CITY OF SCOTTSDALE

Community & Economic Development Division
Office of Environmental Initiatives

7447 East Indian School Road, Suite 125
Scottsdale, Arizona 85251

To: Honorable Mayor and City Council

From: Lisa McNeilly, Sustainability Director

Date: October 30, 2023

Subject: **Scottsdale Community Sustainability Plan.** Presentation, discussion, and possible direction to staff regarding draft sections of the Community Sustainability Plan.

The Scottsdale Community Sustainability Plan will lay the groundwork for the city's commitment to a more sustainable, resilient and thriving future. The City Council included adoption of a sustainability plan as part of the city's 2021 and 2022 Organization Strategic Plans, and it was identified as an element of the General Plan 2035 implementation.

Staff are seeking additional City Council direction on three draft elements of the Community Sustainability Plan: Introduction, Air Quality, and Water. This draft text (Attachment 1) reflects input received from SEAC, as well as from staff. Presentation materials will be forwarded as they are available.

City Council feedback at Work Study Sessions in March and July 2023 resulted in a sharp focus on the five priorities (energy, water, waste, air quality, and heat), a push to develop baseline metrics and set numeric targets, and the need to include the costs and benefits of action. The discussion at these sessions included a range of specific input on topics and requested the use of narratives to tell a story about why sustainability is important.

The Scottsdale Environmental Advisory Commission (SEAC) has been involved in the plan development from the beginning, sharing their valuable expertise and reviewing plan drafts. Input from this seven-member public body has shaped the plan framework, its aspirations and its message, based on ideas generated at meetings (22 to date) devoted to ensuring the plan reflects the character of Scottsdale.

The remaining plan sections – energy, waste, and water – will be discussed at future SEAC meetings and at a Council WSS in March 2024.

Attachments

1. Community Sustainability Plan: Introduction, Air Quality, and Water (Draft)
2. July 10, 2023 City Council Marked Agenda, Scottsdale Community Sustainability Plan
3. March 7, 2023 City Council Marked Agenda, Scottsdale Community Sustainability Plan
4. Public comment received since July 2023 (including written comments received from members of the Scottsdale Environmental Advisory Commission)

ATTACHMENT 1

CITY OF SCOTTSDALE

COMMUNITY SUSTAINABILITY PLAN

SCOTTSDALE COMMUNITY SUSTAINABILITY PLAN

TABLE OF CONTENTS

SUSTAINABILITY TIMELINE

- **2024: Scottsdale Community Sustainability Plan**
- 2023: Solar infrastructure is added to the North Corporation Yard
- 2023: Natural grass in front yards of new single-family homes prohibited
- 2022: Adopted mandatory Green Construction Code for commercial and multifamily buildings
- 2021: 2035 General Plan approved by voters
- 2020: Began installing LED streetlights
- 2019: Water Campus is first in Arizona to be permitted for direct potable reuse
- 2019: Scottsdale received ASU inaugural Resilience Prize
- 2019: Preserve reaches current size of 30,500 acres
- 2017: Traffic signal coordination began
- 2016: First class of the Scottsdale Water Citizen Academy
- 2012: Adoption of voluntary incentivized green construction code
- 2011: Named a Gold Level Bicycle Friendly Community
- 2010: Began installing LED traffic signals
- 2009: Fire Station 602 – city's first LEED Platinum certified building
- 2008: Xeriscape Garden, a 5.5-acre demonstration garden, opens
- 2008: Compressed natural gas fueling infrastructure is added to public works facilities
- 2007: Granite Reef Senior Center – city's first LEED certified building (Gold)
- 2005: First city in the country to require new municipal buildings to be LEED Gold certified
- 2003: City's first energy code adoption for residential and commercial construction
- 2000: Transportation Management Center became operational
- 2000: Establishment of Sensitive Design Principles for new development
- 1999: First Sustainability Indicators Report produced ("Scottsdale Seeks Sustainability")
- 1998: Water Campus (the largest public works project in city history to date) started operations
- 1998: Green Building Program established as first in Arizona and fifth in the country
- 1996: Solid Waste Transfer Station is constructed
- 1996: Scottsdale begins curbside recycling collection program
- 1996: CityShape 2020 included guiding principle to "Seek Sustainability"
- 1995: Voters approved tax to fund expansion of Preserve
- 1994: McDowell Sonoran Preserve created
- 1993: First component of the city's Intelligent Transportation System installed to reduce congestion
- 1993: Sustainability resident board created (now Scottsdale Environmental Advisory Commission)
- 1991: Environmentally Sensitive Lands Overlay District ordinance adopted
- 1982: Water Conservation Office is formed
- 1982: Scottsdale named a Tree City USA
- 1981: Native Plant Ordinance passes
- 1980: Scottsdale Trolley makes first run
- 1970s: Indian Bend Wash Greenbelt constructed
- 1969: First mechanical garbage truck constructed by city staff (Godzilla)
- 1967: Eldorado Park, Scottsdale's first major park, is built.

