



Using GIS to Promote Onsite Water Reuse and Water Conservation

03/10/22



Presentation Outline

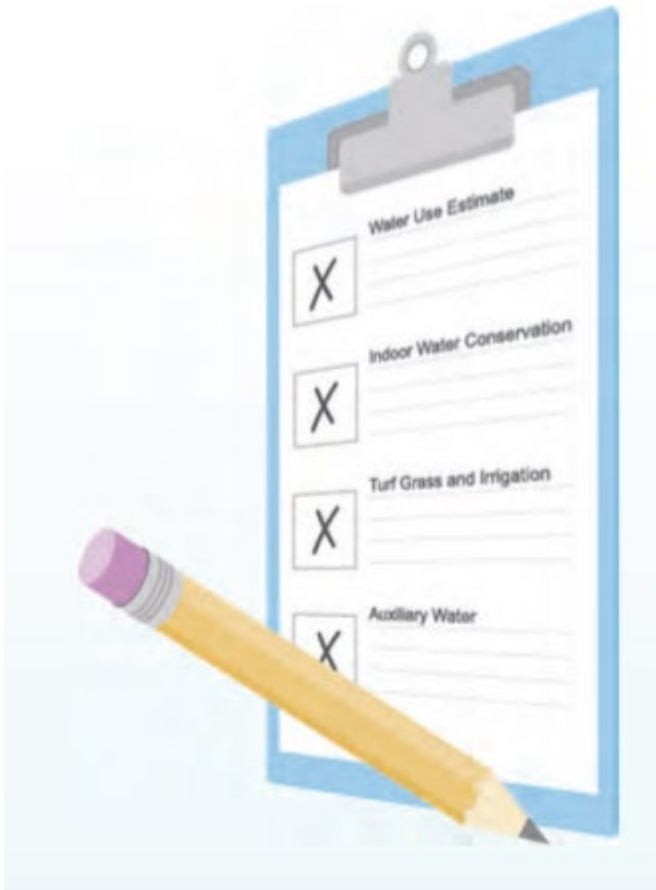
- Background
- AW's Benchmarking tool
- How ArcGIS made it work



Water Forward: Austin's Integrated Water Resource Plan

- A 100 yr water supply plan developed that makes the utility resilient against the risks to water supply from a changing climate and growing population.
- Developed over three years with input from the community and a Citizen Task Force. Approved by Council in 2018
- Demand management and water supply strategies were evaluated under future climate scenarios and growth projections to make recommendations

WATER BENCHMARKING AND BUDGETING

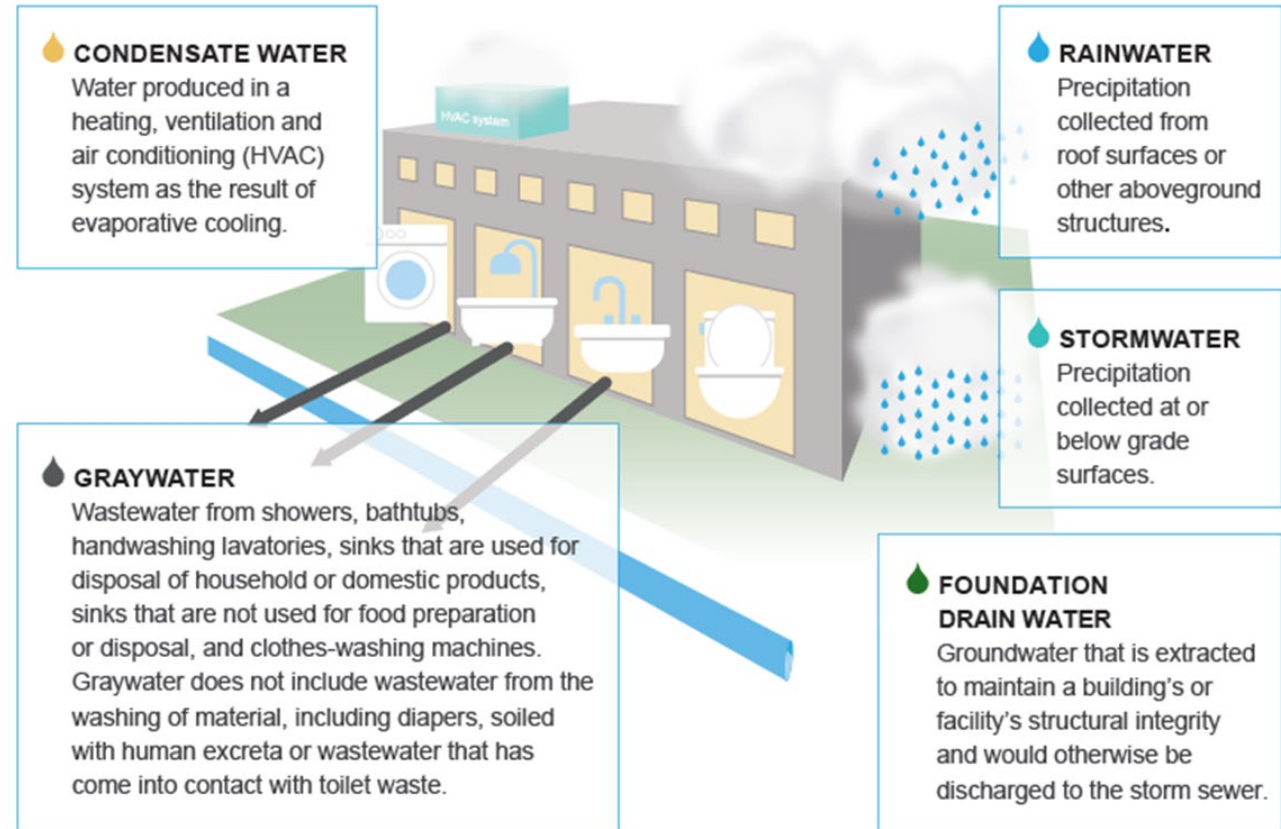


- Need to know what the drivers of water use are
 - Square footage
 - Number of occupants
 - In commercial, maybe number of beds/seats/ capacity
- Data needed
 - To set budgets
 - For water demand projection models
- Data in existing databases is difficult to access, some parts not available and some are inaccurate

Conservation measures reducing overall demand



Onsite water reuse to reduce potable demand



Project Information **Indoor Fixture Demands**
RESIDENTIAL WATER DEMAND

Enter general project information

PROJECT INFORMATION

Project Name
 Project Address
 Project Description
 Project Contact Name
 Contact Phone Number
 Contact Email Address
 Project Title

	Equivalent Occupants	Equivalent Occupied Days per Year
Residents	900	365

RESIDENT WATER USE

Fixture Type	Fixture Flow ⁽¹⁾	Fixture Uses per Person per Day ⁽²⁾	Duration of Fixture Use ⁽²⁾	Daily Building Usage	Annual Building Usage	Non-Potable Building Usage (gallons per year)
Showerhead	2.5 gallons per minute	0.69 showers	7.8 minutes per shower	12,110	4,419,968	N/A
Bathroom Faucet	2.2 gallons per minute	5 uses	0.5 minutes per use	4,950	1,806,750	N/A
Kitchen Faucet	2.2 gallons per minute	15 uses	0.5 minutes per use	14,850	5,420,250	N/A
Clothes Washer ⁽²⁾	4.7 gallons per cubic foot	0.3 loads per day	4 cubic feet of capacity per load	5,076	1,852,740	1,852,740
Toilet	1.28 gallons per flush	5 flushes	1 1 flush per use	5,760	2,102,400	2,102,400
Dishwasher ⁽²⁾	3.5 gallons per load	0.1 uses	1 load per use	315	114,975	N/A
Bath ⁽²⁾	20.2 gallons per bath	0.07 baths	1 bath per use	1,273	464,499	N/A

Daily Building Usage = Fixture Flow x Fixture Uses x Duration of Fixture Use x Equivalent Occupants
Annual Building Usage = Daily Building Usage x Equivalent Occupied Days per Year

Notes:

- (1) Fixture flow rates for showerheads, bathroom faucets, kitchen faucets and toilets are based on maximum fixture flow rates from the City of Austin's adopted plumbing code (Uniform Plumbing Code).
- (2) Fixture uses and durations as well as fixture flows for clothes washers, dishwashers and baths are based on the study Residential End Uses of Water, Version 2 (REU2016) (DeOreo et al. 2016).

