



TECHNOLOGY
SERVICES AND SOLUTIONS

Use GIS Data and Technologies - Simple Ideas Can Make Big Differences

Michelle Wang, County of Santa Clara





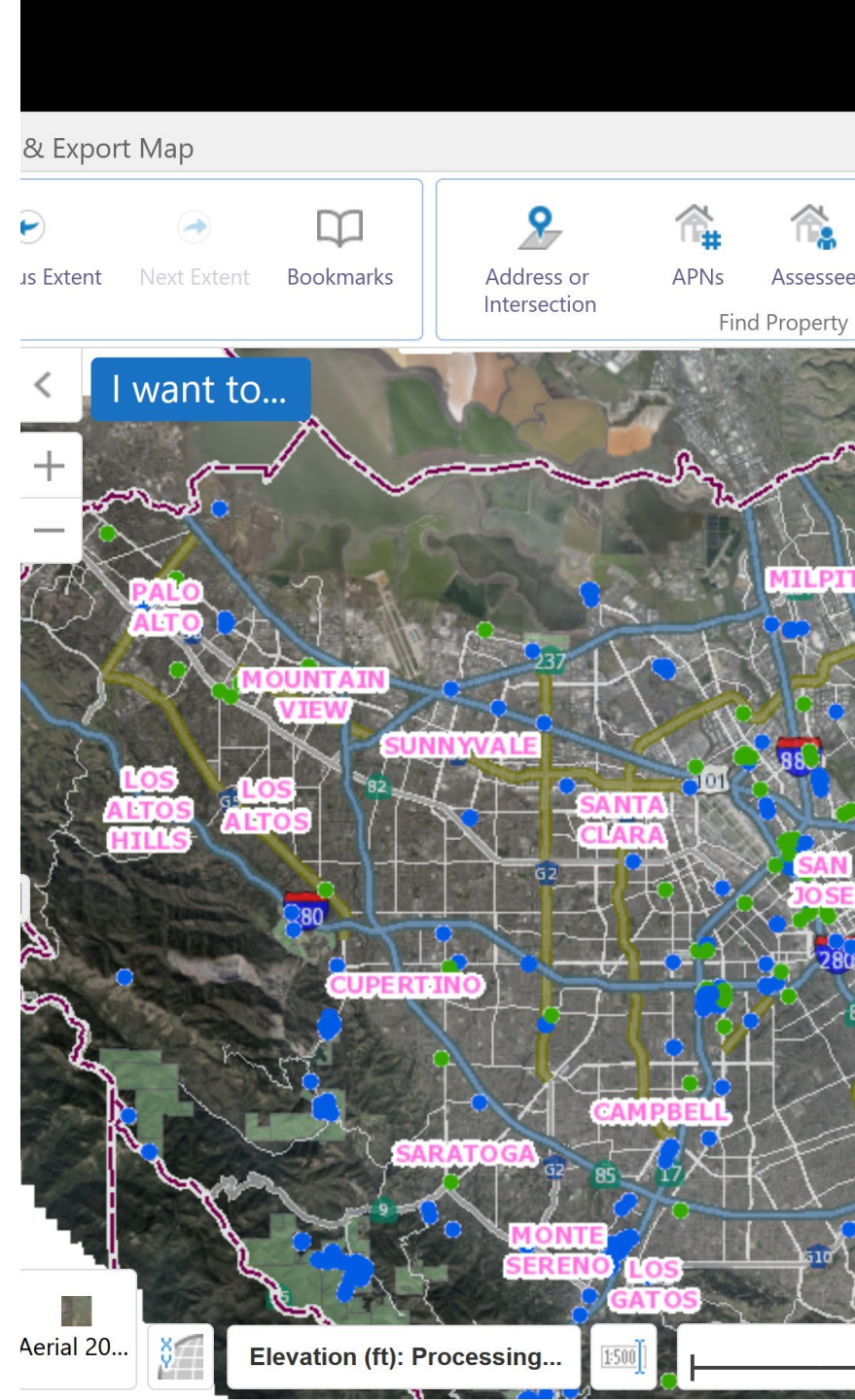
Who We Are

- The County Enterprise GIS group is led by an IT Manger and is composed of Project Manager, Technology Architect, GIS Analysts, and Application Developers.
- The group is charged with:
 - Planning the development, maintenance and promotion of the County-wide Geographic Information Systems (GIS) program aligned with the internal and external agency stakeholders' business needs.
 - Developing and providing enhanced access to high quality geographic information in a timely manner, meeting customers' needs.
 - Supporting County GIS users in the planning, development, deployment, and maintenance of creative, technically sound, enterprise-wide, and cost-effective approaches for addressing their business needs.



