

Using the
MicroSolve/Marshall & Swift
Residential Cost Program

the **CAMA** *2000* version

Adapted with permission from Marshall & Swift, *The Automated Residential Cost Handbook: User Notes*

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APPENDIX

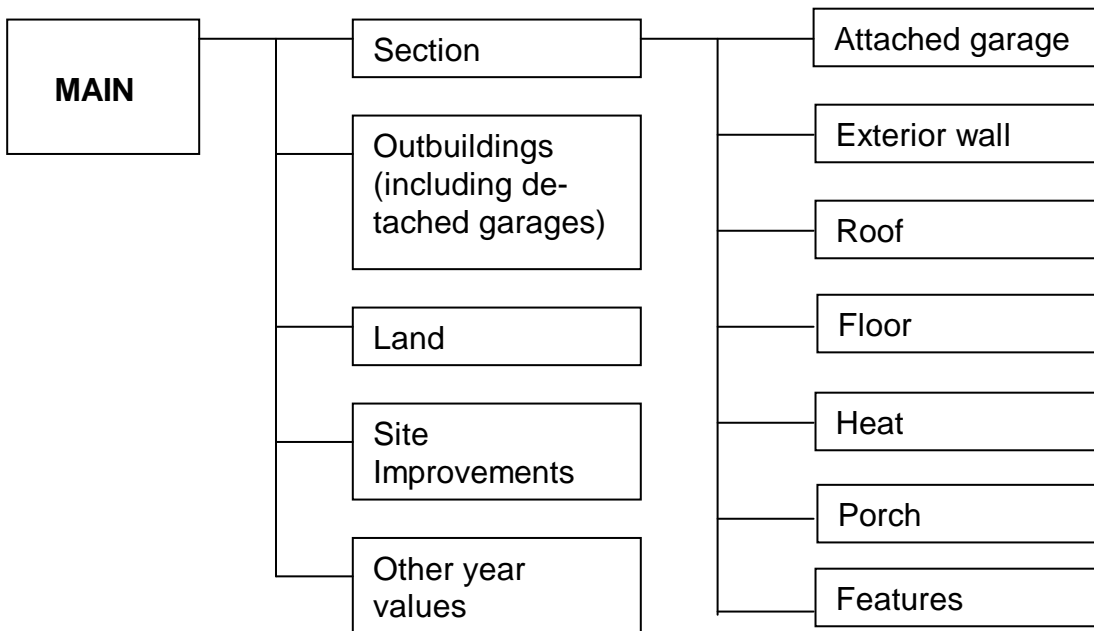
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Overview

The MicroSolve residential cost module makes use of Marshall & Swift cost tables and the Marshall & Swift Square Foot calculation method. This module provides you with the calculations required to compute estimated replacement costs for nearly all residences using the tables and applying appropriate adjustments. The Square Foot Method requires a minimal amount of information - the area of the residence and additional information used to calculate adjustments for the specific residence for which the estimate is being calculated.

In CAMA 2000, the residential cost approach is encoded in a Usit (User's Simplified Instruction Table) program, which operates automatically when you select the cost approach from the Valuation menu option or press the Cost button on the data display/entry form. The Usit program can be modified by users or by MicroSolve staff at a user's request, to change the way the system calculates or displays or to add cost routines for such elements as land or outbuildings. This is a powerful feature which should be used only by people who have received proper training.

The CAMA 2000 database is relational, which means it is composed of a series of linked tables. Each property (identified in the Main table) can have one or more buildings or sections (Section table), one or more outbuildings (Outbuilding table), and one or more land types (Land table). Each building can have one or more exterior wall types (Exterior Wall table). Buildings can also have any number of associated porches, attached garages, and other features, each listed in the appropriate table. In the discussions below on factors used in the cost approach, it should be understood that more than one land type, outbuilding type, or porch type can be processed, even if only one factor for each is mentioned. The complete database layout is shown below.



Base costs are calculated for a particular type of residence (Bldg Type), using Frame and Quality (of construc-

tion), plus Siding to determine the square foot rate. This rate is adjusted by:

Energy Adjustment	Sec/Pg1
Floor Insulation	Sec/Pg1
P/Crawl/Slab (for buildings with no basement)	Sec/Pg1
Plaster Interior (if applicable)	Sec/Pg1
Roof Cover	Sec/Pg1
Subfloor	Sec/Pg1
Floor Cover	Sec/Pg2
Heat/Cool	Sec/Pg2

The right-hand column above shows the tab location on the data entry form. Several factors, including Siding, Roof Cover, Heat/Cool, and Floor Cover, can have multiple occurrences in a building or section, and therefore on the data entry form they are accompanied by a factor allowing users to indicate the percent of the building they apply to. If you indicate more than one Heat/Cool type, it is your responsibility to ensure that the percentages applied to each type total 100.

After the adjusted rate is multiplied by the total square feet of living area, the following additional features may be added in:

Basement	Sec/Pg1
Dormers	Sec/Pg1
Features	Sec/Pg2
Fireplce #	Sec/Pg2
Plumbing (Fixtures and Rough-ins)	Sec/Pg2
Gar/Shed Type	Sec/Pg3
Porches	Sec/Pg3

The total of these items gives the Replacement Cost New (RCN).

If the user puts in an Effective Age (Sec/Pg2), it will be used, along with Condition (Sec/Pg2), to find a physical depreciation rate from the table. If Effective Age is not entered, the system will subtract Year Built (Sec/Pg2) from the current year to obtain an age for table look-up. Users who wish to override the table look-up can enter a physical depreciation rate in the Phys Deprec field. Users can also enter functional and economic depreciation (Func Deprec, Econ Deprec) and these rates will be applied to the RCN as well to produce the Replacement Cost New Less Depreciation (RCNLD).