Number of Buildings in Project
 Maximum Number of Building Stories

Austin Energy
 Project Will Receive an AEEGB Rating

COMMERCIAL WATER DEMAND

	Equivalent Occupants	Equivalent Occupied Days per Year	% Female Occupancy (To Separate Toilet & Urinal Use)
Employees	-	-	50%
Visitors	-	-	50%
Customers	-	-	50%
Students	-	-	50%
Patients/Guests	-	-	50%

Building Information

Enter site-specific information for

RESIDENTIAL AREA INFORMATION

Type of Use
 Multi-family Housing
 Clubhouse
 Maintenance Facility
 Other

EMPLOYEE WATER USE (ALL COMMERCIAL USES)

Fixture Type	Fixture Flow ⁽¹⁾	Fixture Uses per Person per Day ⁽²⁾	Duration of Fixture Use ⁽²⁾	Daily Building Usage	Annual Building Usage	Non-Potable Building Usage (gallons per year)
Showerhead	2.5 gallons per minute	0 uses	5 minutes per shower	-	-	N/A
Bathroom Faucet	0.5 gallons per minute	3 uses	0.5 minutes per use	-	-	N/A
Toilet (Male)	1.28 gallons per flush	1 flush	1 1 flush per use	-	-	-
Toilet (Female)	1.28 gallons per flush	3 flushes	1 1 flush per use	-	-	-
Urinal	0.5 gallons per flush	2 flushes	1 1 flush per use	-	-	-
Kitchen Faucet	2.2 gallons per minute	0.1 uses	0.25 minutes per use	-	-	N/A

Daily Building Usage = Fixture Flow x Fixture Uses x Duration of Fixture Use x Equivalent Occupants
Annual Building Usage = Daily Building Usage x Equivalent Occupied Days per Year

VISITOR WATER USE (OFFICE, EATING & DRINKING, MEDICAL OFFICE, PLACES OF ASSEMBLY, AUTO SERVICE, LAUNDRY & SANITATION, OTHER)

Fixture Type	Fixture Flow ⁽¹⁾	Fixture Uses per Person per Day ⁽²⁾	Duration of Fixture Use ⁽²⁾	Daily Building Usage	Annual Building Usage	Non-Potable Building Usage (gallons per year)
Showerhead	2.5 gallons per minute	0 uses	5 minutes per shower	-	-	N/A
Bathroom Faucet	0.5 gallons per minute	0.5 uses	0.5 minutes per use	-	-	N/A
Toilet (Male)	1.28 gallons per flush	0.1 flush	1 1 flush per use	-	-	-
Toilet (Female)	1.28 gallons per flush	0.5 flushes	1 1 flush per use	-	-	-
Urinal	0.5 gallons per flush	0.4 flushes	1 1 flush per use	-	-	-
Kitchen Faucet (Eating & Drinking)	2.2 gallons per minute	1 uses	0.25 minutes per use	-	-	N/A

Daily Building Usage = Fixture Flow x Fixture Uses x Duration of Fixture Use x Equivalent Occupants
Annual Building Usage = Daily Building Usage x Equivalent Occupied Days per Year

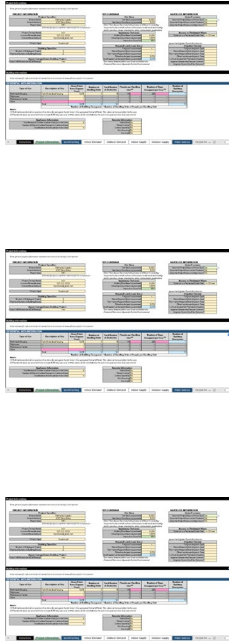
CUSTOMER WATER USE (RETAIL, GROCERY STORE, WAREHOUSING/STORAGE, MANUFACTURING/LIGHT INDUSTRIAL, PERSONAL SERVICES, CAR WASH)

Fixture Type	Fixture Flow ⁽¹⁾	Fixture Uses per Person per Day ⁽²⁾	Duration of Fixture Use ⁽²⁾	Daily Building Usage	Annual Building Usage	Non-Potable Building Usage (gallons per year)
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- Notes:**
 (1) Multi-family residential occupancies
 (2) Residential areas are assumed

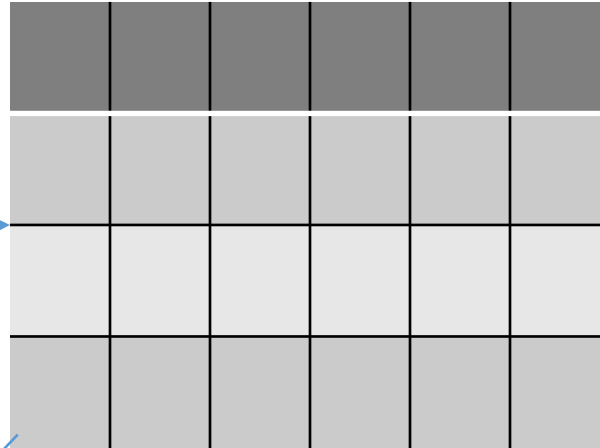
Total Number of Closets
 Total

Water Balance submittals

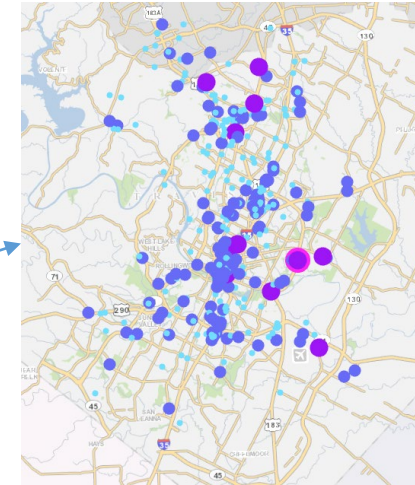


Script to pull data

Create in Access + periodically update
Master database



Spatial analysis



Organize folder storage system

Table 1

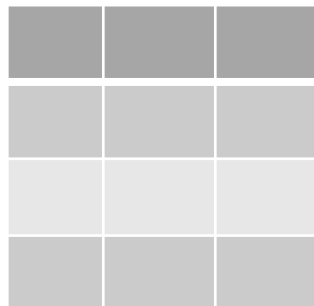
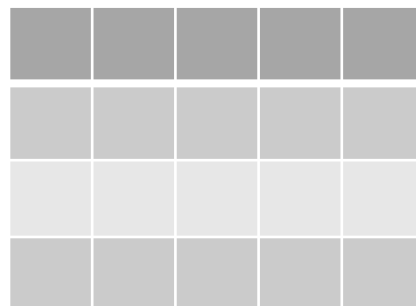
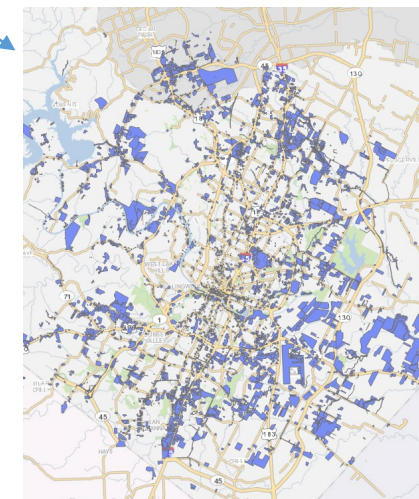