SCCMap

- Provide easy means to access, search, visualize, and analyze geospatial information curated by County.
- Public facing version and internal version.
- There are 336 registered users in internal version of SCCMap.
- The registered users are from 21 County agencies & departments and 2 cities.

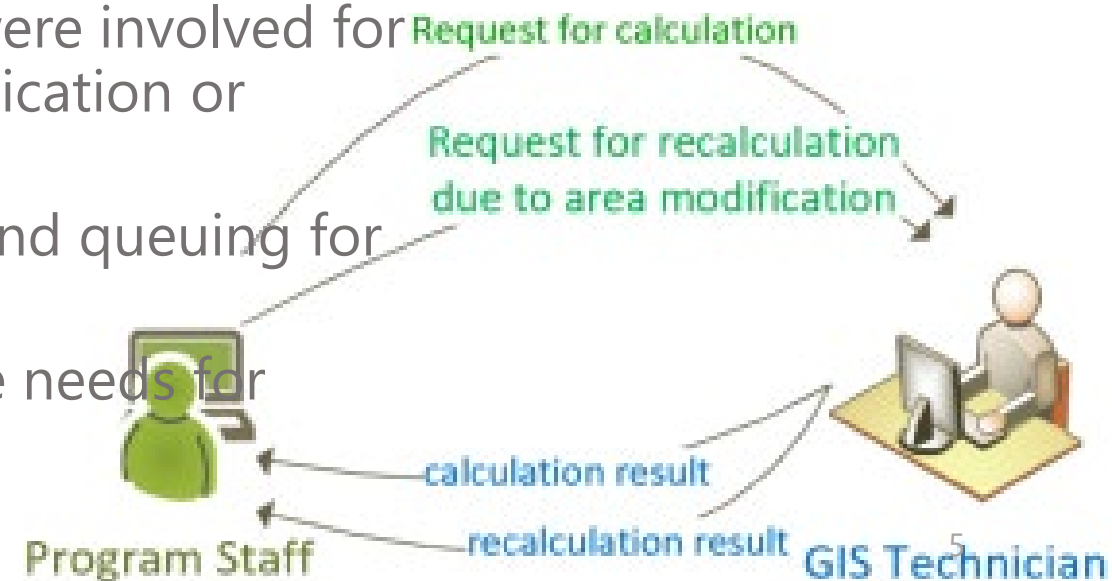


Cases

- 1 Department of Agriculture Williamson Act Program Staff need to calculate percentage of land in agricultural use.
- 2 Assessors need to measure buildings for residential property appraisal / assessment.

Williamson Act Program

- The County of Santa Clara contracts with owners of certain properties to preserve land for agricultural uses pursuant to the California Land Conservation Act of 1965 (the Williamson Act).
- Williamson Act contracted properties can be assessed at agricultural property tax rate.
- For a property to be qualified for Williamson Act contract, certain percentage of the land must be devoted to commercial production of agriculture commodities.
- Prior to SCCMap, people from different teams were involved for land use percentage calculation in contract application or renewal process.
- Extra time and effort were required in triaging and queuing for multiple resources to do the calculations.
- The process could take longer time if there were needs for recalculation due to area modifications.



Sample request from Program Staff to GIS Technician

Williamson Act

Hello,

Can I please have the percentage of the property I have outlined compared to the entire parcel?

Thanks,

Address: [REDACTED]

APN [REDACTED]



5/6/2021, 1:36:53 PM

Parcels (Roll Year2020)

1:4,514
0 0.03 0.06 0.12 mi
0 0.05 0.1 0.2 km



Request and Ideas



Can WA Program Staff use SCCMap to do the calculation themselves?



