

## MSHDA STANDARDS OF DESIGN

The Michigan State Housing Development Authority **Standards of Design** defines the design process and the specific requirements for multifamily housing financed through the Authority. This version of the **Standards of Design** replaces all previous versions.

The following Standards are requirements of the Multi-Housing Design Review Process for the Michigan State Housing Development Authority. It is the intent of these Standards and the Design Review Process to insure that housing financed through MSHDA's Multi-Family lending programs is the best housing that can be provided.

Nothing in this Standard shall be interpreted to waive the requirements under the Michigan Building Codes, The Federal Fair Housing Act, The Uniform Federal Accessibility Standards, The Americans with Disabilities Act or any other applicable law.

It is also the intent of the Design Review Process to determine whether specific standards should be modified for an individual development in order to meet that development's unique site, design, financing or market constraints.

The primary changes in this edition compared to the previous April 28, 2009 edition is that we tried to make it explicit that central air conditioning is required in all units and that common corridors shall have positive air pressure.

Maryanne Vukonich, Chief Architect, 517 373-9478, [vukonichm@michigan.gov](mailto:vukonichm@michigan.gov)

July 9, 2010

## TABLE OF CONTENTS

### **00000 General Design Requirements**

- 00010** General Design Parameters
- 00020** Design Development Policies
  - 00021** Architectural Design Responsibility
- 00030** Reviewer Listing
- 00040** Barrier Free Policy
- 00045** Environmental Design Concerns
- 00050** Field Engineering Submission Requirements
  - 00051** Boundary and Topographic Site Survey
  - 00052** Soil Boring Reports
- 00100** Design Review Process
- 00110** Design Drawing and Specification Submission Requirements
  - 00111** General
  - 00112** Phase 1
  - 00113** Phase 2
  - 00114** Phase 3
  - 00115** Color and Material Selections
- 00150** Specific Design Standards

### **02000 Site Work**

- 02001** Design
- 02280** Termite Control
- 02780** Exterior Lighting
- 02810** Irrigation
- 02860** Tot or Play Lots
- 02870** Seating
- 02900** Plantings
- 02980** Site Signs

### **03000 Concrete**

- 03030** Concrete Finishing Materials
- 03346** Concrete Crack Control
- 03400** Pre-cast Concrete

### **06000 Wood and Plastics**

- 06001** Basic Trim
- 06010** Lumber
- 06190** Trusses
- 06240** Laminates
- 06430** Handrails
- 06600** Plastic Fabrications

**07000 Thermal & Moisture Protection**

- 07001 Design
- 07195 Air Infiltration Barriers
- 07200 Insulation
- 07310 Shingles
- 07500 Membrane Roofing
- 07650 Flashing
- 07710 Gutters
- 07920 Sealants and Caulking

**08000 Doors & Windows**

- 08001 Design
- 08100 Metal doors and frames
- 08200 Wood and Plastic doors
- 08310 Sliding Glass Doors
- 08390 Screen and Storm Doors
- 08500 Metal Windows
- 08610 Wood Windows
- 08630 Vinyl Windows
- 08710 Finish Hardware
- 08742 Electric Locksets
- 08780 Cabinet and Drawer Hardware
- 08810 Glass

**09000 Finishes**

- 09001 Design
- 09250 Gypsum Board
- 09270 Gypsum Board Accessories
- 09650 Resilient Flooring
- 09681 Carpet
- 09682 Carpet Cushion
- 09900 Painting

**10000 Specialties**

- 10001 Package Shelves
- 10550 Mailboxes
- 10800 Grab Bars
- 10825 Residential Bath Accessories

**11000 Equipment**

- 11001 Design
- 11250 Water Softeners
- 11452 Residential Appliances
- 11455 Kitchen and Bath Cabinets

**12000 Furnishings**

- 12505 Blinds
- 12530 Drapery and Curtain Hardware
- 12542 Draperies
- 12600 Furniture
- 12664 Tables and Accessories

**14000 Conveying Systems**

- 14001 Design
- 14200 Elevators

**15000 Mechanical**

- 15010 Design
- 15050 Basic Materials and Methods
- 15180 Pipe Insulation
- 15250 Water Softeners and Water Conditioning
- 15460 Plumbing Fixtures and Trim
- 15470 Water Heaters
- 15500 Fire Sprinkler Heads
- 15600 Heat Generation
- 15900 Mechanical Controls
- 15990 Testing and Balancing

**16000 Electrical**

- 16010 Design
- 16140 Wiring Devices
- 16200 Emergency Generator
- 16500 Lighting
- 16503 Poles, Posts and Standards
- 16510 Interior Luminaires
- 16520 Exterior Luminaires
- 16522 Roadway and Parking Luminaires
- 16720 Alarm and Detection Systems
- 16722 Building Security and Detection Systems
- 16740 Telecommunications Systems
- 16760 Intercommunications
- 16780 Television Systems
- 16850 Electric Heating

## MSHDA STANDARDS OF DESIGN

### 00000 General Design Requirements

#### 00010 General Design Parameters

General design parameters for housing financed by MSHDA shall include these **Standards**, latest applicable codes e.g. Michigan Building Codes, NEC, ASHRAE, NFPA, State Elevator Code, applicable ordinances, Fair Housing Amendments Act, Michigan State Building Code Rules, and the Michigan State Construction Code Barrier Free design requirements. Also the following regulations shall apply:

- 1) when Federal programs or funding are involved in the development, use Section 504 of the Rehabilitation Act of 1973 and the Uniform Federal Accessibility Standards;
- 2) when HUD programs are involved **and** when program guidelines require conformance to MPS, use HUD Minimum Property Standards; and
- 3) when areas within the development are used for public functions, use the Americans with Disabilities Act.

Design parameters discussed and agreed to at Pre-Design meetings, including Development Amenities, shall be incorporated into the design and construction documents.

Architects, engineers and developers should note that these **Standards** are minimums. Good architectural and engineering practices and manufacturer recommendations shall also be observed. MSHDA Design Review comments may address such good practices.

## MSHDA STANDARDS OF DESIGN

### 00020 Design Development Policies

#### A. Architectural Design Responsibility

Developers shall employ State of Michigan licensed architects for design and supervisory services. The design architects shall have experience appropriate to the design of housing proposed for the particular development and shall carry Errors and Omissions Insurance. The design architects shall contract with currently licensed landscape architects and engineers as necessary to carry out the design. Exceptions shall be that Civil Engineering site work and Survey

work may be contracted directly by the developer, however, the architect will be required to coordinate the Civil Engineering with other design work.

The Owner-Architect Agreement asks the design architect to confirm that the construction documents conform to the MSHDA Standards of Design, The Federal Fair Housing Act and any other standards and procedures as may be in effect. When developments are funded with federal assistance (HOME units) Section 504 of the Rehabilitation Act of 1973 applies, and all service and submissions of the Architect shall also comply with the Minimum Guidelines and Requirements for Accessible Design as contained in 36 CFR Part 1190, *et seq*, or any subsequent replacement regulations, as well as the HUD Minimum Property Standards, and Manual of Acceptable Practices.

Typically, construction trade or design/build contractors and subcontractors shall not be employed to carry out design work. Where work such as fire suppression design, irrigation design, truss design and commercial kitchen design are carried out by design build contractors, the architect shall be responsible for coordinating and accepting their work.

## **MSHDA STANDARDS OF DESIGN**

### **B. Errors and Omissions Insurance**

Design and/or supervisory architects shall retain effective professional liability insurance in form, amount, and term satisfactory to the Authority.

All architects must furnish evidence of professional liability insurance satisfactory to the Authority prior to the date of submission of any preliminary drawings and/or specifications to the Authority. The insurance policy must be in full force and effect as of the date of submission, and must be kept in effect for a period of one year after substantial completion.

### **AMOUNT OF COVERAGE**

#### **Design and Supervisory**

Errors and Omissions insurance in an amount equal to the greater of \$1,000,000 or 10% of the construction contract amount depending on the project size with a deductible minimum of \$10,000 to maximum of \$100,000

#### **Supervisory only**

Errors and Omissions insurance in an amount of \$250,000 for buildings with up to 3 floors and \$500,000 for buildings 4 floors or more with a deductible minimum of \$5,000 to maximum of \$25,000

## **MSHDA STANDARDS OF DESIGN**

### **C. Design and Supervision of Housing in Excess of Three Stories in Height**

The Authority requires that appropriate experience of a proposed Design Architect be documented prior to MSHDA approval of the architect's firm. Experience is particularly critical in the design of housing developments in excess of three (3) stories in height. A registered structural engineer with appropriate experience must prepare related structural drawings. All firms proposed for doing such work shall submit documentation of their background in such design and further shall submit professional résumés documenting relevant experience of their participating architects and engineers for MSHDA review before proceeding with design. In cases where a Design Architect's firm does not have a qualified structural engineer possessing such experience on staff, a licensed independent structural engineering firm must be retained by the Design Architect. During construction, the Authority requires that the approved structural engineer participate in the supervision of such structures.

## **MSHDA STANDARDS OF DESIGN**

### **00021 Architectural Design Responsibility**

The Authority relies heavily on the professional competency of participating architectural firms and on the Authority's design process as documented in the **MSHDA Standards of Design**. For this process to work effectively, participants must encourage the free expression of both designing and reviewing architects. The Design Architects should fully express themselves in the design submissions and in their responses to reviews furnished by the Authority and must not submit proposals or certify drawings which they, as professionals, do not agree with or which are not prepared by, or under the direction of, the Design Architects' firms.

It should be noted that the Authority will not approve multiple professional service contracts. All architectural, planning, engineering, landscaping and other services, which contribute to the drawings and specifications by which a housing development is built, shall be in the employ of or under the direction of the Design Architect. Exceptions shall be that Civil Engineering site work and Survey work may be contracted directly by the developer, however, the architect will be required to coordinate the Civil Engineering with other design work.

### **Participation of the Builder**

The Authority encourages constructive participation by the Builder during the design process inviting the Builder's regular input to help maintain cost control for the proposed housing development. Recognizing that field experience has given Builders unique and invaluable insights into cost-saving construction techniques, the Authority seeks the benefit of this experience as it relates to the design process. To facilitate a constructive exchange of ideas, the Authority also forwards review comments to the Sponsor and to the Builder, as well as to the Design Architect.

## MSHDA STANDARDS OF DESIGN

### 00030 Reviewer Listing

#### Architecture Review Consultants

##### **The Design Forum, Inc.**

15 Ionia SW, Suite 250  
Grand Rapids, MI 49503  
(616) 454-1398, ext. 114  
FAX: (616) 454-0944  
Contact: Neale L. Bauman

##### **Peter L. Haddix, Architect**

347 Paradise Point Trail  
Traverse City, MI 49684  
(231) 943-3003  
FAX: (231) 943-3003  
Contact: Peter L. Haddix

##### **Orchard, Hiltz & McCliment, Inc.**

34000 Plymouth Road  
Livonia, MI 48150  
(734) 522-6711  
FAX: 734 522-6427  
Contact: Wade C. Hoppe

## MSHDA STANDARDS OF DESIGN

### Site Review Consultants

#### **Beckett and Raeder, Inc.**

535 West William  
Suite #101  
Ann Arbor, MI 48103  
(734) 663-2622  
FAX: (734) 663-6759  
Contact: John Beckett

#### **O'Boyle, Cowell, Blalock & Associates, Inc.**

521 South Riverview Drive  
Kalamazoo, MI 49004  
(269) 381-3357  
FAX: (269) 381-2944  
Contact: Robert L. O'Boyle

#### **Giffels-Webster Engineers, Inc.**

2871 Bond Street  
Rochester Hills, MI 48309-3515  
(248) 852-3100  
FAX: (248) 852-6372  
Contact: Keith Mayer

#### **Site Design & Management Systems, Inc.**

15851 S. US Highway 27, Suite 318  
Lansing, MI 48906  
(517) 322-9570  
FAX: (517) 322-9571  
Contact: Robert Rinck

#### **Land Use by Design LLC**

1005 Carlisle Circle  
Grand Ledge, MI 48837  
(517) 627-1974  
FAX: (517) 622-0409  
Contact: Al Almy

#### **VIRIDIS Design Group**

313 North Burdick Street  
Kalamazoo, MI 49007  
(269) 978-5143  
FAX: (269) 978-8506  
Contact: Woodrow S. Isaacs III

## MSHDA STANDARDS OF DESIGN

### Engineering Review Consultants

#### **Bada Engineering, Inc.**

17356 Northland Park Court  
Southfield, MI 48075  
(248) 424-7410  
FAX: (248) 424-7464  
Contact: Arturo Bada

#### **R. C. Byce & Associates, Inc.**

487 Portage Street, P.O. Box 50866  
Kalamazoo, MI 49005-0866  
(269) 381-6170  
FAX: (269) 381-6176  
Contact: James Escamilla

#### **Quad Tech, Inc.**

4439 Eastern Avenue, S.E.  
Kentwood, MI 49508  
(616) 532-1606  
FAX: (616) 532-0515  
Contact: Ron Redder

## MSHDA STANDARDS OF DESIGN

### **00040 Barrier Free Policy**

Design and construction documents for each development shall meet the barrier free requirements of MSHDA's Handicapped Design Policy, as modified. This Policy requires:

**Elderly Housing:** For ease in exiting in emergencies, Barrier Free units shall be located on the ground floor (at grade) if possible.

