

**July 1, 2006 Documentation Application prepared pursuant to California Code of Regulations Title 24 Section 10-106(b).**

This report is divided into four parts:

1. The proposed local energy standards.
2. A study with supporting analysis showing how the local agency determined the energy savings.
3. A statement that the local standards will require buildings to be designed to consume no more energy than permitted by Part 6
4. The basis of the agency's determination that the standards are cost effective.

**Part 1, Proposed Local Energy Standards.**

**Additions to Title 8 Building Regulations**

**Title 8 Chapter 1.7 "Energy Efficiency Standards for Single Family Dwellings"**

SECTION ONE: Amendment to Title 8 Building Regulations

**Title 8 Chapter 1.7 "Energy Efficiency Standards for Single Family Dwellings"**

**8-1.70 Background**

- a. All buildings must meet or exceed the energy efficiency requirements contained in the 2005 California Building Energy Efficiency Standards, including California Code of Regulations, Title 24, Parts 1 and 6 (the "Standards"). The Building Department is the local enforcement agency for the Standards. This Article requires the application of the Standards, including but not limited to the definitions, procedures, forms, manuals and alternative calculation methods ("ACMs") associated with the Standards. In addition, this Article establishes a more stringent locally-adopted energy efficiency standard, as described herein, as contemplated by the Standards.
- b. The United States Environmental Protection Agency (EPA) has established a performance standard for Energy Star Certified Homes as those single family homes independently-demonstrated to be 15% more efficient than the otherwise-applicable state requirements.
- c. The intent of this Article is to require that subject dwellings be designed to achieve energy consumption 15% lower than would be required under the otherwise-applicable Standards, through energy efficiency measures, achieving performance comparable to the Energy Star standard, or by offsetting consumption with photovoltaic power production on site, or through a combination.

- d. Buildings Covered The provisions of this Article shall apply to all new primary dwellings and secondary dwellings, where proposed as part of a primary dwelling, for which a building permit has not been applied for and accepted as complete by the Building Department prior to June 30, 2006. The provisions of this Article do not apply to new construction in existing primary dwellings.

**8-1.71 Definitions**

- a. **Grid** means the electrical distribution and transmission system in Los Altos Hills.
- b. **Photovoltaic Power Generation Facility** means a facility that converts sunlight into electricity through the utilization of semiconductor cells.
- c. **Solar Thermal Energy Facility** means a facility that converts radiant energy from the sun into useful thermal energy including heated water.
- d. **TDV Energy Use** means the dwelling's combined space and water heating energy use (electricity kWh, natural gas therms, or fuel oil or LPG gallons) for each energy type, expressed as time-dependent valuation Btu-equivalent energy, or kBtu TDV Energy, per square foot of conditioned floor area per year, using the actual glazing area, orientation, and distribution, and its actual energy conservation and other features, including the actual water-heating, space-conditioning equipment and duct conditions and locations, of the dwelling's proposed design, determined pursuant to the Performance Standards compliance approach in the Standards.
- e. **Conditioned Floor Area** means the floor area (in square feet) of enclosed conditioned space, whether conditioned directly or indirectly, on all floors of the dwelling, whether or not the space is above grade or below grade and whether or not the space is habitable, as measured at the floor level of the exterior surfaces of exterior walls enclosing the conditioned space, as defined in the Standards.
- f. **PV Credit** means the TDV Energy credit applicable to the dwelling for a Photovoltaic Power Generation Facility in the proposed design that is capable supplying electricity directly to buildings on the site and is connected, through a reversible meter, to the Grid. The amount of PV Credit under this Article is defined as  $W_o$  multiplied by 13.262 kBtu/sf-yr TDV Energy, where  $W_o$  is a unitless value calculated as 1000 multiplied by the nominal rating of the proposed Photovoltaic Power Generation Facility in kiloWatts and divided by the total conditioned floor area of the dwelling.

$$W_o = \frac{[\text{Nominal Rating of PV Facility (in kW)} \times 1,000]}{\div \text{Conditioned Floor Area (in square feet)}}$$

$$\text{PV Credit (in kBtu/sf-yr TDV Energy)} = \text{Wo} \\ \times 13.262$$

- g. **Baseline TDV Energy Budget** means the combined maximum allowable space and water heating energy budgets for the dwelling using the standard design determined pursuant to the Performance Standards compliance approach in the Standards, expressed in kBtu/sf-yr TDV Energy.
- h. **Local TDV Energy Budget** means the basic energy efficiency requirement for Los Altos Hills, and is equal to 15% less than the Baseline TDV Energy Budget, expressed in kBtu/sf-yr TDV Energy.

#### 8-1.72 Performance Compliance Approach

- a. Dwellings subject to this Article shall meet all of the following:
  - 1. Either
    - (i) Energy Star Certified Home rating from the EPA or an entity designated by the EPA such as a local utility, or
    - (ii) TDV Energy Use minus any applicable PV Credit equal to or less than the Local TDV Energy Budget, demonstrated pursuant to the Performance Standards compliance approach in the Standards, or
    - (iii) Energy consumption 15% lower than California Energy Efficiency Standards (Title 24)
  - 2. TDV Energy Use equal to or less than the Baseline TDV Energy Budget, demonstrated pursuant to the Performance Standards compliance approach in the Standards.
  - 3. All other provisions applicable to new low-rise residential buildings contained in the California Building Energy Efficiency Standards.
- b. The permit applicant shall submit to the Building Official with the building permit application the following:
  - 1. The standard Title 24 CF-1R Report showing the TDV Energy Budget of the dwelling incorporating the standard design and the TDV Energy Use of the dwelling incorporating the proposed design and any Title 24 compliance margin and any requirements for verification.
  - 2. Calculations using Special Permit Form available from the Building Department to document, explain, and justify the dwelling's TDV Energy Use and any PV Credit to the Building Department for

approval. These calculations may be retained by the Building Department.