- SCCMap already have a measurement tool for calculating area of a shape outlined by an end user in State Plane projection.
- The Parcel layer in SCCMap has an attribute to hold state plane shape area of a parcel feature.
- A new function can be built via Geocortex Workflow to fulfill this request with the data and capabilities already exist in SCCMap.

Technologies behind SCCMap



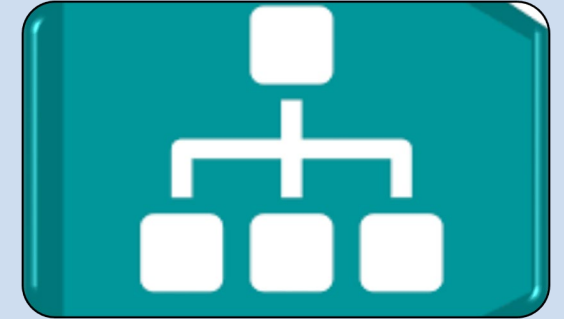
Esri
Technology



Geocortex
Essentials
Manager



Geocortex
HTML5
Viewer

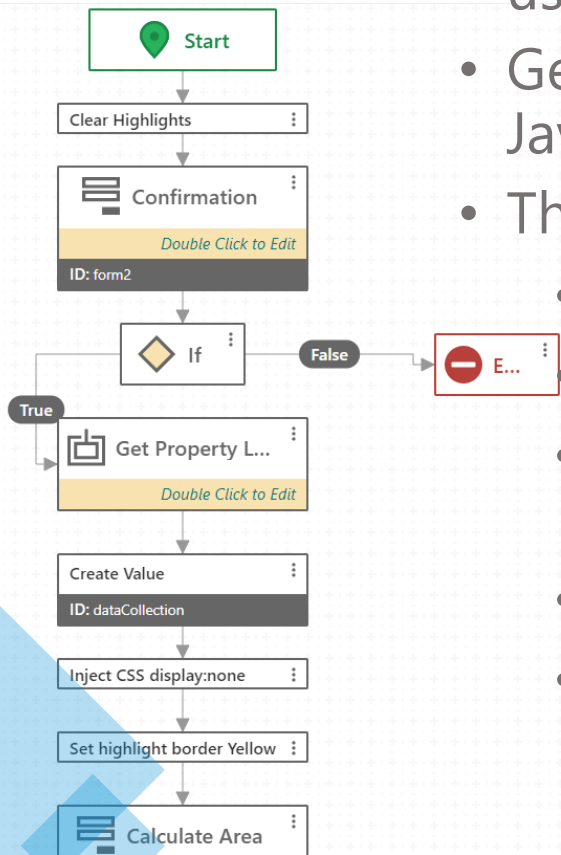


Geocortex
Workflow

Use Geocortex Workflow to build this function



- Geocortex Workflow allows us to build custom business requirements using pre-built activities.
- Geocortex Workflow is built on JavaScript engine and uses ArcGIS API for JavaScript.
- The logic of the new function:
 - Retrieve the shape outlined by an end user from SCCMap graphic layer.
 - Reproject the shape in State Plane projection and calculate its area in sq.ft.
 - Identify the associated parcel boundaries geometry and retrieve its State Plane shape area attribute value (also in sq.ft)
 - Calculate the percentage of the outlined shape against the entire parcel.
 - Display the result.



Land Use Percentage Calculation in SCCMap

Markup Area %

Parcel APN: [REDACTED]

Parcel Calculated Size: 514585.49 sq.ft.

Markup Area / Parcel Size: 62.34%

Close

I want to...

Area: 320,794.82 ft²
Perimeter: 3,834.25 ft

1,019.49 ft

606.20 ft

292.55 ft

CHURCH AVE

MONTEREY RD

With this function in SCCMap, one WA Program Staff member can do a land use percentage calculation in several minutes.

This function can also be used for other purposes as well, for example, an estimation of leach field as a portion of the parcel for an underground septic systems, etc.



