

MaineHousing's

Construction Services

Design & Construction Manual

August 2011 Edition

PREFACE

This Design and Construction Manual (Manual) has been assembled for use by MaineHousing staff and project Partners and their agents who are participating with MaineHousing in the development of safe and affordable housing through their applications for various funding sources administered by MaineHousing. The material contained herein shall be used in the design and construction of all new and rehabilitation multi-family and supportive housing projects developed under the various programs administered by MaineHousing. These standards establish both general and minimum criteria for design, construction and rehabilitation of multi-unit developments financed all or in part by MaineHousing. It is the intent of this manual to assist our partners by outlining MaineHousing's expectations to ensure a basis for providing safe, sanitary, cost effective, energy efficient, accessible, and decent housing for all occupants, as well as protecting the Authority's security interests in the property. This manual is also available on MaineHousing's website: www.MaineHousing.org.

Applicability

MaineHousing understands that not all standards, processes, procedures, and documents may apply to every project, in every instance. For example, projects with limited scope, such as existing building rehabilitation supportive housing projects, that do not include substantial additions or major site alterations, will likely require much less documentation and review than large-scale, new-construction or substantial rehabilitation, multi-family projects that include complete site development, require local approvals, and will include the latest materials and construction technologies and techniques.

Acquisition/rehabilitation and/or preservation projects also present unique challenges in matching work scope with available funds. In developing scopes of work for such projects the allocation of funds should be prioritized based on the specifics of each project using a hierarchy that starts with an evaluation of code compliance including structural integrity, life-safety (including sprinklers), hazardous materials and environmental issues, accessibility, and then an evaluation of deferred maintenance, durability, and energy concerns, and lastly include the feasibility of project upgrades and/or amenities including any proposed additions.

All applicants are encouraged to review this manual in detail and reach a consensus with the Construction Analyst assigned to their project as to the standards, scopes of work, processes, procedures, and documents that will be applicable for the project. The Concept Meeting, as discussed later in this Manual, provides for the project kick-off and is an opportune time to discuss the project scope, level of design detail, and review procedures for each project. If consensus can't be reached, applicants may make further requests, in writing, to the Construction Services Manager of MaineHousing for final determinations.

Requirements and Suggestions

The use of the word "shall" implies that strict conformance to a standard or procedure is required by MaineHousing; the use of the word "should" is a strong suggestion that a standard or procedure be appropriately considered. The use of MaineHousing, MSHA, Maine State Housing Authority, and/or the "Authority" all reference the Maine State Housing Authority.

This manual has been divided into three parts plus an Appendix section: Part One contains the Design and Construction Standards to be used in the development of contract documents; Part Two contains the Design and Construction Document requirements and document submittal procedures; Part Three discusses the project delivery processes and procedures. The appendix section contains additional information that is referenced in the body of the manual.

This Manual has been generated in an effort to provide a quick and easy reference for interested parties involved with the design and construction of housing projects administered by

MaineHousing, and supersedes all previous editions and/or publications printed to date.

The first edition of this manual was provided in February of 2006; the format and general content of this August 2011 edition remains consistent with the initial publication.

Final interpretations, variances, clarifications, amendments, etc. related to this manual shall be made only by the written approval and/or authorization of the Construction Services Manager of MaineHousing.

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PART 1

DESIGN AND CONSTRUCTION STANDARDS

A. INTRODUCTION

This manual establishes both general and minimal criteria for the design, construction, and project delivery for both new construction and substantial rehabilitation of multi-unit housing developments processed through MaineHousing. The primary objectives of this manual are to standardize procedures for design and construction and to aid the design professionals and owners in preparing complete submissions that will allow smoother processing and construction processes. Portions of this manual are applicable to all projects and, therefore, other manuals may be issued for clarity to better align with specific programs administered by MaineHousing. MaineHousing recognizes and endorses the use of national, state, and/or locally adopted building, plumbing, electrical, fire protection, and engineering codes and standards as additional minimal requirements. In addition, MaineHousing requires full compliance with state and local standards for zoning and subdivision regulations. In general, the MaineHousing's standards and/or procedures are meant to complement, supplement, or improve upon any national, state, or local regulations. *However, in any situations where duplication occurs, the more stringent standard or procedure shall apply.*

B. LICENSED DESIGN PROFESSIONAL SERVICES

All construction drawings and specifications shall be prepared, completed, and be certified in accordance with State of Maine statutes by a design professional (for most projects, an architect) licensed in the State of Maine. It is further required that design professionals, trained and licensed in specific disciplines (i.e., civil, structural, mechanical, electrical engineering) be retained and administered by the designer-of-record for such services. In each instance, the designer-of-record shall be the primary responsible professional. It is required that an Owner-Architect (or Design Professional) Agreement be executed for all design services to be performed on MaineHousing projects. Such agreements shall clearly state scopes of work to be performed and the compensation arrangements between the parties. Owner-Architect Agreement, AIA Document B181, is one suggested format that is acceptable to MaineHousing.

The Owner/Architect (or Design Professional) Agreement shall, at a minimum, include:

1. The scope of work shall (as applicable based on the extent of the project) include all architectural, structural, mechanical, electrical, civil, landscape, and other consulting services necessary to clearly identify the requirements for the construction of the entire project. The scope of services should include provisions for the administration of the construction contract through to project completion, including regular on-site visitations by all designers and engineers, special inspections, bi-monthly (minimum) on-site project meetings, responses to requests for information, tracking of change proposals, creation of field reports, and keeping and distributing meeting minutes. Copies of all documentation created by the architect shall be provided to MaineHousing.
2. The Owner-Architect (or Design Professional) Agreement shall delineate the responsibility for all services to be provided whether by the design professional, owner, or others.

3. Responsibilities related to design and construction administration services shall each be clearly delineated.
4. Adequate errors and omissions professional liability insurance shall be provided in accordance with MaineHousing's Insurance requirements.

C. CODES

- * NFPA 101 Life Safety Code 2009State Standard
- * NFPA 211 (chimneys, etc.) 2003 State Standard
- * NFPA 1 Fire prevention Code 2003 State Standard

- *MUBEC (Maine Uniform Building and Energy Code); MaineHousing's Minimum Code as applicable by Project Type; which includes the following:
 - International Building Code (IBC) 2009
 - International Existing Building Code (IEBC) 2009
 - International Residential Code (IRC) 2009
 - International Energy Conservation Code (IECC) 2009
 - ASHRAE 62.1 Ventilation for Acceptable Indoor Air Quality 2007
 - ASHRAE 62.2 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings 2007
 - ASHRAE 90.1 Energy Standard for Buildings except Low-Rise Residential Buildings 2007
 - ASTM E1465-06 Radon Standard for new residential construction - (Maine Model Standard) 2006
- * State Plumbing Code. (Based on IAPMO 2000 Uniform Plumbing Code)..... State Standard
- * National Electric Code 2011..... State Standard
- * ADA Federal Requirement
- * ICC/ANSI A-117.1 2003 State and Federal Requirements
- * Fair Housing Act (design manual) Federal Standard
- * Section 504 (UFAS Standard) Federal Standard

Accessibility Laws, Regulations, and Minimum Standards:

Compliance with all existing laws and regulations is the responsibility of the owner and design professional. MaineHousing, in keeping with the harmonization of the U.S. Access Board, model codes and key industry standards, has adopted the accessibility requirements of the 2003 IBC, Chapter 11 and the technical requirements of ICC/ANSI A1 17.1-2003 "Accessible and Usable Buildings and Facilities" as well as the requirements of the 2010 ADA Standards for Accessible Design. In addition, certain provisions of the Fair Housing Act (FHA) the Fair Housing Accessibility Guidelines (FHAG), the Maine Human Rights Act (MHRA) and Section 504 shall also be considered as further defined below.

All common areas and public spaces shall meet the requirements of the 2010 ADA Standards for Accessible Design as well as ICC/ANSI A117.1-2003.

The 2003 ANSI defines four types of Dwelling Units for purposes of accommodating individuals with physical disabilities:

- Section 1002 Accessible Units
- Section 1003 Type A Units
- Section 1004 Type B Units
- Section 1005 Units with Accessible Communication Features

Defining Handicapped Unit types; Accessible units, Type A units, and Type B units:

An **Accessible** unit is constructed for full accessibility in accordance with the requirements in Chapters 3 through 9 of ICC A117.1. For example, grab bars are installed in the bathrooms, a clear floor space is provided for front approach at the kitchen sink and bathroom lavatories, 32-inch (813 mm) clear width doors with maneuvering clearances and lever hardware are provided, etc. None of the elements in the unit are constructed for adaptability. The requirements for an Accessible unit are more restrictive than either a Type A or a Type B unit.

A **Type A** unit has some elements that are constructed as fully accessible (e.g., 32-inch (813 mm) clear width doors with maneuvering clearances and lever hardware) and some elements designed to be altered when needed (e.g., blocking in the walls of the bathroom for future installation of grab bars).

The scoping or technical requirements for **Type B** units are consistent with the requirements for units required by the FHAG. A Type B unit is constructed to a lower level of accessibility than either an Accessible unit or Type A unit. While a person who uses a wheelchair could maneuver in a Type B unit, the technical requirements are geared more towards persons with mobility impairments. Areas of a Type B unit may be totally non-accessible (e.g., sunken living room, extra bedrooms on a mezzanine level). Side approach is permitted to sinks in the kitchen and lavatories in the bathroom rather than planning for a front approach. Some elements are constructed with a minimal level of accessibility (e.g., doors within the unit are 31 3/4-inch (806 mm) clear width but do not require maneuvering clearances), while some elements are designed to be altered when needed (e.g., blocking in the walls of the bathroom for future installation of grab bars).

In summary, Accessible unit requirements are more stringent than Type A requirements, and Type A requirements are more stringent than Type B requirements. Units are permitted to be constructed to a higher level of accessibility than may be required based on program needs.

Units for individuals with physical disabilities required by State and/or Federal Law and National Standards or by pledge:

Where MaineHousing has established a point system for additive requirements, it's important to distinguish between the minimum numbers and types of units that are required by National Standards, State and Federal law and units that may be provided in addition as the result of a Qualified Allocation Plan (QAP) pledge or other program. For the purposes of this section, accessible dwelling units mandated by National or State Standards/laws are referred to as "required" units. Those units that may have been proposed in addition to that required by National and State Standards are referred to as "pledged" units.

Minimum unit type and quantity of units for individuals with physical disabilities per State and/or Federal Law and National Standards

Recognizing that "accessible" units as defined by ANSI represent the highest level of accessibility that may be provided within a dwelling unit, MaineHousing certainly encourages their inclusion in a project. It's important to note, however, that whether required by State or National Standards, the minimum unit type actually required is a Type A unit as defined per 2003 IBC/ANSI A117.1. MaineHousing does impose additive standards: 50% of the "required" units shall be outfitted with grab bars throughout; and roll in showers shall be provided in 50% of the "required" units.

Type of units for individuals with physical disabilities per Pledge:

In the event an applicant has "pledged" (through the QAP process or other program) to provide

additional dwelling units to accommodate individuals with physical disabilities, the minimum unit type to meet the pledge shall be Type A.

How Many:

As a general rule, the scoping requirements of the MHRA will determine the minimum number of Type A units that are required, as it is typically the most stringent standard applicable with respect to unit quantity. Typically, the number of Type A units is to be no less than 10% of the ground level units and a minimum of 10% of the upper story units connected by an elevator when the project is new construction and contains 20 or more units. Renovations of over \$100,000 for projects of 20 or more units are to have at least one Type A unit for each multiple of 20. The MHRA requirements of 10% exceed the 5% requirement of Section 504 where federal funds are used, but the threshold for Section 504 is five or more units, so 5% would apply for projects between 5 and 19 units, resulting in a minimum of one unit. The scoping requirements of the FHA require all covered units in new construction of 4 or more units to be adaptable. The ANSI Type B unit meets this requirement. Therefore the FHA may require all units in a project to be Type B while more stringent Type A units will be required by MHRA and Section 504.

Any amount of additional Type A units that will need to be provided above and beyond will be dictated by what percentage increase may have been pledged at the time of application through the QAP (or other program funding) process.

Accessible:

The project must comply with the accessible parking requirements of all applicable local, state and federal laws including without limitation, the Federal Fair Housing Act, Section 504 of the Rehabilitation Act, the Americans with Disabilities Act and the Maine Human Rights Act, and the applicable design standards in connection with each of these laws. Understanding that these referenced laws and standards present multiple interpretation challenges, MaineHousing clarifies its understandings of these and its own requirements related to accessible parking herein.

MaineHousing's policy on parking requires one space for each residential unit in projects that receive tax credits and/or funding from MaineHousing. In accordance with the Americans with Disabilities Act which appears to be the most restrictive of the federal requirements, projects that provide one-for-one parking must also provide at least one accessible space for each accessible unit required by applicable law and at least one van accessible space for every six (6) accessible spaces, or fraction thereof.

If a project provides more or less than one parking space for each residential unit, the requirements differ. Specifically:

For projects with more than one space for each resident, in addition to the one accessible space for each accessible unit, at least two percent (2%) of the remaining parking spaces (but not less than one additional space) must be accessible.

- For projects requesting and receiving MaineHousing's approval to provide less than one parking space for each resident, at least two percent (2%) of all parking spaces provided (but not less than one) must be accessible and at least one van accessible space must be provided for every six (6) accessible spaces, or fraction thereof.

All accessible spaces for residents must be located on an accessible route and must be located on the shortest accessible route from the parking space to the dwelling unit served by the accessible space.

In addition, other factors can affect the number of required accessible spaces under the law, including without limitation, the following:

- If a project provides different types of parking, such as surface parking, garage or covered parking, at least one of each type of parking space must be accessible regardless of the minimum number of spaces required above, unless “substantially equivalent or greater accessibility is provided in terms of distance from an accessible route, parking fee and user convenience.” Factors that affect user convenience include, but are not limited to, protection from the weather, security, lighting and comparative maintenance of the alternative parking site. For example, if the project provides covered parking and garage parking (but the garage parking is offsite and not located on an accessible route to the housing), then a covered accessible space can be substituted for each accessible garage space.
- If the project includes a building or facility for common use by the residents that is separate from the housing, there must at least one accessible space for each separate building or facility in addition to the spaces required for the dwelling units. For example, a project that includes a separate building that contains a community room, community kitchen, computer space and laundry facilities, must have at least one accessible space on the shortest accessible route to the building.
- If parking is provided for visitors, at least one space for every twenty-five (25) spaces, or fraction thereof, must be an accessible space. All such spaces must be located on the shortest accessible route from the parking space to the closest accessible entrance. If the project contains more than one accessible visitor space and has more than one accessible entrance, the accessible visitor spaces should be dispersed throughout the site.
- MaineHousing requires at least one designated pick-up/drop-off location for each building with residential units. Each pick-up/drop-off location must comply with applicable accessibility standards (referred to as passenger loading zones in the federal accessibility standards) and be located on an accessible route convenient to the main entrance of each building.
- Regardless of the number of accessible spaces provided at the project, if a resident needs an accessible space and none are available, an accessible space must be provided on the same terms as parking is provided to other residents. If the project provides different types of parking, the full range of choices must be provided, but the space must be on an accessible route. A resident who needs an accessible space can also request that an unused accessible space be moved, but the space must be on an accessible route.

