

2027 RIHousing Design Standards - Section 3





These Development Standards (referred herein as “Standards”) aim to establish a concise and predictable process, articulate program objectives, and document Design and Construction Standards for projects developed with RIHousing funds.

This document outlines specific requirements pertaining to all developments utilizing RIHousing funds, including new construction, existing buildings undergoing renovation/rehabilitation, and those utilizing Housing Trust Funds and/or HOME Program Funds. Where there are conflicts between individual requirements within this document, with other funding source requirements, and/or with the requirements of other state, federal, and local entities, the more stringent limitation or requirement shall always prevail.

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Chapter 1 – Regulation Compliance

All work shall comply with applicable Federal, State, and local codes, ordinances, and zoning requirements. Projects shall be designed by licensed professionals per the Rhode Island Rules and Regulations for Design Professionals <https://bdp.ri.gov/>. Architects, Engineers, and other design professionals shall be registered and/or licensed in the State of Rhode Island and shall ensure full compliance with all the applicable Federal, State and local codes, ordinances, and zoning requirements.

Development teams are expected to conduct their due diligence to verify the full scope of applicable federal, state, and local requirements for their project. Given the normal course of regulation revision cycles, and routine website updates, this list of items may become outdated, and the development team shall ensure that full compliance is achieved with all applicable requirements. The Rhode Island Department of State maintains a list on its website of applicable regulations for the Building Code Commission, Fire Safety Code Board of Appeal and Review, and Department of Labor and Training.

<https://www.sos.ri.gov/divisions/open-government-center/rules-and-regulations/building-and-fire-codes>

Chapter 2 – Design and Construction Submissions & Timeframe

RIHousing assumes that the Developer is wholly familiar with the plans and specifications, that the plans reflect the current financial model, and the Developer has approved the submission of the documents to RIHousing for review. Checklists have been developed to ensure that the Development Team is providing the required information with each submission. Full size hard copies and digital copies are required for all submissions.

1. Note – In lieu of schematic design (SD) and design development (DD) plan submissions, preservation and moderate rehab developments with no significant changes to design shall submit an outline specification and work write narrative broken down by CSI division sets that align with the project Capital Needs Assessment (C.N.A.) scope of work and 20-year positive reserve schedule. All other items listed in SD & DD section are applicable. The submission of 90% and 100% plan submissions will still be required for firm commitment.
2. Note – Moderate Rehab developments with building components that are still in serviceable condition and are not scheduled for replacement in the C.N.A are not required to be replaced to meet the current Design and Construction Standards.
3. Note – For projects exceeding 12 units, an engineer licensed in the State of Rhode Island shall be engaged for structural, HVAC, plumbing, electrical, and fire protection.
4. Note – For projects with 1 or 2 units, development teams shall refer to the RIHousing Homeownership Streamline Program. Contact RIHousing for additional information.

Developments must move from preliminary approval to firm approval within 8 months, and firm approval to closing within 1 month, for a total timeframe of 9 months. The steps from reservation to loan closing:

Step 1 Schematic Design (SD) Submission: Development teams shall submit all required Schematic Design (SD) Submission materials for RIHousing Design and Construction staff, and Underwriting staff review. All submissions must be to RIHousing Design Standards. Upon completion of this review, RIHousing will issue a memorandum of all required revisions or clarifications. The architect must address all comments before moving onto the 100% plan submission.

Step 2 Kick-off Meeting: RIHousing will meet with the Developer, the Architect, and the General Contractor, if selected, to review the requirements of the Standards. At this meeting, RIHousing will review any conditions attached to the approval of the Schematic Design submission and the drawing/specification requirements. As part of the kick-off meeting, a detailed list of the submissions required for firm commitment and closing will be reviewed. The development team will be required to establish a time frame with specific milestones for each submission and be prepared to discuss RIHousing review timelines.

Following the reservation of funds, and the approval of the Schematic Design submission, there are three submission milestones (refer to Chapter 4 for requirements):

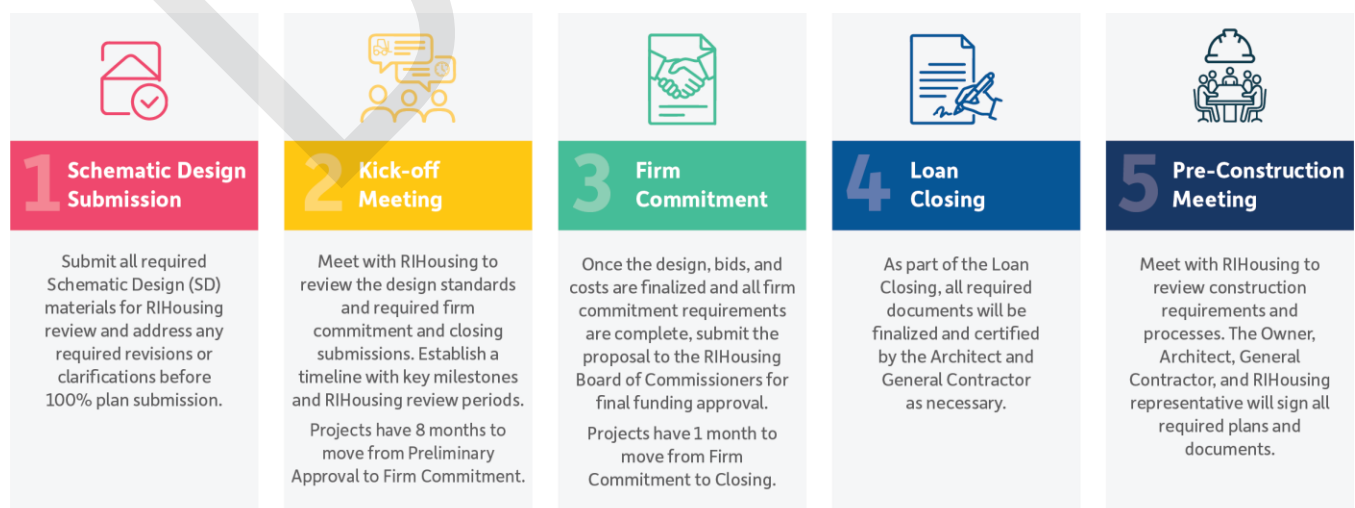
Schematic Design Resubmission Following the issuance of the RIHousing memorandum from schematic design, Development team shall submit a revised schematic design set addressing all the comments outlined in the initial schematic design memorandum, for a second review. RIHousing shall issue a second memorandum if any items were not addressed, and Development team shall proceed to 100% CD drawings.

100% Construction Documents Submission (100% CD): The developer submits 100% CD for final review and comment by RIHousing. RIHousing shall issue a memorandum addressing anything not meeting the RIHousing Standards. Developer shall revise 100% CDs to adhere to standards. Developer may not change these final 100% CD plans without written approval from RIHousing. Any drawing or specification changes shall be submitted as addenda with changes tracked with revision clouds. Changes will require additional review and confirmation that Standards are still being met. Scope under consideration for value engineering must be submitted to and approved by RIHousing.

Step 3 Firm Commitment: Once a development has been designed, bids have been received, the total cost of the development has been determined, and all firm checklist items have been received, the proposal will be submitted to the RIHousing Board of Commissioners (“Board”) for final commitment of funds.

Step 4 Loan Closing: As part of the Loan Closing, all required documents will be finalized and certified by the Architect and General Contractor as necessary.

Step 5 Pre-Construction Meeting: Immediately following the Loan Closing, the Pre-construction Meeting shall be held. At the Pre-Construction Meeting, RIHousing shall review the construction process and requirements. The Owner, Architect, General Contractor, and RIHousing representative shall sign all plans and other required documents.



Chapter 3 – Design and Construction Standards

RIHousing's Design and Construction Standards ensure the long-term viability of housing developed using RIHousing resources and programs. Drawing on experience in managing rental housing, the Standards promote economical, durable, healthy, energy-efficient, and attractive units. They supplement all applicable building codes and regulations.

Sustainable, Healthy Homes Goals:

RIHousing promotes high-quality, durable, and affordable construction using sustainable, cost-effective practices. Developers should consider long-term environmental and financial impacts, aiming for long-lasting, resource-efficient housing.

The Standards are intended to produce affordable, appealing housing that is:

- **Durable:** Built with long-lasting materials and sound design requiring minimal maintenance.
- **Energy-Efficient:** Upfront investments in efficient systems reduce operating costs and conserve resources.
- **Healthy:** Reduce conditions that trigger asthma or respiratory issues through proper design and material choices.
- **Clean:** Avoid dust-collecting materials; carpeting should be used only when necessary.
- **Combustion-Free:** Limit exposure to carbon monoxide and other harmful byproducts.
- **Toxic-Free:** Minimize use of materials and chemicals that release indoor pollutants.
- **Safe:** Prioritize designs that create observable, secure shared spaces and clear distinctions between public and private areas.