Table 2

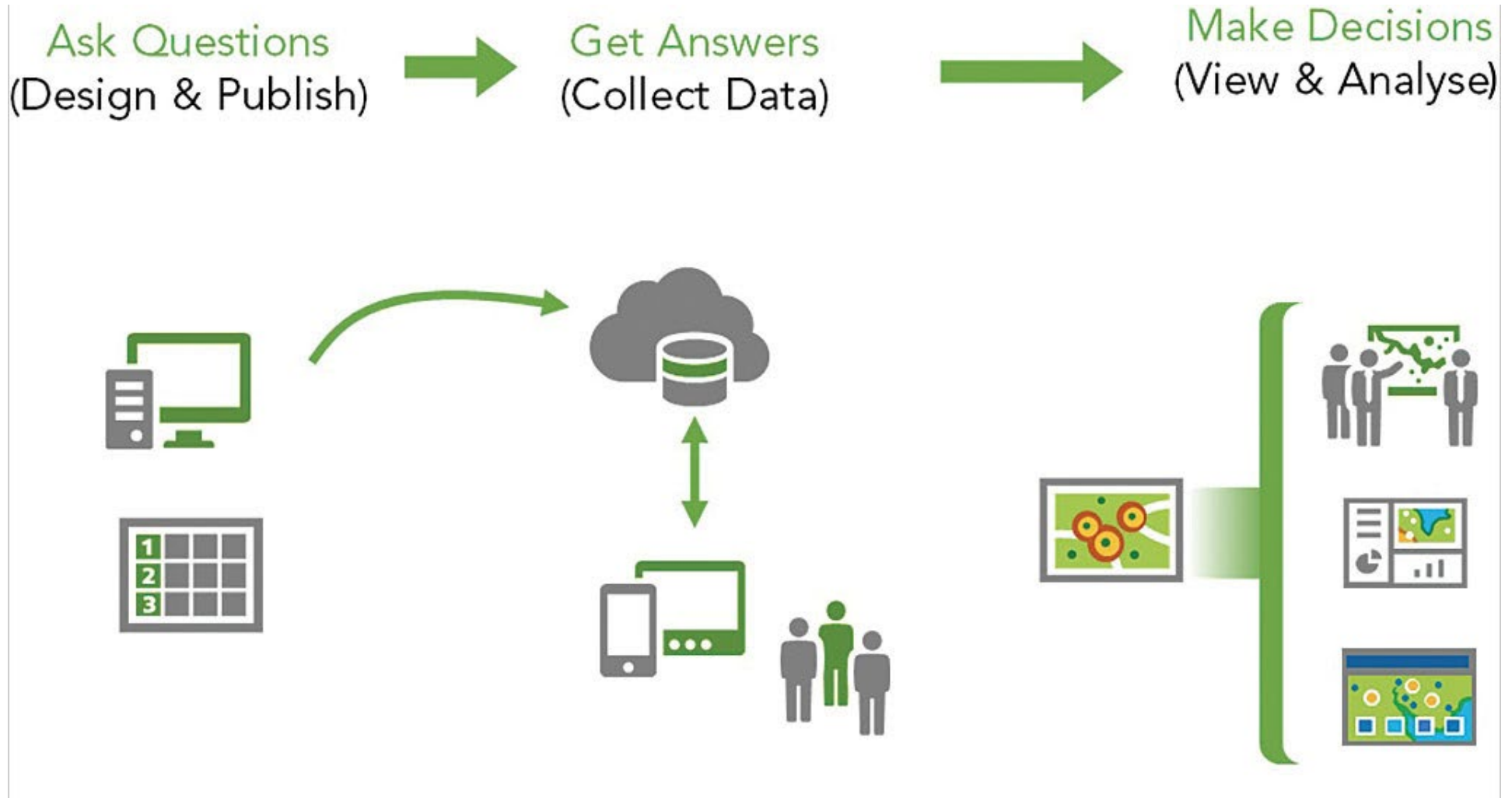


Coordinate with CTM to join to site plan layer

Spatial view



ArcSurvey123 + ArcDashboards

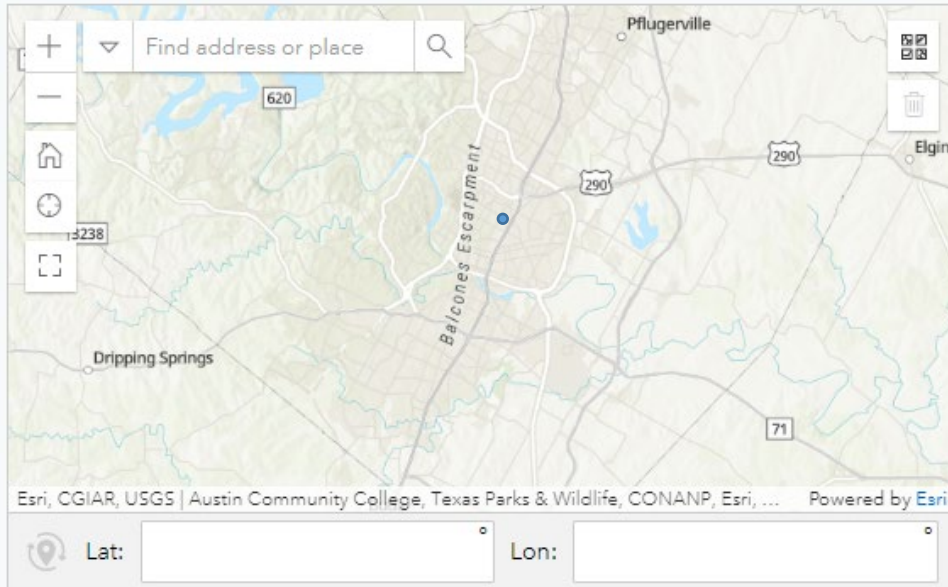


The Water Benchmarking Application provides an opportunity for Site Plan applicants to assess how water will be used within their development projects before construction begins.

Each Water Benchmarking applicant is provided with a set of recommendations for how to improve water use efficiency within their specific project as well as information on the benefits of incorporating these recommendations into their project (such as water utility bill savings and available rebates or incentives).

Project Location*

Please create a geopoint of your project location. You may do so by navigating to your project location using zoom and pan functions and clicking on the map on site location. Alternatively, you can also enter project location address in the search bar and choose your project location from the drop down with address suggestions.



Project Date*

Estimated project completion date (ready for occupancy)

User friendly survey interface

- Development type
- Net site area
- Impervious area
- Landscaped area
- Building roof area
- Total building area
- # of occupants by type
- Types of water using amenities
(pools, water features, chilled water systems)

REVERSE GEOCODING

```
pulldata("@geopoint",{PROJ_LOC},"reversegeocode.address.Match_addr","http://geocode.arcgis.com/arcgis/rest/services/World/GeocodeServer")
```

PROJECT ADDRESS

625 E 10th Street, Austin TX 78701



Relevance

COMMERCIAL AREA INFORMATION

Type of Use ⁽¹⁾	Description of Use	Gross Floor Area (square feet)	Additional Occupancy Information		Occupancy Assumptions per Gross Square Footage (GSF)				Number of Occupants per Day				
			Beds/Seats/Rooms/Washers/Type	Number	Number of Days Occupied per Year ⁽²⁾	GSF per All Occupants ⁽³⁾	GSF per Employee ⁽⁴⁾	Equivalent Occupied Days per Year	Employees	Visitors/Customers/Students/Patients/Guests			
Hospital			Number of Beds		365		108	350	-	0		-	
Office	Office Building	8,627	--	--	250	260	269	310	260	28		5	
Retail	Convenience Store	2,396	--	--	206	260	103	630	260	4		20	36
Eating & Drinking	Bakery or Cafeteria	14,283	Number of Seats	75	299	360	31	200	360	72		393	
Medical Office	Doctor Offices	1,876	--	--	250	260	135	490	260	4		10	
Grocery Store			--	--	299		103	290	-	0		-	
Assisted Living			Number of Beds		365		399	560	-	0		-	
Warehousing/Storage			--	--	126		718	1,020	-	0		-	
Lodging			Number of Rooms		365		431	1,440	-	0		-	
Education			--	--	141		50	890	-	0		-	
Manufacturing/Light Industrial			--	--	234		431	570	-	0		-	
Places of Assembly			--	--	228		14	1,650	-	0		-	
Auto Service			--	--	206		72	430	-	0		-	
Personal Services	Beauty Shop	15,626	--	--	228		72	650	228	25		193	
Laundry & Sanitation			Number of Washers		365		54	690	-	0		-	
Car Wash			Type of Facility		206		54	1,020	-	0		-	
Other			--	--	--		--	--	-	--		--	-
Total		42,808							Equivalent Total	133	-	601	36
Number of Employees = Gross Floor Area (sq. ft.) / GSF per Employee					Number of Visitors/Customers/Students/Patients/Guests = Gross Floor Area (sq. ft.) / GSF per All Occupants - Number of Employees								

Notes:

Building Information ▼

Select all types of commercial uses in development*

<input checked="" type="checkbox"/> Hospital	<input type="checkbox"/> Office	<input type="checkbox"/> Retail
<input type="checkbox"/> Eating & Drinking	<input type="checkbox"/> Medical Office	<input type="checkbox"/> Grocery Store
<input type="checkbox"/> Assisted Living	<input type="checkbox"/> Warehousing/Storage	<input type="checkbox"/> Lodging
<input type="checkbox"/> Education	<input type="checkbox"/> Manufacturing/Light Industrial	<input type="checkbox"/> Places of Assembly
<input type="checkbox"/> Auto Service	<input type="checkbox"/> Personal Services	<input type="checkbox"/> Laundry & Sanitation
<input type="checkbox"/> Car Wash	<input type="checkbox"/> Other	

