



Minnesota Housing Green New Construction Requirements

May 22, 2008



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Continuing Education Systems

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Minnesota Housing 2008

A photograph of two young girls of African descent standing on a staircase. The girl on the left is taller, wearing a white t-shirt, and has her hair in braids. She is smiling broadly and has her arms around the shoulders of the younger girl. The younger girl is wearing a red t-shirt and also has braids. She is looking off to the side with a happy expression. The background is a plain, light-colored wall. The text is overlaid on the right side of the image.

Minnesota Housing finances
and advances affordable housing
opportunities for low and moderate
income Minnesotans to
enhance quality of life and foster
strong communities.

End long-term homelessness.

Finance new affordable housing opportunities.

Increase emerging market homeownership.

Preserve affordable housing.

Learning Objectives

- **Describe (overview) the Minnesota Housing's sustainability policy.**
- **Understand the multi-family's green overlay requirements.**
- **Gain a good understanding of multi-family's first-year experience with the green requirements.**
- **Understand the single-family's green overlay requirements.**
- **Interpret the single-family green requirements in the CRV program.**
- **Understand the evaluation and outcome measures.**

Sustainability Policy

- **Encourage sustainable, healthy housing**
 - » **Optimize use of cost effective durable building materials & systems**
 - » **Minimize consumption of natural resources during construction/rehab & in long term maintenance and operation**
- **Encourage use of renewable energy & resources**
 - » **Minimize damages and impact to the environment**
 - » **Maximize the use of natural amenities of the development site**

Challenges & Choices

- **Choosing a system that matches our Minnesota climate**
- **Selecting a system that reflects the diversity of scale & locations of Minnesota Housing projects**
- **Variety of green building programs**
 - » **LEED**
 - » **Energy Star**
 - » **Federal Tax Credit Program**
 - » **Minnesota GreenStar (MN-specific)**
 - » **Enterprise Green Communities**

Opportunity & Match

- **Enterprise Green Communities**
 - » **National Green Communities Criteria**
 - » **Developed through Enterprise Community Partners**
 - » **Specific to the affordable housing sector**
 - » **Structured with mandatory and optional requirements**
 - » **Basis for Minnesota Green Communities partnership**
 - » **Underlying system for Minnesota Housing's green requirements**

Minnesota Housing Green

- **Incorporated into MF 2007 Request for Proposals**
- **SF 2008 rollout**
- **Minnesota-specific overlay language developed**
- **Mandatory elements of the national criteria only**
- **Applies to new construction projects only**
 - » **Rehabilitation is optional but recommended**
- **Waiver process implemented**
- **Good response from partners & developers**

Other Project Selection Criteria

- **Financial feasibility**
- **Local & regional market conditions**
- **Appropriateness of design for site and proposed population**
- **Achieve long-term sustainability & reduction in operating costs**
- **Integrated supportive services**

Minnesota Housing Multifamily Design Criteria

- **General occupancy standards**
- **Supportive housing standards**
- **Accessibility standards**
- **Visitability standards**
- **General Obligation Bond guidelines**
- **Housing Tax Credit design standards**
- **Minnesota Overlays to Green Communities**

National Green Communities Criteria-- 8 Broad Categories

- 1. Integrated design process/Integrated design team**
 - » **Developer**
 - » **Architect**
 - » **Landscape Architect**
 - » **Engineers**
 - » **Property Manager**
 - » **Contractors**
 - » **Other Consultants**
 - » **Utility Companies - Conservation Improvement Program (CIP)**

National Green Communities Criteria

2. Location and neighborhood fabric

- » Proximity to existing development
- » Smart site location
- » Compact development
- » Proximity to services
- » Walkable neighborhoods

3. Site improvements

- » Environmental remediation
- » Erosion & sedimentation control
- » Landscaping (mandatory only if providing landscaping)

National Green Communities Criteria

4. Water conservation

- » Water conserving appliances & fixtures
- » Efficient irrigation (if irrigation is necessary)

