RICE UNIVERSITY
Shell Center for Sustainability

SUSTAINABLE DEVELOPMENT OF HOUSTON DISTRICTS:

The Health of the City

FINDINGS

LESTER KING, PhD.

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Conclusion

Council districts are the primary level of governance below city-wide administration in Houston. Every two years citizens go to the polls to elect representatives for their public interests. In 2011, the city increased the number of council districts form 9 to 11 as part of a Department of Justice agreement forged in 1979 (COH, 2011). This major act of defining new spatial boundaries for the efficient representation of citizens' interests was mainly for the purpose of ensuring the protection of minority voting rights, under Section 5 of the Voting Rights Act. The only non-demographic considerations were that the areas identified would be contiguous; county voting precincts should not be shared across districts; and attempts would be made to preserve the boundaries of incumbent representatives. It should be noted that the council districts in Houston are primarily representative of demographic and political contiguity. The structure and findings for this report go far past consideration of solely demographics and politics and takes a truly comprehensive approach of addressing social, economic and environmental considerations as outlined by sustainable development.

This report shows the performance of the health of the City of Houston according to the lens of sustainable development. It shows that although the Voting Rights Act was instrumental to ensure equal representation of minorities in the governance of cities like Houston, that there is still a tremendous amount of disparity between areas. This disparity is clear between areas that are primarily composed of the African-American cohort compared to areas that are primarily composed of the White cohort. It is less clear between areas that are primarily composed of the Hispanic cohort compared to areas predominately occupied by other cohorts. One reason is that the Hispanic cohort constitutes 44% of the population so although there is some concentration; this demographic is well distributed across the entire landscape of Houston. The report also shows that issues in Houston from a sustainable development perspective are not explained by racial disparity alone. Many middle and upper middle class areas are adversely affected in some of the measures in this health report on the state of development in Houston.

The following table summarizes some of the findings contained in this report. It lists the indicators, city level performance, and district level performance for comparative purposes. The indicators are accompanied by a green, amber or red icon, symbolizing good progress towards sustainability, moderate progress towards sustainability, or major intervention needed respectively. These ratings were developed, for the purpose of peer review, by a team of approximately 27 experts and development practitioners over the course of three workshops and three surveys in 2012. We hope the report will be used by citizens, city staff, and local decision makers to better understand the sustainable development of Houston.

Summary Findings		
Indicator	**City Performance**	**District Performance**
 **1. Population Growth**	Population in Houston is currently growing at an average annual rate of approximately 1.42%.	From 1990 – 2010, District E had the highest growth rate of 3.3%, while District I had the lowest growth rate of 0.22%. District I includes downtown Houston, Lawndale and Parkplace. District E includes Clearlake.
 **2. Education Attainment**	There exists an attainment gap between the White student cohort and other student groups. In general all graduation rates have improved. The HISD district graduation rate was 74.3% in 2010.	The district level performance review covered all schools within the boundary of Houston. The graduation rates in District E were the highest in the city. District J graduation rates were the lowest. District E also has a higher median household income that District J with $66,924 compared to $29,286. District J also has the highest percentage of persons in poverty in the city with about 1 in every 3 persons (32%).
 **3. Voter Participation**	Only 7% of the population voted in the local election of 2011.	Districts C and G had the highest percentage of voters. These districts contain the affluent neighborhoods of River Oaks, Memorial, Meyerland and University Place. Districts J and F had the lowest voter participation and contain the less affluent neighborhoods of Sharpstown and Alief. The results of this indicator, gives evidence to the impact of income on citizen participation.
 **4. Indicator – Income Inequality**	Income inequality must be addressed in Houston since the median top 20% earned $140,000; median earnings were $43,000; and the bottom 20% earned a median income of $10,000.	Districts D and C had the highest levels of income inequality in 2010. These districts contain the neighborhoods of Meyerland, Central Northwest, Sunnyside and Museum Park. The districts with the lowest level of income inequality are Districts I and J, which contain the neighborhoods of Sharpstown and Magnolia Park.