Description of commercial use

Description of Hospital use*

 Hospital with beds

Commercial gross floor area

Hospital gross floor area*

Additional Occupancy Information

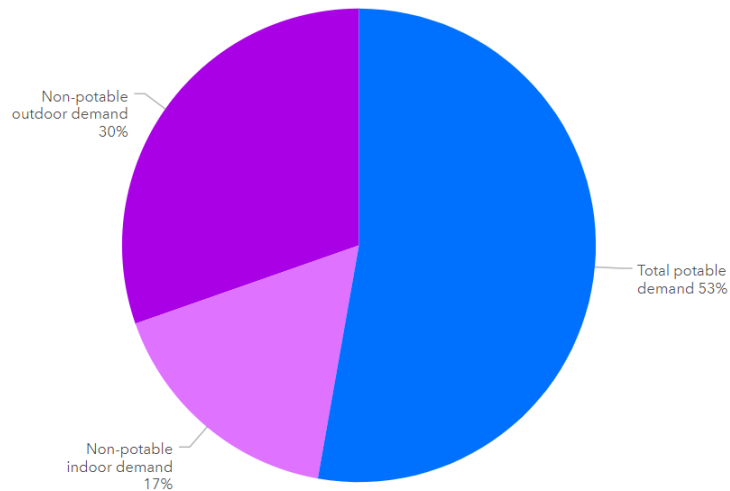
Number of beds in Hospital*

Number of days occupied per year

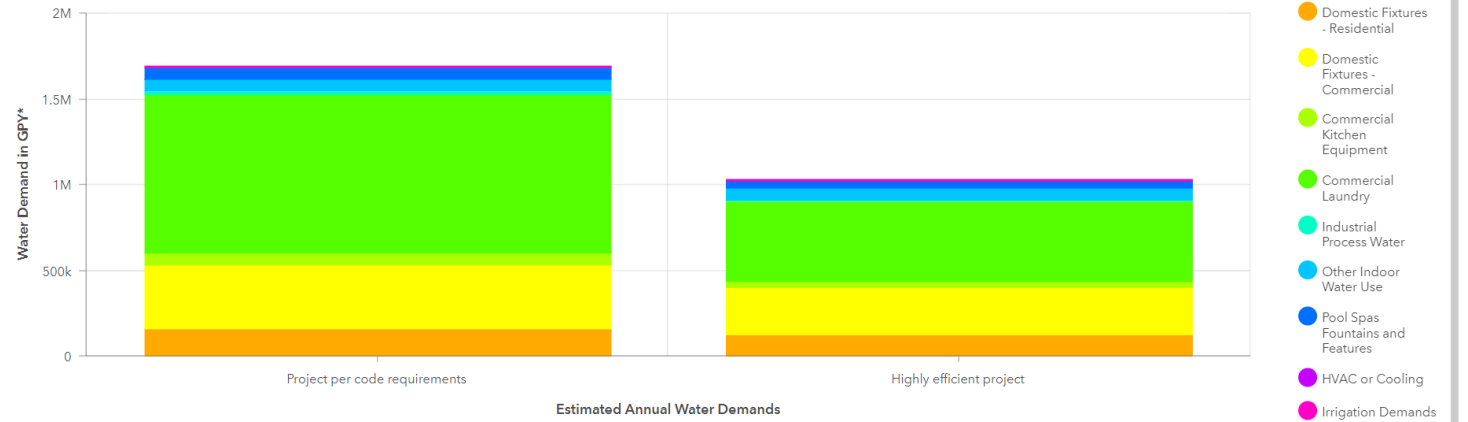
Default values for number of occupied days per year for each space use type are from COMNET Energy Modeling Software Manual, Appendix C Rev. 3 . These values can be overridden by the user.

Hospital use days occupied*

Annual Potable vs. Non-potable Water Demand



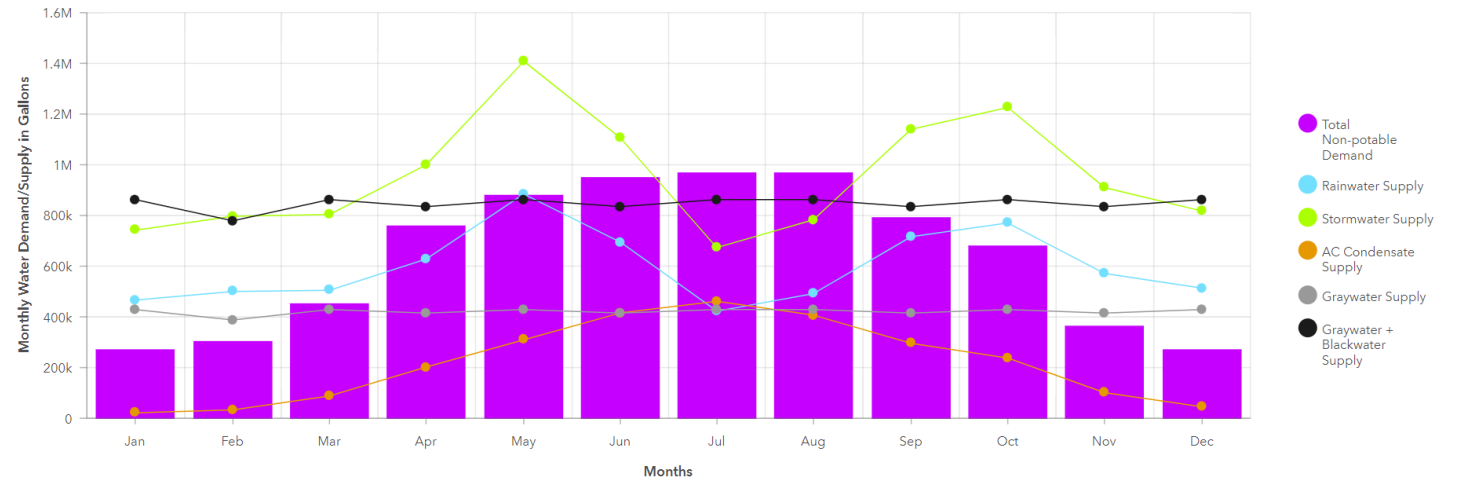
Water Saving Potential from Highly Efficient Water-Using Fixtures and Features



The bar on the left shows your project's estimated annual water demands if all buildings in the project were to install water-using fixtures that simply met City of Austin minimum code efficiency requirements and usage rates. The bar on the right shows how much water your project could potentially save if buildings were to install recommended water-using fixtures and features that use even less water than City of Austin code requires. You can hover over the bar chart to read the total volumes of water demand by fixture or feature type.

*Gallons per Year

Non-potable Demand and Alternative Onsite Supplies



This chart shows your project's monthly non-potable demand and monthly available onsite alternative water supplies. Utilizing one or more of these alternative water supplies to meet your project's non-potable demand can save on utility bills, increase project resiliency and contribute to the goal of extending the City's drinking water supplies. If the City's reclaimed water or 'purple pipe' network is available to your project, you can use reclaimed water for your project's non-potable water demands.



Detailed Monthly Supply and Demand Information

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Potable Indoor Fixture Demand	27,500	24,800	27,500	26,600	27,500	26,600	27,500	27,500	26,600	27,500	26,600	27,500	323,600
Potable Pool/ Spa Demand	4,500	4,600	5,400	5,500	4,900	6,400	7,900	7,600	5,900	5,000	4,800	4,500	67,000
Total Potable Demand	32,000	29,400	32,900	32,100	32,400	33,000	35,400	35,100	32,500	32,500	31,400	32,000	390,600
Non-Potable Indoor Fixture and Water Feature Demand	865,500	781,700	865,500	837,500	865,500	837,500	865,500	865,500	837,500	865,500	837,500	865,500	10,190,124
Non-Potable Outdoor Irrigation and Water Feature Demand	0	100	100	300	400	400	400	400	300	300	100	0	2,900
Cooling Tower Make up Water Demand	1,100	1,000	1,300	1,400	3,200	5,000	6,500	7,600	7,000	3,500	1,100	900	39,600
Dust Control or Street Cleaning Demand	Yes												
Total Non-Potable Demand	866,600	782,800	866,900	838,800	868,700	842,500	872,000	873,100	844,500	869,000	838,600	866,400	10,202,724
Graywater Supply	21,900	19,800	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900	219,000
Graywater + Blackwater Supply	802,700	725,100	802,700	795,000	802,700	795,000	802,700	802,700	795,000	802,700	795,000	802,700	8,000,000
Condensate Water Supply	100	200	100	100	100	100	100	100	100	100	100	100	600
Rainwater Supply	900	1,000	900	900	900	900	900	900	900	900	900	900	1,100
Stormwater Supply	0	0	0	0	0	0	0	0	0	0	0	0	0
Foundation Drainage Supply	No												
Total Onsite Water Supply	803,700	726,300	804,600	797,000	804,600	797,000	804,600	804,600	797,000	804,600	797,000	804,600	8,000,600