5. Energy efficiency

- » Efficient energy use
- » Energy Star appliances
- » Efficient lighting--interior & exterior
- » Electricity meters

National Green Communities Criteria

6. Materials beneficial to the environment:

- » **Recycled content of building materials**
- » **Salvaged or engineered wood products**
- » **Water-permeable site surfaces**
- » **Reduce heat island effect: roofing & paving**

National Green Communities Criteria

7. Healthy living environment

- » **Low or no Volatile Organic Compounds (VOC) paints & primers**
- » **Low or no VOC adhesives & sealants**
- » **Urea formaldehyde-free composite wood**
- » **Green Label Certified floor coverings (if providing floor coverings)**
- » **Exhaust fans—bathroom & kitchen**
- » **Ventilation that meets ASHRAE 62.2**
- » **HVAC sizing**
- » **Water heaters—mold prevention**
- » **Materials in wet areas—surfaces & tub & shower enclosures**
- » **Basements & concrete slabs—vapor barrier & radon**

National Green Communities Criteria

7. Healthy living environment (continued)

- » **Water drainage**
- » **Garage isolation**
- » **Clothes dryer exhaust**
- » **Integrated pest management**
- » **Combustion equipment**

8. Operations & maintenance

- » **Building maintenance & occupant's manuals**
- » **Homeowner orientation**

Minnesota Overlays to the Green Communities Criteria

- **Modify six of the eight broad categories**
- **Adapt Green Communities Criteria to the local environment and economy**

1. Green Development Plan

- **Integrated design action plan**
 - » **MF Overlay: Adds three step certification process including Developer, Architect, and General Contractor**
 - » **SF Overlay: Adds two step certification process including CRV Contract Administrator, Architect and Contractor**
 - » **No special technical certifications (like LEED) are required**

2. Location & Neighborhood Fabric

- **Smart site location**
- **Compact development**
- **Multifamily and Single Family Overlays:**
 - » **Both modify how density is calculated**
- **Single Family Overlay:**
 - » **Provides resource links for wetland, farmland, and endangered species protections**
 - » **Modifies “Proximity to Services” requirements**

3. Site Improvements

- **Environmental remediation**
- **Erosion & sedimentation control**
- **Landscaping**

4. Water Conservation

- **Water conserving appliances & fixtures (same as MN Plumbing Code)**
- **Efficient lawn irrigation: gray water or 95% efficiency**

5. Energy Efficiency

- **Meet one of:**
 - » **2007 Energy Star Standards or;**
 - » **HERS (Home Energy Rating System) score of 80;**
 - » **or exceed ASHRAE 90.1 by 30% (MF only)**
- **Energy-Star appliances and light fixtures**
- **Exterior lighting: daylight sensors or timers/time clocks**
- **Individual or sub-metered electrical service**

6. Materials Beneficial To The Environment

- **Five optional criteria; no mandatory criteria; no overlay amendments**
- **Some options may be low cost/zero cost impact and worth considering or exploring**
- **Don't ignore this section, just because it is optional!**

7. Healthy Living Environment

- **Many MF and SF Overlay elements are identical**
- **The most rigorous criteria that will have the greatest impact on design, construction technologies, and cost**
- **Improve indoor air quality by reducing or eliminating pollutants: volatile organic compounds, formaldehyde, pollen, mold, mildew, other allergenic microbes**
- **Impacts building material selection and finish locations, manufactured material compositions, and moisture and water resistance of components and finishes**

7. Healthy Living Environment

- **Impacts ventilation equipment selection, sizing, operation, and air volumes**
- **Impacts water, moisture, plumbing systems, and humidity/condensation management**
- **Mechanical engineering design implications preclude mechanical design/build delivery methods**

8. Operations & Maintenance

- **MF Overlay**
 - » **Requires preparation of Owner's Manual, Occupant's Manual, & resident training**
 - » **Overlay provides recommended links on how to implement these criteria**
- **SF Overlay**
 - » **Requires Owner's Manual**
 - » **Provides link to additional recommendations**