**Family Housing** (new structures containing 3 units or more): A percentage of the units as required by State Law, but no less than 1% of the total units, shall be Barrier Free.

If the development is primarily town homes, Barrier Free units will need to be ranch units.

**Rehabilitation:** Barrier Free units shall be provided as required by State Law.

#### **Federal Funding:**

Where Federal funds such as HOME funds are used in financing a development, the design must comply with all applicable Federal regulations, which means compliance with the Uniform Federal Accessibility Standards. Under UFAS, the required number of units designed to barrier free standards is 5% of the total number of units plus an additional 2% of the units be made accessible for persons with hearing and vision impairments. (Refer to HUD 24 CFR Part 8) (Refer also to **00010**.)

## **MSHDA STANDARDS OF DESIGN**

### **00045 Environmental Design Concerns**

#### **Mitigation**

Design and construction documents shall incorporate work necessary to mitigate environmental concerns identified by MSHDA and the Owner's consultants unless these concerns are addressed prior to construction start and are outside the limits of the construction documents. Mitigation methods shall be in conformance with a plan prepared in conformance with applicable State and Federal regulations and accepted by MSHDA.

#### **Hazardous Material Notification**

In all developments involving demolition or rehabilitation, specifications shall be written to include the following:

"In carrying out the work of this contract, should the contractor encounter asbestos or other toxic materials the contractor shall:

- 1) Notify all parties to this contract;
- 2) Notify applicable State and Local authorities; and (if the cleanup is to be carried out under the direction of the contractor)
- 3) Make application for permits necessary for removal (or other methods of mitigating the potential harmful effects) of such materials; and
- 4) Upon receipt of required permits mitigate potential harmful effects of such materials in accordance with permits and applicable codes and laws."

If the contractor is not to be responsible for mitigation, the sponsor/developer/owner shall carry out mitigation in accordance with the requirements as stated above.

## MSHDA STANDARDS OF DESIGN

### 00050 Field Engineering Submission Requirements

#### 00051 Boundary and Topographic Site Survey

The **purpose** of these specifications is to designate and describe the minimum requirements for a boundary and topographic site survey for use in the design and construction of MSHDA housing developments.

##### A. General

In **general**, the surveyor shall perform all field work necessary to accurately determine property lines and existing physical conditions of the site, set monument markers, establish bench marks and ascertain and record on a topographical map and boundary survey drawing the information and data as required and hereinafter specified. The surveyor shall obtain such information and data from public and other records, including a review of underlying documents to current (within 30 days) title work, as may be required to complete the work. All data and information required by these specifications shall be shown on the survey drawing or designated as nonexistent. Boundary and topographical work shall be signed and sealed by a licensed professional surveyor.

Compass direction shall be shown by an accurately positioned **North Arrow** designated as (A) magnetic north or (B) true north.

The **legal description** shall appear on the face of the survey map. Said description shall conform entirely to the survey. Whatever form is utilized, the precise legal description shall be preceded by identification of the appropriate street address if one is available. Acceptable forms of legal description are the metes and bounds description or the lot and block description. Any contiguous plot shall be described by a single perimeter description of the entire property. Division into parcels shall be avoided unless such is requested to serve a special purpose. If the property is described as being on a filed map, the survey map should contain a legend relating the plot to the map on which it is shown.

Two **bench marks** referenced to an established datum shall be marked on a permanent object adjacent to the site and clearly located and described on the survey drawing.

**Boundary lines** of the site shall be shown in bearings and distances.

The survey drawing shall be prepared at a **scale** of not less than one inch equal to 50 feet.

All **corners** of the site and other boundary line intersections not previously marked by a monument shall be marked. Where existing structures preclude setting monuments at the intersection of property lines, a brass pin should be set in the property line extended, tagged and so noted, along with the distance from the true corner. At least one corner of the property shall be designated by course and distance from a readily discernible reference marker. Location and description of each marker shall be shown on the survey drawing.

## MSHDA STANDARDS OF DESIGN

The total **area** within boundary lines shall be designated on the drawing in square feet and in acreage, as well as the area of the property of each ownership within the boundary lines.

### **B. Easements, Encroachments, Improvements**

Indicate any and all servient and beneficial easements and any and all easements appurtenant to the property indicating the identity by Liber and Page, if any, the origin (e.g. Deed from A to B), if applicable, and nature. It is also desirable to describe an easement appurtenant to a fee parcel by using a separate parcel description.

Accurately and clearly indicate the location, dimensions and nature of (A) all **encroachments** upon the property; (B) all encroachments upon adjoining property, streets or alleys by any buildings, structures or other improvements upon the property; and (C) all party walls between, with or adjoining the property and other property.

Indicate position, size and material of any and all **improvements** on the property, including buildings, retaining walls, architectural walls, areaways, driveways, paving, etc. Indicate existence and location of off-site structures within 10 feet of the property lines.

Indicate the location of any and all adjacent building lines. Note names of **adjoining property owners**.

## MSHDA STANDARDS OF DESIGN

### C. Trees

Indicate location, species and size of **trees** over six inches in trunk diameter, measured at breast height (dbh).

### D. Roads and Right of Ways

The following data shall be indicated on survey drawing for all **streets, alleys, roads, highways and rights-of-way** adjacent to the site:

- Distance from property lines and dimensions;
- Type and condition of material;
- Type of curb and gutter;
- Elevations of sidewalk along edge nearest site at 50-foot intervals at corners and points of slope change;
- Elevations of top of curbs and flow-line of gutters at 50-foot intervals at corners and points of slope change;
- Description of proposed sidewalk curb and gutter improvements, contemplated date of installation and proposed locations and elevations.

### E. Utilities

The following data pertaining to **utilities** adjacent to the site shall be shown and noted on the survey drawing:

- Location, type and capacity of available **electric** service, including lines, poles and manholes;
- Location of **water** mains, hydrants and manholes, indicating size of water mains;
- Location and size of **gas** mains, including type, pressure and source of gas supply;
- Location, size, direction of flow, rate of fall and type of material of sanitary, storm or combined **sewer** mains. Indicate public or private and if use is exclusively for sanitary wastes or storm water drainage. Indicate elevations of flow-line, "in" and "out" inverts and location of manholes.

If a utility is not available at the site, it shall be noted if service is available in the community and where.

List the company or governmental body of jurisdiction for all utilities.

### F. Topography

**Elevations** of the site shall be taken on a grid suitable to the topography and size of the site. **Contour lines** shall be drawn at intervals that accurately reflect the existing topography of the site. Contour lines shall be at one-foot intervals. Elevations shall be marked on contour lines at regular intervals and shall be based on USGS datum.

## MSHDA STANDARDS OF DESIGN

### G. Miscellaneous Information

Note **other information** pertaining to site conditions, e.g. abandoned underground foundations, ditches, culverts, mine shafts, tunnels, wells, sanitary drain fields, excavations, etc. Also indicate locations of any and all waterways, wetlands and established floodplains and floodways.

In addition to other contractual services, the surveyor shall obtain and/or verify requisite information and data from **public records**, including names, locations, dimensions and elevations of streets, curbs, gutters, sidewalks, established building lines, easements, utilities, proposed improvements, condemnations, etc., necessary for, and incidental to, a completed site survey, preparation of the drawing thereof and the certification by the surveyor that the data represented therein is true and correct.

### H. Coordination with Legal Survey

The survey shall also meet the requirements of MSHDA's Legal document 026.

The drawing shall also have the imprint of the surveyor's registration seal or, in lieu thereof, a certification as to his state registration or license. The "Surveyor's Certificate" (Legal document 025) is required to be executed, sealed and submitted to MSHDA as a prerequisite to Initial Closing. Legal forms may be obtained from MSHDA's Legal Affairs Division.

The surveyor shall **cooperate** with the Title Company, Abstractor or Attorneys selected by the Sponsor to furnish title information in connection with the site in order that the numbering of certificates or opinions of title will correspond with the maps furnished by the surveyor. The surveyor shall review the Title Insurance Commitment/Policy for the particular parcel of property to insure the survey and the Title Insurance Commitment/Policy describe the same parcel of property. The survey must disclose all easements, rights-of-way and encroachments set forth in the Title Insurance Commitment/Policy by Liber and Page Number.

## MSHDA STANDARDS OF DESIGN

### 00052 Soil Boring Reports

The soil survey is to be performed under the direction of a civil engineer registered in the State of Michigan. The entire site is to be inspected to note variations in types of soils and ground water conditions. Locations for borings are to reflect varying site conditions. Special attention is to be given to boring locations in low or marshy areas, areas where there is a history or evidence of fill or where rock may be expected.

Soil borings are to be made with a drilling rig, taking samples as often as the character of the soil changes, and describing it in accordance with acceptable engineering standards. Samples are to be submitted to a soil specialist for analysis.

The engineer is to indicate the location of borings on a boundary survey and log the borings on the site plan or on a separate document. The logs are to use an exaggerated vertical scale to indicate, with acceptable key names and symbols, the nature of soil composition at each stratum to a depth of 15 to 20 feet.

For sites anticipating high-rise buildings, borings are to be concentrated in the area of the anticipated building location. At least one of these borings shall be drilled to a depth of 100 feet or to hardpan.

Borings are to be performed after buildings have been located on the site plan. There shall be one boring per building for low-rise structures and one boring per wing for mid-rise structures with a minimum of three to four borings for this building type. Borings shall also be carried out in parking areas and roadways.

The engineer shall indicate bearing capacities of soils at various levels with a recommendation for the footing / foundation type for proposed structures and shall provide a recommendation for pavement design of roads and parking.

The engineer shall note and make recommendations on ground water conditions and remedies as needed.

## MSHDA STANDARDS OF DESIGN

### 00053.1 Soils Investigation for Previously Developed Sites

Where proposed developments are to be located on previously developed sites, a soils investigation plan shall be submitted to the Authority and receive Authority agreement prior to Authority Feasibility. The intent of the plan is to determine the extent of underground debris that needs to be removed in order to construct the proposed development's buildings, parking, and utilities. The plan shall be based on the location of previous structures using a review of historical Sanborn Insurance maps, similar historical information, historical aerial photographs, previous environmental investigations, and the proposed location of future buildings, parking and utilities.

The plan shall call for test pit trenches, using a backhoe, to be dug across the width of all areas of previous structures. The extent of the test pit trenches shall be explicitly delineated in the plan. The extent shall be suitable to determine the amount and cost of debris removal and replacement of excavated materials. The test pits shall be a minimum of 18" wide and to the depth of virgin soil.

Prior to undertaking the soil investigation, and only after plan approval, the development team shall notify the Authority's Technical Resource and Design staff as to the time and place of the investigation to allow Authority staff to observe the soil investigation. A complete soils report of the investigation, prepared by a qualified professional soils engineer, shall be submitted to the Authority.

This soils investigation shall not remove the development team from the responsibility to carry out soil borings necessary to adequately determine the bearing capacity of the soil and recommend an adequate structural design for buildings, parking and utilities.

After the soils investigation and subsequent report, the developer, contractor and architect shall estimate the costs necessary to remove the underground debris and provide a "buildable" site. The costs shall be submitted to the Authority as a separate line item on the Authority's Trade Payment Breakdown (TPB) form. This line item shall also include costs necessary to cover all environmental remediation of the site. The Authority shall review the soils removal costs and the environmental remediation costs as part of the TPB approval process for Feasibility.

The "soft costs" portion of the Pro Forma for the development, as included in the Feasibility and Commitment action by the Authority's Board, shall include a contingency for the removal of underground debris, environmental remediation and site restoration to a "buildable" condition, in an amount equal to or exceeding 1.5% of the construction contract amount.

## MSHDA STANDARDS OF DESIGN

### 00100 Design Review Process

The Design Review Process includes the following stages:

- Initial Staff Review
- Site Analysis / Site Concept
- Design Development / Feasibility
- Construction Documents / Commitment

#### A. Initial Staff Review

The process starts when an application is received. The Housing Development Officer (HDO) sends a memo to MSHDA staff with information about the development team, the development type, size and location. The Chief Architect and Costing Engineer will visit the site.

#### B. Site Analysis / Site Concept

**The Site Analysis and Site Concept Review meeting** is a response to the preparation and submission of a Site Analysis and a Site Concept in accordance with MSHDA's Submission Requirements. (Refer to **00112**.) This submission is prepared by the Developer's Design Team and submitted to MSHDA and to MSHDA's Site and Architectural Review Consultants ten working days prior to the scheduled Review Meeting.

The MSHDA Site and Architectural Review Consultants will prepare and distribute a written review prior to the meeting. The Developer's Design Team shall prepare a written response for discussion at the meeting.