 **5. Poverty Rate**	The percentage of persons below poverty was 23% (474,346) in 2010. This metric is increasing, which is not a sustainable trend.	District G has the lowest percentage of persons in poverty with 7.1%, while District J has the highest percentage of persons with 31.8%. District J contains the neighborhoods of Sharpstown, Westwood and Gulfton.
 **6. Health Coverage**	30% of persons had no health insurance in Houston in 2010. Houston has the largest medical center in the world, and boasts many jobs in this sector. However, access to health insurance in Houston is a problem.	A look at the distribution of health centers across the city by district shows that Districts G and E have the highest numbers of persons assigned to centers there with over 40,000 persons per center in those districts. The districts that are more centrally located (districts D, B, H and I) have better proximity to health centers with under 8,000 persons assigned to each center.
 **7. Affordability**	30% of Houstonians spent more than 30% of their income on housing in 2010.	District F has the highest percent of housing units costing more than 30% of incomes. While District E has the lowest percentage of housing units in this indicator. District F contains the neighborhoods of Westchase and Alief and District E contains the communities of Clearlake and Edgebrook. Median income in District E is $66, 924 and in District F is $39,766. This difference may explain why a higher percentage of households in District F are finding housing costs more unaffordable.
 **8. Accessibility of Public Spaces**	44% of the population lives within a quarter mile of a public park. This number needs to increase to ensure accessibility to quality of life in Houston.	Districts I and C have the highest percentage of population with good access to parks. District F has the lowest access to parks.
 **9. Food Deserts**	36% of the population lives within a Food Desert. That is, they live more than 1 mile from a grocery store or supermarket that sells fresh fruit and vegetables.	District B has the highest percentage of persons in the Food Desert, while Districts C and G have the lowest percentage of persons in the Food Desert. District B contains the less affluent neighborhoods of Kashmere Gardens and Greater Fifth Ward; while Districts C and G contain the affluent neighborhoods of the Heights, University Place and River Oaks.

10. Employment Status	The unemployment rate for Houston was 10% in 2010. For the white cohort it was 6.2% and for African Americans it was 16.5%. This means disproportionate hiring or employment stability occurs in Houston.	District B has the highest unemployment rate in the city with 12.6%, while District G has the lowest with 4.6%. Although District J has the highest percentage of persons in poverty, the unemployment rate in this district is under the city average (9.6%). This suggests that incomes in District J may be relatively low compared to the cost of living in Houston.
11. Primary Jobs and Green Jobs	Medical jobs in Houston are increasing while industrial jobs are decreasing as an absolute percentage of all jobs. Together, industrial and manufacturing jobs make up 23% of all jobs and are considered primary jobs for Houston. Less than 7% of all jobs in Houston are green jobs.	The Texas Medical Center is located in District D, so that district has the highest number of medical jobs. District A leads all other areas with manufacturing jobs representing 11% of all jobs. District F has under 2,000 manufacturing jobs equal to just 2% of all jobs in that district. District A contains the Spring Branch area and District F contains the Alief area.
12. Income	Since per capita income in 2010 ($44,001), was slightly below 2007 levels ($44,872), it is estimated that the 2008 economic recession set us back approximately 3 years. Large numbers of unskilled new immigrants will further lower the overall per capita income in the near future unless major intervention is undertaken.	Districts G, E, and C have the highest median household incomes in the city, all over $60,000. Districts J and B have median household incomes under $30,000.
13. Waste Generation	The city of Houston collects waste for single family households but private haulers are contracted for multifamily apartments and businesses. Although these haulers report the content of waste they collect, they do not report the source of the waste and hence data on waste generation is estimated. This is a policy issue that complicates developing a robust sustainability strategy to target waste reduction in Houston.	Waste was not calculated for the districts analysis due to lack of sufficient data to understand the disposal practices of business and households.