See Appendix A.3 for a table entitled: Summary of Accessibility Regulations and Additional MaineHousing Requirements.

D. SITE DESIGN STANDARDS

Buildings, roads, parking areas, recreational facilities, paths, and landscaping features should be related thoughtfully to each other while integrating the natural features of the site including: solar orientation, topography, natural plant life, and view amenities both on and off the site.

Buildings should be designed and located so that spaces between them become positive elements in the site plan. A well designed assembly of buildings, open land, and site features will contribute to the lives of the inhabitants by permitting fuller use and enjoyment of the site. Thoughtful site planning, purposefully defined by natural and man-made features, will improve their utility, energy use, and enjoyment while adding a sense of belonging and pride among the residents. This enhanced sense of ownership will instill a sense of appreciation for the facilities, foster a sense of personal contribution, and contribute to the reduction of maintenance due to misuse and vandalism.

Proper site design should incorporate the following:

1. PRIVATE OUTDOOR SPACE directly associated with each dwelling should be provided in single family, semi-detached, row house, and walk-up apartment structures. By extending the sense of belonging of each inhabitant beyond their front and back doors, the life of an individual would be integrated within the community in a series of related steps leading from:
 - a. Protecting the intimate privacy within the dwelling unit itself;
 - b. Extending private space toward the enjoyment of communal outdoor space;
 - c. developing a sense of belonging to a community of neighbors through shared space; Expanding the community's relationship with the local municipality through integrated site planning;
 - d. Encouraging mutual relationship with the village, town, or city including local schools, churches, businesses and civic organizations.

This progression of elements, the relation between them, and the design of each, should be arranged to provide an ordered linkage between the individual, the development, and the community in which it is located. Private outdoor spaces should be located and designed in a manner suitable to the uses expected to be made of it. Areas of each space should be appropriate to the size of the site, building coverage, and dwelling type. Private outdoor space may occur as an entrance way, an outdoor patio or play area, or other definable space. It may be integrated with service needs such as driveways, walks, storage, trash bin shelters, and drying lines. It may be defined by these elements as well as by door locations, building jogs, plantings, fences, parking areas and other features. A protected space should be provided for each family unit suitable as a play area for young children and located to permit ready observation from the kitchen or living areas of the dwelling. Particular attention should be paid to the orientation of these spaces to summer and winter sun.

2. VEHICULAR means of access and egress for inhabitants, visitors, and service needs should not disrupt the privacy, well-being, or the safety of the inhabitants.
3. PEDESTRIAN AND VEHICULAR means of access and egress should be separated to provide for increased safety of the inhabitants. Pedestrian paths and recreation areas must be related to allow ease in access to eliminate vehicular impediment. Family

housing developments must address this requirement and provide appropriate site walkways for children usage leading from dwellings to recreation areas, to school bus stops, and to municipal streets.

4. PARKING required or provided for any dwelling unit shall not be permitted on any street designed for acceptance by the municipality unless such parking is permitted to be so dedicated for the sole use of the project residents, nor will a site scheme be permitted with off-street parking when the street has been accepted by the municipality unless such parking is permitted to be dedicated to the project. Parking should be so arranged or screened such that nighttime headlights will not shine at unit bedroom windows. Parking areas should be located and sized appropriately in order to prevent large massings of undesirable asphalt. At a Minimum, 1 parking space per dwelling unit shall be provided. Parking should not intrude upon portions of the site designed for living and recreation. Parking lots of an area and location which dominate the dwellings are not acceptable.

For sites with limited developable area for on-site parking such that 1:1 unit/parking ratio cannot be met or is not justified, an alternative parking plan will be considered by MaineHousing on a case-by-case basis. In order to be considered for less than a 1:1 unit/parking ratio, the Developer shall develop and provide a Transportation Demand Management Plan (TDMP) that:

1. Documents the demand for on-site or off-site parking consistent with projects of similar size, location, and population.
2. Documents the availability and costs of transportation alternatives that service the project site.
3. Describes alternatives to car parking that will be provided on-site such as parking for motorcycles and/or scooters and/or storage for bicycles.
4. Describes any proposed tenant incentive programs that will reduce car parking needs.
5. Describes tenant education efforts that will be implemented that will reduce car parking needs.
6. Provides for timely and ongoing monitoring of the plan and describes how adjustments to the plan will be implemented.

In addition to the TDMP a written acceptance from the Municipality of the plan shall be provided.

5. OUTDOOR RECREATION FACILITIES should be provided for common use consistent with the needs and size of each project and its site characteristics. All equipment should be constructed for durability, resistance to vandalism, and assure low maintenance. Play grounds should be located to avoid hazards, and to provide accessibility, opportunity for parental supervision, and protection of privacy of nearby inhabitants. Proximity to common laundry facilities or other community centers should be considered. Recreational facilities for elderly tenants' use should be related appropriately to outdoor seating areas, community facilities or other focuses of social gatherings. Gardening plots, playing fields, scenic walks or other features should be considered.
6. COMMUNITY FACILITIES may be proposed for clothes washing, social gathering, maintenance storage, management offices, or other needs. Community facilities should be designed to create a space for multi-purpose functions and to advocate an extension

of the individual units for a sense of neighborhood association.

7. GARBAGE, TRASH, AND RECYCLING FACILITIES should provide sufficient volume for materials accumulated between collections. Dumpsters should be located, sized, and collected on a regular schedule, consistent with the needs of the project. Dumpster capacity needs to be based on occupancy rates and rates of collection. The separation and collection of recyclable materials of all kinds is required based on the availability of services to receive such materials. If collection services are available for recyclables, then adequate containers and/or storage of recyclables should be provided for the expected volumes and types of materials that can be recycled.

Trash and Recyclable storage enclosures should be provided for all containers to maintain orderly collection, neat appearance, and sanitary conditions; should deter access by animals; should minimize hazards to playing children; and should provide protection from rain and snow. Locations and numbers should be convenient to the inhabitants served and be accessible to the collecting vehicle, but should be placed, screened or be otherwise related to other facilities so as to be unobtrusive. Any projects of 25 or more units housed in one building should consider a trash compactor, trash room, and trash chute, centrally designed for ease of tenant use. These facilities should be sized in accordance with anticipated tenant demands.

8. MAILBOXES must be provided and their type and location must be acceptable to the local post office. If provided in centralized outdoor locations, mailboxes should be accessible to the mail carrier, convenient to the inhabitants, and located, screened or related to other facilities so as not be obtrusive.

Preferably, centralized mailboxes should be placed so that their use becomes a definite public activity. Successful design implementation has been proven in cases where mailboxes have been integrated with high traffic areas and sitting arrangements, i.e., the community spaces. In the case where elderly projects do not have community spaces, the location for the mailboxes should be integrated with the space allocated for laundry services. This provides a sheltered location and maximizes the utilization of the space. Special attention shall be provided to assure compliance with Accessibility Regulations and Standards for both mailboxes and package drops.

9. EXTERIOR LIGHTING shall be provided for walkways and parking areas independent of unit lighting and shall be integrated with features of the site to provide a coordinated, harmonious and uncluttered streetscape. Light should not shine intensely upon windows of dwellings, illuminate the night sky, or negatively impact surrounding properties. Lighting should be provided into undistinguishable areas for defensible space as well as general illumination for the safety of the inhabitants. All light pole bases should be located away from potential damage from vehicles or be otherwise protected. SEE MAINEHOUSING'S *GREEN BUILDING STANDARDS* FOR FURTHER REQUIREMENTS
10. TREE species should be selected for form, size and rate of growth to provide for the sheltering of unwanted summer sun (usually mid-day and late afternoon) and for the admission of winter sunshine. The species should be selected according to color,

texture, and other features which will enhance the attractiveness of the site and shall be native species suitable for the geographical areas under consideration and preferably require no irrigation. Root structures should be considered for space needed, effects on nearby pavements, and possible interference with subsurface utilities. They should be sized according to proper planting practice, and should be adequate to withstand normal abuse. SEE MAINEHOUSING'S *GREEN BUILDING STANDARDS FOR FURTHER REQUIREMENTS*.

11. SOLAR ACCESS and passive solar heat gain should be considered for all south facing facades. Potential sites for active solar systems shall be identified and studied, consistent with the proposed building design and energy demands. SEE MAINEHOUSING'S *GREEN BUILDING STANDARDS FOR FURTHER REQUIREMENTS*.

E. BUILDING DESIGN STANDARDS

MaineHousing requires construction design and specifications that provide the greatest durability and economy over the life of the project while meeting the social, safety and communal needs of the inhabitants. To these ends, MaineHousing has identified a number of specific features which should be included in each project. Design submissions should demonstrate compliance with these specific requirements and should respond to the preferences listed below..

1. BUILDING TYPE

- a. SINGLE FAMILY DWELLINGS are preferred only for locations where the surrounding neighborhood has a prevailing single family residential character which would make more intensive forms of development appear out of place, where site area permits adequate space for each living unit whether directly associated with it or in common use. Elderly housing, however, should not be designed for single dwelling structures.
- b. SEMI-DETACHED PAIRS OF DWELLINGS with living units side-by-side are acceptable whenever they are with compatible surrounding neighborhood integrity, site layout, and land and construction costs. All such dwellings shall have individual entrances.
- c. DUPLEX apartments, one above the other, will generally not be acceptable to MaineHousing unless unique characteristics of topography, site area, or construction technology clearly show that such a form would be the most suitable. If duplex apartments are constructed for family use, they shall have separate entrances directly from the outdoors.
- d. ROW HOUSE dwellings may be used whenever they are compatible with surrounding densities, the economies of construction, the resulting open space, the centralization of utilities, and/or other considerations which make this building type the most suitable for the site. Whenever row houses are used, building massing, number of dwellings, and building relationships with other features should be designed to reduce the extended repetition of multiple units, and the sense that numbers and building overwhelm an individual dwelling. In general, no building should contain more than five dwellings unless local features make this limit

impractical.

Each dwelling shall be identifiable from the outside of the building and should be distinguishable from adjacent dwellings by such features as changes of building line, entrance ways, stair towers, window lines, finish materials, roof lines, plantings, or walks. Two entrances should be provided to each dwelling and they should relate private outdoor space with the dwelling interior and the exterior features which define it for the enhancement of privacy and identity of the inhabitants.

- e. WALK-UP apartment buildings with some living units located over others should be avoided, unless MaineHousing determines that they are preferable because of site area, dwelling numbers, surrounding densities, or building technology. Elderly units, though not a preferred unit type as units without stairs are preferred, if accepted, shall not require climbing more than one story. If walkup apartments for family use are accepted, they should be designed without extended corridors, and with separate entrances from the outside for each living unit. Entrances, halls, stairs, and doors leading to living units should be designed to provide each apartment, or group of apartments served in common, a sense of community and shared responsibility for those areas. Outdoor stairs and balcony landings, sheltered against rain and snow, and providing doors to individual living units should be appropriate to reinforce a sense of privacy for each dwelling. The relationships of windows and doors to halls and stairs should be designed to give privacy to the inhabitants by screening doorways from incidental passage and public view.
- f. LOW RISE AND/OR HIGH RISE buildings may be considered by MaineHousing to be appropriate when land cost, site area, number of dwellings and surrounding densities require low/high rise construction. Low/High rise structures with a block mass that, in the opinion of MaineHousing, overwhelms the scale of nearby development are not be acceptable.

2. BUILDING FORM

- a. ORIENTATION of building access, public passageways, places for social gathering, common facilities, dwelling entrances, rooms and windows should be related to sun directions, prevailing seasonal winds, views, nearby land uses, topography, natural features, vegetation, roads, drives, parking, recreation areas, other common facilities, walks, outdoor areas, or any other features as they may together improve the quality and preserve the privacy of the lives of the inhabitants. Living Units should be orientated with daytime living portions related to the sun to capitalize on passive solar heat. They should also be oriented wherever possible to provide view for the daytime living portions of each dwelling of any areas on or off the site where interesting activity may be observed consistent with privacy.
- b. SHADE of buildings should be designed to be appropriate to nearby existing development, to each other, to site improvements, and to natural features. Sunlight, protection from winter winds, exposure to summer breezes, and views should be considered. A major consideration in the design should be given to sun orientation to obtain the maximum amount of passive solar energy.

- c. ACCESSIBLE units shall be provided in accordance with Maine Law, Federal Regulations, and this manual. All buildings shall be designed to facilitate access. Accessible units shall be distributed among the various types and sizes of dwellings included within each development.

3. BUILDING DESIGN

- a. BASEMENTS may be provided for family or elderly housing for utility and storage use unless determined to be impractical because of terrain or underlying soil conditions. For buildings without dwelling units stacked one above another, basements shall be divided along the same walls separating the dwellings above, and be accessible for the private use of each dwelling as well as by individual bulkheads, areaways, or other openings to the exterior. If basement stairs provide direct access from an exterior door to the basement at least three feet wide, and without crossing a habitable room, a bulkhead or areaway may not be required. Private basement spaces shall not be interconnected. Areas containing plumbing, mechanical, or electrical equipment used in common by more than one dwelling should be separately enclosed and be accessible to the exterior without passage through a dwelling.
- b. CRAWL SPACE FOUNDATIONS should be avoided wherever possible. If determined to be necessary, they should include adequate provisions for controlling ground laden moisture, thermal conductivity, and heat losses.
- c. CLOSETS AND STORAGE SPACE shall be provided for personal and housekeeping items and equipment within each living unit and should be appropriately located and sized in relation to use. Adequate general storage shall also be provided.

- 1. Closets:

The following minimum sized closet/storage spaces shall be provided for each living unit:

Bedroom Closets:

Each bedroom (or in the case of zero bedroom units, each sleeping area) shall have readily accessible clear hanging space equipped with a rod and shelf as follows:

Primary and/or double occupancy bedrooms:

2'- 0" deep by 5' - 0" wide by 7' - 0" high minimum

Single occupancy bedrooms:

2'- 0" deep by 3' - 0" wide by 7' - 0" high minimum

Coat Closet: At least one coat closet convenient to the main entrance of all units:

2' - 0" deep by 2' - 0" wide by 7' - 0" high minimum

Linen Storage in all units:

Minimum shelf area:

10 SF for 2 bedrooms or less;

15 SF for 3 bedrooms or more.

Shelves to be spaced not more than 12" o.c. vertically and shelving over 74"

above the floor shall not be counted as part of the required shelf area.