Costs on which the Marshall & Swift square-foot cost method is based include:

* Plans, specifications, survey and building permits

- * Cost on interim money during normal period of construction
- * Cost of labor and materials
- * Sales tax on materials
- * Utilities from house to lot line based on a typical setback
- * Normal site preparation (trenching, excavating for concrete, backfill and finish grading)
- * Prorated amount of real estate commission in large tract development
- * Contractor's overhead and profit, supervision and benefits, equipment, temporary facilities, etc.

Costs do not include:

- * Costs of buying or assembling land (i.e. escrow fees, legal fees, property taxes, demolition, storm drains, rough grading)
- * Pilings or hillside foundations (considered a site improvement as are soil compaction and vibration, terracing, etc.)
- * Costs of land planning or preliminary concept and layout inclusive of developer's overhead and profit
- * Interest or taxes on land
- * Feasibility studies, E.I.R., appraisal and consulting fees
- * Discounts or bonuses for financing
- * Off-site costs including paving, curbs, gutters, sidewalks, fencing, landscaping, utilities, park fees, jurisdictional hook-up, impact or entitlement, tap-in or assessment fees
- * Yard improvements including walls, landscaping, yard lighting, swimming pools, etc.
- * Marketing costs and advertising expenses or temporary operation of homeowners association
- * General contingency reserve where a percentage of the total cost is set aside for some unknown future event (i.e. labor strike, labor and material cost increases, etc.)

Cost figures used in this module are the same as those used in the published Marshall & Swift tables, which in turn are based on a sampling of final building costs for residences actually built. They are the averages of many costs. Since construction practices vary from one location to another, some of the specific costs provided may differ from costs in your location. To the extent possible, location multipliers adjust for these geographic differences.

This reference includes descriptions of the elements required by the calculation module. Not all elements are required for every estimate. The cost figures in the MicroSolve tables are updated periodically from tables provided by Marshall & Swift.

BASE COSTS

Types of Residences

Style

Costs can be calculated for single family, site-built residences, for multi-family residences, and for mobile homes. This manual discusses mainly single family residence costs. Some residence types are identified by different names in different locations. Therefore, general terms are used to describe residences in MicroSolve. These types are:

One Story [level 1]

Residence has one level of living area. The roof has a medium slope. The attic space is limited and is not typically used as the living area.

One and One-Half Story [levels 2,3]

This residence has two levels of living area. Characterized by a steep roof slope and dormer windows, the area of the upper level, whether finished or unfinished, is usually 40% to 60% of the lower level. For one and one-half story residences with a finished upper level, use the total floor area of both levels. For one and one-half story residences with an unfinished upper level, use the floor area of the first floor only.

Two Story [level 4]

Residence has two levels of finished living area. The area of each floor is approximately the same. The roof has a medium slope. Attic space is limited and is not typically used as living area.

Two and One-Half Story [levels 5,6]

This residence, characterized by a steep roof slope and dormers, has three levels of living area. The area of the third floor, whether finished or unfinished, is usually 40% to 60% of the second floor. For two and one-half story residences with the upper level finished, when indicating the total living area, use the floor area of all three levels. For two and one-half story residences with an unfinished upper level, use the floor area of the first two levels.

Two Story - Bi-Level [level 7]

This residence has two levels of living area but the lower level is typically partially below grade and is only partially finished. The distinguishing characteristic is the split-level foyer. Area information for a bi-level residence must be indicated for the area above grade and for the basement area with appropriate adjustments for finishes. Residences with no finishes on the lower level should be classified as One Story residences. Residences with both

levels completely finished should be classified as Two Story Residences.

Split-Level [level 8]

This type has three levels of finished living area: a lower level, intermediate level and upper level. The lower level is immediately below the upper level as in a two story. The intermediate level, adjacent to the other levels, is built on a grade approximately four feet higher than that of the lower level. Use the floor area of all three levels.

Types of Construction

Frame

Costs are provided for two types of residential construction - Wood Frame and Masonry.

Wood frame construction uses lightweight lumber or metal studs for its structural system. Typical exterior covers are plywood, hardboard, stucco, siding, and masonry veneer.

Masonry construction has concrete block, brick or stone veneer on block load bearing walls. Each of these is a necessary structural component and is sometimes used as the exterior finish.

Quality of Construction

Quality

The quality of construction of a residence influences its cost. For this reason, the calculation module requires that the quality of the residence for which the estimate is being prepared be indicated. Quality is determined by materials and workmanship. Design can also be another consideration of quality. Quality levels vary by the type of residence. For all quality levels, with the exception of Excellent, interior walls are assumed to be eight (8) feet in height. (If Wall Height is not 0, it is compared with the value in Table 16, page 5, column 24, and the base rate is adjusted by the difference, if any.) When entering information for a specific residence it may be necessary to indicate adjustments for specific items which differ from any assumptions. Typical quality levels and the assumptions for residences of these qualities are:

Low Quality = 1

Low cost construction meeting minimum building code requirements. Interior and exterior finishes are plain and inexpensive with little or no attention for detail. Design is functional. The building components of a low quality structure can be described as:

Continuous concrete perimeter foundation and piers based on a moderate climate. Wood floor structure and subfloor on first and upper floors.

Inexpensive carpet and asphalt or vinyl composition tile floor covers are typical. Floor covering is not included in base costs but an allowance is provided.

Exterior walls have minimal fenestration with inexpensive sash with little or no trim.

Roof has rafters or prefabricated trusses with plywood or other inexpensive sheathing with a lightweight composition shingle or a built-up with gravel roof cover. Slope is usually less than 4-in-12 with no eaves.

Interior walls are inexpensive drywall with paint or textured finish.

Kitchen and baths may have enamel painted ceilings and walls. Cabinets are paint grade wood or vinyl veneer with low cost laminated plastic countertops. Doors are hollow core with low cost hardware. Minimal amount of closet space.

A forced air furnace for heating is included in the basic residence cost. The energy package in the basic residence cost includes those insulation, framing and glazing items typically found in a moderate climate. Floor insulation is not considered.