The purpose of the Site Analysis / Site Concept meeting is to:

- explain the MSHDA Design Review Process
- discuss the site analysis
- agree on a conceptual plan for the development
- discuss applicable requirements
- discuss specific programmatic parameters
- agree on program amenities
- and to set forth a specific schedule

The Site Analysis / Site Concept meeting is a meeting of members of the Development Team, Authority staff from Development, Design, Market Analysis, Management and other areas as affected, and the Authority Site Review Consultant.

*Site Concept Review meeting shall precede site plan approval by the local municipality.*

The soils report shall be submitted to the Costing Engineer prior to Feasibility.

## MSHDA STANDARDS OF DESIGN

### C. Design Development / Feasibility

The Review of Design Development or Feasibility Drawings is the next stage of the Design Review Process. A complete Feasibility Submission, in accordance with the submission Requirements in the **MSHDA Standards of Design**, is made directly to MSHDA and MSHDA's Site and Architecture Design and Engineering Review Consultants. Allow ten working days after documents are received for the Consultants to complete their review.

After the documents have been corrected to meet the Review Consultants comments submit the documents to the MSHDA and the Review Consultants. After ten working days for the Consultants to complete their review, a Feasibility Design Review Meeting is held.

The participants at the meeting shall be members of the Development Team, Authority staff from Development, Design, Market Analysis, Management and other areas as affected, and the Authority Site and Architecture Design Review Consultants.

The MSHDA Site, Architecture Design, and Engineering Review Consultants will prepare and distribute written reviews prior to the meeting. The Developer's Design Team shall prepare a written response.

The purpose of this step is to **definitively** set forth and agree upon a design solution consistent with the Site Analysis and Site Concept, the Authority's **Standards**, the construction budget available to the development and, appropriate to, the needs of the anticipated future residents. The Development Team shall identify desired variances from the MSHDA Standards of Design. In requesting a variance the Development Team shall provide, for MSHDA's consideration, the reasons for requesting a waiver.

## **MSHDA STANDARDS OF DESIGN**

### **D. Construction Documents / Commitment**

The Review of Construction Documents or Commitment Drawings is the next stage of the Design Review Process. A complete Commitment Submission is made directly to MSHDA. Allow ten working days for the staff to complete their review.

The purpose of this step is to complete construction documents consistent with the Design Development or Feasibility drawings, the Authority's Standards, the construction budget available to the development and, appropriate to, the needs of the anticipated future residents. The Development Team shall identify desired variances from the MSHDA Standards of Design. In requesting a variance the Development Team shall provide, for MSHDA's consideration, the reasons for requesting a waiver.

## MSHDA STANDARDS OF DESIGN

### 00110 Design Drawing and Specification Submission Requirements 00111 General

It is necessary that the programming, planning, design and construction of housing developments be based on a logical, step-by-step process that proceeds from the general to the specific, from the overall to the detailed. Such a process will also provide MSHDA with a rational sequence for the review of applications for financial assistance. Therefore, the development process will be divided into three phases:

**Phase 1: Site Analysis / Concept Plan**

**Phase 2: Design Development / Feasibility**

**Phase 3: Construction Documents / Commitment**

The intent, content and requirements of each phase are outlined herein. Adherence to these requirements will insure expeditious process of applications and minimize the need for modifications. Each submission is to include the following basic information:

**A. All sheets should have:**

Number; graphic and lettered scale; north arrow; sheet title.

**B. Title Sheet**

Development location, including location map; Sponsor; Architect; Landscape Architect, Site Planner, Surveyor, Engineer (if applicable); special consultants; revision dates; MSHDA number; and index of contents.

**C. Development Data Summary, (on Title Sheet) including:** (detailed area calculations are not required at Site Concept Phase)

Total number of family units; area per unit type (net and gross); breakdown of the number of each type of unit (breakdown is to include barrier free units).

Total number of elderly units; area per unit type (net and gross); breakdown of the number of each type of unit (breakdown is to include barrier free units).

Total number of family parking spaces (covered and uncovered).

Total number of elderly parking spaces (covered and uncovered).

Total area of the site in acres.

Gross area tabulation, e.g. elderly building, elderly commons, family building, family commons, commercial building.

## MSHDA STANDARDS OF DESIGN

### 00112 PHASE 1: Site Analysis / Concept Plan

#### A. Site Analysis

Submit one copy to MSHDA and one copy to each Design Review Consultant (Site and Architectural).

This phase shall identify the character, structure and potential of the site. In discovering these characteristics and relying upon them to inspire proper land use, the items listed below should be considered and recorded. The analysis is to be done not only for the site, but also for those contiguous areas that influence site design and use.

#### Contiguous Land Use:

Type and impact of adjoining land use and planned land use.

Direction and distance to community services, hospitals, shopping, etc.

Public transportation route and stops.

#### Topography:

Basic topography.

Special or unique ground formations.

Percent of slope.

#### Drainage:

Natural watershed (direction).

Drainage swales.

Bog and swamp areas, designated wetlands, floodplains and floodways.

#### Soils (if available):

Depth and analysis of topsoil indicating basic soil types and their characteristics.

Locate soil borings and present data (may be separate report).

#### Vegetation:

Locate and identify existing tree masses.

Locate and identify specimen plant material.

Indicate type of ground cover.

#### Climatology:

Prevailing wind direction.

Sun angle/shading (potential passive solar design).

Tempering factors created by site character.

#### Existing Conditions:

Structures.

Utilities (size, capacities, depths).

Circulation.

Easements.

#### Special Features:

Lakes and ponds.

Special land features, rock outcroppings, etc.

Dramatic views.

#### Legal Requirements:

Zoning, Setbacks, Access and Easements, Height Limitations, Densities, local municipality site plan parameters, etc.

## MSHDA STANDARDS OF DESIGN

### **B. Development Program**

This phase shall be based upon market and other development considerations and shall include a proposed program statement for the development that provides guidelines for the concept plan.

#### Dwelling Units:

Allowable site density.

Types of dwelling units (differentiated by number of bedrooms, floor areas, configurations).

Distribution of total number of dwelling units.

Required and proposed parking, carports and garages.

Special requirements, conditions or features.

#### Community Facilities:

Anticipated management and maintenance spaces.

Anticipated indoor and outdoor community recreational and social spaces.

#### Nonresidential Facilities:

Anticipated facilities.

#### Standards:

Requests for variance from MSHDA Standards of Design (if necessary).

Variations, Special Use permits, etc. necessary to the concept.

## MSHDA STANDARDS OF DESIGN

### **C. Site Concept Plan**

This phase shall logically relate the needs documented in the development program to the physical features and structure of the site as clarified by the site analysis. The intent is to prepare a concept appropriate to the site. The concept plan shall indicate general building masses, circulation (vehicular and pedestrian), parking, open spaces, special facilities, and site features portraying the overall intent, spatial form and system of development. It shall be prepared on a site topography base map with contours at no greater than 2'-0" intervals and at a scale no smaller than 1"= 50'-0".

#### Structures:

Indicate location, arrangement and general groupings.

Locate any recreation or service structures.

#### Circulation:

Indicate roadways, parking areas and services.

Indicate the general walkway system and the connection to common facilities.

#### Utilities:

Indicate major trunk lines and connection points to existing utilities. Show easements.

#### Recreation:

Indicate open spaces and facilities.

Indicate parking and service for common facilities.

#### Parking:

Location.

#### Grading:

General character.

Mounds and berms.

On-site storm water detention / retention.

Indicate any special problems.

#### Planting:

Consider existing vegetation in concept development.

General planting concept.

## MSHDA STANDARDS OF DESIGN

### 00113 PHASE 2: Design Development/Feasibility

Submit one copy to MSHDA and to each Design Review Consultant (Site, Architectural, and Engineering).

Provide a Development Data Summary (refer to Title Sheet specifications).

#### A. Site Plan

The design shall be developed from the concept plan. The Design Development Plan shall refine the arrangement and functional groupings of units to a more exact scale to create a meaningful sequence of usable spaces. Specific relationship of unit arrangement, of the structure to the site, site grading, circulation, lighting, paving, screening, setbacks, parking, play areas and recreation areas shall be presented. This plan should be produced at a scale of 1"= 50'-0" or larger and include:

##### Structures:

Location, shape, size, arrangements and groupings.

##### Circulation and Parking:

Indicate location and materials of vehicular and pedestrian routes.

Indicate parking/dwelling unit relationship, location and number of spaces.

##### Soils:

Depth and analysis of topsoil

Locate soil borings and present data (may be separate report).

##### Utilities:

Indicate general major utility layout, easements and connections.

Irrigation source and pressure.

##### Recreation:

Location and type of facilities.

##### Grading:

Resolve special and typical relationships.

General character, existing and proposed contours at 1' intervals, section, etc.

Berms and mounds.

Storm water management; Detention and Retention areas

##### Planting:

Indicate character.

Indicate screening concepts, relationship to units and open space, etc., with sections or sketches.

##### Lighting:

Location and Character (catalog illustration), height, wattage and photometric.

##### Alta Survey:

(reference to 00050 Field Engineering Submission Requirements, 00051 Boundary and Topographic Site Survey).

## MSHDA STANDARDS OF DESIGN

### B. Residential and Community Buildings

Definitive designs for typical dwelling units, residential buildings and community building(s) shall be developed and submitted to MSHDA. These designs shall be based on careful study of the development program and concept plan.

#### Dwelling Unit Schedule:

Total number of units.

Number and percent of total of each unit type.

"Net Area" and "Gross Area" of each unit type.

#### Dwelling Unit Design Development:

Floor plans and sections (with dimensions), as required, at 3"=1'-0" scale for each unit type (including door swings, doors and window locations).

Room area, dimensions and designation of each room and space (including storage).

Demonstration of the "furnishability" of each unit type.

Plans and elevations of typical residential buildings (groups of town houses) at 1/2"= 1'-0" scale.

Indicate basic construction technique and exterior materials. Key residential building plans to site plan.

Outline specification.

#### Community Facilities:

Floor plans, sections and elevations (with dimensions) at 3/4"= 1'-0" scale of community building(s).

Indicate furnishings and room areas.

Gross area of community building(s).

Outline specification.

#### Nonresidential Facilities:

Plans and elevations of commercial and other nonresidential facilities included in development as appropriate.

#### Additional Information:

Such information as is necessary to fully illustrate development conditions

### 00114 PHASE 3: Construction Contract Documents/Commitment

Submit one copy of the construction documents to MSHDA, including a digital copy of a compact disk.

## MSHDA STANDARDS OF DESIGN

### 00115 **Color and Material Selections:**

Exterior and interior material selections shall be submitted and approved **prior to the second Construction Draw**. Upon receipt of a satisfactory submission, the Design Review Officer shall issue a letter of approval. All approved submissions shall be retained by MSHDA and transmitted to MSHDA's Construction Manager for field verification. Where a change in a specific item is desired after approval has been received, the Architect shall submit the request for change. Approval shall be given prior to placing an order for the new item.

#### **a. Submission Format**

Exterior and interior material selections shall be submitted on neutral color boards, e.g. illustration boards. The boards are to be clearly labeled indicating where selections are intended to be used clarifying and distinguishing between selections for family units, elderly units and community spaces.

Selections shall be accompanied by written specifications regarding material name and identifying number, color and manufacturer. Where graphic location of materials warrants an explanation or numerous floor plan changes have occurred since Feasibility submissions floor plans necessary to indicate material locations shall also be submitted.

#### **b. Exterior Material Selections:**

Samples of actual materials to be used in exterior construction are to be submitted. Aluminum products may be represented by flat stock; paints or stains may be represented by "color chips" of paper. All visible surfaces are to be represented, including but not limited to, as follow:

Brick, siding, roofing, trim, gutters, downspouts, frames, doors and graphics.

#### **c. Interior Material Selections:**

Samples of actual finishes and materials to be used are to be submitted. Paints may be represented by "color chips" of paper. Appliance colors may be provided in writing. Surfaces, fixtures, etc., are to be represented, including but not limited to, as follows:

Carpet, vinyl products, ceramic tiles, quarry tiles, base trim, counter tops, wall coverings, paints, ceiling finishes, cabinets, all door finishes, appliances, draperies, and blinds.

Interior selections may include two alternate color schemes for family units and two alternate color schemes for elderly units.

## MSHDA STANDARDS OF DESIGN

### 00150 Specific Design Standards

These Design Standards are guidelines to features and facilities which the Authority has found essential for sound affordable housing. In exceptional cases, departures from the Standards may be considered through the Design Review Process by which they may be accepted, rejected, or result in modified design, depending on the circumstances. In the case of measurable or numeric Standards, Standards given as minimum may be exceeded and maximums should not be exceeded.

