



APPENDIX M

UNIVERSAL DESIGN CHECKLIST REQUIRED AND BONUS BEST PRACTICES

Universal design concepts target all people of all ages, sizes, and abilities and is applied to all buildings. The Center for Universal Design at North Carolina State University defined universal design as, “design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.” Or as Steve Hoffacker, Certified Aging in Place Specialist – Master Instructor, puts it, “Universal design is providing all functional and operational aspects of a home (controls, doorways, passageways, appliances, fixtures, closets, cabinets, windows, door and cabinet hardware, and more) where they can be used by essentially anyone in the home, whether they live there full-time or are just visiting.”

Comprehensive integration of universal design best practices can make homes safe and accessible for everyone, regardless of age, physical ability, or stature. This checklist of universal design best practices was adapted from The Center for Universal Design at North Carolina State University publication “Gold, Silver and Bronze Universal Design Features in Houses.”

This checklist is divided into three divisions.

- Division 1 **Required** Best Practices
- Division 2 **Bonus** Best Practices.
- Division 3 Universal Design Resources

Division 1: Required Best Practices (Fulfills Green Streets Criteria Baseline Criterion 7.12)

The Universal Design practices covered in this section are deemed to be construction best practices and of no or low additional cost.

Division 2: Bonus Best Practices

The Universal Design practices covered in this section, while still considered best practices, may be of moderate additional cost or unique to each home’s construction. Community Development Block Grant Disaster Recovery (CDBG-DR) Housing projects with an interest in pursuing the complete installation of these bonus best practices are eligible to apply for additional funding.



DIVISION 1: REQUIRED BEST PRACTICES

SECTION 1. ENTRANCE

□ 1.1 Stepless Entrances

Install at least one stepless entrance. If only one, not through a garage or from a patio or raised deck.

- Level bridges to uphill point.
- Drive and garage elevated to floor level, so vehicles do the climbing.
- Earth berm and bridge and sloping walk details.
- Site grading and earth work (with foundation waterproofing) and sloping walks at 1 in 20 maximum slope.
- Avoid ramps. If ramps are used, integrate into the design.

□ 1.2 Other Entrances

- One-half inch maximum rise at entrance thresholds.
- Provide clearance/maneuvering space at doors to comply with ANSI A117.1.
- Space at entry doors should be a minimum 5' x 5' level clear space inside and outside of entry door for maneuvering while opening or closing door.
- Clear door opening width (34" minimum = 36" wide doors), for all entrance doorways.

□ 1.3 Other Entrance Features

- Light for operating at entry doors: focused light on lockset, general illumination for seeing visitors at night, and/or motion detector controls that turn on lights when someone approaches the door to eliminate the problem of dark approaches to home and adds a sense of security.
- View of visitors for all people, including children and seated users through sidelights, wide angle viewers, TV monitors, windows in doors, and/or windows nearby.
- A place to put packages while opening doors: built-in shelf, bench or table with knee space below located on the outside next to the door.
- A way for visitors to communicate with residents, such as lighted doorbell at a reachable height, intercom with portable telephone link, and/or hardwired intercom.
- Address/house number should be large, high contrast, located in a prominent place, easy for friends and emergency personnel to locate.

SECTION 2. CIRCULATION

□ 2.1 Interior Circulation

- At least one bedroom and accessible bathroom should be located on an accessible ground floor entry level (same level as kitchen, living room, etc.).
- Clear door opening width (32" minimum, 34" - 36" wide doors), for all doorways. Consider Interior pocket doors and when fully open door should extend 2" minimum outside door jamb and be equipped with open-loop handles for easy gripping.
- Clear floor space (18" minimum) beside door on pull side at latch jamb provides space to move out of the way of the door swing when pulling it open.
- Circulation route (42" minimum width) to provide maneuvering room in hallways/archways.
- Turning space in all rooms (60" diameter required, 66" diameter preferred).
- An open plan design, minimizing hallways and doorways and maximizing sight lines.
- Floor finishes that minimize glare, are slip resistant, & low resistance to walking or rolling.