### **8-1.73 Exceptions**

All buildings must meet or exceed the energy efficiency requirements contained in the 2005 California Building Energy Efficiency Standards, including California Code of Regulations, Title 24, Parts 1 and 6 (the “Standards”). However, the *Building Official* shall have the power to grant exceptions to the strict application of the more stringent locally adopted energy efficiency standard of this chapter in cases where due to special conditions or exceptional characteristics of the structure or property involved, a literal enforcement of the provisions of this chapter would result in practical difficulties or unnecessary hardships; provided, however, no such exceptions shall be granted unless the *Building Official* shall find that the granting of such exception will not be contrary to the intent of the provisions of this chapter.

### **Part 2, Study with Supporting Analysis Showing how the Local Agency Determined the Energy Savings.**

Determination of Energy Savings:

Energy consumption of Single Family Dwellings and energy savings under the proposed ordinance would be measured using the metrics employed under the Performance Standards approach of CCR Title 24 Part 6. A dwelling would be simulated using a Commission-approved alternative calculation method (ACM) computer program both with the “standard design” pursuant to Title 24 to determine the dwelling’s TDV Energy Budget, and with the dwelling’s actual energy efficiency measures to determine the dwelling’s TDV Energy Use.

The proposed ordinance allows applicants to achieve required energy savings through the use of grid-tied on site solar photovoltaic power generation facilities. Like energy efficiency measures, grid-tied photovoltaic power systems reduce the household’s consumption of externally-supplied energy, most likely from non-renewable sources.

The ordinance uses a specific factor to convert the rated kW output of the photovoltaic system into a PV Credit for equivalent displaced annual household energy consumption in TDV Energy. This is the same factor used in Marin County’s single family dwelling energy efficiency ordinance No. 3432<sup>1</sup> approved by the California Energy Commission on September 21, 2005.

This factor was derived by Gabel Associates, LLC and is explained in Marin County’s report to the California Energy Commission in connection with its local energy efficiency

---

<sup>1</sup> [http://www.co.marin.ca.us/depts/CD/main/pdf/BEST\\_pdf/SFDEEO\\_Ord.pdf](http://www.co.marin.ca.us/depts/CD/main/pdf/BEST_pdf/SFDEEO_Ord.pdf)

standard.<sup>2</sup> As explained in that report, this factor takes in to account statewide average photovoltaic system performance, time of day performance variation, and an allowance for performance degradation, as well as performance variation under a range of climatic conditions. Thus this factor is a reasonable basis for translating real-world performance of a photovoltaic system to equivalent TDV Energy for use in this ordinance.

The reduction in consumption of externally-supplied energy achieved through the application of this ordinance to any given project is indicated by the improvement in TDV Energy Use relative to the Baseline TDV Energy Budget, which is the performance level that would otherwise be required under Title 24, plus any PV Credit.

### SECTION 3

#### **Part 3. Statement that Locally-adopted Energy Conservation Standard Will Require Buildings to be Designed to Consume No More Energy than Permitted by CCR Title 24 Part 6.**

The local energy conservation standard adopted under this ordinance requires buildings subject to the ordinance to be designed to consume no more energy than permitted by CCR Title 24 Part 6. An explicit condition for compliance stated the ordinance adopting the local energy conservation standard is that buildings subject to the ordinance must demonstrate, using the Performance Standards Compliance approach established in CCR Title 24 Part 6, their proposed-design energy use as less than the standard-design energy budget established by CCR Title 24 part 6. This test must be met irrespective of any other requirement under the local standard.

#### **Part 4, The Basis of the Agency's Determination that the Standards are Cost Effective.**

The cost effectiveness of the local energy efficiency standard adopted under this ordinance is based on the results of the following analysis:

The local energy efficiency standard adopted under this ordinance requires that new homes be designed to achieve energy consumption 15% lower than would be required under the Title 24 standards, either through energy efficiency measures, or by offsetting consumption with photovoltaic power production on site, or through a combination.

According to the attached Report entitled "Energy Conservation Study", dated March 14, 2006 and prepared by James D. Fruit Senior Plans Examiner and Architect for CSG Consultants, energy efficiency measures to achieve a 15% efficiency improvement relative to the Base TDV Energy Budget in a representative 6,000 square foot home in Los Altos Hills would increase the cost of the home by \$4,602.00 to \$5,614.00. Using

---

<sup>2</sup> Application for Revised Locally Adopted Energy Standards by the County of Marin Community Development Agency for Houses Larger than 3,500 Square Feet In Accordance With Section 10-106 of the California Code of Regulations, Title 24, Part 1; Alex Hinds, Director; Prepared by Michael Gabel, Gabel Associates, LLC; July 26, 2005.

assumed retail prices for electricity of \$.14/kWh and natural gas of \$.70/therm, these measures were estimated to result in an annual energy cost savings of \$466.00 to 867.00 and a simple payback of 12.04 to 5.31 years.

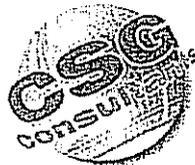
Energy efficiency measures to achieve a 15% efficiency improvement relative to the Base TDV Energy Budget in a representative 8,000 square foot home in Los Altos Hills would increase the cost of the home by \$12,604.00 to \$15,377.00. Using assumed retail prices for electricity of \$.14/kWh and natural gas of \$.70/therm, these measures were estimated to result in an annual energy cost savings of \$842.00 to \$1,564.00 and a simple payback of 18.26 to 8.06 years.

The Los Altos Hills ordinance also allows a home to use a photovoltaic electric power generation system to meet the local standard. These systems may offer a more or less cost-effective alternative. In any case, energy efficiency measures, shown here to be cost-effective, are always an available option.

