

## 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. These Standards supersede all MSHDA Technical Services: Design Bulletins. These **Standards** also replace the MSHDA Master Specifications. This version of the **Standards of Design** replaces all other 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.

It is also the intent of the Design Review Process and the Fast Track Waiver 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 format of this document is intended as an easy reference and one that can be easily updated. Please update your copy of these **Standards** as new or modified pages are issued.

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## 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.

#### 00011 Miscellaneous Reference Standards

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.

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.

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### **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**

Low-rise (1 through 3 floors)	\$250,000.
Mid-rise (4 through 6 floors)	\$500,000.
High-rise (7 floors and above)	\$750,000.

#### **Design only**

Low-rise (1 through 3 floors)	\$250,000.
Mid-rise (4 through 6 floors)	\$500,000.
High-rise (7 floors and above)	\$750,000.

#### **Supervisory only**

Low-rise (1 through 3 floors)	\$150,000.
Mid-rise (4 through 6 floors)	\$325,000.
High-rise (7 floors and above)	\$500,000.

#### **Rehabilitation Developments** \*

\* The lesser of 25% of construction costs or the amount required for new construction. (This requirement is waived if no structural modifications or corrections are involved.)

## **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.**

124 East Fulton Street  
Suite #600  
Grand Rapids, MI 49503  
(616) 454-1398  
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) 943-3939  
Contact: Peter L. Haddix

##### **Wayde C. Hoppe, Architect**

47032 McBride  
Belleville, MI 48111  
(734) 697-9423  
FAX: (734) 697-9432  
Contact: Wayde 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

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

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

#### **HKP P.C.**

3258 Broad Street  
Suite #1  
Dexter, MI 48130  
(734) 426-8222  
FAX: (734) 426-4344  
Contact: John D. Krueger

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

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

#### **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

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

5700 W. Mt. Hope Hwy., Suite 100  
Lansing, MI 48917  
(517) 322-9570  
FAX: (517) 322-9571  
Contact: Robert Rinck

## **MSHDA STANDARDS OF DESIGN**

### **Mechanical / Electrical 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

### **Irrigation Review Consultants**

#### **C. J. Colein and Associates, Inc.**

127 West University  
Rochester, MI 48307  
(248) 656-6805  
FAX: (248) 656-3721  
Contact: Carol J. Colein

## 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:** 5% of all new units shall be Barrier Free, and 100% of all units shall be Accessible. For ease in exiting in emergencies, Barrier Free units shall be located on the ground floor (at grade) if possible.

Where market demand dictates, MSHDA may require that a higher percentage of Barrier Free units be provided.

**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. Where not controlled by State Law a market analysis shall determine unit mix.

Where market demand dictates, MSHDA may require that a higher percentage of Barrier Free units be provided.

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

Where market demand dictates, MSHDA may require that a higher percentage of Barrier Free units be provided.

**Community Facilities:** Except where facilities are provided within Barrier Free units, common spaces such as laundry, storage, kitchens, etc., shall be furnished with Barrier Free equipment and shall be accessible from all Barrier Free units.

#### **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. HOME funds require 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**.)

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### **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.

## MSHDA STANDARDS OF DESIGN

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.

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**.

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### 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.

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### 00052 Investigation of Structures to be Rehabilitated

The Sponsor/Owner shall have completed and submit the MSHDA document Engineer Investigation for Remodel Work. A licensed structural engineer shall investigate all questions regarding structural capacities and conditions. A licensed engineer or a licensed engineer in association with a contractor licensed to do repair work on the system under investigation may investigate conditions of mechanical and electrical systems. (Refer also to **Appendices A and B** of this document.)

## MSHDA STANDARDS OF DESIGN

### 00053 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:

Pre-design / Site Analysis / Site Concept  
Design Development / Feasibility  
Construction Documents / Commitment

(See Fast Track Processing – below)

#### A. Pre-design meeting / Site Analysis / Site Concept

**The Pre-design 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.

The purpose of the Pre-design meeting is to explain the MSHDA Design Review Process, to discuss applicable requirements, distribute the MSHDA Standards of Design, discuss each development's specific programmatic parameters and amenities, and to set forth a specific schedule.

**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 Review Consultant **ten working days prior to the scheduled Review Meeting**. MSHDA Site Concept Review meeting shall precede site plan approval by the local municipality.

The participants are the same as for the Pre-design meeting and the two meetings are often combined.

The purpose of the site analysis and site concept submission and review is to:

1) Prepare a detailed graphic and written analysis of the site and its characteristics to use as a basis for further plan development; and 2) Develop a conceptual plan, using the site analysis as a basis, that relates to the characteristics of the site and conveys the basic intent of the plan that will be developed. (Refer to **00112**.)

The MSHDA Site Review Consultant 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.

## MSHDA STANDARDS OF DESIGN

### B. 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 Review Consultants a minimum of **ten working days prior to the scheduled Feasibility Design Review Meeting**. 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 and Architecture Design 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

### C. Construction Documents / Commitment

The Review of Construction Documents or Commitment Drawings is the next stage of the Design Review Process. A complete Commitment Submission, in accordance with the submission Requirements in the **MSHDA Standards of Design**, is made directly to MSHDA and MSHDA's Site, Architecture, Mechanical/Electrical and Irrigation Design Review Consultants a minimum of **ten working days prior to the scheduled Feasibility design Review Meeting**. After ten working days for the Consultants to complete their review, a Commitment 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, Architecture and Mechanical/Electrical Design Review Consultants.

The MSHDA Design 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 **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.

### D. Fast Track Processing

At the option of MSHDA, Fast Track Processing may be available for qualified, experienced development teams. Fast Track Processing is only available for new construction. For a Fast Track program statement and for information on how to qualify, contact MSHDA's Multi-family Development and Construction Division.

For family developments the design review process will be eliminated. For housing for elderly residents the design review process proceeds as stated in these Standards through the Design Development / Feasibility stage. At the time of combined Feasibility/ Commitment and at Initial Closing the design architect will be required to certify that the proposed development design complies with all of the appropriate Standards of Design. Waivers may be requested in writing by using the appropriate Fast Track form. Fast Track performance will be evaluated based on criteria set forth in the program statement.

## 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 ONE: Site Analysis/Development Program/Concept Plan**

**PHASE TWO: Design Development/Feasibility**

**PHASE THREE: 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; 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

### D. Area tabulations

For purposes of area tabulation, the following spaces in elderly buildings shall be designated common spaces: community room, common kitchen, office, reception, maintenance, library, meeting rooms, common laundry, lounge, rest rooms, mail room, janitor closets, craft rooms, game rooms, lobbies and common storage space. The lobby space necessary for a traffic pattern from the building entry to the elevator and to the unit entry shall not be common space but shall be deemed as necessary residential space.

Residential space shall consist of dwelling units (including the manager's unit), corridors, traffic areas through lobbies, vestibules, elevators, elevator lobbies, receiving, mechanical, electrical, meter rooms, stairways, trash rooms and required tenant storage.

Common spaces in family developments shall include community buildings, maintenance spaces, common laundries and common storage space.

In order to provide a standard measure of unit sizes for housing financed by MSHDA, "Net Area" and "Gross Area" are defined as follows:

**1. Unit Net Area:** All floor area inside finish surfaces of the enclosing walls (unit separation).

**2. Unit Gross Area: (town houses, stacked flats, other configurations without common or shared space)**

Sum of floor areas included within outside faces of unit exterior walls and centerline of common or shared walls; basements are not included.

**Unit Gross Area: (high-rise, mid-rise, garden apartments, other configurations which include common or shared space.**

Subtract the sum of the total Unit Net Areas from the Building Gross Area, divide the remainder by the number of units, and add the result to the Unit Net Area for each unit.

**3. Building Gross Area: (town houses, stacked flats, other configurations without common or shared space)**

All floor area, including construction and shaft spaces within the building, measured from the outside of the exterior walls; spaces only partially enclosed, e.g. balconies, entrance canopies, etc., are not included; basements in town houses are not included.

**Building Gross Area: (high-rise, mid-rise, garden apartments, other configurations that include common or shared space)**

All floor area, including construction and shaft spaces within the building, measured from the outside of the exterior walls shall be included; spaces only partially enclosed, e.g. balconies, entrance canopies, etc., are not included; floor areas of non-housing, e.g. commercial, are not included; basements with common space that has a housing use are included.

## MSHDA STANDARDS OF DESIGN

### 00112 PHASE ONE: Site Analysis/Development Program/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 TWO: Design Development/Feasibility

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

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.

##### 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 c"= 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"= 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 (study models and perspective sketches are desirable).

### **C. Presentation**

Upon Design Review approval of this Phase, a **black line** print of the building and unit plans and elevations and a rendered (or colored) site plan, **suitable for slide photography** shall be submitted. MSHDA will photograph the submission and prepare a presentation to the Authority Board of Directors. Alternate presentation materials may be submitted with approval of the Authority's Chief Architect.