#### A. General Building Arrangement

- Dwelling units shall not be located in basement spaces or where the finish floor of the habitable area is entirely below grade.
- Efficiency units are not an acceptable dwelling unit for MSHDA funding.
- Units of three-bedroom or larger size shall have their entry at grade level. Their habitable spaces may be placed on a second floor level, but not at third floor level or above. Adequate sound insulation must be provided between units on separate floor levels.
- Site plans shall not concentrate three and four bedroom units into one area. Concentrating units in such a manner has an adverse impact on parking and site maintenance.
- In all buildings that are designed to include a multiple number of dwelling units, an enclosed access shall be provided to any of those units that are located above grade. This access may be individual stair enclosures or common stair enclosures.
- All units shall have a high speed internet connection in the living or dining room.
- Units with three or more bedrooms shall have a clothes washer and dryer in the unit

#### B. Common Space in Family Developments

Family developments require community spaces for activities, office space (including work areas) for rent up and continued leasing, maintenance spaces and storage space for flammable items. Proposed furnishings for Community Buildings shall be appropriate for the spaces to be furnished and for the intended resident.

Community space is not required for family developments of less than 50 units, however the development team must satisfactorily provide for office and maintenance operations.

## MSHDA STANDARDS OF DESIGN

### C. Buildings for Elderly Residents

#### 1. Elevators

Buildings designed for elderly residents shall be located at grade or an elevator shall serve each dwelling unit level. Buildings having two or more stories and designed for elderly residents shall be equipped with at least one elevator and of sufficient size (approximately 5' x 7') so as to facilitate move-ins/outs and emergencies (refer also to **14001**).

Buildings designed for elderly residents with 100 or more dwelling units or of three or more stories shall be equipped with at least two elevators. One such elevator shall be located and of sufficient size (approximately 5' x 7') so as to facilitate move-ins/outs and emergencies (refer also to **14001**).

#### 2. Barrier Free Designed Units

Barrier Free designed units shall not be arranged all in one wing of a building. Such units shall be located on the floor at grade for ease of exiting in an emergency, but shall be located throughout that floor.

#### 3. Congregate Housing

At a minimum, congregate housing shall include facilities and services for common dining, housekeeping and personal health services.

#### 4. Common Spaces

Management, mail pick-up and primary vertical circulation functions shall be grouped at the primary entrance and lounge.

All common facilities shall be accessible without passing directly through the lounge. If provided, medical and social services, central dining facilities and similar common facilities (including trash removal) shall be grouped in close proximity to the main circulation elements but in such a way that it is not necessary for a resident to pass through the lobby or the lounge to reach them.

The design shall provide easy "way finding" cues to distinguish location within a building. These cues can include: clear organization in the design of space and circulation, plants, lighting, features, color (carpet, walls, features), furnishings, and consistent signs.

Provide glass panels adjacent to or in doors to common area rooms, allowing residents to see into a room before attempting to open the door.

Proposed furnishings for Common spaces shall be appropriate for the spaces to be furnished and for the intended resident, paying particular attention to the needs of elderly residents. (Refer also to **02870 and 12600**.)

## **MSHDA STANDARDS OF DESIGN**

### **5. Circulation**

Common corridors shall be a minimum of five feet wide. For reasons of eliminating visual and physical corridor length, the maximum length of a corridor shall be 150'. For the purpose of this measurement, a corridor shall be defined as ending at any intersection with another corridor resulting in a visual terminus or where common space provides a significant visual break or offset. The maximum length of travel from a unit to an elevator shall be 150'. The maximum length of travel from the farthest unit to common dining and/or office facilities shall be minimized through building arrangement. No ramps shall be used in corridors.

### **6. Community rooms**

All community rooms shall be provided with a kitchen that shall minimally have a double bowl sink, garbage disposal, a range/oven, a refrigerator, and a barrier free workspace.

### **7. Crafts rooms**

All crafts rooms shall be provided with a sink with gooseneck faucet and plaster trap. All craft rooms shall have negative air pressure.

### **8. Maintenance Space**

Common maintenance space shall be provided for storage and as a work area. Maintenance buildings or, in large buildings, maintenance spaces shall be provided at all developments. Buildings or spaces shall be heated and insulated, a toilet for staff shall be provided. The maintenance space shall be approximately 400 square feet. Provision shall be made for the storage of flammable materials. Workbenches and storage shelves shall be provided within the maintenance space.

### **9. Common Laundry**

Common laundry rooms shall be provided with a table for folding laundry and a rod for hanging clothes. If feasible, common laundry rooms shall have a window to the exterior. Common laundry rooms shall have a floor drain. Common laundry rooms shall have a seating area within, immediately adjacent to, or in line of sight of the laundry room. All laundry rooms shall have negative air pressure.

### **10. Trash Compactor and Trash Chute**

The trash compactor room shall be designed so that the trash gondola can be easily wheeled in and out of the space without sharp turns.

A hose bibb shall be provided within the trash compactor area for ease in washing down the area. A wash down sprayer shall be provided for within the trash chute. The residents shall not have to carry trash through the main lobby in order to dispose of their trash. A remote trash room shall be provided as needed. All trash rooms shall have negative air pressure.

## MSHDA STANDARDS OF DESIGN

### 11. Package Shelves

Where dwelling unit entries are accessed from common corridors, entry package shelves shall be placed immediately outside each dwelling unit entry with a minimum dimension of 12 inches. (Refer also to **06240 and 10001**)

### D. Dwelling Unit Design

The adequacy of the design of dwelling units shall, for the greatest part, be measured by the dwelling units "furnishability" and the inclusion of several key components. "Furnishability" shall be shown to accommodate the following:

1. **Living Room:** Minimum dimension of 11'-6".
  - Sofa: 36" x 84"
  - Two chairs: 30" x 36" (one additional chair for three bedroom units)
  - Television on a table: 20" x 36"
  - Table: 18" x 30"
2. **Foyer** including a 2' x 3' coat closet
3. **General Storage** (near the exterior door)
  - Where no basement is provided:
    - One-bedroom: 15 sq.ft.
    - Two-bedroom: 18 sq.ft.
    - Three-bedroom: 22 sq.ft.
  - In buildings with multiple units for elderly residents, storage may be located in cubicles located in common area storage rooms.
4. **Dining area:**
  - Table 3' x 3' or 3'-6" diameter to accommodate four (accommodate six in three-bedroom units)
  - Buffet or sideboard: 18" x 42"
5. **Kitchen:** (minimum of 48" between counters)
  - Double bowl sink, with garbage disposal and 18" counters each side
  - Task light over sink (Refer also to **16510.3**)
  - Dishwasher shall be adjacent or in close proximity to the sink
  - Range/oven: 30" in width with counter on one side of 18" minimum
  - Exhaust hood with task light (Refer also to **16510.3**)
  - "Frost Free" Refrigerator/freezer with 15" minimum counter on latch side
  - Natural light shall be provided; borrowed light using pass-throughs and open areas over cabinets is acceptable.
  - Cabinets at a pass-through shall allow a vertical opening of 24" minimum.
  - In housing for elderly residents, overhead kitchen cabinets shall be placed 15" above the counter top. Exceptions to this requirement shall be at pass-throughs and above ranges. At ranges and pass-throughs, cabinets shall be placed 24" above the work surface.
  - Appliance and cabinet doors and drawers shall not conflict.

## MSHDA STANDARDS OF DESIGN

- Counter top work surface shall be a minimum of six lineal feet with cabinets above and below (with drawers).
  - Space and an electrical outlet for a counter top microwave oven shall be provided. (Refer also to **11452.3 and 16010**)
  - In family units provide a cabinet above the refrigerator.
  - A pantry is desirable, especially in barrier free designed units.
- 6. Master bedroom:**
- Queen bed: 60" x 80"  
(alternatively in elderly, two twin beds: 39" x 78" each with 24" between)
  - Dresser: 18" x 52"
  - Chair: 18" x 18"
  - Two nightstands: 18" x 18" each
  - Closet with six lineal feet of hanging rod
- 7. Secondary bedroom - elderly** (9'-6" least dimension)
- Double bed: 54" x 80"
  - Dresser: 18" x 42"
  - Chair: 18" x 18"
  - Nightstand: 18" x 18"
  - Closet with five lineal feet of hanging rod
- Secondary bedroom - family** (least dimension 9'-0"; 90 sq.ft. minimum)
- Two twin beds: 39" x 78" each and 18" between
  - Dresser: 18" x 42"
  - Closet with four lineal feet of hanging rod
- 8. Linen closet** near bedrooms with two lineal feet and five shelves
- 9. Bathroom**
- In housing for elderly residents, a minimum of 30% (50% is recommended) of the non-barrier free units shall have bathrooms with step in showers. In housing for elderly residents, all units with two bathrooms shall have one bath with a tub/shower and one with a step in shower.
  - In all dwelling units visitors shall have access to a water closet and lavatory without having to circulate through a bedroom.
  - Bath doors shall swing out in elderly units (Refer also to **08001.2**)
  - Water Closet
  - Bathtub and/or shower
  - Lavatory with vanity (vanity top in barrier free designed units)
  - Mirror
  - Medicine cabinet
  - Toilet paper holder
  - Two Towel bars
  - Grab bars, as required (Refer also to **10800 and 15460.**)

## MSHDA STANDARDS OF DESIGN

### 10. Outdoor space

- For families units provide a patio or balcony at 80 sq. ft. minimum; 8'-0" least dimension.
- For elderly units provide a patio or balcony at 45 sq. ft. with 5'-0" least dimension.

### 11. Circulation

- All interior dwelling unit doors within units designed for elderly residents shall be 2'-10" minimum

### E. Acoustical Rating

Listed Acoustical or Sound ratings for wall and floor/ceiling assemblies shall be as follows:

**STC 50** between living units and public corridors, stairs or lobbies

**STC 55** between living units and noisy public spaces, e.g. elevators, mechanical rooms, etc.

### F. Energy Efficiency

**Energy Star guidelines shall be used in selecting building components.**

An energy analysis shall be submitted for each type of dwelling unit to ensure that HVAC equipment and duct work is sized properly.

Duct work shall be sealed. Duct work shall be insulated in unconditioned space.

Gas fired water heaters and furnaces shall be high efficiency with sealed combustion to protect the air quality for tenants.

Windows and patio doors shall Energy Star qualified.

Prior to installing insulation, the building envelope shall be sealed.

## MSHDA STANDARDS OF DESIGN

- 02000 Site Work**  
Site design shall take advantage of positive site features and characteristics and shall address and mitigate negative site features. Site analysis and design concept shall be developed to respond to these features.
- 02001.1 Design of Drives and Parking**  
**02001.11 Parking Lots**  
Designs shall not contain dead end parking lots.
- 02001.12 Collector Roads**  
Designs shall have no parking along collector roads.
- 02001.13 Parking Ratios**  
Parking for developments for elderly residents shall be provided in the following ratio: 1.0 space per unit or greater. Parking for developments providing congregate services and marketed as "congregate" developments may be provided at 0.8 space per unit or greater. Parking for developments for family (non-elderly) residents shall be provided in the following ratio: 2 spaces per unit or greater.
- 02001.16 Drive Widths**  
Collector drives shall be a minimum of 22'-0" in width.  
Drives within parking areas shall be a minimum of 20'-0".
- 02001.17 Parking Spaces**  
Parking spaces within developments for elderly residents shall be a minimum of 10' in width X 20' in length. Parking spaces within developments for family residents shall be a minimum of 9' in width.
- 02001.18 Curbing**  
All drives, parking areas and parking islands shall be curbed. Curbing shall be concrete. Curb profiles shall accommodate snow plowing in identified areas. The Authority recommends main drives and collector roads be crowned with drainage along curbs.
- 02001.19 Catch Basins**  
Catch basins shall not be located under carports. Drainage shall be away from carports and not towards or through carports.
- 02001.2 Design of Walkways**  
There shall be an internal system of walkways. BF ramps shall be provided at curb crossings. In housing for elderly residents walks shall provide easy access to secure interactions with human activity and natural surroundings.  
Walks shall be concrete. (Refer also to **03000.2.**) Asphalt "walking trails" may be provided.

## MSHDA STANDARDS OF DESIGN

- 02001.21 Gradients**  
No gradients on walks shall be less than 1 percent or more than 5%. Cross slopes shall not exceed ¼" per foot.
- 02001.22 Widths**  
Walkways along parking spaces where cars may overhang the walk shall be 6'-0" wide or as required by ADA, FHAA, or local ordinance, whichever the greater.
- 02001.3 Patios**  
Dwelling units at grade shall have patios with a minimum area of 80 sq.ft. for family units or 45 sq. ft. for elderly. Patios shall be concrete. (Refer also to **00150 D**)
- 02001.5 Lawn areas**  
Grades at lawns shall slope a minimum of 2%, swales at a minimum of 2%, and berms at a maximum of a 1 on 3 "mowable" slopes.
- 02001.6 Maintenance Strips**  
A maintenance strip, not less than 18" in width, to protect siding from mowing operations, shall be provided along all non-masonry building facades. This maintenance strip shall extend beyond the roofline where gutters and downspouts are not provided. A weed barrier shall be provided in the maintenance strip.
- 02280 Termite Control**  
Termite control shall be provided in locales that have had previous evidence of termites. Furthermore, all sites located south of a line drawn between the cities of Monroe and Holland shall receive termite control.  
Toxicants shall be applied by a contractor licensed by the manufacturer to soil beneath concrete slabs on grade and along inside and outside the perimeter of foundation walls.