RIHousing may allow exceptions when alternative methods achieve the same goals, including new materials, systems, or configurations designed for specific populations. Requests for exceptions must be submitted in writing to the Design and Construction and Underwriting Teams.

RIHousing may establish additional requirements before final approval and may revise Standards over time; approved developments will not be affected unless necessary for health and safety. Standards are organized using the CSI format, with some policies placed in the most relevant divisions even if not strictly CSI-aligned.

Division 01 – General Requirements

01 01 Additional Resources

01 01 01 General – The following resources are strongly encouraged for incorporation into developments financed under the Rental Housing Production Program:

A Comprehensive Community Development – Developers and their designers shall familiarize themselves with Rhode Island Housing's Comprehensive Community Development criteria as outlined in the Rhode Island Qualified Allocation Plan and design all development communities with as many of the Comprehensive Community Development design elements as possible.

B Crime Prevention Through Environmental Design – Development is designed using the key principles of CPTED. <https://www.cpted.net/>

01 02 Energy Efficiency and Sustainability

01 02 01 General – Projects must meet or exceed 2024 IECC. Rehabilitation projects may seek an exemption, which will be evaluated on a case-by-case basis and approved at the discretion of RIHousing.

01 03 Flood Resilience Standards

01 03 01 Federally Funded Projects

A HUD Regulations – Note that projects receiving federal funding are required to comply with the U.S. Department of Housing and Urban Development (HUD) Federal Flood Risk Management Standard, which went into effect in May 2024.
<https://www.federalregister.gov/documents/2024/04/23/2024-06246/floodplain-management-and-protection-of-wetlands-minimum-property-standards-for-flood-hazard>
<https://stormtools-mainpage-crc-uri.hub.arcgis.com/>

B Inland and Precipitation Related Flooding – The Design Flood Elevation shall be no lower than 2 feet above the FEMA-defined Base Flood Elevation per minimum established by HUD.

C Building Systems – All critical building systems (i.e. HVAC, electrical, fire alarm, and fire protection) and living areas shall be located above the design flood elevation and designed to be protected from flood-related damage.

D Site and Egress – Parking, site egress, and building egress must be designed outside of the 100-year flood plain per the terms outlined in the QAP.

E Exceptions – Basis and exceptions may be made per the terms outlined in the QAP.

01 03 02 Non-Federally Funded Projects

A Site and Egress – Parking, site egress, and building egress must be designed outside of the 100-year flood plain per the terms outlined in the QAP.

B Design Flood Elevation, at a minimum, shall be no lower than 1 foot above the FEMA-defined Base Flood Elevation.

C Building Systems – All critical building systems (i.e. HVAC, electrical, fire alarm, and fire protection) and living areas shall be located above the design flood elevation and designed to be protected from flood-related damage.

D Exceptions – Basis and exceptions may be made per the terms outlined in the QAP.

01 04 Structural Work in Renovations/Rehabilitations

01 04 01 General – Remediation of all substantial structural damage, deficiencies, and their cause shall be included and corrected in the development scope of work. A qualified professional shall examine each building's load bearing structure and assess its existing condition to determine suitability for continued use. Prior to final commitment, RIHousing reserves the right to require a structural survey by an approved licensed structural engineer to verify the adequacy of all structural members for current and proposed loads.

01 05 Attic Access

01 05 01 General – When attic access is provided for maintenance and/or inspection purposes, it shall occur from building common areas. Access shall have key locks and be sealed and insulated in accordance with the requirements of all applicable energy and building codes.

01 06 Dwelling Unit Requirements

01 06 01 Unit Area – Shall be within the following ranges, measured from the inside face of finished walls enclosing unit, and including mechanical spaces internal to the unit:

Unit Type	Unit Area
Studio (single level)	350 – 550 SQFT
1 Bedroom	550 – 650 SQFT
2 Bedroom	750 – 900 SQFT
3 Bedroom	950 – 1,150 SQFT
4 Bedroom	1,200 – 1,500 SQFT
Studio (loft)	Evaluated on a case-by-case basis
Townhouse	Add 50 – 100 SQFT

*Waiver requests to be submitted to RIHousing for review in regard to alternative housing typologies not meeting these requirements

01 06 02 Bedrooms – Shall at a minimum meet 100 SQFT

01 06 03 Bathrooms – Each unit shall have at least one full bathroom. Units with four or more bedrooms shall have a minimum of two full baths (one bath may have a shower instead of a shower/tub enclosure). Townhouse-style units, with three or more bedrooms, shall be equipped with a minimum of one full bath and one-half bath.

01 06 04 Hallways – Shall provide 42” minimum clear between wall bases. Note that this minimum width may be superseded by other project accessibility requirements that necessitate greater widths/clearances around doorways. Hallway widths of 48” or greater are strongly encouraged.

01 06 05 Storage – Each closet shall meet the following minimum requirements, per unit:

A Bedrooms – 4’ wide by 2’ deep

B Coat – 3’ wide by 2’ deep

C Linen – 2’ wide by 1.5’ deep

D Pantry/Broom – 1’ wide by 1.5’ deep, may be provided as part of a kitchen cabinet system.

01 06 06 Accessible Dwelling Units – Shall be designed and constructed in accordance with current requirements of the Fair Housing Act, Americans with Disabilities Act, Section 504 of the Rehabilitation Act of 1973, all applicable building codes, and the following requirements:

A UFAS “Accessible” – All New Construction and “Substantial” rehabilitation developments require a minimum of 5% of units (minimum of 1 unit) be “accessible” as defined by the Uniform Federal Accessibility Standards (UFAS), regardless of the use group exception contained in the Building Code.

B Visual and Hearing Impaired – All New Construction and “Substantial” rehabilitation developments require at least 2% of units (minimum of 1 additional unit) be designed as accessible to the visual and hearing impaired as defined by UFAS. Note that these units are in addition to those required to be “Accessible” as defined in item “A” above.

C Roll-in showers – Are required in a minimum of 1 out of every 5 accessible units. Roll-in showers are highly encouraged in all age-restricted units and 1-bedroom accessible units. Bathrooms with roll-in showers shall have tile floors with waterproofing membranes, and a central floor drain to capture bulk water outside of shower basin.

D In-wall blocking – Provide blocking that is structurally capable of supporting the future installation of grab bars and shower seats, at all unit bathrooms, at a minimum as defined below:

- o Toilet – Walls adjacent to and behind fixture, 6” beyond front/side, 31”-38” above finished floor
- o Tub – Walls on three sides from the top of tub to 60” above finished floor
- o Shower – Walls on three sides from the top of pan to 60” above the finished floor
- o Alternatives – Prefabricated shower/tub assemblies with integral grab bar reinforcing are acceptable in lieu of in-wall blocking, provided they are installed per manufacturer requirements.

E New Construction and Substantial Rehab – All common spaces shall be made fully accessible.

F Substantial Rehabilitation – Note that “Substantial” rehabilitation projects are defined by the Uniform Federal Accessibility Standards (UFAS) as developments with 15 or more total units and the cost of rehabilitation is 75% or more of the replacement cost. For “Substantial” rehabilitation projects with common spaces, they shall be made accessible to the greatest extent feasible.

G Less-than-Substantial Rehabilitation – For projects with “less-than-substantial” rehabilitation (anything less than “substantial”), the project must be made accessible to the greatest extent feasible until 5% of the units are physically accessible, and common spaces made accessible to the greatest extent possible.

H 1 to 4 Unit Developments – All developments that do not trigger Uniform Federal Accessibility Standards (UFAS) compliance (i.e. developments with 4 or fewer units), are still strongly encouraged to meet these requirements. <https://www.access-board.gov/aba/ufas.html>

I Additional Requirements – Refer to divisions 8, 15, and 16 for additional dwelling unit accessibility related requirements.

01 06 07 Universal Design – Development teams shall review the following resource and familiarize themselves with the concept of Universal Design. <https://www.section508.gov/develop/universal-design/>

01 07 Building and/or Development Amenities

01 07 01 Management Office – Required for developments of 50 or more dwelling units and desirable for developments of less than 50 units. The management office shall be in close proximity to the building’s primary entry and lobby. If a dedicated community building is not provided, alternative spaces within the development shall be set aside for a required management office and adequate maintenance storage.

01 07 02 Community Facilities – Required for developments of 50 or more dwelling units, and strongly encouraged for developments of less than 50 units. Scattered site developments will be reviewed on a case-by-case basis. Developments shall incorporate the following:

A Common meeting room – Minimum size of 12 square feet per dwelling unit or 600 square feet, whichever is greater.

B Kitchen – Separate accessible kitchen to service social functions held in the community room. Ranges are not required where wall ovens or microwave ovens are provided.

C Storage – Adequate area for folding chairs, tables, etc.

D Toilet Room – One gender-neutral accessible room adjacent to the community room, at a minimum, and any additional toilet rooms as required by code. Provide grab bars and provide applicable signage.