A minimum number of outlets and low cost lighting fixtures are included as basic electrical service.

Five competitively priced white plumbing fixtures with one plumbing rough-in are included in the basic residence cost. These fixtures can include a water heater, laundry tray, stall shower, toilet, lavatory, tub, tub with shower over or a kitchen sink.

No built-in appliances are considered.

No fireplaces are included.

Fair Quality = 2

Frequently mass produced residences. Low cost production is the primary consideration. Although overall quality of materials and workmanship is below average, houses are not substandard and meet minimum construction requirements for lenders, insuring agencies and building codes. Interior and exterior finishes are plain with few refinements. Design is generally from stock plans. Ornamentation is usually limited to the front of the structure. The building components of a fair quality structure can be described as:

Continuous concrete perimeter foundation and piers based on a moderate climate.

Wood floor structure and subfloor on first and upper floors.

Carpet and asphalt or vinyl composition tile floor covers are typical. Floor covering is not included in base costs but an allowance is provided.

Exterior walls have moderate fenestration with inexpensive sash; front may have inexpensive trim.

Roof has rafters or prefabricated trusses with plywood or other inexpensive sheathing with a lightweight composition shingle or a built-up with small rock roof cover. Slope is usually less than 4-in-12 with a minimal eaves.

Interior walls are taped and painted drywall (sheetrock) with enamel painted walls and ceilings in the kitchen and baths. Cabinets are stock of paint grade wood or vinyl veneer with laminated plastic countertops with a small splash. Doors are stock hollow core with inexpensive hardware. There is a minimal amount of closet space.

A forced air furnace with minimum output and ductwork for heating is included in the basic residence cost.

The energy package in the basic residence cost includes those insulation, framing and glazing items typically found in a moderate climate. Floor insulation is not considered.

A minimum number of outlets and lighting fixtures are included as basic electrical service.

Six competitively priced white plumbing fixtures with one plumbing rough-in are included in the basic residence cost. These fixtures can include a water heater, laundry tray, stall shower, toilet, lavatory, tub, tub with shower over or a kitchen sink.

No built-in appliances are considered.

No fireplaces are included.

Average Quality = 3

Average residences are the most frequently encountered quality. They are usually mass produced and meet or exceed minimum requirements for lenders, insurers and building codes. The quality of materials and workmanship is acceptable but does not reflect custom craftsmanship. The building components of a fair quality structure can be described as:

Continuous concrete perimeter foundation and foundation or piers under interior bearing wall based on a moderate climate.

Wood subfloor and floor structure on first and upper floors.

Carpet, hardwood, vinyl composition tile, or sheet vinyl floor covers are typical. Floor covering is not included in base costs but an allowance is provided.

Exterior walls have standard aluminum sash or wood sash is typical.

Roof has rafters or prefabricated trusses with exterior grade plywood or other wood sheathing with a me-

dium composition shingle or a built-up with small rock roof cover. Slope is usually less than 5-in-12 or less.

Interior walls are taped and painted drywall (sheetrock) with an allowance for some inexpensive wallpaper or paneling. Kitchen and bath have enamel painted walls and ceilings. Cabinets are prefinished plywood with laminated plastic or ceramic tile countertops. Doors are medium grade, hollow core with standard grade hardware. Baseboard and casings are stock. There is an adequate amount of closet space. Workmanship throughout is average quality.

A forced air furnace with adequate output and ductwork for heating is included in the basic residence cost.

The energy package in the basic residence cost includes those insulation, framing and glazing items typically found in a moderate climate. Floor insulation is not considered.

An adequate number of outlets with some luminous fixtures in kitchen and bath areas are typical of the electrical service.

Eight average quality white or color plumbing fixtures with one plumbing rough-in are included in the basic residence cost. These fixtures can include a water heater, laundry tray, stall shower, toilet, lavatory, tub, tub with shower over or a kitchen sink.

No built-in appliances are considered.

No fireplaces are included.

Good Quality = 4

May be mass produced in above average residential developments or built for an individual. Good quality, standard materials are used throughout. Good quality houses generally exceed the minimum construction requirements for lenders, insurers and building codes. Some attention is given to architectural design in refinements and in details. The building components of a good quality structure can be described as:

Continuous reinforced concrete perimeter foundation and foundation or piers under interior bearing wall, based on a moderate climate.

Floor structure is wood or steel floor joists and subfloor on first and upper floors.

Carpet, hardwood, sheet vinyl or vinyl tile floor covers are typical. Floor covering is not included in base costs but an allowance is provided.

Exterior walls have good fenestration using good quality sash. Some ornamental trim.

Roof has wood rafters and sheathing with hips and valleys. Good quality cedar shingles.

Interior walls are taped and painted drywall (sheetrock) with some good quality wallpaper or wood paneling. Kitchen and baths have enamel painted ceilings and walls. An ample amount of cabinets with natural wood veneer finish are used in the kitchen with a large pullman or vanity in the bath areas. Countertops and splash are laminated plastic, ceramic tile or simulated marble. Doors are good quality, hollow core with attractive hardware. Baseboard and casings are hardwood or softwood and have mitered corners. An ample amount of closet space including walk-in closets or large sliding door wardrobes, linen and storage closets. Workmanship is of good quality.

A forced air furnace for heating with adequate output and ductwork is included in the basic residence cost.

The energy package in the basic residence cost includes those insulation, framing and glazing items typically found in a moderate climate. Floor insulation is not considered.

An ample number of conveniently placed outlets with luminous fixtures in kitchen and bath areas are typical of the electrical service.

Eleven good quality white or color plumbing fixtures with one plumbing rough-in are included in the basic residence cost. These fixtures can include a water heater, laundry tray, stall shower, toilet, lavatory, tub, tub with shower over or a kitchen sink.

No built-in appliances are considered.

No fireplaces are included.

Very Good Quality = 5

Typical of those built in high quality tracts or developments and can be individually designed. Attention has been given to interior and exterior detail. The building components of a very good quality structure can be described as:

Continuous reinforced concrete perimeter foundation and interior bearing wall foundation, based on a moderate climate.

Floor structure is wood or steel floor joists and subfloor on first and upper floors.

High quality carpet, hardwood, sheet vinyl and ceramic tile floor covers are typical. Floor covering is not included in base costs but an allowance is provided.

Exterior walls have well designed fenestration using high quality sash. Custom ornamentation and trim are used

Roof has wood rafters and sheathing. Heavy wood shake roof cover is included.

Interior walls are taped and painted drywall (sheetrock) with high quality paper or vinyl wall covering, hardwood paneling or ceramic tile. An ample amount of cabinets which can include specialty items such as a cooking island, bar, desk, etc. Countertops and splash are ceramic tile or highest quality laminated plastic. Doors are raised panel hardwood veneer or enameled with good quality hardware. Baseboard, casings and moldings have tight mitered corners. An ample amount of closet space including walk-in closets, large sliding door wardrobes, linen and storage closets.

A forced air furnace for heating with insulated ductwork to all main areas.

The energy package in the basic residence cost includes those insulation, framing and glazing items typically found in a moderate climate. Floor insulation is not considered.

Well positioned outlets with high quality fixtures throughout; good luminous fixtures in kitchen and bath areas are typical of the electrical service.

Fourteen high quality white or color plumbing fixtures with one plumbing rough-in are included in the basic residence cost. These fixtures can include a water heater, laundry tray, tiled shower stall, toilet, lavatory, tub, tub with shower over, kitchen sink or wet bar.

No built-in appliances are considered.

No fireplaces are included.

Excellent Quality = 6

Residences of this quality level are usually individually designed and are characterized by the high quality of workmanship, finishes, appointments, and considerable attention to detail. The building components of a very good quality structure can be described as:

Continuous reinforced concrete perimeter foundation and interior bearing wall foundation, based on a moderate climate.

Floor structure is wood or steel floor joists and subfloor on first and upper floors.

High quality carpet, hardwood (parquet or plank), terrazzo, and vinyl, ceramic or quarry tile floor covers are typical.

Exterior walls have well designed fenestration with high quality sash. Custom ornamentation and trim, select brick, cut stone, high quality siding are used.

Roof has heavy wood rafters and sheathing. Clay tile or slate roof cover are included.

Interior walls are taped and painted drywall (sheetrock) with high quality paper or vinyl wall covering, hardwood paneling or ceramic tile. Built-in shelving and an ample amount of cabinets which can include specialty items such as a cooking island, bar, desk, etc. Countertops and splash are ceramic tile, marble or highest quality laminated plastic. Doors are raised panel hardwood veneer or enameled with good quality hardware. Baseboard, casings and moldings have tight mitered corners. An ample amount of closet space including walk-in closets or wardrobes with built-in features, large sliding door wardrobes, fully shelved linen and storage closets.

A forced air furnace for heating with multiple controls, large capacity insulated ductwork to all main areas.

The energy package in the basic residence cost includes those insulation, framing and glazing items typically found in a moderate climate. Floor insulation is not considered.

Many well positioned outlets with high quality fixtures throughout; large luminous fixtures in kitchen, bath and dressing areas are typical of the electrical service.

Seventeen high quality white or color plumbing fixtures with one plumbing rough-in are included in the

basic residence cost. These fixtures can include a water heater, laundry tray, tiled shower stall, toilet, lavatory, tub, tub with shower over, kitchen sink, wet bar or jacuzzi.

No built-in appliances are considered.

No fireplaces are included.

This factor is designed to allow entry of decimal numbers (e.g., 3.5) in cases where the assessor believes the quality grade is between two standard levels. In such cases the program will interpolate square-foot rates between the values found in the table. For exceptional homes (beyond excellent quality), users may enter values from 7 to 12. These quality levels direct the program to Tables 51 to 56, representing levels I through VI of the Marshall & Swift Exceptional Home Tables.

Exterior Wall

Siding

Base costs are determined by indicating siding type and the percent of total floor area to which it applies. The Extwall ID factor may be incremented to indicate as many wall types as needed. Each should have the appropriate siding and percentage indicated, and all percentages should total 100. Available siding types include:

For Wood Frame Structures:

Plywood		1
Hardboard		2
Siding, Metal		3
Siding, Vinyl		4
Stucco		5
Siding, Wood		6
Wood Shingle		7
Synthetic Plaster (EIFS)	8	
Rustic Log		9
Veneer, Brick		10
Veneer, Stone		11

For Masonry Structures:

Concrete Block		12
Stucco on Block	13	
Common Brick		14
Face Brick		15
Adobe Block		16
Stone on Block		17
Poured Concrete (SIP Framing)		18

Level 19, Aluminum, is for use only with mobile homes. Otherwise use level 3, Metal siding.

ADJUSTMENTS

Area costs include those roof covers, floor covers, heating systems, etc., typically found in a given type and quality of residence. The system examines the entries for each of these features and determines whether an adjustment in the base rate needs to be made. Such adjustments are itemized in the cost worksheet.

Roof

Roof Cover

Typical type of roof cover is determined by quality level of residence. For variations, select from types available and enter as a percentage of the same floor area used to determine base cost. Excessive overhangs or slopes may require consideration. Available roof cover types include:

Composition Shingle	1
Built-up, Small Rock	2
Wood Shingle	3
Wood Shake	4
Metal, Preformed	5
Metal, Formed Seams	6
Copper	7
Composition Roll	8
Concrete Tile	9
Clay (Mission Tile)	10
Slate	11
Concrete	12
Neoprene	13
Waterproof	14
Wood - FS	15
Metal-Channel	16

Not all roof types are available for all quality levels.

