

## **EXHIBIT "A"**

### **Minimum Standards**

#### **Energy Efficiency**

In addition to the City's Building Codes and other applicable regulations as they stand or may be amended, the following must be accomplished:

1. The minimum standard for energy efficiency of single-family residential structures shall be the Environmental Protection Agency's ENERGY STAR<sup>®</sup> designation as it stands or may be amended with a score of 83 or below on the Home Energy Rating Systems (HERS) index.
2. Every home must be tested (no batch testing allowed) by a Residential Energy Services Network (RESNET) HERS inspector/rater who is accredited through a RESNET approved HERS provider. The HERS provider must register with the City on an annual basis.
3. A minimum of one programmable thermostat is required on every story.
4. A return air path shall be provided for any room that can be closed off by a door (except for baths, kitchens, closets, pantries, mechanical rooms, and laundry rooms). The pressure differential for that room, with doors closed and air handler operating, must not exceed  $\pm 3$  Pascal pressure differential with respect to the main body of the home or where the central return is located.
5. All joints in the air distribution system including ducts, plenums, and equipment shall be sealed with duct mastic.

#### **Indoor Air Quality**

In addition to the City's Building Codes and other applicable regulations as they stand or may be amended, the following must be accomplished:

1. The minimum standard for indoor air quality of single-family residential structures shall be the ASHRAE<sup>™</sup> Standard 62.2 as it stands or may be amended.
2. Each HVAC unit supplying air to a bedroom must receive all or a portion of outdoor air distribution as required by ASHRAE<sup>™</sup> Standard 62.2. Total ventilation rate must be divided between each HVAC unit supplying air to a bedroom. Ducts supplying outdoor air must be equipped with manual dampers and a filter inside the return.
3. Outdoor air intakes must be screened and located under soffits or gables, at a minimum of 60 inches from all roofing materials that are located below the air intake (except metal roofs where roof penetration is allowed).
4. HVAC plenums on the supply & return side must be constructed of sheet metal (no duct board), or equivalent material approved by the Building Official, with external insulation (minimum R-6, if located in unconditioned space).

5. Heating and cooling equipment shall only be used during construction after manufacturer specified filter is installed. Used filters must be replaced with a new manufacturer recommended filter prior to the homeowner occupying the structure.
6. Central vacuums, where provided, shall be vented outdoors.
7. Carpets, cushions, and carpet adhesives shall carry the Carpet & Rug Institute (CRI) Green Label.
8. Vinyl wallpaper is not allowed on the inside of exterior walls or either side of wet walls such as bathrooms, kitchen, or laundry rooms.
9. Provide metal drip edge at all exposed roof decking.

### **Water Conservation**

In addition to the City's Landscape Ordinance and other applicable regulations as they stand or may be amended, the following must be accomplished:

1. Bedding must be mulched to a depth of 2-4 inches using recycled content mulch which includes wood construction waste.
2. All basic landscape packages for individual lots shall be drought tolerant and able to survive stage three drought restrictions. Bermuda will be allowed as a drought tolerant turf; however, alternative drought tolerant grasses shall be offered as an option.

When a irrigation system is installed:

3. A portable drip irrigation bag or zoned bubbler system must be installed for each installed tree.
4. Provide landscape water conservation information to all new homeowners.
5. Builders will furnish and install an EvapoTranspiration (ET) Based Controller on each individual lot.
6. Each individual lot will have separate zones for a drip system around the foundation, to the required trees in the front yard, and to the adjacent R.O.W. landscape.

### **Waste Recycling**

In addition the City's waste reduction and recycling regulations as they stand or may be amended, the following must be accomplished:

1. Construction waste (brick and wood) hauled from the building site by the builder shall be taken to a site or facility legally empowered to accept it for recycling as approved by the County and State in which the facility is located.

## Residential Green Building Program Benefits

### Energy Efficiency

**“The minimum standard for energy efficiency of single-family residential structures shall be the Environmental Protection Agency’s ENERGY STAR® designation as it stands or may be amended with a score of 83 or below on the Home Energy Rating Systems (HERS) index.”**

- The ENERGY STAR® standard is carried over from the previous program as the primary program component addressing energy efficiency.
- The HERS index is more stringent to encourage the use of radiant barriers or alternative measures that can achieve the additional two points needed to reach an 83.
- Achieving a score of 83 on the HERS index means that a house is more energy efficient than under current regulations.

