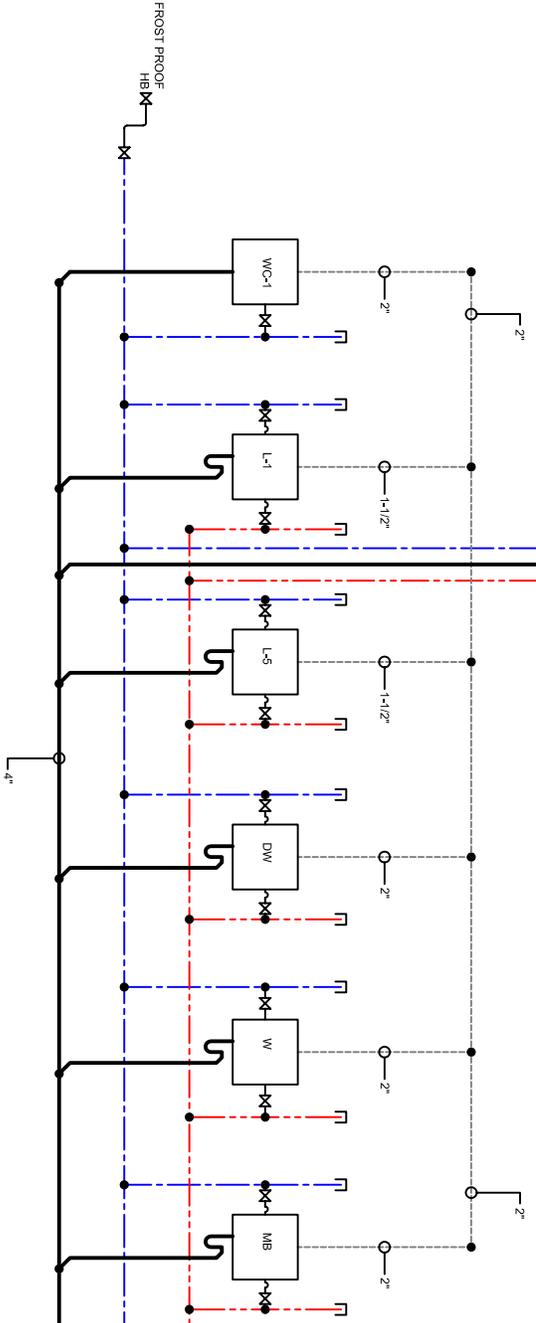
| POWER | | |
|--------------------------------------|----------------|----------|
| Specifications | Price per unit | Total |
| Romex Building Wire, NM-B 12/2 250' | \$60 | \$180 |
| Outlet - Duplex 120V, Box, cover | \$1.50 | \$37.50 |
| Outlet - GFI Duplex 120V, Box, cover | \$10.00 | \$100.00 |
| Outlet - Duplex 240V, Box, cover | \$10.00 | \$20.00 |
| Outlet - Waterproof 120V, Box, cover | \$10.00 | \$40.00 |
| Circuit Breaker Box | \$250.00 | \$250.00 |



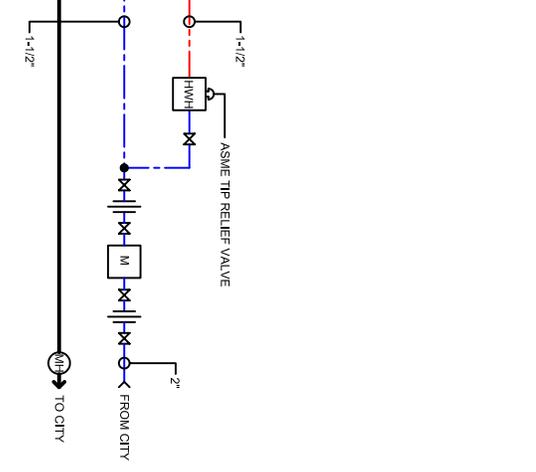
ROOF



2ND FLOOR



1ST FLOOR

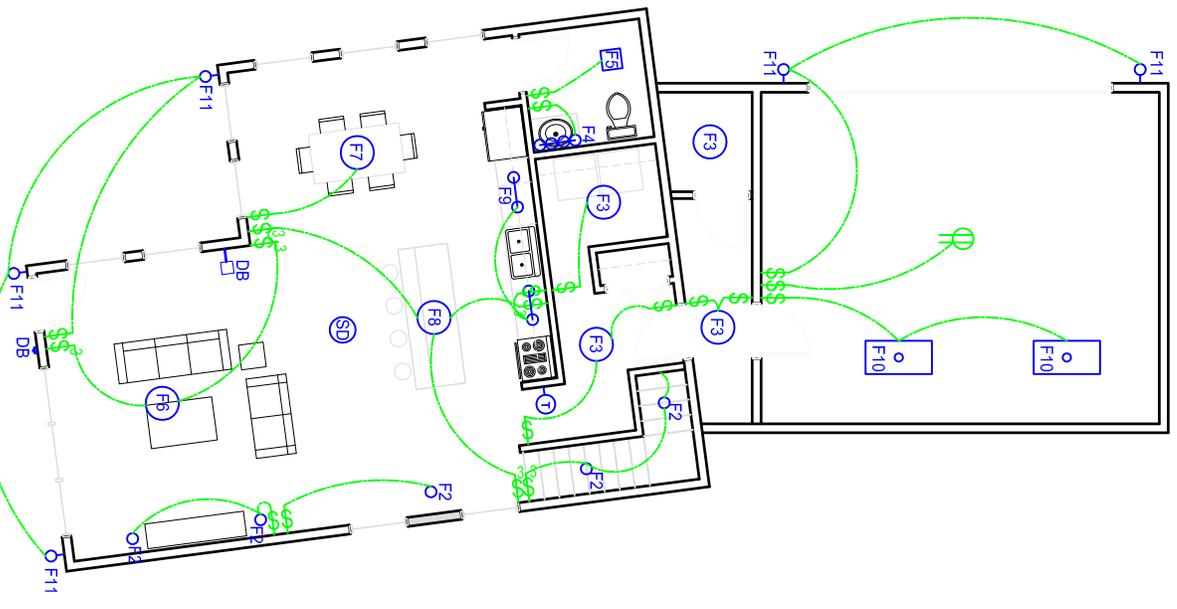
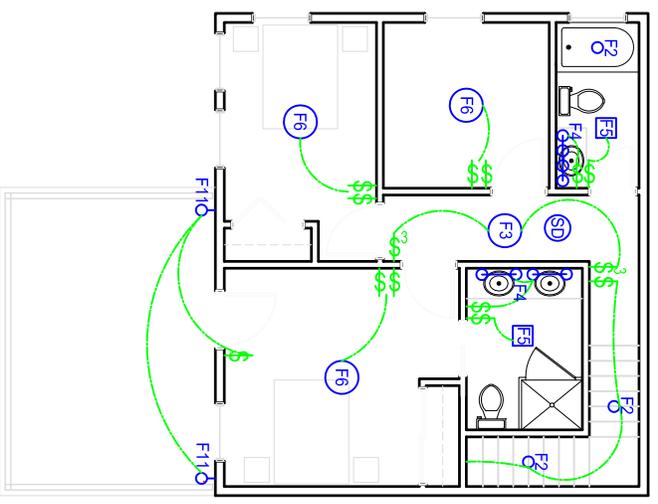


TO CITY

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

LIGHTING DIAGRAM

| Light Fixtures | | |
|----------------|-----------------|--|
| Symbol | Specification | Price per unit Total |
| F1 | Lighting | Box, switch/cover \$4 \$140 |
| F2 | Lighting | Recessed lighting fixtures \$10 \$50 |
| F3 | Lighting | Globe light fixture \$20 \$80 |
| F4 | Lighting | Bathroom lighting fixtures \$100 \$300 |
| F5 | Lighting | Bathroom exhaust fans \$50 \$150 |
| F6 | Lighting | Ceiling fan and light fixture (bed, fam) \$100 \$400 |
| F7 | Lighting | Dining- chandelier \$100 \$100 |
| F8 | Lighting | Pendulum light \$100 \$100 |
| F9 | Lighting | Cabinet lighting \$100 \$100 |
| F10 | Lighting | Florescent fixtures- garage \$40 \$80 |
| F11 | Lighting | Outdoor fixture \$40 \$280 |
| DB | Door Bell | Button and chime \$50 \$50 |
| SD | Fire protection | Detector (smoke and CO) \$30 \$120 |





APPENDIX
2

BUILDING ENVELOPE

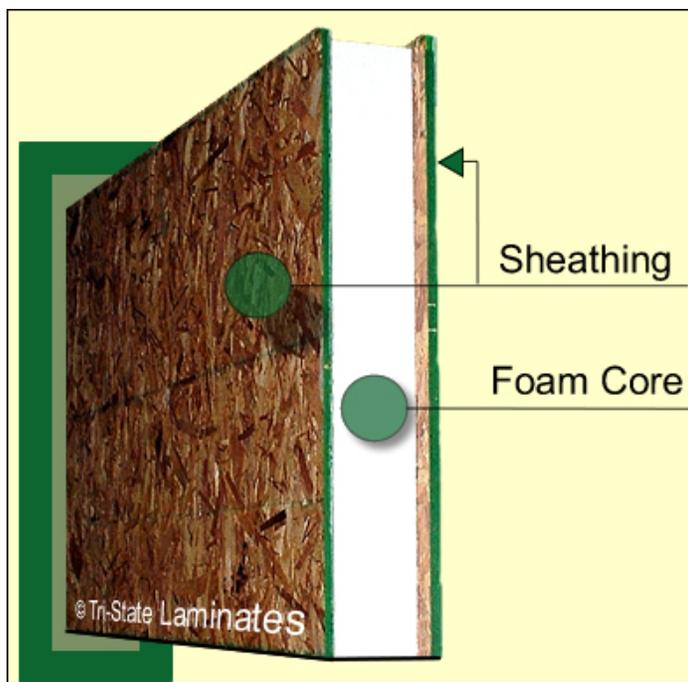


Structural Insulated Panels (SIPs)

SIPs are a composite building material. They consist of an insulation layer or rigid polymer foam sandwiched between two layers of structural board. The boards are usually plywood. SIPs construction relies on careful planning and design prior to delivery and site assembly. Panels are shipped to the jobsite ready to assembly when the foundation and deck are in place. Nails and adhesive foam are used to fasten the panels to top and bottom plates, and to make vertical connections.

SIPs have many benefits. Speed and ease of assembly make it possible for the house to be placed under a roof within days rather than weeks. Basic carpentry skills are required; assemblers don't need to have the skill level of conventional framing crews. SIPs offer R-values from R-15 to R-45, and are significantly more airtight, because of continuous insulation, without thermal bridges and have far fewer interruptions in the insulation.

SIPs also have some disadvantages. They make comfortable nesting chambers for carpenter ants and termites and panel manufactures recommend an aggressive pesticide treatment program both during and after construction. This means significant exposure of the building occupants and surrounding environment to toxic insecticides. SIPs are also very expensive compared to stick-frame construction.



I PRO-358

SIPs Estimate

Paul Skopek

Insulspan

Blissfield, MI

Joe Ellsworth

6 1/2" wall system RTA (ready to assemble). The largest panels will be 8'x9' (set by hand).

This system installs very fast, about three times faster than stick framing. R = 24

| | | |
|-----------------------|--------------------|---------------------|
| Base Price | \$23,962.50 | Exterior Walls Only |
| Shipping (\$800/semi) | \$1,600.00 | |
| Sub Total | \$25,562.50 | |
| Tax for 60202- 9.5% | \$2,428.44 | |
| Total | \$27,990.94 | |

Shipping

Flatbed Trailer 102"x48'

421' of exterior walls

5 walls high (32.5")

48'*5=240' of SIPs on one semi

240'*2=480', so two semi's are needed for shipping = \$1,600.00

Labor

3 man crew

3 days = 24 hours

\$60/hour RS Means

24 hours * \$60/hour = \$1440/man

Total = \$4320.00

Crane (may need to include permit)

Lagrange Crane

Shawn - 708-354-3510

\$170/hour

1 day = \$1,360 includes operator

United Rentals

\$500/day

\$105 for Delivery

\$105 for Pick Up

\$72 for Rental Protection

Total = \$782 does NOT included operator

\$355/day for Operator (RS Means)

Total for Crane = \$1,137.00

| Panel Thickness | Weight per P.S.F |
|-----------------|------------------|
| 6" | 3.47 lbs |
| 8" | 3.61 lbs |
| 10" | 3.78 lbs |
| 12" | 3.92 lbs |
| 6 1/2" | 3.51 lbs |

Linear Interpolation

8'x9'=72 sf

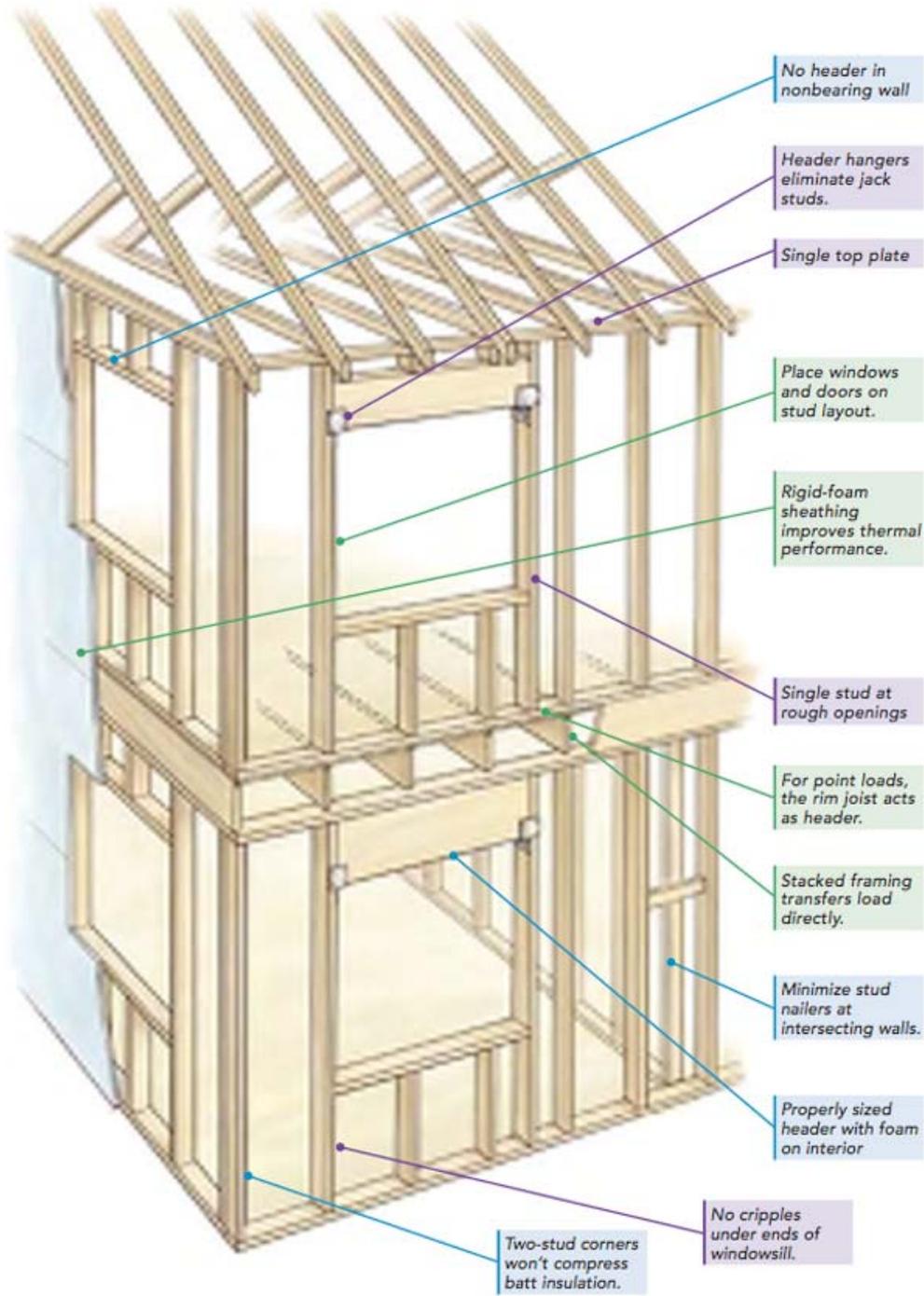
252.2 lbs max load

Total Cost

| | |
|--------------------|--------------------|
| Insulspan | \$27,990.94 |
| Labor | \$4,320.00 |
| Crane | \$1,360.00 |
| Grand Total | \$33,670.94 |

Advanced Framing Techniques

Advanced framing is also known as Optimum Value Engineering. This stick framing technique uses smarter, more efficient design to minimize the use of wood and increase the amount of insulation, resulting in a more energy efficient house. The amount of wood is reduced by using in-line framing to eliminate the use of double top plates, making “two stud corners”, “Ladder T-Walls”, and insulating headers. Also the use of jack studs and header are eliminated in non-load bearing walls. The extra space created is filled with insulation. We also decided to use 2x4s 16” oc. instead of 2x6s 24” oc. because they use the same volume of wood per linear foot of wall, but making 2x6s require larger trees and produces more waste. Overall, this technique minimizes waste while enhancing the performance of the home.



