ORDINANCE

CITY OF NEW ORLEANS

CITY HALL: _November 2, 2006
CALENDAR NO. _26,294

NO. _____ MAYOR COUNCIL SERIES

BY: COUNCILMEMBERS THOMAS, HEAD, LEWIS

AN ORDINANCE authorizing the City of New Orleans to amend the Building Code (11625 MCS Uniform Building Code) establishing standards for the City of New Orleans by creating a new Chapter entitled "Sustainability", for new residences to be built so that New Orleans residents and members of the construction industry can utilize advanced construction techniques which result in durable, high-quality homes that are certifiable and encouraged by the City of New Orleans.

Chapter – **SUSTAINABILITY**

Section I - Housing

SECTION A: **STANDARD OF SUSTAINABILITY ("SOS")**

SECTION 1. Statement of Purpose

WHEREAS in 2005, hundreds of thousands of homes within New Orleans were so severely damaged by Katrina, floods and the failures of the levees that New Orleans has lost more than 50% of its pre-Katrina population.

WHEREAS for many years in the future new home construction will be a multi-billion dollar industry in New Orleans.

WHEREAS many of the homes in New Orleans were subjected to catastrophic failure mechanisms, e.g. floods and category-3 hurricanes, seldom experienced by most newly constructed U.S. homes.

WHEREAS all homes in New Orleans are habitually subjected to failure mechanisms uncommon to most of the US but common here including: unpredictable rain-forest precipitation, subsidence, Formosan termites, and ambient dew-points higher than the middle of the human-comfort range.

WHEREAS the building code of New Orleans has not been updated or customized to address local climatic or soil conditions.

WHEREAS local climatic and soil conditions can present economic opportunities to lower construction costs and raise performance of buildings.

WHEREAS the local building industry has not been retrained or reoriented to most effectively respond to either the old or the new challenges.

WHEREAS some homes that are built better than code can be expected to provide lower operating costs, are safer, more comfortable OR more durable.

WHEREAS some builders believe that they can construct homes that exceed code and provide all of: lower operating costs, more safety, more comfort AND more durability; and some of these builders would like to a process leading to a certification that truly helps the prospective homeowner value and appreciate the benefits of such homes balanced against their higher, initial, construction cost.

WHEREAS the various certifications for homes currently available to builders and homeowners to differentiate these homes do not provide a complete package to assure these benefits and, in particular, do not provide adequate durability whether to the catastrophic challenges to the home or the habitual challenges.

WHEREAS new homes built in Europe and Japan are often mortgaged over a 100-year timeline because such homes are built to last much longer than that, while new homes in the U.S. often fail before their initial, 30-year mortgage is paid.

WHEREAS homeowners can no longer buy standard homeowners' insurance to cover protection from flooding, mold or poor indoor-air quality.

WHEREAS just following Katrina, many thousands of New Orleanians were stranded for most of a week or more in their homes without water, food-refrigeration or air-conditioning and each of these deficiencies lead to extreme hardship and, in some cases, death.

WHEREAS one group of New Orleans-based engineers and architects have developed a home-construction approach that addresses all of these issues.

WHEREAS many large corporations are gearing up at this time to provide goods and services to New Orleans' construction industry, so better choices now can generate many quality jobs in the future.

WHEREAS newly-constructed homes can cost more than 80% of the disposable income earned by a low-income worker during 30 years of employment.

WHEREAS New Orleans can lead the nation in this field.

WHEREAS since the SOS construction standard will drastically lower energy use in a home, residential energy use is the largest energy sector of the U.S. economy, the U.S. is the nation with the 3rd largest population in the world and uses about 25% of all energy used on the planet, wide-scale adoption of this standard can significantly retard the growth of global warming and it predicted effects: rising sea level and increased frequency and strength of major storms.

Therefore:

THE CITY COUNCIL DOES HEREBY ORDANE: There is a defined need to greatly increase the useful life expectancy of housing structures in the City of New Orleans and to eliminate or substantially reduce the negative physical impacts of climatic conditions and environmental factors or elements which lead to the internal and exterior corrosion of dwellings and the quality of the living space therein.

SECTION 2. Building Code Certification

That the building code of the City of New Orleans will certify that a home is "Sustainable".