**“Every home must be tested (i.e. no batch testing allowed) by a Residential Energy Services Network (RESNET) HERS inspector/rater who is accredited through a RESNET approved HERS provider. The HERS provider must register with the City on an annual basis.”**

- This will increase total cost to the builder; however, the per unit cost should decrease because of economies of scale as well as simpler rating procedures
- Fewer callbacks from homeowners will save money for the builder.

**“A minimum of one programmable thermostat is required on every story.”**

- Most builders do this now, but a few exceptions are the reason for this regulation.
- Each floor of a home should have the ability to be controlled independently due to different patterns of use in order to increase HVAC efficiency.

**“A return air path shall be provided for any room that can be closed off by a door (except for baths, kitchens, closets, pantries, mechanical rooms, and laundry rooms). The pressure differential for that room, with doors closed and air handler operating, must not exceed  $\pm 3$  Pascal pressure differential with respect to the main body of the home or where the central return is located.”**

- Helps control the comfort of the home.

- Improves energy efficiency.
- Addresses the critical issues of equalizing air pressure.

**“All joints in the air distribution system including ducts, plenums, and equipment shall be sealed with duct mastic.”**

- This standard is carried over from the previous program to help prevent duct leakage.

### **Indoor Air Quality**

**“The minimum standard for indoor air quality of single-family residential structures shall be the ASHRAE™ Standard 62.2 as it stands or may be amended.”**

- This standard uses a prescriptive, nationally recognized indoor air quality standard that corresponds to standards carried over from the previous program requirements.
- Makes the air in homes healthier.

**“Each HVAC unit supplying air to a bedroom must receive all or a portion of outdoor air distribution as required by ASHRAE™ Standard 62.2. Total ventilation rate must be divided between each HVAC unit supplying air to a bedroom. Ducts supplying outdoor air must be equipped with manual dampers and a filter inside the return.”**

- This standard is carried over from the previous program due to indoor air and health benefits.
- A manual damper allows the air to be balance and controlled to provide the appropriate amount of outdoor air for the home.
- A filter is required so that the outdoor air is filtered prior to entering the home.
- The outdoor air will be delivered to the return and conditioned through the air handler prior to entering the home.

**“Outdoor air intakes must be screened and located under soffits or gables, at a minimum of 60 inches from all roofing materials that are located below the air intake (except metal roofs where roof penetration is allowed).”**

- Keeps Volatile Organic Compounds (VOCs) and other contaminants produced from heated roofing materials from entering the home.

**“HVAC plenums on the supply & return side must be constructed of sheet metal (no duct board), or equivalent material approved by the Building Official, with external insulation (minimum R-6, if located in unconditioned space).”**

- This standard is carried over from the previous program to prevent moisture problems and make the air in the home healthier.

**“Heating and cooling equipment shall only be used during construction after manufacturer specified filter is installed. Used filters must be replaced with a new manufacturer recommended filter prior to the homeowner occupying the structure.”**

- Heating and cooling equipment should never be used without a filter, especially when dust and contaminants are in the air due to construction.
- A clean filter should be in place for the new homeowner.
- Longer unit life for homeowners.

**“Central vacuums, where provided, shall be vented outdoors.”**

- This standard is carried over from the previous program to help make the air in the home healthier and safe.

**“Carpets, cushions, and carpet adhesives shall carry the Carpet & Rug Institute (CRI) Green Label.”**

- Most major carpet manufacturers carry carpet with this label which is priced comparable to other carpet (CRI).
- Identifies carpet products that are truly low-VOC.
- Tested for total volatile organic compounds, BHT (butylated hydroxytoluene), formaldehyde and 4-phenylcyclohexine (4-PC).
- Better indoor air quality.

**“Vinyl wallpaper is not allowed on the inside of exterior walls or either side of wet walls such as bathrooms, kitchen, or laundry rooms.”**

- Other wall coverings are available at a comparable cost.
- Vinyl creates a vapor barrier that traps moisture in the wall and encourages mold growth.

**“Provide metal drip edge at all exposed roof decking.”**

- Metal drip edges are used in most building practice already with a few exceptions.
- Prevents moisture problems.

### **Water Conservation**

**“All plants must be able to survive stage 3 water restrictions as they stand or may be amended as determined by the City’s Planning and Development Services department.”**

- Most builders already use plants that accomplish this standard.
- Plant options are available at comparable pricing to traditional landscapes.
- Saves water and costs the homeowner less money over time.
- Fewer dead plants during water restrictions.
- Less irrigation needed to be installed.
- Less maintenance required.

