



Neighborhood Stabilization Program
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Neighborhood Stabilization Program (NSP) Rehabilitation Standards

The following document sets forth the priorities and rehabilitation standards for city of Phoenix's Neighborhood Stabilization Program (NSP), hence forth referred to as the "NSP Rehab Standards." All rehabilitation activities assisted in whole or in part with Phoenix NSP funds shall meet these NSP Rehab Standards.

NSP Rehab Standards – Program Priorities

These standards set forth the desired outcomes that will be addressed in priority order for all NSP-assisted units by:

- improving health and safety (Section I),
- enhancing aesthetics or "curb appeal" of the property (Section II), and
- increasing energy efficiency (Section III).

NSP Rehab Standards – Program Evaluation

All NSP-assisted rehabilitation work:

- shall be completed in a professional workmanlike manner in compliance with the workmanship standards, industry standards and licensing requirements of the Arizona Registrar of Contractors.
- shall adhere to manufacturer's specifications.
- shall be performed in accordance with applicable local, state and federal laws, codes and regulations, including, but not limited to:
 - Building Codes: <http://phoenix.gov/DEVPRO/bldproc2.html>,
 - Historic Preservation Code and Design Guidelines: <http://phoenix.gov/HISTORIC/index.html>,
 - Housing Quality Standards (HQS): <http://www.hud.gov/offices/adm/hudclips/handbooks/hsg/4910.1/index.cfm>,
 - Neighborhood Preservation Ordinance (Codes of Ordinance/City Code, Chapter 39): <http://www.municode.com/Resources/gateway.asp?pid=13485&sid=3>,
 - Zoning Ordinance: <http://www.municode.com/Resources/gateway.asp?pid=13534&sid=3>.
- shall comply with permitting requirements of the city of Phoenix's Development Services Department; of which a guide may be found at: <http://phoenix.gov/BUILDING/devcntr.html>.
- shall comply with all the comprehensive rehabilitation standards, desired outcomes and performance criteria outlined in this document.

SECTION I: IMPROVING HEALTH AND SAFETY

A. Housing Quality Standards (HQS) and Health and Safety

All rehabilitation work under NSP will meet the city's NSP Rehab Standards as based on HUD's Nationally Applicable Recommended Rehabilitation Provisions (NARRP). The provisions in the NARRP are written to ensure that public health, safety and welfare are maintained or enhanced as work is performed. All work must be completed in a professional workmanlike manner in compliance with the workmanship standards and licensing requirements of the Arizona Registrar of Contractors

NSP Rehab Standards (Cont)

as established by Arizona Statute. All units assisted through city's NSP will meet, at a minimum, Housing Quality Standards (HQS) plus an assessment of the anticipated life expectancy of equipment, systems and structural elements (life expectancy of 5+ years). Units that pass this inspection would not need (or qualify for) rehabilitation assistance. These standards will include Residential Energy Standards that incorporate housing energy assessments and improvements to increase the energy efficiency or conservation of homes.

Any NSP funded acquisition or acquisition/rehabilitation will meet minimum modern, sustainable (green) building and energy efficiency standards as established by the city of Phoenix. The standards will be further supplemented with a "curb appeal" component later detailed in this document. These standards also reflect the 2006 International Residential Code (IRC), as amended by the city, federal and local lead based paint protocols, state codes, and other applicable laws and regulations. The NSP multi-unit rental acquisition and rehabilitation program will follow these standards and comply with applicable codes and ordinances for multi-family uses.

B. Pool Standards

Upon completion all NSP rehabilitation properties with pools, must adhere to pool barriers or demolition as detailed below. As feasible, the city's NSP may offer up to \$1,500.00 in rehabilitation funds to repair or replace certain parts of the pool to bring it up to proper functioning order. If the pool or any of its parts cannot be repaired or replaced for that amount, then demolition of the pool will be deemed necessary.

Pool Barriers Standards

Fences and Gates: Are required around all sides of all pools and spas, and must comply with the seven standards noted below.