Cost Estimate

| | # | Type | Unit | Price | Total |
|----------------------------|------------------|-----------------------------|------|----------------|----------------|
| Exterior Wall | 06 11 10.26 0405 | Partition 10' high 16"oc pn | Lf | 11.6 | 2378 |
| Exterior Wall | 06 11 10.26 1600 | opening add 3.80 | Lf | 15.4 | 1540 |
| Joist Framing (2x12) 16"oc | 06 11 10.10 3565 | 2"x12", 16"oc, pneumatic | mbf | 1525 | 7869 |
| Joist Framing | | Hardwear +10% | % | | 786.9 |
| Girders | 06 11 10.10 3600 | 3"x8" | mbf | 2050 | 574 |
| Blocking | 06 11 10.02 2660 | 2"x8" | mbf | 2400 | 360 |
| | | | | | |
| | | | | Ext Wall Total | 3918 |
| | | | | Total | 13507.9 |

| | # | Type | Unit | Price | A |
|---------------------|------------------|---------------|------|-------|------------|
| Cavity | 07 21 16.20 0120 | Blanket R15 | sf | 0.82 | \$2,501.00 |
| Insulation Sheating | 07 21 13.13 0600 | Foam Board R4 | sf | 1.07 | \$3,263.50 |
| House Wrap | 07 26 10.10 0480 | poly | sf | 0.25 | \$762.50 |
| | | | | | |
| | | | | Total | \$6,527.00 |

Cost Comparison

| Structure Type | R Value | Cost |
|-------------------------------|-----------|-----------|
| Traditional Stick Framing | R | \$ |
| Advanced Framing | RR | \$ |
| Structurally Insulated Panels | RRR | \$\$ |
| Insulated Concrete Forms | RRR | \$\$\$\$ |

Insulated Concrete Form (ICFs)

ICFs are a lightweight, expanded polystyrene form that interlocks with other ICFs to create a cast for exterior concrete walls. The R value for ICFs is 27.

There are many advantages for ICFs. They can be constructed fast and easy and very durable. ICFs are severe weather resistance, provides a healthy indoor environment and use recycled materials.

ICFs also have some disadvantages. ICFs are very expensive and difficult to remodel due to the concrete. There are not many workers who are experienced with installing ICFs, so there is a lot of training for the workers to install correctly. House siding is very hard to install on the ICFs.

There was an estimate done by LOGIX ICFs. It includes all materials needed such as ICF blocks, rebar, lumber, and concrete. It also included labor, equipment and shipping.

The total was \$64,475





Good. Solid. Green.™

Logix Estimation Spreadsheet

Project : Hazem Shehada
Date : 8/28/10 **Expires :** 9/28/10

Estimate By : Rick Umpierre
 218 522 0265
 Estimate Number

Estimate For : Hazem Shehada
 708-351-5052

* all given prices are in US dollars.

* Grade 60 rebar specified

| Item | Quantity | Units | Unit Price | Total |
|--------------------------------|----------|---------------|------------|---------------------|
| Full-height standards | 4" | 0 standards | \$ - | \$ - |
| | 6.25" | 601 standards | \$ 17.10 | \$ 10,277.10 |
| | 8" | 282 standards | \$ 17.50 | \$ 4,935.00 |
| | 10" | 0 standards | \$ - | \$ - |
| | 12" | 0 standards | \$ - | \$ - |
| Full-height 90° corners | 4" | 0 corners | \$ - | \$ - |
| | 6.25" | 154 corners | \$ 17.10 | \$ 2,633.40 |
| | 8" | 56 corners | \$ 17.50 | \$ 980.00 |
| | 10" | 0 corners | \$ - | \$ - |
| | 12" | 0 corners | \$ - | \$ - |
| Full-height 45° corners | 4" | 0 corners | \$ - | \$ - |
| | 6.25" | 0 corners | \$ - | \$ - |
| | 8" | 0 corners | \$ - | \$ - |
| | 10" | 0 corners | \$ - | \$ - |
| Half-height standards | 4" | 0 standards | \$ - | \$ - |
| | 6.25" | 0 standards | \$ - | \$ - |
| | 8" | 0 standards | \$ - | \$ - |
| | 10" | 0 standards | \$ - | \$ - |
| | 12" | 0 standards | \$ - | \$ - |
| Half-height 90° corners | 4" | 0 corners | \$ - | \$ - |
| | 6.25" | 0 corners | \$ - | \$ - |
| | 8" | 0 corners | \$ - | \$ - |
| | 10" | 0 corners | \$ - | \$ - |
| | 12" | 0 corners | \$ - | \$ - |
| Half-height 45° corners | 4" | 0 corners | \$ - | \$ - |
| | 6.25" | 0 corners | \$ - | \$ - |
| | 8" | 0 corners | \$ - | \$ - |
| | 10" | 0 corners | \$ - | \$ - |
| Height adjusters | 0 | adjusters | \$ - | \$ - |
| Brick ledge blocks | 4" | 0 blocks | \$ - | \$ - |
| | 6.25" | 0 blocks | \$ - | \$ - |
| | 8" | 0 blocks | \$ - | \$ - |
| | 10" | 0 blocks | \$ - | \$ - |
| | 12" | 0 blocks | \$ - | \$ - |
| 6.25" Transition block | 0 | blocks | \$ - | \$ - |
| Taper top blocks | 4" | 0 blocks | \$ - | \$ - |
| | 6.25" | 0 blocks | \$ - | \$ - |
| | 8" | 0 blocks | \$ - | \$ - |
| | 10" | 0 blocks | \$ - | \$ - |
| | 12" | 0 blocks | \$ - | \$ - |
| Double taper top blocks | 4" | 0 blocks | \$ - | \$ - |
| | 6.25" | 0 blocks | \$ - | \$ - |
| | 12" | 0 blocks | \$ - | \$ - |
| End caps | 4" | 0 ends | \$ - | \$ - |
| | 6.25" | 0 ends | \$ - | \$ - |
| | 8" | 0 ends | \$ - | \$ - |
| | 10" | 0 ends | \$ - | \$ - |
| | 12" | 0 ends | \$ - | \$ - |
| Logix Formwork Subtotal | | | | \$ 18,825.50 |

Logix Estimation Spreadsheet

Project : Hazem Shehada
 Date : 8/28/10 Expires : 9/28/10

Estimate By : Rick Umpierre
 218 522 0265
 Estimate Number

Estimate For : Hazem Shehada
 708-351-5052

* all given prices are in US dollars.
 * Grade 60 rebar specified

| Item | Quantity | Units | | Unit Price | Total |
|-------------------------------------|----------|-----------------|-------------------|---------------------|-------------|
| Rebar | #3 | 3922 lineal ft | | \$ - | \$ - |
| | #4 | 6591 lineal ft | | \$ - | \$ - |
| | #5 | 1224 lineal ft | | \$ - | \$ - |
| | #6 | 0 lineal ft | | \$ - | \$ - |
| | #7 | 0 lineal ft | | \$ - | \$ - |
| | #8 | 0 lineal ft | | \$ - | \$ - |
| | 10M | 0 lineal ft | | \$ - | \$ - |
| | 15M | 0 lineal ft | | \$ - | \$ - |
| | 20M | 0 lineal ft | | \$ - | \$ - |
| | 25M | 0 lineal ft | | \$ - | \$ - |
| Stirrups for Lintels | #3 | 0 stirrups | No. of bundles 0 | Per bundle \$ - | \$ - |
| | #4 | 0 stirrups | No. of bundles 0 | Per bundle \$ - | \$ - |
| | 10M | 0 stirrups | No. of bundles 0 | Per bundle \$ - | \$ - |
| | 15M | 0 stirrups | No. of bundles 0 | Per bundle \$ - | \$ - |
| Stirrups for Brick Ledge | #3 | 0 stirrups | No. of bundles 0 | Per bundle \$ - | \$ - |
| | 10M | 0 stirrups | No. of bundles 0 | Per bundle \$ - | \$ - |
| Stirrups for 6.25" Transition Block | #3 | 0 stirrups | No. of bundles 0 | Per bundle \$ - | \$ - |
| | 10M | 0 stirrups | No. of bundles 0 | Per bundle \$ - | \$ - |
| Steel Reinforcement Subtotal | | | | | \$ - |
| Form Lock | 4" | 0 lineal ft | No. of bundles 0 | Per bundle \$ - | \$ - |
| | 6.25" | 976 lineal ft | No. of bundles 10 | Per bundle \$ 65.00 | \$ 650.00 |
| | 8" | 386 lineal ft | No. of bundles 4 | Per bundle \$ 68.00 | \$ 272.00 |
| | 10" | 0 lineal ft | No. of bundles 0 | Per bundle \$ - | \$ - |
| | 12" | 0 lineal ft | No. of bundles 0 | Per bundle \$ - | \$ - |
| Concrete | | 120 cubic yards | | \$ - | \$ - |
| Buck lumber | 4" | 0 lineal ft | | \$ - | \$ - |
| | 6.25" | 592.5 lineal ft | | \$ 4.60 | \$ 2,725.50 |
| | 8" | 0 lineal ft | | \$ - | \$ - |
| | 10" | 0 lineal ft | | \$ - | \$ - |
| | 12" | 0 lineal ft | | \$ - | \$ - |
| Plastic buck channel | 4" | 0 lineal ft | | \$ - | \$ - |
| | 6.25" | 0 lineal ft | | \$ - | \$ - |
| | 8" | 0 lineal ft | | \$ - | \$ - |
| | 10" | 0 lineal ft | | \$ - | \$ - |
| | 12" | 0 lineal ft | | \$ - | \$ - |
| Plastic buck connectors | outside | 0 connectors | | \$ - | \$ - |
| | inside | 0 connectors | | \$ - | \$ - |
| Bracing | | 35 posts | Weeks to rent 0 | Per week \$ - | \$ - |
| Waterproofing | | 0 ft² | No. of rolls 0 | Per roll \$ - | \$ - |
| Parge | | 0 ft² | No. of bags 0 | Per bag \$ - | \$ - |
| Fiber glass mesh | | 0 ft² | No. of rolls 0 | Per roll \$ - | \$ - |
| Parge all | | 0 ft² | No. of pails 0 | Per pail \$ - | \$ - |
| Tape | | 0 rolls | | \$ - | \$ - |
| Foam adhesive | | 12 cans | | \$ 17.00 | \$ 204.00 |
| Zip ties | | 1000 ties | No. of packs 20 | Per Pack \$ 12.00 | \$ 240.00 |
| Labor hours | | | | | |
| Basement | | 108.08 hours | | | |
| First | | 126.09 hours | | | |
| second | | 126.09 hours | | | |
| third | | 66.64 hours | | | |
| Section5 | | 0.00 hours | | | |
| Section6 | | 0.00 hours | | | |
| Section7 | | 0.00 hours | | | |
| Section8 | | 0.00 hours | | | |
| Total | | 426.91 hours | | \$ - | \$ - |
| Miscellaneous | | | | | |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| item | | 0 units | | \$ - | \$ - |
| SubTotal: | | | | \$ | 22,917.00 |
| Shipping | | | | \$ | 900.00 |
| Tax1 @ 8% | | | | \$ | 1,905.36 |
| Tax2 @ 0% | | | | \$ | |
| Total Shipping & Taxes: | | | | \$ | 2,805.36 |
| Grand Total: | | | | \$ | 25,722.36 |

Thank you for using Logix!

Energy Efficiency Comparison

Traditional framing (2x4 studs, 16in. O.C.) was used as a structural system for the Green Class Community project with 1" polyisocyanurate insulation on both exterior and interior surfaces and additional R-15 batt insulation between the studs.

Alternatives (SIPs, ICFs, and Advanced Framing) considered during the design stage provided larger R-values comparing to the traditional framing technique. However, after running eQuest energy analyses on the building using all of the alternative construction materials (Table 1) and considering life-cycle aspect, it appeared that traditional framing is the most cost efficient technique.

| | Energy Consumption (kWh) | Cost (USD) |
|---------------------|--------------------------|--------------|
| Traditional Framing | 4000 | \$ 20,034.90 |
| SIPs | 3980 | \$ 33,670.94 |
| ICFs | 3870 | \$ 64,475.00 |

Table 1. Energy Modeling versus Cost using traditional framing, SIPs and ICFs

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APPENDIX

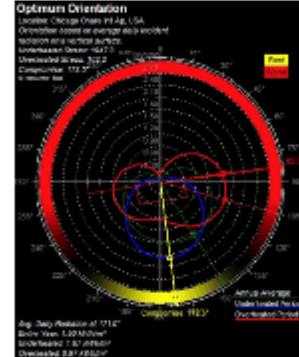
3

PASSIVE DESIGNS



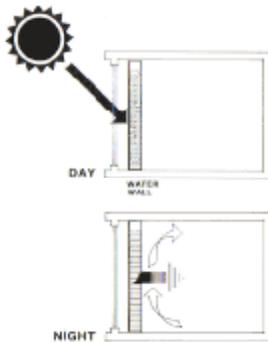
Solar Orientation

Using the Autodesk Ecotect program we calculated the best solar orientation for our housing units. Best solar orientation takes advantage of solar gain through windowed areas orientated properly in order to receive the highest amount of gain on any given day. We believe this has made a substantial improvement over last year's project.



Trombe Wall

Trombe wall is a passive solar design system that traps the sun's heat during the day and releases it slowly and evenly at night to heat a building. A typical



Trombe wall consists of a south-facing thermal wall (brick or concrete) with a dark, heat-absorbing finishing material on the exterior side and faced with a glass layer. Air in the cavity between the glass and the thermal wall stores heat and allows the thermal wall to absorb it slowly during the day. Then, at night, thermal wall releases the stored heat to the interior space.

Hand calculations (see Appendix) were performed to evaluate efficiency of the system. The results obtained showed that

Trombe walls can save as much as 30% of heating loads during the coldest month in winter. However, since the team decided to use ordinary frame system that cannot be served as a thermal mass storage, Trombe wall system was excluded from the project.

Solar Chimney

Solar Chimney is a passive system alternative to an active ventilation system. The system consists of a typical chimney coated with a dark material on the exterior surface. During the day, air inside the chimney can easily exceed 100°F. This temperature difference between the chimney and interior spaces creates pressure difference.