WHY A SUSTAINABILITY PLAN?

Scottsdale is a special place with a reputation for livability, known for unparalleled leisure and world-class amenities. The diversity and natural beauty of Scottsdale's landscapes are among its defining features, and the city has championed environmental stewardship while maintaining a high quality of life for residents, visitors and businesses. The public consistently agrees the "overall quality of natural environment in Scottsdale" is essential or very important.[1]

> *"Sustainability is a condition of living that enables the present generation to enjoy social wellbeing, a vibrant economy and a healthy environment, without compromising the ability of future generations to enjoy the same."*
>
> - Scottsdale General Plan 2035, page 280

As Scottsdale nears build-out, expanding our sustainability efforts will be even more important. The city understands that without thoughtful planning and stewardship, our environment and quality of life may be negatively impacted by long-standing and systemic trends – including drought, extreme heat, air pollution and economic and social inequities. The worsening impacts of climate change compel further action on sustainability by Scottsdale.

The benefits of planning for sustainability in Scottsdale are numerous. The plan's key elements – energy, water, waste, air quality and extreme heat – all improve our natural environment. But the proposed solutions also bring other positive outcomes – including cost savings, health and safety improvements, equity and economic vitality. We know these benefits outweigh the upfront costs because we already see community members taking similar action.

The city will need to work in partnership with residents and businesses to succeed, so this plan will build on Scottsdale's legacy of effective, resident-centered governance and sound economic management. The plan provides a roadmap and specific action steps for achieving long-term goals, and it will require cohesive implementation by both the city government and members of the community.

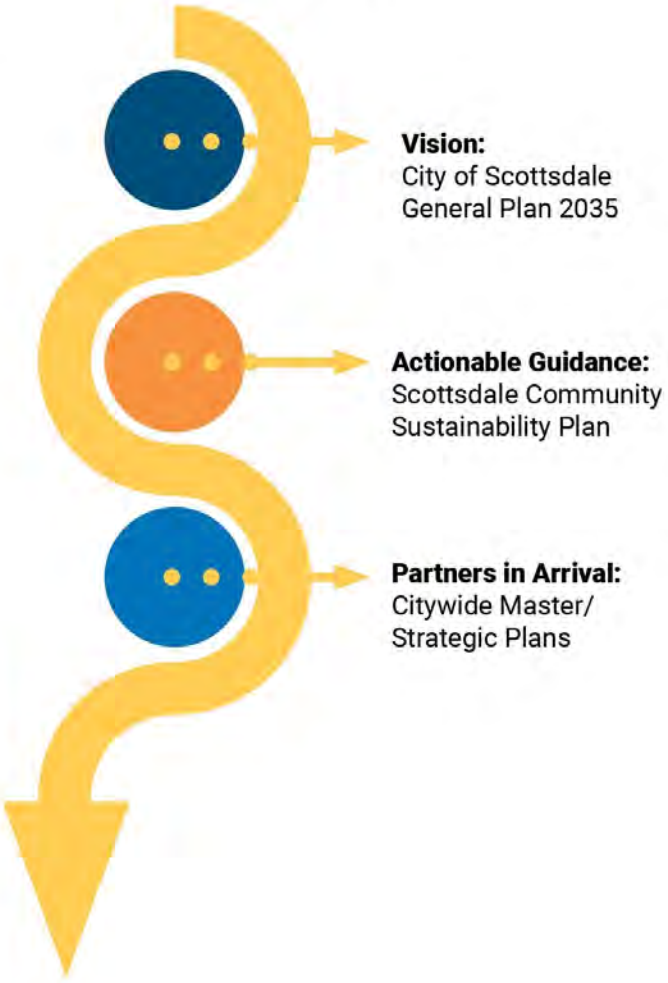
With this plan, Scottsdale embraces a comprehensive approach to achieving ambitious targets and commits to being held accountable for those actions. This Community Sustainability Plan – as imagined by City Council and by the voters who approved the 2035 General Plan – will enhance and expand the work already being done by city staff, residents and businesses. Starting from the 'vision' of the General Plan, the plan will complement others already in place to achieve targets and implement new programs.

Scottsdale may not be a large city, but our position as a respected tourist destination in a unique desert environment has always shaped our outsized commitment to being good stewards. This is not the end of our planning but rather a starting point for a continued sustainability journey -- join us!