1. The fence, including gates, must be 5 feet minimum height above ground when measured on the exterior side of the pool fence.
2. The fence and gates shall have no openings equal to or greater than 4 inches.
3. Minimum 45 inches between horizontal bars to prevent climbing, or use maximum 1 ¾ inch horizontal spacing between vertical bars.
4. Wire mesh or chain link to have a maximum opening size of 1 ¾ measured horizontally.
5. Provide 4 inch maximum space under a fence or gate if a hard surface; 2 inch maximum if it is dirt, gravel, grass, ECT.
6. Gates must swing outward from pool area. Latch must be 54 inch minimum above the ground.
7. Pedestrian gates must be self closing and latching.
8. Gates other than pedestrian gates may be padlocked instead of self closing and latching.

Alternative Fence/Gate: Houses may be used in lieu of a separate pool barrier if they meet the seven standards noted below.

1. All barrier doors must be self closing, self latching. Swinging doors, in new construction must swing away from the pool area; 54 inch minimum latch height.
2. Sliding doors must also be self closing and self latching. Use an approved door closer or use a separate fence/gate outside of the door, or replace the door with a hinged door, or add a hinged door over the opening.

NSP Rehab Standards (Cont)

3. Doggie doors will not be installed in the house barrier. Remove it or cover plate over it using one-way screws.
4. Window latches must be 54 inches minimum above the floor, or use screwed in stops (no thumb screws) that limit the window opening to 4 inches, or use a metal screen screwed into place to keep small children out of pool area.
5. For sleeping rooms, at least one 5 square foot window opening is required for emergency egress and rescue; unless exterior door is provided.
6. Safety glazing is required in windows and doors used as a barrier when within 5 feet of the waters edge and less than 5 feet above the deck.
7. Any bars or screens over required egress windows must be operable from the inside without special key or tool.

Pool Demolition Standards

All required permits for a demolition of a pool, shall be properly obtained to complete work. Demolition work shall include properly terminating all pool equipment and mechanical systems, and their proper removal from the premises. A minimum of three, three foot by three foot holes strategically located for proper drainage shall be jack hammered into the bottom of the pool. After which, the pool will be filled with an approved material, including clean fill dirt for the top three feet, which shall be properly water-settled during the backfill process.

SECTION II: ENHANCING AESTHETICS OF THE PROPERTY

A. "Curb Appeal" Standards

The following details the "curb appeal" portion of city's NSP Rehab Standards, describing minimum acceptable performance criteria for each element. Emphasis has been placed on improving the public or semi-public facade of property for the buyer and the surrounding neighborhood, which include three main "curb appeal" elements: 1) landscaping, 2) elevations, and 3) exterior design and paint.

Element 1: Landscaping

Landscape (Front Yard)

Upon completion, a NSP rehabilitation property will include a landscaped front yard with an automatic permanent (drip) watering system, containing a minimum of one tree per 20 linear feet, three (3) shrubs per tree, one type of groundcover and a decorative dust proofing (crushed rock / decomposed granite). Low-water use plants that reflect and enhance image of Sonoran Desert shall be utilized and turf may not be placed in any public right-of-way per Arizona State Statute. Refer to the city's approved Sonoran Desert plant species list from the North Black Canyon Corridor Overlay for permitted types of landscape materials (Phoenix Zoning Ordinance, Chapter 6, Section 654, Appendix A; <http://www.municode.com/Resources/gateway.asp?pid=13534&sid=3>).

Placement (Front Yard)

Placement of trees shall be focused upon both reducing solar radiation on the home without reducing potential day lighting opportunities, and upon shading pedestrian walkways (both public and private).

NSP Rehab Standards (Cont)

Landscape Design, Selection & Planting (Front Yard)

During rehabilitation, a minimum of three varying plot plans depicting the layout and types of the proposed watering system, landscape material (minimums specified above) and dust proofing (crushed rock / decomposed granite) for the NSP rehabilitation property shall be provided to the NSP buyer for selection. Planting holes for vegetation must be dug twice the size the container (width and depth). Soil shall be mixed with organic compost in a 50/50 measure, water settled and tamped to remove all voids. An underground (automatic) drip system to deliver water in accordance with nursery recommendations for new plants shall be provided (refer to drip system requirements below).