**ENERGY CONSERVATION STUDY**  
**PROPOSED ENERGY CONSERVATION ORDINANCE**  
**LOS ALTOS HILLS, CA. 94022**

**PRESENTED TO:**  
**MR. CARL CAHILL, PLANNING DIRECTOR**  
**TOWN OF LOS ALTOS HILLS**

3-14-2006



**CSG**consultants Inc

1700 South Amphlett Boulevard, 3<sup>rd</sup> Floor ♦ San Mateo, CA 94402 ♦ Tel: 650-522-2500 ♦ Fax: 650-522-2599  
♦ [www.csgwebsite.com](http://www.csgwebsite.com) ♦

James D. Fruit  
Senior Plans Examiner and Architect

## INTRODUCTION

Due to citizen concerns and Town Council study, Los Altos Hills desires to enact a new ordinance that provides energy conservation in new buildings achieving better energy savings performance compared to the California Energy Code currently in effect for new construction. CSG Consultants was contacted by Mr. Carl Cahill, Community Development Director and Interim Town Manager, and requested to provide analysis regarding energy conservation and how certain strategies are cost effective for initial construction costs versus overall energy savings.

The following report text is organized by subject heading to afford convenient referencing.

## ANALYSIS OVERVIEW.

For comparison purposes models for typical buildings were developed based on the prevalent new home sizes built in Los Altos Hills in the last few years. Since one story buildings are more difficult to achieve energy savings compared to the code minimum, 6000 square foot and 8000 square foot one story models were developed for the comparison study. Various types of the more popular energy conservation measures were used in the analysis.

The models achieving 15% had upgraded insulation throughout and better but not too expensive window upgrade. The models achieving 19% or better were based only on high energy performance window upgrade throughout.

After the computer runs were finished, costs for initial construction increases were tabulated including statistical deviation for pricing that is normal to custom home contracting and averages developed. Costs are presented in a range based on statistics in the general Bay Area. Using the energy savings amounts from the computer runs, energy cost savings were tabulated using the current gas and electric rates without increases resulting in a more conservative payback time. Energy saving amounts are presented in a range based on weather statistic variations.

## ANALYSIS DETAIL SUMMARY:

<b>MODEL 6000 STANDARD</b> 2% better than minimum R-19 floor R-13 walls R-30 ceiling Windows U 0.58 SHGC 0.52 97% furnace & 13.0 SEER a/c \$0 saved energy cost \$0 construction cost increase Cost recovery = 0 year	<b>MODEL 6000 15%</b> 15.9% better than minimum R30 floor R-15 walls R-38 ceiling with radiant barrier windows U 0.52 SHGC 0.49 97% furnace & 13.0 SEER a/c \$466 to \$867 per year \$4602 to \$5614 12.04 to 5.31 years	<b>MODEL 6000 19%</b> 19% better than minimum R-19 floor R-13 walls R-30 ceiling windows U 0.39 SHGC 0.37 97% furnace & 13.0 SEER a/c \$1037 to \$1926 per year \$4500 to \$5490 5.29 to 2.34 years
<b>MODEL 8000 STANDARD</b> 1.1% better than minimum R-19 floor R-13 walls R-30 ceiling Windows U 0.57 SHGC 0.52 94% furnace & 13.0 SEER a/c \$0 saved energy cost \$0 construction cost increase Cost recovery = 0 year	<b>MODEL 8000 15%</b> 15.1% better than minimum R-22 floor R-15 walls R-38 ceiling w/radiant barrier windows U 0.52 SHGC 0.49 94% furnace & 13.0 SEER a/c \$842 to \$1564 per year \$12,604 to \$15,377 18.26 to 8.06 years	<b>MODEL 8000 19%</b> 19.9% better than minimum R-19 floor R-13 walls R-30 ceiling windows U 0.39 SHGC 0.37 94% furnace & 13.0 SEER a/c \$1594 to \$2960 \$6000 to \$7320 4.59 to 2.02 years

## ANALYSIS OBSERVATIONS:

Comparing energy savings versus payback on construction costs, the most effective combination for a large single story home is to use very high performance windows due to air conditioning load reduction having the highest dollar savings for electricity. This combination may not be as cost effective for multiple story buildings yet the construction cost increase for higher insulation in the ceiling is balanced by less roof area customary to multiple story buildings. There are many considerations for choosing building features and performance using the computer analysis method for energy code compliance which should provide any necessary combination to achieve the desired 15% better performance.

The 15% better energy performance proposed in the ordinance is readily achievable with current technology and building materials. Depending on the strategy chosen, payback for initial construction costs can be extensive and not very cost effective to short and very cost effective. As with all construction and energy costs, amounts vary widely due to the large number of variables.

The computer runs for the various models are an appendix to the report.

## CONCLUSION

Respectfully submitted to Town of Los Altos Hills

Thank you,

A handwritten signature in cursive script that reads "James D. Fruit".

James D. Fruit  
Senior Plans Examiner and Architect

## TITLE 24 REPORT

### **Title 24 Report for:**

model 6000 standard

Los Altos Hills, CA

### **Project Designer:**

Town of Los Altos Hills  
energy study 6000 standard

### **Report Prepared By:**

Jim Fruit  
CSG Consultants, Inc  
1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
(650) 522-2500

### **Job Number:**

energy study 6000 standard

### **Date:**

3/13/2006

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - [www.energysoft.com](http://www.energysoft.com)

# Certificate Of Compliance : Residential

(Part 1 of 4) **CF-1R**

model 6000 standard  
 Project Title  
 Los Altos Hills  
 Project Address  
 CSG Consultants, Inc. (650) 522-2500  
 Documentation Author Telephone  
 EnergyPro 4  
 Compliance Method Climate Zone

3/13/2006  
 Date  
 Building Permit #  
 Plan Check/Date  
 Field Check/Date

TDV Energy Use (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	12.29	9.63	2.66
Space Cooling	3.86	5.90	-2.04
Fans	1.28	1.64	-0.36
Domestic Hot Water	4.48	4.29	0.19
Pumps	0.00	0.00	0.00
<b>Totals</b>	<b>21.91</b>	<b>21.46</b>	<b>0.45</b>