E Age Restricted Developments – Provide backup generators to enable uninterrupted HVAC functionality in community rooms during power outages.

- 01 07 03 Playground – Projects with 50 or more Units shall incorporate a playground as part of the development or demonstrate that existing playground facilities are in reasonable proximity. Equipment should comply with the latest edition of US Consumer Product Safety Commission playground guidelines, and meet playground regulations of the 2012 Americans with Disabilities Act Standards for Accessible Design. At a minimum, playgrounds shall be fenced with locking gate, well lit, located along an accessible route from the building, have an accessible route to the play equipment, have surfacing that complies with ASTM 1951, and furnished with at least one bench along an accessible route. Senior projects are exempt from playgrounds. Other projects may request an exemption on a case-by-case basis. <https://www.ada.gov/law-and-regs/design-standards/2010-stds/> <https://www.cpsc.gov/safety-education/safety-guides/playgrounds/public-playground-safety-checklist>
- 01 07 04 Outdoor seating – Developments with usable open space shall provide outdoor seating as a minimum amenity and all seating shall be located along an accessible route.
- 01 07 05 Mail Delivery – Per requirements of the local postmaster. A storage room and/or storage locker system shall be provided for package delivery from both USPS and non-USPS carriers that are adequately sized for the number of residents.
- 01 07 06 Bicycle Storage – For projects with parking ratios of less than 1:1 per unit, provide secured and covered bicycle storage.
- 01 07 07 Trash Collection – Facilities per local municipalities' requirements. Adequate space shall be allocated for the collection and storage of recyclable waste.

01 08 Elevator

- 01 08 01 General – Elevators are required in all developments four or more stories in height.

Division 02 – Site Work

02 01 General

- 02 01 01 Applicability – These requirements apply to both new construction and rehabilitation of existing buildings. Rehabilitation developments should identify those Site Construction items that are not applicable to the development and seek an exception from the requirement from RIHousing.

02 02 Site Layout

- 02 02 01 Parking – Locate at the building's rear or side where possible to minimize visibility from the street.
- 02 02 02 Entries, General – Where there are separate building entries, i.e. one from the front/street side and one from the parking at the side or rear, configure the siting of the building and the design of the lobby so that one entry leads directly to the main lobby/reception area.
- 02 02 03 Solar Orientation – Optimize the solar orientation of the building for photovoltaic panels and energy conservation.

02 03 Site Improvements

- 02 03 01 General – Site improvements shall be designed to minimize maintenance. Use paving, plantings, fences, and other elements to delineate clear boundaries between public and private spaces, and semi-private space such as shared open space amenities.
- 02 03 02 Sidewalks – Concrete walks to connect all units, parking, and amenities; minimum 4’ width, minimum 4” thick concrete.
- 02 03 03 Private Roadways – Meet RIDOT-Class I and/or municipal standards.
- 02 03 04 Parking – Shall meet the following criteria:
- A Standards – Meet RIDOT-Class II or better and municipal standards.
 - B Quantities – Where parking counts are not determined by local zoning, minimize parking spaces to reflect the likely rates of vehicle ownership of tenants.
 - C Screening – Configure parking and landscaping to ensure units are screened from headlights.
 - D Spaces – Shall be striped and have wheel stops. Wheel stops are not required in parking lots with perimeter curbing or in parking areas serving less than 3 dwelling units.
 - E New Construction – Trees should be planted along roads and parking areas to help mitigate heat island effect. Alternative shading strategies will be considered by RIHousing.
- 02 03 05 Accommodations for Electric Vehicles – Refer to RI Law: R.I.G.L. 31-28-12.
<https://law.justia.com/codes/rhode-island/2024/title-31/chapter-31-28/section-31-28-12/>
- 02 03 06 Plantings – Landscape Architect or Designer to incorporate the following, as applicable:
- A General – All plantings to be native or nativar species, non-invasive, and drought tolerant. Long-term maintenance costs shall be considered when specifying plantings. The use of lawn alternatives such as clover, “no-mow grass,” and perennial ground covers are encouraged for cost and maintenance savings and increased ecological benefit. Size of plant material is more important than quantity when specifying buffers.
 - B Accent landscaping – At the fronts of buildings and around amenities is required. Landscape Architect or designer to select a mix of deciduous and evergreen plantings and take into consideration established planting windows for all plantings.
 - C Warranty – Contractor to provide one (1) year warranty or guarantee for lawns, plants, and shrubs.
 - D Buffers – Planting buffers located between tenant yard spaces is required for privacy. Planting buffers to be used to shield trash enclosures, utility meters, transformers, generators, condensers, and all other site obstructions/equipment from view as feasible.
- 02 03 07 Irrigation – New plantings shall be provided with adequate irrigation to maintain plant health while being mindful of water conservation concerns. Properties with site irrigation systems shall be equipped with water conservation elements including time clocks, rain sensors, abatement meters, and/or drip systems at plantings.
- 02 03 08 Fencing – Perimeter fencing, if installed, shall be either black vinyl-coated chain link fence including posts and rails or cedar privacy fencing with galvanized posts set in concrete on the back and side yards. Painted wood picket, ornamental galvanized steel, vinyl picket, painted or powder-coated aluminum, or wrought iron fence may be installed on the front yards.
- 02 03 09 Lighting – Shall meet the following criteria:

A General – Residential in appearance for roadways, sidewalks, and building entrances.

B Efficiency – Provide high efficiency exterior light fixtures.

C Dark Spots – No dark spots at building entrances and in parking areas.

D Shielding – Lighting shielded/deflected away from living/sleeping area windows.

E Standards – Lighting standards in scale with development buildings.

F Building Signage – The permanent building entrance sign shall be illuminated.

G Light Levels – A minimum 1-foot candle of illumination in all parking areas, trash dumpsters, mailboxes, accessible routes, and building entrances.

H Dark Sky Compliance – Building and site lighting designed using Dark Sky compliant fixtures and shields to minimize light pollution and be configured to avoid glare at abutting properties.

02 03 10 Safety and Security – Tenant entry into exit stairways from exterior to be discouraged.

02 03 11 Outdoor Trash/ Recycling Storage – Projects with 12 or more units, shall have concrete trash pads with protective bollards, located away from dwelling units, and fenced/screened on all sides with a latching gate at the front. Projects with fewer than 12 units shall have at a minimum, a dedicated tote storage area screened on 3 sides. Vinyl and other non-durable fence products are not permitted.

02 03 12 Grading – Eliminate abrupt or excessive grade changes where possible. Design grading to avoid or minimize the need for retaining walls to control costs, with slopes no steeper than 33% where possible.

02 03 13 Debris – Remove debris, junk, and dead or dangerous tree growth. Dilapidated outbuildings, fences and other structures, unsafe structures, and visual nuisances shall be demolished and removed from the site. Repair or replace badly deteriorated essential paving. Remove nonessential deteriorated paving.

Division 03 – Concrete

03 01 Foundations

03 01 01 Existing foundations – Fill all holes and cracks and re-point as necessary.

03 01 02 New Foundations – Provide damp proofing at foundations. Install a capillary break on top of the footing and the perimeter foundation wall. Slab on grade is exempt except in locations with a high-water table.

03 02 Basement Slabs

03 02 01 Existing Slabs – Shall be cleaned in a manner to expose the existing surface. All visible structural cracks shall be repaired with an approved concrete/bondel mix.

03 02 02 New Slabs – Minimum 4” reinforced concrete installed over 10-mil minimum vapor barrier.

03 02 03 Crawl Spaces – Provide a minimum 2” thick concrete rat slab over the vapor barrier.

Division 04 – Masonry

04 01 Existing Masonry to Remain

- 04 01 01 Chimneys – In rehabilitated structures that are unsound, the chimney shall be repaired or removed entirely. When chimneys are being used for venting, they should be restored, and masonry re-pointed to a safe and operable condition, with flue liners installed as required by code.
- 04 01 02 Historic Masonry – Shall be restored to sound serviceable condition, and in accordance with Section 106 of the National Historic Preservation Act. Where masonry is considered historic, repairs will be carried out utilizing the Secretary of the Interior’s “Standards of Rehabilitation” and related NPS Preservation Briefs for “Repointing Mortar Joints on Historic Masonry Buildings” <https://www.nps.gov/tps/standards/rehabilitation.htm>
- 04 01 03 Mortar – Joints shall be sound, and free of loose or deteriorated mortar, with no voids. Pointing of mortar joints shall be specified as necessary to assure the continued integrity of the structural assembly and prevent water intrusion.

Division 06 – Wood and Plastics

06 01 Rough Carpentry, Sheathing

- 06 01 01 Rating – All sheathing shall be rated at a minimum, Exposure 1 and Structural 1.
- 06 01 02 Pitched Roofs – Plywood/OSB with integral weather barrier such as Zip Roof sheathing.
- 06 01 03 Flat Roofs and Subfloors – Plywood or weather-rated product such as Advantech sheathing.
- 06 01 04 Exterior Structural Walls – Plywood or OSB with integrated weather barrier such as Zip sheathing.
- 06 01 05 Underlayment – Formaldehyde-free ULB, AC Plywood, or gypcrete. Particle board or Luan are not permitted.
- 06 01 06 Rehabilitated Unit Flooring – Replace damaged subfloor and install new underlayment (minimum 1/2”) or approved smooth surface underlayment in all existing bath and kitchen areas where glue-down resilient flooring is installed.