14. Energy Consumption	Average residential energy consumption per household has increased between 2000 and 2010 from 13,496 kwh to 14,221 kwh. This accounts for 11 million Mwh needed to power Houston homes in 2010. The city administration of Houston uses only 10% of this number and HISD uses 4%. Recently the city administrative operations increased its share of renewable energy sources to 50% of its total need. That is the equivalent of an estimated 5% of the total energy needed to power homes in Houston. City led goals to reduce non-renewable energy consumption among Houston households and businesses need to be addressed.	Data on energy consumption at the district level is not available, since this data is considered private. Future research to develop a methodology for analysis of Houston residential and business activities would be necessary to estimate energy consumption.
15. Access to Transit	As of 2010, 68.5% of people in Houston live within a quarter of a mile to a bus stop.	District J has just about the total population within a ¼ mile walk to a bus stop. While District E has only 10.4% of the population within a ¼ mile to stops. District E is very much below the city average of 68.5%.
16. Vehicle Miles Travelled	Annual VMT is projected to increase in Houston. This study used *Travel Time* as a proxy for VMT and found that the average travel time for Houstonians was 25.5 minutes in 2010. Persons living in suburban areas and working in Houston would have much larger travel times and VMT, this contributes quite significantly to the degree of wear and tear on Houston roads and environmental pollution from auto use.	District B has the highest travel time and it is located to the far north of the city, this district includes the Houston International Airport. District C has the lowest travel time, is centrally located and includes the neighborhoods of Montrose, Meyerland and the Greenway Plaza and the Upper Kirby business district.
17. Travel Choice	A higher percentage of people in Houston were travelling alone using private cars in 2010 than in 2000. In 2000 28% of persons used alternative travel sources. The number dropped to 25% in 2010.	On average 5% of Houstonians use public transit to get to work. This number varies among districts from 1.7% in District E, 2.2% in District G and on the high end 8.3% in District J, and 7.9% in District D. District E contains the far southeast and northeast communities of Clearlake, Edgebrook, and Kingwood. Accessibility to bus stops is also very poor with 10.4% of the population within walking distance to a bus stop. District G contains the affluent neighborhoods of Riveroaks, Memorial, and Briarforest. Districts J and D, which have the highest percentage of transit users are both less affluent and more centrally located.

 **18. Ambient concentrations of air pollutants**	Houston has attained federal standards for all criteria pollutants except for Ozone. The Houston region is in non-attainment for the federal standard for Ozone.	District I had the highest AQI reading and is located in close proximity to the petrochemical industries to the east of the city. Neighborhoods in District I include Magnolia Park, Hunterwood and Harrisburg.
 **19. Greenhouse Gas Emissions**	Private vehicles CO_2 emissions are increasing and now constitute the largest source for CO_2 emissions in Harris county. GHG emissions data is not available for the City of Houston or areas within the City. The City of Houston has conducted a GHG inventory for its own operations, but has not conducted an inventory of the city as a whole. In the Fall of 2013, researchers from the Shell Center for Sustainability and the School of Engineering at Rice will develop a methodology to conduct the analysis to fill this void.	GHG emissions data is not available for the City of Houston or areas within the City.
 **20. Water Pollution**	Houston water quality monitoring of waterways expanded considerably between 2004 and 2011. Additionally, the City of Houston publishes annual updates of drinking water quality to all residents.	Water pollution in the waterways was not measured at the district level since no clear methodology or data was available to conduct this level of assessment. Our waterways need to be equipped with continuous monitoring systems so reliable trends could be detected and analyzed.
 **21. Water Use**	Per capita municipal water use in Houston increased from 159 gallons per day in 2000 to 165 gallons per day in 2010. Unless this trend is reversed, water consumption will increase disproportionally with population growth, a trend that is not sustainable.	Districts C and G consume the most water among households and District H consumes the least amount of water. The data used in this indicator is based on an estimate since the City of Houston has created a protocol for some consumers to elect to have their usage bills considered private. As a result, data for total water use by district or neighborhood in the city is not considered public data. Without understanding how various businesses consume water, the research community will not be able to assist the city with intelligence for water reduction strategies. The current water reduction for the City of Houston is not considered robust since it is not sensitive to various types of business operations or sizes or types of households.

22. Water Availability	The City of Houston owns access rights to a little less than half of the available water in the region. That was 1,264,231 acre-feet in 2010. The Houston municipal water demand for 2010 was 389,082 acre-feet.	Water availability was not calculated by districts since it is not applicable to his level of study.
23. Flooding	One quarter of the City of Houston is at risk of flooding.	Districts F and J have the highest amount of people in the Flood Zone. This district includes the neighborhoods of Westchase, Westwood, Sharpstown and Gulfton. These two districts also contain large job centers and hence liability for flood damage is very high. Districts G and I have the lowest amount of people in the Flood Zone. Memorial, Briarforest and River Oaks are neighborhoods in these districts.
24. Land Cover Change	The highest increase in land cover between 2001 and 2006 was for medium intensity development. This was an increase from 150 square miles to 160 square miles. Medium intensity development accounts for the highest land coverage type in Houston and most commonly include single family housing units.	Districts C, G, and H have the highest percentage of land dedicated to Low-medium intensity development with over 60% respectively. District E has the lowest percentage with 28%.
25. Jobs / Housing Balance	A higher percentage of jobs are located within business centers, which is good for agglomeration. However only 21% of housing units are located within a quarter mile of business centers. This means that 78% of persons are commuting alone in private autos.	Districts J, G, and C have the highest percentage of housing units close to job centers. Job centers in these areas include Upper Kirby/ Greenway, Sharpstown and the Westchase district. Districts K, H, and E have the lowest percentage of housing units close to jobs. Districts K and H have no major job centers but District E has the Port of Houston, which is a major employer along with its affiliated businesses.


