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2014 COMMERCIAL BUILDING STOCK ASSESSMENT: APPENDICES B-N

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B.1 Building Type Mapping from 2009 to 2014 CBSA

NEEA and the Navigant project team worked in collaboration with the Building Classification working group to reclassify building types for two main reasons:

- Create building categories with similar energy consuming building types in order to calculate appropriate Energy Use Intensities; and
- Re-classify the "Other" building types into more informative building categories.

Figure 1 provides a mapping from the 2009 building categories into the new 2014 categories, while Figure 2 provides the same mapping at the building type detail level.

Figure 1. Building Category Mapping from 2009 CBSA to 2014 CBSA

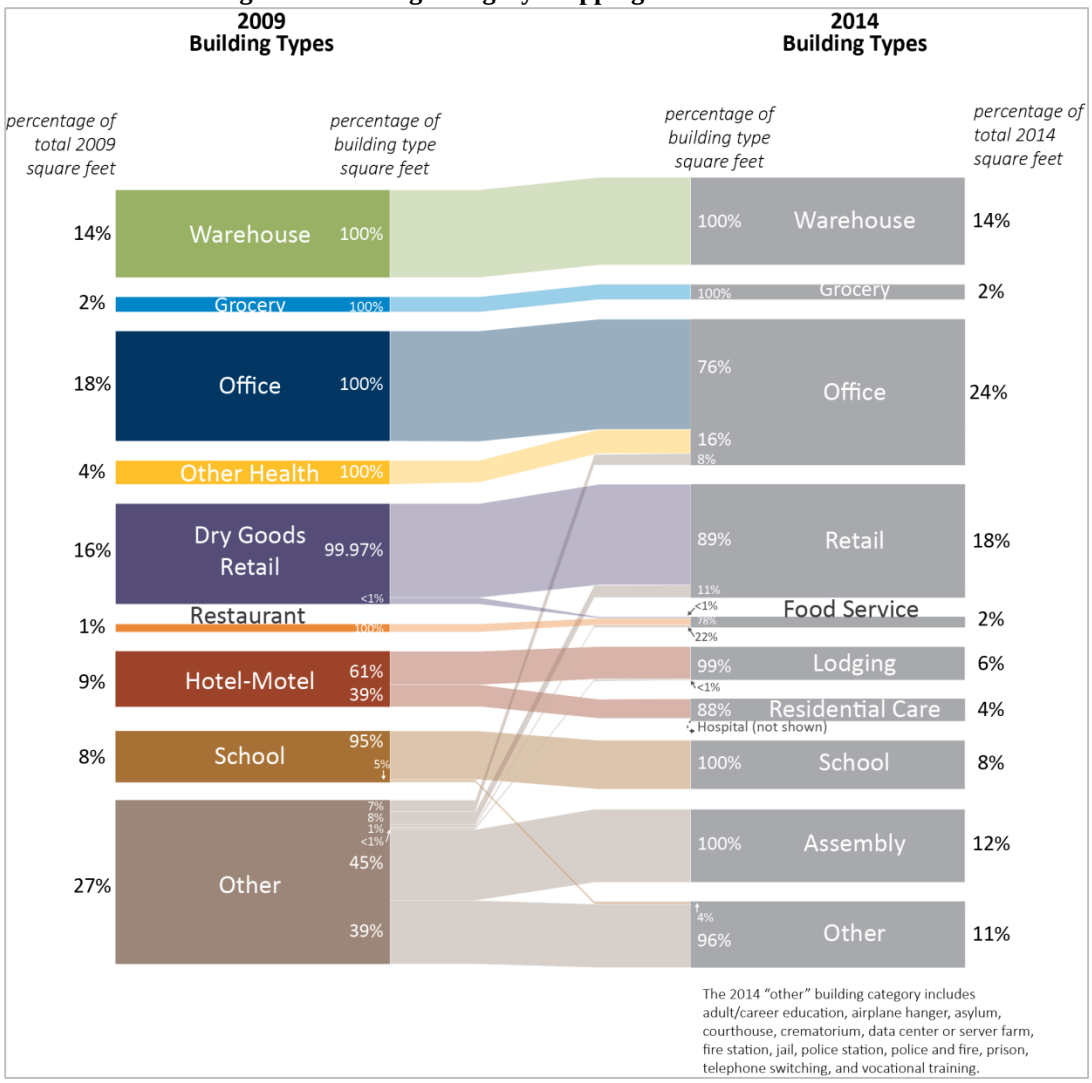


Figure 2. Detail Building Type Mapping from 2009 CBSA to 2014 CBSA

2009 CBSA Building Type			2014 CBSA Building Type		
Dry Goods Retail			*Retail*		
Auto Parts	Florist / Nursery	Studio / Gallery	Auto Parts	Hardware	Beauty / Barber
Auto / Boat Dealer	Hardware	Warehouse Club	Auto / Boat Dealer	Home Improvement	Car Wash
Clothing	Home Improvement	Catering Service	Clothing	Liquor Store	Dry Cleaner
Department Store	Liquor Store	Coffee Shop	Department Store	Pharmacy	Laundromat
Dept. Store with Grocery	Pharmacy	Ice Cream Shop	Dept. Store with Grocery	Rental Center	Post Office
Electronics / Appliances	Rental Center		Electronics / Appliances	Studio / Gallery	Repair Shop
			Florist / Nursery	Warehouse Club	Vehicle Repair
Grocery			*Grocery*		
Convenience Store	Grocery		Convenience Store	Grocery	
Gas Station w/ Convenience			Gas Station w/ Convenience		
Hospital			*Hospital*		
Hospital			Hospital		
In-Patient Rehab					
Hotel / Motel			*Hotel / Motel*		
Hotel	Dormitory	Assisted Living	Hotel	Dormitory	Shelter / Orphanage
Motel	Hotel - Resort	Nursing Home	Motel	Hotel - Resort	Convent or Monastery
Bed & Breakfast	Shelter / Orphanage	Retirement Home	Bed & Breakfast	Shelter / Orphanage	Fraternity or Sorority
Boarding House			Boarding House	Hotel - Resort	Halfway House
Office			*Office*		
Professional Office	Retail Banking	Financial / Govt. Office	Professional Office	Financial / Govt. Office	Medical Office
Call Center	Sales Office		Call Center	City Hall	Urgent Care Clinic
			Retail Banking	Dental Office	Outpatient Rehab
			Sales Office	Outpatient Medical	Veterinarian Office
Restaurant			*Restaurant*		
Cafeteria	Sit-Down Restaurant	Truck Stop	Cafeteria	Take-Out Restaurant	Catering Service
Fast Food Restaurant	Take-Out Restaurant	Other Restaurant	Fast Food Restaurant	Truck Stop	Coffee Shop
			Sit-Down Restaurant	Bar, Pub, Lounge	Ice Cream Shop
School			*School*		
Elementary School	Pre-School	Adult / Career Education	Elementary School	High School	Other K-12 School
Middle School	Other K-12 School	Vocational Training	Middle School	Pre-School	
High School					
University			*University*		
University / College			University / College		
Warehouse			*Warehouse*		
Mini-Storage	Warehouse, Storage		Mini-Storage	Warehouse, Storage	
Cold Storage	Warehouse, Distribution		Cold Storage	Warehouse, Distribution	
Other Health					
Dental Office	Medical Office	Outpatient Rehab	*Not Characterized*		
Outpatient Medical	Urgent Care Clinic	Veterinarian Office			
Not Characterized			*Assembly*		
			Arena	Convention Center	Performing Arts Theater
			Auditorium	Gym, Exercise	Pool
			Marina	Health Spa	Recreation Center
			Bowling Alley	Ice Skating	Religious Assembly
			Casino	Library	Roller Skating
			Club, Lodges	Museum	Senior Center
			Community Center	Movie Theater	
Not Characterized			*Residential Care*		
			Assisted Living	Nursing Home	
			In-Patient Rehab	Retirement Home	
Other			*Other*		
Airplane Hanger	Marina	Ice Skating	Airplane Hanger		
Asylum	Casino	Library	Asylum		
Courthouse	Club, Lodges	Museum	Courthouse		
Crematorium	Community Center	Movie Theater	Crematorium		
Data Center or Server Farm	Convention Center	Performing Arts Theater	Data Center or Server Farm		
Fire Station	Gym, Exercise	Pool	Fire Station		
Jail	Health Spa	Recreation Center	Jail		
Police Station	Beauty / Barber	Religious Assembly	Police Station		
Police & Fire	Car Wash	Roller Skating	Police & Fire		
Prison	Dry Cleaner	Senior Center	Prison		
Telephone Switching	Laundromat	Convent or Monastery	Telephone Switching		
Arena	Post Office	Fraternity or Sorority	Adult / Career Education		
Auditorium	Repair Shop	Halfway House	Vocational Training		
Bowling Alley	Vehicle Repair	City Hall			
Bar, Pub, Lounge					

Note regarding mapping of grocery and retail: The project team recognizes the miss-classification of sites such as Fred Meyer into Retail instead of Grocery. Based on energy consumption these sites fit better into Grocery and remains a topic for change in future studies.

The 2009 CBSA contains only the results of the 2009 mapping; the sub-classification details are not available by building to re-map the 2009 data into the 2014 building classifications. Making comparisons requires either ignoring this limitation or mapping 2014 buildings into the 2009 classification scheme. This study utilizes the latter approach, but the reader must be careful not to use the 2014 data in these comparison charts and tables for further analysis.

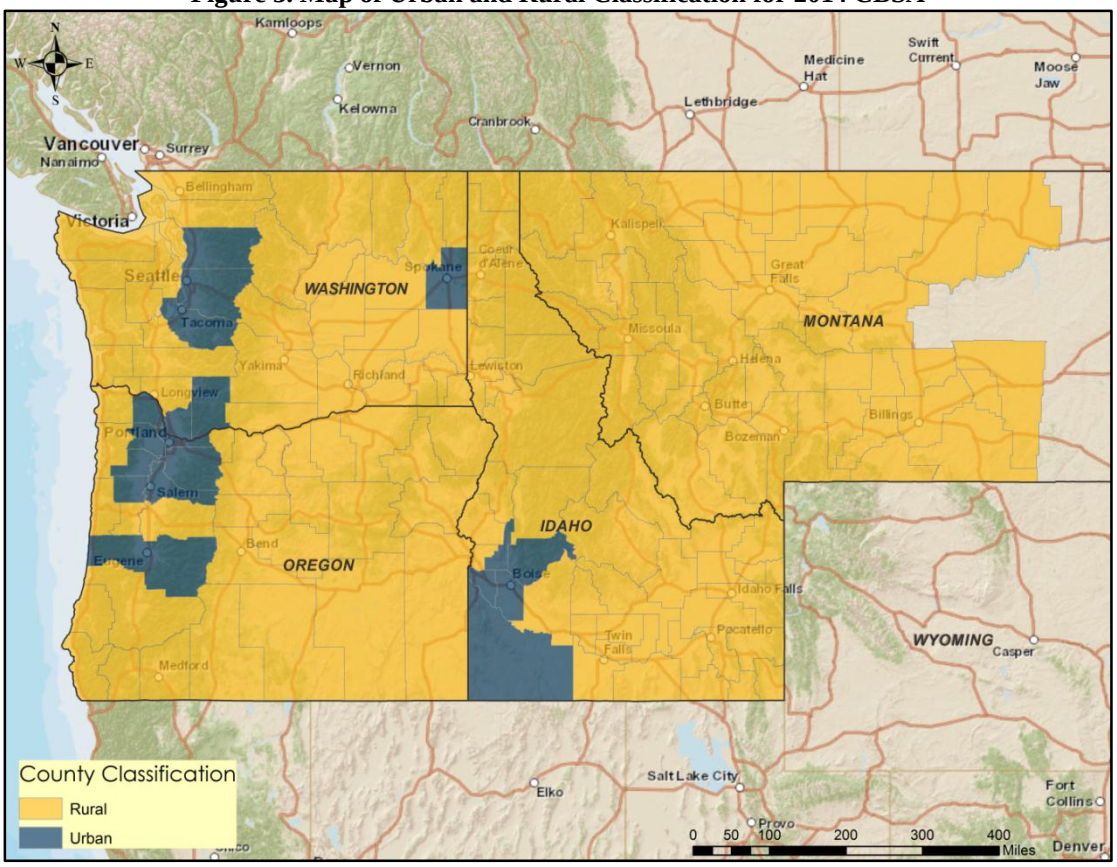
B.2 Sample Design

Table 1. Sample Stratification Definitions

Building Characteristic	Application to the Sample
Building Type (Primary Economic Use)	The primary economic use of a building was determined from a combination of CBI data, North American Industry Classification System (NAICS) codes, and other information sources. The working group mapped these economic uses to twelve building-type categories used for sampling based on the methodology used by the Northwest Power & Conservation Council.
Building Vintage	The Navigant project team split the population into two vintages in order to better ascertain the impacts of recent code changes and construction technology improvements. The team further partitioned buildings into those built prior to 2004 and those built in 2004 or later.
Building Size	The project team applied between one and three building specific size bins to each category, due to the impact building size has on energy-use characteristics for various building types.
Urban/Rural Classification	The sampling priorities working group designated counties by urban or rural based on their Rural-Urban Continuum Code (RUCC).[1] The Navigant project team classified counties with a RUCC of 2 or less as urban, and those with a 3 or higher as rural. Figure 3 shows the urban/rural county designation based on this definition.

[1] Further information available at http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx

Figure 3. Map of Urban and Rural Classification for 2014 CBSA



Combining the four sampling stratifications produced the sampling framework (shown in Figure 4) which consists of seventy "cells" that intersect each stratum.[2] The numbers in each cell are the counts of onsite surveys needed to achieve 20 percent precision with 80 percent confidence in the results. When aggregated to the building-type level, these counts achieve 10 percent precision with 90 percent confidence.

[2] The removal of Hospitals and Universities from the sample framework reduces the number of cells to sixty six.

Figure 4. Sample Framework for the CBSA Study (N=859)

	Vintage	Size (SF)	Retail	Grocery	Office	Food Service	Warehouse	Hospital	Residential Care	Hotel-Motel	School	University	Assembly	Other
Urban	Pre-2004	5,000 or less	16	14	13	12	12	12	12	14	14	12	13	10
		5,001-20,000		12										
		20,001-50,000	12		14								12	9
		50,001-100,000							10		13			
		100,001 & Up	14		12					11			9	8
Rural	Pre-2004	5,000 or less	16	13	16	12	12	12	14	14	12	11	16	14
		5,001-20,000		14										
		20,001-50,000	13		12								15	7
		50,001-100,000							10		13			
		100,001 & Up	11		3					8			3	5
All	2004-2013	5,000 or less	25	11	25	19	19		12	18	11		21	12
		5,001-20,000		10										
		20,001-50,000	13		13								13	12
		50,001-100,000							12		12			
		100,001 & Up	12		9					7			3	4

The necessary sample sizes at the cell level are aggregate across all vintage and size dimensions to produce findings at the building-type level at the 90 percent confidence level. Based on the sample counts developed, the CBSA team estimated the precision for building characteristics when aggregated to the building-type level. These estimates are based on an assumed coefficient of variation of 0.5 on continuous variables, or a proportion estimate of 50 percent on binomial variables. The sampling framework and the desired levels of statistical confidence and precision were the main driver behind the achieved sample sizes and precisions (at the 90 percent confidence level) shown in Table 2.

Table 2. Sample Size and Precision by Building Type

Building Type	Sample Size	Precision at 90% Confidence Level (Coefficient of Variation = 0.5 / Proportion of 50%)
Assembly	102	8.1% / 8.0%
Food Service	42	12.7% / 12.3%
Grocery	71	9.7% / 9.6%
Hospitals	24	16.8% / 16.5%
Lodging	71	9.9% / 9.8%
Office	117	7.6% / 7.5%
Other	84	9.1% / 9.0%
Residential Care	69	9.6% / 9.6%
Retail	119	7.4% / 7.3%
Schools	72	9.6% / 9.5%
Universities	23	16.0% / 16.9%
Warehouse	43	12.7% / 12.3%
Total	**837**	**3.2% / 3.1%**

Notes: Information compiled and analyzed by the CBSA team

B.3 Updating the Population Frame from the Sample

This section describes the methodology used to extrapolate from the 2014 CBSA survey findings to fill in the data gaps in the population frame for the purposes of:

- developing overall square footage estimates for the region by building type;
- categorizing "other" buildings into more informative building categories; and
- improving the population frame details for use in future CBSA studies;

Gaps in the Population Frame Square Footage

In previous CBSA studies, the project team extrapolated aggregate reported square footage from earlier regional square footage estimates based on an estimated rate of construction and demolition in the intervening period. The square footage estimate in the 2014 CBSA represent the results of an effort to construct a regional square footage estimate using an entirely new population frame and the results from the recruitment and surveying work conducted throughout this study.

Filling Gaps in the Population Frame

This section describes the gaps in primary building characteristics needed to categorize the population for the 2014 CBSA. Table 3 shows the proportion of records within the aggregate population frame that lacked information regarding one or more of the key building characteristics.

Table 3. Proportion of Population Frame Records Lacking Key Building Characteristics

Building Type	Square Footage	Vintage
Assembly	24.2%	36.0%
Food Service	9.7%	17.1%
Grocery	7.3%	19.5%
Hospitals	60.0%	0.0%
Lodging	19.3%	31.2%
Office	12.0%	18.9%
Other	37.4%	54.9%
Residential Care	3.6%	9.0%
Retail	11.8%	23.9%
Schools	18.1%	28.1%
Universities	60.8%	100%
Warehouse	6.0%	10.3%
Total	**21.6%**	**33.8%**

It is important to note that the gaps in the population frame are not evenly distributed. As Table 3 shows, there are significant differences among the building types as to the proportion of complete records in the population frame. Additionally, the proportion of incomplete records is not evenly distributed geographically. Many of the databases used to construct the population frame rely upon county-level data sources, particularly tax assessor data. Any disparities in the thoroughness of the primary data at the county-level will be reflected in these databases and ultimately in the CBSA population frame. When making extrapolations to account for gaps in the population frame, the project team attempted to take the unevenness of the discrepancies into account.

Handling of the "Other" Buildings and Unknown Building Characteristics

To fill in gaps, or "unknowns," in the population frame at an aggregate level, the Navigant project team extrapolated results to use as proxies. For all sampled buildings that had one or more pieces of incomplete information in the population frame, the Navigant project team used data collected during site surveys for these buildings to extrapolate results for all of the unknown gaps in the population frame. This extrapolation was performed based on site square footage to reduce the introduction of bias from any differences between the sample design for the 2014 CBSA and the actual distribution of buildings within the region (by building type, size, vintage, or geographic location). To further reduce the introduction of bias, these extrapolations were limited to buildings within each sample cell (or the intersection of as many sample strata as is known) where possible.

Table 4 shows the total square footage by building type for the region both before and after this extrapolation exercise to account for gaps in the population frame.

Table 4. Square Footage Estimates Before and After Extrapolation for Unknown Characteristics

Building Type	Total Square Footage Before Extrapolating for Gaps	Total Square Footage After Extrapolating for Gaps
Assembly	146,588,759	246,595,640
Food Service	39,892,398	48,815,529
Grocery	47,237,143	60,516,721
Lodging	98,366,679	136,164,165
Office	435,030,309	546,230,183
Other	382,196,271	920,089,904
Residential Care	55,963,185	65,143,040
Retail	389,244,555	514,961,575
Schools	139,998,468	241,971,113
Warehouse	448,351,672	511,079,780
Total	**2,182,869,439**	**3,291,567,650**

As a robustness check on this exercise, the Navigant project team performed a second extrapolation using all *known* information in the population frame to populate all *unknown* information. This methodology would assume that there is no systematic difference between the building in the frame with complete information and those without complete information. This methodology produced an aggregate square footage estimate approximately 2.2 percent higher than the methodology described above. This outcome confirmed both the reasonableness of the aggregate square footage estimate from the primary extrapolation method, as well as the expectation that buildings with incomplete information in the population frame tend to be smaller buildings on average.

Adjustments Made Based on Findings from the 2014 CBSA

In addition to using survey data to fill in the *a priori* gaps in the 2014 population frame, the Navigant project team also used the findings from on-sites surveys to adjust the aggregate data in the population frame to account for systematic errors that may be present in the databases comprising the frame. For example, some of the primary data used to compile the population frame uses tax parcel rather than building as the primary unit of record, or the NAICS code of the building owner rather than the primary economic use of the building itself.

To make adjustments for these systematic errors, the project team maintained a log of all discrepancies they discovered during the recruitment process and onsite surveying. The primary discrepancies that influenced the extrapolations described here include error in the listed building type, building vintage, or total square footage. The project team aggregated all errors discovered across all building surveys and extrapolated findings to the balance of the population frame. As with the previous extrapolation, the Navigant project team performed this calculation based on site square footage to reduce the introduction of bias from the sample design.

The project team performed an additional extrapolation to adjust the total square footage in the original population frame to remove square footage that is more properly classified as residential or industrial. This data was collected during the recruitment process and included approximately 13.8 percent of the commercial buildings in the region. The Navigant project team adjusted the aggregate square footage for each building type based on the proportion of building square footage found to be either residential or industrial during recruitment.

Table 5 shows the total square footage by building type for the region both before and after this final extrapolation exercise to account for systematic errors in the population frame.

Table 5. Square Footage Estimates Before and After Extrapolation for Database Discrepancies

Building Type	Total Square Footage Before Extrapolating for Discrepancies	Total Square Footage After Extrapolating for Discrepancies
Assembly	246,595,640	368,872,051
Food Service	48,815,529	53,036,739
Grocery	60,516,721	77,120,838
Lodging	136,164,165	171,040,929
Office	546,230,183	734,358,126
Other	920,089,904	333,434,464
Residential Care	65,143,040	125,160,635
Retail	514,961,575	570,929,488
Schools	241,971,113	245,353,162
Warehouse	511,079,780	442,224,055
Total	**3,291,567,650**	**3,121,530,487**

B.4 Extrapolation from Sample Results to Population Results

This section describes the methodology used to extrapolate from the 2014 CBSA onsite survey key building characteristic findings to the regional key building characteristic findings.

Case Weight Development

The Navigant project team used "case weight" ratios (indicating how many buildings in the population were represented by each sampled building) to extrapolate collected data to the regional level and characterize the commercial building stock for the entire Pacific Northwest. The ratios were calculated as the ratio of the total region-wide square footage for each stratification cell in the overall population frame to the total sampled square footage for the corresponding stratification cell in the sample frame. The team then applied these ratios to the data collected at each site within a stratification cell to extrapolate results across the region.

The project team developed case weights by assigning each building in the population data set to a sample cell, defined by the combination of building type, size, vintage, and urban/rural designation. The total square footage was then summed for the population and the sample in each cell, and the weight for each sample cell was calculated as the ratio of population square footage to sample square footage:

$$W_{tsvu} = \frac{\sum_{population} SF_{tsvu}}{\sum_{sample} SF_{tsvu}}$$

Where:

W = case weight
t = building type
s = building size class
v = building vintage class
u = urban/rural designation
SF = building square footage

Square footage was chosen as the scaling factor over building count because it provides more accurate results, and the data on square footage is more widely available in the population data set than number of buildings.

The assumption implicit in this extrapolation is that once the building type has been controlled for, size, vintage, and urban/rural designation, no systematic bias remains in the characteristics measured in this study. This is an imperfect assumption, but a necessary one if the goal is to represent the entire population.

Note that the sample was only designed for extrapolation to the Pacific Northwest region as a whole, and it is statistically invalid to use these case weights to extrapolate the results to a single sub-region.

Applying Case Weights to Site-Level Results

The team extrapolated site-level results to the entire Pacific Northwest using the regional case weights developed for each cell in the sample frame as described in section 2.1.3. The team applied these weights to the sites that fell within the corresponding stratification framework. For example, all rural, pre-2004, 100,00)+ sqft, Retail sites in the region were weighted by the corresponding rural, pre-2004, 100,000+ sqft, Retail case weight calculated from the sample.

The analysis team applied the case weights slightly differently depending on the data type. Specifically, the team calculated *region totals* (e.g., total window area) by multiplying the site-level values by the appropriate case weight before summing. The team calculated *regional mean values* (e.g., average LPD) by taking the weighted mean of the site-level values, using the case weight as the weighting factor.

B.5 Energy Use Intensity Calculations

To calculate electric and natural gas energy use intensities (EUI, measured in kWh/sf or therms/sf) for each building, the team collected billing data from the utilities that serve the sampled buildings. First, signed billing data release forms were acquired for as many sites as possible, authorizing the customer's utility service providers to release data for the meters that serve the site. These were combined with site identifying information from the FACT database, and sent to the utilities via a secure file transfer protocol (FTP) website. The team requested three years of consumption history (kWh or therms) for each meter, along with dates of service and meter identifying information to link the data back to the individual buildings.

Prior to calculating EUIs, data analysts cleaned the billing data and checked it for errors. First, all meters were linked to a specific site in the FACT database, and non-matching meters were checked by hand using contextual information (site address, business name, etc.) to get as many matches as possible. The CBSA team then ran additional checks on the data to identify missing or duplicate data, and data values that appeared to be outliers.

Once the data were cleaned, the billing data for each meter were apportioned to calendar months and weather-normalized to estimate the consumption in a typical year. Weather normalization was performed using a fixed-reference-temperature Princeton Scorekeeping Method (PRISM)-equivalent approach, with heating and cooling reference temperatures of 65 degrees. For each calendar month at each site, the model produced a base daily consumption (kWh or therms per day) as well as a heating and cooling slope, which estimated the additional consumption per heating degree day (HDD) or cooling degree day (CDD). The CBSA team then estimated typical year consumption for each site by applying the model results to weather data from the Typical Meteorological Year 2 (TMY2) data set.

Calculated EUI values were compared to typical values by building type and sites that appeared to be outliers were manually checked for errors or missing meters. Ultimately, the CBSA team dropped any EUI value that did not appear to be credible[3], and the process described below for missing EUIs was employed to provide the estimate for the building.

Since utilities were not able to provide complete billing histories for all participants of this study, the CBSA team estimated the EUI values for the remaining sites using regression models. Simple and complex models were created for both electric and natural gas EUIs, based on the parameters presented in Table 6 indicate the respective percentages by cell of utility billing data received.

[3] The team flagged data points that were less than 10 percent or greater than 1,000 percent of the median value by building type, except for warehouse data, which were not subject to this screening due to the wide range of possible usage patterns. Flagged data points were dropped if no reasonable explanation for them was found in the site level detail. These cutoff points represent a valid range for including relevant data without including faulty data that may skew results.

Table 6. EUI Model Parameters

	Complex Electric	Simple Electric	Complex Gas	Simple Gas
Square Footage	√	√	√	√
Cooled Percentage	√			
Heated Percentage	√		√	
CDD	√	√		
HDD	√	√	√	√
Building Age	√		√	
Hours of Operation	√		√	
Building Type	√	√	√	√

Missing EUIs were filled using the complex models for sites that had data for all relevant parameters and the simple models for the remaining sites.

B.6 Lighting Power Density Calculations

The following section documents the CBSA project team's LPD sampling methodology. The team recognized the limitations such as cost effectiveness, timeline, and accessibility of data, to gathering all necessary components to calculate an accurate whole building LPD and the LPD by space type from the onsite visits. For example, at sites where as-built drawings and O&M manuals were made available for the surveyor (more typical for newer buildings), more cost effective gathering of in-depth of lighting information could be done by verifying and reviewing this material. This type of data collection generates a high level of confidence in both the raw data and the calculated whole building LPD. At sites where as-built drawings do not exist, the team based whole building LPD calculations on space type weighting (described below). This strategy and the associated sampling procedure may result in some buildings with a lower confidence in the calculated whole building LPD due to a lower percentage of whole building square footage being covered by the space type survey.

$$Whole\ Building\ LPD = \sum_{i=1}^{n} Space\ Type\ LPD_i * \frac{Lighting\ Survey\ Focus\ Area\ (feet^2)_i}{Total\ LSFA\ (feet)^2{}_i}$$

Surveys without as-built drawings

The goal here is to gather all information necessary to calculate the whole building and unique subspace type LPD for each building type (see Subspace Types section below). This protocol should NOT be used if the amount of time it takes to do the full lighting assessment is less than the time to follow this sampling procedure.

1. Identify each unique LPD subspace type for the building type being surveyed (see Subspace Types section below). If another subspace type exists that represents more than 20% of the total building floor area include this subspace type too. Subspace types refer to an area of the building that has distinct lighting features due to the area's use including lamp type, schedule and lighting control method. Additionally the total subspace area included should represent at least 70% of the total building area.

2. If there are multiple tenants for a space type use the three largest tenants to represent the space type. In multi-use building scenarios, the CBECS sampling approach will be used.

3. If the total area of the subspace type is large, isolate a portion of the subspace where a repeatable lighting pattern can be established. The portion of space beneath the repeating lighting pattern will be the lighting survey focus area.

    a) The lighting survey focus area should be at least 10% of the total area of the subspace type. This estimate is recorded in the data collection form.

    b) Measure and record the area (square footage) of the lighting survey focus area and the total subspace type area.

    c) For the lighting survey focus area, visually verify as much information as you can for the data collection form. Be sure to capture fixture height.

4. Locate where replacement lamps are stored (often referred to as the 'lamp (bulb) room.' Determine which replacement lamps are used for each luminaire style and ask building operations staff as needed. Visually verify additional information required on the data collection form such as wattage and lamp type from the spare lamps and/or boxes.

5. The fixture cut sheets located in the O&M manuals may also have lighting information and should be reviewed if there is still information missing or there are discrepancies in information gathered.

6. Record required subspace types that are not present in the space with an area of 0 of 0.

In Addition capture any unaudited areas as follows:

1. Create a row for each Space ID to signify any unaudited subspaces within each Space ID, if there are unaudited subspaces. For example, if you have a school with all common areas in a Space ID and only sample the lighting in the corridor subspace you would include a line item for the unaudited areas (restrooms, mechanical and any other subspaces not sampled). This would be entered with the appropriate Space ID, subspace type (lumped together as "Other" would be typical): Space ID = 1 (consistent with what you assigned the common space to), subspace = "Other" (or Restroom/Mech or some other descriptive), and the area would be indicated as 0 of 1,000 where the 1,000 is the total area of the un-sampled subspaces within the Space ID. The rest of the columns would be left blank.

2. Create a row for any unaudited areas spanning multiple Space IDs and/or multiple subspaces of interest. For example, suppose you have access to only 2 of 16 floors of multi-tenant building with Space IDs representing a garage, common area, retail, restaurant, and office space and 240,000 sq. ft of total building space. The building contact says the unaudited 14 floors are office space, but you have no way of knowing what the subspace make up or lighting pattern is on the unaudited floors. This would get entered with Space ID = 1 (consistent with what you assigned the office space to),

Subspace Type: Off (or something descriptive Unaudited Off, Off-other tenant) and area would be indicated as 0 of 210,000. The rest of the columns would be left blank.

As an example, if an 11,000 square foot elementary school has 15 classrooms representing 7,000 sq. ft., a 500 sq. ft. library, a 2,800 sq. ft. gym, 500 sq. ft. of corridor space and 200 sq. ft. of bathrooms; The subspace types of importance are the classroom, library, gym, and corridor space. However if it was also the case that five of the classrooms (2,333 sq. ft.) had T12s and ten classrooms (4,667 sq. ft.) had T8s, you would want to break these out as separate space types because they have different lighting systems.

Next you would want to find a lighting survey focus area that is at least 10% of the total subspace type area for each of the identified subspace types (T8 classrooms, T12 classrooms, library, gym, corridor). The focus area must represent the characteristics of the subspace type area. To meet the minimum 10% criteria, the gym your lighting survey focus area would have to be 280 sq. ft. or greater, for the library and corridor it would have to be 50 sq. ft. or greater, for the T12 classrooms it would have to be 233 sq. ft. or greater and for the T8 classrooms it would have to be 467 sq. ft. or greater. So if each classroom is 467 sq. ft. you would probably want to look at and record the details for one classroom per group. Use lighting survey focus areas that are convenient to scale up. Special care will be required in areas with display lighting. These areas will likely have to be separated with their own subspace.

Surveys with as-built drawings

The goal here is to gather all information necessary to calculate the whole building LPD and that of the required subspaces. The required subspaces are the same as those required in the sampling method and are listed below.. If as-built drawings are available for a site we want to insert this information into the data collection form. But before we do, a sample of the information provided on the as-built drawings should be verified visually.

1. Determine all space types and subspace types in the building and the relative area of each from the as-built drawings and discussions with the building personnel.

2. Identify each space type and subspace type of importance. Verify the information for the dominate fixture per space type. Also verify that the lighting control strategy given in the as-built is correct for each of these subspace types. If Lamp type is High Performance T8 (HP T8), be sure to record Ballast Type (e.g., Electronic – Unknown Type (E), Standard Electronic (SE), or High Performance Electronic (HPE))

3. If the as-built drawings don't match the existing conditions, investigate the extent of the difference. For space types and subspace types that are mostly different from the as-built drawings use the above 'Surveys without as-built drawings procedure' to determine data collection form inputs.

Required Subspace Types

For each building type listed below, we propose to collect lighting data to produce LPD and lighting characteristics for each of the specified subspace types listed no matter the significance. In addition, we propose to produce LPD estimates for any other subspace type > 20%. All other spaces may or may not be lumped at the auditor's discretion.

Table 1 shows subspaces by primary economic use and detailed building type and Table 2 shows subspaces alphabetically. “Other – Laboratory” and “Parking Garage” individual spaces must be included regardless of building type if they exist.

Table 7. Required Lighting Subspaces by Primary Economic Use and Detailed Building Type

Primary Economic Use	Detailed Building Type			Required Lighting Subspaces*
Assembly	1 ARENA 2 AUDITORIUM 3 BOAT SLIPS, MARINA, YACHT CLUB 4 BOWLING ALLEY 5 CASINO 6 CLUB, LODGES 7 COMMUNITY CENTER	8 CONVENTION CENTER 9 GYM, EXERCISE 10 HEALTH SPA 11 ICE SKATING 12 LIBRARY 13 MUSEUM 14 MOVIE THEATER	15 PERFORMING ARTS THEATER 16 POOL 17 RECREATION CENTER 18 RELIGIOUS ASSEMBLY 19 ROLLER SKATING 20 SENIOR CENTER 21 OTHER ASSEMBLY	**1, 2, 14, 15:** SEATING AREA, CORE - LOBBY/PUBLIC CORRIDOR/CONCESSIONS, OTHER-STAGE/BACKSTAGE, OTHER – STORAGE **3, 5, 6, 7, 20, 21:** OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE- CORRIDOR/LOBBY **4:** OTHER- PLAYING AREA, OTHER - PINSET, CORRIDOR/LOBBY, DINING **8:** OTHER - ASSEMBLY, CORE- CORRIDOR/LOBBY, RESTROOM, OTHER - STORAGE, OFFICE **9, 10, 11, 16, 17, 19**: OTHER - PLAYING/COURT AREA, OTHER - EXERCISE AREA, RESTROOM/LOCKER, LOBBY, OFFICE **12:** CLASSROOM/MEETING, OTHER - STACKS, OFFICE, OTHER - READING/COMPUTER, CORRIDOR/LOBBY **13:** OTHER - EXHIBIT, OTHER - STORAGE, CORE - CORRIDOR/LOBBY, RETAIL **18:** OTHER - WORSHIP, OTHER - FELLOWSHIP/MULTIPURPOSE ROOM, OFFICE, LOBBY + IF INCLUDES A SCHOOL THEN TREAT AS SEPARATE TENANT AND INCLUDE ALL THE EDUCATION SPACE TYPES ABOVE.
Grocery	22 CONVENIENCE STORE (<=5,000SF) 23 GROCERY (> 5000SF)	24 GAS STATION WITH A CONVENIENCE STORE	25 OTHER GROCERY	RETAIL AREA, OTHER - STORAGE, OTHER - FOOD PREP (DELI/BAKERY/MEAT/OTHER), MECHANICAL MEZZANINE

Primary Economic Use	Detailed Building Type			Required Lighting Subspaces*
Retail	26 AUTO PARTS 27 AUTO/BOAT DEALER/ SHOWRM 28 BEAUTY / BARBER 29 BEER, WINE, OR LIQUOR STORE 30 CAR WASH 31 CLOTHING 32 DEPARTMENT STORE 33 DEPT. STORE W/ GROCERY	34 DRY CLEANER 35 ELECRONICS/APPLIANCES 36 FLORIST, NURSERY 37 HARDWARE 38 HOME IMPROVEMENT 39 LAUNDROMAT (SELF-SERVICE) 40 PHARMACY	41 POST OFFICE 42 RENTAL CENTER 43 REPAIR SHOP 44 STUDIO/GALLERY 45 VEHICLE REPAIR 46 WAREHOUSE CLUB 47 OTHER SPECIALTY MERCHANDISE	**28, 34, 39, 42, 43, 45 (SERVICE RELATED):** RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE, OTHER - REPAIR/SERVICE AREA, LOBBY **41:** OTHER - MAIL SORT, LOBBY, OTHER - PO BOX AREA, OFFICE **44:** OTHER - GALLERY, OFFICE, OTHER - STUDIO (WORK AREA) **ALL OTHERS:** RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Hospital	48 HOSPITAL			MAIN LOBBY, CORRIDOR, PATIENT ROOMS, MEDICAL EXAM ROOMS, OPEN OFFICE, ENCLOSED OFFICE (<300SF), OTHER - LAB, OTHER - MEDICAL PROCEDURE (XRAY, SURGERY, EMERGENCY, ETC), EATING AREA, OTHER - STORAGE
Lodging	49 HOTEL 50 MOTEL 51 BED & BREAKFAST 52 BOARDING/ROOMING HOUSE, APT HOTEL	53 CONVENT OR MONASTERY 54 DORMITORY 55 FRATERNITY, OR SORORITY 56 HALFWAY HOUSE	57 HOTEL - RESORT 58 SHELTER, ORPHANAGE, OR CHILDREN'S HOME 59 OTHER LODGING	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Residential Care	60 ASSISTED LIVING 61 IN-PATIENT REHAB	62 NURSING HOME 63 RETIREMENT HOME	64 OTHER RESIDENTIAL CARE	PATIENT ROOM, CORRIDOR, EATING AREA/MULTIPURPOSE, OFFICE

Primary Economic Use	Detailed Building Type			Required Lighting Subspaces*
Office	65 OFFICE- ADMIN, PROFESSIONAL, GOVERNMENT, FINANCIAL 66 CALL CENTER 67 CITY HALL 68 DENTAL OFFICE	69 MEDICAL CLINIC / OUTPATIENT MEDICAL 70 MEDICAL OFFICE 71 MEDICAL URGENT CARE CLINIC 72 OUTPATIENT REHAB	73 RETAIL BANKING 74 SALES OFFICE 75 VETERINARIAN OFFICE/CLINIC 76 OTHER OFFICE	**65, 66, 67, 73, 74, 76 (NON-MEDICAL OFFICE):** OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR **68, 69, 70, 71, 72, 75 (MEDICAL OFFICE):** OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR, MEDICAL EXAM ROOMS, OTHER - MEDICAL PROCEDURE
Restaurant	77 BAR, PUB, LOUNGE 78 CAFETERIA 79 CATERING SERVICE 80 COFFEE, DOUGHNUT, OR BAGEL SHOP	81 FAST FOOD RESTAURANT 82 ICE CREAM OR FROZEN YOGURT SHOP 83 SIT DOWN RESTAURANT	84 TAKE-OUT RESTAURANT 85 TRUCK STOP 86 OTHER RESTAURANT	EATING AREA, KITCHEN
School K-12	87 ELEMENTARY SCHOOL 88 MIDDLE SCHOOL	89 HIGH SCHOOL 90 PRE-SCHOOL	91 OTHER K-12 SCHOOL	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
University	92 UNIVERSITY / COLLEGE	VOCATIONAL, CAREER, AND ADULT EDUCATION CLASSIFIED IN OTHER UNLESS PART OF UNIVERSITY OR COLLEGE		
Warehouse	93 MINISTORAGE 94 WAREHOUSE, DISTRIBUTION	95 WAREHOUSE, STORAGE 96 COLD STORAGE, NON-AMMONIA BASE REFG	97 OTHER WAREHOUSE	–WAREHOUSE, OPEN OFFICE, ENCLOSED OFFICE, OTHER MANUFACTURING

Primary Economic Use	Detailed Building Type			Required Lighting Subspaces*
Other	98 ADULT/CAREER EDUCATION 99 AIRPLANE HANGER 100 ASYLUM 101 COURTHOUSE 102 CREMATORIUM	103 DATA CENTER OR SERVER FARM 104 FIRE STATION 105 JAIL 106 POLICE STATION	107 POLICE & FIRE 108 PRISON 109 TELEPHONE SWITCHING 110 VOCATIONAL TRAINING 111 OTHER	98, 110: CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE 99: OTHER - AIRPLANE HANGER, OFFICE 100, 105,108: OTHER - CELL, CORRIDOR, OFFICE, ASSEMBLY 101: OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR 102: OTHER - FURNACE AREA, OTHER - ASSEMBLY, OFFICE 103, 109: OTHER - DATA/SWITCHING AREA, OFFICE 104, 106, 107: OTHER - TRUCK/CAR BAY, OTHER - SLEEPING, OTHER - LIVING, OFFICE, CONFERENCE ROOMS, OTHER - CELL
Unsampled	200 AGRICULTURE 300 INDUSTRIAL	301 COLD STORAGE, AMMONIA 400 MANUFACTURING	500 RESIDENTIAL	N/A – DON'T PERFORM LIGHTING AUDIT ON THESE TYPES OF BUILDINGS.

*To signify when the subspace is not listed in the data collection form the code 'Other' is shown before the subspace name.

Table 8. Alphabetical Detailed Building Type List of Required Lighting Subspaces

Detailed Building Type	Detailed Building Code	Required Lighting Subspaces
Adult/career education	98	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
Agriculture	200	N/A – DON'T PERFORM LIGHTING AUDIT ON THESE TYPES OF BUILDINGS.
Airplane hanger	99	OTHER - AIRPLANE HANGER, OFFICE
Arena	1	SEATING AREA, CORE - LOBBY/PUBLIC CORRIDOR/CONCESSIONS, OTHER- STAGE/BACKSTAGE, OTHER - STORAGE
Assisted living	60	PATIENT ROOM, CORRIDOR, EATING AREA/MULTIPURPOSE, OFFICE
Asylum	100	OTHER - CELL, CORRIDOR, OFFICE, ASSEMBLY
Auditorium	2	SEATING AREA, CORE - LOBBY/PUBLIC CORRIDOR/CONCESSIONS, OTHER- STAGE/BACKSTAGE, OTHER - STORAGE
Auto parts	26	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Bar, pub, lounge	77	EATING AREA, KITCHEN
Beauty / Barber	28	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE, OTHER - REPAIR/SERVICE AREA, LOBBY
Bed & breakfast	51	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Beer, wine, or liquor store	29	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Boarding/rooming house, Apt Hotel	52	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Boat slips	3	OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE- CORRIDOR/LOBBY
Bowling Alley	4	OTHER- PLAYING AREA, OTHER - PINSET, CORRIDOR/LOBBY, DINING
Cafeteria	78	EATING AREA, KITCHEN
Call Center	66	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR
Car wash	30	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Casino	5	OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE- CORRIDOR/LOBBY
Catering Service	79	EATING AREA, KITCHEN
City Hall	67	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR
Clothing	31	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Club, Lodges	6	OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE- CORRIDOR/LOBBY
Coffee, doughnut, or bagel shop	80	EATING AREA, KITCHEN
Cold storage, ammonia	301	N/A – DON'T PERFORM LIGHTING AUDIT ON THESE TYPES OF BUILDINGS.
Cold storage, non-ammonia base REFG	96	WAREHOUSE, OPEN OFFICE, ENCLOSED OFFICE, OTHER - MANUFACTURING
Community center	7	OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE- CORRIDOR/LOBBY
Convenience Store (<=5,000SF)	22	RETAIL AREA, OTHER - STORAGE, OTHER - FOOD PREP (DELI/BAKERY/MEAT/OTHER), MECHANICAL MEZZANINE
Convent or Monastery	53	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Convention center	8	OTHER - ASSEMBLY, CORE- CORRIDOR/LOBBY, RESTROOM, OTHER - STORAGE, OFFICE
Courthouse	101	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR

Detailed Building Type	Detailed Building Code	Required Lighting Subspaces
Crematorium	102	OTHER - FURNACE AREA, OTHER - ASSEMBLY, OFFICE
Data center or server farm	103	OTHER - DATA/SWITCHING AREA, OFFICE
Dealership Showroom (Auto, Boat)	27	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Dental Office	68	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR, MEDICAL EXAM ROOMS, OTHER - MEDICAL PROCEDURE
Department store	32	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Dept. store w/ grocery	33	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Dormitory	54	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Dry cleaner	34	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE, OTHER - REPAIR/SERVICE AREA, LOBBY
Electronics/appliances	35	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Elementary school	87	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
Fast food Restaurant	81	EATING AREA, KITCHEN
Fire station	104	OTHER - TRUCK/CAR BAY, OTHER - SLEEPING, OTHER - LIVING, OFFICE, CONFERENCE ROOMS, OTHER - CELL
Florist, Nursery	36	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Fraternity, or Sorority	55	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Gas station with a convenience store	24	RETAIL AREA, OTHER - STORAGE, OTHER - FOOD PREP (DELI/BAKERY/MEAT/OTHER), MECHANICAL MEZZANINE
Grocery (> 5000SF)	23	RETAIL AREA, OTHER - STORAGE, OTHER - FOOD PREP (DELI/BAKERY/MEAT/OTHER), MECHANICAL MEZZANINE
Gym, exercise	9	OTHER - PLAYING/COURT AREA, OTHER - EXERCISE AREA, RESTROOM/LOCKER, LOBBY, OFFICE
Halfway house	56	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Hardware	37	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Health Spa	10	OTHER - PLAYING/COURT AREA, OTHER - EXERCISE AREA, RESTROOM/LOCKER, LOBBY, OFFICE
High school	89	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
Home improvement	38	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Hospital	48	MAIN LOBBY, CORRIDOR, PATIENT ROOMS, MEDICAL EXAM ROOMS, OPEN OFFICE, ENCLOSED OFFICE (<300SF), OTHER - LAB, OTHER - MEDICAL PROCEDURE (XRAY, SURGERY, EMERGENCY, ETC), EATING AREA, OTHER - STORAGE
Hotel	49	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Hotel - resort	57	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Ice cream or frozen yogurt shop	82	EATING AREA, KITCHEN
Ice Skating	11	OTHER - PLAYING/COURT AREA, OTHER - EXERCISE AREA, RESTROOM/LOCKER, LOBBY, OFFICE
Industrial	300	N/A – DON'T PERFORM LIGHTING AUDIT ON THESE TYPES OF BUILDINGS.
In-Patient Rehab	61	PATIENT ROOM, CORRIDOR, EATING AREA/MULTIPURPOSE, OFFICE

Detailed Building Type	Detailed Building Code	Required Lighting Subspaces
Jail	105	OTHER - CELL, CORRIDOR, OFFICE, ASSEMBLY
Laundromat (self-service)	39	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE, OTHER - REPAIR/SERVICE AREA, LOBBY
Library	12	CLASSROOM/MEETING, OTHER - STACKS, OFFICE, OTHER - READING/COMPUTER, CORRIDOR/LOBBY
Manufacturing	400	N/A – DON'T PERFORM LIGHTING AUDIT ON THESE TYPES OF BUILDINGS.
Marina	3	OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE-CORRIDOR/LOBBY
Medical Clinic / Outpatient Medical	69	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR, MEDICAL EXAM ROOMS, OTHER - MEDICAL PROCEDURE
Medical Office	70	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR, MEDICAL EXAM ROOMS, OTHER - MEDICAL PROCEDURE
Middle school	88	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
Ministorage	93	WAREHOUSE, OPEN OFFICE, ENCLOSED OFFICE, OTHER - MANUFACTURING
Motel	50	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Movie Theater	14	SEATING AREA, CORE - LOBBY/PUBLIC CORRIDOR/CONCESSIONS, OTHER- STAGE/BACKSTAGE, OTHER - STORAGE
Museum	13	OTHER - EXHIBIT, OTHER - STORAGE, CORE - CORRIDOR/LOBBY, RETAIL
Nursing home	62	PATIENT ROOM, CORRIDOR, EATING AREA/MULTIPURPOSE, OFFICE
Office- admin, professional, government, financial	65	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR
Other	111	
Other Assembly	21	OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE-CORRIDOR/LOBBY
Other Grocery	25	RETAIL AREA, OTHER - STORAGE, OTHER - FOOD PREP (DELI/BAKERY/MEAT/OTHER), MECHANICAL MEZZANINE
Other K-12 school	91	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
Other Lodging	59	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Other office	76	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR
Other residential care	64	PATIENT ROOM, CORRIDOR, EATING AREA/MULTIPURPOSE, OFFICE
Other restaurant	86	EATING AREA, KITCHEN
Other specialty merchandise	47	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Other warehouse	97	WAREHOUSE, OPEN OFFICE, ENCLOSED OFFICE, OTHER - MANUFACTURING
Outpatient Rehab	72	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR, MEDICAL EXAM ROOMS, OTHER - MEDICAL PROCEDURE
Performing Arts Theater	15	SEATING AREA, CORE - LOBBY/PUBLIC CORRIDOR/CONCESSIONS, OTHER- STAGE/BACKSTAGE, OTHER - STORAGE
Pharmacy	40	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Police & Fire	107	OTHER - TRUCK/CAR BAY, OTHER - SLEEPING, OTHER - LIVING, OFFICE, CONFERENCE ROOMS, OTHER - CELL

Detailed Building Type	Detailed Building Code	Required Lighting Subspaces
Police station	106	OTHER - TRUCK/CAR BAY, OTHER - SLEEPING, OTHER - LIVING, OFFICE, CONFERENCE ROOMS, OTHER - CELL
Pool	16	OTHER - PLAYING/COURT AREA, OTHER - EXERCISE AREA, RESTROOM/LOCKER, LOBBY, OFFICE
Post office	41	OTHER - MAIL SORT, LOBBY, OTHER - PO BOX AREA, OFFICE
Pre-school	90	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
Prison	108	OTHER - CELL, CORRIDOR, OFFICE, ASSEMBLY
Recreation Center	17	OTHER - PLAYING/COURT AREA, OTHER - EXERCISE AREA, RESTROOM/LOCKER, LOBBY, OFFICE
Religious assembly	18	OTHER - WORSHIP, OTHER - FELLOWSHIP/MULTIPURPOSE ROOM, OFFICE, LOBBY + IF INCLUDES A SCHOOL THEN TREAT AS SEPARATE TENANT AND INCLUDE ALL THE EDUCATION SPACE TYPES ABOVE.
Rental center	42	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE, OTHER - REPAIR/SERVICE AREA, LOBBY
Repair shop	43	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE, OTHER - REPAIR/SERVICE AREA, LOBBY
Residential	500	N/A – DON'T PERFORM LIGHTING AUDIT ON THESE TYPES OF BUILDINGS.
Retail Banking	73	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR
Retirement home	63	PATIENT ROOM, CORRIDOR, EATING AREA/MULTIPURPOSE, OFFICE
Roller Skating	19	OTHER - PLAYING/COURT AREA, OTHER - EXERCISE AREA, RESTROOM/LOCKER, LOBBY, OFFICE
Sales Office	74	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR
Senior center	20	OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE-CORRIDOR/LOBBY
Shelter, Orphanage, or Children's Home	58	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Sit Down Restaurant	83	EATING AREA, KITCHEN
Studio/gallery	44	OTHER - GALLERY, OFFICE, OTHER - STUDIO (WORK AREA)
Take-out restaurant	84	EATING AREA, KITCHEN
Telephone switching	109	OTHER - DATA/SWITCHING AREA, OFFICE
Truck Stop	85	EATING AREA, KITCHEN
University/College	92	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
Urgent Care Clinic	71	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR, MEDICAL EXAM ROOMS, OTHER - MEDICAL PROCEDURE
Vehicle repair	45	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE, OTHER - REPAIR/SERVICE AREA, LOBBY
Veterinarian Office/clinic	75	OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR, MEDICAL EXAM ROOMS, OTHER - MEDICAL PROCEDURE
Vocational training	110	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY, MECHANICAL MEZZANINE
Warehouse club	46	RETAIL AREA, OTHER - STORAGE, MECHANICAL MEZZANINE
Warehouse, Distribution	94	WAREHOUSE, OPEN OFFICE, ENCLOSED OFFICE, OTHER - MANUFACTURING
Warehouse, Storage	95	WAREHOUSE, OPEN OFFICE, ENCLOSED OFFICE, OTHER -

Detailed Building Type	Detailed Building Code	Required Lighting Subspaces
		MANUFACTURING
Yacht club	3	OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE-CORRIDOR/LOBBY

B.7 HVAC System Characterization

HVAC Summary Variables

The project team generated the following HVAC summary variables for each system.

The System Heating Fuel is the primary fuel of the heating system. This variable is built from various audit fields. The auditor-identified primary fuel is the default primary fuel. In cases where the heating is provided by hot water or steam from a boiler, the boiler fuel is assigned as the primary fuel. In cases where the system has terminal reheat, the reheat fuel (electric or the boiler fuel providing the hot water) is assigned as the primary.

The HVAC system type coding scheme has 3 summary fields to provide a general overview of the HVAC system. Three additional fields provide detailed information that can be used to classify equipment into common code equipment categories.

The primary HVAC type summary fields are:

- HVAC System Type (variable: distsys) – The air-side or zone-side distribution system type; does not address any hydronic distribution.
- System Heating Type (variable: heatsys) – Primary heating type of the system. For most systems it is the type of heat associated with the air handler or zone radiators. For reheat systems which can have two heating types the system heating type is set to the reheat type.
- Cooling System Type (variable: cooleq) – The cooling type of the system. For all systems this is the cooling type associated with the air handler or zone radiators.

The detailed HVAC equipment type fields are:

- System Heating Equipment Type (variable: heatsys_detail) – the primary heating equipment type of the system. For most systems it is the heating equipment associated with the air handler or zone radiators. For reheat systems which can have two equipment types the system heating equipment is set to the reheat equipment type.
- Electric Resistance Heat Type (variable: heatsys_elecrestype) –This variable provides detail on the electric resistance heating equipment in systems with primary electric fuel that are not heat pumps. Like the other heatsys variables, for systems with reheat the

characteristics of the reheat are used as the system heating type. In all other cases it is the type of heat in the air handler or zone radiators.

- Cooling Equipment Type (variable: cooleq_detail) – the cooling equipment type of the system.

The mapping effort relied on primary audit data collected by audit pages 5a (Distributed Single Zone HVAC), 5c (Multi-zone and Specialty HVAC), 6 (Heating Water and Steam), and 7a (Cooling Water System). The tables that follow present the main audit variables used to establish each value in the summary and detailed variables. Hand assignment in some cases and illogical data in others result in some additional cases that have been mapped into these variables that are not addressed here.

HVAC Characterization Tables

Table 9. HVAC Distribution System Types

HVAC System Type *var:distsys*	**HVAC Distribution System Detail** *var:distsys_detail*	**Equipment Types**
Zonal	Baseboard/Zonal with minimal fan	Baseboards, wall heaters
	Radiant	Radiant floor, ceiling, and suspended radiant panels and tube heaters
	SZ Unducted w/ fan	Cabinet heater, Unit heater, Unit ventilator, PTAC, PTHP, Minisplit heat pump, VRF heat pump, Room AC
SZ Ducted	SZ Ducted	Table 5a Roof Top Unit, Air handler, and table 5c Single zone
	MAU/Swamp	Make-up Air units, Swamp coolers
	VVT	VVT
	DOAS / ERV	DOAS, ERV
MZ VAV	MZ air / Single Duct / VAV	Single duct terminal reheat (and not reheat) systems with variable air flow
	MZ air / Dual Duct	Dual duct systems. All have VFD.
MZ CV Reheat	MZ air / Single Duct / CV	Single duct terminal reheat systems with constant air flow
MZ Other	MZ MZ Sys	Other multi-zone systems
Unknown	Unknown	Unknown

Table 10. System Heat Types

System Heating Type *var:heatsys*	**System Heating Equipment** *var:heatsys_detail*	**Assignment Logic[1]**
Boiler	Boiler – Steam	Heating Type= Steam-coil
	Boiler – Water	Heating Type= HW-coil & Reheat Energy != Electric, or Terminal Reheat Energy = Hot Water
Furnace	Furnace	Heating Type = SE or CE ; Equipment Type = Rooftop Unit or Makeup Air Unit or Air Handling Unit or Furnace & heating type = DK or OT or NF
	Unit heater	Equipment Type = Unit Heater & heating type = SE or CE or NF or DK & primary heat fuel != Electric
	Infrared	Equipment Type = Radiant-ceiling & heating type = SE or CE or NF or DK & primary heat fuel != Electric
	Unknown	Equipment Type = DK & heating type = SE or CE or DK & primary heat fuel != Electric
Electric resistance	Coil – elec	Equipment Type != Baseboard and Radiant Ceiling & heating type = NF or OT or DK & primary heat fuel = Electric & heat pump type = NF
	Baseboard/wall heater	Equipment Type = Baseboard & heating type = NF or OT or DK & primary heat fuel = Electric & heat pump type = NF
	Infrared	Equipment Type = Radiant Ceiling & heating type = NF or OT or DK & primary heat fuel = Electric & heat pump type = NF
Heat pump	HP – Air	Heating Type = Heat Pump & Heat Pump Type = Standard Air Source or Ductless Minisplit
	HP – Ground water	Heating Type = Heat Pump & Heat Pump Type = Ground Source – Water (no earth units identified)
	HP – Water	Heating Type = Heat Pump & Heat Pump Type = Water Source
	PTHP	Equipment Type = PTHP & Heating Type = Heat Pump & Heat Pump Type = Standard Air Source
	VRF HP	Heating Type = Heat Pump & Heat Pump Type = VRF
Other	Other	
Unknown	Unknown	
None	None	

1 These are logical statements. Some mapped values are the result of multiple logical statements and each logical statement is separated by a semi-colon. Any record satisfying one of the logical statements will be mapped to the value. Within a statement "&" indicates items that must all be true, "!=" indicates not equal to, and "or" in a list of items following an equal sign indicates items of which only one needs to be true. The names to the left of "=" or "!=" refer to summary variables as defined here or audit form variables.

Table 11. System Electric Resistance Heating Types

Electric Resistance Type *var:heatsys_elecrestype*	**Assignment Logic[1,2]**
Reheat	Distribution system type = MZ VAV or MZ CV Reheat or MZ Other & terminal reheat energy = Electric
PTAC	Equipment Type = PTAC
Unit Heater	Equipment Type = Unit Ventilator or Unit Heaters or Cabinet Heater
Misc Zonal	Equipment Type = Baseboard or Radiant-floor or Radiant-ceiling or Room AC
Ducted	All other equipment with system heat fuel = Electric and heating type not equal Heat Pump.

1 These are logical statements. Some mapped values are the result of multiple logical statements and each logical statement is separated by a semi-colon. Any record satisfying one of the logical statements will be mapped to the value. Within a statement "&" indicates items that must all be true, "!=" indicates not equal to, and "or" in a list of items following an equal sign indicates items of which only one needs to be true. The names to the left of "=" or "!=" refer to summary variables as defined here or audit form variables.

2 Electric resistance heating is identified by system heating fuel being electric and heating type not being heat pump. To get the electric resistance heat types additional logic is applied as detailed in the column.

Table 12. Cooling Equipment Types

Cooling System Type *var:cooleq*	**Cooling Equipment** *var:cooleq _detail*	**Assignment Logic[1]**
Chiller	Chiller – air-cooled	cooling type = CW & chiller type = air cooled
	Chiller – water-cooled	cooling type = CW & chiller type = water cooled
	Chiller – unknown	cooling type = CW & chiller type = unknown
DX – Air	AC – Air	Cooling type = DX-Air & heat pump type = NF & Equipment type = RTU or MAU or AHU or Furnace or Cabinet heater
	HP – Air	Cooling type = DX-Air & heat pump type = Standard Air Source
	HP – Mini-split	Cooling type = DX-Air & heat pump type = Ductless minisplit
	HP – Vrf	Cooling type = DX-Air & heat pump type = VRF
	Pthp	Cooling type = DX-Air & heat pump type = PTHP
	Ptac	Cooling type = DX-Air & heat pump type = NF & Equipment type = PTAC
	Room AC	Cooling type = DX-Air & heat pump type = NF & Equipment type = Room AC
	Unknown	
DX – water	AC – Water	Cooling type = DX-Water & heat pump type = NF
	HP – Ground water	Cooling type = DX-Water & heat pump type = Groundwater Source
	HP – Water	Cooling type = DX-Water & heat pump type = Water Source
Economizer	Economizer	Cooling type = None & Economizer =Air
Evaporative	Evap	Cooling type = Evaporative
Purchased	Purchased	Cooling type = CW & chiller fuel = purchased
Unknown	Unknown	
None	None	

1 These are logical statements. Some mapped values are the result of multiple logical statements and each logical statement is separated by a semi-colon. Any record satisfying one of the logical statements will be mapped to the value. Within a statement "&" indicates items that must all be true, "!=" indicates not equal to, and "or" in a list of items following an equal sign indicates items of which only one needs to be true. The names to the left of "=" or "!=" refer to summary variables as defined here or audit form variables.

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX C
Quality Management Plan

Prepared for:
Northwest Energy Efficiency Alliance

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December 5, 2014

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Appendix C Methodology Details

C.1 Quality Management Plan Objectives

The CBSA team has developed the following Quality Assurance / Quality Control (QA/QC) procedures to ensure data integrity, data accuracy, consistent data collection practices, and consistent external communications. The Quality Management Plan also outlines the team's QA/QC procedures and responsibilities, recognizing that there are two high level objectives for the CBSA data collection effort:

1.) To collect representative data on regional commercial building stock; and

2.) To develop protocols that will ensure the quality of future data collection efforts.

In line with these objectives, the CBSA quality management aims to:

- Provide clear documentation of all data collection protocols such that data collection efforts are easily replicable in a consistent manner.
- Provide consistent project delivery, customer service, data review, and data tracking services.
- Ensure data quality, accuracy, and consistency.
- Identify opportunities for improvements in future study updates.
- Identify and address additional training needs.

These goals will be met through the following initiatives;

- Institute a QA/QC process that is clear and understood by CBSA project participants.
- Work collaboratively with CBSA project participants to identify and implement process improvements.
- Track discrepancies to inform training and resolution processes.

C.2 Quality Management Plan

The CBSA team has developed quality management protocols for the following study components:

- External Communications
- Recruiting
- Surveyor Training and Support
- Field Data Collection
- Additional Data Quality Assurance and Review Protocols

External Communications

The CBSA team will be communicating with a number of external stakeholders such as utilities and building owners throughout the project. The external communication protocols will ensure that these verbal and written communications set accurate expectations about the nature of CBSA and address expected questions from potential participants.

- Required documentation: Communication protocols for NEEA, participants, utilities, etc.
- Required reporting: None

Table 1 identifies the quality assurance tasks, and Table 2 identifies the corresponding quality control tasks, associated with CBSA external communications:

Table 1. Quality Assurance Tasks for External Communications

Quality Assurance Tasks	Responsible	Frequency	Review/Approval
Develop overall project communication plan	Mike Y. Kristine F.	Once	Anu T.
Define and develop answers for questions that may arise from potential participants	Data Collection WG	Once	Anu T.
Ensure language / vernacular in all communication protocols are consistent and representative of study objectives1	Mike Y. Kristine F.	Once	Anu T.
Develop communication protocols for NEEA, participants, utilities, etc.	Mike Yim. Kristine F.	Once	Data Collection WG Anu T.

Table 2. Quality Control Tasks for External Communications

Quality Control Tasks	Responsible	Frequency	Review/Approval
Review and revise communication protocols to capture lessons learned and issues resolved	Mike Y. Kristine F.	As Needed	Anu T.

Recruiting Process

The CBSA team recognizes the challenge of recruiting participants in support of this study. The recruiting process protocols, along with the assignment of a dedicated recruitment staff member, will ensure that data collection activities are scheduled in a way that minimizes customer inconvenience while maximizing resource efficiency. The CBSA team will confer with its recruitment staff on a weekly basis to resolve any issues encountered in the field while adhering to sample design requirements, scheduling pace, logistical efficiency, and protocols established in the communication plan.

- Required documentation: Sample design road map, recruitment process documentation

[1] The *Draft* Utility Communications and Data Request Protocols are provided in Appendix A.

- Required reporting: CBSA Recruiting Progress Report (updated daily)

Table 3 identifies the quality assurance tasks, and Table 4 identifies the corresponding quality control tasks, associated with the CBSA recruiting process:

Table 3. Quality Assurance Tasks for Recruitment Efforts

Quality Assurance Tasks	Responsible	Frequency	Review/Approval
Clearly define sample design and field definition requirements2	Ken S. Mike K.	As Needed	Anu T.
Develop detailed documentation for consistent recruitment protocols3	Kristine F.	Once	Anu T.
Develop detailed documentation and security protocols for utility data requests	Mike Y. Kristine F.	Once	Data Collection WG Anu T.
Develop documentation for consistent scheduling protocols in FACT	Mike Y. Kristine F.	Once	Data Collection WG Anu T.

Table 4. Quality Control Tasks for Recruitment Efforts

Quality Control Tasks	Responsible	Frequency	Review/Approval
Project manager maintains daily availability for work planning and problem solving	Kristine F.	Daily	Anu T.
Update "CBSA Recruiting Progress Report" daily (shows progress to target, recruiter hit rate, list burn rate, record list assignment issues, and participant issues)	Recruiting Staff Kristine F.	Daily	Anu T.
Project manager reviews recruiting report on weekly basis (part of regular CBSA team meeting)	Kristine F.	Weekly (Monday)	Anu T.
Review participant recruiting records and implement recruiting modifications as needed	Kristine F.	As-needed	Mike Y. Anu T.
Review and revise recruiting process to capture lessons learned and issues resolved	Kristine F.	As-needed	Mike Y. Anu T.

Surveyor Training and Support

The CBSA team will be performing site surveys at a large number of buildings in the study. These surveys will be performed by a group of surveyors, many of whom are engineers. The surveyor training and support protocols will provide clear work instructions for surveyors, ensure surveyors receive proper training following a standardized procedure, provide resources to assist surveyors with questions that arise, and will establish feedback loops to ensure that survey results are accurate, complete, and consistent between surveyors.

[2] This will include building "contact title" to ensure that the CBSA team reaches the appropriate person.
[3] This will include letters from NEEA and Utilities that can be sent upon request.

- Required documentation: Survey work instructions, survey training, surveyor resources, site visit checklists
- Required reporting: None

Table 5 identifies the quality assurance tasks, and Table 6 identifies the corresponding quality control tasks, associated with the CBSA surveyor training and support process:

Table 5. Quality Assurance Tasks for Surveyor Training and Support

Quality Assurance Tasks	Responsible	Frequency	Review/Approval
Define the scope of work for surveyors	Mike Y. Kristine F.	Once	Anu T. Data Collection WG
Develop clear work instructions (training), including performance expectations regarding scheduling, surveying, data review, data security, etc.	Kristine F.	Once	Anu T. Mike Y.
Develop surveyor resources to help clarify any field questions (glossary, cheat sheet)4	Mike Y. Kristine F.	Once	Anu T. Data Collection WG
Implement engineering helpline for surveyors to call with any questions in the field	Kristine F	Once	Anu T. Mike Y.
Incorporate mandatory staff trainer "ride-alongs" for new field personnel during their initial site visits to provide immediate feedback (TBD%).	Kristine F.	Once per Trained Surveyor	Anu T. Mike Y.
Develop pre- and post-site visit checklists to ensure all necessary items are addressed during site visit	Kristine F	Once	Anu T. Mike Y.

Table 6. Quality Control Tasks for Surveyor Training and Support

Quality Control Tasks	Responsible	Frequency	Review/Approval
Implement daily individual feedback loops to document issues surveyors discover while in-field and resolution.	Kristine F.	Daily	Anu T. Mike Y.
Implement weekly group feedback loop to illuminate and resolve common problems via conference call with surveyors.	Kristine F.	Weekly (Thursday)	Anu T. Mike Y.
Review and revise surveyor resources (clear points of contact, web resources, training reference materials, etc.) to capture lessons learned and issues resolved	Kristine F.	Ongoing, as needed	Anu T. Mike Y.
Provide on-going training based on common questions and any issues that arise	Kristine F.	Quarterly (every three months)	Anu T. Mike Y.

[4] The Data Collection Protocols Working Group will collaborate with the Field Definitions Working Group when developing the glossary.

Field Data Collection

The CBSA team will develop data collection protocols to ensure surveyor, and subsequent data entry, activities facilitate data quality, accuracy, and consistency. The CBSA team will maintain an updated copy of the data collection protocols that reflect all approved change requests.

- Required documentation: Data collection protocols, data definitions glossary
- Required reporting: Protocol updates per change request process

Table 7 identifies the quality assurance tasks, and

Table 8 identifies the corresponding quality control tasks, associated with the CBSA field data collection process:

Table 7. Quality Assurance Tasks for Field Data Collection

Quality Assurance Tasks	Responsible	Frequency	Review/Approval
Develop final data collection protocols[5]	Mike Y. Kristine F.	Once	Anu T. Data Collection WG
Define change request process	Mike Y. Kristine F.	Once	Anu T. Data Collection WG
Pre-test data collection protocols in the field by.	Kristine F.	Once	Anu T. Mike Y.
Develop data glossary that further defines interpretation of fields (e.g. how is "primary" heating system defined? how is room defined? etc.)[6]	Mike Y. Kristine F. Erin R.	As Needed	Anu T. Data Collection WG

[5] The Data Collection Protocols will provide context on the responses to the CBSA contact. "Show Cards" may be used to define/explain data collection fields.

[6] The Data Glossary will be established primarily through pre-testing feedback. Additional revisions will be discussed with the NEEA team and Working Group Members to balance study practicality (e.g., updating the glossary for a field that is collected across all buildings vs. updating the glossary for a field that is encountered once or twice throughout the study).

Table 8. Quality Control Tasks for Field Data Collection

Quality Control Tasks	Responsible	Frequency	Review/Approval
Review and update data collection protocol as necessary	Mike Y. Kristine F.	As Needed	Anu T. Data Collection WG
Document approved change requests via updating onsite protocol and noting which completed surveys were completed prior to any approved changes	Kristine F.	As Needed	Mike Y. Anu T.

Additional Data Quality Assurance and Review Protocols

The CBSA team is committed to developing multi-step data quality review protocols to locate and learn from any errors or inconsistencies in the collected data. The CBSA team will utilize automated rules to allow surveyors to check data as they enter it into the data collection software platform (i.e., Field Activities and Communication Tracker (FACT)). FACT will also be developed to ensure data security, efficient data collection, the minimization of potential misunderstandings and reprogramming.

These automated checks can be performed where anywhere there is an internet connection. The CBSA team will also develop reference materials for easy in-field use to aid with consistent interpretations and real-time refreshers when in-field. The quality management team will perform daily data quality reviews to monitor data accuracy, completeness, and potential data gaps.

The CBSA team will also conduct in-field QC inspections to ensure that surveys meet project standards. The quality management team will inform surveyors of inspection results and take corrective action for sub-optimum performance, including as-needed retraining.

- Required documentation: Data quality review process, In-field QA inspection process, In-field QA inspection form
- Required reporting: CBSA Survey QC Review Log, Inspection Report

Table 9 identifies the quality assurance tasks, and Table 10 identifies the corresponding quality control tasks, associated with the CBSA data quality review process:

Table 9. Quality Assurance Tasks

Quality Assurance Tasks	Responsible	Frequency	Review/Approval
Develop data collection forms in FACT	Mike Y.	Once	Anu T.
Ensure FACT interface is clearly defined and understood by surveyors	Mike Y. Kristine F.	As Needed	Anu T.
Establish input ranges and validity checks for data collected and stored in FACT	Mike Y. Kristine F.	Once	Anu T. Data Collection WG
Develop documentation and reference manuals for FACT users and reviewers.	Mike Y. Kristine F.	Once	Anu T. Data Collection WG

Quality Assurance Tasks	Responsible	Frequency	Review/Approval
Develop appropriate IT security protocols to ensure data confidentiality	Mike Y. Kristine F.	Once	Anu T.
Develop non-compliance protocols	Mike Y. Kristine F.	Once	Anu T. Data Collection WG

Table 10. Quality Control Tasks

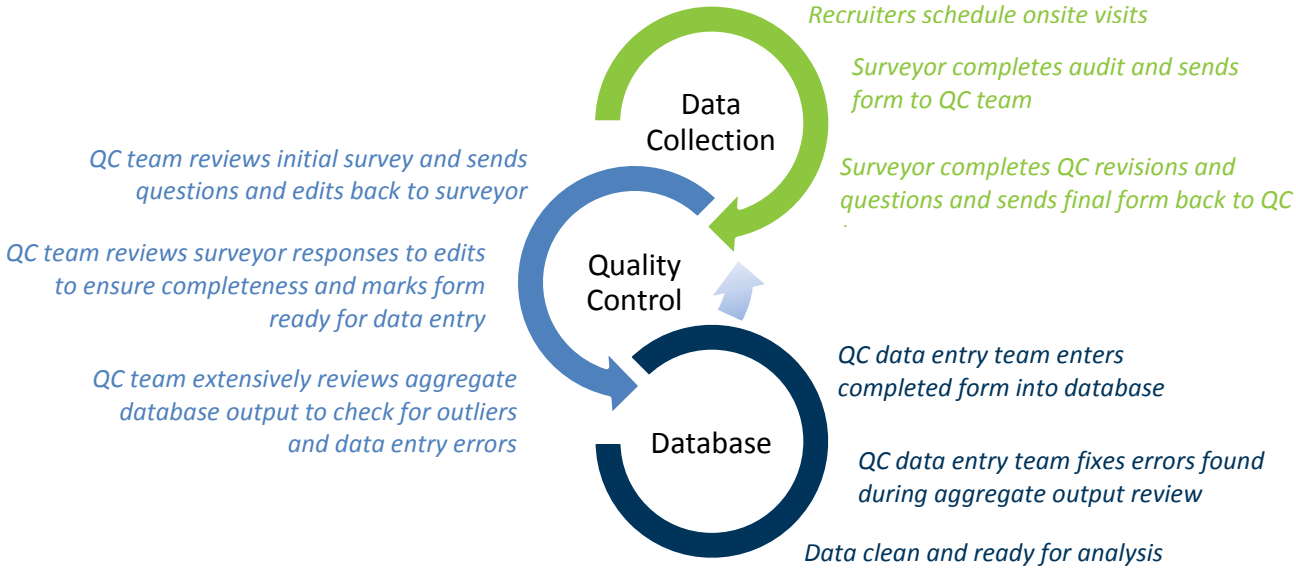
Quality Control Tasks	Responsible	Frequency	Review/Approval
Develop data quality review process (Level I-IV review protocols)	Mike Y. Kristine F.	Once	Anu T. Data Collection WG
Level I Review Protocols: Automated checks in FACT for completeness and realistic data ranges; suspect data will be identified and reviewed	Surveyor Team	Upon Data Entry	Kristine F.
Level II Review: Quality team member reviews data	QC Team	Weekly (Friday)	Erin R.
Level III Review: Project team reviews aggregate data	Erin R.	Weekly (Monday)	Kristine F.
Level IV Review: Senior assessors perform periodic surveys of sites in parallel with surveyors to ensure data is collected properly, while providing immediate feedback. (10% initially, but scaled down throughout the course of the study in light of budgetary requirements).	QC Team	TBD	Kristine F. Erin R. Mike Y.
Retain all hard copies of data collection forms in a central repository	Kristine F.	Daily	Mike Y.
Develop automated backup protocols for FACT to ensure data longevity	Mike Y.	Once	Anu T. Mark R.
Develop FACT protocols to ensure suspect data is identified and addressed prior to analysis (i.e., error tables)	Mike Y. Kristine F.	As Needed	Anu T.
Develop protocols to analyze in-field QC findings (inspection report), and integrate improvements into training and processes as needed.	Mike Y. Kristine F.	Ongoing	Anu T. Data Collection WG
Provide documented feedback to surveyors based on reviews	Erin R.	Ongoing	Kristine F.
Provide weekly summary to CBSA team of in-field QA findings (inspection report)	Kristine F. Erin R.	Weekly	Mike Y. Anu T.

The CBSA team approaches quality management from a "preemptive" (QA) and "reactive" (QC) perspective. This method allows the CBSA team to identify problems or issues relating to data quality, data accuracy, or data consistency early in the project work schedule so any mid-course corrections may be made while minimizing any budget and schedule impacts.

By developing rigorous training procedures for all data collection activities, along with real time support, the CBSA team pre-emptively circumvents potential issues that may jeopardize the accuracy of project deliverables. Similarly, by developing project schedules that are conducive to a multi-step review process (i.e., Level II and Level III Reviews), the CBSA team ensures that there is sufficient time to calibrate and revise data collection, analysis, and reporting protocols to reflect lessons learned and regional expectations. Collectively, these efforts minimize potential quality control issues that would not otherwise be addressed as early in the CBSA study cycle.

Figure X details the various "hand-off" points between surveyors and QC team.

Figure 1. Quality Control Flow Diagram



From a reactive perspective, the CBSA team has developed both computational software and staff protocols for the quality control and review of all analytical work. A successful product of this effort is the FACT system; a web-enabled tool that serves as a central repository for all project-related data collection activities and deliverables. The CBSA team will leverage the robust interactive database maintained by FACT to support the quality control protocols associated with Level I Reviews:

- All CBSA inputs to FACT will be bounded and validated to ensure data integrity. Similarly, data qualifiers and adaptive algorithms are built into FACT infrastructure to automatically identify outliers and data entry/analysis errors that may bias results. The

results of this exercise, including the frequency and nature of errors identified, are presented electronically to project managers on a regular basis such that commonly recurring issues may be resolved. Specific features of the FACT system that will facilitate Level I Reviews, include:

- Input Validity:
  - Required fields are checked for entries either by requiring a dropdown value or manual entry into a textbox.
  - Proper values are checked against standard parameters (e.g., date ranges, integer values, etc.)
  - Non-required fields are allowed to remain unchanged, but can be validated when information is pre-loaded (i.e., previous CBSA data). See Figure 2.
  - Unique values can be entered in text boxes if dropdown choices don't apply.
- Automated Checks:

Input values can be checked for calculation errors (e.g., entries in multiple textboxes can be calculated and multiple textboxes can be calculated and compared to entry in another textbox. See textbox. See

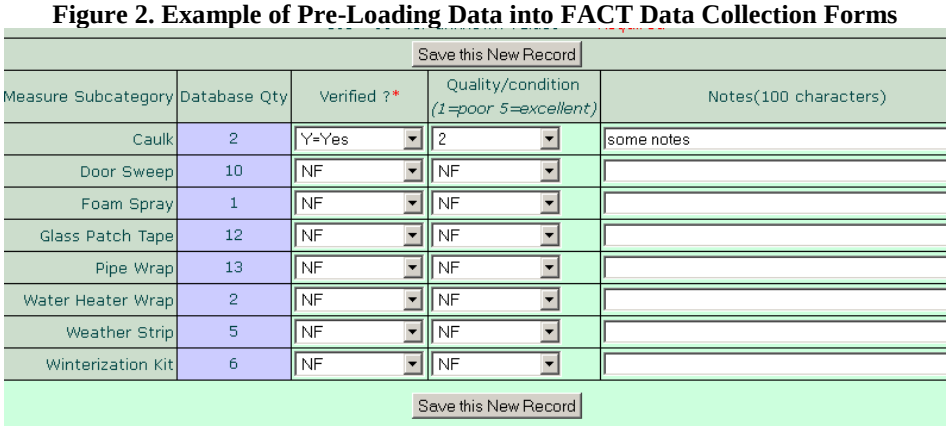
  - Figure 3.
  - Fields can be required to ensure that all relevant data is entered before leaving a screen.
  - Text boxes for 'Other' cannot be filled if dropdown choice isn't 'Other'.
- Identification of Errors:
  - The FACT system incorporates an error system to highlight page errors and individual entry flagging to visually indicate where changes must be made (see Figure 4).
- Treatment of Errors
  - Users must correct errors in order to be allowed to update the online database)

- FACT data may be extracted at any time for interim analysis and reporting. This will ensure that the client, in addition to Navigant, has the opportunity to review project results in real time and provide feedback on additional reporting metrics.
- Project members are also provided with quality control logs prior to conducting an individual review of the datasets and findings.

- Where relevant, existing databases will also be imported directly into the FACT database from seasoned developers and trained users. This process will serve as a pilot for future data analysis activities and will confirm the quality and consistency of information imported. Once validated, primary project data will be entered into the FACT system throughout the duration of the CBSA study for preliminary quality control procedures, including:

Additional quality management advantages afforded by FACT are that the trained users do not need to be connected to an internal network to access and modify data entered into the system. This is convenient for the geographically diverse CBSA team that will require frequent and convenient access to FACT and is also conducive to real-time reporting. Finally, all data is entered into FACT's central database, thus avoiding validation and version problems associated with distributed tools, such as Microsoft Access or Excel.

Figure 2. Example of Pre-Loading Data into FACT Data Collection Forms

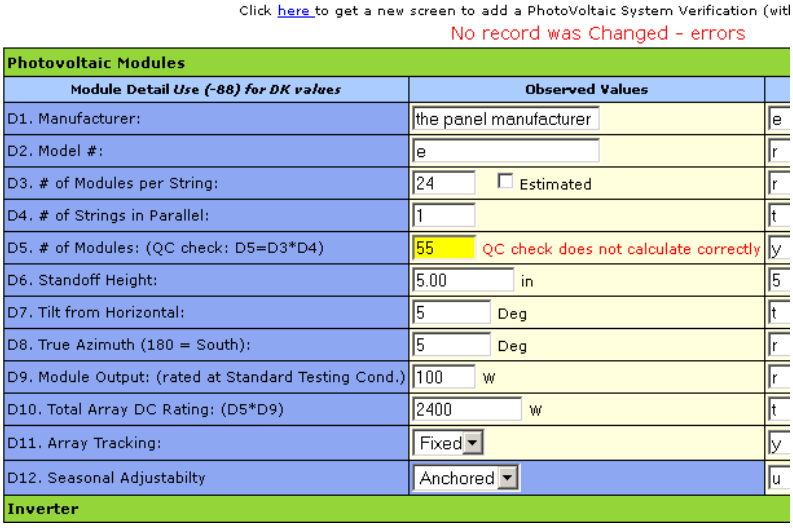


Save this New Record

Measure Subcategory	Database Qty	Verified ?*	Quality/condition *(1=poor 5=excellent)*	Notes(100 characters)
Caulk	2	Y=Yes	2	some notes
Door Sweep	10	NF	NF	
Foam Spray	1	NF	NF	
Glass Patch Tape	12	NF	NF	
Pipe Wrap	13	NF	NF	
Water Heater Wrap	2	NF	NF	
Weather Strip	5	NF	NF	
Winterization Kit	6	NF	NF	

Save this New Record

Figure 3. Example of FACT Cross-Checking and Calculations

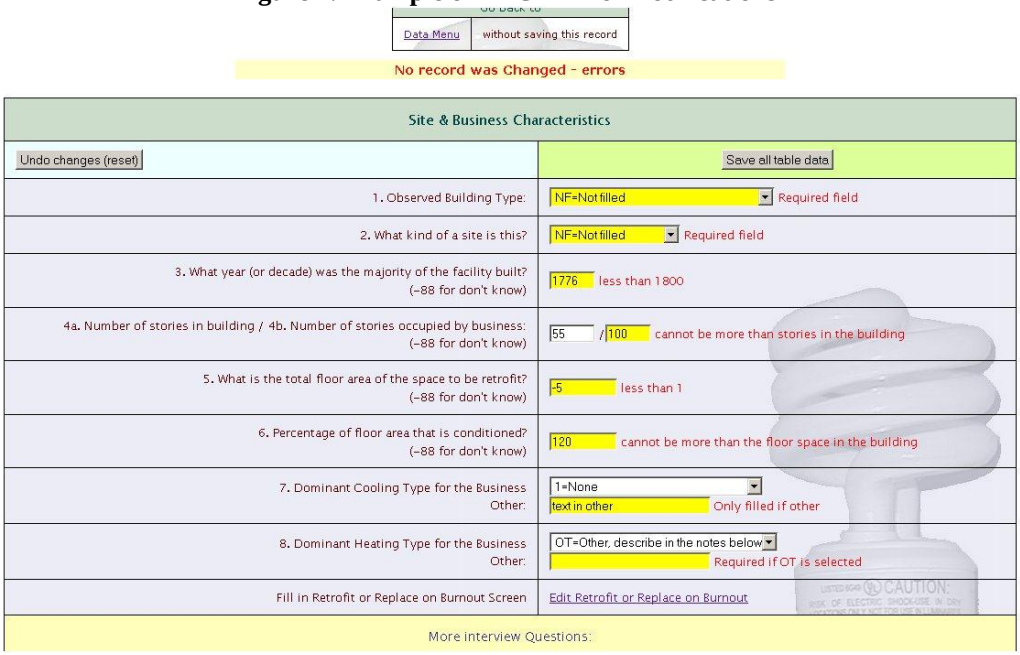


Click here to get a new screen to add a PhotoVoltaic System Verification (witl

No record was Changed - errors

Photovoltaic Modules		
Module Detail *Use (-88) for DK values*	**Observed Values**	
D1. Manufacturer:	the panel manufacturer	e
D2. Model #:	e	r
D3. # of Modules per String:	24 ☐ Estimated	r
D4. # of Strings in Parallel:	1	t
D5. # of Modules: (QC check: D5=D3*D4)	55 QC check does not calculate correctly	y
D6. Standoff Height:	5.00 in	5
D7. Tilt from Horizontal:	5 Deg	t
D8. True Azimuth (180 = South):	5 Deg	r
D9. Module Output: (rated at Standard Testing Cond.)	100 W	r
D10. Total Array DC Rating: (D5*D9)	2400 W	t
D11. Array Tracking:	Fixed	y
D12. Seasonal Adjustabilty	Anchored	u
Inverter		

Figure 4. Example of FACT Error Notifications



Finally, Level IV Reviews will allow senior surveyors to perform periodic surveys on a percentage of simple and complex sites to review the quality of data that was collected. Any discrepancies between the senior and original surveyor's findings will be corrected, and will inform updates to the data collection protocols and potential retraining curriculum (as needed).[7]

[7] The specific frequency of revisits and associated protocols will be discussed further with the Data Collection Protocols Working Group.