06 02 Stairs, Porches, and Stoops

- 06 02 01 Exterior – Provide rot-resistant, durable composite decking and railing systems.
- 06 02 02 Existing – Items intended to remain shall be reasonably level and even surfaces. Decking to remain shall be patched with matching materials.

06 03 Finish Carpentry

- 06 03 01 Exterior Woodwork and Trim – Shall meet the following criteria:

A Type – Pre-primed poly-ash, fiber cement, PVC, or clear wood products (e.g. premium grade, non-finger-jointed, clear cedar or redwood).

B Detailing – Eliminate miter cuts and provide chamfer details at exterior horizontal trims to shed water wherever possible. Only profiled moldings should be mitered; All other trim boards should have lap joints. Exterior miter joints inevitably open as wood shrinks, exposing the end grain of both boards to the weather. It is acceptable to join trim boards with scarf angle cuts.

- 06 03 02 Interior Trim – Baseboards, casings, moldings, and miscellaneous trim to be clear wood or pre-primed finger-jointed pine (FJP).
- 06 03 03 Interior Handrails – If wood, provide clear hardwood products.
- 06 03 04 Exterior Handrails – Newel posts and columns shall be a high-quality composite materials. On Historic projects clear wood (e.g. clear cedar, clear mahogany, or clear hemlock) are acceptable alternatives. Exterior handrails shall be painted steel, PVC-wrapped aluminum, mahogany, or clear douglas fir.
- 06 03 05 Repair of Historic Woodwork – In accordance with Secretary of the Interior’s Standards for Rehabilitation. <https://www.nps.gov/subjects/taxincentives/secretarys-standards-rehabilitation.htm>
- 06 03 06 Closet Shelving – Vinyl-coated wire shelving attached to secure in wall blocking.

Division 7 – Thermal and Moisture Protection

07 01 Thermal Insulation, Air Barriers, and Vapor Control Layers

- 07 01 01 Air Barriers and Vapor Control Layers – Air barriers shall be provided at the entire building envelope, and be coordinated with construction type and insulative materials as appropriate.

07 02 Sound Insulation

- 07 02 01 General – These minimum requirements apply to both new and rehabilitated projects:

- 07 02 02 Common Walls – Shall meet the following criteria:

A Rating – STC 53 minimum at demising walls, stair walls, and mechanical walls.

B Joint Caulking – Shall occur at the base and top of walls on both sides of the wall to maintain the proper STC rating.

C Electrical Boxes – Electrical boxes and low-voltage boxes shall be sealed in electrical/acoustical putty and staggered a minimum of one stud bay from boxes in adjacent space to limit sound transmission.

- 07 02 03 Floors and Ceilings – STC of 55 and IIC 53 minimum. In new construction, wall and floor assemblies shall conform to rated UL assemblies.

- 07 02 04 Kitchens, Bedrooms, Mechanical Closets – Stud cavities at perimeter of bedrooms and bedroom closets, kitchen sink areas, and mechanical closets to be filled with acoustic batt at all adjacencies to other unit spaces. Bedroom common walls shall refer to 07 04 01 above.

- 07 02 05 Adaptive Reuse and Renovations – RIHousing shall evaluate all soundproofing techniques and methods on a case-by-case basis.

07 03 New Pitched Roofs

- 07 03 01 Manufacturer’s Warranty – 30 years from the date of substantial completion.

- 07 03 02 Ice/Water Protection – Self-adhered bituthene product shall be installed at a minimum from the edge of the roof to 2’ beyond the interior face of the exterior wall below, 3’ on both sides of roof valleys, and 2’ on the deck and 1’ up the wall at roof/wall intersections prior to installing metal drip edge, felt paper and shingles. Locations not required to be covered by a self-adhered bituthene product per above, shall include a minimum 15 lb felt underlayment. Development teams shall consult roofing warranties for additional requirements.

07 03 03 Gutters and Downspouts – Aluminum with a minimum thickness of .032" for gutters and .032" for downspouts. Where downspouts are not hard piped to underground systems, provide concrete or stone splash pads pointing away from the path of travel.

07 04 New Flat Roofs

07 04 01 Material - EPDM or TPO with a minimum thickness of .060"

07 04 02 Solar Reflectance Index – Minimum 64

07 04 03 Manufacturer's Warranty – Minimum 20 years from date of manufacturer's final acceptance of the roofing system.

07 05 Existing Roofs

07 05 01 Allowance – Carry an adequate allowance for replacement of roofing sheathing/substrate components.

07 05 02 Existing Flat Roof Systems – Shall be stripped in entirety to examine the existing decking for damage or deterioration. The overlay of existing flat roof systems is not allowed, although waivers may be granted pending the results of moisture testing of the sub-base.

07 05 03 Existing Roof Covering – Shall be replaced if blistered and the mineral covering is substantially deteriorated.

07 05 04 Missing Components – Repair or replace missing/leaking shingles and flashing on functional roofs.

07 05 05 Roof Shingles – All layers shall be stripped to the decking/sheathing when re-roofing. Decking/sheathing shall be examined for large gaps and/or spaces, cracked boards or deterioration. If large gaps or spaces exist between boards or sheathing the roof shall be overlaid with 1/2" exterior plywood underlayment prior to installing new shingles. Rotted decking/sheathing shall be removed and replaced down to framing. The overlay of existing shingle or pitched roof systems is not allowed.

07 05 06 Slate Roofs – Existing historical roofs shall be repaired in accordance with the Secretary of the Interior's "Standards for Rehabilitation" project requirements if applicable.
<https://www.nps.gov/tps/standards/rehabilitation.htm>

07 05 07 Rooftop Equipment – All unutilized or damaged rooftop equipment shall be removed.

07 06 Photovoltaic System

07 06 01 Manufacturer's Warranty – Product and Performance are to be guaranteed for a minimum of 20 years from the date of installation. Performance to be warrantied to include a degradation of no greater than 10% of labeled output.

07 07 Exterior Cladding

07 07 01 Existing Buildings – Cladding and trim to remain shall be intact, free of any defects, and weatherproof. Siding requiring more than 40% replacement shall be entirely removed and replaced. All wood components shall have a continuous coat of paint or stain. Replace existing wood siding on historic buildings as necessary per the Secretary of the Interior's "Standards for Rehabilitation" requirements. <https://www.nps.gov/tps/standards/rehabilitation.htm>

07 07 02 New Exterior Cladding – When located near high-traffic areas at ground level, cladding with greater durability shall be specified. Acceptable cladding materials include:

A Brick

B Wood Siding – Clear grade cedar clapboards of random lengths not less than 4' with an exposure of no more than 6". Finger jointed siding is not permitted.

C Wood Shingles – Either as panels (4" to 7" exposures, no. I grade vertical western red cedar panels available in 3-, 4-, and 5- course panels) or shingles (4" to 7" exposures, no. I grade vertical western red cedar shingles).

D Fiber Cement Siding – Reinforced with fiberglass mesh, with a typical thickness of 5/16" and a minimum thirty (30) year guarantee. The product shall have a minimum 15-year finish warranty.

E PVC sheathing or Fiber Cement Panels – Joints covered by PVC or composite trim products.

F Back primed exterior paintable wood – Siding and trim materials, with primed cut ends to prevent moisture absorption (e.g. clear redwood or cedar). Note the use of pine for trim boards is not permitted.

G Alternative siding materials – Will be considered depending on the type of development and location, subject to RIHousing discretion, are as follows:

- o Stucco - Portland cement plaster with a minimum 3/4" thickness. Acceptable products: Florida stucco, California stucco. Where stucco or EIFS siding meets grade, utilize mulch beds or similar around the foundation to deter damage from weed whackers/landscaping equipment.
- o Vinyl Siding – .042" to .048" thick and has a twenty-five (25) year guarantee. All vinyl J channel, F channel, and other necessary vinyl accessories shall be concealed behind trim boards. If vinyl siding is used on the first floor, it shall be a heavy gauge premium vinyl or a more durable material (e.g. cement board siding, vinyl shingles, pre-primed clear cedar clapboards or shingles). Acceptable products: Wolverine, Alcoa, CertainTeed, Heartland, Allside. Similar products may be submitted to RIHousing for approval. All trim and corner boards shall PVC trim such as Azek and/or reinforced vinyl trim products with built-in 'J' channel.
- o Masonry – Alternative masonry products (i.e. CMU, stone, granite, precast panels, etc.)
- o Poly-ash or PVC Trim Products – Required for wet areas such as: water tables, window sills, door trim, and skirt boards in close proximity to grade, soffit facias, rakes, and trim boards along or in contact with roofs, etc.