## MSHDA STANDARDS OF DESIGN

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

Submit one copy to MSHDA and one copy to each Design Review Consultant (Site, Architectural, Mechanical/ Electrical, Irrigation).

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

#### A. Site Plan

This Phase is the final document from which the development will be constructed. It shall be complete in every detail and dimension. It shall include all spot grades and proposed contours for adequate grading information. Complete specifications in the CSI format shall also be included.

#### 1. List of Drawings:

Title Sheet

Survey

Soil Boring Plan

Demolition Plan

Road and Building Location Plan

Site and Grading Plans

Site Details

Road Profiles

Site Utility Plan

Sewer Profiles

Planting Plans

Irrigation Plans

Soil Erosion and Control Plan (use key system per Michigan Public Act 347)

## MSHDA STANDARDS OF DESIGN

### 2. Contents of Sheets:

#### a. Demolition Plan

Removal of Existing Structures, roads, paved areas, utilities and vegetation  
Removal of any existing utilities within any structures to remain

#### b. Road and Building Location Plan

Proposed roads and buildings  
All base lines and match lines  
Building locations  
Road center line data  
Indicate property line coordinates and data

#### c. Site Layout Plan

Property lines  
Match lines  
Limit of contract  
Bench mark and description  
North point  
All roads excluding existing roads to be abandoned  
Walks and paving (identify types of paving)  
Play areas and athletic field  
Fences, walls, gutters  
Soil boring data (location, table and legend, drilling company noted)  
Building key plan  
Graphic scale  
Building identification, floor elevations (indicate entrances)  
Material identification or construction details

#### d. Grading Plan

Property lines  
Match lines  
Graphic scale  
North point  
Plan of roads, walks, buildings  
Existing and proposed contours (1' intervals)  
Grading limits  
Spot elevations (high and low points, key intersections, proposed grades at base of buildings, top and bottom of walls, and at 40' intervals along centerlines of swales and berms)  
Elevations of drainage structures, detention and retention areas  
Finish floor grades  
Special grading details

## **MSHDA STANDARDS OF DESIGN**

### **e. Planting Plans**

Property lines

Match lines

Limit of contract

Legend

Planting details, including spacing of plants

Maintenance edges at buildings

Swales and berms

Buildings, roads, walks, steps, walls, fences, gutters, etc.

Trees, shrubs, lawn (types of seeded or sodded areas)

Coordinate all plant material with utility lines, irrigation and structures

Plant list (scientific and common name, size, root condition, and special instructions)

Seed and sod limits

Topsoil stockpile (seed area when topsoil is removed)

Indicate existing material to remain and to be removed

Erosion net and staked sod where necessary

### **f. Site Utility Plan**

Building and roads

Existing and proposed contours

Utility mains and laterals

Manholes (top and invert grades, number and type)

Size and material of pipe (check with local authority)

Existing utility lines and easements

Detention and Retention requirements

Dimension catch basins, storm inlets, manholes and end walls

Storm inlets and catch basins (top and invert grades, number and type, building storm water connection to storm system, head walls or connections to off-site storm system, clean-outs)

Detail typical trench

Water (meter house or pit, fire hydrants cleared by local fire department, valves and valve boxes, mains and laterals)

Gas (meter house, valves and pits, main laterals size only, check grades where lines cross)

### **g. Sewer Profiles**

Profile mains only

Indicate finish grades

Check height of manhole against city specifications and standards

Top and invert elevations

Stations and Manhole numbers

Type, size, percentage of grade

Concrete anchors and cradles (if necessary)

Datum, horizontal and vertical scale

0.30

## MSHDA STANDARDS OF DESIGN

### h. Irrigation

Scale no smaller than 1"= 50'-0" and north arrow

Overall irrigation plans

Detail plans indicating sprinkler head

Designer name and telephone number

Water source and pressure information

If municipal water line is used then provide:

Name of agency with jurisdiction over the line, e.g. Public Works, Engineering, etc.

Name and telephone number of the individual contacted within the agency.

Static pressure within the line that will feed the irrigation system.

If static pressure is too low and a booster pump is proposed, the make and model number of the pump with specifications sheet for review.

If well water is used then provide:

Name and telephone number of the well driller.

Copy of the well log from the irrigation well or the test well.

Data on the well pump, e.g. gallons per minute, pressure, with specifications sheet for review.

If surface water is used then provide:

Make, model number and performance data on pump.

Electrical requirements of the pump and on-site availability.

Suction lift (give elevation difference in feet from water surface to pump).

Run-Time

Indicate the necessary run-time to apply .2" of water for each station in the system along with the total hours required to operate the system.

Controller locations

If control timers are to be mounted indoors, exact location shall be indicated on the plans. If control timers are to be mounted outdoors, a more general location is acceptable.

Back flow Prevention Device

Make and model number shall be indicated on the plans. If a vacuum breaker is specified, its approximate installed height, above finished grade, shall be indicated on the plans.

Sprinkler Heads

Make, model number, gallons per minute and radius for all nozzles shall be indicated on the plans.

Valve sizes

Valve and their sizes (1", 1 1/2", 2", etc.) shall be graphically portrayed on the plans.

Additional required submissions to the Irrigation Reviewer

Grading Plan

Landscape Plan

Site plan indicating water distribution

Irrigation portion of Division 2 specifications

## MSHDA STANDARDS OF DESIGN

### i. Miscellaneous Site Considerations (apply to proper sheet)

- Drinking fountains
- Hose bibbs
- Lighting systems, including photometric site lighting plans
- Waste station enclosures
- Mail box locations and details
- Storage buildings
- Carports and garages
- Electrical outlets
- Waste receptacles
- Entrance signs
- Street and directional signs
- Parking layout
- Play courts
- Recreation equipment
- Street furniture including Bicycle racks
- Screens, walls, etc.
- Flagpoles
- Planting tubs
- Sculpture, ceramics, etc.
- Soil Erosion and Control (use key system per Michigan Public Act 347)
- Dumpster enclosures
- Mail distribution locations
- Storage and maintenance out buildings

## **MSHDA STANDARDS OF DESIGN**

### **B. Residential and Community Buildings**

Construction documents for the development shall be complete and in sufficient detail to fully explain the intent of the structural, architectural, mechanical and electrical systems and the materials and operations involved. Drawings and specifications shall provide the required directions, details and instructions to guarantee a sound, safe and durable development that appears, functions and is of the quality intended.

Preparation of construction drawings and specifications shall be coordinated with the designated Builder. Every effort shall be made during this and previous phases to enlist the Builder's expertise and to benefit from his experience.

The following requirements for construction documents apply to each basic living unit, variations thereof, and to the community building(s).

#### **1. List of Drawings:**

- Composite Foundation Plan
- Composite Elevations
- Composite Roof Plan
- Unit Floor Plans
- Unit Elevations
- Unit Sections
- Detail Sections
- Architectural Construction Details
- Schedules
- Structural Framing Plans
- Mechanical Plans
- Electrical Plans

#### **2. Contents of Drawings:**

##### **a. Composite Foundation Plan (scale not less than c"=1'0")**

- Foundation wall dimensions, offsets, heights
- Location, sizes and connections of foundation drainage systems
- Remaining foundation information required if not provided on unit floor plans (basement level)
- Footing locations, sizes, depths
- Locations and sizes of pads, piers, openings
- Slab construction, thickness
- Locations, sizes, spacing and directions of reinforcing
- Enlarged scale details of areas not clearly indicated at above scale
- Notes on drawing stating allowable soil pressure and required concrete and steel strengths and other pertinent design information (as appropriate)

## MSHDA STANDARDS OF DESIGN

### **b. Composite Elevations (scale not less than c"= 1'-0")**

Design of all exterior views, including courts and offsets  
Indication and extent of all major exterior materials  
Existing and proposed grades at buildings  
Floor lines and elevations, floor-to-floor heights  
Windows, doors, openings, vents, louvers, utility meters and equipment  
Outline, depth below grade and stepping of building footings  
Connection conditions between units

### **c. Composite Roof Plan (scale not less than c"= 1'-0")**

Separate roof plan not required if all essential information is provided on site plan or other drawing  
Location of roof ridges, valleys, intersections, chimneys, vents, saddles and parapets  
Direction of roof slopes and building outline

### **d. Unit Floor Plans (scale not less than 3"= 1'-0")**

Separate floor level plans of each unit type, including end units  
Exterior unit dimensions, including outdoor patios, terraces, porches and overall dimensions  
Window and exterior door locations, size and/or schedule key  
Interior door locations, swing, sizes and/or schedule key  
Dimensional location of interior partitions, openings, railings and stairs  
Location of all permanently installed features and equipment, including kitchen appliances, cabinets, shelving and plumbing fixtures  
Each living unit type identified by letter and/or numerical designation

### **e. Unit Elevations (scale not less than 3"= 1'-0")**

Exterior elevation of each unit facade type and major variation thereof  
Indication and extent of all exterior materials  
Location and size of trim members, gutters, downspouts  
Window and door indication, sizes and/or schedule key  
Foundation and areaway outlines  
Exterior lighting system