2.2 Vertical Circulation

- Stair handrails placed on both sides of stairs.

SECTION 3. BATHROOMS

3.1 Adequate Maneuvering Space

- Adequate maneuvering space: 66" diameter turning space in the room and 30" x 48" clear floor spaces at each fixture. Spaces may overlap.
- Provide clear space per ANSI 117.1 in front and to one side of toilet to allow for easy maneuvering to and around toilet.
- Toilet centered 18" from any side wall, cabinet or tub.

3.2 Toilet

- Install all comfort height toilets at height of 17 to 19 inches from the floor to the seat top.

3.4 Extra Blocking / Grab Bars

- Extra blocking in walls around toilet, tub, and shower allows for future placement and relocation of grab bars while assuring adequate load bearing.

3.5 Fixture Controls - Bathroom

- Single-lever water controls at all plumbing fixtures and faucets.
- Mix valve with pressure balancing and hot water limiter prevents scalding people.
- Adjustable height, movable hand-held shower heads in all tubs and showers, in addition to fixed heads, if provided. Single lever diverter valves if needed.
- Offset controls in tub/shower with adjacent clear floor space allows for easy access from outside the tub with no inconvenience when inside.

3.6 Mirrors

- Long mirrors should be placed with bottom no more than 36" above finished floor and top at least 72" high. Full-length mirrors are good choices.

SECTION 4. KITCHENS

4.1 Cabinets / Storage

- Space between face of cabinets and cabinets and walls should be 48" minimum.
- Full-extension, pull-out drawers, shelves and racks in base cabinets for easy reach to all storage (NOT REQUIRED, BUT RECOMMENDED AND PREFERRED).
- Adjustable height shelves in wall cabinets.
- Pantry storage with easy access pull-out and/or adjustable height shelves for easy reaching of otherwise hard-to-get items.

4.2 Fixture Controls - Kitchen

- Single-lever water controls at all plumbing fixtures and faucets.

4.3. Appliances (if provided)

- Front mounted controls on appliances to facilitate easy reach.
- Side-by-side refrigerator allows easy reach of otherwise hard-to-get items, particularly if pull-out shelving is provided.



SECTION 5. SWITCHES AND CONTROLS

5.1 Light Switches

- Locate light switches above floor, 36" - 44" maximum.
- Easy-touch rocker or hands-free switches.

5.2 Electrical Outlets

- Install electrical outlets, at least 20" minimum height from the floor.
- Place additional electrical outlets at bed locations and desk for equipment, four-plex boxes each side for computer and electronic equipment as well as personal use equipment.

5.3 Electrical Panels

- Locate electrical panel with top no more than 54" above floor located with a minimum 30" x 48" clear floor space in front.

5.4 Thermostats

- Place thermostats at 48" maximum height.

SECTION 6. GARAGES / CARPORTS

6.1 Garage Doors

- Install power operated overhead doors.

SECTION 7. HOME AUTOMATION

7.1 Lights

- Motion detector light switches in garages, utility spaces, entrances, and basements.
- Remote controls for selected lights.

7.2 Heating and Cooling System

- Remote controls for heating and cooling. (May connect to Green Streets required smart thermostat.)

7.3 Safety Features

- Audible and visual indicators for doorbell.
- Audible and visual indicators for smoke detectors.

SECTION 8. STORAGE

8.1 Storage and Closets

- 50% of storage to be no more than 54" high.
- Adjustable height closet rods and shelves allow for flexibility of storage options.

SECTION 9. HARDWARE

9.1 Knobs, Handles and Pulls

Install easy to use hardware, requiring little or no strength or flexibility.

- Use lever door handles and / or push plates.
- Install loop handle pulls on drawers and cabinets or use touch latches or mechanical latches (NOT REQUIRED, BUT RECOMMENDED AND PREFERRED).
- Provide keyless locks.

SECTION 10. WINDOWS

10.2 Window Height

- Install windows for viewing with a 36" maximum sill height.