As a result, interior space air is forced to move out through the chimney. However, due to lack of information (because the system is a considerably new system), basic calculations based on

the Bernoulli's Equation (see Appendix) were not sufficient to provide an adequate design of the system.

Trombe wall calculation:

Exterior wall area: $(23+24+23)*20+23*24 = 1952 \text{ SF} \approx 2000 \text{ SF}$

Ave. R-value of Thermal Wall = 25 SF-F-h/Btu

Total heat load per day = $(70\text{F} - 22\text{F}) * 24 \text{ hrs/day} * 2000 \text{ SF} / 25 \text{ SF-F-h/Btu} =$
 $92160 \text{ Btu/day} \approx \mathbf{100\ 000 \text{ Btu/day}}$

Solar insolation in January = 558 Btu/SF-day

Window area = $8' \times 5' + 2' \times 4' \times 5 = 80 \text{ SF}$

Sunshine 10 hours average in January with clearness coefficient of 0.46 gives us 4.6 hours of direct sunlight. Assume that sunspace is at 70F during the day.

Solar heat gain = $558 \text{ Btu/SF-day} \times 80 \text{ SF} = 44640 \text{ Btu/day}$

$44640 \text{ Btu/day} - 30\%$ (heat loss due to conduction, transmission, reflection) $\approx \mathbf{31000 \text{ Btu/day}}$

Solar heat gain is about **30%** of the total heat load needed for one apartment.

Chimney Effect

$$Z_1 + \frac{P_1}{\rho g} + \frac{V_1^2}{2g} = Z_2 + \frac{P_2}{\rho g} + \frac{V_2^2}{2g} + h_L$$

$$Z_1 = 0$$

$$P_1 = 1 \text{ atm}$$

$$V_1 = 0$$

$$Z_2 = 24'$$

$$P_2 = 1 \text{ atm}$$

$$h_L = 0$$

$$V_2 = 35.9 \text{ ft/sec}$$

$$\text{Area of the outlet} = 0.66' \times 0.33' = 0.22 \text{ ft}^2$$

$$Q = V \times A = 35.9 \times 0.22 = 7.9 \text{ ft}^3/\text{sec} = 474 \text{ cfm}$$

Windows

Low-e, argon-filled double-pane windows were used in the project. Low-e coating provides up to 35% less heat gain or loss than conventional double-pane windows. Using argon instead of air to fill the cavity between the panes will also result in larger energy savings due to the chemical composition of the gas. As you can see from Figure 1, Low-e double pane glazing system

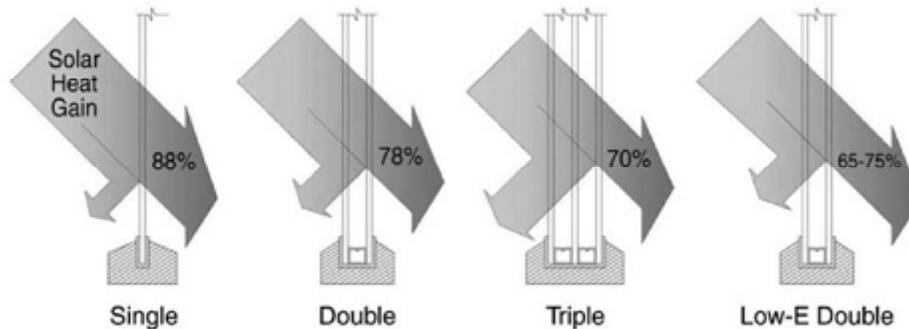


Figure 1 Solar heat gain of different glazing types

Energy Modeling

Ecotect and eQuest software programs were used during the project to create energy models of the buildings. Accurate results were achieved by integration of both programs. The best solar orientation, solar heat gains and losses and daylight control was estimated in Ecotect. eQuest was used to calculate heating and cooling loads with the respect to the data obtained from Ecotect.

Geothermal mechanical system was simulated in eQuest by inputting ground loop heat pump source and adjusting temperature differences in detailed wizard.



APPENDIX
4

HVAC SYSTEMS

Geothermal



The ground is able to maintain a higher rate of temperature consistency because it absorbs 47% of the sun's energy (heat) as it hits the Earth's surface. Heat Pump geothermal systems are able to tap into this free energy with an earth loop. This technology is then used to provide your home or office with central heating and cooling.

| Geothermal Heat Pump | Loop Type | Loop Depth | Pipe | Refrigerant | Cost ¹ | Payback Time |
|----------------------|-----------|------------|--------------------------------|----------------------------------|-------------------|---------------|
| 2-ton Water to Air | Vertical | 220ft | 1.0 in. Diameter U-Tube SDR 11 | 20% Prop. Glycol Flow 3.0 US gpm | \$6,960.00 | About 8 years |

Geothermal Heat Pump Design Detail²

Advantages & Reason choosing this technology for the project:

The biggest benefit of GHPs is that they use 25%–50% less electricity than conventional heating or cooling systems. This translates into a GHP using one unit of electricity to move three units of heat from the earth. According to the EPA, geothermal heat pumps can reduce energy consumption—and corresponding emissions— up to 72% compared to electric resistance heating with standard air-conditioning equipment. GHPs also improve humidity control by maintaining about 50% relative indoor humidity, making GHPs very effective in humid areas.

The hardware requires less space than that needed by conventional HVAC systems, the equipment rooms can be greatly scaled down in size, freeing space for productive use. GHP systems also provide excellent "zone" space conditioning, allowing different parts of your home to be heated or cooled to different temperatures.

Because GHP systems have relatively few moving parts, and because those parts are sheltered inside a building, they are durable and highly reliable. The underground piping often carries warranties of 25–50 years, and the heat pumps often last 20 years or

more. Since they usually have no outdoor compressors, GHPs are not susceptible to vandalism. On the other hand, the components in the living space are easily accessible, which increases the convenience factor and helps ensure that the upkeep is done on a timely basis.

Because they have no outside condensing units like air conditioners, there's no concern about noise outside the home. A two-speed GHP system is so quiet inside a house that users do not know it is operating: there are no telltale blasts of cold or hot air.

1: Cost:

Individual Cost for each Unit:

Mcquay 2-ton Heat Pump \$2,994.00

Wireless Programmable Thermostat \$180.00

20kW Aux. In Duct Heat Strip (Optional) \$265.00 \$3,439.00

AMTROL Fill-Trol 109 Expansion Tank w/ Fill Valve 2.0 Gallon Volume \$68.00

Installation Fee \$1,000

Tax Credit: 30%

Ductwork: \$2,100

Total: \$5,555.00

Sharing Cost for every two units:

Drilling Cost \$2,700.00

440ft long 1in diameter Polyethylene Tubing: \$110.08

Total: \$2,810.00

2: For loop configuration details and mechanical room details, please see the drawings.

Infinity Horizontal ISO Performance Data – Ground Source

Ground Source Performance Data per ISO Standard 13256-1.

| UNIT SIZE | AIRFLOW | | WATERFLOW | | VOLTAGE | COOLING | | | | HEATING | | |
|-----------|---------|-----|-----------|------|--------------|---------|-------|------|-----|---------|-------|-----|
| | CFM | L/S | GPM | L/S | | BTU/HR | WATTS | EER | COP | BTU/HR | WATTS | COP |
| 024 | 800 | 378 | 5.9 | 0.37 | 208/230-1-60 | 28500 | 8345 | 22.5 | 6.6 | 24000 | 7027 | 4.3 |

Notes:
 EER = Energy Efficiency Ratio COP = Coefficient of Performance L/S = Liters per second

Cooling capacity is based on 80.6°F db, 66.2°F wb (27/19°C) entering air temperature and 59°F (15°C) entering water temperature.
 Heating capacity is based on 68°F (20°C) entering air temperature and 50°F (10°C) entering water temperature.

Enfinity™ Model VFC/VFW Vertical Floor-mounted Water Source Heat Pumps

Product Brochure

We are pleased to introduce the new Enfinity™ Model VFC/VFW vertical floor-mounted water source heat pump (sizes 009 thru 070).

Enfinity™ Model VFC/VFW vertical floor-mounted water source heat pumps use non-ozone depleting R-410A refrigerant, which – along with high Energy Efficiency Ratios (EER's) – helps preserve our environment and precious energy resources. Units offer maximum flexibility to help you achieve high efficiency, low operating costs and superior IAQ within your commercial or residential building budget.

- They can be selected for standard boiler/tower or geothermal applications
- Multiple configurations reduce design time and help you avoid obstructions and use minimum ductwork to reduce installation costs
- Multiple factory-installed features and options allow you to select the unit that closely matches your application requirements while lowering installation costs.
- Small footprint design makes it easier to meet space requirements for new construction and replacement applications

Factory-installed Features and Options

- **R-410A Refrigerant** – Has no ozone depletion potential or phase-out date, helping to minimize environmental impact and protect against refrigerant availability issues over the economic life of your equipment investment.
- **MicroTech® III Unit Controller** – Open Choices™ control feature allows Standalone or easy integration into a LONWORKS® (LonMark 3.4 Certified) or BACnet® communications network using and add-on communication module.
- **ECM fan motor** – improves unit efficiency and maintains constant airflow over varying system static pressure.
- **Hot Gas Reheat Coil** – Required for many applications needing added humidity control, this option is selectable for sizes 019 to 070.
- **Desuperheater** – this heat exchanger system aids in domestic hot water production while the water source heat pump is in the cooling mode of operation.
- **Auxiliary/Emergency Electric Heat Coil (5kw or 10kw – single point power)** – in emergency situations where the compressor no longer functions, the integral electric heat coil can provide temporary heating until the compressor is replaced.
- **2-way motorized valves (NO or NC)** – ideal for variable pumping applications – when there isn't a call for unit operation, the valve closes, reducing the flow requirements through the condenser water loop.
- **Compressor Sound Blanket** – new and improved compressor sound blanket for sound sensitive applications.
- **Painted Cabinet** – suitable for residential applications.

Performance Summary

| Unit Size | Capacity (BTUH) | EER – Water Loop | | EER – Ground Loop | | EER – Ground Source | | Nominal Airflow (CFM) |
|-----------|-----------------|------------------|------|-------------------|------|---------------------|------|-----------------------|
| | | PSC | ECM | PSC | ECM | PSC | ECM | |
| VFW007 | * | * | N/A | * | N/A | * | N/A | * |
| VFW009 | 9,060 | 14.0 | N/A | 16.7 | N/A | 23.8 | N/A | 300 |
| VFW012 | 12,000 | 14.4 | N/A | 16.9 | N/A | 23.8 | N/A | 400 |
| VFW015 | 14,700 | 16.0 | * | 19.6 | * | 28.1 | * | 500 |
| VFW019 | 19,200 | 15.2 | 16.6 | 17.3 | 19.0 | 23.5 | 26.1 | 600 |
| VFW024 | 23,800 | 15.1 | 16.3 | 17.7 | 19.2 | 23.3 | 25.8 | 800 |
| VFW030 | 30,000 | 17.0 | 17.0 | 19.1 | 19.3 | 25.1 | 25.5 | 1000 |
| VFW036 | 39,500 | 14.8 | 15.0 | 17.3 | 16.6 | 22.3 | 21.3 | 1300 |
| VFW042 | 43,900 | 15.0 | 16.2 | 17.0 | 18.9 | 22.1 | 24.8 | 1400 |
| VFW048 | 48,100 | 14.7 | 16.0 | 15.8 | 18.2 | 20.3 | 23.8 | 1600 |
| VFW060 | 63,200 | 15.1 | 15.7 | 16.3 | 18.0 | 20.5 | 22.9 | 2000 |
| VFW070 | 75,400 | 13.5 | 14.0 | 13.7 | 16.2 | 16.6 | 19.6 | 2160 |

N/A = Not available

* = To be announced at a later date.

ERV

Energy Recovery Ventilator

Works as a heat exchanger with the geothermal furnace and recovers most heat from the exhaust air.
 Made by Honeywell.

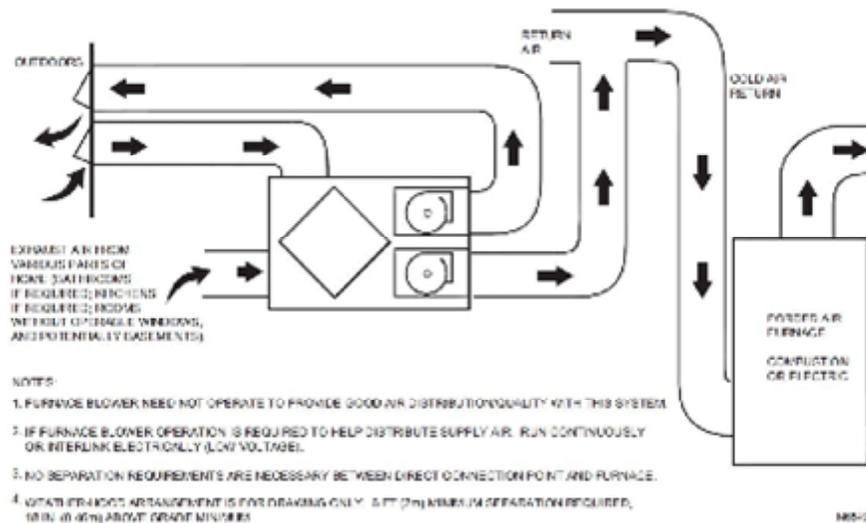
Energy Efficient Ventilation Systems

- Bring in fresh air while maintaining energy efficiency
- Low maintenance, low energy usage solution
- Recovers up to 80% of heating and cooling energy



DETAILS MANUALS FAQ

- **Efficient Ventilation** - Recovers up to 80% of the air leaving the home
- **Low Maintenance** - "Set it and forget it" program gives you optimal ventilation without having to worry about settings
- **Energy Efficient Operation** - Uses about the same amount of energy as a 100-watt light bulb
- **Cold Climate Model (HRV)** - Helps reduce window condensation and excess moisture
- **Hot Climate Model (ERV)** - Helps reduce the amount of humidity brought into the home in the summer and retains humidity in the winter
- **Model Numbers** - ER150B2006, ER200B2006, ER150C2004, ER200C2004, HR150B1005, HR200B1005
- **5-Year Warranty**



Radiant Floor

-\$6 -\$15 a square foot to professionally install a hydronic (hot water) radiant floor heating system; that's **\$9,000 -\$22,500** for a 1,500 square foot home.

-[Popular Mechanics](#) estimates that professionally installing a hydronic floor system in a 2,000-square-foot ranch house averages **\$10,000 -\$14,000**(without air conditioning).

To calculate the cost for radiant floor heating, we requested a detail cost analyses from "Radiant Company".

The price quote from them for our house model was \$4,192.50

In addition to this, a typical boiler costs about \$3000.

We decided not to use this system because it was too expensive.