Drip System (Front Yard)

Upon completion, a permanent, automatic drip system will be provided with the front yard landscaping. The selected drip system shall include a timer and stations containing underground extension to all plants. All landscape material(s) and irrigation shall be installed utilizing water conservation practices. Training on use and maintenance of the drip system, plant care, setting irrigation system in accordance with nursery's recommendations shall be provided to NSP buyer by city or its contracted partner.

Crushed Rock (Front Yard)

Upon completion, an NSP rehabilitation property shall not contain non-dust proofed surfaces or dirt areas in the front yard – with preference given to lighter weight, low cost decorative ground covers (rock or similar, versus decomposed granite). Note that any selected rock (or granite) shall be of ½" to ¾" minus, (NSP buyer to select from standard pre-approved selection listed below in Table 1), and a sufficient quantity is available so that the entire area will be of the same composition and appearance. After preliminary grading is completed and the area has been cleared and grubbed, a pre-emergence control will be applied over the entire area, in accordance with the manufacturer's recommendations. The crushed rock (decomposed granite) will be evenly distributed over the area with a minimum depth of 2 inches. Excavate three inches around borders to prevent rock (granite) from washing out. Excavated dirt should be kept wet while excavating to prevent creating dust and redistributed evenly in area where rock (granite) is being installed. Containment borders shall be installed for granite to further prevent wash out. After finish grading, the rock (granite) will be lightly watered and compacted.

Grading

During rehabilitation, final grading allowing for proper drainage shall be completed for the entire property. Grading shall comply with all applicable federal, state and local codes, ordinances and industry practices.

Existing Vegetation and Debris

During rehabilitation and upon completion, all mature, salvable vegetation should remain on a NSP rehabilitation property. Removal of any existing (mature) landscape vegetation will require approval by the city's Neighborhood Services Department (NSD) or designated partner. Any fencing, debris, vegetation, etcetera will be removed from premises in order to comply with neighborhood preservation ordinances.

NSP Rehab Standards (Cont)

Driveway

Any new or (nearly entirely) repaved/repared driveways shall use 24 inch concrete driveway ribbons, filled with tile and/or decomposed granite (or similar) preventing weeds and blowing dust.

Element 2: Elevations

Building Elevations

During rehabilitation, as feasible, the NSP rehabilitation property shall incorporate architectural design elements to the front of the house. Such measures may include repair(s), alteration(s), addition(s), and/or modification(s) to existing surfaces to improve aesthetic or curb appeal and are subject to approval by the city or its designated partner. Meshing curb appeal and greening principals, emphasis shall be placed upon measures, such as hot shading with quality and durable materials, along the South, West or East front façade (street side) of the home in efforts of adding curb appeal to the building elevations.

Overhangs

Visible overhangs and covered patios shall be covered with durable light color (low LRV; no white) that matches (compliments home color), applied with modified torch down technique, or a similar technique to eliminate heat radiation.

Stucco

During rehabilitation, when stucco is used as a wall covering, the use of 3-inch to 6-inch pop outs around doors/windows, large corner stucco medallions, step-down pop out bands and stucco arches, should be provided. Finished stucco application should vary per home to include cat scratch, Santé Fe, smooth, or rough techniques. The use of wood or synthetic plastic deco shutters, ornamental iron as well as clay vents can be used in small areas or around exterior windows and gables to add depth. Brick or stone facing may be incorporated into the design. When feasible, soffits should be utilized to eliminate any exposed wood fascia.

Walls

During rehabilitation and upon completion, any existing, new or repaired site walls shall comply with local codes and ordinances. Walls visible from off site will be painted to match the building, not exceed maximum city (zoning) heights and comply with neighborhood preservation ordinances. New permanent chain link (or similar) fences are not permitted in residential neighborhoods, per city zoning code.