"Sustainability can be summarized as our stewardship of natural capital for future generations, going well beyond economic and environmental development to embrace health care, urbanization, energy, materials, agriculture, business practices, social services and government... Sustainability is a concept with as much transformative potential as justice, liberty, and equality."

- Dr. Michael Crow, President, Arizona State University

ROADMAP



SUSTAINABILITY IS NOT NEW TO SCOTTSDALE

Scottsdale's sustainability journey goes back decades and has fortified the city's legacy as a place of innovation. "Seek Sustainability" was one of the guiding principles in the 1996 CityShape General Plan. And Scottsdale's commitment to environmental stewardship was reaffirmed in the General Plan 2035, which identifies five core elements of sustainability and the environment – Open Space, Environmental Planning, Conservation, Water Resources and Energy. As part of a commitment to livability and quality of life, Scottsdale prioritizes services and facilities for residents, including 43 parks, four public libraries and eight resource centers.

> *"Keep Scottsdale safe, wild & beautiful. Maintain Scottsdale's small town feel."*
>
> *"100% supportive of a Sustainability Plan for City of Scottsdale"*
>
> - Resident feedback on the draft Sustainability Plan

Over the years, Scottsdale has proactively found creative solutions to environmental challenges and committed to make life better for residents and visitors. The city responded to flooding problems by building the Indian Bend Wash Greenbelt, a series of parks and amenities covering 11 miles in the center of the city, which was also the first non-structural flood control solution in the country.

Over 30,000 acres of desert habitat has been permanently preserved through the McDowell Sonoran Preserve. Currently, 37% of Scottsdale's footprint is open space (public and private including the Preserve). Meaningful desert open space – whether actively or passively managed – is a fundamental part of Scottsdale's character and is created and maintained with the support of residents and for the benefit of the environment.

The city uses zoning and other requirements to guide development in desert and mountain areas, through policies like the Environmentally Sensitive Lands Overlay District (ESL). The ESL ordinance requires a percentage of each property be permanently preserved as Natural Area Open Space and that specific environmental features be protected through land use dedications and easements. Character Area Plans, like those for Desert Foothills and Dynamite Foothills, support these goals.

Scottsdale pioneered total wastewater reuse and water banking through advanced purification systems, recycling and storing water and reducing reliance on non-renewable surface water. The Scottsdale Water Campus is home to the Advanced Water Treatment Facility (AWT), one of the most sophisticated recycled water facilities in the world and the third permanent facility in the nation permitted as a pilot program for advanced water purification (AWP). The AWT is one of the largest potable water purification facilities in the world and can treat up to 20 million gallons of recycled water a day to a water quality standard that exceeds that of bottled water.

Launched in 1998, Scottsdale's first-in-the-state Green Building Program encourages a whole-systems approach through building design and construction to minimize environmental impacts, reduce energy use and improve occupant health. The program led to the construction of the first LEED Platinum certified fire station in the country – Scottsdale Fire Station 602. In 2022, Scottsdale became the first in the state and one of only a few nationwide to adopt mandatory 'green' building code requirements by mandating compliance with the International Green Construction Code (IgCC).

Achieving these large and difficult milestones has not kept the city from undertaking other projects and initiatives that reflect Scottsdale's forward-thinking approach to desert living. The city's Xeriscape Garden serves as an inspiration to residents and developers, demonstrating just how a beautiful a water-wise, natural desert landscape can be. The community science programs offered by the McDowell Sonoran Conservancy protect biodiversity, mitigate invasive plants and restore ecological balance. The Scottsdale Public Library even 'checks out' seeds and citizen science kits to make hands-on learning accessible to all.

Additionally, municipal operations model good stewardship practices for the whole city. The city partners with utilities to reduce our use of electricity on high-demand days and has installed solar panels at the North Corporation Yard complex. Solar installation will proceed under a master citywide solar plan for new covered parking lots with solar panels. LED installations continue throughout our facilities and low-consumption fixtures, flush valves, showerheads, metering faucets, cooling tower controllers and bottle fillers are used to conserve water.

In 2005, Scottsdale became the first city in the country to require all new city buildings to be certified at the LEED[2] Gold standard or higher.

Responding to a call to reduce water use by 5% between 2021 and 2022, the city saved 38 million gallons through conservation and turf removal, exceeding its goal with a 6% overall reduction.

Parks & Recreation increased their efforts, with use dropping to 25% below the allotment from the Arizona Department of Water Resources. Specifically in 2022, the city converted over 140,000 square feet of non-functional/non-recreational turf to xeriscape, saving more than 5.3 million gallons of water annually. The city also saved almost 4 million gallons of water from 40 city-maintained sites through irrigation controllers that shut off watering during summer monsoon rain events.