PRICE QUOTE

WWW.RADIANTCOMPANY.COM

| Name / Address | | Date | Estimate # | |
|---|---|-------------------------|--------------------|-------------------|
| Moses Cho 312-533-8334 | | 10/18/2010 | 2 | |
| System Type: | | Rep | Shipping ESTIMATE: | |
| OPEN (TANK-TYPE) | | BP | PLEASE CALL | |
| Item | Description | Qty | Cost | Total |
| 7/8" XL PEX 20... | 7/8" XL PEX 200ft coil | 10 | 158.00 | 1,580.00 |
| Heat Distr. Fins | 8" X 16" aluminum sheets "Pre-formed" for 7/8" Pex. | 625 | 0.90 | 562.50 |
| 500 sq/ft. roll alu... | 500 sq/ft. roll aluminum reflective material | 1 | 95.00 | 95.00 |
| 1000 sq/ft. roll al... | 1000 sq/ft. roll aluminum reflective material | 1 | 189.00 | 189.00 |
| adaptor | 3/4" copper to 7/8" XL PEX tubing (fitting part #102788) | 20 | 6.75 | 135.00 |
| coupling | 7/8" XL PEX to 7/8" XL PEX coupling (fitting part # 3389) | 10 | 7.50 | 75.00 |
| 3 zone control kit | 3 Zone control relay & 3 (mercury free) digital thermostats for three zones | 1 | 295.50 | 295.50 |
| low vol. stainless ... | Low volume stainless pump | 3 | 195.00 | 585.00 |
| 1" check valve | 1" check valve | 1 | 26.50 | 26.50 |
| 3 zone stainless | 3 zone manifold for stainless pumps | 1 | 649.00 | 649.00 |
| Suggested Heat ... | Suggested Heat Source: CUSTOMER PROVIDED GEOTHERMAL | | | 0.00 |
| Thank you for your request. Returns subject to 25% restock fee.No refunds after 90 days from purchase | | Subtotal | | \$4,192.50 |
| | | Sales Tax (6.0%) | | 50.00 |
| | | Total | | \$4,192.50 |

Furnace

Furnace

Traditional furnace for residential forced air systems by Comfort-Aire

Natural Gas 80% Plus Efficiency Upflow Furnace
 Brand: Comfort-Aire
 Model: GMU150-E3A

\$750.00



PRODUCT INFORMATION

| ITEM | 80% Plus Efficiency Upflow Furnace |
|-------------------------------|---|
| TYPE | Natural Gas |
| VOLTAGE | 120 |
| OUTPUT (BTUH) | 41,000 |
| INPUT (BTUH) | 50,000 |
| APUE (%) | 81.4 |
| HEIGHT (IN.) | 24 |
| WIDTH (IN.) | 14 |
| DEPTH (IN.) | 28-13/16 |
| SUPPLY OPENING WIDTH (IN.) | 12-17/32 |
| SUPPLY OPENING DEPTH (IN.) | 20 |
| AVAILABLE COOLING TONS | 3 |
| CFM @ .5 ESP | 1300 |
| FLUE DIA. (IN.) | Unit Has 3" Connection. A 3 to 4"/5" Adaptor May be Required, Determined by Installation. |
| SIDE RETURN FILTER SIZE | (2) 12 x 16, WRB Optional External Side Filter Frame Number 2WYU3 |
| BOTTOM RETURN FILTER SIZE | 16 x 25 |
| NUMBER OF FILTERS REQUIRED | Side Return 2, Bottom Return 1 |
| ADDITIONAL FEATURES | Slow Opening 100 Percent Shut Off Main Gas Valve, Convertible to Propane, Pre-wired for Addition of Air Conditioning with Heat/Cool Relay and Electronic Air Cleaner, In-Slot Burner, Heat Exchanger Made Of Corrosion Resistant Stainless Steel Materials, Pac-Four Speed Direct Drive High Efficiency Blower With Timed On/Off Blower, Induced Draft Blower, Integrated Furnace Control With Self Diagnostics and Electronic Ignition, 1/2" NPT Gas Connection, |
| TRANSFORMER RATING | 120V Primary, 24V Secondary, 40Va |
| AGENCY COMPLIANCE | CSA |
| MANUFACTURERS WARRANTY LENGTH | Heat Exchanger 20 Year, 12-Year on Other Parts |
| WEIGHT | 67.00 |

- * Residential 80+ APUE Multi-position Gas Furnaces
- * In-shot burner.
- * Timed On, adjustable blower-off delay for cooling SEER improvement. Integrated furnace control with self-diagnostics and fault code displays. Convertible to LP gas.

- * Comfort-Aire
- * Direct spark ignition.
- * 3-speed direct-drive fan. Units have 3" connection. A 3, 4, or 5" adapter may be required, determined by installation.

Condenser Unit

Direct Expansion AC Unit

Traditional condenser for residential forced air systems. Fairly efficient with a SEER of 13

Goodman GSX130361 Central Air Conditioner

3 Ton, 13 SEER Condenser, R410A Refrigerant



ON SALE! \$1,404.99
 Compare to: ~~\$1,843.99~~
 You save: \$437.00

Central Air Conditioner's Standard Features

- R-410A environmentally friendly refrigerant
- Energy-efficient scroll compressor
- High-pressure switch
- Copper tube/enamelled aluminum fin coil
- Service valves with sweat connections and easy-access gauge ports
- Contactor with lug connections
- Ground lug connection
- ARI Certified
- ETL Listed

Cabinet Features

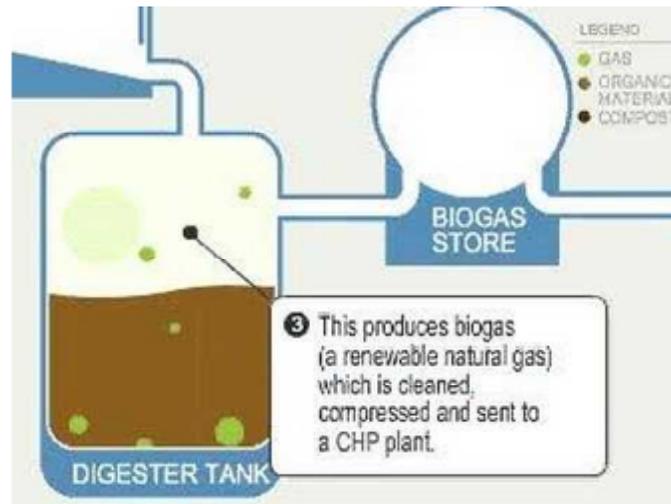
- Unique Goodman® central air conditioner sound control top design
- Steel lower coil guard
- Heavy-gauge galvanized-steel central air cabinet
- Attractive Architectural Gray powder-paint finish with 500-hour salt-spray approval
- Top and side maintenance access
- Single-panel access to controls with space provided for field-installed accessories
- When properly anchored, meets the 2001 Florida Building Code unit integrity requirements for hurricane-type winds

PRODUCT SPECIFICATIONS

| | |
|--------------------------|--------------------|
| Nominal Cooling Capacity | 36000 BTUs |
| Cooling Capacity | 3 Tons |
| Cooling Efficiency | 13 SEER |
| Refrigerant | R410A |
| Voltage | 240/200V (1 Phase) |
| Maximum Breaker Size | 35 Amps |
| Compressor Type | Scroll |
| Suction Line Size | 7/8 inches |
| Liquid Line Size | 3/8 inches |
| TXV Required | No |
| Pad Size | 26x26 inches |
| Shipping Weight | 197 lbs |
| Compressor Warranty | 10 Year(s) |

Biomass

Research on biomass technology, anaerobic digestion was done



-The whole purpose of researching anaerobic digestion was to re-use organic materials (food waste) as an energy source to produce methane and carbon dioxide. Through this, the gas usage and cost would have gone down. Through re-using organic materials, it is very environmental friendly.

-In the end, this was not used because though there are some small size anaerobic digestions systems, most of them were home-built. Some companies do have prototypes of these models. However, they are not ready to be used at homes and have no practical applications yet. Furthermore, the efficiency is very questionable as well. This system lacks too much information. This is the reason why we decided to give up on this system.

50-Gallon Water Heater

Professional™ Ultra Low NO_x (10 ng/J NO_x Emissions) Gas Water Heaters



Get 4 MORE YEARS with ProtectionPlus™

Available in 28, 38, 40, 48, 50 and 60 Gallon Tall – 38 Gallon Short Gas Models

- ▶ 8-Year Limited Tank and Parts Warranty*
- ▶ SCAQMD Rule 1121 Compliant: 10 ng/J NO_x Emissions
- ▶ With ProtectionPlus™ the 8-Year Limited Tank Warranty Becomes 12 Years!

Guardian System™

- One-of-a-kind air/fuel shut-off device offers double protection
- Maintenance free – no filter to clean

Environmentally Friendly Burner

- Ultra Low NO_x radiant burner design
- Stainless steel construction
- 10 ng/J NO_x emissions

Self-Cleaning

- EverKleen™ patented system fights sediment build-up
- Reduces fuel costs
- Provides more hot water

Easy to Light

- No matches required

Energy Efficient

- More hot water at low operating cost

Longer Life

- Patented magnesium anode rod design incorporates a special resistor that protects the tank from rust

High Altitude Compliant

- All models are certified for applications up to 10,200 feet above sea level

Plus...

- Brass drain valve and temperature and pressure relief valve are included
- Meets or exceeds National Appliance Energy Conservation Act (NAECA) requirements

High Efficiency Models Feature:

- High performance and lower operating cost
- Compliant with many gas utility incentive programs

*See Residential Warranty Information Brochure for complete warranty information.

Energy Factor and Average Annual Operating Costs based on D.O.E. (Department of Energy) test procedures. D.O.E. national average fuel rate natural gas \$1.216/therm, LP \$1.87/gallon.

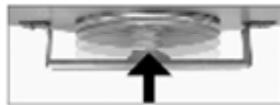


| TYPE | DESCRIPTION | | FEATURES | | | ROUGHING IN DIMENSIONS (SHOWN IN INCHES) | | | | | | | | ENERGY INFO. | | |
|-------|-------------|--------------|----------------------------------|---------------------------------|-----------------------------|--|------------|---------|-------------------|-------------|--------------------|------------------|---------------|-----------------|--------------------|---------------------------|
| | GAL. CAP. | MODEL NUMBER | GAS INPUT IN THOUS. BTU/HR. NAT. | RECOVERY IN G.P.H. BY RISE NAT. | FIRST HOUR DEL. G.P.H. NAT. | HT. TO VENT A | TANK HT. B | DIAM. C | HT. TO GAS DOWN D | VENT SIZE E | INNER DOWN CNTR. F | HT. TO SEE TAP G | WATER COHL. H | SHR. WT. (LBS.) | ENERGY FACTOR NAT. | AVG. ANN. OPER. COST NAT. |
| TALL | 40 | RHG PRC40FN | 38 | 38.4 | 73 | 63 | 60-1/8 | 21 | 17-3/8 | 3 or 4 | 8 | 54 | 3/4 | 140 | 0.62 | \$294 |
| | 50 | RHG PRC50FN | 36 | 36.4 | 91 | 62-5/8 | 59-7/8 | 23 | 17-3/8 | 3 or 4 | 8 | 53-5/8 | 3/4 | 170 | 0.62 | \$294 |
| TALL | 28 | 22V30 PRCFN | 30 | 30.3 | 53 | 58 | 56-1/4 | 16-1/8 | 17-3/8 | 3 or 4 | 8 | 50 | 3/4 | 105 | 0.62 | \$294 |
| | 36 | 22V40 PRCFN | 36 | 36.4 | 72 | 60-5/8 | 57-3/4 | 16-1/8 | 17-3/8 | 3 or 4 | 8 | 51-5/8 | 3/4 | 125 | 0.60 | \$304 |
| | 48 | 22V50 PRCFN | 40 | 40.4 | 91 | 60-5/8 | 57-7/8 | 20-1/8 | 17-3/8 | 3 or 4 | 8 | 51-3/4 | 3/4 | 135 | 0.58 | \$315 |
| | 60 | RHG PRC60FN | 45 | 45.5 | 107 | 63-1/4 | 59-3/4 | 23 | 17-3/8 | 4 | 8 | 53 | 3/4 | 205 | 0.56 | \$326 |
| SHORT | 38 | 22V40S PRCFN | 36 | 36.4 | 68 | 51-7/8 | 49-1/8 | 20-1/8 | 17-3/8 | 3 or 4 | 8 | 43 | 3/4 | 135 | 0.60 | \$304 |

Rheem Professional Ultra Low NO_x with Guardian System Features...



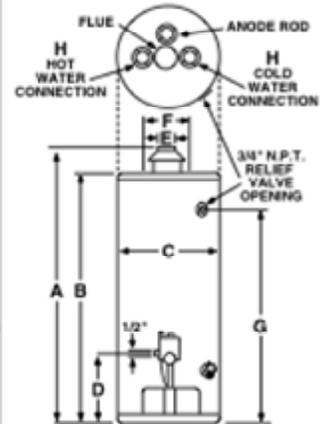
Ultra Low NO_x Burner
Environmentally friendly radiant burner significantly reduces NO_x emissions. Stainless steel construction for increased durability and longevity.



Exclusive Combustion Shut-off System
Should a spill incident occur, the Guardian System shuts off the gas supply and the air supply preventing a sustained vapor burn in the combustion chamber.



Maintenance Free
Superior air filtration prevents the flame arrestor from becoming clogged by lint, dust and oil.



These units are designed to meet or exceed ANSI (American National Standards Institute) requirements and have been tested according to D.O.E. test procedures and meet or exceed the energy efficiency requirements of NAECA, ASHRAE standard 90, ICC Code and all state energy efficiency performance criteria for energy consuming appliances.

Before purchasing this appliance, read important energy cost and efficiency information available from your supplier.

Exclusive Professional Installation Warranty

When this Rheem PROFESSIONAL water heater is installed by a licensed contractor, the consumer can upgrade his limited tank and parts warranty from 6 to 8 years by returning to Rheem the warranty registration card and a copy of the contractor's invoice.

This Rheem exclusive warranty upgrade feature enhances your value as a plumbing professional. A professional installation is a better installation.

Refer to the warranty certificate enclosed with each heater for specific details.

PROTECTIONPLUS™
8 YEAR LIMITED TANK WARRANTY BECOMES 12
For more details, see form 101-7.

In keeping with its policy of continuous progress and product improvement, Rheem reserves the right to make changes without notice.

Instantaneous Water Heater

RHEEM RESIDENTIAL TANKLESS

84 TANKLESS SERIES

Continuous hot water for 2-3 bathroom homes*

RTG-84DV indoor direct vent and RTG-84X outdoor natural and LP models – 11,000 - 180,000 BTU max.
8.4 gal./min at 35° F rise max., 6.7 gal./min. at 45° F rise

Limited Warranty:

12-Year on heat exchanger, 5-Year on parts, 1-Year on labor

See Residential Warranty Information Brochure for complete warranty information.

- 3/5" Concentric Vent System with Integrated Condensate Collector
- Connects to Metal Fab Inc., 3/5" Concentric Venting without an adapter
- Next Generation Burner Technology
- **Industry Best!** .26 GPM Minimum Flow Rate, .40 GPM Minimum Activation Flow Rate
- UMC-117 remote control and 10 ft. of thermostat wire is included
- EZ-Link™ cable available for high demand applications to connect two tankless units to operate as one
- Manifold up to 6 units with an optional MIC-6 manifold control board
- **Exclusive!** All Rheem models can be linked in up to 20 unit manifold installations by using the optional MIC-180 and MICS-180 manifold control assembly
- High-altitude capability – up to 9,840 ft. elevation above sea level (no chip required)
- **Exclusive!** Guardian OFW™ overheat film wrap
- All Rheem tankless models are third-party efficiency certified by GAMA
- Continuous hot water, energy saving and compact, space saving design
- Intelligent electronic controls designed to increase energy efficiency and safety
- Self Diagnostic System
- Digital display shows temperature setting and maintenance codes
- Built-in electric blower
- Supplied with a 120 volt power cord
- Environmentally friendly Low NOx burner meets SCAQMD rule 1146 requirements
- Freeze protection to -30° F

Product appearance may differ.

* Based on simultaneous showers using 2.5 gallons per minute. Flow rates vary depending on temperature of cold water supply.

The 84 Series Tankless models can be converted for Commercial Installations

See Commercial Warranty Brochure for details.



See reverse for specifications.