## MSHDA STANDARDS OF DESIGN

### **02780 Exterior Lighting (refer also to 16520)**

#### **02780.1 Poles**

Building mounted lighting for purposes of lighting parking lots and walks, to or from parking, shall not be used but rather pole-mounted lights shall be used for such purposes. Pole bases shall be located 3'-0" back of curb where cars are parked along the curb. (Refer also to **16503**).

#### **02780.2 Lamps**

Combination photocells and timers shall control exterior lighting. Cut-off lamp fixtures and internal reflectors or other means shall be used to minimize light trespass beyond the property or into adjacent windows.

#### **02780.3 Lighting Levels**

Exterior lighting levels for parking and walkways shall be a minimum of ½ foot candle. Lighting shall be even, and "hot" spots are to be avoided. Switched light fixtures under the control of residents may not be used in the foot-candle calculation. All designs should consider the character and location of the development.

#### **02780.4 Carport Lighting**

Lighting shall be provided beneath carports at the same ½ foot candle lighting level required for parking.

## MSHDA STANDARDS OF DESIGN

### **02810 Irrigation**

#### **02810.1 Design Parameters**

Total run-time shall not exceed ten hours per day based on an application rate of .2" of precipitation per day.

The irrigation plan must conform to the landscape plan, as well as other site features. Appropriate equipment and design principles shall be practiced regarding terrain, planting materials, exposure and obstructions. Zone for sun and shade if practical.

Separately zone sprinklers with differing precipitation rates, particularly sprays and rotaries. Where it is not practical to separately zone full and part circle rotaries, use matched precipitation rate sprinklers or increase the nozzle size of the full circle sprinklers to more nearly match the precipitation rate of the part circle sprinklers.

A maximum 20 percent pressure differential in the mainline will be allowed. For example, if pressure in the mainline at the water source is 55 psi, pressure at the furthest point on the mainline shall be 44 psi or greater (55 psi less 20 percent or 11 psi).

Velocities in the mainline pipe are to be 5 feet per second or less. Velocities in the lateral pipe are to be 6 feet per second or less.

Over-spray on public roads, parking areas or buildings is prohibited. Over-spray across walks is acceptable with MSHDA approval.

Booster pumps shall be approved by the local municipality.

#### **02810.2 Material Specifications**

A maximum of two brands of equipment will be allowed for all irrigation equipment, including sprinklers, automatic valves, quick coupling valves and control timers.

Wire is to be minimum #14 AWG, UF UL, approved.

Mainline pipe is to be PVC, minimum pressure rating of 160 psi. All pipe downstream from the valves is to be polyethylene, medium density, minimum pressure rating of 80 psi.

Install quick coupling valves on three elbow swing joints. Install sprinklers on one or two elbow swing joints.

Controls shall not be located within residential units. Control timers located outdoors are to be in a weather- resistant locking metal enclosure. Simple mechanical or "hybrid" type controller is preferred. A "hybrid" controller contains solid-state circuitry with mechanical controls.

### **02860 Tot or Play Lots**

Tot and/or play lots shall be provided in family (non-elderly) developments. Play equipment shall be installed per manufacturer's recommendations for safety and configuration. In addition to the play equipment, provide a bench and a shade tree.

### **02870 Seating**

In housing for elderly residents exterior seating and common area seating shall have backs and arms. (Refer also to **00150 C.4 and 12600.**)

## MSHDA STANDARDS OF DESIGN

**02900**

### **Plantings**

Select native species where practical.

#### **Sizes**

Shade trees shall have a minimum caliper of 2 ½".

Flowering trees shall have a minimum caliper of 1 2".

Evergreen trees shall have a minimum height of 5'-0", with an average height of all evergreen plants of 6'-0". Mulch all tree saucers with a minimum of 3" of finely processed shredded bark mulch. Mass plantings of evergreen seedlings should be considered for use in screening objectionable views.

Tree stakes shall be metal and within mulch saucers.

#### **Locations**

Plants shall be planted so that at maturity they remain at least 12 inches from all buildings.

When planted beneath windows, they shall not exceed the height of the window sill at maturity.

**02980**

### **Site Signs**

A construction project sign shall be erected on site.

The construction project sign shall be constructed of ¾" AB-exterior grade plywood or better, 4'-0" x 8'-0", painted 2 coats all sides. The construction project sign shall contain at minimum the following information, with letters at the sizes listed:

Development name and MSHDA number (4" min.)

MSHDA logo (6" min.)

Equal Opportunity Employer or EEO (6" min.)

Equal Housing Opportunity logo (6" min.)

MSHDA EEO phone number (2" min.)

Fair Housing Barrier free logo (6" min.)

Owner (LDHA-LP) (2" min.)

General Contractor with phone number (2" min.)

Architect with phone number (2" min.)

A lighted development sign containing Fair Housing and Equal Opportunity logos shall be provided (refer also to **16520**.)

## MSHDA STANDARDS OF DESIGN

### **03000 Concrete**

#### **03001.2 Walk Intersections**

Walk intersections shall have a radius or angle configuration that protects the lawn from "cutting the corner". MSHDA prefers a "haunch" design where the straight leg(s) of the haunch is no less than 12" and the 45 degree diagonal leg of the haunch is no less than 17" (12" x 1.414). The bottom of the haunch connects with the straight run of the intersecting walk.

#### **03030 Concrete Finishing Materials Sealing**

All exposed concrete floors within residential buildings shall be sealed using an epoxy stabilized chlorinated rubber or an acrylic polymer (refer also to **09001.2**).

#### **03346 Concrete Crack Control Expansion Joints**

Exterior contraction joints shall be tooled joints.

Interior joints shall be made within 24 hours of concrete placement.

Expansion joints in interior slabs shall be full depth and located beneath walls.

#### **03400 Precast Concrete Exposed**

Dwelling units shall have painted drywall ceilings. Painted concrete ceilings are acceptable where the concrete is part of the structural system (refer also to **09250** and **09900**.)

## MSHDA STANDARDS OF DESIGN

### **06000 Wood and Plastics**

#### **06001 Base Trim**

All rooms with floor coverings shall have base trim.

#### **06010 Lumber Balconies**

Wood at balconies, decks and patio fences shall be pressure treated lumber. Cedar is an acceptable alternative for patio fence boards and balcony or deck trim. Trim may be other wood species if back-primed and stained.

If balconies are required to be fire rated, fire resistant or fire protected by code, developments shall **not** use lumber that is reported to be **both** pressure treated and fire retardant. MSHDA would prefer to utilize fire protection heads.

#### **06190 Trusses**

Energy heels are required.

Where no gutters are provided, roof overhangs shall be no less than 24". (Refer also to **07710**)

#### **06240 Laminates Stools (Sills)**

Window Stools with plastic laminate shall be sealed with plastic laminate on all six sides. Cultured marble stools are preferred. Painted wood stools are not acceptable.

#### **Package Shelves**

In buildings designed for a multiple number of units for elderly residents, package shelves at unit entries shall be provided. Package shelves shall provide a minimum area of one square foot. Ninety-degree corners shall have a radius. (Refer also to **10001**.)

#### **Counter tops**

Counter tops shall not have sharp exposed corners. Corners protruding in excess of 1-1/2" shall be rounded or have a 45 degree corner.

In housing for elderly residents, the front edge of the counter shall be rolled.

#### **06430 Handrails**

Handrails shall be provided on both sides of all corridors in buildings designed for elderly residents.

#### **06600 Plastic Fabrications Casings and trim**

Polystyrene molded door casing and baseboard shall not be used (refer also to **08200** and **09650**.)

## MSHDA STANDARDS OF DESIGN

- 07000 Thermal & Moisture Protection**
- 07001 Design**  
**Insulating Values**  
Buildings shall meet applicable energy code.
- 07195 Air Infiltration Barriers**  
**07195.1 Sheathing**  
Sheathing shall be a nailable wood product. All joints shall occur over wood structural members on walls.
- 07200 Insulation**  
No plumbing should occur in an exterior wall. If plumbing in the exterior wall cannot be avoided, a furred out and insulated space for the plumbing shall be provided.
- 07200.4 Crawl Space**  
Crawl Spaces shall be mechanically conditioned spaces.
- 07310 Shingles**  
Shingles shall have a minimum 25 year warranty. All old roofing is to be removed. New shingles, flashings, underlayments, and accessories to be installed following National Roofing Contractors Association (NRCA) guidelines and manuals.
- 07500 Membrane Roofing**  
Membrane roofing shall have a minimum 10 year warranty on labor and materials.
- 07650 Flashing**  
All roof systems to include industry best practices as they relate to flashings and roof penetrations.
- 07650.1 Stepped Roofs**  
Stepped sloped roofs shall be flashed with appropriate metal flashing and "Nervestral" or equal two feet vertically where the sloped roof meets the vertical wall.
- 07650.2 Ice dam**  
Eaves shall receive ice dam protection equal to "Nervestral" type underlayment from the eave edge to two feet inside the exterior wall line. Comprehensive plans will be provided detailing adequate ventilation, paying particular attention to problem areas including valley, transition, shed, and over built areas.

## MSHDA STANDARDS OF DESIGN

**07710**

### **Gutters**

Gutters and downspouts and, where necessary, rain diverters shall be used on all developments, unless a specific exception is granted. Where no gutters are provided, roof overhangs shall be no less than 24". (Refer also to **06190**).

**07920**

### **Sealants and Caulking**

Caulk all exterior joints of dissimilar materials. Organic type caulking is not acceptable.

## MSHDA STANDARDS OF DESIGN

### **08000 Doors & Windows**

#### **08001 Design**

In housing for elderly residents, all doors intended for passage shall be a minimum width of 2'-10".

#### **08001.1 Sliding glass doors**

In areas where the crime of breaking and entering is prevalent, pass doors in lieu of sliding doors shall be used as access to ground level patios.

Pass doors, in lieu of sliding glass doors, to patios and balconies are required in housing for elderly residents.

Patio doors on the ground level in family units shall be equipped with locks at a height that prevents children from being able to unlock and open the door.

Particular attention during design shall address FHAA requirements for thresholds and for 32" actual clear width for egress.

#### **08001.2 Bathrooms for Elderly**

Bathroom doors in dwelling units designed for the elderly shall swing outward. (Refer also to **00150 D**)

#### **08100 Metal Doors and Frames**

Exterior unit entry doors shall have foam filled cores and be no less than 1-3/4" thick. Jambs at the strike area shall be reinforced with an equivalent of a plywood plate 3/8" x 3-1/2" x 6" nailed to the back of the jamb. Doorjambs shall be reinforced with 2" x 4" horizontal bracing at latch height.

In-swinging exterior and unit entry doors shall have rabbeted jambs.

#### **08200 Wood and Plastic Doors**

Doorframes or casing shall not be polystyrene. (Refer also to **06600 and 09650**) Where allowed by code, doors may be undercut a maximum of 1" to provide return air from bedrooms and bathrooms.

In elderly and barrier free designed units, bi-fold doors shall have easily graspable pulls, such as 'C' pulls. (refer to **08780**.)

#### **08310 Sliding Glass Doors**

Sliding glass doors shall be forced entry resistant meeting AAMA/NWWDA 101/I.S.2-97 or current equivalent standard.

#### **08390 Screens and Storm Doors**

Sliding screen doorframes may not be rolled form frames.

## MSHDA STANDARDS OF DESIGN

### **08500 Metal Windows Energy**

All windows must have standard weather-stripping, hardware, screens and accessories. Windows shall have thermal break frames and be double or triple glazed. The windows Condensation Resistance factor, in accordance with AAMA specifications shall not be less than 45. The overall Effective Thermal Transmittance Coefficient tested at a 15 mph dynamic wind speed shall not exceed .75 BTU per sq ft per hour per degree F. The maximum air infiltration at a wind speed of 25 mph shall be .35 cfm per foot of sash crack.

#### **Security and operation**

Windows within eight feet of grade, or otherwise accessible without the use of a ladder, shall be forced entry resistant meeting AAMA/NWWDA 101/I.S.2-97 or current equivalent standard. Windows shall have a breakaway effort of less than 30 pounds for single hung windows and 20 pounds for sliders. Windows shall have an operating effort of 18 pounds for single hung and 12 pounds for sliders.

#### **Finish**

Metal windows shall have a baked enamel paint finish and not anodized finish.

### **08610 Wood Windows**

#### **Security and operation**

Windows within eight feet of grade, or otherwise accessible without the use of a ladder, shall be forced entry resistant meeting AAMA/NWWDA 101/I.S.2-97 or current equivalent standard. Windows shall have a breakaway effort of less than 30 pounds for single hung windows and 20 pounds for sliders. Windows shall have an operating effort of 18 pounds for single hung and 12 pounds for sliders.

### **08630 Vinyl Windows**

Vinyl windows shall be certified as meeting or exceeding ANSI/AAMA 101-93 (or subsequent revisions) and shall have fully welded construction.