Floor

Floor Cover

Floor cover costs are not included in the base costs. Costs can be added by itemizing specific coverings in the residence. Item 1 (Resilient) is considered the "allowance" for all quality levels. However, if no level is specified, no floor cover costs will be calculated. When itemizing, indicate the actual area covered by the specific floor covering or the percentage of the total area covered by that specific covering. Available floor cover types include:

Resilient	1
Carpet and Pad	2
Wood Flooring (Generic)	3
Ceramic Tile	4
Terrazzo	5
Hardwood	6
Parquet Blocks	7
Vinyl Composition	8
Vinyl Sheet	9
Light Concrete	10
Standard Allowance	11

Not all types apply to all quality levels of residences.

Floor Insulation

No provision for floor insulation is made in the base costs provided. Options include insulation for Mild, Moderate and Extreme Climate. When floor insulation (Sec/Pg 1) is specified, the area it applies to should be shown in the adjacent factor.

Subfloor

Subfloor

Base costs assume a wood subfloor. The raised wood subfloor allows for a crawl space. At all types and qualities of residences, the cost for a concrete slab on grade is less than for a wood subfloor. If the residence has a concrete slab, the adjustment will be made based on the total area.

Heating / Cooling

Heat/Cool

A forced air heating system with ductwork is included in the base cost for all types and qualities of residences. To itemize more specifically, indicate a percentage of area covered by any of the following specific types. Make sure the percentages of all types sum to 100.

Forced Air	1
Air - Oil	2
Space Heater	3
Electric Radiant	4
Electric Baseboard	5
Hot Water Baseboard	6
Warm/Cool	7
Heat Pump	8
Evaporative Cooling	9
Air Exchange	10
Gravity Furnace	11
Industrial Unit	12
Hot Water Radiant	13

Not all selections are available for every quality level.

Plaster Interior

Plaster Int

Base costs for residences include a drywall finish on all interior walls and ceilings. The plaster interior adjustment (Sec/Pg1) modifies costs for the difference between drywall and plaster. Indicate a percentage of the area that is plastered.

Energy Adjustments

Energy Adj

The energy adjustment provides a simple means by which consideration can be given to those insulation, framing and window glazing items that affect energy conservation. Based on typical code requirements, energy packages have been grouped into four climate classifications:

- (1) Below Average (2) Average (3) Good (4) Excellent

The default is for Average climate, and adjustments should be made for any deviation.

Adjustments include framing variations for Wood Frame construction; basic residence costs for Masonry construction include the glazing and insulation for Average climate. For deviation in glazing and insulation in Masonry construction, the full energy adjustment should not be made.

Floor insulation is not included in the base residence cost nor in the Energy Package. Make separate adjustments as necessary.

Below Average energy package includes single glazing, 2" X 4" stud construction and minimal wall and ceiling insulation.

Average energy package includes a weighting of single and double glazing, 2" X 4" or 2" X 6" stud construction with R-11 to R-19 wall insulation and R-19 to R-30 ceiling insulation.

Good energy package includes a weighting of double and triple glazing, 2" X 6" stud or comparable construction with R-19 to R-25 wall insulation and R-33 to R-45 ceiling insulation.

The Excellent adjustment includes the Good package for windows and floors, stud walls that can be double 2' X 4's or 2' X 8's and R-30 wall insulation with an air infiltrate wrap and up to R-55 ceiling insulation. Air-to-air heat exchangers should be included as Material selections, if appropriate.

Foundation

P/Crawl/Slab

The levels of this categorical factor (Sec/Pg1) are intended for use mainly with mobile homes:

- 1 Post
- 2 Float Slab
- 3 Crawl Slab
- 4 Pier
- 5 Wood
- 6 Concrete
- 7 Conc Block
- 8 Mod Hill
- 9 Steep Hill
- 10 Stone

Do not use these classifications with standard single family residences.

ADDITIONAL FEATURES

Porches and Decks

Porch Area

Porches and decks are not included in the basic residence cost. When entered (Sec/Pg3) they are assumed to be similar in both quality of material and workmanship to that of the residence. Costs are provided for three types of floor structure, three types of wall enclosures, a roof, and ceiling finish. As many porches or decks as necessary can be including with a given building (section). This factor can also be used for breezeways. When including porches and/or decks in an estimate, indicate the following, as necessary:

Floor	Open slab	1
	Open slab with steps	2
	Wood deck	3
Wall	None	1
	Screen only	2
	Knee wall with glass	3
	Solid wall	4
Roof	None	1
	Metal	2
	Wood	3
	Concrete	4
Ceiling	None	1
	Yes	2

The type of roof cover is assumed to be the same as the type indicated for the residence. Ceiling costs include both ceiling structure and finish and should be used in conjunction with a roof, not in place of it.

Garages / Areas over Garages / Carports

Gar/Shed Type

The costs for garages are not included in the basic residence costs. Detached garages are priced as outbuildings (Land/OB); only attached or built-in garages (Sec/Pg3) are treated here. Garage costs include wall structure, roof structure when applicable, a concrete slab floor, doors, and electrical lighting. The garage is assumed to be of the same construction as the residence, but a different siding may be indicated. The same roof and wall types are used for residences and garages. Costs are provided for 1, 1½, and 2 story attached garages, as well as for carports and built-in garages.

Basement garages are priced with basements (Sec/Pg1). They should be considered unfinished basement area; cost adjustments include excavation, overhead door(s) and finishes on common interior walls and ceiling. The program makes the following assumptions based on quality levels:

Low	Light concrete slab floor and an overhead garage door conforming to the residence in quality and construction.
Fair	Reinforced concrete slab floor, an overhead door and electrical lighting, all of which conform to the basic residence in quality and construction.
Average	Reinforced concrete slab floor, overhead door, ornamentation, windows and electrical lighting, all of which conform to the basic residence in quality and construction.
Good	Reinforced concrete slab floor, overhead door, ornamentation, windows and electrical lighting, all of which conform to the basic residence in quality and construction.
Very Good	Reinforced concrete slab floor, pedestrian and overhead doors, ornamentation, windows and electrical lighting, all of which conform to the basic residence in quality and construction.
Excellent	Reinforced concrete slab floor, pedestrian and overhead doors, ornamentation, windows and electrical lighting, all of which conform to the basic residence in quality and construction. If finishes are included, indicate this. Finish costs for garages include the necessary wall finish and ceiling finish to finish all interior surfaces.