**“Bedding must be mulched to a depth of 2-4 inches using recycled content mulch which includes wood construction waste.”**

- This standard is carried over from the previous program.
- The standard now includes the need to use mulch that is partly made up of wood construction waste in order to assure that builders are utilizing the wood that is required to be recycled under the program.
- Mulch from wood construction is priced comparably and usually cheaper for the builder.

**“A portable drip irrigation bag or zoned bubbler system must be installed for each installed tree.”**

- This standard insures that water is not being wasted on installed trees during the establishment period for new landscape.
- Fewer trees will need to be replaced by the builder.

**“Builders will furnish and install an EvapoTranspiration (ET) based Controller on each individual lot.”**

- This standard insures that water is not being wasted.
- More efficiently deliver the landscape water requirements during drought and non-drought conditions.

**“Each individual lot will have separate zones for a drip system around the foundation, to the required trees in the front yard, and to the adjacent R.O.W. landscape.”**

- This standard allows homeowner to water the home’s foundation and the landscape adjacent to a right-of-way without overspray.

### **Waste Recycling**

**“Construction waste (brick and wood) hauled from the building site by the builder shall be taken to a site or facility legally empowered to accept it for recycling as approved by the County and State in which the facility is located.”**

- This standard is carried over from the previous program.
- Decreases wood waste.
- Diverts waste from landfills.
- Saves trees.

## Residential Green Building Program Revision Costs

(The following table shows the anticipated costs of the revised standards as obtained through research and discussion with building industry professionals)

<u>Energy Efficiency</u>	
1. The minimum standard for energy efficiency of single-family residential structures shall be the Environmental Protection Agency's ENERGY STAR® designation as it stands or may be amended with a score of 83 or below on the Home Energy Rating Systems (HERS) index.	≈ \$500 - \$1000
2. Every home must be tested (i.e. no batch testing allowed) by a Residential Energy Services Network (RESNET) HERS inspector/rater who is accredited through a RESNET approved HERS provider. The HERS provider must register with the City on an annual basis.	≈ \$200 - \$500
3. A minimum of one programmable thermostat is required on every story.	≈ \$0 - \$50
4. A return air path shall be provided for any room that can be closed off by a door (except for baths, kitchens, closets, pantries, mechanical rooms, and laundry rooms). The pressure differential for that room, with doors closed and air handler operating, must not exceed ±3 Pascal pressure differential with respect to the main body of the home or where the central return is located.	≈ \$100 - \$300
5. All joints in the air distribution system including ducts, plenums, and equipment shall be sealed with duct	≈ No cost increase

mastic.	
<u>Indoor Air Quality</u>	
1. The minimum standard for indoor air quality of single-family residential structures shall be the ASHRAE™ Standard 62.2 as it stands or may be amended.	≈ \$0 - \$50
2. Each HVAC unit supplying air to a bedroom must receive all or a portion of outdoor air distribution as required by ASHRAE™ Standard 62.2. Total ventilation rate must be divided between each HVAC unit supplying air to a bedroom. Ducts supplying outdoor air must be equipped with manual dampers and a filter inside the return.	≈ \$0 - \$50
3. Outdoor air intakes must be screened and located under soffits or gables, at a minimum of 60 inches from all roofing materials that are located below the air intake (except metal roofs where roof penetration is allowed).	≈ \$0 - \$50
4. HVAC plenums on the supply & return side must be constructed of sheet metal (no duct board), or equivalent material approved by the Building Official, with external insulation (minimum R-6, if located in unconditioned space).	≈ \$0 - \$50
5. Heating and cooling equipment shall only be used during construction after manufacturer specified filter is installed. Used filters must be replaced with a new manufacturer recommended filter prior to the homeowner occupying the structure.	≈ \$0 - \$50
6. Central vacuums, where provided, shall be vented outdoors.	≈ No cost increase
7. Carpets, cushions, and carpet adhesives shall carry the Carpet & Rug Institute (CRI) Green Label.	≈ \$0 - \$50
8. Vinyl wallpaper is not allowed on the inside of exterior walls or either side of wet walls such as bathrooms, kitchen, or laundry rooms.	≈ No cost increase
9. Provide metal drip edge at all exposed roof decking.	≈ \$0 - \$50
<u>Water Conservation</u>	
1. All plants must be able to survive stage 3 water restrictions as they stand or may be amended as determined by the City's Planning and Development Services Frisco Landscape Architect.	≈ No cost increase
2. Bedding must be mulched to a depth of 2-4 inches using recycled content mulch which includes wood construction waste.	≈ No cost increase
3. A portable drip irrigation bag or zoned bubbler system must be installed for each installed tree.	≈ \$30 - \$100