#### **Security and operation**

Windows within eight feet of grade, or otherwise accessible without the use of a ladder, shall be forced entry resistant meeting AAMA/NWWDA 101/I.S.2-97 or current equivalent standard. Windows shall have a breakaway effort of less than 30 pounds for single hung windows and 20 pounds for sliders. Windows shall have an operating effort of 18 pounds for single hung and 12 pounds for sliders.

## MSHDA STANDARDS OF DESIGN

### **08710 Finish Hardware**

#### **08710.1 Peephole/viewer**

All unit entry doors shall have peepholes and all barrier free units shall have a second peephole at 45 inches above the finish floor. Peepholes shall be fitted with a fisheye viewer.

#### **08710.2 Locksets**

All unit entries shall have door locks with simultaneous retraction of the dead bolt and dead latch from the inside and a single key operation from the exterior. The dead bolt shall have a 1" throw. The dead latch shall have a 1/2" throw. Unit entry hardware shall not have parts made of plastic.

Bathrooms and master bedrooms shall have door locks that are non-locking against egress, panic release operation.

Exterior doors from common spaces, stairs, maintenance areas etc. shall have adjustable self-closing devices, self-locking dead latches and trigger bolt protection.

#### **08710.3 Lever handles**

In buildings designed for elderly residents, door handles to be used by the residents shall be of the lever type.

#### **08710.4 Hinge Pins**

Out-swinging exterior doors shall have non-removable hinge pins or shall have security type hinges that prevent unauthorized door removal.

#### **08710.5 Alarms**

Exterior doors in buildings designed for multiple dwelling units for elderly residents in areas where security from trespass is anticipated as a substantial problem shall have door ajar alarms wired to a central control panel. Such security areas shall include large metropolitan areas. (Refer also to **16010.1**.)

#### **08742 Electric Locksets**

Main entrance doors to buildings designed for access to multiple dwelling units for residents shall have electric door release. (Refer also to **16010.1**.)

#### **08780 Cabinet and Drawer Hardware**

In dwelling units designed for elderly or handicapped residents, cabinets and drawers shall have easily graspable pulls. In dwelling units designed for elderly or handicapped residents, graspable pulls such as 'C' pulls shall be provided at bi-fold doors. (Refer also to **11455**.)

#### **08810 Glass**

Doors at laundry rooms shall have integral glazing or glazing immediately adjacent to provide visibility.

## MSHDA STANDARDS OF DESIGN

### **09000 Finishes**

#### **09001 Design**

##### **09001.1 Floor covering**

Floor covering must be provided over all substrates of plywood, "gypcrete" or lightweight concrete.

##### **09001.2 Concrete floors**

All exposed concrete floors within residential buildings shall be sealed using an epoxy stabilized chlorinated rubber or an acrylic polymer. (Refer also to **03030**.)

#### **09250 Gypsum Board**

Dwelling units shall have drywall ceilings. Painted concrete ceilings are acceptable where the concrete is part of the structural system. (Refer also to **03400** and **09900**.)

Ceilings and walls in kitchens and baths shall have a smooth washable surface.

#### **09270 Gypsum Board Accessories**

##### **Expansion joints**

In order to eliminate or reduce shrinkage and expansion cracking, manufactured drywall expansion joints shall be placed in long corridor walls above each jamb of door openings.

#### **09650 Resilient Flooring**

Resilient flooring or vinyl tile shall be used in kitchens, baths and laundry areas (except in basements). Tile shall not be used over wood substrate.

##### **Wall Base**

Wall base trim shall be used in all habitable spaces. Base trim shall not be polystyrene. (Refer also to **06600** and **08200**.)

## MSHDA STANDARDS OF DESIGN

09681

### **Carpet**

Carpeting shall be the usual floor finish material in all rooms.

All carpeting shall meet the requirements of HUD Use of Materials Bulletin UM44D. Carpet shall be used in accordance with the type and class required per the Bulletin. Per UM44D, all carpeting shall be stamped and labeled as meeting the requirements of the Bulletin. An exception to the requirement of stamping and labeling may be granted for common area carpeting i.e. carpeting in lobbies, lounges, community rooms, libraries etc., (not corridors at residential entries). Carpeting in these areas may be certified by the manufacturer as having met or exceeded the performance standards of UM44D and need not be stamped and labeled, if such carpeting exceeds the pile weight and density required by UM44d by 25% or greater. This exception is intended to allow the use of higher quality "feature" carpeting in limited quantities, without adding the cost of laboratory authorized stamping and labeling. Such exceptions must receive written approval from MSHDA prior to the contractor or sponsor or owner ordering the carpet.

MSHDA prefers all carpeting within dwelling units to be nylon, however polypropylene or a blend of nylon and polypropylene is acceptable.

The minimum critical radiant flux limits for carpeting in corridors and exitways in elderly developments is 0.45 watts/cm<sup>2</sup>. This limit shall be reduced to 0.22 watts/cm<sup>2</sup> where the building has fire sprinkler protection.

The limit for carpeting in Elderly units and corridors and exitways in family developments shall be 0.22 watts/cm<sup>2</sup>. Carpeting for family units shall meet applicable requirements of UM44D.

09682

### **Carpet Cushion**

All carpet pad must meet the requirements of UM72.

## MSHDA STANDARDS OF DESIGN

### **09900**      **Painting** **09900.1**    **Interior**

All paint over interior drywall shall meet or exceed the limit of 400 strokes on the "scrubability" testing standards established in the most recent version of ASTM #D-2486.

Kitchens and baths shall be painted with a washable semi-gloss paint. Satin sheen or egg shell finish paint may be used if a satin or egg shell finish is used throughout the residential unit.

Dwelling units shall have painted drywall ceilings. Painted concrete ceilings are acceptable where the concrete is part of the structural system. (Refer also to **03400** and **09250**.)

### **09900.2**    **Common Areas**

Painted surfaces in common areas and rooms shall be semi-gloss or gloss paint. Satin sheen or egg shell finish paint may be used on the ceilings.

### **09900.3**    **Exterior**

Exterior wood shall have at least 2 coats of stain with the first coat being of a slightly lighter color than the finish coat.

Vents penetrating roofs, with the exception of stainless steel vents, shall be painted with appropriate paint to match the roof shingles.

## MSHDA STANDARDS OF DESIGN

### 10000 Specialties

#### 10001 Package Shelves

In buildings designed for a multiple number of units for elderly residents, package shelves at unit entries shall be provided. Package shelves shall have a minimum dimension of 12". Ninety-degree corners shall have a radius. (Refer also to **06240**.) A package shelf shall be provided at the elevator(s) on the first floor.

#### 10550 Mailboxes

Boxes shall have keyed locks. Boxes shall be numbered sequentially and if necessary boxes for Barrier Free designed units shall be located separately to maintain the sequential numbering. Boxes shall have lettering sized for being easily read.

#### 10800 Grab Bars

In buildings designed for elderly residents, grab bars shall be provided at all bathtubs. One 24" long, 1" minimum in diameter, grab bar shall be placed at 45 degrees, centered on the side opposite the accessible side, and with the lowest point of the bar 12" above the tub rim. The highest end of the diagonal bar shall be at the control end of the bathtub. An alternative to this diagonal grab bar may be proposed. One 24" long, 1" minimum in diameter, grab bar shall be placed vertically at the control end of the bathtub at the outside edge with the top of the bar 4'-6" above the floor.

In buildings designed for elderly residents, grab bars shall be provided at all showers. One 24" long, 1" minimum in diameter, grab bar shall be placed at 45 degrees, centered on the side opposite the accessible side, and with the lowest point of the bar 29" above the shower floor. The highest end of the diagonal bar shall be at the control end of the shower. An identical bar shall be placed vertically at the control end of the shower at the outside edge with the top of the bar 4'-6" above the floor.

Tub and/or shower enclosures with integral grab bars substantially complying with the aforementioned grab bar requirements may be used with approval, prior to initial closing, by the MSHDA Chief Architect.

In housing for elderly residents, it is **preferred** to have water closets located adjacent to a wall 48" in length (perpendicular to the plumbing wall) to facilitate the future addition of a grab bar. (Refer also to **15460**.)

#### 10825 Residential Bath Accessories

##### Medicine Cabinets

Medicine cabinets shall be recessed, not surface mounted. They shall not be located on an exterior wall.

## MSHDA STANDARDS OF DESIGN

### 11000 Equipment

#### 11001 Design Appliances

All dwelling unit appliances including range/oven, refrigerator, dishwasher, washers and dryers, shall be by a single group manufacturer. All refrigerators, dishwashers, washers, and room air conditioners shall be Energy Star qualified products. All range and ovens, water heaters, and dryers, shall be energy efficient to the extent that the appliances are rated in the bottom 1/2 in energy consumption ratings of the appliance type. (Refer also to **15010.3.**)

Refrigerators shall be placed so that the door will be able to swing 180 degrees to allow removal of all drawers. Where other than side by side refrigerators are used this requirement may be met by selecting a refrigerator whose door allows removal of all drawers in a 90 degree swing.

#### 11250 Water Softeners

Any domestic water supply with hardness in excess of 200 milligrams/liter of Calcium Carbonate shall be treated by water softening the domestic hot water. This determination will be made by MSHDA Design and Technical Resource staff and will be based upon water quality data provided by the Drinking Water and Radiological Protection Division of the Michigan Department of Environmental Quality.

Domestic hot water only shall be treated. Where it is economically infeasible to treat only the hot water the domestic cold water may also be treated. (Refer also to **15250.**)

## MSHDA STANDARDS OF DESIGN

### 11452 Residential Appliances

#### 11452.1 Refrigerators

All refrigerators shall be frost-free (no-frost) refrigerator/freezers with two separate compartment doors and be Energy Star qualified.

#### 11452.2 Range/Ovens

All ranges and ovens shall be four (4) burner electric appliances with a minimum width of 30 inches. Gas range/ovens may be used where they have automatic ignition and automatic pilot shutoff.

Ranges in units designed as barrier free or for elderly residents shall have front controls with indicator lights. Range/ovens in units designed as barrier free, shall be self-cleaning.

#### 11452.3 Microwave ovens

An electrical outlet shall be conveniently placed for a counter top microwave oven. (Refer also to **16010.**)

#### 11452.4 Exhaust Hoods

Exhaust hoods over ranges and ovens may be the **recirculating type in elderly units** except where code or local ordinance requires a hood ducted to the exterior. A **task light** is required. (Refer also to **15010.3** and **16510.**)

#### 11452.5 Garbage Disposal Units

Garbage disposal units shall be provided. (Refer also to **15010.3.**)

#### 11452.6 Bath Exhausts

Baths shall have an exhaust fan ducted to the outside. (Refer also to **16140.**)

#### 11452.7 Washers and Dryers

If washers and dryers are provided within dwelling units, side-by-side washers and dryers are preferred. Stacked washers and dryers may be used if they are full size units.

In common laundries, rigid metal ductwork shall be used for venting except flexible metal ductwork may be used as a final connection to the appliance. Ductwork shall not be left exposed.

Washers shall be Energy Star qualified.

Dryers shall be vented (ducted) to the outside.

## MSHDA STANDARDS OF DESIGN

### 11455 Kitchen and Bath Cabinets

All cabinets shall comply with the design and construction of the Kitchen Cabinet Manufacturers Association and shall be certified as such.

All cabinets shall have hardwood stiles and rails. Cabinets in units designed for elderly residents may have frames of composite wood materials provided the design, materials and installation insures the screw holding capacity of the frame is equal to or exceeds that of oak. All cabinets except sink bases shall have backs.

In units designed for elderly residents, kitchen cabinets shall have easily grasped door and drawer pulls. (Refer also to **08780**.)

All bathrooms shall have vanities. In bathrooms designed to be barrier free, in order to provide "roll under access" a reduced vanity size may be used or a lavatory set in a counter top may be used. Wall hung lavatories may not be used. (Refer also to **15460**.)

In units designed for elderly residents, bath cabinetry shall have easily grasped door and drawer pulls. (Refer also to **08780**.)

In the primary bath in family units, if the vanity is longer than 39", drawers shall be provided on one side of the vanity.

Vanity placement and size, and lavatory placement shall insure compliance with FHAA.

## MSHDA STANDARDS OF DESIGN

### **12000 Furnishings**

#### **12505 Blinds**

Mini-blinds and vertical blinds may be substituted as an alternative to draperies and rods. (Refer also to **12530** and **12542**.)

#### **12530 Drapery and Curtain Hardware**

In living rooms, dining rooms and master bedrooms a single traverse rod on double brackets, to accommodate two rods, shall be provided at all window and door wall openings. A lined white or off-white drape shall be provided. In all other unit window openings, a single drapery traverse rod with a lined white or off-white drape shall be provided. (Refer also to **12505** and **12542**.)

#### **12542 Draperies**

A lined white or off-white drape shall be provided. Draperies shall be inherently fire retardant. (Refer also to **12505**.)

#### **12600 Furniture**

In housing for elderly residents exterior seating and common area seating shall have backs and some means of support for rising. (Refer also to **00150 C.4** and **02870**.)

#### **12664 Tables and Accessories**

##### **Laundry Rooms**

In common laundry rooms a folding table of 30" to 34" in height and a hanging rack shall be provided.