For garages with asphalt floors, select level 2 of the Floor factor. Concrete is the default floor type and will not affect pricing.

Extra garages or sheds can be added as necessary.

Areas over Garages

For finished areas over attached garages, include that area in the total area of the residence for base costs and adjustments and consider the garage a built-in garage. Areas that have a different flooring, heating, etc. from the rest of the house can be given their own values and an appropriate percentage.

In the case of detached garages, priced as outbuildings (Land/OB), a lump-sum value for the finished portion can be entered in the Finish factor. Other features can be entered as Extras. (See Outbuildings.)

Carports

Carports are not included in the basic residence cost. Carport costs include a roof cover, any necessary structural supports and a concrete slab. Carports should be entered like attached garages (Sec/Pg3), but in addition with standard single-family residences you should specify a roof type of shed (1), flat (2), or gable (3). The shed or flat roof structure is two-dimensional and the gable roof structure is a three-dimensional, trussed roof system. However, if the carport is associated with a mobile home, the cost tables are keyed to roof *material*: fiberglass (4), aluminum (5), or steel (6). For carports, as for garages, indicate asphalt floors for an extra adjustment.

Appliances

Features

Since no provisions are made in base costs for built-in appliances or specialty features, the following items may be entered as Features (Sec/Pg2):

- | | |
|------------------------|-----------------------------|
| 1 Allowance | 9 Microwave |
| 2 Bath Heater | 10 Oven |
| 3 Dishwasher | 11 Range Top |
| 4 Exhaust Fan | 12 Stove (Range + Oven) |
| 5 Freezer/refrigerator | 13 Trash Compactor |
| 6 Garbage Disposer | 14 Vacuum Cleaner System |
| 7 Hood & Fan | 15 Wireless Security System |
| 8 Intercom (Radio) | |

The quality and count (or units) should also be entered. the value from the table will be multiplied by the count and the total from all items will be included in the property cost.

Should you want to add items other than the standard built-ins, place the name in the Name field and specify a Count and a Rate. The system will use the values you provide rather than consulting a table.

Dormers

Dormer LinFt

If the residence for which the estimate is being prepared has dormers, indicate (Sec/Pg1) the linear feet of any of the following types:

Hip Roof	1
Gable Roof	2
Shed Roof	3

Basements

Bsmt Wall

Costs are provided for two common basement wall types (Sec/Pg1) - poured concrete (levels 1-3) and concrete block (levels 4-6). Three wall thickness are also available - 6", 8" and 12". Costs include a moisture proof concrete slab floor, adequate floor drains, wood or steel columns to support the living area above, an adequate number of electrical outlets, windows, and a stairwell with variations depending on the quality of the residence.

In unfinished basements for Low, Fair and Average quality residences, supporting columns are assumed to be wood or steel pipe and the stairway is assumed to be an open-riser, softwood stairway.

Finishes

For basements, two types of finishes are available - minimal and partitioned. Finishes should be applied only to the portion that is finished; the area should be entered in FinSF. Minimal basement finishes by quality level include:

Low/Fair	1,2
----------	-----

Asphalt or vinyl composition tile floor covering, fiberboard ceiling, painted walls, minimum electrical lighting, and incidental heating.

Average	3
---------	---

Vinyl composition tile floor covering, painted walls, electrical lighting, and incidental heating.

Good	4
------	---

Vinyl composition tile floor covering, taped and painted drywall ceiling, drywall or wood paneling on furring, electrical lighting, and incidental heating.

Very Good 5

Vinyl composition tile floor covering, taped and painted drywall ceiling, drywall or wood paneling on furring, electrical lighting, and incidental heating.

Excellent 6

Vinyl tile or sheet floor covering, taped and painted drywall ceiling, high quality drywall or wood paneling on furring, electrical lighting, and incidental heating.

Partitioned basement finishes by quality level are similar in both quality of materials and workmanship to that of the basic residence. It is fully partitioned for recreation room, bedroom, laundry room, bathrooms, etc. Costs include ceiling, wall and floor finish, but include only incidental heating. If necessary, make appropriate adjustments.

The base interior wall height for all basements is 8'. Make adjusting entries as necessary.

Indication should also be made (in the Bsmt Garage factor) if there is a single, double, or triple garage in the basement.

Note: A foundation adjustment should not be made if the residence has a basement.

Fireplaces

Fireplce #

Indicate the number, as appropriate (Sec/Pg2). Fireplaces are assumed to be of the same story height as indicated for the dwelling. Values are derived from Table 36, using building quality to determine the row.

Plumbing Fixtures

Plumb Fixt

Adjustments will be made for deviations from the standards defined by the quality of the residence. Full and half bath figures can be entered for information purposes only but are not used in the costing program. Fixtures and rough-ins (Sec/Pg2) are used. Each quality level has a standard number of fixtures and rough-ins associated with it. Adjustments are made for the number of fixtures or rough-ins over or under the standard for the quality level of the property. If it is ever necessary to put in a “dummy” building that will not cost (e.g., if only a basement is present with no structure above it), a single-family residence type should be specified, along with a quality level and the number of fixtures and rough-ins appropriate to that quality. The system will then neither add nor subtract value for fixtures and rough-ins.

DEPRECIATION

Depreciation

Phys Deprec

Depreciation is loss of value due to any cause. It is the difference between the value of a structural improvement and its reproduction or replacement cost as of the date of valuation. Depreciation (Sec/Pg2) is divided into three general categories:

Physical	Loss of value due to physical deterioration.
Economic	Even a new structure may suffer obsolescence when built (technical obsolescence). Locational or economic obsolescence is loss of value due to causes outside the property and independent of it.
Functional	Loss of value due to lack of utility or desirability of part or all of the property.