SECTION 3. Adoption of a Functional Standard

The City of New Orleans does hereby adopt a *functional* Standard of Sustainability as it relates to Housing. Be it so:

"Sustainability is functionally achieved when a dwelling is designed, built and commissioned to collect, transfer, store and ultimately convert naturally occurring environmental phenomena into a safe, healthy and comfortable indoor living environment, within the prescribed human comfort zone for at least 30 generations.

SECTION 4. Definitions:

1. **Collection** of naturally occurring renewable resources includes but is not limited to air and water, as well as, energy from atmospheric phenomena like air pressures, wind, rain, and sunshine, and geotechnical resources like geothermal, spring and river flows. The collection can be for immediate use or for use at another time during the year. Renewable energy includes, but is

not limited to, hydro-electric, photovoltaic solar, solar thermal, geothermal, biomass, land-fill gas and wind energy.

2. **Storage** can be on-site involving energy storage systems such as but not limited to thermal mass, pressure, springs, rotational momentum devices, electric batteries, cisterns, heated walls, charge potential, temperature and/or ground coupling or can be off-site utilizing the community's electricity grid.
3. **Conversion** mechanisms can involve but are not limited to: electricity to motion, light or heat, and heat and motion to dehumidification.
4. **Transfer** mechanisms in a home can involve active and passive heat and light flows needed to enhance comfort and building durability.
5. A **Safe** home is not susceptible to known catastrophic-failure mechanisms.
    a. It doesn't burn down (4-hour fire rating; 4-hour fire rating is defined in accordance with ASTM E119-00a.)
    b. It doesn't blow away (envelope is capable of withstanding 200 mph winds)
        i. provides a safe-room in case of direct hits of a hurricane or tornado to meet FEMA 320; (Taking Shelter from the Storm: requiring the shelter to resist a 15 lb, 2"x4" missile propelled by 250 mph ground-speed tornado,)
        ii. can withstand the loss of a complete window during a hurricane without loosing a roof, and
        iii. the external walls meet the FEMA 320 projectile-resistance standard applied at 200 mph,

c. The building can withstand flooding without compromising its durability or the health, safety or comfort of its inhabitants. For example, currently proposed solutions to this problem include: siting its lowest living space 30 feet above sea level, providing a dynamic lifting system in case of a flood or floatation.

6. A **Healthy** home is not susceptible to known, health-endangering, habitual failure mechanisms
    a. It is free of pests and pesticides alike
    b. It does not harbor, grow or accumulate
        i. dust mites
        ii. bacteria
        iii. Legionnaire's protozoa
        iv. mold
        v. pollen
    c. Does not emit or accumulate
        i. Formaldehyde
        ii. Urea
        iii. Ozone
        iv. Carbon Monoxide
    d. Ventilation or "fresh air" flows exceed ASHRAE 62.2 Standards by 100%.
    e. Relative Humidity is maintained within 45-55%.

f. HEPA filtration of (intake) ventilation air is required. A HEPA filter must remove at least 99.97% of all airborne particles by particle count at a size of 0.3 microns (which is one-300th the diameter of a human hair.)

g. The ventilation system is capable of positively pressurizing the home to between 2 and 5 Pascals. A Pascal is as unit of pressure, equal to approximately one hundred-thousandth of an atmosphere (which is about 14.7 lbs per square inch).

h. Vacuum cleaning systems exhaust to outside

i. Exhaust fans are controlled by timers

7. A **Comfortable** home means

a. Temperature and humidity are maintained within the prescribed human comfort zone (68-78° (Fahrenheit), 45-55% (Relative Humidity).

b. Artificial lighting is unnecessary during most day-time use,

c. Artificial lighting is more than adequate for optimal productivity at any time, and

d. Occupants will have independent control of lighting, temperature and airflows on a room-by-room basis.

e. Hot and cold potable water are available in more than adequate supply. Potable Water meets the NSF/ANSI 61 standard. Adequate supply of water means 100 gallons per day per person. A home is assumed to have a number of persons equal to one more than the number of its bedrooms. Hot water is defined as potable water heated to 135

degrees F. More than adequate supply of hot water is defined to be 75 gals per day per residence.