2. General Storage:

Useable general storage space shall be provided for the storage of items and equipment essential to the use of the occupants. **This storage requirement or capacity is separate from, and in addition to, required closets listed above and/or kitchen storage.** General storage may be integrated with required closet space, by separate storage closet(s) within the unit, in assigned/secured storage areas within the same building, or assigned/secured storage areas in separate buildings.

GENERAL STORAGE REQUIREMENTS (in cubic feet)

Dwelling Size	Elderly	Family
0 Bedroom	50	50
1 Bedroom	100	100
2 Bedrooms 1	00	100
3 Bedrooms	----	150
4 or more Bedrooms	----	150

Storage spaces less than four feet or more than eight feet in height, or more than four feet in depth without two feet of access space shall not be included within the required volume. Storage area requirements shall not include access space and/or door swing space.

3. Storage Accessible from the Exterior:

When a project is to house families with children, an additional subdivided and secured storage space of at least 150 CF per living unit shall be provided that is conveniently located to the exterior for bicycles, sleds, toys, carriages, snow tires, etc. The inclusion of additional storage, accessible from the exterior in Historic and Elderly projects may be either difficult to achieve or unwarranted however, project teams are encouraged to include such storage to the maximum extent feasible.

- d. UTILITIES should be centralized wherever practicable to realize economies of efficiency in operation and/or maintenance.

Utility meters should have exterior reading devices to eliminate the necessity of entering individual dwelling unit(s).

Electrical utility entrances including telephone, cable TV, internet, and power should be underground leading from a point where overhead service does not intrude upon the residential scale.

- e. WASHER AND DRYER equipment counts for common laundries shall be

based on a minimum of one washer and one dryer for every ten (or fraction thereof) dwelling units in family housing and one for every twenty-five (or fraction thereof) dwelling units in elderly housing. Mid and high rise buildings and elderly housing without washer and dryer hookups provided within the units shall have a common laundry facility provided. Washer and dryer hookups should be provided in each living unit of family housing if common laundry facilities are not provided as part of the development. All dryer vents shall be smooth surfaced metal with joints that are hard-cast sealed and are equipped with self-closing dampers and are ducted full sized to the exterior.

- f. DRINKING FOUNTAINS should be provided in all projects which have community facilities. These fountains are to be accessible to all tenants of all abilities. If a community area sink is provided and adequate drinking receptacles are also provided, a separate fountain is not necessary. The use of bottled water is not a permitted option for meeting this requirement.
- g. TELEPHONE systems shall be pre-wired in suitable proximity to likely placement of furniture. Outlets are to be located in all of the following spaces:
 - 1. Master Bedroom
 - 2. Living Room or Corridor or Dining Room
 - 3. Kitchen
- h. TELEVISION master antenna systems, master satellite systems, and/or Cable TV systems shall be provided in all projects in appropriate locations for viewing and likely furniture placements. At a minimum, jacks shall be installed in all of the following spaces:
 - 1. Master Bedroom
 - 2. Living Room or Corridor or Dining Room
 - 3. Kitchen
- i. INTERNET ACCESS, if a hard-wired distribution system is provided, it shall be pre-wired and be available in the same spaces as the TV and/or Telephone systems. All pre-wiring shall be compatible with the local service provider requirements. If a wireless service is provided, the signal distribution shall be tested and documented to assure adequate signal strength to each space within each living unit where it is reasonable to expect a computer will likely be used.
- j. RANGE HOODS shall be provided in each kitchen over the range; be vented full size directly to the outside; and be equipped with a damper which is self-closing when the fan is not in operation. Ductwork runs shall be as short as possible and with as few elbows as possible to assure proper fan operation. All ductwork shall be concealed within the living unit. Ductwork shall be within heated spaces or properly insulated to eliminate condensation problems.

In projects incorporating whole-building ventilation systems which include kitchen area exhaust, such as Historic Renovation projects which are generally not permitted to have multiple exterior wall penetrations per National Park Services requirements, the use of ductless range hoods will be an acceptable alternative. In projects that are

not Historic but decide to provide both whole-building ventilation systems and ducted range hoods are also acceptable.

In Type A units, a separate wall switch mounted for easy accessibility for a wheelchair occupant shall be provided for, and be wired to, the range hood and light. This switch is to be in addition to the integral switch provided with the fixture.

- k. KITCHEN EQUIPMENT shall be provided for all dwellings and include a cook top and oven, or a range with oven, and a refrigerator with freezer space. Specifications on ranges should include front mounted controls for accessibility in elderly and required accessible units only. Selection of residential kitchen appliances shall be based on number of residents.

The minimum size of refrigerators shall be as follows:

- 0 and 1 bedroom units: 14 cu feet usable
- 2 and 3 bedroom units: 15.5 cu feet usable
- 4 bedroom units: 17.5 cu feet usable

- l. Ranges shall be provided with a minimum of 4 burners and a full sized (30" minimum width) oven for all living units with separate bedrooms. In zero bedroom units, smaller cooking facilities will be reviewed on a case-by-case basis, but as a rule are discouraged.

- m. FIRE AND SOUND TRANSMISSION minimum ratings as required by building and fire codes shall be strictly observed. Plans shall clearly indicate typical wall and floor sections and their design ratings and their locations to demonstrate full compliance with codes and standards. Particular attention shall be paid to the installation of mechanical and electrical items in fire and sound walls such that the ratings are not compromised.

- n. FOR UNITS SERVICING THE ELDERLY, bathrooms should include the following features:

1. Bathroom doors should swing out.
2. Water closets should have 17" rim height
3. Seats should be fitted with "Lift Seat" hinges
4. Water closets should be located in room corners with adequate adjacent wall space to facilitate future installation of grab bars
5. In-wall blocking shall be provided at all future grab bar locations

- o. STRUCTURES PROPOSED FOR REHABILITATION must meet, or be rehabilitated to meet, all of the new construction codes and standards contained herein, wherever possible. Re-use of existing materials, i.e., doors, windows, siding, roofing, structure, woodwork, finishes, etc., will be judged on a case-by-case basis utilizing the new construction criteria as a reference point. It should be further noted that rehabilitation projects present unique accessibility, mechanical, structural, and fire stopping characteristics/challenges that will need to be upgraded to the latest standards in most instances. Consideration must be given to the needs to provide extermination services for all proposed buildings prior to the rehabilitation

construction. All rehabilitation projects shall be evaluated for any environmental issues and any such issues shall be fully remediated as part of the project.

- p. PASSIVE UNDER SLAB RADON SYSTEM should be provided beneath all slabs-on-grade and measures should be taken to prevent unwanted air leakage into the gas permeable layer. The interior radon piping should be run within the thermal envelop and be properly labeled. All passive system pipe routes shall provide space for installing a radon fan and a monitor should testing confirm the need for such added components. Provide an electrical supply adjacent to the vent stack that is located above the highest occupied space and provides adequate clearance for the potential future installation of a fan. Consideration should be given for access to this location. Whenever practicable, the system should be vented through the highest roof or ridge in such a position that it can neither be covered by snow or other material. The vent stack discharge shall meet the separation distances required by code from any window, door, or other opening into the conditioned space.
- q. The heating system shall be safe, quiet, and economical in operation and complete in all respects. This system shall provide a uniform temperature of 70 degrees F. (75 degrees F for elderly) in all living spaces as may be noted on the drawings, when the outside temperature is the appropriate outdoor design temperature for each development location which shall be specified in accordance with the ASHRAE 99% scale.
- r. Where whole-building ventilation is proposed, such systems shall be professionally designed and shall include provisions for make-up air, heat recovery, kitchen, and bathroom exhaust, at a minimum. It is important that the expected operational costs of such systems be included in the Owner's project budget.

F. CONSTRUCTION STANDARDS

MaineHousing has identified specific materials, installations, and construction practices that have proven performance and durability and are appropriate to the quality of the developments it wishes to finance. Also, MaineHousing has determined that certain materials and /or construction practices are uneconomical when considered over the life of the project or the cause of reoccurring problems. The items are arranged in accordance with the original Construction Specifications Institute (CSI) headings. In addition, MaineHousing has adopted a set of *Green Building Standards*, a copy of which is available at: www.mainehousing.org ; full compliance with these standards is mandatory.

Division 1, General Conditions

1. AIA A201 General Conditions, modified with project specific Supplementary General Conditions, should be used for all construction projects.
2. Generally, the General Contractor (GC) or Construction Manager (CM) will be required to furnish surety in the form of 100% Performance & Payment bonds in favor of the Owner and MaineHousing. In certain situations and at the sole discretion of MaineHousing, an Unconditional Irrevocable Letter of Credit (LOC) may be considered as an alternative to bonding only if there are very specific conditions that warrant such consideration. Decisions of the form of security will be made on a case-by-case basis and the general evaluation criteria for these requirements will be based on the value of the proposed work scope as follows:

Up to \$150,000 of construction value – no bonds or LOC are required
\$150,000 to \$300,000 of construction value – bonds or LOC may be required.
Over \$300,000 of construction value – bonds or LOC are required.

For projects when MaineHousing accepts a LOC in lieu of bonds, the LOC shall equal 20% of the construction contract and shall be in place until MaineHousing's determination that the work is complete and acceptable. A LOC in the amount of 5% of the construction contract shall be secured during the warranty period for projects allowed to use the LOC form of surety.

3. All multi-family and/or licensed facilities shall be reviewed by and be permitted by the State Fire Marshal for both Life Safety and Accessibility requirements.
4. A copy of the geotechnical investigation should be either referenced and readily available for viewing or be included in the project manual. Note: Projects of limited sitework scope, such as renovations to existing structures, may not be required to provide geotechnical investigations. Such scopes shall be reviewed and a determination of applicability shall be made by the project's construction analyst.
5. The Owner or general contractor shall retain a qualified testing agency to monitor and test all critical soil fills, concrete, and/or steel.
6. Manufacturer's instructions shall be followed for the installation of all materials, products, and equipment furnished with such instructions. All instruction, specification, and data sheets normally supplied by a manufacturer should be submitted to the designer-of-record before any request for inspection of work incorporating the material, product or equipment.
7. Concrete placement records shall be provided by the contractor or testing agent to the designer-of-record and MaineHousing of all slump and strength tests required in accordance with American Concrete Institute (ACI) documents or the project specifications. At a minimum, there should be one strength test for each 50 cubic yds, or fraction thereof, of material placed in any one day. Three (3) test cylinders constitute one strength test; one cylinder is tested at 7 days for information only; 2 cylinders are tested at 28 days to determine acceptance. (It is recommended that a fourth cylinder be cast at part of each strength test in case a 56 day test becomes necessary.)
9. MaineHousing encourages all parties responsible for the construction of its projects to develop an indoor air quality management program. The plan should address the protection of HVAC equipment and distribution systems, protection against water damage for all items stored at the site, maintaining appropriate environmental controls for the work at hand most specifically for proper applications for finish materials, and general housekeeping procedures to assure a safe working environment.

Division 2, Sitework

1. The owner or contractor shall retain a qualified testing agency to monitor and test all critical soil fill operations.
2. Provide positive drainage away from all buildings – 6" pitch in first 10 feet is a recommended minimum slope. In the event of the inability to provide such natural drainage, an engineered drainage system may be provided.
3. Styrene or corrugated polyethylene piping may be used for foundation drains, leaching fields, or other below grade applications only when the materials and its installation are in accordance with ASTM Standards. Rigid perforated PVC pipe is also permissible provided the minimum wall thickness for 4" pipe is 0.075", and for 6" pipe is 0.10", and is installed in accordance with ASTM Standards.

4. Polyethylene or other suitable and approved vapor/moisture/radon barrier material shall be placed under all concrete slabs including basement and/or crawl space and on-grade floors. Polyethylene under slabs and in crawl spaces shall be at least six (6) mils thick and shall have all joints lapped a minimum of six inches and sealed with mastic or tape. All pipe or other penetrations shall have the vapor/moisture/radon barrier taped around them in a secure fashion to prevent moisture infiltration.
5. Liquid asphalt and/or gravel roads and/or drives shall not be considered to be acceptable within the project bounds. Such surfaces, if acceptable by town standards, may be considered up to the project bounds.
6. Erosion during and after construction shall be controlled in accordance with the “Standards and Specifications” published in the “Environmental Quality Handbook” by the Maine Soil and Water Conservation Commission.
7. Footings shall be constructed on undisturbed material unless otherwise specified by the designer-of-record. All fill placed under footings must be engineered fill, designed, tested and certified by a Professional Engineer, registered in the State of Maine.
8. Foundation drains shall be provided for all foundation types including frost wall designs. These drains shall be provided both inside and outside of all walls unless soil and/or site conditions can adequately justify alternative designs. Soils Engineers’ (geotechnical) reports must be provided as part of any requests for alternatives. These drains should connect to a permanent and positive storm drainage system or daylight to a properly designed surface drainage system. All daylight drains should have their outlooks screened and protected from erosion and the entrance of rodents. Provide backflow preventers should be provided for all foundation drains.
9. Passive under slab radon venting systems should be provided beneath all slabs. Active systems may be required if radon testing confirms the need for such added capacity. Include an electrical supply in the area of all future fan locations should they become necessary.
10. Floor drains and/or sumps should generally be provided in all basements. The floor should be pitched to these drains or sumps and, to the maximum extent feasible, these should be connected to a positive drainage system, exterior of the building.
11. Parking spaces shall be permanently delineated upon the pavement. Accessible parking areas shall be so marked and signed. If accessible units are pledged as part of a developer’s application, accessible parking should also be properly planned and included in the overall parking layouts. Each accessible parking space shall be permanently marked as such both by ground applied symbol and per space signage meeting ANSI requirements
12. Wheel stops may be provided for parking stalls based on topography, drainage, pedestrian separation needs, protection of improvements, etc. These may be pre-cast concrete stops or materials of similar size and mass acceptable to MaineHousing. Standard asphalt curbing, if used as a wheel stop, shall be backed up with full depth compacted earth fill.
13. Paved areas within the subject property that are deemed in need of new bituminous concrete paving will be required to follow the standards listed below:
 - a. Prior to the laying of the new bituminous concrete paving (pavement) the existing paving will be removed completely. All exposed gravel base material shall be inspected for contamination by silts or other foreign, deleterious material. Any contaminated base is to be removed down to clean, sound material. Unless otherwise designed and specified by a design professional, the removed material should be replaced with aggregate base material as per M.D.O.T. Sec. 703.06 Type A. All new material should generally be evenly spread in lifts not to exceed eight (8”) inches in depth and compacted in place to a minimum of 95% of the maximum density as per ASTM

D1 557. The minimum total base thickness shall be 18” for Roadways and Parking Areas; 12” for Walkways and Ramps.