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX D
2012-2014 Commercial Building Stock Assessment Survey

Prepared for:
Northwest Energy Efficiency Alliance

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Suite 200
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www.navigant.com

December 5, 2014

2012-2014 Commercial Building Stock Assessment Survey

****Confidential: All data collected on this form is confidential and may only be used for this study.*

Surveyor Points of Emphasis

Lighting

- Be SURE to review the **LPD Methodology** document and include **REQUIRED** subspaces.
- If Lamp type is High Performance T8 (HP T8), be sure to record **Ballast Type** and **Ballast Factor**
- Be sure to check for as-built drawings, plans, **and O&Ms** (Division 16500 or Division 265000-265999) which contain lighting details.
- If a fixture or wattage is listed as **unknown**, please explain why and try to give a **RANGE for the wattage in the wattage field** (e.g. an unknown HID wattage but one can tell it's between 150 and 250 watts)
- Lighting Subspaces are a ***subset*** of Space IDs

Space IDs/Building Information

- Space IDs should **define / distinguish major parts and functional differences** of a building
    - For enclosed malls, strip malls, and first floor retail, use the **Strip Mall Form.** *(Mall_Sampling_Protocol_Form.xlsx)*
    - Space IDs **MUST** add to 100%
- **Mixed use scenarios** occur where spaces with different business and different use types occupy the same building/complex (e.g., strip malls, enclosed malls, and offices buildings with first floor retail/restaurant/etc.). If there are more than 2 businesses in the mall or in the first floor retail, use the **sampling protocol** to determine which spaces to audit.
- Be sure to properly record **Building Type, Area, and Vintage**

HVAC

- Be sure to check for as-built **drawings, plans, and O&Ms** which Contain HVAC information
- If there is **NO ACCESS** to the HVAC equipment:
    - Make this explicitly clear in Section 4, HVAC Description, ***AND*** note that plans and O&Ms were not available.
    - Try and get **contact information** for an HVAC Maintenance service company they use

Other Points

- Office Equipment (e.g., laptops, monitors, etc.) only need to be collected for Schools / Office / Office Areas in Warehouse Buildings.
- Refrigeration **Compressor and Condenser** information should ONLY be collected IF:
    - There is **MORE THAN 400 SQFT** of *storage box and walk-in* refrigeration, or **MORE THAN 60LF** of *refrigerated display case.*
    - **Case and walk-in information must be collected in all cases.**

IMPORTANT CODING POINTS:

- Code a field as **0** if you looked for the field but *it* ***does not exist*** (e.g. Pool Area=0 if no Pool)
    - Can be interpreted the same as **NA, BUT CODE AS 0**
- Code a field as **-1** only to mark data that is ***unknown***. (e.g. building has garage but area unknown)
- It is ok to **cross out or leave blank fields** that are *subordinate to another field which is coded as* ***no or negative*** (e.g. if Skylights are coded NO, Skylight Area and Dimming area can be left blank

1a. General Building Information

Site Identifier			
Surveyor Name		Survey Completion Date	
Site Name			
Site Address			
City/State/Zip			

Primary Contact for Site Visit

Contact 1		Title					
Address		City		State		Zip	
Phone 1a		Phone 1b		Email			

Alternate Contact for Site Visit

Contact 2		Title					
Address		City		State		Zip	
Phone 2a		Phone 2b		Email			

General Building/Complex Information

Is the site building primarily: **F**unctional, **D**emolished, **V**acant, or **I**naccessible?	F D V I
Is this site a **S**ingle building or a **M**ultiple building complex?	S M
If the site is part of a **M**ultiple building complex, how many buildings are in the complex?	
What best describes the primary economic use of the building/complex? (table below)	
If Other, Describe:	
What best describes the detailed economic use of the building/complex? (next page)	
If Other, Describe:	
Total Bldg. Floor Area (SQFT) not including parking garage (exclude residential)	
Parking garage floor area (SQFT)	
First floor perimeter (FT)	
Typical upper floor perimeter (FT)	
Floor to floor height (FT)	
# of dedicated outdoor parking lot spaces with exterior lighting (list # of space, 0 if none, -1 if unknown)	
Primary Heating Fuel (table below)	
Primary Cooling Fuel (table below)	
Photos taken of each building exposure	Y N
No. of Floors above grade	
No. of Floors below grade	
Are there areas within bldg. dedicated to holding computer servers? (If Yes, complete section 12)	Y N

Primary Economic Use			
1	Assembly	8	Restaurant
2	Grocery	9	School K-12
3	Retail/Service	10	University
4	Hospital	11	Warehouse
5	Lodging	12	Other
6	Residential Care	13	Unsampled
7	Office		

Fuel Type Codes	
1	Electricity
2	Natural Gas
3	Oil
4	Propane
5	Purchased Steam
6	Purchased Hot Water
7	Other
0	None

1c. General Building Information

Comments/Building Use Description:

Detailed Building Type Codes

Segment	Detailed Building Type		
Assembly	1 ARENA 2 AUDITORIUM 3 BOAT SLIPS, MARINA, YACHT CLUB 4 BOWLING ALLEY 5 CASINO 6 CLUB, LODGES 7 COMMUNITY CENTER	8 CONVENTION CENTER 9 GYM, EXERCISE 10 HEALTH SPA 11 ICE SKATING 12 LIBRARY 13 MUSEUM 14 MOVIE THEATER	15 PERFORMING ARTS THEATER 16 POOL 17 RECREATION CENTER 18 RELIGIOUS ASSEMBLY 19 ROLLER SKATING 20 SENIOR CENTER 21 OTHER ASSEMBLY
Grocery	22 CONVENIENCE STORE (<=5,000SF) 23 GROCERY (> 5000SF)	24 GAS STATION WITH A CONVENIENCE STORE	25 OTHER GROCERY
Retail	26 AUTO PARTS 27 AUTO/BOAT DEALER/ SHOWRM 28 BEAUTY / BARBER 29 BEER, WINE, OR LIQUOR STORE 30 CAR WASH 31 CLOTHING 32 DEPARTMENT STORE 33 DEPT. STORE W/ GROCERY	34 DRY CLEANER 35 ELECRONICS/APPLIANCES 36 FLORIST, NURSERY 37 HARDWARE 38 HOME IMPROVEMENT 39 LAUNDROMAT (SELF-SERVICE) 40 PHARMACY	41 POST OFFICE 42 RENTAL CENTER 43 REPAIR SHOP 44 STUDIO/GALLERY 45 VEHICLE REPAIR 46 WAREHOUSE CLUB 47 OTHER SPECIALTY MERCHANDISE
Hospital	48 HOSPITAL		
Hotel-Motel	49 HOTEL 50 MOTEL 51 BED & BREAKFAST 52 BOARDING/ROOMING HOUSE, APT HOTEL	53 CONVENT OR MONASTERY 54 DORMITORY 55 FRATERNITY, OR SORORITY 56 HALFWAY HOUSE	57 HOTEL - RESORT 58 SHELTER, ORPHANAGE, OR CHILDREN'S HOME 59 OTHER LODGING
Residential Care	60 ASSISTED LIVING 61 IN-PATIENT REHAB	62 NURSING HOME 63 RETIREMENT HOME	64 OTHER RESIDENTIAL CARE
Office	65 OFFICE- ADMIN, PROFESSIONAL, GOVERNMENT, FINANCIAL 66 CALL CENTER 67 CITY HALL 68 DENTAL OFFICE	69 MEDICAL CLINIC / OUTPATIENT MEDICAL 70 MEDICAL OFFICE 71 MEDICAL URGENT CARE CLINIC 72 OUTPATIENT REHAB	73 RETAIL BANKING 74 SALES OFFICE 75 VETERINARIAN OFFICE/CLINIC 76 OTHER OFFICE
Restaurant	77 BAR, PUB, LOUNGE 78 CAFETERIA 79 CATERING SERVICE 80 COFFEE, DOUGHNUT, OR BAGEL SHOP	81 FAST FOOD RESTAURANT 82 ICE CREAM OR FROZEN YOGURT SHOP 83 SIT DOWN RESTAURANT	84 TAKE-OUT RESTAURANT 85 TRUCK STOP 86 OTHER RESTAURANT
School K-12	87 ELEMENTARY SCHOOL 88 MIDDLE SCHOOL	89 HIGH SCHOOL 90 PRE-SCHOOL	91 OTHER K-12 SCHOOL
University	92 UNIVERSITY / COLLEGE	Vocational, career, and adult education classified in Other unless part of university or college	
Warehouse	93 MINISTORAGE 94 WAREHOUSE, DISTRIBUTION	95 WAREHOUSE, STORAGE 96 COLD STORAGE, NON-AMMONIA BASE REFG	97 OTHER WAREHOUSE
Other	98 ADULT/CAREER EDUCATION 99 AIRPLANE HANGER 100 ASYLUM 101 COURTHOUSE 102 CREMATORIUM	103 DATA CENTER OR SERVER FARM 104 FIRE STATION 105 JAIL 106 POLICE STATION	107 POLICE & FIRE 108 PRISON 109 TELEPHONE SWITCHING 110 VOCATIONAL TRAINING 111 OTHER
Unsampled	200 AGRICULTURE 300 INDUSTRIAL	301 COLD STORAGE, AMMONIA 400 MANUFACTURING	500 RESIDENTIAL

Functional Use Codes (Space Type)		
1 Assembly / Recreation	6 Laundry / Housekeeping	11 Warehouse – High bay
2 Classroom	7 Office	12 Indoor Parking Garage
3 Dining	8 Sales	13 Common Area
4 Guest room	9 Storage – Low bay	14 Other
5 Kitchen	10 Vacant	

1c. General Building Information

Building Occupancy and Management

What percentage of the building/complex is occupied by the Owner and/or Tenants?		%owner	%tenant
Number of tenants currently in space			
Original Year of Construction		Original Total Floor Area (sqft)	
Year of Construction for majority of building (by floor area)			
Is there a staff person whose duties include energy conservation and/or management?			Y N

Building Renovation History

	Lighting Ballasts	Lighting Fixtures	Lighting Controls	HVAC	HVAC Controls	Refrig.	Windows	Roof Insulation
Were any of the following systems ever replaced or renovated?	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk
How many years ago? (yrs)								
What percent of each system was impacted? (%)								
Are you expecting to replace or renovate the following systems in the next 2 years?	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk

Is there someone who we can contact with additional questions about building change history?	Name		Phone		Email	
Additional comments/Renovation Description:						

Mixed Use Scenario

	Mixed Use ID: 1	Mixed Use ID: 2	Mixed Use ID: 3	Mixed Use ID: 4
Is this a mixed-use building / scenario? If yes, fill in the rest of this table.	Y N			
Primary Economic Use Type				
Detailed Economic Use Type				
Name (if different from building)				
Area (SQFT)				

General Space Information

	Space ID: 1	Space ID: 2	Space ID: 3	Space ID: 4	Space ID: 5
Mixed Use ID (if applicable)	1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA
Functional Use Code (table on page 2)					
If other, describe:					
% Of Mixed Use (if applicable) or % Total Building SQFT (totals to 100%)					
Space Cooled?	Y N Unk Refrigerated Frozen	Y N Unk Refrigerated Frozen	Y N Unk Refrigerated Frozen	Y N Unk Refrigerated Frozen	Y N Unk Refrigerated Frozen
After Hours Shutoff/Setup?	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Space Heated?	Heated Semi-heated Not heated Unknown	Heated Semi-heated Not heated Unknown	Heated Semi-heated Not heated Unknown	Heated Semi-heated Not heated Unknown	Heated Semi-heated Not heated Unknown
After Hours Shutoff/Setback?	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk

1d. General Building Information

Building Schedule 1

Space ID (s) Served	1 2 3 4 5 None Unknown	Weeks Open per Year	

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Avg Hours Open							
Avg Hours Occupied							
Avg Hours HVAC On							
Avg Hours Interior Lights On							

Building Schedule 2

Space ID (s) Served	1 2 3 4 5 None Unknown	Weeks Open per Year	

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Avg Hours Open							
Avg Hours Occupied							
Avg Hours HVAC On							
Avg Hours Interior Lights On							

Building Schedule 3

Space ID (s) Served	1 2 3 4 5 None Unknown	Weeks Open per Year	

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Avg Hours Open							
Avg Hours Occupied							
Avg Hours HVAC On							
Avg Hours Interior Lights On							

Building Schedule 4

Space ID (s) Served	1 2 3 4 5 None Unknown	Weeks Open per Year	

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Avg Hours Open							
Avg Hours Occupied							
Avg Hours HVAC On							
Avg Hours Interior Lights On							

2. Energy Sources

Whole Building

Energy Source	Used at site?	Energy Source	Used at site?	Energy Source	Used at site?
Electricity	Y N	Propane	Y N	Purchased Hot Water	Y N
Natural Gas	Y N	Purchased Cooling	Y N	Purchased Steam	Y N
Oil	Y N	Wood	Y N	Other _____	Y N

Electric Accounts

Bill Release ID[1]			
Do meters include exterior & parking lighting?	Y N Unknown	Y N Unknown	Y N Unknown
Do meters include consumption of areas not audited?	Y N Unknown	Y N Unknown	Y N Unknown

Gas Accounts

Bill Release ID[1]			
Do meters include consumption of areas not audited?	Y N Unknown	Y N Unknown	Y N Unknown

On-site Generation

Generation Type			
Is equipment operational?	Y N Unknown	Y N Unknown	Y N Unknown
Fuel Type Code (see table)			
Total Capacity (kW)			
Is this a cogeneration system? (i.e. is the heat produced used to supplement space, domestic, or industrial processes)	Y N	Y N	Y N
Runtime: **24/7** **P**eak **D**emand **B**ack-**u**p only	24/7 PD BU	24/7 PD BU	24/7 PD BU
If back-up only, how often is the system tested (years)			
Is system interconnected to the grid?	Y N Unknown	Y N Unknown	Y N Unknown
Bill Release ID			

Generation Type			
1 Photovoltaics (PV)	3 Micro Turbine (MT)	6 Wind Turbines	9 Solar Water Heat - Domestic
2 Fuel Cells (FC)	4 Large Gas Turbine (GT)	7 Reciprocating Engine (RE)	10 Solar Water Heat - Pool
	-1 Unknown	0 None	11 Other

[1] **Be sure to complete, and have the site contact sign, the Utility Data Authorization Form.**

3a. Building Envelope

Percent of overall building façade that is lit: _____ %

EXTERIOR WALLS

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Surface Type: **B** = Brick	B	B	B	B
C = Concrete	C	C	C	C
CB = Concrete Block	CB	CB	CB	CB
W = Wood	W	W	W	W
M = Metal	M	M	M	M
S = Stucco	S	S	S	S
G = Glass/curtain wall	G	G	G	G
Framed Wall Type: **M** = Metal Stud	M	M	M	M
W = Wood	W	W	W	W
C = Concrete Block	C	C	C	C
B = Brick Wall	N	N	N	N
M = Metal Building	U	U	U	U
Insulation? **Y** = Yes	Y	Y	Y	Y
N = None	N	N	N	N
U = Unknown	U	U	U	U

WINDOWS

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
% of Wall Area (estimate)				
Window Opening: **P**=Punched	P	P	P	P
C=Curtain Wall	C	C	C	C
S=Storefront	S	S	S	S
Layers of Glazing	1 2 3	1 2 3	1 2 3	1 2 3
Low E Present?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
COG U Value (BTU/sqft * F)				
Glazing Material: **C** = Clear	C	C	C	C
O = Opaque	O	O	O	O
R = Reflective	R	R	R	R
T = Tinted	T	T	T	T
Blinds, shades, or other window coverings? **Op**erable	Op	Op	Op	Op
Fixed	F	F	F	F
Other	Oth	Oth	Oth	Oth
None	N	N	N	N
Frame Type: **M** = Metal, Standard	M	M	M	M
MT = Metal, Thermally Broken	MT	MT	MT	MT
MU = Metal, Unknown	MU	MU	MU	MU
V = Vinyl	V	V	V	V
W = Wood	W	W	W	W
Percent Area Operable?				
Window Age:	0-5 years 5-10 years 10-20 years 20-30 years 30+ years Unknown Age of building	0-5 years 5-10 years 10-20 years 20-30 years 30+ years Unknown Age of building	0-5 years 5-10 years 10-20 years 20-30 years 30+ years Unknown Age of building	0-5 years 5-10 years 10-20 years 20-30 years 30+ years Unknown Age of building

3b. Building Envelope

ROOFS

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Roof Type: **F** = Flat **P** = Pitched **A** = Attic **R** = Residential above **U** = Unknown	F P A R U	F P A R U	F P A R U	F P A R U
Insulation? **Y** = Yes **N** = None **U** = Unknown	Y N U	Y N U	Y N U	Y N U
Is it possible to add additional insulation?	Y N Unknown	Y N Unknown	Y N Unknown	Y N Unknown
Roof Area (SF): **[Only for built up roof without attic]**				
Skylights?	Y N	Y N	Y N	Y N
Skylight Area (SF) (estimate):				
Lighting Dimming Control?	Y N	Y N	Y N	Y N

FLOORS

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Floor Type: **B** = Basement **C** = Crawl **S** = Slab on ground **E** = Slab or frame, elevated **U** = Unknown	B C S E U	B C S E U	B C S E U	B C S E U
Insulation? **Y** = Yes **N** = None **U** = Unknown	Y N U	Y N U	Y N U	Y N U

4. General HVAC & Control Description

Briefly describe the HVAC system (including HVAC fans, heating & cooling system) & control.
Especially important for HVAC system configurations that aren't neatly defined by protocol fields

Examples:

Electric backup boiler to heat recovery / heat pump chiller
First stage of cooling uses ground water through plate and frame heat exchanger connected to chilled water loop.

DOAS preheat coil is supplied by refrigerate coil supplied by VRF system.

VAV system air source heat pump is backed up with gas fired duct heater which only runs when outside air is under 35F.

Hybrid air distribution and ventilation system. Natural ventilation mode is manually activated at room level by opening window. Window switch automatically turns off airflow at terminal unit when window is manually opened. Building owner reports occupants manually activate the Nat Vent mode in spring and summer, but rarely in winter.

5a. Distributed Single Zone HVAC Equipment

This page is intended for RTUs and small distributed equipment serving single zones (systems not utilizing heat recovery as a heat source).

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

GENERAL

Equipment Type (Table below)			
If HP Type (Table below)			
Primary Unit for: Heating **C**ooling **V**entilation **N**one (circle all that apply)	H C V N	H C V N	H C V N
Cooling Type: Chilled **W**ater **DX**-**A**ir **Dx-W**ater **G**eo-Coil **E**vaporative **N**one **O**ther:_____	CW DXA DXW G E N O	CW DXA DXW G E N O	CW DXA DXW G E N O
Primary Heating Fuel: Nat. **G**as **Oi**l **P**ropane **E**lectric **N**one **O**ther:_____	NG OI P E N O	NG OI P E N O	NG OI P E N O
Heating Type: Std **E**ff. **C**ondensing **E**ff. **HW**-**C**oil **S**team**-C**oil **O**ther:_____	SE CE HWC SC O	SE CE HWC SC O	SE CE HWC SC O
Number of Units			
Representative Equipment Age (Years)			
Representative Manufacturer			
Representative Model Name/Number			

CAPACITY

Rated Cooling Capacity (input MBTU) - if unknown enter -1			
Cooling Capacity Range (tons) (DX/HP cooling equipment only)	<5 5-9 10-19 20-59 Unk	<5 5-9 10-19 20-59 Unk	<5 5-9 10-19 20-59 Unk
Rated Heating Capacity (input) – if unknown enter -1			
Specify Heating Capacity Units	kW MBTU	kW MBTU	kW MBTU

SUPPLEMENTARY HEATING (IF APPLICABLE)

Heating Equipment Type (Table below)			
Heating Fuel: Nat. **G**as **O**il **P**ropane **E**lectric **O**ther:_____	NG OI P E O	NG OI P E O	NG OI P E O

VENTILATION & CONTROLS

Fan Control: **C**onstant flow **I**ntermittent: Cycles on/off **V**ariable flow	C I V Unk	C I V Unk	C I V Unk
Delivery of Ventilation Air: **A**t **U**nit **F**rom **C**entral **S**ystem **O**perable **W**indow or Louver **N**one	AU FCS OW N Unk	AU FCS OW N Unk	AU FCS OW N Unk
Economizer: **A**ir **W**ater **N**one	A W N Unk	A W N Unk	A W Unk
Temperature Control: **M**anual-**T**stat **P**rogrammable-**T**stat **E**MS-DDC **M**anual on/off	MT PT E M	MT PT E M	MT PT E M
Occupancy sensor used to set-up/back or turn off zone?	Y N Unk	Y N Unk	Y N Unk
High Ventilation > 70% outside air	Y N Unk	Y N Unk	Y N Unk
Demand Controlled Ventilation? Yes**-**In **Z**one **Y**es**-**At **U**nit **Y**es-**Unk**nown **N**one **Unk**nown	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk

Equipment Type Codes	
Ducted Systems (Generally)	
1	Rooftop Units (RTUs)
2	Makeup Air Unit (MAU)
3	Air Handling Unit (AHU)
4	Furnace
5	Heat Pump
Non Ducted Systems (Generally)	
6	PTAC / PTHP
7	Unit Ventilator
8	Room AC (window unit)
9	Unit Heater (suspended)
10	Baseboard / Radiator
11	Cabinet Heater (fan coil)
12	Radiant – floor
13	Radiant – ceiling (suspended)
14	Swamp Cooler

Heat Pump Type Codes	
1	Standard – air source
2	Water Source – supplemental boiler and cooler
3	Ground Source – water
4	Ground Source – earth
5	Ductless / Mini Split – air source
6	VRF – single mode (either heat or cool)
7	VRF – multimode (simultaneous heat and cool)

5b. Multi-zone and Specialty Single Zone HVAC Fan Units

Does this building have equipment that applies to this section of the data collection form? Y N

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

GENERAL

Fan System Type (Table below)			
Primary Unit for: Heating **C**ooling **V**entilation **N**one (circle all that apply)	H C V N	H C V N	H C V N
Airflow Control: Constant Volume (**CV**) Stepped Constant Volume (**SCV**) Variable Air Volume (**VAV**)	CV SCV VAV	CV SCV VAV	CV SCV VAV
Cooling Type: Chilled **W**ater **DX-A**ir **DX–W**ater **G**eo**-C**oil **E**vaporative **N**one **O**ther:	CW DXA DXW GC E N O	CW DXA DXW GC E N O	CW DXA DXW GC E N O
Primary Heating Fuel: Nat. **G**as **Oi**l **P**ropane **E**lectric **N**one **Ot**her: _____	NG OI P E N O	NG OI P E N O	NG OI P E N O
Heating Type: HP Std **E**ff. **C**ondensing **E**ff. **HW**-**C**oil **S**team**-C**oil **O**ther:_____	HP SE CE HWC SC O	HP SE CE HWC SC O	HP SE CE HWC SC O
If HP Type (Table below)			
Terminal Reheat Energy: Electric Hot **W**ater **S**team **N**one **O**ther:_____	E HW S N O Unk	E HW S N O Unk	E HW S N O Unk
Number of Units			
Airflow Capacity (CFM) - if unknown enter -1			
Representative Equipment Age (Years)			
Representative Manufacturer			
Representative Model Name/Number			

CAPACITY

Rated Cooling Capacity (input MBTU) - if unknown enter -1			
Cooling Capacity Range (tons)	0-10 10-20 20-59 60-120 >120 Unk	0-10 10-20 20-59 60-120 >120 Unk	0-10 10-20 20-59 60-120 >120 Unk
Rated Heating Capacity (input) – if unknown enter -1			
Specify Heating Capacity Units	kW MBTU	kW MBTU	kW MBTU

VENTILATION & CONTROLS

Air Distribution System: Overhead **U**nderfloor Low **W**all **O**ther:_____	OV U W O	OV U W O	OV U W O
Supply Fans: Volume Control: *N**one* *I**nlet Vane* *D**ischarge damper* *V**FD* *B**ypass Damper*	N I D V B Unk	N I D V B Unk	N I D V B Unk
Supply Fans Motor HP (Total)-if unknown enter -1			
Return Fans and/or Exhaust Fans?	Y N Unk	Y N Unk	Y N Unk
Motor HP			
VAV Terminal Type (circle all that apply): Standard **I**nduction FPB**-P**arallel FPB-**S**eries **N**one **U**nknown	St I P S N U	St I P S N U	St I P S N U
Temperature Control: : Manual-**T**stat **P**rogrammable-**T**stat **E**MS-DDC **M**anual on/off	MT PT E M	MT PT E M	MT PT E M
Demand Controlled Ventilation? Yes**-**In **Z**one **Y**es**-**At **U**nit **Y**es-**Unk**nown **N**one **Unk**nown	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk
Occupancy sensor used to set-up/back or turn off zone?	Y N Unk	Y N Unk	Y N Unk
Economizer? Air **W**ater **N**one	A W N Unk	A W N Unk	A W N Unk
High Ventilation > 70% outside air	Y N Unk	Y N Unk	Y N Unk
Exhaust Air Heat Recovery?	Y N Unk	Y N Unk	Y N Unk
Heat Recovery Type: Exhaust Air **R**efrigeration **C**ondenser	E C R	E C R	E C R

Fan System Type Codes	
1	Single Zone
2	Dual Duct
3	Single Duct - Terminal Reheat
4	Multi zone
5	VVT
6	DOAS
7	Makeup Air Unit (MAU)
8	Other (describe in section 4)

Heat Pump Type Codes	
1	Standard – air source
2	Water Source – supplemental boiler and cooler
3	Ground Source – water
4	Ground Source – earth
5	Ductless / Mini Split – air source
6	VRF – single mode (either heat or cool)
7	VRF – multimode (simultaneous heat and cool)

6. Heating Water and Steam Systems

Does this building have equipment that applies to this section of the data collection form? Y N

BOILER

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Boiler Service: **S**team **H**ot Water	S H	S H	S H
Fuel Type (Table below)			
Back-up Fuel Type (Table below)			
Number of Identical Boilers			
Number of Redundant Units			
Age of Boiler(s) (years)			
Manufacturer			
Model Name/Number			
Input Capacity (MBTU Total) - if unknown enter -1			
Condensing?	Y N Unk	Y N Unk	Y N Unk
Boiler Function: Space **H**eat **DHW P**rocess (Circle all that apply)	SH DHW P	SH DHW P	SH DHW P
Heat Recovery?	Y N Unk	Y N Unk	Y N Unk
Heat Recovery: Flue-**G**as **B**low-**D**own **O**ther:_____	FG BD O Unk	FG BD O Unk	FG BD O Unk

BOILER Dedicated Circulation PUMPS (PRIMARY)

Quantity			
Number of Redundant Units			
Motor HP (Total) - if unknown enter -1			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V Unk	1 2 V Unk	1 2 V Unk
EMS Control?	Y N Unk	Y N Unk	Y N Unk

SPACE HEAT DISTRIBUTION PUMPS (SECONDARY)

Quantity			
Number of Redundant Units			
Motor HP (Total) - if unknown enter -1			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V Unk	1 2 V Unk	1 2 V Unk
EMS Control?	Y N Unk	Y N unk	Y N Unk

Fuel Type Codes	
1	Electricity
2	Natural Gas
3	Oil
4	Propane
5	Off-Site Steam
6	Off-Site Hot Water
7	Other
0	None
-1	Unknown

7a. Cooling Water System

Does this building have equipment that applies to this section of the data collection form? Y N

CHILLER

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Compressor Type (Table below)			
Number of Identical Chillers			
Number of Redundant Units			
Age of Chiller(s) (Years)			
Manufacturer			
Model Name/Number			
Rated Cooling Capacity - if unknown enter -1			
Rated Capacity Units	kW Tons	kW Tons	kW Tons
Water side economizer?	Y N Unk	Y N Unk	Y N Unk
Compressor VFD?	Y N Unk	Y N Unk	Y N Unk

HEAT REJECTION

Condenser Type (Table below)			
Fan Control: **Co**nstant On Constant **CY**cle **T**wo **m**otors **T**wo-**S**peed motor **V**ariable Speed **Unk**nown	CO CY TM TS V Unk	CO CY TM TS V Unk	CO CY TM TS V Unk
Number of Identical Condensers			
Number of Redundant Units			
Fan Motor HP (Total) - if unknown enter -1			
EMS Control?	Y N Unk	Y N Unk	Y N Unk
Condenser Heat Recovery	Y N Unk	Y N Unk	Y N Unk

COOLING WATER DEDICATED CIRCULATION PUMPS (PRIMARY)

Number of Identical Pumps			
Number of Redundant Units			
Motor HP (Total) - if unknown enter -1			

COOLING WATER DISTRIBUTION PUMPS (SECONDARY)

Number of Identical Pumps			
Number of Redundant Units			
Motor HP (Total) - if unknown enter -1			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V Unk	1 2 V Unk	1 2 V Unk
EMS Control?	Y N Unk	Y N Unk	Y N Unk

7b. Cooling Water System

HEAT REJECTION WATER PUMPS

Number of Identical Pumps			
Number of Redundant Units			
Motor HP (Total)			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V Unk	1 2 V Unk	1 2 V Unk
EMS Control?	Y N Unk	Y N Unk	Y N Unk

Compressor Type Codes		Heat Rejection Condensing Type Codes
1 Centrifugal	5 Absorption, natural gas	1 Air Cooled Refrigerant
2 Reciprocating	6 Absorption, steam	2 Evaporative Cooler Refrigerant
3 Screw	7 Off-site	3 Water Cooled Fluid
4 Scroll	-1 Unknown	4 Air Cooled Fluid
		5 Other
		-1 Unknown

8. Building System Controls

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

System Configurations (select all that apply):

Full DDC (major equipment & zone level) **(FD)**	FD Unk	FD Unk	FD Unk
Hybrid – Pneumatic (DDC at major Equip & Pneumatic at zone level **(HP)**	HP Unk	HP Unk	HP Unk
Hybrid -Electric (DDC at major Equip & electronic at zone level) **(HE)**	HE Unk	HE Unk	HE Unk
Full Pneumatic **(FP)**	FP Unk	FP Unk	FP Unk
Full Electronic **(FE)** – Programmable **OR** Manual T-stat	FE Unk	FE Unk	FE Unk
Other (O) **(e.g. at unit only)**:_____	O Unk	O Unk	O Unk

Control Sequences (select all that apply):

General Building Functions: Fill out for buildings with central control systems only.			
Time clock start / stop function (T)	Y N Unk	Y N Unk	Y N Unk
Optimum start / stop (O)	Y N Unk	Y N Unk	Y N Unk
Unoccupied temperature setback (UB)	Y N Unk	Y N Unk	Y N Unk
Unoccupied temperature setup (UU)	Y N Unk	Y N Unk	Y N Unk
Air Handlers (multi-zone systems) – Does this building have equipment that applies to this section of the data collection form? **Y N**			
Supply air temperature reset (S)	Y N Unk	Y N Unk	Y N Unk
Static pressure reset (P)	Y N Unk	Y N Unk	Y N Unk
Zone damper airflow reset (Z)	Y N Unk	Y N Unk	Y N Unk
Hydronic Loops – Does this building have equipment that applies to this section of the data collection form? **Y N**			
Hot water temperature reset (HW)	HW Unk	HW Unk	HW Unk
Chilled water temperature reset (CHW)	CHW Unk	CHW Unk	CHW Unk
Condenser water temperature reset (CW)	CW Unk	CW Unk	CW Unk
Noted Control Troubles	Y N Unk	Y N Unk	Y N Unk

Comments:

Garage Exhaust Fan Ventilation Control (circle all that apply) Always On Timeclock CO with Fan Cycle CO with VFD None Unknown	AO TC FC VFD N U	AO TC FC VFD N U	AO TC FC VFD N U

9. Domestic Water Heating

Does this building have equipment that applies to this section of the data collection form? Y N

Mixed Use ID (s) Served		1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA
Water Heater Type	(Table below)			
Primary Fuel Type	(Table below)			
Secondary Fuel Type	(Table below)			
Condensing?		Y N Unk	Y N Unk	Y N Unk
Number of Identical Units				
Number of Redundant Units				
Age Of Water Heater	(years)			
Tank Capacity (0 if tankless)	(Gallons)			
Input Capacity	(kW or MBTU)			
External Tank Insulation?		Y N Unk	Y N Unk	Y N Unk
Additional Storage Tanks:	**I**nsulated **#** **U**ninsulated **#**	I# U#	I# U#	I# U#
Solar Preheat?		Y N Unk	Y N Unk	Y N Unk
Recirculation System?		Y N Unk	Y N Unk	Y N Unk
If yes, recirculation pump control: **(select all that apply)** **N =** None (running 24/7) **E = E**MS - Timeclock **T =** Time Clock **A** = Aquastat **U =** Unknown		N E T A U	N E T A U	N E T A U

Water Heater Type Codes	
1	Heat Pump
2	DHW Tank
3	Point of Use – Tankless or Tanks <5 gallon
4	Dedicated Boiler
5	HX from Space Heat Boiler
6	Off-Site
7	HR from Boiler equipment
8	HR from Chiller condenser
9	HR from Process equipment
10	Other
0	None
-1	Unknown

Fuel Type Codes	
1	Electricity
2	Natural Gas
3	Fuel Oil
4	Propane
5	Other
-1	Unknown

10a. Indoor / Outdoor Lighting Fixture Schedule

Fixture Type ID	Fixture Type	Lamp Type	Lamp Details	# of Lamps[2]	Watts/ Lamp[5]	Fixture Watts (optional)	Source[3]	Ballast Type[1,4]	Ballast Factor (T8 Only)	Notes (optional)

Notes:

Be sure to document any fixture or lamp types not well characterized in the reference pages. Include exit lights on this page but there is no need to count them in the fixture counts.

[1] **If Lamp type is High Performance T8 (HP T8), be sure to record Ballast Type (e.g., Electronic – Unknown Type (E), Standard Electronic (SE), or High Performance Electronic (HPE)) and ballast factor.**

[2] Or lineal feet for track, rope lights, neon, etc.

[3] Source: **O**bservation / **P**lans / **I**nterview / **R**eplacement **S**tock / **O&M** / **OTH**er / **UNK**nown / **G**uess

[4] Only gather if HID, T12, or T8 lamp

[5] FOR UNKNOWN HIDS and INC Wattages –

- HIDs – Code <200W, 200W-400W, or >400W
- INCs – Code <50W, 50-100W, or >100W

10b. Indoor / Outdoor Lighting Tables

Fixture Type	Description
W x L[1,4]	Width x length in feet (e.g. 1x4, 2x8, etc) **Included Mounting Type**
-r(d/i/b)	Recessed- **d**irect, **i**ndirect, or **b**oth (specify which)
-s(d/i/b)	Surface Mount- **d**irect, **i**ndirect, or **b**oth (specify which)
-p(d/i/b)	Pendant Mount - **d**irect, **i**ndirect, or **b**oth (specify which)
STRIP[1]	Bare or lensed strip. Use –I for strip fixtures providing indirect light.
CAN	Recessed Can Fixture
DISPLAY	Miscellaneous Display Lighting
EXIT	Exit Sign
HEAD	Track Light Head
TSK[2]	Task Lighting[2]
OTH[3]	Other[3]
POLE25	Pole <= 25’
POLE40	Pole >25’ & <=40’
POLE60	Pole >40’
WALL	Wall Pack
FLOOD	Flood Light
Un	Unable to determine

[1]Only required for top 10 fixtures but if working from a lighting schedule capture for more. For strip fixtures, fixtures should counted as 4 foot length equivalents.

[2]Only include for Lodging & Office building types. Only include task lighting that is consistent throughout space.

[3] Do not use for other fixtures that are oddballs in terms of fixtures and lamp. Make fixture type be description (e.g. rope light, step light). Descriptive fixture types are allowed for any fixture that would otherwise be coded OTH.

[4]Include indented mounting type (e.g. ‘-r(d/i/b)’). Can specify mounting type without WxL for non-linear lighting too.

Lamp Type	Description	Lamp Details	Description
T5	Fluorescent T5	SO	Standard Output
		HO	High Output
		Un	Unable to determine
T8	Fluorescent T8	SP	Standard Performance
		HP	High Performance
		Un	Unable to determine
T12	Fluorescent T12		No details required
CFL	Compact Fluorescent	S	Screw-in
		P	Pin-based
		Un	Unable to determine
F-OTH	Other Fluorescent		No details required
INC	Incandescent	R	Reflector
		G	General Service
		D	Decorative / Miscellaneous
		H-R	Halogen - Reflector
		H-G	Halogen - General Service
		H-D	Halogen - Decorative / Miscellaneous
		Un	Unable to determine
HID	HID	MV	Mercury Vapor
		MH	Metal Halide
		CMH	Ceramic Metal Halide
		HPS	High Pressure Sodium
		LPS	Low Pressure Sodium
		IN	Induction
		NE	Neon / Cold Cathode
		Un	Unable to determine
LED	LED	R	Reflector
		G	General Service
		D	Decorative / Miscellaneous
MISC	Miscellaneous		No details required

Ballast Type	Description
SE	Standard Electronic
E	Electronic - Unknown
HPE	High Performance Electronic
M	Magnetic
PULSE	HID Pulse Start Ballast
PROBE	HID Probe Start Ballast
NONE	No ballast required
Un	Unable to determine

Control Type	Description
EMS-S	Automatic Sweep Controls with EMS System
EMS	EMS System (without automatic sweep
DS	Daylight Sensing, Details Unknown
DS-SS	Daylight Sensing, Single-Step Dimming
DS-MN	Daylight Sensing, Multiple Stepped Dimming
DS-CD	Daylight Sensing, Continuous Dimming
DIM	Dimming (non-daylight)
EGR	Egress control 24/7
MCB	Manual - circuit breaker / central switch
MS	Manual - wall switch
MB	Manual - bi-level
OS	Occupancy Sensors
T	Timeclock (electronic or mechanical)
OTH	Other
N	None (continuous)
Un	Unable to determine

10c. Indoor / Outdoor Lighting Summary

LIGHTING SUMMARY

Briefly describe the lighting scheme (including controls) at this building.	
Does this building have exterior lighting?	**Y N**
Does this building have stairwell lighting?	**Y N**
If building has stairwell lighting, what controls are used? (circle all that apply)	None (24/7) Off during unoccupied Off on occupancy sensor Dimmed on occupancy sensor Switched
Area of outdoor sales? (SF)	
Are egress lights on all night?	Y N Unknown
Are there lighting fixtures for sale that are illuminated?	Y N
If yes, Estimate connected kW:	<1 kW 1-5 kW 5-20 kW 20+ kW

11a. Indoor Lighting

Subspace Information				Fixture Takeoff			Fixture Controls		
SpaceID, Subspace Type[1]	Sampled Subspace Area (ft^2)[2]	Total Subspace Area (ft^2)[2]	Ceiling Height	Fixture Height	Fixture Type ID	Total Fixture Count	Control Type[3]	% Lighting load controlled[4]	Are controls overridden?[4]

[1] **Subspace Type Codes -** Include subspaces as required based on the building's Primary Economic Use Type and Detailed Building Type (table on next page). In addition, include all subspace types representing more than 20% of the total building area

[2] If fixture counts are for sample of subspace enter XXX (Sampled Area) in Sampled Column and YYY (Total Subspace Area) in total column. ***Totals per spaceID should add up to the % listed in section 1c.***

[3] See lighting control reference, enter all that apply separated by a comma. Do not leave control blank.

[4] For multiple controls enter per control in same order, separated by a comma.

[5] Total Subspace Area should add up to be no more that 5% higher or 10% lower than the reported building Sq Ft

Fixtures to NOT Survey

1. Emergency lighting that is automatically OFF during normal building operation.
2. Lighting that is part of machines, equipment or furniture. Record refrigerated case and walk-in lighting in the refrigeration section.
3. Technical production lights in theaters.

Primary Economic Use	Detailed Building Type			Required Lighting Subspaces*
Assembly	1 ARENA 2 AUDITORIUM 3 BOAT SLIPS, MARINA, YACHT CLUB 4 BOWLING ALLEY 5 CASINO 6 CLUB, LODGES 7 COMMUNITY CENTER	8 CONVENTION CENTER 9 GYM, EXERCISE 10 HEALTH SPA 11 ICE SKATING 12 LIBRARY 13 MUSEUM 14 MOVIE THEATER	15 PERFORMING ARTS THEATER 16 POOL 17 RECREATION CENTER 18 RELIGIOUS ASSEMBLY 19 ROLLER SKATING 20 SENIOR CENTER 21 OTHER ASSEMBLY	**1, 2, 14, 15:** SEATING AREA, CORE - LOBBY/PUBLIC CORRIDOR/CONCESSIONS, OTHER- STAGE/BACKSTAGE, OTHER – STORAGE **3, 5, 6, 7, 20, 21:** OTHER - ASSEMBLY, OFFICE, EATING/ FOOD PREP, CORE- CORRIDOR/LOBBY **4:** OTHER- PLAYING AREA, OTHER - PINSET, CORRIDOR/LOBBY, DINING **8:** OTHER - ASSEMBLY, CORE- CORRIDOR/LOBBY, RESTROOM, OTHER - STORAGE, OFFICE **9, 10, 11, 16, 17, 19**: OTHER - PLAYING/COURT AREA, OTHER - EXERCISE AREA, RESTROOM/LOCKER, LOBBY, OFFICE **12:** CLASSROOM/MEETING, OTHER - STACKS, OFFICE, OTHER - READING/COMPUTER, CORRIDOR/LOBBY **13:** OTHER - EXHIBIT, OTHER - STORAGE, CORE - CORRIDOR/LOBBY, RETAIL **18:** OTHER - WORSHIP, OTHER - FELLOWSHIP/MULTIPURPOSE ROOM, OFFICE, LOBBY + IF INCLUDES A SCHOOL THEN TREAT AS SEPARATE TENANT AND INCLUDE ALL THE EDUCATION SPACE TYPES ABOVE.
Grocery	22 CONVENIENCE STORE (<=5,000SF) 23 GROCERY (> 5000SF)	24 GAS STATION WITH A CONVENIENCE STORE	25 OTHER GROCERY	RETAIL AREA, OTHER - STORAGE, OTHER - FOOD PREP (DELI/BAKERY/MEAT/OTHER)
Retail	26 AUTO PARTS 27 AUTO/BOAT DEALER/ SHOWRM 28 BEAUTY / BARBER 29 BEER, WINE, OR LIQUOR STORE 30 CAR WASH 31 CLOTHING 32 DEPARTMENT STORE 33 DEPT. STORE W/ GROCERY	34 DRY CLEANER 35 ELECRONICS/APPLIANCES 36 FLORIST, NURSERY 37 HARDWARE 38 HOME IMPROVEMENT 39 LAUNDROMAT (SELF-SERVICE) 40 PHARMACY	41 POST OFFICE 42 RENTAL CENTER 43 REPAIR SHOP 44 STUDIO/GALLERY 45 VEHICLE REPAIR 46 WAREHOUSE CLUB 47 OTHER SPECIALTY MERCHANDISE	**28, 34, 39, 42, 43, 45 (SERVICE RELATED):** RETAIL AREA, OTHER - STORAGE, OTHER - REPAIR/SERVICE AREA, LOBBY **41:** OTHER - MAIL SORT, LOBBY, OTHER - PO BOX AREA, OFFICE **44:** OTHER - GALLERY, OFFICE, OTHER - STUDIO (WORK AREA) **ALL OTHERS:** RETAIL AREA, OTHER - STORAGE

Primary Economic Use	Detailed Building Type			Required Lighting Subspaces*
Hospital	48 HOSPITAL			MAIN LOBBY, CORRIDOR, PATIENT ROOMS, MEDICAL EXAM ROOMS, OPEN OFFICE, ENCLOSED OFFICE (<300SF), OTHER - LAB, OTHER - MEDICAL PROCEDURE (XRAY, SURGERY, EMERGENCY, ETC), EATING AREA, OTHER - STORAGE
Lodging	49 HOTEL 50 MOTEL 51 BED & BREAKFAST 52 BOARDING/ROOMING HOUSE, APT HOTEL	53 CONVENT OR MONASTERY 54 DORMITORY 55 FRATERNITY, OR SORORITY 56 HALFWAY HOUSE	57 HOTEL - RESORT 58 SHELTER, ORPHANAGE, OR CHILDREN'S HOME 59 OTHER LODGING	ROOM, CORRIDOR, MAIN LOBBY, OFFICE, OTHER - MEETING/CONFERENCE/AUDITORIUM
Residential Care	60 ASSISTED LIVING 61 IN-PATIENT REHAB	62 NURSING HOME 63 RETIREMENT HOME	64 OTHER RESIDENTIAL CARE	PATIENT ROOM, CORRIDOR, EATING AREA/MULTIPURPOSE, OFFICE
Office	65 OFFICE- ADMIN, PROFESSIONAL, GOVERNMENT, FINANCIAL 66 CALL CENTER 67 CITY HALL 68 DENTAL OFFICE	69 MEDICAL CLINIC / OUTPATIENT MEDICAL 70 MEDICAL OFFICE 71 MEDICAL URGENT CARE CLINIC 72 OUTPATIENT REHAB	73 RETAIL BANKING 74 SALES OFFICE 75 VETERINARIAN OFFICE/CLINIC 76 OTHER OFFICE	**65, 66, 67, 73, 74, 76 (NON-MEDICAL OFFICE):** OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR **68, 69, 70, 71, 72, 75 (MEDICAL OFFICE):** OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR, MEDICAL EXAM ROOMS, OTHER - MEDICAL PROCEDURE
Restaurant	77 BAR, PUB, LOUNGE 78 CAFETERIA 79 CATERING SERVICE 80 COFFEE, DOUGHNUT, OR BAGEL SHOP	81 FAST FOOD RESTAURANT 82 ICE CREAM OR FROZEN YOGURT SHOP 83 SIT DOWN RESTAURANT	84 TAKE-OUT RESTAURANT 85 TRUCK STOP 86 OTHER RESTAURANT	EATING AREA, KITCHEN
School K-12	87 ELEMENTARY SCHOOL 88 MIDDLE SCHOOL	89 HIGH SCHOOL 90 PRE-SCHOOL	91 OTHER K-12 SCHOOL	CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY

Primary Economic Use	Detailed Building Type			Required Lighting Subspaces*
University	92 UNIVERSITY / COLLEGE	VOCATIONAL, CAREER, AND ADULT EDUCATION CLASSIFIED IN OTHER UNLESS PART OF UNIVERSITY OR COLLEGE		
Warehouse	93 MINISTORAGE 94 WAREHOUSE, DISTRIBUTION	95 WAREHOUSE, STORAGE 96 COLD STORAGE, NON-AMMONIA BASE REFG	97 OTHER WAREHOUSE	WAREHOUSE, OPEN OFFICE, ENCLOSED OFFICE, OTHER - MANUFACTURING
Other	98 ADULT/CAREER EDUCATION 99 AIRPLANE HANGER 100 ASYLUM 101 COURTHOUSE 102 CREMATORIUM	103 DATA CENTER OR SERVER FARM 104 FIRE STATION 105 JAIL 106 POLICE STATION	107 POLICE & FIRE 108 PRISON 109 TELEPHONE SWITCHING 110 VOCATIONAL TRAINING 111 OTHER	98, 110: CLASSROOM, CORRIDOR, AUDITORIUMS, EATING/ MULTIPURPOSE, GYM, OFFICE, OTHER - LIBRARY 99: OTHER - AIRPLANE HANGER, OFFICE 100, 105,108: OTHER - CELL, CORRIDOR, OFFICE, ASSEMBLY 101: OPEN OFFICE, ENCLOSED OFFICE (<300SF), CONFERENCE ROOMS, MAIN LOBBY, CORRIDOR 102: OTHER - FURNACE AREA, OTHER - ASSEMBLY, OFFICE 103, 109: OTHER - DATA/SWITCHING AREA, OFFICE 104, 106, 107: OTHER - TRUCK/CAR BAY, OTHER - SLEEPING, OTHER - LIVING, OFFICE, CONFERENCE ROOMS, OTHER - CELL
Unsampled	200 AGRICULTURE 300 INDUSTRIAL	301 COLD STORAGE, AMMONIA 400 MANUFACTURING	500 RESIDENTIAL	N/A – DON'T PERFORM LIGHTING AUDIT ON THESE TYPES OF BUILDINGS.

11b. Outdoor Lighting

Fixture Type ID	Use Type[1]	# of fixtures	Control Type[2]	Are controls functional and used?
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
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	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N
	S F P SF O W ES		P T AT PT M 24 SO ST UN	Y N

[1] **S(**ignage), **F**(Building Facade), **P**(arking lot), **SF**(sporting field), **O**(ther), **W**(walkway/area), **ES**(exterior sales)
[2] **P(p**hotocell), **T**(time clock), **AT**(astronomical time clock), **PT**(photocell/timeclock), **M(**manual),
24(24 hour), **SO**(stepped, occupancy), **ST**(stepped, timeclock), **UN**(unable to determine)

12a. Miscellaneous Equipment

Food Service & Equipment			**Mixed Use ID (circle only one)**
Kitchen	Circle all applicable Kitchen Types: Snack bar **SB** Fast food **FF** Cafeteria/restaurant **C** Large Kitchen/commercial kitchen **LK** Small kitchen **SK** Other **O** None **N**	SB FF C LK SK O N	1 2 3 4 NA
	Total Kitchen Area (SQ FT)		
	Dining Area (SQ FT)		
	Number of meals served per day (#)		
	Number of pre-rinse spray valves (#)		
	Electric Warming Equipment (Yes/No)	Y N	
	Total Linear Feet of Kitchen Hood (LF)		
	Standard (% of total LF kitchen hood)		
	HR (% of total LF kitchen hood)		
	DCV (% of total LF kitchen hood)		
	Compensating (% of total LF kitchen hood)		
	Steamers (Electric/Gas/None)	E G N	
	Hot Food Holding Cabinet (Electric/Gas/None)	E G N	
	Broilers / Fryers (Electric/Gas/None)	E G N	
	Griddle / Grill (Electric/Gas/None)	E G N	
	Combination Oven (Electric/Gas/None)	E G N	
	Oven (excluding combination ovens) (Electric/Gas/None)	E G N	
	Range (Electric/Gas/None)	E G N	
	Dishwasher Booster Fuel (Electric/Gas/None)	E G N	
Plug Load Refrigeration and Vending	Refrigerated Vending Machines (#)		1 2 3 4 NA
	Non-Refrigerated Vending Machines (#)		
	Beverage Merchandizers (1-2 door beverage display cases) (#)		
	Ice Machines (#)		
	Commercial Refrigerators (full height) (# of doors)		
	Commercial Refrigerators (half height) (# of doors)		
	Commercial Freezers (# of doors)		

12b. Miscellaneous Equipment

Additional Miscellaneous Equipment			**Mixed Use ID (circle only one)**
Pool/Hot Tub	Pool Indoor (total sq)		1 2 3 4 NA
	Pool Outdoor (total sq)		
	Pool Fuel (**E**lectric, **G**as, **P**ropane, **O**ther, **N**one)	E G P O N	
	Hot Tub Indoor (total sq)		
	Hot Tub Outdoor (total sq)		
	Hot Tub Fuel (**E**lectric, **G**as, **P**ropane, **O**ther, **N**one)	E G P O N	
Laundry	Type (Coin-Op **C**, Drycleaner **D**, Small **S**, Large Commercial **L,** None **N**)	C D S N L	1 2 3 4 NA
	% of laundry done on-site (%)		
	Electric Clothes Dryer (#)		
	Gas Clothes Dryer (#)		
Laboratory	Laboratory Present?	Y N	1 2 3 4 NA
	Does this building have specialized laboratory equipment that requires extra energy consumption? (exp. gas chromatographs, centrifuges, spectometers, and analysis equipment)	Y N	
	Fume Hood (#)		
	Fume Hood Control System (% Variable Flow)		

12c. Miscellaneous Equipment

Miscellaneous Equipment per Economic Use Type

Only fill out the section that corresponds to the building's economic use or mixed use type.

Economic Type or Mixed Use Type			Mixed Use ID
Hotel/Motel/Residential Care	Guest Rooms (#)		1 2 3 4 NA
	Annual Average Occupancy (%)		
	Percent of rooms with in-unit cooking (%)		
	Percent of rooms with in-unit refrigerator (%)		
	Presence of showers	Y N Unk	
	Presence of low-flow showerheads	Y N Unk	
Health Care	Surgery Rooms (#)		1 2 3 4 NA
	Beds (for overnight stay) (#)		
	High energy medical machines (#)		
Office / Schools / Office Areas in Warehouse Buildings	Occupants (#)		1 2 3 4 NA
	Laptop PCs (#)		
	Desktop PCs (1 computer and 1 monitor) (#)		
	Additional Monitors (#)		
	Printers/copiers (#)		
	Do the numbers above represent the whole building (WB) or only the office portion as specified in the lighting audit (LA)?	WB LA	
	If the lighting audit area, specify representative space id.	1 2 3 4 5	
School	Classrooms (#)		1 2 3 4 NA
	Current Students (#)		
	Student Capacity (# of seats)		
School/ Fitness	Presence of showers	Y N Unk	1 2 3 4 NA
	Presence of low-flow showerheads	Y N Unk	
Retail/Grocery	Point-of-Sale terminals (#)		1 2 3 4 NA
	Food Prep – Meat Dept.	Y N Unk	
	Food Prep – Bakery	Y N Unk	
	Food Prep – Deli	Y N Unk	
Warehouse / Retail/ Grocery	Floor polishers (#)		1 2 3 4 NA
	Floor polisher charging stations (electric only) (#)		
	Forklifts (electric only) (#)		
	Forklift charging stations (electric only) (#)		
	Air Compressors (include vacuum pumps) (total HP)		
ALL BUILDINGS	TVs (#)		1 2 3 4 NA
	Vehicle Charging Stations (#)		
	Area of **Mechanical/Refrigeration Mezzanine** (total sq)		
	Does this building have **refrigeration** equipment? If yes, complete Section 13 of the Data Collection Instrument	Y N Unk	
	Does this building have **data center** equipment? If yes, complete Section 14 of the Data Collection Instrument	Y N Unk	
	Does this building have **Residential** Areas? If yes, complete Section 15 of the Data Collection Instrument	Y N Unk	

13a. Refrigeration Equipment

Does this building have equipment that applies to this section of the data collection form? Y N

Compressors/Condensers

****Note: Compressor/Condenser data only needs to be collected if the total linear feet of display cases is greater than 60 LF and/or if the total area of Walk-Ins & Storage Boxes is greater than 400 SQ FT. Display cases, walk-ins, and storage box information must be collected in all case (see section 13b.)****

Compressors

Space ID	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Type: **R**eciprocating **Sc**rew **Scr**oll **O**ther **Unk**nown	R Sc Sl O Unk	R Sc Sl O Unk	R Sc Sl O Unk	R Sc Sl O Unk	R Sc Sl O Unk
System Type: **S**ingle **M**ultiplex **O**ther **U**nknown	S M O Unk	S M O Unk	S M O Unk	S M O Unk	S M O Unk
Design Suction Temp: **L**ow (0 to -40 °F) **M**edium (0 to 35 °F) **H**igh (>35°F)	L M H	L M H	L M H	L M H	L M H
Total HP: (per unit)					
Manufacturer & Model # (if Total HP is unknown)					
Quantity:					
Unloaders or VSD compressors?	Unloaders VSD Unknown	Unloaders VSD Unknown	Unloaders VSD Unknown	Unloaders VSD Unknown	Unloaders VSD Unknown
Floating Head Pressure Control?	Y N	Y N	Y N	Y N	Y N
Heat Recovery Type: **N**one **S**pace Heating/Reheat Domestic **W**ater heating **S**pace Heating & **D**omestic Water heating **O**ther	N S W SD O	N S W SD O	N S W SD O	N S W SD O	N S W SD O

Condensers

Space ID	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Type: **A**ir-cooled Air-cooled w/**P**re-cooler **E**vap-cooled **W**ater-cooled	A P E W	A P E W	A P E W	A P E W	A P E W
Total Fan HP: (all types)					
Fan VSD or multi-speed?	Y N	Y N	Y N	Y N	Y N
Fan Motor Type Shaded Pole **(SP)** Electric Commentated **(EC)** Permanent Split Capacitor **(PSC)**	SP EC PSC	SP EC PSC	SP EC PSC	SP EC PSC	SP EC PSC
Pump Motor HP (evap-cooled only)					
Pump VSD?	Y N	Y N	Y N	Y N	Y N

13b. Refrigeration Equipment

Display Cases

Space ID	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Type: **M**edium **T**emperature Case **L**ow **T**emperature Case (**f**rozen **f**ood) **L**ow **T**emperature (**i**ce **c**ream)	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC
Self-Contained Compressor/Condenser?	Y N	Y N	Y N	Y N	Y N
Case Length: (LF)					
Do the cases have doors?	Y N	Y N	Y N	Y N	Y N
# of doors					
Is there an Anti-sweat heater with (ASHWC) or without control (ASH)?	ASHWC ASH NO	ASHWC ASH NO	ASHWC ASH NO	ASHWC ASH NO	ASHWC ASH NO
Primary Lighting Type: (T12, T8, T5, LED) List lamp type, watts per lamp, and total number of lamps					
Secondary Lighting Type: (T12, T8, T5, LED) List lamp type, watts per lamp, and total number of lamps					
Lighting Schedule (24 hours, same as store hours - **SH,** Occupancy Sensor – **OS)**	24 SH OS	24 SH OS	24 SH OS	24 SH OS	24 SH OS

**All Display Cases should have SEPARATE Entries for cases with and without doors even in the same temperature case*
***Coffin Cases are low temperature frozen food cases with NO DOORS*

Refrigerated Walk-ins[2] & Storage Boxes:[3]

Space ID	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Type: Refrigerated **W**alk-in Refrigerated **S**torage Box	W S	W S	W S	W S	W S
Type: **M**edium **T**emperature **L**ow **T**emperature (**f**rozen **f**ood) **L**ow **T**emperature (**i**ce **c**ream)	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC
Location: **I**ndoor**, c**onditioned **I**ndoor**, u**nconditioned **O**utdoor	I,c I,u O	I,c I,u O	I,c I,u O	I,c I,u O	I,c I,u O
Floor Area: (SQFT)					
Height: (FT)					
Doorway protection? **S**trip curtains **A**utomatic door closer **N**either	S A N	S A N	S A N	S A N	S A N
Evaporator fan controls?	Y N Unknown	Y N Unknown	Y N Unknown	Y N Unknown	Y N Unknown
Primary Lighting Type: **(T12, T8, LED, Induction, Incandescent)** List lamp type, watts per lamp, and total number of lamps.					
Secondary Lighting Type: **(T12, T8, LED, Induction, Incandescent)** List lamp type, watts per lamp, and total number of lamps.					

[2] Walk-ins are intended for shopping access by customers and / or workrooms in (as in prep rooms) by employees
[3] Storage boxes are not intended for customer occupancy or access. Storage boxes are intended for temporary access by employees to put product into the boxes for storage or to remove product from the boxes for transfer into display cases.

13c. Refrigeration Equipment

Refrigerated Reach-in Boxes:

Space ID	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Type: **M**edium **T**emperature **L**ow **T**emperature (**f**rozen **f**ood) **L**ow **T**emperature (**i**ce **c**ream)	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC	MT LT-FF LT-IC
Location: **I**ndoor**, c**onditioned **I**ndoor**, u**nconditioned **O**utdoor	I,c I,u O	I,c I,u O	I,c I,u O	I,c I,u O	I,c I,u O
Floor Area: (SQFT)					
Height: (FT)					
Customer Access Doors?	Y N	Y N	Y N	Y N	Y N
Evaporator fan controls?	Y N Unknown	Y N Unknown	Y N Unknown	Y N Unknown	Y N Unknown
# of doors					
Length of Reach-in Box Front (Linear FT)					
Primary Lighting Type:[4] **(T12, T8, LED, Induction, Incandescent)** List lamp type, watts per lamp, and total number of lamps.					
Secondary Lighting Type: **(T12, T8, LED, Induction, Incandescent)** List lamp type, watts per lamp, and total number of lamps.					

[4] Refrigeration lighting captured in this section should NOT be duplicated in the lighting sections of the form (10 & 11)

14a. Data Centers

Does this building have equipment that applies to this section of the data collection form? Y N

Data Centers

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
GENERAL:					
Total Floor Area (SF)					
Percentage of space that is leased? (%)					
Integrated with Telecomm?	Y N Unknown	Y N Unknown	Y N Unknown	Y N Unknown	Y N Unknown
Total number of racks in use (#)					
Number of racks NOT in use (#)					
Total IT load (from IT contact or UPS) (kW)					
UPS Make / Model (if available)					
UPS Capacity					
UPS Capacity Unit	kW kVA	kW kVA	kW kVA	kW kVA	kW kVA
Current UPS Load (%)					
Energy Star servers?	Y N	Y N	Y N	Y N	Y N
Degree of Virtualization (%)	0% <25% 25-50% >50% Unknown	0% <25% 25-50% >50% Unknown	0% <25% 25-50% >50% Unknown	0% <25% 25-50% >50% Unknown	0% <25% 25-50% >50% Unknown
Separate Electric Meter	Y –w/HVAC Y- w/o HVAC N	Y –w/HVAC Y- w/o HVAC N	Y –w/HVAC Y- w/o HVAC N	Y –w/HVAC Y- w/o HVAC N	Y –w/HVAC Y- w/o HVAC N
If Yes, average electric load (kW)					

14b. Data Centers

HVAC[5]

HVAC desc: (select all that apply)	**A**ir cooled DX **W**ater cooled **DX** **W**ater cooled **CHW** **D**irect **E**vaporative cooled **I**ndirect **E**vaporative cooled **B**uilding transfer / return air **N**one	A W DX W CHW DE IE B N	A W DX W CHW DE IE B N	A W DX W CHW DE IE B N	A W DX W CHW DE IE B N	A W DX W CHW DE IE B N
Space Temperature Range (<68F, 68-76F, >76F)		<68F 68-76F >76F	<68F 68-76F >76F	<68F 68-76F >76F	<68F 68-76F >76F	<68F 68-76F >76F
Does space have humidification control?		Y N	Y N	Y N	Y N	Y N
Does space have dedicated air conditioning?		Y-primary Y-secondary N Unknown	Y-primary Y-secondary N Unknown	Y-primary Y-secondary N Unknown	Y-primary Y-secondary N Unknown	Y-primary Y-secondary N Unknown
If NO: **Does data center cause building system to run extended hours?**		Y N	Y N	Y N	Y N	Y N
If YES:						
Total cooling system capacity	**(tons)**					
Number of CRAC/H units	**(#)**					
Is this equipment standalone or networked?		S N	S N	S N	S N	S N
Economizer:	**W**ater **A**ir **N**one **U**nknown	W A N U	W A N U	W A N U	W A N U	W A N U

Is there someone who we can contact with additional questions about server rooms in your building?	Name		Phone		Email	

[5] HVAC equipment recorded in this section should also be included in the HVAC sections of the form (5).

15. Residential Building / Areas Information

Does this building have equipment that applies to this section of the data collection form? Y N

Residential areas (apartments, residential condominiums, and the like) that are associated with the audited building should not be audited with the other sections of this form, and the floor area and number of levels associated the residential portion of the building should not be include on page one. Instead this section should be completed. Situations where this might occur include:

- residential floors of a mixed use building
- managers residence at a storage facility
- managers residence at a motel
- apartments that are part of a Residential Care facility

The definition of residential is tricky. Generally it is defined as an area containing independent living units with a full kitchen. If whole floors or buildings contain nothing but residential areas, then the common area on that floor or in that building should be included here.

Residential Building Information (Unaudited)			
Un-audited Residential Areas (apartments, condominiums)*	Residential areas present?	Y N	
	Number of residential units (#)		
	Floor area of residential areas (#)		
	Number of Residential Floors (#)		
	Primary Heating Fuel in residential areas		
	How many dedicated residential garage parking spaces are there? (#)		
	Is building height at or below 75 feet or over 75	<=75' >75' Unk	
	Basic residential type (apartments, condo, co-op, apt & coop, other (specify)	Apt Condo Co-op Other	
	What percentage of residential units are condominiums(#)		
	Is all residential and nonresidential energy use separately metered (including parking garage lighting and ventilation, elevators, HVAC and DHW systems?	Y N Unk	
	Is all residential energy use on non-residential meters? If not fill out the table below	Y N Unk	

Specify the meter type for the energy used by the listed end uses. If the end use consumption for the residential areas is metered separately from the non-residential then indicate Separate, otherwise indicate which meter records the energy use for that end-use.:

Building Energy End Use	**Service Meter** Separate (Sep); Residential (Res); Non Residential (Nres); Unknown (Unk)
Parking garage lighting	Sep Res Nres Unk
Parking garage ventilation	Sep Res Nres Unk
Elevators	Sep Res Nres Unk
HVAC	Sep Res Nres Unk
DHW	Sep Res Nres Unk
Other (specify)	Sep Res Nres Unk
Other 2 (specify)	Sep Res Nres Unk
Other 3 (specify)	Sep Res Nres Unk

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX E
2012-2014 Commercial Building Stock Assessment Study – Hospital and University

Prepared for:
Northwest Energy Efficiency Alliance

Navigant Consulting, Inc.
1375 Walnut Street
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Boulder, CO 80302

303.728.2500
www.navigant.com

December 5, 2014

2012-2014 Commercial Building Stock Assessment Survey

****Confidential: All data collected on this form is confidential and may only be used for this study.*

1a. General Building Information

Site Identifier							
Surveyor Name		Survey Completion Date					
Site Name							
Site Address							
City/State/Zip							

Primary Contact for Site Visit

Contact 1		Title					
Address		City		State		Zip	
Phone 1a		Phone 1b		Email			

Alternate Contact for Site Visit

Contact 2		Title					
Address		City		State		Zip	
Phone 2a		Phone 2b		Email			

General Building/Complex Information

Is the site building primarily: **F**unctional, **D**emolished, **V**acant, or **I**naccessible?	F D V I
Is this site a **S**ingle building or a **M**ultiple building complex?	S M
If the site is part of a **M**ultiple building complex, how many buildings are in the complex?	
What best describes the primary economic use of the building/complex? (table below)	
If Other, Describe:	
What best describes the detailed economic use of the building/complex? (table below)	
If Other, Describe:	
Total Facility Bldg. Floor Area (SQFT) not including parking garage (Include dormitories)	
If dedicated outdoor parking lot, list # of spaces	
Primary Heating Fuel (table below)	
Primary Cooling Fuel (table below)	
Photos taken of sample of buildings	Y N
No. of Floors above grade of average building	
Are there areas within bldg. dedicated to holding computer servers? (If Yes, complete section 12)	Y N

Primary Economic Use	
4 Hospital	10 University

Detailed Economic Use	
901 Hospital	910 2 year college
902 Specialty Hospital	911 4 year college
	912 4 year + grad school
	913 Other describe.

Fuel Type Codes	
1	Electricity
2	Natural Gas
3	Oil
4	Propane
5	Purchased Steam
6	Purchased Hot Water
7	Other
0	None

Comments: describe audited portion of campus

1c. General Building Information

Building Occupancy and Management

Original Year of Construction	
Year of Construction for majority of facility (by floor area)	
Percent of facility floor area built in 2004 or after?	
Percent of facility floor area built before 1960?	
Amount of floor are coming on-line in next 2 years? (ft^2, 0 if none, -1 if yes but unknown amount)	
Are there other changes planned for the next 2 years that will have large impact on energy use?	Y N Unk
If yes, describe:	
Is there an energy conservation plan, or list of potential conservation measures for the facility?	Y N Unk
If yes, can we get a copy?	
Ownership type (**N**on-profit, **P**rofit, **G**overnmental, **Pub**lic, **Pri**vate, **O**ther)	N P G Pub Pri O
Off-site floor area associated with campus owned and operated? (ft^2)	
(# bldgs)	
Off-site floor area associated with campus leased and operated? (ft^2)	
(# bldgs)	

Building Renovation History

Contact for additional questions about facility energy system change history (e.g. lighting retrofit programs)?	Name		Phone		Email	
Comments on any recent major changes:						

1d. Floor Area Accounting

Hospital General Space Information

Space Type	Audited Campus[1] (es)		After Hours HVAC Shutoff /Vol Reduction?	Notes	Excluded Off-site[2]	
	Area	Percent			Area	Percent
Hospital			Y N VR Unk			
Vacant			Y N VR Unk			
Medical Offices in own bldg.			Y N VR Unk			
Other			Y N VR Unk			

1 –Get areas by type, or the assignable / non-assignable area plus percentages.
2 –Get areas, or the assignable/non-assignable area plus percentages. Not to be included in areas or percentages in other part of the form.

University General Space Information

Space Type	Audited Campus (es)		Notes	Excluded Off-site	
	Area	Percent		Area	Percent
Classroom					
Laboratory					
Office					
Study					
Special Use					
General Use					
Support					
Health Care					
Residential					
Unclassified					

Parking Garage Type	Floor area	Parking spots	After Hours HVAC Shutoff/Vol Reduction[1]	Lighting Control[2]	Lighting % Controlled
Non-enclosed parking garage (but under roof)			NA N TC CO	N TC OS PC Unk NA	
Enclosed parking garage			NA N TC CO	N TC OS PC Unk NA	

- 1 – **N**one, **TC** – off based upon clock, **CO –** CO based, **NA** if garage but no ventilation
- 2 – **N**one, **TC** – off based upon clock, **OS** – off based upon OS, **PC** – photocell, **NA** if garage not lit.

2. Energy Sources

Whole Facility

Energy Source	Used at site?	Energy Source	Used at site?	Energy Source	Used at site?
Electricity	Y N	Propane	Y N	Purchased Hot Water	Y N
Natural Gas	Y N	Purchased Cooling	Y N	Purchased Steam	Y N
Oil	Y N	Wood	Y N	Other _____	Y N

On-site Generation

Generation Type			
Is equipment operational?	Y N Unknown	Y N Unknown	Y N Unknown
Fuel Type Code (see table)			
Total Capacity (kW)			
Is this a cogeneration system? (i.e. is the heat produced used to supplement space, domestic, or industrial processes)	Y N	Y N	Y N
Runtime: **24/7** **P**eak **D**emand **B**ack-**u**p only	24/7 PD BU	24/7 PD BU	24/7 PD BU
If back-up only, how much is the system operated (hours/yr)			
If back-up only, how often is the system tested (years)			
Is system interconnected to the grid?	Y N Unknown	Y N Unknown	Y N Unknown
Bill Release ID			

Fuel Type Codes			
1 Electricity	3 Oil	5 Purchased Steam	7 Other, _____
2 Natural Gas	4 Propane	6 Purchased Hot Water	0 None

Generation Type			
1 Photovoltaics (PV)	3 Micro Turbine (MT)	6 Wind Turbines	9 Solar Water Heat - Domestic
2 Fuel Cells (FC)	4 Large Gas Turbine (GT)	7 Reciprocating Engine (RE)	10 Solar Water Heat - Pool
	-1 Unknown	0 None	11 Other

4. General HVAC & Control Description

Briefly describe the HVAC system (including HVAC fans, heating & cooling system) & control.
Especially important for HVAC system configurations that aren't neatly defined by protocol fields

HVAC Characteristics

Heated - % of floor area	*(0-100, -1 for unknown)*	
Heated by primary electric resistance - % of floor area	*(0-100, -1 for unknown)*	
Electric reheat - % of floor area	*(0-100, -1 for unknown)*	
Cooled - % of floor area	*(0-100, -1 for unknown)*	
Ventilated - % of floor area	*(0-100, -1 for unknown)*	
Does facility have a central plant?	*(circle all that apply)*	No Heat Cool DHW
Percent of floor area served by central plant?	*(0-100, -1 for unknown)*	

check box indicating the applicable % of floor area for the control item

System Trait	0	1-2	3-10	11-25	26-50	51-75	76-99	All	Unk
100% Outdoor air fraction									
50% - 99% outdoor air fraction									
24/7 HVAC operation?									
Are supply airflows of 24/7 systems reduced at night? *If yes, indicate method:* ***Sch****eduled,* ***OS, Other*** _____									
Are outdoor airflows of 24/7 systems reduced at night? *If yes, indicate method:* ***Sch****eduled,* ***OS, Other*** _____									
Are surgery room airflows reduced at night? *If yes, indicate method:* ***Sch****eduled,* ***OS, Other*** _____									
Are patient room airflows reduced at night? *If yes, indicate method:* ***Sch****eduled,* ***OS, Other*** _____									
Conference room floor area with OS control of HVAC??									
Classroom floor area with OS control of HVAC?									

Heat Recovery – list type, source, destination, and an estimate of size (CFM, % of CFM, % of floor area) for all heat recovery systems

Type	Source of Heat	Destination of Heat	Size

5. HVAC Systems

General

System Type (Table below)				
Area served or percent of total floor area				
Services Provided: Heating **C**ooling **V**entilation **N**one (circle all that apply)	H C V N	H C V N	H C V N	H C V N
Airflow Control: Constant Volume (**CV**) Stepped Constant Volume (**SCV**) Variable Air Volume (**VAV**)	CV SCV VAV	CV SCV VAV	CV SCV VAV	CV SCV VAV
Cooling Type: Chilled **W**ater **DX-A**ir **DX–W**ater **G**eo**-C**oil **E**vaporative **N**one **O**ther:	CW DXA DXW GC E N O	CW DXA DXW GC E N O	CW DXA DXW GC E N O	CW DXA DXW GC E N O
Primary Heating Fuel: Nat. **G**as **Oi**l **P**ropane **E**lectric **N**one **Ot**her: _____	NG OI P E N O	NG OI P E N O	NG OI P E N O	NG OI P E N O
Heating Type: HP Std **E**ff. **C**ondensing **E**ff. **HW**-**C**oil **S**team**-C**oil **O**ther:_____	HP SE CE HWC SC O	HP SE CE HWC SC O	HP SE CE HWC SC O	HP SE CE HWC SC O
If HP Type (Table below)				
Terminal Reheat Energy: Electric Hot **W**ater **S**team **N**one **O**ther:_____	E HW S N O Unk	E HW S N O Unk	E HW S N O Unk	E HW S N O Unk
Airflow Capacity (CFM) - if unknown enter -1				

VENTILATION & CONTROLS

Supply Fans: Volume Control: *None I**nlet Vane D**ischarge damper V**FD B**ypass Damper***	N I D V B Unk	N I D V B Unk	N I D V B Unk	N I D V B Unk
VAV Terminal Type (circle all that apply): Standard **I**nduction FPB-**P**arallel FPB-**S**eries **N**one **U**nknown	St I P S N U	St I P S N U	St I P S N U	St I P S N U
Percent of floor area served that has thermostat based VAV operation (0-100, 0 for none, -1 for unknown)				
Demand Controlled Ventilation? Yes**-**In **Z**one **Y**es**-**At **U**nit **Y**es-**Unk**nown **N**one **Unk**nown	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk
Occupancy sensor used to set-up/back or turn off zone?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Economizer? Air **W**ater **N**one	A W N Unk	A W N Unk	A W N Unk	A W N Unk
High Ventilation – 100% outside air	Y N Unk	Y N Unk	Y N Unk	Y N Unk
High Ventilation – 50%-100% outside air	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Exhaust Air Heat Recovery?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Heat Recovery Type? Exhaust air**, C**ondenser	E C	E C	E C	E C

System Type Codes			
1	Single Zone	8	Unit Ventilator
2	Dual Duct	9	Unit Heater (suspended)
3	Single Duct - Terminal Reheat	10	Baseboard / Radiator
4	Multi zone	11	Cabinet Heater (fan coil)
5	VVT	12	Radiant – floor
6	DOAS	13	Radiant – ceiling (suspended)
7	Other (describe in section 4)	14	PTAC / PTHP

Heat Pump Type Codes	
1	Standard – air source
2	Water Source – supplemental boiler and cooler
3	Ground Source – water
4	Ground Source – earth
5	Ductless / Mini Split – air source
6	VRF – single mode (either heat or cool)
7	VRF – multimode (simultaneous heat and cool)

6. Heating Water and Steam Systems

BOILER

Space ID (s) Served	**Primary**	**Secondary**	**Tertiary**	**Fourth**
Percent of floor area served by this system type (0-100, -1 for unknown)				
Boiler Service: **S**team **H**ot Water	S H	S H	S H	S H
Fuel Type (Table below)				
Back-up Fuel Type (Table below)				
Number of Identical Boilers				
Number of Redundant Units				
Age of Boiler(s) (years)				
Manufacturer				
Model Name/Number				
Input Capacity (MBTU Avg) - if unknown enter -1				
Condensing?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Boiler Function: **S**pace **H**eat **DHW** **P**rocess (Circle all that apply)	SH DHW P	SH DHW P	SH DHW P	SH DHW P
Heat Recovery?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Heat Recovery: **F**lue-**G**as **B**low-**D**own **O**ther:_____	FG BD O	FG BD O	FG BD O	FG BD O

Fuel Type Codes	
1	Electricity
2	Natural Gas
3	Oil
4	Propane
5	Off-Site Steam
6	Off-Site Hot Water
7	Other
0	None
-1	Unknown

7a. Cooling Water System

CHILLER

Space ID (s) Served	**Primary**	**Secondary**	**Tertiary**	**Fourth**
Percent of floor area served by this system type (0-100, -1 for unknown)				
Compressor Type (Table below)				
Number of Identical Chillers				
Number of Redundant Units				
Age of Chiller(s) (Years)				
Manufacturer				
Model Name/Number				
Rated Cooling Capacity - if unknown enter -1				
Rated Unit	kW Tons	kW Tons	kW Tons	kW Tons
Water side economizer?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Compressor VFD?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Heat Rejection Condensing Type				

Compressor Type Codes		**Heat Rejection Condensing Type Codes**
1 Centrifugal	5 Absorption, natural gas	1 Air Cooled Refrigerant
2 Reciprocating	6 Absorption, steam	2 Evaporative Cooler Refrigerant
3 Screw	7 Off-site	3 Water Cooled Fluid
4 Scroll	-1 Unknown	4 Air Cooled Fluid
		5 Other
		-1 Unknown

8. Building Automation System Controls

System	Primary	Secondary	Tertiary
Percent of floor area served by this system type (0-100, -1 for unknown)			

System Configurations (select all that apply):

Full DDC (major equipment & zone level) (FD)	No FD Unk	No FD Unk	No FD Unk
Hybrid – Pneumatic (DDC at major Equip & Pneumatic at zone level (HP)	No H Unk	No H Unk	No H Unk
Hybrid -Electric (DDC at major Equip & electronic at zone level) (HE)	No P Unk	No P Unk	No P Unk
Full Pneumatic (FP)	No HE Unk	No HE Unk	No HE Unk
Full Electronic (FE)	No FP Unk	No FP Unk	No FP Unk
Other (O):_____	No FE Unk	No FE Unk	No FE Unk
	No O Unk	No O Unk	No O Unk

Control Sequences (select all that apply):

General Building Functions			
Time clock start / stop function (T)	No T Unk	No T Unk	No T Unk
Optimum start / stop (O)	No O Unk	No O Unk	No O Unk
Unoccupied temperature setback (UB)	No UB Unk	No UB Unk	No UB Unk
Unoccupied temperature setup (UU)	No UU Unk	No UU Unk	No UU Unk
Air Handlers (multi-zone systems)			
Supply air temperature reset (S)	No S Unk	No S Unk	No S Unk
Static pressure reset (P)	No P Unk	No P Unk	No P Unk
Zone damper airflow reset (Z)	No Z Unk	No Z Unk	No Z Unk
Hydronic Loops			
Hot water temperature reset (HW)	No HW Unk	No HW Unk	No HW Unk
Chilled water temperature reset (CHW)	No CHW Unk	No CHW Unk	No CHW Unk
Condenser water temperature reset (CW)	No CW Unk	No CW Unk	No CW Unk
Noted Control Troubles	Y N Unk	Y N Unk	Y N Unk

Comments:

9. Domestic Water Heating

System	Primary	Secondary	Tertiary
Percent of floor area served by this system type (0-100, -1 for unknown))			
Water Heater Type (Table below)			
Primary Fuel Type (Table below)			
Secondary Fuel Type (Table below)			
Condensing?	Y N Unk	Y N Unk	Y N Unk

Water Heater Type Codes	
1	Heat Pump
2	DHW Tank
3	Point of Use – Tankless or Tanks <5 gallon
4	Dedicated Boiler
5	HX from Space Heat Boiler
6	Off-Site
7	HR from Boiler equipment
8	HR from Chiller condenser
9	HR from Process equipment
10	Other
0	None
-1	Unknown

Fuel Type Codes	
1	Electricity
2	Natural Gas
3	Fuel Oil
4	Propane
5	Other
-1	Unknown

LIGHTING SUMMARY

Briefly describe the lighting scheme (including controls) at this facility.	

Sweep to off control in non-24/7 areas? *(check box indicating the applicable % of floor area with control)*	% of floor area->	None	1-20	21-40	41-60	61-80	81-99	All	Unk
Occupancy sensor control of lighting in the following areas? *(check box indicating the applicable % of floor area with control)*	Offices								
	Classrooms								
	Conference rooms								
	Storage rooms								
	Restrooms								
	Others, *describe:* _____								
Daylight control of top day light zones *(check box indicating the applicable % of core with control)*	**Top Daylight Zones** Yes No Unk								
Daylight control of side day light zones *(check box indicating the applicable % of perimeter with control)*									

Are egress lights on all night?	Y N Unknown
Stair well lighting control? (circle all that apply, only circle if a majority have the control)	None (on 24/7) Off during unoccupied Off on occupancy sensor Dimmed on occupancy sensor Switched
Percent of standard medium base screw-in sockets with incandescent lamps installed? (0-100, -1 for unknown)	_____% or NA
Is there an active program to convert fixtures with T12 lamps?	Y N NA Unknown
Is there an active program to convert fixtures with Incandescent lamps?	Y N NA Unknown
If covered parking garage, what is the primary lamp type?	

What percent of INDOOR floor space in facility is usually lit during normal operating hours by the following types of lights *(excluding display and outdoor lighting)? (Please estimate. If there is a seasonal variation, please fill in an average value. It should total to 100%.) If percent is based upon something other than floor area (e.g. lamp count or watts),*

please indicate the basis _____. If % is unknown leave all present but unknown %'s blank, and fill in 0 for all lamp types that are not present.

_____ % INCANDESCENT *(conventional light bulbs)*

_____ % FLUORESCENT

_____ % LED

_____ % METAL HALIDE

_____ % OTHER HID – HPS/NEON/COLD CATHODE/MV

_____ % OTHER LIGHT. SPECIFY __

IF YOU HAVE LINEAR FLUORESCENT LAMPS, approximately what percentage of them are of the following efficiencies? *(Please fill in values unless your facility has none.)*

_____ % T12 STANDARD *(40 Watt, T12 type)*

_____ % T12 ENERGY SAVER *(34 Watt, T12 type)*

_____ % T8 *(32 Watt, T8 type)*

_____ % T8 HIGH-PERFORMANCE *(32 Watt, high performance T8 type)*

_____ % T8 HIGH-PERFORMANCE, LOW WATTAGE *(25-30 Watt, high performance T8 type)*

_____ % T5

IF YOU HAVE T8 HIGH PERFORMANCE TUBES, approximately what percentage have the following types of ballasts? *(Pleas fill in values unless your facility has none.)*

_____ % STANDARD BALLASTS

_____ % HIGH-PERFORMANCE BALLASTS – LOW BALLAST FACTOR

_____ % HIGH-PERFORMANCE BALLASTS – NORMAL BALLAST FACTOR

_____ % HIGH-PERFORMANCE BALLASTS – UNKNOWN BALLAST FACTOR

IF YOU HAVE 4' T8 HIGH PERFORMANCE TUBES, approximately what percentage have the following wattage*?*

_____ % 32 WATT LAMP

_____ % 30 WATT LAMP

_____ % 28 WATT LAMP

_____ % 25 WATT LAMP

What percent of the INDOOR floor space lit by fluorescent lamps is lit by the following lamp types *(excluding display and outdoor lighting)? (Please estimate. If there is a seasonal variation, please fill in an average*

value. It should total to 100%.) If percent is based upon something other than floor area (e.g. lamp count or watts), please indicate the basis _____

_____ % FLUORESCENT TUBES *(straight tubes)*

_____ % COMPACT FLUORESCENT, SCREW-IN LAMPS

_____ % COMPACT FLUORESCENT, HARD-WIRED FIXTURES

_____ % COMPACT FLUORESCENT, UNKNOWN

What percent of the PARKING GARAGE lighting watts are by the following lamp types? *(Please estimate. If there is a seasonal variation, please fill in an average value. It should total to 100%.) If percent is based upon something other than watts (e.g. lamp count), please indicate the basis _____*

_____ % T12

_____ % T8

_____ % T5

_____ % OTHER FLUORESCENT

_____ % HID

_____ % LED

What percent of the EXTERIOR lighting watts are by the following lamp types *(excluding parking garage outdoor lighting)? (Please estimate. If there is a seasonal variation, please fill in an average value. It should total to 100%.) If percent is based upon something other than watts (e.g. lamp count), please indicate the basis*

_____

_____ % T12

_____ % T8

_____ % T5

_____ % OTHER FLUORESCENT

_____ % HID

_____ % LED

12. Miscellaneous Equipment (for audited facility only – if possible)

All Facilities

Misc	Employees FTE (#)	
	Electric Vehicle Charging Stations (#)	
	Surface area of indoor pools and hot tubs (SF)	
	Surface area of outdoor pools and tubs (SF)	
	Months per year outdoor pools used (0-12)	
Laundry	Type (Coin-Op **C**, Drycleaner **D**, Small **S**, Large Commercial **L,** None **N**)	C D S N L
	% of laundry done on-site (%)	
Laboratory	Laboratory Present?	Y N
	Floor area of laboratory (-1 for unknown)	
	Does this building have specialized laboratory equipment that requires extra energy consumption? (exp. gas chromatographs, centrifuges, spectometers, and analysis equipment)	Y N
	Fume Hood in building (#)	
	Fume Hood Control System (% Variable Flow)	

Miscellaneous Equipment per Economic Use Type

Only fill out the section that corresponds to the building's economic use or mixed use type.

Economic Type or Mixed Use Type (for audited facility only – if possible)		
Health Care	Surgery Rooms (#)	
	Trauma Center Level (1-5) (0 for none)	
	Offers Tertiary Care	Y N
	Beds – In service (for overnight stay) (#)	
	Bed – Licenses (for overnight stay) (#)	
	Average Occupancy (%)	
	High energy medical machines (#)	
	Number of MRI machines (#)	
	Number of CT machines (#)	
	Number of Cath Labs (#)	
	Laptop PCs (#)	
	Desktop PCs (1 computer and 1 monitor) (#)	
	Computer power management software used	Y N
Education	Current Total Students (#)	
	Current undergraduate students (#)	
	Current graduate students (#)	
	Current professional students (#)	
	Student Housing on campus: number of rooms (#)	
	Student Housing on campus: number of residents (#)	
	Academic FTE	
	Non - Academic FTE (#)	

14a. Data Centers

Contact for questions about server rooms in facility?