Element 3: Exterior Design and Paint

Exterior Design

Upon completion, the exterior design scheme composed of the home's body, trim, accent, roof and dust proofing material shall be muted and blend with rather than contrast strongly with the city of Phoenix's surrounding Sonoran Desert environment. Accent and trim colors may be appropriate, but should be used judiciously and with restraint. Significantly used colors should minimize heat / light absorption and reflectivity. The Sonoran Desert contains a full range of colors beyond just beige and tan and are appropriate for buildings and wall colors, but should contain muted shades that project and enhance the image of the Phoenix's Sonoran Desert.

NSP Rehab Standards (Cont)

Paint

During rehabilitation, the following table contains pre-approved color palettes as may be selected and used by the NSP buyer or city's designated partner (if no buyer at time of work) without further review or approval. Minor changes or comparable substitutes to these pre-approved color palettes may be approved in the field by the city or its designated partner. Alternative color palettes schemes differing from those in the table may be considered for NSP rehabilitation properties. Approvable alternative schemes submitted to the city or its designated partner shall comply with the criteria in the "exterior design" element (from above). All paint surfaces shall be properly prepared per paint manufacturer's specifications.

Table 1: Pre-Approved Color Scheme Packages

#	Body Color*	Accent Color(s)*	Trim Color*	Shingle Colors**	Rock Selections***
1					
A	Burnished Cream (DE5365, LRV 75)	Cherry Cola (DE156, LRV 10); Coffee Cream (DE5365, LRV 83)	White Heat (DEW338, LRV 87)	Amber, Brownwood, Desert Tan, Teak, Driftwood, Estate Grey	Saddleback Brown, Arizona Blonde, Madison Gold, Apache Pink
B	Verona Beach (DE6135, LRV 63)	Quite Splendor (DE5323, LRV 75); Mission Trail (DE6223, LRV 19)	Tan Plan (DE6137, LRV 35)	Amber, Brownwood, Desert Tan, Teak, Driftwood	Saddleback Brown, Arizona Blonde, Sedona Red, Madison Gold
C	Weathered Coral (DEC725, LRV 61)	Aged Eucalptus (DE5496, LRV 21)	Iron River (DEA176, LRV 8)	Desert Tan, Brownwood, Teak, Driftwood	Jesse Red, Saddleback Brown, Arizona Blonde, Yavapai Coral, Madison Gold
2					
A	Sandcastle (DEC740, LRV 65)	Center Ridge (DE6230, LRV 18); Outer Boundary (DE6021, LRV 8)	Pigeon Gray (DE6214, LRV 43)	Brownwood, Teak, Driftwood	Jesse Red, Saddleback Brown, Sedona Red, Madison Gold
B	Porous Stone (DE6220, LRV 57)	Light Beige (DE6211, LRV 80); Cellar Door (DE157, LRV 10)	Wooden Peg (DE6215, LRV 31)	Brownwood, Teak, Driftwood, Estate Grey	Saddleback Brown, Yavapai Coral, Madison Gold
C	Travertine (DEC738, LRV 55)	Pebble Walk (DE6277, LRV 41); Bannister Brown (DE6069, LRV 15)	Swiss Coffee (DEW341, LRV 83)	Amber, Desert Tan, Brownwood, Teak, Driftwood	Saddleback Brown, Arizona Blonde, Yavapai Coral, Apache Pink, Madison Gold
3					
A	Light Gray (DEC789, LRV 31)	Pearl Necklace (DEW343, LRV 86)	Black Bay (DEA188, LRV 7)	Brownwood, Teak, Driftwood, Estate Grey	Jesse Red, Saddleback Brown, Arizona Blonde, Sedona Red, Apache Pink
B	Calico Rock (DE6229, LRV 28)	Root Beer Float (DE5326, LRV 38)	Muslin (DE6227, LRV 59)	Brownwood, Teak, Driftwood	Saddleback Brown, Arizona Blonde, Yavapai Coral, Madison Gold
C	Shaggy Barked (DEC771, LRV 38)	Navajo White (DEC772, LRV 70); Dark Pewter (DE6314, LRV 13)	Shaker Grey (DE6231, LRV 13)	Amber, Brownwood, Teak, Driftwood	Jesse Red, Saddleback Brown, Arizona Blonde, Apache Pink, Madison Gold

NSP Rehab Standards (Cont)

* All paint colors were selected from Dunn Edwards

(<http://www2.dunnedwards.com/article/content/paintcenter/paintcenter.html>); however, equivalent colors from different manufactures are acceptable.