Division 8 – Windows and Doors

08 01 Windows

08 01 01 Performance – Windows and doors shall be Energy Star certified.

08 01 02 New Construction or Replacement – Shall meet the following:

A Frames – Fiberglass, vinyl/uPVC, vinyl-clad, or aluminum that are thermally broken with a minimum thickness of frame wall – 3mm .12" or 1/8". If the building is located in a historic

district or is listed on the National Register, the appropriate authority shall approve the type of window used. Note that wood frames are permitted on historic buildings.

B Warranty – Minimum ten (10) years on frames, twenty (20) years on glazing, ten (10) years on finishes, and two (2) years on hardware, from the date of substantial completion.

C Screens – Operable half screens for single and double-hung windows, full screens for tilt-turn or casement windows.

D Testing – In projects with 12 or more units, a qualified independent testing and inspecting agency shall perform field air and water infiltration testing of 3 or more fully installed and flashed windows in compliance with AAMA 502. Windows are to be selected by the Architect and include a sampling of different window types, locations, and cladding types as is feasible.

E Flashing – Install full-depth flashings on the rough openings of all windows and exterior doors. Windows, doors, and corner board locations, mechanical and plumbing penetrations shall have self-adhered flashing installed to all perimeters and sills for protection against air, water, and moisture.

F Living and Bedrooms – To have a minimum of one operable window with locking hardware. Windows shall have one operable sash to minimize maintenance issues, if permitted by code.

G Limiters or Guards – Install in all windows lower than 18” from the finish floor to prevent falling. New construction shall meet code including window guards or limiters.

H Accessible Units – Window controls within all accessible units shall be located within accessible reach ranges no more than 54” above the finished floor. Window controls are strongly encouraged to be located within accessible reach ranges within all units, and no more than 48” above the finished floor at accessible units. Note that other funding requirements may differ, and the most stringent requirement shall be enforced.

08 01 03 Existing Windows to Remain – Structures with existing windows may be allowed to remain when storm windows and screens are installed. To be reviewed on a case-by-case basis. Criteria includes:

A Weather Stripping – Install new weather stripping to provide a seal against weather elements and air infiltration.

B Air Seal – Within shim spaces and window weight pockets as feasible

C Hardware – Shall be intact and operational, or be replaced with new hardware as required

D Restore and Modify – As required to provide useful life. Windows shall have lead free friction surfaces and panned sills.

E Historic Windows - If designated to remain shall be restored to sound serviceable condition, and in accordance with the Secretary of the Interior’s “Standards for Rehabilitation” project requirements.

08 02 Doors

08 02 01 Exterior Common Entrance – Shall provide at a minimum:

A Doors – Minimum 1-3/4" thick, 18-gauge raised panel steel insulated doors with 16-gauge steel frame or 1-3/4" solid core wood raised panel door suitable for exterior locations. 1-4 unit developments may use 20-gauge doors. Aluminum Storefront Systems are an acceptable alternative for larger projects, provided they meet the requirements of the Energy Code.

B Door Width – Minimum 36” wide, with a 32” clear opening when door leaf is open 90 degrees.

C Hardware – Shall include lever style handle, self-locking mechanism, closers, and weather-stripping.

D Auto Door Openers – Shall be included at all primary building entrances, including entrances to Community Buildings.

08 02 02 Exterior Unit Entrance Doors – Shall provide at a minimum:

A Doors – High-quality fiberglass doors with Energy Star ratings for non-fire rated unit entry doors, which open directly to the building exterior. In 1-4 unit residential developments solid wood frames are an acceptable alternative. Hardware to include lever style handle.

B Storm Doors – Rhode Island State Law requires that exterior entrances opening directly into dwelling units be equipped with a screened door. Refer to RI Law: R.I.G.L. 45-24.3-6&10.
<http://webserver.rilin.state.ri.us/Statutes/TITLE45/45-24.3/INDEX.htm>

C Door Width – Minimum 36” wide, with a 32” clear opening when door leaf is open 90 degrees.

08 02 03 Exterior Sliders/Patio Doors – Aluminum or protected wood shall be at minimum double-glazed and provided with a thermal break and screens.

08 02 04 Interior Doors – Shall provide at a minimum:

A Door Construction – Bedrooms and bathroom doors must be 1-3/8" solid wood or solid/semi-solid core high-density fiberboard (HDF). Hollow core doors are acceptable at closets only.

B Door Width – Minimum 34” wide, with a 32” clear opening when door leaf is open 90 degrees. 36” wide doors are strongly encouraged.

C Hardware – Provide lever style handles throughout, and include privacy locks with “coin turn” overrides at all bedrooms and bathrooms.

D Stops – Base trim-mounted doorstops shall be supplied for all doors. Floor-mounted stops or wall-mounted bumpers/stops are only acceptable where base trim-mounted stops are not feasible. Hinge stops are not acceptable.

E Auto Door Openers – Required at primary interior community room entrances. Pre-wiring for the future installation of auto door openers is strongly encouraged at all other common programs (such as laundry rooms, meeting rooms, fitness centers, etc.)

08 02 05 Unit Entrances – Shall provide double-locking interconnected locksets with lever style hardware. Regardless of the manufacturer, the operation of the lockset shall include the following features:

A From the exterior, key unlocks both latch and deadbolt.

B From the interior, turning knob disengages both latch and deadbolt at the same time.

C Single deadbolt locking interconnected locksets are an acceptable alternative.

08 02 06 Renovation / Rehabilitation – Restore doors as required to provide a useful life. Test and modify as necessary to operate properly. Install new weather stripping and sweeps to provide seal against weather elements and air infiltration. Historic doors designated to remain shall be restored to sound serviceable condition, and in accordance with the Secretary of the Interior’s “Standards for Rehabilitation” project requirements.

Division 9 – Finishes

09 01 Interior Finish Coatings

09 01 01 New Construction – Shall provide:

A Paint – One coat of primer paint and two coats of finish paint

B VOCs – Paints, stains, and varnishes to have low (<50g/L) or no volatile organic compounds

C Substrate – Drywall minimum Level 4 finish in finished areas (unfinished areas to receive Level 2 finish).

D Finishes – Walls to have eggshell finish; Ceilings to have flat finish; Trims, baseboards, casings, and doors to have semi-gloss finish.

E Wet Spaces – Bathrooms, plumbing wet walls in kitchens, laundry rooms/closets, mechanical closets, and basement walls and ceilings shall provide moisture/mold resistant finishes and substrates, including:

Mildew-resistant eggshell finish paint on walls and ceilings (in lieu of general finishes above).

Moisture/mold resistant drywall, mold/mildew resistant fiberglass faced gypsum wallboard, cementitious backer board, or a skim coat plaster finish on walls/ceilings over an Imperial Drywall.

09 01 02 Renovation / Rehabilitation – Shall provide:

A Renewed Coatings – New paint, stain, or varnish coatings if provided at interior ceiling, wall, and trim surfaces shall have low (<50g/L) or no volatile organic compounds.

B Existing Walls, Ceilings and Trim – To be free from peeling paint and loose or cracked plaster. Deteriorated or stained paint or wallpaper shall be removed prior to preparation and painting. Solid plaster or wallboard that has uneven but sound surfaces may remain.

C Fire Rated Assemblies – Where existing finishes are proposed to remain as part of a fire-rated assembly, the State Preservation & Heritage Commission Office shall assist in making a determination as to the suitability. Refer to codes as they pertain to archaic materials and relevant NPS Preservation Briefs.

D Existing Trim – Shall be repaired and restored to usable condition, free of deterioration which compromises its use. Repair of historic woodwork & trims shall be in accordance with the Secretary of the Interior's "Standards for Rehabilitation" project requirements.

<https://www.nps.gov/tps/standards/rehabilitation.htm>

09 02 Floor Coverings

09 02 01 New Construction / New Flooring – Shall Provide:

A Unit Bedrooms, living areas, and kitchens – luxury vinyl tile (LVT) or plank (LVP) with minimal wear surface layer of 12 mils and 4" wood or vinyl/rubber base; Engineered wood/hardwood flooring is permitted throughout the dwelling unit except for kitchens and bathrooms, provided project funding is available.

B Unit Bathrooms – Ceramic Tile or LVP with minimal wear surface layer of 12 mils. Community Bathrooms to be ceramic tile with ceramic tile base or LVP with minimal wear surface of 20 mils with 4" vinyl/rubber cove base.

C Entrance Foyers /Vestibules – Impervious tile and base with entrance mat is strongly encouraged. Corridors, Community Rooms, and Foyers – LVT or LVP with minimal wear

surface layer of 20 mils and 4" wood or vinyl/rubber base. While discouraged, if carpet is proposed at corridors, it shall have a rating of ≥ 3.5 TARR ("Severe").