Name: _____ Phone: _____ Email: _____

	Primary	Secondary	Tertiary	All Others
Total Floor Area (SF)				
Total number of racks in use (#)				
Number of racks NOT in use (#)				
Total IT load (from IT contact or UPS) (kW)				
UPS Make / Model (if available)				
UPS Capacity				
UPS Capacity Unit	kW kVA	kW kVA	kW kVA	kW kVA
Current UPS Load (%)				
Energy Star servers?	Y N	Y N	Y N	Y N
Degree of Virtualization (%)	0% <25% 25-50% >50% Unknown	0% <25% 25-50% >50% Unknown	0% <25% 25-50% >50% Unknown	0% <25% 25-50% >50% Unknown
Separate Electric Meter	Y –w/HVAC Y- w/o HVAC N	Y –w/HVAC Y- w/o HVAC N	Y –w/HVAC Y- w/o HVAC N	Y –w/HVAC Y- w/o HVAC N
If Yes, average electric load (kW)				

HVAC

	Primary	Secondary	Tertiary	All Others
HVAC desc: (select all that apply) **A**ir cooled DX **W**ater cooled **DX** **W**ater cooled **CHW** **D**irect **E**vaporative cooled **I**ndirect **E**vaporative cooled **B**uilding transfer / return air **N**one	A W DX W CHW DE IE B N	A W DX W CHW DE IE B N	A W DX W CHW DE IE B N	A W DX W CHW DE IE B N
Space Temperature Range (<68F, 68-76F, >76F)	<68F 68-76F >76F	<68F 68-76F >76F	<68F 68-76F >76F	<68F 68-76F >76F
Does space have humidification control?	Y N	Y N	Y N	Y N
Does space have dedicated air conditioning?	Y-primary Y-secondary No Unknown	Y-primary Y-secondary No Unknown	Y-primary Y-secondary No Unknown	Y-primary Y-secondary No Unknown
If No: Does data center cause building system to run extended hours?	Y N	Y N	Y N	Y N
If Yes:				
Total cooling system capacity (tons)				
Number of CRAC/H units (#)				
Is this equipment standalone or networked?	S N	S N	S N	S N
Economizer: **W**ater **A**ir **N**one **U**nknown	W A N U	W A N U	W A N U	W A N U

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX F
CBSA Data Dictionary v7 (9/25/2013)

Prepared for:
Northwest Energy Efficiency Alliance

Navigant Consulting, Inc.
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Suite 200
Boulder, CO 80302

303.728.2500
www.navigant.com

December 5, 2015

1a. General Building Information

Site Identifier							
Surveyor Name		Survey Completion Date					
Site Name							
Site Address							
City/State/Zip							

Primary Contact for Site Visit

Contact 1		Title					
Address		City		State		Zip	
Phone 1a		Phone 1b		Email			

Alternate Contact for Site Visit

Contact 2		Title					
Address		City		State		Zip	
Phone 2a		Phone 2b		Email			

General Building/Complex Information

Is the site building primarily: **F**unctional, **D**emolished, **V**acant, or **I**naccessible?	F D V I
Is this site a **S**ingle building or a **M**ultiple building complex?	S M
If the site is part of a **M**ultiple building complex, how many buildings are in the complex?	
What best describes the primary economic use of the building/complex? (table below)	
If Other, Describe:	
What best describes the detailed economic use of the building/complex? (next page)	
If Other, Describe:	
Total Bldg. Floor Area (SQFT) not including parking garage (exclude residential)	
Parking garage floor area (SQFT)	
First floor perimeter (FT)	
Typical upper floor perimeter (FT)	
Floor to floor height (FT)	
# of dedicated outdoor parking lot spaces with exterior lighting (list # of space, 0 if none, -1 if unknown)	
Primary Heating Fuel (table below)	
Primary Cooling Fuel (table below)	
Photos taken of each building exposure	Y N
No. of Floors above grade	
No. of Floors below grade	
Are there areas within bldg. dedicated to holding computer servers? (If Yes, complete section 12)	Y N

1a. General Building Information

This section is used to identify and link building survey information from various sources. The contact information provides a point of reference for follow-up calls / clarification. All applicable fields must be completed. Multiple entries are allowed in many cases.

Site Information	Description	Data Source
Site Identifier	Unique site identifier tied to all sources of survey information for the site (e.g., Utility Authorization Data Request, Plans, etc.). The site identifier is provided in FACT.	CBSA Catalogue / Provided in Advance
Surveyor Name	Surveyor Initials.	Surveyor Judgment
Survey Completion Date	Date on which the site survey was conducted.	Surveyor Judgment
Site Name	Building Name (e.g., Wendy's, Costco, etc.).	CBSA Catalogue / Provided in Advance
Site Address	Building Address that corresponds to the CBSA FACT entry.	CBSA Catalogue / Provided in Advance
City/State/Zip	Building City/State/Zip that corresponds to the CBSA FACT entry.	CBSA Catalogue / Provided in Advance

Primary Contact for Site Visit	Description	Data Source
Contact 1 / 2	Site representative authorizing the survey or the site representative that assists the surveyor during the site visit.	Interview / Surveyor Judgment
Title	Title of site representative.	Interview / Surveyor Judgment
Address	Address of site representative. This may differ from the building site (e.g., facility management office).	Interview / Surveyor Judgment
City	City of site representative.	Interview / Surveyor Judgment
State	State of site representative.	Interview / Surveyor Judgment
Zip	Zip of site representative.	Interview / Surveyor Judgment
Phone 1a	Primary phone number of site representative.	Interview / Surveyor Judgment
Phone 1b	Alternative phone number of site representative.	Interview / Surveyor Judgment
E-Mail	E-mail address of site representative.	Interview / Surveyor Judgment

General Building/Complex Information	Description	Data Source
Is the site building primarily: **F**unctional **D**emolished **V**acant **I**naccessible	Indicate the building status. If a building declines to participate when the surveyor is on site, attempt to complete the Lite Survey (CBSA Lite Survey.docx) form. Notify the recruitment leads (Michelle Lewis and Michelle Udem) immediately.	Interview / Surveyor Judgment
Is this site a **S**ingle building or a **M**ultiple building complex?	Indicate whether the site is contained in a single building or multiple buildings (e.g., Microsoft campus).	Interview / Surveyor Judgment
If the site is part of a **M**ultiple building complex, how many buildings are in the complex?	Indicate the number of buildings in a multiple building complex.	Interview / Surveyor Judgment
What best describes the primary economic use of the building/complex?	Indicate the primary economic use of the building/complex from the Primary Economic Use Table: 1.) Assembly 2.) Grocery 3.) Retail/Service 4.) Hospital 5.) Lodging 6.) Residential Care 7.) Office 8.) Restaurant 9.) School K-12 10.) University 11.) Warehouse 12.) Other 13.) Unsampled If the building type chosen is "'12. Other,"' describe the building.	Interview / Surveyor Judgment
If Other, Describe:	If the building type cannot be classified by the Primary Economic Use Table, describe the building.	Interview / Surveyor Judgment
What best describes the detailed economic use of the building/complex?	Indicate the detailed economic use of the building/complex from the Detailed Building Type Codes Table (see table below).	Interview / Surveyor Judgment
If Other, Describe:	If the building's detailed economic use cannot be classified from the Detailed Building Type Codes Table, describe the building.	Interview / Surveyor Judgment
Total Bldg. Floor Area (SQFT) not including parking garage	Total building floor area excluding the parking garage area. This can be taken from plans or by using the laser measuring equipment. Mezzanine area should count as a part of the total square footage if it provides 'floor' space (e.g., warehouse with office or process area below and storage above or two levels of low ceiling open bay storage in some areas and one level of high ceiling storage in other areas).	Surveyor Calculation / Plans
Parking garage floor area (SQFT)	Parking garage floor area. This can be taken from plans or by using the laser measuring equipment.	Surveyor Calculation / Plans
First floor perimeter (FT)	First floor perimeter of the surveyed building. This can be taken from plans or by using the laser measuring equipment.	Surveyor Calculation / Plans
Typical upper floor perimeter (FT)	Typical upper floor perimeter of the surveyed building. This can be taken from plans or by using the laser measuring equipment.	Surveyor Calculation / Plans

General Building/Complex Information	Description	Data Source
Floor to floor height (FT)	Average or typical floor to floor height for the surveyed building. This can be taken from plans or by using the laser measuring equipment. Use floor to roof/ceiling insulation height in 1 story buildings, and use average floor to floor height in buildings < 5 floors with very different first floors. For mezzanine areas (e.g., half the building has 2 floors 9' each, and the other half has 18' floor to roof height), calculate a weighted floor to floor height based on the distribution of floor space with different floor to floor heights.	Surveyor Calculation / Plans
If dedicated outdoor parking lot spaces with exterior lighting (# of spaces)	Number of dedicated outdoor parking spaces for the surveyed building/complex serviced by outdoor lighting fixtures that are fed through the building meter. This parameter may be estimated. Enter zero if none, -1 if # of parking space fed by building meter unknown.	Surveyor Calculation / Plans
Primary Heating Fuel	Indicate the primary heating fuel of the building/complex from the Fuel Type Codes Table. In buildings with multizone systems with reheat, the reheat fuel should be considered primary. In buildings with heat pump loops, electric is the primary fuel. 1.) Electricity 2.) Natural Gas 3.) Oil 4.) Propane 5.) Purchased Steam 6.) Purchased Hot Water 7.) Other 0.) None	Interview / Bill Release
Primary Cooling Fuel	Indicate the primary cooling fuel of the building/complex from the Fuel Type Codes Table: 1.) Electricity 2.) Natural Gas 3.) Oil 4.) Propane 5.) Purchased Steam 6.) Purchased Hot Water 7.) Other 0.) None	Interview / Bill Release
Photos taken of each building exposure	Surveyors should take digital photos of each building/complex exposure and any unusual items or items requiring additional clarification. All photos must be uploaded to FACT.	Interview / Surveyor Judgment
No. of Floors above grade	Number of floors above grade (Typically the number of floors above the basement). Do not include unheated parking garage floors.	Surveyor Calculation
No. of Floors below grade	Number of floors below grade. (Typically the number of basement and sub-floors). Do not include unheated parking garage floors.	Surveyor Calculation
Are there areas within bldg. dedicated to holding computer servers?	If yes, complete section 12.	Interview / Surveyor Judgment

Detailed Building Type Codes

Segment	Detailed Building Type		
Assembly	1 ARENA 2 AUDITORIUM 3 BOAT SLIPS, MARINA, YACHT CLUB 4 BOWLING ALLEY 5 CASINO 6 CLUB, LODGES 7 COMMUNITY CENTER	8 CONVENTION CENTER 9 GYM, EXERCISE 10 HEALTH SPA 11 ICE SKATING 12 LIBRARY 13 MUSEUM 14 MOVIE THEATER	15 PERFORMING ARTS THEATER 16 POOL 17 RECREATION CENTER 18 RELIGIOUS ASSEMBLY 19 ROLLER SKATING 20 SENIOR CENTER 21 OTHER ASSEMBLY
Grocery	22 CONVENIENCE STORE (<=5,000SF) 23 GROCERY (> 5000SF)	24 GAS STATION WITH A CONVENIENCE STORE	25 OTHER GROCERY
Retail	26 AUTO PARTS 27 AUTO/BOAT DEALER/ SHOWRM 28 BEAUTY / BARBER 29 BEER, WINE, OR LIQUOR STORE 30 CAR WASH 31 CLOTHING 32 DEPARTMENT STORE 33 DEPT. STORE W/ GROCERY	34 DRY CLEANER 35 ELECRONICS/APPLIANCES 36 FLORIST, NURSERY 37 HARDWARE 38 HOME IMPROVEMENT 39 LAUNDROMAT (SELF-SERVICE) 40 PHARMACY	41 POST OFFICE 42 RENTAL CENTER 43 REPAIR SHOP 44 STUDIO/GALLERY 45 VEHICLE REPAIR 46 WAREHOUSE CLUB 47 OTHER SPECIALTY MERCHANDISE
Hospital	48 HOSPITAL		
Hotel-Motel	49 HOTEL 50 MOTEL 51 BED & BREAKFAST 52 BOARDING/ROOMING HOUSE, APT HOTEL	53 CONVENT OR MONASTERY 54 DORMITORY 55 FRATERNITY, OR SORORITY 56 HALFWAY HOUSE	57 HOTEL - RESORT 58 SHELTER, ORPHANAGE, OR CHILDREN'S HOME 59 OTHER LODGING
Residential Care	60 ASSISTED LIVING 61 IN-PATIENT REHAB	62 NURSING HOME 63 RETIREMENT HOME	64 OTHER RESIDENTIAL CARE
Office	65 OFFICE- ADMIN, PROFESSIONAL, GOVERNMENT, FINANCIAL 66 CALL CENTER 67 CITY HALL 68 DENTAL OFFICE	69 MEDICAL CLINIC / OUTPATIENT MEDICAL 70 MEDICAL OFFICE 71 MEDICAL URGENT CARE CLINIC 72 OUTPATIENT REHAB	73 RETAIL BANKING 74 SALES OFFICE 75 VETERINARIAN OFFICE/CLINIC 76 OTHER OFFICE
Restaurant	77 BAR, PUB, LOUNGE 78 CAFETERIA 79 CATERING SERVICE 80 COFFEE, DOUGHNUT, OR BAGEL SHOP	81 FAST FOOD RESTAURANT 82 ICE CREAM OR FROZEN YOGURT SHOP 83 SIT DOWN RESTAURANT	84 TAKE-OUT RESTAURANT 85 TRUCK STOP 86 OTHER RESTAURANT
Schools	87 ELEMENTARY SCHOOL 88 MIDDLE SCHOOL	89 HIGH SCHOOL 90 PRE-SCHOOL	91 OTHER K-12 SCHOOL
University	92 UNIVERSITY / COLLEGE	Vocational, career, and adult education classified in Other unless part of university or college	
Warehouse	93 MINISTORAGE 94 WAREHOUSE, DISTRIBUTION	95 WAREHOUSE, STORAGE 96 COLD STORAGE, NON-AMMONIA BASE REFG	97 OTHER WAREHOUSE
Other	98 ADULT/CAREER EDUCATION 99 AIRPLANE HANGER 100 ASYLUM 101 COURTHOUSE 102 CREMATORIUM	103 DATA CENTER OR SERVER FARM 104 FIRE STATION 105 JAIL 106 POLICE STATION	107 POLICE & FIRE 108 PRISON 109 TELEPHONE SWITCHING 110 VOCATIONAL TRAINING 111 OTHER
Unsampled	200 AGRICULTURE 300 INDUSTRIAL	301 COLD STORAGE, AMMONIA 400 MANUFACTURING	500 RESIDENTIAL

1c. General Building Information

Building Occupancy and Management

What percentage of the building/complex is occupied by the Owner and/or Tenants?		%owner	%tenant
Number of tenants currently in space			
Original Year of Construction		Original Total Floor Area (SQFT)	
Year of Construction for majority of building (by floor area)			
Is there a staff person whose duties include energy conservation and/or management?			Y N

Building Renovation History

	Lighting Ballasts	Lighting Fixtures	Lighting Controls	HVAC	HVAC Controls	Refrig.	Windows	Roof Insulation
Were any of the following systems ever replaced or renovated?	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk
How many years ago? (yrs)								
What percent of each system was impacted? (%)								
Are you expecting to replace or renovate the following systems in the next 2 years?	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk

Is there someone who we can contact with additional questions about building change history?	Name		Phone		Email	
Additional comments:						

Mixed Use Scenario	**Mixed-Use ID: 1**	**Mixed-Use ID: 2**	**Mixed-Use ID: 3**	**Mixed-Use ID: 4**
Is this a mixed-use building / scenario? If yes, fill in the rest of this table.	Y N			
Primary Economic Use Type				
Detailed Economic Use Type				
Name (if different from building)				
Area (SQFT)				

General Space Information	**Space ID: 1**	**Space ID: 2**	**Space ID: 3**	**Space ID: 4**	**Space ID: 5**
Mixed-Use ID (if applicable)	1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA
Functional Use Code (table on page 2)					
If other, describe:					
% Of Mixed Use (if applicable) or % Total Building SQFT					
Space Cooled?	Y N Unk Refrigerated Frozen	Y N Unk Refrigerated Frozen	Y N Unk Refrigerated Frozen	Y N Unk Refrigerated Frozen	Y N Unk Refrigerated Frozen
After Hours Shutoff/Setup?	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Space Heated?	Heated Semi-heated Not heated Unknown	Heated Semi-heated Not heated Unknown	Heated Semi-heated Not heated Unknown	Heated Semi-heated Not heated Unknown	Heated Semi-heated Not heated Unknown
After Hours Shutoff/Setback?	Y N Unk	Y N Unk	Y N Unk	Y N Unk	Y N Unk

1c. General Building Information

This section is used to capture general building, schedule, and space type characteristics of the site. All applicable fields must be completed. Multiple entries are allowed in many cases.

Building Occupancy and Management	Description	Data Source
What percentage of the building/complex is occupied by the Owner and/or Tenants?	What percentage of the building/complex is occupied by the owner of the building (% owner), and what percentage of the building/complex is occupied by a tenant (% tenant). An example of an owner occupied building would be a family-owned convenience store. An example of a tenant occupied building would be a multi-story office building with lower level retail.	Interview
Number of tenants currently in space	Approximate number of tenants that occupy the building/complex being audited. Do not include the owner.	Interview
Original Year of Construction	Original year or building/complex construction (not major renovation).	Interview
Original Total Floor Area (SQFT)	Original building/complex floor area (prior to major renovation or expansions)	Interview
Year of Construction for majority of building (by floor area)	The year of construction for a majority of the building/complex (by floor area).	Interview
Is there a staff person whose duties include energy conservation and/or management?	Applicable energy conservation and/or management staff would be a facilities engineer managing EMS controls, conservation program lead, etc. (Y/N)	Interview

Building Renovation History	Description	Data Source
Were any of the following systems ever replaced or renovated?	When speaking with the appropriate building staff (preferably energy management), inquire about major renovations that took place across the following system categories: 1.) Lighting Ballasts* 2.) Lighting Fixtures* 3.) Lighting Controls 4.) HVAC 5.) HVAC Controls 6.) Refrigeration 7.) Windows 8.) Roof Insulation *It is important to distinguish between lighting ballast and lighting fixture renovations as future studies will want to distinguish between re-ballasting projects and complete lighting fixture retrofit projects.	Interview
How many years ago? (yrs)	Inquire how long ago the major renovations across the applicable system categories took place.	Interview
What percent of each system was impacted? (%)	Inquire about the percentage each system category affected by the renovation.	Interview
Are you expecting to replace or renovate the following systems in the next 2 years?	For each of the eight system categories, above, inquire about any future replacement or renovation plans over the next two years.	Interview
Is there someone who we can contact with additional questions about building change history?	Inquire if it would be alright to contact the site lead, or another staff member with additional building change questions. If so, record their contact information.	Interview
Additional comments:	Capture any additional context that will help inform the interview responses for the above questions. Also, capture any other changes mentioned that could impact energy use (e.g. additional floor area being added in the next 2 years)	Interview

1c. General Building Information

Mixed Use Scenario	Description	Data Source
Mixed use scenarios occur in strip malls, enclosed malls, and offices buildings with first floor retail/restaurant/grocery, situations where spaces with different businesses and different economic use types occupy the same building/complex. Each group of businesses with different economic use types must be entered as a separate Mixed-Use ID and have its own primary and detailed type. **If there are more than 2 businesses in the above cases the auditor should consider auditing a sample of the spaces rather than all of them.** To choose which businesses need to be audited, the sampling protocol (*Mall_Sampling_Protocol_Form.xlsx*) must be completed and submitted with projects. The selection form will indicate which spaces should be audited. It is up to the auditor to decide which businesses are allocated to which Mixed-Use ID. There are a maximum of 4 Mixed-Use IDs available. The sampling protocol (*Mall_Sampling_Protocol_Form.xlsx*) will typically select 2 businesses and must be completed *prior* to visiting the site. This requires some extra effort on the part of the surveyor to look at all their sites before visiting, identifying which may be a part of a mixed use scenario. Once identified, the surveyor should call the site and ask for the mall/building manager's name and call them to get proper sq. ft. for all businesses to use the mall sample form correctly. In first floor situations with upper floor areas of office or residential, the upper floor area must be assigned to Mixed-Use ID #1. The sample protocol selected spaces are assigned to any of the remaining Mixed-Use IDs. In the case of large enclosed malls, the mall common area must be assigned one of the Mixed-Use IDs. The sample protocol will select 2 or 3 other spaces to audit and these should be entered as separate Mixed-Use IDs. Water heater and miscellaneous equipment is tracked by Mixed-Use ID and any data indicated as occurring in a mixed-use space specifically, say the water heater, would be assumed to scale with the Mixed-Use ID, not the building. When using Mixed-Use ID's be careful when indicating entries as occurring in specific Space ID and Mixed-Use IDs. Some sections of the audit track data by Mixed-Use ID, other items such as lighting are tracked at a Space ID level.		
Is this a mixed-use building / scenario? **If yes, fill in the rest of this table.**	Enter Yes if building is strip mall, enclosed mall, or has first floor retail/restaurant/grocery with upper floors some other use. If yes, then a malls form (*Mall_Sampling_Protocol_Form.xlsx*) needs to be completed.	Interview / Inspection / Plans
Primary Economic Use Type	For each Mixed-Use ID, indicate the primary economic use of the selected business from the Primary Economic Use Table: 1.) Assembly 2.) Grocery 3.) Retail/Service 4.) Hospital 5.) Lodging 6.) Residential Care 7.) Office 8.) Restaurant 9.) School K-12 10.) University 11.) Warehouse 12.) Other 13.) Unsampled	Interview / Inspection / Plans (The table of detailed economic uses can be used to determine the primary type for a given detailed type.)
Detailed Economic Use Type	For each Mixed-Use ID, indicate the detailed economic use of the selected business from the Detailed Building Type Codes Table.	Interview / Inspection / Plans
Name (if different from building)	Indicate the site name if different from the building name.	Interview / Inspection / Plans
Area (SQFT)	For each Mixed-Use ID, indicate the Mixed-Use floor area.	Interview / Inspection / Plans

General Space Information	Description	Data Source
Space IDs should define / distinguish major parts of a building. Specifically, the intent is for the Space ID to capture the main divisions in a building, with most buildings only having 1-3 Space IDs. If Mixed-Use IDs have been assigned then Space IDs are subsets of the mixed use areas. **Generally the maximum number of Space IDs is 5 except for enclosed malls where a second form will be used and up to 10 Space IDs are allowed.** The main divisions are determined by differences in functional use, conditioning levels, hours or operation, fuel type, lighting and HVAC system types. As an example of functional use differences, a restaurant would typically be divided into dining and kitchen with other auxiliary spaces such as restrooms, closets, or an office grouped with the main spaces they are attached to. In general, it is not the survey objective to separate the building into all of the functional use categories that exist in the building. For example, storage is a major area in a warehouse or retail building, but typically small in most others. Surveyors should only separate the major areas for the given building. Space IDs should also distinguish areas that have different space conditioning or envelope/HVAC/lighting traits even if they have the same functional use. This should be targeted towards major differences such as unheated versus heated storage areas, areas with 24/7 versus 9 to 5 operation, or possibly vintage differences in an older building with an addition. There is some judgment about what is meant by a heated space. For example, a closet without a heater but inside the same envelope as and surrounded by heated space should be considered heated space. The closet is also not a major area so it would not have its own Space ID. On the other hand an unheated or semi-heated warehouse space that comprises a major portion of a building should be a separate space and have its own Space ID. The "other" functional use code can be used anytime to capture major spaces that don't fit into any of the other categories. **If there is a parking garage it should be assigned its own Space ID.** Examples: (building type: typical spaces) • Warehouse: Office, Warehouse • Small Office: Office • Large Office: Office, Common Area, and whatever is on the first floor (Dining, Kitchen, Sales) • School: Classroom, Office, Assembly/Rec, Common Area (Corridors) • Restaurant: Dining, Kitchen • Motel w/ Ext Corridor, no Rec, & Small Office/Laundry: Guest Room, Other (Laundry, Office) • Motel: Guest Room, Common (Corridors, Lobby, Laundry, Office) • Hotel: Guest Room, Assembly/Rec, Common Area (Corridors, Lobby), Other(Laundry, Office) • Warehouse: Office, Semi-Heated Warehouse, Heated Warehouse • Police Station with call center: Office, 24/7 Call Center. An office in a restaurant would not typically be considered a major division unless it was somehow abnormally large or were very different. In cases where many Space IDs have been defined, it is important to remember that not all systems need to be tracked by individual spaces. Space IDs can and should be lumped. If a store has the same HVAC equipment type in the retail and storage areas, then the equipment can be entered together with both Space IDs circled. If the envelope materials are the same and amount of window area is similar then the envelope should be lumped, unless it is easier for the Surveyor to separate.		
Mixed-Use ID (if applicable)	Indicate the appropriate Mixed-Use IDs associated with each Space ID. If Mixed-Use IDs are not assigned this row should be left blank or indicated as "NA".	Interview / Inspection / Plans

General Space Information	Description	Data Source
Functional Use Code (table on page 2)	For each Space ID, indicate the functional use code of the building/complex Space ID using the Functional Use Codes (Space Type) Table: 1.) Assembly / Recreation 2.) Classroom 3.) Dining 4.) Guest Room 5.) Kitchen 6.) Laundry / Housekeeping 7.) Office 8.) Sales 9.) Storage – Low Bay 10.) Vacant 11.) Warehouse – High Bay 12.) Indoor Parking Garage 13.) Common Area 14.) Other	Interview / Inspection / Plans
If other, describe:	For each Space ID, If the building / complex Space ID is not captured by any of the functional use codes, provide a description of the building's functional use.	Interview / Inspection / Plans
% Of Mixed Use (if applicable) or % Total Building SQFT	For each Space ID, Indicate the Space ID's area as a percentage of the total area associated with the Mixed-Use ID (if applicable), or the Space ID's area as a percentage of the total building area. This number should be accurate to the nearest percent if possible. If Mixed-Use IDs are not used, the percentages for all Space IDs in a building must sum to 100. If Mixed-Use IDs are used, the percentages for all Space IDs in a Mixed-Use area must sum to 100.	Interview / Inspection / Plans
Space Cooled?	For each Space ID, indicate if the area is cooled (Y / N / Unk / Refrigerated / Frozen)	Interview / Inspection / Plans
After Hours Shutoff/Setup?	For each Space ID, indicate if the cooled area has automatic or manual after-hours shutoff/setup.	Interview / Inspection / Plans
Space Heated?	For each Space ID, indicate if the area is heated (Heated, Semi-Heated, Not Heated, Unknown). Semi-heated indicates a space with a heating set point below 55°F.	Interview / Inspection / Plans
After Hours Shutoff/Setup?	For each Space ID, indicate if the heated area has automatic or manual after-hours shutoff/setup.	Interview / Inspection / Plans

1d. General Building Information

Building Schedule 1

Space ID (s) Served	1 2 3 4 5 None Unknown	Weeks Open per Year	

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Avg Hours Open							
Avg Hours Occupied							
Avg Hours HVAC On							
Avg Hours Interior Lights On							

Building Schedule 2

Space ID (s) Served	1 2 3 4 5 None Unknown	Weeks Open per Year	

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Avg Hours Open							
Avg Hours Occupied							
Avg Hours HVAC On							
Avg Hours Interior Lights On							

Building Schedule 3

Space ID (s) Served	1 2 3 4 5 None Unknown	Weeks Open per Year	

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Avg Hours Open							
Avg Hours Occupied							
Avg Hours HVAC On							
Avg Hours Interior Lights On							

Building Schedule 4

Space ID (s) Served	1 2 3 4 5 None Unknown	Weeks Open per Year	

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Avg Hours Open							
Avg Hours Occupied							
Avg Hours HVAC On							
Avg Hours Interior Lights On							

1d. General Building Information

Building Schedule	Description	Data Source
This section is used to enter major building schedules. Entries should be made for each major set of schedules with no more than one schedule set per Space ID. If the same set of schedules applies to several spaces, then the schedule can be entered once with all relevant Space IDs circled. ***Special Schedule for Rooms in Lodging Buildings: Since hours of use are so intermittent and unknown for equipment in hotel and other lodging rooms, there should be a separate schedule for the Rooms Space ID of a lodging building. This would be open 24 hours and have a -1 (unknown) entered for hours occupied, hours HVAC on and hours Interior Lighting On. ***		
Space ID (s) Served	Indicate all of the Space IDs associated with each building schedule.	Interview / Observation
Weeks Open per Year	For each day, indicate the weeks/year that the building/complex is open. Open can be defined as any time that tenant staff or customers occupy the building.	Interview / Observation
Avg Hours Open	For each day, indicate the number of hours that the building/complex is open for business. Public hours should be indicated for buildings with public hours versus staff hours.	Interview / Observation
Avg Hours Occupied	For each day, indicate the number of hours that the building/complex is open for business plus the internal hours / maintenance (e.g., cleaning hours).	Interview / Observation
Avg Hours HVAC On	For each day, indicate the number of hours that the building/complex HVAC system is scheduled to be on or in occupied mode. In facilities with HVAC that is manually turned off each night by staff this should be hours the systems is typically on or set up.	Interview / Observation
Avg Hours Interior Lights On	For each day, indicate the number of hours that the building/complex lights are on. If lights are controlled by OS or manual switches that track occupancy indicate "OS" or "manual" respectively.	Interview / Observation

2. Energy Sources

Whole Building

Energy Source	Used at site?	Energy Source	Used at site?	Energy Source	Used at site?
Electricity	Y N	Propane	Y N	Purchased Hot Water	Y N
Natural Gas	Y N	Purchased Cooling	Y N	Purchased Steam	Y N
Oil	Y N	Wood	Y N	Other _____	Y N

Electric Accounts (Be sure to complete, and have the site contact sign, the Utility Data Authorization Form)

Bill Release ID			
Do meters include exterior & parking lighting?	Y N Unknown	Y N Unknown	Y N Unknown
Do meters include consumption of areas not audited?	Y N Unknown	Y N Unknown	Y N Unknown

Gas Accounts (Be sure to complete, and have the site contact sign, the Utility Data Authorization Form)

Bill Release ID			
Do meters include consumption of areas not audited?	Y N Unknown	Y N Unknown	Y N Unknown

On-site Generation (electric and/or hot water, including backup generators)

Generation Type			
Is equipment operational?	Y N Unknown	Y N Unknown	Y N Unknown
Fuel Type Code (see table)			
Total Capacity (kW)			
Is this a cogeneration system? (i.e. is the heat produced used to supplement space, domestic, or industrial processes)	Y N	Y N	Y N
Runtime: **24/7** **P**eak **D**emand **B**ack-**u**p only	24/7 PD BU	24/7 PD BU	24/7 PD BU
If back-up only, how often is the system tested (years)			
Is system interconnected to the grid?	Y N Unknown	Y N Unknown	Y N Unknown
Bill Release ID			

Generation Type							
1	Photovoltaics (PV)	3	Micro Turbine (MT)	6	Wind Turbines	9	Solar Water Heat - Domestic
2	Fuel Cells (FC)	4	Large Gas Turbine (GT)	7	Reciprocating Engine (RE)	10	Solar Water Heat - Pool
		-1	Unknown	0	None	11	Other

2. Energy Sources

This section captures the energy sources used and generated at the site. Data from this section will be used to estimate building/complex EUI. All applicable fields must be completed. An entry should be made for each billing release ID or generation type as defined by the first row of the table.

Whole Building	Description	Data Source
Energy Source	Circle **Y** or **N** for each energy source for the building/complex. • Electricity • Natural Gas • Oil • Propane • Purchased Cooling • Wood • Purchased Hot water • Purchased Steam (e.g., campus where the central plant provided steam to heat the building) • Other:_____	Interview / Observation

Electric Accounts	Description	Data Source
Bill Release ID	Generate a Bill Release ID associated with building/complex Utility Authorization Release Form. This ID will link the subsequent consumption history (requested from the utility), to the building characteristics captured by the CBSA Data Collection Instrument.	Interview / Observation
Do meters include exterior & parking lighting?	Indicate whether the meters captured in the form associated with the Bill Release ID indicated above provide power to exterior and parking lighting.	Interview / Observation
Do meters include consumption of areas not audited?	Indicate whether the meters captured in the form associated with the Bill Release ID indicated above provide power to areas not audited. If yes please provide notes as to the type and extent of the area covered.	Interview / Observation

Gas Accounts	Description	Data Source
Bill Release ID	Generate a Bill Release ID associated with building/complex Utility Authorization Release Form. This ID will link the subsequent consumption history (requested from the utility), to the building characteristics captured by the CBSA Data Collection Instrument.	Interview / Observation
Do meters include consumption of areas not audited?	Indicate whether the meters captured in the form associated with the Bill Release ID indicated above provide power to areas not audited. If yes please provide notes as to the type and extent of the area covered.	Interview / Observation

On-Site Generation	Description	Data Source
Make an entry for each type of on-site generation (one column represents one type of on-site generation)		
Generation Type	Indicate the type of on-site generation at the building/complex referring to the Generation Type Table: 1.) Photovoltaics (PV) 2.) Fuel Cells (FC) 3.) Micro Turbine (MT) 4.) Large Gas Turbine (LT) 5.) Unknown (-1) 6.) Wind Turbines 7.) Reciprocating Engine (RE) 8.) None 9.) Solar Water Heat – Domestic 10.) Solar Water Heat – Pool 11.) Other	Interview / Observation
Is equipment operational?	Indicate whether the on-site generation equipment is functional / operational.	Interview / Observation
Fuel Type Code (see table)	Indicate the fuel type used by on-site generation equipment (refer to Fuel Type Table). Enter zero for none when generation uses no fuel.	Interview / Observation
Total Capacity (kW)	Indicate the total peak design capacity of the on-site generation equipment. Enter -1 for unknown.	Interview / Observation
Is this a cogeneration system?	Indicate whether the on-site generation equipment is a cogeneration system (i.e. is some of the heat produced used to supplement space, domestic, or industrial processes?).	Interview / Observation
Runtime: **24/7** **P**eak **D**emand **B**ack-**u**p only	Indicate operational frequency of on-site generation equipment.	Interview / Observation
If back-up only, how often is the system tested (years)	If the on-site generation equipment is used as back-up, indicate the number of years between tests. Enter 1 if tested annually, 2 if tested biennially and so forth.	Interview / Observation
Is system interconnected to the grid?	Indicate if the on-site generation system is connected to the grid.	Interview / Observation
Bill Release ID	Provide the Bill Release ID associated with building/complex Utility Authorization Release Form. This ID will link the subsequent consumption history (requested from the utility), to the building characteristics captured by the CBSA Data Collection Instrument. Note that if natural gas is used the generation equipment will impact both gas and electric bills. These should be on same bill release.	Interview / Observation

3a. Building Envelope – Guidance

Exterior Walls	Description	Data Source
Make an entry for the major wall type(s) in the building. Generally there should only be one wall type per Space ID. If the same wall type occurs in several spaces, enter it once and circle all the Space IDs that apply. If for some reason a space has two major wall types then multiple wall types can be specified, but in general this is discouraged.		
Space ID (s) Served	Indicate the Space ID(s), as established in section 1, in which this wall type occurs. A wall separating a conditioned area from an unconditioned area (e.g., between a heated office space and an unconditioned warehouse) should be considered an exterior wall of the conditioned space.	Surveyor Judgment
Surface Type	This refers to the material on the EXTERIOR only. Internal composition of exterior walls is captured below in "Framing Type" and "Insulation". Concrete block is distinguished from concrete by the presence of grout between each block. Classify Exterior Insulation and Finish Systems (EIFS) as stucco.	Visual inspection, photos
Framed Wall Type	This is the framing type of the framed wall.	Visual inspection, interview, plans
Insulation?	Indicate the presence of any insulation irrespective of type (e.g., rigid, batt) or R-value.	Interview, plans

Windows	Description	Data Source
Make an entry for each major window type in the building. If the window area as a percent of wall area of a space is VERY different between spaces with differing conditioning level (heated/unheated - typical in office/warehouse), consider having a separate window entry for the spaces. If mixed-use IDs have been assigned and the % window is different between the spaces then develop entries for the combination of spaces in each Mixed-Use ID. Spaces can have more than one window. If the same window type occurs in several spaces that have similar window-to-wall-ratio (WWR), enter it once and circle all the Space IDs that apply.		
Space ID (s) Served	Indicate the Space ID(s), as established in section 1.	Surveyor judgment
% of Wall Area (estimate)	Estimate the area of this window type as a percent of as a % of Space ID exterior wall. Do not include spandrel sections as window. Sprandrel sections have either framed wall inside of the glass or have insulated panels in place of the glass. If mixed-use, estimate for both sections separately. For instances where there are no windows present indicate 0 for the % of wall area and circle the associated Space ID's. The remainder of this section for 0% of wall area will be blank.	Whole building visual inspection
Window Opening	**P:** Punched opening. A single window. Bought from manufacturer and installed as-is. **C:** Curtain wall/window wall. The building envelope is a window which encompasses multiple floors of the building. May be insulated glass (spandrel) sections at the floors and ceiling plenum. **S:** Site built (Storefront). The windows are custom made and installed in a strip that runs horizontally along a portion of the building. Applies to more than just retail building types.	Whole building visual inspection
Layers of Glazing	Number of panes of glass in the window. In the absence of plans, using a shiny object or flashlight the number of reflections indicates the number of panes.	Plans, close visual inspection of a representative window

Windows	Description	Data Source
Low E Present?	Is there Low-emissivity (Low E) coating present?	Interview, Plans, O&M manuals
COG U Value	Center of Glass (COG) U-factor (BTU/SQFT*F)	Interview, plans, O&M manuals
Glazing Material	**C:** Clear. Transparent. **O:** Opaque but not reflective. Like a bathroom window or translucent panels such as Kalwall. **R:** Reflective. Mirror-like. You could comb your hair in it. **T:** Tinted. Dark when viewed from the exterior.	Whole building visual inspection
Blinds, shades, or other window coverings?	**Op**erable: Can be manipulated. **F**ixed: Not operable. **Oth**er **N**one	Visual inspection
Frame Type	**M:** Metal non-thermally improved. Has a rubbery filling along the edge of the installed window. **MT:** Metal, thermally improved. Will include a cross section that represents thermal break. Difficult to establish visually – verify through plans. **MU:** Metal, Unknown **V:** Vinyl **W:** Wood includes vinyl and metal clad wood windows.	Close visual inspection of a representative window
Percent Operable? (%)	Percent of total window area that can be opened. For example, if you have all residential style punched windows that slide up, the entry here would be 50%. Key here is potential not whether they are opened.	Whole building visual inspection
Window Age	Age of the window glass, not the frame.	Interview, plans

3b. Building Envelope – Guidance

Roofs	Description	Data Source
Make an entry for the major roof type(s) in the building. Generally there should only be one type per Space ID. If the same roof type occurs in several spaces, enter it once and circle all the Space IDs that apply. If for some reason a space has two major roof types then multiple types can be specified, but in general this is discouraged. As an example, if the building is two floors with a different Space ID for each floor then circle both Space IDs.		
Space ID (s) Served	Indicate the Space ID as established in section 1.	Surveyor judgment
Roof Type	**F:** Flat. Roof slope less than 1:12 (8%). **P:** Pitched. Sloped roof, non-ventilated. **A:** Attic. Sloped roof, ventilated. Insulation is on top of ceiling, not at exterior roof surface. **R:** Residential above. **U:** Unknown.	Visual inspection
Insulation?	Indicate the presence of any insulation irrespective of type (e.g., rigid, batt) or R-value.	Interview, plans
Is it possible to add additional insulation?	Is it technically and financially feasible to add insulation? E.g., for a flat built up roof, additional rigid insulation could be added the next time the roof is replaced.	Interview, plans
Roof Area (SF)	This applies to flat roofs (roof type "F") defined above. Leave blank for other roof types. Built up roofs are flat roofs (decking + rigid insulation) that are covered with sealed, waterproof. Layers.	Plans, whole building visual inspection
Skylights?	Are skylights installed in the roof?	Plans, whole building visual inspection
Skylight Area (SF) (estimate)	If skylights are installed, indicate their cumulative area. Indicate the actual area of the skylights, not the horizontal projection if on a sloped roof.	Plans, whole building visual inspection
Lighting Dimming Control?	If skylights are installed, are the interior lights dimmable and automatically controlled to maintain indoor lighting levels?	Interview, plans

Floors	Description	Data Source
Make an entry for the major floor type(s) in the building. Generally there should only be one type per Space ID. If the same floor type occurs in several spaces, enter it once and circle all the Space IDs that apply. If for some reason a space has two major floor types multiple types can be specified, but in general this is discouraged.		
Space ID (s) Served	Indicate the Space ID as established in section 1.	Surveyor judgment
Floor Type	**B:** Basement. Occupied floors below grade, such as storage areas and/or mechanical spaces, having earth below. This excludes parking garages. **C:** Crawl space. A basement too short to stand up in, typically with a soil floor surface. **S:** Concrete floor slab on grade. **E:** Concrete floor slab elevated above grade, such as on piers or above a parking garage. **U:** Unknown.	Interview, plans

Floors	Description	Data Source
Insulation?	Select "Y" if the floor is insulated at all, such as with rigid insulation. Examples include: • Vertical insulation at slab edge and foundation. • Horizontal insulation on underside of floor slab above parking garage.	Interview, plans

4. General HVAC & Control Description

Briefly describe the HVAC system (including HVAC fans, heating & cooling system) & control. Especially important for HVAC system configurations that aren't neatly defined by protocol fields. If you encounter HVAC systems that are in disrepair, make a note in the descriptive areas in the appropriate HVAC sections. This information won't always be obvious in the field, so we don't have a specific field to characterize it.

Examples:

Electric backup boiler to heat recovery / heat pump chiller
First stage of cooling uses ground water through plate and frame heat exchanger connected to chilled water loop.

DOAS preheat coil is supplied by refrigerate coil supplied by VRF system.

VAV system air source heat pump is backed up with gas fired duct heater which only runs when outside air is under 35F.

4. General HVAC & Control Description

General HVAC & Control Description	Description	Data Source
This section shall be completed for all buildings.		
Briefly Describe HVAC system & control	A brief description of the HVAC system and control. For common systems this should be very brief. The description should be more complete for odd systems or odd aspects of system that are not well defined by the protocol fields.	Surveyor summary
Examples – Common Well Characterized Systems		
Gas-fired rooftop package units.		
Retail areas: Gas-fired, rooftop package units with DCV. Storage: gas fired unit heaters. Entry: electric air curtains.		
Examples – Poorly Characterized Systems		
Purchased steam, 2 chillers, 2 cooling towers. CV AHU's in stacks, auditorium and general library spaces. VAV AHU's with parallel fan terminals and electric reheat in office spaces and meeting rooms. CO2 control everywhere. CV AHU's have VFD's but set once by balancer. Fresh air supplied by AHU's and exhausted by one huge fan in Atrium so exhaust air heats atrium. Perimeter radiators as primary heat in many areas. Perimeter radiator designed as second stage heat in office areas.		
Res wings: Perimeter HW radiators with 100%OA AHU supplying tempered air to corridor with exhaust from units. HX of supply and exhaust air. Common area: Same but <100% OA & no HR. No cooling in res or common. Cooling in kitchen building.		

5a. Distributed Single Zone HVAC Equipment

This page is intended for RTUs and small distributed equipment serving single zones (systems not utilizing heat recovery as a heat source).

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

GENERAL

Equipment Type (Table below)			
If HP Type (Table below)			
Primary Unit for: Heating **C**ooling **V**entilation **N**one of these (circle all that apply)	H C V N	H C V N	H C V N
Cooling Type: Chilled **W**ater DX-**A**ir **DX-W**at**er** **G**eo-Coil **E**vaporative **N**one **O**ther:	CW DXA DXW G E N O	CW DXA DXW G E N O	CW DXA DXW G E N O
Primary Heating Fuel: Nat. **G**as **Oi**l **P**ropane **E**lectric **N**one **O**ther:	NG OI P E N O	NG OI P E N O	NG OI P E N O
Heating Type: Std **E**ff. **C**ondensing **E**ff. **HW**-**C**oil **S**team**-C**oil **O**ther:_____	SE CE HWC SC O	SE CE HWC SC O	SE CE HWC SC O
Number of Units			
Representative Equipment Age (Years)			
Representative Manufacturer			
Representative Model Name/Number			

CAPACITY

Rated Cooling Capacity (input MBTU) - if unknown enter -1			
Cooling Capacity Range (tons) (DX/HP cooling equipment only)	<5 5-9 10-19 20-59 Unk	<5 5-9 10-19 20-59 Unk	<5 5-9 10-19 20-59 Unk
Rated Heating Capacity (input) – if unknown enter -1			
Specify Heating Capacity Units	kW MBTU	kW MBTU	kW MBTU

SUPPLEMENTARY HEATING (IF APPLICABLE)

Heating Equipment Type (Table below)			
Heating Type: Nat. **G**as **Oi**l **P**ropane **E**lectric Other:	NG OI P E O	NG OI P E O	NG OI P E O

5a. Distributed Single Zone HVAC Equipment

Distributed Single Zone HVAC Equipment	Description	Data Source
This section is intended for single zone HVAC equipment not utilizing heat recovery as a heat source. All fields must be completed. Multiple entries are allowed and in many cases required for a single space or group of spaces. Lumping Rules: Equipment of different sizes, ages, manufacturer, make and model number, that are otherwise the same (equipment type, cooling type, heating type, heating fuels, heat pump type, fan & OA controls, *and* cooling capacity category), may be grouped into a single entry. If the Cooling Type is not DX-Air or DX-Water then the cooling capacity category boundaries can be ignored as lumping boundaries *unless 1) the average rated cooling capacity is unknown and 2) there is more than one type of 5a or 5b equipment serving the space*. In this case, the equipment should be lumped into cooling capacity range groups based upon the auditor's best judgment of the equipment capacity. See directions for Rated Cooling Capacity Group. **If more than 3 entries are required use another page**. Equipment does not have to be separated by the space served unless there is a significant type difference. A building with multiple spaces that are each served by package gas fired roof top AC units can have the units lumped per the instructions above for all spaces rather than separately for each space.		
Space ID (s) Served	Indicate all Space IDs served by this system (as established in section 1)	Visual inspection, interview, plans
GENERAL		
Equipment Type	Equipment type code. Enter one. See distributed single zone equipment map for examples.	Visual inspection, interview, plans
If Heat Pump – Type	The heat pump type code. See distributed single zone equipment map for examples.	Inspection, interview, plans, O&M
Primary Unit For:	Indicate which services, if any, this equipment is the primary provider of in the indicated Space ID(s). Choices include **H**eating, **C**ooling, **V**entilation, **N**one. Circle all that apply.	Inspection, interview, plans, O&M
Cooling Type	The mechanical cooling type of the equipment. Circle one. **Chilled Water** = Chilled water coil. **DX-Air** = Air cooled direct expansion. **DX-Water** = Water cooled direct expansion. **Geo-Coil** = Direct ground water or water loop buried in ground **Evaporative** =Evaporative cooler. **None** = No mechanical cooling. See distributed single zone equipment map for examples. Heat pump units are DX devices.	Inspection, interview, plans, O&M
Primary Heat Fuel:	The primary heating fuel of the equipment. Circle one. If other, be sure to enter other fuel in the provided space. For heat pumps enter Electric.	Name plate, plans, O&M, interview
Heating Type:	The heating type. Circle one. Not required if HP or electric resistance. **Std. Eff.** = Combustion equipment ≤ 88% efficient (output/input) **Condensing Eff.** = Combustion equipment >88% efficient (output/input) **HW-Coil** = Hot Water Coil **Steam-Coil** = Steam Coil	Name plate, plans, O&M, interview
Number of Units	Number of units of this size group and type.	Visual inspection, interview, plans
Representative Age of Unit(s)	Typical age of equipment listed in this column in years (year today – year made). Exact, or estimate whichever is available. Integer only. Enter -1 if unknown.	Name plate, interview

Distributed Single Zone HVAC Equipment	Description	Data Source
Representative Manufacturer	The predominant manufacturer of equipment listed in this column. Only required if Cooling Type=DX-Air or DX-Water, or if Heating type=Std. Eff., Cond. Eff., or HP.	Name plate, O&M, TAB report
Representative Model Name/Number	The predominant model name and number of the equipment listed in this column. Only required if Cooling Type= DX-Air or DX-Water, or if Heating type=Std. Eff., Cond. Eff., or HP.	Name plate, O&M, TAB report
CAPACITY		
Rated Cooling Capacity	Average rated maximum cooling capacity of equipment listed in this column (MBtu). Enter for all equipment types. If unknown, enter -1. 1 MBtu = 1,000 Btu/h , 12MBtu = 1 ton	Name plate, plans, O&M
Cooling Capacity Range (group)	The cooling capacity "bin" of the equipment listed in this column (tons). Required for all DX/HP equipment and for other cooling equipment types where the average cooling capacity is unknown. When the cooling capacity is unknown estimate this based upon air flow, unit size, and any other available information. 1 ton = 12,000Btu/h = 12MBtu	Name plate, plans, O&M
Rated Heating Capacity (input)	The average maximum heating capacity of the equipment in kW or MBtu. 1Mbtu = 1 kBtu/h = 1000 Btu/h	Name plate, plans, O&M
Specify Heating Capacity Units	The units of the rated heating capacity. Circle one.	Name plate, plans, O&M
SUPPLEMENTARY HEATING		
Heating Equipment:	Supplementary Heating Equipment type. Supplementary heating equipment should be thought as the secondary heating source in the space. For example, baseboard heaters would be selected as supplementary heating equipment when there is a primary air delivery system (e.g. RTU) also serving the same space. The supplementary heating equipment type code will generally be baseboard or fan coil. The primary HVAC unit would handle the general space heating and treatment of ventilation air while the baseboard heater handles heat loss through perimeter windows. DX and combustion equipment should never be listed as supplementary equipment. For auxiliary heat associated with heat pumps enter the same equipment type as the primary type.	Inspection, name plate, plans, O&M
Heating Fuel: **N**at. **G**as Fuel **O**il **P**ropane **E**lectric **O**ther	The supplementary heating fuel type. Circle one. Fuel type may or may not match primary heat source. For heat pumps this is the auxiliary heating fuel.	Inspection, name plate, plans, O&M

5a. Distributed Single Zone HVAC Equipment

VENTILATION & CONTROLS			
Fan Control: **C**onstant flow **I**ntermittent: Cycles on/off **V**ariable flow	C I V Unk	C I V Unk	C I V Unk
Delivery of Ventilation Air: **A**t **U**nit **F**rom **C**entral **S**ystem **O**perable **W**indow or Louver **N**one	AU FCS OW N Unk	AU FCS OW N Unk	AU FCS OW N Unk
Economizer: **A**ir **W**ater **N**one	A W N Unk	A W N Unk	A W Unk
Temperature Control: **M**anual-**T**stat **P**rogrammable-**T**stat **E**MS-DDC **M**anual on/off	MT PT E M	MT PT E M	MT PT E M
Occupancy sensor used to set-up/back or turn off zone?	Y N Unk	Y N Unk	Y N Unk
High Ventilation > 70% outside air	Y N Unk	Y N Unk	Y N Unk
Demand Controlled Ventilation? **Y**es**-**In **Z**one **Y**es**-**At **U**nit **Y**es-**Unk**nown **N**one **Unk**nown	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk

Equipment Type Codes	
Ducted Systems (Generally)	
1	Rooftop Units (RTUs)
2	Makeup Air Unit (MAU)
3	Air Handling Unit (AHU)
4	Furnace
5	Heat Pump
Non Ducted Systems (Generally)	
6	PTAC / PTHP
7	Unit Ventilator
8	Room AC (window unit)
9	Unit Heater (suspended)
10	Baseboard / Radiator
11	Cabinet Heater (fan coil)
12	Radiant – floor
13	Radiant – ceiling (suspended)
14	Swamp Cooler

Heat Pump Type Codes	
1	Standard – air source
2	Water Source – supplemental boiler and cooler
3	Ground Source – water
4	Ground Source – earth
5	Ductless / Mini Split – air source
6	VRF – single mode (either heat or cool)
7	VRF – multimode (simultaneous heat and cool)

5a. Distributed Single Zone HVAC Equipment

Distributed Single Zone HVAC Equipment	Description	Data Source
VENTILATION & CONTROLS		
Fan Control:	Fan control type. This can be determined from inspection of the thermostat (fan vs. auto), discussions with staff, observing whether all units are on or not, and sequence of control documentation. Variable indicates a system that has reduced flows (>30% reduction) during non-cooling hours. Typically this will be implemented as a single zone VAV system which runs at a low speed unless more air is required for cooling or to reduce CO2 levels.	Inspection, interview, plans, Seq. of Ops.
Delivery of Ventilation Air:	Do the units in this group provide outdoor air (OA) for ventilation? **At unit**, indicates ventilation air is brought in from outside by the unit. A unit located on the exterior wall would have an opening to introduce outside air. A unit located in the building interior would have a duct that runs to the exterior wall to receive outdoor air. **Central system** indicates that air from a central system (usually 100% OA system) is introduced by this system. For example, a hotel fan coil unit might receive ducted air from a central air handler to meet zone ventilation needs. **Operable Window** or Louver indicates outside air is introduced separately from the HVAC system. This will generally be manually activated, but in some cases can be automatically activated as part of a natural ventilation system.	Inspection, interview, plans
Economizer:	Do the units in this group provide economizer cooling? Water side economizer manifests in water cooled equipment when a valve directs condenser water directly to a cold water coil bypassing the DX coil or chiller. This is done when outdoor conditions are such that water temperatures leaving the heat rejection device can satisfy the cooling load without mechanical cooling. It is possible to have units with air and water economizer. Units that provide outdoor air cooling when needed but do not have mechanical cooling are considered to have economizer.	Inspection, interview, plans, O&M, Tab
Temperature Control:	Type of temperature control for the equipment. Manual–Tstat is manually operated to turn on/off the HVAC unit and set temperature setpoints. Many older homes have manual thermostats, but these are rarely used in commercial buildings. Programmable-Tstat has the ability to establish a variety of on/off schedules and occupied/unoccupied temperature setpoints. EMS-DDC describes systems that use digital controllers (e.g. computers) that are networked together and that have enhanced scheduling and programming ability. There is generally a main control terminal where the facility operator can make operational changes. Manual on/off is for units with no temperature control.	Inspection, interview
Occupancy sensor used to set-up/back or turn off zone?	Are occupancy sensors used to increase the thermostat dead band, reduce supply air flow, or turn off equipment? This is often implemented at a zone level in high ventilation spaces such as classroom and conference rooms.	
High Ventilation > 70% outside air	Does the system deliver a high fraction of outdoor air? Enter yes if the outdoor air fraction during heating, venting, and cooling (non-economizer) hours is over 70%. Typically systems will be 100% OA or less than 40% OA.	Inspection, plans, TAB, interview
Demand Controlled Ventilation?	Demand control ventilation is when the amount of outdoor air provided is controlled/varied by an in-unit or zone CO2 sensor or occupancy sensing device. Use **Yes-Unk** when it is determined that DCV exists but the location of the sensor is unknown.	Interview, plans, Seq. of Ops.

Equipment Type Codes	
Ducted Systems (generally)	
1 Rooftop Units (RTUs)	Roof top package air handlers with AC and/or heating units (furnaces or heat pumps).
2 Makeup Air Unit (MAU)	Air handlers designed for high outside air flow fractions. Typically runs at 100% outdoor air but often has ability to run at other outside air fractions. Furnaces in makeup air units typically can modulate continuously or with fine steps to very low part loads.
3 Air Handling Unit (AHU)	Air handler with hydronic or split system (AC/HP) heating and/or cooling.
4 Furnace	Package air handler with combustion heating. Can also have split system AC. Electric furnace should be recorded as system type 3 – AHU.
5 Heat Pump	Air hander with heat pump heating. Includes package and split heat pumps except those included in 1.
Non Ducted Systems (generally)	
6 PTAC / PTHP	Package terminal AC and HP units. Permanently installed. Typical in hotel/motel.
7 Unit Ventilator	Unducted fan coil unit that provides outdoor air and has hydronic or electric heating and/or cooling.
8 Room AC (window unit)	Room AC, typically window units but also including portable spot cooling solutions.
9 Unit Heater (suspended)	Unducted fan coil unit providing hydronic, electric or furnace heating and/or hydronic cooling but no ventilation.
10 Baseboard / Radiator	Hydronic and electric baseboards and hydronic radiators.
11 Cabinet Heater (fan coil)	Fan coil unit that provides hydronic or electric heating and/or cooling. This covers any fan coil unit that's not explicitly addressed by other equipment type codes.
12 Radiant – floor	Hydronic or electric radiant floor heat.
13 Radiant – ceiling (suspended)	All forms of radiant heat except for radiant floors.
14 Swamp Cooler	An evaporative cooler. Generally 100% outdoor air units that only run to provide cooling.

Heat Pump Type Codes	
1 Standard – air source	Package or split air source heat pumps except for ductless split systems defined in 5-8.
2 Water Source	Water source heat pumps connected to common water loop with supplemental boiler and cooling tower.
3 Ground Source – water	Water source heat pumps connected to common water loop and uses heat exchanger with ground water loop on other side. May have supplemental boiler.
4 Ground Source – earth	Water source heat pumps connected to common water loop where water loop is buried in ground through large piping system. May have supplemental boiler.
5 Ductless / Mini Split	Air source variable speed split HP with refrigerant system serving 2 or less terminals. Typically less than 2.5 tons and unducted.
6 VRF –Single mode	Air or water source variable speed split HP with refrigerant system serving multiple terminals. No simultaneous heat/cool, all terminals are in the same mode. Water source may have supplemental boiler and cooling tower.
7 VRF –multimode	Air or water source variable speed split HP with refrigerant system serving multiple terminals. Simultaneous heat/cool at different terminals on same system. 3-pipe systems are most common, but 2 pipe systems are possible. Water source may have supplemental boiler and cooling tower.

5b. Multi-zone and Specialty Single Zone HVAC Fan Units

Does this building have equipment that applies to this section of the data collection form? Y N

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

GENERAL

Fan System Type (Table below)			
Primary Unit for: Heating **C**ooling **V**entilation **N**one (circle all that apply)	H C V N	H C V N	H C V N
Airflow Control: Constant Volume (**CV**) Stepped Constant Volume (**SCV**) Variable Air Volume (**VAV**)	CV SCV VAV	CV SCV VAV	CV SCV VAV
Cooling Type: Chilled **W**ater **DX-A**ir **DX–W**ater **G**eo-**C**oil **E**vaporative **N**one **O**ther:	CW DXA DXW GC E N O	CW DXA DXW GC E N O	CW DXA DXW GC E N O
Primary Heating Fuel: Nat. **G**as **Oi**l **P**ropane **E**lectric **N**one **Oth**er: _____	NG OI P E N O	NG OI P E N O	NG OI P E N O
Heating Type: HP Std **E**ff. **C**ondensing **E**ff. **HW**-**C**oil **S**team-**C**oil **O**ther:_____	HP SE CE HWC SC O	HP SE CE HWC SC O	HP SE CE HWC SC O
If HP Type (Table below)			
Terminal Reheat Energy: Electric Hot **W**ater **S**team **N**one **O**ther:	E HW S N O Unk	E HW S N O Unk	E HW S N O Unk
Number of Units			
Airflow Capacity (CFM) - if unknown enter -1			
Representative Age of Fan (Years)			
Representative Manufacturer			
Representative Model Name/Number			

CAPACITY

Rated Cooling Capacity (input MBTU) - if unknown enter -1			
Cooling Capacity Range (tons)	0-10 10-20 20-59 60-120 >120 Unk	0-10 10-20 20-59 60-120 >120 Unk	0-10 10-20 20-59 60-120 >120 Unk
Rated Heating Capacity (input) – if unknown enter -1			
Specify Heating Capacity Units	kW MBTU	kW MBTU	kW MBTU

VENTILATION & CONTROLS

Air Distribution System: Overhead **U**nderfloor Low **W**all **O**ther:_____	OV U NV O	OV U NV O	OV U NV O
Supply Fans: Volume Control: *N**one* ***I****nlet Vane* ***D****ischarge damper* ***V****FD* ***B****ypass Damper*	N I D V B Unk	N I D V B Unk	N I D V B Unk
Supply Fans Motor HP (Total)-if unknown enter -1			

Return Fans and/or Exhaust Fans?	Y N Unk	Y N Unk	Y N Unk
Motor HP			
VAV Terminal Type (circle all that apply): **St**andard **I**nduction FPB-**P**arallel FPB-**S**eries **N**one **U**nknown	St I P S N U	St I P S N U	St I P S N U
Temperature Control: : Manual-**T**stat **P**rogrammable-**T**stat **E**MS-DDC **M**anual on/off	MT PT E M	MT PT E M	MT PT E M
Demand Controlled Ventilation? Yes-In **Z**one **Y**es-At **U**nit **Y**es-**Unk**nown **N**one **Unk**nown	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk	Y-Z Y-U Y-Unk N Unk
Occupancy sensor used to set-up/back or turn off zone?	Y N Unk	Y N Unk	Y N Unk
Economizer? Air **W**ater **N**one	A W N Unk	A W N Unk	A W N Unk
High Ventilation > 70% outside air	Y N Unk	Y N Unk	Y N Unk
Exhaust Air Heat Recovery?	Y N Unk	Y N Unk	Y N Unk
Heat Recovery Type: **E**xhaust Air **R**efrigeration **C**ondenser	E C R	E C R	E C R

Fan System Type Codes	
1	Single Zone
2	Dual Duct
3	Single Duct - Terminal Reheat
4	Multi zone
5	VVT
6	DOAS
7	Makeup Air Unit (MAU)
8	Other (Describe in section 4)

Heat Pump Type Codes	
1	Standard – air source
2	Water Source – supplemental boiler and cooler
3	Ground Source – water
4	Ground Source – earth
5	Ductless / Mini Split – air source
6	VRF – single mode (either heat or cool)
7	VRF – multimode (simultaneous heat and cool)

5b. Multi-zone and Specialty Single Zone HVAC Fan Units

Multi-zone and Specialty Single Zone HVAC Fan Units	Description	Data Source
This section is intended for HVAC air handling equipment that serves more than one zone and specialty single zone equipment (DOAS). All fields must be completed. Lumping Rules: Equipment of different sizes, ages, manufacturer, make and model number, that is otherwise the same (equipment type, cooling type, heating type, heating fuels, heat pump type), may be grouped. If the Cooling Type is not DX-Air or DX-Water then the cooling capacity category boundaries can be ignored as lumping boundaries *unless the average rated cooling capacity is unknown and there is more than one type of 5a or 5b equipment serving the space*. In this case, the equipment should be lumped in to cooling capacity range groups based upon the auditor's best judgment of the equipment capacity. See directions for Cooling Capacity Range Group. If more than 3 entries are required use another page.		
Space ID (s) Served	Indicate all Space IDs served by this system (as established in section 1)	Visual inspection, interview, plans
Fan System Type (Table below)	Fan System type code. See HVAC Type Code page. Enter one.	Visual inspection, interview, plans
Primary Unit For:	Indicate which services, if any, this equipment is the primary provider of in the indicated Space ID(s). Choices include Heating, Cooling, Ventilation, None. Circle all that apply.	Inspection, interview, plans, O&M
Airflow Control:	The supply fan control. Constant Volume (CV) operation is where the primary air volume does not significantly change in response to zone loads. Variable Air Volume (VAV) control requires primary air turndown of at least 50% in response to zone loads. Stepped Constant Volume (SCV) requires essentially constant volume operation but with time of day reduction in flows.	Plans, O&M, TAB report
Cooling Type: **C**hilled **W**ater **DX-A**ir **DX–W**ater **G**eo**-C**oil **E**vaporative **N**one	The mechanical cooling type of the equipment. Circle one. **Chilled Water** = Chilled water coil **DX-Air** = Air cooled direct expansion **DX-Water** = Water cooled direct expansion **Geo-Coil** = Direct ground water or water loop buried in ground **E** = Evaporative cooler **None** = No mechanical cooling	Inspection, interview, plans, O&M
Primary Heating Fuel:	The primary heating fuel of the equipment. Circle one. Not required if heating type is Hot Water, Steam, or None. Enter Electric for heat pumps.	Inspection, name plate, plans, O&M
Heating Type: **HP** **S**td **E**ff. **C**ondensing **E**ff. **HW-C**oil **S**team**-C**oil **O**ther	The heating type. Circle one. **HP** = Heat pump **Std Eff.** = Standard combustion equipment ≤ 88% efficient (output/input) **Condensing Eff.** = Condensing combustion equipment > 88% efficient (output/input) **HW-Coil** = Hot water coil **Steam-Coil** = Steam coil **Other** = Other – enter type in space provided	Name plate, plans, O&M
If Heat Pump – Type	The heat pump type code. See HVAC Type Code page.	Inspection, interview, plans, O&M

Multi-zone and Specialty Single Zone HVAC Fan Units	Description	Data Source
Terminal Reheat Energy: **E**lectric Hot **W**ater **S**team **N**one **O**ther	Terminal reheat energy type. Reheat is limited to systems that deliver cold air that must then be reheated in some zones. Enter None if no reheat present.	Interview, plans, O&M
Number of Units	Number of units of this size and type.	Visual inspection, interview, plans
Airflow Capacity (CFM)	The average primary supply air flow this group. Enter -1 if unknown	Plans, TAB report
Representative Equipment Age (Years)	Typical age of equipment listed in this column in years (year today – year made). Exact, or estimate whichever is available. Integer only. Enter -1 if unknown.	Name plate, interview
Representative Manufacturer	The predominant manufacturer of equipment listed in this group. Only required if Cooling Type=DXA or DXW or if Heating type=SE, CE, or HP.	Name plate, O&M, TAB report
Representative Model Name/Number	The predominant model name and number of the equipment in this column. Only required if Cooling Type=DXA or DXW or if Heating type=SE, CE, or HP.	Name plate, O&M, TAB report
CAPACITY		
Rated Cooling Capacity (Input MBTU)	Average rated maximum cooling capacity of equipment listed in this column (MBtu). Enter for all equipment types. If unknown, enter -1. 1 MBtu = 1,000 Btu/h , 12MBtu = 1 ton	Name plate, plans, O&M, interview
Cooling Capacity Range (tons)	The cooling capacity "bin" of the equipment listed in this column (tons). Required for all DX/HP equipment and for other equipment types where the average cooling capacity is unknown and there is more than equipment listing (5a or 5c) for the space. When the cooling capacity is unknown estimate this field based upon air flow, unit size, and any other available information. 1 ton = 12,000Btu/h = 12 MBtu/h	Name plate, plans, O&M
Rated Heating Capacity (Input)	The average maximum heating capacity of the equipment in kW or MBtu (1Mbtu = 1 kBtu/h = 1000 Btu/h).	Name plate, plans, O&M
Specify Heating Capacity Units	The units of the rated heating capacity. kW or MBtu, Circle one.	Name plate, plans, O&M

Multi-zone and Specialty Single Zone HVAC Fan Units	Description	Data Source
VENTILATION		
Air Distribution System:	Air distribution type. Circle One. **Ov**erhead = ductwork run to air diffusers located overhead, typically in a suspended ceiling. **U**nderfloor = open air plenum underfloor with manual or automatic floor diffusers. Low **W**all = ductwork run to air diffusers located low on a wall or in floor. Also referred to as displacement system. **O**ther:_____	Visual inspection, interview, plans
Supply Fans: Volume Control:	Means of controlling fan delivered airflow: **N**one = no device used. **I**nlet Vane = set of louvers on inlet of fan. **D**ischarge damper = set of dampers on fan discharge. **V**FD = variable frequency drive that controls fan rotational speed. **B**ypass Damper = set of dampers and ducting on fan discharge that return a percentage of airflow to inlet side of fan.	Inspection, interview, plans,
Supply Fans Motor HP	Total HP of supply motors associated each unit. Enter -1 if unknown.	Inspection, interview, plans, TAB
Return Fans and /or Exhaust Fans?	Do the units in this group have return and/or exhaust fans.	Inspection, interview, plans, TAB, Seq. of Opts.
Motor HP	Total HP of return and exhaust motors associated each unit. Enter -1 if unknown.	Inspection, interview, plans, TAB
VAV Terminal Type:	VAV terminal type. Required in all systems with VAV terminals. Circle all that apply. **Standard Induction** = Standard fanless units **Induction** = Fanless units that induce plenum air into the air stream as it is introduced to the zone. FPB-**Parallel** = Fan powered parallel units FPB-**Series** = Fan powered series units **N**one = no device used. Typically systems with fan powered terminals will also have standard terminals. The fan in FPS units runs continuously, the fans in FPP units only run when heating is required. Induction terminals should be rare.	Plans, TAB, interview

Multi-zone and Specialty Single Zone HVAC Fan Units	Description	Data Source
Temperature Control:	Type of temperature control for the equipment. Manual–Tstat is manually operated to turn on/off the HVAC unit and set temperature setpoints. Many older homes have manual thermostats, but are rarely used in commercial buildings. Programmable-Tstat has the ability to establish a variety of on/off schedules and occupied/unoccupied temperature setpoints. EMS-DDC describes systems that use digital controllers (e.g. computers) that are networked together and that have enhanced scheduling and programming ability. There is generally a main control terminal where the facility operator can make operational changes. Manual on/off is for units with no temperature control.	
Demand Controlled Ventilation Type:	Demand control ventilation is when the amount of outdoor air provided is controlled/varied by an in-unit or zone CO2 sensor or occupancy sensing device. Use Yes-Unk when it is determined that DCV exists but the location of the sensor is unknown.	Interview, plans, Seq. of Ops.
Occupancy sensor used to set-up/back or turn off zone?	Are occupancy sensors used to increase the thermostat dead band, reduce supply air flow, or turn off equipment? This is often implemented at a zone level in high ventilation spaces such as classroom and conference rooms.	
Economizer? **A**ir **W**ater **N**one	Do the units in this group provide economizer cooling? Water side economizer manifests in water cooled equipment when a valve directs condenser water directly to a cold water coil bypassing the DX coil or chiller. This is done when outdoor conditions are such that water temperatures leaving the heat rejection device can satisfy the cooling load without mechanical cooling. Units that provide outdoor air cooling when needed but do not have mechanical cooling are considered to have economizer.	Inspection, plans, TAB, interview
High Ventilation > 70% outside air	Does the system deliver a high fraction of outdoor air? Enter yes if the outdoor air fraction during heating, venting, and cooling (non-economizer) hours is over 70%. Typically systems will be 100% OA or less than 40% OA.	Inspection, plans, TAB, interview
Exhaust Air Heat Recovery?	Presence of exhaust air heat recovery. Heat may be used to preheat incoming outdoor air or for another purpose. Exhausting building air to the garage is not considered heat recovery.	Plans, interview
Heat Recovery Type	Type of heat recovery. Circle one. **E**xhaust Air **R**efrigeration **C**ondenser	Plans, interview

Fan System Type Codes	
1 Single Zone	Single zone air systems. Limited to specialty systems
2 Dual Duct	Dual duct air system that delivers warm and cold air to zone terminals where the air is mixed to deliver air at a temperature customized for each zone.
3 Single Duct - Reheat	Single duct air system delivering cool air to all zones. Zone terminal units vary the air flow and/or reheat the air as needed to maintain zone comfort.
4 Multizone	Air handler producing warm and cold air that is mixed at the air handler to deliver air at a temperature customized for each zone. A single duct conducts air from the air handler mixing box to the zone. This is generally older system style.
5 VVT	Constant volume air hander that delivers variable air flow to the zones utilizing a bypass damper. Generally the system will deliver heating or cooling not both. This is generally older system style.
6 DOAS	System delivering ventilation air to zones with limited heating and cooling. Heating and cooling are primarily provided by other systems such as chilled beams and perimeter radiation which do not provide ventilation air except possibly as economizer cooling.
7 Makeup Air Unit (MAU)	Larger air handler that conditions 100% outside air and no recirculated air.
8 Other	If the fan system type is not represented above, describe the fan system type.

Heat Pump Type Codes	
1 Standard – air source	Package or split air source heat pumps except for ductless split systems defined in 5-8.
2 Water Source	Water source heat pumps connected to common water loop with supplemental boiler and cooling tower.
3 Ground Source – water	Water source heat pumps connected to common water loop and uses heat exchanger with ground water loop on other side. May have supplemental boiler.
4 Ground Source – earth	Water source heat pumps connected to common water loop where water loop is buried in ground through large piping system. May have supplemental boiler.
5 Ductless / Mini Split	Air source variable speed split HP with refrigerant system serving 2 or less terminals. Typically less than 2.5 tons and unducted.
6 VRF –Single mode	Air or water source variable speed split HP with refrigerant system serving multiple terminals. No simultaneous heat/cool, all terminals are in the same mode. Water source may have supplemental boiler and cooling tower.
7 VRF –multimode	Air or water source variable speed split HP with refrigerant system serving multiple terminals. Simultaneous heat/cool at different terminals on same system. 3-pipe systems are most common, but 2 pipe systems are possible. Water source may have supplemental boiler and cooling tower.

6. Heating System

BOILER

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Boiler Service: **S**team **H**ot Water	S H	S H	S H
Fuel Type (Table below)			
Back-up Fuel Type (Table below)			
Number of Identical Boilers			
Number of Redundant Units			
Age of Boiler(s) (years)			
Manufacturer			
Model Name/Number			
Input Capacity (MBTU Total) - if unknown enter -1			
Condensing?	Y N Unk	Y N Unk	Y N Unk
Boiler Function: **S**pace **H**eat **DHW** **P**rocess (Circle all that apply)	SH DHW P	SH DHW P	SH DHW P
Heat Recovery?	Y N Unk	Y N Unk	Y N Unk
Heat Recovery: **F**lue-**G**as **B**low-**D**own **N**one **O**ther:_____	FG BD N O Unk	FG BD N O Unk	FG BD N O Unk

BOILER Dedicated Circulation PUMPS (PRIMARY)

Quantity			
Number of Redundant Units			
Motor HP (Total) - if unknown enter -1			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V Unk	1 2 V Unk	1 2 V Unk
EMS Control?	Y N Unk	Y N Unk	Y N Unk

SPACE HEAT DISTRIBUTION PUMPS (SECONDARY)

Quantity			
Number of Redundant Units			
Motor HP (Total) - if unknown enter -1			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V Unk	1 2 V Unk	1 2 V Unk
EMS Control?	Y N Unk	Y N Unk	Y N Unk

Fuel Type Codes	
1	Electricity
2	Natural Gas
3	Oil
4	Propane
5	Off-Site Steam
6	Off-Site Hot Water
7	Other
0	None
-1	Unknown

6. Heating System – Guidance

Boilers	Description	Data Source
Make a separate entry for each type of heating boiler except those used exclusively for domestic hot water. Where boilers are of very similar size and type, lumping is allowed with typical manufacturer and model number entered. Also, make a boiler entry if any of the systems use hot water provided by an offsite source or plant.		
Space ID (s) Served	Indicate all Space IDs served by this system (as established in section 1).	Visual inspection, interview, plans
Boiler Service: **S**team **H**ot Water	This is the boiler type or working fluid produced by the boiler, steam or hot water.	Visual inspection, interview, plans
Fuel Type (Table below)	The fuel code for the primary fuel used by the boiler. If entry is for an unaudited plant enter the fuel code for "off-site" steam or hot water as the fuel type.	Visual inspection, interview, plans
Back up Fuel Type (Table below)	The fuel code of any boiler back up fuel. Typically this is oil. Enter code for none if no back up fuel.	Visual inspection, interview, plans
Number of Identical Boilers	The number of boilers covered by this entry. Includes redundant units.	Visual inspection, interview, plans
Number of Redundant Units	Number of boilers in this entry that are used strictly for backup. Ask how many boilers are for backup, or how many are used regularly during winter cold spells (the unused units would be entered here).	Interview
Age of Boiler(s) (years)	Typical age of equipment listed in this column in years (year today – year made). Exact, or estimate whichever is available. Integer only. Enter -1 if unknown.	Name plate, interview
Manufacturer	The boiler manufacturers name.	Name plate, plans, O&M
Model Name/Number	The boiler model name and number.	Name plate, plans, O&M
Input Capacity (MBTU Total)	Total input capacity of boiler burners in this group (MBTU) Enter -1 in unknown. 1Mbtu = 1 kBtu/h = 1000 Btu/h = 0.293 kW).	Name plate, plans, O&M
Condensing?	Is the boiler a condensing boiler? Presence of plastic flue pipe indicates condensing combustion, absence not definitive. Efficiency (rated or input/output) > 88%.	Name plate, interview, plans, O&M
Boiler Functions Served: **S**pace **H**eat **DHW** **P**rocess	Indicate all of the loads the boiler serves. Circle all that apply.	Interview, plans, inspection
Heat Recovery	Is heat recovered from the boiler flue gas (sometimes called a "stack economizer") or from steam boiler blow down water?	Interview, plans, inspection
Heat Recovery Type	Indicate type of heat recovery. Flue gas heat recovery is also known as a "stack economizer". Blow-down indicates heat recovery from steam boiler blow down systems.	Interview, plans, inspection

Boiler Dedicated Circulation Pumps (PRIMARY)	Description	Data Source
Must be completed if boiler entry present.		
Quantity	Number of pumps associated the primary heating loop through the boilers in this column. The pump columns correspond to the boiler columns above. Enter pumps below the boiler they serve. Only enter the pumps in one column. If a common pump is used by more than one boiler entry, enter it in one column only. If pumps have different capacity control, enter the control of the lead pump. Include active and redundant pumps.	Visual inspection, plans
Number of Redundant Units	Number of pumps in this column used strictly for backup. Ask whether all pumps are used or whether some are used only for back up. Get count.	Interview, plans
Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1.	Visual inspection, TAB, O&M, plans
Capacity Control: **1** speed **2** speed **V**ariable	How is the pump capacity controlled? 1 and 2 speed motors are constant speed motors operating continuously or cycling. The 2- speed motor also changes speed as needed. Variable is for pumps with VFD motor drive.	Visual inspection, interview, plans
EMS Control?	Are the pumps controlled by or hooked up to the EMS system? Enter **Y** if the pumps have a DDC connection that could control the pumps even if the pumps run continuously.	Visual inspection, interview, plans

Space Heat Distribution Pumps (SECONDARY)	Description	Data Source
Same as Boiler Dedicated Circulation Pumps but only enter pumps that are used as secondary pumps that circulate water to the building and do not circulate water through the boiler. The pump columns correspond to the boiler columns above. Enter pumps below the boiler they serve. Only enter pumps in one column. If a common pump is used by more than one boiler group, enter it in one column only. If pumps have different capacity control enter the control of the lead pump.		

7a. Cooling Water System

CHILLER

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Compressor Type (Table below)			
Number of Identical Chillers			
Number of Redundant Units			
Age of Chiller(s) (Years)			
Manufacturer			
Model Name/Number			
Rated Cooling Capacity - if unknown enter -1			
Rated Capacity Units	kW Tons	kW Tons	kW Tons
Water side economizer?	Y N Unk	Y N Unk	Y N Unk
Compressor VFD?	Y N Unk	Y N Unk	Y N Unk

HEAT REJECTION

Condenser Type (Table below)			
Fan Control: **Co**nstant On Constant **CY**cle **T**wo **m**otors **T**wo-**S**peed motor **V**ariable Speed **Unk**nown	CO CY TM TS V Unk	CO CY TM TS V Unk	CO CY TM TS V Unk
Number of Identical Condensers			
Number of Redundant Units			
Fan Motor HP (Total) - if unknown enter -1			
EMS Control?	Y N Unk	Y N Unk	Y N Unk
Condenser Heat Recovery	Y N Unk	Y N Unk	Y N Unk

COOLING WATER DEDICATED CIRCULATION PUMPS (PRIMARY)

Number of Identical Pumps			
Number of Redundant Units			
Motor HP (Total) - if unknown enter -1			

COOLING WATER DISTRIBUTION PUMPS (SECONDARY)

Number of Identical Pumps			
Number of Redundant Units			
Motor HP (Total) - if unknown enter -1			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V Unk	1 2 V Unk	1 2 V Unk
EMS Control?	Y N Unk	Y N Unk	Y N Unk

7a. Cooling Water System – Guidance

Chiller	Description	Data Source
Make a separate chiller entry for each type of chiller. When there are chillers of very similar size and type, lumping is allowed (but discouraged) with typical manufacturer and model number entered. Also, make a chiller entry if any of the systems use cold water provided by an offsite source or plant.		
Space ID (s) Served	Indicate all Space IDs served by this system (as established in section 1).	Visual inspection, interview, plans
Compressor Type (Table below)	Compressor type code from compressor code list. If chilled water is provided by an unaudited plant then enter the type code for "off-site". Chiller compressor types can be difficult to identify. Model numbers and product literature are the best source of information.	Visual inspection, O&M, interview, plans
Number of Identical Chillers	The number of chillers covered by this entry. Include redundant chillers.	Visual inspection, interview, plans
Number of Redundant Units	Number of chillers in this entry that are used strictly for backup. Ask how many are chillers backup, or how many are used regularly during summer hot spells (the unused units would be entered here).	Interview, plans
Age of Chiller(s) (Years)	Age of the chiller in years (integer only). Exact, or nearest 5-10 years whichever is available. Enter -1 if unknown.	Name plate, interview
Manufacturer	The chiller manufacturers name.	Name plate, plans, O&M
Model Name/Number	The chiller model name and number.	Name plate, plans, O&M
Rated Cooling Capacity	The average chiller output capacity. Enter -1 in unknown. 1 ton = 12,000Btu/h = 3.515kW.	Name plate, plans, O&M
Rated Capacity Units	The units of the rated cooling capacity, kW or tons. Generally this will be tons.	Name plate, plans, O&M
Water side economizer?	A chiller with a waterside economizer has valves that during cold weather let water bypass the chiller and go to the cooling tower directly.	Name plate, plans, O&M
Compressor VFD?	Centrifugal, screw, and scroll compressors can have VFD drives. This is usually integral to the unit so the drive may be difficult to locate.	Interview, plans, inspection

Heat Rejection (Cooling Tower / Condenser)	Description	Data Source
Must be completed if chiller or water cooled DX systems present. Do not complete for air cooled DX systems.		
Condenser Type	Enter the condenser type code for the heat rejection equipment serving the chiller group listed in the same column. An entry must also be made for heat rejection equipment serving water cooled DX equipment. This should be in a column with no chiller entered above. Add additional pages as required. Do not enter heat rejection equipment twice. If heat rejection equipment serves multiple chiller entries, enter it in one column only. If "other" provide description.	Inspection, plans, interview
Fan Control: **Co**nstant On Constant **CY**cle **T**wo **m**otors **T**wo-**S**peed motor **V**ariable Speed **Unk**nown	Type of condenser fan control. VFD control will often be visible.	Inspection, plans, interview

Heat Rejection (Cooling Tower / Condenser)	Description	Data Source
Number of Identical Condensers	Number of identical condensers. Enter zero if there are no condensers for the associated chiller (compressor type = off-site). Include redundant units in this count.	Visual inspection, plans
Number of Redundant Units	Number of condensers used strictly for backup. Ask whether all units are used or whether some are used only for back up. Get count.	Interview, plans
Fan Motor HP (Total)	Total fan motor HP for all fans in the condenser. If the auditor treats a multi-cell condenser as some number of identical condensers then this would be the motor HP for single cell. If a condensing unit with a number of cells is treated as one unit then the total HP of all motors in the unit would be entered. If there is small pony motor that runs only when the large motor isn't on, then only include the larger motor.	Name plate, inspection, interview, plans, O&M
EMS Control?	Are the fans controlled by or hooked up to the EMS system? Enter Y if the condenser or tower has a DDC connection that does or could control the units.	Interview, plans
Condenser Heat Recovery	Presence of condenser heat recovery to recover heat for some use, typically hot water or outdoor air-preheat.	Interview, plans

Cooling Water Dedicated Circulation Pumps (PRIMARY)	Description	Data Source
Must be completed if chiller entry present.		
Number of Identical Pumps	Number of pumps associated the primary cooling loop through the chillers. The columns are meant to correspond to the chiller columns above. Enter pumps below the chiller they serve, but only enter the pumps in one column. If a common pump is used by more than one chiller entry, enter it one column only. Count is inclusive of redundant units.	Visual inspection, plans
Number of Redundant Units	Number of pumps used strictly for backup. Ask whether all pumps are used or whether some are used only for back up. Get count.	Interview, plans
Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1.	Visual inspection, O&M, plans

Cooling Water Distribution Pumps (SECONDARY)	Description	Data Source
Must be completed if chiller entry present.		
Number of Identical Pumps	Number of pumps associated a secondary cooling loop that circulate water to the building and do not circulate water through the chiller. The pump columns are meant to correspond to the chiller columns above. Enter pumps below the chiller entry they serve, but only enter pumps once. If a common pump is used by more than one chiller entry, enter it one column only. Enter zero if there are no secondary pumps. Count is inclusive of redundant units.	Visual inspection, plans
Number of Redundant Units	Number of pumps used strictly for backup. Ask whether all pumps are used or whether some are used only for back up. Get count.	Interview, plans
Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1.	Visual inspection, O&M, plans
Capacity Control: **1** speed **2** speed **V**ariable	How is the pump capacity controlled? 1 and 2 speed motors are constant speed motors operating continuously or cycling. The 2-speed motor also changes speed as needed. Variable is for pumps with VFD motor drive.	Visual inspection, interview, plans
EMS Control?	Are the pumps controlled by or hooked up to the EMS system? Enter Y if the pumps have a DDC connection that could control the pumps even if the pumps run continuously.	Visual inspection, interview, plans

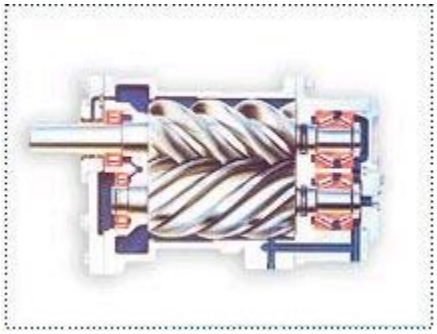
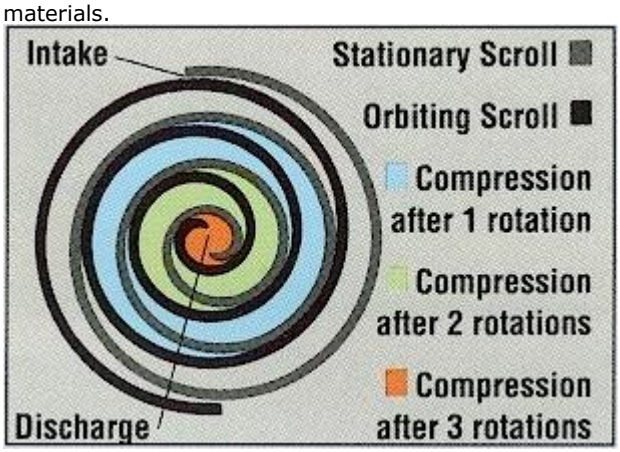
7b. Cooling Water System

HEAT REJECTION WATER PUMPS

Number of Identical Pumps			
Number of Redundant Units			
Motor HP (Total)			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V Unk	1 2 V Unk	1 2 V Unk
EMS Control?	Y N Unk	Y N Unk	Y N Unk

Heat Rejection Water Pumps	**Description**	**Data Source**
Must be completed if chiller or water cooled DX systems present.		
Number of Identical Pumps	Number of pumps associated the condenser water loop between the chillers or DX equipment and the cooling tower or dry cooler. The pump columns are meant to correspond to the condenser columns above. Enter pumps below the condenser entry they serve but only enter the pumps in one column. If a common pump is used by more than one chiller entry, enter it one column only. An entry must also be made for heat rejection equipment serving water cooled DX equipment. This should be entered in a column with no chiller entered above. Add additional pages as required. Enter zero if there are no secondary pumps. Count is inclusive of redundant units.	Visual inspection, plans
Number of Redundant Units	Number of pumps used strictly for backup. Ask whether all pumps are used or whether some are used only for back up. Get count.	Interview, plans
Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1.	Visual inspection, O&M, plans
Capacity Control: **1** speed **2** speed **V**ariable	How is the pump capacity controlled? 1 and 2 speed motors are constant speed motors operating continuously or cycling. The 2-speed motor also changes speed as needed. Variable is for pumps with VFD motor drive.	Visual inspection, interview, plans
EMS Control?	Are the pumps controlled by or hooked up to the EMS system? Enter Y if the pumps have a DDC connection that could control the pumps even if the pumps run continuously.	Visual inspection, interview, plans

Compressor Type Codes				**Heat Rejection Condensing Type Codes**
1	Centrifugal	5	Absorption, natural gas	1 Air Cooled Refrigerant
2	Reciprocating	6	Absorption, steam	2 Evaporative Cooler Refrigerant
3	Screw	7	Off-site	3 Water Cooled Fluid
4	Scroll	-1	Unknown	4 Air Cooled Fluid
				5 Other
				-1 Unknown

Compressor Type Codes	
1 Centrifugal	Rotating wheel located within discharge housing, much like an AHU fan. Determine from nameplate, make and model, or O&M materials.
2 Reciprocating	Piston moving up and down within a cylinder, much like car engine. Determine from nameplate, make and model, or O&M materials.
3 Screw.	Two counter – rotating shafts, much like a meat grinder. Determine from nameplate, make and model, or O&M materials.  Screws are two counter-rotating shaft
4 Scroll	Scroll or spirals rotating one into the other. Determine from nameplate, make and model, or O&M materials. 
5 Absorption, natural gas	Uses two different fluids (H2O/ammonia) with different adsorption/dissolving and evaporation/condensing properties. Absorption chiller with gas fired combustion burner included as part of unit.
6 Absorption, steam	Uses two different fluids (H2O/ammonia) with different adsorption/dissolving and evaporation/condensing properties. Absorption chiller utilizing steam from separate boiler or steam generator.
7 Off-site	This type indicates chilled water is delivered to the audited area from a source outside of the audit scope. This typically would be from a district chilled water system or central plant that is not within the audit scope

Heat Rejection Condensing Type Codes	
1 Air cooled refrigerant	Air cooled refrigerant condensers are common in package air cooled chillers. Typically refrigerant copper tubing with aluminum fins to enhance heat transfer.
2 Evaporative cooled refrigerant	Refrigerant is cooled by unit with external water spray to produce evaporative effect on the refrigerant coils.