Demo

SCCMap Land Use Percentage Calculation Tool



Measure Buildings in Property Appraisal / Assessment

- Some use cases:
 - Value buildings not on County records. Rural properties commonly have multiple unrecorded buildings.
 - Appraise detached ADUs for Urban & Rural properties.
- Traditional ways for building valuation
 1. Manually measure a building on GIS maps and assign a nominal PSF value depending on condition and quality of the building.
 2. Assign a nominal per building value to a building, which is not the preferred way but saves time.
- Disadvantage and challenge of manual measurement
 - Time consuming
 - Unrepeatable results
 - Results affected by visibility issues
 - ...

Rural Property Appraisal Example



Comparable Land Sales

	Subject		Comp 1		Comp 2		Comp 3	
Address	NO SITUS							
City	Subject		Comparable 1		Comparable 2		Comparable 3	
APN								
Proximity to Subject			N/A		N/A		N/A	
Days on Market			N/A		N/A		N/A	
Sale Price			\$6,800,000		\$1,570,000		\$6,750,000	
Zoning	AR-SR		AR-D1		HS		AR-D1-SR	
Site Usable Area (Sq.Ft./Acre)	89,874,298 / 2,063.23		31,773,100 / 729.41		6,969,600 / 160.00		64,784,610 / 1,487.25	
Parcel Size (Sq.Ft./Acre)	46,870,560 / 1,076.00		31,773,100 / 729.41		6,969,600 / 160.00		64,784,610 / 1,487.25	
Buildable Sites			1		1		1	
Price / Sq. Ft.			\$0.21		\$0.23		\$0.10	
Price / Site			\$6,800,000		\$1,570,000		\$6,750,000	
Value Adjustment	Description	Adj. rate	Description	Adjustment	Description	Adjustment	Description	Adjustment
Condition of Sales				0		0		0
Cond. Adj. Sales Price				\$6,800,000		\$1,570,000		\$6,750,000
Value Date / Sale Date	12/30/18		01/07/19	\$0	05/29/18	\$54,950	07/03/17	\$573,750
Time Adjusted Sales Price			\$6,800,000		\$1,624,950		\$7,323,750	
Location	Average		Inferior	5% 340,000	Superior	-10% -162,495	Superior	-5% -366,187
View				0		0		0
Street Adjustment	L	-20 %	H	-1,360,000	L	0	L	0
Site Improvements			0		0		0	
Lot Size Adjustment	L	-20.00 %	M	-10% -680,000	H	-20% -324,990	L	
Dwelling \$150 PSF	8173		5059	467,100	1432	1,011,150	0	1,225,950
Tennis Courts \$20K each	2	40,000	0	-40,000	0	-40,000	0	-40,000
ADU \$125 PSF	7300	912,500	1100	775,000	0	912,500	0	912,500
Accessory Bldgs \$10 PSF	3000	30,000	7300	-43,000	0	30,000	0	30,000
Swimming Pool	N	30,000	Y	-30,000	N		N	
Gross Adjustment			55 %	\$3,735,100	162 %	\$2,536,085	47 %	\$3,148,387
Net Adjustment			-8 %	-\$570,900	94 %	\$1,481,115	35 %	\$2,336,013
Total Adj. Sales Price			\$6,229,100		\$3,051,115		\$9,086,013	
Adjusted Price / Sq. Ft.			\$0.20		\$0.44		\$0.14	
Adjusted Price / Site			\$6,229,100		\$3,051,115		\$9,086,013	