- b. The minimum compacted thickness and mix design for the pavement courses shall be as follows:
 - Base/Binder Course: 2” MDOT Type B
 - Surface/Finish Course: 1” MDOT Type D
 - c. Existing and new surfaces should meet in a smooth continuous plane free from variations in height or smoothness. Clean and treat all areas thoroughly prior to installation of asphalt.
 - d. The temperature of the pavement mix should be regulated to ensure that at the time of spreading the mix is within specifications. Pavement having temperatures outside of the specified temperature range when dumped into the spreader should be rejected.
 - e. The pavement mixture should be thoroughly compacted by rolling. Rolling is to begin as soon as the placement of the mixture will bear the roller without undue displacement or delay.
 - f. The construction of the new pavement shall be carried on only when the surface on which the mix is to be placed is dry, and when the surface temperature of the underlying course is greater than 45 degrees F for course thickness greater than one-inch and 55 degrees F for course thickness one-inch or less.
 - g. It shall be the Contractor’s responsibility to prohibit vehicular traffic, including heavy equipment, from traveling upon the pavement until the surface temperature has cooled to 120-degrees F.
14. Soils used for plantings, planting beds, and grassed areas are to be purposely specified and field tested for conformance to the construction documents. Lawn areas of projects should be planted and properly maintained to assure proper establishment coverage and growth. Because plantings and grass growth are season dependant, an Incomplete Work Escrow (IWE) in the amount of the cost of the work as determined by the Construction Analyst, times 150% may need to be established at the conclusion of the project and will be held by MaineHousing until the work is completed to the satisfaction of Construction Services.
15. Provide adequate notice to building occupants, visitors, guests and employees of the scope and extent of applicability of the project’s smoke-free status (re: reduction of exposure to Environmental Tobacco Smoke (ETS)). To effectively accomplish this, provide conspicuous notices (building and/or site signage) of ‘smoke free’ status at all entry ways to smoke free buildings, and, if applicable, at the points of entry for vehicles or for foot traffic onto the grounds of the property. Notices, at a minimum, shall be: “Smoke Free Building” and “Smoking Prohibited 25 feet from entryways, windows, vents and balconies” or “Smoke Free Property” (as the case may be). Signage shall meet applicable signage design requirements of the Americans with Disabilities Act of 1990.

Division 3, Concrete

- 1. Foundation design should be consistent with the findings and recommendations of the geotechnical engineer’s soils report.
- 2. Cast-in-place concrete should achieve the following minimum 28 day compressive strengths: Footings: 3,000 PSI; Foundation walls: 3,000 PSI; Interior flatwork: 3,000 PSI; Exterior flatwork: 4,000 PSI with 5-7% air entrainment. All concrete shall be designed and specified by the designer-of-record for both strength and durability; strengths listed herein are minimums for durability.
- 3. Admixtures proposed for use in concrete should be used in accordance with the American

Concrete Institute's recommendations with the exception of calcium chloride which is undesirable due to the side effects and conditions it creates within the concrete. Accelerating admixtures, if needed, are to be used in place of calcium chloride. The accelerator used should be a national brand which has been performance tested. Any and all admixtures shall be specified by the designer-of-record and be used in strict accordance with the manufacturer's instructions.

4. Polyethylene or other suitable and approved moisture/vapor/radon barrier material shall be placed under all concrete slabs-on-grade including basement and/or crawl space floors. Polyethylene under slabs and in crawl spaces should be at least six (6) mils thick and shall have all joints lapped a minimum of six inches and sealed with mastic or tape. All pipe or other penetrations shall have the polyethylene taped around them in a secure fashion to prevent moisture and radon infiltration.
5. Footings should be constructed on undisturbed material unless otherwise specified by the designer-of-record. All fill placed under footings must be engineered fill; designed, tested and certified by a Professional Engineer, registered in the State of Maine.
6. Floor drains and/or sump pits should be provided in all basements. The floor should be pitched to these drains or sumps and these should be connected to a positive drainage system, and discharge exterior of the building. Connections to storm water systems should be equipped with backflow preventers.
7. To help control cracking due to temperature changes, concrete foundations for wood frame structures shall be reinforced with at least two number four bars in the bottom of the wall or footing and two in the top of the wall. All corner reinforcing shall be pre-formed, lapped and securely tied to the main reinforcing bars. Structural reinforcement and/or additional shrinkage and temperature reinforcement shall be designed and/or specified by the designer of record.
8. The owner or contractor shall retain a qualified testing agency to monitor and test all structural concrete. Concrete placement records shall be provided by the testing agent to the Owner, Contractor and MaineHousing of all slump and strength tests required in accordance with ACI documents and/or specifications. At a minimum, there should be one strength test for each 50 cubic yds or fraction thereof of material placed in any one day. Three (3) test cylinders constitute one strength test; one cylinder is tested at 7 days for information only; 2 cylinders are tested at 28 days to determine acceptance. It is recommended that a fourth cylinder be cast in case a 56 day test becomes necessary.

Division 4, Masonry

1. All masonry ties and anchors for veneer walls shall be stainless steel.
2. Particular attention should be paid to maintaining cavity walls free from mortar during construction. Appropriate methods and means to achieve this requirement should be agreed to prior to masonry installation.
3. Particular attention shall be paid to the detailing and installation of through-wall flashings and weep systems for cavity wall construction..

Division 5, Steel & Metals

1. Particular attention should be paid to the detailing of structural steel elements that may penetrate the thermal envelopes. Efforts should be made to avoid thermal "short circuits."
2. All structural element field-welding should be third party inspected and/or tested and appropriate documentation provided to assure quality of welds consistent with the construction documents requirements.

Division 6, Carpentry

1. Pressure treated (PT) lumber shall meet manufactures' requirements for installation location, e.g., framing in contact with concrete or masonry; or posts embedded in soil. Fasteners and hangers are to be hot dipped galvanized or stainless steel. Metallic flashings, except copper, are to be isolated from PT lumber.
2. Drywall or other hard ceiling finishes in buildings with the bottom chords of roof trusses or floor framing spaced at 24" on center shall be installed on wood strapping or resilient channels spaced at a maximum of 16" on center.
3. Wood foundations are not permitted without the express approval of MaineHousing and may be suggested only when all other proven methods of foundation construction have been eliminated, and/or when MaineHousing determines for a particular installation that wood foundations constitute a substantial advantage over other materials. The system must be listed and certified by a national listing service.
4. Interior trim of composition or particle board, with or without plastic coating, is not permitted.
5. The use of composite or particle board shelving is not permitted.
6. New stairs serving more than one dwelling unit shall provide a minimum clear width of 44" unless otherwise required by code.
7. Provide underlayment grade plywood at all areas scheduled to receive sheet vinyl, linoleum, or VCT.

Division 7, Thermal and Moisture Protection

1. Polyurethane foam and/or other combustible insulations shall not be permitted except when enclosed within a structural assembly which will protect it from sources of fire, and prevent the propagation of flame and the provision of air.
2. Polyethylene (minimum 6 mils thick) vapor barriers shall be placed on the interior surfaces of all envelope framing that is insulated with fiberglass insulation. All joints and penetrations shall be properly sealed to prevent moisture migration.
3. Specialty insulation products such as spray foams should be presented to and be reviewed by MaineHousing for approval prior to use in any project. Products that provide superior air-sealing qualities are encouraged. Any such products shall be installed per industry standards and be protected per the State Fire Marshal's requirements.
4. R-5 closed cell rigid insulation or R-5 composite, cross woven polyethylene, aluminum and polyethylene closed cell foam core blankets are required beneath the entire floor slab-on-grade floor area. Note: The use of composite blankets beneath slabs-on-grade must be used in conjunction with R-10 foundation wall insulation as follows: Rigid insulation, minimum R-10 vertically continuous from footing to under slab AND rigid insulation, minimum R-10, 2' – 0" in horizontally around the entire slab perimeter. To assure an effective moisture barrier is provided, all blanket seams shall be securely sealed utilizing blanket manufacturer's recommended products. All blankets are to be placed on top of horizontal rigid insulation and be continuous from outside wall to outside wall.
5. Aluminum and T-1 11 Wood sheathing is not be permitted as siding materials on any buildings.
6. Vinyl siding and trim shall be a minimum of .044" thickness and simulate standard wood sidings as to exposure, shadow lines, depths, etc.
7. White cedar shingles may be used as an exterior finish alternative in any development subject to the material complying with "Clear Grade" as defined in MRSA* T.30, C.226 and 3704.2, Standards for Maine Cedar Shingles and with the definitions of "Black Knot",

- “Defects”, “Rot and Decay”, and “Sapwood”, provided in that statute. Maximum coursing shall be 5” T.T.W. Minimum side lap of 1” in adjacent courses. Avoid vertical alignment in alternate courses.
8. The minimum standard of quality for roofing shingles is a 30-year warranty organic asphalt or fiberglass. Heavier grade, “Architectural” shingles are strongly recommended.
 9. EPDM roofing – Standard of quality is Firestone fully adhered (0.060) system, with a minimum 15 year Full System Warranty.
 10. Flashing and Sheet Metal – Roof drip edge shall be 0.032” min aluminum (no galvanized).
 11. The use of “Ice & Watershield” by W.R. Grace Co. or MaineHousing approved equal is required for all drip edge (minimum 6’ up the roof), rake (minimum 3’ in from roof edge, and valley underlayments beneath shingles (minimum of 4.5’ up each side of valley). Also, roof to wall intersections shall receive an additional layer of the same fabric flashings/underlayments, run up walls and onto roof substrates 18” minimum.
 12. Other roofing products, including metal roof systems, will be considered on a case-by-case basis.

Division 8, Doors and Windows

1. The use of hinge pin type doorstops is prohibited.
2. Metal frames for doors and windows will not be permitted without thermal breaks between interior and exterior surfaces which prevent any parts exposed to the interior air from reaching temperatures which would cause condensation. Manufacturer’s certification of the effectiveness of the thermal breaks shall be furnished to MaineHousing before approval for installation of such doors and/windows will be considered.
3. Screens shall be provided for all operable windows.
4. Storm and screen doors, if provided, shall be of sufficient strength to withstand hard use, and shall be equipped with closers which will prevent the springing of the door from wind and hard use.
5. The use of sliding glass doors for exterior access is prohibited.

Division 9 Finishes

1. Drywall used for walls and/or ceilings shall have a minimum nominal thickness of 1/2”. If used with supporting members spaced more than 16” on centers, minimum drywall thickness shall be 5/8”. Metal or plastic casing bead shall be used whenever gypsum board butts up against a dissimilar material wherever covering trim will not be used. All gypsum board used on walls and ceilings as a finish material shall be fastened with drywall screws in accordance with manufacturer’s instructions.
2. Use of plywood paneling as an interior finish is discouraged – if used and less than 3/8” nominal thickness, it shall be placed over an approved substrate such as gypsum board.
3. Ceiling finishes other than standard paint on taped and patched drywall shall be approved by MaineHousing as being easily patched in an indiscernible manner. A sample shall be prepared by the contractor and submitted to MaineHousing for approval before installation of the finish.
4. Paint used on interior walls should be no less resistant to wear and washing than a satin finish, alkyd base paint; on trim and wood-work, no less than a satin finish enamel. Semi-gloss latex paint for dry wall surfaces is acceptable. SEE MAINEHOUSING’S *GREEN BUILDING STANDARDS FOR FURTHER REQUIREMENTS*
5. Vinyl wall covering, if provided, shall have a minimum weight of sixteen (16) ounces per square yard which is the equivalent of twenty-four (24) ounces per linear yard of fifty-four

- (54) inch wide material.
6. All exposed piping shall be finish painted.
 7. Floor areas designated for carpeting shall be covered with material meeting following specifications:

All carpets specified for MaineHousing projects shall have a minimum 10 year performance warranty including but not limited to abrasive wear static protection, tuft bind, delamination.

	<u>Moderate Traffic</u> <i>includes carpets inside units</i>	<u>Heavy Traffic</u> <i>Common corridors, community rooms and public spaces</i>
<u>Carpet</u>		
Construction:	Tufted Level & Textured Level Loop	Tufted Level & Textured Level Loop
Fiber:	100% Nylon	100% Nylon
Dye Method:	70% or greater solution dyed	70% or greater solution dyed
Face Weight:	24 oz or greater	24 oz or greater
Secondary backing:	Action Backing or Unitary Backing w/20lbs Tuft or Equal	Unitary Backing w/20lbs Tuft or Equal
Gauge:	1/8 min.	1/10 min.
Standard:	UM44d, Green Label Plus Certification Program	UM44d, Green Label Plus Certification Program
<u>Carpet Emission Limits</u>		
VOC:	0.50 mg/m ² • hr	0.50 mg/m ² • hr
4-Phenylcyclohexane:	0.05 mg/m ² • hr	0.05 mg/m ² • hr
Formaldehyde:	0.05 mg/m ² • hr	0.05 mg/m ² • hr
Styrene:	0.40 mg/m ² • hr	0.40 mg/m ² • hr
Standard:	Green Label Plus Certification Program	Green Label Plus Certification Program
<u>Cushion</u> (Recommended, but not required.)		
Material:	Synthetic Fiber	Synthetic Fiber
Thickness/Weight:	.25" thick / 6-8 lbs	.3" thick / 6-8 lbs
Standard:	Green Label Plus Certification Program	Green Label Plus Certification Program
<u>Cushion Emission</u>		
<u>Limits</u>		
TVOC's:	1.00 mg/m ² • hr	1.00 mg/m ² • hr
BHT:	0.30 mg/m ² • hr	0.30 mg/m ² • hr
Formaldehyde:	0.05 mg/m ² • hr	0.05 mg/m ² • hr
4-PCH:	0.05 mg/m ² • hr	0.05 mg/m ² • hr
Standard:	Green Label Plus Certification Program	Green Label Plus Certification Program

If Modular carpets are scheduled they must meet the following general criteria:

- a) Construction: tufted Level and Textured Level Loop
- b) Fiber: 100% nylon
- c) Dye Method: 70% or greater solution dyed
- d) Face Weight: 22 oz or greater
- e) Backing: high-performance, PVC-free with min 15% recycled content backing with fiberglass or equal stabilizer
- f) Standard: HUD UM44d
- g) Warranties: Fiber- abrasion wear and static protection, Backing-tuft bind, edge reveal and delamination

- h) All modular carpets must meet green label and green label plus program requirements for product and adhesives
- i) Carpet Emission limits: Same as broadloom

SEE MAINEHOUSING'S *GREEN BUILDING STANDARDS* FOR FURTHER REQUIREMENTS.