** All roof colors were selected from Oakridge Shingles

(<http://www.ocpreferred.com/worldwide/admin/tempupload/pdf.Oakridge%20Shingles.pdf>); however, equivalent colors from different manufactures are acceptable.

*** All rock selections were selected from Rock 'N Rollin' Rock Sales (<http://www.rocknrollinrock.com/id18.htm>); however, equivalent colors and quality from alternative manufactures are acceptable.

B. City of Phoenix Neighborhood Preservation Ordinance

Upon completion, NSP rehabilitation properties shall be in compliance with the city's Neighborhood Preservation Ordinance. The list below sets forth the most common violations and main maintenance standards from this ordinance; however, to access a full copy proceed to the city's Codes of Ordinance, Chapter 39, Article II online at:

<http://www.municode.com/Resources/gateway.asp?pid=13485&sid=3>.

Vegetation

The property, and the adjacent right-of way, will be free of dead or dried vegetation. Weeds / tumbleweeds on the property and the adjacent right-of way and are not to exceed six inches in height, and the lawn grass should be maintained at six inches or shorter.

Inoperable Vehicles

No inoperable vehicles may be seen from beyond the bounds of the property lines. An inoperable vehicle is a vehicle that is not equipped with all parts that are required to legally and safely operate it on public streets and/or cannot be driven under its own power. Car covers, tarps, bamboo, shades and other similar types of materials are not acceptable screening.

Junk, Litter, and Debris

Junk, litter, and debris cannot be left on the property; they must be disposed of properly.

Open and vacant buildings and structures

Windows, doors, and other openings must be kept secure so they cannot be opened from the outside.

Outside storage

Outside storage on residentially zoned properties that can be seen from beyond the bounds of the property line is not allowed. Generally, any equipment, building or landscaping materials; parts/auto parts; appliances or any scrap items may not be visible.

Fences in disrepair

Fencing and screening walls must be sound and made from the same materials. They also must be structurally sound and free from deterioration and blight. Fences in residential zones cannot be higher than three feet in the required front yard and six feet in the required back yard (setbacks).

Parking

There are limits to the amount of residential yard area that can be used for a driveway or parking, Designated parking areas must be dust-proofed according to city specifications.

NSP Rehab Standards (Cont)

Graffiti

Graffiti must be removed from all sidewalks, walls, fences, signs and other structures or surfaces visible from beyond the bounds of the property.

SECTION III: INCREASING ENERGY EFFICIENCY

A. Rehab Energy Standard(s)

The following outlines the city's NSP rehab energy standards. Similar to the city's Weatherization Assistance Program (WAP) the intent of these energy standards are to protect the health and safety of the client, increase the durability of the structure, increase the comfort of the client and reduce the energy cost to the client in a cost effective manner. These energy standards:

- have been written so that improvements in this category may come from multiple funding sources (NSP and WAP monies).
- will require an energy audit to gather, record and analyze energy efficiency data on rehabilitation structures.
- incorporate "greening" standards whenever cost effective.

Energy Audit

A site audit conducted by a Building Performance Institute (BPI) Contractor shall be completed, recording all of the relevant data on the structure needed to perform cost effectiveness tests. Note that priority is to be given to health and safety issues such as combustion safety items and combustible gas leakage, fire place, etcetera; after which, items may follow an order determined by the cost effectiveness procedure outlined in the following section. The pressure diagnostic procedure, a health and safety audit and final inspection shall be completed and subsequent findings documented.