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Glossary

Accessibility: The degree to which a product, device, service, or environment is available to as many people as possible.

Acre-feet: a unit of volume commonly used in the United States in reference to large-scale water resources. Equal to 325,851 gallons.

Affordable Care Act: A United States federal statute signed into law by President Barack Obama on March 23, 2010.

Agglomeration: An extended city or town area comprising the built-up area of a central place and any suburbs linked by continuous urban area.

Ambient concentration: Amount of the particulate or gas pollutant per volume unit of air.

Attainment gap: The observed and persistent disparity on a number of educational measures between the performance of groups of students, especially groups defined by gender, race/ethnicity, and socioeconomic status.

CMSA: Consolidated Metropolitan Statistical area. Houston Region CMSA is an 8 county region. Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller.

CO2 emissions: The release of carbon dioxide gas into the atmosphere.

Contiguous estuaries: Mixed fresh and salt water bodies that are connected or adjacent to each other.

Employment status: Refers to the three recognized work schedules of full-time, part-time and temporary.

Flood plain: A floodplain or flood plain is a flat or nearly flat land adjacent a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high discharge.

Food Desert: Any area more than 1 mile from a grocery store that sells fresh fruits and vegetables.

Fragile lands: Land that is sensitive to degradation when disturbed; such as with highly erodible soils, soils where salts can and do accumulate, and soils at high elevations.

GHG: A greenhouse gas (sometimes abbreviated GHG) is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range.

Globalization: Globalization is the process of international integration arising from the interchange of world views, products, ideas, and other aspects of culture.

GPCD: Unit for the water usage of an area, in gallons per capita per day.

Green jobs: Work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute(s) substantially to preserving or restoring environmental quality.

HGAC Region: 13 county region administered by Houston Galveston Area Council. The HGAC region is composed of 13 counties: Austin, Brazoria, Chambers, Colorado, Fort Bend, Galveston, Harris, Liberty, Matagorda, Montgomery, Walker, Waller, Wharton.

Housing affordability: Relates to the ability of individual households to meet their monthly rent or mortgage payments within a reasonable threshold of their income.

kwh: Kilowatt-hour; a unit of energy commonly used for electricity purposes.

Land cover: Land cover is the physical material at the surface of the earth. Includes grass, asphalt, trees, bare ground, water, etc.

Medium intensity development: Includes areas with a mixture of constructed materials and vegetation.

MSA: Metropolitan Statistical Area. The Houston MSA is composed of 10 counties: Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, San Jacinto, Waller.

Municipal Solid Waste (MSW): A waste type consisting of everyday items that are discarded by the public.

Mwh: Megawatt-hour; one thousand kilowatt-hours; a unit of energy commonly used for electricity purposes.

National Ambient Air Quality Standards (NAAQS): Standards established by the United States Environmental Protection Agency under authority of the Clean Air Act that apply for outdoor air throughout the country.

Natural resources: Resources occurring naturally within environments that exist relatively undisturbed by mankind.

Personal Income: Refers to an individuals total earnings involving wages, investment enterprises, and other ventures.

PM 2.5, 10: Particulate matter of 2.5 or 10 micrometers; tiny pieces of solid or liquid matter associated with the Earth's atmosphere.

PMSA: Primary Metropolitan Statistical Area. The Houston PMSA is composed of 6 counties: Chambers, Fort Bend, Harris, Liberty, Montgomery, Waller.

Poverty line: the minimum level of income deemed adequate in a given country.

ppb: Parts per billion; a unit of concentration of chemical compounds in the atmosphere.

ppm: Parts per million; a unit of concentration of chemical compounds in the atmosphere.

Primary jobs: A primary job is a job which brings in new capital (money) to an area.

Street intersection density: The number of street intersection per unit area in a metropolitan area.

Subsidence from groundwater extraction: The sinking of land resulting from groundwater extraction.

