Attachment D: The Home Assessment Direct Measurements

If you require information to be presented in an accessible format or reasonable accommodations to participate in this study, please contact us with any specific requests by calling XXX-XXX-XXXX or emailing XXXX@XXXX.XXX. If you require language assistance to participate in this study, please contact us with any specific language assistance requests or needs.

Paperwork Reduction Act Burden Statement
This collection of information is voluntary and will be used to evaluate the US Department of Housing and Urban Development's Community Choice Demonstration. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, gathering and maintaining the data needed, and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB number for this collection is OMB 2528-0337 which expires on XX/XX/XXXX. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to NAME at XXXX@XXXXX.XXX or call XXX-XXX-XXXX.

Privacy Act Statement
Authority: Section 502 of the Housing and Urban Development Act of 1970 (Public Law 91-609) (12 U.S.C. §§ 1701z-1; 1701z-2(d) and (g)).
Purpose: Evaluation of the Community Choice Demonstration (CCD).
Routine Use: The information will be used for the purpose set forth above and may be provided to Congress or other Federal, state, and local agencies, when determined necessary.
Disclosure: Records will be used for research and statistical analysis and will not be used to make decisions that affect the rights, benefits, or privileges of specific individuals.
SORN ID: Community Choice Demonstration Evaluation Data Files, HUD/PDR-09

As part of the Home Assessment, the evaluation contractor will collect several different samples and measurements in the household. Using a handheld air quality monitor, they will directly collect temperature, relative humidity, carbon dioxide levels, and carbon monoxide levels. Separate handheld devices will be used to directly measure volatile organic compound (VOC) levels and particulate matter (PM) concentration. The contractor will collect five measurements for each of the environmental conditions or air pollutants in different locations throughout the home to ensure proper measurement. The contractor will also collect one outdoor measurement for each of the environmental factors and pollutants. To measure mouse and cockroach allergens, the contractor will use a pump to collect dust samples over a one-foot-square area that will be sent out to a lab for analysis. No outdoor sample will be collected for these allergens. During the in-home visit, the contractor will also conduct a visual inspection using a triggers assessment[1] that specifically checks for mold, rodents, and other conditions that may impact interpretation of the direct measurements. Please see the table below for a description of the samples that will be collected.

Environmental Sample	Sampling Protocol	Definition and Rationale	Outcomes and Comparison Values
Temperature (°F and °C)	TSI Indoor Air Quality Meter 7575 (or compatible)	Range of indoor air temperatures inside the home. Indicates whether homes are within a comfortable temperature.	Indoor air temperature is within ideal range assuming 50% relative humidity: Summer: 73° to 79°F Winter: 68° to 75°F
Relative humidity (%)		Amount of atmospheric moisture relative to the maximum humidity at a given temperature expressed as a percentage. High humidity can result in mold and mildew growth, and low humidity can result in several health issues including respiratory system morbidity.	Relative humidity is below 60%, or within ideal range between 30-50%
Carbon dioxide (CO_2) concentration		The concentration of CO_2 measured indoors is commonly included in air quality monitoring as an indicator of indoor ventilation quality. Indoor levels are typically higher than outdoors. Though high levels can cause health effects, this is not expected to be of concern in homes.	CO_2 concentration is below harmful threshold of 1,000 ppm, and the magnitude of the concentration
Carbon monoxide (CO) concentration		CO is an odorless and colorless toxic gas with numerous sources within the home including gas stoves, spaces heaters, poorly installed furnaces, smoking. CO affects oxygen transport; depending on its levels, it can cause clinical symptoms such as fatigue, headaches, dizziness, and even death at very high levels.	Magnitude of CO concentration; recommended safe level is as close to 0 ppm as possible. Recommended 24-hour average below 6 ppm

[1] The triggers assessment is adapted from: Asthma Education and Intervention Program: Partnership for Asthma Trigger-Free Homes (PATH), https://apps.dtic.mil/sti/pdfs/ADA489872.pdf

Environmental Sample	Sampling Protocol	Definition and Rationale	Outcomes and Comparison Values
Mouse (Mus m 1) allergen levels in dust	Low flow air sampling pumps (BDX-11 or comparable)	Mus m 1 is an allergen originating from the urine of common house mice. Higher concentrations in air and dust have been linked to asthma morbidity.	Allergen levels are detectable, the magnitude of levels, and whether they are above the threshold as unsafe for asthma symptoms: 1.6 µg /g (in kitchen)
Cockroach (Bla g1) allergen levels in dust		Bla g1 is an allergen originating from the feces of cockroaches. Higher concentrations in air and dust have been linked to asthma morbidity.	Allergen levels are detectable, the magnitude of levels, and whether they are above the threshold as unsafe for asthma symptoms: 8 µg/g (in kitchen)
Particulate matter in dust: PM_{10}, $PM_{2.5}$	TSI P-Trak Particle Counter 8525 (or compatible)	PM_{10} are coarse inhalable particles with a diameter of 10 microns or less; they include $PM_{2.5}$, which have a diameter of 2.5 microns or less. These particles can enter the lungs and are associated with several heart and lung diseases. Outdoor levels are an indicator of local air quality, and ideally indoor levels would be similar. Indoor sources include combustion (e.g., candle burning, smoking, gas stoves) and dust.	PM concentration is below threshold (≤12 µg/m^3), and magnitude of the concentration
Volatile organic compounds (VOCs) concentration	Rae Systems MultiRae Lite PID Monitor (059-A or compatible)	VOCs refers to a class of chemicals that are generally emitted from their source as a gas due to high vapor pressure and low water solubility (e.g., formaldehyde, benzene). Sources of indoor VOCs include furniture, cleaners, solvents, personal care products, and more. Health effects depend on the type of VOCs. Some VOCs are associated with asthma and other respiratory symptoms.	Mean of VOC samples is below threshold (<200 µg/m^3), and magnitude of the concentration
ppm = parts per million, by volume in air; µg/g = micrograms per gram of dust; µg/m^3 = micrograms per meter of air cubed			