Percent better than Standard: 2.0%

## BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type:  Single Family  Addition  
 Multi Family  Existing + Add/Alt  
 Total Conditioned Floor Area: 6,000 ft<sup>2</sup>  
 Existing Floor Area: n/a ft<sup>2</sup>  
 Building Front Orientation: (N) 0 deg  
 Raised Floor Area: 6,000 ft<sup>2</sup>  
 Fuel Type: Natural Gas  
 Slab on Grade Area: 0 ft<sup>2</sup>  
 Fenestration:  
 Average Ceiling Height: 9.3 ft  
 Area: 900 ft<sup>2</sup> Avg. U: 0.58  
 Number of Dwelling Units: 1.00  
 Ratio: 15.0% Avg. SHGC: 0.52  
 Number of Stories: 1

BUILDING ZONE INFORMATION				# of	Zone Type	Thermostat	Vent
Zone Name	Floor Area	Volume	Units			Type	Hgt. Area
HVAC System	6,000	55,800	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES												
Type	Frame	Area	U-Fac	Insulation		Act	Gains		Condition	JA IV Reference	Location / Comments	
				Cav.	Conf.	Azm	Tilt	Y / N	Status			
Floor	Wood	6,000	0.037	R-19	R-0.0	0	180	<input checked="" type="checkbox"/>	New	20-A4	1st Floor	
Wall	Wood	610	0.102	R-13	R-0.0	0	90	<input checked="" type="checkbox"/>	New	09-A3	1st Floor	
Door	None	40	0.500	None	R-0.0	0	90	<input checked="" type="checkbox"/>	New	28-A4	1st Floor	
Wall	Wood	370	0.102	R-13	R-0.0	90	90	<input checked="" type="checkbox"/>	New	09-A3	1st Floor	
Wall	Wood	590	0.102	R-13	R-0.0	180	90	<input checked="" type="checkbox"/>	New	09-A3	1st Floor	
Wall	Wood	370	0.102	R-13	R-0.0	270	90	<input checked="" type="checkbox"/>	New	09-A3	1st Floor	
Roof	Wood	6,000	0.032	R-30	R-0.0	0	0	<input checked="" type="checkbox"/>	New	01-A17	1st Floor	



# Certificate Of Compliance : Residential

(Part 3 of 4) **CF-1R**

model 6000 standard

3/13/2006

Project Title

Date

## HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
HVAC System	Central Furnace	97% AFUE	Split Air Conditioner	13.0 SEER	New	Setback

## HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
HVAC System	Ducted	Ducted	Crawlspace	6.0	New	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul Thick

## WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated <sup>1</sup> Input (Btu/hr)	Tank Cap (gal)	Condition Status	Energy Factor or RE <sup>1</sup>	Standby <sup>1</sup> Loss (%)	Tank Insul R-Value Ext.
A O Smith Water Products CTG-50-227	Small Gas	No Pipe Insulation	1	37,000	50	New	0.62	n/a	n/a

## Multi-Family Central Water Heating Details

Control	Hot Water Pump			Hot Water Piping Length (ft)			Add 1/2" Insulation
	#	HP	Type	In Plenum	Outside	Buried	

<sup>1</sup> For small gas storage (rated input <= 75000 Btu/hr) electric resistance and heat pump water heaters, list energy factor  
 For large gas storage water heaters (rated input > 75000 Btu/hr) list Rated Input, Recovery Efficiency and Standby Loss  
 For instantaneous gas water heaters list Rated Input, and Recovery Efficiency

## REMARKS

## COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

### Designer or Owner (per Business & Professions Code)

Name: \_\_\_\_\_  
 Title/Firm: Town of Los Altos Hills  
 Address: energy study 6000 standard  
 Telephone: \_\_\_\_\_  
 Lic #: \_\_\_\_\_

### Documentation Author

Name: Jim Fruit  
 Title/Firm: CSG Consultants, Inc  
 Address: 1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
 Telephone: (650) 522-2500

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

### Enforcement Agency

Name: \_\_\_\_\_  
 Title/Firm: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone: \_\_\_\_\_

(signature/stamp) \_\_\_\_\_ (date) \_\_\_\_\_

Run Initiation Time: 03/13/06 08:55:31		Run Code: 1142268931	
EnergyPro 4.1 by EnergySoft	User Number: 6763	Job Number: energy study	Page: 4 of 5



## TITLE 24 REPORT

**Title 24 Report for:**  
model 6000 fifteen percent  
Los Altos Hills, CA

**Project Designer:**  
Town of Los Altos Hills  
energy study 6000 standard

**Report Prepared By:**  
Jim Fruit  
CSG Consultants, Inc  
1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
(650) 522-2500

**Job Number:**  
energy study 6000 standard

**Date:**  
3/13/2006

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - [www.energysoft.com](http://www.energysoft.com)

# Certificate Of Compliance : Residential

(Part 1 of 4) **CF-1R**

model 6000 fifteen percent  
 Project Title  
 Los Altos Hills  
 Project Address  
 CSG Consultants, Inc  
 Documentation Author  
 EnergyPro  
 Compliance Method

3/13/2006  
 Date  
 Building Permit #  
 Plan Check/Date  
 Field Check/Date

(650) 522-2500  
 Telephone  
 4  
 Climate Zone

TDV Energy Use (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	12.29	7.55	4.74
Space Cooling	3.86	5.20	-1.34
Fans	1.28	1.39	-0.11
Domestic Hot Water	4.48	4.29	0.19
Pumps	0.00	0.00	0.00
<b>Totals</b>	<b>21.91</b>	<b>18.43</b>	<b>3.47</b>

Percent better than Standard: 15.9%

## BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type:  Single Family  Addition  Multi Family  Existing + Add/Alt  
 Building Front Orientation: (N) 0 deg  
 Fuel Type: Natural Gas  
 Fenestration:  
 Area: 900 ft<sup>2</sup> Avg. U: 0.52  
 Ratio: 15.0% Avg. SHGC: 0.49