### **f. Building Sections (scale not less than c"= 1'-0")**

Typical and atypical Cross-sections  
Floor level and height relationships  
Special structural conditions  
Size and spacing of framing members

## MSHDA STANDARDS OF DESIGN

### **g. Unit Sections (scale not less than 3"= 1'-0")**

Cross-sections through each unit type  
Size and spacing of all floor, wall and ceiling/roof framing members  
Interior and exterior finishes, sheathing, insulation  
Floor levels and heights relationships  
Basement floors, footings, pads, proposed grades

### **h. Detail Sections (scale not less than : "= 1'-0")**

Each common wall type, fire wall and typical exterior wall complete from footing to roof  
Fire and sound ratings for all walls  
Size and spacing of all floor, wall and ceiling/roof framing members  
Interior and exterior finishes, sheathing, insulation  
Opening heights and framing  
Overhangs, cornices, sill conditions

### **i. Architectural Construction Details**

#### **Interior details (scale not less than 1/4"= 1'-0")**

Elevation, section and plan (if not adequately presented on unit plans) of kitchen and bath counters, cabinets and fixtures  
Details of any built-in cabinet work, fireplaces and equipment

#### **Stair details (scale not less than : "= 1'-0")**

Section and plan (if not adequately presented on unit plan) of any stairs with rise, run and headroom dimensions: tread, riser, stringer, baluster and handrail sized and with dimensions

#### **Special conditions (scale as necessary)**

Adequate information to detail any special conditions in foundations, sills, walls, roofs, overhangs and projections  
Handrail details showing cross section and mounting requirements and handrail interruptions

### **j. Schedules** (complete information for each door and window type and interior treatments)

Door and frame

Size, thickness, construction, material, finish, design, approved fire rating (if required) and key designation

Window

Size, material, design, key designation

Finish

Material and finish type for floor, base, wainscot, wall, ceiling and trim for all rooms and areas

## MSHDA STANDARDS OF DESIGN

### **k. Structural Framing Plans**

Plans and details for each floor level and roof construction if not adequately presented on foundation and unit floor plans

Size and spacing of floor, wall and ceiling/roof framing members

Size and spacing of columns, piers, posts

Size, type and construction of girders, beams, headers and lintels

### **l. Mechanical Plans**

Drawings shall include composite floor/roof plans (scale not less than 1/8"= 1'-0") and unit floor plans and mechanical equipment room plans (scale not less than 3/8"= 1'-0").

Heating and/or cooling system drawings for individual systems shall indicate the following:

Location and size of all equipment and schedules indicating the make, model number, type and complete performance data of each. Performance data shall include entering and leaving conditions, air/water quantities, pressures, horsepower ratings, electrical characteristics, total capacities in BTU/hour, etc. Layout, location and size of all piping. All piping should be properly identified and all flow arrows shown. Provide a mechanical legend and/or symbol list of various piping, equipment etc. Indicate ductwork and piping to be insulated. Ductwork is to include mains, risers and branches.

Indicate quantity of fresh air make-up required to accommodate exhaust, combustion air and building pressurization.

Location, sizes and output in kilowatts, BTU/hour, CFM and/or GPM of all radiators, registers, diffusers and grilles, fans, etc. Indicate all accessories to include valves, traps, vents, balancing dampers, fire dampers, louvers, flues, drains, controls, unit supports, thermostats, thermometers, gauges, etc.

Data upon which the design of the system was based, including outside design temperature; system operating temperatures; BTU/hour outputs; pressures or temperature drops; air temperatures at registers; pump or fan capacities; volumes and velocities; heat loss for each space to be heated; total heat loss; heat gain of each building; and the total calculated heat load connected to each system.

Data upon which the design of each domestic hot water system was based connected to a heating system.

## MSHDA STANDARDS OF DESIGN

### **m. Plumbing Plans**

Plumbing drawings for individual systems shall indicate the following:

Foundation and composite floor plans at  $\frac{1}{8}'' = 1'-0''$  and unit floor plans and plumbing equipment room plans at  $\frac{3}{8}'' = 1'-0''$ .

Horizontal storm, sanitary sewers and drain systems together with soil, waste and vent stacks, branch wastes and vents, vents through roofs, floor drains, clean-outs, traps, tile drainage, sump pumps, etc., connections to the sewer indicating invert elevations, sizes of all lines and stacks. Riser diagrams of typical stacks, including soil, waste and vents.

Cold water distribution system, size of mains, risers and branches, location of hose bibbs, valves, drains, meter sizes and service.

Hot water distribution system together with recirculating lines and pumps, valves, sizes and mains and branches.

Gas distribution system, sizes of mains and branches, meters location of all gas-fired equipment, etc., to include tabulation of total connected loads in cubic feet per hour and location and size of domestic water heating equipment to include gallons storage, gallons per hour recovery at 100°F rise, gas input, etc.

All piping should be properly identified and all flow arrows shown. Provide a mechanical legend and/or symbol list of various piping, equipment etc.

## MSHDA STANDARDS OF DESIGN

- n. Fire Protection Plans** (composite floor plans at  $\frac{1}{8}'' = 1'-0''$  and unit floor plans at  $\frac{3}{8}'' = 1'-0''$ , unit floor plans and mechanical equipment room plans at  $\frac{3}{8}'' = 1'-0''$ )

**Fire Protection Plans may be submitted as shop drawings. Contract specifications shall state that the fire suppression system shall comply with and be approved by the applicable code authority.**

Fire protection drawings shall indicate sprinkler head locations on composite floor plans, unit and mechanical equipment room plans and/or on reflected ceiling plans. All main pipe routing should be indicated. Show fire protection pipe sizes of all piping (if pipe schedule) and/or hydraulic calculations with pipe sizes if designed hydraulically. Show any fire pump schedule indicating make, model number and complete performance data.

- o. Electrical Plans** (composite floor plans at  $\frac{1}{8}'' = 1'-0''$  and unit floor plans at  $\frac{3}{8}'' = 1'-0''$ )  
Load calculations for main and branch services in conformance with N.E.C.

Service location, type, entrance connection

Riser diagram of primary and secondary distribution, wire sizes, conduit sizes and panel diagrams

Layout of receptacles, light fixtures, emergency lighting, special purpose outlets, doorbells, smoke detectors, intercom, switching connections for each unit type

Layout of site lighting, time clock control, exterior wiring and switching connections

Wiring diagram of special equipment as required, e.g. fire detection, emergency generators, security systems, intercom systems

Lighting fixture schedule and legend

Site Lighting plans and photometric layout

Electrical specifications shall address the requirements for low voltage systems, telephone systems, intercom systems, television reception systems, etc.

- p. Specifications:**

Complete specification of all materials and work to be performed for all aspects of construction shall be in conformance with the **Uniform System for Construction Specifications, Data Filing and Cost Accounting (CSI)**.

## MSHDA STANDARDS OF DESIGN

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

Exterior and interior material selections shall be submitted and approved **prior to the first 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 local area network connection in the living or dining room (Refer to 16740.1)
- 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. (Refer also to **00150 C.**) (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.)

## **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.

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.

Developers may elect to participate in MSHDA's "Congregate Plus" Pilot Program. A program statement and information on the program is available from MSHDA's Multi-family Development and Construction Division. This program has further design standards. The cost of providing the improvements identified in those standards will be offset by an interest rate reduction with the interest accruing and payable at the end of the first loan.

#### **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.

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## **MSHDA STANDARDS OF DESIGN**

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 C.4 and 12600.**)

### **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

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## MSHDA STANDARDS OF DESIGN

dispose of their trash. A remote trash room shall be provided as needed. All trash rooms shall have negative air pressure.

### 11. Signs

All interior signs shall be sans serif font, and shall be consistent with Michigan Building Code (2000) Section 1109-Signage and by reference AANSI (1998) A117.1 Section 703-Signs. (Refer also to **10426**.)

### 12. Package Shelves

Where dwelling unit entries are accessed from common corridors, entry package shelves shall be placed immediately outside each dwelling unit entry. (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
  - Entry door shall be 3 feet in width
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**)
  - If provided, the 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**)
  - "Frost Free" Refrigerator/freezer with 15" minimum counter on latch side

## MSHDA STANDARDS OF DESIGN

- Either side-by-side refrigerator or bottom mount freezer refrigerators in barrier free designed units
  - 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.
  - Counter top work surface shall be a minimum of six lineal feet with cabinets above and below (with drawers).
  - In housing for elderly residents, 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.

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## MSHDA STANDARDS OF DESIGN

- Bath doors shall swing out in elderly units (Refer also to **08001**)
  - Water Closet
  - Bathtub and/or shower
  - Lavatory with vanity (vanity top in barrier free designed units)
  - Mirror
  - Medicine cabinet
  - Toilet paper holder
  - Towel bars
  - Grab bars, as required (Refer also to **10800 and 15460.**)
- 10. Outdoor space**
- At units for families provide a patio at 80 sq.ft. minimum; 8'-0" least dimension. For units for elderly residents provide a patio at 45 sq. ft. with 5'0" least dimension) (refer also to **03001**). Provide a balcony at 45 sq.ft. minimum; 5'-0" least dimension (refer also to **06001**)
- 11. Circulation**
- All interior dwelling unit doors within units designed for elderly residents shall be 2'-10" minimum
  - No winders shall be placed in stair runs

### **E. Acoustical Rating**

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

**STC 50** between living units

**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.

## MSHDA STANDARDS OF DESIGN

**00160**

### **Special Rehabilitation Standards**

Refer to Appendix A for MSHDA Rehabilitation Design Standards.  
Refer to Appendix B for MSHDA Replacement Criteria.