From County Records



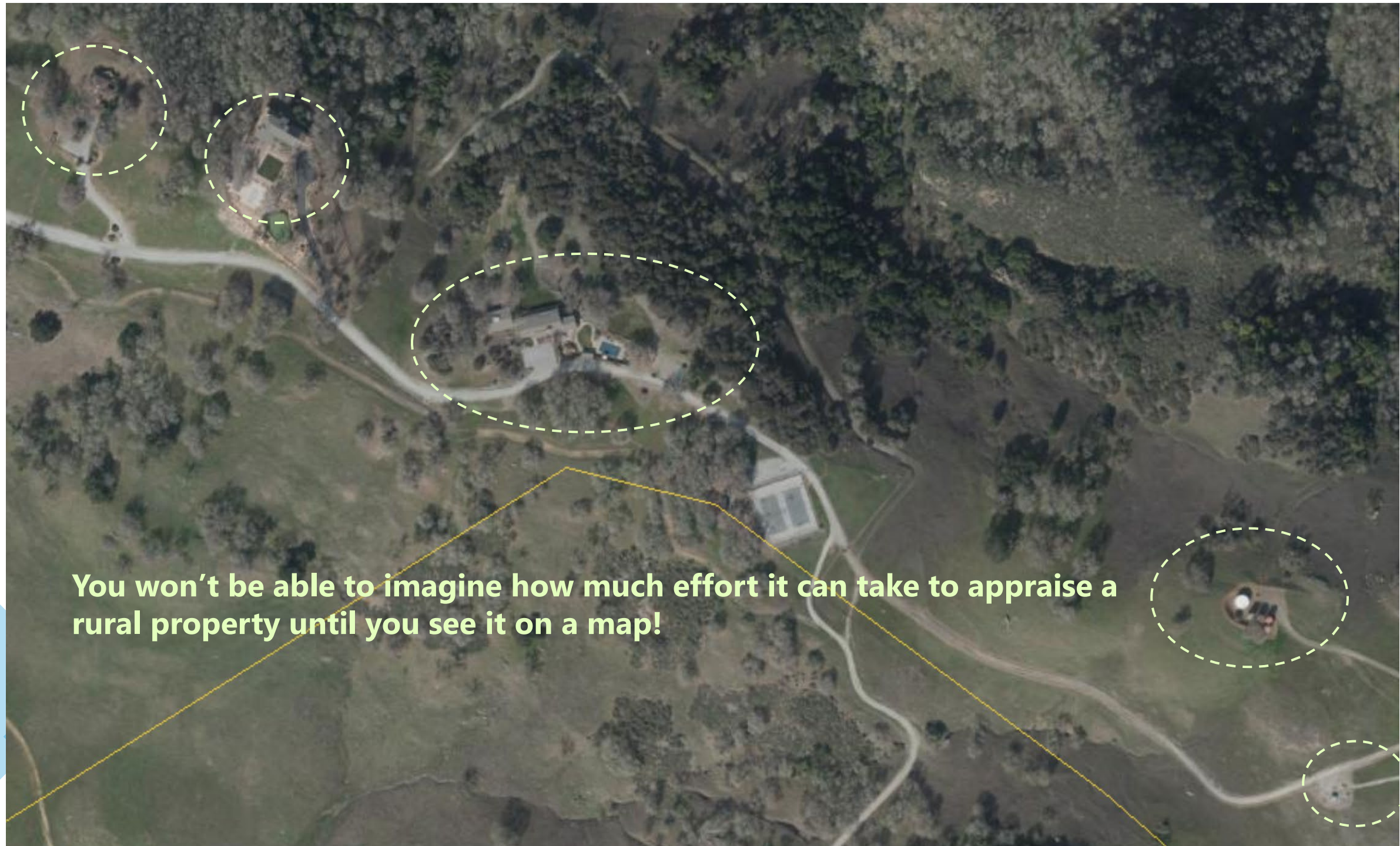
No County Records



Indicated Sales Price per Sq. Ft. : \$0.15 x 89,874,298 = \$13,481,145

Indicated Sales Price per Site : \$0 x 1 = \$0

Indicated Market Value : \$13,500,000

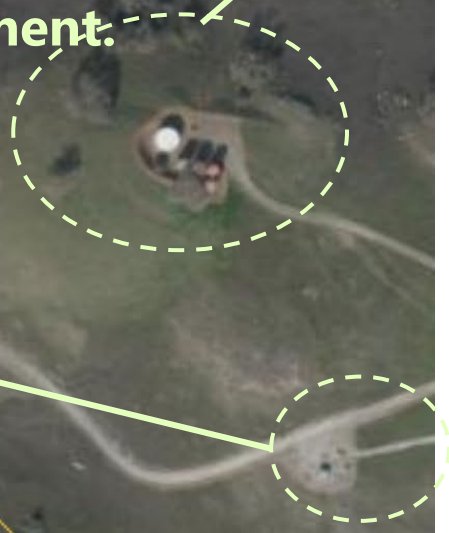
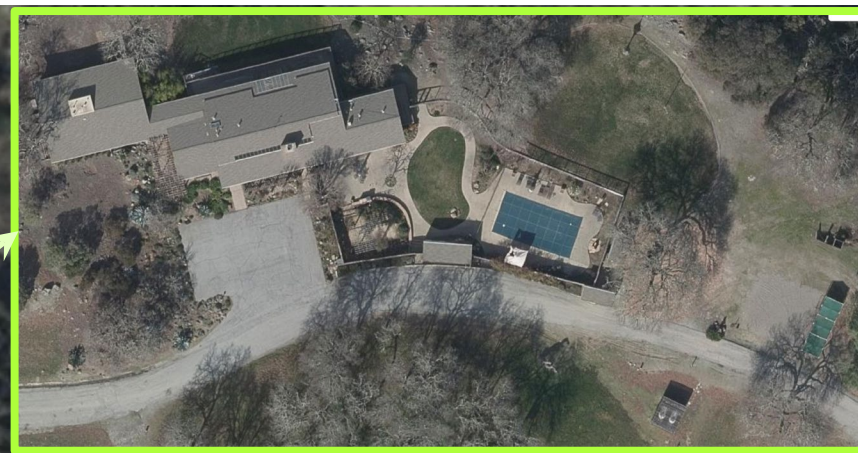
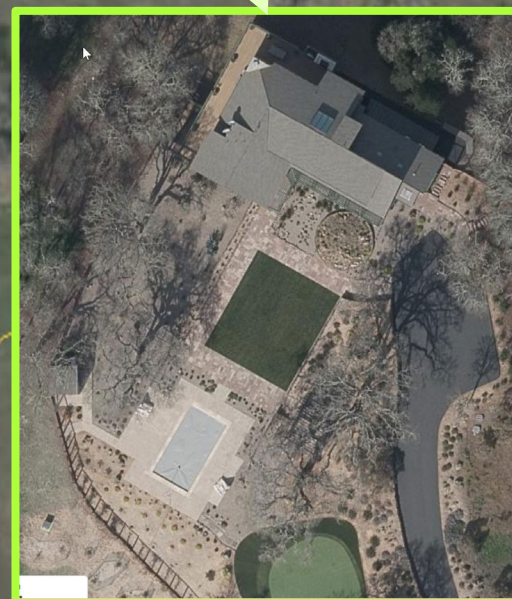
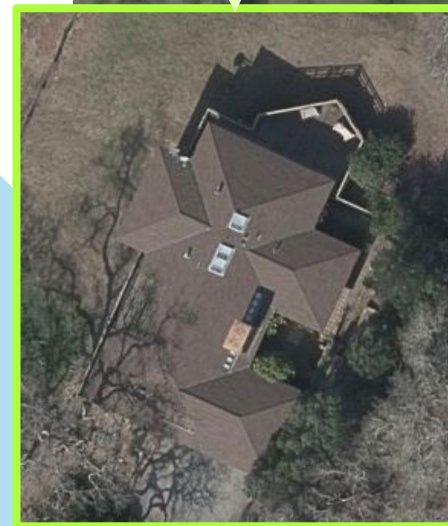


You won't be able to imagine how much effort it can take to appraise a rural property until you see it on a map!





Zoom in to get a closer look, and you will see visibility issues which can affect hand measurement.





When an assessor manually measure buildings of a property in year 2019 (using 2018 Aerial Image), one building was missed due to poor visibility.



Accessory Bldgs 5300 + 1000 + 1000 = 7300 SF

ADU 1100 SF with Satellite Dishes



Requests and Ideas

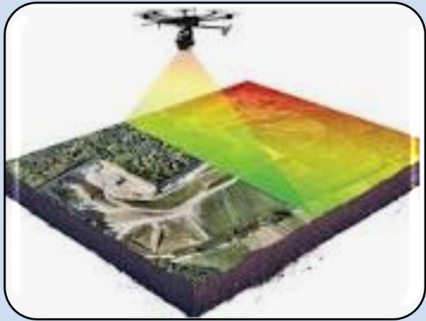


- Is it possible that upon clicking on a building, SCCMap gives an approximate square footage of the building?
- Is it possible that *SCCMap takes APNs and measure the buildings of those properties automatically and plots the results on the map?*



- County started to get Lidar Data from Sanborn Map Company in 2020.
- The Lidar Data has 2D building footprints dataset which covers all buildings across the County.
- A map layer can be built from the 2D building footprints dataset.
- Geocortex has a module which takes in a polygon geometry, computes its area, perimeter and individual segment lengths and plots the polygon on the map along with its measurements.
- Geocortex Workflow can be used to build in the logic to compute and plot building measurements for a given building, a given property, or multiple properties!