DIVISION 2: BONUS BEST PRACTICES

SECTION 1. ENTRANCE - BONUS

□ 1.2 Other Entrance Features

- Weather protection shelter while unlocking and opening doors, such as porches, stoop with roof, awnings, long roof overhangs, and/or carport.

SECTION 3. BATHROOMS - BONUS

□ 3.3 Sink

- Countertop lavatories preferred with bowl mounted as close to front edge as possible.
- Wall hung lavatories acceptable with appropriate pipe protection.
- Knee space under lavatory (29" high) allows someone to use lavatory from a seated position. May be open knee space or achieved by removable vanity or fold-back or self-storing doors.
- Pipe protection panels must be provided to prevent contact with hot or sharp surfaces.
- Pedestal lavatories are not acceptable

□ 3.6 Shower / Tub

- Minimum 5' x 3' (4' preferred), deep curbless shower. OR
- Tub with integral seat, waterproof floor, and a floor drain. OR
- Other bathrooms in the same house may have a tub with an integral seat or a 3' x 3' transfer shower with "L" shaped folding seat and 1/2" maximum lip (curb) in lieu of fixtures described above. When more than one bathroom has the same type of bathing fixture (a tub, shower, wet area shower), at least one shower should be arranged for left-hand use and one for right.

SECTION 4. KITCHENS - BONUS

□ 4.3. Appliances

- Cook top or range with staggered burners and front or side mounted controls to eliminate dangerous reaching over hot burners
- Cook top with knee space below allows someone to use the appliance from a seated position. May be open knee space or achieved by means of removable base cabinets or fold-back or self-storing doors. Pipe protection panels must be provided to prevent contact with hot or abrasive surfaces.
- Built-in oven with knee space beside, set for one pull-out oven rack at the same height as adjacent counter top OR drop-in range with knee space beside, top set at 34" above finished floor.
- Dishwasher raised on a platform or drawer unit, so top rack is level with adjacent countertop, puts bottom racks within easy reach requiring less bending.

□ 4.4 Counters

- Contrasting color border treatment on countertops. Color or contrast difference allows easy recognition of the edges of counters and the different heights to prevent accidental spills.
- Stretches of continuous counter tops for easy sliding of heavy items.



SECTION 6. GARAGES / CARPORTS - BONUS

□ 6.2 Garage Entrance

- Provide extra length and width inside for circulation around parked cars.
- Door height and headroom clearances (8' minimum) for tall vehicles or provide alternative on-site outdoor parking space.
- Do not install entrance ramps in garages.
- If necessary, to provide step-free entrance, use a sloping garage floor (with through-the-wall vents at bottom of slope to release fumes) in lieu of stepped entrance with ramp from garage to house.

SECTION 10. WINDOWS - BONUS

□ 10.1 Window Types

- Install casement and crank operated windows.

DIVISION 3: UNIVERSAL DESIGN RESOURCES

Building Zero-Step Entries

www.jlconline.com/projects/building-zero-step-entries_o

Enterprise Green Communities Universal Design Specifications (Note: Time saving specifications.)

www.enterprisecommunity.org/download?fid=4713&nid=3575

Gold, Silver and Bronze Universal Design Features in Houses

projects.ncsu.edu/www/ncsu/design/sod5/cud/pubs_p/docs/GBS.pdf

Practical Guide to Universal Home Design: Convenience, Ease and Livability

www.environmentsforall.org/files/2015/10/practicalguide.pdf

Residential Remodeling and Universal Design (Note: Helpful images of best practices.)

www.huduser.gov/publications/pdf/remodel.pdf

Should it Cost More to Build or Renovate With Universal Design?

www.stevhoffacker.com/2018/11/10/should-it-cost-more-to-build-or-renovate-with-universal-design/

Universal Design Strategies

www.stevhoffacker.com/universal-design-strategies/

What is Design for Independent Living?

www.nahb.org/Education-and-Events/Education/Designations/Certified-Aging-in-Place-Specialist-CAPS/Additional-Resources/What-is-Design-for-Independent-Living