In rehabilitations, design documents shall be prepared to assume that wood floor joists in existing kitchens and bathrooms have rotted and are to be replaced unless investigations prove otherwise.

Other areas of special consideration shall be rafters and sleepers. (Refer also to **00052**.)

## MSHDA STANDARDS OF DESIGN

### **02000 Sitework**

#### **02001 Sitework Design Parameters**

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. (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.)

##### **02001.12 Collector Roads**

Designs shall have no parking along collector roads. (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.)

##### **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.

##### **02001.14 Paving Thickness**

Paving thickness shall be based on recommendations provided by the soil engineer in his Soils Report.

Paving at and in front of waste disposal stations shall be designed to bear the weight of dumpster trucks, 6" thick with reinforcing mesh, minimum. This paving shall be sufficiently large to provide a pad for the truck wheels (front OR rear) at time of loading. The minimum width of the concrete paving shall be the width of the dumpster enclosure. (refer also to **03001**)

##### **02001.15 Gradients**

No gradients on drives shall be less than 1 percent or more than 8% (5% where traversed by pedestrians). Parking lots and areas shall have a cross slope or transverse slope no greater than 3 percent. All ADA, State of MI BF, UFAS and FHAA guidelines shall be met where applicable.

##### **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".

## MSHDA STANDARDS OF DESIGN

### **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 (refer also to **03001**.) Curb profiles shall accommodate snow plowing in identified areas. The Authority recommends main drives and collector roads be crowned with drainage along curbs. (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.)

### **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**.) Asphalt "walking trails" may be provided.

### **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. family units or 45 sq. ft. for elderly. Patios shall be concrete. (Refer also to **03000** and **00150 D**.)

### **02001.4 Retaining walls**

Unless an engineered wall, dry block (no mortar) or timber retaining walls shall be constructed such that the wall shall not exceed 4' in height without an equal horizontal setback. An adequate safety barrier shall be provided at retaining walls as required by code. Where the code is silent on retaining walls and the top of a retaining wall is 30" or greater above adjacent grade and a dangerous condition putting pedestrians at risk exists, an adequate safety barrier shall be provided.

## MSHDA STANDARDS OF DESIGN

### **02001.5 Lawn areas**

Grades shall slope away from buildings at 6" in the first 10' (5%). 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. (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.) Pole bases shall be located 3'-0" back of curb where cars are parked along the curb. (Refer also to **16503**).

#### **02780.2 Lamps**

Exterior lighting shall be of the high-pressure sodium or metal halide type. 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 (See also **Appendix C**).

#### **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** (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.)

**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.

## MSHDA STANDARDS OF DESIGN

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

Tot and/or play lots shall be provided in family (non-elderly) developments. Play equipment shall be installed per manufacturers recommendations for safety and configuration.

### **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.**)

### **02900 Plantings 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.

### **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 Concrete Design**

Slabs and walks shall be a minimum of 4" thick.

Concrete drives shall be a minimum of 6" thick.

Paving at the front of dumpster stations shall be reinforced concrete a minimum of 6" thick. (Refer also to **02001.14**)

#### **03001.1 Curbs**

All curbs shall be concrete (refer also to **02001.18**.)

#### **03001.2 Patios**

Concrete patios shall typically be provided as outdoor space for grade level dwelling units. Patios at units for family residents shall be a minimum of 80 sq.ft. Patios at units for elderly residents may be 45 sq. ft. (refer also to **00150 D** and **02001.3**.)

#### **03001.3 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.

#### **03010 Concrete Materials Strength**

Concrete exposed to weather shall be 4000 psi 28-day compressive strength or better or equal with reinforced materials.

Exterior concrete shall be air-entrained.

Concrete for footings or interior slabs shall be 3000 psi 28-day compressive strength or better.

Slump limits shall meet ACI Standards.

#### **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**.)

#### **03315 Concrete Placement Vapor Retarder**

Provide a vapor retarder or vapor barrier under all interior slabs on grade. Such retarder or barrier shall be polyethylene not less than 6 mils thick or better (refer also to **07190**.)

## MSHDA STANDARDS OF DESIGN

**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**.)

**03650 Cementitious Underlayment**

Cementitious underlayment, including poured gypsum and lightweight concrete, shall be installed in accordance with manufacturer recommendations. Note in particular the requirements for underlayment for resilient flooring.

## MSHDA STANDARDS OF DESIGN

**04000**      **Masonry**

## MSHDA STANDARDS OF DESIGN

**05000 Metals**

**05030 Coatings**

Aluminum windows and doors shall have a baked-on finish. An anodized finish shall not be used.

**05720 Railings and Handrails**

Handrails shall be provided on both sides of all corridors in buildings designed for elderly residents. Handrails shall be provided and installed in accordance with the Michigan Building Code. The “graspability” of handrails shall meet the Handrail Graspability requirements of the Michigan Building Code. Handrails shall return to the walls at interruptions such as doorways and openings (refer also to **06430**.) The interruption by fire hose or extinguisher cabinets shall be shown on drawings.

## MSHDA STANDARDS OF DESIGN

### **06000 Wood and Plastics**

#### **06001 Design**

##### **06001.1 Balconies**

Balconies shall typically be provided as outdoor space for all dwelling units whose living area is above grade. Balconies shall be a minimum of 5'-0" on depth and 50 sq.ft. in area (refer also to **00150 D.**)

##### **06001.2 Framing**

Framing at windows shall be placed for adequate nailing of siding materials.

##### **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. Stains shall be solid stains (refer also to **09900.**) 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. (Refer also to **06300**) (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.)

#### **06190 Trusses**

Energy heels are required. Insulation placed at eaves shall be R-19 minimum (refer also to **07200.**)

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 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.

## MSHDA STANDARDS OF DESIGN

### **06300 Wood Treatment**

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. Stains shall be solid stains (refer also to **09900**.) 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. (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.) (Refer also to **06010**)

### **06430 Handrails**

Handrails shall be provided on both sides of all corridors in buildings designed for elderly residents. They shall be easy to grasp and able to withstand a 300 pound impact load. Handrails shall be placed in accordance with the Michigan Building Code. The “graspability” of handrails shall meet the Handrail Graspability requirements of the Michigan Building Code. Handrails shall return to the walls at interruptions such as doorways and openings. The interruption by fire hose or extinguisher cabinets shall be shown on drawings. (refer also to **05720**.)

### **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**

Walls, not including windows and doors, shall have a minimum insulating value of R-19. Walls constructed to include siding, a wood product sheathing, R-15 unfaced batt insulation, a 4 mil polyethylene vapor retarder and drywall shall be considered in general compliance with the R-19 requirement.

#### **07190 Vapor Retarders**

Provide a vapor retarder or vapor barrier under all interior slabs on grade. Such retarder or vapor barrier shall be polyethylene not less than 6 mils thick or better (refer also to **03315**.)

A continuous vapor retarder or vapor barrier shall be placed on the inside of all exterior walls. The retarder or vapor barrier shall be 4 mil polyethylene or better, overlapped at all joints and wrapped at all window and door framing. Window heads shall not be wrapped. The retarder or barrier shall be fitted and sealed at electrical boxes at exterior walls.

A vapor barrier shall be placed over the crawl space ground surface (refer also to **07200**.)

#### **07195 Air Infiltration Barriers**

##### **07195.1 Sheathing**

Sheathing shall be a nailable wood product. All joints shall occur over wood structural members on walls.

##### **07195.2 Sill Plate**

The sill plate insulation/sealer shall be placed at the junction of the sill plate and foundations.

## MSHDA STANDARDS OF DESIGN

### 07200 **Insulation**

Insulation shall be placed between the frame and rough opening of all exterior doors and windows.

Insulation shall be placed behind all electrical boxes and ducts at the exterior walls. All openings drilled for pipes or wires at the exterior walls shall be sealed tight.

Where unit separation walls or other interior walls with plumbing intersect exterior walls, insulation shall be placed in the interior wall to continue R-19 insulating value and thereby minimize the chance for frozen pipes. Additionally 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.

### 07200.1 **Band Joist**

Insulation equal to R-19 shall be placed at the band joist.

### 07200.2 **Ceiling/attic**

Ceiling/attic insulation shall not be less than R-38.

#### **Exception:**

In mid or high-rise, new construction with a flat roof the insulating value may be R-14.

Energy heels shall be used. Insulation placed at the eaves shall be R-19 minimum (refer also to **06190**.)

Attic access panels shall be weather stripped and tightly fitted and insulated to R-19.

