APPENDIX E

RPLP ENERGY EFFICIENCY STANDARDS

This section is included for additional guidance to be applied on rehabilitation/replacement of systems/items included in the agreed-upon scope of work.

RPLP rehabilitation projects shall incorporate energy efficiency components to the extent that doing so is economically feasible and, if applicable, as allowed by historic preservation rules.

At a minimum, any component of the building which is replaced, must meet the following standards:

Component	**Standard**
All Appliances	Energy Star
Windows	Insulated, double pane, U-factor of 0.35 or below and a SHGC of 0.30
Shingles	Algae resistant (AR) with a minimum 30-year warranty
Faucets, Shower heads and Toilets	EPA "Watersense" labeled
Light Fixtures	Initially installed light bulbs in all fixtures must be LED or pin-based lighting
Cooling	Heat Pump: 15 SEER/8.8 HPSF
Heat	Gas: 90% Efficiency or greater, Heat Pump: 15 SEER/8.8 HPSF
Insulation	Meet IBC 2012 if framing allows
Insulation – Attic	Meet IBC 2012 if framing allows
Insulation - Floor	Meet IBC 2012 if framing allows
Electric Tank Hot Water Heater	UEF Value of at least 0.93

TABLE R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U-FACTOR*[b]	SKYLIGHT[b] *U-FACTOR*	*GLAZED FENESTRATION SHGC*[b, e]	CEILING *R-VALUE*	*WOOD FRAME WALL R-VALUE*	*MASS WALL R-VALUE*[i]	FLOOR *R-VALUE*	*BASEMENT*[c] WALL *R-VALUE*	*SLAB*[d] *R-VALUE & DEPTH*	*CRAWL SPACE*[c] WALL *R-VALUE*
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	>0.32	0.55	NR	49	20+5 or 13+10[h]	19/21	38[g]	15/19	10, 4 ft	15/19

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.

b. The fenestration *U-factor colu*mn excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

FROM 2012 IBC SECTION 402.1.1

1. General

1.1. Where feasible and applicable, the Department of Energy Single Family Work Specifications (see Standard Work Specifications at https://sws.nrel.gov/) shall be referenced.

1.2. All major structural and durability concerns must be addressed.

2. Attic - Ceiling & Knee Walls

When made easily accessible by rehabilitation and when applicable or when a related building component is replaced it shall be replaced according to this standard:

2.1. There shall be a continuous, durable air barrier enclosing the conditioned space. This includes features such as chases, knee walls, soffits, garage interfaces, intersecting walls and dropped ceilings.

2.2. Air sealing shall be required at the attic plane - Any visible hole or crack leading from the attic into the building or building cavities shall be sealed (e.g., plumbing penetrations, electrical penetrations, chases, dropped soffits, chimney penetrations, top plate-to-drywall connections, bonus room floors, balloon framing).

2.3. Insulation shall be installed at walls and ceilings to manufacturer specifications with no gaps, voids, compression or wind intrusion.

2.4. Insulation and the air barrier shall be installed in physical contact with each other.

2.5. Accessible attics shall be insulated to R-38 or greater.

2.6. Knee walls shall be insulated and backed with support material.

2.7. Attic accesses will be insulated to a minimum of R-30. This will require an insulated box be constructed for attic pull-down stairs.

3. Exterior Walls - Including Windows & Doors

When made easily accessible by rehabilitation and when applicable Or when a related building component is replaced it shall be replaced according to this standard:

3.1. There shall be a continuous, durable air barrier enclosing the conditioned space. This includes features at garage & storage interfaces and attached porches.

3.2. Air sealing shall be required at the exterior walls - Windows, doors, and any visible hole or crack leading from the building to the exterior shall be weather-stripped or sealed.

3.3. When installed insulation shall be to manufacturer specifications with no gaps, voids, compression or wind intrusion. Insulation shall be insulated to R5 or greater.

3.4. When installed, insulation and the air barrier shall be in physical contact with each other.

3.5. Replacement windows, if installed, shall be ENERGY STAR labeled. At a minimum, replacement windows shall be insulated, double pane, U-factor of 0.35 or below and a SHGC of 0.30.

4. Foundation- Crawl Space and Basement

When made easily accessible by rehabilitation and when applicable Or when a related building component is replaced it shall be replaced according to this standard:

4.1. There shall be a continuous, durable air barrier enclosing the conditioned space.

4.2. Air sealing shall be required at the subfloor - All penetrations between conditioned and unconditioned space shall be sealed.

4.3. Insulation shall be installed and/or fixed in floors to manufacturer specifications with no gaps, voids, or compression.

4.4. For vented crawls, floors must be insulated to meet code. For closed crawl spaces, foundation wall or floors shall be insulated to code.

4.5. Insulation and the subfloor shall be installed and/or fixed to be in physical contact with each other.

4.6. All crawl spaces shall have a 100 percent ground cover as required by the NC building code.

4.7. Buildings with crawl spaces that show signs of standing water shall not be included in the program unless drainage is a part of the scope of work.

5. Heating & Cooling- Equipment & Ductwork

When made easily accessible by other rehabilitation Or when a related building component is replaced it shall be replaced according to this standard:

5.1. All accessible duct connections shall be sealed with a UL-listed bucket mastic product.

5.2. All uninsulated ductwork outside the conditioned envelope shall be insulated to R-8.

5.3. Replacement heating and cooling systems shall be rated at or above the following efficiencies:

Furnace	90%
AC (w/furnace)	15 SEER
Heat Pumps	15 EER/8.8 HSP

6. Lighting and Appliances

6.1. All light fixtures shall utilize fluorescent lamps (CFLs), light emitting diodes (LEDs) or Pin bulbs.

6.2. Appliances (e.g. refrigerator, dishwasher, clothes washer), if installed, shall be ENERGY STAR labeled.

6.3. New water heaters shall have a Minimum UEF as indicated in the table:

Water Heater Type:	Minimum UEF Value
Electric Tank	.93
Gas Tank	.60
Gas Tankless	.61
Heat Pump	Any

7. Combustion Safety

7.1. If existing gas equipment will remain atmospherically vented and scope of work includes air-sealing of the building envelope, BPI protocol or other combustion safety testing protocol must be completed to verify appliances are not backdrafting into the building.

7.2. Buildings containing vent-free gas logs or gas/kerosene space heaters shall not be retrofitted until units are permanently removed.

7.3. If gas equipment is replaced and gas appliances are installed inside of the conditioned space, other than gas ranges, the new appliances shall be direct-vent or power-vented.

7.4. If any gas appliances remain inside the building envelope, one carbon monoxide (CO) detector shall be installed outside of each bedroom or sleeping area and according to manufacturer specifications.