## MSHDA STANDARDS OF DESIGN

### **14000 Conveying Systems**

#### **14001 Design Buildings for Elderly Residents**

Buildings designed for elderly residents shall be located at grade or an elevator shall serve each dwelling unit level. Buildings having two or more stories and designed for elderly residents shall be equipped with at least one elevator and of sufficient size (approximately 5' x 7') so as to facilitate move-ins/outs and emergencies.

Buildings designed for elderly residents with 100 or more dwelling units or of three or more stories shall be equipped with at least two elevators. One such elevator shall be located and of sufficient size (approximately 5' x 7') so as to facilitate move-ins/outs and emergencies (Refer also to **00150C**.)

#### **14200 Elevators**

Hooks and removable pads shall be provided in elevators that will be used for move-ins.

## MSHDA STANDARDS OF DESIGN

### **15000 Mechanical 15010 Design**

Energy load data for heating, cooling and electrical energy loads comprised of summary loads of each type of dwelling shall be included as part of the Commitment Submission. (Refer also to **00114**)

#### **15010.2 Heating and Cooling**

All dwelling units shall have individual HVAC units. Wall or window mounted air conditioning is not acceptable in new construction.

Where unit entries are located at grade for units that have living areas above grade i.e. individual entry stacked units, a supply air duct run shall be provided at the grade level entry foyer. At a minimum, this duct shall be provided in the ceiling of this foyer.

Electrical heating shall not be used except as specifically approved by MSHDA. Allowable in the foyer of multi-unit building. (Refer also to **16850**.)

All common corridors in developments shall be air-conditioned and provide positive air pressure. Corridor make-up air shall maintain corridor temperature at 76 degrees F in the summer and 70 degrees F in the winter. (Refer also to **15600.1**)

Common laundries, craft rooms and trash and trash compactor rooms shall all be designed to have negative pressure.

#### **15010.3 Appliances**

Garbage disposal units shall be provided in all dwelling unit kitchens and common space kitchens. (Refer also to **11452.5**)

Exhaust hoods over ranges/ovens shall include a task light. (Refer also to **11452.4** and **16510**.)

### **15050 Basic Materials and Methods**

#### **15050.2 Valves**

Hot and cold water shut off valves for each living unit shall be provided. Valves shall be installed at all service connections and in all branch lines and risers.

#### **15050.7 Wall, Floor and Ceiling Plates**

In finished spaces and within sink and vanity bases, furnish a chromium plated sectional escutcheon on each pipe or hanger rod penetrating the wall, floor or ceiling. Plates shall fit snugly.

## MSHDA STANDARDS OF DESIGN

### **15050.8 Plastic Drain Pipe**

Cellular foam core PVC shall not be used.

### **15180 Pipe Insulation**

Insulation shall be continuous over pipes, valves and fittings, etc.

### **15180.1 Heating Piping**

Insulation with a minimum C value of 0.56 shall be securely applied to all steam heating and hot water heating supply and return piping exposed or concealed, except short run-outs above the floor to terminal units and in such locations where the piping is completely imbedded in an insulated wall.

### **15180.2 Domestic Water Supply**

Insulation and a vapor barrier shall be securely applied to all domestic water mains, all domestic horizontal cold water piping, domestic water piping installed in locations of the building subject to freezing temperatures, and vertical piping where condensation can create a problem.

Additionally, insulation with a minimum C value of 0.50 shall be applied to all recirculating domestic hot water piping. Hot water lines that are dead end loops such as running from mains to service a single unit need not be insulated.

### **15180.3 Storm Water Piping**

Insulate all horizontal storm water piping above finished ceilings, including elbows looking up, elbows looking down from the horizontal and underside of drains.

### **15250 Water Softeners and Water Conditioning**

Any domestic water supply with hardness in excess of 200 milligrams/liter of Calcium Carbonate shall be treated by water softening domestic hot water. This determination will be made by MSHDA Design and Technical Resource staff and will be based upon water quality data provided by the Drinking Water and Radiological Protection Division of the Michigan Department of Environmental Quality.

Domestic hot water only shall be treated. Where it is economically infeasible to treat only the hot water the domestic cold water may be treated. (Refer also to **11250**.)

## MSHDA STANDARDS OF DESIGN

### 15460 **Plumbing Fixtures and Trim**

Kitchen sinks shall be double bowl and shall be stainless steel. (Refer also to **00150 D.**) Sinks shall have a single lever control. A garbage disposal shall be provided. Lavatories shall not be fiberglass material. Wall hung lavatories shall not be used in any units. (Refer also to **11452** and **11455.**) In common areas where wall hung lavatories are used; use wall chairs to support the lavatories.

All bathtub bottoms shall have a non-slip finish.

In housing for elderly residents, unit bathroom should be designed, **if feasible**, with water closets located in a corner to facilitate the future addition of grab bars. (Refer also to **10800.**)

All bathroom water controls shall be single lever controls.

All exposed fittings, trimmings, faucets, traps and exposed connections shall be chromium plate brass.

Faucets shall be heavy brass, compression type with renewable seats and discs or cartridge style.

Provide a stop or shut-off valve in the water connection(s) to each water heater, water closet, group of fixtures and main riser.

### 15470 **Water Heaters**

#### 15470.1 **Residential Water Heaters**

All dwelling units designed for family occupancy shall have individual water heaters. Water heaters shall be gas-fired.

Where permitted shutoff valves for inlet and outlet lines shall be provided for ease of replacement.

#### 15470.2 **Commercial Water Heaters**

Water heaters shall be gas-fired. All common water heaters shall be of the continuous recirculation design.

All copper fin-tube domestic water heaters with storage tanks shall have solid state electronic controls to circulate water through the boiler based upon a drop in water temperature in the storage tank.

## MSHDA STANDARDS OF DESIGN

### **15500 Fire Sprinkler Heads**

All fire sprinkler heads within residential space shall be white in color and recessed into ceilings and walls.

### **15600 Heat Generation**

#### **15600.1 Boilers and Chillers**

Gas fired boilers and chillers shall be used where heating systems are not provided for each senior dwelling unit. Boiler systems shall have two or more boilers and shall be furnished with a control panel designed to reset the supply water temperature based on the outdoor temperature. The Control panel shall step fire the boilers in sequential order. A heat exchanger is to be provided so that each unit may have cool air. Systems shall be designed to evenly and adequately distribute conditioned air throughout the living unit. (Refer also to **15010.2**)

All heating systems shall be designed so that each living unit has at least one thermostat to control space temperature.

### **15900 Mechanical Controls**

#### **15900.1 Thermostats**

In all heating/cooling systems, unit thermostats shall be placed on an interior wall, at 48" above the finish floor, away from the direct flow of forced air and drafts. (refer to **15600.1**)

Thermostats in common areas shall have automatic setback controls.

In elderly units the thermostat shall have large easy to read settings.

### **15990 Testing and Balancing**

All testing and balancing of mechanical systems shall conform to the Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB) Standards.

## MSHDA STANDARDS OF DESIGN

### **16000 Electrical 16010 Design**

Electrical service shall be designed so that all dwelling units can be metered separately.

Large multipurpose rooms shall be wired so that one half the fixtures may be shutoff and a uniformly reduced lighting level is achieved with the balance of the lighting wired in a similar manner.

An electrical outlet shall be conveniently placed for a counter top microwave oven, unless a built-in microwave is being provided. (Refer also to **11452.3.**)

### **16010.1 Doors**

Exterior doors in buildings designed for multiple dwelling units for elderly residents in areas where security from trespass is anticipated as a substantial problem shall have door ajar alarms wired to a central control panel. The door ajar signal shall have a manual reset. (Refer also to **08710**)

Main entrance doors to buildings designed for access to multiple dwelling units for residents shall have electric door release. (Refer also to **16010.1.**)

### **16140 Wiring Devices Switches**

A dwelling unit's bath exhaust fan shall be switched separately from the lights. Bathroom lights shall be the first switch adjacent to the door latch; the second switch shall be for the bathroom exhaust fan. (Refer also to **11452.6**)

### **16200 Emergency Generator**

An emergency generator shall be provided in all elderly buildings exceeding two stories. Additionally any building that is required to have a fire pump for the fire protection system, unless a diesel fire pump is provided, shall have an emergency generator.

Emergency Generators shall provide automatically transferred power for the full operation of all loads essential for the safety of human life as defined in N.E.C. and Life Safety Code 101. In addition, the system shall include but not be limited to:

lighting in areas of refuge, emergency elevator (with cab size capable of handling a stretcher horizontally), and emergency call systems.

Where capacity exists in a generator sized for the above equipment, recirculation pumps on boilers and make up air supply shall be powered off that generator.

The emergency generator shall be provided with a fuel supply that will operate such a generator for a minimum of 24 hours. No underground storage tanks shall be used.

## MSHDA STANDARDS OF DESIGN

### **16500 Lighting**

#### **16500.1 Lighting Levels**

Average illumination levels at the task surface shall be:

50 fc	offices
15 fc	corridors, lobby, stairs
30 fc	kitchen counter top, sink and range surfaces
15 fc	toilet rooms and bathrooms at vanity top
10 fc	bathrooms at bathtub
10 fc	store rooms, mechanical rooms, electrical rooms, etc.

In housing for elderly residents, provide lighting at vanity tops equal to 30 fc. Fixtures shall be selected to provide a minimum of glare.

Egress emergency lighting shall be maintained at a 1 foot-candle level inside the building and to a point 20 feet outside the building exits.

#### **16500.2 Night lights**

A night light, or outlet for a night light, shall be provided near the bedroom/bathroom area in all units.

#### **16503 Poles, Posts, and Standards**

Building mounted lighting for purposes of lighting parking lots and walks to or from parking shall not be used. Pole mounted lights of an appropriate height shall be used for such purposes. Aluminum poles are preferred.

Lighting shall be provided beneath carports at the same ½-foot candle lighting level required for parking. (Refer also to **02780**)

### **16510 Interior Luminaires**

#### **16510.1 Corridor Lighting**

Wiring systems shall be designed to allow shutdown of half the corridor lighting at night. This does not apply to garden apartment buildings with common corridors.

Corridor lighting shall be fluorescent lighting. This requirement is not to discourage attractive fixtures such as wall sconces as these fixtures with a variety of lamps types are available for fluorescent applications. Corridor lighting shall be a minimum of 15 foot-candles.

#### **16510.2 Common Area Lighting**

Common area lighting shall be fluorescent lighting. Exceptional situations may exist where incandescent lighting may be used, however alternative fluorescent fixtures should be evaluated for all common area conditions.

## MSHDA STANDARDS OF DESIGN

### **16510.3 Kitchen Lighting**

Dwelling unit kitchen lights shall be fluorescent. Each kitchen shall have a task light above the sink and a ceiling mounted general kitchen light. Additionally the range hood shall have a task light. (Refer also to **00150 D.**)

### **16510.4 Fixture Types**

Bare bulb porcelain fixtures shall not be used except in basements and mechanical closets.

Exit lights shall be LED type fixtures.

### **16520 Exterior Luminaires**

Exterior lighting shall be controlled by photocells. Luminaires shall be designed to reduce light spillage into unwanted areas.

Site development signs shall be illuminated (refer also to **02780** and **02980.**)

### **16520.1 Balcony and Patio Lighting**

Balconies and patios shall have a switched light.

### **16522 Roadway and Parking Luminaires**

Exterior lighting levels for parking and walk areas shall be a minimum of 1/2 foot-candle. Provide a maximum to minimum foot-candle ratio of 10 within the limits of the parking area and walks to buildings.

**16720 Alarm and Detection Systems**  
**16720.1 Smoke Detectors**

All dwelling unit smoke detectors shall be photoelectric type except in the kitchen.

In buildings for elderly residents the unit smoke detectors shall be part of a "fully addressable" system and shall be wired to activate an audible alarm in the unit and at the primary annunciator panel. The system shall also activate a remote signal in the manager's unit if a secondary panel is provided. Unit smoke detectors shall not be wired in a "buddy" or "zoned" configuration with other **dwelling** units nor shall they initiate the general building alarm.

"Fully addressable" shall mean that this unit smoke detector system shall have the capability to identify the location of the dwelling unit from which the signal originated and display such information at the annunciator panel. The system must require a manual reset at the annunciator panel. The system shall also have the capability to send the same identifying information to a remote location off-site to a monitoring agent, a pager, etc.

The operation of this system shall be discussed during the design stage with the local fire department to determine how the system shall operate. The operation of the system shall comply with the fire department regulations, however the capabilities of the system, as required herein, shall not be diminished.

**16720.2 Emergency Call**

An emergency call system shall be installed in all buildings designed for elderly residents. The emergency call system shall be a "fully addressable" system which shall include:

- 1) pull cord stations in the bathroom and bedrooms with "furnishability" dictating station placement (note especially conflicts with towel bars);
- 2) optionally a light, and only a light (not to include a bell or alarm) over the unit entry;
- 3) an annunciator panel located in the manager's office or reception area on which a light displays and a sound is emitted to indicate the dwelling unit in which the emergency call was pulled; and
- 4) optionally a remote annunciator panel located in the manager's unit.