Detailed Efficient Water-Using Fixture and Feature Recommendations

Fixtures	Water efficiency code requirement	Daily demand (gallons per day)	Annual potable demand (gallons per year)	Efficiency recommendation	Efficient project annual potable demand (gallons per year)	Percent more efficient
Domestic Fixtures - Residential						
Showerhead	2.5 gallons per minute	200	73,700	2 gallons per minute	59,000	20
Bathroom faucet	2.2 gallons per minute	83	30,100	1 gallon per minute	13,700	55
Kitchen faucet	2.2 gallons per minute	250	90,300	1.8 gallons per minute	73,900	18
Clothes Washer	4.7 gallons per cubic foot*	85	30,900	3.2 gallons per cubic foot Energy Star (R) rated appliance	21,000	32
Toilet	1.28 gallons per flush	96	35,000	1 gallon per flush	27,300	22
Dishwasher	3.5 gallons per load*	5	1,920	2.9 gallons per load Energy Star (R) rated appliance	1,590	17
Bath	20.2 gallons per bath*	21	7,740	Bath volumes are not reduced by efficient fixtures	NA	NA
Subtotal		740	269,660		204,230	24.00
Domestic Fixtures - Commercial						
Showerhead	2.5 gallons per minute	180	65,800	2 gallons per minute	52,600	20
Bathroom Faucet	0.5 gallons per minute	32	10,700	0.25 gallons per minute	5,350	50
Toilet (Male)	1.28 gallons per flush	59	20,700	1 gallon per flush	16,200	22
Toilet (Female)	1.28 gallons per flush	87	29,300	1 gallon per flush	22,900	22
Urinal	0.5 gallons per flush	14	4,260	1 pint per flush	1,070	75
Kitchen Faucet	2.2 gallons per minute	32	9,490	1.8 gallons per minute	7,760	18
Subtotal		404	140,250		105,880	25.00
Commercial Kitchen Equipment						
Commercial Dishwasher	1.31 gallons per rack *	37	11,000	Use an ENERGY STAR® 0.79 gallon per rack dishwasher	6,630	40



Potential Annual Water and Wastewater Utility Bill Savings from Using Alternative Water Sources

If project type is Residential refer to table below

Project Billed as	Maximum estimated project savings from using alternative supply to meet non-potable demand (\$)	Project Non Potable Demand (gallons)
Residential	140,000	10,200,000

If project type is Commercial refer to table below

Project Billed as	Maximum estimated project savings from using alternative supply to meet non-potable demand (\$)	Project Non Potable Demand (gallons)
Commercial	140,000	10,200,000

Note: Mixed use projects are either billed as residential or commercial based on the dominant use (square footage) for the project.

This table shows the estimated maximum savings you can expect to see each year if your project used either an alternative onsite supply or reclaimed water to meet all of the project's non-potable demands. Actual project savings will depend on the water balance of the development, and the type(s) of alternative water supplies that are used to meet the non-potable demands.

● Additional Rebates and Incentives

Rebates for Alternative Water Use

If you plan on using an onsite alternative supply, you may qualify for up to \$500,000 with the [OWRS Pilot Incentive Program](#)

OR

Up to \$100,000 using the [Bucks for Business](#) rebate

OR

Up to \$5,000 with [Rainwater Harvesting Rebate](#)

Reduced Connection Fees

Reclaimed water customers can expect to pay lower water and wastewater impact fees for their project since reclaimed water meters are not assessed those fees. These savings can be as much as a few thousand dollars to hundreds of thousands of dollars per project, depending on the number of service units for the reclaimed water meter.

Water Your Landscape Whenever You Want

Properties that use an alternative water source for irrigation, either reclaimed or onsite alternative water, are not subject to the City's mandatory watering restrictions.

Additional Information

[Onsite Water Reuse Permitting Process and Resources](#)

[AW Conservation Program](#)

City Code for Alternative Water Use

City Code Requirements for Reclaimed Water Use

If your project is located within 250 feet of the City's reclaimed water piping, City Code requires the property to connect to the reclaimed system and use the water for your project's non-potable demands like toilet flushing, irrigation and cooling. The mandatory reclaimed connection distance increases to 500 feet for large development projects with 250,000 square feet or more of gross floor area.

To determine if this ordinance applies to your project refer to the reclaimed pipe network in Austin Water's Records Access Application (RAA), an online GIS viewer available to organizations external to City of Austin, or email ReclaimedWater@austintexas.gov. If you do not already have access, you may request access to [RAA here](#).

City Code Requirements for Reuse for Cooling Towers

New developments with an evaporative cooling tower system with a combined cooling capacity equal to or greater than 100 tons shall have a minimum of 10 percent of the cooling tower make-up water offset with reclaimed water or onsite water reuse.

New developments with an evaporative cooling tower system with a combined cooling capacity equal to or greater than 200 tons must collect and use A/C condensate water for a project's non-potable water demands.

City Code Requirements for Onsite Water Reuse

Beginning in December 2023, new large development projects, those with 250,000 square feet or more of gross floor area, will be required to install an onsite water reuse system to meet a project's non-potable water demands. An onsite water reuse system collects and treats rainwater, graywater, stormwater, A/C condensate or foundation drain water for reuse.

After having gone through the summarized information in this dashboard, please answer the following as best as you can

Alternative Water Supplies

We have provided you with information on the City's code requirements for alternative water use in new commercial development projects in page 6 City Code for Alternative Water Use of the dashboard. Please indicate below whether or not your project is subject to any of the City's alternative water use codes/ordinances. If your project is not subject to any of the City's alternative water use codes/ordinances, but you anticipate voluntary adoption of either a reclaimed water connection or installation of an onsite water reuse system, please indicate the type of alternative water use being considered.

My project is within 250' of a reclaimed water line*

Yes No

In addition to the mandatory reclaimed connection, my project will voluntarily use the following alternative water supplies*

Rainwater A/C Condensate Graywater
 Stormwater None

Submit

Austin Water | Pre-Development Water Benchmarking Application

Development Information Summary

Project Name : weve
Project Address : 6310 wilhemina
Project Gross Floor Area : 4800

Annual Water Demand Summary: Baseline Water Use

Project with code required fixtures & no alternative water supply: 10600000 gallons

Annual Water Demand Summary: Project with Maximized Water Use Efficiency

Project with all efficient fixture recommendations and meeting all non-potable demands with alternative onsite or reclaimed water: 285000 gallons

Annual Water Demand Summary: Your Project

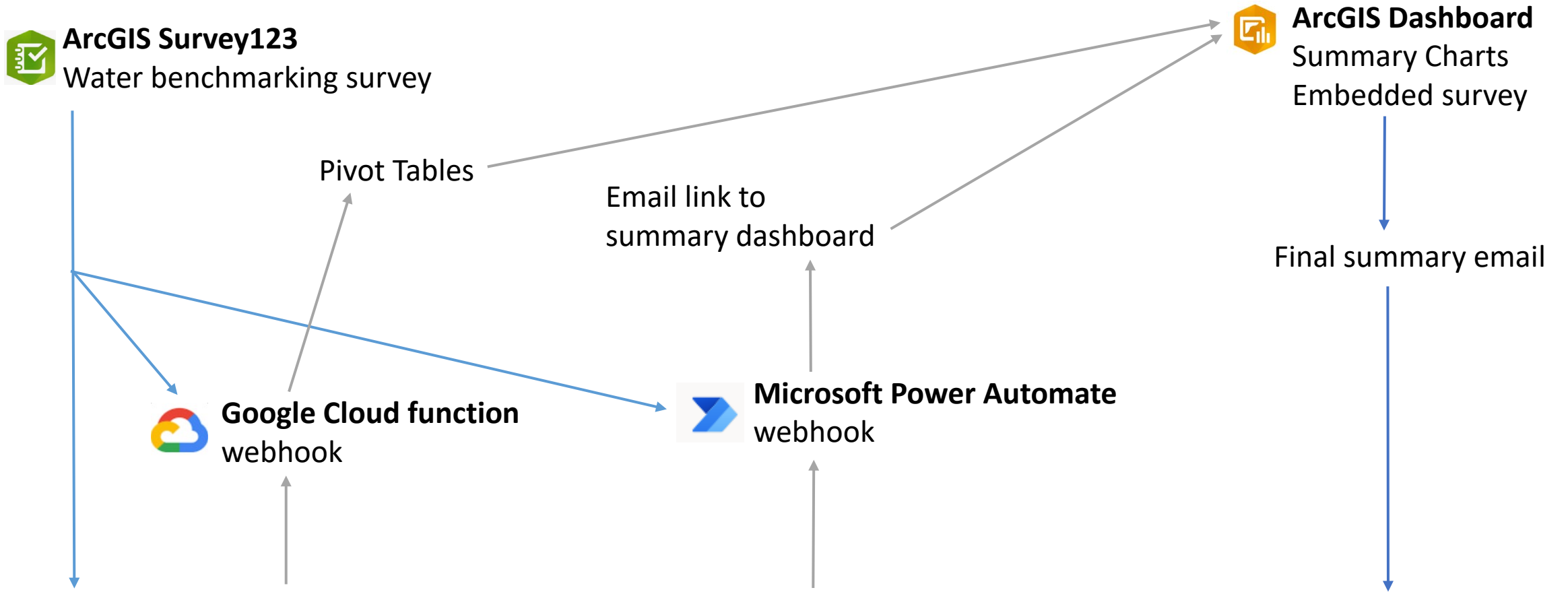
Project incorporating applicant's indicated water efficient fixtures and applicant's indicated alternative onsite or reclaimed supply to meet applicant's indicated non-potable demands: 300000 gallons

Note:

Projects with 250,000 square feet of gross floor area or more will be required to meet with Austin Water staff prior to site plan release to discuss water efficiency code requirements, water use benchmarking data, and incentives and rebates for alternative water use and conservation. You may schedule this meeting by contacting AW_Benchmarking@austintexas.gov

Thank you,
AW Water Benchmarking Team

Process flow



Underlying feature layer	Underlying feature layer	Underlying feature layer
GIS Point Locations	Project Data	Survey Responses

When a survey response is submitted

Delay

Send an email (V2)

* To: body/feature/a... x

* Subject: Water Use Summary - body/feature/a... x

* Body:

Font 12 B I U [Rich Text Editor Icons]

Hello body/feature/attributes/APP_NAME x,

Thank you for completing the first step of your water benchmarking application. Next steps are listed below:

Step 1: Review water use summary of your project. Click here to view summary - <https://austinwater.maps.arcgis.com/apps/dashboards/c3c2a9c76ec14924b9cfd52370a38e40#Test2={body/feature/result/globalId x}>

If you signed into the field app when filling out the survey, please sign into the same account in arcgisonline, and open the above link in the same browser.