MicroSolve provides the ability to depreciate a structure using any and/or all of these categories. Based on an indicated Effective Age and the Condition (Sec/Pg2) of a structure, MicroSolve automatically calculates depreciation using the rates in Table 40. This calculation considers the progression of normal deterioration and functional obsolescence. The system also provides the ability to apply functional and economic depreciations by specifying the appropriate percentages.

The Effective Age of a property is its age as compared with other properties performing like functions. It is the actual age less the age which has been taken off by face-lifting, structural reconstruction, removal of functional inadequacies, modernization of equipment, etc. It is an age which most realistically reflects a true remaining life for the property, taking into consideration the typical life expectancy of buildings based on its quality and construction type. If no Effective Age is shown, the system computes the actual age by subtracting Year Built from the current year, and thus depreciation rates for a given property will change from year to year.

OUTBUILDINGS

Outbuildings

OutblD ID

Table 46 contains outbuilding costs from the Marshall & Swift commercial manual, available in the Vermont residential cost approach. As indicated on page 6, there is an Outbuilding subtable in the relational database in which any number of outbuildings can be specified, one for each outbuilding ID.

The following structure types are available:

01	Light commercial utility building	20	Poultry house - cage operation
02	Equipment building (shop)	21	Poultry house - floor operation
03	Material storage building	22	Corn crib
04	Lumber storage building	23	Farm implement (equipment shop)
05	Boat storage building	24	Farm utility
06	Material storage shed	25	Cattle shed (feeder barn)
07	Lumber storage shed	26	Farm implement (equipment shed)
08	Boat storage shed	27	Farm utility storage shed
09	Equipment shed	28	Farm shelter (hay shed)
10	Material shelter	29	Farm storage (silo)
11	Toolshed	30	Greenhouse
12	Creamery	31	Porch *
13	Dairy	32	Finished area *
14	Milkhouse	33	Carport *
15	Hayloft	34	Finished apartment *
16	Barn, general purpose	35	1 Story Detached Garage
17	Freestall barn	36	1½ Story Detached Garage
18	Stable	37	2 Story Detached Garage
19	Arena		

The four items marked with an asterisk are generally used as additions to other structures. They are costed from tables 27 and 28.

Quantity, usually square feet, should be entered in the Area field. Class and quality codes are as follows:

<u>Class</u>	<u>Quality</u>
1 A	1 Low
2 B	2 Fair
3 C	3 Average
4 D	4 Good
5 D Pole	5 Very good
6 S	6 Excellent

% good ratings are given by a three-digit number which translates as a percentage.

The % good indicator denotes the amount by which the table-derived value will be multiplied. A rating of 100 (100%) will not change the value at all.

Silos (#29) are indicated by placing the diameter in the Area field and the height in the Silo Height field.

If outbuilding Type is other than 0 and the Name field is left blank, the outbuilding will be displayed and priced according to the table value associated with Type.

If Type is left blank (“No Data”) but the Name field is not blank and the Rate field is not 0, an outbuilding called <Name> will be displayed and priced at a lump-sum value of <Rate>.

If outbuilding Type is specified but the Name field is also specified (not blank), then the outbuilding will be displayed and priced according to the table value associated with Type, but an Extra called <Name> and valued at <Rate> will be displayed and added to the outbuilding total.

If the outbuilding value is to be included in the homestead value, indicate this in the field provided.

A NOTE ON THE TABLES: Table pages for silo values have the same structure as the other pages in Table 46, in that rows and columns are numbered 1 to 6. However, on page 29 the actual range of diameters (rows) possible for silos is 10 to 30 because the computer uses the formula $(D - 6)/4$ to translate diameter to row number. Similarly, height may range from 30 to 80 using the formula $(H - 20)/10$. In the case of the greenhouse page (30), areas may range from 0 to 1000; these numbers are translated into column numbers using the formula $A/200 + 1$.

LAND PRICING

Land Pricing

Land Type

Vermont land tables for acreage, square foot, and frontage and depth rates are incorporated in the MicroSolve system as Tables 43, 44, and 45 respectively. To produce values, the system needs to know the Land Type (Land/OB), Calculation Method, Grade, and Area (or Frontage and Depth).

Calculation methods are:

- | | |
|---|--------------------|
| 1 | Site |
| 2 | Acreage (no site) |
| 3 | Square foot |
| 4 | Frontage and depth |

Land type codes are:

- | | |
|---|----------|
| 1 | Bldg Lot |
| 2 | Wood |
| 3 | Crop |
| 4 | Pasture |
| 5 | Other |
| 6 | Total |

Grade adjustments are expressed as a decimal: .85 indicates that the value from the table should be multiplied by .85 to produce the final value. If the table value should not be adjusted, enter 1.

Should it be necessary to indicate that a particular land segment should have no cost applied (for example, a segment that extends into a neighboring town), a grade of 0.00 can be entered.

When the "Site" calculation method is used, no more than two acres should be entered for Land ID 1. If a number greater than 2 is used, the computer will reduce it to 2. The portion of a building lot in excess of 2 acres should be associated with an ID higher than 1 and also given the calculation method "site." It will then be calculated as residual acreage using a different part of the table. This approach allows users to associate different quality indicators with the two-acre portion and the portion above two acres.

Lots that are to be calculated by acreage but not as part of a "site" should be designated as Acreage (no site), i.e. by Calculation Method 2.

In Table 45 columns 3 and 4 are devoted to a frontage rate and constant respectively. If this table is to be used, these columns must contain non-zero values. If the program encounters a zero in column 3, it will use Table 50 and the pricing method associated with it.