To be "fully addressable" the display at the office annunciator panel(s) shall differentiate between the smoke detector alarm signal and the emergency call signal and shall be able to identify from which dwelling unit the call originated. The system must require a manual reset at the annunciator panel. The system shall have the capability to send the same identifying information to a remote location off-site to a monitoring agent, a pager, etc.

The operation of this system shall be discussed during the design stage with the local emergency medical service provider to determine how the system shall operate. The operation of the system may comply with the service provider regulations; however the capabilities of the system shall not be diminished.

## MSHDA STANDARDS OF DESIGN

- 16722 Building Security and Detection Systems**  
Intrusion alarms shall be installed within residential units, which are at grade or otherwise accessible to intrusion, in areas where criminal trespass is a substantial problem.
- 16740 Telecommunications Systems**  
In dwelling units designed for occupancy by elderly residents, a telephone jack shall be provided in the living area and in the bedroom.
- 16760 Intercommunications**  
All buildings that are designed to include a multiple number of dwelling units accessible through a common entry shall have a two-way intercom between the main entry and the individual units. Intercom communications shall not result in costs to the resident.  
In areas where added security is necessary, as determined by MSHDA and the development's management company, door releases at common entries shall be at the door and not remotely operated.
- 16780 Television Systems**  
A central TV antenna system shall be provided unless three major networks and public television can be received at the site without cost to the resident or basic cable is to be provided at no cost to the residents. All units shall be wired for cable television. Television antenna and cable outlets shall be provided on at least two walls of the living room and one location in the master bedroom.  
All antenna and cable wiring shall be concealed within walls.
- 16850 Electric Heating**  
Electrical heating shall not be used except as specifically approved by MSHDA (refer also to **15010.2.**)

# MSHDA STANDARDS OF DESIGN

## INDEX

Acoustical rating .....	0.32
Air infiltration .....	7.1, 8.2
Alarms .....	8.3, 16.1, 16.5
Appliance .....	0.26, 0.30, 11.1-11.2, 15.1
Asbestos .....	0.10
Balconies .....	6.1, 8.1, 16.3
Balcony .....	0.32, 6.1, 16.3
Barrier free .....	0.1, 0.9, 0.20, 0.29, 0.31, 2.5, 8.1, 8.3, 10.1, 11.2, 11.3
Basement .....	0.27, 0.30, 9.1, 16.3
Bath exhausts .....	11.2, 16.1
Bathroom .....	0.31, 8.1, 8.3, 11.3, 15.3, 16.1, 16.2, 16.4
Bathtub .....	0.31, 10.1, 15.3, 16.2
Bathtubs .....	10.1
Bedroom .....	0.22, 0.27, 0.30, 0.31, 8.1, 8.3, 12.1, 16.2, 16.4, 16.5
Blinds .....	0.26, 12.1
Boilers .....	15.4, 16.1
Builder .....	0.5
Cabinets .....	0.26, 0.30, 0.31, 8.3, 10.1, 11.3
Cable television .....	16.5
Carpet .....	0.26, 0.28, 9.2
Carpet cushion .....	9.2
Carpet pad .....	9.2
Carpeting .....	9.2
Casings .....	6.1, 8.1
Caulking .....	7.2
Closet .....	0.30, 0.31, 10.1, 15.3, 16.3
Collector roads .....	2.1
Color and material selections .....	0.26
Commitment .....	0.14, 0.16, 0.17, 0.19, 0.20, 0.25, 15.1
Common space .....	0.27, 0.28, 8.3, 15.1
Community rooms .....	0.29, 9.2
Concrete .....	2.1, 2.2, 3.1, 9.1, 9.3
Congregate .....	0.28, 2.1
Construction documents .....	0.1, 0.2, 0.9, 0.10, 0.17, 0.19, 0.20, 0.25
Contraction joints .....	3.1
Cooling .....	15.1, 15.4
Corridors .....	0.29, 0.30, 0.32, 6.1, 9.1, 9.2, 15.1, 16.2
Counter top .....	0.26, 0.30, 0.31, 6.1, 11.2, 11.3, 16.1, 16.2
Crafts .....	0.29
Crawl space .....	7.1
Curbing .....	2.1
Curbs .....	0.13, 0.14, 2.1
Curtain .....	12.1

## MSHDA STANDARDS OF DESIGN

Definitive design .....	0.25
Demolition.....	0.10
Development data .....	0.20, 0.24
Dining .....	0.27 - 0.30, 12.1
Dishwasher.....	0.30, 11.1
Doors .....	0.27, 0.26, 0.28, 0.30, 0.31, 8.1, 8.3, 11.2, 16.1
Downspouts.....	0.26, 2.2, 7.2
Drapery.....	12.1
Drive .....	0.12, 2.1
Drives .....	2.1
Dryers .....	11.1, 11.2
Ductwork.....	11.2
Eaves.....	7.1
Efficiency units.....	0.27
Elderly.....	0.9, 0.20 - 0.26, 0.28, 0.31, 0.32, 2.1, 2.2, 2.4, 6.1, 8.1, 8.3, 9.2 10.1, 11.2, 11.3, 12.1, 14.1, 15.1, 15.3, 15.4, 16.1, 16.2, 16.4, 16.5
Electrical heating .....	15.1, 16.5
Elevators.....	0.28, 0.32, 14.1
Emergency call.....	16.1, 16.4
Energy heels.....	6.1
Energy loads.....	15.1
Environmental.....	0.10, 0.16, 11.1, 15.2, 15.4
Errors and Omissions Insurance .....	0.2, 0.3
Escutcheon.....	15.1
Exhaust hood.....	0.30, 11.2, 15.1
Exitways .....	9.2
Expansion joints .....	3.1, 9.1
Fair Housing Amendments Act.....	0.1
Faucets.....	15.3
Feasibility.....	0.16-0.20, 0.24, 0.26
Fiberglass .....	15.3
Finishes .....	0.26, 9.1
Fire protection.....	6.1, 16.1
Fire pump .....	16.1
Flashing .....	7.1
Floor covering.....	6.1, 9.1
Floor drain .....	0.29
Fluorescent lighting .....	16.2, 16.3
Foyer .....	0.30, 15.1
Furnaces.....	0.32
Furnishability .....	0.24, 0.30, 16.4
Furnishings.....	0.25, 0.27, 0.28, 12.1
Garbage disposal .....	0.29, 0.30, 11.2, 15.1, 15.3
Generators.....	16.1
Glass .....	0.28, 8.1, 8.3, 15.3

## MSHDA STANDARDS OF DESIGN

Glazing .....	8.3
Grab bars.....	0.31, 10.1, 15.3
Gradients .....	2.2
Gutters.....	0.13, 0.14, 0.26, 2.2, 6.1, 7.2
Gypsum board .....	9.1
Handrails .....	6.1
Hardware .....	8.2-8.3, 12.1
Hazardous material .....	0.10
Health services .....	0.28
Heating .....	15.1, 15.2, 15.4, 16.5
Hinge pins.....	8.3
Hose bibb .....	0.29
Housekeeping.....	0.28
Ice dam.....	7.1
Insulating values.....	7.1
Insulation .....	0.27, 0.32, 7.1, 15.2
Intercom.....	16.5
Intercommunications .....	16.5
Irrigation.....	0.2, 0.24, 2.4
Jambs .....	8.1
Joints .....	2.4, 3.1, 7.1, 7.2, 9.1
Kitchen.....	0.2, 0.29, 0.30, 9.1, 9.3, 11.3, 15.1, 15.3, 16.2-16.4
Labeling .....	9.2
Laminates .....	6.1
Lamps.....	2.3, 16.2
Laundries.....	11.2, 15.1
Laundry.....	0.29, 8.3, 9.1, 12.1
Lavatories .....	11.3, 15.3
Lavatory.....	0.31, 11.3
Lawn .....	2.2, 3.1
Lever handles .....	8.3
Lighting .....	0.24, 0.28, 2.3, 16.1-16.3
Lighting levels.....	2.3, 16.1-16.3
Lightweight concrete.....	9.1
Linen.....	0.31
Living room.....	0.30, 12.1, 16.5
Locksets .....	8.3
Lumber .....	6.1
Luminaires .....	16.2, 16.3
Mail .....	0.28,
Mailboxes .....	10.1
Maintenance.....	0.22, 0.27, 0.29, 2.2, 8.3
Masonry.....	2.2
Medicine cabinet.....	0.31, 10.1
Meeting.....	0.1, 0.17, 0.18, 8.1, 8.2, 9.2

July 9, 2010

## MSHDA STANDARDS OF DESIGN

Membrane roofing .....	7.1
Metal .....	2.4, 2.5, 7.1, 8.1, 8.2, 11.2
Microwave .....	0.31, 11.2, 16.1
Mirror .....	0.31
Net area .....	0.25
Night lights .....	16.2
Office .....	0.27, 0.29, 16.2, 16.4
Package shelves .....	0.30, 6.1, 10.1
Paint .....	0.26, 2.5, 3.1, 6.1, 8.2, 9.1, 9.3
Pantry .....	0.31
Parking .....	0.15, 0.16, 0.20, 0.22-0.24, 0.27, 2.1-2.4, 16.2, 16.3
Parking lots .....	2.1, 2.3, 16.2
Pass-through .....	0.30
Patio .....	0.32, 2.2, 6.1, 8.1, 16.3
Paving .....	0.12, 0.24
Peephole .....	8.3
Planting .....	0.23, 0.24, 2.4, 2.5
Plastic .....	6.1, 8.1, 8.3, 15.2
Plumbing .....	7.1, 10.1, 15.3
Poles .....	0.13, 2.3, 16.2
Polystyrene .....	6.1, 8.1, 9.1
Pre-design .....	0.1
Precast concrete .....	3.1
Ramps .....	0.29, 2.1
Range/oven .....	0.29, 0.30, 11.1, 11.2
Range Hood .....	16.3
Refrigerator .....	0.29-0.31, 11.1, 11.2
Rehabilitation .....	0.1, 0.2, 0.9, 0.10
Resilient flooring .....	9.1
Retaining walls .....	0.12
Reviewer .....	0.6
Screens .....	8.1, 8.2
Sealants .....	7.2
Sealing .....	3.1
Security .....	8.2, 8.3, 16.1, 16.5
Sheathing .....	7.1
Shingles .....	7.1, 9.3
Siding .....	0.26, 2.2
Signs .....	0.25, 0.28, 16.3
Sills .....	6.1
Sink .....	0.29, 0.30, 11.3, 15.1, 15.3, 16.2, 16.3
Site analysis .....	0.17, 0.18, 0.20, 0.21, 0.23, 2.1
Site concept .....	0.17, 0.18, 0.20, 0.23
Slab .....	2.2, 3.1
Sliding glass doors .....	8.1

## MSHDA STANDARDS OF DESIGN

Smoke detectors.....	16.4
Soil borings.....	0.15, 0.16, 0.21, 0.24
Sound ratings.....	0.32
Sprinklers.....	2.4
Stain.....	0.26, 6.1, 9.3
Stair(s).....	0.27, 0.32, 8.3, 16.2, 16.3
Storage.....	0.25, 0.27, 0.29, 0.30, 15.3, 16.1
Storm doors.....	8.1
Storm water.....	0.13, 0.23, 0.24, 15.2
Structural engineer.....	0.4
Submission.....	0.2, 0.3, 0.5, 0.11, 0.17-0.20, 0.24, 0.26, 15.1
Survey.....	0.2, 0.5, 0.11, 0.13-0.15, 0.20, 0.24
Switches.....	16.1
Table(s).....	0.29, 0.30, 12.1
Tank(s).....	15.3, 16.1
Task light.....	0.30, 11.2, 15.1, 16.3
Telecommunications.....	16.5
Television.....	0.30, 16.5
Termite control.....	2.2
Testing.....	9.3, 15.4
Three bedroom.....	0.30
Toilet.....	0.29, 0.31, 16.2
Tot or Play lots.....	2.4
Toxic.....	0.10, 2.2
Trash chute.....	0.29
Trash compactor.....	0.29, 15.1
Trash removal.....	0.28
Trees.....	0.13, 2.5
Trusses.....	6.1
Valves.....	2.4, 15.1, 15.2, 15.3
Vapor barrier.....	15.2
Vent.....	7.1, 9.3, 11.2
Viewer.....	8.3
Waiver.....	0.18, 0.19
Walk(s).....	0.13, 0.14, 2.1-2.4, 3.1, 16.2, 16.3
Walkways.....	0.23, 2.1-2.3
Wall base.....	9.1
Washers.....	11.1, 11.2
Water closet(s).....	0.31, 10.1, 15.3
Water conditioning.....	15.2
Water heaters.....	11.1, 15.3
Water softeners.....	11.1, 15.2
Windows.....	0.32, 2.3, 2.5, 8.1, 8.2
Wiring.....	16.1, 16.2, 16.5
Wood.....	2.5, 6.1, 7.1, 8.1, 8.2, 9.1, 9.3, 11.3