Lessons Learned

- **Intended Method of Satisfying Green Communities Criteria Form/Worksheet**
 - » **Required submission with loan application**
 - » **Fulfills Green Development Plan requirement**
 - » **Provides a template for managing team contributions**
 - » **Provides Minnesota Housing with a checklist to verify compliance**
 - » **Reusable template from project to project**

Development Name: Sunnyside Acres

	ITEM TITLE	INTENDED METHOD OF SATISFYING GREEN CRITERIA	YES	NO	WALVER REQUEST
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Section 1. Integrated Design Process

1.1	Green Development Plan (Mandatory):	<p>RESPONSIBLE PARTY; ROLES & RESPONSIBILITIES:</p> <p>Developer (name): Select complying site; Assemble, approve, and coordinate team; Prepare Owner's Manual; Prepare Tenant's Manual.</p> <p>Architect (name): Coordinate Design Consultants: Civil, Landscape, Structural, Mechanical, Electrical; Ensure compliance with Sections 2.1b, 2.2, 2.3, etc., etc., etc.</p> <p>Civil Engineer/Landscape Design (name): Ensure compliance with Art's 3.1, 3.2, 3.3, 4.2.</p> <p>Mech. Engr (name): Ensure compliance with Arts. 4.1 a, 5.1a (Mech. Equip.)</p> <p>Elect. Engr (name): Ensure compliance with Arts. 5.3a & b, 5.4</p> <p>Property Manager (name): Assist with preparation of Owner's Manual & Tenant Manual. Implement tenant training and orientation with Tenant Manual.</p> <p>Gen'l Contr. (name): Provide cost estimating and value engineering of sustainable features and options. Assist in cost benefit analysis and life cycle costing.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Section 2: Location and Neighborhood Fabric

2.1a	Smart Site Location - Proximity to Existing Development (Mandatory):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.1b	Smart Site Location - Protecting Environmental Resources (Mandatory):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.1c	Smart Site Location - Proximity to Services (Mandatory):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.2	Compact Development (Mandatory):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.3	Walkable Neighborhoods (Mandatory):	Arch. Plans: Shows connecting sidewalks (or permanent easement for future walks, per Mn. MF Overlay) on site plans. Ensure all site plans prepared by others (Civil Engineer, Landscape Architect, etc.) also comply.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4a	Smart Site Location (Optional):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.4b	Smart Site Location (Optional):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2.5	Compact Development (Optional):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	ITEM TITLE	INTENDED METHOD OF SATISFYING GREEN CRITERIA	YES	NO	WALVER REQUEST
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Section 4: Water Conservation

4.1a	Water-Conserving Appliances and Fixtures - New Construction (Mandatory):	Mech. Engineering Specification to include: Water Closets: 1.5 gpm; Showers: 2.0 gpm; Kitchen Faucets: 1.5 gpm; Bath Faucets: 2.0 gpm. (Make & Model no.s of fixtures alone is insufficient to verify compliance.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.1b	Water-Conserving Appliances and Fixtures - Moderate Rehab (Optional):		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2	Efficient Irrigation (Mandatory):		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 5: Energy Efficiency