### 07200.3 **Slab**

For slab on grade floors, extruded polystyrene perimeter insulation equal to R-10 shall be placed downward from the bottom of the slab a distance of 24" or from the edge of the slab horizontally beneath the slab for 24" towards the interior. A minimum 2" thermal break shall be placed at the junction of the slab and foundation.

### 07200.4 **Crawl Space**

For floors over crawl spaces, insulation equal to R-19 shall be placed between the floor and crawl space. If the crawl space is to be used as a heated plenum, insulation shall be placed at the exterior wall of the crawl space. A vapor barrier shall be placed over the crawl space ground surface (refer also to **07190**.)

## MSHDA STANDARDS OF DESIGN

**07248**      **Insulation Accessories**  
**Baffles**

Full-width baffles shall be placed between every roof truss and shall allow for cold air movement across the bottom of the roof sheathing and shall prevent insulation from migrating in to the vented soffit area.

**07310**      **Shingles**

MSHDA prefers asphalt shingles to fiberglass shingles on sloped roofs. Shingles shall have a minimum 25 year warranty.

**07460**      **Siding**

Where horizontal aluminum or vinyl siding is continuous across two or more stories of wood construction, an expansion joint shall be provided at the floor line to "absorb" the vertical shrinkage of the wood framing. Aluminum "flat stock" material, exceeding 6" in width, shall not be used at the "band board" or "fascia" unless a "break" in the aluminum stock is provided. This required "break" must be substantial enough to mitigate the effect of "oil canning". A "formed" siding piece may be used in lieu of stock with a "break". Wood or cement board may be used as band board or fascia material.

Siding shall be double or triple 3", 4" or 5" widths and may include decorative siding products. Aluminum siding shall be a minimum gauge of .024". Vinyl siding shall be solid color virgin vinyl. Trim pieces shall be factory specified inside corners, j channels, trim boxes (for light fixtures), etc. Wood may be used for outside corners and window trim.

**07500**      **Membrane Roofing**

Membrane roofing shall have a minimum 10 year warranty on labor and materials.

**07650**      **Flashing**

**07650.1**      **Stepped Roofs**

Stepped sloped roofs shall be flashed with "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 50# felt or "Nervestral" type underlayment from the eave edge to two feet inside the exterior wall line.

**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**).

## MSHDA STANDARDS OF DESIGN

**07920**

### **Sealants and Caulking**

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

Sealant shall be placed around the interior frame of all windows, doors and doorwalls.

## 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. Eight foot wide sliding glass doors shall not be used.

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**

All Exterior doors shall have a maximum thermal transmission coefficient of  $U = .50$ .

Threshold, sides and top of the door opening shall be weather-stripped to limit infiltration to a maximum .35 cfm per linear foot of crack.

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. (Refer also to **06001.2**)

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**.)

## MSHDA STANDARDS OF DESIGN

### **08310 Sliding Glass Doors**

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

Aluminum sliding glass doors shall have a baked on finish and not an anodized finish.

Sliding glass doors (doorwalls) shall meet the insulating, air infiltration, and condensation ratings of windows of like material. (Refer also to **08500, 08610, and 08630.**)

### **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.

### **08520 Aluminum Windows**

Aluminum windows shall have a baked on finish and not an anodized finish.

### **08610 Wood Windows Energy**

All windows must have standard weatherstripping, hardware, screens and accessories. Windows shall have thermal break frames and be double or triple glazed. The windows Condensation Resistance, the overall Effective Thermal Transmittance Coefficient and the maximum air infiltration shall be equal to or exceed the requirements of metal windows (Refer also to **08500**.)

#### **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

### **08630 Vinyl Windows Energy**

All windows must have standard weatherstripping, hardware, screens and accessories. Windows shall have thermal break frames and be double or triple glazed. The windows Condensation Resistance factor, the overall Effective Thermal Transmittance Coefficient and the maximum air infiltration shall be equal to or exceed the requirements of metal windows (Refer also to **08500**.)

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.

### **08670 Storm sash**

Basement windows shall be double-glazed or have storm windows.

## 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.

Stair tower doors, first through sixth floors, to the corridor shall have self-locking dead latches and trigger bolt protection prohibiting entry from the stair tower to the corridor. In buildings over three stories, these doors shall also have electric strike releases that will unlock upon signal from the fire alarm. (Refer also to **16010.1**)

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 **16720.**)

## MSHDA STANDARDS OF DESIGN

**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 **08200 and 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.

Manufacturers recommendations shall be followed in specifying ceiling drywall sufficient to support the weight of specified attic insulation.

#### **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 except kitchens, toilet/baths, laundry, storage, mechanical and similar 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. Using one paint type (satin or egg shell) throughout is preferable to MSHDA.

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**    **Exterior**

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

If the exterior is stained, exterior stain shall not be the transparent or semi-transparent type. (Refer also to **06010**.)

Vents penetrating roofs, with the exception of stainless steel vents, shall be painted with appropriate paint to match the roof shingles. (Refer also to **15800.1**)

## MSHDA STANDARDS OF DESIGN

### **10000 Specialties**

#### **10001 Design 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.

#### **10426 Signs**

All interior signs shall be sans serif font, and consistent with Michigan Building Code (2000) Section 1109-Signage, and by reference AANSI (1998) A11 7.1 Section 703-Signs. (Refer also to **00150 C**.)

#### **10550 Mailboxes**

In buildings designed for elderly residents, mailboxes shall be mounted with the bottom of the lowest box no less than 28 inches and the top of the highest box is no more than 58 inches above the floor, or to meet applicable BF requirements. 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.

## MSHDA STANDARDS OF DESIGN

### 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.

Nothing in this Standard shall be interpreted to waive the requirements for blocking under the FHAA.

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.

## 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 appliances including range and ovens, refrigerators, water heaters, washers, dryers, dishwashers, and air conditioners 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. In all units designed as barrier free units the compartments shall be side by side.

#### **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 unless a roll-under access space (for cleaning) is located adjacent to the appliance.

#### **11452.3 Microwave ovens**

Where microwave ovens are provided as an amenity, they shall be a minimum of 1.0 cubic feet. An electrical outlet shall be provided directly behind the microwave location.

In housing for elderly residents, 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 of the recirculating type except where code or local ordinance requires a hood ducted to the exterior. (Refer also to **15010.3.**) 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 **15010.3** and **16140.**)

## MSHDA STANDARDS OF DESIGN

### 11452.7 Washers and Dryers

If washers and dryers are provided within dwelling units, side-by-side washers and dryers shall be used. Stacked washers and dryers may be used in units designed for elderly residents and in one bedroom units. If the provided stacked washers and dryers are full size units they may be used in two bedroom 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. (Refer also to **15800.1**.)

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**.) In elderly developments and in units designed for barrier free occupancy, **where fire suppression of the units is not provided**, blinds shall not be made from polyvinyl chloride.

Safety cord stops shall be installed on all window treatment cords to prevent injury.

#### 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

**13000**      **Special construction**

## 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. 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 (5' x 7' approx.) so as to facilitate move-ins/outs and emergencies. (Refer also to **00150.B.**)

#### **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 B**)

#### **15010.1 Demolition**

The extent of the demolition and any existing equipment, piping, etc., being reused shall be indicated on the drawings.

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

Heating and cooling systems shall be designed to meet or exceed the requirements of the minimum energy levels set forth in the State Code or any other applicable local code, whichever is more stringent.

All dwelling units designed for family (non-elderly designated) occupancy shall have individual HVAC units.

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. (Refer also to **16850**.)

All common spaces in developments designed for elderly residents shall be air-conditioned. Corridor make-up air shall maintain corridor temperature at 76 degrees F in the summer and 70 degrees F in the winter.

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**.)

Exhaust hoods over ranges/ovens may be of the recirculating type except where code or local ordinance requires a hood ducted to the exterior. All hoods shall include a task light. (Refer also to **11452** and **16510**.)

Baths and common area toilet rooms shall have an exhaust fan ducted to the outside. (Refer also to **11452.6**.) Bath exhaust fans shall be switched separately from the light. (refer also to **16140**)

## MSHDA STANDARDS OF DESIGN

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

#### **15050.1 Pipes and Pipe Fittings**

Domestic water piping shall be copper or solvent welded CPVC.

#### **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.

#### **15050.3 Thermometer and Gauges**

Thermometer and gauge locations shall be indicated on the drawings. All thermometers and gauges shall be readable from the floor.

#### **15050.4 Expansion Loops**

Expansion loops in hot water piping shall be provided. Expansion joints are to be avoided.

#### **15050.5 Mechanical Equipment Identification and Labeling**

Provide proper labeling of equipment and piping in conformance with the latest industry standards.

#### **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.

#### **15050.8 Plastic Drain Pipe**

Cellular foam core PVC shall not be used.

## MSHDA STANDARDS OF DESIGN

### **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.

### **15180.4 Barrier Free Design**

Insulate exposed piping below lavatories in units designed as barrier free to insure residents in wheelchairs do not touch exposed metal piping.

## MSHDA STANDARDS OF DESIGN

### 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**.)

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

Kitchen sinks shall be double bowl and shall be stainless steel. (Refer also to **00150 D**.) In housing for elderly residents, kitchen 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.

In buildings designed for elderly residents, except in Barrier Free designed units, bathtub rim heights above finish floor shall not be higher than 16". 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**.)

In housing for elderly residents, all bathroom water controls shall be single lever controls complying with barrier free design requirements. Controls at bathtubs and showers shall be offset toward the entry side of the fixture for ease of access.

Showerheads shall have a design flow of a maximum of 3 GPM.

In housing for elderly residents and for barrier free designed units, all showerheads, whether in bathtubs or showers, shall be height adjustable. Showerheads in barrier free design units shall be height adjustable using a slide bar device. In non-barrier free designed units for elderly residents a flexible detachable head with brackets allowing several mounting heights is an acceptable alternative.

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.

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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. Water heaters used as the heat source shall be installed per manufacturer's recommendations with particular attention paid to the outlet locations.

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 of 100 gallon capacity or more shall have solid state electronic controls to circulate water through the boiler based upon a drop in water temperature in the storage tank.

### **15500 Fire Protection Sprinkler Systems**

All fire protection systems shall be a wet-pipe sprinkler system.

#### **15500.1 Fire Sprinkler Heads**

All fire sprinkler heads within residential space shall be white in color and have a minimal cowling. Heads recessed into ceilings and walls are preferable.

### **15600 Heat Generation**

#### **15600.1 Modular Boilers**

Gas fired boilers shall be used where heating systems are not provided for each 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.

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

#### **15600.2 Gas Fired Furnaces**

Furnace filters shall not be of fiberglass material. All furnaces shall bear all applicable UL and AGA seals of approval.

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### **15800 Air Distribution** **15800.1 Ductwork / Flues**

Comply with SMACNA HVAC Duct Construction Standards.

Fiberglass ductwork or fiberglass insulation within ductwork shall not be used. Rigid glass fiber insulation with a factory applied vapor barrier on the side facing the air stream is acceptable if all requirements of UL 181 for a Class 1 Air Duct System are satisfied.

All ductwork terminating at the exterior shall be equipped with a back draft damper.

Provide insulation on all ductwork that runs in cold ceiling/attic spaces.

Vertical flue vent pipe shall be double-wall vent type in order to prevent condensation due to the high-efficiency furnaces, boiler and water heaters. Vent pipes shall not extend more than 6" above a chimney or chimney enclosure. (refer also to **09900.2**)

Horizontal direct venting is acceptable.

### **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.

### **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.

Energy load data for heating 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 B**)

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.

Branch circuit load calculations for general lighting and receptacles in dwelling areas shall be a maximum of 80% of branch circuit capacity.

In housing for elderly residents, 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**.)

Stair tower doors to the corridor shall have self-locking dead latches and trigger bolt protection prohibiting entry from the stair tower to the corridor. This requirement is applicable for the first through sixth floors. In buildings over three stories, these doors shall also have electric strike releases that will unlock upon signal from the fire alarm. (Refer also to **08710**)

#### **16120 Wires and Cables**

Copper wiring shall be used throughout except that aluminum wiring may be used in wiring #6 or larger. Wire size shall be based on 75 degrees Celsius.

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### **16140 Wiring Devices Switches**

Disposal unit and range hood switches shall be considered controls which are required to be within reach and therefore located on a side wall or at the front of the counter for access by handicapped persons.

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** and **15010.3**)

### **16200 Emergency generator**

An emergency generator shall be provided in any MSHDA financed multi-story building exceeding forty feet to the top floor. 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.

### **16300 Service**

A maximum of six service main disconnects in the same location or room will be allowed. Rated fire assemblies, separating main disconnects shall not be penetrated with circuiting.

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### **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 elderly 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. Lamps for lighting carports shall be the same HID lighting type. (Refer also to **02780**)

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- 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.
- 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**  
Common exterior lighting shall be of the high-pressure sodium or metal halide type. 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. (See **Appendix C** for the HOME TEAM Advantage Program Modifications to Standards.)

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

All dwelling unit smoke detectors shall be photoelectric type.

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.

**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

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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.

### **16740.1 Local Area Network**

All dwelling units shall be provided with a Local Area Network connection in the living or dining room, capable of providing a high speed internet connection.

### **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.**)

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### Appendix A

#### Rehabilitation Design Standards

##### General Policy Statement

MSHDA will undertake financing developments involving rehabilitation when developments provide the best alternative for development, meet MSHDA targeted objectives **and** provide a reasonable risk with a reasonable prediction that the development will result in successful outcomes. Successful outcomes are measured in terms of providing a continuing marketable development, a stable resident population, a well-maintained structure and repayment of the loan throughout the term of the loan.

##### Occupied Housing Developments

1. Where the development proposal involves the rehabilitation of an existing occupied development, a Capital Needs Assessment (CNA) shall be required. The CNA shall be thorough and provide a written analysis of all major systems of the structure(s) and life cycle costing. The CNA shall meet all of the requirements of The State of Michigan's Tax Credit Preservation Holdback's Tax Credit Capital Needs Assessment Requirements. Additionally, the CNA shall incorporate a report that evaluates the **structural capacity** of the existing buildings in compliance with the requirements of MSHDA's Engineer Investigation for Remodel Work. A licensed structural engineer shall prepare this portion of the CNA.
2. The proposed design and costing shall address all CNA identified needs through the proposed construction or replacement reserves.
3. Where the development is not a previously financed MSHDA development, MSHDA design, costing and construction staff shall carryout a walk-through of the development prior to acceptance for processing but after receipt of the CNA.
4. An analysis by MSHDA Underwriting shall be made to determine if the proposal will meet the overall objectives set forth in the General Policy Statement.
5. Where the development proposal includes the reuse of internal building components, the reuse shall be done in accordance with MSHDA's Replacement Criteria.
6. All replacement materials shall be equal to materials and methods of construction as required in the MSHDA Standards of Design for new construction.
7. Financing shall provide a construction contingency equal to no less than 10% of the construction contract.

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### Appendix A Rehabilitation Design Standards Page Two

#### Adaptive Re-use or Unoccupied Housing Developments

1. Where the development proposal involves the rehabilitation of non-occupied existing housing structures or an adaptive re-use of structures, MSHDA shall require the development team to prepare a thorough investigation and analysis of the structure, exterior and interior. The investigation report shall incorporate a completed MSHDA "Engineer Investigation for Remodel Work", available from MSHDA's Multi-family Development and Construction Division.
2. A preliminary analysis of the effects of historic designation requirements i.e. impact on the community, funding, and costs, shall be prepared by the development team.
3. Location and site selection shall be important underwriting considerations of acceptance for processing.
  - a. Locations shall provide appropriate parking meeting MSHDA Multi-family standards.
  - b. Locations shall provide reasonable security.
  - c. Locations shall provide appropriate outdoor spaces for the developments.
  - d. Locations shall provide nearby amenities for the targeted resident population and meet MSHDA's site selection criteria.
4. If commercial space is to be located within the structure, an analysis of the marketability and financial impact of the proposed commercial space shall be prepared by the development team. Uses inappropriate for or incompatible with the target population shall be not be allowed.
5. A preliminary analysis prepared by the development team architect shall be submitted showing the proposed size and configuration of units and common spaces.
  - a. Rehabilitation proposals shall provide units and common spaces that are marketable provide living conditions comparable to new construction and provide a development that is cost effective to operate and maintain.
  - b. Units shall provide acceptable views.
  - c. Living units located in basement level conditions are not acceptable.
  - d. Living units accessed by elevator shall not be provided for family occupancy.
6. Major systems including plumbing, electrical, HVAC, elevators, roofs, windows and insulation shall be replaced and brought up to "new construction" standards as part of the proposal. None of the existing systems shall be considered usable.
7. It shall be presumed that all finish materials will be new.
8. Design and construction drawings, specifications and standards shall be equal to MSHDA Standards of Design for new construction.
9. Financing shall provide a construction contingency equal to no less than 10% of the construction contract.

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### Appendix B Replacement Criteria

**The following criteria are to be used in a MSHDA financed rehabilitation where interior building components are to be reused.**

All work shall conform to applicable codes. Replacement materials and methods shall comply with the requirements of the MSHDA Standards of Design.

The evaluation of building components, using these criteria, shall be done by the assigned MSHDA construction staff person in cooperation with the supervising architect, owner, and contractor. Components not covered in this listing shall be evaluated using the listed criteria for similar components.

#### A. **General**

1. Painting: Repaint all painted surfaces and paint all repaired surfaces to match existing and / or adjacent. Lead based paint shall be abated in conformance with applicable law.
2. Drywall: Must be clean, smooth, and have as an homogeneous surface as new.
3. Floor Covering: Unless existing is as new, all sheet vinyl is to be replaced. Reuse carpet only if it has no stains, no worn areas and each room within a unit matches. Ceramic tile bathroom floors must have no chips or cracks and be clean. If a ceramic floor is not acceptable, it may be replaced or it may be overlaid with new sheet vinyl after preparation of existing flooring so as to be a smooth, clean surface not subject to telegraphing the joints.
4. Closet Shelving: Must be smooth, tight fitting, with no delaminating, and be properly anchored.
5. Drapery Hardware: Must function properly, have clean appearance, and be properly anchored.
6. Draperies or Blinds: Unless existing is as new, new draperies or blinds shall be provided. Existing draperies and blinds shall comply with MSHDA Standards of Design.
7. Appliances, motors and other equipment: Life cycle costing should be considered. The projected life of existing appliances, motors and other existing equipment should be equal to or exceed five (5) years. If less than five years replacement is required.

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## MSHDA STANDARDS OF DESIGN

### Appendix B Replacement Criteria

#### B. Kitchens

1. Kitchen Appliances: Reuse only if they function properly, have good overall appearance, and only minor scratches.
2. Kitchen Counter tops: No bad chips, burns, stains, cracks, or deformities; must match within same kitchen and be adequately anchored.
3. Kitchen Cabinets: Must function properly and occupy same space as new; new and existing in same kitchen must match; hardware must match; no deep gouges or broken pieces or parts. In developments for elderly, cabinets must have easily graspable hardware pulls.
4. Kitchen Sinks: No cracks or chips (unless chip can be satisfactorily re-glazed); must function properly and be adequately anchored; small light stains are acceptable.
5. Disposal: Must function properly and not leak.

#### C. Bathrooms

1. Bath Vanity, Vanity Top, Lavatory (sink) and Medicine Cabinet: Remove any wall-hung sink and replace with new vanity and lavatory (sink). Existing vanities, sinks, tops, legs, and medicine cabinets must meet criteria for kitchen tops, cabinets and sinks above.
2. Bathtub, Showers, Water Closets, Wall Surround (Ceramic Wall Tile or Fiberglass): Bathtubs and shower bases shall have no cracks or chips (unless chip can be satisfactorily re-glazed); must function properly and be adequately anchored; small light stains are acceptable. Fixtures must function properly. Ceramic wall tile and fiberglass surrounds must have no chips or cracks and be clean with no bad stains or deformities and tiles must match within same bathroom and be adequately anchored.

#### D. Doors and Door Hardware

1. Unit Interior Doors: Repairs will be attempted on minor cracks and punctures only; otherwise, new doors will be installed. Repaired doors must function properly, be smooth and tight fitting with no delaminating. All door finishes within unit must match. Re-paint all painted doors. Previously unpainted (stained) doors may be painted to match doors within units.
2. Unit Entry Door: All entry doors are to be new with new door hardware.
3. Door Hardware: All unit entry door hardware is to be new and shall meet MSHDA criteria for entry door hardware. Interior hardware must function properly and have clean appearance.

## MSHDA STANDARDS OF DESIGN

### MSHDA Standards of Design

#### Appendix B

#### Replacement Criteria

##### E. Windows

1. Interior Trim: All window finishes within a unit must match. Re-paint all painted window trim. Previously unpainted (stained) trim may be painted to match all window trim within units. At all window units seal perimeter.
2. Window Glazing and Sash: All windows and sash shall be thermal break with insulating glass. All window units are to be free of paint and have functional locks. Replace all torn screens, broken glass, and insulating glass that has spoiled thermal seals.

##### F. Plumbing

1. Plumbing: Must function properly. See fixtures under **Bathrooms** and **Kitchens** above.

##### G. Mechanical

1. Heating, Air Conditioning Units and Covers: Must function properly and have clean and neat appearance with no large dents or visible damage. Paint covers to match adjacent walls.

##### H. Electrical

1. Electrical wiring: Replace all aluminum wiring smaller than #4 or used for branch service other than to a range.
2. Electrical Fixtures, Outlets, Switches, Exhaust Fans, etc.: Must function properly and have clean appearance with no chips, cracks, or paint.
3. Electrical Receptacles and Switch Cover Plates: Replace all cover plates.
4. Smoke Detectors: Must function properly and have clean appearance. Replacement smoke detectors shall preferably be hard-wired and, if hard-wired, shall be photoelectric within units.

## MSHDA STANDARDS OF DESIGN

### Appendix C HOME TEAM Advantage Program Modifications to the MSHDA Standards of Design

For all developments with 50 or more units the full MSHDA Standards of Design apply. For all developments with less than 50 units the same Standards shall apply with the following allowable modifications.

00020. Mechanical and electrical design may be carried out by the architect as permitted by the Michigan Building Code.
- 00040 The use of HOME funding will require compliance with all applicable Federal regulations. The HOME TEAM Advantage Program requires 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. HOME funds require 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.**)
- 00100 Design Review Process  
On a development by development basis some streamlining of the Design Review Process will be attempted. Primarily the streamlining will be based on whether the proposed units and buildings have been previously built and are successfully being rented. Reviews may be written with no meeting for Commitment level review. The need for mechanical and electrical reviews will be evaluated.
00150. Community space is not required for family developments, however the development team must satisfactorily provide for office and maintenance operations.
- 02001.11 In family developments, the limited use of dead end parking lots will be allowed. Safety and convenience should not be significantly sacrificed. Dead end lots shall be limited to a maximum of 5 car widths.
- 02001.12 In family developments, the limited use of parking along a collector road will be allowed. Safety and convenience should not be significantly sacrificed.
- 02001.18 All drives and parking areas need not be curbed. The extent of curbing shall be based on safety and maintenance. The extent of curbing should be consistent with the community. Parking should be designed to maximize the use of turned down sidewalks / curbs (thickened walks). Place curbing at radii and include provisions for plowing snow.

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### Appendix C HOME TEAM Advantage Program Modifications to Standards

- 02001.2 Provide walks as required by the local municipality and as necessary to travel from parking to the building entries.
- 02780.1 Site lighting should be consistent with the surrounding community and avoid a neighborhood "glow". Lighting should be designed for the safety of the residents travel to and from parked cars. In family developments, some lighting can be from building mounted lights, however, building mounted lights must avoid glare which compromises visibility for pedestrians or drivers.
- 02810.1 Irrigation is not required, however, some method of watering must be provided.
02900. Shade or canopy trees shall not be less than 2" caliper. Indigenous plant materials should be used. The use of evergreen seedlings for screening is encouraged.
02930. The use of sod may be limited. Establish a lawn with seeding.
06010. The use of vinyl trim in lieu of painted wood to reduce maintenance is encouraged. An exception to this standard is the requirement to provide a detail for shrinkage at the band joist. (Refer to **07460** of the Standards of Design.)

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Dining .....	0.41 - 0.43, 12.1
Dishwasher .....	0.43, 11.1
Doors .....	0.27, 0.31, 0.34, 0.39, 0.41, 0.44, 0.45, 2.5, 5.1, 7.1, 7.2, 7.4, 8.1, 8.2, 8.5, 8.6, 11.2, 16.1
Downspouts .....	0.34, 0.39, 2.3, 7.3
Drapery .....	12.1
Drive .....	0.12, 2.1, 2.2, 3.1
Drives .....	2.1, 2.2, 3.1
Dryers .....	11.1, 11.3
Ductwork .....	0.36, 11.3, 15.6
Eaves .....	6.1, 7.2, 7.3
Efficiency units .....	0.40
Elderly .....	0.9, 0.20 - 0.22, 0.39 - 0.45, 2.1, 2.2, 2.6, 3.1, 5.1, 6.1, 6.2, 8.1, 8.5, 8.6 9.2, 10.1, 10.2, 11.2-11.4, 12.1, 14.1, 15.1, 15.4, 16.1, 16.3, 16.5, 16.6
Electric strike releases .....	8.5, 16.1
Electrical heating .....	15.1, 16.6
Elevators .....	0.22, 0.41, 0.45, 14.1
Emergency call .....	16.2, 16.5
Energy heels .....	6.1, 7.2
Energy loads .....	15.1, 16.1
Environmental .....	0.10, 0.17, 11.1, 15.4, 15.6
Errors and Omissions Insurance .....	0.2, 0.3
Escutcheon .....	15.2
Exhaust hood .....	0.43, 11.2, 15.1
Exitways .....	9.2
Expansion joints .....	3.2, 9.1, 15.2
Expansion loops .....	15.2
Fair Housing Amendments Act .....	0.1
Fast Track processing .....	0.2
Faucets .....	15.4
Feasibility .....	0.17-0.21, 0.26, 0.39
Fiberglass .....	7.3, 15.4-15.6
Finishes .....	0.35, 0.39, 9.1
Fire protection .....	0.38, 6.1, 6.2, 15.5, 16.2
Fire pump .....	0.38, 16.2
Flashing .....	7.3
Floor covering .....	6.1, 9.1
Floor space requirements, dwelling units... see Dwelling Unit design, noting Furnishability .....	0.45
Floor drain .....	0.37, 0.42