Heat Rejection Condensing Type Codes	
3 Water cooled fluid	Cooling tower with wetted media that uses evaporative cooling effect. Cooled water is pumped to condenser heat exchanger(s).
4 Air cooled fluid	Cooling tower with dry fin and tube heat exchanger that uses sensible cooling. Cooled water is pumped to condenser heat exchanger(s). Sometimes referred to as a dry cooler
5 Other	Provide description of any equipment coded as other.

8. Building System Controls

Space ID (s) Served	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

System Configurations (select all that apply):

Full DDC (major equipment & zone level) **(FD)**	FD Unk	FD Unk	FD Unk
Hybrid – Pneumatic (DDC at major Equip & Pneumatic at zone level **(HP)**	HP Unk	HP Unk	HP Unk
Hybrid -Electric (DDC at major Equip & electronic at zone level) **(HE)**	HE Unk	HE Unk	HE Unk
Full Pneumatic **(FP)**	FP Unk	FP Unk	FP Unk
Full Electronic **(FE) –** Programmable **OR** Manual T-stat	FE Unk	FE Unk	FE Unk
Other (O) **(e.g. at unit only)**:	O Unk	O Unk	O Unk

Control Sequences (select all that apply):

General Building Functions: Fill out for buildings with central control systems only.			
Time clock start / stop function (T)	Y N Unk	Y N Unk	Y N Unk
Optimum start / stop (O)	Y N Unk	Y N Unk	Y N Unk
Unoccupied temperature setback (UB)	Y N Unk	Y N Unk	Y N Unk
Unoccupied temperature setup (UU)	Y N Unk	Y N Unk	Y N Unk
Air Handlers (multi-zone systems) – Does this building have equipment that applies to this section of the data collection form? **Y N**			
Supply air temperature reset (S)	Y N Unk	Y N Unk	Y N Unk
Static pressure reset (P)	Y N Unk	Y N Unk	Y N Unk
Zone damper airflow reset (Z)	Y N Unk	Y N Unk	Y N Unk
Hydronic Loops – Does this building have equipment that applies to this section of the data collection form? **Y N**			
Hot water temperature reset (HW)	HW Unk	HW Unk	HW Unk
Chilled water temperature reset (CHW)	CHW Unk	CHW Unk	CHW Unk
Condenser water temperature reset (CW)	CW Unk	CW Unk	CW Unk
Noted Control Troubles	Y N Unk	Y N Unk	Y N Unk
Comments:			
Garage Exhaust Fan Ventilation Control (circle all that apply) Always On Timeclock CO with Fan Cycle CO with VFD None Unknown	AO TC FC VFD N U	AO TC FC VFD N U	AO TC FC VFD N U

8. Building Automation System Controls – Guidance

System Configurations	Description	Data Source
All entries required for all sites. Select all that apply to building.		
Full DDC (major equipment & zone level) (FD)	Full DDC control has central DDC control of major equipment and communicating DDC control of zone equipment and thermostats.	Interview, inspection
Hybrid – Pneumatic (DDC at major Equip & Pneumatic at zone level (HP)	Hybrid-Pneumatic control has central DDC control of major equipment and pneumatic control of zone equipment and thermostats (thermostats are not electronic). Pneumatic controls use compressed air to transfer control signals. This is primarily located in older buildings where DDC has been retrofitted. Pneumatic control is a control method that uses compressed air. The thermostats are not electronic.	Interview, inspection
Hybrid -Electric (DDC at major Equip & electronic at zone level) (HE)	Hybrid-Electric has central DDC control of major equipment and non-communicating electronic control of zone equipment and thermostat.	Interview, inspection
Full Pneumatic (FP)	Full Pneumatic means all system controls, major equipment, zone level equipment, and zone thermostats are pneumatic with no electronic controls. Pneumatic controls use compressed air as the means of generating and transmitting the control signals.	Interview, inspection
Full Electronic – Programmable OR Manual T-stat	Full Electronic means all controls for major equipment, zone equipment, and thermostats are electronic controls (e.g. typical programmable thermostat) that do not report to a central DDC system. FEM refers to Manual Thermostats and FEP refers to programmable thermostats. Circle either Programmable or Manual	Interview, inspection
Other (e.g. at unit only)	Describe any "Other" controls in the right margin. Prime example is a unit that you control by manually turning it on and off.	Interview, inspection

Control Sequences	Description	Data Source
All sections/items must be completed for all sites.		
General Building Functions		
Time clock start / stop function (T)	Is the HVAC system controlled by a time clock which turns the system off and on based on time of day?	Interview, plans (seq. of ops) , BAS
Optimum start / stop (O)	Optimum start control adjusts the HVAC start time based upon outdoor or space conditions so HVAC warm-up/cool-down operation time is minimized. In some thermostats, this is referred to as adaptive recovery.	Interview, plans (seq. of ops) , BAS
Unoccupied temperature setback (UB)	Is there an unoccupied period where space heating temperature set point is reduced either electronically or by regular staff operation? Set back must be at least 5F to qualify.	Interview, plans (seq. of ops) , BAS
Unoccupied temperature setup (UU)	Is there an unoccupied period where space cooling temperature set point is increased either electronically or by regular staff operation? Set up must be at least 5F to qualify.	Interview, plans (seq. of ops) , BAS
Air Handlers (multizone systems)		
Supply air temperature reset (S)	In reheat or mixing systems, is the central supply air temperature automatically adjusted based upon zone temperature, zone terminal damper position, outdoor air temperature, or other means.	Interview, plans (seq. of ops), BAS
Static pressure reset (P)	In VAV systems, is the central supply air pressure set point adjusted based upon something (zone temperature, zone terminal damper position, outdoor air temperature, season, or other).	Interview, plans (seq. of ops) , BAS

Zone damper airflow reset (Z)	In systems with VAV terminals, are the zone terminal minimum airflows lowered (e.g. 30 – 50%) prior to terminal reheat is turned on.	Interview, plans (seq. of ops) , BAS
Hydronic Loops		
Hot water temperature reset (HW)	Hot water temperature reset is when the hot water circulation loop temperature is automatically reduced when ambient conditions are warmer or heating loads are low. Controller is sometimes visible on boiler.	Interview, inspection, plans (seq. of ops) , BAS
Chilled water temperature reset (CHW)	Chilled water temperature reset is when the chilled water circulation loop temperature is automatically increased when ambient conditions are colder or cooling loads are low.	Interview, plans (seq. of ops) , BAS
Condenser water temperature reset (CW)	Condenser water temperature reset is when the condenser water circulation loop temperature is automatically decreased when ambient conditions are colder or cooling loads are low.	Interview, plans (seq. of ops) , BAS
Noted Control Troubles		
Comments:	Enter any control troubles noted by the site staff.	Interview
Garage		
Garage Exhaust Fan Ventilation Control	Indicate the fan control methods used in the spaces. Circle all that apply. Systems with CO with VFD control will also have either Always On or Time Clock control. Complete any time a garage is indicated on page 1a. Enter none for garage spaces with no ventilation system.	Interview, inspection, plans (seq. of ops)

Equipment Type Attribute Cheat Sheet

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Equipment Type Codes		Possible Mounting Location		Delivery of Ventilation Air	Heating	Cooling	Potential for Hydronic Connection	Potential Service or Application
Ducted Systems (Generally)		Primary	Alternatively					
1	Rooftop Units (RTUs)	Roof	Ground	At Unit	Yes	Generally	Occasionally	Individual classrooms, common building thermal zones (perimeter vs. core), larger areas, e.g. gym
2	Makeup Air Unit (MAU)	Roof	Wall	At Unit	Yes	Occasionally	Occasionally	Supply to Kitchen, Lab or Process exhaust systems
3	Air Handling Unit (AHU)	Plenum	Closet	Ducted to unit	Yes	Generally	Occasionally	Smaller fan coil with heating and/or cooling coils
4	Furnace	Closet	Open ceiling	Ducted to unit	Yes	Generally	Occasionally	Small fan coil with combustion heat source
5	Heat Pump	Plenum	Closet	Ducted to unit	Yes	Yes	Occasionally	Small fan coil with heap pump
Non Ducted Systems (Generally)								
6	PTAC / PTHP	Through Wall	None	At Unit	Yes	Yes	None	Motel or Dorm rooms
7	Unit Ventilator	Through Wall	None	At Unit	Yes	Occasionally	Generally	Classroom
8	Room AC (window unit)	Window	Wall Opening	At Unit	No	Yes	None	Individual bedroom or office
9	Unit Heater (suspended)	Open ceiling	None	None	Yes	Rarely	Occasionally	Storage, garage, mechanical room
10	Baseboard / Radiator	On Floor	In Floor	None	Yes	No	Generally	Older buildings, spaces with larger window area
11	Cabinet Heater (fan coil)	On Floor	In wall	None	Yes	Rarely	Generally	Simple spaces - entryways or corridors
12	Radiant - floor	In floor	None	None	Yes	Rarely	Generally	residential or classrooms, tall spaces
13	Radiant - ceiling (suspended)	In Ceiling panels	Open ceiling	None	Yes	Rarely	Occasionally	Offices with active or passive chilled beams, tall storage or industrial spaces

	Yes = Always	Generally	Occasionally	Rarely	None = Never
Frequency	100%	75-50%	50-25%	<10%	0

5a. Distributed Single Zone HVAC Equipment – Examples

Nominal System Type	Equipment type	HP type	Cooling Type	Heating Fuel	Heating type	Fan Control	Other entries required
Package heating, Unitary AC							
Baseboard - Electric	10 - Baseboard/Radiator	-----	None	E	-----	----	----
Duct Furnace	3 - Furnace	-----	None	NG or E	SE, CE, or blank	C, I , V, Unk	----
Ductless AC (mini-split AC)	11 - Cabinet Heater	-----	DX-Air	None	-----	V	----
Furnace / split AC (not rtu)	4 - Furnace	-----	None or DX-Air	NG or E	SE, CE, or blank	C, I , V, Unk	----
RTU - Gas Furnace/ package AC	1- RTUs	-----	DX-Air	NG	SE or CE	C, I , V, Unk	----
Unit heater - G/E	9 - Unit Heater	-----	None	NG or E	SE, CE, or blank	C, I , V, Unk	
Wall furnace - Gas (unducted)	11 - Cabinet heater	-----	None	NG	SE or CE	----	----
Wall heater (cadet) - Electric	11 - Cabinet heater	-----	None	E	-----	C, I , V, Unk	----
Window AC	8 - Room AC (window unit)	-----	DX-Air	None	-----	C, I , V, Unk	----
Package terminal AC	6 - PTAC / PTHP	-----	DX-Air	None	-----	C, I , V, Unk	----
Package terminal AC with electric res	6 - PTAC / PTHP	-----	DX-Air	E	-----	C, I , V, Unk	----
Unitary HP, split and package							
Package terminal AC with heat pump	6 - PTAC / PTHP	1 –Std. air source	DX-Air	E	-----	C, I , V, Unk	----
Ductless, split system heat pump (mini-split HP)	11 - Cabinet Heater or 5 – Heat Pump	5 - ductless / mini-split	DX-Air	E	-----	V	----
Ground source HP Loop	5 – Heat Pump	4 - Ground source – earth	DX-Water	E	-----	C, I , V, Unk	Boiler, condenser pumps
Ground water Source HP Loop	5 – Heat Pump	3 – Ground Source - water	DX-Water	E	-----	C, I , V, Unk	Boiler, condenser pumps
HP - Air source (package)	5 – Heat Pump	1 –Std. air source	DX-Air	E	-----	C, I , V, Unk	----
HP - Air source (split)	5 – Heat Pump	1 –Std. air source	DX-Air	E	-----	C, I , V, Unk	----
HP - Water source	5 – Heat Pump	2 - Water Source	DX-Water	E	-----	C, I , V, Unk	Boiler, condenser pump
RTU - Package HP	5 – Heat Pump	1 –Std. air source	DX-Air	E	-----	C, I , V, Unk	----
VRF (multi-mode - heat/cool)	11 - Cabinet Heater or 5 – Heat Pump	7- VRF multimode	DX-Air	E	-----	V	----
VRF (single mode)	11 - Cabinet Heater or 5 – Heat Pump	6- VRF single mode	DX-Air	E	-----	V	----
Radiant Systems							
Chilled beam	13- Radiant Ceiling	-----	Std-Coil	-----	----	----	Chiller, pumps
Electric ceiling panels	13- Radiant Ceiling	-----	None	Electric	-----	----	----
Low/medium/high temp. (>300) radiant - wall or ceiling mount	13- Radiant Ceiling	-----	None	NG or E	SE, CE, or -----	----	----
Radiant Floor (electric)	12- Radiant Floor	-----	None	Electric	----	----	----
Radiant Floor (hot water)	12- Radiant Floor	-----	None	----	HW-Coil	----	Boiler, pumps

Nominal System Type	Equipment type	HP type	Cooling Type	Heating Fuel	Heating type	Fan Control	Other entries required
Hydronic (non-radiant)							
2 pipe fan coil - heating and cooling	11 - Cabinet Heater	-----	Std-Coil	-----	HW-Coil	C, I , V, Unk	Boiler, chiller, condenser, & pumps
2 pipe fan coil - heating only	11 - Cabinet Heater	-----	None	-----	HW-Coil	C, I , V, Unk	Boiler and pumps
4 pipe fan coil	11 - Cabinet Heater	-----	Std-Coil	-----	HW-Coil	C, I , V, Unk	Boiler, chiller, pumps
Baseboard - Hydronic	10 - Baseboard/Radiator	-----	None	-----	HW-Coil	----	Boiler and pumps
Central station single zone AHU with hot and cold water	3 - Air Handler	-----	Std-Coil	-----	HW-Coil	C, I , V, Unk	Boiler and if cooling chiller, pumps
Hydronic/steam radiators	10 - Baseboard/Radiator	-----	None	-----	HW-Coil or Stm-Coil	----	Boiler and pumps
Single zone VAV hot and cool water	3 - Air Handler	-----	Std-Coil	-----	HW-Coil	V	Boiler and if cooling chiller, pumps
Unit heater - hydronic	9 - Unit Heater	-----	None	-----	HW-Coil	C, I , V, Unk	Boiler and pumps
Unit ventilator - hydronic	7 - Unit Ventilator	-----	None or Std-Coil	-----	HW-Coil	-----	Boiler and if cooling chiller, pumps

5c. Multi-zone and Specialty Single Zone HVAC Fan Units - Examples

Nominal System Type	Fan System Type	Airflow Control	Cooling type	Heating Fuel	Heating type	Terminal Reheat Energy	Air Distribution Type	Supply Fan Vol. Control	VAV Terminal type	Other entries required
Standard VAV	3 - single duct - terminal reheat	VAV	CW or DX	Fuel of primary or preheat coil. If no central heating or preheating then=None , if heating is with hot water or steam coil then leave blank.	Heating type of primary or preheat coil. If no central heating or preheatin g then leave blank.	yes	Overhead	V or I	Std	
VAV with Fan powered box	3 - single duct - terminal reheat	VAV	CW or DX			yes	Overhead	V or I	FPBS or FPBP	
Medical VAV with no turndown or only in a limited number of zones	3 - single duct - terminal reheat	CV	CW or DX			yes	overhead	V or I	Std	
Medical VAV with night turndown	3 - single duct - terminal reheat	SCV	CW or DX			yes	overhead	V or I	Std	
Standard CV with reheat	3 - single duct - terminal reheat	CV	CW or DX			yes	overhead	None	None	
Dual duct VAV	2 - dual duct	VAV	CW or DX			yes	overhead	V or I	Std	
Multizone hot and cold deck mixing at air handler	4 - Multizone	CV	CW or DX			No	overhead	None	None	
Chilled beam, doas, perimeter radiation	6 - DOAS	CV	CW or DX			no	overhead	None	None	Complete 5a for radiators and chilled beams
UFAD - perimeter fan coil	3 - single duct - terminal reheat	VAV	CW or DX			yes	under floor or displacement	V or I	FPBS or FPBP	
RTU supplying VVT	5 - VVT	CV	CW or DX			yes or no	overhead	Bypass	Any	

9. Domestic Water Heating

Mixed-Use ID (s) Served	1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA	1 2 3 4 NA
Water Heater Type (Table below)				
Primary Fuel Type (Table below)				
Secondary Fuel Type (Table below)				
Condensing?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Number of Identical Units				
Number of Redundant Units				
Age Of Water Heater (years)				
Tank Capacity (0 if tankless) (Gallons)				
Input Capacity (kW or MBTU)				
External Tank Insulation?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Additional Storage Tanks: **I**nsulated **#** **U**ninsulated **#**	I# U#	I# U#	I# U#	I# U#
Solar Preheat?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
Recirculation System?	Y N Unk	Y N Unk	Y N Unk	Y N Unk
If yes, recirculation pump control: (select all that apply) **N =** None (running 24/7) **E = E**MS - Timeclock **T =** Time Clock **A** = Aquastat **U =** Unknown	N E T A U	N E T A U	N E T A U	N E T A U

Water Heater Type Codes	
1	Heat Pump
2	DHW Tank
3	Point of Use – Tankless or Tanks <5 gallon
4	Dedicated Boiler
5	HX from Space Heat Boiler
6	Off-Site
7	HR from Boiler equipment
8	HR from Chiller condenser
9	HR from Process equipment
10	Other
0	None
-1	Unknown

Fuel Type Codes	
1	Electricity
2	Natural Gas
3	Fuel Oil
4	Propane
5	Other
-1	Unknown

9. Domestic Water Heating

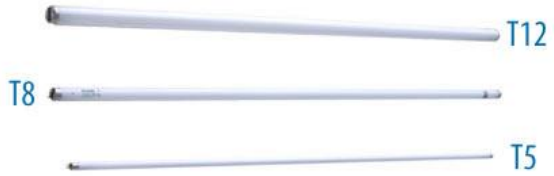
Domestic Water Heating	Description	Data Source
This section is intended for domestic water heating equipment that serve single or multiple spaces in a building/complex. If more than 3 entries are required use another page.		
Mixed-Use ID (s) Served	Indicate all Mixed-Use IDs served by this system (as established in section 1).	Visual inspection, interview, plans
Water Heater Type (Table below)	Indicate the water heater type using the Water Heater Type Code Table: 1.) Heat Pump 2.) DHW Tank 3.) Point of Use – Tankless or Tanks <5 Gallon located at location of use with no more than 30' of piping. 4.) Dedicated Boiler 5.) HX from Space Heat Boiler 6.) Off-Site 7.) HR from Boiler Equipment 8.) HR from Chiller Condenser 9.) HR from Process Equipment 10.) Other 11.) None 12.) Unknown	Inspection, interview, name plate, plans
Primary Fuel Type (Table below)	Indicate the primary water heater fuel type from the Fuel Type Codes Table 1.) Electricity 2.) Natural Gas 3.) Fuel Oil 4.) Propane 5.) Other 6.) Unknown	Inspection, interview, name plate, plans
Secondary Fuel Type (Table below)	Indicate the secondary water heater fuel type (if any) from the Fuel Type Codes Table: 1.) Electricity 2.) Natural Gas 3.) Fuel Oil 4.) Propane 5.) Other 6.) Unknown	Inspection, interview, name plate, plans
Condensing?	Indicate whether the water heater is a condensing water heater. Condensing Water Heaters extract the additional heat from the exhaust gases to improve the overall water heater efficiency (generally above 90%).	Inspection, interview, name plate, plans
Number of Identical Units	The number of water heaters covered by this entry. Includes redundant units.	Inspection, interview, plans
Number of Redundant Units	Number of water heaters in this entry that are used strictly for backup. Ask how many water heaters are for backup, or how many are used regularly (the unused units would be entered here).	Inspection, interview, plans
Age Of Water Heater (years)	Indicate the age of the water heater in years.	Inspection, interview, name plate, plans

Domestic Water Heating	Description	Data Source
Tank Capacity (0 if tankless) (Gallons)	The capacity of the tank water heater in gallons. Tankless water heaters of 0 gallons of capacity.	Visual inspection, interview, name plate, plans
Input Capacity (kW or MBTU)	Indicate the input capacity of the tank or tankless water heater in kW (for electric water heaters) or kBtuh (for gas water heaters).	Visual inspection, interview, name plate, plans
External Tank Insulation?	Indicate whether there is external tank wrap insulation surrounding the water heater (tank only).	Visual inspection
Additional Storage Tanks: **I**nsulated **#** **U**ninsulated **#**	Indicate whether the water heater (tank only) has additional storage tank capacity. This is different from the number of identical or redundant units as any additional storage tanks will be associated with a single water heating unit.	Inspection, interview, plans
Solar Preheat?	Indicate whether the water heater uses solar energy to pre-heat building / complex water before it enters the water heater.	Visual inspection, interview, name plate, plans
Recirculation System?	Identify whether the water heater has a recirculation system. Recirculation systems feature sensor valves that when the water on the hot water side cools to a certain temperature, recirculation the cool water back into the water heater.	Visual inspection, interview, name plate, plans
If yes, recirculation pump control: (select all that apply) **N =** None (running 24/7) **E = E**MS - Timeclock **T =** Time Clock **A** = Aquastat **U =** Unknown	If the water heater has a recirculation system, indicate whether it features (select all that apply): **N =** None (running 24/7) **E = E**MS - Timeclock **T =** Time Clock **A** = Aquastat **U =** Unknown	Visual inspection, interview, name plate, plans

10a. Indoor / Outdoor Lighting Fixture Schedule

Indoor / Outdoor Lighting Fixture Schedule	Description	Data Source
Make an entry for each unique fixture, lamp type, # of lamps, and lamp watt combination. Fixtures with different lamp details must be separate entries. One-off, low count linear fluorescent fixtures with the same lamp details can be lumped without fixture type information if they are a minor portion of the lighting. If you encounter lighting systems that are in disrepair (e.g., only 1/3 of the warehouse light fixtures are operational and only 2-lamps in the office 4 lamp light fixtures are present), make a note in the descriptive areas in the lighting sections. This information won't always be obvious in the field, so we don't have a specific field to characterize it. **If as-built drawings are accessible and accurate include all lighting information. Check for O&M manuals which may also contain lighting details.**		
Ballast Factor - If known (HP T8 ONLY)	Ballast factor is a measure of the actual lumen output for a specific lamp-ballast system relative to the rated lumen output measured with reference ballast under ANSI test conditions. Only gather for High Performance T8 lamps. **Make special effort to determine this when the lamps are High Performance T8 or have a mounting height greater than 12 feet. Ask for O&M manuals and look in the lighting section (in electrical).**	Plans, O&M manual
Ballast Type	From table in Section 10b. Only gather if HID, T12, or T8 lamp. See definitions on subsequent pages. **If Lamp type is High Performance T8 (HP T8), be sure to distinguish Ballast Type (e.g., Electronic – Unknown Type (E), Standard Electronic (SE), or High Performance Electronic (HPE)). Again, make some effort on this point: Check O&Ms (Division 16500 or Division 265000-265999). If HP T8 lamps added as part of retrofit ask whether ballasts were changed too?**	Visual inspection using flicker checker, O&M manuals, plans, replacement stock
Source	Source of information for the "Watt/Lamp" & "Fixture Watts" columns. Use codes : **O**bservation / **P**lans / **I**nterview / **R**eplacement Stock / **O&M** / **OTH**er / **UNK**nown / **G**uess	Surveyor judgment
Fixture Watts	If known, include total fixture wattage here. Do not calculate from watts per lamp and number of lamps, the computer can do that. Only enter if O&M cut sheets or plans specify fixture wattage.	Plans, interview, replacement stock, O&M manual
Watts/ Lamp	Wattage per lamp or per linear foot for rope lights and neon. If unknown, assume wattage based on comparable fixtures in Section 10b. The effort spent confirming lamp wattage should correlate with the percentage of lighting represented by the lamps in the building (e.g., Surveyors should spend a more effort trying to confirm the wattage of T8s representing 90% of lighting within a site).	Visual inspection, plans, interview, replacement stock, O&M manual
# of Lamps	# of lamps per fixture or linear feet for rope lights, neon, etc.	Close visual inspection of fixture, lighting schedule/plans
Lamp Details	This is a code for the detailed type of lamp in the fixture. See codes and associated descriptions in table in Section 10b.	Close visual inspection of fixture, lighting schedule/plans, interview
Lamp Type	This is a code for the general type of lamp in the fixture. See codes and associated descriptions in table in Section 10b. **If Lamp type is High Performance T8 (HP T8), be sure to record Ballast Type (e.g., Electronic – Unknown Type (E), Standard Electronic (SE), or High Performance Electronic (HPE)) and ballast factor.**	Close visual inspection of fixture, lighting schedule/plans

Fixture Type	This is a description of the fixture type. From table in section 10b. For fixtures that would be characterized as other, the "other" can be used, or a more informative code can be used instead (e.g. Rope light or step light) If other is used, it should be accompanied by a description of the fixture and any lamp type details not well characterized in the reference pages. For example, rope light, step light, or down light. This can help in the analysis of the data and also help keep track of the lighting during the audit. Include exit lights on this page but there is no need to count them in section 10a or 11a.	Close visual inspection of fixture, lighting schedule/plans
Fixture Type ID	Code created to correlate with a row in section 10a and 11a.	Surveyor judgment

Lamp Type	**Description**	**Lamp Details**	**Description**	**Typical Watts/Lamp** **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	**Example Picture**
T5	Fluorescent T5 – linear fluorescent 5/8" width.	SO	Standard Output (typical designation: F28T5, 28T5, FP28T5)	4' Std- 28W 2' Std– 14W	 Example: You look at the installed lamps or if not visible a replacement stock lamp designated by the building contact and see the following:
		HO	High Output – Determine from model number (may have to look online). Usually designated by 'HO'.	2' HO – 24W 4' HO - 54W 4' HO LW - 49W, 47W, or 45W	
		Un	Unable to determine	Assume same as Standard Output	
T8	Fluorescent T8– linear fluorescent 1" width. Include T8 U shaped lamps.	SP	Standard Performance - Lumens/Watt< 90, CRI <80, Initial Lumens < 2950, Life < 20,000 hours @ 3 hour start, Lumen maintenance < 90%.	8' Std = 59 watts 8' HO = 86 watts 4' Std - 32W 4' HO - 44 watts 2ft Std – 17W	
		HP	High Performance – relates to the quality of the lamp: Lumens/Watt > 90, CRI >80, Initial Lumens >3100, Life > 24,000 hours @ 3 hour start, Lumen maintenance > 94%. If low wattage T8 then enter HP. If 32 watt T8, look up model number in the CEE high performance lamp list. .	4' Std - 32W 4' LW -30W, 28W, 25W	

Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
		Un	Unable to determine	Assume same as Standard Wattage (Std).	
T12	Fluorescent T12– linear fluorescent 1.5" width. Include "U" shaped T12.		No details required	4' Std – 40W 4' Std ES - 34W 4' HO - 60W 4' VHO – 115W 8' Std - 75W 8' Std ES – 60W 8' HO - 110W 8' HO ES – 95W 8' VHO – 215W 8' VHO ES – 185W	It's a good idea to write the manufacturer and the model number of the main lamps down or take a picture and verify specifics online afterwards even you have another source of information. In this case F=fluorescent type, # after F = wattage = 32 watts. T5 lamps have a 5/8" diameter, T8 lamps have a 1" diameter and, T12 lamps have a 1.5" diameter. You would then have to look up the manufacturer & model number to determine if it is a high performance lamp or not. This is a good resource list: http://library.cee1.org/content/commercial-lighting-qualifying-products-lists . This model number is not on the list but the 'ECO3' is so the lamp detail is standard performance 'SP'.
CFL	Compact Fluorescent – Include twist, twin tube, biax, triple tube and quad tube lamps. Biax/twin tube lamps can be up to 24" long.	S	Screw-in	7W to 42W	

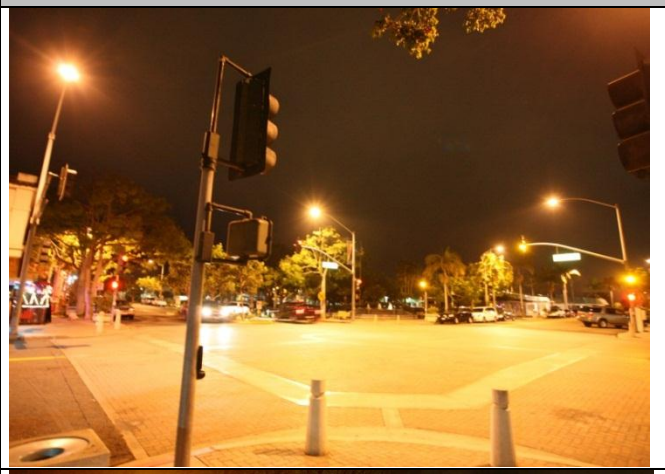
Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
		P	Pin-based		
		Un	Unable to determine		
F-OTH	Other Fluorescent – Fluorescent that doesn't fit into one of the above categories		No details required Examples: 4' T10 – 40W 5' T17 – 90W	Varies	
INC	Incandescent – very inefficient. Color most similar to natural sunlight. Common in retail.	R	Reflector –standard incandescent bulb with coating on back to direct light. Notice the shape of the bulb is more cone or pear shaped & the smooth mirror like lens.	Varies	

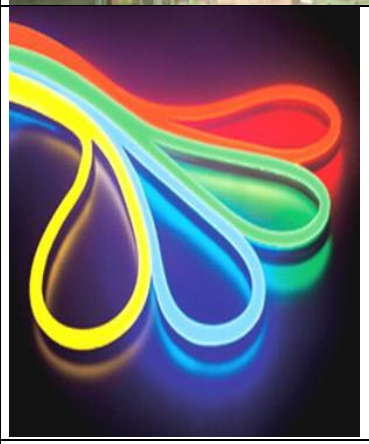
Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
		G	General Service, A type, globe, etc.		
		D	Decorative / Miscellaneous – incandescent bulb used for decorative or misc. purpose.		
		H-R	Halogen – Reflector - halogen bulb with coating on back to direct light. Shape of the bulb is more parabolic shaped. Left picture is low voltage (12 volt) MR 16. Small 2” diameter used in decorative or retail fixtures. Wattage typically 50 watts, but comes in 20 watt to 75 watts versions. Right picture is line voltage (120 volts). Larger 2 ½” to 4” diameter used in can or track lighting. Notice the thick cell pattern lens. Wattage typically under 75 watts.		

Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
		H-G	Halogen - General Service – more efficient than a standard incandescent due to iodine or bromide coating on tungsten filament. Notice the 'mini' bulb inside the larger bulb this can help identify if the bulb is a halogen or an incandescent.		
		H-D	Halogen - Decorative / Miscellaneous –used for a halogen bulb used for decorative or misc. purpose.		
		Un	Unable to determine.		
HID	HID – High intensity discharge. Common in high bay fixtures, parking lots, and in outdoor wall and walkway lighting. CMH is used in some display situations.	MV	Mercury Vapor – very inefficient outdoor lighting, not very common, blue/green color. Sometimes preferred for landscape lighting.	Varies	

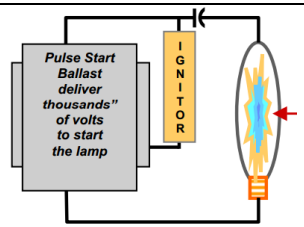
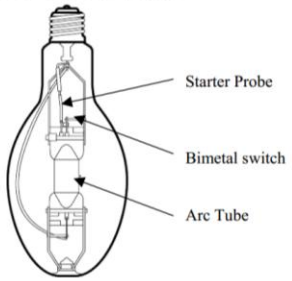
Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
		MH	Metal Halide - Typically used in flood lighting applications due to high output for small bulb size. Also notice the color variations in the picture; this happens as the light ages, a negative characteristic of MH. Most types are fitted with an outer glass bulb to protect the inner components and prevent heat loss. Requires a warm-up period so not used in critical areas. Common in high bay indoor applications, e.g. warehouse, factory, gym, etc.	35W (for small installations such as flood lighting mounted on the corners of buildings) to 1000W if site lighting (high pole mounted - pictured here).	

Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
		CMH	Ceramic Metal Halide – The bulb contains a ceramic tube that is filled with mercury, argon, and metal halide salts. Produces a blue/white light. Smaller wattage 20-150 watts typically used in retail and driven by electronic ballast.	Same range as MH.	

Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
		HPS	High Pressure Sodium – Typical in outdoor locations such as street lighting, yellow glow.	Same range as MH.	
		LPS	Low Pressure Sodium – Used in outdoor lighting when little light or a short wavelength is required. Not very common. Very yellow color light. Used in communities with space telescopes to reduce light pollution.	Varies	

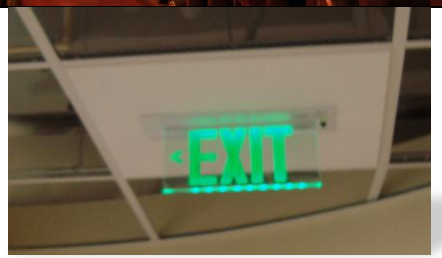
Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
		IN	Induction – a light source in which the power required to generate light is transferred from outside the lamp envelope to inside via electromagnetic fields. Whiter light than HPS & LPS and more efficient.	Varies	
		NE	Neon / Cold Cathode – Typically tubes and used for signage, accent lighting.	Varies	
		Un	Unable to determine.	Varies	

Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp **ES:** Energy Savings **HO**: High Output **LW**: Low Wattage **Std**: Standard Wattage **VHO**: Very High Output	Example Picture
LED	LED - can be a variety of colors. Quality and efficiency varies. Generally about as efficient as CFLs. Long lamp life and useful in applications where fixture access is difficult. Common for exit signs.	R	Reflector - Shown here. Note several LEDs are grouped into a single lamp.	Varies	
		G	General Service. Similar to incandescent general service but using a group of LEDs as a light source.		
		D	Decorative / Miscellaneous. Lots of forms including individual LEDs.		
MISC	Miscellaneous		No details required.	Varies	

Ballast Type	Description	Detailed Description	Example Picture	Data Source
E	Electronic – Unknown Type			If fluorescent, visual inspection using flicker checker can identify if magnetic or electronic. To identify if a high performance electronic ballast use the plans or replacement stock to gather model number and manufacturer and verify online if high performance or not. This same information source should reveal ballast factor as well. (http://library.cee1.org/content/commercial-lighting-qualifying-products-lists). In addition, HP ballasts may say 'NEMA Premium' on the box or ballast, if you can see the ballast. HID ballast type (electronic, pulse start, or probe start) is best found by looking up ballast numbers observed on high bay fixtures or from cut sheets. The lamp type can give a clue to the ballast. Electronic and pulse ballasts utilize pulse arc lamps. Generally these lamps have a "P" or "PS" in the name. Look up a few lamps to get familiar with the lamp family designations for pulse.
SE	Standard Electronic	Driven by state of the art circuit boards. Operating Frequency 20,000Hz.25% more efficient than magnetic. Do not hum or flicker. CFLs can have integrated electronic ballasts		
HPE	High Performance Electronic	Typically paired with 4' T8 fluorescent lamps.		
M	Magnetic	Driven by copper coils. Operating Frequency 60Hz.Less Efficient than Electronic. Contains Poly-chlorinated biphenyls (PCBs).		
PULSE	HID Pulse Start Ballast	HID lamp which requires separate ballast to provide thousands volts to start lamp because it doesn't contain an internal starter probe.		
PROBE	HID Probe Start Ballast	HID lamp with an internal starter probe near one of the main electrodes to help in gas ionization during the first few seconds of the starting cycle.		
NONE	No ballast required	Use when the lighting system requires no ballast.		
Un	Unable to determine	Use if you are unable to determine what type of ballast is used.		

Fixture Type W: Width L: Length	Description	Detailed Description	Example Picture
W x L - r(d/i/b)	Recessed linear fluorescent – **d**irect, **i**ndirect, or **b**oth (specify which). Parenthesis may be left out of suffix (e.g. "rd" rather then "r(d)")	Recessed linear fluorescent fixture. Include width (# of bulbs wide) and length. Mounted in ceiling. If lights the area only indirectly it's an indirect fixture. If lights the area directly it's a direct fixture. Pictured is a recessed mounted direct fixture (2x4-rd). For fixtures with reflector less than 1' use 1' for W. Only required for top 10 linear fluorescent fixture fixtures but if working from a lighting schedule capture for more. Fixture length must always be captured if lamp watts, type or count are unknown.	
W x L -s(d/i/b)	Surface Mount linear fluorescent – **d**irect, **i**ndirect, or **b**oth (specify which)	Surface mount linear fluorescent fixture. Include width (# of bulbs wide) and length. Mounted on the surface of the ceiling so fixture height is lower than the ceiling, typically by about 4 inches. If lights the area only indirectly it's an indirect fixture. If lights the area directly it's a direct fixture. Pictured is a surface mount direct fixture (2x4-sd). For fixtures with reflector less than 1' use 1' for W. Only required for top 10 linear fluorescent fixture fixtures but if working from a lighting schedule capture for more. Fixture length must always be captured if lamp watts, type, or count are unknown.	

W x L – p(d/i/b)	Pendant Mount linear fluorescent – **d**irect, **i**ndirect, or **b**oth (specify which)	Pendant mount linear fluorescent. Include width (# of bulbs wide) and length and whether direct/indirect/both. Fixture is hanging from ceiling. If light only shines up it's an indirect fixture. If light only shines down it's a direct fixture. Pictured is a direct/indirect fixture (1x4-pb). For fixtures with reflector less than 1' use 1' for W. Only required for top 10 linear fluorescent fixture fixtures but if working from a lighting schedule capture for more. Fixture length must always be captured if lamp watts, type, or count are unknown.	
STRIP(-i)	Bare or lensed linear fluorescent strip. Use –I for strip fixtures providing indirect light such as cove or wall washers.		
CAN	Recessed Can Fixture	Recessed can mounted in the ceiling.	

DISPLAY	Miscellaneous Display Lighting	Lighting used to highlight a display or presentation space but is not track lighting.	
EXIT	Exit Sign	Sign used to highlight the location of the exit for the building.	
HEAD	Track Light Head	Lighting on a track potentially with multiple heads. The direction the head is pointed and the location along the track could potentially be changed.	
TSK	Task Lighting	Only include for Lodging & Office building types & task lighting that is consistent throughout space. The most common type of task lighting is under-cabinet or shelf fluorescent lighting used in systems furniture. Anything that is plugged in to an outlet is basically task lighting, e.g. Torchiere fixtures.	 

OTH	Other	Use when the fixture type doesn't fit into the above categories. Use of OTH is not required and is discouraged in cases where fixture is unique. Making the fixture type be descriptive (e.g. rope light, step light, down light, surface, pendant) can help keep track of the lighting during the audit and provides more information.	
POLE25	Pole Mounted Fixture	Pole <= 25'	
POLE40	Pole Mounted Fixture	Pole >25' & <= 40'	
POLE60	Pole Mounted Fixture	Pole >40'	
WALL	Wall Mounted Fixture	Wall Pack	
FLOOD	Flood Light	Flood Light	
Un	Unable to determine	Use when you cannot determine the fixture type.	

Control Type	Description	Description Details
EMS-S	Automatic Sweep Controls with EMS System	Some buildings set the controls to 'sweep' off all lights at night sometimes several times to get lights that have been turned back on by office or janitorial staff working late through the energy/lighting/building management system. Use this code for this case.
EMS	EMS System (without automatic sweep)	Use when there is an energy/lighting/building management system to control when the lights are turned on/off, etc. but there is NOT a programmed automatic sweep.
DS	Daylight Sensing, Details Unknown	Use when lights are dimmed based on daylighting but how the lights are dimmed is unknown. Perhaps you see photocells but no one on-site knows the details of the dimming process.
DS-SS	Daylight Sensing, Single-Step Dimming	Lamps have one reduced lighting output level, or are at max output. In general this is done by switching off a percentage of lamps with in the fixture.
DS-MN	Daylight Sensing, Multiple Stepped Dimming	Lamps have more than one reduced lighting output level, or are at max output. In general this is done by switching off a percentage of lamps with in the fixture.
DS-CD	Daylight Sensing, Continuous Dimming	Lamps can be dimmed to l a range of light levels from a min to max output.
DIM	Dimming (non-daylight)	Dimming controls which are not daylight sensing.
EGR	Egress control 24/7	Separately controlled fixtures for emergency/egress lighting that are on 24/7. Egress lighting that is shut off to create a dark building when the building is unoccupied should not be separated or indicated as having EGR control.
MCB	Manual - circuit breaker	Lights are controlled manually at the circuit breaker or some other central switch
MS	Manual - wall switch	Lights are controlled manually at a local wall switch (full on/off).
MB	Manual - bi-level	Lights are controlled manually at a bi-level wall switch (typically two switches serve the fixtures with one switch controlling half of the lamps and the other switch controlling the remaining lamps).
OS	Occupancy Sensors	Occupancy sensors are used to turn off or reduce the light output when the space is unoccupied.
T	Timeclock (electronic or mechanical)	A timeclock turns off the lighting at a specified hour of the day and turns the lights back on at a specified hour.
OTH	Other	Controls are used but do not fit into any of these categories.
N	None (continuous)	There are no lighting controls; the lights in this space are on continuously (24/7).
Un	Unable to determine	Unable to determine if any lighting controls are used in this space.

LIGHTING SUMMARY

Lighting Summary	Description	Data Source
Briefly describe the lighting scheme (including controls) at this building.	Briefly describe the lighting design and controls at this building. Can be short such as "T8 lighting with timeclock control, OS in bathrooms and storage". If lighting controls are poorly captured on the lighting count form or only generally known provide more detail here.	Interview
Does this building have exterior lighting?	Does the building have exterior lighting	Visual inspection, plans
Does this building have stairwell lighting?	Are there stairwells with lighting in the building? In general, stairwells will be separated from the primary space by fire doors.	Visual inspection, plans
If building has stairwell lighting, what controls are used? (circle all that apply)	**None (24/7)** – Stairway lighting is on 24/7. **Off during unoccupied** – Stairway lighting is off during unoccupied hours. **Off on occupancy sensor** – Stairway lighting is switched on by occupancy sensors and off when the occupancy sensor detects no one in the space. **Dimmed on occupancy sensor** – Stairway lighting is dimmed based on occupancy sensor. **Switched** – Stairway lighting is turned on and off using wall switches.	Interview, plans
Area of outdoor sales? (SF)	Does the building have an outdoor sales area? If so, what is the area? This is for enclosed outdoor areas such as the gardening center at the home improvement store. Do not include side walk sales displays.	Visual inspection, plans
Are egress lights on all night?	Is there egress (emergency lighting) on at night?	Interview
Are there lighting fixtures for sale that are illuminated?	Are there lighting fixtures in a lighting fixture sales department that are illuminated for demonstration purposes? Example: lighting department in the local home improvement center.	Visual inspection, plans
If yes, Estimate connected kW:	<1 kW 1-5 kW 5-20 kW 20+ kW Estimate based on # of lamps/fixtures & average wattage/lamp or wattage/fixture. Sample area if large as needed. Plans often have the display circuit capacity.	Visual inspection, plans

11a. Indoor Lighting

Indoor Lighting	Description	Data Source
Use this form to indicate all lighting in the audited building, or if following the sampling methodology all of the sampled lighting. An entry is required for each subspace of interest within each Space ID. For each space/subspace entry, either: an entry is required for each lighting fixture type/ lighting control type combination; or an entry for each lighting fixture type. See the lighting control field instructions for how these two entry schemes change the control field entry. Add additional pages if needed. Use subspace type codes from below the table or from the sampling methodology. Use code 'Other' and write in the subspace when the subspace doesn't fit into one of the predefined subspaces. See separate lighting example as a reference. **If as-built drawings are accessible and accurate include all lighting information. Check for O&M manuals which usually contain lighting fixture details (Division 16500 or Division 265000-265999 for more recent projects).** **If as-built drawings are not accessible and accurate, at a minimum include all subspace types:** 1. Representing more than 20% of the total building area. 2. As required in the lighting sampling methodology based on the building's Primary Economic Use Type/ Detailed Building Type or Mixed-Use ID. 3. To meet the goal of representing over 70% of the buildings total square footage. **In Addition capture any unaudited areas as follows:** 1. Create a row for each Space ID to signify any unaudited subspaces within each Space ID, if there are unaudited subspaces. For example, if you have a school with all common areas in a Space ID and only sample the lighting in the corridor subspace you would include a line item for the unaudited areas (restrooms, mechanical and any other subspaces not sampled). This would be entered with the appropriate Space ID, subspace type (lumped together as "Other" would be typical): Space ID = 1 (consistent with what you assigned the common space to), subspace = "Other" (or Restroom/Mech or some other descriptive), and the area would be indicated as 0 of 1,000 where the 1,000 is the total area of the unsampled subspaces within the Space ID. The rest of the columns would be left blank. 2. Create a row for any unaudited areas spanning multiple Space IDs and/or multiple subspaces of interest. For example, suppose you have access to only 2 of 16 floors of multi-tenant building with Space IDs representing a garage, common area, retail, restaurant, and office space and 240,000 sq. ft of total building space. The building contact says the unaudited 14 floors are office space, but you have no way of knowing what the subspace make up or lighting pattern is on the unaudited floors. This would get entered with Space ID = 1 (consistent with what you assigned the office space to), Subspace Type: Off (or something descriptive Unaudited Off, Off-other tenant) and area would be indicated as 0 of 210,000. The rest of the columns would be left blank.		
Are controls overridden?	Yes/No for each type of control. For multiple controls separate by a semicolon and list in same order as 'Control Type'.	Interview
% Lighting load controlled	% of the lighting load that is being controlled by all the controls you listed under 'Control Type' For multiple controls separate by a semicolon and list in same order as 'Control Type'.	Visual inspection, plans
Control Type	The type of controls used on in this subspace, include all that apply, separate by a semicolon. See above control table. Do not leave this column blank. The surveyor has two options when there are different controls on the same fixture type in a space: 1. A separate entry can be made for each fixture/control type combination. Then the % lighting load controlled will be 100%. 2. One entry can be made for the fixture type and the % lighting load controlled will be something less than 100%.	Visual inspection, plans
Total Fixture Count	The total number of fixtures in the subspace or area of the subspace that is being surveyed.	Visual inspection, plans

Indoor Lighting	Description	Data Source
Fixture Type ID	The fixture identifier; matches a row in section 9. Do NOT include: 1. Emergency lighting that is automatically OFF during normal building operation. 2. Lighting that is part of machines, equipment or furniture; Record refrigerated case and walk-in lighting in the refrigeration section. 3. Technical production lights in theaters.	Surveyor judgment
Fixture Height	The height of the fixture identified in 'Fixture Type ID' rounded to the nearest foot. Fixture height is not required if fixture is within 1' of the ceiling height, if it is wall mounted, task light, plug in light, or if it is an uncommon fixture in the building. This variable is meant to capture the fixture height of the general lighting and not every last fixture.	Visual inspection using laser measuring tool, plans
Ceiling Height	The ceiling height in the space rounded to the nearest foot.	Visual inspection using laser measuring tool, plans
Total Subspace Area (ft^2)	The **total** area of the subspace. If you are not sampling and auditing the entire subspace, this should be equal to the previous box (Sample Subspace Area). Otherwise, this is should always be the total area of the subspace.	Plans or Visual inspection using laser measuring tool, counting ceiling tiles, or by walking off the space (discouraged except as last resort)
Sampled Subspace Area (ft^2)	The **sampled** area of the subspace. If you are not sampling and auditing the entire subspace, this should be equal to the next box (Total Subspace Area). Otherwise, this is the sample subspace area as compared to the total subspace area in the next box	
Space ID, Subspace Type	Identify subspaces of interest for each Space ID. Required subspaces are identified in the sampling methodology document and lighting must be separated by these categories whether the project is sampled or not. Write the Space ID, a comma, and then the subspace (e.g. "1,Corr", "1,Offcl"). Space ID is taken from General Space Information in section 1C. Use subspace type codes from below and from the sampling methodology. Use code 'Other' or write in a descriptive subspace type when the subspace doesn't fit into one of the below categories. See separate lighting example as a reference.	Surveyor judgment, plans, visual inspection

SubSpace Types

Aud	Auditoriums	Gym	Gyms	Rest	Restroom/locker
Class	Classroom	Kit	Kitchens	Ware	Warehouses
Conf	Conference rooms	Lobby	Main Lobby	Show	Wholesale showrooms
Core	Building Core/lobby/bathrooms	Mech	Mechanical Mezzanine	Seat	Seating Area
Corr	Corridor	Off	Office	Thea	Theater
Eating	Eating areas	Offcl	Enclosed Office (<300sf)	Room	Patient/hotel room/Dwelling Unit
Exam	Medical exam rooms	Offop	Open Office	Parking	Parking Garage
Groc	Grocery	Retail	Retail	*specify*	Other

11b. Outdoor Lighting

Outdoor Lighting	Description	Data Source
Entry required for each fixture type / control type combination.		
Are controls functional and used?	For this fixture group are the controls listed functional ***and*** used? If multiple controls are present or a percentage of the fixture controls do not work choose the answer that describes the majority of the fixtures.	Interview
Control Type	Choose the code(s) that best describes the outdoor lighting control method: • **P** – Photocells turn on/off lights based on available sunlight. Typically used to turn on lights in areas such as parking lots after dark. • **T** – A timeclock is used to turn on/off the lights based on the hour of the day. • **AT** – An astronomical timeclock is used to turn on/off the lights based on the hour of the day AND the date of the year. • **PT** – Both a photocell and a timeclock are used to turn on/off the lights. Typically used to turn on the lights in areas such as parking lots after dark, and then turn the lights off at a specified time when no one is expected to be around. Vice versa in the a.m. • **M** – Manual: The lights are manually controlled by a switch, circuit breaker, etc. • **24** – 24 Hour: The lights not controlled in anyway & are on 24/7. • **SO** – Stepped Occupancy: The lights are controlled by an occupancy sensor low level on/high level on. For example, the lights are on at low level, OS control triggers high level. • **ST** – Stepped Timeclock: The lights are controlled by a timeclock and are turned off/low level on/high level on. • **UN** – Unable to Determine: Use if you cannot determine the type of controls used.	Interview, Plans
# of fixtures	The number of fixtures in the group.	Visual Inspection, Plans
Use Type	Choose the code that best describes the outdoor use of the lighting: • **S** – Used for signage (lights up text). • **F** – Used to directly light the building façade. This includes wall mounted down lights and flood lights directed at the façade. • **P** – Parking Lot: Used to light the building's parking lot (Typically lights on poles throughout parking area). • **SF** – Sporting Field: Used to light a sporting field. • **O** – Other: Use that doesn't fit into any of the other categories • **W** – Walkway/Area: Used to light the path/walkway or an area where people would congregate • **ES** – Exterior sales: Used to highlight items the building is selling. This is for areas indicated as exterior sales areas in the lighting section of the form.	Surveyor Judgment, Visual Inspection
Fixture Type ID	The fixture identifier; matches a row in section 9.	Surveyor Judgment

12a. Miscellaneous Equipment

Food Service & Equipment			Mixed-Use ID (circle only one)
Kitchen	Circle all applicable Kitchen Types: Snack bar **SB** Fast food **FF** Cafeteria/restaurant **C** Large Kitchen/commercial kitchen **LK** Small kitchen **SK** Other **O** None **N**	SB FF C LK SK O N	1 2 3 4 NA
	Total Kitchen Area (SQ FT)		
	Dining Area (SQ FT)		
	Number of meals served per day (#)		
	Number of pre-rinse spray valves (#)		
	Electric Warming Equipment (Yes/No)	Y N	
	Total Linear Feet of Kitchen Hood (LF)		
	Standard (% of total LF kitchen hood)		
	HR (% of total LF kitchen hood)		
	DCV (% of total LF kitchen hood)		
	Compensating (% of total LF kitchen hood)		
	Steamers (Electric/Gas/None)	E G N	
	Hot Food Holding Cabinet (Electric/Gas/None)	E G N	
	Broilers / Fryers (Electric/Gas/None)	E G N	
	Griddle / Grill (Electric/Gas/None)	E G N	
	Combination Oven (Electric/Gas/None)	E G N	
	Oven (excluding combination ovens) (Electric/Gas/None)	E G N	
	Range (Electric/Gas/None)	E G N	
	Dishwasher Booster Fuel (Electric/Gas/None)	E G N	
Plug Load Refrigeration	Refrigerated Vending Machines (#)		1 2 3 4 NA
	Non-Refrigerated Vending Machines (#)		
	Beverage Merchandizers (1-2 door beverage display cases) (#)		
	Ice Machines (#)		
	Commercial Refrigerators (full height) (# of doors)		
	Commercial Refrigerators (half height) (# of doors)		
	Commercial Freezers (# of doors)		

Additional Miscellaneous Equipment			**Mixed Use ID (circle only one)**
Pool/Hot Tub	Pool Indoor (total sq)		1 2 3 4 NA
	Pool Outdoor (total sq)		
	Pool Fuel (**E**lectric, **G**as, **P**ropane, **O**ther, **N**one)	E G P O N	
	Hot Tub Indoor (total sq)		
	Hot Tub Outdoor (total sq)		
	Hot Tub Fuel (**E**lectric, **G**as, **P**ropane, **O**ther, **N**one)	E G P O N	
Laundry	Type (Coin-Op **C**, Drycleaner **D**, Small **S**, Large Commercial **L,** None **N**)	C D S N L	1 2 3 4 NA
	% of laundry done on-site (%)		
	Electric Clothes Dryer (#)		
	Gas Clothes Dryer (#)		
Laboratory	Laboratory Present?	Y N	1 2 3 4 NA
	Does this building have specialized laboratory equipment that requires extra energy consumption? (exp. gas chromatographs, centrifuges, spectometers, and analysis equipment)	Y N	
	Fume Hood (#)		
	Fume Hood Control System (% Variable Flow)		

Miscellaneous Equipment per Economic Use Type
Only fill out the section that corresponds to the building's economic use or mixed use type.

Economic Type or Mixed Use Type			Mixed Use ID
Hotel/Motel/Residential Care	Guest Rooms (#)		1 2 3 4 NA
	Annual Average Occupancy (%)		
	Percent of rooms with in-unit cooking (%)		
	Percent of rooms with in-unit refrigerator (%)		
	Presence of showers	Y N Unk	
	Presence of low-flow showerheads	Y N Unk	
Health Care	Surgery Rooms (#)		1 2 3 4 NA
	Beds (for overnight stay) (#)		
	High energy medical machines (#)		
Office / Schools / Office Areas in Warehouse Buildings	Occupants (#)		1 2 3 4 NA
	Laptop PCs (#)		
	Desktop PCs (1 computer and 1 monitor) (#)		
	Additional Monitors (#)		
	Printers/copiers (#)		
	Do the numbers above represent the whole building (WB) or only the office portion as specified in the lighting audit (LA)?	WB LA	
	If the lighting audit area, specify representative space id.	1 2 3 4 5	
School	Classrooms (#)		1 2 3 4 NA
	Current Students (#)		
	Student Capacity (# of seats)		
School/ Fitness	Presence of showers	Y N Unk	1 2 3 4 NA
	Presence of low-flow showerheads	Y N Unk	
Retail/Grocery	Point-of-Sale terminals (#)		1 2 3 4 NA
	Food Prep – Meat Dept.	Y N Unk	
	Food Prep – Bakery	Y N Unk	
	Food Prep – Deli	Y N Unk	
Warehouse / Retail/ Grocery	Floor polishers (#)		1 2 3 4 NA
	Floor polisher charging stations (electric only) (#)		
	Forklifts (electric only) (#)		
	Forklift charging stations (electric only) (#)		
	Air Compressors (include vacuum pumps) (total HP)		
ALL BUILDINGS	TVs (#)		1 2 3 4 NA
	Vehicle Charging Stations (#)		
	Area of **Mechanical/Refrigeration Mezzanine** (total)		
	Does this building have refrigeration equipment? If yes, complete Section 13 of the Data Collection	Y N Unk	
	Does this building have data center equipment? If yes, complete Section 14 of the Data Collection	Y N Unk	
	Does this building have Residential Areas? If yes, complete Section 15 of the Data Collection	Y N Unk	

12a. Miscellaneous Equipment

Food Service and Equipment	Description	Data Source
This section is captures information on miscellaneous food service equipment for buildings that have Kitchens and Plug Load Refrigeration. Attempt to populate this section for all buildings surveyed. Most entries should be accurate to within 10%. When entering data into FACT negative (No or None) and zero values will have to be entered for items not present (e.g. Kitchen Type=None, Pool Area = 0. In audit and diagonal line through section is adequate.		
Mixed-Use ID (s) Served	Indicate all Mixed-Use IDs served by each miscellaneous equipment category	Visual inspection, interview, plans
Kitchen		
Kitchen Types	Circle all kitchen types that exist within the building: **SB –** Snack bar **FF –** Fast food **C –** Cafeteria/restaurant **LK** – Large Kitchen/commercial kitchen **SK** – Small kitchen **O** – Other **N** – None	Inspection, interview
Total Kitchen Area (SQFT)	Indicate the total kitchen area in square feet. Kitchen space is defined as food preparation area for any of the kitchen type categories identified above.	Inspection, interview
Dining Area (SQFT)	Indicate the total dining area in square feet. Dining area is classified as space used to eat prepared meals.	Inspection, interview
Number of meals served per day	Estimate the total number of meals prepared by the kitchen type areas per day. This is the essentially the number of customers.	Inspection, interview
Number of pre-rinse spray valves	Indicate the presence of pre-rinse spray valves. Pre-rinse spray valves are typically found in the cleaning area of the kitchen and are used to remove food particles from dishes prior to cleaning. Reference: http://www.epa.gov/WaterSense/products/prsv.html	Inspection, interview
Electric Warming Equipment (Yes/No)	Indicate the presence of electric food warming and holding equipment. The devices should not be used to cook / prepare food; instead they maintain the temperature of food that has already been prepared. Warming equipment would include warming drawers, and equipment used to maintain temperatures below 135 °F.	Inspection, interview
Total Linear Feet of Kitchen Hood (LF)	Indicate the total length of kitchen hood (lineal feet). Kitchen hoods remove airborne grease, combustion products, fumes, smoke, odors, heat, and steam from the air by evacuation of the air and filtration.	Inspection, interview
Standard (% of total LF kitchen hood)	Indicate the percentage of total kitchen hood length that features standard kitchen hoods.	Inspection, interview
HR (% of total LF kitchen hood)	Indicate the percentage of total kitchen hood length that features Heat Recovery (HR) kitchen hoods.	Inspection, interview
DCV (% of total LF kitchen hood)	Indicate the percentage of total kitchen hood length that features Demand Controlled Ventilation (DCV). These kitchen hoods have sensors that measure temperature, steam and smoke in the hood, and adjust the fan speed accordingly to save both fan energy and conditioned air.	Inspection, interview
Compensating (% of total LF kitchen hood)	Indicate the percentage of total kitchen hood length that features compensating kitchen hoods. Compensating hoods supply up to 90% make-up air through stainless steel perforated panels on the front face of the hood. The hood performs at extremely low CFM exhaust flow rates.	Inspection, interview
Steamers	Indicate the presence (**N**one), and fuel type (**E**lectric or **G**as) of food steamers.	Inspection, interview

Food Service and Equipment	Description	Data Source
Hot Food Holding Cabinet	Indicate the presence (**N**one), and fuel type (**E**lectric or **G**as) of hot food holding cabinets in the kitchen. Examples include any equipment used to maintain temperatures above 135 °F.	Inspection, interview
Broilers / Fryers	Indicate the presence (**N**one), and fuel type (**E**lectric or **G**as) of boilers / fryers.	Inspection, interview
Griddle / Grill	Indicate the presence (**N**one), and fuel type (**E**lectric or **G**as) of griddles.	Inspection, interview
Combination Oven	Indicate the presence (**N**one), and fuel type (**E**lectric or **G**as) of combination oven (An oven with a combination mode. Cook in convection mode while maintaining the humidity levels you want, from 0% to 100%, reducing shrinkage and weight loss.)	Inspection, interview
Oven (excluding combination ovens)	Indicate the presence (**N**one), and fuel type (**E**lectric or **G**as) of non-combination ovens.	Inspection, interview
Range	Indicate the presence (**N**one), and fuel type (**E**lectric or **G**as) of cooking ranges.	Inspection, interview
Dishwasher Booster Fuel	Indicate the presence (**N**one), and fuel type (**E**lectric or **G**as) of dishwasher booster fuel.	Inspection, interview
Plug Load Refrigeration and Vending		
Refrigerated Vending Machines	Indicate the number of refrigerated vending machines (e.g., fruit dispensaries).	Inspection, interview
Non-Refrigerated Vending Machines	Indicate the number of non-refrigerated vending machines (e.g., snack dispensaries).	Inspection, interview
Beverage Merchandizers (1-2 door beverage display cases)	Indicate the number of beverage merchandizers (e.g., cold soda dispensaries).	Inspection, interview
Ice Machines	Indicate the number of ice machines.	Inspection, interview
Commercial Refrigerators (full height) (# of doors)	Indicate the total number of full height ***commercial*** refrigerator doors. Commercial refrigerators usually feature larger interior dimensions provide more storage space than their residential counterparts.	Inspection, interview
Commercial Refrigerators (half height) (# of doors)	Indicate the total number of half height ***commercial*** refrigerator doors. Commercial refrigerators usually feature larger interior dimensions provide more storage space than their residential counterparts.	Inspection, interview
Commercial Freezers (# of doors)	Indicate the total number of ***commercial*** freezer doors. Commercial freezers usually feature larger interior dimensions provide more storage space than their residential counterparts.	Inspection, interview

12b. Miscellaneous Equipment

Additional Miscellaneous Equipment	Description	Data Source
This section is captures additional information on miscellaneous equipment for buildings that feature sales, pool/hot tub, laundry, and laboratory areas. Attempt to populate this section for all buildings surveyed. Most entries should be accurate to within 10%.		
Mixed-Use ID (s) Served	Indicate all Mixed-Use IDs served by each miscellaneous equipment category.	Visual inspection, interview, plans
Pool/Hot Tub		
Pool Indoor (total sq)	Indicate the total indoor pool square footage.	Inspection, interview
Pool Outdoor (total sq)	Indicate the total outdoor pool square footage.	Inspection, interview
Pool Fuel (**E**lectric, **G**as, **P**ropane, **O**ther, **N**one)	Indicate the presence of a pool (**N**one), and fuel type (**E**lectric, **G**as, **P**ropane, **O**ther).	Inspection, interview
Hot Tub Indoor (total sq)	Indicate the total indoor hot tub square footage.	Inspection, interview
Hot Tub Outdoor (total sq)	Indicate the total outdoor hot tub square footage.	Inspection, interview
Hot Tub Fuel (**E**lectric, **G**as, **P**ropane, **O**ther, **N**one)	Indicate the presence of a hot tub (**N**one), and fuel type (**E**lectric, **G**as, **P**ropane, **O**ther).	Inspection, interview
Laundry		
Type (Coin-Op **C**, Drycleaner **D**, Small **S**, Large Commercial **L,** None **N**)	Indicate the presence of laundry machines (**N**one), and type (**C**oin-Op, **D**ryclearner, **S**mall, **L**arge Commercial).	Inspection, interview
% of laundry done on-site (%)	Indicate the percentage of laundry done on-site.	Inspection, interview
Electric Clothes Dryer (#)	Indicate the number of electric clothes dryers.	Inspection, interview
Gas Clothes Dryer (#)	Indicate the number of gas clothes dryers.	Inspection, interview
Laboratory		
Laboratory Present?	Indicate the presence of a laboratory space.	Inspection, interview
Does this building have specialized laboratory equipment that requires extra energy consumption? (exp. Gas chromatographs, centrifuges, spectrometers, and analysis equipment)	Indicate whether the surveyed building has specialized laboratory equipment that consumes additional energy? (Ex: Gas chromatographs, centrifuges, spectrometers, and analysis equipment).	Inspection, interview
Fume Hood (#)	Indicate the number of laboratory fume hoods.	Inspection, interview
Fume Hood Control System (% Variable Flow)	Indicate the percentage of laboratory fume hoods that feature a variable flow system.	Inspection, interview

12c. Miscellaneous Equipment

Miscellaneous Equipment per Economic Use Type	Description	Data Source
This section is captures information on miscellaneous equipment **by economic use type.** In general, only fill out sections that correspond to the surveyed building/complex or mixed use type. The one exception is Warehouses; for warehouses, populate the "Office" portion of this section. Most entries should be accurate to within 10%.		
Mixed-Use ID (s) Served	Indicate all Mixed-Use IDs served by each miscellaneous equipment category.	Visual inspection, interview, plans
Hotel / Motel / Residential Care		
Guest Rooms (#)	Indicate the total number of guest rooms.	Inspection, interview
Annual Average Occupancy (%)	Indicate the annual average occupancy percentage.	Inspection, interview
Percent of rooms with in-unit cooking (%)	Indicate the percentage of guest rooms with in-unit cooking.	Inspection, interview
Percent of rooms with in-unit refrigeration	Indicate the percentage of guest rooms with in-unit refrigerators.	Inspection, interview
Presence of showers	Indicate the presence of showers (**Y**es, **N**o, **U**nknown).	Inspection, interview
Presence of low-flow showerheads	Indicate the presence of low flow-showerheads (**Y**es, **N**o, **U**nknown).	Inspection, interview
Health Care		
Surgery Rooms (#)	Indicate the total number of surgery rooms.	Inspection, interview
Beds (for overnight stay)	Indicate the total number of beds for overnight stay.	Inspection, interview
High energy medical machines	Indicate the total number of high energy medical machines (e.g., X-Ray machines, CT Scan, MRI machines, dialysis machines, ultrasound machines, linear accelerators, and air compressors).	Inspection, interview
Office		
Occupants	Indicate the number of office occupants.	Inspection, interview
Laptop PCs	Indicate the number of laptop PCs.	Inspection, interview
Desktop PCs (1 computer and 1 monitor) (#)	Indicate the number of desktop PCs.	Inspection, interview
Additional Monitors (#)	Indicate the number of additional monitors. In the case of a computer with two monitors, one of the monitors would be counted in this section.	Inspection, interview
Printers/copiers (#)	Indicate the number of printers/copiers.	Inspection, interview
Do the numbers above represent the whole building (WB) or only the office portion as specified in the lighting audit (LA)?	Specify whether the counts of office equipment represent the inventory of the entire building, or only the office portion specified in the lighting audit.	Inspection, interview
If the lighting audit area, specify representative space id.	If the counts of office equipment represent only the office portion specified in the lighting area, specify the representative space ID.	Inspection, interview
School		
Classrooms	Indicate the number of classrooms.	Inspection, interview

Current Students	Indicate the number of students.	Inspection, interview
Student Capacity (# of seats)	Indicate the school's student capacity.	Inspection, interview
Lodging / School / Fitness		
Presence of showers	Indicate the presence of showers (**Y**es, **N**o, **U**nknown).	Inspection, interview
Presence of low-flow showerheads	Indicate the presence of low flow-showerheads (**Y**es, **N**o, **U**nknown).	Inspection, interview
Grocery / Retail		
Point-of-Sale terminals (#)	Indicate the number of point-of-sale terminals in the sales area (examples include cashiers, credit card processing stations, etc.).	Inspection, interview
Food Prep – Meat Dept. (1=Yes, 0=No)	Indicate the presence of a Food Prep – Meat department (1=Yes, 0=No).	Inspection, interview
Food Prep – Bakery (1=Yes, 0=No)	Indicate the presence of a Food Prep – Bakery department (1=Yes, 0=No).	Inspection, interview
Food Prep – Deli (1=Yes, 0=No)	Indicate the presence of a Food Prep – Deli department (1=Yes, 0=No).	Inspection, interview
Warehouse/Grocery / Retail		
Floor polishers	Indicate the number of floor polishers.	Inspection, interview
Floor polisher charging stations (electric only)	Indicate the number of floor polisher charging stations.	Inspection, interview
Forklifts (electric only)	Indicate the number of forklifts (for electric only).	Inspection, interview
Forklift charging stations (electric only) (#)	Indicate the number of forklift charging stations (for electric only).	Inspection, interview
Air Compressors (include vacuum pumps) (total HP)	Indicate the total HP of all Air Compressors (include vacuum pumps).	Inspection, interview
All Buildings		
TVs (#)	Indicate the number of TVs.	Inspection, interview
Vehicle Charging Stations (#)	Indicate the number of Charging Stations (for electric vehicles).	Inspection, interview
Area of **Mechanical/Refrigeration Mezzanine** (total sq)	Total Sq Ft of a Mechanical or Refrigeration Mezzanine. If the area(s) exist, Mech Mezz becomes a required subspace in the Lighting Audit.	Inspection, interview
Does this building have refrigeration equipment?	If the building has refrigeration equipment, such as Walk-Ins, Display Cases and Storage Boxes, FILL OUT SECTION 13	Inspection, interview
Does this building have data center equipment?	If the building has a data center or a small room with database equipment, FILL OUT SECTION 14	Inspection, interview
Does this building have Residential Areas?	Does this building have any residential areas in it? These can be Residential Floors of a mixed use building, manager's residences at a building, or apartments that are a part of Residential Care Facilities. If YES, FILL IN SECTION 15	Inspection, interview

13a. Refrigeration Equipment – Guidance

Compressors	Description	Data Source
Compressor information should be collected in all grocery/retail/warehouse buildings with over 400SF of storage box and walk-in refrigeration, or more than 60LF of refrigerated display case. This section (13a) does not need to be completed for other building types or in situations that do not meet the above criteria. **Case and walk-in information must be collected in all cases.**		
Type: **R**eciprocating **Sc**rew **S**croll **Unk**nown **O**ther	Indicate the type of compressor.	Visual inspection
System Type: **S**ingle **M**ultiplex **O**ther **U**nknown	Use Single for condensing unit and stand-alone single compressors, and multiplex for parallel connected compressor systems.	Visual inspection
Design Suction Temp: **L**ow (0 to -40 °F) **M**edium (0 to 35 °F) **H**igh (>35°F)	Design saturated suction temperature of the system the compressor(s) are operating at.	Visual inspection from EMS display, refrigeration schedule, or otherwise indicated in compressor room.
Total HP (per unit)	Total HP per compressor.	Visual inspection, refrigeration schedule
Manufacturer & Model # (if Total HP is unknown)	Manu and model # used to ID HP later, if unknown on site.	Visual inspection, refrigeration schedule
Quantity:	Quantity of compressors being defined.	Visual inspection, refrigeration schedule
Unloaders or VSD compressors?	Indicate the presence of compressor unloaders or compressor VSDs. Unloaders (mounted on the cylinder heads of semi-hermetic compressors) can be mechanical valves with no wire harness, or electronic controlled with wire harnesses. VSDs are mounted on the wall or on the suction group rack (could be in panel).	Visual inspection
Floating Head Pressure Control?	Indicated whether or not floating head pressure control is capable.	Visual inspection of the EMS, interview of contractor or maintenance (if possible)
Heat Recovery Type: **N**one **S**pace Heating/Reheat Domestic **W**ater heating **S**pace Heating & **D**omestic Water heating **O**ther	Indicate the type (the use) of refrigeration heat recovery (heat reclaim). Space heating (HVAC), domestic hot water (aka service water), or space heat and domestic water (both).	Visual inspection, refrigeration schedule

Condensers	Description	Data Source
Condenser information should be collected in all grocery/retail/warehouse buildings with over 400SF of storage box and walk-in refrigeration, or more than 60LF of refrigerated display case. This section (13b) does not need to be completed for other building types or in situations that do not meet the above criteria. **Case and storage box/walk-in information must be collected in all cases.**		
Type: **A**ir-cooled Air-cooled w/**P**re-cooler **E**vap-cooled **W**ater-cooled	Specify the type of condenser. Air-cooled are simple and most common. Air-cooled w/pre-coolers are air-cooled condensers that drawn air over a moisture source (water spray or moist pad) that is external to the condenser. Evaporative condensers draw air that is cooled by water source (internal to the condenser). Water-cooled condensers are the rarest. They can be tubing or cylinder shaped.	Visual inspection
Total Fan HP: (all types)	Indicate the total fan HP for the all condenser fans.	Visual inspection
Fan VSD or multi-speed?	Indicate the presence of a condenser fan VSD or multi speed motor. This could be in the compressor room, or directly in or on a control panel mounted on the condenser.	Visual inspection, possibly a note on refrigeration schedule
Fan Motor Type: Shaded Pole **(SP)** Electric Commentated **(EC)** Permanent Split Capacitor **(PSC)**	Indicate the condenser fan motor type.	Visual inspection
Pump Motor HP (evap-cooled only)	For evaporative-cooled condensers, indicate the total spray pump HP.	Visual inspection
Pump VSD? (evap-cooled only)	For evaporative-cooled condensers, indicate the presence of spray pump VSD. This could be in the compressor room, or directly in or on a control panel mounted on the condenser.	Visual inspection

13b. Refrigeration Equipment

Display Cases	Description	Data Source
Type: **M**edium **T**emperature Case **L**ow **T**emperature Case (**f**rozen **f**ood) **L**ow **T**emperature (**i**ce **c**ream)	Specify the relative operating temperature of the case by indicating one of the three options.	Visual inspection of product found, refrigeration schedule
Self-Contained Compressor/Condenser?	A "Y" indicates the case in a "self-contained" unit (it has its own internal compressor and condenser).	Visual inspection
Case Length: (LF)	Indicate the total linear feet of case for this case type.	Measured on site, refrigeration schedule
Do the cases have doors?	For "reach-in" cases that have glass doors, indicate a "Y".	Visual inspection
# of doors	Door count for this case type.	Visual inspection
Is there an Anti-sweat heater with (ASHWC) or without control (ASH)?	Indicate whether the case has anti-sweat heaters without control, with control, or no ASH present.	Verified onsite visually for presence, and use of low-voltage meter on the glass
Primary Lighting Type: (T12, T8, T5, LED) List lamp type, watts per lamp, and total number of lamps	Primary lighting is the predominant type of lighting found in the case. Also use this for single lighting types only. Some cases (multideck islands) have same lamp but with many lamp lengths. Record the fixture as the dominant lamp type and convert all the odd lengths to equivalents. For example, a case that has 8-4' T5, 4-3' T5, and 6-2' T5 could be recorded as having 14-4' T5	Visual inspection
Secondary Lighting Type: (T12, T8, T5, LED) List lamp type, watts per lamp, and total number of lamps	Where more than one lighting type is present in the case, use this to specify the other lighting types.	Visual inspection
Lighting Schedule (24 hours, same as store hours - **SH,** Occupancy Sensor – **OS)**	Indicate the lighting schedule for the case lights.	Interview

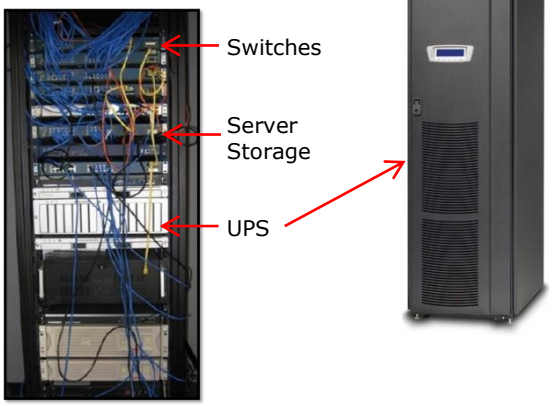
Refrigerated Walk-ins & Storage Boxes	Description	Data Source
Specify whether the refrigerated space is a walk-in or a storage box. Walk-ins are intended for shopping access by customers and / or workrooms in (as in prep rooms) by employees. Storage boxes are not intended for customer occupancy or access. Storage boxes are intended for temporary access by employees to put product into the boxes for storage or to remove product from the boxes for transfer into display cases.		
Type: Refrigerated **W**alk-in Refrigerated **S**torage Box	Specify whether the refrigerated space is a walk-in or a storage box. Walk-ins are accessed by customers or worked in (as in prep rooms) by employees. Storage boxes are not meant for continuous occupancy, only temporary for restocking access by employees.	Visual inspection
Type: **M**edium **T**emperature **L**ow **T**emperature (**f**rozen **f**ood) **L**ow **T**emperature (**i**ce **c**ream)	Specify the relative operating temperature of the refrigerated space by indicating one of the three options.	Visual inspection of product found, refrigeration schedule
Location: **I**ndoor**, c**onditioned **I**ndoor**, u**nconditioned **O**utdoor	Indicate whether the refrigerated space is either indoor or outdoor, and conditioned. If indoor, whether or not the room the refrigerated space is in is conditioned (cooled by an HVAC system).	Visual inspection, building plans
Floor Area: (SQFT)	Indicate the total floor area of the walk-in or storage box.	Onsite measurement
Height: (FT)	Indicate the internally measured height of the walk-in or storage box.	Onsite measurement
Doorway protection? **S**trip curtains **A**utomatic door closer **N**either	Specify the "infiltration blocking" doorway protection devices as listed.	Visual inspection
Evaporator fan controls?	Indicate the presence of evaporator fan controls in the refrigerate space.	Visual inspection, interview, could possibly be listed as a note on refrigeration schedule
Primary Lighting Type: **(T12, T8, LED, Induction, Incandescent)** List lamp type, watts per lamp, and total number of lamps.	Primary lighting is the predominant type of lighting found in the walk-in or storage box. Also use this for single lighting types only.	Visual inspection
Secondary Lighting Type: **(T12, T8, LED, Induction, Incandescent)** List lamp type, watts per lamp, and total number of lamps.	Where more than one lighting type is present in the walk-in or storage box, use this to specify the second most predominant lighting type.	Visual inspection

13c. Refrigeration Equipment

Refrigerated Reach-in Boxes	Description	Data Source
Type: **M**edium **T**emperature **L**ow **T**emperature (**f**rozen **f**ood) **L**ow **T**emperature (**i**ce **c**ream)	Specify the relative operating temperature of the refrigerated space by indicating one of the three options.	Visual inspection of product found, refrigeration schedule
Location: **I**ndoor**, c**onditioned **I**ndoor**, u**nconditioned **O**utdoor	Indicate whether the refrigerated space is either indoor or outdoor, and conditioned. If indoor, whether or not the room the refrigerated space is in is conditioned (cooled by an HVAC system).	Visual inspection, building plans
Floor Area: (SQFT)	Indicate the total floor area of the reach-in box.	Onsite measurement
Height: (FT)	Indicate the internally measured height of the reach-in box.	Onsite measurement
Customer Access Doors?	Enter a "Y" to specify the presence of reach-in glass doors. If the reach-in box does not have doors, enter "N".	Visual inspection
Evaporator fan controls?	Indicate the presence of evaporator fan controls in the refrigerate space.	Visual inspection, interview, could possibly be listed as a note on refrigeration schedule
# of doors	If the reach-in box has doors, enter the total number. If no doors, enter zero.	Visual inspection
Length of Reach-in Box Front (Linear FT)	Specify the total linear feet of reach-in box (the front where the doors would be or are).	Onsite measurement
Primary Lighting Type: **(T12, T8, LED, Induction, Incandescent)** List lamp type, watts per lamp, and total number of lamps.	Primary lighting is the predominant type of lighting found in the reach-in box. Also use this for single lighting types only.	Visual inspection
Secondary Lighting Type: **(T12, T8, LED, Induction, Incandescent)** List lamp type, watts per lamp, and total number of lamps.	Where more than one lighting type is present in the reach-in box, use this to specify the second most predominant lighting type.	Visual inspection

14a. Data Centers – Guidance

Data Centers	Description	Data Source
Space ID (s) Served	Indicate the Space ID as established in section 1.	Surveyor judgment
Total Floor Area:	Floor area of the server closet/server room/data center. If more than 5 data centers, group and identify total square footage as well as number of rooms.	Visual inspection, interview, building plans
Percentage of space that is leased:	If the data center is occupied by the space owner (owner may be the tenant in a leased building), this is zero. If space in the data center is leased to an outside business (commonly referred to as co-location), identify the percentage that is leased.	Interviews
Integrated with Telecomm?	A room that contains telecomm equipment as well as IT equipment is integrated. If a room is telecomm only, do not include as a data center space.	Surveyor judgment, interview, building plans
Total number of racks in use	The total number of racks that are in the server room. Racks can be 2 or 4 post racks or cabinets. Count the rack if it is 1/3 or more full. If equipment is on shelves or desks and not in racks, state 'on ground' and estimated # of servers.	Visual inspection, interview
	Here are some pictures of types of racks (2 post, 4 post, and cabinet/enclosure): 	
Number of racks NOT in use	Identify the number of racks in the data center that are empty or less than 1/3 full.	Visual inspection, interview
Total IT load (from IT contact or UPS) (kW)	Determine the IT load (i.e. load serving the racks located in the data center). First and best option is to obtain from IT personnel. Second option is to use the UPS to estimate load. This is the sum of the UPS units, with detailed information on the UPS collected below.	Interview, visual inspection
UPS Make / Model (if available)	UPS (uninterruptible power supply) is used to provide power to the data center equipment in case of main supply power failure. UPS may be stand-alone units or they may be rack-mounted units in which case they are typically found at the bottom of the rack. Identify make and model number of UPS units. The make may be on the front of the unit as is the case in the second picture below, or on the back of the unit.	Visual inspection, interview

Data Centers	Description	Data Source
	Here are some pictures of UPS:  	
UPS Capacity	Capacity of the UPS unit in kW or kVA. From nameplate or IT personnel.	Visual inspection, interview
UPS Capacity Unit	Circle kW if the units are kW or kVA if the units are kVA.	Visual inspection, interview
Current UPS Load (%)	For some models, the output of the unit may only be available from LED display. In this case, use this and the total UPS capacity to calculate % loading. Some models may only have indicator lights or bars to show approximate % loading (i.e. one of four lights lit indicates about 25% loading). Estimate % loading based on % of lights lit.	Visual inspection, interview
Energy Star servers?	Look for Energy Star label on server equipment. If any of the equipment is Energy Star answer Y.	Visual inspection, interview
Degree of Virtualization (%)	Virtualization is the running of multiple "virtual" server loads on a single physical server. Identify if any degree of virtualization is being undertaken by the IT staff.	Only available by interview
Separate Electric Meter	Identify if the total electrical load of the data center is metered separately. If the meter includes IT load, distribution system losses (from transformers such as UPS units), and cooling load choose 'Y-w/HVAC'. If the data center is metered separately but does not include cooling equipment, choose 'Y-w/o HVAC'. If the data center does not have a dedicated electric meter choose 'N'.	Interview, building plans
If Yes, average electric load (kW)	If metered, identify the kW load at the time of the audit. If this data is collected by facility or IT personnel, obtain the average load.	Interview, visual inspection of meter

14b. Data Centers – Guidance4

HVAC	Description	Data Source
HVAC equipment recorded in this section should also be included in the HVAC sections of the form (5).		
HVAC desc: **A**ir cooled DX **W**ater cooled **DX** **W**ater cooled **CHW** **D**irect **E**vaporative cooled **I**ndirect **E**vaporative cooled **B**uilding transfer / return air **N**one	Identify the type of cooling used to cool the data center space. Select all that apply. **A**ir cooled DX – Air-cooled direct-expansion computer room air conditioning unit (CRAC). DX refers to the fact that the refrigerant evaporator is in direct contact with the air stream to be cooled. Heat rejection is through air. **W**ater cooled **DX -** Water-cooled direct expansion computer room air conditioning unit (CRAC). DX refers to the fact that the refrigerant evaporator is in direct contact with the air stream to be cooled. Heat rejection is through water. In water-cooled DX, a 'fluid cooler' is used for heat rejection, rather than an air-cooled condenser or connection to chiller coils. These systems can also include an economizer coil, where the refrigeration cycle is turned off when the glycol can be cooled below a certain temperature by the outside air. **W**ater cooled **CHW –** Chiller water coils connected to computer room air handler unit for cooling air (CRAH). **D**irect **E**vaporative cooled – Unit that uses water evaporation to directly cool and humidify the air. **I**ndirect **E**vaporative cooled – Unit that uses the energy from the evaporation of water to cool air through a heat exchanger device. **B**uilding transfer / return air – Building AHU return air is used to cool space. **N**one	Visual inspection, interview, building plans
Space Temperature Range (<68F, 68-76F, >76F) (degrees F)	Choose the range representing the approximate space temperature of the data center at the time of the audit.	Interview, building plans
Does space have humidification control?	Choose Yes or No. Data centers often contain humidification systems to ensure humidity requirements are maintained. CRAC units may have humidification units integral to the unit (display may indicate humidification set points).	Interview, building plans, visual inspection
Does space have dedicated air conditioning?	Dedicated air conditioning would be a system that serves only the data center. Typical equipment types include mini split systems or DX/CRAC unit (computer room air conditioner). Examples of systems that are NOT dedicated include chilled water fan coil units where the chiller serves air handlers serving other parts of the building. Choose Y-primary if dedicated air conditioning is the primary method of cooling the data center space. Choose Y-secondary fi the dedicated air conditioning is the secondary method of cooling the space. This may be the case in offices with data centers such as PECI where the building HVAC return air is used for primary cooling and a dedicated unit is used as secondary cooling (i.e. when more cooling is required).	Interview, building plans, visual inspection
If NO: **Does data center cause building system to run extended hours?**	Choose Yes or No. If, for example, the building system is monitoring the temperature is the space and trying to maintain set point you would choose yes.	
If YES: Total cooling system capacity (tons)	Identify the total cooling capacity serving the data center only, in tons of cooling.	Visual inspection, interview, building plans

HVAC	Description	Data Source
If YES: Number of CRAC/H units (#)	Identify the total number of units: CRAC = computer room air conditioner (typically DX cooling) CRAH = computer room air handler (chilled water cooling coils)	Visual inspection, interview
If YES: Is this equipment standalone or networked?	For larger data centers where there are multiple cooling units, these units may be operating based on a local controller. This may result in overcooling or situations where one unit is humidifying while the adjacent unit is dehumidifying. Network controls are used to control units as a system.	Interview
If YES: Economizer: **W**ater **A**ir **N**one **U**nknown	Identify if the dedicated equipment has an air or water economizer. For example, a water-cooled DX where the unit includes waterside economizer operation.	Interview, building plans

15 Residential Building / Areas Information – Guidance

Residential Areas	Description	Data Source
Space ID (s) Served	Indicate the Space ID as established in section 1.	Surveyor judgment
Residential areas present?	These can be **Residential Floors** of a mixed use building, **manager's residences** at a building, or **apartments** that are a part of Residential Care Facilities. Generally it is defined as an **area containing independent living units with a full kitchen**. If whole floors or buildings contain nothing but residential areas, then the common area on that floor or in that building should be included here	Visual inspection, interview
Number of residential units (#)	The Number of Residential Units in the Building	Visual inspection, Interview, Plans
Floor area of residential areas	The total floor area of Residential Areas (SqFt)	Visual inspection, Interview, Plans
Number of Residential Floors	The number of floors in the building that are dedicated to Residential Units	Visual inspection, Interview, Plans
Primary Heating Fuel in residential areas	List Primary Heating Fuel in the residential area	Visual inspection, Interview, Plans
How many dedicated residential garage parking spaces are there?	Enter the number of spaces that are dedicated to the Residential Areas. Enter 0 for none or NA and -1 for unknown.	Visual inspection, Interview, Plans
Is building height at or below 75 feet or over 75	Estimate if the building is over or under 75ft tall, and circle appropriately	Visual inspection, Interview, Plans
Basic residential type (apartments, condo, co-op, apt & coop, other (specify)	Please circle all that apply. If other is circled, please indicated what type of residential space it is.	
What percentage of residential units are condominiums	If condo is circled in the last question, indicated the % of the resdiential area that are condos. If all are condos, pelase enter 100%	
Is all residential and nonresidential energy use separately metered (including parking garage lighting and ventilation, elevators, HVAC and DHW systems?	This is to figure out if the residential areas share meters with the non-res areas of the building.	
Is all residential energy use on non-residential meters? If not fill out the table below	If some residential areas (or all) have their own meters, indicate on the next table which end uses are controlled by which meter for residential areas.	