Tankless water heaters
Continuous hot water

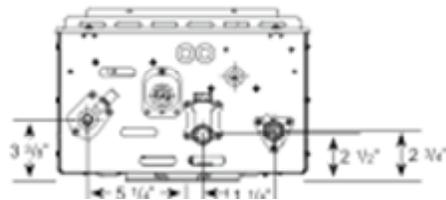
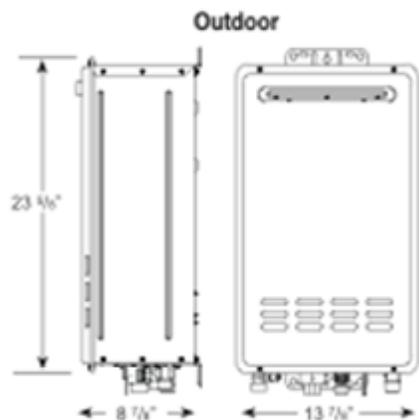
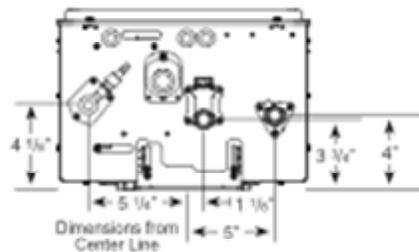
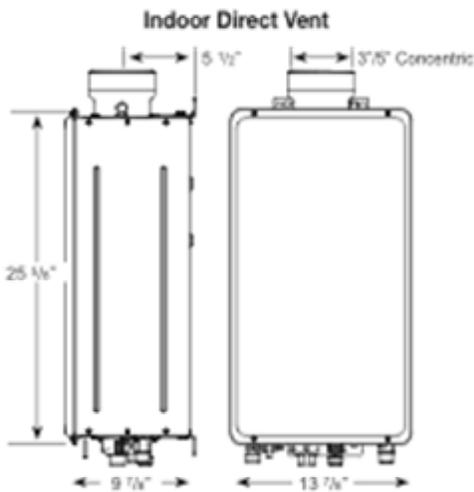


relax
It's Rheem®

84 TANKLESS SERIES

Specifications

| DESCRIPTION | | | FEATURES | | | | ROUGHING IN DIMENSIONS (SHOWN IN INCHES) | | | | | | ENERGY INFO. | | |
|--|-------------------|--------------------|---------------|---------------------|---------------------|---------------------|--|-----|--------|--------|-------|------------------------|--------------------|---------------|-----------------------------|
| MODEL NUMBER | GAS INPUT BTU/HR. | TYPE | TEMP. RANGE | WATER FLOW RATE | | | CONNECTION | | HEIGHT | WIDTH | DEPTH | VENT DIAMETER (INCHES) | SHP. WEIGHT (LBS.) | ENERGY FACTOR | D.O.E. ANN. OP. COST NA/CLP |
| | | | | GPM @ 77° RISE MAX. | GPM @ 45° RISE MAX. | GPM @ 35° RISE MAX. | WATER | GAS | | | | | | | |
| RHEEM TANKLESS WATER HEATERS FOR 3 BATHROOM HOMES | | | | | | | | | | | | | | | |
| RTG-84DVN | 11,000-180,000 | Indoor Direct Vent | 85° to 140° F | 3.9 | 6.7 | 8.4 | 3/4 | 3/4 | 25-5/8 | 13-7/8 | 9-7/8 | 3 by 5 CONCENTRIC | 54 | .82 | \$223/\$374 |
| RTG-84XN | 11,000-180,000 | Outdoor | 85° to 140° F | 3.9 | 6.7 | 8.4 | 3/4 | 3/4 | 23-5/8 | 13-7/8 | 8-7/8 | N/A | 54 | .82 | \$223/\$374 |



Energy Factor and Average Annual Operating Costs based on D.O.E. (Department of Energy) test procedures. D.O.E. national average fuel rate natural gas \$1.218/therm, LP \$1.87/gallon.

All models are available in Natural Gas and Propane (LP). For Propane replace the N with P when ordering.

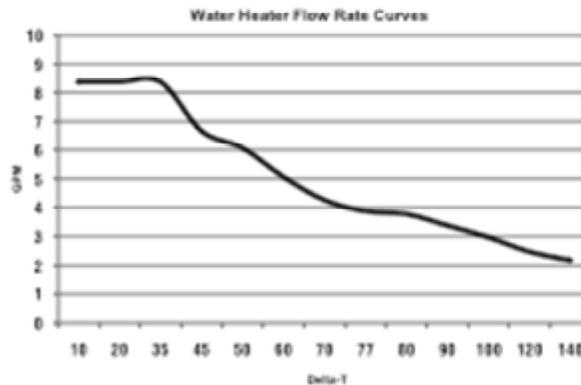
- Factory set maximum temperature is 120° F. See Use and Care Manual for setting.
- Consult factory for information on sizing the application.

Vent Termination Kits are required for Direct Vent models. Contact your distributor for details.

Proper gas pressure must be ensured to supply tankless gas water heaters – up to 180,000 BTU for RTG-84 models. (Consult your gas supplier)

| Model Number | Temperature Rise (° F) | | | | | | | | | |
|-------------------------|------------------------|-----|-----|-----|-----|-----|-----|-----|------|--|
| | 35° | 45° | 50° | 60° | 70° | 77° | 80° | 90° | 100° | |
| RTG-84 Water Flow (GPM) | 8.4 | 6.7 | 6.1 | 5.1 | 4.3 | 3.9 | 3.8 | 3.4 | 3.0 | |

Above estimates are for sizing purposes only.



*COMMERCIAL OPERATION AVAILABLE WITH CONVERSION KITS:

RTG20216A FOR RTG-84DVN RTG20216C FOR RTG-84XN
 RTG20216B FOR RTG-84DVP RTG20216D FOR RTG-84XP

Temperature range for commercial: 85° to 185° F.

These units are designed to meet or exceed ANSI (American National Standards Institute) requirements and have been tested according to D.O.E. test procedures and meet or exceed the energy efficiency requirements of NAECA, ASHRAE standard 90, ICC Code and all state energy efficiency performance criteria for energy consuming appliances.

Before purchasing this appliance, read important energy cost and efficiency information available from your supplier.

In keeping with its policy of continuous progress and product improvement, Rheem reserves the right to make changes without notice.

Rheem Water Heating and Heating & Cooling Products
 101 Bell Road • Montgomery, AL 36117-4305
 1-866-720-2076 • www.rheem.com

Rheem Canada Ltd./Ltée • Water Heater Division
 100 Edmonson Road, Unit 1, Brampton, Ontario L6Y 0R6

Energy Consciousness

Energy Consciousness

We employed a home automation system by Life Ware® that allows the resident to control every facet of their experience within the home. All houses are also equipped with an LCD TV and in ceiling speakers which they can use to adjust settings and monitor their energy consumption as well as enjoy their favorite movies or music off of their two terabyte media center. We chose a Panasonic 50" LCD TV and the basic package for the Life Ware® system which includes 2 MCE PCs, 1 Xbox 360 Extender, 20 Lights (Not a full home), 4 Audio Zones and 2 Audio Source Devices, Security System with 12 Zones, 2 HVAC Units, 3 Security Cameras, Weather for 1 zip code, and 10 Scenes. Scenes are settings for the system such as, at home systems on, and away economy mode.

Panasonic Viera TC-P50VT25 50" Plasma TV - TCP50VT25
ATSC - HDTV - 1080p - LCD - 16:9 - 1000 x 1000 - 60Hz - Standard



\$2,599.95

Life Ware System
Order form

\$3200



Boilers

Through my research for an efficient with high AFUE percentage Boiler I found couple of good ones that fits our demands. We needed a Boiler that could generate a heat capacity of about 32,000 BTU per hour, so we were looking at those boilers that have this range of heating capacity. The problem is as the Heating capacity reduced the efficiency of the boiler decrease, but even though we found good product that satisfy our demands. In this research I am going to show one of the boilers that I thought is the most efficient and economical boiler.

Peerless PF-50

50,000 BTU, Water Boiler, 95% Efficiency,
Electronic Ignition, Natural Gas / LP, Direct
Vented

The Peerless® PureFire® gas-fired condensing boiler is a high-efficiency boiler for residential and commercial applications and is available for either natural gas or LP (propane). The direct vent, sealed combustion PureFire boilers have an ultra-high efficiency rating up to 97.3% and are ENERGY STAR® qualified. The PureFire, now available in six sizes, has ASME and ETL certifications for both the U.S. and Canada and is the most thoroughly tested high efficiency boiler on the market. A unique condensate system with built-in neutralizer component and float switch protection is a top feature of the boiler.

Cost = \$2,726.99

Standard Features:

- Up to 97.3% AFUE - Energy Star qualified
- Fully modulating burner for maximum efficiency
- Float switch and built-in neutralizer in condensate system
- Outdoor reset and domestic hot water priority
- LCD display control board offers a heat recovery function reducing the off cycle losses
- System test mode for manual control of firing rate
- Zero clearance to combustibles
- Combination temperature-pressure gauge and 30 PSIG relief valve
- Outdoor sensor and leveling legs
- Stainless steel burner and heat exchanger
- 120 volt convenience outlet

PRODUCT SPECIFICATIONS Heating

| | |
|---|------------------------------------|
| Capacity | 50000 BTU |
| Efficiency Percentage (AFUE) | 95 % |
| Effective Heating Capacity | 46000 BTU |
| Water Capacity | 0.62 Gallons |
| Net Water Rating | 40000 BTU |
| Tax Credit This product may qualify for an energy efficiency tax credit. | Yes |
| Power Source | 120 VAC 60Hz |
| Max Vent Length | 200 Ft |
| Dual Pipe Vent Diameter | 3 inches |
| Dimensions (WxDxH) | 17 3/16 x 13 1/2 x 33 11/16 Inches |
| Weight | 68 lbs |
| Warranty | 12 Year Limited |



Portable Furnace 1500-Watt Room Heater

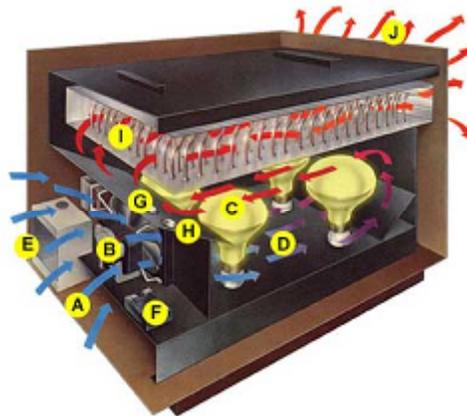
The Portable Furnace infrared heating system is a revolutionary concept offering more efficient heat at less cost. The Portable Furnaces impressive air quality and effective heating performance are the result of an innovative system design using absorption of infrared energy by a unique heat exchanger to produce, mix, circulate and recycle heated air at the proper location. The resulting even distribution minimizes heat loss at walls, windows, and ceilings; saving heat, energy and money! This system heats air in much the same way that the sun heats the earth and its atmosphere by means of safe infrared absorption.

Price = \$499.95



How the Portable Furnace provides more comfortable & efficient heat

A low CFM fan quietly draws ambient (room) air into a plenum through the lifetime washable air filter; then the air is gently forced through the heat exchanger. The temperature of the air passing through the unit is increased by approximately 46°C (115°F) then delivered back into the room through the exhaust grill. This heating unit is safe enough to be housed in a real wood oak veneer cabinet with casters for ease of



mobility.

- A. **Air Inlet:** Return Air Enters Rear of Unit
- B. **Fan:** Permanently lubricated, maintenance free fan moves 120 cubic ft. of air per minute. Continuous-Duty Rated. A quiet, energy-efficient portable furnace, circulates and recycles heated air through the Lamp Chamber providing even heat from floor to ceiling.

- C. **Lamps:** Four unfiltered infra-red lamps. The exclusive design of the heat exchanger absorbs heat energy from four powerful, long-lasting infra-red industrial lamps, converting the energy to heat for transfer to the air. This heating approach protects recycled air from loss of humidity.
- D. **Lamp Chamber:** Non-reflective steel chamber for maximum absorption of infrared light energy.
- E. **Thermostat:** Temperature control.
- F. **Solid-State Control Relay:** Turns lamps on and off when signaled by thermostat.
- G. **High Limit Safety Switch:** Will turn unit off if temperature of lamp chamber exceeds 190 degrees.
- H. **Fan Control Switch:** Operates fan motor when temperature in lamp chamber reaches 90 degrees.
- I. **Exclusive Heat Exchanger:** Metal plate with multiple rows of hollow venturi-tubes. Maximum Heat transfer occurs in the heat chamber as the air passes around and through the hot tubes of the heat exchanger, increasing air temperature for re-entering to living area.
- J. **Air Outlet Grill:** Heated energized air exits front of unit. Clean, comfortable heated air gently flows into the living area, mixing and stabilizing air at the floor for more even temperature distribution and more effective floor-level circulation and recycling.

Safety: Extensive testing has verified the safety of the Portable Furnace zone furnace. Safe, clean infrared lamps provide the heat; there is no combustion or fumes. Due to its safe operating temperature, the Portable Furnace may be placed next to flammable materials with no safety clearance needed. This highest safety rating means lowest possible insurance costs. The Portable

Economy: The unique Portable Furnace process virtually prevents the wasteful air layering of conventional systems. The heat does not accumulate near the ceiling. By using individual controlled units the radiant heater system provides heat only where and when it is needed. Portable Furnace zone heating is less expensive per heated square foot and requires no expensive duct installation, therefore, no heat is lost every time the unit runs. The Portable Furnace uses standard 100-volt household current. Portable Furnace has lower operating and maintenance costs. There is only one moving part, the fan motor, and is equipped with quality trouble free controls. There are no burners to rust corrode or adjust; no pilot light to waste energy. Safe, clean, long-life infrared lamps provide the heat energy and are replaced easily and inexpensively (Average lamp

life is 5000+ hours or approximately 3-5 years), The Portable Furnace is constructed of lifetime metals, copper, galvanized steel and aluminum.

Technical Specifications:

- Weight: 65 lbs Height: 18" Length: 24.5" Width: 16"
- Amperage: 12.5
- Watts: 1500

HVAC – Total Cost: \$103,048.44



APPENDIX
5

FIXTURES
EPA AND ENERGY STAR



All the Fixtures and the Appliances we used in our Green Home are EPA and Energy Star certified. This means that we used the most efficient products in the market that saves energy and achieve our goal which is to build a green and efficient house.

Fixtures

For the plumbing fixtures we used the EPA certified products which is more efficient and saves more energy.

Plumbing Fixtures included:-

- Dual Flush (EPA Certified) Toilets
- Bathroom Sinks
- Bathroom Faucets (EPA Certified)(Faucet Aerator attached)*
- Bathtub
- Bathtub Faucet and Shower Head (EPA Certified)
- Dual Kitchen Sink
- Utility Sink
- Utility Sink Faucet
- Walk-in Shower
- Kitchen Faucet (Faucet Aerator attached)*

*Faucet Aerator is a metal or plastic piece that installed at the tip of the faucet in order to save water and reduce splashing. (Certified by LEED)

Green Class Community

| Quantity | Unit | Unit Cost | Total | Description |
|----------|------|-----------|------------|---|
| 4 | EACH | \$22.00 | \$88.00 | Kohler Sink Drain |
| 1 | EACH | \$128.00 | \$128.00 | American Standard Wall Mount Utility Faucet |
| 1 | EACH | \$428.00 | \$428.00 | Kohler Utility Sink |
| 1 | EACH | \$348.00 | \$348.00 | Stand-Up Shower Kit |
| 2 | EACH | \$86.00 | \$172.00 | Single-Handle Tub Faucet |
| 2 | EACH | \$44.95 | \$89.90 | Waterpik EcoFlow 5-Spray Hand Shower |
| 1 | EACH | \$407.00 | \$407.00 | Kohler Villager Right Hand Cast Iron Tub |
| 3 | EACH | \$98.00 | \$294.00 | Glacier Bay Dual Flush High Efficiency Toilet |
| 4 | EACH | \$88.00 | \$352.00 | American Standard 2-Handle Bathroom Faucet |
| 4 | EACH | \$55.00 | \$220.00 | White Cast Bath Lavatory Sink |
| 1 | EACH | \$108.00 | \$108.00 | Two Handle Kitchen Faucet |
| 1 | EACH | \$311.84 | \$311.84 | Dual Mount Double Bowl Kitchen Sink |
| 6 | EACH | \$4.29 | \$25.74 | 1.5 GPM Regular Male Aerator |
| | | | | |
| | | Total | \$2,972.48 | |



Welcome, (Sign In or Register) Chicago, IL is your

Share Email Print



Zoom View Product Demo

MOEN Adler Single-handle Tub and Shower faucet in Chrome

Model # L82694 Internet # 202060910
Store SKU # 242911

\$86.00/EA-Each

Ships FREE with \$249.00 Order

Average Customer Rating

★★★★☆ 2.5 out of 5

Write a review for a chance to win a \$1,000 Gift Card.