- 8. Special attention shall be paid to the design of the flooring at all main building entrances and/or unit entry entries that can potentially be wetted. In particular, designers are encouraged to design sufficient wet area space that can accommodate the entry, removal, and storage of footwear at all unit entries. SEE MAINEHOUSING'S *GREEN BUILDING STANDARDS* FOR FURTHER REQUIREMENTS.
- 9. Provide moisture resistant (MR) board on all walls and ceilings of all bathrooms.

Division 10, Specialties

- 1. Room darkening shades or blinds shall be provided for all bedroom windows. Shades shall be sufficiently opaque to darken the room when drawn closed. Pull down shades with cardboard rollers are prohibited.
- 2. Curtain rods should be installed above all windows. Equipment and installation shall be strong enough to withstand hard use.
- 3. Provide toilet paper holders and towel bars at all bathrooms. One inch diameter grab bars, properly mounted to in-wall blocking are recommended in lieu of standard towel bars. All bathroom and toilet room accessories are to be mounted to in-wall blocking.

Division 11, Equipment

- 1. Ranges and/or cook top surfaces shall not be located adjacent to wall surfaces.
- 2. Refrigerators with ice-makers are prohibited within dwelling units.
- 3. Built-in microwave appliances are prohibited within dwelling units.
- 4. Dishwashers may be provided but must be reviewed and accepted by MaineHousing prior to their inclusion.
- 5. SEE MAINEHOUSING'S *GREEN BUILDING STANDARDS* FOR FURTHER REQUIREMENTS.

Division 12, Furnishings

- 1. Residential Kitchen Cabinets shall be of all plywood box construction and all drawer fronts, cabinet faces, styles, and rails shall be constructed of hardwood. The use of particle board and/or melamine is prohibited.
- 2. In all cases where casework is provided as "adaptable," all surfaces that may eventually be exposed shall be completely finished (paint, base, piping insulation kits, etc.) prior to the placement of the cabinetry.
- 3. In addressing future accessibility needs, the adjustable countertop option is highly discouraged – setting countertops at a fixed, 34" height is a preferred option.
- 4. Of particular note are the requirements for clearances in casework for accessible living units. If removable components are incorporated into the cabinet layouts they shall be easily removable by maintenance staff, and all of the exposed components including cabinet sides, walls, flooring, base, etc. shall be fully finished as part of the initial installation.
- 5. Seal all countertop miters with silicone sealant during assembly.

Division 13, Fire protection

1. Sprinkler systems are required for all projects.
2. Wet sprinkler lines shall not be run in unheated attic spaces, outside wall cavities, unheated crawl spaces or any other areas subject to freezing temperatures. Use of anti-freeze loops or dry pipe systems for sprinkler lines in such areas are acceptable alternatives but shall be engineered for such use.
3. Tamper proof switches shall be provided for all sprinkler valves.
4. All exposed piping shall be finish painted.

Division 14, Elevators

1. For multistory projects serving an elderly population, an emergency generator sized to handle electrical requirements of the elevator, central heating system, and some common areas equipped with accessible, powered outlets, is strongly recommended.
2. In projects with 4 or more stories above a level of exit discharge, standby power (emergency generator) shall be provided to assure that the elevator remains as a means of egress available to emergency personnel in accordance with NFPA 101 and IBC .

Division 15, Mechanical Systems

1. Provide a main water supply shutoff for each building.
2. All domestic above grade water supply piping shall be Type "L" copper or Chlorinated Poly Vinyl Chloride (CPVC) tubing or cross-linked polyethylene (PEX) tubing which is designed, specified, and be installed per the mechanical design professional's requirements for the systems provided.
3. All above grade heat system piping shall be type "L" copper, steel, or cross-linked polyethylene (PEX) tubing designed, specified, and be installed per the design professional's requirements for the systems provided.
4. The use of "Power Vents" for combustion exhaust on heating appliances is prohibited.
5. Combustion and ventilation air is required in all mechanical rooms housing fuel burning appliances that require combustion air or produce residual heat as part of their function. All such systems shall be designed by design professionals.
6. Tankless coils for DHW generation are discouraged. If proposed, they shall be sized to produce adequate DHW for 125% of the projected worst case unit needs.
7. For larger facilities, two boilers, each sized to meet 75% of heating load, are recommended.
8. All domestic hot water delivery in Elderly Projects shall be adjusted so that the maximum hot water temperature will be 125 degrees F. at the fixtures.
9. Floor drains and/or sump holes should be provided in all basements. The floor should be pitched to these drains or sumps and these should be connected to a positive drainage system, or to the exterior of the building. Connections to storm water systems should be equipped with backflow preventers.
10. Plumbing valves and traps should be located so as to be accessible. Access panels shall be constructed in accordance with the Maine State Plumbing Code and be properly fire rated should they be installed in fire rated assemblies.
11. Water heater drains from pressure-temperature relief valves shall not discharge on living

- unit floors. Pressure-temperature relief valve piping should be securely mounted.
12. Domestic water and/or heat piping shall not be run in unheated attic spaces, outside wall cavities, unheated crawl spaces or any other areas subject to freezing temperatures.
 13. All heat and domestic hot and cold water supply piping shall be properly insulated to both prevent heat loss to surrounding spaces and loss of energy within the piping systems.
 14. The Mechanical subcontractor shall be responsible for maintaining the entire heating system in good working order for at least one year from the date of substantial completion of the entire project.
 15. It is recommended that bathrooms with floors, walls or ceilings that are part of the thermal envelope be fitted with supplemental heat within such rooms. Supplemental heat for interior bathrooms, especially in elderly units, should be evaluated on a case-by-case basis. If baseboard heaters are provided within bathrooms, corrosion resistance type shall be utilized.
 16. Fixtures and/or devices containing mercury are prohibited.
 17. The installation of any pressurized piping including domestic hot and cold water and heat piping of any materials beneath slab on grade construction is strongly discouraged.
 18. Passive under slab radon venting systems should be provided beneath all slabs. Active systems may be required if radon testing confirms the need for such added capacity. Include an electrical supply in the area of all future fan locations should they become necessary.
 19. All ductwork for heating, ventilating, and air-conditioning systems and including venting for clothes dryers, bathroom exhausts, and kitchen range hoods shall be smooth surfaced metallic type and be hard-cast sealed at all joints.
 20. All plumbing and/or mechanical components penetrating into building thermal envelope components shall be properly air-sealed.

Division 16, Electrical Systems

1. Products of combustion detectors (smoke detectors) shall be provided in all bedrooms and shall provide BOTH audible and visual alarms. Smoke detectors shall be powered from a circuit that includes essential lights and/or devices.
2. Carbon Monoxide detectors shall be provided in accordance with state law and the Fire Marshal's requirements.
3. Unit electrical panels in accessible and adaptable units shall be mounted consistent with reach requirements for wheelchair users. In general, electric panels should be located behind the master bedroom door. Electric panels shall not be located in closets. Electric panels shall not be located back to back in common walls.
4. Electric space heating equipment as a primary heating system is prohibited. Maine law states that "electric space heating equipment" does not include electric thermal storage space heating equipment or a geothermal heat pump.
5. For projects serving frail elderly, an emergency generator sized to handle electrical requirements of the elevator, heat, and life safety systems is strongly recommended.
6. All circuits shall be 20 amp minimum (The use of #14 wire is prohibited).
7. Incandescent lamps are prohibited. Provide pin-type compact fluorescent fixtures or other types of energy efficient fixtures. SEE ALSO MAINEHOUSING'S GREEN BUILDING STANDARDS FOR FURTHER REQUIREMENTS.
8. Generally, recessed "can" type lighting fixtures in the ceiling of top story are prohibited (Intent: maintain integrity of thermal envelope). SEE ALSO MAINEHOUSING'S GREEN BUILDING STANDARDS FOR FURTHER

REQUIREMENTS.

9. Pre-wiring or wireless distribution hardware for connection to internet providers is required.
10. Opposing recessed device receptacle/switch boxes located in common walls or dwelling unit separation walls shall be installed per requirements in the IBC codes to maintain fire rating and to minimize sound transmission and air movement between units.
11. Fixtures and/or devices containing mercury are prohibited.
12. Include an electrical supply in the area of all future radon fan locations should they become necessary.
13. All wiring penetrating into building thermal envelope components shall be properly air-sealed.
14. All unit bathrooms shall have a switched light fixture at or over the mirror.

END OF PART 1

PART 2

DESIGN AND CONSTRUCTION DOCUMENTS

A. INTRODUCTION

Design and construction documents shall be submitted to MaineHousing at four points during their development for review and approval by Construction Services. The formal submissions are defined in detail below and include Concept, Design Development (50% Completion of Construction Documents), and Construction Documents (90% Completion and Pricing Phase). All documents shall be prepared by or under the direction of a design professional (usually an architect) registered in the State of Maine, stamped with the design professional's registration seal, and accompanied by a statement signed by the professional certifying compliance with MaineHousing's standards. Each submission shall be prepared in accordance with the requirements of this Design & Construction Manual and all other applicable referenced documents and shall be approved by MaineHousing before submission of the next phase of document development. Review by MaineHousing's Construction Analyst is strictly assistance to the design professionals; responsibility for compliance with MaineHousing's standards and codes rests solely and entirely with the developer, designers, and contractors. Due to the very nature of the periodic reviews by the construction analysts, it is impossible to identify all areas of non-compliance and/or deficiencies. If the developer does not agree with a determination or interpretation made by the project construction analyst during plan review or construction, the developer may contact the Construction Services Manager to discuss such matters. Such requests shall be in writing and provide good cause with each request. MaineHousing and its staff assume no responsibility or liability for errors or omissions in the design and contract documents as prepared by the Owner's project team. MaineHousing will not review any submittals which are not complete in accordance with the following:

B. CONCEPT SUBMISSION - 1 COPY for MaineHousing's review

The design of a project begins after the selection of a proposed application by MaineHousing. The mechanism utilized to initiate the design process is through a concept meeting and is described herein.

A joint meeting between Applicant, the design professional, and MaineHousing is held, at which time preliminary design as well as other facets of the project/program are discussed. Preliminary design discussions relate to form, type, and number of buildings, and proposed unit mix that will comprise the project and the respective siting of these buildings, which in turn requires soil and survey information for meaningful decision making. Therefore, MaineHousing requires that a soil survey and a topographical and boundary plan be completed and be provided at concept design.

1. A SOIL SURVEY shall be made of all sites for new construction, and may be required on project sites that include substantial rehabilitation and/or additions. A soil survey shall be of high intensity type performed by a soil scientist registered by the State of Maine and reported in accordance with the standards and nomenclature of the National Comprehensive Soil Survey.

It is at the discretion of MaineHousing to accept soil surveys provided by a certified engineer. Additional information may be required where circumstances merit and, in

particular, all filled sites will require several borings under each proposed building site to determine both bearing capacity and composition of the various strata of fill.

2. ALTA Survey of Existing Conditions – See Appendix for survey requirements.
3. DIAGRAMMATIC SITE PLAN required at a scale not less than forty (40) feet to the inch showing the general development of the site and include:
 - A. location of streets
 - B. parking and driveways
 - C. in retrofit construction – location of existing and adjacent buildings
 - D. in new construction existing and proposed buildings
 - E. passive and active recreation areas
 - F. intention of dedication of streets where applicable
 - G. property lines must be shown for all streets and rights-of-way.
 - H. solar access
 - I. contours at 2 foot intervals (errors shall not exceed one-half contour interval) of the property and of adjacent roads and of adjacent areas which either conduct concentrated drainage onto the site, or receive concentrated drainage from the site in sufficient area to determine its effects on site drainage
 - J. test boring locations, if any taken
4. FLOOR PLANS for new construction should diagrammatically show the orientation of areas for daytime use, the principle entrances to structures, and the way the living units relate to the exterior to provide an arrangement which achieves privacy and a sense of home for the inhabitants. These considerations should be made in an attempt to provide passive solar heat to the interior space, especially those areas designated for daytime use.
5. FLOOR PLANS FOR THE REHABILITATION OF AN EXISTING BUILDING should be submitted for the building as it exists and as proposed. A plan for each floor or typical floors should be submitted at a scale not less than eight feet to the inch. When possible one set of plans can be submitted showing existing walls, partitions, columns, doors, windows, stairs and plumbing (unless the building is to be gutted, in which case indicating only the major structural systems) and showing proposed modifications to the layout of the existing building to indicate rooms, entrances, stairs, halls, storage and common areas. Differentiation should be made between existing to remain, existing to be removed, and new construction.
6. BUILDING ELEVATIONS drawn to convenient scale indicating the design intent for the primary façade(s). Label typical finish materials; indicate entries, and general glazing patterns and sizes.

Agreement must be reached by the Applicant and MaineHousing on the general form the project will take before proceeding to the Design Development Phase (50% Completion).

C. DESIGN DEVELOPMENT (50% Completion of Construction Documents) SUBMISSION - 1 COPY for MaineHousing's review

The Design Development Submission is expected to present approximately 50% of the Construction Documents level of information and should formalize the site plan, building configuration, and internal layout of the living units in sufficient detail to allow preparation of an estimate of the construction costs without proceeding to the preparation of the final construction drawings. MaineHousing will review this submission for conformance with Concept Submission and previously referenced standards relating to general layout of site, buildings, and dwelling units, room size and shape, special provisions of plan layout for

accessibility requirements, fire separation and the provision of adequate means of egress, and removal of solid waste.

MaineHousing may waive, in writing, the requirement of some of the information defined herein or may require in writing, additional information. Design Development Submissions will not be reviewed or processed by MaineHousing until MaineHousing is in receipt of approved Concept drawings which include the Soil Survey, Boundary and Topographic information as previously described.