Technologies Involved



Lidar
Technology



Esri
Technology



Geocortex
Essentials
Manager



Geocortex
HTML5
Viewer



Geocortex
Workflow

Area: 3,980.02 ft²
Perimeter: 311.13 ft

Area: 5,827.15 ft²
Perimeter: 340.83 ft

Measure rural parcel buildings with Lidar data and the newly developed tool in SCCMap

< 500 SF NTA - Not To Assess (Ignore < 500 SF Structures)
Easily identified with no additional effort

Primary building on record

Area: 8,798.68 ft²
Perimeter: 527.50 ft

Area: 378.00 ft²
Perimeter: 77.78 ft

Area: 352.00 ft²
Perimeter: 84.85 ft

Area: 232.00 ft²
Perimeter: 63.64 ft

Water Tank
NTA

Area: 81.00 ft²
Perimeter: 32.00 ft

Area: 114.00 ft²
Perimeter: 32.00 ft

Area: 201.00 ft²
Perimeter: 32.00 ft

Area: 1,000.00 ft²
Perimeter: 100.00 ft

Area: 1,000.00 ft²
Perimeter: 100.00 ft

Area: 1,000.00 ft²
Perimeter: 100.00 ft

Area: 1,000.00 ft²
Perimeter: 100.00 ft

Area: 1,000.00 ft²
Perimeter: 100.00 ft

Area: 780.00 ft²
Perimeter: 100.00 ft

Area: 161.85 ft²
Perimeter: 50.78 ft

Area: 180.50 ft²
Perimeter: 53.74 ft

Building Outline 1 of 3

Building Outline

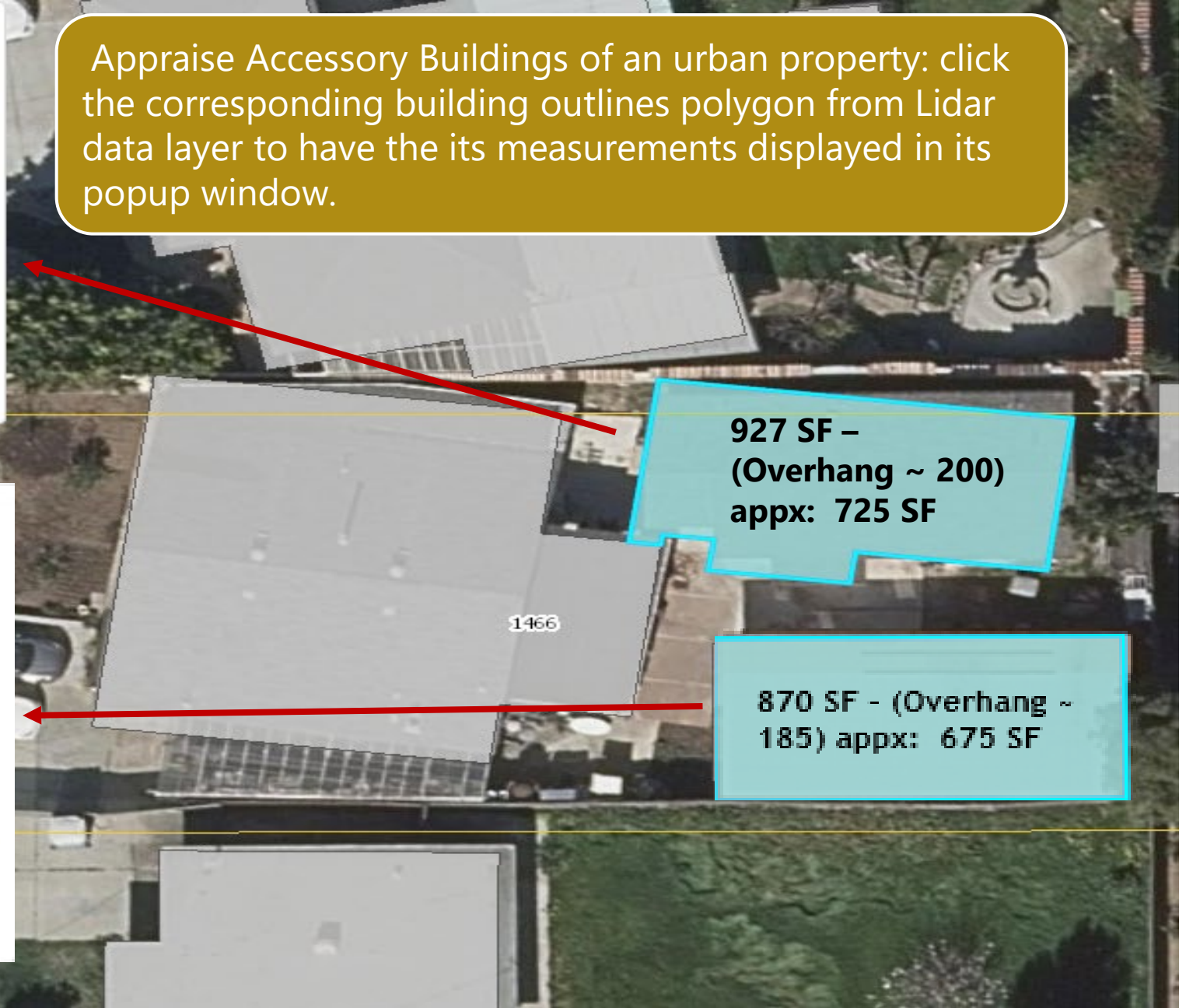
Calculated Area: 927.46 sq.ft
Calculated Perimeter: 135.82 ft