Read Reviews Write a Review

\$86.00/EA-Each

Add to My List

Sold At Your Local Store

SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



Metal Lever 2-Handle Claw Foot Tub Faucet with Diverter ...

\$56.96/Each



Fairfax® Rite-Temp® Pressure-Balancing Tub and Shower ...

\$111.00/Each



Hampton Three Handle Tub and Shower Set in Polished ...

\$168.00/Each

Description

Whether you're remodeling your home or just replacing the fixtures, this MOEN Adler Single-Handle Tub and Shower Faucet in Chrome is a great choice. A lever and a knob are included, so you can choose which style handle best suits your needs or aesthetic preference. The PosiTemp pressure-balancing valve keeps water temperature constant while other people in the house run water. So, you can enjoy your shower without sudden bursts of hot or cold water.

- Single-handle design for quick and easy water control with a single lever
- Lever and knob handle options included
- PosiTemp pressure-balancing valve maintains water pressure and controls temperature
- Single-function showerhead for simple operation
- Chrome finish looks polished and clean
- Classic design blends easily with many decorating styles
- Self-cleaning nozzles help you maintain a clean and functioning fixture
- ADA compliant
- Showerhead maximum flow rate of 2.5 gallons per minute for efficient cleaning
- 1/2 in. connection
- MFG Brand Name : MOEN
- MFG Model # : L82694
- MFG Part # : L82694

Specifications

- ADA Compliant : Yes
- Assembled Depth (in.) : 5.00 in
- Assembled Height (in.) : 7.25 in
- Assembled Width (in.) : 7.25 in
- Bath Faucet Type : Combo Tub & Shower
- Built-in Water Filter : No
- Ceramic disk valves : No
- Collection Name : Adler
- Color/Finish : Chrome
- Color/Finish Family : Chrome
- Connection Size : 1/2
- Diverter type : Plunger
- Faucet type : Bath Faucet
- Flow rate (gallons per minute) : 2.5
- Hand Shower : No
- Handle type : Lever
- Handles included : Yes
- Integral stops : No
- Item Package Type : Cardboard Container
- Item Weight : 5.00 lb
- Manufacturer Warranty : Limited Lifetime Warranty
- Material : Metal
- Number of Faucet Handles : Single Handle
- Number of Spray Settings : 1
- Plug Included : No
- Pressure Balancing or Thermostatic : Pressure Balancing

Required rough-in valve included : Yes
Showerhead face diameter (in.) : 2.75
Showerhead type : Fixed mount
Spout Reach (in.) : 5.0 in
Style : Classic
Tub/Shower Faucet Type : Tub-Shower

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.

Shipping

Most orders ship within 1 business days.

Please allow an additional 3-5 business days for **Standard Ground Delivery** in the U.S.

E-MAIL EXCLUSIVES

Sign up to receive special offers and promotions from the Home Depot

Enter Email Address

FOLLOW THE HOME DEPOT



ABOUT THE HOME DEPOT

- Affiliate Program
- Careers
- Corporate Info
- Government Customers
- Investor Relations
- Privacy & Security
- Supplier Center
- Supplier Diversity
- The Home Depot Canada
- The Home Depot Mexico

STRESS FREE SHOPPING

- Gift Cards
- Price Match Policy
- Privacy Policy
- Return Policy
- Service Plan Registration
- Site Map

PARTNER SITES

- Home Improver Club
- Home Decorators Collection
- Garden Club
- The Home Depot Racing
- Eco Options

CUSTOMER SERVICE

- Contact Us
- Home Depot Opinion
- Order Status
- Product Recalls
- Store Information

CREDIT CENTER



No Interest if Paid in Full Within 12 Months*
\$299 Minimum Purchase Required. Minimum Payments Required.
Valid 11/4-11/10/2010.

12 MONTHS >

† Local store prices may vary from those displayed. Products shown as available are normally stocked but inventory levels cannot be guaranteed.

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More saving. More doing.®

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[Print](#)



Zoom View

KOHLER Villager Right Hand Cast Iron Tub, White

Model # K-716-0 Internet # 100069783
Store SKU # 702951

\$407.00/EA-Each

This item does not qualify for free shipping.

This item cannot be shipped to the following state(s): AK, HI

Average Customer Rating

★★★★☆ 3.8 out of 5

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Villager(TM) Bath, White

\$529.00/Each



Cambridge 5 ft. Right Drain Bathtub in White

\$576.00/Each



60 in. x 30 in. White Bathtub with Left Hand Drain...

\$217.00/Each

Description

With its functional design and KOHLER® styling, the Villager is our most popular bath. The integral apron allows for quick installation, and the bath's durable KOHLER® Cast Iron construction ensures years of beauty and reliable performance. This model features a right-hand drain.

- 60 in. L x 30-1/4 in. W x 14 in. H
- Our Most Popular Bath
- Integral Apron For Quick Installation
- KOHLER(R) Cast Iron
- Designed for one-person bathing
- MFG Brand Name : KOHLER
- MFG Model # : K-716-0
- MFG Part # : 716-0

Specifications

- ADA Compliant : No
- Assembled Depth (in.) : 63 in
- Assembled Height (in.) : 15.5 in
- Assembled Width (in.) : 32.75 in
- Bath Product Type : Freestanding Bath Tub
- Collection Name : Villager
- Color : White
- Color Family : White
- Color/Finish : White
- Energy Star Compliant : No
- Exterior bath shape : Rectangle
- Faucet mount : Wall
- Filled Weight : 591 lb
- Filled weight (lb.) : 591
- Floor Loading : 49 lbs./sq.ft.
- Floor loading (lb./sq. ft.) : 49
- Gallons To Overflow Single or Left Bowl : 82 gal (US)
- Interior bath shape : Rectangle
- Item Package Type : Wood Crate
- Item Weight : 316 lb
- Lumbar Support : No
- Manufacturer Warranty : Lifetime limited warranty
- Material : Cast Iron
- Maximum Number of Occupants : 1
- Operational water depth : 8.625
- Outlet Location : Right Hand
- Product Depth (in.) : 8.625
- Product Height (in.) : 14
- Product Length (in.) : 60 in
- Product Weight (lb.) : 316
- Product Width (in.) : 30.25
- Slip-resistant tub floor : No
- Tub Size : 5 ft
- Tub depth (in.) : 8.625

Tub length (in.) : 60
 Tub width (in.) : 30.25
 Water Depth To Overflow : 8.63 in
 Water capacity (gallons) : 33
 Water depth to overflow (in.) : 8.625
 Width : 30.25 in

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.

Shipping

Most orders ship within 1 business days.

Please allow an additional 2-6 business days for **Curbside Truck Delivery** in the Continental U.S. Deliveries are made to receiving area/dock for Businesses or curbside for Residential orders. Delivery appointments are required.

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 Valid 11/4-11/10/2010.

12 MONTHS >

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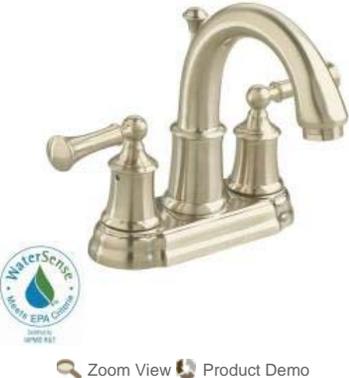
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American Standard Neo 4 in. 2-Handle Mid-Arc Bathroom Faucet in Satin Nickel

Model # 6004SF Internet # 100684614
Store SKU # 762665

\$88.00/EA-Each

Ships FREE with \$249.00 Order

This item cannot be shipped to the following state(s): AK, HI

Average Customer Rating

★★★★★ 5 out of 5

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\$88.00/EA-Each

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SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



[Two Handle Lavatory Faucet in Brushed Nickel Trim ...](#)

\$182.00/Each



[Pegasus Verdanza 4 in. Two Handle Lavatory in Brushed ...](#)

\$68.00/Each



[Glacier Bay - Lyndhurst 4 in. Two Handle Lavatory ...](#)

\$59.00/Each

Description

The American Standard Neo 4 in. 2-Handle Mid-Arc Bathroom Faucet in Satin Nickel is WaterSense certified and has a 1.5-gallon per minute water flow rate to help conserve water. The 2-handle design and mid-arc spout make the faucet easy to use. The satin nickel finish is easy to clean, and the 1/2 in. connection and deck-plate mount make the faucet easy to install. The faucet is also ADA compliant.

- 2-handle design for easy use
- Mid-arc spout has a height of 6-5/8 in.
- Spout has a reach of 4-9/16 in.
- Satin nickel finish is easy to clean
- Features ceramic disc valves
- WaterSense certified to help reduce water use
- 1.5-gallon per minute water flow rate helps conserve water
- ADA compliant
- 1/2 in. connection
- 3 installation holes required
- MFG Brand Name : American Standard
- MFG Model # : 6004SF
- MFG Part # : 6004SF

Specifications

- ADA Compliant : Yes
- Assembled Depth (in.) : 8.50 in
- Assembled Height (in.) : 4.50 in
- Assembled Width (in.) : 4.50 in
- Bath Faucet Type : 4" Centerset
- Built-in Water Filter : No
- Ceramic disk valves : Yes
- Collection Name : Neo
- Color/Finish : Satin Nickel
- Color/Finish Family : Nickel
- Connection size (in.) : 1/2 In.
- Faucet type : Bath Faucet
- Flow rate (gallons per minute) : 1.5
- Handle type : Lever
- Handles included : Yes
- Item Package Type : Cardboard Container
- Item Weight : 4.1500 lb
- Manufacturer Warranty : Limited Lifetime
- Mount type : Deckplate
- Number of installation holes required : 3
- On-center measurement : 4 in. center set
- Pull out sprayer : No
- Side sprayer : No
- Soap dispenser : No
- Spout Reach (in.) : 4.5625 in
- Spout arc : Mid
- Spout height (in.) : 6.625



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Thermocast Oceana High Gloss White Cast Acrylic Bath Lavatory Sink 4 In. Center

Model # 91400 Internet # 100341951

\$55.00/EA-Each

Ships FREE with \$249.00 Order

This item cannot be shipped to the following state(s): AK,HI

Average Customer Rating

★★★★★ 5 out of 5

Write a review for a chance to win a \$1,000 Gift Card.

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\$55.00/EA-Each

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SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



Archer(TM) Self-rimming Lavatory with 4" Centers, ...

\$106.00/Each



Oceana High Gloss Bone Cast Acrylic Bath Lavatory ...

\$59.00/Each



Cornelia White 8 Inch Faucet Spread 3.2 Cast Acrylic ...

\$76.96/Each

Description

This "Master Collection" designer lavatory is exquisitely crafted to meet any architectural style. It exhibits a rich high gloss finish that is easy to maintain with non abrasive cleaners and can be polished with ordinary liquid based sink or counter top polish. It's durable surface resists stain, rust, oxidation, chipping, and scratches. Canadian Standards Association and NAHB Certified. Thermocast Lifetime Warranty.

- Easy to clean high gloss finish
- Stain, rust, and oxidation resistant
- Scratch, Chip and Impact Resistant
- Easy installation, plumbers putty for drain & silicone sealant for perimeter is all that's needed
- Lifetime Warranty
- MFG Brand Name : Thermocast
- MFG Model # : 91400
- MFG Part # : 91400

Specifications

- ADA Compliant : Yes
- Assembled Depth (in.) : 17.0 in
- Assembled Height (in.) : 6.50 in
- Assembled Width (in.) : 20.0 in
- Basin Depth (in.) : 6.5
- Basin Length (in.) : 20
- Basin Width (in.) : 17
- Bath Product Type : Drop-In Sink
- Collection Name : Master Collection
- Color : White
- Color Family : Whites
- Color/Finish : White
- Cut-Out Depth (in.) : 6.5 in
- Cut-Out Length (in.) : 18
- Cut-Out Width (in.) : 15 in
- Depth : 6.5 in
- Energy Star Compliant : No
- Gallons To Overflow Single or Left Bowl : 2 gal (US)
- Inner bowl front to back length (in.) : 11.5
- Inner bowl side to side width (in.) : 17
- Item Weight : 20.0 lb
- Manufacturer Warranty : Lifetime Warranty
- Number of Bowls : 1
- Number of basins : 1
- Predrilled holes : Yes
- Product Depth (in.) : 6.5
- Product Length (in.) : 20 in
- Product Weight (lb.) : 17
- Product Width (in.) : 21
- Shape : Oval
- Sink Type : Self-Rimming
- Water Depth To Overflow : 5.5 in

Width : 20 in

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.

Shipping

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Swanstone Dual Mount 33 in. x 22 in. Double Bowl Kitchen Sink

Model # QZ03322DB.170 Internet # 202508764

\$311.84/EA-Each

Price includes shipping

This item cannot be shipped to the following state(s): AK, HI



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\$311.84/EA-Each

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SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



Double Bowl Kitchen Sink in Black Galaxy, 22 In. x ...

\$231.00/Each



Ascend Dual Mount 33 in. x 22 in. Single Bowl Kitchen ...

\$343.03/Each



33 In. x 22 In. x 9 In. Double Bowl Kitchen Sink - ...

\$353.42/Each

Description

You will love the look of this granite double bowl kitchen sink. Made with actual quartz natural stone, this sink provides a high design appeal. The large, deep bowls provide an improved work area. Same sink can be installed as a drop-in or an undermount application in your choice of countertop styles.

Made of quartz stone, only a diamond is a harder material
 Can be installed as a drop-in or undermounted in your choice of countertop materials such as tile, granite or solid surface
 Heat, stain and scratch resistant and won't be harmed by hot pots or boiling water
 Single hole drilled with additional drill points underneath to accommodate most faucet styles
 MFG Brand Name : Swanstone
 MFG Model # : QZ03322DB.170
 MFG Part # : QZ03322DB.170

Specifications

ADA Compliant : No
Assembled Depth (in.) : 22 in
Assembled Height (in.) : 9.75 in
Assembled Width (in.) : 33 in
Color/Finish : Espresso
Cut-Out Depth (in.) : 22 in
Cut-Out Length (in.) : 33.0
Cut-Out Width (in.) : 22 in
Finish type : Matte
Item Weight : 38.0 lb
Kitchen Product Type : Sink
Left bowl length (in.) : 15.25
Left bowl width (in.) : 18.37
Manufacturer Warranty : Limited Lifetime for Residential Applications
Mount type : Drop In or Undermount
Product Weight (lb.) : 38.0
Right bowl length (in.) : 12.87
Right bowl width (in.) : 16.0
Sound insulation : No

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.

Shipping

Most orders ship within 1 business days.