Building Energy End Use	**Service Meter** Separate (Sep); Residential (Res); Non Residential (Nres); Unknown (Unk)
Parking garage lighting	For each of the RESIDENTIAL End Uses to the left, indicate what meter it is on. This is only to be filled out if residential areas are not all on Non-Res meters, as indicated in the last question of the above table. Circle SEP if the end use is on a complete separate meter, RES if it is on a residential meter separate from the commercial meter, NRES if the residential end use is on the same meter as the Non-Res and UNK if this information is unknown.
Parking garage ventilation	
Elevators	
HVAC	
DHW	
Other (specify)	
Other 2 (specify)	
Other 3 (specify)	

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX G
CBSA FACT System Data Dictionary

Prepared for:
Northwest Energy Efficiency Alliance

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December 5, 2015

Table of contents

1 activity_code

Creation: Feb 14, 2013 at 11:45 AM
Last update: Feb 14, 2013 at 01:05 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
code_id	int(2)		No		auto_increment			
name	char(100)		Yes	NULL				
value	char(3)		Yes	NULL				

2 airhandler

Creation: Feb 07, 2013 at 09:06 AM
Last update: Feb 13, 2013 at 03:37 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
airhandler_id	char(3)		No	NF				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(3)		No	NF				
air_system_type	char(3)		No	NF				
air_cool_type	char(3)		No	NF				
air_cool_capacity	float(9,2)		Yes	NULL				
air_heat_type	char(3)		No	NF				
air_heat_capacity	float(9,2)		Yes	NULL				
air_handler_age	int(4)		Yes	NULL				
air_supply_fan_vol_control	char(3)		No	NF				
air_supply_motor_hp	float(9,2)		Yes	NULL				
air_return_fans	char(3)		No	NF				
air_return_motor_hp	float(9,2)		Yes	NULL				
air_economizer	char(3)		No	NF				
air_temp_control_type	char(3)		No	NF				
air_demand_vent_type	char(3)		No	NF				
air_occupancy_sensor	char(3)		No	NF				
air_exhaust_heat_recovery	char(3)		No	NF				

3 boiler

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 04:16 PM
Last check: Feb 13, 2013 at 02:45 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
boiler_id	int(10)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	int(10)		Yes	NULL				
boiler_service	char(12)		No	NF				
fuel_type	char(3)		No	NF				
back_up_fuel_type	char(3)		No	NF				
number_identical_boilers	int(10)		Yes	NULL				
number__standby_units	int(10)		Yes	NULL				
age_of_boiler	int(10)		Yes	NULL				
manufacturer	char(100)		Yes	NULL				
model_name_number	char(100)		Yes	NULL				
input_capacity_kbtu_hr	float(12,2)		Yes	NULL				
condensing	char(3)		No	NF				
primary_quantity	int(10)		Yes	NULL				
primary_num_standby_units	int(10)		Yes	NULL				
primary_motor_hp	float(12,2)		Yes	NULL				
secondary_quantity	int(10)		Yes	NULL				
secondary_num_standby_units	int(10)		Yes	NULL				
secondary_motor_hp	float(12,2)		Yes	NULL				

secondary_capacity_control	char(3)		No	NF				

4 buildinginfo

Creation: Jan 09, 2013 at 01:08 PM
Last update: Jan 09, 2013 at 02:08 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
tbl_index	int(11)		No		auto_increment			
site_id	int(11)		No					
bldg_condition	char(3)		No	NF				
single_multiple	char(3)		No	NF				
building_num	int(4)		Yes	NULL				
primary_econ	char(3)		No	NF				
primary_econ_other	char(100)		Yes	NULL				
detailed_econ	char(3)		No	NF				
detailed_econ_other	char(100)		Yes	NULL				
multi_use	char(3)		No	NF				
floor_area_bldg	int(10)		Yes	NULL				
enclosed_park_area	int(10)		Yes	NULL				
outdoor_park_spaces	int(10)		Yes	NULL				
primary_heat_fuel	char(3)		No	NF				
primary_cool_fuel	char(3)		No	NF				
photos_bldg_exposure	char(3)		No	NF				
floors_above_grade	int(4)		Yes	NULL				
floors_below_grade	int(4)		Yes	NULL				
has_servers	char(3)		No	NF				
build_comments	varchar(1024)		Yes	NULL				
owner_occ_percent	float(6,2)		Yes	NULL				
tenant_occ_percent	float(6,2)		Yes	NULL				
tenant_number	int(4)		Yes	NULL				
construction_year	int(4)		Yes	NULL				

original_floor_area	int(7)		Yes	NULL				
majority_year_built	int(4)		Yes	NULL				
energy_staff	char(3)		No	NF				

5 chiller

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 04:16 PM
Last check: Feb 13, 2013 at 02:45 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
chiller_id	int(10)		Yes	NULL				
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id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(25)		Yes	NULL				
compressor_type	char(3)		No	NF				
num_identical_chillers	int(10)		Yes	NULL				
num_standby_units	int(10)		Yes	NULL				
chiller_age	int(10)		Yes	NULL				
chiller_manufacturer	char(100)		Yes	NULL				
chiller_model_name_num	char(100)		Yes	NULL				
rated_cooling_capacity_	float(12,2)		Yes	NULL				
compressor_design_load_kwh	float(12,2)		Yes	NULL				
compressor_vfd	char(3)		No	NF				
hr_condenser_type	char(3)		No	NF				
hr_fan_control	char(3)		No	NF				
hr_num_identical_condensers	int(10)		Yes	NULL				
hr_num_units_standby	int(10)		Yes	NULL				
hr_motor_hp	float(12,2)		Yes	NULL				
hr_ems_control	char(3)		No	NF				
primary_num_identical_pumps	int(10)		Yes	NULL				

primary_num_standby_units	int(10)		Yes	NULL				
primary_motor_hp	float(12,2)		Yes	NULL				
secondary_num_identical_pumps	int(10)		Yes	NULL				
secondary_num_standby_units	int(10)		Yes	NULL				
secondary_motor_hp	float(12,2)		Yes	NULL				
secondary_capacity_control	char(3)		No	NF				
secondary_ems_control	char(3)		No	NF				

6 compressor

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 03:59 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
space_id	char(3)		No	NF				
compressor_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
compressor_type	char(3)		No	NF				
system_type	char(3)		No	NF				
design_suction	char(3)		No	NF				
total_hp	float(12,2)		Yes	NULL				
quantity	int(10)		Yes	NULL				
standy_units_num	int(10)		Yes	NULL				
compressor_vsd	char(3)		No	NF				
float_head_pres_control	char(3)		No	NF				
heat_recovery_type	char(3)		No	NF				

7 condenser

Creation: Jan 18, 2013 at 06:17 AM
Last update: Jan 18, 2013 at 09:03 AM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
condenser_id	int(3)		Yes	NULL				
condenser_type	char(3)		No	NF				
condenser_fan_hp	float(12,2)		Yes	NULL				
fan_vsd	char(3)		No	NF				
condenser_pump_hp	float(12,2)		Yes	NULL				
pump_vsd	char(3)		No	NF				

8 contents

Creation: Jan 10, 2013 at 10:07 AM
Last update: Jan 18, 2013 at 07:55 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
contentsindex	int(2)		Yes	NULL				
pagephp	varchar(30)		Yes	NULL				
pagename	varchar(85)		Yes	NULL				
pagenameabv	varchar(20)		Yes	NULL				
contentspage	int(1)		Yes	NULL				
dropdown	int(1)		Yes	NULL				
nonavigation	int(1)		Yes	NULL				

9 displaycases

Creation: Jan 17, 2013 at 06:46 PM
Last update: Jan 17, 2013 at 07:48 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
display_case_id	int(3)		Yes	NULL				
display_case_type	char(3)		No	NF				
length	float(6,2)		Yes	NULL				
doors	char(3)		No	NF				
anti_sweat	char(3)		No	NF				
lighting_type	char(3)		No	NF				
watts_per_lamp	float(6,2)		Yes	NULL				
total_number_lamps	float(6,2)		Yes	NULL				

10 econequip

Creation: Jan 18, 2013 at 09:00 AM
Last update: Jan 18, 2013 at 10:04 AM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
guest_rooms	int(10)		Yes	NULL				
average_occupancy	float(12,2)		Yes	NULL				
inunit_cooking	char(3)		No	NF				
surgery_rooms	int(10)		Yes	NULL				
beds	int(10)		Yes	NULL				
patient_rooms	int(10)		Yes	NULL				
xray_machines	int(10)		Yes	NULL				
ct_scan	int(10)		Yes	NULL				
mri_machines	int(10)		Yes	NULL				
dialysis_machines	int(10)		Yes	NULL				
ultrasound_machines	int(10)		Yes	NULL				
linear_accelerator	int(10)		Yes	NULL				
health_air_compressors	float(12,2)		Yes	NULL				
office_occupants	int(10)		Yes	NULL				
laptops	int(10)		Yes	NULL				
desktops	int(10)		Yes	NULL				
additional_monitors	int(10)		Yes	NULL				
printers_copiers	int(10)		Yes	NULL				
tvs	int(10)		Yes	NULL				
school_classrooms	int(10)		Yes	NULL				
current_students	int(10)		Yes	NULL				
student_capacity	int(10)		Yes	NULL				
forklifts	int(10)		Yes	NULL				
charging_stations	int(10)		Yes	NULL				

warehouse_air_compressors	float(12,2)		Yes	NULL				

11 electricmeter

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 05:46 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
electricmeter_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
elec_utility_name	varchar(50)		Yes	NULL				
elec_meter_number	varchar(35)		Yes	NULL				
space_id_served	char(3)		No	NF				
meter_with_exterior	char(3)		No	NF				

12 energysource

Creation: Jan 18, 2013 at 04:23 PM
Last update: Jan 18, 2013 at 05:56 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
electricity	char(3)		No	NF				
natural_gas	char(3)		No	NF				
oil	char(3)		No	NF				
propane	char(3)		No	NF				
purchased_heat	char(3)		No	NF				
purchased_cooling	char(3)		No	NF				
wood	char(3)		No	NF				
other	char(3)		No	NF				

13 floor

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 06:46 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
floor_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(4)		No	NF				
floor_type	char(3)		No	NF				
floor_insulation	char(3)		No	NF				

14 gasmeter

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 06:16 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
gasmeter_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
gas_utility_name	varchar(50)		Yes	NULL				
gas_meter_number	varchar(35)		Yes	NULL				
space_id_served	char(3)		No	NF				

15 generation

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 06:46 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
generation_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
generation_type	varchar(4)		No	NF				
fuel_type	char(3)		No	NF				
fuel_type_other	varchar(50)		Yes	NULL				
total_capacity	int(11)		Yes	NULL				
cogeneration	char(3)		No	NF				
runtime	char(3)		No	NF				
backup_tested	float(5,2)		Yes	NULL				
grid_connected	char(3)		No	NF				
elec_meter	varchar(35)		Yes	NULL				
gas_meter	varchar(35)		Yes	NULL				
space_id_served	char(3)		No	NF				

16 history

Creation: Jan 18, 2013 at 06:52 PM
Last update: Jan 18, 2013 at 07:52 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
history_id	int(3)		Yes	NULL				
lighting_repl_ren	char(3)		No	NF				
lighting_years_ago	int(3)		Yes	NULL				
lighting_impacted	float(9,2)		Yes	NULL				
lighting_anticipate	char(3)		No	NF				
hvac_repl_ren	char(3)		No	NF				
hvac_years_ago	int(3)		Yes	NULL				
hvac_impacted	float(9,2)		Yes	NULL				
hvac_anticipate	char(3)		No	NF				
hvac_controls_repl_ren	char(3)		No	NF				
hvac_controls_years_ago	int(3)		Yes	NULL				
hvac_controls_impacted	float(9,2)		Yes	NULL				
hvac_controls_anticipate	char(3)		No	NF				
refrigeration_repl_ren	char(3)		No	NF				
refrigeration_years_ago	int(3)		Yes	NULL				
refrigeration_impacted	float(9,2)		Yes	NULL				
refrigeration_anticipate	char(3)		No	NF				
windows_repl_ren	char(3)		No	NF				
windows_years_ago	int(3)		Yes	NULL				
windows_impacted	float(9,2)		Yes	NULL				

windows_anticipate	char(3)		No	NF				
insulation_repl_ren	char(3)		No	NF				
insulation_years_ago	int(3)		Yes	NULL				
insulation_impacted	float(9,2)		Yes	NULL				
insulation_anticipate	char(3)		No	NF				
contact_name	varchar(100)		Yes	NULL				
contact_phone	varchar(50)		Yes	NULL				
contact_email	varchar(100)		Yes	NULL				

17 hvac

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 03:45 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
hvac_id	int(5)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(4)		No	NF				
hvac_system_type	char(4)		No	NF				
hvac_units_networked	char(2)		No	NF				
hvac_units_network_how	char(2)		No	NF				
hvac_num_identical_units	int(4)		Yes	NULL				
hvac_age	int(4)		Yes	NULL				
hvac_manuf	varchar(50)		Yes	NULL				
hvac_model	varchar(50)		Yes	NULL				
hvac_supply_fan_hp	float(9,2)		Yes	NULL				
hvac_return_fan_hp	float(9,2)		Yes	NULL				
hvac_cooling_type	char(3)		No	NF				
hvac_cool_capacity	float(9,2)		Yes	NULL				
hvac_fan_control	char(3)		No	NF				
hvac_ventilation_air	char(3)		No	NF				
hvac_economizer	char(3)		No	NF				
primary_fuel_type	char(3)		No	NF				

primary_heating_type	char(3)		No	NF				
primary_rated_heat_cap	float(9,2)		Yes	NULL				
primary_heat_cap_units	char(4)		No	NF				
secondary_heat_source	char(4)		No	NF				
vav_terminal_type	char(4)		No	NF				
secondary_fuel_type	char(3)		No	NF				
temp_control_type	char(3)		No	NF				
demand_control_vent	char(3)		No	NF				

18 indoorlight

Creation: Feb 15, 2013 at 10:59 AM
Last update: Feb 15, 2013 at 11:59 AM
Last check: Feb 15, 2013 at 10:59 AM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
indoorlight_id	char(20)		Yes	NULL				
subspace_type	char(10)		No	NF				
area	float(12,2)		Yes	NULL				
ceiling_height	float(12,2)		Yes	NULL				
fixture_height	float(12,2)		Yes	NULL				
fixture_type_id	char(3)		No	NF				
fixture_controls	char(3)		No	NF				
light_load_controlled	float(12,2)		Yes	NULL				
controls_functional	char(3)		No	NF				
total_fixture_count	int(10)		Yes	NULL				

19 lightschedule

Creation: Jan 18, 2013 at 11:08 AM
Last update: Jan 18, 2013 at 12:25 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
fixture_type_id	char(20)		Yes	NULL				
fixture_type	char(100)		Yes	NULL				
lamp_type	char(100)		Yes	NULL				
lamp_details	char(100)		Yes	NULL				
num_lamps	int(10)		Yes	NULL				
watts_lamp	float(12,2)		Yes	NULL				
source	char(100)		Yes	NULL				
ballast_type_	char(100)		Yes	NULL				
ballast_factor	float(12,2)		Yes	NULL				

20 miscequip

Creation: Jan 18, 2013 at 09:49 AM
Last update: Jan 18, 2013 at 11:02 AM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
number_of_rooms	int(10)		Yes	NULL				
seating_capacity	int(10)		Yes	NULL				
events_held_last_year	int(10)		Yes	NULL				
point_of_use_terminals	int(10)		Yes	NULL				
charging_stations	int(10)		Yes	NULL				
food_prep_meat_dept	char(3)		No	NF				
food_prep_bakery	char(3)		No	NF				
food_prep_deli	char(3)		No	NF				
pool_indoor	float(12,2)		Yes	NULL				
pool_outdoor	float(12,2)		Yes	NULL				
pool_fuel	char(3)		No	NF				
hot_tub_indoor	float(12,2)		Yes	NULL				
hot_tub_outdoor	float(12,2)		Yes	NULL				
hot_tub_fuel	char(3)		No	NF				
laundry_type	char(3)		No	NF				
laundry_done_onsite	float(12,2)		Yes	NULL				
electric_clothes_dryer	int(10)		Yes	NULL				
gas_clothes_dryer	int(10)		Yes	NULL				
fume_hood	int(10)		Yes	NULL				
fume_hood_control_system	float(12,2)		Yes	NULL				

21 outdoorlight

Creation: Jan 18, 2013 at 10:26 AM
Last update: Jan 18, 2013 at 11:29 AM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
fixture_type_id	char(20)		Yes	NULL				
out_light_use_type	char(3)		No	NF				
num_fixtures	int(10)		Yes	NULL				
out_light_control_type	char(3)		No	NF				
out_controls_used	char(3)		No	NF				

22 qcna

Creation: Feb 14, 2013 at 02:18 PM
Last update: Feb 14, 2013 at 03:18 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
qnindex	int(5)		No		auto_increment			
qnid	int(5)		No					
sikey	int(11)		Yes	NULL				
bhna	tinyint(1)		No	0				
bhqc	tinyint(1)		No	0				
bina	tinyint(1)		No	0				
biqc	tinyint(1)		No	0				
bona	tinyint(1)		No	0				
boqc	tinyint(1)		No	0				
chna	tinyint(1)		No	0				
chqc	tinyint(1)		No	0				
cmna	tinyint(1)		No	0				
cmqc	tinyint(1)		No	0				
cnna	tinyint(1)		No	0				
cnqc	tinyint(1)		No	0				
dcna	tinyint(1)		No	0				
dcqc	tinyint(1)		No	0				
eena	tinyint(1)		No	0				
eeqc	tinyint(1)		No	0				
emna	tinyint(1)		No	0				
emqc	tinyint(1)		No	0				
esna	tinyint(1)		No	0				
esqc	tinyint(1)		No	0				
flna	tinyint(1)		No	0				
flqc	tinyint(1)		No	0				
gmna	tinyint(1)		No	0				
gmqc	tinyint(1)		No	0				
gnna	tinyint(1)		No	0				
gnqc	tinyint(1)		No	0				
gsna	tinyint(1)		No	0				
gsqc	tinyint(1)		No	0				
hana	tinyint(1)		No	0				
haqc	tinyint(1)		No	0				
hdna	tinyint(1)		No	0				
hdqc	tinyint(1)		No	0				
lona	tinyint(1)		No	0				
loqc	tinyint(1)		No	0				
lsna	tinyint(1)		No	0				

lsqc	tinyint(1)		No	0				
mena	tinyint(1)		No	0				
meqc	tinyint(1)		No	0				
olna	tinyint(1)		No	0				
olqc	tinyint(1)		No	0				
rona	tinyint(1)		No	0				
roqc	tinyint(1)		No	0				
rrna	tinyint(1)		No	0				
rrqc	tinyint(1)		No	0				
rwna	tinyint(1)		No	0				
rwqc	tinyint(1)		No	0				
scna	tinyint(1)		No	0				
scqc	tinyint(1)		No	0				
sena	tinyint(1)		No	0				
seqc	tinyint(1)		No	0				
skna	tinyint(1)		No	0				
skqc	tinyint(1)		No	0				
wana	tinyint(1)		No	0				
waqc	tinyint(1)		No	0				
whna	tinyint(1)		No	0				
whqc	tinyint(1)		No	0				
wina	tinyint(1)		No	0				
wiqc	tinyint(1)		No	0				

23 reachin

Creation: Jan 17, 2013 at 06:34 PM
Last update: Jan 17, 2013 at 07:34 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
reach_in_id	int(6)		Yes	NULL				
reach_in_type	char(3)		No	NF				
doors	char(3)		No	NF				
door_length	float(6,2)		Yes	NULL				
length	float(6,2)		Yes	NULL				
lighting_type	char(3)		No	NF				
watts_per_lamp	float(6,2)		Yes	NULL				
total_number_lamps	int(6)		Yes	NULL				

24 roof

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 03:45 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
roof_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(4)		No	NF				
roof_type	char(3)		No	NF				
roof_surface_material	char(3)		No	NF				
roof_deck_material	char(3)		No	NF				
roof_insulation_material	char(3)		No	NF				
roof_sf	int(11)		Yes	NULL				

25 schedule

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 03:45 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
schedule_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	int(3)		Yes	NULL				
open_hrs_week	float(9,2)		Yes	NULL				
occupied_hrs_week	float(9,2)		Yes	NULL				
weeks_occupied	int(3)		Yes	NULL				
seasonal_fluctuate	char(3)		No	NF				
weeks_high_season	float(9,2)		Yes	NULL				
weeks_open_high_season	float(9,2)		Yes	NULL				

26 server

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 03:45 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
data_center_id	int(6)		Yes	NULL				
server_id	tinyint(1)		No	0				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_type	char(3)		No	NF				
total_server_floor_area	float(12,2)		Yes	NULL				
total_num_racks	int(6)		Yes	NULL				
num_racks_not_in_use	int(6)		Yes	NULL				
total_elec_load	int(6)		Yes	NULL				
sep_elec_meter	char(3)		No	NF				
av_elec_load	float(12,2)		Yes	NULL				
degree_virtualization	float(12,2)		Yes	NULL				
dedicated_air_cond	char(3)		No	NF				
hvac_characterization	char(3)		No	NF				
num_crac	int(4)		Yes	NULL				
cooling_system_cap	int(10)		Yes	NULL				
economizer	char(3)		No	NF				

27 sites

Creation: Jan 18, 2013 at 06:54 PM
Last update: Feb 15, 2013 at 11:47 AM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
site_id	int(11)		No		auto_increment			
sikey	int(10)		No	0				
surveyor_name	varchar(50)		Yes	NULL				
survey_completion_date	date		Yes	NULL				
site_name	varchar(100)		Yes	NULL				
site_address	varchar(100)		Yes	NULL				
city	varchar(100)		Yes	NULL				
state	varchar(2)		Yes	NULL				
zip	int(5)		Yes	NULL				
contact1	varchar(50)		Yes	NULL				
title1	varchar(100)		Yes	NULL				
address1	varchar(100)		Yes	NULL				
city1	varchar(100)		Yes	NULL				
state1	varchar(2)		Yes	NULL				
zip1	int(5)		Yes	NULL				
phone1a	varchar(20)		Yes	NULL				
phone1b	varchar(20)		Yes	NULL				
email1	varchar(100)		Yes	NULL				
contact2	varchar(50)		Yes	NULL				
title2	varchar(100)		Yes	NULL				
address2	varchar(100)		Yes	NULL				
city2	varchar(100)		Yes	NULL				
state2	varchar(2)		Yes	NULL				
zip2	int(5)		Yes	NULL				
phone2a	varchar(20)		Yes	NULL				
phone2b	varchar(20)		Yes	NULL				

email2	varchar(100)		Yes	NULL				
sistatus1	char(20)		Yes	NULL				
sischeddatetime1	double(16,9)		No	0.000000000				
sianid1	int(11)		No	0				
sischedanid1	int(11)		No	0				
sistatus2	char(20)		Yes	NULL				
sischeddatetime2	double(16,9)		No	0.000000000				
sianid2	int(11)		No	0				
sischedanid2	int(11)		No	0				
sistatus3	char(20)		Yes	NULL				
sischeddatetime3	double(16,9)		No	0.000000000				
sianid3	int(11)		No	0				
sischedanid3	int(11)		No	0				
sinotes	varchar(1024)		No					
buildinginfo_notes	varchar(1024)		Yes	NULL				
econequip_notes	varchar(1024)		Yes	NULL				
miscequip_notes	varchar(1024)		Yes	NULL				
outdoorlight_notes	varchar(1024)		Yes	NULL				
energysource_notes	varchar(1024)		Yes	NULL				
history_notes	varchar(1024)		Yes	NULL				

28 sites_or

Creation: Oct 15, 2012 at 06:04 PM
Last update: Oct 15, 2012 at 06:17 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
sikey	int(10)		No	0				
siproject_no	char(20)		Yes	NULL				
sisamplecat	char(15)		Yes	NULL				
siprogram	char(3)		No	ALL				
sistratum	smallint(6)		No	0				
siregion	char(8)		Yes	NULL				
sibuildtype	char(2)		No	NF				
siutility	char(15)		Yes	NULL				
sitotalkwhperyear	int(15)		No	0				
sicustomername	char(60)		Yes	NULL				
sicontact	char(50)		Yes	NULL				
siaddress	char(40)		Yes	NULL				
siapt	char(35)		Yes	NULL				
sicity	char(35)		Yes	NULL				
sistate	char(2)		Yes	NULL				
sizip	int(5)		Yes	NULL				
siemail	char(60)		Yes	NULL				
siphone	char(30)		Yes	NULL				
sialtphone	char(30)		Yes	NULL				
sitype	char(2)		No	NF				
siaccount	char(12)		Yes	NULL				
siservice	char(9)		Yes	NULL				
sibuilding	char(32)		Yes	NULL				
sikwhsavings	int(11)		No	0				
sikwsavings	float(7,1)		No	0.0				
sistatus1	char(20)		Yes	NULL				
sischeddatetime1	double(16,9)		No	0.000000000				
sianid1	int(11)		No	0				
sischedanid1	int(11)		No	0				
sistatus2	char(20)		Yes	NULL				
sischeddatetime2	double(16,9)		No	0.000000000				
sianid2	int(11)		No	0				
sischedanid2	int(11)		No	0				
sistatus3	char(20)		Yes	NULL				

sischeddatetime3	double(16,9)		No	0.000000000				
sianid3	int(11)		No	0				
sischedanid3	int(11)		No	0				
sinotes	varchar(1024)		No					

29 skylight

Creation: Feb 13, 2013 at 02:45 PM
Last update: Feb 13, 2013 at 03:45 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
skylight_id	int(11)		No					
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(4)		No	NF				
skylights_present	char(4)		No	NF				
sky_distributed	char(4)		No	NF				
sky_square_ft	int(6)		Yes	NULL				
sky_dimming_control	char(3)		No	NF				

30 space

Creation: Jan 18, 2013 at 05:24 PM
Last update: Jan 18, 2013 at 06:29 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
space_id	int(3)		Yes	NULL				
functional_use	char(3)		No	NF				
functional_use_other	varchar(100)		Yes	NULL				
use_percent	float(9,2)		Yes	NULL				
space_cooled	char(3)		No	NF				
after_hours_shutoff_cool	char(3)		No	NF				
space_heated	char(3)		No	NF				
after_hours_shutoff_heat	char(3)		No	NF				

31 statuslist

Creation: Oct 15, 2012 at 06:04 PM
Last update: Oct 15, 2012 at 06:17 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
pdkeyname	char(30)		Yes	NULL				
pdsort	int(11)		No	0				
pdcode	char(8)		Yes	NULL				
pddesc	char(100)		Yes	NULL				
pdstatus	char(20)		Yes	NULL				

32 tracking

Creation: Feb 12, 2013 at 05:40 AM
Last update: Feb 15, 2013 at 11:47 AM
Last check: Feb 12, 2013 at 05:40 AM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
tracking_id	int(11)		No		auto_increment			
trkeyname	char(30)		Yes	NULL				
trkeyvalue	char(255)		Yes	NULL				
trsikey	int(11)		Yes	NULL				
trprojectflag	tinyint(2)		Yes	NULL				
trdatetime	double(16,9)		No	0.000000000				
trcreatedate	double(16,9)		No	0.000000000				
trupdatedate	double(16,9)		No	0.000000000				
trdatafirst	char(30)		Yes	NULL				
trdatalast	char(30)		Yes	NULL				
trstatus	char(8)		Yes	NULL				
tranid	int(11)		No	0				
trfiletype	char(2)		No	NF				
trcomment	char(255)		Yes	NULL				
trstage	smallint(6)		No	1				
trdataanid	int(11)		No	0				

33 walkin

Creation: Jan 17, 2013 at 06:34 PM
Last update: Jan 17, 2013 at 07:35 PM
Last check: Jan 17, 2013 at 06:34 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
walkin_id	int(6)		Yes	NULL				
walkin_type	char(30)		No	NF				
temp_type	char(30)		No	NF				
area	int(6)		Yes	NULL				
strip_curtains	char(3)		No	NF				
lighting_type	char(3)		No	NF				
watts_per_lamp	float(6,2)		Yes	NULL				
total_number_lamps	int(6)		Yes	NULL				

34 wall

Creation: Feb 07, 2013 at 08:53 AM
Last update: Feb 07, 2013 at 10:43 AM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
wall_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(4)		No	NF				
walls_surface_type	char(3)		No	NF				
walls_framing_type	char(3)		No	NF				
walls_ins_material	char(3)		No	NF				

35 waterheat

Creation: Feb 13, 2013 at 02:46 PM
Last update: Feb 13, 2013 at 03:46 PM

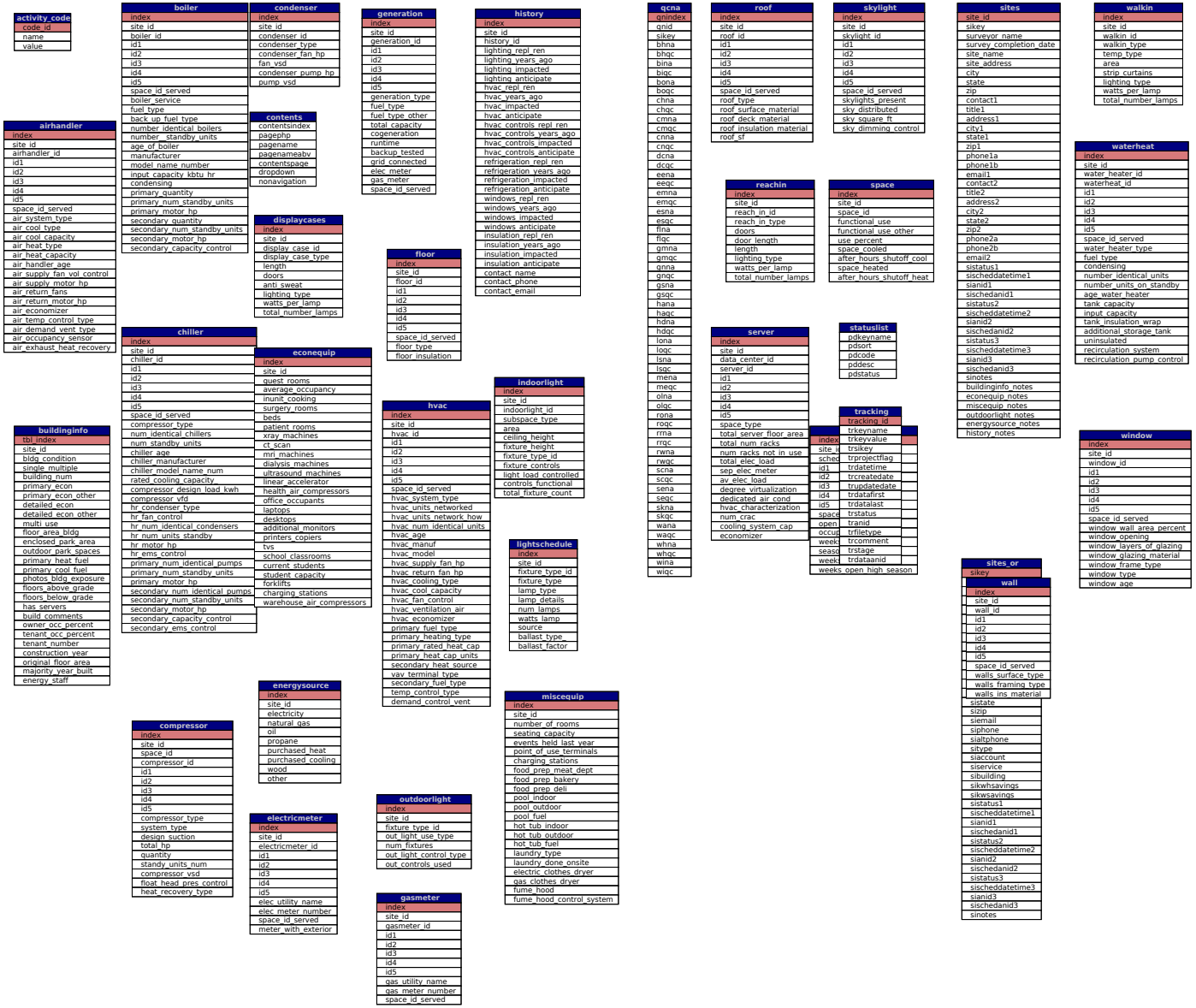
Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
water_heater_id	int(3)		Yes	NULL				
waterheat_id	tinyint(1)		No	0				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(3)		No	NF				
water_heater_type	char(3)		No	NF				
fuel_type	char(3)		No	NF				
condensing	char(3)		No	NF				
number_identical_units	int(10)		Yes	NULL				
number_units_on_standby	int(10)		Yes	NULL				
age_water_heater	int(10)		Yes	NULL				
tank_capacity	float(12,2)		Yes	NULL				
input_capacity	float(12,2)		Yes	NULL				
tank_insulation_wrap	char(3)		No	NF				
additional_storage_tank	int(10)		Yes	NULL				
uninsulated	int(10)		Yes	NULL				
recirculation_system	char(3)		No	NF				
recirculation_pump_control	char(3)		No	NF				

36 window

Creation: Feb 13, 2013 at 02:46 PM
Last update: Feb 13, 2013 at 03:46 PM

Column	Type	Attributes	Null	Default	Extra	Links to	Comments	MIME
index	int(11)		No		auto_increment			
site_id	int(11)		No					
window_id	int(3)		Yes	NULL				
id1	tinyint(1)		No	0				
id2	tinyint(1)		No	0				
id3	tinyint(1)		No	0				
id4	tinyint(1)		No	0				
id5	tinyint(1)		No	0				
space_id_served	char(4)		No	NF				
window_wall_area_percent	float(9,2)		Yes	NULL				
window_opening	char(3)		No	NF				
window_layers_of_glazing	char(3)		No	NF				
window_glazing_material	char(3)		No	NF				
window_frame_type	char(3)		No	NF				
window_type	char(3)		No	NF				
window_age	char(20)		No	NF				

CbsaSchema1



NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX H
CBSA Full DB Data Dictionary

Prepared for:
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December 5, 2015

2013 CBSA Full DB Data Dictionary

This data dictionary provides details on each of the variables found in the 2013 CBSA Database. Each table of data found in the database is separated into its own tab in this file. Each tab contains the FACT database variable name, the associated survey question, a detailed description of each variable, and a definition of each coded value assigned to that variable. Below is a brief description of each data table and the associated tab name.

Table Name	Tab Name	Table Description
Sites	*Sites*	General site contact information
Building Information	*Building Info*	General Building Information
Building Renovation History	*Renovation*	History of renovations on the building and future renovation plans
Mixed Use	*Mixed Use*	Identifies if a building is mixed use and gives information on the mixed use
General Space Information	*Spaces*	Identifies and defines the major different spaces of a building
Schedule	*Schedule*	Building Schedule identification
Hours	*Hours*	Hours for the identified schedule from the *Schedule* table (relational)
Energy Sources	*Energy Sources*	Identifies all the energy sources used on site
Electric Meters	*Electric Meters*	Additional information on the electric meter
Gas Meters	*Gas Meters*	Additional information on the gas meter
Onsite Generation	*Generation*	Characterizes any on-site power generation
Walls	*Walls*	Provides information on the building walls
Windows	*Windows*	Provides information on the building window(s)
Roofs	*Roofs*	Provides information on the building roof(s)
Floors	*Floors*	Provides information on the building floor(s)
HVAC Summary	*HVAC Summary*	Provides an overall description of the building's HVAC description
Single Zone HVAC	*SZ HVAC*	Characterizes any Single Zone HVAC Systems onsite
Multi-Zone HVAC	*MZ HVAC*	Characterizes any Multi Zone HVAC Systems onsite
Boilers	*Boilers*	Characterizes any boilers found onsite
Chillers	*Chillers*	Characterizes any chillers found onsite
Building Controls	*Building Controls*	Provides detailed information on the building HVAC Controls
Water Heaters	*Water Heat*	Characterizes any Water Heaters or Dedicated DHW Boilers onsite
Indoor/Outdoor Fixture Schedule	*Light Schedule*	Lists all of the indoor and outdoor fixtures onsite
Lighting Summary	*Light Summary*	Describes the building lighting system
Indoor Lighting	*Indoor Lights*	Identifies the Lighting Spaces, Subspaces and the sampled/total area of these subspaces
Indoor Fixture Takeoff	*Fixture Takeoff*	Lists all of the indoor lighting fixtures (defined in *Light Schedule* table) associated with each subspace area identified in *Indoor Lighting* table (relational)
Indoor Fixture Controls	*Fixture Controls*	Details the lighting controls for each of the lighting fixtures identified in *Fixture Takeoff* table (relational)
Outdoor Lighting	*Outdoor Lights*	Lists all of the outdoor lighting fixtures (defined in *Light Schedule* table
Food Service Equipment	*Food Equip*	Provides information on Kitchens, Food Service Equipment, and Plug Load Refrigerators
Miscellaneous Equipment	*Misc Equip*	Provides information on Pools, Spas, Laundry and Laboratory equipment
Economic Use Equipment	*Econ Misc Equip*	Provides information on miscellaneous equipment for all buildings and by economic use
Refrigeration Compressors	*Compressors*	Characterizes the Refrigeration Compressors onsite
Refrigeration Condensers	*Condensers*	Characterizes the Refrigeration Condensers onsite
Refrigerated Dispay Cases	*Display Cases*	Details all Refrigerated Display Cases onsite
Refrigerated Walk-ins/Storage Boxes	*Walk-ins*	Details all Refrigerated Reach-ins onsite
Refrigerated Reach-ins	*Reach-ins*	Details all Refrigerated Walk-ins/Storage Boxes onsite
Servers/Data Centers	*Servers*	Provides information on the server rooms and equipment onsite

Sites

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
site_id	NA	Unique site ID	NA
surveyor_name	NA	Name of surveyor	NA
survey_completion_date	NA	Date survey completed	NA
building_name	NA	Name of building	NA
physical_street_address	NA	Building street address	NA
city	NA	Building city	NA
site_state	NA	State	NA
five_digit_zip	NA	Zip	NA
contact1	NA	Contact 1 name	NA
title1	NA	Contact 1 title	NA
address1	NA	Contact 1 street address	NA
city1	NA	Contact 1 city	NA
state1	NA	Contact 1 state	NA
zip1	NA	Contact 1 zip	NA
site_phone	NA	Contact 1 main phone	NA
phone1b	NA	Contact 1 secondary phone	NA
email1	NA	Contact 1 email	NA
contact2	NA	Contact 2 name	NA
title2	NA	Contact 2 title	NA
address2	NA	Contact 2 street address	NA
city2	NA	Contact 2 city	NA
state2	NA	Contact 2 state	NA
zip2	NA	Contact 2 zip	NA
phone2a	NA	Contact 2 main phone	NA
phone2b	NA	Contact 2 secondary phone	NA
email2	NA	Contact 2 email	NA
primary_electric_service	NA	Electric utility provider	NA
primary_gas_service	NA	Gas utility provider	NA

Building Info

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
tbl_index		Buidling Info Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
bldg_condition	Is the site building primarily: Functional Demolished Vacant Inaccessible	Indicates the building condition or status. Either Functional, Demolished, Vacant, or Inaccessible	F = Functional D = Demolished V = Vacant I = Inaccessible
single_multiple	Is this site a **S**ingle building or a **M**ultiple building Complex	Indicates whether the site is contained in a single building or multiple buildings (e.g., Microsoft campus).	S = Single M = Multiple
building_num	If the site is part of a **M**ultiple building complex, how many buildings are in the complex?	Indicates the number of buildings in a multiple building complex. (0 for Single Buildings)	
primary_econ	What best describes the primary economic use of the building/complex?	Indicates the primary economic use of the building/complex from the Primary Economic Use. If the building type chosen is "'12. Other,"' describe the building.	1.) Assembly 2.) Grocery 3.) Retail/Service 4.) Hospital 5.) Lodging 6.) Residential Care 7.) Office 8.) Restaurant 9.) School K-12 10.) University 11.) Warehouse 12.) Other 13.) Unsampled
primary_econ_other	If Other, Describe:	If the building type cannot be classified by the Primary Economic Use Table, describe the building.	
detailed_econ	What best describes the detailed economic use of the building/complex?	Indicate the detailed economic use of the building/complex from the Detailed Building Type Codes Table (see table below).	Table Below
detailed_econ_other	If Other, Describe:	If the building's detailed economic use cannot be classified from the Detailed Building Type Codes Table, describe the building.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
floor_area_bldg	Total Bldg. Floor Area (SQFT) not including parking garage (excludes residential)	Total building floor area excluding the parking garage area and residential area.	
enclosed_park_area	Parking garage floor area (SQFT)	Parking garage floor area.	
first_floor_perimeter	First floor perimeter (FT)	First floor perimeter of the surveyed building.	
upper_floor_perimeter	Typical upper floor perimeter (FT)	Typical upper floor perimeter of the surveyed building.	
floor_to_floor_height	Floor to floor height (FT)	Average or typical floor to floor height for the surveyed building. Use floor to roof/ceiling insulation height in 1 story buildings, and use average floor to floor height in buildings < 5 floors with very different first floors.	
outdoor_park_spaces	If dedicated outdoor parking lot spaces with exterior lighting (# of spaces)	Number of dedicated outdoor parking spaces for the surveyed building/complex serviced by outdoor lighting fixtures that are fed through the building meter. This parameter may be estimated. Entered zero if none, -1 if # of parking space fed by building meter unknown.	
heating_fuel	Primary Heating Fuel	Indicate the primary heating fuel of the building/complex from the Fuel Type Codes Table. In buildings with multizone systems with reheat, the reheat fuel should be considered primary. In buildings with heat pump loops, electric is the primary fuel.	1.) Electricity 2.) Natural Gas 3.) Oil 4.) Propane 5.) Purchased Steam 6.) Purchased Hot Water 7.) Other 0.) None
heating_fuel_other		Filled if heating fuel type is 7 - Other	
cooling_fuel	Primary Cooling Fuel	Indicate the primary cooling fuel of the building/complex from the Fuel Type Codes	1.) Electricity 2.) Natural Gas 3.) Oil 4.) Propane 5.) Purchased Steam 6.) Purchased Hot Water 7.) Other 0.) None
cooling_fuel_other		Filled if cooling fuel type is 7 - Other	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
photos_bldg_exposure	Photos taken of each building exposure	Surveyors should take digital photos of each building/complex exposure and any unusual items or items requiring additional clarification. All photos must be uploaded to FACT.	
floors_above_grade	No. of Floors below grade	Number of floors above grade (Typically the number of floors above the basement).	
floors_below_grade	Primary Heating Fuel	Number of floors below grade. (Typically the number of basement and sub-floors).	
has_servers	Are there areas within bldg. dedicated to holding computer servers?	If yes, server table should be filled	
build_comments	Additional comments:	Capture any additional context that will help inform the interview responses for the above questions. Also, capture any other changes mentioned that could impact energy use (e.g. additional floor area being added in the next 2 years)	
owner_occ_percent	What percentage of the building/complex is occupied by the Owner and/or Tenants?	What percentage of the building/complex is occupied by the owner of the building (% owner), and what percentage of the building/complex is occupied by a tenant (% tenant). An example of an owner occupied building would be a family-owned	
tenant_occ_percent			
tenant_number	Number of tenants currently in space	Approximate number of tenants that occupy the building/complex being audited. Do not include the owner.	
construction_year	Original Year of Construction	Original year or building/complex construction (not major renovation).	
original_floor_area	Original Total Floor Area (SQFT)	Original building/complex floor area (prior to major renovation or expansions). This field ***includes*** parking garage floor area.	
majority_year_built	Year of Construction for majority of building (by floor area)	The year of construction for a majority of the building/complex (by floor area).	
energy_staff	Is there a staff person whose duties include energy conservation and/or management?	Applicable energy conservation and/or management staff would be a facilities engineer managing EMS controls, conservation program lead, etc. (Y/N)	
percent_facade_lit	% façade Lit?	Percentage of the exterior building façade that is lit	

Detailed Economic Use Description	Associated Primary Economic Use
ARENA	Assembly
AUDITORIUM	Assembly
BOAT SLIPS, MARINA, YACHT CLUB	Assembly
BOWLING ALLEY	Assembly
CASINO	Assembly
CLUB, LODGES	Assembly
COMMUNITY CENTER	Assembly
CONVENTION CENTER	Assembly
GYM, EXERCISE	Assembly
HEALTH SPA	Assembly
ICE SKATING	Assembly
LIBRARY	Assembly
MUSEUM	Assembly
MOVIE THEATER	Assembly
PERFORMING ARTS THEATER	Assembly
POOL	Assembly
RECREATION CENTER	Assembly
RELIGIOUS ASSEMBLY	Assembly
ROLLER SKATING	Assembly
SENIOR CENTER	Assembly
OTHER ASSEMBLY	Assembly
CONVENIENCE STORE (<=5,000SF)	Grocery
GROCERY (> 5000SF)	Grocery
GAS STATION WITH A CONVENIENCE STORE	Grocery
OTHER GROCERY	Grocery
AUTO PARTS	Retail
AUTO/BOAT DEALER/ SHOWRM	Retail
BEAUTY / BARBER	Retail
BEER, WINE, OR LIQUOR STORE	Retail
CAR WASH	Retail
CLOTHING	Retail
DEPARTMENT STORE	Retail

Detailed Economic Use Description	Associated Primary Economic Use
DEPT. STORE W/ GROCERY	Retail
DRY CLEANER	Retail
ELECRONICS/APPLIANCES	Retail
FLORIST, NURSERY	Retail
HARDWARE	Retail
HOME IMPROVEMENT	Retail
LAUNDROMAT (SELF-SERVICE)	Retail
PHARMACY	Retail
POST OFFICE	Retail
RENTAL CENTER	Retail
REPAIR SHOP	Retail
STUDIO/GALLERY	Retail
VEHICLE REPAIR	Retail
WAREHOUSE CLUB	Retail
OTHER SPECIALTY MERCHANDISE	Retail
HOSPITAL	Hospital
HOTEL	Lodging
MOTEL	Lodging
BED & BREAKFAST	Lodging
BOARDING/ROOMING HOUSE, APT HOTEL	Lodging
CONVENT OR MONASTERY	Lodging
DORMITORY	Lodging
FRATERNITY, OR SORORITY	Lodging
HALFWAY HOUSE	Lodging
HOTEL - RESORT	Lodging
SHELTER, ORPHANAGE, OR CHILDRENS HOME	Lodging
OTHER LODGING	Lodging
ASSISTED LIVING	Residential Care
IN-PATIENT REHAB	Residential Care
NURSING HOME	Residential Care
RETIREMENT HOME	Residential Care
OTHER RESIDENTIAL CARE	Residential Care

Detailed Economic Use Description	Associated Primary Economic Use
OFFICE- ADMIN, PROFESSIONAL, GOVERNMENT, FINANCIAL	Office
CALL CENTER	Office
CITY HALL	Office
DENTAL OFFICE	Office
MEDICAL CLINIC / OUTPATIENT MEDICAL	Office
MEDICAL OFFICE	Office
MEDICAL URGENT CARE CLINIC	Office
OUTPATIENT REHAB	Office
RETAIL BANKING	Office
SALES OFFICE	Office
VETERINARIAN OFFICE/CLINIC	Office
OTHER OFFICE	Office
BAR, PUB, LOUNGE	Restaurant
CAFETERIA	Restaurant
CATERING SERVICE	Restaurant
COFFEE, DOUGHNUT, OR BAGEL SHOP	Restaurant
FAST FOOD RESTAURANT	Restaurant
ICE CREAM OR FROZEN YOGURT SHOP	Restaurant
SIT DOWN RESTAURANT	Restaurant
TAKE-OUT RESTAURANT	Restaurant
TRUCK STOP	Restaurant
OTHER RESTAURANT	Restaurant
ELEMENTARY SCHOOL	School
MIDDLE SCHOOL	School
HIGH SCHOOL	School
PRE-SCHOOL	School
OTHER K-12 SCHOOL	School
UNIVERSITY / COLLEGE	University
MINISTORAGE	Warehouse
WAREHOUSE, DISTRIBUTION	Warehouse
WAREHOUSE, STORAGE	Warehouse

Detailed Economic Use Description	Associated Primary Economic Use
COLD STORAGE, NON-AMMONIA BASE REFG	Warehouse
OTHER WAREHOUSE	Warehouse
ADULT/CAREER EDUCATION	Other
AIRPLANE HANGER	Other
ASYLUM	Other
COURTHOUSE	Other
CREMATORIUM	Other
DATA CENTER OR SERVER FARM	Other
FIRE STATION	Other
JAIL	Other
POLICE STATION	Other
POLICE & FIRE	Other
PRISON	Other
TELEPHONE SWITCHING	Other
VOCATIONAL TRAINING	Other
OTHER	Other
AGRICULTURE	Unsampled
INDUSTRIAL	Unsampled
COLD STORAGE, AMMONIA	Unsampled
MANUFACTURING	Unsampled
RESIDENTIAL	Unsampled

Renovation History

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
history_index		History Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
ballast_repl_ren	Were any of the Lighting Ballasts ever replaced or renovated?	Yes/No/Unknown if major renovations or replacements took place on the Lighting Ballasts	
fixture_repl_ren	Were any of the Lighting Fixtures ever replaced or renovated?	Yes/No/Unknown if major renovations or replacements took place on the Lighting Fixtures	
control_repl_ren	Were any of the Lighting Controls ever replaced or renovated?	Yes/No/Unknown if major renovations or replacements took place on the Lighting Controls	
hvac_repl_ren	Were any of the HVAC Systems ever replaced or renovated?	Yes/No/Unknown if major renovations or replacements took place on the HVAC Systems	
hvac_control_repl_ren	Were any of the HVAC Controls ever replaced or renovated?	Yes/No/Unknown if major renovations or replacements took place on the HVAC Controls	
refer_repl_ren	Were any of the Refrigeration Systems ever replaced or renovated?	Yes/No/Unknown if major renovations or replacements took place on the Refrigeration Equipment	
window_repl_ren	Were any of the Windows ever replaced or renovated?	Yes/No/Unknown if major renovations or replacements took place on the Windows	
roof_ins_repl_ren	Was the Roof Insulation ever replaced or renovated?	Yes/No/Unknown if major renovations or replacements took place on the Roof Insulation	
ballast_years_ago	Number of years ago that the Lighting Ballasts were renovated or replaced (if applicable)	Number of years ago that the Lighting Ballasts were renovated or replaced (if applicable)	
fixture_years_ago	Number of years ago that the Lighting Fixtures were renovated or replaced (if applicable)	Number of years ago that the Lighting Fixtures were renovated or replaced (if applicable)	
control_years_ago	Number of years ago that the Lighting Controls were renovated or replaced (if applicable)	Number of years ago that the Lighting Controls were renovated or replaced (if applicable)	
hvac_years_ago	Number of years ago that the HVAC Systems were renovated or replaced (if applicable)	Number of years ago that the HVAC Systems were renovated or replaced (if applicable)	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
hvac_control_years_ago	Number of years ago that the HVAC Controls were renovated or replaced (if applicable)	Number of years ago that the HVAC Controls were renovated or replaced (if applicable)	
refer_years_ago	Number of years ago that the Refrigeration Systems were renovated or replaced (if applicable)	Number of years ago that the Refrigeration Systems were renovated or replaced (if applicable)	
window_years_ago	Number of years ago that the Windows were renovated or replaced (if applicable)	Number of years ago that the Windows were renovated or replaced (if applicable)	
roof_ins_years_ago	Number of years ago that the Roof Insulation were renovated or replaced (if applicable)	Number of years ago that the Roof Insulation were renovated or replaced (if applicable)	
ballast_impacted	% of the Lighting Ballasts that were renovated or replaced (if applicable)	The Percentage of the site's total Lighting Ballasts that were renovated or replaced (if applicable)	
fixture_impacted	% of the Lighting Fixtures that were renovated or replaced (if applicable)	The Percentage of the site's total Lighting Fixtures that were renovated or replaced (if applicable)	
control_impacted	% of the Lighting Controls that were renovated or replaced (if applicable)	The Percentage of the site's total Lighting Controls that were renovated or replaced (if applicable)	
hvac_impacted	% of the HVAC Systems that were renovated or replaced (if applicable)	The Percentage of the site's total HVAC Systems that were renovated or replaced (if applicable)	
hvac_control_impacted	% of the HVAC Controls that were renovated or replaced (if applicable)	The Percentage of the site's total HVAC Controls that were renovated or replaced (if applicable)	
refer_impacted	% of the Refrigeration Systems that were renovated or replaced (if applicable)	The Percentage of the site's total Refrigeration Systems that were renovated or replaced (if applicable)	
window_impacted	% of the Windows that were renovated or replaced (if applicable)	The Percentage of the site's total Windows that were renovated or replaced (if applicable)	
roof_ins_impacted	% of the Roof Insulation that were renovated or replaced (if applicable)	The Percentage of the site's total Roof Insulation that were renovated or replaced (if applicable)	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
ballast_anticipate	Are you expecting to replace or renovate the Lighting Ballasts in the next 2 years?	Yes/No/Unknown if major renovations or replacements are anticipated to take place in the next 2 years on the Lighting Ballasts	
fixture_anticipate	Are you expecting to replace or renovate the Lighting Fixtures in the next 2 years?	Yes/No/Unknown if major renovations or replacements are anticipated to take place in the next 2 years on the Lighting Fixtures	
control_anticipate	Are you expecting to replace or renovate the Lighting Controls in the next 2 years?	Yes/No/Unknown if major renovations or replacements are anticipated to take place in the next 2 years on the Lighting Controls	
hvac_anticipate	Are you expecting to replace or renovate the HVAC Systems in the next 2 years?	Yes/No/Unknown if major renovations or replacements are anticipated to take place in the next 2 years on the HVAC Systems	
hvac_control_anticipate	Are you expecting to replace or renovate the HVAC Controls in the next 2 years?	Yes/No/Unknown if major renovations or replacements are anticipated to take place in the next 2 years on the HVAC Controls	
refer_anticipate	Are you expecting to replace or renovate the Refrigeration Equipment in the next 2 years?	Yes/No/Unknown if major renovations or replacements are anticipated to take place in the next 2 years on the Refrigeration Equipment	
window_anticipate	Are you expecting to replace or renovate the Windows in the next 2 years?	Yes/No/Unknown if major renovations or replacements are anticipated to take place in the next 2 years on the Windows	
roof_ins_anticipate	Are you expecting to replace or renovate the Roof Insulation in the next 2 years?	Yes/No/Unknown if major renovations or replacements are anticipated to take place in the next 2 years on the Roof Insulation	
contact_name	Is there someone who we can contact with additional questions about building change history?	Contact Name (PC = Primary Contact)	
contact_phone		Contact Phone Number (PC = Primary Contact)	
contact_email		Contact Email (PC = Primary Contact)	
history_comments	Additional comments:	Capture any additional context that will help inform the interview responses for the above questions. Also, capture any other changes mentioned that could impact energy use (e.g. additional floor area being added in the next 2 years)	

Mixed Use

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
mixed_use_index		Mixed Use Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
mixed_use_id		The Mixed Use ID number	
mixed_use	Is this a mixed-use building / scenario?	Yes or no if the site is a mixed use site or not. Mixed use scenarios occur in strip malls, enclosed malls, and offices buildings with first floor retail/restaurant/grocery, situations where spaces with different businesses and different economic use types occupy the same building/complex. Each group of businesses with different economic use types must be entered as a separate Mixed-Use ID and have its own primary and detailed type.	
primary_econ_type	What best describes the primary economic use of the Mixed Use ID?	Indicates the primary economic use of the Mixed Use ID from the Primary Economic Use. If the building type chosen is "'12. Other,"' describe the building.	1.) Assembly 2.) Grocery 3.) Retail/Service 4.) Hospital 5.) Lodging 6.) Residential Care 7.) Office 8.) Restaurant 9.) School K-12 10.) University 11.) Warehouse 12.) Other 13.) Unsampled
primary_econ_type_other	If Other, Describe:	If the building type cannot be classified by the Primary Economic Use Table, describe the building.	
detailed_econ_type	What best describes the detailed economic use of the Mixed Use ID?	Indicate the detailed economic use of the Mixed Used ID from the Detailed Building Type Codes Table	See DDVALS2
detailed_econ_type_other	If Other, Describe:	If the building's detailed economic use cannot be classified from the Detailed Building Type Codes Table, describe the building.	
mixed_name	Name (if different from building)	Indicate the site name if different from the building name.	
area	Area (SQFT)	For each Mixed-Use ID, indicate the Mixed-Use floor area.	

Spaces

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
space_index		Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
space_id		The Space ID number (relational to many other variables)	
id1	Mixed-Use ID (if applicable)	Indicates the appropriate Mixed-Use IDs associated with each Space ID. If Mixed-Use IDs are not assigned, the idNA will be indicated	
id2			
id3			
id4			
idna			
functional_use_code	Functional Use Code (table on page 2)	For each Space ID, indicate the functional use code of the building/complex Space ID using the Functional Use Codes (Space Type)	1.) Assembly / Recreation 2.) Classroom 3.) Dining 4.) Guest Room 5.) Kitchen 6.) Laundry / Housekeeping 7.) Office 8.) Sales 9.) Storage – Low Bay 10.) Vacant 11.) Warehouse – High Bay 12.) Indoor Parking Garage 13.) Common Area 14.) Other
functional_use_other	If other, describe:	If functional use code is other (code 14), the space is decribed here	
mixed_use_percent	% Of Mixed Use (if applicable) or % Total Building SQFT	For each Space ID, Indicate the Space ID's area as a percentage of the total area associated with the Mixed-Use ID (if applicable), or the Space ID's area as a percentage of the total building area. This number should be accurate to the nearest percent if possible. If Mixed-Use IDs are not used, the percentages for all Space IDs in a building must sum to 100. If Mixed-Use IDs are used, the percentages for all Space IDs in a Mixed-Use area must sum to 100.	
bldg_sq_ft_percent			

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
space_cooled	Space Cooled?	For each Space ID, indicate if the area is cooled (Y / N / Unk / Refrigerated / Frozen)	Y = Yes N = No R = Refrigerated F = Frozen NF = Not Filled UNK = Unknown
cooled_shutoff	After Hours Shutoff/Setup?	For each Space ID, indicate if the cooled area has automatic or manual after-hours shutoff/setup.	Y = Yes N = No DK = Don't Know NF = Not Filled
space_heated	Space Heated?	For each Space ID, indicate if the area is heated (Heated, Semi-Heated, Not Heated, Unknown). Semi-heated indicates a space with a heating set point below 55°F.	H = Heated SH = Semi- Heated NH = Not Heated NF = Not Filled UNK = Unknown
heated_shutoff	After Hours Shutoff/Setup?	For each Space ID, indicate if the heated area has automatic or manual after-hours shutoff/setup.	Y = Yes N = No DK = Don't Know NF = Not Filled

Schedule

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
schedule_id		Schedule ID number (Primary Key)	
site_id		The Unique Site ID	
schedule_name		Schedule Name (numeric, created automatically upon data entry)	
schedule_seq_num		Schedule Sequence Number	
space_id1	Space IDs Served?	Indicates the Space IDs Served by the Schedule. 1 = served 0 = *not* served	
space_id2			
space_id3			
space_id4			
space_id5			
space_none			
space_unknown			
open_weeks_per_year	Weeks per year open?	For each day, indicate the weeks/year that the building/complex is open. Open can be defined as any time that tenant staff or customers occupy the building.	
schedule_notes		Any additional notes about the schedule	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
hour_id		Hours Table ID number (Primary Key)	
site_id		The Unique Site ID	
hour_sequence		Day of week indicator (1=Mon, 7=Sun)	
schedule_id		Foreign key, links to Schedule table	
avg_open	Avg Hours Open	For each day, indicate the number of hours that the building/complex is open for business. Public hours should be indicated for buildings with public hours versus staff hours.	
avg_occupied	Avg Hours Occupied	For each day, indicate the number of hours that the building/complex is open for business plus the internal hours / maintenance (e.g., cleaning hours).	
avg_hvac	Avg Hours HVAC On	For each day, indicate the number of hours that the building/complex HVAC system is scheduled to be on or in occupied mode. In facilities with HVAC that is manually turned off each night by staff this should be hours the systems is typically on or set up.	
avg_lights	Avg Hours Interior Lights On	For each day, indicate the number of hours that the building/complex lights are on. If lights are controlled by OS or manual switches that track occupancy indicate “OS” or “manual” respectively.	

Energy Sources

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Energy Sources Table Index Number (Primary Key)	
site_id		The Unique Site ID	
university_hospital		Indicates if this site is a Hosiptal or University	
electricity	Electricity Used on Site? (Y/N)	Indicates if Electricity is used on site	Y = Yes N = N DK = Don't Know NF = Not Filled
natural_gas	Natural Gas Used on Site? (Y/N)	Indicates if Natural Gas is used on site	
oil	Oil Used on Site? (Y/N)	Indicates if Oil is used on site (indicated as 'yes' if Diesel is filled as an "other" fuel type for onsite generation)	
propane	Propane Used on Site? (Y/N)	Indicates if Propane is used on site (Gas cooking or misc equipment will be indicated if Propane is used onsite but not Natural Gas)	
purchased_cooling	Purchased Cooling Used on Site? (Y/N)	Indicates if Purchased Cooling is used on site	
wood	Wood Used on Site? (Y/N)	Indicates if Wood is used on site	
purchased_hot_water	Purchased Hot Water Used on Site? (Y/N)	Indicates if Purchased Hot Water is used on site	
purchased_steam	Purchased Steam Used on Site? (Y/N)	Indicates if Purcahsed Steam is used on site	
other	Other Energy Sources Used on Site? (Y/N)	Indicates if other energy sources are used on site	

Electric Meter

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Electric Meter Table Index Number (Primary Key)	
site_id		The Unique Site ID	
electricmeter_id		Electric Meter Unique ID (assigned automatically - NOT utility meter #)	
include_not_audited	Do meters include exterior & parking lighting?	Indicate whether the meters captured in the form associated with the Bill Release ID indicated above provide power to exterior and parking lighting.	Y = Yes N = N DK = Don't Know NF = Not Filled
meter_with_exterior	Do meters include consumption of areas not audited?	Indicates if Propane is used on site (Gas cooking or misc equipment will be indicated if Propane is used onsite but not Natural Gas)	

Gas Meter

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Electric Meter Table Index Number (Primary Key)	
site_id		The Unique Site ID	
gasmeter_id		Gas Meter Unique ID (assigned automatically - NOT utility meter #)	
include_not_audited	Do meters include exterior & parking lighting?	Indicate whether the meters captured in the form associated with the Bill Release ID indicated above provide power to areas not audited. If yes please provide notes as to the type and extent of the area covered.	Y = Yes N = N DK = Don't Know NF = Not Filled

Generation

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Generation Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
generation_id		Site-specific Unique ID	
generation_type	Generation Type	Indicate the type of on-site generation at the building/complex referring to the Generation Type Table:	1.) Photovoltaics (PV) 2.) Fuel Cells (FC) 3.) Micro Turbine (MT) 4.) Large Gas Turbine (LT) 5.) Unknown (-1) 6.) Wind Turbines 7.) Reciprocating Engine (RE) 8.) None 9.) Solar Water Heat – Domestic 10.) Solar Water Heat – Pool 11.) Other
equip_operational	Is equipment operational?	Indicate whether the on-site generation equipment is functional / operational.	
fuel_type	Fuel Type Code (see table)	Indicate the fuel type used by on-site generation equipment (refer to Fuel Type Table). Enter zero for none when generation uses no fuel.	1.) Electricity 2.) Natural Gas 3.) Oil 4.) Propane 5.) Purchased Steam 6.) Purchased Hot Water 7.) Other 0.) None
fuel_type_other		Filled if heating fuel type is 7 - Other (Diesel is indicated as an 'other' to differeintiate from fuel oil. Oil indicated on energy sources tab if diesel)	
total_capacity	Total Capacity (kW)	Indicates the total peak design capacity of the on-site generation equipment (in kW). Enter -1 for unknown.	
cogeneration	Is this a cogeneration system?	Indicate whether the on-site generation equipment is a cogeneration system (i.e. is some of the heat produced used to supplement space, domestic, or industrial processes?).	Y = Yes N = N DK = Don't Know NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
runtime	Runtime: **24/7** **P**eak Demand **B**ack-**u**p only	Indicate operational frequency of on-site generation equipment.	247 = Runs 24/7 PD = Runs during Peak Demand BU = Back-Up only DK = Don't Know NF = Not Filled
backup_tested	If back-up only, how often is the system tested (years)	If the on-site generation equipment is used as back-up, indicate the number of years between tests. Enter 1 if tested annually, 2 if tested biennially and so forth.	0.08 indicates once a month 0.02 indicates once a week
grid_connected	Is system interconnected to the grid?	Indicate if the on-site generation system is connected to the grid.	Y = Yes N = N DK = Don't Know NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Wall Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
wall_id	NA	Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Schedule.	
id2			
id3			
id4			
id5			
walls_surface_type	Surface Type	This refers to the material on the EXTERIOR only. Internal composition of exterior walls is captured below in "Framing Type" and "Insulation". Concrete block is distinguished from concrete by the presence of grout between each block. Classify Exterior Insulation and Finish Systems (EIFS) as stucco.	C = Concrete CB = Concrete Block B = Brick S = Stucco W = Wood G = Glass Curtain M = Metal V = Vinyl DK = Don't Know
walls_framing_type	Framed Wall Type	This is the framing type of the framed wall.	MS = Metal Stud MB = Metal Building W = Wood C = Concrete B = Brick DK = Don't Know
walls_ins_material	Insulation?	Indicate the presence of any insulation irrespective of type (e.g., rigid, batt) or R-value.	Y = Yes N = N DK = Don't Know NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Window Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
window_id	NA	Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Window	
id2			
id3			
id4			
id5			
window_wall_area_percent	% of Wall Area (estimate)	Estimate of the area of this window type as a percent of as a % of exterior walls. Spandrel sections are not included as windows. For instances where there are no windows present indicate 0 for the % of wall area and circle the associated Space ID's. The remainder of this section for 0% of wall area will be blank.	Y = Yes N = N DK = Don't Know NF = Not Filled
window_opening	Window Opening	Indicates the type of window opening	247 = Runs 24/7 PD = Runs during Peak Demand BU = Back-Up only DK = Don't Know NF = Not Filled
window_layers_of_glazing	Layers of Glazing	Number of panes of glass in the window. In the absence of plans, using a shiny object or flashlight the number of reflections indicates the number of panes.	
low_e_present	Low E Present?	Indicates if there is Low-emissivity (Low E) coating present	Y = Yes N = N DK = Don't Know NF = Not Filled
cog_u_value	COG U Value	Center of Glass (COG) U-factor (BTU/SQFT*F)	
window_glazing_material	Glazing Material	Type of Glazing Material	C: Clear O: Opaque R: Reflective T: Tinted

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
window_frame_type	Frame Type	Type of Window Frame	M: Metal non-thermally improved. MT: Metal, thermally improved. MU: Metal, Unknown V: Vinyl W: Wood (includes metal clad wood windows)
window_covering	Blinds, shades, or other window coverings?	Indicates if there are any window coverings and if those coverings are operable or not	O: Operable Coverings F: Fixed Coverings OT: Other N: None NF: Not Filled
percent_operable	Percent Operable? (%)	Percent of total window area that can be opened. For example, if you have all residential style punched windows that slide up, the entry here would be 50%. Key here is potential not whether they are opened.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Roof Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
roof_id	NA	Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Roof	
id2			
id3			
id4			
id5			
roof_type	Roof Type	Idicates the type of roof based on the table to the right	F: Flat. Roof slope less than 1:12 (8%). P: Pitched. Sloped roof, non-ventilated. A: Attic. Sloped roof, ventilated. R: Residential above. U: Unknown.
insulation	Insulation?	Indicate the presence of any insulation irrespective of type (e.g., rigid, batt) or R-value.	Y = Yes N = N DK = Don't Know NF = Not Filled
add_insulation	Is it possible to add additional insulation?	Is it technically and financially feasible to add insulation? E.g., for a flat built up roof, additional rigid insulation could be added the next time the roof is replaced.	
roof_sf	Roof Area (SF)	This applies to flat roofs (roof type "F") defined above. Leave blank for other roof types. Built up roofs are flat roofs (decking + rigid insulation) that are covered with sealed, waterproof. Layers.	
skylights	Skylights?	Indicates if skylights installed in the roof	Y = Yes N = N DK = Don't Know NF = Not Filled
skylight_area	Skylight Area (SF) (estimate)	If skylights are installed, this indicates their cumulative area (sq ft)	
light_dimming_control	Lighting Dimming Control?	If skylights are installed, indciates if the interior lights are dimmable and automatically controlled to maintain indoor lighting levels	Y = Yes N = N DK = Don't Know NF = Not Filled NA = NA

Floors

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Floor Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
floor_id	NA	Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Floor	
id2			
id3			
id4			
id5			
floor_type	Floor Type	B: Basement. Occupied floors below grade, such as storage areas and/or mechanical spaces, having earth below. This excludes parking garages. C: Crawl space. A basement too short to stand up in, typically with a soil floor surface. S: Concrete floor slab on grade. SE: Concrete floor slab elevated above grade, such as on piers or above a parking garage. U: Unknown. N: Not Filled	B: Basement. C: Crawl space. S: Concrete floor slab on grade. SE: Concrete floor slab elevated above grade U: Unknown. N: Not Filled
floor_insulation	Insulation?	"Y" if the floor is insulated at all, such as with rigid insulation. Examples include: • Vertical insulation at slab edge and foundation. • Horizontal insulation on underside of floor slab above parking garage.	Y = Yes N = N U = Unknown NF = Not Filled

HVAC Summary

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
hvacsummary_index		HVAC Summary Index Number (Primary Key)	
site_id		The Unique Site ID	
university_hospital		Indicates if this site is a Hosiptal or University	
hvac_comments	Briefly describe the HVAC system (including HVAC fans, heating & cooling system) & control.	A brief description of the HVAC system and control. For common systems this should be very brief. The description should be more complete for odd systems or odd aspects of system that are not well defined by the protocol fields.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
szhvac_index		SZ HVAC Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
szhvac_id		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the SZ HVAC System	
id2			
id3			
id4			
id5			
hvac_equip_type	Equipment Type (Table below)	Equipment type code. Enter one. See distributed single zone equipment map for examples (simple list to the right, detailed list below this table).	1 = Rooftop Units (RTUs) 2 = Makeup Air Unit (MAU) 3 = Air Handling Unit (AHU) 4 = Furnace 5 = Heat Pump 6 = PTAC / PTHP 7 = Unit Ventilator 8 = Room AC (window unit) 9 = Unit Heater (suspended) 10 = Baseboard / Radiator 11 = Cabinet Heater (fan coil) 12 = Radiant – floor 13 = Radiant – ceiling (suspended) 14 = Swamp Cooler
heat_pump_type	If Heat Pump – Type	The heat pump type code. See distributed single zone equipment map for examples (simple list to the right, detailed list below this table).	1 = Standard – air source 2 = Water Source – supplemental boiler and cooler 3 = Ground Source – water 4 = Ground Source – earth 5 = Ductless / Mini Split – air source 6 = VRF – single mode (either heat or cool) 7 = VRF – multimode (simultaneous heat and cool)

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
primary_unit_heat	Primary Unit For:	Indicates this equipment is the primary provider of **Heating** that supplies the selected space ID(s)	
primary_unit_cool		Indicates this equipment is the primary provider of **Cooling** that supplies the selected space ID(s)	
primary_unit_vent		Indicates this equipment is the primary provider of **Ventilation** that supplies the selected space ID(s)	
primary_unit_none		Indicates this equipment provides heating, cooling and/or ventilation the selected space ID(s), but is not the primary equipment	
hvac_cooling_type	Cooling Type	The mechanical cooling type of the equipment	CW = Chilled water coil. DXA = Air cooled direct expansion. DXW = Water cooled direct expansion. G = Direct ground water or water loop buried in ground E =Evaporative cooler. N = No mechanical cooling. Oth = Other cooling type NF = Not Filled DK = Don't Know
hvac_cooling_type_other		Filled if cooling fuel type is Other	
primary_fuel_type	Primary Heat Fuel:	The primary heating fuel of the equipment. Circle one. If other, be sure to enter other fuel in the provided space. For heat pumps enter Electric.	E = Electricity NG = Natural Gas FO = Oil P = Propane OT = Other N = None NF = Not Filled
primary_fuel_type_other		Filled if heating fuel type is Other	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
primary_heating_type	Heating Type:	Indicates the heating type - Not required if electric resistance.	SE = Std. Eff. = *Combustion equipment ≤ 88% efficient (output/input)* CE = Condensing Eff. = *Combustion equipment >88% efficient (output/input)* HWC = HW-Coil = Hot Water Coil SC = Steam-Coil = Steam Coil HP = Heat Pump OT = Other DK = Don't Know NF = Not FIlled
primary_heating_type_other		Filled if heating type is Other	
number_units	Number of Units	Number of units of this size group and type.	
unit_age	Representative Age of Unit(s) (Years)	Typical age of equipment listed in this column in years (year today – year made). Integer only. Enter -1 if unknown.	
unit_manuf	Representative Manufacturer	The predominant manufacturer of equipment listed in this column.	
unit_model	Representative Model	The predominant model name and number of the equipment listed in this column.	
unit_model_number	Representative Model Number		
cooling_capacity	Rated Cooling Capacity	Average rated maximum cooling capacity of equipment listed in this column (MBtu). Enter for all equipment types. If unknown, enter -1 and 0 if no cooling. 1 MBtu = 1,000 Btu/h , 12MBtu = 1 ton	
cool_capacity_range	Cooling Capacity Range (group)	The cooling capacity "bin" of the equipment listed in this column (tons). Required for all DX/HP equipment and for other cooling equipment types where the average cooling capacity is unknown. When the cooling capacity is unknown estimate this based upon air flow, unit size, and any other available information. 1 ton = 12,000Btu/h = 12MBtu	
heating_capacity	Rated Heating Capacity (input)	The average maximum heating capacity of the equipment in kW or MBtu. 1Mbtu = 1 kBtu/h = 1000 Btu/h	
heating_capacity_units	Specify Heating Capacity Units	The units of the rated heating capacity.	kW, MBTU, DK, NF

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
sup_heat_equip_type	Supplemental Heating Equipment:	Supplementary Heating Equipment type. Supplementary heating eq	Same Equipment Codes as primary_heat_type
sup_heat_fuel_type	Supplemental Heating Fuel Type:	The supplementary heating fuel type. Fuel type may or may not ma	Same Equipment Codes as primary_heat_fuel
sup_heat_fuel_type_other		Filled if heating fuel type is Other	
fan_control	Fan Control:	Fan control type. This can be determined from inspection of the thermostat (fan vs. auto), discussions with staff, observing whether all units are on or not, and sequence of control documentation. Variable indicates a system that has reduced flows (>30% reduction) during non-cooling hours. Typically this will be implemented as a single zone VAV system which runs at a low speed unless more air is required for cooling or to reduce CO2 levels.	C = Constant I = Intermittent V = Variable N = None Unk = Unknown NA = Not Applicable NF = Not Filled
ventilation_air	Delivery of Ventilation Air:	Do the units in this group provide outdoor air (OA) for ventilation? **At unit**, indicates ventilation air is brought in from outside by the unit. A unit located on the exterior wall would have an opening to introduce outside air. A unit located in the building interior would have a duct that runs to the exterior wall to receive outdoor air. **Central system** indicates that air from a central system (usually 100% OA system) is introduced by this system. For example, a hotel fan coil unit might receive ducted air from a central air handler to meet zone ventilation needs. **Operable Window** or Louver indicates outside air is introduced separately from the HVAC system. This will generally be manually activated, but in some cases can be automatically activated as part of a natural ventilation system.	AU = At Unit FCS = From Central System OW = Operable Window N = None NA = Not Applicable Unk = Unknown NF = Not Filled
economizer	Economizer: Air Water None	Do the units in this group provide economizer cooling? Water side economizer manifests in water cooled equipment when a valve directs condenser water directly to a cold water coil bypassing the DX coil or chiller. This is done when outdoor conditions are such that water temperatures leaving the heat rejection device can satisfy the cooling load without mechanical cooling. It is possible to have units with air and water economizer.	A = Air Economizer W = Water Economizer N = None DK = Don't know NA = Not Applicable NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
temp_control_type	Temperature Control:	Type of temperature control for the equipment. Manual–Tstat is manually operated to turn on/off the HVAC unit and set temperature setpoints. Many older homes have manual thermostats, but these are rarely used in commercial buildings. Programmable-Tstat has the ability to establish a variety of on/off schedules and occupied/unoccupied temperature setpoints. EMS-DDC describes systems that use digital controllers (e.g. computers) that are networked together and that have enhanced scheduling and programming ability. There is generally a main control terminal where the facility operator can make operational changes. Manual on/off is for units with no temperature control.	1 = Manual T-Stat 2 = Programmable T-Stat 3 = EMS-DDC 4 = Manual On/Off DK = Don't Know NA = Not Applicable NF = Not Filled
occ_sensor_setback	Occupancy sensor used to set-up/back or turn off zone?	Are occupancy sensors used to increase the thermostat dead band, reduce supply air flow, or turn off equipment? This is often implemented at a zone level in high ventilation spaces such as classroom and conference rooms.	Y = Yes N = N DK = Don't Know NF = Not Filled NA = Not Applicable
high_vent	High Ventilation > 70% outside air	Does the system deliver a high fraction of outdoor air? Enter yes if the outdoor air fraction during heating, venting, and cooling (non-economizer) hours is over 70%. Typically systems will be 100% OA or less than 40% OA.	
demand_control	Demand Controlled Ventilation?	Demand control ventilation is when the amount of outdoor air provided is controlled/varied by an in-unit or zone CO2 sensor or occupancy sensing device. Use **Yes-Unk** when it is determined that DCV exists but the location of the sensor is unknown.	Y-Z = Yes - In Zone Y-U = Yes - At Unit Y-Unk = Yes - Unknown N = No Unk = Unknown NA = Not Applicable NF = Not Filled

Equipment Type Codes/Description	
Ducted Systems (generally)	
1 Rooftop Units (RTUs)	Roof top package air handlers with AC and/or heating units (furnaces or heat pumps).
2 Makeup Air Unit (MAU)	Air handlers designed for high outside air flow fractions. Typically runs at 100% outdoor air but often has ability to run at other outside air fractions. Furnaces in makeup air units typically can modulate continuously or with fine steps to very low part loads.
3 Air Handling Unit (AHU)	Air handler with hydronic or split system (AC/HP) heating and/or cooling.
4 Furnace	Package air handler with combustion heating. Can also have split system AC. Electric furnace should be recorded as system type 3 – AHU.
5 Heat Pump	Air hander with heat pump heating. Includes package and split heat pumps except those included in 1.
Non Ducted Systems (generally)	
6 PTAC / PTHP	Package terminal AC and HP units. Permanently installed. Typical in hotel/motel.
7 Unit Ventilator	Unducted fan coil unit that provides outdoor air and has hydronic or electric heating and/or cooling.
8 Room AC (window unit)	Room AC, typically window units but also including portable spot cooling solutions.
9 Unit Heater (suspended)	Unducted fan coil unit providing hydronic, electric or furnace heating and/or hydronic cooling but no ventilation.
10 Baseboard / Radiator	Hydronic and electric baseboards and hydronic radiators.
11 Cabinet Heater (fan coil)	Fan coil unit that provides hydronic or electric heating and/or cooling. This covers any fan coil unit that's not explicitly addressed by other equipment type codes.
12 Radiant – floor	Hydronic or electric radiant floor heat.
13 Radiant – ceiling (suspended)	All forms of radiant heat except for radiant floors.
14 Swamp Cooler	An evaporative cooler. Generally 100% outdoor air units that only run to provide cooling.

Heat Pump Type Codes	
1 Standard – air source	Package or split air source heat pumps except for ductless split systems defined in 5-8.
2 Water Source	Water source heat pumps connected to common water loop with supplemental boiler and cooling tower.
3 Ground Source – water	Water source heat pumps connected to common water loop and uses heat exchanger with ground water loop on other side. May have supplemental boiler.
4 Ground Source – earth	Water source heat pumps connected to common water loop where water loop is buried in ground through large piping system. May have supplemental boiler.
5 Ductless / Mini Split	Air source variable speed split HP with refrigerant system serving 2 or less terminals. Typically less than 2.5 tons and unducted.
6 VRF –Single mode	Air or water source variable speed split HP with refrigerant system serving multiple terminals. No simultaneous heat/cool, all terminals are in the same mode. Water source may have supplemental boiler and cooling tower.
7 VRF –multimode	Air or water source variable speed split HP with refrigerant system serving multiple terminals. Simultaneous heat/cool at different terminals on same system. 3-pipe systems are most common, but 2 pipe systems are possible. Water source may have supplemental boiler and cooling tower.

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
mzhvac_index		MZ HVAC Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the SZ HVAC System	
id2			
id3			
id4			
id5			
mzhvac_id		Site-specific Unique ID	
fan_system_type	Fan System Type (Table below)	Fan System type code. Enter one. (simple list to the right, detailed list below this table).	1 = Single Zone 2 = Dual Duct 3 = Single Duct - Reheat 4 = Multizone 5 = VVT 6 = DOAS 7 = Makeup Air Unit (MAU) 8 = Other
fan_system_type_other		Filled if Fan system type is Other	
primary_unit_heat	Primary Unit For:	Indicates this equipment is the primary provider of **Heating** that supplies the selected space ID(s)	
primary_unit_cool		Indicates this equipment is the primary provider of **Cooling** that supplies the selected space ID(s)	
primary_unit_vent		Indicates this equipment is the primary provider of **Ventilation** that supplies the selected space ID(s)	
primary_unit_none		Indicates this equipment provides heating, cooling and/or ventilation the selected space ID(s), but is not the primary equipment	
airflow_control	Airflow Control:	The supply fan control. Constant Volume (CV) operation is where the primary air volume does not significantly change in response to zone loads. Variable Air Volume (VAV) control requires primary air turndown of at least 50% in response to zone loads. Stepped Constant Volume (SCV) requires essentially constant volume operation but with time of day reduction in flows.	CV = Constant Volume SCV = Stepped Constant Vol. VAV = Variable Air Volume DK = Don't Know NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
hvac_cooling_type	Cooling Type:	The mechanical cooling type of the equipment. Circle one.	CW = Chilled water coil. DXA = Air cooled direct expansion. DXW = Water cooled direct expansion. GC = Direct ground water or water loop buried in ground E =Evaporative cooler. N = No mechanical cooling. Oth = Other cooling type NF = Not Filled DK = Don't Know
primary_fuel_type	Primary Heating Fuel:	The primary heating fuel of the equipment. Circle one. Enter Electric for heat pumps.	E = Electricity NG = Natural Gas FO = Fuel Oil P = Propane OT = Other N = None NF = Not Filled
primary_fuel_type_other		Filled if heating fuel type is Other	
primary_heating_type	Heating Type:	The heating type.	SE = Std. Eff. = *Combustion equipment ≤ 88% efficient (output/input)* CE = Condensing Eff. = *Combustion equipment >88% efficient (output/input)* HWC = HW-Coil = Hot Water Coil SC = Steam-Coil = Steam Coil HP = Heat Pump OT = Other DK = Don’t Know NF = Not FIlled
primary_heating_type_other		Filled if cooling fuel type is 7 - Other	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
heat_pump_type	If Heat Pump – Type	The heat pump type code. See distributed single zone equipment map for examples (simple list to the right, detailed list below this table).	1 = Standard – air source 2 = Water Source – supplemental boiler and cooler 3 = Ground Source – water 4 = Ground Source – earth 5 = Ductless / Mini Split – air source 6 = VRF – single mode (either heat or cool) 7 = VRF – multimode (simultaneous heat and cool)
terminal_reheat_energy	Terminal Reheat Energy:	Terminal reheat energy type. Reheat is limited to systems that deliver cold air that must then be reheated in some zones. Enter None if no reheat present.	E = Electric W = Hot Water S = Steam N = None OT = Other DK = Don't Know NF = Not Filled
number_units	Number of Units	Number of units of this size and type.	
airflow_capacity	Airflow Capacity (CFM)	The average primary supply air flow this group. Enter -1 if unknown	
unit_age	Representative Equipment Age (Years)	Typical age of equipment listed in this column in years (year today – year made). Exact, or estimate whichever is available. Integer only.	
unit_manuf	Representative Manufacturer	The predominant manufacturer of equipment listed in this group. -1 if unknown	
unit_model	Representative Model Name/Number	The predominant model name and number of the equipment in this column. -1 if unknown	
unit_model_number			
cooling_capacity	Rated Cooling Capacity	Average rated maximum cooling capacity of equipment listed in this column (MBtu). Enter for all equipment types. If unknown, enter -1 and 0 if no cooling. 1 MBtu = 1,000 Btu/h , 12MBtu = 1 ton	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
cool_capacity_range	Cooling Capacity Range (tons)	The cooling capacity "bin" of the equipment listed in this column (tons). Required for all DX/HP equipment and for other cooling equipment types where the average cooling capacity is unknown. When the cooling capacity is unknown estimate this based upon air flow, unit size, and any other available information. 1 ton = 12,000Btu/h = 12MBtu	
heating_capacity	Rated Heating Capacity (input)	The average maximum heating capacity of the equipment in kW or MBtu. 1Mbtu = 1 kBtu/h = 1000 Btu/h	
heating_capacity_units	Specify Heating Capacity Units	The units of the rated heating capacity.	kW, MBTU, DK, NF
air_distrib_system	Air Distribution System:	Air distribution type. Circle One. Overhead = ductwork run to air diffusers located overhead, typically in a suspended ceiling. Underfloor = open air plenum underfloor with manual or automatic floor diffusers. Low Wall = ductwork run to air diffusers located low on a wall or in floor. Also referred to as displacement system. Other: _____	Ov = Overhead U = Underfloor W = Low Wall OT = Other DK = Don't Know NF = Not Filled
air_distrib_system_other		Filled if Air Distribution Type = Other	
supply_fan_vol_control	Supply Fans: Volume Control:	Means of controlling fan delivered airflow: None = no device used. Inlet Vane = set of louvers on inlet of fan. Discharge damper = set of dampers on fan discharge. VFD = variable frequency drive that controls fan rotational speed. Bypass Damper = set of dampers and ducting on fan discharge that return a percentage of airflow to inlet side of fan.	N = None IV = Inlet Vane D = Discharge Damper V = VFD B = Bypass Damper UNK = Unknown NF = Not Filled
supply_motor_hp	Supply Fans Motor HP	Total HP of supply motors. Should be system total, not per unit. Enter -1 if unknown.	
return_or_exhaust_fan	Return Fans and /or Exhaust Fans?	Do the units in this group have return and/or exhaust fans.	Y = Yes N = N DK = Don't Know NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
motor_hp	Motor HP	Total HP of return and exhaust motors. Should be system total, not per unit. Enter -1 if unknown.	
terminal_standard	VAV Terminal Type:	VAV terminal type. Required in all systems with VAV terminals. Indicates all that apply with a 1. Standard Induction = Standard fanless units Induction = Fanless units that induce plenum air into the air stream as it is introduced to the zone. FPB-Parallel = Fan powered parallel units FPB-Series = Fan powered series units None = no device used. Typically systems with fan powered terminals will also have standard terminals. The fan in FPS units runs continuously, the fans in FPP units only run when heating is required. Induction terminals should be rare.	
terminal_induction			
terminal_fpb_parallel			
terminal_fpb_series			
terminal_none			
terminal_unknown			
temp_control_type	Temperature Control:	Type of temperature control for the equipment. Manual–Tstat is manually operated to turn on/off the HVAC unit and set temperature setpoints. Many older homes have manual thermostats, but are rarely used in commercial buildings. Programmable-Tstat has the ability to establish a variety of on/off schedules and occupied/unoccupied temperature setpoints. EMS-DDC describes systems that use digital controllers (e.g. computers) that are networked together and that have enhanced scheduling and programming ability. There is generally a main control terminal where the facility operator can make operational changes. Manual on/off is for units with no temperature control.	1 = Manual T-Stat 2 = Programmable T-Stat 3 = EMS-DDC 4 = Manual On/Off DK = Don't Know NA = Not Applicable NF = Not Filled
demand_control	Demand Controlled Ventilation Type:	Demand control ventilation is when the amount of outdoor air provided is controlled/varied by an in-unit or zone CO2 sensor or occupancy sensing device. Use Yes-Unk when it is determined that DCV exists but the location of the sensor is unknown.	Y-Z = Yes - In Zone Y-U = Yes - At Unit Y-Unk = Yes - Unknown N = No Unk = Unknown NA = Not Applicable NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
occ_sensor_setback	Occupancy sensor used to set-up/back or turn off zone?	Are occupancy sensors used to increase the thermostat dead band, reduce supply air flow, or turn off equipment? This is often implemented at a zone level in high ventilation spaces such as classroom and conference rooms.	Y = Yes N = N DK = Don't Know NF = Not Filled
high_vent	High Ventilation > 70% outside air	Does the system deliver a high fraction of outdoor air? Enter yes if the outdoor air fraction during heating, venting, and cooling (non-economizer) hours is over 70%. Typically systems will be 100% OA or less than 40% OA.	Y = Yes N = N DK = Don't Know NF = Not Filled
economizer	Economizer?	Do the units in this group provide economizer cooling? Water side economizer manifests in water cooled equipment when a valve directs condenser water directly to a cold water coil bypassing the DX coil or chiller. This is done when outdoor conditions are such that water temperatures leaving the heat rejection device can satisfy the cooling load without mechanical cooling. Units that provide outdoor air cooling when needed but do not have mechanical cooling are considered to have economizer.	A = Air Economizer W = Water Economizer N = None DK = Don't know NA = Not Applicable NF = Not Filled
exhaust_heat_recovery	Exhaust Air Heat Recovery?	Presence of exhaust air heat recovery. Heat may be used to preheat incoming outdoor air or for another purpose. Exhausting building air to the garage is not considered heat recovery.	Y = Yes N = N DK = Don't Know NF = Not Filled
heat_recovery_type	Heat Recovery Type	Type of heat recovery. Circle one.	E = Exhaust Air R = Refrigeration C = Condenser DK = Don't Know NF = Not Filled

Fan System Type Codes	
1 Single Zone	Single zone air systems. Limited to specialty systems
2 Dual Duct	Dual duct air system that delivers warm and cold air to zone terminals where the air is mixed to deliver air at a temperature customized for each zone.
3 Single Duct - Reheat	Single duct air system delivering cool air to all zones. Zone terminal units vary the air flow and/or reheat the air as needed to maintain zone comfort.
4 Multizone	Air handler producing warm and cold air that is mixed at the air handler to deliver air at a temperature customized for each zone. A single duct conducts air from the air handler mixing box to the zone. This is generally older system style.
5 VVT	Constant volume air hander that delivers variable air flow to the zones utilizing a bypass damper. Generally the system will deliver heating or cooling not both. This is generally older system style.
6 DOAS	System delivering ventilation air to zones with limited heating and cooling. Heating and cooling are primarily provided by other systems such as chilled beams and perimeter radiation which do not provide ventilation air except possibly as economizer cooling.
7 Makeup Air Unit (MAU)	Larger air handler that conditions 100% outside air and no recirculated air.
8 Other	If the fan system type is not represented above, describe the fan system type.

Heat Pump Type Codes	
1 Standard – air source	Package or split air source heat pumps except for ductless split systems defined in 5-8.
2 Water Source	Water source heat pumps connected to common water loop with supplemental boiler and cooling tower.
3 Ground Source – water	Water source heat pumps connected to common water loop and uses heat exchanger with ground water loop on other side. May have supplemental boiler.
4 Ground Source – earth	Water source heat pumps connected to common water loop where water loop is buried in ground through large piping system. May have supplemental boiler.
5 Ductless / Mini Split	Air source variable speed split HP with refrigerant system serving 2 or less terminals. Typically less than 2.5 tons and unducted.
6 VRF –Single mode	Air or water source variable speed split HP with refrigerant system serving multiple terminals. No simultaneous heat/cool, all terminals are in the same mode. Water source may have supplemental boiler and cooling tower.
7 VRF –multimode	Air or water source variable speed split HP with refrigerant system serving multiple terminals. Simultaneous heat/cool at different terminals on same system. 3-pipe systems are most common, but 2 pipe systems are possible. Water source may have supplemental boiler and cooling tower.

Boilers

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
boiler_index		MZ HVAC Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
boiler_id		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the SZ HVAC System	
id2			
id3			
id4			
id5			
university_hospital		Indicates if this site is a Hosiptal or University	
boiler_service	Boiler Service:	Boiler service type or working fluid. Either Steam or Hot Water	Steam Hot Water -1 = Unknown
fuel_type	Fuel Type	The fuel code for the primary fuel used by the boiler.	1.) Electricity 2.) Natural Gas 3.) Oil 4.) Propane 5.) Purchased Steam 6.) Purchased Hot Water 7.) Other 0.) None -1.) Unknown
back_up_fuel_type	Backup Fuel Type	The fuel code of any boiler back up fuel.	
number_identical_boilers	Number of Identical Boilers	The number of boilers covered by this entry. Includes redundant units.	
number__standby_units	Number of Redundant Units	Number of boilers in this entry that are used strictly for backup.	
age_of_boiler	Age of Boiler(s) (years)	Typical age of equipment listed in this column in years (year today – year made). Enter -1 if unknown.	
manufacturer	Boiler Manufacturer	The boiler manufacturers name.	
model_name_number	Model Name/Number	The boiler model name and number.	
input_capacity_mbtu_total	Input Capacity (MBTU Total)	Total input capacity of boiler burners in this group (MBTU) Enter -1 in unknown.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
heat_recovery	Heat Recovery	Is heat recovered from the boiler flue gas (sometimes called a "stack economizer") or from steam boiler blow down water?	Y = Yes N = N -1 = Unknown NF = Not Filled
heat_recovery_type	Heat Recovery Type	Indicates type of heat recovery. Flue gas heat recovery is also known as a "stack economizer". Blow-down indicates heat recovery from steam boiler blow down systems.	FG = Flue Gas BD = Blow Down OT = Other -1 = Unknown N = None NA = NA NF = Not Filled
heat_recovery_other	Heat Recovery Type- Other	If heat recovery type is other, this field is filled	
condensing	Condensing?	Is the boiler a condensing boiler? Efficiency (rated or input/output) > 88%.	Y = Yes N = N -1 = Unknown NF = Not Filled
boiler_function	Boiler Functions Served: Space Heat DHW Process Combo	Indicate all of the loads the boiler serves. Space Heat only, DHW only, Process only, or a combination. Combo entered for boilers with more than one function. Pool and Spa boilers are included as Process	SH = Space Heat Only DHW = DHW only P = Process only C = Combination
primary_quantity	Primary Distribution Pump Quantity	Number of pumps associated the primary heating loop through the boilers in this column. The pump columns correspond to the boiler. If a common pump is used by more than one boiler entry, enter it in one column only. If pumps have different capacity control, enter the control of the lead pump. Include active and redundant pumps.	
primary_num_standby_units	Number of Redundant Units	Number of pumps in this column used strictly for backup	
primary_motor_hp	Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1. Total for boiler system and all pumps together, not per pump.	
primary_capacity_control	Capacity Control:	How is the pump capacity controlled? 1 and 2 speed motors are constant speed motors operating continuously or cycling. The 2- speed motor also changes speed as needed. Variable is for pumps with VFD motor drive.	1 = 1 Speed 2 = 2 Speed V = Variable -1 = Unknown NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
primary_ems_control	EMS Control?	Are the pumps controlled by or hooked up to the EMS system? Enter Y if the pumps have a DDC connection that could control the pumps even if the pumps run continuously.	Y = Yes N = N -1 = Unknown NF = Not Filled
secondary_quantity	Secondary (or Space Heat) Distribution Pump Quantity	Number of pumps associated the secondary heating loop through the boilers in this column.	
secondary_num_standby_units	Number of Secondary Redundant Units	Number of pumps in this column used strictly for backup	
secondary_motor_hp	Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1. Not per pump but total for boiler system.	
secondary_capacity_control	Capacity Control:	How is the pump capacity controlled? 1 and 2 speed motors are constant speed motors operating continuously or cycling. The 2- speed motor also changes speed as needed. Variable is for pumps with VFD motor drive.	1 = 1 Speed 2 = 2 Speed V = Variable -1 = Unknown NF = Not Filled
secondary_ems_control	EMS Control?	Are the pumps controlled by or hooked up to the EMS system? Enter Y if the pumps have a DDC connection that could control the pumps even if the pumps run continuously.	Y = Yes N = N -1 = Unknown NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
chiller_index		MZ HVAC Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
chiller_id		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the SZ HVAC System	
id2			
id3			
id4			
id5			
university_hospital		Indicates if this site is a Hosiptal or University	
compressor_type	Compressor Type	Compressor type code from compressor code list. If chilled water is provided by an unaudited plant then enter the type code for "off-site". Chiller compressor types can be difficult to identify. Model numbers and product literature are the best source of information. (simple table to the right, detailed table below)	1 = Centrifugal 2 = Reciprocating 3 = Screw 4 = Scroll 5 = Absorption, Nat Gas 6 = Absorption, Steam 7 = Other -1 = Unknown NF = Not Filled
num_identical_chillers	Number of Identical Chillers	The number of chillers covered by this entry. Include redundant chillers.	
num_standby_units	Number of Redundant Units	Number of chillers in this entry that are used strictly for backup. Ask how many are chillers backup, or how many are used regularly during summer hot spells (the unused units would be entered here).	
chiller_age	Age of Chiller(s) (Years)	Age of the chiller in years (integer only). Exact, or nearest 5-10 years whichever is available. Enter -1 if unknown.	
chiller_manufacturer	Manufacturer	The chiller manufacturers name.	
chiller_model_name_num	Model Name/Number	The chiller model name and number.	
rated_cooling_capacity	Rated Cooling Capacity	The average chiller output capacity. Enter -1 in unknown. 1 ton = 12,000Btu/h = 3.515kW.	
rated_capacity_units	Rated Capacity Units	The units of the rated cooling capacity, kW or tons. Generally this will be tons.	Tons, KW, DK or NF (not filled)

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
water_side_economizer	Water side economizer?	A chiller with a waterside economizer has valves that during cold weather let water bypass the chiller and go to the cooling tower directly.	Y = Yes N = N DK = Don't Know NF = Not Filled
compressor_vfd	Compressor VFD?	Centrifugal, screw, and scroll compressors can have VFD drives. This is usually integral to the unit so the drive may be difficult to locate.	Y = Yes N = N DK = Don't Know NF = Not Filled NA = NA
hr_condenser_type	Heat Rejection Condenser Type	Enter the condenser type code for the heat rejection equipment serving the chiller group listed in the same column. An entry must also be made for heat rejection equipment serving water cooled DX equipment. This should be in a column with no chiller entered above. Add additional pages as required. Do not enter heat rejection equipment twice. If heat rejection equipment serves multiple chiller entries, enter it in one column only. If "other" provide description. (simple table to the right, detailed table below)	1 = Air Cooled Refrigerant 2 = Evaporative Cooler Refrigerant 3 = Water Cooled Fluid 4 = Air Cooled Fluid 5 = Other -1 = Unknown NF = Not Filled
hr_fan_control	HR Fan Control:	Type of condenser fan control. VFD control will often be visible.	CO = Constant On CY = Constant Cycle TM = Two motors TS = Two-Speed motor V = Variable Speed Unk = Unknown NF = Not Filled
hr_num_identical_condensers	Number of Identical HR Condensers	Number of identical condensers. Enter zero if there are no condensers for the associated chiller (compressor type = off-site). Include redundant units in this count.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
hr_num_units_standby	Number of Redundant Units	Number of condensers used strictly for backup. Ask whether all units are used or whether some are used only for back up. Get count.	
hr_motor_hp	Fan Motor HP (Total)	Total fan motor HP for all fans in the condenser. If the auditor treats a multi-cell condenser as some number of identical condensers then this would be the motor HP for single cell. If a condensing unit with a number of cells is treated as one unit then the total HP of all motors in the unit would be entered. If there is small pony motor that runs only when the large motor isn't on, then only include the larger motor.	
hr_ems_control	EMS Control?	Are the fans controlled by or hooked up to the EMS system? Enter Y if the condenser or tower has a DDC connection that does or could	
condenser_heat_recovery	Condenser Heat Recovery	Presence of condenser heat recovery to recover heat for some use, typically hot water or outdoor air-preheat.	
primary_num_identical_pumps	Primary Distribution Pump Quantity	Number of pumps associated the primary cooling loop through the chillers. The columns are meant to correspond to the chiller columns above. Enter pumps below the chiller they serve, but only enter the	
primary_num_standby_units	Number of Redundant Units	Number of pumps used strictly for backup. Ask whether all pumps are used or whether some are used only for back up. Get count.	
primary_motor_hp	Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1.	
secondary_num_identical_pumps	Cooling Water Distribution Pumps (Secondary) Number of Identical Pumps	Number of pumps associated a secondary cooling loop that circulate water to the building and do not circulate water through the chiller. The pump columns are meant to correspond to the chiller columns above. Enter pumps below the chiller entry they serve, but only enter pumps once. If a common pump is used by more than one chiller entry, enter it one column only. Enter zero if there are no secondary pumps. Count is inclusive of redundant units.	
secondary_num_standby_units	Number of Secondary Redundant Units	Number of pumps used strictly for backup. Ask whether all pumps are used or whether some are used only for back up. Get count.	
secondary_motor_hp	Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
secondary_capacity_control	Capacity Control:	How is the pump capacity controlled? 1 and 2 speed motors are constant speed motors operating continuously or cycling. The 2-speed motor also changes speed as needed. Variable is for pumps with VFD motor drive.	1 = 1 Speed 2 = 2 Speed V = Variable -1 = Unknown NF = Not Filled
secondary_ems_control	EMS Control?	Are the pumps controlled by or hooked up to the EMS system? Enter Y if the pumps have a DDC connection that could control the pumps even if the pumps run continuously.	Y = Yes N = N -1 = Unknown NF = Not Filled
wp_num_identical_pumps	Heat Rejection Water Pumps Number of Identical Units	Number of pumps associated the condenser water loop between the chillers or DX equipment and the cooling tower or dry cooler. The pump columns are meant to correspond to the condenser columns above. Enter pumps below the condenser entry they serve but only enter the pumps in one column. If a common pump is used by more than one chiller entry, enter it one column only. An entry must also be made for heat rejection equipment serving water cooled DX equipment. This should be entered in a column with no chiller entered above. Add additional pages as required. Enter zero if there are no secondary pumps. Count is inclusive of redundant units.	
wp_num_standby_units	Number of Secondary Redundant Units	Number of pumps used strictly for backup. Ask whether all pumps are used or whether some are used only for back up. Get count.	
wp_motor_hp	Motor HP (Total)	Total motor nameplate HP. If name plate not available enter brake HP if available otherwise enter -1.	
wp_capacity_control	Capacity Control:	How is the pump capacity controlled? 1 and 2 speed motors are constant speed motors operating continuously or cycling. The 2-speed motor also changes speed as needed. Variable is for pumps with VFD motor drive.	1 = 1 Speed 2 = 2 Speed V = Variable -1 = Unknown NF = Not Filled
wp_ems_control	EMS Control?	Are the pumps controlled by or hooked up to the EMS system? Enter Y if the pumps have a DDC connection that could control the pumps even if the pumps run continuously.	Y = Yes N = N -1 = Unknown NF = Not Filled

Compressor Type Codes	
1 Centrifugal	Rotating wheel located within discharge housing, much like an AHU fan. Determine from nameplate, make and model, or O&M materials.
2 Reciprocating	Piston moving up and down within a cylinder, much like car engine. Determine from nameplate, make and model, or O&M materials.
3 Screw	Two counter – rotating shafts, much like a meat grinder. Determine from nameplate, make and model, or O&M materials. Screws are two counter-rotating shaft
4 Scroll	Scroll or spirals rotating one into the other. Determine from nameplate, make and model, or O&M materials.
5 Absorption, natural gas	Uses two different fluids (H2O/ammonia) with different adsorption/dissolving and evaporation/condensing properties.
6 Absorption, steam	Uses two different fluids (H2O/ammonia) with different adsorption/dissolving and evaporation/condensing properties. Absorption chiller utilizing steam from separate boiler or steam generator.
7 Off-site	This type indicates chilled water is delivered to the audited area from a source outside of the audit scope. This typically would be from a district chilled water system or central plant that is not within the audit scope

Heat Rejection Condensing Type Codes	
1 Air cooled refrigerant	Air cooled refrigerant condensers are common in package air cooled chillers. Typically refrigerant copper tubing with aluminum fins to enhance heat transfer.
2 Evaporative cooled refrigerant	Refrigerant is cooled by unit with external water spray to produce evaporative effect on the refrigerant coils.
3 Water cooled fluid	Cooling tower with wetted media that uses evaporative cooling effect. Cooled water is pumped to condenser heat exchanger(s).
4 Air cooled fluid	Cooling tower with dry fin and tube heat exchanger that uses sensible cooling. Cooled water is pumped to condenser heat exchanger(s). Sometimes referred to as a dry cooler
5 Other	Provide description of any equipment coded as other.

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
controls_id		Automation Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
seq_num		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Automation Controls	
id2			
id3			
id4			
id5			
full_dcc	Full DDC (major equipment & zone level) (FD)	Full DDC control has central DDC control of major equipment and communicating DDC control of zone equipment and thermostats.	FD = Yes - Full DDC Unk = Unknown NF = Not Applicable
hybrid_pneumatic	Hybrid – Pneumatic (DDC at major Equip & Pneumatic at zone level (HP)	Hybrid-Pneumatic control has central DDC control of major equipment and pneumatic control of zone equipment and thermostats (thermostats are not electronic). Pneumatic controls use compressed air to transfer control signals. This is primarily located in older buildings where DDC has been retrofitted. Pneumatic control is a control method that uses compressed air. The thermostats are not electronic.	HP = Yes - Hybrid-Pneumantic Unk = Unknown NF = Not Applicable
hybrid_electric	Hybrid -Electric (DDC at major Equip & electronic at zone level) (HE)	Hybrid-Electric has central DDC control of major equipment and non-communicating electronic control of zone equipment and thermostat.	HE = Yes - Hybrid Electric Unk = Unknown NF = Not Applicable
full_pneumatic	Full Pneumatic (FP)	Full Pneumatic means all system controls, major equipment, zone level equipment, and zone thermostats are pneumatic with no electronic controls. Pneumatic controls use compressed air as the means of generating and transmitting the control signals.	FP = Yes - Full Pneumantic Unk = Unknown NF = Not Applicable
full_electronic_manual	Full Electronic – Manual T-stat	Full Electronic means all controls for major equipment, zone equipment, and thermostats are electronic controls (e.g. typical programmable thermostat) ***that do not report to a central DDC system*** . FEM refers to Manual Thermostats and FEP refers to programmable thermostats. Circle either Programmable or Manual	FEM = Yes - Full Electronic (Manual T-Stat) FEP = Yes - Full Electronic (Programmable T-Stat) Unk = Unknown NF = Not Applicable
full_electronic_programmable	Full Electronic – Programmable T-stat		
config_other	Other (e.g. at unit only)	Describe any "Other" controls in the right margin. Prime example is a unit that you control by manually turning it on and off.	OT = Yes - Other Controls Unk = Unknown NF = Not Applicable

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
config_other_entry		If other is identified, this field will be filled	FD = Yes - Full DDC Unk = Unknown NF = Not Applicable
time_clock_start	Time clock start / stop function (T)	Is the HVAC system controlled by a time clock which turns the system off and on based on time of day?	T = Yes - Timeclock Unk = Unknown NF = Not Applicable
optimum_start	Optimum start / stop (O)	Optimum start control adjusts the HVAC start time based upon outdoor or space conditions so HVAC warm-up/cool-down operation time is minimized. In some thermostats, this is referred to as adaptive recovery.	O = Yes - Optimum Unk = Unknown NF = Not Applicable
unocc_temp_setback	Unoccupied temperature setback (UB)	Is there an unoccupied period where space heating temperature set point is reduced either electronically or by regular staff operation? Set back must be at least 5F to qualify.	UB = Yes - Setback Unk = Unknown NF = Not Applicable
unocc_temp_setup	Unoccupied temperature setup (UU)	Is there an unoccupied period where space cooling temperature set point is increased either electronically or by regular staff operation? Set up must be at least 5F to qualify.	UU = Yes - Setup Unk = Unknown NF = Not Applicable
air_handler_na	Does the building have MZ systems that the following Questions would apply to?	Yes or no. If no, then the next 3 variables will all be NF	Y = Yes N= No DK = Don't know NF = Not filled
supply_temp_reset	Supply air temperature reset (S)	In reheat or mixing systems, is the central supply air temperature automatically adjusted based upon zone temperature, zone terminal damper position, outdoor air temperature, or other means.	S = Yes - Supply Temp Reset Unk = Unknown NF = Not Applicable
static_pressure_reset	Static pressure reset (P)	In VAV systems, is the central supply air pressure set point adjusted based upon something (zone temperature, zone terminal damper position, outdoor air temperature, season, or other).	S = Yes - Static Pressure Reset Unk = Unknown NF = Not Applicable
zone_damper_air_reset	Zone damper airflow reset (Z)	In systems with VAV terminals, are the zone terminal minimum airflows lowered (e.g. 30 – 50%) prior to terminal reheat is turned on.	S = Yes - Zond Damper Reset Unk = Unknown NF = Not Applicable
hydronic_na	Does the building have Hydronic Loops that the following questions would apply to?	Yes or no. If no, then the next 3 variables will all be NF	Y = Yes N= No DK = Don't know NF = Not filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
hot_water_temp_reset	Hot water temperature reset (HW)	Hot water temperature reset is when the hot water circulation loop temperature is automatically reduced when ambient conditions are warmer or heating loads are low. Controller is sometimes visible on boiler.	HW = Yes - Hot Water Reset Unk = Unknown NF = Not Applicable
chilled_water_temp_reset	Chilled water temperature reset (CHW)	Chilled water temperature reset is when the chilled water circulation loop temperature is automatically increased when ambient conditions are colder or cooling loads are low.	CHW = Yes - Chilled Water Reset Unk = Unknown NF = Not Applicable
cond_water_temp_reset	Condenser water temperature reset (CW)	Condenser water temperature reset is when the condenser water circulation loop temperature is automatically decreased when ambient conditions are colder or cooling loads are low.	CW = Yes - Condenser Water Reset Unk = Unknown NF = Not Applicable
noted_control_troubles	Noted Control Troubles	Any control troubles noted by the site staff.	Y = Yes N= No DK = Don't know NF = Not filled
vent_ao	Garage Exhaust Fan Ventilation Control (Circle All that Apply)	Indicates Garage Exhaust Fan is **Always On**	
vent_tc		Indicates Garage Exhaust Fan uses a **Timeclock**	
vent_fc		Indicates Garage Exhaust Fan uses a **CO with Fan Cycle**	
vent_vfd		Indicates Garage Exhaust Fan uses a **CO with VFD**	
vent_n		Indicates **None -** There is no Garage Exhaust Fan	
vent_u		Indicates Garage Exhaust Fan is **Unknown**	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
waterheat_index		Water Heater Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
water_heater_id		Site-specific Unique ID	
id1	MIXED USE IDs Served? (Circle)	Indicates the Mixed Use IDs Served by the Water Heater (NOTE - NOT Space IDs - The NA column is indicated if there are no mixed use IDs)	
id2			
id3			
id4			
id5			
na			
water_heater_type	Water Heater Type	Indicate the water heater type using the Water Heater Type	1 = Heat Pump 2 = DHW Tank 3 = Point of Use – Tankless or Tanks <5 gallon 4 = Dedicated Boiler 5 = HX from Space Heat Boiler 6 = Off-Site 7 = HR from Boiler equipment 8 = HR from Chiller condenser 9 = HR from Process equipment 10 = Other -1 = Unknown
water_heater_type_other		If other is identified, this field will be filled	
fuel_type	Primary Fuel Type	Indicate the primary water heater fuel type from the Fuel Type Codes Table	1 = Electricity 2 = Natural Gas 3 = Fuel Oil 4 = Propane 5 = Other 6 = None -1 = Unknown
fuel_type_secondary	Secondary Fuel Type	Indicate the secondary water heater fuel type from the Fuel Type Codes Table	1 = Electricity 2 = Natural Gas 3 = Fuel Oil 4 = Propane 5 = Other 6 = None -1 = Unknown

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
condensing	Condensing?	Indicate whether the water heater is a condensing water heater. Condensing Water Heaters extract the additional heat from the exhaust gases to improve the overall water heater efficiency (generally above 90%).	Y = Yes N = N DK = Don't Know NF = Not Filled
number_identical_units	Number of Identical Units	The number of water heaters covered by this entry. Includes redundant units.	
number_units_on_standby	Number of Redundant Units	Number of water heaters in this entry that are used strictly for backup.	
age_water_heater	Age Of Water Heater (years)	Indicate the age of the water heater in years.	
tank_capacity	Tank Capacity (0 if tankless) (Gallons)	The capacity of the tank water heater in gallons. Tankless water heaters of 0 gallons of capacity.	
input_capacity	Input Capacity	Indicate the input capacity of the tank or tankless water heater	
input_capacity_units	Input Capacity Units	kW (for electric water heaters) or MBTU (for gas water heaters).	KW, MBTU, or DK (Don't Know)
tank_insulation_wrap	External Tank Insulation?	Indicate whether there is external tank wrap insulation surrounding the water heater (tank only).	Y = Yes N = N DK = Don't Know NA = Not Applicable
additional_storage_tank	Additional Inuslated Storage Tanks	Number of additional insulated storage tanks	
solar_preheat	Solar Preheat?	Indicate whether the water heater uses solar energy to pre-heat building / complex water before it enters the water heater.	Y = Yes N = N DK = Don't Know NA = Not Applicable NF = Not Filled
uninsulated	Additional Un-Inuslated Storage Tanks	Number of additional un-insulated storage tanks	
recirculation_system	Recirculation System?	Identify whether the water heater has a recirculation system. Recirculation systems feature sensor valves that when the water on the hot water side cools to a certain temperature, recirculation the cool water back into the water heater.	Y = Yes N = N DK = Don't Know NA = Not Applicable NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
recirc_pump_none	If Recirculation system = yes, recirculation pump control:	Indicates there is no recirculation pump controls (runs 24/7)	
recirc_pump_ems		Indicates EMS - Timeclock Recirculation Controls	
recirc_pump_time_clock		Indicates Timeclock Recirculation Controls	
recirc_pump_aquastat		Indicates Aquastat Recirculation Controls	
recirc_pump_unk		Indicates Unknown Recirculation Controls	

Light Schedule

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
lightschedule_id		Light Schedule Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
seq_num		Site-specific Unique ID	
fixture_type_id	Fixture Type ID	Site-specific Unique ID (code given by field tech)	
fixture_type	Fixture Type	This is a description of the fixture type. For fixtures that would be characterized as other, the "other" can be used, or a more informative code can be used instead (e.g. Rope light or step light) IInclude exit lights on this page but there is no need to count them in section 10a or 11a.	See "Suppl Lighting Codes" Tab
fixture_width	Fixture Width		
fixture_length	Fixture Length		
recessed		Indicates if the Fixture is recessed (not required for all fixture types)	
surface_mount		Indicates if the Fixture is pendant mounted (not required for all fixture types)	
pendant_mount		Indicates if the Fixture is pendant mounted (not required for all fixture types)	
fixture_watts	Fixture Watts	Fixture watts	
recessed_type		Indicates the lighting direction of an identified recessed fixture	
surface_type		Indicates the lighting direction of an identified surface fixture	
pendant_type		Indicates the lighting direction of an identified pendant fixture	
lamp_type	Lamp Type	This is a code for the general type of lamp in the fixture. See codes and definitions in 'Suppl Lighting Codes' Tab	See "Suppl Lighting Codes" Tab
lamp_details	Lamp Details	This is a code for the detailed type of lamp in the fixture. See codes and definitions in 'Suppl Lighting Codes' Tab	See "Suppl Lighting Codes" Tab
num_lamps	# of Lamps	# of lamps per fixture or linear feet for rope lights, neon, etc.	
watts_lamp	Watt/Lamp	Wattage per lamp or per linear foot for rope lights and neon. If unknown, assume wattage based on comparable fixtures in Section 10b. The effort spent confirming lamp wattage should correlate with the percentage of lighting represented by the lamps in the building (e.g., Surveyors should spend a more effort trying to confirm the wattage of T8s representing 90% of lighting within a site).	

Light Schedule

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
source	Source	Source of information for the “Watt/Lamp” & “Fixture Watts” columns. Assumed is filled for any lamps that were unknown wattages	O = Observation P = Plans I = Interview RS = Replacement Stock OM = O&M OTH = Other UNK = Unknown G = Guess A = Assumed
ballast_type	Ballast Type	Only gather if HID, T12, or T8 lamp. See codes and definitions in 'Suppl Lighting Codes' Tab	See "Suppl Lighting Codes" Tab
ballast_factor	Ballast Factor - If known (HP T8 ONLY)	Ballast factor is a measure of the actual lumen output for a specific lamp-ballast system relative to the rated lumen output measured with reference ballast under ANSI test conditions. Only gather for High Performance T8 lamps.	
fixture_notes	Notes	Notes	

Supplemental Lighting Codes

Fixture Type	Description	Detailed Description
W x L -r(d/i/b)	Recessed linear fluorescent – **d**irect, **i**ndirect, or **b**oth (specify which). Parenthesis may be left out of suffix (e.g. "rd" rather then "r(d)")	Recessed linear fluorescent fixture. Include width (measured – not number of lamps) and length. Mounted in ceiling. If lights the area only indirectly it's an indirect fixture. If lights the area directly it's a direct fixture.
W x L -s(d/i/b)	Surface Mount linear fluorescent – **d**irect, **i**ndirect, or **b**oth (specify which)	Surface mount linear fluorescent fixture. Include width (measured – not number of lamps) and length. Mounted on the surface of the ceiling so fixture height is lower than the ceiling, typically by about 4 inches. If lights the area only indirectly it's an indirect fixture. If lights the area directly it's a direct fixture.
W x L –p(d/i/b)	Pendant Mount linear fluorescent – **d**irect, **i**ndirect, or **b**oth (specify which)	Pendant mount linear fluorescent. Include width (measured – not number of lamps) and length and whether direct/indirect/both. Fixture is hanging from ceiling. If light only shines up it's an indirect fixture. If light only shines down it's a direct fixture.
STRIP	Bare or lensed linear fluorescent strip.	
CAN	Recessed Can Fixture	Recessed can mounted in the ceiling.
DISPLAY	Miscellaneous Display Lighting	Lighting used to highlight a display or presentation space but is not track lighting.
EXIT	Exit Sign	Sign used to highlight the location of the exit for the building.
HEAD	Track Light Head	Lighting on a track potentially with multiple heads. The direction the head is pointed and the location along the track could potentially be changed.
TSK	Task Lighting	Only include for Lodging & Office building types & task lighting that is consistent throughout space. The most common type of task lighting is under-cabinet or shelf fluorescent lighting used in systems furniture. Anything that is plugged in to an outlet is basically task lighting, e.g. Torchiere fixtures.
OTH	Other	Use when the fixture type doesn't fit into the above categories. Use of OTH is not required and is discouraged in cases where fixture is unique. Making the fixture type be descriptive (e.g. rope light, step light, down light, surface, pendant) can help keep track of the lighting during the audit and provides more information.
POLE25	Pole Mounted Fixture	Pole <= 25'
POLE40	Pole Mounted Fixture	Pole >25' & <= 40'
POLE60	Pole Mounted Fixture	Pole >40'
WALL	Wall Mounted Fixture	Wall Pack
FLOOD	Flood Light	Flood Light
Un	Unable to determine	Use when you cannot determine the fixture type.

Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp ES: Energy Savings HO: High Output LW: Low Wattage Std: Standard Wattage VHO: Very High Output
T5	Fluorescent T5 – linear fluorescent 5/8″ width.	SO	Standard Output (typical designation: F28T5, 28T5, FP28T5)	4′ Std- 28W
				2′ Std– 14W
		HO	High Output – Determine from model number (may have to look online). Usually designated by 'HO'.	2′ HO – 24W
				4′ HO - 54W
				4′ HO LW - 49W, 47W, or 45W
		Un	Unable to determine	Assume same as Standard Output
T8	Fluorescent T8– linear fluorescent 1″ width. Include T8 U shaped lamps.	SP	Standard Performance - Lumens/Watt< 90, CRI <80, Initial Lumens < 2950, Life < 20,000 hours @ 3 hour start, Lumen maintenance < 90%.	8′ Std = 59 watts
				8′ HO = 86 watts
				4′ Std - 32W
				4′ HO - 44 watts
				2ft Std – 17W
		HP	High Performance – relates to the quality of the lamp: Lumens/Watt > 90, CRI >80, Initial Lumens >3100, Life > 24,000 hours @ 3 hour start, Lumen maintenance > 94%. If low wattage T8 then enter HP. If 32 watt T8, look up	4′ Std - 32W
				4′ LW -30W, 28W, 25W
		Un	Unable to determine	Assume same as Standard Wattage (Std).
T12	Fluorescent T12– linear fluorescent 1.5″ width. Include "U" shaped T12.	No details required	No details required	4′ Std – 40W
				4′ Std ES - 34W
				4′ HO - 60W
				4′ VHO – 115W
				8′ Std - 75W
				8′ Std ES – 60W
				8′ HO - 110W
				8′ HO ES – 95W
				8′ VHO – 215W
				8′ VHO ES – 185W

Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp ES: Energy Savings HO: High Output LW: Low Wattage Std: Standard Wattage VHO: Very High Output
CFL	Compact Fluorescent – Include twist, twin tube, biax, triple tube and quad tube lamps. Biax/twin tube lamps can be up to 24" long.	S	Screw-in	7W to 42W
		P	Pin-based	
		Un	Unable to determine	
F-OTH	Other Fluorescent – Fluorescent that doesn't fit into one of the above categories		No details required EX: 4' T10 – 40W; 5' T17 – 90W	Varies
INC	Incandescent – very inefficient. Color most similar to natural sunlight. Common in retail.	R	Reflector –standard incandescent bulb with coating on back to direct light. Notice the shape of the bulb is more cone or pear shaped & the smooth mirror like lens.	Varies
		G	General Service, A type, globe, etc.	
		D	Decorative / Miscellaneous –incandescent bulb used for decorative or misc. purpose.	
		H-R	Halogen – Reflector - halogen bulb with coating on back to direct light. Shape of the bulb is more parabolic shaped.	
		H-G	Halogen - General Service – more efficient than a standard incandescent due to iodine or bromide coating on tungsten filament. Notice the 'mini' bulb inside the larger bulb this can help identify if the bulb is a halogen or an incandescent.	
		H-D	Halogen - Decorative / Miscellaneous –used for a halogen bulb used for decorative or misc. purpose.	
		Un	Unable to determine.	

Lamp Type	Description	Lamp Details	Description	Typical Watts/Lamp ES: Energy Savings HO: High Output LW: Low Wattage Std: Standard Wattage VHO: Very High Output
HID	HID – High intensity discharge. Common in high bay fixtures, parking lots, and in outdoor wall and walkway lighting. CMH is used in some display situations.	MV	Mercury Vapor – very inefficient outdoor lighting, not very common, blue/green color. Sometimes preferred for landscape lighting.	Varies
		MH	Metal Halide - Typically used in flood lighting applications due to high output for small bulb size. Also notice the color variations in the picture; this happens as the light ages, a negative characteristic of MH. Most types are fitted with an outer glass bulb to protect the inner components and prevent heat loss. Requires a warm-up period so not used in critical areas. Common in high bay indoor applications, e.g. warehouse, factory, gym, etc.	35W (for small installations such as flood lighting mounted on the corners of buildings) to 1000W if site lighting (high pole mounted - pictured here).
		CMH	Ceramic Metal Halide – The bulb contains a ceramic tube that is filled with mercury, argon, and metal halide salts. Produces a blue/white light. Smaller wattage 20-150 watts typically used in retail and driven by electronic ballast.	Same range as MH.

Supplemental Lighting Codes

Ballast Type	Description	Detailed Description
E	Electronic – Unknown Type	
SE	Standard Electronic	Driven by state of the art circuit boards. Operating Frequency 20,000Hz.25% more efficient than magnetic. Do not hum or flicker. CFLs can have integrated electronic ballasts
HPE	High Performance Electronic	Typically paired with 4' T8 fluorescent lamps.
M	Magnetic	Driven by copper coils. Operating Frequency 60Hz.Less Efficient than Electronic. Contains Poly-chlorinated biphenyls (PCBs).
PULSE	HID Pulse Start Ballast	HID lamp which requires separate ballast to provide thousands volts to start lamp because it doesn't contain an internal starter probe.
PROBE	HID Probe Start Ballast	HID lamp with an internal starter probe near one of the main electrodes to help in gas ionization during the first few seconds of the starting cycle.
NONE	No ballast required	Use when the lighting system requires no ballast.
Un	Unable to determine	Use if you are unable to determine what type of ballast is used.

Supplemental Lighting Codes

Control Type	Description	Description Details
EMS-S	Automatic Sweep Controls with EMS System	Some buildings set the controls to 'sweep' off all lights at night sometimes several times to get lights that have been turned back on by office or janitorial staff working late through the energy/lighting/building management system. Use this code for this case.
EMS	EMS System (without automatic sweep)	Use when there is an energy/lighting/building management system to control when the lights are turned on/off, etc. but there is NOT a programmed automatic sweep.
DS	Daylight Sensing, Details Unknown	Use when lights are dimmed based on daylighting but how the lights are dimmed is unknown. Perhaps you see photocells but no one on-site knows the details of the dimming process.
DS-SS	Daylight Sensing, Single-Step Dimming	Lamps have one reduced lighting output level, or are at max output. In general this is done by switching off a percentage of lamps with in the fixture.
DS-MN	Daylight Sensing, Multiple Stepped Dimming	Lamps have more than one reduced lighting output level, or are at max output. In general this is done by switching off a percentage of lamps with in the fixture.
DS-CD	Daylight Sensing, Continuous Dimming	Lamps can be dimmed to l a range of light levels from a min to max output.
DIM	Dimming (non-daylight)	Dimming controls which are not daylight sensing.
EGR	Egress control 24/7	Separately controlled fixtures for emergency/egress lighting that are on 24/7. Egress lighting that is shut off to create a dark building when the building is unoccupied should not be separated or indicated as having EGR control.
MCB	Manual - circuit breaker	Lights are controlled manually at the circuit breaker or some other central switch
MS	Manual - wall switch	Lights are controlled manually at a local wall switch (full on/off).
MB	Manual - bi-level	Lights are controlled manually at a bi-level wall switch (typically two switches serve the fixtures with one switch controlling half of the lamps and the other switch controlling the remaining lamps).
OS	Occupancy Sensors	Occupancy sensors are used to turn off or reduce the light output when the space is unoccupied.
T	Timeclock (electronic or mechanical)	A timeclock turns off the lighting at a specified hour of the day and turns the lights back on at a specified hour.
OTH	Other	Controls are used but do not fit into any of these categories.
N	None (continuous)	There are no lighting controls; the lights in this space are on continuously (24/7).
Un	Unable to determine	Unable to determine if any lighting controls are used in this space.

Lighting Summary

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
tbl_index		Light Summary Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
light_scheme	Briefly describe the lighting scheme (including controls) at this building.	Briefly describes the lighting design and controls at this building.	
has_exterior_lighting	Does this building have exterior lighting?	Indicates if the building has exterior lighting	Y = Yes N = N DK = Don't Know NF = Not Filled
stairwell_lights	Does this building have stairwell lighting?	Indicates if the building has stairwell lighitng - if yes, the next portion is filled	
stairwell_none	If building has stairwell lighting, what controls are used? (circle all that apply)	None (24/7) – Stairway lighting is on 24/7.	
stairwell_off_occupied		Off during unoccupied – Stairway lighting is off during unoccupied hours.	
stairwell_off_sensor		Off on occupancy sensor – Stairway lighting is switched on by occupancy sensors and off when the occupancy sensor detects no one in the space.	
stairwell_on_sensor		Dimmed on occupancy sensor – Stairway lighting is dimmed based on occupancy sensor.	
stairwell_switched		Switched – Stairway lighting is turned on and off using wall switches.	
area_sales	Area of outdoor sales? (SF)	Area of outdoor sales area (if applicable) This is for enclosed outdoor areas such as the gardening center at the home improvement store. Do not include side walk sales displays.	
egress_on	Are egress lights on all night?	Is there egress (emergency lighting) on at night?	Y = Yes N = N DK = Don't Know NA = Not Applicable NF = Not Filled
sales_lit	Are there lighting fixtures for sale that are illuminated?	Are there lighting fixtures in a lighting fixture sales department that are illuminated for demonstration purposes? Example: lighting department in the local home improvement center.	
estimated_kw	If yes, Estimated Connected kW	Estimate based on # of lamps/fixtures & average wattage/lamp or wattage/fixture. Sample area if large as needed. Plans often have the display circuit capacity.	<1 kW 1-5 kW 5-20 kW 20+ kW DK = Don't Know NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
indoorlight_id		Indoor Light ID Number (Primary Key)	
site_id		The Unique Site ID	
seq_num		Site-specific Unique ID	
space_id	Space ID	Foreign key, links to Spaces table	
subspace_type	Subspace Type	Identify subspaces of interest for each Space ID. Required subspaces are identified in the sampling methodology document and lighting must be separated by these categories whether the project is sampled or not. Use code 'Other' or write in a descriptive subspace type when the subspace doesn't fit into one of the below categories. See separate lighting example as a reference.	See Below
subspace_type_other	Subspace Type - Other	If Subspace type is other, specify here	
sampled_subspace_area	Sampled Subspace Area (ft2)	The **sampled** area of the subspace. This is the sample subspace area as compared to the total subspace area in the next field	
total_subspace_area	Total Subspace Area (ft2)	The **total** area of the subspace. If not sampling and auditing the entire subspace, this should be equal to the previous field (Sample Subspace Area).	
ceiling_height	Ceiling Height	The ceiling height in the space rounded to the nearest foot.	

Subspace Type/Code	Subspace Description
Aud	Auditoriums
Class	Classroom
Conf	Conference rooms
Core	Building Core/lobby/bathrooms
Corr	Corridor
Eating	Eating areas
Exam	Medical exam rooms
Groc	Grocery
Gym	Gyms
Kit	Kitchens
Lobby	Main Lobby
Mech	Mechanical Mezzanine
Off	Office
Offcl	Enclosed Office (<300sf)
Offop	Open Office
Parking	Parking Garage
Rest	Restroom/locker
Retail	Retail
Room	Patient/hotel room/Dwelling Unit
Seat	Seating Area
Show	Wholesale showrooms
Storage	Storage
Thea	Theater
Ware	Warehouses
OT - *specify*	Other

Fixture Takeoff

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
fixtakeoff_id		Indoor Light Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
seq_num		Site-specific Unique ID	
indoorlight_id		Foreign key, links to Indoor Lighting table	
fixture_height	Subspace Type	The height of the fixture identified in 'Fixture Type ID' rounded to the nearest foot.	
fixture_type_id	Subspace Type - Other	Foreign key, links (in combination with site_id) to Light Schedule table	
total_fixture_count	Total Fixture Count	The total number of fixtures in the subspace or area of the subspace that is being surveyed.	

Fixture Controls

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
fixcontrols_id		Fixture Controls Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
seq_num		Site-specific Unique ID	
indoorlight_id		Foreign key, links to Indoor Lighting table	
fixtakeoff_id		Foreign key, links to Fixture Takeoff table	
control_type	Control Type/Multiple Controls	The type of controls used on in this subspace, include all that apply, separate by a semicolon. See above control table. Do not leave this column blank. The surveyor has two options when there are different controls on the same fixture type in a space: 1. A separate entry can be made for each fixture/control type combination. Then the % lighting load controlled will be 100%. 2. One entry can be made for the fixture type and the % lighting load controlled will be something less than 100%.	See "Suppl Lighting Codes" Tab
multiple_control_types		Fill if multiple controls but all control 100% of load	
light_load_controlled	% Lighting load controlled	% of the lighting load that is being controlled by all the controls you listed under 'Control Type' For multiple controls separate by a semicolon and list in same order as 'Control Type'.	
controls_functional	Are controls overridden?	Yes/No for each type of control. For multiple controls separate by a semicolon and list in same order as 'Control Type'.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
tbl_index		Outdoor Light Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
outdoorlight_id		Site-specific Unique ID	
fixture_type_id	Fixture Type ID	Foreign key, links (in combination with site_id) to Light Schedule table	
out_light_use_type	Use Type	Code that best describes the outdoor use of the lighting: • S – Used for signage (lights up text). • F – Used to directly light the building façade. This includes wall mounted down lights and flood lights directed at the façade. • P – Parking Lot: Used to light the building's parking lot (Typically lights on poles throughout parking area). • SF – Sporting Field: Used to light a sporting field. • O – Other: Use that doesn't fit into any of the other categories • W – Walkway/Area: Used to light the path/walkway or an area where people would congregate • ES – Exterior sales: Used to highlight items the building is selling. This is for areas indicated as exterior sales areas in the lighting section of the form.	S = Signage F = Façade P = Parking Lot SF = Sporting Field O = Other W = Walkway ES = Exterior Sales Unk = Unknown NF = Not Filled
num_fixtures	# of fixtures	The number of fixtures in the group.	
out_light_control_type	Control Type	Choose the code(s) that best describes the outdoor lighting control method: • P – Photocells turn on/off lights based on available sunlight. Typically used to turn on lights in areas such as parking lots after dark. • T – A timeclock is used to turn on/off the lights based on the hour of the day. • AT – An astronomical timeclock is used to turn on/off the lights based on the hour of the day AND the date of the year. • PT – Both a photocell and a timeclock are used to turn on/off the lights. Typically used to turn on the lights in areas such as parking lots after dark, and then turn the lights off at a specified time when no one is expected to be around. Vice versa in the a.m. • M – Manual: The lights are manually controlled by a switch, circuit breaker, etc. • 24 – 24 Hour: The lights not controlled in anyway & are on 24/7. • SO – Stepped Occupancy: The lights are controlled by an occupancy sensor low level on/high level on. For example, the lights are on at low level, OS control triggers high level. • ST – Stepped Timeclock: The lights are controlled by a timeclock and are turned off/low level on/high level on. • UN – Unable to Determine: Use if you cannot determine the type of controls used.	P = Photo Cell T = Timeclock AT = Astronomical Timeclock PT = Photocell and Timeclock M = Manual 24 = 24/7 no controls SO = Stepped Occupancy ST = Stepped Timeclock UN = Unknown NF = Not Filled
out_controls_used	Are controls functional and used?	For this fixture group are the controls listed functional ***and*** used? If multiple controls are present or a percentage of the fixture controls do not work choose the answer that describes the majority of the fixtures.	Y = Yes N = N DK = Don't Know NA = Not Applicable NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
food_index		Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
food_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by food service equip	
sb	Kitchen Types (select all that apply	Indicates a **SNACK BAR** Kitchen Type	
ff		Indicates a **FAST FOOD** Kitchen Type	
c		Indicates a **CAFETERIA/RESTAURANT** Kitchen Type	
lk		Indicates a **LARGE/COMMERCIAL KITCHEN** Type	
sk		Indicates a **SMALL KITCHEN** Type	
ot		Indicates an **OTHER** Kitchen Type	
n		Indicates NO KITCHEN present	
total_kitchen_area	Total Kitchen Area (SQFT) (SQ FT)	Indicate the total kitchen area in square feet. Kitchen space is defined as food preparation area for any of the kitchen type categories identified above.	
dining_area	Dining Area (SQFT)	Indicate the total dining area in square feet. Dining area is classified as space used to eat prepared meals.	
number_meals	Number of meals served per day	Estimate the total number of meals prepared by the kitchen type areas per day. This is the essentially the number of customers	
number_spray_valves	Number of pre-rinse spray valves (#)	Indicate the presence of pre-rinse spray valves. Pre-rinse spray valves are typically found in the cleaning area of the kitchen and are used to remove food particles from dishes prior to cleaning.	
elec_warming_eq	Electric Warming Equipment (Yes/No)	Indicate the presence of electric food warming and holding equipment. The devices should not be used to cook / prepare food; instead they maintain the temperature of food that has already been prepared. Warming equipment would include warming drawers, and equipment used to maintain temperatures below 135 °F.	Y = Yes N = N NF = Not Filled
kitchen_hood_linear_ft	Total Linear Feet of Kitchen Hood (LF)	Indicate the total length of kitchen hood (lineal feet). Kitchen hoods remove airborne grease, combustion products, fumes, smoke, odors, heat, and steam from the air by evacuation of the air and filtration.	
standard_hood_percent	Standard (% of total LF kitchen hood)	Indicate the percentage of total kitchen hood length that features standard kitchen hoods.	
hr_hood_percent	HR (% of total LF kitchen hood)	Indicate the percentage of total kitchen hood length that features Heat Recovery (HR) kitchen hoods.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
dcv_hood_percent	DCV (% of total LF kitchen hood)	Indicate the percentage of total kitchen hood length that features Demand Controlled Ventilation (DCV). These kitchen hoods have sensors that measure temperature, steam and smoke in the hood, and adjust the fan speed accordingly to save both fan energy and conditioned air.	
compensating_hood_percent	Compensating (% of total LF kitchen hood)	Indicate the percentage of total kitchen hood length that features compensating kitchen hoods. Compensating hoods supply up to 90% make-up air through stainless steel perforated panels on the front face of the hood. The hood performs at extremely low CFM exhaust flow rates.	
steamers	Steamers	Indicate the presence (None), and fuel type (Electric or Gas) of food steamers.	E = Electric G = Gas (may be Natural Gas or Propane) N = None NF = Not Filled
hot_food_cabinet	Hot Food Holding Cabinet	Indicate the presence (None), and fuel type (Electric or Gas) of hot food holding cabinets in the kitchen. Examples include any equipment used to maintain temperatures above 135 °F. (Gas may represent Propane)	
boiler_fryer	Broilers / Fryers	Indicate the presence (None), and fuel type (Electric or Gas) of boilers / fryers. (Gas may represent Propane)	
griddle_grill	Griddle / Grill	Indicate the presence (None), and fuel type (Electric or Gas) of griddles. (Gas may represent Propane)	
combo_oven	Combination Oven	Indicate the presence (None), and fuel type (Electric or Gas) of combination oven (An oven with a combination mode. Cook in	
oven	Oven (excluding combination ovens)	Indicate the presence (None), and fuel type (Electric or Gas) of non-combination ovens. (Gas may represent Propane)	
kit_range	Range	Indicate the presence (None), and fuel type (Electric or Gas) of cooking ranges. (Gas may represent Propane)	
dish_boost_fuel	Dishwasher Booster Fuel	Indicate the presence (None), and fuel type (Electric or Gas) of dishwasher booster fuel. (Gas may represent Propane)	
refer_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by Plug Load Refrigeration Equip	
refer_vend_machines	Refrigerated Vending Machines	Indicate the number of refrigerated vending machines (e.g., fruit dispensaries).	
nonrefer_vend	Non-Refrigerated Vending Machines	Indicate the number of non-refrigerated vending machines (e.g., snack dispensaries).	
beverage_merch	Beverage Merchandizers (1-2 door beverage display cases)	Indicate the number of beverage merchandizers (e.g., cold soda dispensaries).	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
ice_machines	Ice Machines	Indicate the number of ice machines.	
com_refers_full	Commercial Refrigerators (full height) (# of doors)	Indicate the total number of full height *commercial* refrigerator doors. Commercial refrigerators usually feature larger interior dimensions provide more storage space than their residential counterparts.	
com_refers_half	Commercial Refrigerators (half height) (# of doors)	Indicate the total number of half height *commercial* refrigerator doors. Commercial refrigerators usually feature larger interior dimensions provide more storage space than their residential counterparts.	
com_freezers	Commercial Freezers (# of doors)	Indicate the total number of *commercial* freezer doors. Commercial freezers usually feature larger interior dimensions provide more storage space than their residential counterparts.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
tbl_index		Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
pool_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by pool/spa equip	
pool_indoor	Pool Indoor (total sq)	Indicate the total indoor pool square footage.	
pool_outdoor	Pool Outdoor (total sq)	Indicate the total outdoor pool square footage.	
pool_fuel	Pool Fuel (**E**lectric, **G**as, **P**ropane, **O**ther, **N**one)	Indicate the presence of a pool (**N**one), and fuel type (**E**lectric, **G**as, **P**ropane, **O**ther).	E = Electricity NG = Natural Gas P = Propane OT = Other N = None DK = Don't Know NF = Not Filled
hot_tub_indoor	Hot Tub Indoor (total sq)	Indicate the total indoor hot tub square footage.	
hot_tub_outdoor	Hot Tub Outdoor (total sq)	Indicate the total outdoor hot tub square footage.	
hot_tub_fuel	Hot Tub Fuel (**E**lectric, **G**as, **P**ropane, **O**ther, **N**one)	Indicate the presence of a hot tub (**N**one), and fuel type (**E**lectric, **G**as, **P**ropane, **O**ther).	E = Electricity NG = Natural Gas P = Propane OT = Other N = None DK = Don't Know NF = Not Filled
laundry_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by laundry equip	
laundry_type	LaundryType (Coin-Op **C**, Drycleaner **D**, Small **S**, Large Commercial **L,** None **N**)	Type (Coin-Op **C**, Drycleaner **D**, Small **S**, Large Commercial **L,** None **N**)	C = Coin-Op D = Drycleaner S = Small L = Large Commercial N = None DK = Don't Know NF = Not Filled
laundry_done_onsite	% of laundry done on-site (%)	% of laundry done on-site (%)	
electric_clothes_dryer	Electric Clothes Dryer (#)	Electric Clothes Dryer (#)	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
gas_clothes_dryer	Gas Clothes Dryer (#)	Gas Clothes Dryer (#)	
lab_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by the Laboratory equip	
lab_present	Laboratory Present?	Indicate the presence of a laboratory space.	
specialized_lab_equip	Does this building have specialized laboratory equipment that requires extra energy consumption?	Indicate whether the surveyed building has specialized laboratory equipment that consumes additional energy? (Ex: Gas chromatographs, centrifuges, spectrometers, and analysis equipment).	
fume_hood	Fume Hood (#)	Indicate the number of laboratory fume hoods.	
fume_hood_control_system	Fume Hood Control System (% Variable Flow)	Indicate the percentage of laboratory fume hoods that feature a variable flow system.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
index		Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
hotel_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by Lodging/Residential Care Additional Equipment	
guest_rooms	Guest Rooms (#) (#)	Indicate the total number of guest rooms.	
average_occupancy	Annual Average Occupancy (%) (%)	Indicate the annual average occupancy percentage.	
inunit_cooking	Percent of rooms with in-unit cooking (%) (%)	Indicate the percentage of guest rooms with in-unit cooking.	
hotel_in_unit_refer	Percent of rooms with in-unit refrigeration (%)	Indicate the percentage of guest rooms with in-unit refrigerators.	
hotel_showers_present	Presence of showers	Indicate the presence of showers (**Y**es, **N**o, **U**nknown).	
hotel_low_flow_showerhead	Presence of low-flow showerheads	Indicate the presence of low flow-showerheads (**Y**es, **N**o, **U**nknown).	
health_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by Healthcare Additional Equipment	
surgery_rooms	Surgery Rooms (#)	Indicate the total number of surgery rooms.	
beds	Beds (for overnight stay) (#)	Indicate the total number of beds for overnight stay.	
high_energy_machines	High energy medical machines (#)	Indicate the total number of high energy medical machines (e.g., X-Ray machines, CT Scan, MRI machines, dialysis machines, ultrasound machines, linear accelerators, and air compressors).	
office_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by Office Additional Equipment	
office_occupants	Occupants (#)	Indicate the number of office occupants.	
laptops	Laptop PCs (#)	Indicate the number of laptop PCs.	
desktops	Desktop PCs (1 computer and 1 monitor) (#)	Indicate the number of desktop PCs.	
additional_monitors	Additional Monitors (#)	Indicate the number of additional monitors. In the case of a computer with two monitors, one of the monitors would be counted in this section.	
printers_copiers	Printers/copiers (#)	Indicate the number of printers/copiers.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
whole_or_office	Do the numbers above represent the whole building (WB) or only the office portion as specified in the lighting audit (LA)?	Specify whether the counts of office equipment represent the inventory of the entire building, or only the office portion specified in the lighting audit.	
lighting_space_id	If the lighting audit area, specify representative space id.	If the counts of office equipment represent only the office portion specified in the lighting area, specify the representative space ID.	
school_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by School Additional Equipment	
school_classrooms	Classrooms (#)	Indicate the number of classrooms.	
current_students	Current Students (#)	Indicate the number of students.	
student_capacity	Student Capacity (# of seats)	Indicate the school's student capacity.	
school_fit_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by Lodging/School/Fitness Additional Equipment	
school_fit_showers_present	Presence of showers	Indicate the presence of showers (**Y**es, **N**o, **U**nknown).	
school_fit_low_flow_shower	Presence of low-flow showerheads	Indicate the presence of low flow-showerheads (**Y**es, **N**o, **U**nknown).	
grocery_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by Additional Grocery Equipment	
point_of_use_terminals	Point-of-Sale terminals (#)	Indicate the number of point-of-sale terminals in the sales area (examples include cashiers, credit card processing stations, etc.).	
add_charging_stations	Range	Indicate the presence (None), and fuel type (Electric or Gas) of cooking ranges. (Gas may represent Propane)	
food_prep_meat_dept	Food Prep – Meat Dept. (1=Yes, 0=No)	Indicate the presence of a Food Prep – Meat department (1=Yes, 0=No).	
food_prep_bakery	Food Prep – Bakery (1=Yes, 0=No)	Indicate the presence of a Food Prep – Bakery department (1=Yes, 0=No).	
food_prep_deli	Food Prep – Deli (1=Yes, 0=No)	Indicate the presence of a Food Prep – Deli department (1=Yes, 0=No).	
warehouse_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by Warehouse/Grocery/Retail Additional Equipment	
floor_polisher	Floor polishers (#)	Indicate the number of floor polishers.	
floor_polisher_charger	Floor polisher charging stations (electric only) (#)	Indicate the number of floor polisher charging stations.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
forklifts	Forklifts (electric only) (#)	Indicate the number of forklifts (for electric only).	
forklift_charger	Forklift charging stations (electric only) (#)	Indicate the number of forklift charging stations (for electric only).	
warehouse_air_compressors	Air Compressors (include vacuum pumps) (total HP) (total HP)	Indicate the total HP of all Air Compressors (include vacuum pumps).	
charging_stations	NA LEGACY FIELD		
all_mixed_use_id	Mixed-Use ID (s) Served	Indicate the Mixed-Use IDs served by Additional Equipment Required for ALL buildings	
tvs	TVs (#)	Indicate the number of TVs.	
vehicle_charging_stations	Vehicle Charging Stations (#)	Indicate the number of Charging Stations (for electric vehicles).	
mech_refer_area	Area of Mechanical/Refrigeration Mezzanine (total sq)	Total Sq Ft of a Mechanical or Refrigeration Mezzanine. If the area(s) exist, Mech Mezz becomes a required subspace in the Lighting Audit.	
has_refer_equip	Does this building have refrigeration equipment?	If the building has refrigeration equipment, such as Walk-Ins, Display Cases and Storage Boxes, FILL OUT SECTION 13 (refrigeration)	
has_data_equip	Does this building have data center equipment?	If the building has a data center or a small room with database equipment, FILL OUT SECTION 14 (Data Center)	
has_residential_areas	Does this building have Residential Areas?	Does this building have any residential areas in it? These can be Residential Floors of a mixed use building, manager's residences at a building, or apartments that are a part of Residential Care Facilities. If YES, FILL IN SECTION 15 (Residential Areas)	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
comp_index		Compressor Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
comp_id		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Compressor	
id2			
id3			
id4			
id5			
compressor_type	Compressor Type	Indicate the type of compressor.	R = Reciprocating SC = Screw SL =Scroll UNK = Unknown OT = Other
system_type	System Type	Use Single for condensing unit and stand-alone single compressors, and multiplex for parallel connected compressor systems.	S = Single M = Multiplex OT = Other Unk = Unknown
design_suction	Design Suction Temp	Design saturated suction temperature of the system the compressor(s) are operating at.	L = Low (0 to -40 F) M = Medium (0 to 35 F) H = High (>35 F) DK = Don't Know
manufact_model	Manufacturer & Model # (if Total HP is unknown)	Manu and model # used to ID HP later, if unknown on site.	
total_hp	Total HP (per unit)	Total HP per compressor.	
quantity	Quantity:	Quantity of compressors being defined.	

compressor_vsd	Unloaders or VSD compressors?	Indicate the presence of compressor unloaders or compressor VSDs. Unloaders (mounted on the cylinder heads of semi-hermetic compressors) can be mechanical valves with no wire harness, or electronic controlled with wire harnesses. VSDs are mounted on the wall or on the suction group rack (could be in panel).	U = Unloader V = VSD NO/NA = Not Applicable UNK = Unknown NF = Not Filled
float_head_pres_control	Floating Head Pressure Control?	Indicated whether or not floating head pressure control is capable.	Y = Yes N = No DK = Don't Know
heat_recovery_type	Heat Recovery Type:	Indicate the type (the use) of refrigeration heat recovery (heat reclaim). Space heating (HVAC), domestic hot water (aka service water), or space heat and domestic water (both).	S = Space Heat W = DHW SD = Space Heat & DHW N = None NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
tbl_index		Condenser Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
condenser_id		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Condenser	
id2			
id3			
id4			
id5			
idna			
condenser_type	Condenser Type	Specify the type of condenser. Air-cooled are simple and most common. Air-cooled w/pre-coolers are air-cooled condensers that drawn air over a moisture source (water spray or moist pad) that is external to the condenser. Evaporative condensers draw air that is cooled by water source (internal to the condenser). Water-cooled condensers are the rarest. They can be tubing or cylinder shaped.	R = Reciprocating SC = Screw SL =Scroll UNK = Unknown OT = Other
condenser_fan_hp	Total Fan HP: (all types)	Indicate the total fan HP for the all condenser fans.	L = Low (0 to -40 F) M = Medium (0 to 35 F) H = High (>35 F) DK = Don't Know
fan_vsd	Fan VSD or multi-speed?	Indicate the presence of a condenser fan VSD or multi speed motor. This could be in the compressor room, or directly in or on a control panel mounted on the condenser.	Y = Yes N = No DK = Don't Know
fan_motor_type	Fan Motor Type	Indicate the condenser fan motor type.	SP = Shaded Pole EC = Electric Commentated PSC = Permanent Split Capacitor DK = Don't Know NA = NA NF = Not Filled
condenser_pump_hp	Pump Motor HP (evap-cooled only)	For evaporative-cooled condensers, indicate the total spray pump HP.	
pump_vsd	Pump VSD? (evap-cooled only)	For evaporative-cooled condensers, indicate the presence of spray pump VSD. This could be in the compressor room, or directly in or on a control panel mounted on the condenser.	Y = Yes N = No NA = NA DK = Don't Know

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
displaycases_index		Display Case Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
displaycases_id		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Refrigerated Reach-Ins	
id2			
id3			
id4			
id5			
idna			
idnf			
display_type	Display Case Type	Specify the relative operating temperature of the case by indicating one of the three options.	MT = Meduim Temp LT-FF = Low Temp Frozen Food LT-IC = Low Temp Ice Cream DK = Don't Know
self_contained	Self-Contained Compressor/Condenser?	A “Y” indicates the case in a “self-contained” unit (it has its own internal compressor and condenser).	Y = Yes N = No DK = Don't Know
case_length	Case Length: (LF)	Indicate the total linear feet of case for this case type.	
cases_with_doors	Do the cases have doors?	For “reach-in” cases that have glass doors, indicate a “Y”.	Y = Yes N = No NF = Not Filled
num_doors	# of doors	Door count for this case type.	
anti_sweat	Is there an Anti-sweat heater with (ASHWC) or without control (ASH)?	Indicate whether the case has anti-sweat heaters without control, with control, or no ASH present.	ASH = Anti-Sweat Heater (no controls) ASHWC = Anti-Sweat Heater with Controls NO = None NF = Not Filled DK = Don't Know
primary_light_type	Primary Lighting Type: (T12, T8, T5, LED) List lamp type, watts per lamp, and total number of lamps	Primary lighting is the predominant type of lighting found in the case. Also use this for single lighting types only. Some cases (multideck islands) have same lamp but with many lamp lengths. Record the fixture as the dominant lamp type and convert all the odd lengths to equivalents. For example, a case that has 8-4’ T5, 4-3’ T5, and 6-2’ T5 could be recorded as having 14-4’ T5	T5, T8, T12, LED, DK or NF (NF indicates no lights)
primary_lamp_type			Any Lamp details or notes
primary_watts_per_lamp			Watts per lamp
primary_num_lamps			Total number of lamps
secondary_light_type	Secondary Lighting Type: (T12, T8, T5, LED) List lamp type, watts per lamp, and total number of lamps	Where more than one lighting type is present in the case, use this to specify the other lighting types.	T5, T8, T12, LED, DK or NF (NF indicates no lights)
secondary_lamp_type			Any Lamp details or notes
secondary_watts_per_lamp			Watts per lamp
secondary_num_lamps			Total number of lamps
light_schedule	Lighting Schedule (24 hours, same as store hours - **SH,** Occupancy Sensor – **OS)**	Indicate the lighting schedule for the case lights.	SH = Store Hours 24 = 24/7 Hours OS = Occupancy Sensor DK = Don’t Know NF = Not Filled

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
walkin_index		Walk-In Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
walkin_id		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Refrigerated Walk-Ins/Storage Boxes	
id2			
id3			
id4			
id5			
idna			
idnf			
box_type	Box Type	Specify whether the refrigerated space is a walk-in or a storage box. Walk-ins are accessed by customers or worked in (as in prep rooms) by employees. Storage boxes are not meant for continuous occupancy, only temporary for restocking access by employees.	W = Refrigerated Walk-in S = Refrigerated Storage Box DK = Don't Know
temp_type	Box Temperature Type	Specify the relative operating temperature of the refrigerated space by indicating one of the three options.	MT = Meduim Temp LT-FF = Low Temp Frozen Food LT-IC = Low Temp Ice Cream DK = Don't Know
location	Box Location	Indicate whether the refrigerated space is either indoor or outdoor, and conditioned. If indoor, whether or not the room the refrigerated space is in is conditioned (cooled by an HVAC system).	IC = Indoor Conditioned IU = Indoor Unconditioned O = Outdoor NF = Not Filled
floor_area	Floor Area: (SQFT)	Indicate the total floor area of the walk-in or storage box.	
height	Height: (FT)	Indicate the internally measured height of the walk-in or storage box.	
doorway_protection	Type of Doorway Protection?	Specify the “infiltration blocking” doorway protection devices as listed.	S = Strip curtains A = Automatic door closer N = Neither B = Both NF = Not Filled
evap_fan_controls	Evaporator fan controls?	Indicate the presence of evaporator fan controls in the refrigerate space.	Y = Yes N = No DK = Don't Know NF = Not Filled
primary_light_type	Primary Lighting Type: (T12, T8, LED, Induction, Incandescent, CFL) List lamp type, watts per lamp, and total number of lamps.	Primary lighting is the predominant type of lighting found in the walk-in or storage box. Also use this for single lighting types only.	T5, T8, T12, LED, INC, CFL, OT, DK or NF (NF indicates no lights)
primary_lamp_type		Any Lamp details or notes	
primary_watts_per_lamp		Watts per lamp	
primary_num_lamps		Total number of lamps	
secondary_light_type	Secondary Lighting Type: (T12, T8, LED, Induction, Incandescent, CFL) List lamp type, watts per lamp, and total number of lamps.	Where more than one lighting type is present in the walk-in or storage box, use this to specify the second most predominant lighting type.	T5, T8, T12, LED, INC, CFL, OT, DK or NF (NF indicates no lights)
secondary_lamp_type		Any Lamp details or notes	
secondary_watts_per_lamp		Watts per lamp	
secondary_num_lamps		Total number of lamps	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
reachin_index		Walk-In Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Refrigerated Walk-Ins/Storage Boxes	
id2			
id3			
id4			
id5			
idna			
idnf			
reach_in_id	NA	Site-specific Unique ID	
temp_type	Reach In Temperature Type	Specify the relative operating temperature of the refrigerated space by indicating one of the three options.	MT = Meduim Temp LT-FF = Low Temp Frozen Food LT-IC = Low Temp Ice Cream DK = Don't Know
location	Reach-In Location	Indicate whether the refrigerated space is either indoor or outdoor, and conditioned. If indoor, whether or not the room the refrigerated space is in is conditioned (cooled by an HVAC system).	IC = Indoor Conditioned IU = Indoor Unconditioned O = Outdoor NF = Not Filled
floor_area	Floor Area: (SQFT)	Indicate the total floor area of the reach-in box.	
height	Height: (FT)	Indicate the internally measured height of the reach-in box.	
doors	Customer Access Doors?	Enter a "Y" to specify the presence of reach-in glass doors. If the reach-in box does not have doors, enter "N".	Y = Yes N = No
evap_fan_controls	Evaporator fan controls?	Indicate the presence of evaporator fan controls in the refrigerate space.	Y = Yes N = No DK = Don't Know NA = Not Filled
number_doors	# of doors	If the reach-in box has doors, enter the total number. If no doors, enter zero.	
front_length	Length of Reach-in Box Front (Linear FT)	Specify the total linear feet of reach-in box (the front where the doors would be or are).	
primary_light_type	Primary Lighting Type: (T12, T8, LED, Induction, Incandescent, CFL) List lamp type, watts per lamp, and total number of lamps.	Primary lighting is the predominant type of lighting found in the walk-in or storage box. Also use this for single lighting types only.	T5, T8, T12, LED, INC, CFL, OT, DK or NF (NF indicates no lights)
primary_lamp_type		Any Lamp details or notes	
primary_watts_per_lamp		Watts per lamp	
primary_num_lamps		Total number of lamps	
secondary_light_type	Secondary Lighting Type: (T12, T8, LED, Induction, Incandescent, CFL) List lamp type, watts per lamp, and total number of lamps.	Where more than one lighting type is present in the walk-in or storage box, use this to specify the second most predominant lighting type.	T5, T8, T12, LED, INC, CFL, OT, DK or NF (NF indicates no lights)
secondary_lamp_type		Any Lamp details or notes	
secondary_watts_per_lamp		Watts per lamp	
secondary_num_lamps		Total number of lamps	

Servers

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
server_index		Server Table Unique Index Number (Primary Key)	
site_id		The Unique Site ID	
data_center_id		Site-specific Unique ID	
id1	Space IDs Served? (Circle)	Indicates the Space IDs Served by the Data Center/Server Room	
id2			
id3			
id4			
id5			
university_hospital		Indicates if this site is a Hosiptal or University	
total_server_floor_area	Total Floor Area:	Floor area of the server closet/server room/data center. If more than 5 data centers, group and identify total square footage as well as number of rooms.	
percent_space_leased	Percentage of space that is leased:	If the data center is occupied by the space owner (owner may be the tenant in a leased building), this is zero. If space in the data center is leased to an outside business (commonly referred to as co-location), identify the percentage that is leased.	
integrated_telcom	Integrated with Telecomm?	A room that contains telecomm equipment as well as IT equipment is integrated. If a room is telecomm only, do not include as a data center space.	
total_num_racks	Total number of racks in use	The total number of racks that are in the server room. Racks can be 2 or 4 post racks or cabinets. Count the rack if it is 1/3 or more full. If equipment is on shelves or desks and not in racks, state 'on ground' and estimated # of servers.	
num_racks_not_in_use	Number of racks NOT in use	Identify the number of racks in the data center that are empty or less than 1/3 full.	
total_elec_load	Total IT load (from IT contact or UPS) **(kW)**	Determine the IT load (i.e. load serving the racks located in the data center). First and best option is to obtain from IT personnel. Second option is to use the UPS to estimate load. This is the sum of the UPS units, with detailed information on the UPS collected below.	Y = Yes N = N NF = Not Filled
ups_make	UPS Make / Model	Identify make and model number of UPS units.	
ups_capacity	UPS Capacity (kW)	Capacity of the UPS unit in kW or kVA. From nameplate or IT personnel.	
ups_capacity_unit	UPS Capacity Unit	Circle kW if the units are kW or kVA if the units are kVA.	
ups_load	Current UPS Load (%)	Current UPS Usage Load (%)	
energy_star	Energy Star servers?	Look for Energy Star label on server equipment. If any of the equipment is Energy Star answer Y.	
degree_virtualization	Degree of Virtualization (%)	Virtualization is the running of multiple "virtual" server loads on a single physical server. Identify if any degree of virtualization is being undertaken by the IT staff.	
sep_elec_meter	Separate Electric Meter	Identify if the total electrical load of the data center is metered separately. If the meter includes IT load, distribution system losses (from transformers such as UPS units), and cooling load choose 'Y-w/HVAC'. If the data center is metered separately but does not include cooling equipment, choose 'Y-w/o HVAC'. If the data center does not have a dedicated electric meter choose 'N'.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
av_elec_load	If Yes, average electric load (kW)	If metered, identify the kW load at the time of the audit. If this data is collected by facility or IT personnel, obtain the average load.	
hvac_a	HVAC desc: Air cooled DX Water cooled DX Water cooled CHW Direct Evaporative cooled Indirect Evaporative cooled Building transfer / return air None	Identify the type of cooling used to cool the data center space. Select all that apply. Air cooled DX – Air-cooled direct-expansion computer room air conditioning unit (CRAC). DX refers to the fact that the refrigerant evaporator is in direct contact with the air stream to be cooled. Heat rejection is through air. Water cooled DX - Water-cooled direct expansion computer room air conditioning unit (CRAC). DX refers to the fact that the refrigerant evaporator is in direct contact with the air stream to be cooled. Heat rejection is through water. In water-cooled DX, a 'fluid cooler' is used for heat rejection, rather than an air-cooled condenser or connection to chiller coils. These systems can also include an economizer coil, where the refrigeration cycle is turned off when the glycol can be cooled below a certain temperature by the outside air. Water cooled CHW – Chiller water coils connected to computer room air handler unit for cooling air (CRAH). Direct Evaporative cooled – Unit that uses water evaporation to directly cool and humidify the air. Indirect Evaporative cooled – Unit that uses the energy from the evaporation of water to cool air through a heat exchanger device. Building transfer / return air – Building AHU return air is used to cool space. None	
hvac_w_dx			
hvac_w_chw			
hvac_de			
hvac_ie			
hvac_b			
hvac_n			
space_temp_range	Space Temperature Range	Choose the range representing the approximate space temperature of the data center at the time of the audit.	
space_humid_control	Does space have humidification control?	Choose Yes or No. Data centers often contain humidification systems to ensure humidity requirements are maintained. CRAC units may have humidification units integral to the unit (display may indicate humidification set points).	
dedicated_air_cond	Does space have dedicated air conditioning?	Dedicated air conditioning would be a system that serves only the data center. Typical equipment types include mini split systems or DX/CRAC unit (computer room air conditioner). Examples of systems that are NOT dedicated include chilled water fan coil units where the chiller serves air handlers serving other parts of the building.	
extended_hours	If NO Dedicated AC: Does data center cause building system to run extended hours?	Choose Yes or No. If, for example, the building system is monitoring the temperature is the space and trying to maintain set point you would choose yes.	

