



Design and Construction Standards

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Loveland Housing Authority, Loveland, Colorado

September 2019

The following are Design and Construction Standards to be used for New Construction projects, current as of September 11, 2019. These standards should also be used for Major Rehabilitation projects where appropriate.

Sustainability Requirements

- General for LIHTC Projects: Meet or exceed requirements for compliance with mandatory and targeted credits of Enterprise Green Communities (EGC).
- Use materials and products with recycled content wherever possible.
- Use Low VOC interior adhesives, sealants, paints and stains.

Operations & Maintenance Manuals

- Contractor shall organize O & M manuals in electronic PDF format only, provided on flash drive.
- O & M manuals shall be reviewed and approved by the Architect and Consulting Engineers prior to being forwarded to LHA.

Warranty Requirements

- Contractor shall provide warranties or bonds scanned in electronic PDF format, organized by CSI division of work and provided on flash drive.
- General Building Warranty: Minimum 1-year. Contractor to provide Alternate pricing for 2-year general building warranty.
- Landscaping and Site Irrigation Systems: 2-year.
- Specific Product Warranty Requirements: As specified elsewhere.

Demonstration and Training Requirements

- Contractor shall provide in-person training for designated LHA Maintenance staff for all major mechanical systems, controls, elevators, etc. as applicable to the project scope.
- Contractor shall videotape training sessions and provide to LHA in DVD format.

Required Spaces

- Janitorial Equipment Rooms: Provide at least one (1) equipment room for each floor of multi-floor buildings with common corridors. Minimum size: 80 sq. ft. each, unless otherwise approved. Provide terrazzo mop basin or raised fiberglass mop sink in each room, with stainless steel mop/broom holder, Bobrick or equal.
- Mechanical Equipment Rooms: Provide equipment rooms of minimum size to accommodate all specified mechanical equipment, with adequate clearances for maintenance and servicing. Provide direct exterior access where feasible.

- Common Laundry Room: Provide one (1) locked room in all developments for one (1) set of common washer/dryer units, for use by residents when individual appliances are broken or awaiting repair or replacement.
- Table and Chair Storage: Provide adequate storage space for the anticipated quantity of tables and chairs for common gathering areas, located directly off of the common room. Protect storage room walls with chair rails or line with painted plywood. For access, provide a pair of 3'-0" wide doors or a single 4'-0" wide door.

Unit Design

- In-Unit Laundry: Provide closets or utility rooms large enough for standard size, side-by-side washers/dryers. Ensure that adequate space exists behind the dryers for vent hose connections and in front of appliances for closet door clearances.
- Coat Closets: Provide minimum 2-1/2 lin. ft. of closet rod space at the entry door of each unit.
- Linen Closets: Provide linen closets in each apartment, where feasible.
- Pantry Closets: See Cabinetry section below.
- Closet Space: Provide minimum 4 lin. ft. of closet rod space in each bedroom closet.

Landscaping and Site Irrigation

- Landscape Materials: Xeriscape and drought-tolerant turf, trees and plant materials, as approved by the jurisdiction through planning/entitlement approvals. Minimize the amount of irrigated turf, and use primarily for active play areas, tree lawns along public streets and similar locations.
- Dry Zones: Provide a dry zone of mulch without irrigation around all building foundations.
- Tree Species: Do not use fruit- or nut-bearing trees, i.e. crabapples with fruit.
- Tree Calipers: Minimum 1-1/2" caliper, unless smaller sizes are allowed by applicable development standards for affordable housing developments.
- Shrub Species: Avoid the use of deciduous shrubs with thorns or berries.
- Shrubs: Minimum 5-gallon containers, unless smaller sizes are allowed by applicable development standards for affordable housing developments. Do not use less than 2-gallon container sizes.
- Ornamental Grasses, Vines, Etc.: Only as approved on an individual project basis, minimum 1-gallon containers.
- Site Irrigation System: Design with a combination of pop-up spray and rotary spray heads, as appropriate to the size and type of turf areas. Use drip emitters for shrub and planting beds.
- Site Irrigation Controller: Rainbird Maxicom controller required, complying with EGC criteria, with dedicated telephone line.