5.1a	Efficient Energy Use - New Construction (Mandatory):	Arch. & Mech. Engr: Ensure compliance for each bldg. Type. S.F. & TH's: Energy Star Bldg's Option Pkge -(list required performance criteria, such as R-48 attic insul., R-21 roofs as detailed on drawings; A/C SEER >13; Furnace AFUE > 90 in Mech. Spec/Equip. Schedule, etc. Apartments: Exceed ASHRAE 90.1, 1997 STD. by at least 30%. (list required performance criteria, such as roof insul. R-28, Wall Insul. R 15, Mech. & Elect. Equip Performance Criteria, etc.) (Failure to include specific energy performance criteria in plans and specs is grounds for "Revise & Resubmit.")	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.1b	Efficient Energy Use - Moderate Rehab (Optional):		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.2	Energy Star Appliances - Moderate Rehab (Mandatory):	Arch. Spec.: Include all appliances: Range (gas or elect.?), Refrigerator, Dishwasher, Kitchen Venthood, Washing Machines, Clothes Dryers, bath fans, including appliances in Hdcp. Accessible dwelling units.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3a	Efficient Lighting - Interior (Mandatory):	Elect. Engr. Spec., & Fixt. Schedule: Energy Star Fixt's only. (Any incandescent lamps are grounds for "revise & resubmit.")	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3b	Efficient Lighting - Exterior (Mandatory):	Elect. Engr. Spec. & Schedule: Photo Cells, Time Clocks, Motion Detectors; Metal Halide, HPS, cold temp. fluor. ballasts only.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.4	Electricity Meter (Mandatory):	Elect. Engr.: Show locations on bldg plans, unit plans, specify individual meters, in addition to House Meter. Arch. to coordinate discrete placement of meters.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.5a	Additional Reductions in Energy Use for New Construction (Optional):		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.5b	Additional Reductions in Energy Use for Moderate Rehab (Optional):		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.6a	Photovoltaic (PV) Panels (Optional):		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.6b	Photovoltaic (PV) Ready (Optional):		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 6: Materials Beneficial to the Environment

	ITEM TITLE	INTENDED METHOD OF SATISFYING GREEN CRITERIA	YES	NO	WAIVER REQUEST
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Section 7: Healthy Living Environment

7.1	Low/No VOC Paints and Primers (Mandatory) :	Specify the appropriate National Standard for Low/No VOC's in Arch. Spec. Sect. 09900; Mech. Spec. 15010; Elect. Spec. 16010. (Include Overlay amendment to provide, as long as Contractor's Warranties are not voided by doing so.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.2	Low/No VOC Adhesives and Sealants (Mandatory) :	Specify the Appropriate National Standard for Low/No VOC's in Arch. Spec. 03300, 04200, 06100, 06200, 06400, 07900, 08500, 08800, etc., etc., etc. Mech. Spec. 15010; Elect. Spec. 16010. (Include Overlay amendment to provide, as long as Contractor's Warranties are not voided by doing so.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.3	Formaldehyde-free Composite Wood (Mandatory) :	Arch. Spec.: Sections 06100, 06200, 06400, 12300.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.4	Green Label Certified Floor Covering (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5a	Exhaust Fans - Bathroom (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5b	Exhaust Fans - Kitchen (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.6	Ventilation (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.7	HVAC Sizing (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.8a	Water Heaters - Mold Prevention (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.8b	Water Heaters - Minimizing CO (Optional):		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.9	Cold Water Pipe Insulation (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.10a	Materials in Wet Areas - Surfaces (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.10b	Materials in Wet Areas - Tub and Shower Enclosure (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.11a	Basements and Concrete Slabs - Vapor Barrier (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.11b	Basements and Concrete Slabs - Radon (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.12	Water Drainage (Mandatory) :		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.13	Garages Isolation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Multifamily Compliance

- **Implementation & certification**
 - » **Plan & spec review**
 - » **Owner & architect sign “Certification of Intent to Comply”**
 - » **Also sign “Certification of Contract Document Compliance” at or prior to loan closing or end loan commitment**
 - » **Owner, architect, & contractor sign “Certificate of Compliance” at end of construction**
 - » **“Intended Method of Satisfying Green Communities Criteria” form**

Evaluation



- **Utility releases signed by the tenant at time of lease**
- **Operating budgets**
- **Tenant and owner education**
- **Are things working as intended?**
- **Modify criteria and/or administrative requirements to optimize sustainability**