Two recent city events – the 2023 State of the City Address and the 2022 Employee Awards were zero waste functions, achieving more than 93% diversion from the landfill.

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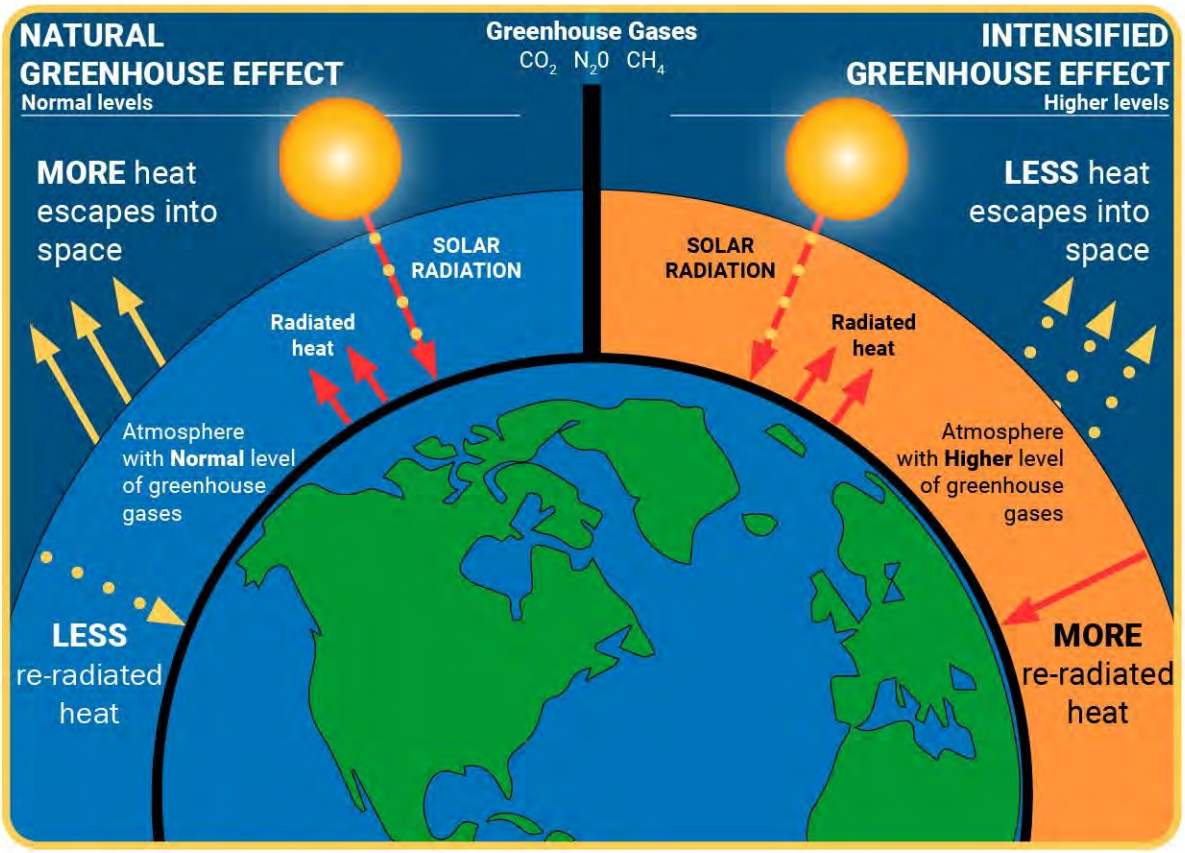
THE SCIENCE OF SUSTAINABILITY

The science behind sustainability efforts is compelling. NASA's records and analysis confirm that the climate is warming and warming faster than any time in the past 10,000 years. Average temperatures are up two degrees Fahrenheit, mostly in the last 40 years, and driven by emissions of carbon dioxide and other human activities.[3] Most of these emissions result from burning fossil fuels for electricity, heat and transportation. The result is an amplification of the natural greenhouse gas effect that is essential for the Earth to be habitable, resulting in more heat trapped in the atmosphere.

Models estimate that temperatures may increase another 4.5 to 8 degrees Fahrenheit by 2100,[4] but other changes in our climate are occurring much faster and can already be seen. NASA has compiled datasets that show warming oceans, rising sea levels and more extreme weather events, among a long list of impacts. Extreme heat acts a threat multiplier, worsening air quality and making our climate more arid.