Total Conditioned Floor Area: 6,000 ft<sup>2</sup>  
 Existing Floor Area: n/a ft<sup>2</sup>  
 Raised Floor Area: 6,000 ft<sup>2</sup>  
 Slab on Grade Area: 0 ft<sup>2</sup>  
 Average Ceiling Height: 9.3 ft  
 Number of Dwelling Units: 1.00  
 Number of Stories: 1

### BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
HVAC System	6,000	55,800	1.00	Conditioned	Setback	2	n/a

### OPAQUE SURFACES

Type	Frame	Area	U-Fac	Insulation Cav.	Cont.	Act Azm.	Tilt	Gains Y/N	Condition Status	JA IV Reference	Location / Comments
Floor	Wood	6,000	0.028	R-30	R-0.0	0	180	X	New	20-A7	1st Floor
Wall	Wood	610	0.095	R-15	R-0.0	0	90	X	New	09-A4	1st Floor
Door	None	40	0.500	None	R-0.0	0	90	X	New	28-A4	1st Floor
Wall	Wood	370	0.095	R-15	R-0.0	90	90	X	New	09-A4	1st Floor
Wall	Wood	590	0.095	R-15	R-0.0	180	90	X	New	09-A4	1st Floor
Wall	Wood	370	0.095	R-15	R-0.0	270	90	X	New	09-A4	1st Floor
Roof	Wood	6,000	0.025	R-38	R-0.0	0	0	X	New	01-A18	1st Floor



# Certificate Of Compliance : Residential

(Part 3 of 4) **CF-1R**

model 6000 fifteen percent

3/13/2006

Project Title

Date

## HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
HVAC System	Central Furnace	97% AFUE	Split Air Conditioner	13.0 SEER	New	Setback

## HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
HVAC System	Ducted	Ducted	Crawlspace	6.0	New	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul Thick

## WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated <sup>1</sup> Input (Btu/hr)	Tank Cap (gal)	Condition Status	Energy Factor or RE <sup>1</sup>	Standby <sup>1</sup> Loss (%)	Tank Insul R-Value Ext.
A O Smith Water Products 227	CTG-50- Small Gas	No Pipe Insulation	1	37,000	50	New	0.62	n/a	n/a

## Multi-Family Central Water Heating Details

Control	Hot Water Pump			Hot Water Piping Length (ft)			Add 1/2" Insulation
	#	HP	Type	In Plenum	Outside	Buried	

<sup>1</sup> For small gas storage (rated input <= 75000 Btu/hr), electric resistance and heat pump water heaters, list energy factor. For large gas storage water heaters (rated input > 75000 Btu/hr) list Rated Input, Recovery Efficiency and Standby Loss. For instantaneous gas water heaters, list Rated Input, and Recovery Efficiency.

## REMARKS

## COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

### Designer or Owner (per Business & Professions Code)

Name: \_\_\_\_\_  
 Title/Firm: Town of Los Altos Hills  
 Address: energy study 6000 standard  
 Telephone: \_\_\_\_\_  
 Lic #: \_\_\_\_\_

### Documentation Author

Name: Jim Fruit  
 Title/Firm: CSG Consultants, Inc  
 Address: 1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
 Telephone: (650) 522-2500

(signature) \_\_\_\_\_ (date) \_\_\_\_\_ (signature) \_\_\_\_\_ (date) \_\_\_\_\_

### Enforcement Agency

Name: \_\_\_\_\_  
 Title/Firm: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone: \_\_\_\_\_

(signature/stamp) \_\_\_\_\_ (date) \_\_\_\_\_



## TITLE 24 REPORT

**Title 24 Report for:**  
model 6000 nineteen percent  
Los Altos Hills, CA

**Project Designer:**  
Town of Los Altos Hills  
energy study 6000 standard

**Report Prepared By:**  
Jim Fruit  
CSG Consultants, Inc  
1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
(650) 522-2500

**Job Number:**  
energy study 6000 standard

**Date:**  
3/13/2006

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - [www.energysoft.com](http://www.energysoft.com)

# Certificate Of Compliance : Residential

(Part 1 of 4) **CF-1R**

model 6000 nineteen percent  
 Project Title  
 Los Altos Hills  
 Project Address  
 CSG Consultants, Inc  
 Documentation Author  
 EnergyPro  
 Compliance Method

3/13/2006  
 Date  
 Building Permit #  
 Plan Check/Date  
 Field Check/Date

(650) 522-2500  
 Telephone  
 4  
 Climate Zone

TDV Energy Use (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	12.29	8.66	3.63
Space Cooling	3.86	3.63	0.23
Fans	1.28	1.17	0.11
Domestic Hot Water	4.48	4.29	0.19
Pumps	0.00	0.00	0.00
<b>Totals</b>	<b>21.91</b>	<b>17.75</b>	<b>4.16</b>

Percent better than Standard: 19.0%

## BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type:  Single Family  Addition  Multi Family  Existing + Add/Alt  
 Building Front Orientation: (N) 0 deg  
 Fuel Type: Natural Gas  
 Fenestration:  
 Area: 900 ft<sup>2</sup> Avg. U: 0.39  
 Ratio: 15.0% Avg. SHGC: 0.37

Total Conditioned Floor Area: 6,000 ft<sup>2</sup>  
 Existing Floor Area: n/a ft<sup>2</sup>  
 Raised Floor Area: 6,000 ft<sup>2</sup>  
 Slab on Grade Area: 0 ft<sup>2</sup>  
 Average Ceiling Height: 9.3 ft  
 Number of Dwelling Units: 1.00  
 Number of Stories: 1

### BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Area
HVAC System	6,000	55,800	1.00	Conditioned	Setback	2	n/a

### OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Act. Cont.	Azm.	Tilt	Gains Y/N	Condition Status	JA IV Reference	Location / Comments
Floor	Wood	6,000	0.037	R-19	R-0.0	0	180	X	New	20-A4	1st Floor
Wall	Wood	610	0.102	R-13	R-0.0	0	90	X	New	09-A3	1st Floor
Door	None	40	0.500	None	R-0.0	0	90	X	New	28-A4	1st Floor
Wall	Wood	370	0.102	R-13	R-0.0	90	90	X	New	09-A3	1st Floor
Wall	Wood	590	0.102	R-13	R-0.0	180	90	X	New	09-A3	1st Floor
Wall	Wood	370	0.102	R-13	R-0.0	270	90	X	New	09-A3	1st Floor
Roof	Wood	6,000	0.032	R-30	R-0.0	0	0	X	New	01-A17	1st Floor



# Certificate Of Compliance : Residential

(Part 3 of 4) **CF-1R**

model 6000 nineteen percent

3/13/2006

Project Title

Date

## HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
HVAC System	Central Furnace	97% AFUE	Split Air Conditioner	13.0 SEER	New	Setback

## HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
HVAC System	Ducted	Ducted	Crawlspace	6.0	New	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul Thick

## WATER HEATING SYSTEMS

System Name	Water Heater Type	Water Heater Distribution	# in Syst.	Rated <sup>1</sup> Input (Btu/hr)	Tank Cap (gal)	Condition Status	Energy Factor or RE <sup>1</sup>	Standby <sup>1</sup> Loss (%)	Tank Insul R-Value Ext.
A O Smith Water Products CTG-50-22T	Small Gas	No Pipe Insulation	1	37,000	50	New	0.62	n/a	n/a

## Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

<sup>1</sup> For small gas storage (rated input <= 75000 Btu/hr), electric resistance and heat pump water heaters, list energy factor. For large gas storage water heaters (rated input > 75000 Btu/hr) list Rated Input Recovery Efficiency and Standby Loss. For instantaneous gas water heaters, list Rated Input, and Recovery Efficiency

## REMARKS

## COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24 Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

### Designer or Owner (per Business & Professions Code)

Name: \_\_\_\_\_  
 Title/Firm: Town of Los Altos Hills  
 Address: energy\_study 6000 standard  
 Telephone: \_\_\_\_\_  
 Lic #: \_\_\_\_\_

### Documentation Author

Name: Jim Fruit  
 Title/Firm: CSG Consultants, Inc  
 Address: 1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
 Telephone: (650) 522-2500

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

### Enforcement Agency

Name: \_\_\_\_\_  
 Title/Firm: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone: \_\_\_\_\_

(signature/stamp) \_\_\_\_\_ (date) \_\_\_\_\_

Run Initiation Time: 03/13/06 10:15:51		Run Code: 1142273751	
EnergyPro 4.1 by EnergySoft	User Number: 6783	Job Number: energy_study	Page: 4 of 5
6000 standard			



## TITLE 24 REPORT

### **Title 24 Report for:**

Model 8000 standard  
Los Altos Hills

### **Project Designer:**

Town of Los Altos Hills  
energy study 8000 standard

### **Report Prepared By:**

Jim Fruit  
CSG Consultants, Inc  
1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
(650) 522-2500

### **Job Number:**

energy study 8000 standard

### **Date:**

3/13/2006

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - [www.energysoft.com](http://www.energysoft.com)

# Certificate Of Compliance : Residential

(Part 1 of 4) **CF-1R**

Model 8000 standard  
 Project Title  
 Los Altos Hills  
 Project Address  
 CSG Consultants, Inc. (650) 522-2500  
 Documentation Author Telephone  
 EnergyPro 4  
 Compliance Method Climate Zone

Date 3/13/2006  
 Building Permit #  
 Plan Check/Date  
 Field Check/Date

TDV Energy Use (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	12.32	9.57	2.75
Space Cooling	3.73	6.12	-2.39
Fans	1.26	1.66	-0.40
Domestic Hot Water	3.36	3.08	0.28
Pumps	0.00	0.00	0.00
<b>Totals</b>	<b>20.67</b>	<b>20.43</b>	<b>0.24</b>

Percent better than Standard: 1.1%

## BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type:  Single Family  Addition  Multi Family  Existing + Add/Alt  
 Total Conditioned Floor Area: 8,000 ft<sup>2</sup>  
 Existing Floor Area: n/a ft<sup>2</sup>  
 Building Front Orientation: (N) 0 deg  
 Raised Floor Area: 8,000 ft<sup>2</sup>  
 Fuel Type: Natural Gas  
 Slab on Grade Area: 0 ft<sup>2</sup>  
 Fenestration:  
 Area: 1,200 ft<sup>2</sup> Avg. U: 0.57 Average Ceiling Height: 10.3 ft  
 Ratio: 15.0% Avg. SHGC: 0.52 Number of Dwelling Units: 1.00  
 Number of Stories: 1

### BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
HVAC System	8,000	82,400	1.00	Conditioned	Setback	2	n/a

### OPAQUE SURFACES

Type	Frame	Area	U-Fac	Insulation Cav.	Cont.	Act. Azm.	Tilt	Gains Y/N	Condition Status	JA IV Reference	Location / Comments
Floor	Wood	8,000	0.037	R-19	R-0.0	0	180	X	New	20-A4	1st Floor
Wall	Wood	810	0.102	R-13	R-0.0	0	90	X	New	09-A3	1st Floor
Door	None	40	0.500	None	R-0.0	0	90	X	New	28-A4	1st Floor
Wall	Wood	452	0.102	R-13	R-0.0	90	90	X	New	09-A3	1st Floor
Wall	Wood	780	0.102	R-13	R-0.0	180	90	X	New	09-A3	1st Floor
Wall	Wood	452	0.102	R-13	R-0.0	270	90	X	New	09-A3	1st Floor
Roof	Wood	8,000	0.032	R-30	R-0.0	0	0	X	New	01-A17	1st Floor



# Certificate Of Compliance : Residential

(Part 3 of 4) **CF-1R**

Model 8000 standard

3/13/2006

Project Title

Date

## HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
HVAC System	Central Furnace	94% AFUE	Split Air Conditioner	13.0 SEER	New	Setback

## HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
HVAC System	Ducted	Ducted	Crawlspace	6.0	New	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul Thick

## WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated <sup>1</sup> Input (Btu/hr)	Tank Cap (gal)	Condition Status	Energy Factor or RE <sup>1</sup>	Standby <sup>1</sup> Loss (%)	Tank Insul R-Value Ext.
Rheem 41VRP50PT	Small Gas	No Pipe Insulation	1	40,000	50	New	0.65	n/a	n/a

## Multi-Family Central Water Heating Details

Control	Hot Water Pump			Hot Water Piping Length (ft)			Add 1/2" Insulation
	#	HP	Type	In Plenum	Outside	Buried	

<sup>1</sup> For small gas storage (rated input <= 75000 Btu/hr), electric resistance and heat pump water heaters, list energy factor  
 For large gas storage water heaters (rated input > 75000 Btu/hr), list Rated Input Recovery Efficiency and Standby Loss  
 For instantaneous gas water heaters, list Rated Input and Recovery Efficiency

## REMARKS

## COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

### Designer or Owner (per Business & Professions Code)

Name: \_\_\_\_\_  
 Title/Firm: Town of Los Altos Hills  
 Address: energy study 8000 standard  
 Telephone: \_\_\_\_\_  
 Lic #: \_\_\_\_\_

### Documentation Author

Name: Jim Fruit  
 Title/Firm: CSG Consultants, Inc  
 Address: 1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
 Telephone: (650) 522-2500

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

### Enforcement Agency

Name: \_\_\_\_\_  
 Title/Firm: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone: \_\_\_\_\_

(signature/stamp) \_\_\_\_\_ (date) \_\_\_\_\_

Run Initiation Time: 03/13/06 16:32:43		Run Code: 1142296363	
EnergyPro 4.1 by EnergySoft	User Number: 6783	Job Number: energy study	Page: 4 of 5



## TITLE 24 REPORT

### **Title 24 Report for:**

Model 8000 15%  
Los Altos Hills

### **Project Designer:**

Town of Los Altos Hills  
energy study 8000 standard

### **Report Prepared By:**

Jim Fruit  
CSG Consultants, Inc  
1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
(650) 522-2500

### **Job Number:**

energy study 8000 standard

### **Date:**

3/13/2006

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - [www.energysoft.com](http://www.energysoft.com)

# Certificate Of Compliance : Residential

(Part 1 of 4) **CF-1R**

Model 8000 15%  
 Project Title  
 Los Altos Hills  
 Project Address  
 CSG Consultants, Inc. (650) 522-2500  
 Documentation Author Telephone  
 EnergyPro 4  
 Compliance Method Climate Zone

Date 3/13/2006  
 Building Permit #  
 Plan Check/Date  
 Field Check/Date

TDV Energy Use (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	12.32	8.23	4.08
Space Cooling	3.73	4.88	-1.14
Fans	1.26	1.36	-0.10
Domestic Hot Water	3.36	3.08	0.28
Pumps	0.00	0.00	0.00
<b>Totals</b>	<b>20.67</b>	<b>17.55</b>	<b>3.12</b>

Percent better than Standard: 15.1%

## BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type:  Single Family  Addition  
 Multi Family  Existing + Add/Alt  
 Total Conditioned Floor Area: 8,000 ft<sup>2</sup>  
 Existing Floor Area: n/a ft<sup>2</sup>  
 Building Front Orientation: (N) 0 deg  
 Raised Floor Area: 8,000 ft<sup>2</sup>  
 Fuel Type: Natural Gas  
 Slab on Grade Area: 0 ft<sup>2</sup>  
 Fenestration:  
 Average Ceiling Height: 10.3 ft  
 Area: 1,200 ft<sup>2</sup> Avg. U: 0.52  
 Number of Dwelling Units: 1.00  
 Ratio: 15.0% Avg. SHGC: 0.49  
 Number of Stories: 1

### BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
HVAC System	8,000	82,400	1.00	Conditioned	Setback	2	n/a

### OPAQUE SURFACES

Type	Frame	Area	U-Fac	Insulation Cav.	Act Cont.	Azm.	Tilt	Gains Y/N	Condition Status	JA IV Reference	Location / Comments
Floor	Wood	8,000	0.034	R-22	R-0.0	0	180	X	New	20-A5	1st Floor
Wall	Wood	810	0.095	R-15	R-0.0	0	90	X	New	09-A4	1st Floor
Door	None	40	0.500	None	R-0.0	0	90	X	New	28-A4	1st Floor
Wall	Wood	452	0.095	R-15	R-0.0	90	90	X	New	09-A4	1st Floor
Wall	Wood	780	0.095	R-15	R-0.0	180	90	X	New	09-A4	1st Floor
Wall	Wood	452	0.095	R-15	R-0.0	270	90	X	New	09-A4	1st Floor
Roof	Wood	8,000	0.025	R-38	R-0.0	0	0	X	New	01-A1B	1st Floor



# Certificate Of Compliance : Residential

(Part 3 of 4) **CF-1R**

Model 8000 15%

3/13/2006

Project Title

Date

## HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
HVAC System	Central Furnace	94% AFUE	Split Air Conditioner	13.0 SEER	New	Setback

## HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
HVAC System	Ducted	Ducted	Crawlspace	6.0	New	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul Thick

## WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated <sup>1</sup> Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE <sup>1</sup>	Standby <sup>1</sup> Loss (%)	Tank Insul R-Value Ext.
Rheem 41VRP50PT	Small Gas	No Pipe Insulation	1	40,000	50	New	0.65	n/a	n/a

## Multi-Family Central Water Heating Details

Control	Hot Water Pump			Hot Water Piping Length (ft)			Add 1/2" Insulation
	#	HP	Type	In Plenum	Outside	Buried	

<sup>1</sup> For small gas storage (rated input <= 75000 Btu/hr), electric resistance and heat pump water heaters, list energy factor  
 For large gas storage water heaters (rated input > 75000 Btu/hr), list Rated Input Recovery Efficiency and Standby Loss  
 For instantaneous gas water heaters list Rated Input, and Recovery Efficiency