Step 2: Answer questions that appear on the survey in the link above. Click 'Submit' after completing survey.

Step 3: Upon hitting submit, you will get an email titled 'Water Benchmarking Application - body/feature/attributes/PROJ_NAME x' confirming your submission.

Thank you,
AW Water Benchmarking Team

Water Use Summary - Bergstrom Storage

AW_Benchmarking
To Patel, Prachi

[Reply](#) [Reply All](#) [Forward](#)

Thu 3/3/2022 4:4

Hello Prachi Patel,

Thank you for completing the first step of your water benchmarking application. Next steps are listed below:

Step 1: Review water use summary of your project. Click here to view summary - <https://austinwater.maps.arcgis.com/apps/dashboards/c3c2a9c76ec14924b9cfd52370a38e40#Test2={83D2CF11-8B30-4CE3-8B3B-8E4798DCF271}>
If you signed into the field app when filling out the survey, please sign into the same account in arcgisonline, and open the above link in the same browser.

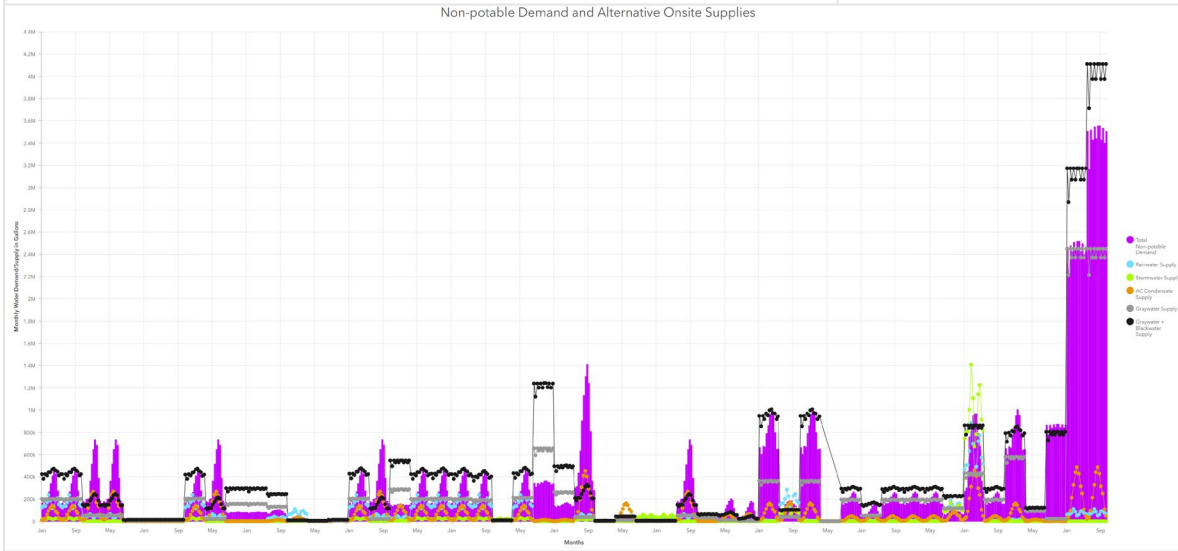
Step 2: Answer questions that appear on the survey in the link above. Click 'Submit' after completing survey.

Step 3: Upon hitting submit, you will get an email titled 'Water Benchmarking Application – Bergstrom Storage' confirming your submission.

Thank you,
AW Water Benchmarking Team

Unfiltered chart (no URL parameter)

<https://austinwater.maps.arcgis.com/apps/dashboards/c3c2a9c76ec14924b9cfd52370a38e40>



Filtered chart (with URL parameter)

Category parameter

Name

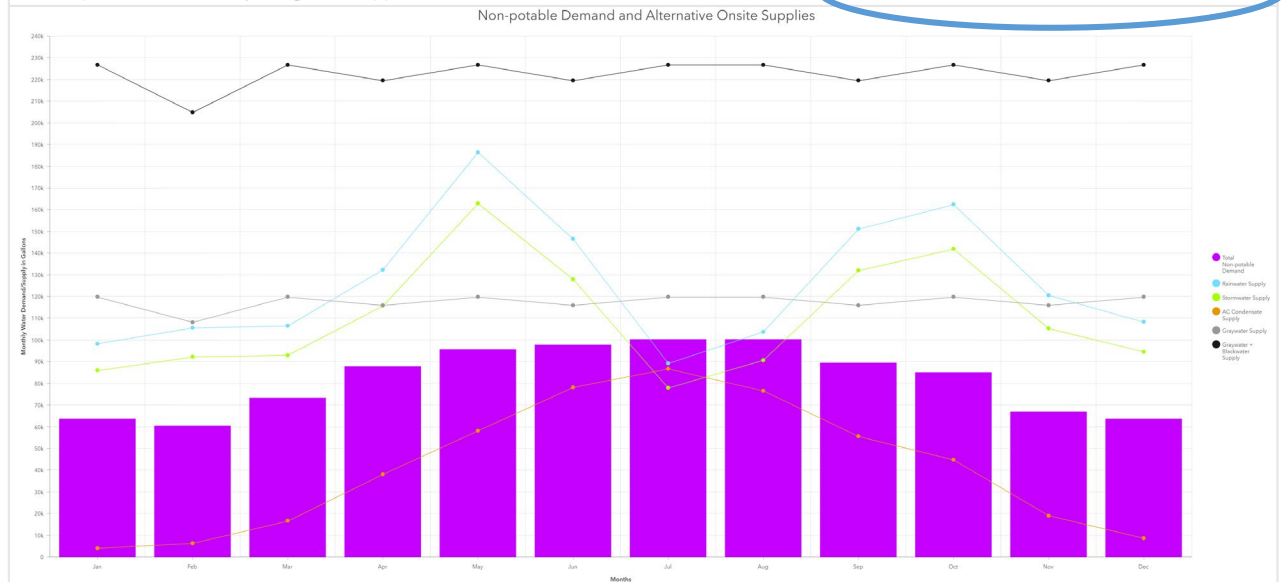
When parameter value(s) change

Filter

Non-potable Demand and Alternative Onsite Supplies

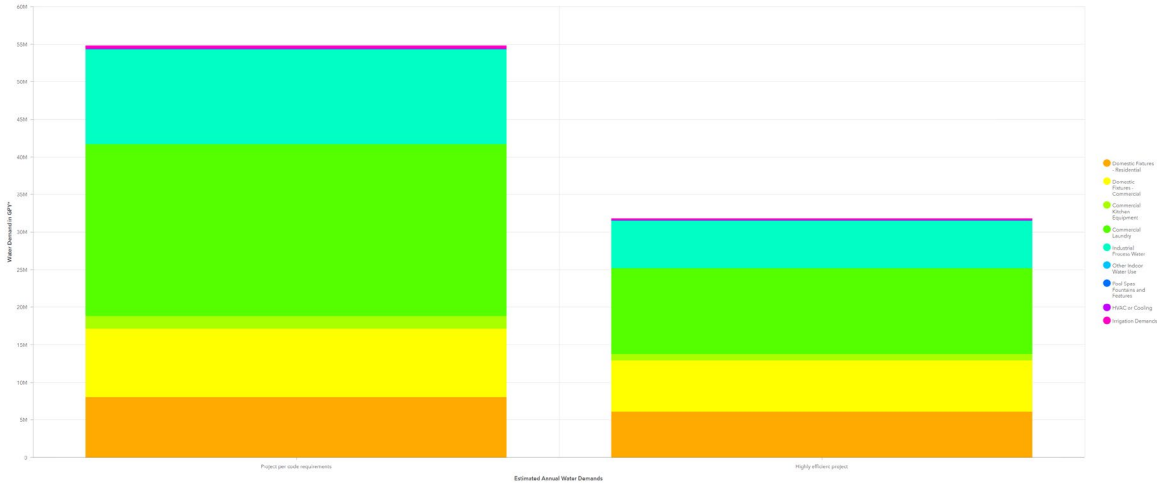
Source field Target field

<https://austinwater.maps.arcgis.com/apps/dashboards/c3c2a9c76ec14924b9cfd52370a38e40#Test2={2D5E4E61-0910-4C4B-9890-00DAE6686B16}>