Vehicle Miles Traveled (VMT): A measure of the extent of motor vehicle operation within a specific geographic area over a given period of time.

Urbanized Area (UA): Densely settled territory which consists of core census block groups or blocks that have a population density of at least 1,000 people per square mile and surrounding census blocks that have an overall density of at least 500 people per square mile. Less densely settled territory may be part of each UA as well.

Water availability: Describes the amount of water available for irrigation or consumption per person, per year in a region.

Wetland: Land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem.

µg: Microgram; unit of weight often used for small concentrations of contaminants.

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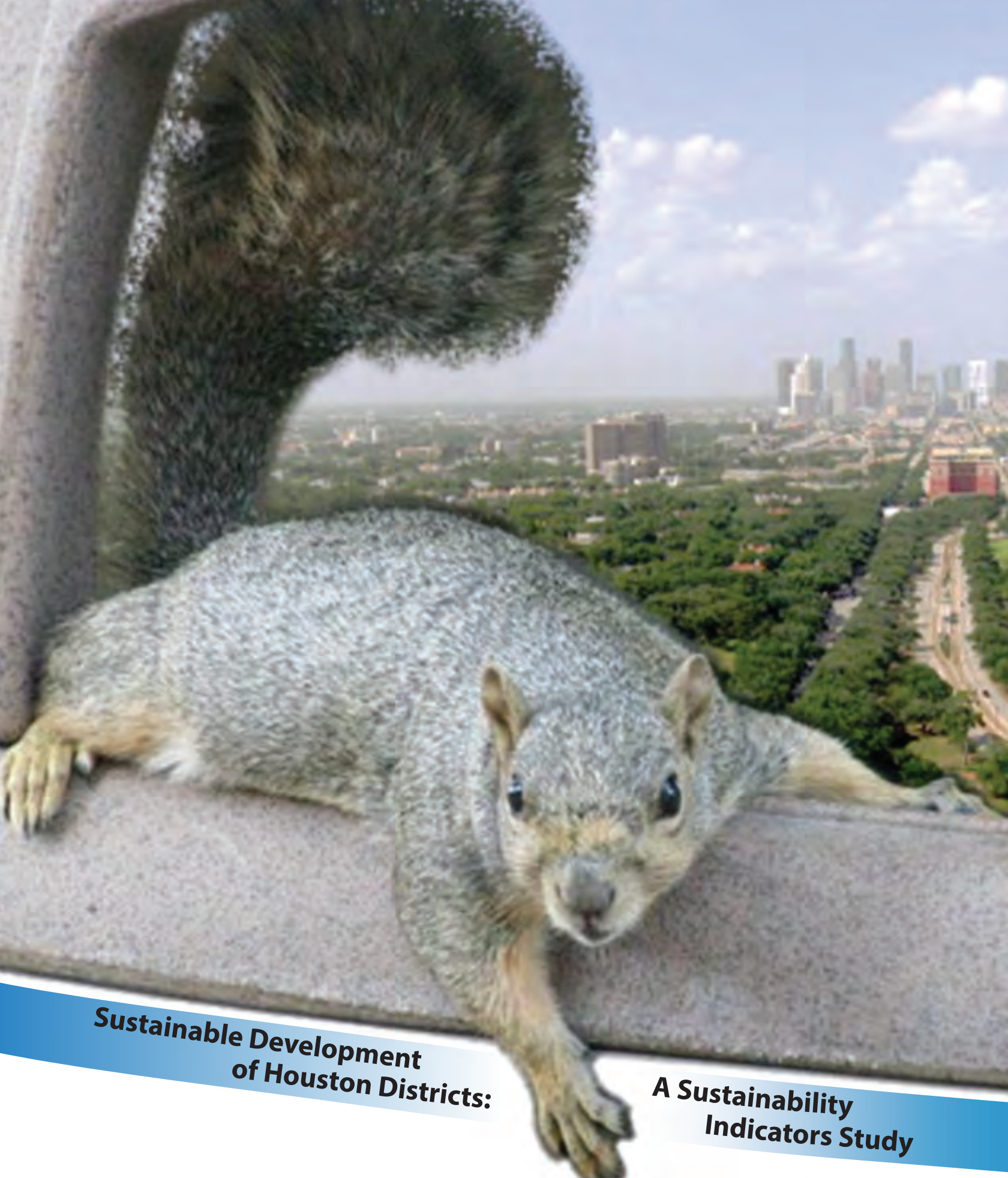

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