Brick and Stone Masonry

- General: Specify durable masonry materials with integral color, where appropriate for the project scope and budget.
- Brick: Design, texture, color(s) and manufacturer as recommended by the Architect for the specific project design.
- Concrete (Block) Unit Masonry: Basalite or equal.

- Stone: Manufactured stone veneer, Eldorado Stone or equal. Use fully mortared installation over expanded metal reinforcing; dry stack is not acceptable unless specifically approved.

Exterior Stucco

- General: Specify minimum 2-coat, fiber-reinforced cementitious stucco system with pre-tinted acrylic finish coat, installed over expanded metal lath over stucco weather barrier, El Rey Stucco, Rio Grande or equal. Provide galvanized metal accessories, including corner and casing beads, control and expansion joints, and weep screeds.

Exterior Siding and Trim Materials

- General: Specify prefinished exterior finish materials where appropriate for the project scope and budget.
- Siding: Prefabricated cement fiber siding, horizontal bevel lap, board and batten, or panel pattern(s) as appropriate, HardiPanel, LP Smartside or equal.
- Soffits: Prefabricated cement fiber ventilated soffit board, Hardi, LP Smartside or equal.
- Corner Trims and Casings: Match siding materials.
- Fascias: Prefabricated cement fiber fascia boards, Hardi, LP Smartside or equal. Where covered in metal, use prefinished galvanized metal or aluminum, minimum 22-gage.
- Metal Handrails and Guardrails: Prefinished powder-coated finish preferred.

Interior Gypsum Wallboard

- Standard Interior Drywall: Minimum 5/8" thick.
- Fire-Rated Interior Drywall: Minimum 5/8" thick, Type X.
- Moisture-Resistant Backer Material at "Wet" Areas or as Backer for Ceramic or Porcelain Tile: Use glass-fiber mesh tile backer board, Dens-Shield or equal, or cementitious backer board, Durock or equal.
- Texture: Spray-applied "knock down" texture preferred. 3-coat smooth or other specialty texture is not allowed.

Interior Casings, Base and Trims

- General: Painted MDF preferred, except in "wet" areas. Kitchens, bathrooms and laundry rooms should have 4" high coved rubber base.
- Casings: Minimum 1" x 2", square cut.
- Base: Minimum 1" x 4", square cut.
- Window Sills: Painted MDF, plastic laminate or other solid surface composite material. Provide eased edges and skirt trim, and rounded corners if sill projection is more than 1-1/2".

Roofing, Gutters and Downspouts

- Shingles: Textured, laminated, fiberglass-reinforced asphalt shingles, U.L. Class A, impact-resistant type, 30-year warranty, by Owens-Corning, Elk, CertainTeed, Malarkey or equal. Tamko is not approved.

- Primary Underlayment: 30-lb. asphalt saturated and coated organic felt primary roof underlayment over the entire roof surface.
- Secondary Underlayment: 40-mil single-ply elastomeric sheet-type secondary underlayment, Grace Ice and Water Shield or equal, at overhanging roof eaves and rake ends (to the minimum extent required by applicable building codes), and all roof valleys.
- Prefinished Metal Roofing: Minimize the use of metal roofing, using for awnings and similar accent areas. Metal roofing for these areas should be prefinished, interlocking standing seam type, minimum 1-1/2" high seams with maximum 16" wide flat pans, minimum 24 gage.
- Sheet Roofing: Minimize the use of "flat" roof areas, using for mechanical equipment roof wells or similar limited areas, unless the approved architectural design of the building dictates flat roof elements. Sheet roofing for these areas should be TPO, minimum 60-mil thick, U.L. Class A, by Johns-Manville, Firestone, Versico, Carlisle or equal, white or grey.
- Gutters: Prefinished metal, minimum 26-gage, seamless construction preferred. Square or half round profiles are preferred to ogee profiles.
- Downspouts: Prefinished closed box-type. Avoid the use of open-faced boxes, unless approved. Provide minimum 3'-0" extensions at downspout discharges.

Cabinetry and Cabinet Hardware

- General Cabinetry Design: Ensure that cabinetry is laid out to avoid conflicts between cabinet drawers, doors and appliance handles. Use lazy susan-type corner base cabinets in lieu of blind corner cabinets where feasible. Use angled corner wall cabinets in lieu of blind corner cabinets.
- General Cabinet Construction: Plywood cabinet box construction preferred to OSB box construction. Rail and stile door construction preferred to flat slab construction. Plank or flat slab construction is acceptable for drawer fronts.
- Drawer Construction: Dovetail construction for attachment of drawer fronts to sides.
- Cabinet Door and Drawer Hardware: Prefer no cabinet door or drawer pull hardware for family housing developments; surface-mounted cabinet door and drawer pulls are acceptable for senior housing developments and Type A accessible units. Use concealed door hinges, soft-close type, Blum or equal.
- Drawer Guides: Minimum 3/4 extension dual drawer guides, minimum 75 lb. capacity. Full extension guides are preferred, if feasible.
- Unit Pantry Cabinets: Provide pantry cabinets in lieu of built-in pantry closets where feasible.
- Unit Microwave Shelves: Provide wall-mounted open shelf as part of wall cabinets in Type B and non-accessible units, with minimum 15" clearance below shelf to countertop. Microwaves will set on countertops in Type A accessible units.

Adhesives and Sealants

- General: Low VOC general purpose adhesives and sealants.
- Interior Sealants: Paintable 1-part acrylic sealants for miscellaneous building joints, BASF, Dow, Sika or equal. Use clear silicone sealant to seal joints at sinks or lavatories, toilets, urinals, tubs, shower bases and surrounds, and joints at countertops to walls and backsplashes.
- Exterior Sealants: 1- or 2-part polyurethane-based elastomeric sealants, BASF, Dow, Sika or equal. Use silicone-based, non-staining sealants for exterior stone or other porous substrates.

- Firestopping Sealants: U.L.-classified elastomeric foam sealants, Class A per ASTM E84, Hilti, 3M, GE Silicones or equal.

Doors and Windows

- Building Entry Doors: Prefinished aluminum storefront doors or painted insulated hollow metal doors, as appropriate to the approved building design. Glass storefront doors should be medium stile design, Kawneer or equal.
- Unit Entry Doors (Exterior Entries): Embossed face, insulated doors with 4- or 6-panel design, as appropriate to the building design, Therma Tru or equal.
- Unit Entry Doors (Interior Corridor Entries): Embossed face, uninsulated metal or wood doors with 4- or 6-panel design, as appropriate to the building design.
- Interior Unit Doors: Embossed face, molded hardboard hollow core doors, 4- or 6-panel design as appropriate to the building design, Masonite Colonist or equal.
- Interior Closet and Laundry Closet Doors: By-pass style double doors with dual head tracks and sill guides, same design as swing doors. Do not use bi-fold doors.
- Unit Patio and Deck Doors: Full lite fiberglass doors with double tempered, Low-E clear glazing.
- Windows: Vinyl or fiberglass windows with double tempered, Low-E clear glazing. Horizontal sliding or double hung styles preferred, but casement or awning units may be approved for specific applications. Provide ADA-compliant hardware for all Type A and B units, including locks in the sills instead of the meeting stile where required.
- Window Openings: Typical unit window openings should have drywall-wrapped jambs and head, and MDF or other solid surface sills. See Interior Casings above.

Door Hardware

- General: All doors to have lever style trims, satin chrome finish unless otherwise approved. Do not use round knobs, including for non-public mechanical spaces.
- Lobby and Other Common Building Entries: Access doors shall be furnished with access control systems with proximity fob keys, and be installed on the interior set of door(s) where an airlock vestibule is designed. Exterior door(s) in such vestibules shall not be locked.
- Exit Doors: Panic hardware should be integral push bar type, with dogged-open capability, Von Duprin or equal. Door and frame configuration should allow the use of rim-type devices; paired doors with vertical rod devices should be avoided.
- Unit Entries: Kwik-Set lever passage hardware, with SmartKey controlled key system and dual core deadbolts.
- Unit Patios: Kwik-Set hardware, lever passage sets with same SmartKey deadbolt. No locksets. Provide paddle-type deadbolt for all Type A accessible units.
- Unit Decks (2nd floor or higher): Kwik-Set lever passage sets with same SmartKey deadbolt. No locksets. Provide paddle-type deadbolt for all Type A accessible units.
- Mechanical/Electrical Equipment Rooms: Specify locksets with utility function.
- Kickplates: Provide prefinished metal kickplates at the push side bottom rail of all unit entry doors, minimum 8" high.

- Peepholes: Provide wide-angle, thru-door viewer at all unit entry doors. Provide two (2) viewers, high and low, at all unit entry doors in senior housing developments and Type A accessible units.

Interior Painting

- General: Low VOC interior paints and primers, 2 coats finish over 1 prime coat, unless substrate materials are factory primed. Specify Behr I-300 as design standard, satin or egg-shell sheen, "Aspen White".
- Unit Interiors: All interior wall and ceilings within individual units shall be painted using LHA standard color, without accent colors for walls, doors, casings or base.
- Common Areas: Customized paint color palettes with accent colors are acceptable for common lobby, office, conference rooms, gathering spaces and similar spaces, as approved.

Exterior Painting

- General: Specify prefinished exterior finish materials where appropriate for the project scope and budget. For materials to be painted, use 2 finish coats over 1 prime coat, unless substrate materials are factory primed. Specify Sherwin-Williams as design standard, satin or egg-shell sheen. Semi-gloss finish may be used for metal doors, metal brackets and similar materials.
- Metal Handrails and Guardrails: Prefinished powder-coated finish preferred.

Flooring

- General: Use hard surfaced flooring materials to the maximum extent possible, as appropriate for the project scope and budget.
- Unit Living Rooms, Dining Rooms, Kitchens, Bathrooms and Entry Foyers: LVP flooring only, minimum 5/16" thick, 5" nominal width planks with beveled edges, FloorScore certified, 25-year warranty, Mannington Revolutions Plank Series as design standard, "Spalted Maple".
- Unit Bedrooms: Broadloom carpeting or carpet tile, 24" x 24".
- Unit Laundry Closets or Rooms: LVP flooring only, to match product specified above.
- Common Lobby, Interior Corridors and Gathering Areas: LVP flooring only, to match product specified above.
- Offices, Conference Rooms, Library and Similar Spaces: Carpet tile, 24" x 24".
- Fitness Rooms and Other Specialty Spaces: TBD.

Toilet and Bath Accessories

- General: Specify prefinished commercial-quality toilet and bath accessories, Bobrick or equal, satin stainless steel or chrome finish.
- Unit Bathrooms: Provide minimum two (2) 18" towel bars, one (1) towel ring, one (1) robe hook and one (1) shower curtain in each full bathroom. Half baths should have one (1) towel ring.
- Mirrors: Provide frameless mirrors at each vanity.
- Medicine Cabinet: Provide built-in medicine cabinet with reversible mirrored door in each full or 3/4 unit bathroom.
- Common Public Restrooms: Provide one (1) drop-down stainless steel baby changing station in each common area restroom, both men's and women's.

- Common Public Restrooms: LHA vendor provides roll-type paper towel, toilet paper dispensers and soap dispensers, to be Contractor installed. Other accessories shall be provided and installed by the Contractor.
- Grab Bars: Stainless steel with peened grip surfaces, 1-1/2" diameter, Bobrick or equal. Provide horizontal and vertical grab bars in lengths and configurations as required by current ANSI standards. Provide grab bars at all unit bathroom toilets and showers in all senior housing developments.

Appliances

- General: Energy Star appliances, white.
- Unit Refrigerators: 18 CF capacity for all unit types and sizes. Top-mount freezer compartment, unless otherwise approved. Provide ADA-compliant refrigerators at Type A accessible units. All refrigerator and freezer compartment doors shall be reversible.
- Unit Microwaves: If microwaves are provided by LHA, use countertop type, not built-in over-the-range, minimum 1000 watts.
- Unit Ranges: Electric 4- or 5-burner smooth ceramic or glass cooktop type; no removable cooking coils with drip pans. Provide front controls for all Type A accessible unit kitchens.
- Unit Range Hoods: Vented type with light and replaceable metal charcoal filters. Provide switch at countertop for all Type A handicapped accessible units.
- Unit Dishwashers: Full-size undercounter type, with dual racks and multiple wash/dry cycles.
- Unit Washers/Dryers: Side-by-side type for all unit types, with multiple wash/dry cycles. Can be stacked in non-Type A accessible units. Avoid unitized stackable combination units, unless approved by Maintenance.
- Common Laundry Washers/Dryers: Match specifications for unit appliances.
- Common Area Appliances: Stainless steel finish is acceptable for these appliances.
- Common Area Refrigerators: Provide ADA-compliant side-by-side or French door type refrigerator.

Window Coverings

- Unit Windows: 3-1/2" vertical blinds, light neutral color, Hunter Douglas or equal. Do not use metal mini-blinds or fabric pleated shades.
- Full Lite Patio Doors: Metal horizontal mini-blinds, Hunter Douglas or equal. Provide hold-down clips or other attachment to secure the blinds at the bottom rail of the door.
- Common Lobby, Office, Conference Room and Gathering Areas: Roller shades, skrim shades or other approved window coverings, as appropriate to the building design.

Plumbing Fixtures

- General: All fixtures and faucets shall be water-conserving type, meeting the applicable requirements of Enterprise Green Communities criteria.
- Unit Bathrooms: All toilet and sink fixtures shall be vitreous china, Kohler or equal, white. Toilets shall be 1.28 gal. per flush maximum per EGC criteria, WaterSense labeled, no pressure-assist. Provide floor-mounted, tank-type toilets with elongated bowls.

- Urinals: Wall-mounted, vitreous china, Kohler or equal, white. Flush valves shall be 0.5 gal. per flush maximum per EGC criteria, WaterSense labeled.
- Unit Kitchens: All kitchen sinks shall be double bowl stainless steel, Elkay or equal.
- Lavatory or Vanity Faucets: Single arm faucets, Delta or equal, chrome. Faucets shall be 1.5 gal. per minute maximum per EGC criteria, WaterSense labeled.
- Kitchen Faucet: Single arm faucets with goose-neck spout, Delta or equal, chrome. Provide separate sprayer attachment and hose; combination faucet and extendable sprayer is not desired. Kitchen faucets shall be 2.0 gal. per minute maximum per EGC criteria.
- Bathtubs: Not desired.
- Showers: Provide step-in showers for all non-accessible units, except transfer showers for all Type B units and at least one (1) roll-in Type A shower.
- Shower Faucet Sets: Delta or equal, chrome. Provide fixed showerhead at non-accessible unit showers, both fixed showerhead and hand-held sprayer in all Type B transfer showers, and hand-held sprayers only in all Type A showers. Showerheads shall be 2.0 gal. per minute maximum per EGC criteria, WaterSense labeled.
- Shower Base and Surrounds: Smooth acrylic multi-piece shower wall surrounds and textured base, with molded-in soap/shampoo shelves. Provide molded-in reinforcements for installation of grab bars.

Plumbing Systems

- Above-grade Domestic Water Piping: Copper or PEX tubing. If PEX is used, couplings and terminations shall be provided in a secure mechanical closet not accessible by the resident.
- Below-grade Domestic Water Service Piping: Copper only.
- Below-slab Domestic Water Piping: Copper or PEX tubing.
- Above-grade Sanitary Sewer Piping: PVC.
- Below-grade Sanitary Sewer Piping: Solid core PVC below concrete slabs; PVC elsewhere.
- Unit Water Shut-Off Valves: Provide water shut-off valves below kitchen sinks and bathroom vanities in locations conveniently accessible to residents and LHA maintenance staff.