[Show outline dimensions on the map](#)

** The building outlines are from Lidar data and are based on rooftop area, not building base area. Users should be aware that temporal changes may have occurred since the data was collected and that the building outlines may not reflect the exact shape of the actual building footprint. See [Layer Description](#) for more information about the data.

[Add to Results](#) | [View Details](#) | [Show Buffer Options](#)

Appraise Accessory Buildings of an urban property: click the corresponding building outlines polygon from Lidar data layer to have the its measurements displayed in its popup window.



Building Outline 1 of 3

Building Outline

Calculated Area: 870.00 sq.ft
Calculated Perimeter: 124.45 ft

[Show outline dimensions on the map](#)

** The building outlines are from Lidar data and are based on rooftop area, not building base area. Users should be aware that temporal changes may have occurred since the data was collected and that the building outlines may not reflect the exact shape of the actual building footprint. See [Layer Description](#) for more information about the data.

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Note: For this parcel, neither of the two accessory buildings were on County records. With Lidar data and the new function, both buildings can be readily assigned quantitative values based on SF measurements during appraisal.



Potential use cases and limitations

Potential use cases:

- Use this tool across all county properties, aggregate SF of each property (excluding say 150 SF structures) and compared to the total SF on County records to automatically generate a list of potential escape assessments.
- Use this tool at multi year intervals and overlay with the most current Lidar data to detect structures that may not have been permitted. Currently it's done by using visual Aerial Imagery overlays that can be clouded by poor visibility due to trees and shadows.

Limitations:

- For double story structures, assessor will need to review and do additional manual measurements for 2nd story area. This situation is rare, since most accessory structures are single stories.
- Assessors still need to use their judgement in terms of condition and quality of each structure based on GIS for assessment purposes.



Demo

SCCMap Building Lidar Data Layer and Building Measurement Tool



Thanks to SCCMap users who contributed to
the development of these two new functions

Marcus Tai, Assessor's Office

Carola Jeyaraj, CEPA

Aaron Ho, CEPA



Thanks to the whole GIS Team!

Thank you!

Questions	Answers
1. Does SCC Map has a flyover image layer?	Yes, orthoimageries are used as basemap layers.
2. How often is SCC Map refreshed?	Data layer is updated quarterly or on as needed basis; Orthoimagery is updated every year.

Q & A