<u>Waste Recycling</u>	
1. Construction waste (brick and wood) hauled from the building site by the builder shall be taken to a site or facility legally empowered to accept it for recycling as approved by the County and State in which the facility is located.	≈ No cost increase
<b>Total cost increase for homebuilders per home</b>	<b>≈ \$830 - \$2,300</b>

### Responsibilities Table

<p>Planning &amp; Development Services</p>	<ul style="list-style-type: none"> <li>• Homes may be randomly tested by a City inspector prior to Certificate of Occupancy (CO) to assure compliance. If a home which has received a passing score by a HERS rater fails to pass the test by the City inspector, a formal warning will be issued to the HERS provider. After three warnings, the provider will lose City certification for one year and will not be able to perform testing in the City during that time.</li> <li>• Plant selection will be reviewed.</li> </ul> <p>Inspectors will confirm that:</p> <ul style="list-style-type: none"> <li>• a minimum of one programmable thermostat is on every story.</li> <li>• new manufacturer recommended filters have been installed for all heating and cooling equipment after construction is complete but prior to the homeowner occupying the structure.</li> <li>• vinyl wallpaper is not installed on the inside of exterior walls or either side of wet walls such as bathrooms, kitchen, or laundry rooms.</li> <li>• metal drip edge is installed for all exposed roof decking.</li> <li>• a portable drip irrigation bag or zoned bubbler system has been installed for each installed tree.</li> <li>• mulch is applied consistently and that there are no bare spaces.</li> </ul>
<p>Environmental Services</p>	<ul style="list-style-type: none"> <li>• Responsible for enforcement of the recycling portion of the Ordinance.</li> <li>• Responsible for verifying that recycling information will be provided to residents at move-in.</li> </ul>

Public Works	<ul style="list-style-type: none"> <li>• Public works will assist in monitoring the water conservation regulations.</li> </ul>
Builder	<ul style="list-style-type: none"> <li>• Fulfill all requirements under the Residential Green Building Program.</li> <li>• Provide City documentation showing that Carpets, cushions, and carpet adhesives carry the Carpet &amp; Rug Institute (CRI) Green Label.</li> <li>• Provide City documentation showing the Builder's plant selection.</li> <li>• Provide City documentation showing that the mulch they use contains wood construction waste.</li> <li>• Heating and cooling equipment should not operate during construction without an installed filter. The unit and ducts must be free of dust or debris.</li> <li>• Dishwashers must have the ability to dry without heat.</li> </ul>
HERS Provider	<ul style="list-style-type: none"> <li>• HERS providers must register with the City. A certification fee of \$50.00 will be paid to the City at this time.</li> <li>• Test every home under the Environmental Protection Agency's Energy Star standards and require that builders reach an 83 or below on the HERS index in order to pass inspection.</li> <li>• Confirm each room with its doors closed (except for baths, kitchens, closets, pantries, mechanical rooms, and laundry rooms) does not exceed <math>\pm 3</math> Pascal pressure differential with respect to the main body of the home or where the central return is located.</li> <li>• Confirm that all joints in the air distribution system including ducts, plenums, and equipment shall be sealed with duct mastic or approve equivalent.</li> <li>• Confirm that the standards for indoor air quality of single-family residential structures conform to ASHRAE Standard 62.2 as it stands or may be amended.</li> <li>• Confirm that each HVAC unit supplying air to a bedroom is receiving fresh air in accordance to ventilation rates outlined in ASHRAE Standard 62.2. To avoid too much fresh air, the total whole house fresh air requirements must be divided between the separate HVAC units.</li> <li>• Confirm that outdoor air intakes are located under soffits or gables at a minimum of 60 inches from roofing materials.</li> <li>• Confirm that HVAC plenums on the supply &amp; return side are constructed of sheet metal (no duct board), or equivalent material approved by the Building Official, with external insulation (minimum R-6, if located in unconditioned space).</li> <li>• Confirm that central vacuums, where provided, are vented outdoors.</li> </ul>