Cost Effectiveness Procedure

The NSP rehab energy standards and the city's WAP program incorporate a performance-based energy audit procedure, focusing on optimizing investment in energy efficiency through a systems approach. To enable this program to optimize the investment in energy efficiency, the following requirements have been established for the audit procedure:

- The energy audit procedure must determine that each weatherization material/measure is cost effective by ensuring the discounted savings-to-investment ratio (SIR) is greater or equal to one.
- The energy audit procedure must assign priorities among weatherization materials/measures in descending order of SIR and must account for interactions between architectural and mechanical measures.
- In the case of WAP program funding, the energy audit procedure must ensure that the overall SIR for the entire package of materials/measures, including the cost of incidental repairs, is greater or equal to one. Incidental repairs are only allowed if they are necessary to make the installation of weatherization materials effective. Items that do not meet the greater or equal to one ratio rule, may still be funded under the NSP program.
- Funds spent to abate energy related health and safety hazards do not need to be included in the preceding requirements. Funds can be spent to eliminate health and safety hazards when

NSP Rehab Standards (Cont)

the elimination of the hazard is necessary before or because of the installation of weatherization materials.

- If in addition to NSP funding WAP program funding is being used, written authorization must be received from the Arizona Department of Commerce's Energy Office (<http://www.azcommerce.com/Energy>) before the installation of measures/materials that do not meet the established cost effectiveness or health and safety requirements.
- To determine the cost effectiveness of weatherization materials/measures, the contractor must use a computer audit approved by the Arizona Department of Commerce's Energy Office or an appropriate priority list for homes that meet the criteria contained in the list; such as REM/Design analysis software.

Climate Zones

Arizona Climate Zones used for the cost effectiveness priority lists may be found online, at: http://www.azcommerce.com/doclib/energy/climate_zones_az.pdf.

Pressure Diagnostic Procedure

The city's NSP energy rehab standards shall incorporate the pressure diagnostic procedures established in the city's WAP program requirements (pgs. 15-17). The pressure diagnostic procedures are to be followed when performing air leakage diagnostics and repair. These procedures provide crews with immediate feedback on the effectiveness of air sealing work, insure that repairs will provide long-term energy benefit in a safe manner, and provide essential management information needed to monitor the cost effectiveness of the air sealing programs. The pressure diagnostic procedures includes four tests, which includes the initial air leakage and room pressure test, duct repair, envelope air sealing and room pressure balancing.

- Pressure Diagnostic Decision Tree – The pressure diagnostic decision tree provides assistance to agency personnel in identifying the minimum level of pressure testing that needs to be performed to meet the Weatherization Program requirements. The decision tree is comprised of two levels of housing characteristics and corresponding test requirements. In all cases, air sealing can only be performed in conjunction with pressure diagnostics.
 - Level 1: Homes with central forced air heating or cooling. Complete diagnostic process must be following.
 - Level 2: Homes with no central forced air heating or cooling. The use of pressure diagnostic process is optional; however, with exceptions that 1) pressure diagnostic must be complete done homes where the cost of the space heating and/or cooling provides possible cost effective envelope sealing opportunities, and 2) the worst case pressure test must be performed in all zones that contain a combustion appliance.
- Economics – The cost effectiveness of pressure diagnostic and repair is to be based on a comparison of the present valued of the reduced air leakage and the cost (labor and materials) to achieve the reduction.

Energy Efficiency Improvements and/or Replacements

Energy efficiency improvements and/or replacements are based on a calculation of a 20 year payback considering replacement cost and energy savings. All materials specified must be installed per the manufacturer's instructions, applicable (building/construction) codes and the city's NSP Rehab Standards. Energy Star Qualified Homes standards should be applied whenever applicable, to any building component that is replaced or modified during NSP funded activities. This includes

NSP Rehab Standards (Cont)

selecting Energy Star-qualified products and using energy-efficient related products to replace inferior ones, including insulated windows and doors, and additional insulation.