Mechanical Equipment

- General: All units shall be individually metered for natural gas, or sub-metered internally to the building, unless otherwise approved.
- Unit HVAC Equipment: Individual, localized gas-fired furnaces or fan coil units are preferred. VTAC or PTAC systems may be considered on an individual project basis, as may be required by the development budget. Provide direct exterior access to mechanical rooms if possible, as opposed to interior to the unit.
- Unit Water Heaters: Gas-fired tankless water heaters.
- Common Area HVAC Systems: Rooftop packaged HVAC equipment, or other approved system as appropriate to the project scope and scale. Prefer to not use boilers.
- Dryer Vents: Provide rigid sheet metal “periscope” type connection between dryer and in-wall vent ductwork.

Electrical and Specialty Systems

- General: All units shall be individually metered for power, or sub-metered internally to the building, unless otherwise approved.
- Unit Electrical: Provide individual circuit breaker panelboard internal to each unit, easily accessible by the resident, Square D or equal.
- Boxes and Conduit: Provide metal junction boxes and conduit in locations required by the current NEC.
- Secondary Service Wiring to Panels: SER cable.
- Internal Building Wiring: Plastic-coated wire is preferred where permitted by the NEC for the specific occupancy classification of the building construction, Romex or equal.
- Circuits: Specify 15-amp circuits where possible.
- Electrical Devices: Provide duplex power outlets as required by the current NEC.
- Cover Plates: Smooth plastic plates, ivory or white as approved in the project design.
- Cable and Satellite TV Cabling: Provide coaxial cable and outlets for cable or satellite television in unit living room and each bedroom. Satellite antennas shall be one location for each satellite provider per building, mounted on the roof eave in locations approved by LHA, with cabling to splitters located in a secure electrical or data closet.
- Telephone Cabling: Hard-wired telephone lines to individual units TBD. Provide lines to the building for office areas and fire alarm system monitoring; number of lines TBD.
- Data Cabling: CAT-6 or equal.
- WIFI: TBD, depending upon project type and scope.
- Emergency Generator: Provide back-up emergency generator for senior housing developments, if feasible within the project's development budget. Equipment or systems to be on the generator include elevators, emergency and corridor lighting, fire and security alarm systems, office area power and data outlets, and other items as directed by LHA.
- Fire Alarm Systems: Certified and monitored system, FireLite or Silent Knight only, with appropriate control panel depending upon project size. Cellular dialers shall be TelGuard, Napco or equal, compatible with specified alarm system.

Lighting

- General: Energy Star compliant. Prefer the use of threaded LED lamps to other types. Do not use halogen lamps.
- Occupancy Sensors: Provide lighting in offices, conference rooms and other common areas controlled by occupancy sensors.
- Interior Unit Lighting: Provide ceiling fixtures in all bedrooms. Provide pendant fixture at designated dining rooms or dining areas. Provide switched outlets in all living rooms, unless ceiling fans are specified. Switched under-cabinet lighting in kitchens is preferred, particularly for senior housing developments, but is not a requirement.
- Exterior Unit Lighting: Provide switched downward-directed fixture at all exterior decks or patios, meeting Dark-Sky criteria.
- Exterior Site Lighting: Provide pole-mounted and/or bollard type site lighting as appropriate to the project design, or as approved by the jurisdiction during planning/entitlement approvals. All fixtures shall be downward-directed and shielded, meeting Dark-Sky criteria. All exterior site

lighting to be photocell controlled, with switch to bypass for testing, and circuited to a “house” panelboard.

Site Structures

- **Trash Enclosures:** Construction should be 8” concrete block masonry clad with brick, manufactured stone or stucco to match the building design. Size of enclosures shall be as required to contain at least one (1) 3 CY minimum trash dumpster and two (2) recycling poly carts, or as required by the jurisdiction during planning/entitlement approvals.
- **Trash Enclosure Gates:** Double swinging gates, tubular steel frames with opaque steel slat or wood slat screening. Provide a separate man gate along an accessible path for access by residents into the trash enclosure. Protect gate posts along vehicular drive aisles with 6” dia. steel pipe bollards.
- **Bicycle Racks:** Provide permanently mounted bicycle rack(s) in a secure location convenient to the residents, or as approved by the jurisdiction during planning/entitlement approvals.