Single-Family Homes

- **Process for integration into CRV**
 - » **Need for a single-family overlay**
 - » **Administrator/developer structured feedback**
 - » **Collaborative process: funding partners, CSBR, MF architects, policy, SF**
 - » **Ongoing technical & marketing resources**
 - » **Rollout & implementation**
 - » **Evaluation & testing of SF unit performance**
 - » **Iterative process with periodic reviews**

Single-Family Homes CRV RFP

- **Required for Fall 2008 CRV RFP**
- **New construction only**
- **Mandatory elements required**
- **Optional items encouraged**
- **Waiver requests considered if demonstrable hardship created or requirement makes project infeasible**

Single-Family Overlay: Focus on 5

- 1. Smart site location: proximity to existing services**
 - Added services per comparable national green programs
 - Developed two locational standards: MSAs & other areas
- 2. Smart site location: compact development & density**
 - Single-family detached unit density required at 5 units/acre
 - Exception for platted lots connected to existing infrastructure (less than 5 units or scattered site)

Single-Family Overlay: Focus on 5

3. Environmental remediation

- **Phase 1 required for 5-unit scale development with change in land use –OR- for each residence not connected to city water**

4. Efficient energy use--new construction testing

- **50 constructed units will be subject to participation in a Minnesota Housing energy efficiency pilot**
- **All new construction units must meet mandatory standards for energy performance & efficiency testing**

5. Green label carpeting—sustainable floor covering

- **Encourage use of alternative green flooring**

Energy Efficiency

- **Challenges**

- » **Lack of building/energy code enforcement**
- » **Lack of qualified network of raters**
- » **Cost of testing**
- » **Location/scale of units**

- **Opportunities**

- » **Improve quality of units/building performance**
- » **Cost savings (utilities) for the homeowner**
- » **Enhance local building knowledge**

Efficient Energy Use

- **Demonstrate energy efficiency by meeting or exceeding**
 - » **Energy Star standards, including the Builder's Option Package for the appropriate climate zone in Minnesota, OR**
 - » **Home Energy Rating Systems (HERS) design index of 80**
- **Additionally, all homes must meet state building & energy codes**

Energy Efficiency & Evaluation Program

- **Administered by Center for Sustainable Building Research**
- **Single-family units to be tested: 50 new CRV homes**
 - » **Testing protocol under development—based on EnergyStar & HERS**
 - **Test 3 houses per developer & random testing of 10% thereafter**
 - **Expedited plan review/processing once 3 homes rated**
- **Control group: 30 CRV funded homes built in last two years**

Energy Efficiency & Evaluation Program

- **Plan review**
- **Code check**
- **Pre-construction meeting (optional)**
- **Construction inspection framing (optional)**
- **Construction inspection thermal bypass**
- **Blower door test**
- **Duct blast**
- **Radon test**

Energy Efficiency & Evaluation Program

Additional testing being considered for program:

- **Verify proper ventilation**
- **Verify proper kitchen exhaust**
- **Verify bathroom ventilation**
- **Decompression/combustion safety**

Evaluation Program Outcomes

- **Comparative analysis report**
 - » **Control group data measured against pilot data**
- **Reporting from the field**
- **Identification of technical assistance needs**
- **Utility bill analysis**
 - » **Control group utility costs (if available) compared to pilot group**
 - » **Utility costs compared with state/local averages**

Single-Family Homes CRV RFP

- **Continuation of existing CRV focus on efficiency in land use, resources, & energy**
- **CRV team to coordinate & assist with ongoing technical assistance**
- **Templates for Green Development Plan & Occupant's Manual to be provided**
- **Minnesota Housing to fund testing for first 50 homes, & CSBR to fund testing of control group (approximately \$1,000/home)**
- **Minnesota Green Communities committed to compiling & providing sources of green building research & design**

Questions?



**This concludes the
American Institute
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Program.**

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Minnesota Housing Multifamily Architectural & Design Standards:

http://www.mnhousing.gov/housing/architects/standards/MHFA_006625.aspx

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