Please allow an additional 3-5 business days for **Standard Ground Delivery** in the



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NEOPERL 1.5 GPM Regular Male Aerator

Model # 37.0084.98
Store SKU # 704994

\$4.29/EA-Each

★★★★★

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\$4.29/EA-Each
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SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



48 in. Plug Aerator
\$214.00/Each



Composting Tool
\$15.96/Each



40 in. Plug Aerator
\$349.00/Each

Description

The NEOPERL 1.5 GPM Regular Male Aerator has 15/16 in. male threads and is designed to connect to most inside-threaded faucets. The aerator is crafted with solid brass for strength and features an anti-liming honeycomb screen. It is WaterSense certified and saves up to 30% water.

- Solid brass construction
- WaterSense certified
- 1.5 GPM saves up to 30% water
- Anti-liming honeycomb screen
- Connects to most faucets with inside threads
- AB 1953 compliant (CA and VT)
- Lead free as defined by CA AB1953 and VT S152
- MFG Brand Name : NEOPERL
- MFG Model # : 37.0084.98
- MFG Part # : 37.0084.98

Specifications

- Assembled Depth (in.)** : .925 in
- Assembled Height (in.)** : .512 in
- Assembled Width (in.)** : .925 in
- Color/Finish Family** : Chrome
- Fits Faucet Brand** : All Brands
- Flow Rate** : 1.5 gal (US)/min
- Flow Restrictor** : Yes
- Item Package Type** : Plastic Container
- Item Weight** : 0.040 lb
- Manufacturer Warranty** : None. Aerators should be changed as regular maintenance.
- Material** : Solid Brass
- Plumbing Part Type** : Aerator
- Thread Type** : Male

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.

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Delta Vessona Two Handle Kitchen Faucet with Spray in Chrome

Model # 21925LF Internet # 202057354
Store SKU # 864858

\$108.00/EA-Each

Ships FREE with \$249.00 Order

Average Customer Rating

★★★★★ 5 out of 5

Write a review for a chance to win a \$1,000 Gift Card.

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\$108.00/EA-Each

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Lyndhurst 2-Handle Bridge Kitchen Faucet with Side ...

\$104.00/Each



Colony Soft Gooseneck Faucet with Spray in Chrome

\$78.96/Each



Hampton Double Handle Kitchen Faucet in Chrome

\$137.00/Each

Description

The versatile Vessona collection exudes elegance and simplicity with a charming, old-world feel. Its timeless design will be a delight in your kitchen for years to come. Whether you choose to install Vessona yourself or hire someone to do it, you can rest assured knowing that every Delta faucet is backed with a lifetime faucet and finish warranty.

- Traditional and modern elements enable this faucet to coordinate in every setting
- Handles included
- Matching side spray included
- High-arc spout perfect for filling large pots
- MFG Brand Name : Delta
- MFG Model # : 21925LF
- MFG Part # : 21925LF
- Savings Center : New Lower Prices

Specifications

- ADA Compliant : Yes
- Adjustable flow rate : No
- Assembled Depth (in.) : 8.03 in
- Assembled Height (in.) : 13.25 in
- Assembled Width (in.) : 10.66 in
- Built-in Water Filter : No
- Collection Name : Vessona
- Color/Finish : Chrome
- Color/Finish Family : Chrome
- Connection size (in.) : 1/2 In.
- Faucet Spray : Side
- Faucet type : Kitchen Faucet
- Flow Rate : 2.2 gal (US)/min
- Flow rate (gallons per minute) : 2.2
- Handle Type : Lever
- Handles included : Yes
- Housing Material : Brass
- Item Package Type : Cardboard Container
- Item Weight : 4.9 lb
- Kitchen Faucet Type : Fixed
- Low flow rate setting (gallons per min.) : 2.2
- Manufacturer Warranty : Lifetime limited
- Mount type : Deckplate
- Number of installation holes required : 4.0
- Safety Listing : CSA
- Side Sprayer Included : Yes
- Spout Height : 13.25 in
- Spout Reach (in.) : 8.03 in
- Spout Type : High Arc
- Spout height (in.) : 13.25
- Supply lines included : No
- Valve material : Composite
- Wall Mountable : No



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ASB 38 In. Neo-Angle Shower Kit

Model # 403306

Store SKU # 641745

\$348.00/EA-Each

Average Customer Rating

★★★★☆ 3.7 out of 5

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\$348.00/EA-Each

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SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



Economy Corner Entry Shower Kit, 32 in. x 32 in. x ...

\$746.00/Each



Intrigue 39 In. x 39 In. x 79-1/8 In. Tile Corner ...

\$557.00/Each



Economy Neo-angle Shower Kit, 38 in. x 38 in. x 72 ...

\$682.00/Each

Description

The classic design of our Neo-Angle Shower Kits will enhance any bathroom. Our units are easy to install and offer modern styling with high quality construction.

Anodized aluminum frame
Tempered safety glass with sturdy pivot door construction
Corner caddy with four shelves and towel bar
Limited 5-year warranty
MFG Brand Name : ASB
MFG Model # : 403306
MFG Part # : 403306

Specifications

ADA Compliant : No
Assembled Depth (in.) : 38 in
Assembled Height (in.) : 74.25 in
Assembled Width (in.) : 38 in
Bath Product Type : Shower Stall/Kit
Collection Name : N/A
Color Family : Metallics
Color Family : White
Color/Finish : Chrome
Energy Star Compliant : No
Item Package Type : Cardboard Container
Item Weight : 99 lb
Manufacturer Warranty : Limited 5-Year Warranty
Product Depth (in.) : 38
Product Height (in.) : 74.25
Product Length (in.) : 38 in
Product Weight (lb.) : 99
Product Width (in.) : 38
Shape : Neo-angle Straight
Size (Width) : 38 in.
Tray Material : Other
Wall Color : White
Wall Material : Acrylic

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.



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Waterpik EcoFlow 5-Spray Hand Shower in Chrome

Model # ECO-563 Internet # 100660154
Store SKU # 646782

\$44.95/EA-Each

Ships FREE with \$249.00 Order

This item cannot be shipped to the following state(s): AK, HI

Average Customer Rating

★★★★☆ 2.9 out of 5

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\$44.95/EA-Each

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SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



Eco-Friendly Shower Head in Polished Chrome

\$10.97/Each



Flowise Three Function Water Saving Showerhead in ...

\$42.25/Each



Flowise Water Saving Showerhead (40 Percent Water ...

\$16.25/Each

Description

This Waterpik EcoFlow 5-Spray Hand Shower in Chrome provides a way for you to enjoy the luxurious benefits of a multi-spray showerhead while saving water. Reduce energy consumption without compromising water force and use the water pause setting located on the handle for an additional water-saving option. The attractive chrome finish looks fresh and polished. The 60 in. hose lets you easily wash the dog or rinse off the shower wall.

Handheld design helps you bathe kids, pets and spray down shower walls
5-function showerhead allows you to customize your shower experience
Water pause provides a way to reduce water consumption during your shower
Chrome finish looks polished and clean
Simple design easily blends with existing bathroom features
Showerhead flow rate of 1.6 gallons per minute
60 in. hose
WaterSense certified
Vacuum breaker included
Installs in minutes
Eco Options : Eco Options
MFG Brand Name : Waterpik
MFG Model # : ECO-563
MFG Part # : 20011538-HD

Specifications

ADA Compliant : No
Assembled Depth (in.) : 3.5 in
Assembled Height (in.) : 11.5 in
Assembled Width (in.) : 3.5 in
Bath Faucet Type : Hand Shower
Built-in Water Filter : No
Collection Name : EcoFlow
Color/Finish : Chrome
Color/Finish Family : Chrome
Connection size (in.) : 1/2 In.
Diverter type : 1 way
Faucet type : Bath Faucet
Flow Rate : 1.6 gal (US)/min
Flow rate (gallons per minute) : 1.6
Hose length (in.) : 60
Item Package Type : Plastic Container
Item Weight : 1. lb
Manufacturer Warranty : Lifetime
Number of Spray Settings : 5
Showerhead face diameter (in.) : 4
Vacuum breaker included : Yes

More Info

Warranty



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Glacier Bay Elongated Dual Flush High Efficiency 1.1/1.6 GPF All-in-One Toilet

Model # N2316
Store SKU # 215583

\$98.00/EA-Each

This item cannot be shipped to the following state(s): HI,AK

Average Customer Rating

★★★★☆ 4.4 out of 5

Write a review for a chance to win a \$1,000 Gift Card.

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\$98.00/EA-Each
Not Sold Online

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SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



Escale Toilet in White

\$895.00/Each



Perfect Flush, Eco Friendly Dual Flush Upgrade Kit...

\$90.96/Each



English Turn Elongated Toilet Bowl, Bisque

\$260.00/Each

Description

Glacier Bay 1.1/1.6 GPF Dual Flush Elongated High Efficiency All-In-One Toilet. Liquids flush at 1.1 GPF, solids flush at 1.6GPF. Chrome plated top mounted flush button. EPA WaterSense Certified. Meets HET rebate standards - high rebate \$\$\$\$. Chair height elongated bowl meets ADA standards. Large footprint - excellent for retrofitting. Everything you need in one box - tank, bowl, wax ring, floor bolts w/caps and toilet seat.

- Best Flush Performance - 10
- EPA WaterSense Certified
- Liquids flush at 1.1GPF / Solids flush at 1.6GPF
- Chrome plated top mounted flush button
- All-in-One packaging includes: tank, bowl, wax ring, floor bolts w/caps and toilet seat
- MFG Brand Name : Glacier Bay
- MFG Model # : N2316
- MFG Part # : 215-583
- Savings Center : New Lower Prices

Specifications

- ADA Compliant : Yes
- Assembled Depth (in.) : 31 in
- Assembled Height (in.) : 33.5 in
- Assembled Width (in.) : 17.75 in
- Bath Product Type : Two Piece Dual Flush Toilet
- Bolt cap included : Yes
- Color : White
- Color Family : White
- Color/Finish : White
- Item Package Type : Cardboard Container
- Item Weight : 87 lb
- Manufacturer Warranty : Limited Lifetime
- Material : Ceramic
- Product Depth (in.) : 31
- Product Height (in.) : 33.5 in
- Product Weight (lb.) : 87 lb
- Product Width (in.) : 17.75 in
- Supply lines included : No
- Tank included : Yes
- Wax ring included : Yes

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.

Shipping



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Zoom View

American Standard Heritage Exposed Yoke Wall Mount Utility Faucet With 3 Spout, Threaded Hose End, Polished Chrome

Model # 8340.243.002 Internet # 100045203

\$128.00/EA-Each

This item does not qualify for free shipping.



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\$128.00/EA-Each

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SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



[Heritage 2-Handle Kitchen Faucet in Polished Chrome ...](#)

\$174.00/Each



[Colony Soft Gooseneck Faucet with Spray in Chrome](#)

\$78.96/Each



[Princeton Two Lever Handle Centerset Faucet, Metal ...](#)

\$74.10/Each

Description

When looking for an airy, sanctuary feel in a bathroom, look no further than the Heritage Collection. Its a timeless collection of quality design and smart engineering. A vintage look with crisp clean lines makes Heritage a classic, traditional collection. Its relaxing effect will exceed your expectations. All items are design matched to coordinate with the Townsend or Heritage Fixtures.

- For commercial / institutional use
- Exposed yoke, wall mount faucet
- 8" center faucet holes
- 3" spout with hose end and bucket hook
- MFG Brand Name : American Standard
- MFG Model # : 8340.243.002
- MFG Part # : 8340243.002

Specifications

- ADA Compliant : No
- Assembled Depth (in.) : 11.70 in
- Assembled Height (in.) : 5.10 in
- Assembled Width (in.) : 9.20 in
- Bath Faucet Type : 4" Centerset
- Collection Name : Heritage
- Color/Finish : Chrome
- Color/Finish Family : Chrome
- Connection Size : .5
- Energy Star Compliant : No
- Faucet type : Bath Faucet
- Flow Rate : 10 gal (US)/min
- Height : 5.10 in
- Item Weight : 4.8000 lb
- Number of Faucet Handles : 2
- Number of Faucet Handles : Double Handle
- Spout Height : 0 in
- Spout Reach (in.) : 0 in
- Width : 9.20 in

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.

Shipping

Most orders ship within 1 business days.

Please allow an additional 3-5 business days for **Standard Ground Delivery** in the U.S.



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View Larger

KOHLER Sudbury(tm) Service Sink, White

Model # K-6652-0 Internet # 100067203

\$428.00/EA-Each

Price includes shipping

This item cannot be shipped to the following state(s): HI,AK



Be the first to **Write a Review**

Write a review for a chance to win a \$1,000 Gift Card.

\$428.00/EA-Each

Add to My List

Online Only

SHOPPERS WHO VIEWED THIS ITEM ALSO VIEWED



Bannon(TM) Service Sink, White

\$552.00/Each



Bannon(TM) Service Sink, White

\$609.00/Each



Gilford(TM) Scrub-Up/Plaster Sink, White

\$554.00/Each

Description

Bring functionality and distinctive KOHLER styling to your workspace with the Sudbury service sink. This deep, single-basin sink is constructed of durable vitreous china for years of reliable performance. Combine it with a KOHLER wall-mount faucet.

- Blank back
- Vitreous china
- KOHLER finishes resist corrosion and tarnishing, exceeding industry durability standards two times
- Fluid design lines for ease of cleaning
- MFG Brand Name : KOHLER
- MFG Model # : K-6652-0
- MFG Part # : 6652-0

Specifications

- ADA Compliant : No
- Assembled Depth (in.) : 32.5 in
- Assembled Height (in.) : 24.5 in
- Assembled Width (in.) : 26.75 in
- Collection Name : Sudbury
- Color : White
- Color/Finish : White
- Energy Star Compliant : No
- Freestanding : No
- Height : 24 in
- Item Weight : 83 lb
- Kitchen Product Type : Single Basin Utility Sink/Laundry Tub
- Number of Holes : 0
- Sink Type : Wall Mount
- Sound Reduction System : No
- Width : 20 in

More Info

Warranty

For warranty information on this product, please call our Internet Customer Service Center at 1-800-435-4654.

Shipping

Most orders ship within 1 business days.

Please allow an additional 5-10 business days for **Basic Home Delivery** in the Continental U.S. Basic Home Delivery service includes delivery to your door or first dry area. Delivery appointments are not required. Freight included.

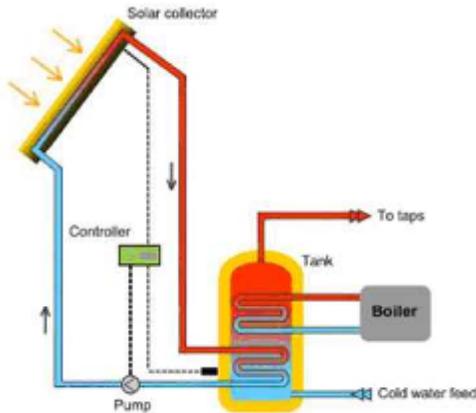


APPENDIX

6

OPTIONAL PACKAGES

Solar Thermal Energy



Solar thermal is one of the renewable technologies. Nowadays, solar energy is getting an attention because solar heat is environmentally friendly because it does not produce any greenhouse gases nor does not pollute the environment. Also, it is very clean and safe to use as an energy source.

To get a legitimate solar thermal system, it costs about \$20,000. Energy saving is around \$200. This is one of our optional packages that we are promoting.