## REMARKS

## COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

### Designer or Owner (per Business & Professions Code)

Name: \_\_\_\_\_  
 Title/Firm: Town of Los Altos Hills  
 Address: energy study 8000 standard  
 Telephone: \_\_\_\_\_  
 Lic #: \_\_\_\_\_

### Documentation Author

Name: Jim Fruit  
 Title/Firm: CSG Consultants, Inc  
 Address: 1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
 Telephone: (650) 522-2500

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

### Enforcement Agency

Name: \_\_\_\_\_  
 Title/Firm: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone: \_\_\_\_\_

(signature/stamp) \_\_\_\_\_ (date) \_\_\_\_\_



## TITLE 24 REPORT

### **Title 24 Report for:**

Model 8000 19.9%  
Los Altos Hills

### **Project Designer:**

Town of Los Altos Hills  
energy study 8000 standard

### **Report Prepared By:**

Jim Fruit  
CSG Consultants, Inc  
1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
(650) 522-2500

### **Job Number:**

energy study 8000 standard

### **Date:**

3/13/2006

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - [www.energysoft.com](http://www.energysoft.com)

# Certificate Of Compliance : Residential

(Part 1 of 4) **CF-1R**

Model 8000 19.9%  
 Project Title  
 Los Altos Hills  
 Project Address  
 CSG Consultants, Inc. (650) 522-2500  
 Documentation Author Telephone  
 EnergyPro 4  
 Compliance Method Climate Zone

Date 3/13/2006  
 Building Permit #  
 Plan Check/Date  
 Field Check/Date

TDV Energy Use (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	12.32	8.93	3.39
Space Cooling	3.73	3.41	0.33
Fans	1.26	1.13	0.13
Domestic Hot Water Pumps	3.36	3.08	0.28
	0.00	0.00	0.00
<b>Totals</b>	<b>20.67</b>	<b>16.55</b>	<b>4.12</b>

Percent better than Standard: 19.9%

## BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type:  Single Family  Addition  
 Multi Family  Existing + Add/Alt  
 Total Conditioned Floor Area: 8,000 ft<sup>2</sup>  
 Existing Floor Area: n/a ft<sup>2</sup>  
 Building Front Orientation: (N) 0 deg  
 Raised Floor Area: 8,000 ft<sup>2</sup>  
 Fuel Type: Natural Gas  
 Slab on Grade Area: 0 ft<sup>2</sup>  
 Fenestration:  
 Average Ceiling Height: 10.3 ft  
 Area: 1,200 ft<sup>2</sup> Avg. U: 0.39  
 Number of Dwelling Units: 1.00  
 Ratio: 15.0% Avg. SHGC: 0.37  
 Number of Stories: 1

### BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
HVAC System	8,000	82,400	1.00	Conditioned	Setback	2	n/a

### OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Act. Cont.	Azm.	Tilt	Gains Y/N	Condition Status	JA IV Reference	Location / Comments
Floor	Wood	8,000	0.037	R-19	R-0.0	0	180	X	New	20-A4	1st Floor
Wall	Wood	810	0.102	R-13	R-0.0	0	90	X	New	09-A3	1st Floor
Door	None	40	0.500	None	R-0.0	0	90	X	New	28-A4	1st Floor
Wall	Wood	452	0.102	R-13	R-0.0	90	90	X	New	09-A3	1st Floor
Wall	Wood	780	0.102	R-13	R-0.0	180	90	X	New	09-A3	1st Floor
Wall	Wood	452	0.102	R-13	R-0.0	270	90	X	New	09-A3	1st Floor
Roof	Wood	8,000	0.032	R-30	R-0.0	0	0	X	New	01-A17	1st Floor



# Certificate of Compliance : Residential

(Part 3 of 4) **CF-1R**

Model 8000 19.9%

3/13/2006

Project Title

Date

## HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
HVAC System	Central Furnace	94% AFUE	Split Air Conditioner	13.0 SEER	New	Setback

## HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
HVAC System	Ducted	Ducted	Crawlspace	6.0	New	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul Thick

## WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated <sup>1</sup> Input (Btu/hr)	Tank Cap (gal)	Condition Status	Energy Factor or RE <sup>1</sup> (%)	Standby <sup>1</sup> Loss (%)	Tank Insul R-Value Ext.
Rheem 41VRP50PT	Small Gas	No Pipe Insulation	1	40,000	50	New	0.65	n/a	n/a

## Multi-Family Central Water Heating Details

Control	Hot Water Pump			Hot Water Piping Length (ft)			Add 1/2" Insulation
	#	HP	Type	In Plenum	Outside	Buried	

<sup>1</sup> For small gas storage (rated input <= 75000 Btu/hr), electric resistance and heat pump water heaters, list energy factor.  
 For large gas storage water heaters (rated input > 75000 Btu/hr) list Rated Input, Recovery Efficiency and Standby Loss  
 For instantaneous gas water heaters list Rated Input and Recovery Efficiency

## REMARKS

## COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

### Designer or Owner (per Business & Professions Code)

Name: \_\_\_\_\_  
 Title/Firm: Town of Los Altos Hills  
 Address: energy study 8000 standard  
 Telephone: \_\_\_\_\_  
 Lic #: \_\_\_\_\_

### Documentation Author

Name: Jim Frull  
 Title/Firm: CSG Consultants, Inc  
 Address: 1700 Amphlett Blvd, 3rd Floor  
San Mateo, CA 94402  
 Telephone: (650) 522-2500

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

(signature) \_\_\_\_\_ (date) \_\_\_\_\_

### Enforcement Agency

Name: \_\_\_\_\_  
 Title/Firm: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telephone: \_\_\_\_\_

(signature/stamp) \_\_\_\_\_ (date) \_\_\_\_\_

Run Initiation Time: 03/13/06 11:46:37 Run Code: 1142279197