D Stairs – Rubber stair treads and risers the full width of the tread. Rubber base at landings. Contrasting color shall occur at treads, risers, and stair landings to aid the visually impaired.

E Basements and Ground Level Utility Rooms – 4" minimum concrete floors treated with hardener/sealer or painted

09 02 02 Renovations / Rehabilitation – Shall meet the following criteria:

A Existing Finishes – Existing hardwood, terrazzo, etc. may remain in order to maintain the same characteristics as previously installed or those of adjacent finishes.

B Existing Wood Flooring – In good condition should be repaired, sanded, and refinished.

C Substrate – All new flooring shall be installed over suitable substrates per manufacturer's specifications.

09 02 03 Thresholds/Transitions – Thresholds shall not exceed 1/2 inch height as measured from finished face of adjacent floor surfaces and shall be beveled on both sides with a slope no greater than one-in-two (1:2). Flooring transitions shall have an edge strip or threshold that is beveled at a ratio of one-in-two (1:2).

09 03 Exterior Finish

09 03 01 Wood, Poly-ash, or PVC Trim Products – One coat of primer, and two coats of finish acrylic paint, or solid wood stains.

09 03 02 Pressure-Treated Wood – Two coats of compatible stain.

09 03 03 Trim, Doors, and Rails – Semi-gloss finish, with paint product compatible with substrate.

09 03 04 Siding – Satin/eggshell finish.

09 03 05 Renovation / Rehabilitation Projects – All exterior surfaces to be free from peeling paint and deteriorated/stained finishes. Remove all loose paint and address all sources of moisture that may compromise the lifespan of the finish prior to recoating. Bare wood must be primed with stain-concealing primer. Use only coating systems compatible with underlying paint/material.

Division 10 – Specialties

10 01 Signage

10 01 01 Temporary Construction Signage – In conformance with RIHousing standards, temporary construction signage shall be furnished and installed by the Contractor, who will remove it when construction is complete. Refer to Chapter 7 "Supplementary Conditions", Segment C for details.

10 01 02 Permanent Building and Unit Identification Signage – Shall meet the following requirements:

A Permanent Development Signs – Shall be distinct, well-designed, easily readable, and maintenance-free.

B Interior Signage – All rooms and interior unit entries shall be marked with high-contrast typeface, tactile numbers, and braille. Refer to the 2010 ADA standards for Accessible Design, Section 703 "Signs" for guidance. <https://www.ada.gov/law-and-regs/design-standards/2010-stds/#703-signs>

C Exterior Unit Signage – Exterior unit entries shall provide 4" minimum metal signage in compliance with local signage requirements, as applicable.

10 02 Accessories

10 02 01 Unit Bathrooms – Shall meet the following requirements:

A In-wall Blocking – required at all accessory locations.

B Accessories – Furnish and install the following:

- o Surface mounted mirror with overhead light and additional enclosed storage within bathroom.
- o Minimum one towel bar 18"-24" in length.
- o Soap/Shampoo dish or shelf at showers
- o Robe hook
- o Shower Rod
- o Toilet paper roll holder

10 02 02 Common Area Bathroom Accessories – Shall meet the following requirements:

A In-wall Blocking – required at all accessory locations.

B Accessories – Furnish and install the following:

- o Mirror behind sink
- o Soap Dispenser
- o Toilet paper roll holder
- o Trash receptacle
- o Coat and bag hooks

10 02 03 Mailboxes – Mailboxes shall be in accordance with United States Postmaster requirements. See Division 1 requirements for package delivery narrative.

10 02 04 Fire Stop Canisters – Each kitchen range hood, located in common areas and within units, shall be outfitted with a pair of fire stop canisters to prevent kitchen fires.

10 02 05 Fire Extinguishers – Extinguishers shall be furnished and installed in all common areas and corridors per code. Alternatively, dedicated extinguishers may be installed in each unit kitchen in lieu of corridor extinguishers when permitted per code.

Division 11 – Equipment

11 01 Appliances

11 01 01 Energy Star – Provide certified refrigerators, range hoods, washers, dryers, and dishwashers.

11 01 02 Refrigerator/Freezer – Shall be frost-free, two-door style; At one-bedroom units provide with minimum 14.5 cubic feet, and at two or more bedroom units provide a minimum 18.0 cubic; At accessible units refrigerator/freezer shall be compliant with UFAS/ADA requirements.

11 01 03 Range – 30" minimum width electric range with integral oven. At accessible units, range shall be equipped with front controls and a self-cleaning oven. Gas ranges/ovens are not permitted.

11 01 04 Range Hood – To have washable grease filters. At accessible units, locate switch at apron of base cabinet within UFAS/ADA reach ranges. Re-circulation type hoods are encouraged, but only permitted when paired with a balanced central ventilation system.

11 01 05 Dishwashers – Required in all units containing one or more bedrooms.

11 01 06 Washer/Dryer – See "Laundry Facilities" under Division 15.

- 11 01 07 Non-Standard Equipment – Combination microwave range hood and garbage disposals are not considered standard equipment. However, if the development has sufficient non-RIHousing subordinate resources available, then these appliances can be included within each apartment.

Division 12 – Furnishings

12 01 Kitchens and Bathrooms

- 12 01 01 Kitchen Casework – Shall meet requirements for KCMA severe use. Acceptable alternatives shall be made of solid wood and plywood, without the use of MDF or particle board. Cabinet doors shall have raised or recessed panels and accessible door pulls. The use of flat panel cabinet doors shall be reviewed on a case-by-case basis.
- 12 01 02 Countertops – If laminate, one piece and backsplash. More durable materials such as Quartz are permitted where not cost-prohibitive. Cultured stone vanity tops are acceptable in bathrooms. Contrasting color shall exist between counter tops and casework to aid the visually impaired.
- 12 01 03 Bathroom Vanities – Provide below sink storage are required in all dwelling units full and half-bathrooms except accessible units requiring clear knee space and rehabilitated units utilizing existing lavatories not adaptable to vanity arrangements. Cabinet doors shall have accessible door pulls.

12 02 Window Treatments

- 12 02 01 Type – Non-dust collecting types, such as fiberglass reinforced shades. Mini blinds are an acceptable alternative for projects with cost constraints. Provide vertical blinds at sliding patio doors.

Division 13 – Specialty Construction

13 01 Lead Safe Construction

- 13 01 01 General – Renovation work shall be completed in a lead-safe manner as defined by the RI Rules and Regulations for Lead Poisoning Prevention (216-RICR-50-15-3). Furthermore, HUD Lead Safe Housing Rule (24 CFR, Part 35) requires various levels of evaluation and treatment of lead paint hazards when federal money is used for housing rehabilitation. All friction surfaces within units shall be made lead-free as defined by the aforementioned regulations. In addition, contracting firms shall become certified with the EPA and shall successfully complete an EPA-accredited renovator course for its workers. Furthermore, prior to tenant occupancy, post-abatement clearance testing shall be required for all units, soils, exteriors, common areas and water. The developer is responsible for the hiring of an independent Rhode Island licensed lead inspector to conduct all pre and post-abatement lead testing and clearance. Refer to Chapter 8 – “Lead Hazard Reduction Policy” for additional requirements.

13 02 Existing Asbestos

- 13 02 01 General – For renovations and rehabilitations, project must be assessed for the existence of asbestos-containing building materials by qualified professionals.

13 03 Radon Protection

- 13 03 01 General – All new construction and gut rehabilitation projects are required to install passive radon systems with wiring for future exhaust fans. All units with higher than EPA permissible exposure limits of 4.0 pci/l for radon gas exposure are required to install active radon systems. In addition, community buildings, office buildings, maintenance buildings, and other auxiliary buildings where

tenants or personnel occupy shall also comply with current radon guidelines. Radon testing is required pre and post construction in conformance with HUD, EPA and RIHousing protocols.

Division 15 – Plumbing and HVAC

15 01 General

- 15 01 01 Design Team – All Mechanical and Plumbing systems shall be designed by an Engineer licensed in the State of Rhode Island.
- 15 01 02 Housekeeping Pads – At grade, provide a 4” thick concrete pad below all mechanical equipment. At wood framed floors and roofs provide support systems per manufacturer requirements.
- 15 01 03 Commissioning – Plan for a commissioning process in buildings with 12 or more units, to ensure that heating, ventilating, and air-conditioning (HVAC) systems perform in conformity with design intent. Commissioning Agent to provide testing and balancing reports/commissioning of systems in large multi-unit buildings (i.e. Heating and Cooling Systems greater than 200,000 BTU’s will require commissioning). At a minimum, manufacturer start-up reports shall be required for all new furnace, boiler, and HVAC equipment regardless of project size.
- 15 01 04 Final Commissioning Report – To be submitted to RIH for review and approval.
- 15 01 05 Water Damage Protection – Equipment storing any amount of water shall be located in rooms with floor drains and water-resistant floor coverings or drip pans with hard piped overflows. All boiler rooms are to be equipped with floor drains.
- 15 01 06 Refrigerant Piping – When located outdoors shall be jacketed for UV protection and sealed weather tight. The use of line set enclosures to hide/protect multiple line sets is encouraged.
- 15 04 07 Magnetic Filters – New high efficiency boilers and new variable speed pumps with electronically commutated motors shall have magnetic filters installed to capture ferrous impurities in the piping system.