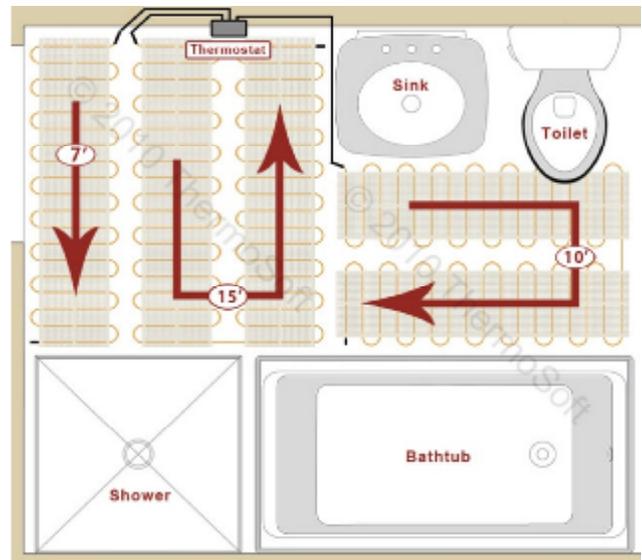
*Based in 2000 ft²

Bathroom Radiant Underfloor Heating

By installing electric radiant floor heating in the bathroom, it saves money and protects the over-heat in an advance. This is good because this helps to control bathroom individually for the comfort.

The average-size bathroom costs about \$400-700 to install a thin electric mat with a timer-thermostat.

This is one of the packages that we offer for those who want electric radiant floor heating to their bathrooms.



The products are from "Thermosoft" Company



| Model | Electricity cost | Installation | Suited for |
|--|--|--------------|---|
| TT80-240 Width: 1.5ft Length: 80ft | \$93.8722 (4 months) (6 hours/day) | \$587.31 | Tile Marble Stone Porcelain |
| TF 3005-120 Width: 3 ft Length: 5 | \$9.744 (4 months) (6 hours/day) | \$810 | Laminate floor Engineered floor Floating/glue-down Snap lock tiles |

Photovoltaic



Photovoltaic (PV) is a method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect.

| PV Panel Dimensions ¹ (Inch) | Max Yearly ² Output (kWh) | Total Cost | Yearly Electric Bill Saving | Payback Time |
|--|---|-------------|--------------------------------|-----------------------------------|
| Length: 216" Width: 232.5" Depth: 0.6" | 6,765.12kWh | \$21,724.00 | \$723.87 | 30 years 1 month |

PV Panel Design Detail

Advantages:

The 89 petawatts of sunlight reaching the Earth's surface is plentiful - almost 6,000 times more than the 15 terawatts equivalent of average power consumed by humans. Additionally, solar electric generation has the highest power density (global mean of 170 W/m²) among renewable energies. Solar power is pollution-free during use. PV installations can operate for many years with little maintenance or intervention after their initial set-up.

Reasons for not choosing this technology for this project:

Photovoltaic are costly to install, so that the payback time is too long.

Solar electricity is not produced at night and is much reduced in cloudy conditions. Therefore, a "storage or complementary power system"³ is required.

Solar electricity production depends on the limited power density of the location's insulation.

Solar cells produce DC, which must be converted to AC (using a grid tie inverter) when used in existing distribution grids. This incurs an energy loss of 4-12%.

1: 144W PV panel sheet with dimension 216 inch in length, 15.5 inch in width, 0.6 inch in depth including potted terminal housing assembly. A total number of 15 units are needed for the system.

2: Maximum yearly output is calculated with 10 hours of sunlight in Chicago. The 13% of the electricity loss from the inverter is included.

3: Instead of purchasing the expansive batteries, net metering is considered to use. In Illinois, net metering is available to electric customers that generate electricity using solar energy. The utility must provide the necessary metering equipment for systems up to 40 kW in capacity, while customers with systems greater than 40 kW but less than 2 MW must pay for the costs of installing necessary metering equipment, the price is about 1000 dollars.

Wind Turbine



A wind turbine is a rotary device that extracts energy from the wind.

| Max Yearly ² Output (kWh) | Total Cost | Yearly Maintenance | Yearly Electric Bill Saving | Payback Time |
|--------------------------------------|------------|--------------------|-----------------------------|-----------------------------|
| 8,019.72kWh | \$7,610.49 | \$80.18 | \$858.11 | 9 years 10 month |

Wind Turbine Design Detail

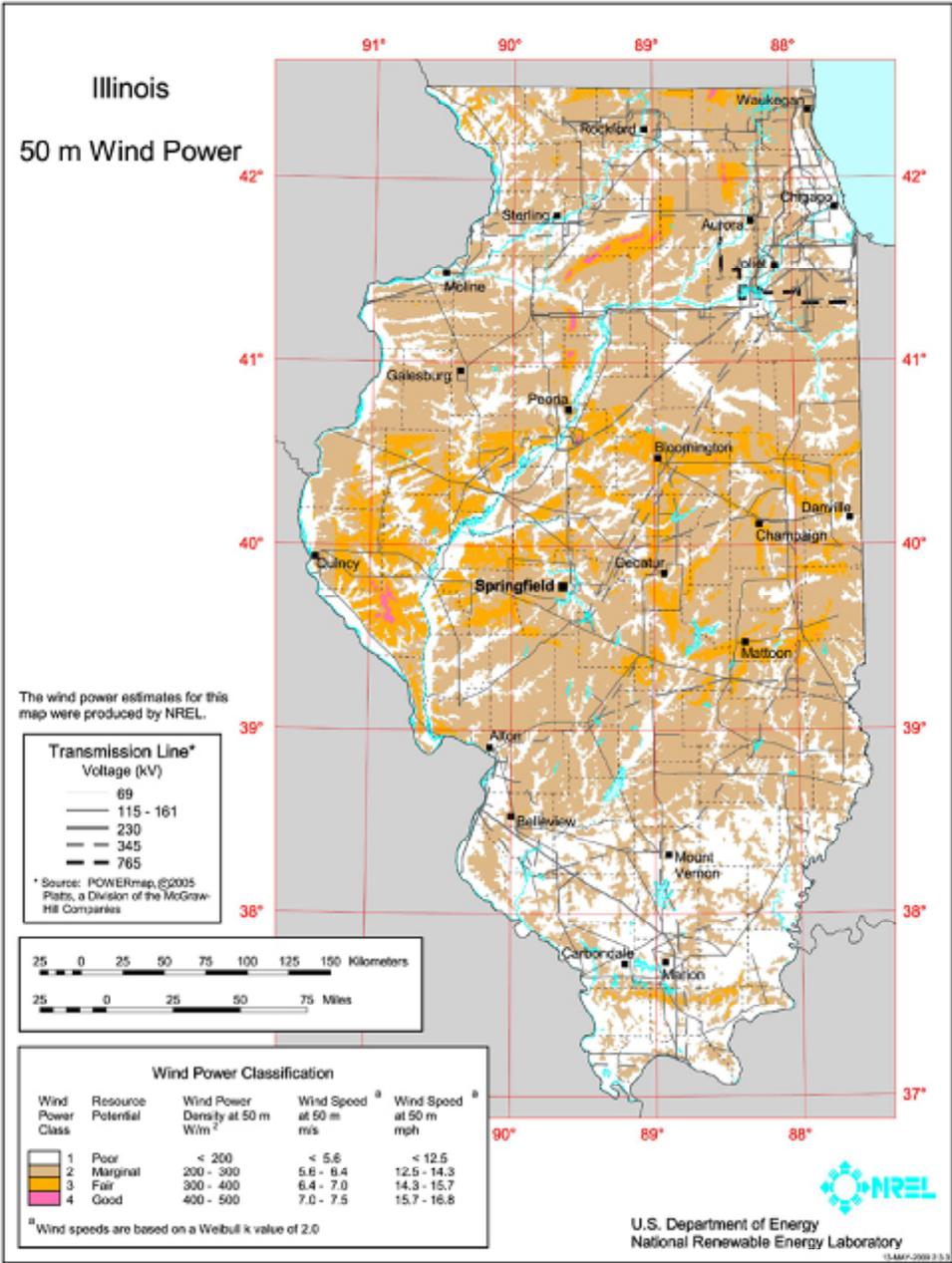
Advantages:

The benefits of home wind turbines include lowering energy costs, tax breaks, improving the value of home and helping the world move toward using more green energy.

Reasons for not choosing this technology for this project:

For wind turbine efficiency, "NREL (National Renewable Energy Laboratory)"¹ map of Illinois shows that 11mph of wind speed or better average to be successful. The map shows the resource potential is poor in Chicago. Based on the data collected, the average wind speed in Chicago is only 10.3mph.

The wind turbine tower needs to be built at least 20 feet above any surrounding trees or structures in a 250-foot radius to reach a minimum efficiency requirement. However this is illegal according to the zoning ordinance.



1: NREL (National Renewable Energy Laboratory) Map of Illinois



APPENDIX
7

FINISHES



Concrete Counter Tops

Because the material and color of countertops are very important to many consumers, we are giving them the option to choose their own from a list of green materials. We are recommending concrete counter tops, which can be very similar to granite in looks and durability, but uses less energy in the mining and transportation costs.



| Material | Cost/Sq ft. | | Kitchen | | Bathrooms | | | Total |
|---|-------------|-----|---------|---------|-----------|-----------|---------|---------|
| | | | Counter | Island | 1st floor | 2nd floor | Master | |
| Concrete countertops | 60 | 75 | \$1,755 | \$1,823 | \$506 | \$506 | \$1,080 | \$5,670 |
| Laminate counters | 25 | 50 | \$975 | \$1,013 | \$281 | \$281 | \$600 | \$3,150 |
| Paper countertops | 50 | 50 | \$1,300 | \$1,350 | \$375 | \$375 | \$800 | \$4,200 |
| Plastic countertop | 50 | 100 | \$1,950 | \$2,025 | \$563 | \$563 | \$1,200 | \$6,300 |
| Stone countertops | 65 | 65 | \$1,690 | \$1,755 | \$488 | \$488 | \$1,040 | \$5,460 |
| Recycled glass countertops (terrazzo) | 50 | 120 | \$2,210 | \$2,295 | \$638 | \$638 | \$1,360 | \$7,140 |

| Material | Selection Tips | Pros | Cons | Materials Cost |
|---|---|---|--|--|
| Concrete Simple mixture of cement, aggregate (often sand), and water. | Because large amounts of energy are required for transport, look for a local fabricator. Use fly ash as a substitute for cement (at least 30%). | <ul style="list-style-type: none"> * highly durable * easy to clean * no offgassing * recyclable as slab or crushed aggregate | <ul style="list-style-type: none"> * high embodied energy for manufacture of cement * requires sealant to avoid stains * dust during installation | \$60 to \$75 per square foot |
| Laminate Green laminates are made from recycled plastic, nontoxic glues, and formaldehyde-free substrate. | Look for laminate made from recycled plastic that has been glued to formaldehyde-free substrate with nontoxic glues. Fasten to cabinet boxes with mechanical fasteners. | <ul style="list-style-type: none"> * easy to clean * stain-resistant | <ul style="list-style-type: none"> * low durability * particleboard substrate may offgas formaldehyde * not recyclable | \$25 to \$50 per square foot |
| Paper Composite (Solid Surfacing) Made from paper and a resin binder. | High content of recycled paper is preferable. Look for low VOC resins. | <ul style="list-style-type: none"> * easy to clean * durable (particularly impact and heat resistant) * raw material is a renewable resource * recycled content | <ul style="list-style-type: none"> * can be scratched * lighter colors may show stains * colors may not be UV stable | \$50+ per square foot |
| Recycled Plastic (Solid Surfacing) Highly durable material made from recycled plastics that would otherwise go to the landfill. | High content of recycled plastic is preferable. | <ul style="list-style-type: none"> * easy to clean * recycled content * highly durable | <ul style="list-style-type: none"> * may scratch, but can be sanded out in most cases * not recyclable * may flex over time | \$50 to \$100 per square foot |
| Terrazzo Aggregate of glass or stone chips (sometimes recycled) and binders. | Look for locally manufactured products with high recycled glass content, preferably post-consumer. Some binders may emit VOCs. Available as both tiles and poured-in-place integral floor slab (with epoxy or cement binder). | <ul style="list-style-type: none"> * recycled content * highly durable * easy to clean * resistant to stains and burning | <ul style="list-style-type: none"> * because of its heavy weight, high embodied energy for transport | \$50 to \$120 per square foot for slab |
| Recycled Plastic (Solid Surfacing) Highly durable material made from recycled plastics that would otherwise go to the landfill. | High content of recycled plastic is preferable. | <ul style="list-style-type: none"> * easy to clean * recycled content * highly durable | <ul style="list-style-type: none"> * may scratch, but can be sanded out in most cases * not recyclable * may flex over time | \$50 to \$100 per square foot |

Kitchen Cabinetry

Base Cabinetry to fit under the countertops as well as wall mounted to fit above the countertops. In the interest of time only one style of cabinetry was priced.

| | Model | | Description | Qty | Unit Price |
|-----------------|---------------|---|---|-------------|------------|
| Subtotal: | \$3,143.59 | | | | |
| Shipping: | \$221.19 | | | | |
| 20% off | -\$628.72 | | | | |
| Discount Total: | -\$628.72 | | | | |
| Tax: | \$0.00 | | | | |
| | \$2,736.06 | | | | |
| Remove | SB33-HCN |  | HENDLEY CAYENNE (HCN) Sink Base 33" | 1 Update | \$347.26 |
| Remove | B18FHL-HCN |  | HENDLEY CAYENNE (HCN) Base 18" Full Height Hinged Left | 3 Update | \$265.36 |
| Remove | WMS301818-HCN |  | HENDLEY CAYENNE (HCN) Wall Microwave Shelf 30" x 18" x 18" | 1 Update | \$146.02 |
| Remove | W362418-HCN |  | HENDLEY CAYENNE (HCN) Wall 36" x 24" x 18" | 4 Update | \$285.95 |
| Remove | W1836L-HCN |  | HENDLEY CAYENNE (HCN) Wall 18" x 36" Hinged Left | 3 Update | \$236.81 |

Flooring

- **Hardwood**

- ✓ About 736 SF
- ✓ Material = \$ 2208 (\$59.80/ 20 SF (case))
- ✓ Labor = \$1472 (\$1.99/ SF)
- ✓ Transitions = \$ 500



- **Tiles**

- ✓ About 178 SF
- ✓ Material = \$ 300 (\$25.20/ 15 SF (case))
- ✓ Labor = \$782 (\$4.39/ SF)



- **Carpet**



- ✓ About 511 SF
 - ✓ Material = \$ 1441(\$25.65/ Sq. Yard) (\$2.85/ SF)
 - ✓ Labor = \$97 (regardless the size(This deal is offered by HOMEDEPOT)
- Insulation under flooring (Quiet walk) = \$900 (59.97/ 100 SF)

| | Hardwood | Tiles | Carpet |
|-----------|---------------|---------------|------------|
| Size (SF) | 736 | 178 | 511 |
| Materials | 59.80 / 20 SF | \$25.02/15 SF | \$2.85/ SF |
| Total | \$2,708 | \$300 | \$1,441 |
| Labor | \$1.99/ SF | \$4.39/ SF | - |
| Total | \$1,472 | \$782 | \$97 |

Total Cost of Flooring = \$7603 / unit

Reference: HOMEDEPOT



Rent To Own Payment Model



The real estate market hasn't been easy on developers and people who are looking to sell. We are experimenting with a payment model that has gained popularity recently and is generating unprecedented results. The model is Rent to Own, this model works by leasing out the unit to a tenant with the option to buy the house in three years. This is an option where the tenant gets to see and use the facilities of the house before making the decision to buy it. Rent is collected from the tenants and **80%** of the rent goes to the owners while **20%** is added to a pile which the tenant can use to pay (subtracted from) the down payment if the tenant decides to buy the house. If the tenant decides not to buy the house, the tenant will have to forfeit the entire 20%. This is used to encourage the tenants to stay and also to protect the owners of the house when the house is vacant.

We believe that this is the payment model that will provide a solid return on investment for the owners of the houses. Sustainability and affordability are our major marketable items, but the rent to own payment model could also be a feature that can bring in customers who are worried about buying a house outright.