Stacked charts on ArcGIS Dashboard

Water Saving Potential from Highly Efficient Water-Using Fixtures and Features



```
# Reshape the survey data for the submitted survey
```

```
unpivoted_data = pd.DataFrame(
    columns=['ParentGlobalID', 'Mon', 'TOTNPOT_DEM', 'RW', 'SW', 'CONCOL', 'GW', 'BW', 'FD_SUP'],
    index=['Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', 'Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec'])
```

```
# Get all the survey data
```

```
gis = GIS("http://austinwater.maps.arcgis.com", username="InterAGO", password="")
survey_layer = gis.content.get('619b15a5bc35404ca58d7b48402f3e8f').layers[0]
```

```
# The submitted row gets unpivoted to 12 rows (one per month)
```

```
for index, row in survey_data.iterrows():
    unpivoted_data.loc['Jan'] = [{" + str(row['globalid']) + "}, 'Jan',
    row['TOTNPOT_DEM_JAN'], row['RW_JAN'], row['SW_JAN'], row['CONCOL_JAN'], row['GW_JAN'], row['BW_JAN'], row['FD_SUP']]

    unpivoted_data.loc['Feb'] = [{" + str(row['globalid']) + "}, 'Feb',
    row['TOTNPOT_DEM_FEB'], row['RW_FEB'], row['SW_FEB'], row['CONCOL_FEB'], row['GW_FEB'], row['BW_FEB'], row['FD_FEB']]

    ...

chart_table.edit_features(adds=unpivoted_data.spatial.to_featureset())
```

Survey 123 Webhook

Water Benchmarking Survey Overview Design Collaborate Analyze Data Settings

Version

Webhooks

Edit webhook

A POST request will be sent to the payload URL below with selected details of any subscribed events.

Name *

Google Cloud Functions

Payload URL *

https://us-central1-winged-standard-223817.cloudfunctions.net/pivot_table

Trigger events

New record submitted Existing record edited

Submitted record

Event data

Include following information in the payload

Survey info Server response User info Portal info

Status

On

Save Cancel

```
# Get the ObjectID of the submitted survey
request_json = request.get_json(silent=True)
object_id = request_json['feature']['result']['objectId']

# Query the survey layer for the matching ObjectID
survey_data = survey_layer.query(where='objectId = ' + str(object_id))
```

Python script on Google Cloud Platform

Google Cloud Platform Austin Water GIS - StreetView Search products and resources

Cloud Functions Functions CREATE FUNCTION REFRESH

Filter Filter functions

Name	Region	Trigger	Runtime	Memory allocated	Executed function	Last deployed	Authentication	Actions
pivot_table	us-central1	HTTP	Python 3.7	1 GB	update_table	Dec 21, 2021, 12:15:05 PM	Allow unauthenticated	

main.py requirements.txt

```
fixtype_table = gis.content.get('9d0b4bf46ecb4fa4b0ba7bb4076c30dc').tables[0]
# Get all the survey data
survey_layer = gis.content.get('619b15a5bc35404ca58d7b48402f3e8f').layers[0]
# Reshape the survey data for the submitted survey
survey_data = survey_layer.query(where='objectId = ' + str(object_id), as_df=True)
pivoted_data = pd.DataFrame(columns=['ParentGlobalID', 'Mon', 'TOTNPOT_DEM', 'RW', 'SW',
                                     'CONCOL', 'GW', 'BW', 'FD_SUP'],
                             index=['Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', 'Jul',
                                     'Aug', 'Sep', 'Oct', 'Nov', 'Dec'])
pivoted_fixtype_data = pd.DataFrame(columns=['ParentGlobalID', 'FIX_TYP', 'DOMRES_ABN', 'DOMCON_ABN',
                                             'CONCRET_ABN', 'TOT_COLLAUN_ABN', 'IPW_ABN', 'OTH_ABN',
                                             'POSPADCFE_ABN', 'CT_ABN', 'IRR1_ABN'], index=['CODE', 'EF'])
```

METRICS DETAILS SOURCE VARIABLES **TRIGGER** PERMISSIONS LOGS TESTING

HTTP

Trigger URL https://us-central1-winged-standard-223817.cloudfunctions.net/pivot_table

Require HTTPS

Debug 10

Default 2

LOG NAME

PROJECT ID

winged-standard-223817

FUNCTION NAME

pivot_table

REGION

us-central1

Query results 12 log results

SEVERITY TIMESTAMP

Showing logs for last 7 days from 12/29/21, 3:26 PM to 1/5/22, 3:26 PM

Timestamp	Severity	Message
2022-01-04 17:46:12.130 CST	INFO	Function execution started
2022-01-04 17:46:13.383 CST	WARNING	OpenBLAS WARNING - could not determine the L2 cache size on this system, assuming 256
2022-01-04 17:46:22.577 CST	INFO	Function execution took 10448 ms, finished with status code: 204
2022-01-04 17:46:22.706 CST	INFO	Function execution started
2022-01-04 17:46:26.661 CST	INFO	Function execution took 3956 ms, finished with status code: 200
2022-01-04 17:46:37.233 CST	INFO	Function execution started
2022-01-04 17:46:40.378 CST	INFO	Function execution took 3146 ms, finished with status code: 200
2022-01-04 17:50:47.243 CST	INFO	Function execution started



Creating user-friendly tables

Detailed Monthly Supply and Demand Information

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Potable Indoor Fixture Demand	27,500	24,800	27,500	26,600	27,500	26,600	27,500	27,500	26,600	27,500	26,600	27,500	323,600
Potable Pool/ Spa Demand	4,500	4,600	5,400	5,500	4,900	6,400	7,900	7,600	5,900	5,000	4,800	4,500	67,000
Total Potable Demand	32,000	29,400	32,900	32,100	32,400	33,000	35,400	35,100	32,500	32,500	31,400	32,000	390,600
Non-Potable Indoor Fixture and Water Feature Demand	865,500	781,700	865,500	837,500	865,500	837,500	865,500	865,500	837,500	865,500	837,500	865,500	10,190,124
Non-Potable Outdoor Irrigation and Water Feature Demand	0	100	100	300	400	400	400	400	300	300	100	0	2,900
Cooling Tower Make up Water Demand	1,100	1,000	1,300	1,400	3,200	5,000	6,500	7,600	7,000	3,500	1,100	900	39,600
Dust Control or Street Cleaning Demand	Yes												
Total Non-Potable Demand	866,600	782,800	866,900	838,800	868,700	842,500	872,000	873,100	844,500	869,000	838,600	866,400	10,202,724
Graywater Supply	21,900	19,800	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900	219,000
Graywater + Blackwater Supply	802,700	725,100	802,700	796,900	802,700	796,900	802,700	802,700	796,900	802,700	796,900	802,700	8,000,000
Condensate Water Supply	100	200	100	100	100	100	100	100	100	100	100	100	600
Rainwater Supply	900	1,000	900	900	900	900	900	900	900	900	900	900	1,100
Stormwater Supply	0	0	0	0	0	0	0	0	0	0	0	0	0
Foundation Drainage Supply	No												
Total Onsite Water Supply	803,700	726,300	804,600	798,800	804,600	798,800	804,600	804,600	798,800	804,600	798,800	804,600	8,011,300

Detailed Efficient Water-Using Fixture and Feature Recommendations

Fixtures	Water efficiency code requirement	Daily demand (gallons per day)	Annual potable demand (gallons per year)	Efficiency recommendation	Efficient project annual potable demand (gallons per year)	Percent more efficient
Domestic Fixtures - Residential						
Showerhead	2.5 gallons per minute	200	73,700	2 gallons per minute	59,000	20
Bathroom faucet	2.2 gallons per minute	83	30,100	1 gallon per minute	13,700	55
Kitchen faucet	2.2 gallons per minute	250	90,300	1.8 gallons per minute	73,900	18
Clothes Washer	4.7 gallons per cubic foot*	85	30,900	3.2 gallons per cubic foot Energy Star (R) rated appliance	21,000	32
Toilet	1.28 gallons per flush	96	35,000	1 gallon per flush	27,300	22
Dishwasher	3.5 gallons per load*	5	1,920	2.9 gallons per load Energy Star (R) rated appliance	1,590	17
Bath	20.2 gallons per bath*	21	7,740	Bath volumes are not reduced by efficient fixtures	NA	NA
Subtotal		740	269,660		204,230	24.00
Domestic Fixtures - Commercial						
Showerhead	2.5 gallons per minute	180	65,800	2 gallons per minute	52,600	20
Bathroom Faucet	0.5 gallons per minute	32	10,700	0.25 gallons per minute	5,350	50
Toilet (Male)	1.28 gallons per flush	59	20,700	1 gallon per flush	16,200	22
Toilet (Female)	1.28 gallons per flush	87	29,300	1 gallon per flush	22,900	22
Urinal	0.5 gallons per flush	14	4,260	1 pint per flush	1,070	75
Kitchen Faucet	2.2 gallons per minute	32	9,490	1.8 gallons per minute	7,760	18
Subtotal		404	140,250		105,880	25.00
Commercial Kitchen Equipment						
Commercial Dishwasher	1.31 gallons per rack *	37	11,000	Use an ENERGY STAR® 0.79 gallon per rack dishwasher	6,630	40