15 02 HVAC, New Construction and New Equipment

- 15 02 01 Ductwork – Seal all seams and joints with liquid mastic. Duct systems that cross compartmentalization boundaries shall be sealed to the following standards, based on SMACNA HVAC Air Duct Leakage Test Manual 2012: Seal Class A, Leakage Class 2 for round ductwork and Leakage Class 4 for rectangular ductwork. The use of fiberglass/fibrous duct liner and duct-board is not permitted.
- 15 02 02 Concealment – Soffited, boxed, or concealed above ceilings within all dwelling unit living spaces. Exposed spiral ductwork will be reviewed on a case-by-case basis and is encouraged in mill conversion buildings and commercial areas with high ceilings.
- 15 02 03 Mechanical Penetrations – Seal all penetrations with corrosion and rodent-proof materials.
- 15 02 04 Unconditioned Spaces – Equipment and Ductwork is not permitted in unconditioned spaces located outside the thermal envelope.
- 15 02 05 Testing – Ducts shall be tested with duct blaster to be $\leq 8\%$ total leakage and $\leq 4\%$ leakage to outside. Ductwork to be pressure tested per Energy Star Requirements and/or code. Submit duct test results to ClearResult for compliance.
- 15 02 06 Exterior Vents – Install mechanical vents that penetrate buildings on painted blocking and locate at side or rear elevations, or roof areas of the building wherever possible. Vents should be modest in

scale and color that blends into the façade and aligned from floor to floor where possible to avoid a random appearance.

- 15 02 07 Controls and Thermostats – Individual wall-mounted controls and thermostats are required. Controls/Thermostats shall be mounted with operable portion of screen/device no higher than 48” above the finished floor. All controls and thermostats shall be located in places unlikely to be obstructed by furniture, and Type A and visual/hearing impaired accessible units shall include simple interface with large text.
- 15 02 08 Sound and Vibration Isolation – All condensers attached to buildings or located on rooftops shall be installed with isolation pads or other means to prevent sound and vibration transmission to the interior.
- 15 02 09 Maintenance Utilities – Condenser and other similar equipment located on rooftops shall have a frost-proof hose bib and power outlet for maintenance measures.
- 15 02 10 Screening – Provide screening of large rooftop equipment located in highly visible locations or historically sensitive communities. Locate at-grade equipment so views and egress are not impeded and conceal with plant buffers or other screening at visible locations.
- 15 02 11 Balanced Ventilation – 24/7 balanced ventilation systems with air-to-air recovery is required for all dwelling units. When Energy Recovery equipment is provided, its sensible recovery performance shall be greater than 80% and latent recovery greater than 50%.
- 15 02 12 Filters – Minimum MERV 13 filtration required on all incoming air streams and fan coils with recirculated air.
- 15 02 13 Electrical Rooms – Engineer to ensure that operational temperatures within all electrical rooms are controlled to ensure the safe operation and maintenance of all electrical equipment. As buildings move towards full-electrification and incorporate equipment related to electric-vehicle charging, the risk of uncomfortable and/or less efficient operational temperatures increases. As such, climate control of all electrical rooms is strongly encouraged.

15 03 HVAC, Renovation and Rehabilitation

- 15 03 01 Air Conditioning – In projects without central HVAC systems, provide heavy-duty air conditioning brackets for future window installations. Specified brackets shall not void window warranties. In addition, developments that have only one egress window located in any unit area, shall utilize code-compliant air conditioners that do not restrict window egresses in accordance with HUD’s Uniform Physical Condition Standards (UPCS). Dedicated air conditioner outlets shall be installed underneath or directly adjacent to at least one living room and one primary bedroom window.
- 15 03 02 Bathroom Fans – Energy Star rated continuous run or Smart Flow technology exhaust fan and light with integral timer and timer controls, or as required by code. A separate ceiling exhaust fan and light fixture with same function are acceptable alternatives. Sones: ≤ 1 for continuous run fans and ≤ 3 for intermittent fans. Verify exhaust approach meets code.
- 15 03 03 Exhaust – Unless prohibited by the Energy Code or performance certification criteria, exhaust kitchen and bath moisture and odors to the exterior. The bathroom fan does not have to be continuously run if there is an alternate ERV system. Recirculating range hoods are only acceptable if an ERV system is present.

- 15 03 04 Existing Heating Systems – When inoperative, hazardous, or inefficient (under 75% efficiency per test) they shall be repaired to perform at a minimum of 80% efficiency or be replaced. Ductwork and piping shall be enclosed in all habitable areas.
- 15 03 05 Finned Tube Radiation – Where used, shall be high output with heavy gauge enclosure. Replace existing ones as appropriate.

15 04 Heating Systems

15 04 01 All Electric Heat Pumps – All-electric, Air-Source Heat Pump systems are required for space heating, and shall meet the following criteria:

A Type – Equipment to be “cold climate” type that operates down to -13F (Fahrenheit) and sized to provide the required heat on a design heating day (currently +5F in Rhode Island).

B Capacity – Heat pumps shall be sized per its derated capacity and not its nominal capacity.

C Snow Considerations – Exterior equipment shall be located carefully to be above expected snow height/drifts, and to facilitate periodic snow removal.

E Hardship Request – Renovation/rehabilitation projects with limited intervention of building enclosure (i.e. no continuous exterior insulation) may not benefit from heat pump systems in the same way that new construction can. Development teams may submit a written request to demonstrate hardship, which shall be reviewed and approved/rejected at the discretion of RIHousing.

15 04 02 Electric Resistance Heat – Shall be limited to select areas such as: stairwells, utility closets, and other locations where it is used only as emergency, backup, or for limited freeze protection. Tamper-proof thermostats shall be installed and set for minimal heating.

15 04 03 Motors and Pumps – Premium efficiency motors with variable speed capability.

15 04 04 Controls – Control wiring and control strategies with outdoor temperature reset, if applicable.

15 04 05 Unoccupied Zones – Avoid unnecessary heating of unoccupied spaces, such as storage, mechanical, and utility areas where permitted by code.

15 04 06 Equipment Placement – Locating heating equipment in basements is strongly discouraged.

15 05 Domestic Hot Water Supply

15 05 01 All Electric Ready – At a minimum provide electric conduit with pull wire, an appropriately sized electrical panel, appropriately sized room(s), and ventilation to accommodate the future installation of air-source heat pump domestic hot water systems. Rehab projects should be evaluated on a case by case basis.

15 05 02 Water Heater – Equipment shall be all electric heat pumps or high efficiency, condensing, and direct vent combustion equipment. See Item 01 03 01 for minimum future electrification provisions. Atmospheric combustion is not permitted. System to supply the following minimum storage requirements:

Efficiency, one and two-bedroom units – 30-gallon water heater or central heating system.

Three-bedroom unit – 40-gallon water heater or central water heating system.

Four-bedroom unit – 55-gallon water heater or central water heating system.

Acceptable Alternatives – Properly sized/engineered high-efficiency on-demand water heaters are acceptable alternatives to standard tank systems so long as they provide equivalent capacity.

- 15 05 03 All Electric Heat Pump Water Heaters – All-electric, Air-Source Heat Pump systems are strongly encouraged for water heating, and if provided shall meet the following criteria:
- A Type – Equipment to be “cold climate” type that operates down to -13F (Fahrenheit) and sized to provide the required heat on a design heating day (currently +5F in Rhode Island).
 - B Capacity – Heat pumps shall be sized per its derated capacity and not its nominal capacity.
 - C Snow Considerations – Exterior equipment shall be located carefully to be above expected snow height/drifts, and to facilitate periodic snow removal.
 - D Refrigerant – The use of R744 refrigerant is strongly encouraged (Carbon Dioxide with a Global Warming Potential of 1).
- 15 05 04 Electric Resistance Water Heaters – Not permitted to ensure the required RNC Tier Rating and Energy Star Certification are met.
- 15 05 05 Hybrid Heat Pump Type Water Heaters – Are strongly discouraged within dwelling units due to equipment noise and risk of cold drafts.
- 15 05 06 System Design – Locate equipment in close proximity to kitchens and bathrooms to minimize piping runs and increase overall system efficiency. Recirculation piping systems, where present, shall be optimized to limit system length, utilize variable speed pumps, and include self-balancing thermostatic balancing valves.
- 15 05 07 Water Quality – The plumbing system design shall include water quality treatment to meet the water heater manufacturer’s requirements and avoid the buildup of calcium carbonate scale. Water treatment may include filtration, chemical and/or electronic systems. Incoming water shall be tested for hardness, dissolved solids, pH and Chloride during the design phase of the project. Existing domestic hot water piping shall be flushed to remove built up scale.