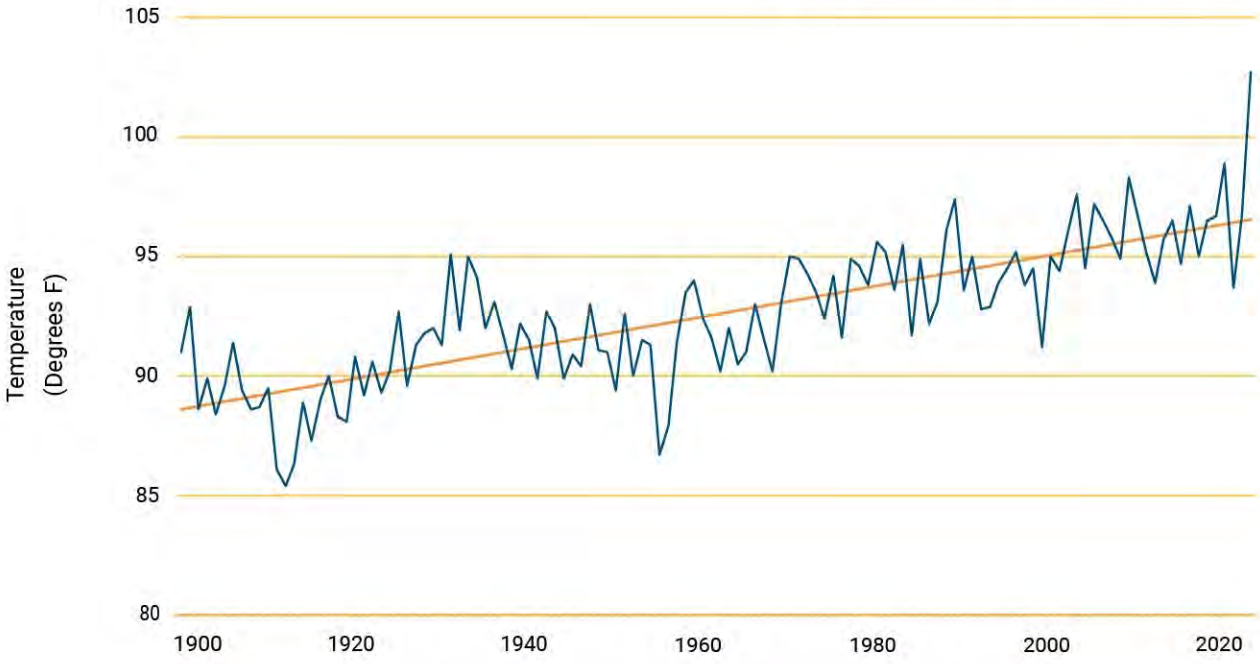
Source: National Park Service

"The implications of the science around climate change are alarmingly clear. The link between greenhouse gases and climate change is now well established, and scientists are gaining a greater understanding of what the Earth might look like if it were to warm by 1.5°C, 2°C [2.7°F, 3.6°F], or more."

- Deloitte, "Act Now: Future Scenarios and the Case for Equitable Climate Action"

Temperatures Valleywide in July 2023 made it the hottest month ever recorded in a U.S. city — a result of natural variability, the urban heat island effect and climate change.[5] This new record continues a trend of increasing average temperatures going back over a century of data. But averages only tell some of the story, since the number and length of heat waves has also been increasing.[6] The cumulative effect of multiple days of extreme daytime highs also means that nighttime temperatures were uncomfortably high, combining to create a deadly weather phenomenon.

AVERAGE JULY TEMPERATURE IN THE PHOENIX AREA (1900-2020)



Source: National Weather Service NOWData, Phoenix Area, Monthly Summarized

The desert southwest is also experiencing one of its worst droughts in 1,200 years. Insufficient rainfall and snowpacks have lowered lake levels, endangered water supplies and impacted soil moisture and vegetation. The Arizona Department of Water Resources monitors drought conditions using precipitation and streamflow data, compares annual data to a 40-year historical record and publishes weekly reports on the status and level of the drought. Similarly, both Scottsdale and the Central Arizona Project assess the impacts of the drought on predicted water supply and react accordingly. The over-allocation of Colorado River water supplies, coupled with trends of a hotter and drier climate make protecting water resources essential.

Scientific data helps us understand how our air quality is changing and the resulting health impacts. The region's two biggest concerns are ozone and particulate matter (PM), as these exceed federal health-based standards most frequently. The causes of these pollutants are complex, especially given how far ozone can travel in the air. Regional air quality has fluctuated in recent years, in part reflecting the influence of extremely hot summers on the number of unhealthy days. In 2022, almost 1 in 3 days exceeded federal air quality standards – 30% or 106 days (Figure 1). In 2020 and 2021, the air quality was in the 'very unhealthy' range for more than two months.

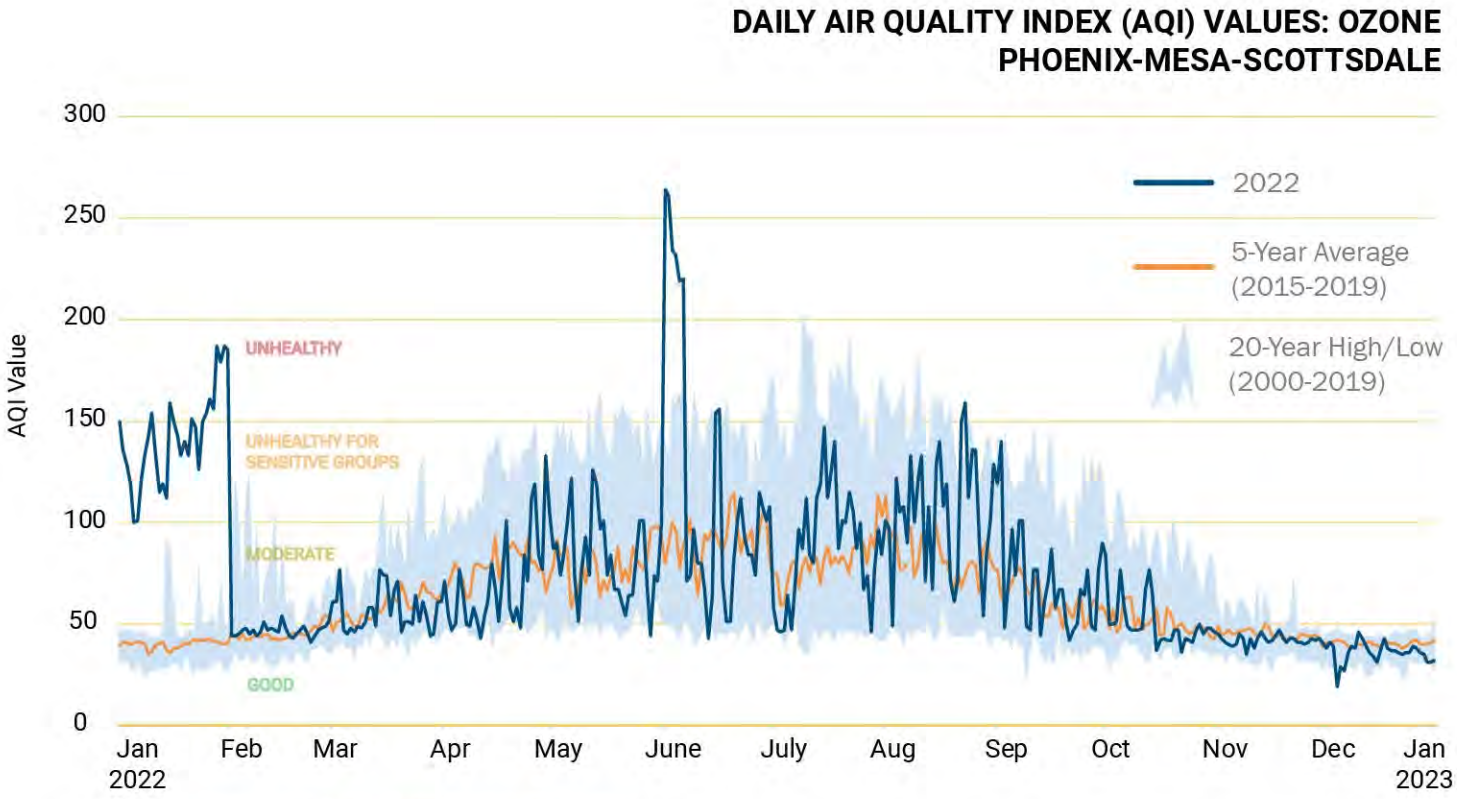


Figure 1. *Source: Air Data - Daily Air Quality Tracker*

Now is the time to act. NASA reports that 97 percent of climate scientists "agree that humans are causing global warming and climate change,"[7] and almost 7 out of 10 people locally agree that global warming is happening.[8] To preserve Scottsdale as a highly livable city that is environmentally and economically healthy, we are responding with mitigation and resiliency solutions to these challenges.