8. A **Durable** home is not susceptible to known building-endangering catastrophic or habitual, failure mechanisms
    a. Subsidence will not threaten its structure, upright stature (within 5 degrees of exactly level), integrity, or alignment. E.g., no more distortions of homes which lead to windows that will not close or components that do not provide for weather-tight exteriors.
    b. Exterior walls must be designed to withstand rain-forest precipitation: i.e., ten inches of rain in any month. For example, current building science recommends either
        i. pressure-equalized shedding walls or
        ii. high-moisture capacity external mass walls
    c. To protect against moisture accumulations in the roof or structures that support the roof, all impediments to heat or moisture flow shall be installed to allow moisture to flow from bottom to top and then to outside.
    d. Envelope building materials and energy distribution systems are rated for centuries of normal use without significant degradation.
    e. The building's components are not susceptible to mold, wood-rotting fungus or subterranean termites.
    f. The building's components and design provide for multiple layers of component failure without resulting in ultimate failure of the building.

For example, a minor roof leak is not a problem if it never presents itself to the homeowner and does not result in degradation of the structure.

g. So that it can withstand gross moisture loading without failure, the structure shall have ten times the moisture-holding capacity of wood-framed construction compliant with 2003 IRC

h. During the life of every home, some parts need replacement. A home will not be considered durable, unless the projected average annual cost of maintenance and replacement of its constituent parts does not exceed 0.5% of the original construction cost measured in current dollars.

9. A **Well-Constructed** home has been built so that

a. All of the above considerations and goals were integrated into its design by a team of licensed, certified or accredited, building-design professionals having local expertise in architecture, energy efficiency, engineering and building science. A building-design professional is considered to have local expertise if he has actively practiced his profession for at least five years within 50 miles of the site of construction. The design considerations of a well constructed home include but are not limited to

i. Orienting the windows and the home

ii. Sizing the HVAC system

iii. Engineering the HVAC distribution system

iv. Engineering the foundation / floatation system
v. Engineering the roof's design and support system
vi. Specifying flashing details
vii. The design benefits from the work of an engineering professional who integrates the needs of the building to the resources available in the climate and soils.

b. Building materials are chosen to meet the previously mentioned goals.
c. Workers and sub-contractors are provided training as needed to meet the goals of the design
d. During and at the end of construction, the home is checked for
    i. **prescriptive requirements** which include but are not limited to
        1. choice and placement of insulation
        2. windows
        3. HVAC equipment
        4. Structural connections
    ii. **performance requirements** include but are not limited to measuring the
        1. Leakiness of the home
        2. Leakiness of the HVAC distribution system
        3. Solar gain of the windows
        4. Defective heat and moisture flows with thermal imaging

e. Commissioning, which means oversight of construction, is sufficient to reach the above goals and timed to be unpredictable by the construction team.

f. Commissioning is provided by a third-party, certified or licensed, commissioning agent, (as defined by the USGBC - LEED 2.1), who is not part of the construction team.

10. A home has **Passive Survivability** if during a week that the home is disconnected from all community utilities,

    a. Food refrigeration is not compromised. Food refrigeration includes both a refrigerator and freezer. The freezer must be at least 3 cubic feet. A freezer is capable to protect the food within it if it can sustain temperature at or below 0 degrees F. The refrigerator must be at least 15 cubic feet. A refrigerator is deemed capable to protect its food if it can sustain temperature at or below 35 degrees F.

    b. Comfort is not degraded, and

    c. An adequate supply of potable water is more than in storage.

11. Just like a typical home, a **Zero Energy Home (ZEH)** is connected to, and uses energy from, the local electric utility. But unlike typical homes, at times the ZEH makes enough power to send some back to the utility. Annually, a ZEH produces enough energy to offset the amount purchased from the utility-resulting in a net-zero annual energy bill.

12. A ***Sustainable*** home is

a. "…functionally achieved when a dwelling can collect, transfer, store and ultimately convert naturally occurring environmental phenomena into a safe, healthy and comfortable indoor living environment, within the prescribed human comfort zone, "

b. A **Zero Energy Home**,

c. provides **Passive Survivability,**

d. is **Well-Constructed** and

e. Designed to be **Durable** for 30 generations (about a thousand years).

SECTION 5. Responsibility to Provide Documentation

The responsibility to provide documentation that this standard has been reached shall fall upon the developer and/or builder. All sustainable homes shall also conform to the traditional permitting and inspection requirements of the City of New Orleans building code prior to issuance of a certificate of occupancy.

ADOPTED BY THE COUNCIL of the CITY of NEW ORLEANS _____

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PRESIDENT of COUNCIL

DELIVERED TO THE MAYOR ON _____

APPROVED:
DISAPPROVED: _____

_____
MAYOR

RETURNED BY THE MAYOR ON _____ **AT** _____

_____
CLERK of COUNCIL

YEAS:

NAYS:

ABSENT: