

Provenance of Spatial Data

Award of Work #1801
NONRESIDENTIAL BUILDING SCIENCE TECHNICAL SUPPORT
Prime Contract #400-12-003
CALIFORNIA ENERGY COMMISSION
California AB 802 Support

Prepared by

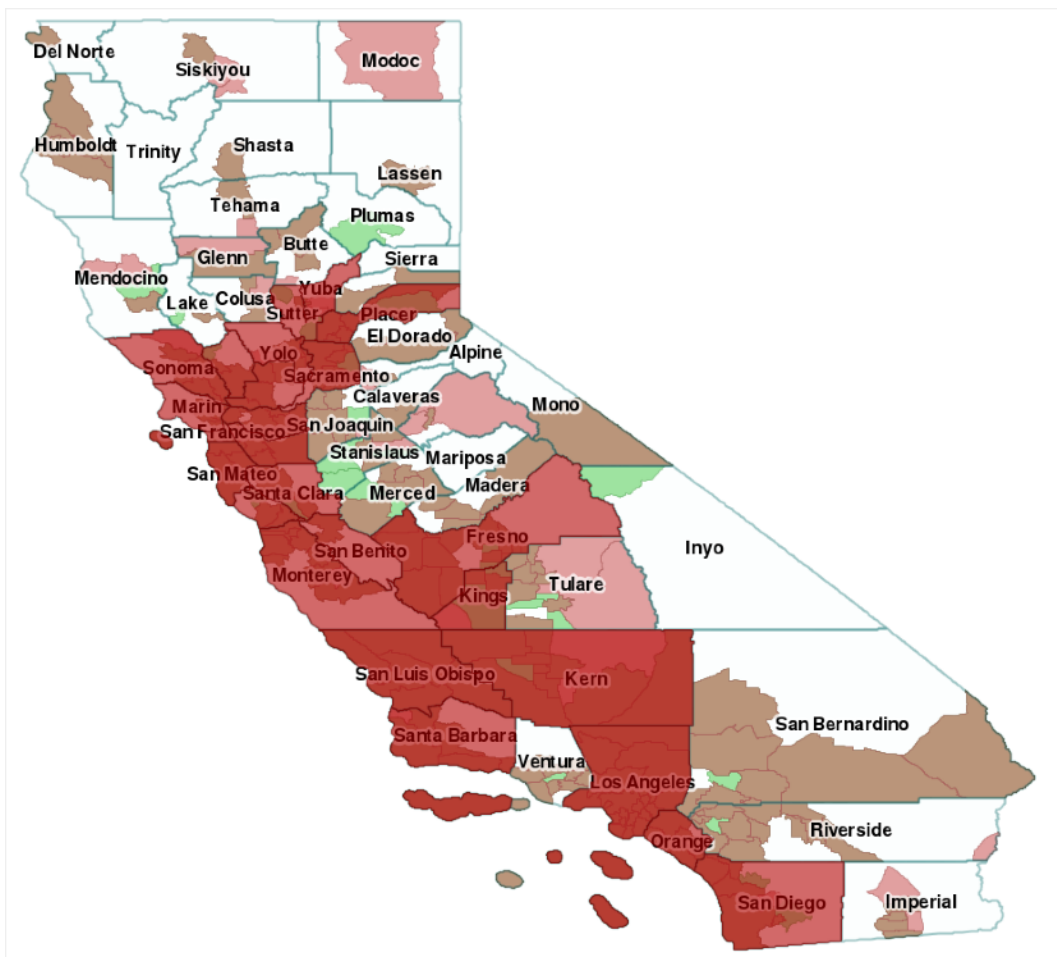
LIGHT42



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2. Problem Statement

California's Assembly Bill 802, the Building Energy Use Benchmarking and Public Disclosure Program, mandates the establishment of a new statewide building energy use benchmarking and public disclosure system. Specifically, it requires utilities to provide energy consumption data for covered buildings to the owners and operators of such buildings upon request, and requires the Energy Commission to establish a building energy use benchmarking and public disclosure program for such buildings, defined as all nonresidential buildings and multifamily buildings with 5 or more active utility accounts. Public disclosure of the benchmarking of energy use data is required for certain covered buildings greater than 50,000 square feet. As a part of such a program, building square footage data must be collected.

This contract covers the collection of spatial data describing building square footage data ("building footprint locations") for such covered buildings, for the purpose of linking to energy consumption data for those buildings. Since this data is collected from existing spatial data sources, the provenance of the data must be documented, to ensure that there are no encumbrances placed on the further publishing of the product as open data, and so the data can be regularly updated.

3. Solution Statement

Spatial data describing building footprint locations is produced and/or distributed by a variety of organizations, including:

- Cities
- Counties
- Regional governments
- Non-Governmental Organizations (NGOs)

A comprehensive survey was conducted of all counties in the State of California, as well as of the major Metropolitan Planning Organizations (MPOs). From this survey, other sources of data were identified, including some instances where counties did not themselves have building footprint data, but certain cities within those counties did. In other instances, the cities and counties were not the authoritative source, but the MPO had undertaken an independent effort to collect and/or produce building footprint data.

In at least one instance, there is an available, authoritative governmental data source, but the data is also available from OpenStreetMap (a NGO), which represents a volunteer-driven effort to clean up, add value to, and produce data that is freely available under an Open Data license.



Each organization contacted must be documented as the source for each individual dataset, so that update routines can be established and followed to regularly pull new copies of the data so that it may remain current.

Accordingly, Appendix A lists all building footprint data sources used by this project.

Appendix B lists all California counties that were surveyed to collect the data described in Appendix A, but for which no data was available, and the reason for this lack of availability.

Appendix A – Provenance of Data Collected

Table 1. Building Footprint Data

| Descriptive Name: | Los Angeles County Buildings |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alias | Status |
| la_buildings | Complete for all buildings over 64 sq ft in LA City, 400 sq ft in balance of county. Years may vary. |
| Source | <p>LARIAC produced the original, authoritative dataset. Original data is in California State Plane Coordinate System (NAD1983, Zone V) Open Street Map then performed an iterative step, beginning by re-projecting all data to Geographic WGS-84 (EPSG:4326). Then, assessor's building use attributes were merged to building polygon based on the the AIN attribute. Building and address data were divided into smaller chunks based on census blocks, and building attributes were converted to OSM tags. See:</p> <p>LARIAC: http://egis3.lacounty.gov/dataportal/lariac/lariac-products-and-samples/</p> <p>OSM Import: http://wiki.openstreetmap.org/wiki/Los_Angeles_California_Buildings_Import</p> |
| Description | The Los Angeles Region Imagery Acquisition Consortium (LARIAC) Program is a collaborative acquisition program for digital aerial imagery data which has included the participation of 10 County departments, 30 municipalities, and four other public agencies. |
| Contact | Mark Greninger, Los Angeles County Geographic Information Officer. (213) 974-2154 MGRENINGER@CIO.LACOUNTY.GOV |
| Descriptive Name: | Marin County Buildings |
| Alias | Status |
| marin_buildings | Complete as of 2004. |
| Source | Marin County / MarinMap |



Description

Building outline products for Marin County encompass the Urban/ Suburban land area with a 200 feet fringe outside the county boundary. Building footprints were produced using stereo pairs from the 2004 orthophoto project to ensure that the on ground bases were captured, and are accurately depicted against a backdrop of the orthophoto sources. Data were collected using softcopy photogrammetry for the purposes of orthorectification and contour generation, as well as a variety of other purposes including planning and field reference.

Contact

gisprojects@co.marin.ca.us, Marin County

County Name:

Mono County

Alias**Status**

BuildingFootprints

Updated: Tuesday, January 31, 2017

Source

Mono County

Description

Buildings for Mono County.

Contact

Christopher McManus, (760)924-1692, gis@mono.ca.gov, <https://gis.mono.ca.gov/site/data>

Descriptive Name:

Sacramento County Buildings

Alias**Status**

SacCounty_BUILDING_FOOTPRINTS

Incomplete; LRT station areas only. Published: 4/20/2012

Source

SACOG, Sacramento County GIS

Description

Building Footprints of structures along the Sacramento Regional Transit corridor. Areas include 1/2 mile radius from RT stations and 1 block either side of railways. Data was contracted through SACOG.

Contact

sacgis@sacounty.net

Descriptive Name:

San Diego County NonResidential Buildings

Alias**Status**

Footprints_NonResidential_SD

2015-04-22

Source

SANDAG

Description

Layer was developed by SANDAG for non-residential buildings only.

Contact

Grace Chung, SANDAG. grace.Chung@sandag.org (619)699-6950

Descriptive Name:

San Francisco City/County Buildings

Alias**Status**

SF_Building_Footprints June, 2011

Source 3D building model data the City licensed from Pictometry, Inc.

Description This data layer shows building footprints for the City and County of San Francisco as of June 2011. The layer was created using the ArcGIS 3D Analyst conversion tool, "MultiPatch Footprint," converting the 3D building model data the City licensed from Pictometry, Inc. The data represents "blobs" that show contiguous buildings as a single polygon. For example, several row homes right next to each other will not be represented as separate buildings in this data because of the methodology used to derive the footprints.

Contact https://data.sfgov.org/d/6p33-sdua?category=Housing-and-Buildings&view_name=Building-Footprints

Descriptive Name: Santa Cruz County Buildings

Alias **Status**

Building_Footprints 2003 to 2008; Last Modified: 7 October 2016

Source Santa Cruz County GIS

Description The Building Footprint layer was developed between 2003 and 2008 based on Ortho-photography from the same years. Structures that were visible on the orthos were traced. The City of Santa Cruz and Watsonville had their footprints mapped by a consultant. The rest of the county was done by a combination of interns and County GIS staff. The primary purpose was for Fire Modeling and disaster preparedness.

Contact http://gis.co.santa-cruz.ca.us/sccgis/rest/services/OpenData_Build_Single/MapServer/143

Descriptive Name: Solano County Buildings

Alias **Status**

BuildingOutlines2009, BuildingChange2015 2009-2015

Source Pictometry



Description

This data layer shows building footprints for the County of Solano. The data was developed from Orthophotography and Lidar data collected at the end of the year 2009. The layer was created by Pictometry, Inc and delivered November 2012. This includes: Outlines built off 2008 Pictometry imagery Length of Sides File Building Count File Data linked to APN Data projected in State Plane, NAD83, California Zone 2, US Survey Feet Deck included in outlines In order to continue to improve our products, project deliverables and customer service, attached you will find a ChangeFindr Customer Acceptance Form and a ChangeFindr Customer Feedback Form. Once you have received your results, set up Change Analysis and have had a chance to review your deliverable, please take a moment to complete and return these forms (either electronically or via fax at 585-486-0098-Attn: Jamie Brown). We appreciate any comments and/or suggestions that you can provide us. If you have any questions or concerns, please contact Pictometry Customer Support at customersupport@pictometry.com or by calling 585-486-0093. Best, Jamie Brown Special Projects Coordinator for Engineering and Operations 100 Town Centre Drive, Suite A, Rochester, NY 14623 Toll Free: 888.771.9714 Direct: 585-487-1471 FAX: 585-444-2617

Contact

http://solano.doitgis.opendata.arcgis.com/datasets/3117702425474725805f9b8b0f7561d6_0

Descriptive Name:

Association of Monterey Bay Area Governments Buildings

Alias

Footprints_RGNL

Status

Oct. 31st, 2016

Source

Association of Monterey Bay Area Governments (AMBAG)

Description

Layer was developed by AMBAG as a derivative product from LIDAR.

Contact

Gina Schmidt, (831)883-3750 x321, gschmidt@ambag.org

Descriptive Name:

City of Bakersfield Buildings

Alias

Buildings

Status

2011

Source

City of Bakersfield

Description

Buildings in the City of Bakersfield.

Contact

<http://bakersfielddata.library.cob.opendata.arcgis.com>,
MapCenter@bakersfieldcity.us

Descriptive Name:

City of Newport Beach Buildings

Alias

Buildings_CommBase

Status

Existing

Source

City of Newport Beach



| | |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description | Buildings in Newport Beach |
| Contact | http://www.newportbeachca.gov/gis , Scott Watson, (949)644-3184, swatson@newportbeachca.gov |
| Descriptive Name: | City of Roseville Buildings |
| Alias | Status |
| buildingpolygon | Dec 5th, 2015 |
| Source | City of Roseville Buildings |
| Description | Layer was developed by City of Roseville |
| Contact | http://www.roseville.ca.us/eservices/maps_n_data/data_clearinghouse.asp |
| Descriptive Name: | City of Petaluma Buildings |
| Alias | Status |
| BASE_FAC_BUILDINGS | 5/27/2014 |
| Source | City of Petaluma |
| Description | A collection of polygons that represent building footprints in Petaluma |
| Contact | http://cityofpetaluma.net/cmgr/gisdownloads.html |



Appendix B: Survey Results for Data Not Collected

Table 2. Building Data Not Collected

List of all California counties for which no building data is publicly available, or for which spatial data concerning building footprint locations was not collected.

| | |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| County Name: | Alameda County |
| Status | Not collected |
| Description | While Alameda County does track condominium units, it does not currently track/distribute building footprint locations using spatial data. |
| Contact | https://www.acgov.org/government/geospatial.htm |
| County Name: | Alpine County |
| Status | Not collected |
| Description | Alpine County does not maintain building footprint data. |
| Contact | Home > Departments > Community Development > Planning Department > GIS Data Data for sale |
| County Name: | Amador County |
| Status | Not collected |
| Description | Amador County does not maintain building footprint data. |
| Contact | http://www.co.amador.ca.us/index.aspx?page=623 |
| County Name: | Butte County |
| Status | Not collected |
| Description | Butte County does not maintain building footprint data. |
| Contact | Brian Lasagna, Regional Analyst, (530) 809-4616, blasagna@bcag.org . http://www.bcag.org/GIS/GIS-Data/index.html |
| County Name: | Calaveras County |
| Status | Not collected |
| Description | Calaveras County does not maintain building footprint data. |
| Contact | http://calaverasgov.us/Departments/HZ/InformationTechnology/GIS/LayerDescriptions.aspx |
| County Name: | Colusa County |
| Status | Not collected |



Description Colusa County does not maintain building footprint data.
Contact Greg Plucker, Planning Director, (530)458-0480, gplucker@countyofcolusa.org, <http://www.countyofcolusa.org/index.aspx?nid=713>

County Name: **Contra Costa County**

Status Not collected

Description Contra Costa County does not maintain building footprint data.

Contact <http://www.ccmmap.us/>, Isaac Cabrera, (925)313-1351, isaac.cabrera@doit.cccounty.us

County Name: **Del Norte County**

Status Not collected

Description Del Norte County does not maintain building footprint data.

Contact <http://www.co.del-norte.ca.us/departments/information-technology/geographic-information-services-gis>

County Name: **El Dorado County**

Status Not collected

Description El Dorado County does not maintain building footprint data.

Contact http://www.edcgov.us/Government/Surveyor/FAQs/G_I_S_FAQs.aspx

County Name: **Fresno County**

Status Not collected

Description Fresno County does not maintain building footprint data.

Contact <http://www.co.fresno.ca.us/DepartmentPage.aspx?id=52122>

County Name: **Glenn County**

Status Not collected

Description Glenn County does not maintain building footprint data.

Contact <http://gcppwa.net/disclaimer.aspx>

County Name: **Humboldt County**

Status Not collected

Description Humboldt County does not maintain building footprint data.

Contact <http://www.humboldtgov.org/201/Maps-GIS-Data>

County Name: **Imperial County**



Status Not collected

Description Imperial County may have building footprint data, but if so, we were unable to reach a suitable agreement to secure sharing privileges for it, or even to assess its completeness.

Contact <http://www.icpds.com/?pid=577>, Derek Newland

County Name: Inyo County

Status Not collected

Description Inyo County does not maintain building footprint data.

Contact Planning Staff, 760-878-0263; <http://inyoplanning.org/functions.htm>

County Name: Kern County

Status Not collected

Description Kern County does not maintain building footprint data.

Contact Jeffrey Utter - County GIS Coordinator, utterj@co.kern.ca.us, <http://esps.kerndsa.com/gis/gis-download-data>

County Name: Kings County

Status Not collected

Description Kings County does not maintain building footprint data.

Contact Jo Anna Walker, (559) 852-2647, <http://www.countyofkings.com/departments/general-services/community-development-agency/gis-mapping/accepted>

County Name: Lake County

Status Not collected

Description Lake County does not maintain building footprint data.

Contact Lon Sharp, 707-263-2287, lon.sharp@lakecountyca.gov, <http://gis.co.lake.ca.us/>

County Name: Lassen County

Status Not collected

Description Lassen County does not maintain building footprint data.

Contact <http://www.lassencounty.org>

County Name: Madera County

Status Not collected

Description Madera County does not maintain building footprint data.



Contact <http://madera-county.com/index.php/programs/602-madera-county-maps-online-website-terms-of-use>, Cadastral Drafting Dept. of the Assessor's Office, Kurt 559-675-7703

County Name: **Mariposa County**

Status Not collected

Description Mariposa County does not maintain building footprint data.

Contact <http://www.mariposacounty.org/index.aspx?NID=1163>, gis@mariposacounty.org, (209) 966-5151

County Name: **Mendocino County**

Status Not collected

Description Mendocino County does not maintain building footprint data.

Contact <http://www.co.mendocino.ca.us/econdev/gis/>, (707) 234-6000

County Name: **Merced County**

Status Not collected

Description Merced County does not maintain building footprint data.

Contact <http://www.co.merced.ca.us/index.aspx?NID=1624>

County Name: **Modoc County**

Status Not collected

Description Modoc County does not maintain building footprint data.

Contact <http://www.co.modoc.ca.us/departments/planning>

County Name: **Monterey County**

Status Collected from AMBAG.

Description Monterey County does not maintain building footprint data. However, AMBAG has produced a regional building footprint GIS dataset from LIDAR, which covers Monterey County. Monterey County is thus not the authoritative source.

Contact <http://www.co.monterey.ca.us/government/departments-i-z/information-technology/gis-mapping-data>

County Name: **Napa County**

Status Not collected due to liability concerns.

Description Napa County does maintain building footprint data, but was unwilling to share it due to liability concerns.



Contact <http://gis.napa.ca.gov>, GIS Manager: Patrick Kowta, gisstaff@countyofnapa.org, (707) 259-8141

County Name: Nevada County

Status Not collected

Description Nevada County does not maintain building footprint data.

Contact Sebastian Roberts, 530.265.1608, MapInquiry@co.nevada.ca.us, <http://data.nevcounty.opendata.arcgis.com>

County Name: Orange County

Status Not collected

Description Orange County may maintain building footprint data, but we were unable to reach a satisfactory agreement to enable sharing of said data..

Contact <http://www.ocpublicworks.com/survey/products/>, geomatics@ocpw.ocgov.com

County Name: Placer County

Status Not collected

Description Placer County does not maintain building footprint data, however, the City of Roseville does.

Contact <http://www.placer.ca.gov/departments/communitydevelopment/gis>

County Name: Plumas County

Status Not collected

Description Plumas County does not maintain building footprint data.

Contact <http://www.plumascounty.us/index.aspx?nid=2199>

County Name: Riverside County

Status Not collected

Description Riverside County does not maintain building footprint data.

Contact <http://data.countyofriverside.opendata.arcgis.com>

County Name: San Benito County

Status Collected from AMBAG.

Description San Benito County does not maintain building footprint data. However, AMBAG has produced a regional building footprint GIS dataset from LIDAR, which covers San Benito County. San Benito County is thus not the authoritative source.



Contact Rene Anchieta, GIS Analyst, ranchieta@cosb.us, <http://www.cosb.us/county-departments/geographic-information-systems-gis/#.WJE0JbGZPUI>

County Name: San Bernardino County

Status Not collected

Description San Bernardino County may or may not maintain building footprint data, but we were unable to reach an agreement to allow sharing of said data, should it actually exist..

Contact <http://cms.sbcounty.gov/gis/GISDataServices/DataLayerCatalog.aspx>, (909) 388-5917

County Name: San Joaquin County

Status Not collected

Description San Joaquin County does not maintain building footprint data.

Contact <http://www.sjmap.org/GISDataDownload.htm>

County Name: San Luis Obispo County

Status Not collected

Description San Luis Obispo County does not maintain building footprint data.

Contact <http://www.slocounty.ca.gov/planning/zoning.htm>

County Name: San Mateo County

Status Not collected

Description San Mateo County does not maintain building footprint data.

Contact <http://isd.smcgov.org/gis-data-download>, countygis@co.sanmateo.ca.us

County Name: Santa Barbara County

Status Not collected

Description Santa Barbara County does not maintain building footprint data.

Contact <http://sbcountyplanning.org/forms/maps/index.cfm?id=GIS>

County Name: Santa Clara County

Status Not collected

Description Santa Clara County does not maintain building footprint data. They do apparently have LIDAR data, however, which is an excellent input into a model to create building footprint data.

Contact <https://www.sccgov.org/sites/gis/GISData/Pages/Available-GIS-Data.aspx>, gis@isd.sccgov.org



| | |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| County Name: | Shasta County |
| Status | Not collected |
| Description | Shasta County does not maintain building footprint data. |
| Contact | http://www.co.shasta.ca.us/index/gis_index.aspx |
| County Name: | Sierra County |
| Status | Not collected |
| Description | Sierra County does not maintain building footprint data. |
| Contact | http://www.sierracounty.ca.gov/index.aspx?nid=249 |
| County Name: | Siskiyou County |
| Status | Not collected |
| Description | Siskiyou County does not maintain building footprint data. |
| Contact | http://www.co.siskiyou.ca.us/page/planning-division |
| County Name: | Sonoma County |
| Status | Not collected |
| Description | It is unclear if Sonoma County maintains building footprint data. They appear to have LIDAR data, which should allow for the easy creation of building footprint data, but our efforts to obtain building footprint data have been unsuccessful to data. |
| Contact | http://sonomacounty.ca.gov/ISD/Information-Management/GIS/Data-Downloads/ , |
| County Name: | Stanislaus County |
| Status | Not collected |
| Description | Stanislaus County does not maintain building footprint data. |
| Contact | http://gis.stancounty.com/giscentral/public/downloads.jsp?main=4 , Angela Freitas, angela@stancounty.com |
| County Name: | Sutter County |
| Status | Not collected |
| Description | Sutter County does not maintain building footprint data. |
| Contact | http://www.co.sutter.ca.us/apps/gis/gisdownload.aspx |
| County Name: | Tehama County |
| Status | Not collected |



Description Tehama County does not maintain building footprint data.
Contact <http://www.co.tehama.ca.us/gov-departments/86-planning/288-gis>

County Name: **Trinity County**

Status Not collected

Description Trinity County does not maintain building footprint data.

Contact <http://www.trinitycounty.org/index.aspx?page=73>

County Name: **Tulare County**

Status Not collected

Description Tulare County does not maintain building footprint data.

Contact <http://tularecounty.ca.gov/tcict/index.cfm/information-services/geographic-information-system-gis/gis-data/>

County Name: **Tuolumne County**

Status Not collected

Description Tuolumne County does not maintain building footprint data.

Contact <http://www.co.tuolumne.ca.us/index.aspx?nid=526>

County Name: **Ventura County**

Status Not collected

Description Ventura County does not maintain building footprint data.

Contact <http://www.ventura.org/gis-mapping/gis-data-downloads-mapping-base/>

County Name: **Yolo County**

Status Not collected

Description Yolo County does not maintain building footprint data.

Contact [http://www.yolocounty.org/community-services/planning-public-works/geographic-information-system-gis/data-downloads\(925\)313-1351,isaac.cabrera@doit.cccounty.us](http://www.yolocounty.org/community-services/planning-public-works/geographic-information-system-gis/data-downloads(925)313-1351,isaac.cabrera@doit.cccounty.us)

County Name: **Yuba County**

Status Not collected

Description Yuba County does not maintain building footprint data.

Contact <http://gis.co.yuba.ca.us/data.html>