## MSHDA STANDARDS OF DESIGN

Fluorescent lighting .....	16.4
Foyer .....	0.43, 15.1
Framing .....	0.33-0.36, 6.1, 7.1, 7.3
Furnaces.....	15.5 - 15.7
Furnishability .....	0.27, 0.43, 16.5
Furnishings.....	0.27, 0.40, 0.41, 0.42, 12.1
Garbage disposal .....	0.42, 0.43, 11.2, 15.1, 15.4
Gauges.....	0.36, 15.2
Generators.....	0.38, 16.2
Glass .....	0.41, 7.3, 8.1, 8.2, 8.6, 15.4, 15.6
Glazing .....	8.6
Grab bars.....	0.45, 10.2, 15.4
Gradients .....	2.1, 2.2
Gutters.....	0.13, 0.14, 0.29, 0.30, 0.34, 0.39, 2.3, 6.1, 7.3
Gypsum board .....	9.1
Handrails .....	5.1, 6.2
Hardware .....	8.3-8.6, 12.1
Hazardous material .....	0.10
Health services .....	0.41
Heating .....	0.36, 0.37, 15.1, 15.3, 15.5, 15.6, 16.1, 16.6
Hinge pins.....	8.5
Hose bibb .....	0.37, 0.42
Housekeeping.....	0.41
Ice dam.....	7.3
Insulating values.....	7.1
Insulation .....	0.35, 0.40, 6.1, 7.1-7.3, 9.1, 15.3, 15.6
Intercom.....	0.38, 16.6
Intercommunications .....	16.6
Irrigation.....	0.2, 0.8, 0.20, 0.26, 0.28, 0.30, 0.31, 2.5
Jambs .....	8.1
Joints .....	2.5, 3.2, 7.1, 7.4, 9.1, 15.2
Kitchen.....	0.2, 0.9, 0.22, 0.34, 0.35, 0.42, 0.43, 0.44, 0.46, 9.1-9.3, 11.4, 15.1, 15.4, 16.3, 16.4
Labeling .....	9.2, 15.2
Laminates .....	6.1
Lamps .....	2.4, 16.3, 16.4
Laundries.....	0.22, 11.3, 15.1
Laundry.....	0.9, 0.22, 0.42, 8.6, 9.1, 9.2, 12.1
Lavatories .....	11.4, 15.3, 15.4
Lavatory.....	0.44, 11.4
Lawn .....	0.30, 2.3, 3.1
Lever handles .....	8.5
Lighting.....	0.26, 0.32, 0.34, 0.38, 0.41, 2.4, 16.1-16.4
Lighting levels.....	2.4, 16.3, 16.4
Lightweight concrete.....	3.2, 9.1
Linen.....	0.44
Living room.....	0.43, 12.1, 16.6

## MSHDA STANDARDS OF DESIGN

Locksets .....	8.5, 8.6
Lumber .....	6.1, 6.2
Luminaires .....	16.4
Mail .....	0.22, 0.32, 0.41
Mailboxes .....	10.1
Maintenance .....	0.22, 0.24, 0.30, 0.32, 0.40, 0.42, 2.3, 8.5
Masonry .....	2.3, 4.1
Medicine cabinet.....	0.45, 10.2
Meetings .....	0.1, 0.18
Membrane roofing .....	7.3
Metals .....	5.1
Microwave .....	0.44, 11.2, 16.1
Mirror .....	0.45
Net area.....	0.22, 0.27
Night lights.....	16.3
Office .....	0.22, 0.39, 0.40, 0.42, 16.3, 16.5
Offices .....	16.3
Package shelves .....	0.43, 6.1, and 10.1
Paint .....	0.39, 2.6, 3.2, 6.1, 8.3, 9.1, 9.3
Painting.....	9.3
Pantry .....	0.44
Parking .....	0.16, 0.17, 0.21, 0.24-0.26, 0.32, 0.40, 2.1-2.2, 2.4, 2.5, 16.3, 16.4
Parking lots.....	2.1, 2.4, and 16.3
Pass-through .....	0.44
Patio .....	0.34, 0.45, 2.2, 3.1, 6.1, 6.2, 8.1, 16.4
Paving.....	0.12, 0.26, 0.29, 2.1, 3.1
Peephole .....	8.5
Plantings.....	2.6
Plastic .....	6.1, 6.2, 8.1, 8.5, 11.3, 15.2
Plumbing.....	0.34, 0.37, 7.2, 10.2, 15.4
Poles.....	0.13, 0.32, 2.4, 16.3
Polystyrene.....	6.2, 7.2, 8.1, 9.1
Pre-design .....	0.1, 0.18
Precast concrete.....	3.2
Presentation .....	0.27
Railings.....	0.34, 5.1
Ramps .....	0.42, 2.2
Range/oven .....	0.42, 0.43, 11.1, 11.2
Range Hood and light .....	11.2, 15.1, 16.4
Receptacles.....	0.32, 0.38, 16.1
Refrigerator.....	0.42 - 0.44, 11.1, 11.2
Rehabilitated.....	0.15
Rehabilitation.....	0.1, 0.3, 0.9, 0.10, 0.46
Resilient flooring.....	3.2, 9.1
Retaining walls .....	0.12, 2.2
Reviewer.....	0.6, 0.31

## MSHDA STANDARDS OF DESIGN

Screens .....	0.32, 8.2-8.4
Sealants.....	7.4
Sealing.....	3.1
Security.....	0.38, 8.3-8.5, 16.1, 16.6
Sheathing .....	0.35, 7.1, 7.3
Shingles.....	7.3, 9.3
Siding.....	0.39, 2.3, 6.1, 7.1, 7.3
Signs.....	0.27, 0.32, 0.41, 0.43, 2.1, 2.4, 2.6, 10.1, 16.4
Sill plate .....	7.1
Sills .....	0.35, 6.1
Sink.....	0.42, 0.43, 11.4, 15.2, 15.4, 16.3, 16.4
Site analysis .....	0.18, 0.19, 0.21, 0.23, 0.25, 2.1
Site concept.....	0.18, 0.19, 0.21, 0.25
Sitework.....	2.1
Slab .....	0.33, 2.3, 3.1, 3.2, 7.1, 7.2
Sliding glass doors .....	8.1, 8.2
Smoke detectors.....	0.38, 16.5
Soil borings.....	0.16, 0.17, 0.23, 0.26
Sound ratings .....	0.35, 0.45
Sprinklers.....	2.5
Stain .....	0.39, 6.1, 6.2, 9.3
Stair .....	0.22, 0.34, 0.35, 0.40, 0.45, 8.5, 16.1, 16.3
Stairs .....	0.34, 0.35, 0.45, 8.5, 16.3
Steps .....	0.30
Storage .....	0.9, 0.22, 0.27, 0.32, 0.37, 0.40, 0.42, 0.43, 9.2, 15.5, 16.2
Storm doors .....	8.2
Storm water .....	0.13, 0.25, 0.26, 0.30, 15.3
Structural engineer .....	0.4, 0.15
Submission .....	0.3, 0.5, 0.11, 0.18-0.21, 0.26, 0.27, 0.31, 0.39, 15.1, 16.1
Survey .....	0.2, 0.5, 0.11-0.14, 0.16, 0.21, 0.26, 0.28
Switches .....	16.2
Tables.....	12.1
Tanks.....	15.5, 16.2
Task light .....	0.43, 15.1, 16.4
Telecommunications.....	16.6
Television .....	0.38, 0.43, 16.6
Termite control.....	2.3
Testing.....	9.3, 15.6
Thermometer .....	0.36, 15.2
Three bedroom .....	0.43
Toilet.....	0.42, 0.45, 9.2, 15.1, 16.3
Tot or Play lots.....	2.6
Toxic .....	2.3, 2.4
Trash chute.....	0.42
Trash compactor.....	0.42, 15.1

## MSHDA STANDARDS OF DESIGN

Trash removal.....	0.41
Trees .....	0.13, 0.30, 2.6
Trusses.....	6.1
Valves.....	0.30, 0.36, 0.37, 2.5, 15.2, 15.5, 15.6
Vapor barrier.....	3.1, 7.1, 7.2, 15.3, 15.6
Vapor retarder .....	3.1, 7.1
Vent .....	0.34, 0.36, 0.37, 7.3, 8.1, 8.5, 9.3, 12.1, 15.6
Viewer.....	8.5
Waiver .....	0.19, 0.20
Walk.....	16.4
Walks.....	0.29, 0.30, 2.2, 2.4, 2.5, 3.1, 16.3, 16.4
Walkways .....	2.2, 2.4
Wall base.....	9.1
Washers .....	11.1, 11.3
Water closet.....	0.44, 0.45, 15.5
Water closets.....	10.2, 15.4
Water conditioning.....	15.4
Water heaters .....	11.1, 15.5, 15.6
Water softeners .....	11.1, 15.4
Winders .....	0.45
Windows .....	0.34, 0.40, 2.4, 5.1, 6.1, 7.1, 7.2, 7.4, 8.1-8.4
Wiring .....	0.38, 16.1, 16.2, 16.4, 16.6
Wood treatment.....	6.2