1. SOILS ENGINEER'S REPORT shall be submitted for all new construction developments specified by MaineHousing. This report should include recommendations for foundation design and site drainage in accordance with soil survey information previously obtained. (In many instances the developer may choose to do both portions of the soil study at one time. If this is done, the report should be provided at Concept and re-submitted at with the Design Development Submission.)
2. SITE PLAN(S) drawn to a scale no less than forty (40) feet to the inch, showing the general development of the site with locations of buildings, walks, streets, parking spaces, driveways, service areas, including solid waste collection areas, recreation and private outdoor spaces. Topography should be shown at two (2) foot intervals, indicating both existing (dotted lines) and finish (solid lines) grades where changed. First floor elevation should be noted for each building; utilities should be shown, including underground and/or overhead power feeds, transformer locations, water and sewer mains, hydrants, storm drains, catch basins and outfalls. Streets intended for dedication and public acceptance should be delineated and accessible units, accessible parking, and means of access shall be indicated. Preservation of existing growth and new planting should be shown, identifying form, size and whether deciduous or coniferous, but not necessarily species.
3. BUILDING PLANS, ELEVATIONS AND TYPICAL SECTION(S) drawn to scale of not less than eight (8) feet to the inch, showing the location of living units, accessible units, common area, entrances, windows, circulation, and relation to site features. Lines of fire and acoustical separation and ratings shall be shown on plans and sections as necessary to demonstrate conformance with the standards.
4. FLOOR PLANS of typical living units drawn to a scale not less than four (4) feet to the inch showing furniture layouts and indicating dimensions of rooms measured as clear distance between walls. Usable storage areas are to be shaded/blocked out/cross-hatched or otherwise delineated with applicable dimensions and volumes also provided on plans.
5. MECHANICAL AND ELECTRICAL SYSTEMS drawings indicating overall scopes of work, locations of major components, and overall design concepts of systems.
6. A DESCRIPTION OF THE TYPE OF SPACE AND WATER HEATING SYSTEMS AND VENTILATION, ENERGY RECOVERY, AND CONDITIONING SYSTEMS proposed. This must be submitted separately and accompany schematic drawings that document proposed equipment locations and distribution systems for heat and ventilation.
7. OUTLINE SPECIFICATIONS are to include a brief description of all of the trades, their proposed work scopes, and the major materials that are being considered for each trade.
8. A DESCRIPTION OF MEANS AND FREQUENCY OF SOLID WASTE AND RECYCLING COLLECTION and removal, including the amount of storage necessary.
9. CALCULATIONS AND STATEMENT OF EXPECTED CONSTRUCTION COSTS for the scope of work defined in the documents. Estimates shall be by line item utilizing the CSI format and be of sufficient detail with proper backup to demonstrate an accurate reflection of the materials, equipment, and labor that will be necessary to construct the project. Estimates may be submitted after the initial 50% submittal but must be before comments on the submittal will be delivered.
10. PRELIMINARY CODE STUDY demonstrating compliance with local and state building and fire codes.
11. DESIGN PROFESSIONAL'S TRANSMITTAL FORM
12. TABULATION OF BUILDING, LIVING UNIT FLOOR AREAS according to the format provided in the Appendix.

D. CONSTRUCTION DOCUMENTS - - 1 COPY each for MaineHousing's review, 90% Completion, and Pricing Documents

Working drawings and specifications shall be the contract construction documents which completely describe the design, materials and assembly of the entire development to determine the finished state of work shall follow from the 50% submittal. Formal submittals shall be provided at the 90% completion stage and a set of the documents used to solicit Pricing shall be provided at the beginning of the pricing phase. . The term "or equal," alternates of methods, materials or equipment shall not be used without qualification (i.e. "approved equal," prior to bids); any changes subsequent to the 90% submittal and noted from review of the Pricing Documents shall be made by Addendum during the pricing phase.

Drawings shall be of uniform size and be stamped on each sheet by the designer-of-record and include all of the information provided in the 50% submittal including a narrative response to the review comments provided. The Construction Documents shall include the following information:

1. COVER SHEET

- A. TITLE OF PROJECT, the Maine State Housing Authority Project Number and Project Location.
- B. INDEX OF DRAWINGS by name, numbered consecutively.
- C. SITE LOCATION MAP
- D. CODE STUDY/ANALYSIS SUMMARY
- E. SIGNATURE BLOCK setting forth space for signatures of the Architect, Owner, Contractor, MaineHousing, and the Construction Lender.

2. PLOT OR SITE PLAN

- A. SCALE not less than 1" = 40'
- B. PROPERTY BOUNDARIES and markers
- C. NORTH INDICATION true and magnetic north points
- D. EXISTING PUBLIC AND PRIVATE WAYS adjacent to or within the property boundaries, indicating as applicable legal boundaries, the traveled way, edges of pavements, curbs, walks, wheel stops, and other physical features existing to remain or to be removed, and improvements to them.
- E. NEW STREETS AND DRIVES parking areas, walks, curbs, edges of pavement, wheel stops, and boundaries of any property for dedication and public acceptance.
- F. OTHER PAVED AREAS and constructed site improvements such as play and sitting areas, service courts, drying yards, fences, retaining walls, solid waste collection facilities, outdoor mail boxes
- G. UTILITIES including water mains and hydrants; electric lines: overhead and underground, poles, lighting and transformers; telephone lines, cable TV lines, MATV lines, sanitary and storm sewers, manholes, and catch basins. Indicate diameters and inverts for storm, sanitary sewers, and foundation drainage systems at building exits, in and out of all manholes, connections, and cross-over points. Also show diameters for water mains. Show utilities to the point of connection with the existing system.
- H. TOPOGRAPHY indicate finish grades by solid lines and existing grades to be changed by dotted lines at two (2) foot intervals if a separate grading and drainage plan is not provided. Existing trees and other natural features, indicating whether to be removed or preserved.

- I. BUILDING LOCATIONS AND DESIGNATIONS with grade elevations at corners and entrances if not show on a separate grading and drainage plan.
 - J. PROFILES of streets, walks, storm and sanitary sewers showing existing and proposed grades and appurtenances.
 - K. DIMENSIONS for locating and over all dimensions of all of the above.
 - L. LAYOUT LINES with dimensions and bearing for all structures and paving.
3. GRADING & DRAINAGE PLAN – Minimum scale of 1” = 40’
- When the information listed below cannot be shown clearly on the Site Plan, a Grading and Drainage Plan shall be provided to show the following:
- A. FINISH GRADE ELEVATIONS at all building corners and at entrances.
 - B. EXISTING AND FINISH GRADE CONTOURS shall be shown at two (2) foot intervals indicated in solid line where changed, and with exiting contours indicated with dotted line.
 - C. MEANS OF COLLECTING SURFACE DRAINAGE protection of abutting properties and relation to any subsurface system provided.
 - D. FOUNDATION drainage layouts and connections to subsurface systems or outlooks.
 - E. RADON piping and system information.
 - F. DISTRIBUTION OF PLANT MATERIAL location, quantity and key number of each general species of plant in group, lawn areas, and existing trees, if any, to be preserved or transplanted.
 - G. ENLARGED SCALED PARTIAL PLANS clearly indicating compliance with all accessibility requirements at entries.
4. LANDSCAPE PLAN - Scale not less than the Site Plan (minimum 1” = 40’).
- A. OUTLINE OF BUILDINGS and other improvements of the project, together with physical features of the site for the purpose of establishing the location and relationships between planting and other construction.
 - B. DISTRIBUTION OF PLANT MATERIAL; location, quantity, and key number of each general species of plant in group; lawn areas, and existing trees, if any, to be preserved or transplanted.
 - C. SCHEDULE OF PLANT MATERIAL giving standardized plant names, key number for each variety in reference to plan, and the size, quality, or other pertinent description.
 - D. OTHER EQUIPMENT with sufficient details such as benches, fences, drying lines, paths, game areas, play equipment, etc.
5. FOUNDATION PLANS - Minimum scale of 1/8” = 1’
- A. FOOTINGS, step footings, pilings, grade beams, walls, columns, piers, and slabs with dimensions, thicknesses, and locations.
 - B. CONSTRUCTION AND EXPANSION JOINTS bond outs, windows, sumps, electrical, telephone, plumbing, and air duct locations.
 - C. ENLARGED DETAILS of reinforcing, foundation drainage systems, keys, corners, joints, insulation, sub-base, vapor barrier, waterproofing, etc. when not shown clearly at the above scale, or explained in notes.
6. BUILDING LAYOUT PLANS – Minimum scale of 1/8” = 1” unless fully shown on living unit plans for small buildings, Building Floor Plans of each building shall show the following:
- A. THE DIMENSIONED RELATION of living units and buildings to each other; over-all dimensions of buildings, partition arrangement and fenestration of end living units, units at corners and units at offsets; other partitions as may be necessary only to show variations from the typical living unit plans and relation of rooms in adjacent

- living units; walls separating living units and their material and thickness.
- B. ALL BUILDINGS IDENTIFIED by numbers or letters and each living unit identified, including accessible units.
 - C. WALL CONSTRUCTION TYPES AND LEGEND WITH KEYS INDICATING locations required for fire and acoustical separation. Provide adequate cross references as to locations of all wall types and details. Provide design references justifying all fire and sound rated assemblies.
7. LIVING UNIT FLOOR PLANS - Minimum scale of 1/4" = 1'
- A. LIVING UNIT FLOOR PLANS for each type of living unit and variation.
 - B. SEPARATE UNIT PLANS are not required when the general floor plans are provided at the above scale and contain all essential information.
 - C. OVER-ALL DIMENSIONS and dimensions to all partitions, window locations and type designations referring to schedule, dimensioned stair location, runs and widths, landings and handrails.
 - D. CLOSETS, shelving and clothes rods; radiators or other heating devices, chimneys, and all other such items, unless shown on separate plumbing, mechanical and electrical drawings to same scale.
LOCATION OF STRUCTURAL ELEMENTS such as columns, lintels, joists, beams, girders, and bearing partitions. Show sizes, spacing and direction of members. Submit separate structural drawings where structural information cannot be shown clearly.
 - E. ALL CONDITIONS where units are to join other units, including end unit conditions
 - F. LIVING UNIT TYPES identified by a number or letter.
8. ROOF PLANS - Minimum scale of 1/8" = 1'
- A. RELATION of intersection of the various building roofs; direction of slopes on roofs; parapets, chimneys, vents, and other projections above roofs; downspout location and sizes, flashing and underlayment details.
 - B. PROVIDE free air ventilation calculation demonstrating compliance with standards.
 - C. FIRE AND SMOKE barriers.
9. BUILDING ELEVATIONS - Minimum scale of 1/8" = 1'
- A. ALL FACADES of each typical building showing materials, window and exterior door types related to schedules.
 - B. FLOOR LINES and elevations, exterior grades.
 - C. FLASHING locations, widths, and exposure dimensions
10. PARTIAL ELEVATIONS - Minimum scale of 1/4" = 1'
- Partial elevations may be omitted when Building Elevations have been drawn to the above scale to include information required of partial elevations.
- A. Portions of each type of façade showing the exterior design, including materials, jointing, flashing, special features, windows, doorways, cornices, parapets and all details.
11. BUILDING SECTIONS – Minimum scale of 1/4" = 1'
- A. Cross sectional characteristics of the building and floor level relations at one or more points as necessary to show typical configurations.
12. CONSTRUCTION SECTIONS - Minimum scale of 3/8" = 1'

- A. EXTERIOR WALL SECTIONS from footing to roof to show each type. Complete construction of: walls with thickness at various stories; floors; furring; waterproofing; ceilings; roofs; including pitch and material; window heads and sills; window heights; flashings; room heights; anchorage and bearings; cornice and gutter; insulations; vapor barrier, foundation walls and footings; footing drains; radon systems; conditions at various depth basements, basement floors or crawl space; roof space, and attic vents.
- B. BEARING WALL OR PARTITION SECTIONS for all types of walls and partitions with floor, ceiling and roof construction; supporting walls or members, columns and girders; foundations and footing; size and spacing of all members' joists, splices or ties; sub and finished floors; walls and ceilings. Provide adequate cross-references to plans for locations of all wall types. Provide design references for all required fire and sound rated assemblies.

13. DETAILS - Minimum scale of 1/2" = 1'

- A. STAIRS with plans and sections showing stringers, treads, risers, newels, balusters, handrails, rise, run and headroom; show all dimensions.
- B. KITCHEN LAYOUTS with plans and elevations showing accessories, cabinets, location of heaters and ductwork runs. Note accessibility requirements where applicable.
- C. PLAN OF BATHROOM LAYOUTS with elevations showing accessories, radiator or heater, cabinets and fixtures.
- D. SPECIAL EXTERIOR AND INTERIOR DETAILS such as bay windows, dormers, cupolas, vents, built-in furniture, closet sections, blocking for grab bars, range hoods, wood trim details, sheet rock details if returned at windows and doors.

14. SCHEDULES

Shown on any drawing or in project manual convenient for reference.

- A. DOOR SCHEDULE: size, thickness, materials, and design of each door, with designation on plans. All fire doors shall be indicated with their approved rating.
- B. WINDOW SCHEDULE: Size, thickness, glazing, material and design of each window, with designation on plan elevation. Identify egress windows.
- C. FINISH SCHEDULE: Material and type of finish of floors, walls, ceilings and trim for all rooms. Flame spread and smoke generation ratings for all surfaces required to be limited.
- D. HARDWARE SCHEDULE: Material and type of hardware for each door in door schedule. Include special hardware such as closets, electric door strikes intercom devices, and panic hardware.

15. STRUCTURAL

- A. Structural drawings shall include a framing plan for each floor and roof of each structure not identical to other structures in the project.
 - 1. REPETITIVE FRAMING plans for the floors of structures with more than one story may be combined on one (1) drawing, provided that variations are minor and are clearly identified.
 - 2. FRAMING PLANS shall identify the material, size, location and orientation of all structural members, bracing and bridging, and the structural materials acting as the surfaces of the floors and roof.
 - 3. THE CONNECTIONS of the walls and floor to the foundation shall be detailed.
 - 4. STRUCTURAL FRAMING around all openings, including those for mechanical ducts, shall be shown, as well as that supporting mechanical equipment.

B. Trusses, at a minimum, should be detailed and/or specified by performance criteria meeting all stated live and dead load requirements as set forth by the design professional substantiated by shop drawings and computations from the manufacturer and approved by the design professional prior to installation. The manufacturer's drawings shall be signed and sealed by a professional engineer, registered in the State of Maine. The drawings should show:

1. THE CONNECTION at each joint should clearly be shown and the connecting device or method specifically identified.
2. CONNECTORS should be located by dimensions from the sides and ends of the members connected.
3. STRUCTURAL ADHESIVES used in connections should be specifically identified and the standard applicable to their use referenced on the structural drawings.
4. THE ANALYSIS of trusses should take full account of their method of support. Line stress diagrams are acceptable.
5. LATERAL AND WIND BRACING details as well as handling details
6. WHERE THE LOADS occurring between panel points induce bending significantly affecting the member stresses, such effects shall be included.
7. ADEQUATE HOLD DOWN for uplift due to wind and overhang conditions.

C. With the exception of simple connections, such as the typical end nailing of studs to top and bottom plates which can be covered by notes, all connections shall be detailed. Notching of trusses will not be allowed.

D. Consideration of any items that may be installed in and on structures should be evaluated and appropriate upgrades made. An example of such items might be solar panels, domestic water tanks, etc.