DB Variable Name	Survey Form Field/Question	Description	Table of Codes (if necessary)
cooling_system_cap	If YES Dedicated AC: Total cooling system capacity (tons)	Identify the total cooling capacity serving the data center only, in tons of cooling.	
num_crac	If YES: Number of CRAC/H units (#)	Identify the total number of units:	
networked	If YES: Is this equipment standalone or networked?	For larger data centers where there are multiple cooling units, these units may be operating based on a local controller. This may result in overcooling or situations where one unit is humidifying while the adjacent unit is dehumidifying. Network controls are used to control units as a system.	
economizer	If YES: Economizer?	Identify if the dedicated equipment has an air or water economizer. For example, a water-cooled DX where the unit includes waterside economizer operation.	
contact_name	IT Contact Name	IT Contact Name	
phone	IT Contact Phone	IT Contact Phone	
email	IT Contact Email	IT Contact Email	

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX I
CBSA Summary Tables Data Dictionary

Prepared for:
Northwest Energy Efficiency Alliance

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Index	Variable	Unit	Description	Data Type	Codes	DB Table	DB Var
1	Site_ID	None	Unique Site ID	Character		Both	site_id
2	System_ID	None	System ID (unique for each site)	Character		NA	NA
3	HeatSys	None	System-level heating type	Character		NA	NA
4	HeatSys_Detail	None	System-level detailed heating equipment type	Character		NA	NA
5	HeatSys_PrimFuel	None	System-level primary heating fuel	Character		NA	NA
6	HeatSys_SecFuel	None	System-level secondary heating fuel	Character		NA	NA
7	HeatSys_ElecResType	None	System-level electric resistance heat type (if applicable)	Character		NA	NA
8	HeatEq	None	Equipment-level Heating type	Character		NA	NA
9	HeatEq_Detail	None	Equipment-level detailed heating equipment type	Character		NA	NA
10	HeatEq_PrimFuel	None	Equipment-level primary heating fuel	Character		NA	NA
11	HeatEq_SecFuel	None	Equipment-level secondary heating fuel	Character		NA	NA
12	Heat_Frac	Fraction of Building Heating Load	Fraction of Building Heating Load Served	Numeric		NA	NA
13	Heat_Rank	None	Rank (of heating load served) among heating systems within the site	Character		NA	NA
14	CoolEq	None	Cooling system type	Character		NA	NA
15	CoolEq_Detail	None	Cooling system equipment type	Character		NA	NA
16	Cool_Frac	Fraction of Building Cooling Load	Fraction of Building Cooling Load Served	Numeric		NA	NA
17	Cool_Rank	None	Rank (of cooling load served) among cooling systems within the site	Character		NA	NA
18	DistSys	None	HVAC distribution system type	Character		NA	NA
19	DistSys_Detail	None	Detailed HVAC distribution system type	Character		NA	NA
20	DistSys_SupFanCtr	None	Supply fan volume control	Character		NA	NA
21	DistSys_HydHeat	True/False	Does the system have hydronic heating?	True/False		NA	NA
22	DistSys_HydCool	True/False	Does the system have hydronic cooling?	True/False		NA	NA
23	DistSys_Hyd	True/False	Does the system have hydronic heating and/or cooling?	True/False		NA	NA
24	System_Weight	CFM	System weight (CFM-equivalent), used in determining heating/cooling frac	Numeric		NA	NA
25	ID1	True/False	System serves space 1 (from spaces table)?	True/False		Both	id1
26	ID2	True/False	System serves space 2 (from spaces table)?	True/False		Both	id2
27	ID3	True/False	System serves space 3 (from spaces table)?	True/False		Both	id3
28	ID4	True/False	System serves space 4 (from spaces table)?	True/False		Both	id4
29	ID5	True/False	System serves space 5 (from spaces table)?	True/False		Both	id5
30	Primary_Unit_Heat	True/False	System is the primary heating system in the spaces it serves?	True/False		Both	primary_unit_heat
31	Primary_Unit_Cool	True/False	System is the primary cooling system in the spaces it serves?	True/False		Both	primary_unit_cool
32	Primary_Unit_Vent	True/False	System is the primary ventilation system in the spaces it serves?	True/False		Both	primary_unit_vent
33	Number_Units	Count	Number of units of this size and type	Numeric		Both	number_units
34	Unit_Age	Years	Representative equipment age	Numeric		Both	unit_age
35	Unit_Age_Group	None	Equipment age group	Character		NA	NA
36	Unit_Manufacturer	None	Representative manufacturer	Character		Both	unit_manuf
37	Unit_Model	None	Representative model name/number	Character		Both	unit_model, unit_model_number

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
1	Site	General		Site_ID	None	Unique Site ID	Character
2	Site	General		Bldg_Name	None	Building Name	Character
3	Site	General		Address	None	Site Physical Address	Character
4	Site	General		City	None	Site City	Character
5	Site	General		State	None	Site State	Character
6	Site	General		Zip	None	Site Zip Code	Numeric
7	Site	General		Util_Elec	None	Electric Service Provider	Character
8	Site	General		Util_Gas	None	Natural Gas Service Provider	Character
9	Site	General		Urban_Rural	None	Urban/Rural Designation	Character
10	Site	Sample		Sample	None	Sample that the site is a part of (core, BPA oversample, PSE oversample, etc)	Character
11	Site	Sample		Sample_Cell	None	Sample cell, determined by building type, size, vintage, and urban/rural desig	Numeric
12	Site	Sample		Wt_PNW	PNW SF/Sam	Site regional case weight	Numeric
13	Site	Sample		Sf_PNW	Square Feet	Regional square footage represented by site (site SF * case weight)	Numeric
14	Site	Sample		Sf_PNW_Heated	Square Feet	Regional heated square footage represented by site	Numeric
15	Site	Sample		Sf_PNW_Cooled	Square Feet	Regional cooled square footage represented by site	Numeric
16	Site	Building Vintage		Year_Constructed	Year	Original Year of Construction	Numeric
17	Site	Building Vintage		Year_Majority_Built	Year	Year of Construction for Majority of Site	Numeric
18	Site	Building Vintage		Vintage	None	Sample building vintage group	Character
19	Site	Building Vintage		Vintage_Detailed	None	Detailed building vintage group	Character
20	Site	Building Type		Bldg_Status	None	Building status - functional, demolished, vacant, inaccessible	Character
21	Site	Building Type		Bldg_Type	None	Building type	Character
22	Site	Building Type		Bldg_Type_Other	None	Other building type description	Character
23	Site	Building Type		Bldg_Type_Detailed	None	Detailed building type	Character
24	Site	Building Type		Bldg_Type_Detailed_Other	None	Other detailed building type description	Character
25	Site	Building Type		Bldg_Type_2009	None	2009 CBSA building type	Character
26	Site	Building Type		Bldg_Type_CBECS	None	CBECS building type	Character
27	Site	Building Type		Bldg_Type_NWPCC	None	Northwest Power and Conservation Council building type	Character
28	Site	Building Type		Mixed_Use	None	Building under mixed use?	True/False
29	Site	Functional Use		Primary_Use	None	Primary Functional Use	Character
30	Site	Functional Use		Primary_Use_Pct	% Total Floor	Primary Use % of Floor Area	Numeric
31	Site	Functional Use		Secondary_Use	None	Secondary Functional Use	Character
32	Site	Functional Use		Secondary_Use_Pct	% Total Floor	Secondary Use % of Floor Area	Numeric
33	Site	Functional Use		Tertiary_Use	None	Tertiary Functional Use	Character
34	Site	Functional Use		Tertiary_Use_Pct	% Total Floor	Tertiary Use % of Floor Area	Numeric
35	Site	Functional Use		Common_Area_Pct	% Total Floor	Common % of Floor Area	Numeric
36	Site	Functional Use		Parking_Area_Pct	% Total Floor	Parking Garage % of Floor Area	Numeric
37	Site	Functional Use		Vacant_Area_Pct	% Total Floor	Vacant % of Floor Area	Numeric
38	Site	Building Size		Sf_Total	Square Feet	Total building floor area, including parking garages	Numeric
39	Site	Building Size		Sf_Bldg	Square Feet	Building floor area, without parking garages	Numeric
40	Site	Building Size		Sf_Parking	Square Feet	Parking garage floor area	Numeric
41	Site	Building Size		Size_Group	None	General building size group	Character
42	Site	Building Size		Bldg_Type_Size_Group	None	Building size group by building type, used for sample	Character
43	Site	Building Size		Heat_Area_Pct	% Building Fl	% of non-parking floor area that is heated	Numeric
44	Site	Building Size		SemiHeat_Area_Pct	% Building Fl	% of non-parking floor area that is semi-heated	Numeric
45	Site	Building Size		Heat_SB_Area_Pct	% Heated Flo	% of heated floor area that has an after hours shutoff/setback	Numeric
46	Site	Building Size		Cool_Area_Pct	% Building Fl	% of non-parking floor area that is cooled	Numeric
47	Site	Building Size		Cool_SU_Area_Pct	% Cooled Flo	% of cooled floor area that has an after hours shutoff/setup	Numeric
48	Site	Building Size		Refrigerated_Area_Pct	% Building Fl	% of non-parking floor area that is refrigerated	Numeric
49	Site	Building Size		Unconditioned_Area_Pct	% Building Fl	% of non-parking floor area that is unconditioned	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
50	Site	Building Size		Floors_Above_Grade	Count	Number of floors above ground	Numeric
51	Site	Building Size		Floors_Below_Grade	Count	Number of floors below ground	Numeric
52	Site	Building Size		Out_Park_Spaces	Count	Number of Outdoor Parking Spaces	Numeric
53	Site	Building Size		Bldg_Multiple	None	Single building, or part of a larger complex?	Character
54	Site	Building Size		Bldg_Number	Count	Total number of buildings at site	Numeric
55	Site	Climate		TMY_HDD	HDD	Typical year (TMY2) heating degree days (HDD), base 65	Numeric
56	Site	Climate		TMY_CDD	CDD	Typical year (TMY2) cooling degree days (CDD), base 65	Numeric
57	Site	Climate		Climate_Zone_Heating	None	Heating climate zone, based on TMY HDD	Character
58	Site	Climate		Climate_Zone_Cooling	None	Cooling climate zone, based on TMY CDD	Character
59	Site	Occupancy		Owner_Occ_Pct	% Building Fl	% of Site Owner Occupied	Numeric
60	Site	Occupancy		Tenant_Occ_Pct	% Building Fl	% of Site Tenant Occupied	Numeric
61	Site	Occupancy		Tenant_Number	Count	Number of tenants	Numeric
62	Site	Occupancy		Has_Energy_Manager	True/False	Does the building have a dedicated energy manager?	True/False
63	Site	Occupancy		Hrs_Open	Hours/Week	Hours/Wk Open For Business (averaged across all building spaces)	Numeric
64	Site	Occupancy		Hrs_Occupied	Hours/Week	Hours/Wk Occupied (averaged across all building spaces)	Numeric
65	Site	Occupancy		Hrs_Hvac	Hours/Week	Hours/Wk HVAC On (averaged across all building spaces)	Numeric
66	Site	Occupancy		Hrs_Lights	Hours/Week	Hours/Wk Lighting On (averaged across all building spaces)	Numeric
67	Site	Occupancy		Open_Sat	True/False	Fraction of Building Area Open Saturday	True/False
68	Site	Occupancy		Open_Sun	True/False	Fraction of Building Area Open Sunday	True/False
69	Site	Occupancy		Open_24	True/False	Fraction of Building Area Open 24/7	True/False
70	Site	Occupancy		Hrs_Open_Cat	None	Hrs Open Category (averaged across all building spaces)	Character
71	Site	Occupancy		Weeks_Open	Weeks	Open Weeks/Yr (averaged across all building spaces)	Numeric
72	Site	Energy Sources		Has_Energy_Electricity	True/False	Does the site use Electricity?	True/False
73	Site	Energy Sources		Has_Energy_NaturalGas	True/False	Does the site use Natural Gas?	True/False
74	Site	Energy Sources		Has_Energy_Oil	True/False	Does the site use Oil?	True/False
75	Site	Energy Sources		Has_Energy_Propane	True/False	Does the site use Propane?	True/False
76	Site	Energy Sources		Has_Energy_PurchasedCooling	True/False	Does the site use Purchased Cooling?	True/False
77	Site	Energy Sources		Has_Energy_Wood	True/False	Does the site use Wood?	True/False
78	Site	Energy Sources		Has_Energy_PurchasedHotWater	True/False	Does the site use Purchased Hot Water?	True/False
79	Site	Energy Sources		Has_Energy_PurchasedSteam	True/False	Does the site use Purchased Steam?	True/False
80	Site	Energy Sources		Has_Energy_Other	True/False	Does the site use Other energy sources?	True/False
81	Site	Power Generation		Has_OnSite_Gen	True/False	Is there Power Generation On-Site?	True/False
82	Site	Power Generation		Has_Cogen	True/False	Is there Cogeneration on-site?	True/False
83	Site	Power Generation		Is_Grid_Connected	True/False	Is on-site generation Grid Connected?	True/False
84	Site	Power Generation		Tot_Gen_Capacity	kW	Total On-Site Generation Capacity	Numeric
85	Site	Renovations	Lighting Ballasts	Ren_Ballast	None	Were Lighting Ballasts ever replaced or renovated?	Character
86	Site	Renovations	Lighting Ballasts	Ren_Ballast_YearsAgo	Years	Years since Lighting Ballasts were renovated	Numeric
87	Site	Renovations	Lighting Ballasts	Ren_Ballast_Percent	%	Percent of Lighting Ballasts that was renovated	Numeric
88	Site	Renovations	Lighting Ballasts	Ren_Ballast_Plans	None	Plans to renovate Lighting Ballasts in the next two years?	Character
89	Site	Renovations	Lighting Fixtures	Ren_Fixture	None	Were Lighting Fixtures ever replaced or renovated?	Character
90	Site	Renovations	Lighting Fixtures	Ren_Fixture_YearsAgo	Years	Years since Lighting Fixtures were renovated	Numeric
91	Site	Renovations	Lighting Fixtures	Ren_Fixture_Percent	%	Percent of Lighting Fixtures that was renovated	Numeric
92	Site	Renovations	Lighting Fixtures	Ren_Fixture_Plans	None	Plans to renovate Lighting Fixtures in the next two years?	Character
93	Site	Renovations	Lighting Controls	Ren_Control	None	Were Lighting Controls ever replaced or renovated?	Character
94	Site	Renovations	Lighting Controls	Ren_Control_YearsAgo	Years	Years since Lighting Controls were renovated	Numeric
95	Site	Renovations	Lighting Controls	Ren_Control_Percent	%	Percent of Lighting Controls that was renovated	Numeric
96	Site	Renovations	Lighting Controls	Ren_Control_Plans	None	Plans to renovate Lighting Controls in the next two years?	Character
97	Site	Renovations	HVAC	Ren_Hvac	None	Were HVAC ever replaced or renovated?	Character
98	Site	Renovations	HVAC	Ren_Hvac_YearsAgo	Years	Years since HVAC were renovated	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
99	Site	Renovations	HVAC	Ren_Hvac_Percent	%	Percent of HVAC that was renovated	Numeric
100	Site	Renovations	HVAC	Ren_Hvac_Plans	None	Plans to renovate HVAC in the next two years?	Character
101	Site	Renovations	HVAC Controls	Ren_HvacCtr	None	Were HVAC Controls ever replaced or renovated?	Character
102	Site	Renovations	HVAC Controls	Ren_HvacCtr_YearsAgo	Years	Years since HVAC Controls were renovated	Numeric
103	Site	Renovations	HVAC Controls	Ren_HvacCtr_Percent	%	Percent of HVAC Controls that was renovated	Numeric
104	Site	Renovations	HVAC Controls	Ren_HvacCtr_Plans	None	Plans to renovate HVAC Controls in the next two years?	Character
105	Site	Renovations	Refrigeration	Ren_Ref	None	Were Refrigeration ever replaced or renovated?	Character
106	Site	Renovations	Refrigeration	Ren_Ref_YearsAgo	Years	Years since Refrigeration were renovated	Numeric
107	Site	Renovations	Refrigeration	Ren_Ref_Percent	%	Percent of Refrigeration that was renovated	Numeric
108	Site	Renovations	Refrigeration	Ren_Ref_Plans	None	Plans to renovate Refrigeration in the next two years?	Character
109	Site	Renovations	Windows	Ren_Window	None	Were Windows ever replaced or renovated?	Character
110	Site	Renovations	Windows	Ren_Window_YearsAgo	Years	Years since Windows were renovated	Numeric
111	Site	Renovations	Windows	Ren_Window_Percent	%	Percent of Windows that was renovated	Numeric
112	Site	Renovations	Windows	Ren_Window_Plans	None	Plans to renovate Windows in the next two years?	Character
113	Site	Renovations	Roof Insulation	Ren_RoofIns	None	Were Roof Insulation ever replaced or renovated?	Character
114	Site	Renovations	Roof Insulation	Ren_RoofIns_YearsAgo	Years	Years since Roof Insulation were renovated	Numeric
115	Site	Renovations	Roof Insulation	Ren_RoofIns_Percent	%	Percent of Roof Insulation that was renovated	Numeric
116	Site	Renovations	Roof Insulation	Ren_RoofIns_Plans	None	Plans to renovate Roof Insulation in the next two years?	Character
117	Building Enve	Walls	General	First_Floor_Perimeter	Linear Feet	First floor perimeter	Numeric
118	Building Enve	Walls	General	Upper_Floor_Perimeter	Linear Feet	Typical upper floor perimeter	Numeric
119	Building Enve	Walls	General	Floor_To_Floor_Height	Feet	Average floor-to-floor height	Numeric
120	Building Enve	Walls	General	Wall_Area	Square Feet	Total wall area	Numeric
121	Building Enve	Walls	General	Wall_Pct_Window	% Wall Area	% of wall area that is windows	Numeric
122	Building Enve	Walls	Wall Surface	WallSurf_Brick_Pct	% Wall Area	% of wall area that has Brick surface	Numeric
123	Building Enve	Walls	Wall Surface	WallSurf_Concrete_Pct	% Wall Area	% of wall area that has Concrete surface	Numeric
124	Building Enve	Walls	Wall Surface	WallSurf_ConcreteBlock_Pct	% Wall Area	% of wall area that has Concrete Block surface	Numeric
125	Building Enve	Walls	Wall Surface	WallSurf_Wood_Pct	% Wall Area	% of wall area that has Wood surface	Numeric
126	Building Enve	Walls	Wall Surface	WallSurf_Metal_Pct	% Wall Area	% of wall area that has Metal surface	Numeric
127	Building Enve	Walls	Wall Surface	WallSurf_Stucco_Pct	% Wall Area	% of wall area that has Stucco surface	Numeric
128	Building Enve	Walls	Wall Surface	WallSurf_Glass_Pct	% Wall Area	% of wall area that has Glass surface	Numeric
129	Building Enve	Walls	Wall Surface	WallSurf_Vinyl_Pct	% Wall Area	% of wall area that has Vinyl surface	Numeric
130	Building Enve	Walls	Wall Framing	WallFrame_MetalStud_Pct	% Wall Area	% of wall area that has Metal Stud framing	Numeric
131	Building Enve	Walls	Wall Framing	WallFrame_Wood_Pct	% Wall Area	% of wall area that has Wood framing	Numeric
132	Building Enve	Walls	Wall Framing	WallFrame_ConcreteBlock_Pct	% Wall Area	% of wall area that has Concrete Block framing	Numeric
133	Building Enve	Walls	Wall Framing	WallFrame_Brick_Pct	% Wall Area	% of wall area that has Brick framing	Numeric
134	Building Enve	Walls	Wall Framing	WallFrame_MetalBldg_Pct	% Wall Area	% of wall area that has Metal Building framing	Numeric
135	Building Enve	Windows	General	Window_Area	Square Feet	Total window area	Numeric
136	Building Enve	Windows	General	Win_SinglePane_Pct	% Window A	% of window area that is single pane	Numeric
137	Building Enve	Windows	General	Win_DoublePane_Pct	% Window A	% of window area that is double pane	Numeric
138	Building Enve	Windows	General	Win_TriplePane_Pct	% Window A	% of window area that is triple pane	Numeric
139	Building Enve	Windows	General	Window_Opening	None	Primary window opening type	Coded Charact
140	Building Enve	Windows	General	Window_Operable_Pct	% Window A	% of window area that are operable windows	Numeric
141	Building Enve	Windows	General	Window_Age	Years	Primary Window Age	Character
142	Building Enve	Windows	Window Glazing	WinGlaze_Clear_Pct	% Window A	% of window area with clear glazing	Numeric
143	Building Enve	Windows	Window Glazing	WinGlaze_Opaque_Pct	% Window A	% of window area with opaque glazing	Numeric
144	Building Enve	Windows	Window Glazing	WinGlaze_Reflect_Pct	% Window A	% of window area with reflective glazing	Numeric
145	Building Enve	Windows	Window Glazing	WinGlaze_Tint_Pct	% Window A	% of window area with tinted glazing	Numeric
146	Building Enve	Windows	Window Frame	WinFrame_Metal_Pct	% Window A	% of window area with standard metal frames	Numeric
147	Building Enve	Windows	Window Frame	WinFrame_InsMetal_Pct	% Window A	% of window area with insulated (thermally broken) metal frames	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
148	Building Enve	Windows	Window Frame	WinFrame_UnkMetal_Pct	% Window A	% of window area with metal frames with unknown presence of insulation/th	Numeric
149	Building Enve	Windows	Window Frame	WinFrame_Vinyl_Pct	% Window A	% of window area with vinyl frames	Numeric
150	Building Enve	Windows	Window Frame	WinFrame_Wood_Pct	% Window A	% of window area with wood frames	Numeric
151	Building Enve	Roof		Roof_Area	Square Feet	Total Roof Area	Numeric
152	Building Enve	Roof		Roof_Flat_Pct	% Roof Area	% of roof that is flat	Numeric
153	Building Enve	Roof		Roof_Pitched_Pct	% Roof Area	% of roof that is pitched	Numeric
154	Building Enve	Roof		Roof_Attic_Pct	% Roof Area	% of roof that has an attic above	Numeric
155	Building Enve	Roof		Roof_Res_Pct	% Roof Area	% of roof that has residential space above	Numeric
156	Building Enve	Roof		Has_Skylights	True/False	Does the building have any skylights?	True/False
157	Building Enve	Roof		Skylight_Area	Square Feet	Total Skylight Area	Numeric
158	Building Enve	Floor		Floor_Slab_Pct	% Ground Flo	% of floor that is slab-on-grade	Numeric
159	Building Enve	Floor		Floor_ElevSlab_Pct	% Ground Flo	% of floor that is elevated slab-on-grade	Numeric
160	Building Enve	Floor		Floor_Crawl_Pct	% Ground Flo	% of floor that is above a crawlspace	Numeric
161	Building Enve	Floor		Floor_Basement_Pct	% Ground Flo	% of floor that is above a basement	Numeric
162	Lighting	Summary		LPD_Ind	Indoor Watts	Indoor Lighting Watts per Square Foot, without parking garages	Numeric
163	Lighting	Summary		LPD_IndPark	Total Watts/	Indoor Lighting Watts per Square Foot, including parking garages	Numeric
164	Lighting	Summary		LPD_Park	PG Watts/PG	Parking Garage Lighting Watts per Square Foot	Numeric
165	Lighting	Summary		LPD_Ref	Ref Watts/In	Refrigeration lighting watts per square foot	Numeric
166	Lighting	Summary		LPD_Out	Outdoor Wat	Outdoor lighting watts per square foot of indoor space	Numeric
167	Lighting	Summary		Watts_Ind	Watts	Total Indoor Lighting Wattage, without parking garages	Numeric
168	Lighting	Summary		Watts_Park	Watts	Total Parking Garage Lighting Wattage	Numeric
169	Lighting	Summary		Watts_Ref	Watts	Total Refrigeration Lighting Wattage	Numeric
170	Lighting	Summary		Watts_Out	Watts	Total Outdoor Lighting Wattage associated with site	Numeric
171	Lighting	Summary		Fixture_Height_Avg	Feet	Average Light Fixture Height	Numeric
172	Lighting	Summary		Ceiling_Height_Avg	Feet	Average Ceiling Height	Numeric
173	Lighting	Summary		Has_Out_Lighting	True/False	Building has Outdoor Lighting?	True/False
174	Lighting	Summary		Façade_Lit_Pct	% of Façade	% of Building Façade that is lit	Numeric
175	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T5_Pct_Watts	% Indoor Wa	% Indoor Watts that are T5	Numeric
176	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T5_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are T5	Numeric
177	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T5_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are T5	Numeric
178	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T8_Pct_Watts	% Indoor Wa	% Indoor Watts that are T8	Numeric
179	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T8_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are T8	Numeric
180	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T8_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are T8	Numeric
181	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T12_Pct_Watts	% Indoor Wa	% Indoor Watts that are T12	Numeric
182	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T12_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are T12	Numeric
183	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T12_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are T12	Numeric
184	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Cfl_Pct_Watts	% Indoor Wa	% Indoor Watts that are CFL	Numeric
185	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Cfl_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are CFL	Numeric
186	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Cfl_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are CFL	Numeric
187	Lighting	Indoor Lighting	Primary Lamp Type	Ind_OthFl_Pct_Watts	% Indoor Wa	% Indoor Watts that are Other Fluorescent	Numeric
188	Lighting	Indoor Lighting	Primary Lamp Type	Ind_OthFl_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are Other Fluorescent	Numeric
189	Lighting	Indoor Lighting	Primary Lamp Type	Ind_OthFl_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are Other Fluorescent	Numeric
190	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Hid_Pct_Watts	% Indoor Wa	% Indoor Watts that are HID	Numeric
191	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Hid_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are HID	Numeric
192	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Hid_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are HID	Numeric
193	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Led_Pct_Watts	% Indoor Wa	% Indoor Watts that are LED	Numeric
194	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Led_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are LED	Numeric
195	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Led_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are LED	Numeric
196	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Inc_Pct_Watts	% Indoor Wa	% Indoor Watts that are Incandescent	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
197	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Inc_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are Incandescent	Numeric
198	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Inc_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are Incandescent	Numeric
199	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Misc_Pct_Watts	% Indoor Wa	% Indoor Watts that are Misc	Numeric
200	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Misc_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are Misc	Numeric
201	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Misc_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are Misc	Numeric
202	Lighting	Indoor Lighting	T8 Lamp Type	T8_Hp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are HP	Numeric
203	Lighting	Indoor Lighting	T8 Lamp Type	T8_Hp_Pct_Qty	% Indoor T8 I	% Indoor T8 Fixtures that are HP	Numeric
204	Lighting	Indoor Lighting	T8 Lamp Type	T8_Hp_Pct_Lumens	% Indoor T8 I	% Indoor T8 Lumens (proxy for lit area) that are HP	Numeric
205	Lighting	Indoor Lighting	T8 Lamp Type	T8_Std_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are Standard	Numeric
206	Lighting	Indoor Lighting	T8 Lamp Type	T8_Std_Pct_Qty	% Indoor T8 I	% Indoor T8 Fixtures that are Standard	Numeric
207	Lighting	Indoor Lighting	T8 Lamp Type	T8_Std_Pct_Lumens	% Indoor T8 I	% Indoor T8 Lumens (proxy for lit area) that are Standard	Numeric
208	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Screw_Pct_Watts	% Indoor CFL	% Indoor CFL Watts that are Screw-In	Numeric
209	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Screw_Pct_Qty	% Indoor CFL	% Indoor CFL Fixtures that are Screw-In	Numeric
210	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Screw_Pct_Lumens	% Indoor CFL	% Indoor CFL Lumens (proxy for lit area) that are Screw-In	Numeric
211	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Pin_Pct_Watts	% Indoor CFL	% Indoor CFL Watts that are Pin-Based	Numeric
212	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Pin_Pct_Qty	% Indoor CFL	% Indoor CFL Fixtures that are Pin-Based	Numeric
213	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Pin_Pct_Lumens	% Indoor CFL	% Indoor CFL Lumens (proxy for lit area) that are Pin-Based	Numeric
214	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Ref_Pct_Watts	% Indoor Inc	% Indoor Incandescent Watts that are Reflector	Numeric
215	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Ref_Pct_Qty	% Indoor Inc	% Indoor Incandescent Fixtures that are Reflector	Numeric
216	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Ref_Pct_Lumens	% Indoor Inc	% Indoor Incandescent Lumens (proxy for lit area) that are Reflector	Numeric
217	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Gen_Pct_Watts	% Indoor Inc	% Indoor Incandescent Watts that are General Service	Numeric
218	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Gen_Pct_Qty	% Indoor Inc	% Indoor Incandescent Fixtures that are General Service	Numeric
219	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Gen_Pct_Lumens	% Indoor Inc	% Indoor Incandescent Lumens (proxy for lit area) that are General Service	Numeric
220	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Dec_Pct_Watts	% Indoor Inc	% Indoor Incandescent Watts that are Decorative/Misc	Numeric
221	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Dec_Pct_Qty	% Indoor Inc	% Indoor Incandescent Fixtures that are Decorative/Misc	Numeric
222	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Dec_Pct_Lumens	% Indoor Inc	% Indoor Incandescent Lumens (proxy for lit area) that are Decorative/Misc	Numeric
223	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalRef_Pct_Watts	% Indoor Inc	% Indoor Incandescent Watts that are Halogen - Reflector	Numeric
224	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalRef_Pct_Qty	% Indoor Inc	% Indoor Incandescent Fixtures that are Halogen - Reflector	Numeric
225	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalRef_Pct_Lumens	% Indoor Inc	% Indoor Incandescent Lumens (proxy for lit area) that are Halogen - Reflector	Numeric
226	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalGen_Pct_Watts	% Indoor Inc	% Indoor Incandescent Watts that are Halogen - General Service	Numeric
227	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalGen_Pct_Qty	% Indoor Inc	% Indoor Incandescent Fixtures that are Halogen - General Service	Numeric
228	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalGen_Pct_Lumens	% Indoor Inc	% Indoor Incandescent Lumens (proxy for lit area) that are Halogen - General S	Numeric
229	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalDec_Pct_Watts	% Indoor Inc	% Indoor Incandescent Watts that are Halogen - Decorative/Misc	Numeric
230	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalDec_Pct_Qty	% Indoor Inc	% Indoor Incandescent Fixtures that are Halogen - Decorative/Misc	Numeric
231	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalDec_Pct_Lumens	% Indoor Inc	% Indoor Incandescent Lumens (proxy for lit area) that are Halogen - Decorati	Numeric
232	Lighting	Indoor Lighting	HID Lamp Type	Hid_Mv_Pct_Watts	% Indoor HID	% Indoor HID Fixtures that are MV	Numeric
233	Lighting	Indoor Lighting	HID Lamp Type	Hid_Mv_Pct_Qty	% Indoor HID	% Indoor HID Watts that are MV	Numeric
234	Lighting	Indoor Lighting	HID Lamp Type	Hid_Mv_Pct_Lumens	% Indoor HID	% Indoor HID Watts that are MV	Numeric
235	Lighting	Indoor Lighting	HID Lamp Type	Hid_NonMv_Pct_Watts	% Indoor HID	% Indoor HID Fixtures that are non-MV	Numeric
236	Lighting	Indoor Lighting	HID Lamp Type	Hid_NonMv_Pct_Qty	% Indoor HID	% Indoor HID Watts that are non-MV	Numeric
237	Lighting	Indoor Lighting	HID Lamp Type	Hid_NonMv_Pct_Lumens	% Indoor HID	% Indoor HID Watts that are non-MV	Numeric
238	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_OneLamp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are 1 Lamp fixtures	Numeric
239	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_OneLamp_Pct_Qty	% Indoor T8 I	% Indoor T8 Fixtures that are 1 Lamp fixtures	Numeric
240	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_OneLamp_Pct_Lumens	% Indoor T8 I	% Indoor T8 Lumens (proxy for lit area) that are 1 Lamp fixtures	Numeric
241	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_TwoLamp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are 2 Lamp fixtures	Numeric
242	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_TwoLamp_Pct_Qty	% Indoor T8 I	% Indoor T8 Fixtures that are 2 Lamp fixtures	Numeric
243	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_TwoLamp_Pct_Lumens	% Indoor T8 I	% Indoor T8 Lumens (proxy for lit area) that are 2 Lamp fixtures	Numeric
244	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_ThreeLamp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are 3 Lamp fixtures	Numeric
245	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_ThreeLamp_Pct_Qty	% Indoor T8 I	% Indoor T8 Fixtures that are 3 Lamp fixtures	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
246	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_ThreeLamp_Pct_Lumens	% Indoor T8 l	% Indoor T8 Lumens (proxy for lit area) that are 3 Lamp fixtures	Numeric
247	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_FourLamp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are 4 Lamp fixtures	Numeric
248	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_FourLamp_Pct_Qty	% Indoor T8 I	% Indoor T8 Fixtures that are 4 Lamp fixtures	Numeric
249	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_FourLamp_Pct_Lumens	% Indoor T8 I	% Indoor T8 Lumens (proxy for lit area) that are 4 Lamp fixtures	Numeric
250	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_OneLamp_Pct_Watts	% Indoor T12	% Indoor T12 Watts that are 1 Lamp fixtures	Numeric
251	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_OneLamp_Pct_Qty	% Indoor T12	% Indoor T12 Fixtures that are 1 Lamp fixtures	Numeric
252	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_OneLamp_Pct_Lumens	% Indoor T12	% Indoor T12 Lumens (proxy for lit area) that are 1 Lamp fixtures	Numeric
253	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_TwoLamp_Pct_Watts	% Indoor T12	% Indoor T12 Watts that are 2 Lamp fixtures	Numeric
254	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_TwoLamp_Pct_Qty	% Indoor T12	% Indoor T12 Fixtures that are 2 Lamp fixtures	Numeric
255	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_TwoLamp_Pct_Lumens	% Indoor T12	% Indoor T12 Lumens (proxy for lit area) that are 2 Lamp fixtures	Numeric
256	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_ThreeLamp_Pct_Watts	% Indoor T12	% Indoor T12 Watts that are 3 Lamp fixtures	Numeric
257	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_ThreeLamp_Pct_Qty	% Indoor T12	% Indoor T12 Fixtures that are 3 Lamp fixtures	Numeric
258	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_ThreeLamp_Pct_Lumens	% Indoor T12	% Indoor T12 Lumens (proxy for lit area) that are 3 Lamp fixtures	Numeric
259	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_FourLamp_Pct_Watts	% Indoor T12	% Indoor T12 Watts that are 4 Lamp fixtures	Numeric
260	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_FourLamp_Pct_Qty	% Indoor T12	% Indoor T12 Fixtures that are 4 Lamp fixtures	Numeric
261	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_FourLamp_Pct_Lumens	% Indoor T12	% Indoor T12 Lumens (proxy for lit area) that are 4 Lamp fixtures	Numeric
262	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_HLB_Pct_Watts	% Indoor HLE	% Indoor Watts that are High/Low Bay fixtures	Numeric
263	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_HLB_Pct_Qty	% Indoor HLE	% Indoor Fixtures that are High/Low Bay fixtures	Numeric
264	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_HLB_Pct_Lumens	% Indoor HLE	% Indoor Lumens (proxy for lit area) that are High/Low Bay fixtures	Numeric
265	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_LF_Pct_Watts	% Indoor HLE	% Indoor Watts that are Linear Fluorescent fixtures	Numeric
266	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_LF_Pct_Qty	% Indoor HLE	% Indoor Fixtures that are Linear Fluorescent fixtures	Numeric
267	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_LF_Pct_Lumens	% Indoor HLE	% Indoor Lumens (proxy for lit area) that are Linear Fluorescent fixtures	Numeric
268	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_RC_Pct_Watts	% Indoor HLE	% Indoor Watts that are Recessed Can fixtures	Numeric
269	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_RC_Pct_Qty	% Indoor HLE	% Indoor Fixtures that are Recessed Can fixtures	Numeric
270	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_RC_Pct_Lumens	% Indoor HLE	% Indoor Lumens (proxy for lit area) that are Recessed Can fixtures	Numeric
271	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_DTS_Pct_Watts	% Indoor HLE	% Indoor Watts that are Display Track/Surface Mount fixtures	Numeric
272	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_DTS_Pct_Qty	% Indoor HLE	% Indoor Fixtures that are Display Track/Surface Mount fixtures	Numeric
273	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_DTS_Pct_Lumens	% Indoor HLE	% Indoor Lumens (proxy for lit area) that are Display Track/Surface Mount fixt	Numeric
274	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_Other_Pct_Watts	% Indoor HLE	% Indoor Watts that are Other fixtures	Numeric
275	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_Other_Pct_Qty	% Indoor HLE	% Indoor Fixtures that are Other fixtures	Numeric
276	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_Other_Pct_Lumens	% Indoor HLE	% Indoor Lumens (proxy for lit area) that are Other fixtures	Numeric
277	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T5_Pct_Watts	% Indoor HLE	% Indoor high/low bay fixtures that are T5	Numeric
278	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T5_Pct_Qty	% Indoor HLE	% Indoor high/low bay watts that are T5	Numeric
279	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T5_Pct_Lumens	% Indoor HLE	% Indoor high/low bay watts that are T5	Numeric
280	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T8_Pct_Watts	% Indoor HLE	% Indoor high/low bay fixtures that are T8	Numeric
281	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T8_Pct_Qty	% Indoor HLE	% Indoor high/low bay watts that are T8	Numeric
282	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T8_Pct_Lumens	% Indoor HLE	% Indoor high/low bay watts that are T8	Numeric
283	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Led_Pct_Watts	% Indoor HLE	% Indoor high/low bay fixtures that are LED	Numeric
284	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Led_Pct_Qty	% Indoor HLE	% Indoor high/low bay watts that are LED	Numeric
285	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Led_Pct_Lumens	% Indoor HLE	% Indoor high/low bay watts that are LED	Numeric
286	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Hid_Pct_Watts	% Indoor HLE	% Indoor high/low bay fixtures that are HID	Numeric
287	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Hid_Pct_Qty	% Indoor HLE	% Indoor high/low bay watts that are HID	Numeric
288	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Hid_Pct_Lumens	% Indoor HLE	% Indoor high/low bay watts that are HID	Numeric
289	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Cfl_Pct_Watts	% Indoor HLE	% Indoor high/low bay fixtures that are CFL	Numeric
290	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Cfl_Pct_Qty	% Indoor HLE	% Indoor high/low bay watts that are CFL	Numeric
291	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Cfl_Pct_Lumens	% Indoor HLE	% Indoor high/low bay watts that are CFL	Numeric
292	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_TimeClock	True/False	Presence of Indoor light Timeclock controls	True/False
293	Lighting	Indoor Lighting	Lighting Controls	IndCtr_TimeClock_Pct_Watts	% Indoor Wa	% Indoor Watts that have Timeclock controls	Numeric
294	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_EMS	True/False	Presence of Indoor light EMS controls	True/False

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
295	Lighting	Indoor Lighting	Lighting Controls	IndCtr_EMS_Pct_Watts	% Indoor Wa	% Indoor Watts that have EMS controls	Numeric
296	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_PhotoCell	True/False	Presence of Indoor light Photocell controls	True/False
297	Lighting	Indoor Lighting	Lighting Controls	IndCtr_PhotoCell_Pct_Watts	% Indoor Wa	% Indoor Watts that have Photocell controls	Numeric
298	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_OccSensor	True/False	Presence of Indoor light Occupancy Sensor controls	True/False
299	Lighting	Indoor Lighting	Lighting Controls	IndCtr_OccSensor_Pct_Watts	% Indoor Wa	% Indoor Watts that have Occupancy Sensor controls	Numeric
300	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_Manual	True/False	Presence of Indoor light Manual controls	True/False
301	Lighting	Indoor Lighting	Lighting Controls	IndCtr_Manual_Pct_Watts	% Indoor Wa	% Indoor Watts that have Manual controls	Numeric
302	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_Dimmer	True/False	Presence of Indoor light Bi-level/Dimmer controls	True/False
303	Lighting	Indoor Lighting	Lighting Controls	IndCtr_Dimmer_Pct_Watts	% Indoor Wa	% Indoor Watts that have Bi-level/Dimmer controls	Numeric
304	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_Egress	True/False	Presence of Indoor light 24/7 Egress controls	True/False
305	Lighting	Indoor Lighting	Lighting Controls	IndCtr_Egress_Pct_Watts	% Indoor Wa	% Indoor Watts that have 24/7 Egress controls	Numeric
306	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_Other	True/False	Presence of Indoor light Other controls	True/False
307	Lighting	Indoor Lighting	Lighting Controls	IndCtr_Other_Pct_Watts	% Indoor Wa	% Indoor Watts that have Other controls	Numeric
308	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Facade_Pct_Watts	% Outdoor W	% Outdoor Watts that are Building Façade lights	Numeric
309	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Facade_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Building Façade lights	Numeric
310	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Facade_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Building Façade lights	Numeric
311	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Pole_Pct_Watts	% Outdoor W	% Outdoor Watts that are Pole Lights (area/parking/roadway)	Numeric
312	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Pole_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Pole Lights (area/parking/roadway)	Numeric
313	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Pole_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Pole Lights (area/parking/road	Numeric
314	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_SportField_Pct_Watts	% Outdoor W	% Outdoor Watts that are Sporting Field lights	Numeric
315	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_SportField_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Sporting Field lights	Numeric
316	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_SportField_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Sporting Field lights	Numeric
317	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Other_Pct_Watts	% Outdoor W	% Outdoor Watts that are Other lights	Numeric
318	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Other_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Other lights	Numeric
319	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Other_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Other lights	Numeric
320	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T5_Pct_Watts	% Outdoor W	% Outdoor Watts that are T5	Numeric
321	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T5_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are T5	Numeric
322	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T5_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are T5	Numeric
323	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T8_Pct_Watts	% Outdoor W	% Outdoor Watts that are T8	Numeric
324	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T8_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are T8	Numeric
325	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T8_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are T8	Numeric
326	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T12_Pct_Watts	% Outdoor W	% Outdoor Watts that are T12	Numeric
327	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T12_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are T12	Numeric
328	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T12_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are T12	Numeric
329	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Cfl_Pct_Watts	% Outdoor W	% Outdoor Watts that are CFL	Numeric
330	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Cfl_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are CFL	Numeric
331	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Cfl_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are CFL	Numeric
332	Lighting	Outdoor Lighting	Primary Lamp Type	Out_OthFl_Pct_Watts	% Outdoor W	% Outdoor Watts that are Other Fluorescent	Numeric
333	Lighting	Outdoor Lighting	Primary Lamp Type	Out_OthFl_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Other Fluorescent	Numeric
334	Lighting	Outdoor Lighting	Primary Lamp Type	Out_OthFl_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Other Fluorescent	Numeric
335	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Hid_Pct_Watts	% Outdoor W	% Outdoor Watts that are HID	Numeric
336	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Hid_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are HID	Numeric
337	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Hid_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are HID	Numeric
338	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Led_Pct_Watts	% Outdoor W	% Outdoor Watts that are LED	Numeric
339	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Led_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are LED	Numeric
340	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Led_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are LED	Numeric
341	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Inc_Pct_Watts	% Outdoor W	% Outdoor Watts that are Incandescent	Numeric
342	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Inc_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Incandescent	Numeric
343	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Inc_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Incandescent	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
344	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Misc_Pct_Watts	% Outdoor W	% Outdoor Watts that are Misc	Numeric
345	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Misc_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Misc	Numeric
346	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Misc_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Misc	Numeric
347	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_TimeClock	True/False	Presence of Outdoor light Timeclock controls	True/False
348	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_TimeClock_Pct_Watts	% Outdoor W	% Outdoor Watts that have Timeclock controls	Numeric
349	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_PhotoCell	True/False	Presence of Outdoor light Photocell controls	True/False
350	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_PhotoCell_Pct_Watts	% Outdoor W	% Outdoor Watts that have Photocell controls	Numeric
351	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_TimePhoto	True/False	Presence of Outdoor light Timeclock/Photocell controls	True/False
352	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_TimePhoto_Pct_Watts	% Outdoor W	% Outdoor Watts that have Timeclock/Photocell controls	Numeric
353	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_Manual	True/False	Presence of Outdoor light Manual controls	True/False
354	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_Manual_Pct_Watts	% Outdoor W	% Outdoor Watts that have Manual controls	Numeric
355	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_None	True/False	Presence of Outdoor lights with no controls (continuous operation)	True/False
356	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_None_Pct_Watts	% Outdoor W	% Outdoor Watts that have no controls (continuous operation)	Numeric
357	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_Other	True/False	Presence of Outdoor light Other controls	True/False
358	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_Other_Pct_Watts	% Outdoor W	% Outdoor Watts that have Other controls	Numeric
359	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T5_Pct_Watts	% Parking Ga	% Parking Garage Watts that are T5	Numeric
360	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T5_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are T5	Numeric
361	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T5_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are T5	Numeric
362	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T8_Pct_Watts	% Parking Ga	% Parking Garage Watts that are T8	Numeric
363	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T8_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are T8	Numeric
364	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T8_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are T8	Numeric
365	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T12_Pct_Watts	% Parking Ga	% Parking Garage Watts that are T12	Numeric
366	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T12_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are T12	Numeric
367	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T12_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are T12	Numeric
368	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Cfl_Pct_Watts	% Parking Ga	% Parking Garage Watts that are CFL	Numeric
369	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Cfl_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are CFL	Numeric
370	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Cfl_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are CFL	Numeric
371	Lighting	Parking Garage Lig	Primary Lamp Type	Park_OthFl_Pct_Watts	% Parking Ga	% Parking Garage Watts that are Other Fluorescent	Numeric
372	Lighting	Parking Garage Lig	Primary Lamp Type	Park_OthFl_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are Other Fluorescent	Numeric
373	Lighting	Parking Garage Lig	Primary Lamp Type	Park_OthFl_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are Other Fluorescent	Numeric
374	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Hid_Pct_Watts	% Parking Ga	% Parking Garage Watts that are HID	Numeric
375	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Hid_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are HID	Numeric
376	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Hid_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are HID	Numeric
377	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Led_Pct_Watts	% Parking Ga	% Parking Garage Watts that are LED	Numeric
378	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Led_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are LED	Numeric
379	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Led_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are LED	Numeric
380	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Inc_Pct_Watts	% Parking Ga	% Parking Garage Watts that are Incandescent	Numeric
381	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Inc_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are Incandescent	Numeric
382	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Inc_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are Incandescent	Numeric
383	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Misc_Pct_Watts	% Parking Ga	% Parking Garage Watts that are Misc	Numeric
384	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Misc_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are Misc	Numeric
385	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Misc_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are Misc	Numeric
386	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_TimeClock	True/False	Presence of parking garage light Timeclock controls	True/False
387	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_TimeClock_Pct_Watts	% Parking Ga	% Parking Garage Watts that have Timeclock controls	Numeric
388	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_PhotoCell	True/False	Presence of parking garage light Photocell controls	True/False
389	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_PhotoCell_Pct_Watts	% Parking Ga	% Parking Garage Watts that have Photocell controls	Numeric
390	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_OccSensor	True/False	Presence of parking garage light Occupancy Sensor controls	True/False
391	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_OccSensor_Pct_Watts	% Parking Ga	% Parking Garage Watts that have Occupancy Sensor controls	Numeric
392	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_None	True/False	Presence of parking garage light with no controls (continuous operation)	True/False

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
393	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_None_Pct_Watts	% Parking Ga	% Parking Garage Watts that have no controls (continuous operation) controls	Numeric
394	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_Other	True/False	Presence of parking garage light Other controls	True/False
395	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_Other_Pct_Watts	% Parking Ga	% Parking Garage Watts that have Other controls	Numeric
396	HVAC	Distribution System		DistSys_Primary	None	Distribution System: Primary System Type	Character
397	HVAC	Distribution System		DistSys_Secondary	None	Distribution System: Secondary System Type	Character
398	HVAC	Distribution System		DistSys_ReHeatFuel	None	Distribution System: Reheat Fuel	Coded Charact
399	HVAC	Distribution System		DistSys_VavType	None	Distribution System: VAV Type	Character
400	HVAC	Distribution System		DistSys_SupFanCtr	None	Distribution System: Supply Fan Control	Coded Charact
401	HVAC	Distribution System		DistSys_EconType	None	Distribution System: Economizer Type	Coded Charact
402	HVAC	Distribution System		DistSys_HighVentilation	True/False	Distribution System: High Ventilation	True/False
403	HVAC	Distribution System		DistSys_SupFanHP	HP	Distribution System: Total Supply Fan HP	Numeric
404	HVAC	Distribution System		DistSys_RetExhaustFanHP	HP	Distribution System: Total Return/Exhaust Fan HP	Numeric
405	HVAC	Heating System	Heating Fuel	HeatSys_Electricity_Pct	%	% of floor area that is heated with electricity as the primary fuel	Numeric
406	HVAC	Heating System	Heating Fuel	HeatSys_NaturalGas_Pct	%	% of floor area that is heated with natural gas as the primary fuel	Numeric
407	HVAC	Heating System	Primary Heating System	HeatSys_Primary	None	Primary Heating System: System Type	Character
408	HVAC	Heating System	Primary Heating System	HeatSys_Primary_PrimFuel	None	Primary Heating System: Primary Heating Fuel	Character
409	HVAC	Heating System	Primary Heating System	HeatSys_Primary_SecFuel	None	Primary Heating System: Secondary Heating Fuel	Character
410	HVAC	Heating System	Primary Heating System	HeatSys_Primary_Age	None	Primary Heating System: System Age Group	Character
411	HVAC	Heating System	Secondary Heating System	HeatSys_Secondary	None	Secondary Heating System: System Type	Character
412	HVAC	Heating System	Secondary Heating System	HeatSys_Secondary_PrimFuel	None	Secondary Heating System: Primary Heating Fuel	Character
413	HVAC	Heating System	Secondary Heating System	HeatSys_Secondary_SecFuel	None	Secondary Heating System: Secondary Heating Fuel	Character
414	HVAC	Heating System	Secondary Heating System	HeatSys_Secondary_Age	None	Secondary Heating System: System Age Group	Character
415	HVAC	Heating System	Boiler	Boiler_Qty	Count	Total Number of Boilers	Numeric
416	HVAC	Heating System	Boiler	Boiler_Primary_Fuel	None	Primary Boiler: Primary Fuel Type	Character
417	HVAC	Heating System	Boiler	Boiler_Avg_Capacity	kBtu/h	Average boiler capacity	Numeric
418	HVAC	Heating System	Boiler	Boiler_Avg_Age	Years	Average boiler age	Numeric
419	HVAC	Heating System	Boiler	Boiler_Max_Age	Years	Maximum boiler age	Numeric
420	HVAC	Heating System	Boiler	Boiler_Function	None	Primary Boiler: Boiler Function	Coded Charact
421	HVAC	Heating System	Boiler	Boiler_Condensing	True/False	Primary Boiler: Condensing Boiler?	True/False
422	HVAC	Heating System	Boiler	Boiler_HeatRecovery	True/False	Primary Boiler: Boiler Heat Recovery?	True/False
423	HVAC	Cooling System	Primary Cooling System	CoolSys_Primary	None	Cooling System: Primary System Type	Character
424	HVAC	Cooling System	Primary Cooling System	CoolSys_Primary_Age	None	Cooling System: Primary System Age Group	Character
425	HVAC	Cooling System	Secondary Cooling System	CoolSys_Secondary	None	Cooling System: Secondary System Type	Character
426	HVAC	Cooling System	Secondary Cooling System	CoolSys_Secondary_Age	None	Cooling System: Secondary System Age Group	Character
427	HVAC	Cooling System	Chiller	Chiller_Qty	Count	Total number of chillers	Numeric
428	HVAC	Cooling System	Chiller	Chiller_Avg_Capacity	Tons	Average chiller capacity	Numeric
429	HVAC	Cooling System	Chiller	Chiller_Avg_Age	Years	Average chiller age	Numeric
430	HVAC	Cooling System	Chiller	Chiller_Max_Age	Years	Maximum chiller age	Numeric
431	HVAC	Cooling System	Chiller	Chiller_Compressor_Type	None	Primary chiller: Compressor Type	Character
432	HVAC	Cooling System	Chiller	Chiller_VfdControl	True/False	Primary chiller: VFD Control?	True/False
433	HVAC	Cooling System	Chiller	Chiller_WaterSideEcon	True/False	Primary chiller: Water Side Economizer?	True/False
434	HVAC	HVAC Controls		Has_Hvac_Ctrl_FullDDC	True/False	Do on-site HVAC controls include Full DDC?	True/False
435	HVAC	HVAC Controls		Has_Hvac_Ctrl_HybridPneumatic	True/False	Do on-site HVAC controls include Hybrid - Pneumatic?	True/False
436	HVAC	HVAC Controls		Has_Hvac_Ctrl_HybridElectric	True/False	Do on-site HVAC controls include Hybrid - Electric?	True/False
437	HVAC	HVAC Controls		Has_Hvac_Ctrl_FullPnuematic	True/False	Do on-site HVAC controls include Full Pneumatic?	True/False
438	HVAC	HVAC Controls		Has_Hvac_Ctrl_FullElectronicProg	True/False	Do on-site HVAC controls include Full Electronic, Prog T-stat?	True/False
439	HVAC	HVAC Controls		Has_Hvac_Ctrl_FullElectronicMan	True/False	Do on-site HVAC controls include Full Electronic, Manual T-stat?	True/False
440	HVAC	HVAC Controls		Has_Hvac_Ctrl_Other	True/False	Do on-site HVAC controls include Other control types?	True/False
441	HVAC	HVAC Controls		Has_Hvac_Ctrl_Timeclock	True/False	Do on-site HVAC controls include Timeclock Start/Stop?	True/False

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
442	HVAC	HVAC Controls		Has_Hvac_Ctrl_Optimum	True/False	Do on-site HVAC controls include Optimum Start/Stop?	True/False
443	HVAC	HVAC Controls		Has_Hvac_Ctrl_UnoccTempSetba	True/False	Do on-site HVAC controls include Unoccupied Temp Setback?	True/False
444	HVAC	HVAC Controls		Has_Hvac_Ctrl_UnoccTempSetup	True/False	Do on-site HVAC controls include Unoccupied Temp Setup?	True/False
445	Service HW	General		Shw_Input_Cap	kBtu/h	Total domestic water heat input capacity	Numeric
446	Service HW	General		Shw_Avg_Age	Years	Average domestic water heat system age	Numeric
447	Service HW	General		Shw_Max_Age	Years	Maximum domestic water heat system age	Numeric
448	Service HW	SHW Type		ShwType_Tank_Pct	% SHW input	Percent of SHW input capacity from tank water heaters	Numeric
449	Service HW	SHW Type		ShwType_Pou_Pct	% SHW input	Percent of SHW input capacity from point-of-use (tankless) water heaters	Numeric
450	Service HW	SHW Type		ShwType_Boiler_Pct	% SHW input	Percent of SHW input capacity from a dedicated boiler	Numeric
451	Service HW	SHW Type		ShwType_Hp_Pct	% SHW input	Percent of SHW input capacity from heat pump water heaters	Numeric
452	Service HW	SHW Type		ShwType_Oth_Pct	% SHW input	Percent of SHW input capacity from other types of water heaters	Numeric
453	Service HW	SHW Fuel		ShwFuel_Elec_Pct	% SHW input	Percent of SHW input capacity that uses electricity	Numeric
454	Service HW	SHW Fuel		ShwFuel_Gas_Pct	% SHW input	Percent of SHW input capacity that uses natural gas	Numeric
455	Service HW	SHW Fuel		ShwFuel_Oth_Pct	% SHW input	Percent of SHW input capacity that uses another fuel (propane, fuel oil, etc)	Numeric
456	Refrigeration	Compressors		Comp_Tmp_Low_Pct	% Compressc	% of refrigeration compressors that serve low temp refrigeration	Numeric
457	Refrigeration	Compressors		Comp_Tmp_Med_Pct	% Compressc	% of refrigeration compressors that serve medium temp refrigeration	Numeric
458	Refrigeration	Compressors		Comp_Tmp_High_Pct	% Compressc	% of refrigeration compressors that serve high temp refrigeration	Numeric
459	Refrigeration	Compressors		Comp_Vsd	None	Primary refrigeration compressor: Unloaders/VSDs?	Character
460	Refrigeration	Compressors		Has_Comp_Fhpc	True/False	Primary refrigeration compressor: Floating Head Pressure Control?	True/False
461	Refrigeration	Compressors		Comp_Hrt	None	Primary refrigeration compressor: Heat Recovery?	Character
462	Refrigeration	Condensers		Cond_Type	None	Primary refrigeration condenser type	Character
463	Refrigeration	Condensers		Cond_Vsd	True/False	Primary refrigeration condenser: Condenser Fan VSD?	True/False
464	Refrigeration	Condensers		Cond_Motor_Type	None	Primary refrigeration condenser: Condenser Fan Motor Type	Character
465	Refrigeration	Display Cases		Has_Display_Case	True/False	Presence of Refrigerated Display Cases?	True/False
466	Refrigeration	Display Cases		Display_Case_LF	Linear Feet	Total Linear Feet of Refrigerated Display Cases	Numeric
467	Refrigeration	Display Cases		Display_Case_With_Door_Pct	% Display Ca	% Refrigerated Display Cases with Doors?	Numeric
468	Refrigeration	Display Cases		Display_Case_Light_Type	None	Refrigerated Display Case Primary Light Type	Character
469	Refrigeration	Walk-Ins		Has_Walk_In	True/False	Presence of Refrigerated Walk-Ins/Storage Boxes?	True/False
470	Refrigeration	Walk-Ins		Walk_In_Area	Square Feet	Total Square Feet of Refrigerated Walk-Ins/Storage Boxes	Numeric
471	Refrigeration	Walk-Ins		Walk_In_Light_Type	None	Refrigerated Walk-Ins/Storage Boxes Primary Light Type	Character
472	Refrigeration	Reach-Ins		Has_Reach_In	True/False	Presence of Refrigerated Reach-In Cases?	True/False
473	Refrigeration	Reach-Ins		Reach_In_Area	Square Feet	Total Square Feet of Refrigerated Reach-In Cases	Numeric
474	Refrigeration	Reach-Ins		Reach_In_With_Door_Pct	% Reach In	% of Refrigerated Reach-In Cases with Doors?	Numeric
475	Refrigeration	Reach-Ins		Reach_In_Light_Type	None	Refrigerated Reach-In Cases Primary Light Type	Character
476	Refrigeration	Plug Load Refrigeration		Has_Ref_Vending	True/False	# Refrigerated Vending Machines	True/False
477	Refrigeration	Plug Load Refrigeration		Has_NonRef_Vending	True/False	# Non-Refrigerated Vending Machines	True/False
478	Refrigeration	Plug Load Refrigeration		Has_Beverage_Merch	True/False	# Beverage Merchandizers	True/False
479	Refrigeration	Plug Load Refrigeration		Has_Ice_Machine	True/False	# Ice Machines	True/False
480	Refrigeration	Plug Load Refrigeration		Has_Comm_Ref_Full	True/False	# Commercial Refrigerators (Full Height)	True/False
481	Refrigeration	Plug Load Refrigeration		Has_Comm_Ref_Half	True/False	# Commercial Refrigerators (Half Height)	True/False
482	Refrigeration	Plug Load Refrigeration		Has_Comm_Freezer	True/False	# Commercial Freezers	True/False
483	Misc	Kitchen		Has_Kitchen_SnackBar	True/False	Presence of Snack Bar Kitchen?	True/False
484	Misc	Kitchen		Has_Kitchen_FastFood	True/False	Presence of Fast Food Kitchen?	True/False
485	Misc	Kitchen		Has_Kitchen_Cafe_Rest	True/False	Presence of Cafeteria/Restaurant Kitchen?	True/False
486	Misc	Kitchen		Has_Kitchen_Large_Comm	True/False	Presence of Large/Commercial Kitchen?	True/False
487	Misc	Kitchen		Has_Kitchen_Small	True/False	Presence of Small Kitchen?	True/False
488	Misc	Kitchen		Has_Kitchen_Other	True/False	Presence of Other Kitchen?	True/False
489	Misc	Kitchen		Kitchen_Area	Square Feet	Total Kitchen Area	Numeric
490	Misc	Kitchen		Kitchen_Steamers_Fuel	None	Kitchen: Steamers Fuel	Coded Charact

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
491	Misc	Kitchen		Kitchen_Hot_Food_Cabinet_Fuel	None	Kitchen: Hot Food Holding Cabinet Fuel	Coded Charact
492	Misc	Kitchen		Kitchen_Boiler_Fryer_Fuel	None	Kitchen: Broilers/Fryers Fuel	Coded Charact
493	Misc	Kitchen		Kitchen_Griddle_Grill_Fuel	None	Kitchen: Griddle/Grill Fuel	Coded Charact
494	Misc	Kitchen		Kitchen_Combo_Oven_Fuel	None	Kitchen: Combination Oven Fuel	Coded Charact
495	Misc	Kitchen		Kitchen_Oven_Fuel	None	Kitchen: Standard Oven Fuel	Coded Charact
496	Misc	Kitchen		Kitchen_Range_Fuel	None	Kitchen: Range Fuel	Coded Charact
497	Misc	Grocery		Has_Groc_Meat_Dept	True/False	Presence of Food Prep - Meat Dept?	True/False
498	Misc	Grocery		Has_Groc_Bakery	True/False	Presence of Food Prep - Bakery?	True/False
499	Misc	Grocery		Has_Groc_Deli	True/False	Presence of Food Prep - Deli?	True/False
500	Misc	Laundry		Has_Laundry_Facility	True/False	Laundry Facility Present?	True/False
501	Misc	Laundry		Laundry_Type	None	Laundry Facility Type	Character
502	Misc	Laundry		Laundry_Onsite_Pct	% Laundry	% Laundry Done On-site	Numeric
503	Misc	Laundry		Laundry_Electic_Dryer_Qty	Count	Laundry: # Electric Dryers	Numeric
504	Misc	Laundry		Laundry_Gas_Dryer_Qty	Count	Laundry: # Gas Dryers	Numeric
505	Misc	Lodging		Lodging_Guest_Room_Qty	Count	Lodging: # Guest Rooms	Numeric
506	Misc	Lodging		Lodging_Avg_Room_Occupancy	%	Lodging: Guest Room Average Occupancy	Numeric
507	Misc	Lodging		Lodging_Room_In_Unit_cooking_	% Guest Roo	Lodging: Guest Rooms with In-Unit Cooking	Numeric
508	Misc	Laboratory		Has_Lab	True/False	Laboratory Present?	True/False
509	Misc	Laboratory		Lab_Fume_Hoods_Qty	Count	Laboratory: # of Fume Hoods	Numeric
510	Misc	Laboratory		Has_Lab_Specialized_Equip	True/False	Laboratory: Specialized Lab Equipment Present?	True/False
511	Misc	Medical		Med_Surgery_Rooms_Qty	Count	Medical: # of Surgery Rooms	Numeric
512	Misc	Medical		Med_Beds_Qty	Count	Medical: # of Beds	Numeric
513	Misc	Medical		Med_High_Energy_Machines_Qty	Count	Medical: # of High Energy Machines	Numeric
514	Misc	Pool/Hot Tub		Has_Pool_Ind	True/False	Indoor Pool Present?	True/False
515	Misc	Pool/Hot Tub		Has_Pool_Out	True/False	Outdoor Pool Present?	True/False
516	Misc	Pool/Hot Tub		Pool_Fuel	None	Pool Fuel	Character
517	Misc	Pool/Hot Tub		Has_HotTub_Ind	True/False	Indoor Hot Tub Present?	True/False
518	Misc	Pool/Hot Tub		Has_HotTub_Out	True/False	Outdoor Hot Tub Present?	True/False
519	Misc	Pool/Hot Tub		HotTub_Fuel	None	Hot Tub Fuel	Character
520	Misc	Misc		Cash_Register_Qty	Count	Total # Cash Registers	Numeric
521	Misc	Misc		Desktop_PC_Qty	Count	Total # Desktop PCs	Numeric
522	Misc	Misc		Laptop_PC_Qty	Count	Total # Laptop PCs	Numeric
523	Misc	Misc		Additional_Monitor_Qty	Count	Total # Additional Monitors	Numeric
524	Misc	Misc		Printer_Copier_Qty	Count	Total # Printers/Copiers	Numeric
525	Misc	Misc		Tv_Qty	Count	Total # TVs	Numeric
526	Misc	Misc		Vehicle_Charge_Station_Qty	Count	Vehicle Charging Stations	Numeric
527	Misc	Misc		Forklift_Charger_Qty	Count	Forklift Charging Stations	Numeric
528	Misc	Misc		Floor_Polisher_Charger_Qty	Count	Floor Polisher Charging Stations	Numeric
529	Misc	Misc		Air_Compressor_HP	Count	Air Compressor HP	Numeric
530	Billing	Electric		Electric_EUI_Billed	kWh/SF	Actual billed electric energy use intensity (kWh/SF)	Numeric
531	Billing	Electric		Electric_EUI_Normalized	kWh/SF	Weather-normalized electric energy use intensity (kWh/SF)	Numeric
532	Billing	Electric		Electric_EUI_Type	None	Electric EUI type (actual vs modeled)	Character
533	Billing	Electric		kWh_Annual_Billed	kWh	Actual billed annual kWh consumption	Numeric
534	Billing	Electric		kWh_Annual_Normalized	kWh	Weather-normalized annual kWh consumption	Numeric
535	Billing	Electric		kwh_Billed_Jan	kWh	Actual Billed Jan kWh	Numeric
536	Billing	Electric		kwh_Billed_Feb	kWh	Actual Billed Feb kWh	Numeric
537	Billing	Electric		kwh_Billed_Mar	kWh	Actual Billed Mar kWh	Numeric
538	Billing	Electric		kwh_Billed_Apr	kWh	Actual Billed Apr kWh	Numeric
539	Billing	Electric		kwh_Billed_May	kWh	Actual Billed May kWh	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
540	Billing	Electric		kwh_Billed_Jun	kWh	Actual Billed Jun kWh	Numeric
541	Billing	Electric		kwh_Billed_Jul	kWh	Actual Billed Jul kWh	Numeric
542	Billing	Electric		kwh_Billed_Aug	kWh	Actual Billed Aug kWh	Numeric
543	Billing	Electric		kwh_Billed_Sep	kWh	Actual Billed Sep kWh	Numeric
544	Billing	Electric		kwh_Billed_Oct	kWh	Actual Billed Oct kWh	Numeric
545	Billing	Electric		kwh_Billed_Nov	kWh	Actual Billed Nov kWh	Numeric
546	Billing	Electric		kwh_Billed_Dec	kWh	Actual Billed Dec kWh	Numeric
547	Billing	Electric		kwh_Normalized_Jan	kWh	Weather-Normalized Jan kWh	Numeric
548	Billing	Electric		kwh_Normalized_Feb	kWh	Weather-Normalized Feb kWh	Numeric
549	Billing	Electric		kwh_Normalized_Mar	kWh	Weather-Normalized Mar kWh	Numeric
550	Billing	Electric		kwh_Normalized_Apr	kWh	Weather-Normalized Apr kWh	Numeric
551	Billing	Electric		kwh_Normalized_May	kWh	Weather-Normalized May kWh	Numeric
552	Billing	Electric		kwh_Normalized_Jun	kWh	Weather-Normalized Jun kWh	Numeric
553	Billing	Electric		kwh_Normalized_Jul	kWh	Weather-Normalized Jul kWh	Numeric
554	Billing	Electric		kwh_Normalized_Aug	kWh	Weather-Normalized Aug kWh	Numeric
555	Billing	Electric		kwh_Normalized_Sep	kWh	Weather-Normalized Sep kWh	Numeric
556	Billing	Electric		kwh_Normalized_Oct	kWh	Weather-Normalized Oct kWh	Numeric
557	Billing	Electric		kwh_Normalized_Nov	kWh	Weather-Normalized Nov kWh	Numeric
558	Billing	Electric		kwh_Normalized_Dec	kWh	Weather-Normalized Dec kWh	Numeric
559	Billing	Natural Gas		Gas_EUI_Billed	Therms/SF	Actual billed natural gas energy use intensity (therms/SF)	Numeric
560	Billing	Natural Gas		Gas_EUI_Normalized	Therms/SF	Weather-normalized natural gas energy use intensity (therms/SF)	Numeric
561	Billing	Natural Gas		Gas_EUI_Type	None	Natural Gas EUI type (actual vs modeled)	Character
562	Billing	Natural Gas		Therms_Annual_Billed	Therms	Actual billed annual therm consumption	Numeric
563	Billing	Natural Gas		Therms_Annual_Normalized	Therms	Weather-normalized annual therm consumption	Numeric
564	Billing	Natural Gas		Therms_Billed_Jan	Therms	Actual Billed Jan Therms	Numeric
565	Billing	Natural Gas		Therms_Billed_Feb	Therms	Actual Billed Feb Therms	Numeric
566	Billing	Natural Gas		Therms_Billed_Mar	Therms	Actual Billed Mar Therms	Numeric
567	Billing	Natural Gas		Therms_Billed_Apr	Therms	Actual Billed Apr Therms	Numeric
568	Billing	Natural Gas		Therms_Billed_May	Therms	Actual Billed May Therms	Numeric
569	Billing	Natural Gas		Therms_Billed_Jun	Therms	Actual Billed Jun Therms	Numeric
570	Billing	Natural Gas		Therms_Billed_Jul	Therms	Actual Billed Jul Therms	Numeric
571	Billing	Natural Gas		Therms_Billed_Aug	Therms	Actual Billed Aug Therms	Numeric
572	Billing	Natural Gas		Therms_Billed_Sep	Therms	Actual Billed Sep Therms	Numeric
573	Billing	Natural Gas		Therms_Billed_Oct	Therms	Actual Billed Oct Therms	Numeric
574	Billing	Natural Gas		Therms_Billed_Nov	Therms	Actual Billed Nov Therms	Numeric
575	Billing	Natural Gas		Therms_Billed_Dec	Therms	Actual Billed Dec Therms	Numeric
576	Billing	Natural Gas		Therms_Normalized_Jan	Therms	Weather-Normalized Jan Therms	Numeric
577	Billing	Natural Gas		Therms_Normalized_Feb	Therms	Weather-Normalized Feb Therms	Numeric
578	Billing	Natural Gas		Therms_Normalized_Mar	Therms	Weather-Normalized Mar Therms	Numeric
579	Billing	Natural Gas		Therms_Normalized_Apr	Therms	Weather-Normalized Apr Therms	Numeric
580	Billing	Natural Gas		Therms_Normalized_May	Therms	Weather-Normalized May Therms	Numeric
581	Billing	Natural Gas		Therms_Normalized_Jun	Therms	Weather-Normalized Jun Therms	Numeric
582	Billing	Natural Gas		Therms_Normalized_Jul	Therms	Weather-Normalized Jul Therms	Numeric
583	Billing	Natural Gas		Therms_Normalized_Aug	Therms	Weather-Normalized Aug Therms	Numeric
584	Billing	Natural Gas		Therms_Normalized_Sep	Therms	Weather-Normalized Sep Therms	Numeric
585	Billing	Natural Gas		Therms_Normalized_Oct	Therms	Weather-Normalized Oct Therms	Numeric
586	Billing	Natural Gas		Therms_Normalized_Nov	Therms	Weather-Normalized Nov Therms	Numeric
587	Billing	Natural Gas		Therms_Normalized_Dec	Therms	Weather-Normalized Dec Therms	Numeric

Index	Variable	Unit	Description	Data Type	Codes	DB Table	DB Var
38	Equip_Type	None	Equipment type (SZ systems)	Coded Numeric	1 = Rooftop Units (RTUs) 2 = Makeup Air Unit (MAU) 3 = Air Handling Unit (AHU) 4 = Furnace 5 = Heat Pump 6 = PTAC / PTHP 7 = Unit Ventilator 8 = Room AC (window unit) 9 = Unit Heater (suspended) 10 = Baseboard / Radiator 11 = Cabinet Heater (fan coil) 12 = Radiant – floor 13 = Radiant – ceiling (suspended) 14 = Swamp Cooler	SZ HVAC	hvac_equip_type
39	Heat_Pump_Type	None	Heat pump type	Coded Numeric	1 = Standard – air source 2 = Water Source – supplemental boiler and cooler 3 = Ground Source – water 4 = Ground Source – earth 5 = Ductless / Mini Split – air source 6 = VRF – single mode (either heat or cool) 7 = VRF – multimode (simultaneous heat and cool)	Both	heat_pump_type
40	Primary_Heating_Type	None	Primary heating type	Coded Character	SE = Std. Eff. = *Combustion equipment ≤ 88% efficient (output/input)* CE = Condensing Eff. = *Combustion equipment >88% efficient (output/input)* HWC = HW-Coil = Hot Water Coil SC = Steam-Coil = Steam Coil HP = Heat Pump OT = Other DK = Don't Know NF = Not FIlled	Both	primary_heating_type
41	Primary_Heating_Type_Other	None	Other heating type description	Character		Both	primary_heating_type_other
42	Primary_Fuel_Type_Other	None	Other fuel type description	Character		Both	primary_fuel_type_other
43	Sup_Heat_Equip	None	Supplemental heating type (SZ systems)	Coded Numeric	Same Equipment Codes as Primary_Hea	SZ HVAC	sup_heat_equip_type
44	Sup_Heat_Fuel	None	Supplemental heating fuel (SZ systems)	Character		SZ HVAC	heat_fuel_sup
45	Sup_Heat_Fuel_Other	None	Other supplemental heating fuel description (SZ systems)	Character		SZ HVAC	sup_heat_fuel_type_other
46	Heat_kbtuh	kBtu/h	Rated heating capacity	Numeric		NA	NA

Index	Variable	Unit	Description	Data Type	Codes	DB Table	DB Var
47	Cooling_Type	None	Cooling type	Coded Character	CW = Chilled water coil. DXA = Air cooled direct expansion. DXW = Water cooled direct expansion. G = Direct ground water or water loop buried in ground E =Evaporative cooler. N = No mechanical cooling. Oth = Other cooling type NF = Not Filled DK = Don't Know	Both	hvac_cooling_type
48	Cooling_Type_Other	None	Other cooling type description	Character		Both	hvac_cooling_type_other
49	Reheat_Type	None	Terminal reheat energy type	Coded Character	E = Electric W = Hot Water S = Steam N = None OT = Other DK = Don't Know NF = Not Filled	MZ HVAC	terminal_reheat_energy
50	Cool_kbtuh	kBtu/h	Rated cooling capacity	Numeric		NA	NA
51	Fan_Ctr	None	Fan control type (SZ systems)	Coded Character	C = Constant I = Intermittent V = Variable N = None Unk = Unknown NA = Not Applicable NF = Not Filled	SZ HVAC	fan_control
52	Airflow_Ctr	None	Airflow control type (MZ systems)	Coded Character	CV = Constant Volume SCV = Stepped Constant Vol. VAV = Variable Air Volume DK = Don't Know NF = Not Filled	MZ HVAC	airflow_control
53	FanSys_Type	None	Fan system type (MZ systems)	Coded Numeric	1 = Single Zone 2 = Dual Duct 3 = Single Duct - Reheat 4 = Multizone 5 = VVT 6 = DOAS 7 = Makeup Air Unit (MAU) 8 = Other	MZ HVAC	fan_system_type
54	FanSys_Type_Other	None	Other fan system description (MZ systems)	Character		MZ HVAC	fan_system_type_other
55	Airflow_Cap	CFM	Average primary supply airflow (MZ systems)	Numeric		MZ HVAC	airflow_capacity
56	Air_Dist_System	None	Air distribution system (MZ systems)	Coded Character	Ov = Overhead U = Underfloor W = Low Wall OT = Other DK = Don't Know NF = Not Filled	MZ HVAC	air_distrib_system
57	Air_Dist_System_Other	None	Other air distribution system description (MZ systems)	Character		MZ HVAC	air_distrib_system_other

Index	Variable	Unit	Description	Data Type	Codes	DB Table	DB Var
58	Supply_Fan_Ctr	None	Supply fan volume control (MZ systems)	Coded Character	N = None IV = Inlet Vane D = Discharge Damper V = VFD B = Bypass Damper UNK = Unknown NF = Not Filled	MZ HVAC	supply_fan_vol_control
59	Has_Fan_VFD	True/False	Flag var, indicating supply fan VFD presence	True/False		NA	NA
60	Supply_Motor_HP	HP	Total HP of supply fan motors (MZ systems)	Numeric		MZ HVAC	supply_motor_hp
61	Has_Return_Exhaust_Fan	True/False	Presence of return/exhaust fans (MZ systems)	True/False		MZ HVAC	return_or_exhaust_fan
62	Return_Exhaust_Motor_HP	HP	Total HP of return/exhaust fan motors (MZ systems)	Numeric		MZ HVAC	motor_hp
63	Has_VAV_Standard	True/False	Does the system have standard VAV terminals? (MZ systems)	True/False		MZ HVAC	terminal_standard
64	Has_VAV_Induction	True/False	Does the system have induction VAV terminals? (MZ systems)	True/False		MZ HVAC	terminal_induction
65	Has_VAV_FPB_Parallel	True/False	Does the system have fan-powered parallel VAV terminals? (MZ systems)	True/False		MZ HVAC	terminal_fpb_parallel
66	Has_VAV_FPB_Series	True/False	Does the system have fan-powered series VAV terminals? (MZ systems)	True/False		MZ HVAC	terminal_fpb_series
67	Has_VAV_None	True/False	Does the system have no VAV terminals? (MZ systems)	True/False		MZ HVAC	terminal_none
68	Vent_Type	None	Delivery of ventilation air (SZ systems)	Coded Character	AU = At Unit FCS = From Central System OW = Operable Window N = None NA = Not Applicable Unk = Unknown NF = Not Filled	SZ HVAC	ventilation_air
69	Econ_Type	None	Economizer type/presence	Coded Character	A = Air Economizer W = Water Economizer N = None DK = Don't know NA = Not Applicable NF = Not Filled	Both	economizer
70	DCV_Type	None	Demand controlled ventilation type/presence	Coded Character	Y-Z = Yes - In Zone Y-U = Yes - At Unit Y-Unk = Yes - Unknown N = No Unk = Unknown NA = Not Applicable NF = Not Filled	Both	demand_control
71	Has_High_Vent	True/False	Does the system deliver a high fraction of outdoor air (>70%)?	True/False		Both	high_vent
72	Temp_Ctr	None	Temperature control type	Coded Numeric	1 = Manual T-Stat 2 = Programmable T-Stat 3 = EMS-DDC 4 = Manual On/Off DK = Don't Know NA = Not Applicable NF = Not Filled	Both	temp_control_type
73	Has_OS_Setback	True/False	Are occupancy sensors used to set-up/back or turn off zone?	True/False		Both	occ_sensor_setback

Index	Variable	Unit	Description	Data Type	Codes	DB Table	DB Var
74	Has_Exhaust_HR	True/False	Does the system have exhaust air heat recovery? (MZ systems)	True/False		MZ HVAC	exhaust_heat_recovery
75	HR_Type	None	Heat recovery type (MZ systems)	Coded Character	E = Exhaust Air R = Refrigeration C = Condenser DK = Don't Know NF = Not Filled	MZ HVAC	heat_recovery_type
76	Boiler_Primary_Fuel	None	Primary boiler for the site: Primary Fuel Type	Character		NA	NA
77	Chiller_Compressor_Type	None	Primary chiller for the site: Compressor Type	Character		NA	NA
78	Bldg_Type	None	Building type	Character		NA	NA
79	Bldg_Type_Detailed	None	Detailed building type	Character		NA	NA
80	Sf_Total	Square Feet	Total building floor area, including parking garages	Numeric		NA	NA
81	Size_Group	None	General building size group	Character		NA	NA
82	Urban_Rural	None	Urban/Rural Designation	Character		NA	NA
83	Vintage	None	Sample building vintage group	Character		NA	NA
84	City	None	Site City	Character		NA	NA
85	State	None	Site State	Character		NA	NA
86	Sample	None	Sample that the site is a part of (core, BPA oversample, PSE oversample, etc)	Character		NA	NA
87	Wt_PNW	PNW SF/Sample SF	Site regional case weight	Numeric		NA	NA
88	Sf_PNW	Square Feet	Regional square footage represented by site (site SF * case weight)	Numeric		NA	NA
89	Sf_PNW_Heated	Square Feet	Regional heated square footage represented by site	Numeric		NA	NA
90	Sf_PNW_Cooled	Square Feet	Regional cooled square footage represented by site	Numeric		NA	NA