Table 50 contains frontage rates in column 1 and land adjustment rates in column 2. In order for this table to be read, Factor 9 (Neighborhood) must contain the proper neighborhood number. The computer will look up the neighborhood adjustment in the table (and the depth adjustment if a frontage-and-depth calculation is used) and apply the values.

SITE IMPROVEMENTS

Site Improvements

S-Imp

Site improvements (Land/OB) consist of water, sewer, landscaping, or ponds. Any number of site improvements can be entered, together with information about quality and quantity. This information is used to locate the appropriate rate in Table 49.

Both Quantity and Quality use a five-point scale:

<u>Quantity</u>		<u>Quality</u>
Minimal	1	Low cost
< Typical	2	Below avg.
Typical	3	Average
> Typical	4	Good
Extensive	5	Excellent

Non-standard site improvements such as patios may be entered as well, using the SI-Name field. These will not be looked up in a table, so the user must put in a lump sum amount for the item in the Rate field, which otherwise remains blank.

Site improvements appear on the printed cost report immediately after the land detail. To include the total in the homestead value, indicate "Yes" in the "Add to Homestead" field.

APPENDIX

The Basics

Just a few things to keep in mind as you use the residential cost module ...

Condition

Any condition indicated is for depreciation table purposes only.

Building SF

This is based on *outside* dimensions and is inclusive of the thickness of exterior walls. The area is the Total Finished Floor Area.

For multi-story dwellings with unfinished upper areas, only the area of the lower finished levels should be used (i.e. a one and one-half story residence with no finishes in the upper half story).

Location Multipliers

You should enter your own Location Multipliers in Table 1. Marshall & Swift provides tables of such multipliers for your guidance, but you may want to take specific local conditions into account.

Rough-ins (Plumbing)

These refer to drain and water supply line hook-ups for laundry facilities or for future plumbing fixture installation.

Wall Heights

The program assumes the base interior wall height of a residence is 8 feet (or 2.7 meters), except for Excellent Quality residences where the assumption is 10 feet.

Adjustments should be made for areas with high pitched ceilings.

List of Marshall & Swift Tables in MicroSolve

<u>No.</u>	<u>Table</u>	<u>Column</u>	<u>Row</u>	<u>Page</u>
1	Multiplier Control	Quality	Mult. type	Frame type
2	Single, Low Quality	Exterior Wall	Sq. feet	Style
3	Single, Fair Quality	Exterior Wall	Sq. feet	Style
4	Single, Average Quality	Exterior Wall	Sq. feet	Style
5	Single, Good Quality	Exterior Wall	Sq. feet	Style
6	Single, Very Good Quality	Exterior Wall	Sq. feet	Style
7	Single, Excellent Quality	Exterior Wall	Sq. feet	Style
8	Multiple Residential Rate	Units	Sq. feet	Quality
9	Town House & Duplex, End	Style	Sq. feet	Quality
10	Town House & Duplex, Inside	Style	Sq. feet	Quality
11	Row House, End	Space	Sq. feet	Quality
12	Row House, Inside	Space	Sq. feet	Quality
13	Row House, Detached	Space	Sq. feet	Quality
14	Mobile Home Base Rates	Width	Length	Quality
15	Tropical House Rates	Style	Sq. feet	Quality
16	Siding Adjustment	Exterior Wall	Quality	Building type
17	Single Family Roofing Adjustment	Material	Style	Quality
18	Roofing Adjustment, Other	Material	Building type	Quality
19	Subfloor Adjustment	Material	Building type	Quality
20	Flooring Adjustment	Material	Building type	Quality
21	Plaster/Energy/Foundation Adj.	Adjustment	Style	Quality
22	Heating Adjustment	Ht/Cool	Building type	Quality
23	Plumbing Adjustment	Plumbing	Building type	Quality
24	Built-in Appliances	Appliances	Building type	Quality
25	Dormer Adjustment	Dormer Roof	Quality	---
26	Single Family Basements	Sq. feet	Basement wall	Quality
27	Single Family Porches	Porch part	Sq. feet	Quality
28	Attached Garage	Siding	Sq. feet	Quality
29	Detached Garage	Siding	Sq. feet	Quality
30	Built-in Garage	Siding	Sq. feet	Quality
31	Floor Insulation Adjustment	Floor insul.	Building type	Quality
32	Mult. Res. Basement Adjustment	Sq. feet	Basement wall	Quality
33	TH End Basement Adjustment	Sq. feet	Basement wall	Quality
34	TH Inside Basement Adjustment	Sq. feet	Basement wall	Quality
35	Plaster/Energy/Fnd. Adj. (Mult)	Adjustment	Building type	Quality

<u>No.</u>	<u>Table</u>	<u>Column</u>	<u>Row</u>	<u>Page</u>
36	Fireplaces	Stories	Bldg quality	---
37	Multiple Residence Balconies	Const.	Finish	Quality
38	Multiple Residence Garages	Garage area	Wall type	Quality
39	Town House Garages	Finish	Type/size	Quality
40	Depreciation	Condition	(Eff.) age	---
41	Town House Porch/Balcony	Type	Size	Quality
42	Row House Porch/Entryway/Stairs	Type	Size	Quality
43	Site/acre Land Rates	Val/constant	Acres	Neighborhood
44	Square Foot Land Rates	Rate/constant	Area	Neighborhood
45	Frontage and Depth Adjustments plus (optional) FF rate & constant	FrAdj/DptAdj/ FF rate/const	Feet	Neighborhood
46	Outbuildings	Class	Quality	Building type
47	MH Foundation, Skirting, Cpt.	Type	Quality	1=fnd;2=skt;3=cpt
48	Mobile Home Porches	Flr/wall/roof	Sq. feet	Quality
49	Site Improvements	Quantity	Quality	1=landsc; 2=pond; 3=water; 4=sewer
50	Fr. foot rates & nbhd multipliers	FF/Mult	Neighborhood	
51-56	Exceptional Homes rates (I-VI)	Exterior Wall	Sq. feet	Style