Green Building Rehabilitation Practices

In addition to increasing energy efficiency, the NSP energy rehab standards will incorporate green building rehabilitation standards to maintain a healthy environment. These specifications will include the following:

- Use of low/no volatile organic compound paints, primers, adhesives and sealants;
- Use of formaldehyde free particle board;
- All floor coverings to have the Carpet and Rug Institutes Green Label (no long pile carpets);
- Use of Energy Star bathroom and kitchen fans exhausting to the outside;
- Use of low flow shower heads, water faucets, toilets, etcetera;
- Use of no or low glare lighting and surfaces;
- Use of three way sleep switches to turn off power to electronics and other appliances during night/absences;
- Procedures to assure that each unit has 15 cubic feet of fresh air per minute per occupant following completion of work (ventilated at 0.35 air changes per hour);
- Use of tankless hot water systems with sealed combustion;
- Hot and cold water pipe insulation installed;
- Use of moisture resistant material in wet areas;
- Venting cloths dryers to the outside;
- Integrated pest management systems will be followed;
- Maximizing use of recycled materials and recycling construction waste;
- Information materials for occupants to maximize the benefits of the systems and approaches;
- Use of Energy Star labeled lighting fixtures and replace incandescent bulbs with compact fluorescent bulbs (or LED).

These standards also encourage working closely with local constructors and/or local building material suppliers, assisting in identification of those building supplies and or practices that are designated as green, environmentally safe products to help contractors meet these standards of the program.

Energy Standards – Systems, Components, Equipment and Fixtures Guidelines

HVAC Equipment

Replacement – During rehabilitation, HVAC equipment replacement should be done if existing unit is equal to or older than twenty (20) years old, with other considerations for replacement made using the following information as a guide. To determine which is the best choice, replacement or repair, a comparison of the cost to repair the equipment plus the lost savings opportunity of the new equipment must be made to the cost of replacing the equipment.

Repair or Replace Determination Guidelines – During rehabilitation, when determining to repair or replace inoperable equipment, compare the cost to repair to the cost of replacement minus the saving that will result from the new replacement equipment.

2006 IRC Energy Code:

Table 2*: Air Conditioner/Heat Pump (cooling only)

NSP Rehab Standards (Cont)

Climate Zone	1	2	3	4	5	6
Present Value	none	\$520	\$110	\$360	\$140	\$600

* Present value per an increase in SEER of one.

Table 3*: Forced Air Furnace (natural gas or propane)

Climate Zone	1	2	3	4	5	6
Present Value	\$210	\$40	\$110	\$45	\$110	\$25

* Present value per one-percent increase in the AFUE.

Example – Repair of a 15 year old Air Conditioner:

- Estimated repair cost of \$2000;
- Estimated SEER of existing equipment;
- Estimated Cost of 5 ton 13 SEER replacement of \$4000;
- Going from a SEER 8 to a SEER 13 in climate zone 2 provides \$2600 (5 X 520) in potential savings (Difference in seer(5) X Climate Zone Present Value, \$520);
- The cost of the new 13 SEER minus the saving equals \$1400 (\$4000 - \$2600);
- The cost of the new equipment minus saving is less than the repair cost;
- In this example it would be cost effective to replace the equipment.

Acceptable replacements:

- AC: 13 SEER (Seasonal Energy Efficiency Rating);
- Heat Pump: 7.7 HSPF – (Heating Seasonal Performance Factor);
- Combustion furnace: 80% AFUE (Annual Fuel Utilization Efficiency).

Note – Electric resistance heating can be used only when the utility costs for the structure can be documented to be equal to or less than the International Energy Conservation Code (IECC) Systems Analysis (Chapter 4) approach for design of like architectural characteristics. The analysis will be completed utilizing a combustion furnace for the standard design with an efficiency value of 80% AFUE.