Index	Variable	Unit	Description	Data Type
1	Site_ID	None	Unique Site ID	Character
2	Location	None	Location within site (indoor, outdoor, parking garage, refrigeration)	Character
3	Space_ID	None	Associated space ID	Character
4	Space_Type	None	Space functional use	Character
5	Space_Area	Square Feet	Total area of space	Numeric
6	Subspace_ID	None	Associated sampled subspace ID	Character
7	Subspace_Type	None	Sampled subspace functional use	Character
8	Total_Subspace_Area	Square Feet	Total area of subspace	Numeric
9	Sampled_Subspace_Area	Square Feet	Area of subspace in which lighting survey was performed	Numeric
10	Outdoor_Light_Use_Type	None	Outdoor lighting use type	Character
11	Ceiling_Height	Feet	Ceiling height	Numeric
12	Fixture_Height	Feet	Fixture height	Numeric
13	Fixture_Type	None	Fixture type	Character
14	Fixture_Details	None	Fixture details, specific to fixture type	Character
15	Control_Type	None	General control type	Character
16	Control_Type_Details	None	Detailed control type	Character
17	Controls_Used	True/False	Are the controls used/functional?	True/False
18	Lamp_Type	None	Lamp type	Character
19	Lamp_Details	None	Lamp details, specific to lamp type	Character
20	Ballast_Type	None	Ballast type	Character
21	Lamps_Per_Fixture	Count	Number of lamps per fixture	Numeric
22	LF_Assumed	True/False	Flag variable indicating that lamps/fixture was unknown, and had to be assumed based on engineering judgment	True/False
23	Watts_Per_Lamp	Watts/Lamp	Watts per lamp	Numeric
24	WL_Assumed	True/False	Flag variable indicating that watts/lamp was unknown, and had to be assumed based on engineering judgment	True/False
25	Ballast_Factor	Fixture Watts/Total Lamp Watts	Assigned effective ballast factor (fixture watts / total lamp watts), used to calculate fixture watts from lamps/fixture and watts/lamp	Numeric
26	BF_Assumed	True/False	Flag variable indicating that effective BF was unknown, and had to be assumed based on engineering judgment	True/False
27	Watts_Per_Fixture	Watts/Fixture	Calculated watts per fixture	Numeric
28	Sampled_Fixture_Qty	Count	Actual surveyed fixture quantity	Numeric
29	Sampled_Watts	Watts	Actual surveyed total watts	Numeric
30	Sampled_Lumens	Lumens	Actual surveyed equivalent lumens (proxy for lit area)	Numeric
31	Subspace_Weight	None	Weighting factor to scale surveyed values up to subspace level	Numeric
32	Subspace_Fixture_Qty	Count	Calculated subspace fixture quantity	Numeric
33	Subspace_Watts	Watts	Calculated subspace total watts	Numeric
34	Subspace_Lumens	Lumens	Calculated subspace equivalent lumens (proxy for lit area)	Numeric
35	Site_Weight	None	Weighting factor to scale subspace values up to site level	Numeric
36	Site_Fixture_Qty	Count	Calculated site fixture quantity	Numeric
37	Site_Watts	Watts	Calculated site total watts	Numeric
38	Site_Lumens	Lumens	Calculated site equivalent lumens (proxy for lit area)	Numeric
39	Bldg_Type	None	Building type	Character
40	Bldg_Type_Detailed	None	Detailed building type	Character
41	Sf_Total	Square Feet	Total building floor area, including parking garages	Numeric
42	Size_Group	None	General building size group	Character
43	Urban_Rural	None	Urban/Rural Designation	Character
44	Vintage	None	Sample building vintage group	Character
45	City	None	Site City	Character
46	State	None	Site State	Character
47	Sample	None	Sample that the site is a part of (core, BPA oversample, PSE oversample, etc)	Character
48	Wt_PNW	PNW SF/Sample SF	Site regional case weight	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
1	Site	General		Site_ID	None	Unique Site ID	Character
2	Site	General		Bldg_Name	None	Building Name	Character
3	Site	General		Address	None	Site Physical Address	Character
4	Site	General		City	None	Site City	Character
5	Site	General		State	None	Site State	Character
6	Site	General		Zip	None	Site Zip Code	Numeric
7	Site	General		Util_Elec	None	Electric Service Provider	Character
8	Site	General		Util_Gas	None	Natural Gas Service Provider	Character
9	Site	General		Urban_Rural	None	Urban/Rural Designation	Character
10	Site	Sample		Sample	None	Sample that the site is a part of (core, BPA oversample, PSE oversample, etc)	Character
11	Site	Sample		Sample_Cell	None	Sample cell, determined by building type, size, vintage, and urban/rural designa	Numeric
12	Site	Sample		Wt_PNW	PNW SF/Sam	Site regional case weight	Numeric
13	Site	Sample		Sf_PNW	Square Feet	Regional square footage represented by site (site SF * case weight)	Numeric
14	Site	Sample		Sf_PNW_Heated	Square Feet	Regional heated square footage represented by site	Numeric
15	Site	Sample		Sf_PNW_Cooled	Square Feet	Regional cooled square footage represented by site	Numeric
16	Site	Building Vintage		Year_Constructed	Year	Original Year of Construction	Numeric
17	Site	Building Vintage		Year_Majority_Built	Year	Year of Construction for Majority of Site	Numeric
18	Site	Building Vintage		Vintage	None	Sample building vintage group	Character
19	Site	Building Vintage		Vintage_Detailed	None	Detailed building vintage group	Character
20	Site	Building Type		Bldg_Status	None	Building status - functional, demolished, vacant, inaccessible	Character
21	Site	Building Type		Bldg_Type	None	Building type	Character
22	Site	Building Type		Bldg_Type_Other	None	Other building type description	Character
23	Site	Building Type		Bldg_Type_Detailed	None	Detailed building type	Character
24	Site	Building Type		Bldg_Type_Detailed_Other	None	Other detailed building type description	Character
25	Site	Building Type		Bldg_Type_2009	None	2009 CBSA building type	Character
26	Site	Building Type		Bldg_Type_CBECS	None	CBECS building type	Character
27	Site	Building Type		Bldg_Type_NWPCC	None	Northwest Power and Conservation Council building type	Character
28	Site	Building Type		Mixed_Use	None	Building under mixed use?	True/False
29	Site	Functional Use		Primary_Use	None	Primary Functional Use	Character
30	Site	Functional Use		Primary_Use_Pct	% Total Floor	Primary Use % of Floor Area	Numeric
31	Site	Functional Use		Secondary_Use	None	Secondary Functional Use	Character
32	Site	Functional Use		Secondary_Use_Pct	% Total Floor	Secondary Use % of Floor Area	Numeric
33	Site	Functional Use		Tertiary_Use	None	Tertiary Functional Use	Character
34	Site	Functional Use		Tertiary_Use_Pct	% Total Floor	Tertiary Use % of Floor Area	Numeric
35	Site	Functional Use		Common_Area_Pct	% Total Floor	Common % of Floor Area	Numeric
36	Site	Functional Use		Parking_Area_Pct	% Total Floor	Parking Garage % of Floor Area	Numeric
37	Site	Functional Use		Vacant_Area_Pct	% Total Floor	Vacant % of Floor Area	Numeric
38	Site	Building Size		Sf_Total	Square Feet	Total building floor area, including parking garages	Numeric
39	Site	Building Size		Sf_Bldg	Square Feet	Building floor area, without parking garages	Numeric
40	Site	Building Size		Sf_Parking	Square Feet	Parking garage floor area	Numeric
41	Site	Building Size		Size_Group	None	General building size group	Character
42	Site	Building Size		Bldg_Type_Size_Group	None	Building size group by building type, used for sample	Character
43	Site	Building Size		Heat_Area_Pct	% Building Fl	% of non-parking floor area that is heated	Numeric
44	Site	Building Size		SemiHeat_Area_Pct	% Building Fl	% of non-parking floor area that is semi-heated	Numeric
45	Site	Building Size		Heat_SB_Area_Pct	% Heated Flo	% of heated floor area that has an after hours shutoff/setback	Numeric
46	Site	Building Size		Cool_Area_Pct	% Building Fl	% of non-parking floor area that is cooled	Numeric
47	Site	Building Size		Cool_SU_Area_Pct	% Cooled Flo	% of cooled floor area that has an after hours shutoff/setup	Numeric
48	Site	Building Size		Refrigerated_Area_Pct	% Building Fl	% of non-parking floor area that is refrigerated	Numeric
49	Site	Building Size		Unconditioned_Area_Pct	% Building Fl	% of non-parking floor area that is unconditioned	Numeric
50	Site	Building Size		Floors_Above_Grade	Count	Number of floors above ground	Numeric
51	Site	Building Size		Floors_Below_Grade	Count	Number of floors below ground	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
52	Site	Building Size		Out_Park_Spaces	Count	Number of Outdoor Parking Spaces	Numeric
53	Site	Building Size		Bldg_Multiple	None	Single building, or part of a larger complex?	Character
54	Site	Building Size		Bldg_Number	Count	Total number of buildings at site	Numeric
55	Site	Climate		TMY_HDD	HDD	Typical year (TMY2) heating degree days (HDD), base 65	Numeric
56	Site	Climate		TMY_CDD	CDD	Typical year (TMY2) cooling degree days (CDD), base 65	Numeric
57	Site	Climate		Climate_Zone_Heating	None	Heating climate zone, based on TMY HDD	Character
58	Site	Climate		Climate_Zone_Cooling	None	Cooling climate zone, based on TMY CDD	Character
59	Site	Occupancy		Owner_Occ_Pct	% Building Fl	% of Site Owner Occupied	Numeric
60	Site	Occupancy		Tenant_Occ_Pct	% Building Fl	% of Site Tenant Occupied	Numeric
61	Site	Occupancy		Tenant_Number	Count	Number of tenants	Numeric
62	Site	Occupancy		Has_Energy_Manager	True/False	Does the building have a dedicated energy manager?	True/False
63	Site	Occupancy		Hrs_Open	Hours/Week	Hours/Wk Open For Business (averaged across all building spaces)	Numeric
64	Site	Occupancy		Hrs_Occupied	Hours/Week	Hours/Wk Occupied (averaged across all building spaces)	Numeric
65	Site	Occupancy		Hrs_Hvac	Hours/Week	Hours/Wk HVAC On (averaged across all building spaces)	Numeric
66	Site	Occupancy		Hrs_Lights	Hours/Week	Hours/Wk Lighting On (averaged across all building spaces)	Numeric
67	Site	Occupancy		Open_Sat	True/False	Fraction of Building Area Open Saturday	True/False
68	Site	Occupancy		Open_Sun	True/False	Fraction of Building Area Open Sunday	True/False
69	Site	Occupancy		Open_24	True/False	Fraction of Building Area Open 24/7	True/False
70	Site	Occupancy		Hrs_Open_Cat	None	Hrs Open Category (averaged across all building spaces)	Character
71	Site	Occupancy		Weeks_Open	Weeks	Open Weeks/Yr (averaged across all building spaces)	Numeric
72	Site	Energy Sources		Has_Energy_Electricity	True/False	Does the site use Electricity?	True/False
73	Site	Energy Sources		Has_Energy_NaturalGas	True/False	Does the site use Natural Gas?	True/False
74	Site	Energy Sources		Has_Energy_Oil	True/False	Does the site use Oil?	True/False
75	Site	Energy Sources		Has_Energy_Propane	True/False	Does the site use Propane?	True/False
76	Site	Energy Sources		Has_Energy_PurchasedCooling	True/False	Does the site use Purchased Cooling?	True/False
77	Site	Energy Sources		Has_Energy_Wood	True/False	Does the site use Wood?	True/False
78	Site	Energy Sources		Has_Energy_PurchasedHotWater	True/False	Does the site use Purchased Hot Water?	True/False
79	Site	Energy Sources		Has_Energy_PurchasedSteam	True/False	Does the site use Purchased Steam?	True/False
80	Site	Energy Sources		Has_Energy_Other	True/False	Does the site use Other energy sources?	True/False
81	Site	Power Generation		Has_OnSite_Gen	True/False	Is there Power Generation On-Site?	True/False
82	Site	Power Generation		Has_Cogen	True/False	Is there Cogeneration on-site?	True/False
83	Site	Power Generation		Is_Grid_Connected	True/False	Is on-site generation Grid Connected?	True/False
84	Site	Power Generation		Tot_Gen_Capacity	kW	Total On-Site Generation Capacity	Numeric
85	Site	Renovations	Lighting Ballasts	Ren_Ballast	None	Were Lighting Ballasts ever replaced or renovated?	Character
86	Site	Renovations	Lighting Ballasts	Ren_Ballast_YearsAgo	Years	Years since Lighting Ballasts were renovated	Numeric
87	Site	Renovations	Lighting Ballasts	Ren_Ballast_Percent	%	Percent of Lighting Ballasts that was renovated	Numeric
88	Site	Renovations	Lighting Ballasts	Ren_Ballast_Plans	None	Plans to renovate Lighting Ballasts in the next two years?	Character
89	Site	Renovations	Lighting Fixtures	Ren_Fixture	None	Were Lighting Fixtures ever replaced or renovated?	Character
90	Site	Renovations	Lighting Fixtures	Ren_Fixture_YearsAgo	Years	Years since Lighting Fixtures were renovated	Numeric
91	Site	Renovations	Lighting Fixtures	Ren_Fixture_Percent	%	Percent of Lighting Fixtures that was renovated	Numeric
92	Site	Renovations	Lighting Fixtures	Ren_Fixture_Plans	None	Plans to renovate Lighting Fixtures in the next two years?	Character
93	Site	Renovations	Lighting Controls	Ren_Control	None	Were Lighting Controls ever replaced or renovated?	Character
94	Site	Renovations	Lighting Controls	Ren_Control_YearsAgo	Years	Years since Lighting Controls were renovated	Numeric
95	Site	Renovations	Lighting Controls	Ren_Control_Percent	%	Percent of Lighting Controls that was renovated	Numeric
96	Site	Renovations	Lighting Controls	Ren_Control_Plans	None	Plans to renovate Lighting Controls in the next two years?	Character
97	Site	Renovations	HVAC	Ren_Hvac	None	Were HVAC ever replaced or renovated?	Character
98	Site	Renovations	HVAC	Ren_Hvac_YearsAgo	Years	Years since HVAC were renovated	Numeric
99	Site	Renovations	HVAC	Ren_Hvac_Percent	%	Percent of HVAC that was renovated	Numeric
100	Site	Renovations	HVAC	Ren_Hvac_Plans	None	Plans to renovate HVAC in the next two years?	Character
101	Site	Renovations	HVAC Controls	Ren_HvacCtr	None	Were HVAC Controls ever replaced or renovated?	Character
102	Site	Renovations	HVAC Controls	Ren_HvacCtr_YearsAgo	Years	Years since HVAC Controls were renovated	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
103	Site	Renovations	HVAC Controls	Ren_HvacCtr_Percent	%	Percent of HVAC Controls that was renovated	Numeric
104	Site	Renovations	HVAC Controls	Ren_HvacCtr_Plans	None	Plans to renovate HVAC Controls in the next two years?	Character
105	Site	Renovations	Refrigeration	Ren_Ref	None	Were Refrigeration ever replaced or renovated?	Character
106	Site	Renovations	Refrigeration	Ren_Ref_YearsAgo	Years	Years since Refrigeration were renovated	Numeric
107	Site	Renovations	Refrigeration	Ren_Ref_Percent	%	Percent of Refrigeration that was renovated	Numeric
108	Site	Renovations	Refrigeration	Ren_Ref_Plans	None	Plans to renovate Refrigeration in the next two years?	Character
109	Site	Renovations	Windows	Ren_Window	None	Were Windows ever replaced or renovated?	Character
110	Site	Renovations	Windows	Ren_Window_YearsAgo	Years	Years since Windows were renovated	Numeric
111	Site	Renovations	Windows	Ren_Window_Percent	%	Percent of Windows that was renovated	Numeric
112	Site	Renovations	Windows	Ren_Window_Plans	None	Plans to renovate Windows in the next two years?	Character
113	Site	Renovations	Roof Insulation	Ren_RoofIns	None	Were Roof Insulation ever replaced or renovated?	Character
114	Site	Renovations	Roof Insulation	Ren_RoofIns_YearsAgo	Years	Years since Roof Insulation were renovated	Numeric
115	Site	Renovations	Roof Insulation	Ren_RoofIns_Percent	%	Percent of Roof Insulation that was renovated	Numeric
116	Site	Renovations	Roof Insulation	Ren_RoofIns_Plans	None	Plans to renovate Roof Insulation in the next two years?	Character
117	Building Enve	Walls	General	First_Floor_Perimeter	Linear Feet	First floor perimeter	Numeric
118	Building Enve	Walls	General	Upper_Floor_Perimeter	Linear Feet	Typical upper floor perimeter	Numeric
119	Building Enve	Walls	General	Floor_To_Floor_Height	Feet	Average floor-to-floor height	Numeric
120	Building Enve	Walls	General	Wall_Area	Square Feet	Total wall area	Numeric
121	Building Enve	Walls	General	Wall_Pct_Window	% Wall Area	% of wall area that is windows	Numeric
122	Building Enve	Walls	Wall Surface	WallSurf_Brick_Pct	% Wall Area	% of wall area that has Brick surface	Numeric
123	Building Enve	Walls	Wall Surface	WallSurf_Concrete_Pct	% Wall Area	% of wall area that has Concrete surface	Numeric
124	Building Enve	Walls	Wall Surface	WallSurf_ConcreteBlock_Pct	% Wall Area	% of wall area that has Concrete Block surface	Numeric
125	Building Enve	Walls	Wall Surface	WallSurf_Wood_Pct	% Wall Area	% of wall area that has Wood surface	Numeric
126	Building Enve	Walls	Wall Surface	WallSurf_Metal_Pct	% Wall Area	% of wall area that has Metal surface	Numeric
127	Building Enve	Walls	Wall Surface	WallSurf_Stucco_Pct	% Wall Area	% of wall area that has Stucco surface	Numeric
128	Building Enve	Walls	Wall Surface	WallSurf_Glass_Pct	% Wall Area	% of wall area that has Glass surface	Numeric
129	Building Enve	Walls	Wall Surface	WallSurf_Vinyl_Pct	% Wall Area	% of wall area that has Vinyl surface	Numeric
130	Building Enve	Walls	Wall Framing	WallFrame_MetalStud_Pct	% Wall Area	% of wall area that has Metal Stud framing	Numeric
131	Building Enve	Walls	Wall Framing	WallFrame_Wood_Pct	% Wall Area	% of wall area that has Wood framing	Numeric
132	Building Enve	Walls	Wall Framing	WallFrame_ConcreteBlock_Pct	% Wall Area	% of wall area that has Concrete Block framing	Numeric
133	Building Enve	Walls	Wall Framing	WallFrame_Brick_Pct	% Wall Area	% of wall area that has Brick framing	Numeric
134	Building Enve	Walls	Wall Framing	WallFrame_MetalBldg_Pct	% Wall Area	% of wall area that has Metal Building framing	Numeric
135	Building Enve	Windows	General	Window_Area	Square Feet	Total window area	Numeric
136	Building Enve	Windows	General	Win_SinglePane_Pct	% Window Ar	% of window area that is single pane	Numeric
137	Building Enve	Windows	General	Win_DoublePane_Pct	% Window Ar	% of window area that is double pane	Numeric
138	Building Enve	Windows	General	Win_TriplePane_Pct	% Window Ar	% of window area that is triple pane	Numeric
139	Building Enve	Windows	General	Window_Opening	None	Primary window opening type	Coded Character
140	Building Enve	Windows	General	Window_Operable_Pct	% Window Ar	% of window area that are operable windows	Numeric
141	Building Enve	Windows	General	Window_Age	Years	Primary Window Age	Character
142	Building Enve	Windows	Window Glazing	WinGlaze_Clear_Pct	% Window Ar	% of window area with clear glazing	Numeric
143	Building Enve	Windows	Window Glazing	WinGlaze_Opaque_Pct	% Window Ar	% of window area with opaque glazing	Numeric
144	Building Enve	Windows	Window Glazing	WinGlaze_Reflect_Pct	% Window Ar	% of window area with reflective glazing	Numeric
145	Building Enve	Windows	Window Glazing	WinGlaze_Tint_Pct	% Window Ar	% of window area with tinted glazing	Numeric
146	Building Enve	Windows	Window Frame	WinFrame_Metal_Pct	% Window Ar	% of window area with standard metal frames	Numeric
147	Building Enve	Windows	Window Frame	WinFrame_InsMetal_Pct	% Window Ar	% of window area with insulated (thermally broken) metal frames	Numeric
148	Building Enve	Windows	Window Frame	WinFrame_UnkMetal_Pct	% Window Ar	% of window area with metal frames with unknown presence of insulation/ther	Numeric
149	Building Enve	Windows	Window Frame	WinFrame_Vinyl_Pct	% Window Ar	% of window area with vinyl frames	Numeric
150	Building Enve	Windows	Window Frame	WinFrame_Wood_Pct	% Window Ar	% of window area with wood frames	Numeric
151	Building Enve	Roof		Roof_Area	Square Feet	Total Roof Area	Numeric
152	Building Enve	Roof		Roof_Flat_Pct	% Roof Area	% of roof that is flat	Numeric
153	Building Enve	Roof		Roof_Pitched_Pct	% Roof Area	% of roof that is pitched	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
154	Building Enve	Roof		Roof_Attic_Pct	% Roof Area	% of roof that has an attic above	Numeric
155	Building Enve	Roof		Roof_Res_Pct	% Roof Area	% of roof that has residential space above	Numeric
156	Building Enve	Roof		Has_Skylights	True/False	Does the building have any skylights?	True/False
157	Building Enve	Roof		Skylight_Area	Square Feet	Total Skylight Area	Numeric
158	Building Enve	Floor		Floor_Slab_Pct	% Ground Flc	% of floor that is slab-on-grade	Numeric
159	Building Enve	Floor		Floor_ElevSlab_Pct	% Ground Flc	% of floor that is elevated slab-on-grade	Numeric
160	Building Enve	Floor		Floor_Crawl_Pct	% Ground Flc	% of floor that is above a crawlspace	Numeric
161	Building Enve	Floor		Floor_Basement_Pct	% Ground Flc	% of floor that is above a basement	Numeric
162	Lighting	Summary		LPD_Ind	Indoor Watts	Indoor Lighting Watts per Square Foot, without parking garages	Numeric
163	Lighting	Summary		LPD_IndPark	Total Watts/1	Indoor Lighting Watts per Square Foot, including parking garages	Numeric
164	Lighting	Summary		LPD_Park	PG Watts/PG	Parking Garage Lighting Watts per Square Foot	Numeric
165	Lighting	Summary		LPD_Ref	Ref Watts/In	Refrigeration lighting watts per square foot	Numeric
166	Lighting	Summary		LPD_Out	Outdoor Wat	Outdoor lighting watts per square foot of indoor space	Numeric
167	Lighting	Summary		Watts_Ind	Watts	Total Indoor Lighting Wattage, without parking garages	Numeric
168	Lighting	Summary		Watts_Park	Watts	Total Parking Garage Lighting Wattage	Numeric
169	Lighting	Summary		Watts_Ref	Watts	Total Refrigeration Lighting Wattage	Numeric
170	Lighting	Summary		Watts_Out	Watts	Total Outdoor Lighting Wattage associated with site	Numeric
171	Lighting	Summary		Fixture_Height_Avg	Feet	Average Light Fixture Height	Numeric
172	Lighting	Summary		Ceiling_Height_Avg	Feet	Average Ceiling Height	Numeric
173	Lighting	Summary		Has_Out_Lighting	True/False	Building has Outdoor Lighting?	True/False
174	Lighting	Summary		Façade_Lit_Pct	% of Façade I	% of Building Façade that is lit	Numeric
175	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T5_Pct_Watts	% Indoor Wa	% Indoor Watts that are T5	Numeric
176	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T5_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are T5	Numeric
177	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T5_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are T5	Numeric
178	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T8_Pct_Watts	% Indoor Wa	% Indoor Watts that are T8	Numeric
179	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T8_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are T8	Numeric
180	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T8_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are T8	Numeric
181	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T12_Pct_Watts	% Indoor Wa	% Indoor Watts that are T12	Numeric
182	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T12_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are T12	Numeric
183	Lighting	Indoor Lighting	Primary Lamp Type	Ind_T12_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are T12	Numeric
184	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Cfl_Pct_Watts	% Indoor Wa	% Indoor Watts that are CFL	Numeric
185	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Cfl_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are CFL	Numeric
186	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Cfl_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are CFL	Numeric
187	Lighting	Indoor Lighting	Primary Lamp Type	Ind_OthFl_Pct_Watts	% Indoor Wa	% Indoor Watts that are Other Fluorescent	Numeric
188	Lighting	Indoor Lighting	Primary Lamp Type	Ind_OthFl_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are Other Fluorescent	Numeric
189	Lighting	Indoor Lighting	Primary Lamp Type	Ind_OthFl_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are Other Fluorescent	Numeric
190	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Hid_Pct_Watts	% Indoor Wa	% Indoor Watts that are HID	Numeric
191	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Hid_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are HID	Numeric
192	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Hid_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are HID	Numeric
193	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Led_Pct_Watts	% Indoor Wa	% Indoor Watts that are LED	Numeric
194	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Led_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are LED	Numeric
195	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Led_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are LED	Numeric
196	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Inc_Pct_Watts	% Indoor Wa	% Indoor Watts that are Incandescent	Numeric
197	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Inc_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are Incandescent	Numeric
198	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Inc_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are Incandescent	Numeric
199	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Misc_Pct_Watts	% Indoor Wa	% Indoor Watts that are Misc	Numeric
200	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Misc_Pct_Qty	% Indoor Fixt	% Indoor Fixtures that are Misc	Numeric
201	Lighting	Indoor Lighting	Primary Lamp Type	Ind_Misc_Pct_Lumens	% Indoor Lun	% Indoor Lumens (proxy for lit area) that are Misc	Numeric
202	Lighting	Indoor Lighting	T8 Lamp Type	T8_Hp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are HP	Numeric
203	Lighting	Indoor Lighting	T8 Lamp Type	T8_Hp_Pct_Qty	% Indoor T8 I	% Indoor T8 Fixtures that are HP	Numeric
204	Lighting	Indoor Lighting	T8 Lamp Type	T8_Hp_Pct_Lumens	% Indoor T8 I	% Indoor T8 Lumens (proxy for lit area) that are HP	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
205	Lighting	Indoor Lighting	T8 Lamp Type	T8_Std_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are Standard	Numeric
206	Lighting	Indoor Lighting	T8 Lamp Type	T8_Std_Pct_Qty	% Indoor T8 F	% Indoor T8 Fixtures that are Standard	Numeric
207	Lighting	Indoor Lighting	T8 Lamp Type	T8_Std_Pct_Lumens	% Indoor T8 L	% Indoor T8 Lumens (proxy for lit area) that are Standard	Numeric
208	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Screw_Pct_Watts	% Indoor CFL	% Indoor CFL Watts that are Screw-In	Numeric
209	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Screw_Pct_Qty	% Indoor CFL	% Indoor CFL Fixtures that are Screw-In	Numeric
210	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Screw_Pct_Lumens	% Indoor CFL	% Indoor CFL Lumens (proxy for lit area) that are Screw-In	Numeric
211	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Pin_Pct_Watts	% Indoor CFL	% Indoor CFL Watts that are Pin-Based	Numeric
212	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Pin_Pct_Qty	% Indoor CFL	% Indoor CFL Fixtures that are Pin-Based	Numeric
213	Lighting	Indoor Lighting	CFL Lamp Type	Cfl_Pin_Pct_Lumens	% Indoor CFL	% Indoor CFL Lumens (proxy for lit area) that are Pin-Based	Numeric
214	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Ref_Pct_Watts	% Indoor Inca	% Indoor Incandescent Watts that are Reflector	Numeric
215	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Ref_Pct_Qty	% Indoor Inca	% Indoor Incandescent Fixtures that are Reflector	Numeric
216	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Ref_Pct_Lumens	% Indoor Inca	% Indoor Incandescent Lumens (proxy for lit area) that are Reflector	Numeric
217	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Gen_Pct_Watts	% Indoor Inca	% Indoor Incandescent Watts that are General Service	Numeric
218	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Gen_Pct_Qty	% Indoor Inca	% Indoor Incandescent Fixtures that are General Service	Numeric
219	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Gen_Pct_Lumens	% Indoor Inca	% Indoor Incandescent Lumens (proxy for lit area) that are General Service	Numeric
220	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Dec_Pct_Watts	% Indoor Inca	% Indoor Incandescent Watts that are Decorative/Misc	Numeric
221	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Dec_Pct_Qty	% Indoor Inca	% Indoor Incandescent Fixtures that are Decorative/Misc	Numeric
222	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_Dec_Pct_Lumens	% Indoor Inca	% Indoor Incandescent Lumens (proxy for lit area) that are Decorative/Misc	Numeric
223	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalRef_Pct_Watts	% Indoor Inca	% Indoor Incandescent Watts that are Halogen - Reflector	Numeric
224	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalRef_Pct_Qty	% Indoor Inca	% Indoor Incandescent Fixtures that are Halogen - Reflector	Numeric
225	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalRef_Pct_Lumens	% Indoor Inca	% Indoor Incandescent Lumens (proxy for lit area) that are Halogen - Reflector	Numeric
226	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalGen_Pct_Watts	% Indoor Inca	% Indoor Incandescent Watts that are Halogen - General Service	Numeric
227	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalGen_Pct_Qty	% Indoor Inca	% Indoor Incandescent Fixtures that are Halogen - General Service	Numeric
228	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalGen_Pct_Lumens	% Indoor Inca	% Indoor Incandescent Lumens (proxy for lit area) that are Halogen - General Se	Numeric
229	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalDec_Pct_Watts	% Indoor Inca	% Indoor Incandescent Watts that are Halogen - Decorative/Misc	Numeric
230	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalDec_Pct_Qty	% Indoor Inca	% Indoor Incandescent Fixtures that are Halogen - Decorative/Misc	Numeric
231	Lighting	Indoor Lighting	Incandescent Lamp Type	Inc_HalDec_Pct_Lumens	% Indoor Inca	% Indoor Incandescent Lumens (proxy for lit area) that are Halogen - Decorative	Numeric
232	Lighting	Indoor Lighting	HID Lamp Type	Hid_Mv_Pct_Watts	% Indoor HID	% Indoor HID Fixtures that are MV	Numeric
233	Lighting	Indoor Lighting	HID Lamp Type	Hid_Mv_Pct_Qty	% Indoor HID	% Indoor HID Watts that are MV	Numeric
234	Lighting	Indoor Lighting	HID Lamp Type	Hid_Mv_Pct_Lumens	% Indoor HID	% Indoor HID Watts that are MV	Numeric
235	Lighting	Indoor Lighting	HID Lamp Type	Hid_NonMv_Pct_Watts	% Indoor HID	% Indoor HID Fixtures that are non-MV	Numeric
236	Lighting	Indoor Lighting	HID Lamp Type	Hid_NonMv_Pct_Qty	% Indoor HID	% Indoor HID Watts that are non-MV	Numeric
237	Lighting	Indoor Lighting	HID Lamp Type	Hid_NonMv_Pct_Lumens	% Indoor HID	% Indoor HID Watts that are non-MV	Numeric
238	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_OneLamp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are 1 Lamp fixtures	Numeric
239	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_OneLamp_Pct_Qty	% Indoor T8 F	% Indoor T8 Fixtures that are 1 Lamp fixtures	Numeric
240	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_OneLamp_Pct_Lumens	% Indoor T8 L	% Indoor T8 Lumens (proxy for lit area) that are 1 Lamp fixtures	Numeric
241	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_TwoLamp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are 2 Lamp fixtures	Numeric
242	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_TwoLamp_Pct_Qty	% Indoor T8 F	% Indoor T8 Fixtures that are 2 Lamp fixtures	Numeric
243	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_TwoLamp_Pct_Lumens	% Indoor T8 L	% Indoor T8 Lumens (proxy for lit area) that are 2 Lamp fixtures	Numeric
244	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_ThreeLamp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are 3 Lamp fixtures	Numeric
245	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_ThreeLamp_Pct_Qty	% Indoor T8 F	% Indoor T8 Fixtures that are 3 Lamp fixtures	Numeric
246	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_ThreeLamp_Pct_Lumens	% Indoor T8 L	% Indoor T8 Lumens (proxy for lit area) that are 3 Lamp fixtures	Numeric
247	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_FourLamp_Pct_Watts	% Indoor T8 \	% Indoor T8 Watts that are 4 Lamp fixtures	Numeric
248	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_FourLamp_Pct_Qty	% Indoor T8 F	% Indoor T8 Fixtures that are 4 Lamp fixtures	Numeric
249	Lighting	Indoor Lighting	T8 Lamps In Profile	T8_FourLamp_Pct_Lumens	% Indoor T8 L	% Indoor T8 Lumens (proxy for lit area) that are 4 Lamp fixtures	Numeric
250	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_OneLamp_Pct_Watts	% Indoor T12	% Indoor T12 Watts that are 1 Lamp fixtures	Numeric
251	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_OneLamp_Pct_Qty	% Indoor T12	% Indoor T12 Fixtures that are 1 Lamp fixtures	Numeric
252	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_OneLamp_Pct_Lumens	% Indoor T12	% Indoor T12 Lumens (proxy for lit area) that are 1 Lamp fixtures	Numeric
253	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_TwoLamp_Pct_Watts	% Indoor T12	% Indoor T12 Watts that are 2 Lamp fixtures	Numeric
254	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_TwoLamp_Pct_Qty	% Indoor T12	% Indoor T12 Fixtures that are 2 Lamp fixtures	Numeric
255	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_TwoLamp_Pct_Lumens	% Indoor T12	% Indoor T12 Lumens (proxy for lit area) that are 2 Lamp fixtures	Numeric

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
256	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_ThreeLamp_Pct_Watts	% Indoor T12	% Indoor T12 Watts that are 3 Lamp fixtures	Numeric
257	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_ThreeLamp_Pct_Qty	% Indoor T12	% Indoor T12 Fixtures that are 3 Lamp fixtures	Numeric
258	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_ThreeLamp_Pct_Lumens	% Indoor T12	% Indoor T12 Lumens (proxy for lit area) that are 3 Lamp fixtures	Numeric
259	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_FourLamp_Pct_Watts	% Indoor T12	% Indoor T12 Watts that are 4 Lamp fixtures	Numeric
260	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_FourLamp_Pct_Qty	% Indoor T12	% Indoor T12 Fixtures that are 4 Lamp fixtures	Numeric
261	Lighting	Indoor Lighting	T12 Lamps In Profile	T12_FourLamp_Pct_Lumens	% Indoor T12	% Indoor T12 Lumens (proxy for lit area) that are 4 Lamp fixtures	Numeric
262	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_HLB_Pct_Watts	% Indoor HLB	% Indoor Watts that are High/Low Bay fixtures	Numeric
263	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_HLB_Pct_Qty	% Indoor HLB	% Indoor Fixtures that are High/Low Bay fixtures	Numeric
264	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_HLB_Pct_Lumens	% Indoor HLB	% Indoor Lumens (proxy for lit area) that are High/Low Bay fixtures	Numeric
265	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_LF_Pct_Watts	% Indoor HLB	% Indoor Watts that are Linear Fluorescent fixtures	Numeric
266	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_LF_Pct_Qty	% Indoor HLB	% Indoor Fixtures that are Linear Fluorescent fixtures	Numeric
267	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_LF_Pct_Lumens	% Indoor HLB	% Indoor Lumens (proxy for lit area) that are Linear Fluorescent fixtures	Numeric
268	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_RC_Pct_Watts	% Indoor HLB	% Indoor Watts that are Recessed Can fixtures	Numeric
269	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_RC_Pct_Qty	% Indoor HLB	% Indoor Fixtures that are Recessed Can fixtures	Numeric
270	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_RC_Pct_Lumens	% Indoor HLB	% Indoor Lumens (proxy for lit area) that are Recessed Can fixtures	Numeric
271	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_DTS_Pct_Watts	% Indoor HLB	% Indoor Watts that are Display Track/Surface Mount fixtures	Numeric
272	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_DTS_Pct_Qty	% Indoor HLB	% Indoor Fixtures that are Display Track/Surface Mount fixtures	Numeric
273	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_DTS_Pct_Lumens	% Indoor HLB	% Indoor Lumens (proxy for lit area) that are Display Track/Surface Mount fixtur	Numeric
274	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_Other_Pct_Watts	% Indoor HLB	% Indoor Watts that are Other fixtures	Numeric
275	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_Other_Pct_Qty	% Indoor HLB	% Indoor Fixtures that are Other fixtures	Numeric
276	Lighting	Indoor Lighting	Indoor Fixture Type	Ind_Other_Pct_Lumens	% Indoor HLB	% Indoor Lumens (proxy for lit area) that are Other fixtures	Numeric
277	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T5_Pct_Watts	% Indoor HLB	% Indoor high/low bay fixtures that are T5	Numeric
278	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T5_Pct_Qty	% Indoor HLB	% Indoor high/low bay watts that are T5	Numeric
279	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T5_Pct_Lumens	% Indoor HLB	% Indoor high/low bay watts that are T5	Numeric
280	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T8_Pct_Watts	% Indoor HLB	% Indoor high/low bay fixtures that are T8	Numeric
281	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T8_Pct_Qty	% Indoor HLB	% Indoor high/low bay watts that are T8	Numeric
282	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_T8_Pct_Lumens	% Indoor HLB	% Indoor high/low bay watts that are T8	Numeric
283	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Led_Pct_Watts	% Indoor HLB	% Indoor high/low bay fixtures that are LED	Numeric
284	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Led_Pct_Qty	% Indoor HLB	% Indoor high/low bay watts that are LED	Numeric
285	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Led_Pct_Lumens	% Indoor HLB	% Indoor high/low bay watts that are LED	Numeric
286	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Hid_Pct_Watts	% Indoor HLB	% Indoor high/low bay fixtures that are HID	Numeric
287	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Hid_Pct_Qty	% Indoor HLB	% Indoor high/low bay watts that are HID	Numeric
288	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Hid_Pct_Lumens	% Indoor HLB	% Indoor high/low bay watts that are HID	Numeric
289	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Cfl_Pct_Watts	% Indoor HLB	% Indoor high/low bay fixtures that are CFL	Numeric
290	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Cfl_Pct_Qty	% Indoor HLB	% Indoor high/low bay watts that are CFL	Numeric
291	Lighting	Indoor Lighting	High/Low Bay Fixture Type	HLB_Cfl_Pct_Lumens	% Indoor HLB	% Indoor high/low bay watts that are CFL	Numeric
292	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_TimeClock	True/False	Presence of Indoor light Timeclock controls	True/False
293	Lighting	Indoor Lighting	Lighting Controls	IndCtr_TimeClock_Pct_Watts	% Indoor Wa	% Indoor Watts that have Timeclock controls	Numeric
294	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_EMS	True/False	Presence of Indoor light EMS controls	True/False
295	Lighting	Indoor Lighting	Lighting Controls	IndCtr_EMS_Pct_Watts	% Indoor Wa	% Indoor Watts that have EMS controls	Numeric
296	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_PhotoCell	True/False	Presence of Indoor light Photocell controls	True/False
297	Lighting	Indoor Lighting	Lighting Controls	IndCtr_PhotoCell_Pct_Watts	% Indoor Wa	% Indoor Watts that have Photocell controls	Numeric
298	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_OccSensor	True/False	Presence of Indoor light Occupancy Sensor controls	True/False
299	Lighting	Indoor Lighting	Lighting Controls	IndCtr_OccSensor_Pct_Watts	% Indoor Wa	% Indoor Watts that have Occupancy Sensor controls	Numeric
300	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_Manual	True/False	Presence of Indoor light Manual controls	True/False
301	Lighting	Indoor Lighting	Lighting Controls	IndCtr_Manual_Pct_Watts	% Indoor Wa	% Indoor Watts that have Manual controls	Numeric
302	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_Dimmer	True/False	Presence of Indoor light Bi-level/Dimmer controls	True/False
303	Lighting	Indoor Lighting	Lighting Controls	IndCtr_Dimmer_Pct_Watts	% Indoor Wa	% Indoor Watts that have Bi-level/Dimmer controls	Numeric
304	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_Egress	True/False	Presence of Indoor light 24/7 Egress controls	True/False
305	Lighting	Indoor Lighting	Lighting Controls	IndCtr_Egress_Pct_Watts	% Indoor Wa	% Indoor Watts that have 24/7 Egress controls	Numeric
306	Lighting	Indoor Lighting	Lighting Controls	Has_IndCtr_Other	True/False	Presence of Indoor light Other controls	True/False

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
307	Lighting	Indoor Lighting	Lighting Controls	IndCtr_Other_Pct_Watts	% Indoor Wa	% Indoor Watts that have Other controls	Numeric
308	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Facade_Pct_Watts	% Outdoor W	% Outdoor Watts that are Building Façade lights	Numeric
309	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Facade_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Building Façade lights	Numeric
310	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Facade_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Building Façade lights	Numeric
311	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Pole_Pct_Watts	% Outdoor W	% Outdoor Watts that are Pole Lights (area/parking/roadway)	Numeric
312	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Pole_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Pole Lights (area/parking/roadway)	Numeric
313	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Pole_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Pole Lights (area/parking/roadwa	Numeric
314	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_SportField_Pct_Watts	% Outdoor W	% Outdoor Watts that are Sporting Field lights	Numeric
315	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_SportField_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Sporting Field lights	Numeric
316	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_SportField_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Sporting Field lights	Numeric
317	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Other_Pct_Watts	% Outdoor W	% Outdoor Watts that are Other lights	Numeric
318	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Other_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Other lights	Numeric
319	Lighting	Outdoor Lighting	Outdoor Lighting Type	Out_Other_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Other lights	Numeric
320	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T5_Pct_Watts	% Outdoor W	% Outdoor Watts that are T5	Numeric
321	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T5_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are T5	Numeric
322	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T5_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are T5	Numeric
323	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T8_Pct_Watts	% Outdoor W	% Outdoor Watts that are T8	Numeric
324	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T8_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are T8	Numeric
325	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T8_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are T8	Numeric
326	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T12_Pct_Watts	% Outdoor W	% Outdoor Watts that are T12	Numeric
327	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T12_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are T12	Numeric
328	Lighting	Outdoor Lighting	Primary Lamp Type	Out_T12_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are T12	Numeric
329	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Cfl_Pct_Watts	% Outdoor W	% Outdoor Watts that are CFL	Numeric
330	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Cfl_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are CFL	Numeric
331	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Cfl_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are CFL	Numeric
332	Lighting	Outdoor Lighting	Primary Lamp Type	Out_OthFl_Pct_Watts	% Outdoor W	% Outdoor Watts that are Other Fluorescent	Numeric
333	Lighting	Outdoor Lighting	Primary Lamp Type	Out_OthFl_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Other Fluorescent	Numeric
334	Lighting	Outdoor Lighting	Primary Lamp Type	Out_OthFl_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Other Fluorescent	Numeric
335	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Hid_Pct_Watts	% Outdoor W	% Outdoor Watts that are HID	Numeric
336	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Hid_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are HID	Numeric
337	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Hid_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are HID	Numeric
338	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Led_Pct_Watts	% Outdoor W	% Outdoor Watts that are LED	Numeric
339	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Led_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are LED	Numeric
340	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Led_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are LED	Numeric
341	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Inc_Pct_Watts	% Outdoor W	% Outdoor Watts that are Incandescent	Numeric
342	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Inc_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Incandescent	Numeric
343	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Inc_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Incandescent	Numeric
344	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Misc_Pct_Watts	% Outdoor W	% Outdoor Watts that are Misc	Numeric
345	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Misc_Pct_Qty	% Outdoor Fi	% Outdoor Fixtures that are Misc	Numeric
346	Lighting	Outdoor Lighting	Primary Lamp Type	Out_Misc_Pct_Lumens	% Outdoor Lu	% Outdoor Lumens (proxy for lit area) that are Misc	Numeric
347	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_TimeClock	True/False	Presence of Outdoor light Timeclock controls	True/False
348	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_TimeClock_Pct_Watts	% Outdoor W	% Outdoor Watts that have Timeclock controls	Numeric
349	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_PhotoCell	True/False	Presence of Outdoor light Photocell controls	True/False
350	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_PhotoCell_Pct_Watts	% Outdoor W	% Outdoor Watts that have Photocell controls	Numeric
351	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_TimePhoto	True/False	Presence of Outdoor light Timeclock/Photocell controls	True/False
352	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_TimePhoto_Pct_Watts	% Outdoor W	% Outdoor Watts that have Timeclock/Photocell controls	Numeric
353	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_Manual	True/False	Presence of Outdoor light Manual controls	True/False
354	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_Manual_Pct_Watts	% Outdoor W	% Outdoor Watts that have Manual controls	Numeric
355	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_None	True/False	Presence of Outdoor lights with no controls (continuous operation)	True/False
356	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_None_Pct_Watts	% Outdoor W	% Outdoor Watts that have no controls (continuous operation)	Numeric
357	Lighting	Outdoor Lighting	Lighting Controls	Has_OutCtr_Other	True/False	Presence of Outdoor light Other controls	True/False

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
358	Lighting	Outdoor Lighting	Lighting Controls	OutCtr_Other_Pct_Watts	% Outdoor W	% Outdoor Watts that have Other controls	Numeric
359	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T5_Pct_Watts	% Parking Ga	% Parking Garage Watts that are T5	Numeric
360	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T5_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are T5	Numeric
361	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T5_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are T5	Numeric
362	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T8_Pct_Watts	% Parking Ga	% Parking Garage Watts that are T8	Numeric
363	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T8_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are T8	Numeric
364	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T8_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are T8	Numeric
365	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T12_Pct_Watts	% Parking Ga	% Parking Garage Watts that are T12	Numeric
366	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T12_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are T12	Numeric
367	Lighting	Parking Garage Lig	Primary Lamp Type	Park_T12_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are T12	Numeric
368	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Cfl_Pct_Watts	% Parking Ga	% Parking Garage Watts that are CFL	Numeric
369	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Cfl_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are CFL	Numeric
370	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Cfl_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are CFL	Numeric
371	Lighting	Parking Garage Lig	Primary Lamp Type	Park_OthFl_Pct_Watts	% Parking Ga	% Parking Garage Watts that are Other Fluorescent	Numeric
372	Lighting	Parking Garage Lig	Primary Lamp Type	Park_OthFl_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are Other Fluorescent	Numeric
373	Lighting	Parking Garage Lig	Primary Lamp Type	Park_OthFl_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are Other Fluorescent	Numeric
374	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Hid_Pct_Watts	% Parking Ga	% Parking Garage Watts that are HID	Numeric
375	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Hid_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are HID	Numeric
376	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Hid_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are HID	Numeric
377	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Led_Pct_Watts	% Parking Ga	% Parking Garage Watts that are LED	Numeric
378	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Led_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are LED	Numeric
379	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Led_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are LED	Numeric
380	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Inc_Pct_Watts	% Parking Ga	% Parking Garage Watts that are Incandescent	Numeric
381	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Inc_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are Incandescent	Numeric
382	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Inc_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are Incandescent	Numeric
383	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Misc_Pct_Watts	% Parking Ga	% Parking Garage Watts that are Misc	Numeric
384	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Misc_Pct_Qty	% Parking Ga	% Parking Garage Fixtures that are Misc	Numeric
385	Lighting	Parking Garage Lig	Primary Lamp Type	Park_Misc_Pct_Lumens	% Parking Ga	% Parking Garage Lumens (proxy for lit area) that are Misc	Numeric
386	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_TimeClock	True/False	Presence of parking garage light Timeclock controls	True/False
387	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_TimeClock_Pct_Watts	% Parking Ga	% Parking Garage Watts that have Timeclock controls	Numeric
388	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_PhotoCell	True/False	Presence of parking garage light Photocell controls	True/False
389	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_PhotoCell_Pct_Watts	% Parking Ga	% Parking Garage Watts that have Photocell controls	Numeric
390	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_OccSensor	True/False	Presence of parking garage light Occupancy Sensor controls	True/False
391	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_OccSensor_Pct_Watts	% Parking Ga	% Parking Garage Watts that have Occupancy Sensor controls	Numeric
392	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_None	True/False	Presence of parking garage light with no controls (continuous operation)	True/False
393	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_None_Pct_Watts	% Parking Ga	% Parking Garage Watts that have no controls (continuous operation) controls	Numeric
394	Lighting	Parking Garage Lig	Lighting Controls	Has_PkCtr_Other	True/False	Presence of parking garage light Other controls	True/False
395	Lighting	Parking Garage Lig	Lighting Controls	PkCtr_Other_Pct_Watts	% Parking Ga	% Parking Garage Watts that have Other controls	Numeric
396	HVAC	Distribution System		DistSys_Primary	None	Distribution System: Primary System Type	Character
397	HVAC	Distribution System		DistSys_Secondary	None	Distribution System: Secondary System Type	Character
398	HVAC	Distribution System		DistSys_ReHeatFuel	None	Distribution System: Reheat Fuel	Coded Character
399	HVAC	Distribution System		DistSys_VavType	None	Distribution System: VAV Type	Character
400	HVAC	Distribution System		DistSys_SupFanCtr	None	Distribution System: Supply Fan Control	Coded Character
401	HVAC	Distribution System		DistSys_EconType	None	Distribution System: Economizer Type	Coded Character
402	HVAC	Distribution System		DistSys_HighVentilation	True/False	Distribution System: High Ventilation	True/False
403	HVAC	Distribution System		DistSys_SupFanHP	HP	Distribution System: Total Supply Fan HP	Numeric
404	HVAC	Distribution System		DistSys_RetExhaustFanHP	HP	Distribution System: Total Return/Exhaust Fan HP	Numeric
405	HVAC	Heating System	Heating Fuel	HeatSys_Electricity_Pct	%	% of floor area that is heated with electricity as the primary fuel	Numeric
406	HVAC	Heating System	Heating Fuel	HeatSys_NaturalGas_Pct	%	% of floor area that is heated with natural gas as the primary fuel	Numeric
407	HVAC	Heating System	Primary Heating System	HeatSys_Primary	None	Primary Heating System: System Type	Character
408	HVAC	Heating System	Primary Heating System	HeatSys_Primary_PrimFuel	None	Primary Heating System: Primary Heating Fuel	Character

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
409	HVAC	Heating System	Primary Heating System	HeatSys_Primary_SecFuel	None	Primary Heating System: Secondary Heating Fuel	Character
410	HVAC	Heating System	Primary Heating System	HeatSys_Primary_Age	None	Primary Heating System: System Age Group	Character
411	HVAC	Heating System	Secondary Heating System	HeatSys_Secondary	None	Secondary Heating System: System Type	Character
412	HVAC	Heating System	Secondary Heating System	HeatSys_Secondary_PrimFuel	None	Secondary Heating System: Primary Heating Fuel	Character
413	HVAC	Heating System	Secondary Heating System	HeatSys_Secondary_SecFuel	None	Secondary Heating System: Secondary Heating Fuel	Character
414	HVAC	Heating System	Secondary Heating System	HeatSys_Secondary_Age	None	Secondary Heating System: System Age Group	Character
415	HVAC	Heating System	Boiler	Boiler_Qty	Count	Total Number of Boilers	Numeric
416	HVAC	Heating System	Boiler	Boiler_Primary_Fuel	None	Primary Boiler: Primary Fuel Type	Character
417	HVAC	Heating System	Boiler	Boiler_Avg_Capacity	kBtu/h	Average boiler capacity	Numeric
418	HVAC	Heating System	Boiler	Boiler_Avg_Age	Years	Average boiler age	Numeric
419	HVAC	Heating System	Boiler	Boiler_Max_Age	Years	Maximum boiler age	Numeric
420	HVAC	Heating System	Boiler	Boiler_Function	None	Primary Boiler: Boiler Function	Coded Character
421	HVAC	Heating System	Boiler	Boiler_Condensing	True/False	Primary Boiler: Condensing Boiler?	True/False
422	HVAC	Heating System	Boiler	Boiler_HeatRecovery	True/False	Primary Boiler: Boiler Heat Recovery?	True/False
423	HVAC	Cooling System	Primary Cooling System	CoolSys_Primary	None	Cooling System: Primary System Type	Character
424	HVAC	Cooling System	Primary Cooling System	CoolSys_Primary_Age	None	Cooling System: Primary System Age Group	Character
425	HVAC	Cooling System	Secondary Cooling System	CoolSys_Secondary	None	Cooling System: Secondary System Type	Character
426	HVAC	Cooling System	Secondary Cooling System	CoolSys_Secondary_Age	None	Cooling System: Secondary System Age Group	Character
427	HVAC	Cooling System	Chiller	Chiller_Qty	Count	Total number of chillers	Numeric
428	HVAC	Cooling System	Chiller	Chiller_Avg_Capacity	Tons	Average chiller capacity	Numeric
429	HVAC	Cooling System	Chiller	Chiller_Avg_Age	Years	Average chiller age	Numeric
430	HVAC	Cooling System	Chiller	Chiller_Max_Age	Years	Maximum chiller age	Numeric
431	HVAC	Cooling System	Chiller	Chiller_Compressor_Type	None	Primary chiller: Compressor Type	Character
432	HVAC	Cooling System	Chiller	Chiller_VfdControl	True/False	Primary chiller: VFD Control?	True/False
433	HVAC	Cooling System	Chiller	Chiller_WaterSideEcon	True/False	Primary chiller: Water Side Economizer?	True/False
434	HVAC	HVAC Controls		Has_Hvac_Ctrl_FullDDC	True/False	Do on-site HVAC controls include Full DDC?	True/False
435	HVAC	HVAC Controls		Has_Hvac_Ctrl_HybridPneumatic	True/False	Do on-site HVAC controls include Hybrid - Pneumatic?	True/False
436	HVAC	HVAC Controls		Has_Hvac_Ctrl_HybridElectric	True/False	Do on-site HVAC controls include Hybrid - Electric?	True/False
437	HVAC	HVAC Controls		Has_Hvac_Ctrl_FullPnuematic	True/False	Do on-site HVAC controls include Full Pneumatic?	True/False
438	HVAC	HVAC Controls		Has_Hvac_Ctrl_FullElectronicProg	True/False	Do on-site HVAC controls include Full Electronic, Prog T-stat?	True/False
439	HVAC	HVAC Controls		Has_Hvac_Ctrl_FullElectronicManu	True/False	Do on-site HVAC controls include Full Electronic, Manual T-stat?	True/False
440	HVAC	HVAC Controls		Has_Hvac_Ctrl_Other	True/False	Do on-site HVAC controls include Other control types?	True/False
441	HVAC	HVAC Controls		Has_Hvac_Ctrl_Timeclock	True/False	Do on-site HVAC controls include Timeclock Start/Stop?	True/False
442	HVAC	HVAC Controls		Has_Hvac_Ctrl_Optimum	True/False	Do on-site HVAC controls include Optimum Start/Stop?	True/False
443	HVAC	HVAC Controls		Has_Hvac_Ctrl_UnoccTempSetbac	True/False	Do on-site HVAC controls include Unoccupied Temp Setback?	True/False
444	HVAC	HVAC Controls		Has_Hvac_Ctrl_UnoccTempSetup	True/False	Do on-site HVAC controls include Unoccupied Temp Setup?	True/False
445	Service HW	General		Shw_Input_Cap	kBtu/h	Total domestic water heat input capacity	Numeric
446	Service HW	General		Shw_Avg_Age	Years	Average domestic water heat system age	Numeric
447	Service HW	General		Shw_Max_Age	Years	Maximum domestic water heat system age	Numeric
448	Service HW	SHW Type		ShwType_Tank_Pct	% SHW input	Percent of SHW input capacity from tank water heaters	Numeric
449	Service HW	SHW Type		ShwType_Pou_Pct	% SHW input	Percent of SHW input capacity from point-of-use (tankless) water heaters	Numeric
450	Service HW	SHW Type		ShwType_Boiler_Pct	% SHW input	Percent of SHW input capacity from a dedicated boiler	Numeric
451	Service HW	SHW Type		ShwType_Hp_Pct	% SHW input	Percent of SHW input capacity from heat pump water heaters	Numeric
452	Service HW	SHW Type		ShwType_Oth_Pct	% SHW input	Percent of SHW input capacity from other types of water heaters	Numeric
453	Service HW	SHW Fuel		ShwFuel_Elec_Pct	% SHW input	Percent of SHW input capacity that uses electricity	Numeric
454	Service HW	SHW Fuel		ShwFuel_Gas_Pct	% SHW input	Percent of SHW input capacity that uses natural gas	Numeric
455	Service HW	SHW Fuel		ShwFuel_Oth_Pct	% SHW input	Percent of SHW input capacity that uses another fuel (propane, fuel oil, etc)	Numeric
456	Refrigeration	Compressors		Comp_Tmp_Low_Pct	% Compresso	% of refrigeration compressors that serve low temp refrigeration	Numeric
457	Refrigeration	Compressors		Comp_Tmp_Med_Pct	% Compresso	% of refrigeration compressors that serve medium temp refrigeration	Numeric
458	Refrigeration	Compressors		Comp_Tmp_High_Pct	% Compresso	% of refrigeration compressors that serve high temp refrigeration	Numeric
459	Refrigeration	Compressors		Comp_Vsd	None	Primary refrigeration compressor: Unloaders/VSDs?	Character

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
460	Refrigeration	Compressors		Has_Comp_Fhpc	True/False	Primary refrigeration compressor: Floating Head Pressure Control?	True/False
461	Refrigeration	Compressors		Comp_Hrt	None	Primary refrigeration compressor: Heat Recovery?	Character
462	Refrigeration	Condensers		Cond_Type	None	Primary refrigeration condenser type	Character
463	Refrigeration	Condensers		Cond_Vsd	True/False	Primary refrigeration condenser: Condenser Fan VSD?	True/False
464	Refrigeration	Condensers		Cond_Motor_Type	None	Primary refrigeration condenser: Condenser Fan Motor Type	Character
465	Refrigeration	Display Cases		Has_Display_Case	True/False	Presence of Refrigerated Display Cases?	True/False
466	Refrigeration	Display Cases		Display_Case_LF	Linear Feet	Total Linear Feet of Refrigerated Display Cases	Numeric
467	Refrigeration	Display Cases		Display_Case_With_Door_Pct	% Display Cas	% Refrigerated Display Cases with Doors?	Numeric
468	Refrigeration	Display Cases		Display_Case_Light_Type	None	Refrigerated Display Case Primary Light Type	Character
469	Refrigeration	Walk-Ins		Has_Walk_In	True/False	Presence of Refrigerated Walk-Ins/Storage Boxes?	True/False
470	Refrigeration	Walk-Ins		Walk_In_Area	Square Feet	Total Square Feet of Refrigerated Walk-Ins/Storage Boxes	Numeric
471	Refrigeration	Walk-Ins		Walk_In_Light_Type	None	Refrigerated Walk-Ins/Storage Boxes Primary Light Type	Character
472	Refrigeration	Reach-Ins		Has_Reach_In	True/False	Presence of Refrigerated Reach-In Cases?	True/False
473	Refrigeration	Reach-Ins		Reach_In_Area	Square Feet	Total Square Feet of Refrigerated Reach-In Cases	Numeric
474	Refrigeration	Reach-Ins		Reach_In_With_Door_Pct	% Reach In	% of Refrigerated Reach-In Cases with Doors?	Numeric
475	Refrigeration	Reach-Ins		Reach_In_Light_Type	None	Refrigerated Reach-In Cases Primary Light Type	Character
476	Refrigeration	Plug Load Refrigeration		Has_Ref_Vending	True/False	# Refrigerated Vending Machines	True/False
477	Refrigeration	Plug Load Refrigeration		Has_NonRef_Vending	True/False	# Non-Refrigerated Vending Machines	True/False
478	Refrigeration	Plug Load Refrigeration		Has_Beverage_Merch	True/False	# Beverage Merchandizers	True/False
479	Refrigeration	Plug Load Refrigeration		Has_Ice_Machine	True/False	# Ice Machines	True/False
480	Refrigeration	Plug Load Refrigeration		Has_Comm_Ref_Full	True/False	# Commercial Refrigerators (Full Height)	True/False
481	Refrigeration	Plug Load Refrigeration		Has_Comm_Ref_Half	True/False	# Commercial Refrigerators (Half Height)	True/False
482	Refrigeration	Plug Load Refrigeration		Has_Comm_Freezer	True/False	# Commercial Freezers	True/False
483	Misc	Kitchen		Has_Kitchen_SnackBar	True/False	Presence of Snack Bar Kitchen?	True/False
484	Misc	Kitchen		Has_Kitchen_FastFood	True/False	Presence of Fast Food Kitchen?	True/False
485	Misc	Kitchen		Has_Kitchen_Cafe_Rest	True/False	Presence of Cafeteria/Restaurant Kitchen?	True/False
486	Misc	Kitchen		Has_Kitchen_Large_Comm	True/False	Presence of Large/Commercial Kitchen?	True/False
487	Misc	Kitchen		Has_Kitchen_Small	True/False	Presence of Small Kitchen?	True/False
488	Misc	Kitchen		Has_Kitchen_Other	True/False	Presence of Other Kitchen?	True/False
489	Misc	Kitchen		Kitchen_Area	Square Feet	Total Kitchen Area	Numeric
490	Misc	Kitchen		Kitchen_Steamers_Fuel	None	Kitchen: Steamers Fuel	Coded Character
491	Misc	Kitchen		Kitchen_Hot_Food_Cabinet_Fuel	None	Kitchen: Hot Food Holding Cabinet Fuel	Coded Character
492	Misc	Kitchen		Kitchen_Boiler_Fryer_Fuel	None	Kitchen: Broilers/Fryers Fuel	Coded Character
493	Misc	Kitchen		Kitchen_Griddle_Grill_Fuel	None	Kitchen: Griddle/Grill Fuel	Coded Character
494	Misc	Kitchen		Kitchen_Combo_Oven_Fuel	None	Kitchen: Combination Oven Fuel	Coded Character
495	Misc	Kitchen		Kitchen_Oven_Fuel	None	Kitchen: Standard Oven Fuel	Coded Character
496	Misc	Kitchen		Kitchen_Range_Fuel	None	Kitchen: Range Fuel	Coded Character
497	Misc	Grocery		Has_Groc_Meat_Dept	True/False	Presence of Food Prep - Meat Dept?	True/False
498	Misc	Grocery		Has_Groc_Bakery	True/False	Presence of Food Prep - Bakery?	True/False
499	Misc	Grocery		Has_Groc_Deli	True/False	Presence of Food Prep - Deli?	True/False
500	Misc	Laundry		Has_Laundry_Facility	True/False	Laundry Facility Present?	True/False
501	Misc	Laundry		Laundry_Type	None	Laundry Facility Type	Character
502	Misc	Laundry		Laundry_Onsite_Pct	% Laundry	% Laundry Done On-site	Numeric
503	Misc	Laundry		Laundry_Electic_Dryer_Qty	Count	Laundry: # Electric Dryers	Numeric
504	Misc	Laundry		Laundry_Gas_Dryer_Qty	Count	Laundry: # Gas Dryers	Numeric
505	Misc	Lodging		Lodging_Guest_Room_Qty	Count	Lodging: # Guest Rooms	Numeric
506	Misc	Lodging		Lodging_Avg_Room_Occupancy	%	Lodging: Guest Room Average Occupancy	Numeric
507	Misc	Lodging		Lodging_Room_In_Unit_cooking_F	% Guest Roo	Lodging: Guest Rooms with In-Unit Cooking	Numeric
508	Misc	Laboratory		Has_Lab	True/False	Laboratory Present?	True/False
509	Misc	Laboratory		Lab_Fume_Hoods_Qty	Count	Laboratory: # of Fume Hoods	Numeric
510	Misc	Laboratory		Has_Lab_Specialized_Equip	True/False	Laboratory: Specialized Lab Equipment Present?	True/False

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
511	Misc	Medical		Med_Surgery_Rooms_Qty	Count	Medical: # of Surgery Rooms	Numeric
512	Misc	Medical		Med_Beds_Qty	Count	Medical: # of Beds	Numeric
513	Misc	Medical		Med_High_Energy_Machines_Qty	Count	Medical: # of High Energy Machines	Numeric
514	Misc	Pool/Hot Tub		Has_Pool_Ind	True/False	Indoor Pool Present?	True/False
515	Misc	Pool/Hot Tub		Has_Pool_Out	True/False	Outdoor Pool Present?	True/False
516	Misc	Pool/Hot Tub		Pool_Fuel	None	Pool Fuel	Character
517	Misc	Pool/Hot Tub		Has_HotTub_Ind	True/False	Indoor Hot Tub Present?	True/False
518	Misc	Pool/Hot Tub		Has_HotTub_Out	True/False	Outdoor Hot Tub Present?	True/False
519	Misc	Pool/Hot Tub		HotTub_Fuel	None	Hot Tub Fuel	Character
520	Misc	Misc		Cash_Register_Qty	Count	Total # Cash Registers	Numeric
521	Misc	Misc		Desktop_PC_Qty	Count	Total # Desktop PCs	Numeric
522	Misc	Misc		Laptop_PC_Qty	Count	Total # Laptop PCs	Numeric
523	Misc	Misc		Additional_Monitor_Qty	Count	Total # Additional Monitors	Numeric
524	Misc	Misc		Printer_Copier_Qty	Count	Total # Printers/Copiers	Numeric
525	Misc	Misc		Tv_Qty	Count	Total # TVs	Numeric
526	Misc	Misc		Vehicle_Charge_Station_Qty	Count	Vehicle Charging Stations	Numeric
527	Misc	Misc		Forklift_Charger_Qty	Count	Forklift Charging Stations	Numeric
528	Misc	Misc		Floor_Polisher_Charger_Qty	Count	Floor Polisher Charging Stations	Numeric
529	Misc	Misc		Air_Compressor_HP	Count	Air Compressor HP	Numeric
530	Billing	Electric		Electric_EUI_Billed	kWh/SF	Actual billed electric energy use intensity (kWh/SF)	Numeric
531	Billing	Electric		Electric_EUI_Normalized	kWh/SF	Weather-normalized electric energy use intensity (kWh/SF)	Numeric
532	Billing	Electric		Electric_EUI_Type	None	Electric EUI type (actual vs modeled)	Character
533	Billing	Electric		kWh_Annual_Billed	kWh	Actual billed annual kWh consumption	Numeric
534	Billing	Electric		kWh_Annual_Normalized	kWh	Weather-normalized annual kWh consumption	Numeric
535	Billing	Electric		kwh_Billed_Jan	kWh	Actual Billed Jan kWh	Numeric
536	Billing	Electric		kwh_Billed_Feb	kWh	Actual Billed Feb kWh	Numeric
537	Billing	Electric		kwh_Billed_Mar	kWh	Actual Billed Mar kWh	Numeric
538	Billing	Electric		kwh_Billed_Apr	kWh	Actual Billed Apr kWh	Numeric
539	Billing	Electric		kwh_Billed_May	kWh	Actual Billed May kWh	Numeric
540	Billing	Electric		kwh_Billed_Jun	kWh	Actual Billed Jun kWh	Numeric
541	Billing	Electric		kwh_Billed_Jul	kWh	Actual Billed Jul kWh	Numeric
542	Billing	Electric		kwh_Billed_Aug	kWh	Actual Billed Aug kWh	Numeric
543	Billing	Electric		kwh_Billed_Sep	kWh	Actual Billed Sep kWh	Numeric
544	Billing	Electric		kwh_Billed_Oct	kWh	Actual Billed Oct kWh	Numeric
545	Billing	Electric		kwh_Billed_Nov	kWh	Actual Billed Nov kWh	Numeric
546	Billing	Electric		kwh_Billed_Dec	kWh	Actual Billed Dec kWh	Numeric
547	Billing	Electric		kwh_Normalized_Jan	kWh	Weather-Normalized Jan kWh	Numeric
548	Billing	Electric		kwh_Normalized_Feb	kWh	Weather-Normalized Feb kWh	Numeric
549	Billing	Electric		kwh_Normalized_Mar	kWh	Weather-Normalized Mar kWh	Numeric
550	Billing	Electric		kwh_Normalized_Apr	kWh	Weather-Normalized Apr kWh	Numeric
551	Billing	Electric		kwh_Normalized_May	kWh	Weather-Normalized May kWh	Numeric
552	Billing	Electric		kwh_Normalized_Jun	kWh	Weather-Normalized Jun kWh	Numeric
553	Billing	Electric		kwh_Normalized_Jul	kWh	Weather-Normalized Jul kWh	Numeric
554	Billing	Electric		kwh_Normalized_Aug	kWh	Weather-Normalized Aug kWh	Numeric
555	Billing	Electric		kwh_Normalized_Sep	kWh	Weather-Normalized Sep kWh	Numeric
556	Billing	Electric		kwh_Normalized_Oct	kWh	Weather-Normalized Oct kWh	Numeric
557	Billing	Electric		kwh_Normalized_Nov	kWh	Weather-Normalized Nov kWh	Numeric
558	Billing	Electric		kwh_Normalized_Dec	kWh	Weather-Normalized Dec kWh	Numeric
559	Billing	Natural Gas		Gas_EUI_Billed	Therms/SF	Actual billed natural gas energy use intensity (therms/SF)	Numeric
560	Billing	Natural Gas		Gas_EUI_Normalized	Therms/SF	Weather-normalized natural gas energy use intensity (therms/SF)	Numeric
561	Billing	Natural Gas		Gas_EUI_Type	None	Natural Gas EUI type (actual vs modeled)	Character

Index	Category	Subcategory1	Subcategory2	Variable	Unit	Description	Data Type
562	Billing	Natural Gas		Therms_Annual_Billed	Therms	Actual billed annual therm consumption	Numeric
563	Billing	Natural Gas		Therms_Annual_Normalized	Therms	Weather-normalized annual therm consumption	Numeric
564	Billing	Natural Gas		Therms_Billed_Jan	Therms	Actual Billed Jan Therms	Numeric
565	Billing	Natural Gas		Therms_Billed_Feb	Therms	Actual Billed Feb Therms	Numeric
566	Billing	Natural Gas		Therms_Billed_Mar	Therms	Actual Billed Mar Therms	Numeric
567	Billing	Natural Gas		Therms_Billed_Apr	Therms	Actual Billed Apr Therms	Numeric
568	Billing	Natural Gas		Therms_Billed_May	Therms	Actual Billed May Therms	Numeric
569	Billing	Natural Gas		Therms_Billed_Jun	Therms	Actual Billed Jun Therms	Numeric
570	Billing	Natural Gas		Therms_Billed_Jul	Therms	Actual Billed Jul Therms	Numeric
571	Billing	Natural Gas		Therms_Billed_Aug	Therms	Actual Billed Aug Therms	Numeric
572	Billing	Natural Gas		Therms_Billed_Sep	Therms	Actual Billed Sep Therms	Numeric
573	Billing	Natural Gas		Therms_Billed_Oct	Therms	Actual Billed Oct Therms	Numeric
574	Billing	Natural Gas		Therms_Billed_Nov	Therms	Actual Billed Nov Therms	Numeric
575	Billing	Natural Gas		Therms_Billed_Dec	Therms	Actual Billed Dec Therms	Numeric
576	Billing	Natural Gas		Therms_Normalized_Jan	Therms	Weather-Normalized Jan Therms	Numeric
577	Billing	Natural Gas		Therms_Normalized_Feb	Therms	Weather-Normalized Feb Therms	Numeric
578	Billing	Natural Gas		Therms_Normalized_Mar	Therms	Weather-Normalized Mar Therms	Numeric
579	Billing	Natural Gas		Therms_Normalized_Apr	Therms	Weather-Normalized Apr Therms	Numeric
580	Billing	Natural Gas		Therms_Normalized_May	Therms	Weather-Normalized May Therms	Numeric
581	Billing	Natural Gas		Therms_Normalized_Jun	Therms	Weather-Normalized Jun Therms	Numeric
582	Billing	Natural Gas		Therms_Normalized_Jul	Therms	Weather-Normalized Jul Therms	Numeric
583	Billing	Natural Gas		Therms_Normalized_Aug	Therms	Weather-Normalized Aug Therms	Numeric
584	Billing	Natural Gas		Therms_Normalized_Sep	Therms	Weather-Normalized Sep Therms	Numeric
585	Billing	Natural Gas		Therms_Normalized_Oct	Therms	Weather-Normalized Oct Therms	Numeric
586	Billing	Natural Gas		Therms_Normalized_Nov	Therms	Weather-Normalized Nov Therms	Numeric
587	Billing	Natural Gas		Therms_Normalized_Dec	Therms	Weather-Normalized Dec Therms	Numeric

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX J
CBSA Invitation Letter

Prepared for:
Northwest Energy Efficiency Alliance

Navigant Consulting, Inc.
1375 Walnut Street
Suite 200
Boulder, CO 80302

303.728.2500
www.navigant.com

December 5, 2015

April, 2014

Greetings,

The Northwest Energy Efficiency Alliance (NEEA), a non-profit organization, is writing to invite you to participate in the 2013-2014 Commercial Building Stock Assessment (CBSA) study. If your business qualifies, agrees to participate and an assessment is completed, we will provide a $200 Visa gift card as a token of our appreciation. The CBSA is an important regional study commissioned by NEEA with support from the 100+ utilities in the Northwest. This study was also conducted in 1995, 2003, 2007 and 2008. More than a thousand utility customers have participated and the findings were very helpful in designing energy efficiency programs and rebates. We expect this year's findings to be just as valuable when used by the Northwest Power and Conservation Council to prepare its 7th Power Plan.

NEEA has hired Navigant and Portland Energy Conservation Inc. (PECI) to manage the data collection for this study. If you agree to help us, a Building Surveyor will visit your building at a time that is convenient for you. A typical visit takes between two and four hours but it is not necessary for you to accompany our surveyor during his or her walkthrough. Please be assured that he or she will carry proper ID at all times and will be respectful of your property, tenants and patrons, and gladly answer any questions that you may have.

During the visit, the Building Surveyor will gather building characteristics data on the building's lighting, heating, ventilation and air-conditioning system, construction and renovation history and other energy-using appliances. The Building Surveyor will also ask a few questions about the building's occupancy and operation schedule. Your building has been randomly selected to be part of this study. All data gathered will be kept confidential and only aggregated results will be presented. You can view the report of our 2008 study at **www.neea.org**.

Your assistance is critical. As mentioned, this year's findings will inform our region's power and energy resources planning effort, including the types of rebate programs utilities will offer to help customers save energy. It will also help strengthen our region's innovation in energy efficiency and conservation efforts. Our representative will call to follow up on this letter soon. During that call, we will ask a few short qualifying questions to determine if the study is suitable for your business location. We hope you decide to help us with this important study and take a few minutes to answer those qualifying questions. In the meantime, we strongly encourage you to call **(877) 932-0617** to get this process started.

Thank you in advance,

Anu Teja
Market Research and Evaluation
Project Manager
(503) 688-5421

Northwest Energy Efficiency Alliance
421 SW Sixth Avenue, Suite 600, Portland, OR 97204
503.688.5400 | Fax 503.688.5447
neea.org | info@neea.org

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX K
CBSA Participation Agreement & Utility Data Authorization Form

Prepared for:
Northwest Energy Efficiency Alliance

Navigant Consulting, Inc.
1375 Walnut Street
Suite 200
Boulder, CO 80302

303.728.2500
www.navigant.com

December 5, 2015

Commercial Buildings Stock Assessment
Participation Agreement & Utility Data Authorization Form

Please review and complete this form before your scheduled building survey.

I hereby give permission to the servicing utility or utilities listed below, or their agents, to provide the Northwest Energy Efficiency Alliance (NEEA) and its contractors with energy use information related to this business. This information is being collected as part of a research project sponsored by the NEEA to gain a better understanding of energy use characteristics of commercial buildings in the Pacific Northwest and to help update the regional power plan.

I authorize the utilities supplying my fuel and/or electricity to provide monthly usage histories, and interval data, where available, for up to the last 36 months. I understand that this information will remain confidential, and will be used for purposes of statistical analysis only. I further understand that the information related to my business will not be published, and neither NEEA nor its contractors will contact me for advertising or promotional purposes.

A photocopy of this authorization may be accepted with the same authority as the original. Data will be provided for multiple meters at a single premise provided they are on the above noted utilities account(s).

Business Name: _____ Tel: _____

Service Address: _____

City: _____ ST: _____ ZIP: _____

Please provide the names of your utilities. Be sure to circle if the utility is your gas or electric provider.

	Utility Name	Circle one	Meter Number	Account Number
1.		Gas Elec.		
2.		Gas Elec.		
3.		Gas Elec.		

Gift Card #:
(To be filled out by Surveyor) _____

Authorized by: _____ _____
(Please print) Signature

_____ _____
Title Date

Please fill out this form as completely as you can and present it to our Building Surveyor. If you have any questions, please call Sonrisa Cooper at 360-828-4019.

Internal Use Only (do not fill out this section)
Site ID NO.: _____
Bill Release ID: _____
Serves Space(s) (circle): all 1 2 3 4 5 unknown other

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX L
CBSA Site Visit Recruitment Script

Prepared for:
Northwest Energy Efficiency Alliance

Navigant Consulting, Inc.
1375 Walnut Street
Suite 200
Boulder, CO 80302

303.728.2500
www.navigant.com

December 5, 2015

CBSA Site Visit Recruitment Script
May 2, 2013

First cold-call, phone-conversation with candidate:

1. If a building address falls in Montana, be sure to confirm that they are serviced through Northwestern Energy **or** BPA. If not, **[No Audit]**
2. If **[No Audit]**, collect as much information as you can on this recruitment script and then terminate call with Section E.
3. Find the contact information for the facilities or maintenance manager of the building. If none, then ask for the building manager.
4. Make sure to have surveyors' Outlook calendars open
5. Have each building's address on hand.

[In all situations, if the contact person requests a contact at NEEA to ensure that this is a legitimate call, please provide the information below.]

Anu Teja
Senior Project Manager, NEEA
Email address: ateja@neea.com
Phone: 503-688-5421

Script Color Key	
RED	Scripted Questions to Ask
BLUE	Scripted Text to Read
PURPLE	Look Up & Populate Script Field
BLACK	Responses, Direction & Skip Logic

A. Contact Script

A.1. [If contact name is available, and contact answers the phone, continue to B.]

A.2. [If contact name is available, but administrative person answers the phone] ***Hello, my name is _____ and I am calling on behalf of the Northwest Energy Efficiency Alliance regarding a study of commercial building characteristics.*** **May I speak with _____ [individual given as contact person, or ask for the maintenance/facilities manager]?**

- If Yes **[Continue to Section B. below]**
- If contact is not available at the moment **[Continue with A.3 and/or A.4, below]**
- If contact no longer with the company **[Prompt with description of appropriate contact from A.5 below]**

A.3. [If contact person is not available] When is a good time that I might call back to speak with _____ [individual given as contact person]? [Identify time and schedule callback. Indicate you will call then and to please let the contact person know you called.]

A.4. [Leaving a message on a machine] ***Hello. This is _____ calling on behalf of the Northwest Energy Efficiency Alliance to invite your business at _____ to participate in a study that pays $200 to qualified businesses. There are a few qualifying questions that I need to ask before I can determine if this study is suitable for your business location. Those qualifying questions will only take few minutes. Please call me back at 877 932 0617. Your study ID is _____.***

A.5. [If contact is no longer with the company] Can you provide me with the contact information of the building manager or anyone else that would be able to discuss this study?

Contact Title: _____
Contact Name: _____
Contact Phone Number: _____
Contact E-Mail Address: _____

Restart recruitment script with new contact information.

B. Recruiting Script

Hello Mr./Ms._____, (facilities or maintenance manager) my name is _____ and I am calling on behalf of the Northwest Energy Efficiency Alliance. Our nonprofit organization is conducting a study of building stock and energy use and have randomly selected your building. This is not a sales call. I would like to request permission to visit your building to collect building information. There are a few qualifying questions that I need to ask before I can determine if this study is suitable for your business location. If your business qualifies, agrees to participate and an assessment is completed, we will provide a $200 Visa gift card to your organization as a token of our appreciation. The incentive can be in the form of a prepaid Visa gift card or we can donate it on your behalf to any organization you designate.

- "Can you tell me more about this study/what you need from me?" **[Continue with B.1. below]**
- "I don't know…" **[Continue with B.2. below]**
- "What are the incentives/what do I get from participating?" **[Continue with B.3. below]**
- "Ok, let's go ahead with the study" **[Continue to Section C.]**

B.1. Study Information

- *The process requires one of our surveyors to visit your building and collect the necessary building information. This information includes lighting, HVAC, building construction characteristics, utility meter information, etc.*
- *All of this information is kept completely anonymous, and our visit is non-invasive—we do not turn anything on/off, open/close anything.*
- *Ideally, someone familiar with the building, like a building engineer, facilities person, or similar indiviual will show our surveyor around and answer questions.*
- *The project is being commissioned by NEEA, and is supported by regional utility companies.*
- *This building stock assessment will enable your utilities to plan for the future, and design more effective energy efficiency programs and rebates that will help consumers save energy and money while helping the region meet future energy needs.*

B.2. Study Significance

- *Your participation is incredibly important for the success of our study. We need to survey as many buildings as possible to get the most complete and accurate results. This building stock assessment will enable your utilities to plan for the future, and design more effective energy efficiency programs and rebates that will help Northwest consumers save energy and money while helping the region meet future energy needs.*

B.3. Participation Benefits

- *Your participation is helping out your entire community and the Northwest region. You will be helping building owners such as yourself save both money and energy through better energy efficiency rebate programs from your utilities. The more accurate and representative building information we can get, the better the region's utilities can help you save money and energy.*

C. Preliminary Questions

RECRUITER

-Great! I just have a few preliminary questions-

1. *I'd like to confirm the address of the building:*_____ **[Interviewer: Recite Address from recruitment list for Respondent]**. **Is this correct?**
   a. Yes
   b. No

   If Yes **[Continue with 2. below]**
   If No **[Contine with 1.A. below]**

1.A. What is the address of your building?

a. _____

1.B. And would you say **that at least 51% of the building** is used for commercial purposes?

If Yes **[Continue with 1.C below]**
If No **[Terminate]**

1.C. Does your business occupy the entire building?

If Yes **[Continue with 1.D below]**
If No **[Continue with 1.E below]**

1.D. What is the building used for? _____ (Building Type)

1.E. What is the **majority** of the building used for? _____ (Building Type)

2. **If the Square Footage field from sample draw has a value [Continue with 2.A. below]**
   If the Square Footage field from sample draw is blank [Continue with 2.B. below]

2.A. Our records indicate that your building is approximately _____ square feet. Is this correct?

a. Yes
b. No
c. I don't know

If Square Feet are <500 **[No Audit]**
If Yes **[Continue with 3 below]**
If No **[Continue with 2.B. below]**
If client does not know **[Continue with 2.B. below]**

2.B. What is the square footage of the building?

a. _____ Square Feet
b. I don't know

If Square Feet are < 500 **[No Audit]**
If Square Feet are > 500 **[Continue with 3 below]**
If client does not know **[Continue with 2.C. below]**

2.C. ***Ok. I'm going to read some ranges to you and we'll assign your building to the correct square footage range (READ RANGES):***

a. ***Less than 500 Square feet***
b. ***500 to 5,000 SF***
c. ***5,001 – 20,000 SF***
d. ***20,001 – 50,000 SF***

e. *50,001 – 100,000 SF*
f. *100,001 or greater SF*
g. *Don't Know*

If "a. Less than 500 Square Feet" [**No Audit]**
Else [**Continue with 3 below]**

3. If the Building Type field from the sample draw has a value [Continue with 3.A. below]
If the Building Type field from sample draw is blank [Continue with 3.B. below]

3.A. *Our records indicate that your building is a _____ building type.* **Is this correct?**

a. Yes
b. No
c. I don't know

If Yes **[Continue with 3.D. below]**
If No **[Continue with 3.B. below]**
If client does not know **[Continue with 3.B. below]**

3.B. Can you describe your building type?

a. (**from this answer, determine if the building uses energy for lighting or heating/cooling.** If building **does not** use energy of lighting for conditioning, go to **No Audit**) _____ **(Primary building type segment from Table 2)**
b. If primary building type segment is **Office**: _____ (# of floors)

If primary building type segment **is not** "Unsampled" **[Continue with 3.D. below]**
If primary building type segment **is** "Unsampled" **[Continue with 3.C. below]**

3.C. Is the building used for commercial purposes?

a. Yes **[Commercial Building Use: _____ (Primary building type segment from Table 1)]**
b. No **[No Audit]**

3.D. _____ (Confirm detailed building type segment code from Table 2)

3.E. Is your establishment part of a larger building or strip mall?

a. If Yes [Continue with 3.F. below]
b. If No [Continue with 4. Below]

3.F. Can you provide contact information for the overall building manager?

a. Yes [_____ (Name & Phone Number or E-Mail)]
c. No [Continue with 3.G. Below]

3.G. Can you provide the names of the major business/businesses of the strip mall? (This one is pending addition)

a. Yes [_____ (Name & Phone Number or E-Mail)]
d. No [Continue with 4. Below]

4. If the Age field from sample draw has a value [Continue with 4.A. below]
If the Age field from sample draw is blank [Continue with 4.B. below]

4.A. Our records indicate that your building was built in _____. Is this correct?

a. Yes
b. *No*

If Yes **[Continue with 5 below]**
If No **[Continue with 4.B. below]**

4.B. When was the building constructed?

a. _____(YEAR)
b. I don't know

If YEAR is given **[Continue with 5 below]**
If client does not know **[Continue with 4.C. below]**

4C. ***Please give me your best estimate of your building's age?***

a. ***2004 to 2013***
b. ***1998 through 2003***
c. ***1988 through 1997***
d. ***1980 through 1987***
e. ***1970 through 1979***
f. ***1960 through 1969***
g. ***Before 1960***

5. Have there been any major renovations in the last decade? ***Major renovation includes but is not limited to the replacement of the HVAC system, the lighting system, the building envelope (outside exterior), and other components of the building that have a major impact on energy usage. Additionally, major renovation is a renovation of any kind with a cost exceeding 25% of the replacement value of the building.***

a. Yes
b. No
c. Don't Know

6. **If Tax Parcel contains multiple Buildings: Can you provide me with an estimate of the number of buildings and building types in your campus or complex?**

Table 1. Additional Buildings in Tax Parcel (#)

	5,000 SF or Less	5,001 – 20,000 SF	20,001 – 50,000 SF	50,001 – 100,000 SF	100,000 SF and Up
Retail					
Grocery					
Office					
Food Service					
Warehouse					
Hospital					
Residential Care					
Hotel-Motel					
School					
University					
Assembly					
Other					

Table 2. Detailed Building Type Segments

Segment	Detailed Building Type		
Assembly	1 ARENA 2 AUDITORIUM 3 BOAT SLIPS, MARINA, YACHT CLUB 4 BOWLING ALLEY 5 CASINO 6 CLUB, LODGES 7 COMMUNITY CENTER	8 CONVENTION CENTER 9 GYM, EXERCISE 10 HEALTH SPA 11 ICE SKATING 12 LIBRARY 13 MUSEUM 14 MOVIE THEATER	15 PERFORMING ARTS THEATER 16 POOL 17 RECREATION CENTER 18 RELIGIOUS ASSEMBLY 19 ROLLER SKATING 20 SENIOR CENTER 21 OTHER ASSEMBLY
Grocery	22 CONVENIENCE STORE (<=5,000SF) 23 GROCERY (> 5000SF)	24 GAS STATION WITH A CONVENIENCE STORE	25 OTHER GROCERY
Retail	26 AUTO PARTS 27 AUTO/BOAT DEALER/ SHOWRM 28 BEAUTY / BARBER 29 BEER, WINE, OR LIQUOR STORE 30 CAR WASH 31 CLOTHING 32 DEPARTMENT STORE 33 DEPT. STORE W/ GROCERY	34 DRY CLEANER 35 ELECRONICS/APPLIANCES 36 FLORIST, NURSERY 37 HARDWARE 38 HOME IMPROVEMENT 39 LAUNDROMAT (SELF-SERVICE) 40 PHARMACY	41 POST OFFICE 42 RENTAL CENTER 43 REPAIR SHOP 44 STUDIO/GALLERY 45 VEHICLE REPAIR 46 WAREHOUSE CLUB 47 OTHER SPECIALTY MERCHANDISE
Hospital	48 HOSPITAL		
Lodging	49 HOTEL 50 MOTEL 51 BED & BREAKFAST 52 BOARDING/ROOMING HOUSE, APT HOTEL	53 CONVENT OR MONASTERY 54 DORMITORY 55 FRATERNITY, OR SORORITY 56 HALFWAY HOUSE	57 HOTEL - RESORT 58 SHELTER, ORPHANAGE, OR CHILDREN'S HOME 59 OTHER LODGING
Residential Care	60 ASSISTED LIVING 61 IN-PATIENT REHAB	62 NURSING HOME 63 RETIREMENT HOME	64 OTHER RESIDENTIAL CARE
Office	65 OFFICE- ADMIN, PROFESSIONAL, GOVERNMENT, FINANCIAL 66 CALL CENTER 67 CITY HALL 68 DENTAL OFFICE	69 MEDICAL CLINIC / OUTPATIENT MEDICAL 70 MEDICAL OFFICE 71 MEDICAL URGENT CARE CLINIC 72 OUTPATIENT REHAB	73 RETAIL BANKING 74 SALES OFFICE 75 VETERINARIAN OFFICE/CLINIC 76 OTHER OFFICE
Restaurant	77 BAR, PUB, LOUNGE 78 CAFETERIA 79 CATERING SERVICE 80 COFFEE, DOUGHNUT, OR BAGEL SHOP	81 FAST FOOD RESTAURANT 82 ICE CREAM OR FROZEN YOGURT SHOP 83 SIT DOWN RESTAURANT	84 TAKE-OUT RESTAURANT 85 TRUCK STOP 86 OTHER RESTAURANT
School K-12	87 ELEMENTARY SCHOOL 88 MIDDLE SCHOOL	89 HIGH SCHOOL 90 PRE-SCHOOL	91 OTHER K-12 SCHOOL
University	92 UNIVERSITY / COLLEGE	Vocational, career, and adult education classified in Other unless part of university or college	
Warehouse	93 MINISTORAGE 94 WAREHOUSE, DISTRIBUTION	95 WAREHOUSE, STORAGE 96 COLD STORAGE, NON-AMMONIA BASE REFG	97 OTHER WAREHOUSE
Other	98 ADULT/CAREER EDUCATION 99 AIRPLANE HANGER 100 ASYLUM 101 COURTHOUSE 102 CREMATORIUM	103 DATA CENTER OR SERVER FARM 104 FIRE STATION 105 JAIL 106 POLICE STATION	107 POLICE & FIRE 108 PRISON 109 TELEPHONE SWITCHING 110 VOCATIONAL TRAINING 111 OTHER
Unsampled	200 AGRICULTURE 300 INDUSTRIAL	301 COLD STORAGE, AMMONIA 400 MANUFACTURING	500 RESIDENTIAL

D. Site Visit Scheduling

- *Let's schedule an appointment while I have you on the phone.* **[check surveyor's Outlook calendar]**
- *Based on the information we've confirmed, the site visit will take approximately _____ [See Table 3, below] hours.*
- *Are you or another appropriate representative who is familiar with the building construction, systems, and history be available on _____* **(date - MM/DD)** *at _____* **(time - HH:MM)***?*
- *What is your email address and the best phone # to reach you?*
- *What is the name of the person meeting with our surveyor, and where should I tell the surveyor to meet him/her/you?*
- *I will email you a calendar invite for this appointment. This email will contain important information about how to prepare for the survey. I recommend reading through the "What to Expect" document prior to our visit.*
- *The surveyor who will be visiting will get in touch with you to verify a few items to prepare for the visit. It will only take a few minutes, but it is very important that you speak with him or her, OK? And I hope you understand that the $200 thank-you incentive can only be handed over if the answers to the qualifying questions are accurate and that the appointment is kept. OK? And is it OK with that the surveyor provides the $200 incentive in the form of a prepaid Visa gift card?*

Yes

No – To whom should the check be written?

Name:

Mail to (Full address)

Table 3. Estimated Site Survey Times

Building Size	Complex Audit	Simple Audit
20,000 SF or less	4 Hours	2 Hours
20,000 – 100,000 SF	6 Hours	4 Hours
100,000 SF and up	8 Hours	5 Hours

- *Thank you very much. Would it be alright for NEEA and/or its affiliates to contact you in the future regarding other research initiatives and opportunities?*
  - Yes
  - No

- *Have a great day.*

E. <u>No Audit</u>

- *Thank you for your time; your building does not coincide with the building characteristics sampled for this study. However, the information you have provided is valuable and will be used to weight the final study results.*
- *Would it be alright for NEEA and/or its affiiliates to contact you in the future regarding other research initiatives and opportunities?*
    - Yes
    - No
- *Thank you very much and have a great day.*

Commercial Building Stock Assessment (CBSA)
Frequently Asked Questions (FAQ)

<u>Who</u>

Q: Who is NEEA?

A: The Northwest Energy Efficiency Alliance is a non-profit organization that uses the market power of the region to accelerate the innovation and adoption of energy-efficient products, services and practices. NEEA is supported by, and works in collaboration with, the Bonneville Power Administration, Energy Trust of Oregon and over 100 Northwest utilities on behalf of more than 12 million energy consumers.

NEEA, with the support of local utility companies, is conducting this comprehensive assessment of energy efficiency in the Northwest's commercial buildings. This study will help Energy Trust of Oregon and Bonneville Power Administration to help consumers save energy in the form of energy efficiency utility programs and rebates.

Q: Who is Navigant?

A: Navigant is a consulting company contracted by NEEA to plan and perform this Commercial Building Stock Assessment project.

Q: Who is PECI?
A: PECI is a nonprofit corporation based in Portland, Oregon, specializing in the design and management of demand side solutions for utilities, government and private sector clients. Both Navigant and PECI will be handling data collection for this project, providing in-building surveyors and engineers to perform site visits.

Q: Who will have access to this study?
A: The collected information will be publicly available in database form. Information about buildings will be anonymous so that your building will not be able to be individually identified in the database. A report summarizing this data will also be available and we will be happy to send you a link when the report and the database are published. We expect them to be available in mid-2014.

Q: Who is my main point of contact?
A: For general information:

- NEEA Senior Project Manager: Anu Teja, (503) 688-5421
- Navigant Contact: Mike Yim, (925) 930-2707
- PECI Contact: Kristine Falletta, (503) 575-4163

<u>What</u>
Q: What are the benefits of participating/why should I participate?
A: With the inclusion of your building in our Commercial Building Stock Assessment project, your utility and energy efficiency professionals will be able to more accurately and thoroughly study, analyze, and represent the unique energy efficiency needs in your region. We are collecting information to aid in the design of energy efficiency rebate programs to address increasing commercial energy needs through conservation of energy rather than increased generation; energy consumers will have better targeted rebate programs.

Overall, you are helping your whole region position itself to become more energy efficient by participating in this important research effort. We have previously performed a Commercial Building Stock Assessment, released in 2009, and by participating in this study, we will be able to report on successes and the performance of previously implemented energy efficiency programs.

Buildings consume 72% of the nation's total electricity, and the Energy Information Administration estimates that 40% of current greenhouse gases released nationwide are due to building energy consumption.[1]

Through uniquely designed energy efficiency rebate programs, we will help the Northwest meet increasing commercial energy needs through conservation rather than new generation. Energy efficiency is the lowest-cost energy source for consumers and utilities; the cheapest

[1] SOURCE: Energy Information Administration Annual Energy Review

power is the power you do not need to buy. The results from this study will be used for research and policy making, all towards better energy efficiency measures in the region.

More information can be found online:
NEEA website: http://neea.org/resource-center/regional-data-resources/commercial-building-stock-assessment

Q: What do we need from you (the building manager)?
A: Your support and time in helping us gather information about your building.

Q: What exactly will the CBSA surveyors do to collect data in my building?
A: The information that we are gathering in this study will be characteristics in your building such as lighting systems, HVAC, construction characteristics, etc. Our data gathering efforts will be non-invasive; we will not manipulate how any system is running, and we will not be interfering with any electrical connections.

When
Q: When will you be performing the site visit?
A: Dependent on building availability.

Why
Q: Why are you performing the Commercial Building Stock Assessment?
A: The results of this study will inform the Northwest Power and Conservation Council's 7th Power Plan as well as local utilities in identifying energy efficiency opportunities unique to your region. The information collected on commercial buildings in the Northwest region will help determine the best energy efficiency programs and rebates, helping consumers save energy and money.

Motivation behind NEEA pursing the CBSA: Buildings consume 72% of the nation's total electricity, and the Energy Information Administration estimates that 40% of current greenhouse gases released nationwide are due to building energy consumption.[2] The region's utilities, Energy Trust of Oregon, the Bonneville Power Administration, the Northwest Power and Conservation Council and NEEA will use the study results to design energy efficiency rebate programs to help the Northwest meet increasing commercial energy needs through conservation rather than new generation. Energy efficiency is the lowest-cost energy source for consumers and utilities—the cheapest power is the power you do not need to buy.

More information can be found online:
NEEA website: http://neea.org/resource-center/regional-data-resources/commercial-building-stock-assessment

[2] SOURCE: Energy Information Administration Annual Energy Review

How:

Q: How long is the site visit?

A: Site visits will typically last between 2 to 8 hours, depending on building size and system complexity.

Q: How are you protecting customer privacy?

A: Any information with identifying characteristics is maintained and kept confidential by the data collection team. Data with identifying characteristics will never be emailed and will be maintained using industry best practices. The final database will be completely anonymous- no address, names, contact information, business information, etc.

Q: How can I stay updated on the study as it progresses?

A: Visit NEEA's website: http://neea.org/resource-center/regional-data-resources/commercial-building-stock-assessment

Q: Will my company/building name be used in the study?

A: No, the company/building name is kept anonymous. We are only interested in studying your building's features, and assessing this in the context of the Northwest region.

Q: Will the information gathered from the site visit be available to me?

A: You will have access to our final database, but it will be anonymous. We will not be able to provide the exact data collected on your building.

Q: Can we review the onsite data protocol (the data collection instrument)?

A: Available upon request.

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX M
CBSA Site Visit Preparation Checklist

Prepared for:
Northwest Energy Efficiency Alliance

Navigant Consulting, Inc.
1375 Walnut Street
Suite 200
Boulder, CO 80302

303.728.2500
www.navigant.com

December 5, 2015

CBSA Site Visit Preparation Checklist

While it is not required, having the following available & ready will expedite the study while we're at your site.

IT WOULD BE HELPFUL TO HAVE SOMEONE - TYPICALLY A FACILITIES OR MAINTENANCE MANAGER - AVAILABLE FOR AT LEAST PART OF THE VISIT TO ANSWER QUESTIONS ON THESE TOPICS:

- ☐ BUILDING & SPACE SQUARE FOOTAGE
- ☐ BUILDING CONSTRUCTION & RENOVATION HISTORY
- ☐ LOCATION OF UTILITY METERS
- ☐ BUILDING OCCUPANCY AND SCHEDULE
- ☐ HEATING/AIR CONDITIONING/ VENTILATION SYSTEM & CONTROL

TO HAVE AVAILABLE:

- ☐ KEYS TO SERVER ROOM/ELECTRICAL ROOM/MECHANICAL ROOM ETC.
- ☐ LADDER – IF NECESSARY
- ☐ A WORKSPACE FOR SURVEYORS TO GO OVER PLANS

PAPERWORK (COPIES OF AT LEAST ONE OF PLANS, OR MORE AS APPLIES):

- ☐ AS-BUILT CONSTRUCTION DRAWINGS
- ☐ ELECTRICAL PLANS
- ☐ MECHANICAL PLANS
- ☐ IF NONE OF THE ABOVE ARE AVAILABLE, FIRE EVACULATION DRAWINGS WOULD BE HELPFUL

Thank you; we greatly appreciate your time and help in collecting your building's data for our research study!

Outline of On-site Visit

Interview: Gather information about building use, operation and history.

1. **General Building Information**
   - Building Complex Information
   - Building Occupancy
   - Renovation History
   - Site Orientation: Space Uses & sq. ft of each space
   - Building & Occupancy Schedule

Access to As-Built Drawings or Fire Evacuation Drawings would be helpful.

2. **Energy Sources**
   - Electric & Gas Meter #s & Associated Spaces

Access to Utility Bills would be helpful.

Walk Through: Gather information visually from building and the nameplates on energy using equipment**.**

3. **Building Envelope**
   - Walls / Windows
   - Roofs / Skylights
   - Floors

4. **HVAC Equipment*^**
   - Type of Air Distribution System & Space Served
   - Heating Equipment Type & Size
   - Cooling Equipment Type & Size
   - HVAC Control Method

5. **Domestic Water Heating***
   - Type / Capacity / Control

9. **Indoor Lighting per Space Served^**
   - Fixture Type & #
   - # of Lamps per Fixture & Wattage
   - Lighting Control Method

May conduct on a sample of spaces rather than entire building based on surveyor's discretion.

10. **Outdoor Lighting^**
    - Fixture Type & #
    - # of Lamps per Fixture & Wattage
    - Lighting Control Method

11. **Miscellaneous Equipment by Space Use**
    - Office - # of PCs, printers, TVs, occupants
    - Kitchen - # and fuel type of various equipment
    - Refrigeration – # of vending, ice machines, refrigerators & freezers
    - Etc…

12. **Refrigeration Equipment*** *(if applicable)*
    - Compressor & Condenser Type, HP & Control

13. **Data Centers***
    - Type, # Racks, Total Electrical Load
    - Cooling System Type & Capacity

**We will need access to the spaces where this equipment resides.*
^Access to As-Built Drawings & relevant building control systems would be helpful.

Wrap-Up *(If Applicable)*: Discuss control method of equipment or other information that couldn't be gathered visually during the walk through. Discuss future follow-up and provide leave behind materials.

NAVIGANT

2014 Northwest Commercial Building Stock Assessment

APPENDIX N
CBSA Thank You Letter

Prepared for:
Northwest Energy Efficiency Alliance

Navigant Consulting, Inc.
1375 Walnut Street
Suite 200
Boulder, CO 80302

303.728.2500
www.navigant.com

December 5, 2015

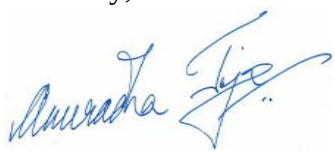
Dear Valued Participant,

Thank you for participating in the Northwest Energy Efficiency Alliance's regional energy efficiency research study. By participating in the Commercial Building Stock Assessment, you have helped your whole region position itself to become more energy efficient, helping utilities to identify energy efficiency programs and rebates. The results of the study will be used for research and policy making, helping consumers save energy and money.

As previously stated, no information on individual buildings will be made public. Final reports and data will be posted on our website in June of 2014. We are funded by regional electric utilities, the Energy Trust of Oregon and the Bonneville Power Administration. See www.nwalliance.org for more information about our organization.

If you have additional questions, please visit our website:
http://neea.org/resource-center/regional-data-resources/commercial-building-stock-assessment

Sincerely,



Anu Teja

Market Research and Evaluation
Project Manager

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