15 06 Plumbing

- 15 06 01 Water Conservation – All newly installed fixtures (except kitchen faucets) shall meet the current published EPA water sense standards. Water-conserving plumbing fixtures, showerheads, and faucet aerators are required. Toilets may not exceed 1.28 gallons per flush.
<https://www.epa.gov/watersense>
- 15 06 02 Exterior Walls – The installation of supply or drain piping within exterior walls is not permitted, except where serving an exterior fixture.
- 15 06 03 Main Shutoff – Provide a labeled shutoff for each dwelling unit located either in the unit or interior to the structure and easily accessible.
- 15 06 04 Hose Bibs – Exterior frost-proof hose bibs are required adjacent to landscape areas. Lockable hose-bibs for maintenance use only are required.
- 15 06 05 Supply Piping Insulation – Insulation and vapor jacketing to be provided per code.
- 15 06 06 Accessible Units – All exposed supply and drain piping below sinks, shall be insulated with a protective insulative jacket.
- 15 06 07 Acoustic Insulation – Roof drain “rain leaders” and domestic drain lines shall be insulated for acoustic considerations when traveling through dwelling units or amenity spaces.
- 15 06 08 Vent Stacks – Install plumbing stacks at rear roof areas as feasible. Consider black finished piping at pitched roofs, and white finished piping at flat roofs.
- 15 06 09 Sink, Shower, and Tub Faucet Hardware – Shall be single lever/handle style, with no knobs.

15 06 10 Toilet Levers – Shall be located on the access side of the toilet.

15 06 11 Accessible Bathrooms and Kitchens – All newly installed fixtures in accessible units and all common areas shall be ADA-compliant (including Type A adaptable units, UFAS accessible units, public restrooms, community spaces, and similar. Toilets located within all accessible unit and common area bathrooms shall locate the top of the toilet seat between 17-19 inches above the finished floor.

15 06 12 Escutcheon Plates – To be installed at all through wall/pipe penetrations.

15 07 Laundry Facilities

15 07 01 General – Accessible central laundry facilities shall be provided in all developments, at a ratio of one set of washer/dryer per 14 units, and one additional washer/dryer to be ADA compliant). The ADA-compliant facilities shall be located to be accessible by residents in accessible units. Energy Star rated washers and dryers shall be used if supplied at common laundry rooms. The building manager or developer shall contract out or purchase and install coin-operated equipment.

15 07 02 Dwelling Unit Laundry – Clothes washer and dryer connections shall be provided within each dwelling unit where no central laundry facility is provided or is not easily accessible. If connections are supplied in every unit, the tenants are responsible for furnishing and installing laundry appliances.

15 07 03 Gas Dryers – Are not permitted.

15 07 04 Scattered Site Properties – Laundry equipment hook-ups (hot and cold water, electrical duplex outlet, 220V electrical dryer outlet, dryer vent to exterior) shall be installed in the basements.

15 07 05 Water Damage Protection – Central laundry rooms shall have floor drains and water-resistance floor coverings. In-unit washing machines shall have hard piped drip pans. All washing machines shall have water leak detection shut-off devices, and easily accessible shut-off valves.

15 07 06 Stacked Laundry Equipment – Vertical washer and dryer stacked combination units are discouraged due to cost but will be considered on a case-by-case basis.

Division 16 – Electrical

16 01 Power Supply System

16 01 01 All Electric Ready – At a minimum all electrical service, equipment, and related room(s) to be sized to accommodate a future conversion to all-electric heating and domestic hot water systems.

16 01 02 Service – Minimum 100-amp service for each dwelling unit.

16 01 03 Meters – Shall be installed on the sides and rears of buildings and buffered with plantings, as permitted by the electrical utility company and state electrical code.

16 01 04 Existing Components – The designer, in concert with the State electrical inspector, shall examine the system and equipment. Substandard or critical non-code-compliant components shall be replaced. Open circuit breakers, knockouts, and/or gaps in the electrical panel, junction boxes, and other fixtures shall be properly capped/blanked.

16 01 05 Existing Service Entrance – Shall have a minimum capacity of 100 amps and be in good condition and sized to safely service all outlets, fixtures, and appliances proposed to remain or be newly

installed during the rehab. Essential motors requiring 240 volts shall have a separate dedicated circuit and outlet.

16 01 06 Commercial Devices – In dwelling units of projects with 12 or more units, commercial grade receptacles, switches, and all other wiring devices shall be installed.

16 01 07 Low Vision Lighting – Provide low-level floor surface lighting tied to a photoelectric sensor at all hallways and bathrooms within visual/hearing impaired units.

16 02 Lighting and Convenience Outlets

16 02 01 Switches – Provide decora/rocker style switches centered no higher than 48” above finished floor.

16 02 02 Convenience Outlets – Shall be centered no higher than 18” above the finished floor, except at kitchen countertops, bathroom vanities, or as required by specialty equipment/appliances.

16 02 03 Lighting - All new light fixtures shall be LED.

16 02 04 Lighting Fixtures – Provide the following:

A In every habitable room – At least one light fixture or outlet controlled by a wall switch.

B Stairways within dwelling unit – Fixture(s) controlled by a three-way switch

C Common stairways/hallways – Fixtures controlled by a three-way switch or occupancy devices.

D Exterior stairs – Fixture(s) to illuminate exit discharge per code.

E Dining areas – Ceiling light fixture.

F Bathrooms – Ceiling light fixture, mirror light fixture, and exhaust fan. A GFI duplex convenience outlet to be located close to the sink.

G Kitchens – Minimum of one overhead light fixture and one light fixture located above the sink area with separate switches.

H Closets – Ceiling light fixture at walk-in closets, laundry closets, and mechanical closet areas.

I Building Security – Flood lights shall be equipped with motion sensors and/or photocell/timeclock controllers. Parking lighting shall be on photocell/timeclock controllers.

16 03 Telecommunications

16 03 01 Telephone – Pre-wire for telephone service in accordance with the current regulations of the utility company. Include the installation of terminal boxes and interconnects resulting in a system ready for operation. Provide one phone jack in each dwelling unit, and at management office(s) as required.

16 03 02 Cable/Data – Install rough wiring and jacks for CATV outlets in each dwelling unit living room, all bedrooms, management office, and in any common spaces including community rooms, lounges, and fitness rooms if provided. Cable services provided to developments shall have broadband capability compatible with the most current federal upload and download feed standards.

16 04 Security

- 16 04 01 Security Plans – Shall be provided for all developments describing what security features are included in the development (peep holes, security cameras, access controls, motion sensor lighting, etc).
- 16 04 02 Emergency Call Systems – In senior/assisted living developments, the installation of a fully operational call system is encouraged, but at a minimum senior/assisted living developments shall pre-wire for future emergency call systems in all units and common bathrooms.
- 16 04 03 Security Systems – Projects containing more than 12 units and buildings that house the elderly, shall install security alarm and camera monitoring systems.

16 05 Doorbells and Intercoms

- 16 05 01 Scoping – Developments shall comply with the following as applicable:
- A 1-3 units or exterior townhouse entries – Install doorbells.
 - B 4-12 units – Install intercom systems with electronic buzzers and door strikes in buildings with two or more floors.
 - C More than 12 units and two or more floors – Provide video intercom at all units.
 - D Hearing impaired units – Provide doorbells with combination strobe/sounder devices in all living spaces, bedrooms, and bathrooms within the unit.
- 16 05 02 Mounting Height – Mount doorbells centered no higher than 48” above the finished floor. Mount video intercoms (where required above) with operable portions of screen/device no higher than 48” above the finished floor.

16 06 Fire Alarms

- 16 06 01 General – Install per code. All fire alarm wiring shall be concealed in walls, ceilings, floors, and chases, where possible. In Historic or renovation projects, electrical metallic tubing (EMT) that cannot be concealed shall be installed along the perimeter of the room in inconspicuous locations and painted to match adjacent ceiling and/or wall areas.
- 16 06 02 Visual and Hearing-Impaired Units – Install devices tied to primary and local building fire alarm. Provide combination strobe/sounder devices in living rooms and bedrooms, and strobe devices in bathrooms.

Division 21 – Fire Suppression

21 01 Sprinklers

- 21 01 01 General – System to be designed and installed per the following criteria:
- A Verification – Install sprinklers per code.
 - B Scoping – Each riser should include tamper and flow switches tied to a central station alarm or fire department.
 - C Concealment – All fire protection piping shall be concealed in walls, ceilings, floors, and chases, where possible. In Historic or renovation projects, piping that cannot be concealed shall be installed along the perimeter of the room in inconspicuous locations and painted to match adjacent ceiling and/or wall areas.
 - D Escutcheon Plates –To be installed at all wall/pipe penetrations.
 - E Sprinkler Heads – Shall be clean and free of paint or other materials that may compromise water flow.