Evaporative Cooler Installation – It is strictly prohibited to install an evaporative cooler on the ductwork of a forced air heating or cooling system that did not previously include an evaporative cooler. Replacing an existing evaporative cooler with a new evaporative cooler on a forced air heating or cooling system is allowed. All existing evaporative coolers must be equipped with a damper system that allows the cooler to be isolated from forced air ductwork or the conditioned space

Duct Work

Replacement must meet post testing of leakage and may not exceed 3% of the house floor area. Existing duct leakage should be sealed, which may require additional testing through the construction process).

- Remove all registers and wall/duct openings and seal with mastic or approved equivalent;

NSP Rehab Standards (Cont)

- Seal all accessible duct connections including the drywall to boot connections with duct mastic or approved equivalent;
- Installation of new duct systems will comply with construction Energy Conservation Air Distribution Systems standard;
- All joints in the air distribution system will be sealed with duct mastic or approved equivalent;
- For duct systems located outside the conditioned space, total duct leakage in CFM, measured at 25 Pascal's pressure, will be less than or equal to 3% of the square footage served by the system (e.g., 1,000 Sq. ft. unit x 3% = 30 CFM allowable leakage);
- All ducts located outside the conditional space will be insulated to a minimum of R-8;
- Airflow to each room will match design airflow calculations to within +/- 10%.
- Increase air ventilation between rooms by installing shorter doors (1.5 inches) or air transfer grills above door entrances.

Gas Appliance (Draft Test)

A combustible appliance zone (CAZ) and carbon monoxide test must be completed. Carbon monoxide test must be completed on roof mount (or exterior) units to insure proper function. In addition to draft testing flues, a smoke test to check natural draft shall be required.

Indoor Air Quality

The house is a system and each part must complement the whole. Consideration shall be given to how the indoor environment is affected by construction techniques, which includes all air flow movement from existing and new equipment. Flooring must be cleanable (old carpeting should be considered for replacement with tile). The following additional items shall also be addressed:

- Exhaust hoods above gas ranges must be vented to the outside with back draft dampers;
- Un-vented combustion appliances (fireplaces, heaters or gas logs) are not allowed;
- A carbon monoxide detector, hardwired, will be installed in all Units with an attached garage or with any combustion appliance located in the conditioned space**;
- Smoke detectors will be installed in accordance with 2006 IRC, section R313**.

** Use 120 Volt interconnected UL approved combination type c/o smoke detectors.

Room Pressures

Room pressures will be balanced with jump ducts or wall vents. Door vents should only be used if no other means is available. Room Pressures will comply with the new construction Energy Conservations standard and Air Conditioning Contractors of America (ACCA) "MANUAL J". Under normal operating conditions, an air handler cannot create room pressures with a magnitude greater than +/- 3.0 Pascal's, with reference to outside, anywhere in the Unit.

Renewables

Renewable energy systems shall meet the requirements established by the State of Arizona for state tax credits which imposed several requirements on the seller of solar devices in order to qualify the equipment and application. Title 44, chapter 11, article 11 of the Arizona revised statues (44-1761- Definitions, and 44-1762 - Solar energy device warranties; installation standards; inspections) provides details on the requirements.

Water Heater Systems

NSP Rehab Standards (Cont)

Water heaters should be set at 120 degrees. Install water heater blanket unless manufacturer-warning label prohibits its use (minimum R19). New electric water heater should be a type that allows water heater blanket. Water heaters internal to a home shall be placed in a protected enclosed environment with a fresh air intake.

Windows

Replacement must meet U-Factor of 0.60, solar heat gain coefficient of 0.40, visible transmittance of 0.57.

Insulation / Infiltration

Minimum R-30 for attic must be installed; and, if replacement is required, R-13 for walls, and R-19 for raised floors.

- Insulation must be installed such that there are no gaps, voids, compression or wind intrusion of the insulation.
- The insulation and air barrier (e.g. sheetrock) must be continuous and aligned in all cases. Sound insulation is required in party walls / knee walls / pony walls etc.
- For WAP funding, all items on the Thermal Bypass Inspection Checklist must be verified where accessible.
- Items not meeting these standards must be repaired unless the repair is not cost effective.

Shade Screens

Shade screens shall be installed on exposed South, East, and West windows.