16. MECHANICAL

The following information should be shown on separate drawings at an appropriate scale. If the information can provide clear indication of all details, the preferred scale is that used in earlier drawings for the basement and floor layout (1/8" = 1') in order to allow overlay.

A. HEATING AND VENTILATION DESIGN

1. Locations of equipment: Drawings should show, with dimensions, the location, size, and clearance for all equipment and fixed appliances, e.g., fans, warm air furnaces, boilers, absorption units, etc.
2. Equipment Schedules: The drawings should show a tabulation of all equipment and fixed appliance used, showing the listing, the manufacturer's name, make, model number, BTU/hr, and input rating for all energy inputs.
3. Mechanical Ventilation Systems should be provided with layouts and sizes for all equipment, ductwork, insulation, controls, etc. to describe each total system; show all parts of systems that are to be thermally insulated.
4. Include air-sealing details at all penetrations of mechanical systems through and into building envelopes.

B. PLUMBING AND SPRINKLER DESIGN

1. Plans and/or schematic drawings of the plumbing layouts, including but not limited to sizes of piping, fittings, traps, and vents, cleanouts and valves; gas, sprinklers, water, radon, and drainage systems should be provided.
2. Horizontal and vertical sewer and drainage system drawings should include riser

diagrams of typical stacks. These diagrams should show pipe, vents, and trap sizes, cleanouts fixtures, interceptors and floor drains. Connection and installation details between pipes, fixtures, and appliances shall be provided. Drawings should show proper slope of waste and vent lines and should clearly define how such lines penetrate walls and floors without destroying the structural and/or fire safety integrity of such systems.

3. Hot and cold water supply drawings should include all supply pipe sizes, shutoff valves and descriptions of fixtures supplied, along with a statement as to the supply water-pressure used for the design. Note: All fixtures are required to have shut-off valves for both hot and cold water supply and are also required to be connected by threaded unions. Provide hot and cold main water supply shut-offs for each living unit.
4. All plumbing materials should be shown either on the drawings, on schedules, or in the specifications with applicable cross-reference provided for clarity. All fixtures should be located on appropriate drawings with fixture unit capacity of system (s) and make, model and rating/capacity of all equipment and appliances shall be indicated and installed in accordance with these requirements and the manufacturer's instructions. Provide piping insulation details for ALL mechanical and domestic water piping.
5. Where not covered in other drawing, i.e., mechanical or electrical, details, make and model of safety controls (such as for water heaters), their location and listings or labelings, should be provided.
6. Drawings should indicate details of pipe and fixture supports (i.e., type and spacing) and indicate pipe protection such as wrapping, sealing and insulating and provide for thermal expansion as applicable.
7. Where not provided by other details, locations of vents above roofs and required clearances for air intakes, windows, other flues and vents, should be provided.
8. Sprinkler designs shall at least indicate the main feeds and distribution, understanding that the final designs will need to be provided by qualified subcontractors of the trade and be approved by the State Fire Marshal's Office prior to their installation. Full coordination of the various mechanical systems is necessary prior to installation.
9. Radon piping from beneath all slab areas up through the building and the roof.
10. Include air-sealing details at all penetrations of plumbing systems through and into building envelopes.

17. ELECTRICAL DESIGN

- A. Provide branch circuit and feed load calculations which contain the total connected loads before applying demand factors, the demand factor used, the computed load after applying demand factors, and the type and size of conductors to be used.
- B. Provide details and diagrams of the number, types and sizes of service entrances, types and sizes of service conductors and all installation requirements including location, assembly, mounting, protection, and the short circuit current available at all supply terminals from the electric utility. Details of wall penetrations and service entrance cable protection shall be shown.
- C. Provide details of all over-current protection provisions for equipment and conductors, including sizes, ratings, types and locations.
- D. Provide complete details of the grounding and bonding provisions including the methods used, the location of connections, and types and sizes of conductors and electrodes. Provide installation details and location of all outlet, switch and junction

boxes. NOTE: Do not locate outlet boxes and/or other devices and/or back boxes back to back in “Party” or “Fire Walls.”

- E. Provide schematic plans showing branch circuit distribution system, cable TV systems, telephone systems, television antenna systems, emergency call systems, emergency lighting systems, fire alarm systems including the details and identification of all circuits, outlets, appliances and equipment.
- F. Provide panel schedules for each scheduled panel.
- G. Lighting of all public spaces including yard lighting within the buildings and grounds, including controls, shall be shown on the drawings.
- H. Include air-sealing details of all penetrations of electrical systems into the thermal envelope.

18. PROJECT MANUAL

A project manual shall accompany the drawings and should include the following:

PART 1: Contract Documents

- A. Cover Page: Printed in black or blue on white paper, stating:
 - 1. Title of project and
 - 2. MaineHousing’s project number, and
 - 3. Project location and
 - 4. Signature block setting forth space for the signatures of the Architect, Owner, Contractor, MaineHousing and Construction Lender
- B. Index: Reference and page number for each section all portions of both Part 1 and Part 2 of the Project Manual
- C. General Conditions of the Contract for Construction (AIA 201 or approved equivalent)
- D. Performance Bond (AIA A311 or approved equivalent)
- E. Labor and Material Payment Bond (AIA A311 or approved equivalent)
- F. Instructions to Bidders (AIA A701 or approved equivalent for bid projects)
- G. Supplementary Conditions of the Contract for Construction
- H. Geotechnical Report – By reference or inclusion: “For Information Only”
- I. MaineHousing’s *Design & Construction Manual* by reference or inclusion: “For Information Only”
- J. MaineHousing’s *Green Building Standards* by reference or inclusion: “For Information Only”
- K. Application and Certificate of Payment (AIA G702 or approved equivalent)
- L. Continuation Sheet (reference L above (AIA G703 or approved equal)
- M. MaineHousing Final Certificate and Release for Contractors/Subcontractors/Vendors
- N. MaineHousing Owner/Agency Certificate of Completion
- O. MaineHousing Construction Services Final Completion Checklist
- P. Incomplete Work Escrow (IWE)
- Q. Final Certificate and Lien Release for Contractors/Subcontractors/Vendors

PART 2: Specifications

The specifications should be divided into sections separately describing the work to be done by each of the trades including landscaping work and off-site construction which is essential to the completion of the project. The CSI format should be used unless prior approval to use another system is accepted by MaineHousing. In each section, under the Trade Title, a complete description, in specific detail, of all the work to be performed by that trade, including descriptions of “Scope of Work”, “Workmanship”, and “Materials” and the manufacturer, grade or model designation of each item of equipment as well as any necessary specific instructions for coordinating the work with that of other trades, also specific instruction and detailed descriptions of work not clearly evident from the drawings.

19. CONTRACT FORM

- A. The contract should reference the scope of work or plans, specs and addenda by the most recent revision date.
- B. Contracts should contain a detailed schedule of values and unit prices.
- C. The contract should specify a specific completion date or number of calendar days to complete the project.
- D. The contract should specify amount and terms of liquidated damages, if any.
- E. Construction Management (CM) Contracts may contain Contractor/Owner shared savings clauses and/or bonuses, but all such clauses shall be specifically reviewed with and approved by MaineHousing prior to their implementation.
- F. The contract should specify that the owner will retain a percentage of the billed amount until the project is complete. Suggested retainage language is: “Retainage shall be 10% of the work in-place and billed and may be reduced, at the owner’s discretion, when the amount of retainage equals 5% of the contract value (including change orders) provided all contractual obligations have been met and work progress and quality is acceptable.”
- G. A MaineHousing Construction Analyst must review, accept, and sign all change order proposals and change orders before they are a valid amendment to the contract.
- H. The Contractor shall provide a list of Subcontractors with subcontracts in excess of \$2,000.00 and Material Suppliers/Vendors with purchases ~~in~~ exceeding \$10,000.00.

20. OTHER

- A. REVISED COST ESTIMATES (at 90% Submittal)
- B. DESIGN PROFESSIONAL’S CERTIFICATION (at Pricing Phase-See appendix)
- C. TRANSMITTAL FORM
- D. COMMISSIONING REPORTS (at 50% and 90% Submittals)

ADMINISTRATIVE SUBMITTAL PROCEDURES: Once the completion of the review of Construction Documents and the correction of all discrepancies and/or omissions has been accomplished, and the Pricing Phase is completed, the final submission becomes an administrative function.

The Design Professional submits, at a minimum, five (5) “clean” copies of the Drawings, and Project Manual specifications, and Certifications for sign-off by all interested parties, including MaineHousing. All drawing sheets and the Project Manual are to be sealed by the Design Professional providing the professional services contained therein. The cover sheet of the project manual and drawings shall also bear the primary Design Professional’s seal and signature. The cover sheet of the specifications and plans shall also bear the Design Professional’s seal as well as his signature. One set of documents will be retained by MaineHousing for its use. Two of the sets of documents should be retained by the contractor, one for his records and one for on-site use by all parties. One set of the documents is to be retained by the Owner and one by the Architect. Any additional sets of signed documents (more than the 5 outlined above) must also be submitted to MaineHousing for signatures.

E. PRE-CONSTRUCTION LOAN CLOSING (CLC) requirements

Once the final construction costs have been determined, Construction Services is responsible for the review of several additional documents. These documents are required to be provided with sufficient time for review prior to the CLC. The pre-CLC documentation shall include the following information:

1. Full set of approved, sealed working drawings and specifications signed by the Owner, Architect, Contractor, and MaineHousing. (For projects with a rehab cost of less than \$100,000, a written scope of work along with some descriptive sketches and/or schedules may be sufficient to satisfy this requirement.)
2. Construction contract signed by the Owner and Contractor and acceptable to MaineHousing.
3. For MaineHousing's Insurance requirements see:
<http://www.mainehousing.org/Documents/HousingDevelopments/HousingDev-InsuranceChecklist.pdf>
4. Copy of the Building permit from the local Code Enforcement Officer or other satisfactory evidence of local approval.
5. Copy of the Construction Permit and Barrier Free Permit issued by the Department of Public Safety, State Fire Marshal's Office. (For small, non licensed rehab projects this requirement may be waived)
6. Copy of letter of acceptance from the Department of Health Engineering (If applicable)
7. One hundred percent Performance and Payment bonds with dual obligee rider naming MaineHousing. (For projects under \$200,000 this requirement may be waived)
8. Commissioning Report (Design phase) and Commissioning Plan listing required inspections and testing.
9. In certain cases additional information such as an Environmental Site Assessment or itemized cost breakdown may be required.
10. Alta Survey (See Appendix for detailed requirements)
11. Establishment of a Project Contingency budget. NOTE: MaineHousing has in its Rental Loan Program Guide a policy concerning the allowable uses of project contingency. The Construction Analyst is responsible for assuring that any use of the contingency is consistent with the policy.
12. If the project contains historic tax credits, National Parks Service (NPS) written acceptance of the project as meeting historic preservation requirements shall be provided.

Once all of the pre-CLC documentation is received and is found acceptable by the Construction Analyst, the Construction Services Manager is required to provide notification of such acceptance via a checklist sign-off to the loan officer.

END OF PART 2

PART 3

PROJECT CONSTRUCTION

A. PROJECT DELIVERY METHODS - GENERAL

The development of a project involves the evaluation of ideas, building and use programs, budgets, and considerable time and, as such, the project team and delivery method utilized must fit together to achieve the overall project goals. MaineHousing recognizes that not all projects fit within the same parameters and, therefore, recognizes two viable project delivery methods, which may be considered for its projects. Specifically, the Design - Bid - Build project delivery method and the Construction Manager - At - Risk project delivery method. MaineHousing will generally allow the developer to choose which delivery method is utilized, however, the method chosen must be disclosed to MaineHousing and is subject to review and approval by the Construction Services Manager.

Understanding that both methods have their own inherent strengths and weaknesses to achieving cost effective, timely construction, MaineHousing has set forth parameters for consideration for each project delivery method. For all of PART 3, the term “Architect” shall also mean Design Professional or Designer-Of-Record.

B. DESIGN – BID – BUILD

Traditionally, the Owner selects an architect of choice with whom he prefers to work, usually based on professional qualifications and experience and who is qualified to meet all of MaineHousing’s requirements and standards. The Architect, based on the Owner’s program requirements including the project budget, then provides design documents for the pre-conceptual, conceptual, design development, and construction documents phases of the project development. The Architect and his design consultants, who normally include civil, structural, mechanical, and electrical engineers, are expected to design within a construction budget set by the Owner and the Authority at the onset. The Architect and consultants will be responsible for estimating the project as designed and advising the Owner of the expected construction costs, based on their respective experience, for each phase of the design process, and the Architect is responsible for communicating the entire design intent through accurate, complete, and well coordinated construction documents (plans, project manual, and specifications) such that the project can be put out for competitive bidding. Once the design is complete and the expected costs are estimated by the Architect and the entire package is acceptable to the Owner and to MaineHousing, the project is advertised for bidding. A bidding procedure and time frame is set up and contractors, including generals, subcontractors, suppliers, and vendors, assemble their prices based on the content of the documents and submit “bids” to accomplish the work per the parameters set forth by the Architect and his consultants in the bidding documents. Subcontractors, suppliers, and vendors “bid” for their respective scopes of work to the general contractors (GCs) and the GCs submit their bid for the entire project using a combination of their own estimates, the bids they receive, and their proposed methods of executing the work. Unless there is some irregularity discovered just after the bids are received, usually the low bidder is offered the project, assuming that it is within the project budget as set by the Owner. MaineHousing’s Construction Services shall be included and participate throughout the bidding process.

In general, the bidding process shall: be either Open Bid or Select Bid; assure that a minimum of 3 (4 preferred) bids will be received; provide for an open public bid opening format; provide bids that are valid for a minimum of 60 days. If there are extenuating circumstances that may require a longer bid hold period, these are to be discussed with the Construction Analyst and any such extension shall be agreed to by MaineHousing prior to bidding.

If a select bid process is proposed, all preselected bidders shall be presented to MaineHousing for review and acceptance prior to the bidding process.

After bids are opened, references are to be checked/confirmed by the developer.

Bids vs. budget:

If the lowest responsible bid exceeds the project budget by ten percent (10%) or less, the developer may negotiate changes (conduct a “value engineering” process) with the contractor, provided all changes are approved by the developer, designers of record, and MaineHousing prior to adoption. Negotiated changes requiring modification of the approved plans and specifications that are in excess of ten percent (10%) of the project construction budget will not be accepted. If negotiated changes to the plans and specifications do exceed ten percent (10%) of the construction budget, then re-design by the designers of record (and approved by MaineHousing) and re-bidding will be required. Additional bids may be required should MaineHousing consider the general contractor cost or any subcontractor costs are excessive.