Creating user-friendly tables

Table



PROJ_NAME	PRJ_TYP
16400 PARKVIEW PROJECT	1
234234234	1

Table



PROJ_NAME	PRJ_TYP	NO_BLDGS	SIT_GFA
Acts Fellowship Church	Commercial	1	34,636
Project West Austin	Commercial	3	1,084,147
Northgate IH-35 Warehouse	Commercial	1	144,754
Manor Transportation Facility	Commercial	2	42,015
Hines Johnny Morris Industrial	Commercial	4	688,080
742-746 Northwestern Ave	Commercial	1	16,287
Clarius Industrial	Commercial	6	1,003,700

Data

Table

Header

Values

Summary

General

Actions

Data options Show data table

Layer: Water_Benchmarking Change

Filter

Table type Grouped values Features

Category field

Value fields Add

PRJ_TYP Count

Sort by Add

Data

Table

Header

Values

General

Actions

Data options Show data table

Layer: Water_Benchmarking Change

Filter + Filter

Table type Grouped values Features

Value fields Add field

PROJ_NAME trash

PRJ_TYP trash

NO_BLDGS trash

SIT_GFA trash

Sort by Add field

PRJ_TYP list icon trash

Maximum rows

Creating user-friendly tables

Data | **List options**

List | **Advanced formatting** ⓘ Enable

General

Actions | **Line item template**

Fixtures	Water efficiency code requirement	Daily demand (gallons per day)	Annual
Domestic Fixtures - Residential			
Showerhead	2.5 gallons per minute	{RSHOW_DLY}	{RSH
Bathroom faucet	2.2 gallons per minute	{RBFAUCT_DLY}	{RBF
Kitchen faucet	2.2 gallons per minute	{RKFAUCT_DLY}	{RKF
Clothes Washer	4.7 gallons per cubic foot*	{RCWASH_DLY}	{RCV
Toilet	1.28 gallons per flush	{RTOIL_DLY}	{RTC
Dishwasher	3.5 gallons per load*	{RDWASH_DLY}	{RDV
Bath	20.2 gallons per bath*	{RBATH_DLY}	{RBA
Subtotal		{DOMRES_DLY}	{DO

Line item icon: None **Symbol**

Data | **List options**

List | **Advanced formatting** ⓘ Enable

General

Actions | **Line item template**

```

<table border="1" cellpadding="1" cellspacing="1"
style="width:1100px">
  <tbody>
    <tr>
      <th style="background-color:#004D7B"><span
style="color:#ffffff"><span style="font-
size:12px">Fixtures</span></span></th>
      <th style="background-color:#004D7B">
<p><span style="color:#ffffff"><span style="font-
size:12px">Water efficiency code requirement</span></span></p>
</th>
      <th style="background-color:#004D7B">
<p><span style="color:#ffffff"><span style="font-
size:12px">Daily demand (gallons per day)</span></span></p>
</th>
      <th style="background-color:#004D7B">
<p><span style="color:#ffffff"><span style="font-
size:12px">Annual potable demand (gallons per year)</span></span>
</span></p>
</tr>
      <th style="background-color:#004D7B">

```

Line item icon: None **Symbol**



Linking both surveys/ features

ArcGIS Dashboard



Data options Show data table

Type Static Features

Layer: Water_Benchmarking Change

Filter + Filter

Content Type Document Image Video

URL Fields: {}

`share/e51b48c490a34772bcb8ee12244a49af?mode=view&globalId={globalid}`

Interface

Benchmarking Follow up Information Survey

Project Name
Example Project Lot 3 Block A Condominiums

Project Address
1000 Austin Road

Survey 123 Connect



	form_title	form_id	instance_name	submission_url
1				
2	Benchmarking Follow up Information Survey	Test_1_Water_Benchmarking		https://austinwater.maps.arcgis.com/sharing/rest/content/items/619b15a5bc35404ca58d7b48402f3e8f
3				

Survey Data Table

Test_1_Water_Benchmarking (Features: 8, Selected: 0)

GlobalID	SP_CASE	PROJ_NAME	PROJ_ADD	PROJ_DATE	PRJ_TYP	SITE_AREA	ObjectID
2d5e4e61-0910-4c4b-9890-00dae6686b16	SP-2021-0445CSH	Example Project Lot 3 Block A Condominiums	1000 Austin Road	2/1/2024, 12:00 PM	Residential	258,572	62
5aad135a-4447-4a48-bc63-95dbda1130d8	SP-2021-0446D	Example New Development	555 Capitol City Boulevard, Austin TX	12/31/2023, 12:00 PM	Mixed Use	1,698,900	63
08fecbf1-cc4b-490e-8c2e-b0d1b0ad03a1	345B	December Test2	123 Park Avenue	12/29/2021, 12:00 PM	Mixed Use	4,500	64

Water Benchmarking Survey

The Water Benchmarking Application provides an opportunity for Site Plan applicants to assess how water will be used within their development projects before construction begins. Each Water Benchmarking applicant is provided with a set of recommendations for how to improve water use efficiency within their specific project as well as information on the benefits of incorporating these recommendations into their project (such as water utility bill savings and available rebates or incentives).

This survey asks for general project and site information as well as building use and occupancy descriptions. Most inputs can be found within the project site plan. The questions marked with a red asterisk are required. In some cases default values are provided but applicants are encouraged to provide project specific information when available. Text that appears in blue is a calculated value. In some cases, applicant can override a calculation. Some other values are calculated but fixed and can only be changed by changing the inputs. For inputs not found in the site plan, please answer to the best of your knowledge at this time.

Site Plan Case number *

▶ **Project Information**

▼ **Site Coverage**

<p>Site Area *</p> <p>also called Total Site Area (in square feet)</p> <div style="border: 1px solid #ccc; height: 20px; width: 100%;"></div>	<p>Site Gross Floor Area *</p> <p>also called Gross Floor Area, is the total enclosed area of all floors in a building measured to the outside surface of the exterior walls, excludes loading docks, porches, stoops, basements, attics, stories below grade plane, parking facilities, driveways (in square feet).</p> <div style="border: 1px solid #ccc; height: 20px; width: 100%;"></div>	<p>Will you need a meeting with Staff prior to Site Plan approval? *</p> <p>Projects with a total site gross floor area of 250,000 square feet or more must meet with Austin Water staff prior to site plan approval to discuss water efficiency code requirements, water use benchmarking data and incentives and rebates for alternative water use.</p> <p><input type="radio"/> Yes <input type="radio"/> No</p>
<p>Building Roof Area *</p> <p>also called Building Coverage (in square feet)</p> <div style="border: 1px solid #ccc; height: 20px; width: 100%;"></div>	<p>Other Impervious Area *</p> <p>Impervious area not including Building Roof Area (in square feet)</p> <div style="border: 1px solid #ccc; padding: 2px;">0</div>	<p>Impervious Cover *</p> <p>(%)</p> <div style="border: 1px solid #ccc; height: 20px; width: 100%;"></div>

▶ **Irrigated Landscape Areas**

▶ **Building Information**

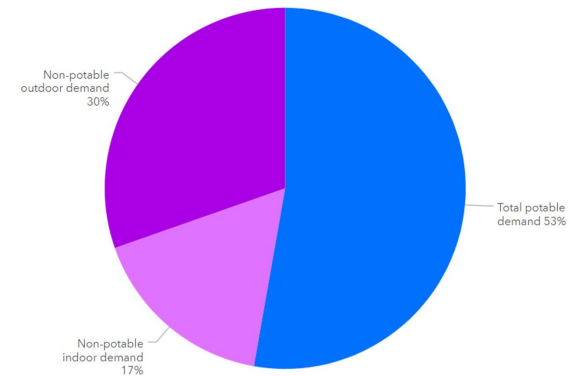
▶ **Other Water Use Information**

✓

Water Forward Strategies

- Benchmarking
- Budgeting
- Conservation
- Onsite Water Reuse

Annual Potable vs. Non-potable Water Demand





Questions?

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