> *"Climate change will impact water prices, food prices, housing prices…energy prices, it will impact our quality of life, our health, our jobs and economy."*
>
> - Resident feedback on the draft Sustainability Plan

THE ECONOMICS OF SUSTAINABILITY

Just as the science of sustainability motivates us to take action, the economics of sustainability can help us understand how to get started, guiding the efficient use of resources and the long-term response to climate change. The concept of the 'triple bottom line' means that financial, social and environmental performance should influence decision-making, highlighting how our ecosystem fuels the economy.

Safeguarding a sustainable future for Scottsdale will require investments, both by the city and by residents and businesses. Innovation and other factors have been driving down the costs of technology like photovoltaic systems (down 80% since 2010), and rebates and grants can also lower upfront costs. Similarly, the prices of renewable energy, electric vehicles and batteries have also dropped.

A case-by-case comparison of costs to benefits -- including the cost of doing nothing -- will identify projects that make financial sense. Reducing energy and water use often yields favorable cost-benefit ratios, meaning that the cumulative savings from lowered use can exceed the costs in a short period of time. Benefits to consumers can be quantified – like reduced utility bills and maintenance costs when utilizing longer-lasting lightbulbs – or be more subjective as when occupants are more comfortable. A seminal work by McKinsey identified numerous negative-cost options for improving energy efficiency in buildings and appliances, which are recommended as quick wins.[9]

Another way to assess the economics of policies is through life cycle analysis, by analyzing the costs and benefits of an item from production to end-of-life disposal. For solid waste, this involves different calculations for different efforts. Reusing items can save money by deferring expenditures. For recycling, there are tradeoffs like the environmental cost of mining for bauxite versus the collection and recycling costs of aluminum. Overall, the region-specific costs of transportation and maintenance of landfills should also influence sound decision-making.

Similarly, the utility staff in Gilbert commissioned a report to examine the overall impact on rates of reducing water demand. This analysis of avoided costs quantified the impacts of conservation over 20 years and found that water rates are 5.8% lower that they would have been without the per capita reductions. The conclusion was that by conserving water, customers avoided the higher costs of building new infrastructure to deliver and treat additional water supplies.[10]

Macerich [which owns and operates Scottsdale Fashion Square and Kierland Commons] "aims to set the bar for sustainability in the real estate industry by operating properties with purpose that "walk the walk" in stewarding resources for the shopping centers' guests, investors, tenants, industry partners, employees, communities and the planet."

Failing to act also has costs, highlighting the relationship between a healthy economy and the environment. Extreme heat, poor air quality and drought can affect the economy in a range of ways: health impacts, loss of business when people stay indoors or cut visits short and utility bills squeezing disposable income.

A recent study by The Nature Conservancy (TNC) evaluated the impacts of extreme heat in the Phoenix area across five indicators of human and economic wellbeing: mortality, morbidity, labor productivity, roadway infrastructure and energy demand. On the low end of the estimated range, the economic consequences of inaction would average $1.9 billion between 2020 and 2059. The largest source of these costs was heat-related mortality ($898 million) and labor productivity losses ($855 million).[11]

The TNC study also analyzed the return on investment for two solutions – adopting cool roofs for 100% of buildings in the area and increasing the urban tree canopy to 25% by 2050. For each, the accumulated benefits were estimated to exceed the upfront costs after 4-5 years, even without including benefits like reduction in air pollution or reduced stormwater runoff.[12]

Another study in the journal Science evaluated the economy-wide impacts of different future warming scenarios and found that Maricopa County would see a 5-10% drop in gross domestic product by the end of the century (Figure 2).[13] The Atlantic Council similarly examined broad economic impacts and calculated that losses from decreased labor productivity would exceed $5 million per year by 2050 in Maricopa County and that occupational injuries due to human heat stress could be as high as 15,000 per year.[14]

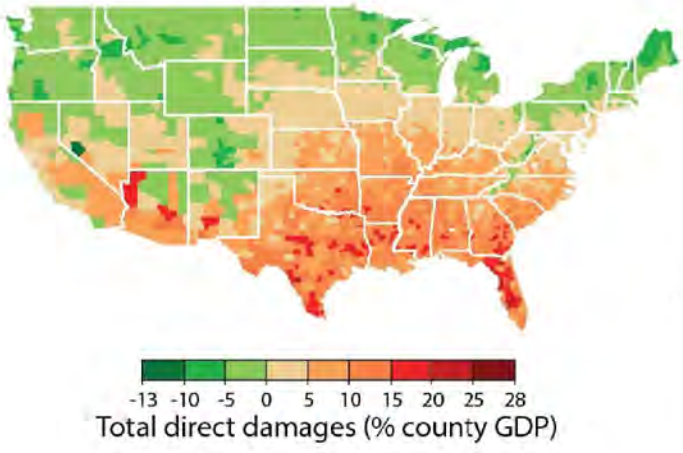


Figure 2. Source: Estimating economic damage from climate change in the United States," Science, Hsiang et al, June 2017