During the construction period, the Architect is retained by the Owner to administer the terms and conditions of the construction contract between the Owner and the General Contractor and to provide field oversight to assure that the design intent, the construction schedule, and the expected quality are met.

With this project delivery method, the Owner has a contract with the Designer of Record for all design services and the Designer of Record has agreements for the professional services of his consultants. The Owner has a contract with the low bidder/General Contractor for the construction.

Focus points of emphasis related to this method of project delivery:

- It is perceived to be the method that is most “fair” to the construction industry generally resulting in the lowest cost for the construction phase based on competition for the work.
- The design intent is communicated solely through the documents – they are the basis of the bid, the relationships during construction, and the construction contract. The documents must be complete, properly coordinated, and timely.
- Change Orders result if the documents are incomplete, not coordinated, or the intent is not clear.
- The Architect administers the Construction Contract and continues to provide services on an as-needed basis as the construction takes place.

C. CONSTRUCTION MANAGER-AT-RISK

In this scenario, the owner hires an Architect as described above. The Owner and the Architect get

together and discuss criteria that they are looking for in a Construction-Manager-At-Risk and choose to openly advertise for qualifications of Construction Managers (CMs), develop a list of qualified CMs (minimum of 4), interview, make a selection, and negotiate a contract for services. MaineHousing's Construction Services shall be included and participate throughout the selection process.

With this project delivery method, a "team" is set up very early in the design process, which includes the Owner, the Architect (and his engineering consultants), and the Construction Manager. The traditional design phases of pre-concept, concept, design development, and construction documents are followed however, the CM has the responsibility of developing all estimates, not the Architect. The CM also has the added responsibility of offering input to the Owner and Architect for alternatives to achieve the design intent and to maintain the construction budget. All team members participate in the decision making process as the design evolves and all parties are expected to communicate their ideas, concerns, etc. openly and freely to the betterment of the project.

During the final pricing at the construction documents stage, the CM is responsible for soliciting multiple/competitive quotes (a minimum of 3 in each trade or work scope) from suppliers, vendors, and subcontractors and usually selects companies that he has pre-qualified to provide the necessary scopes of work, rather than simply opening it up to all. This helps to assure that the entire construction team will work well together. All of the prices are tabulated and the CM makes recommendations to the project team on which subs are best qualified to the other members of the project team. Once the construction team is assembled and a final price put together (guaranteed maximum price or GMP), the construction process begins.

With this project delivery method, the Owner has a contract with the Designer of Record for all design services and the Designer of Record has agreements for the professional services of his consultants. The Owner has a two-part contract with the CM: Part 1, for pre-construction services and Part 2, for the actual construction. NOTE: It is important that all parties understand the importance of avoiding "Choice Limiting Actions" – Please see Appendix for MaineHousing's required Amendment attachment to all CM Contracts.

Focus points of emphasis related to this method of project delivery:

- The Owner and Architect must be willing, qualified, and committed to administer and participate in the pre-construction services portion of the project with the CM.
- The Owner and Architect must carefully define the level of services and the prequalifications they require of the CM and conduct an interview/selection process that results in the best possible project team.
- The CM must be qualified and be held accountable and actively participate during the preconstruction phases of the project.
- The CM has the responsibility for soliciting competitive pricing by assembling and administering a "bidding" process for all trades and major scopes of work and establishes a Guaranteed Maximum Price (GMP) which all parties can rely upon. In order to assure a competitive pricing process occurs, the CM must strive to solicit competitive pricing.
- The CM should be careful not to exclude suppliers, subcontractors, and vendors who might

otherwise provide quotes in a traditional bid project delivery.

- Usually the form of contract for the construction phase is based on the costs of the work plus a negotiated flat fee. Financial incentives for both the owner and/or the CM are also usually discussed and negotiated and might include considerations for early completion and actual costs vs. estimated costs. These incentives are usually structured in such a way to encourage the CM to continue to find the best value for the Owner during the construction phase.
- The design intent is communicated through the documents and through the ongoing participation of the project team members. The CM assumes a level of understanding beyond the documents by actively participating in the decision making and design processes during the pre-preconstruction phase of the project development.
- The Architect administers the Construction Contract and continues to provide services on an as-needed basis as the construction takes place.
- The Owner must hold the CM accountable for justifying all costs related to the project. A full accounting shall be provided by the CM for review by the Owner and/or his agents.

D. GENERAL CONDITIONS OF CONSTRUCTION & QUALITY CONTROL

1. Standards for Construction and Contractor's Warranty:

- A. The Project shall be constructed according to accepted Construction Documents and in full compliance with applicable building codes and regulations. All materials and equipment shall be new, unless otherwise specified, and all construction shall be of good quality, free from faults and defects.
- B. The Contractor warrants to the Owner, the Design Professional, and MaineHousing that all construction will be accomplished in compliance with the Standards for Construction stated above.

2. Notwithstanding any additional requirements imposed by either the architect or the Owner in the construction contract, or the Construction Lender, Construction Contract Retainage shall be:

- A. For construction contracts less than \$100,000 stipulated sum or guaranteed maximum, MaineHousing does not require construction contract retainage.
- B. For construction contracts more than \$100,000 but less than \$200,000 stipulated sum or guaranteed maximum, MaineHousing may waive its retainage requirements. If not waived, retainage shall be 10% on all progress payments until the project is complete.
- C. For construction contracts more than \$200,000 stipulated sum or guaranteed maximum, MaineHousing requires 10% retainage on all progress payments until the project is 50% complete. Once the dollar value of the work scope meets or exceeds 50% of the contract value (including change orders) then the contractor may request that no further retainage be withheld. With agreement from the architect, Owner, and MaineHousing, no further retainage shall be withheld.

3. The Contractor shall provide the following on-site facilities:

- A. A site office of sufficient size for the review and discussion of the construction documents
- B. A site phone
- C. A site toilet
- D. A current set of signed drawings, specifications, and other documents as amended and as accepted by MaineHousing for the use of the MaineHousing personnel at all times.E. A “project sign” which designates the project as an Equal Housing Opportunity project and includes references to the Project name, Developer, Architect, Contractor, Bank, Bonding Company, and MaineHousing. This sign should also provide a phone number for rental information.

4. Quality Control Inspections

MaineHousing requires inspections of the construction by the designer-of-record to determine that work is proceeding according to the Standards for Construction stated above, the contract documents, and generally accepted construction practices. MaineHousing reserves the option to make similar or additional inspections for the same purposes. These inspections should generally be as follows for each building and/or unit:

- A. Initial excavations; the following items should be completed and visible for inspections:
 - 1. all excavation for footings and foundations;
 - 2. forms for footings and any required footing reinforcing steel in place; and
 - 3. batter boards or other suitable locating devices in place and wall lines established
- B. Foundation Preparation; the following items should be completed and visible for inspection:
 - 1. forms for walls and any required reinforcing in place; and
 - 2. forms should be aligned, securely braced, and properly treated with release agents.
- C. Foundation Completed; the following items should be completed and visible for inspection prior to placing backfill:
 - 1. all footings, foundation walls, piers, and any other foundation work, including rodent barriers;
 - 2. damp proofing or water-proofing and foundation drainage installations
- D. Concrete Slabs; an inspection of the non-capillary bed, slab vapor, barrier, below slab insulations, embedded piping including drainage and radon systems, reinforcing steel, etc. should be made prior to the placement of concrete floor slabs.
- E. Close-In; a “close-in” inspection is required to inspect work completed after the initial inspections and prior to the concealment of all building systems. The following construction should be completed and visible for inspection:
 - 1. the structure should be enclosed with all wall, ceiling, and roof framing exposed;
 - 2. masonry veneer, if applicable, should not be installed;
 - 3. interior wall and ceiling finish material and insulation should not be installed, but
 - 4. roofing may be applied;
 - 5. heating, plumbing and electrical work should be roughed in;
 - 6. footings and foundations for stoops, porches and terraces before backfilling, with any

required reinforcing and flashing for slabs in place, before pouring slabs, if not inspected during previous inspections.

7. All air-barriers should be established and be sealed including, but not limited to, all mechanical and electrical penetrations in framing.

F. Final Inspection; at “final inspection,” all required construction should be completed and ready for inspection. The Contractor shall arrange to have the building(s) open for the Architect and MaineHousing review. The following items should be completed and ready for inspection:

1. the dwelling structure completed, cleaned and ready for occupancy - this should include the installation and operation of permanent equipment, buildings and on-site improvements except for those items specified and accepted as suitable for deferred completion in accordance with the provision for Uncompleted Work Escrows;
2. finish grading, seeding, sodding, and landscape planting completed;
3. walks and drives completed, including their extension to the public walk, curb or pavement, and utilities installed including their extension and connection to off-site public mains;
4. fences, garden walls, retaining walls, and other accessory structures completed;
5. off-site improvements, if any, completed;
6. all non-compliances noted by the Architect and/or Authority during the construction should be corrected and accepted by the Architect and MaineHousing.

5. Concealments

If the Authority encounters construction that has been concealed before being properly inspected as required by a scheduled inspection or a follow-up thereto, MaineHousing may require the uncovering of concealed work or an alternative verification acceptable to the MaineHousing. MaineHousing shall not be liable for the cost of any such uncovering or alternative verification.

6. Re-inspections

Any inspection performed by MaineHousing which, in its sole discretion, is determined to be necessary due to an action, omission, or deficiency caused by the Contractor, Owner, or Design Professional shall be considered a re-inspection. Re-inspections shall be made after corrections have been completed and the Contractor or Architect shall notify MaineHousing of the status of all work requiring re-inspections.

7. Inspection Documentation

A report should be provided to the Contractor following each inspection or re-inspection by the architect. The Contractor should carefully review his copy of the report and correct any non-compliance. Copies of all reports are also to be submitted to MaineHousing

MaineHousing will generally rely on the Architect’s field reports and/or meeting minutes for the proper documentation and tracking of all required inspections and/or re-inspections.

8. Corrective Actions

Upon its sole determination that the construction is not proceeding in compliance with the Standards for Construction, MaineHousing may require of either the Contractor or the Owner or both any of the following corrective actions:

- A. Repair or correct non-compliance; then notify the Architect and MaineHousing for re-inspection.
- B. Stop construction in area of non-compliance until further notice.
- C. Establish a Full Time Project Representative of the Design Professional.

9. Change Orders

Any modifications, including but not limited to, additions, variations, substitutions, or revisions to the accepted Construction Documents shall be submitted to MaineHousing, the Architect, and Owner for review and acceptance prior to the execution of those changes. All change orders shall be submitted on a Change order form acceptable to the Architect and MaineHousing and shall be accompanied by adequate information describing the proposed changes including drawings and description of materials when needed. MaineHousing may request such additional information as it deems reasonably necessary under the circumstances to justify any change order requests. In an effort to expedite approvals for changes, MaineHousing may decide to review and approve individual "Change Proposals" as they are presented, understanding that a Change Order will later be developed to summarize and total approved Change Proposals into a formal Change Order prior to requests for payment of such change items.

10. Incomplete Work Escrow (IWE)

When completion of site or limited building improvements is prevented by seasonal conditions or other considerations deemed by MaineHousing as being beyond the control of the Contractor, the final inspection will not include the uncompleted construction, provided MaineHousing finds that the development can be occupied without hazards caused by such uncompleted work.

MaineHousing will require a complete written description of all deferred work and the holding in escrow a sum of money equal to not less than one and one half times MaineHousing's estimated cost of completion, and the establishment of a suitable date of completion of the deferred items shall be established. MaineHousing will require an inspection of the deferred work upon completion prior to the release of any escrow amount.

In establishing Incomplete Work Escrows (IWE), MaineHousing will consider the estimated value of the work to be completed as a minimum basis but also may include costs, both direct and indirect, that might be incurred should the Contractor default on his obligations to complete the identified work. The establishment of the IWE amounts is at the sole discretion of MaineHousing. See Appendix for further description of the IWE process.

E. PROJECT CLOSE-OUT

As part of the final project accounting, establishment of the incomplete work list and prior to the

permanent loan closing (PLC), MaineHousing's Construction Services requires the submittal, review, and acceptance of several documents. The following documents shall be provided:

1. Certificate of Substantial Completion (AIA document prepared by architect)
2. Elevator License (if applicable)
3. Fire Alarm system Test Report and Sign-off by System Manufacturer's Rep
4. Sprinkler Test Report/Sign-off by qualified installer and SFMO permit signed-off by "RMS"
5. Certificate of Occupancy from local municipality
6. Electrical Permit Sign-off by state or local electrical inspector
7. Plumbing Permit Sign-off by state or local plumbing inspector
8. Certificate of Completion of Design Professional (MSHA Document)
9. Incomplete Work Escrow Agreement
10. Requisition for all items not identified on Incomplete Work Escrow list
11. Lien Releases (typically using MSHA's Contractors Final Certificate and Release Form)
12. O& M manuals (deliver to Owner) as applicable
13. Warranty information to Owner (e.g. Roofing, Boilers.) as applicable
14. As-built drawings (deliver to Owner, copy to MSHA)
15. As-built (Alta) survey with MSHA Certification (may be waived if work did not increase building footprint)
16. State Fire Marshal Inspection and Plan of Correction (if required)
17. Owner/Agency Certificate of Completion (MSHA Doc.)
18. Contractor's report of participation - Minority/Women Owned Business Enterprises
19. Evidence of satisfactory Lead Based Paint Clearance testing (not required for new construction)
20. Consent of Surety to release of final payment
21. Blower Door Test Results
22. Commissioning Report
23. Green Building Standard #10 Compliance

END OF PART 3

Appendix A

Appendix A provides copies of documents for use by all project parties throughout the project process.

1. MaineHousing and Alta Survey Requirements	9 Pages
2. Construction Documents Certification	1 Page
3. Summary of Accessibility Regulations and MaineHousing Requirements.....	3 Pages
4. Construction Services Document Review Sign-off.....	1 Page
5. Addendum to CM Contracts.....	2 Pages
6. Building and Unit Square Foot (SF) Tabulations.....	1 Page

Appendix B

Appendix B provides copies of specific documents that are required as part of the project close-out process. If the enclosed documents do not provide for adequate functionality or ease of use by the project parties, contact the Construction Analyst for the project and they will provide assistance as necessary.

1. Construction Services Final Completion Checklist.....	1 Page
2. Certificate of Completion of Design Professional	1 Page
3. Final Certificate and Release for Contractors/Subcontractors/Vendors	1 Page
4. Incomplete Work Escrow (IWE)	2 Pages
5. Supportive Housing/One Write Project Certification of Completion of Construction/Rehabilitation Activities	1 Page

Appendix C
Amendments/ Additions