- *33 percent of companies list improving operational efficiency and lowering costs as a top reason for addressing sustainability*
- *94 percent say their companies have integrated sustainability into strategic planning*
- *53 percent say company performance on sustainability is at least somewhat important to attracting and retaining employees*

- McKinsey & Company survey

Support for sustainability in Scottsdale is driven by many factors, including the economic benefits of action. As a city that thrives on innovation, collaboration and sustainable growth, Scottsdale already fosters a business-friendly climate that generates some of the world's most successful companies and entrepreneurs. The beauty and sustainability of the region's natural environment is integral to its economic vitality, with tourism alone having an estimated annual economic impact of $2.5 billion.[15] A recent study found that 64% of visitors to Scottsdale cited 'beautiful scenery' as a key factor in deciding to visit.[16]

As individual projects are identified to move the city closer to its goals, an analysis of costs and benefits will be used to set priorities. A greener future can also be one where residents, tourists and businesses continue to prosper. In order to sustain our economy, it is essential that we take actions to ensure that our ecosystem is healthy.

"The rapidly escalating costs of continuing greenhouse gas emissions continue to outpace the costs of mitigation (future citizens considered), and we bear responsibility to plan and implement aggressive mitigation."

- Resident feedback on the draft Sustainability Plan

OUR COMMUNITY VALUES

Scottsdale established Community Values to guide implementation of the goals of the 2035 General Plan. The Community Sustainability Plan will reflect these values as it stewards the natural environment, protects human health, and advances the social and economic well-being of the community for the present and future generations.

Respect Character and Culture

Enhance and protect Scottsdale's unique features, neighborhood identity, character, livability, southwestern heritage, and tourism through appropriate land uses and high standards for design. Create vibrant and attractive places that accommodate a variety of ages and incomes and support the arts and multicultural traditions.

Conserve and Preserve the Environment

Lead the region in the stewardship and sustainable management of the Sonoran Desert environment and conservation of natural resources and open spaces for the visual, physical, and personal enrichment of everyone.

Collaborate and Engage

Promote strong, visionary leadership that is transparent, responsive, and efficient; collaborates regionally; respects and honors our community values; recognizes the benefit of interactive community involvement and volunteerism; and embraces citizens as active partners in decisions that affect their neighborhoods and city.

Foster Well-Being

Promote a culture of lifelong physical and mental health, safety, and well-being for residents, visitors, employers, and employees. Foster social connectivity across cultural and generational boundaries by cultivating a welcoming environment; respecting human dignity; and recognizing and embracing citywide and regional diversity.

Connect the Community

Connect all community members within the city and to the region by striving for cost-effective, adaptable, innovative, safe, and efficient mobility options. Connectivity and mobility involve more than getting people from here to there, connectivity and mobility influence the form and comfort of urban communities.

Revitalize Responsibly

Vigorously evaluate the short- and long-term impacts of development and redevelopment decisions to ensure that public and private investment work collaboratively to support and maintain the unique features and local identity that make Scottsdale special, and contribute positively to the community's physical, fiscal, and economic needs and high quality of life.

Advance Innovation and Prosperity

Embrace a diverse and innovative economy to sustain our high quality of life through a variety of businesses, health and research institutions, and educational, technological, tourism and cultural elements.

HOW THE PLAN WAS DEVELOPED

The Scottsdale Community Sustainability Plan is an important part of the city's commitment to a more sustainable future; it implements creative solutions and solves environmental challenges. The City Council included adoption of a sustainability plan as part of the city's 2021 and 2022 Organization Strategic Plans, and it was identified as an element of the General Plan 2035 implementation.

GETTING STARTED

Work on the plan began in June 2021, with support of the Rob and Melani Walton Sustainability Solution Service (ASU) and with input from the Scottsdale Environmental Advisory Commission (SEAC) and other community members. ASU researchers interviewed city personnel, researched best practices and frameworks and collected ideas about possible actions at community meetings in May 2022, resulting in an initial draft plan.

CITY COUNCIL DIRECTION

Beyond driving the creation of the sustainability plan, City Council feedback at XX Work Study Sessions resulted in a sharp focus on the five priorities, a push to develop baseline metrics and set numeric targets, and the need to include the costs and benefits of action. The discussion at these sessions included a range of specific input on topics and requested the use of narratives to tell a story about why sustainability is important.

SCOTTSDALE ENVIRONMENTAL ADVISORY COMMISSION

SEAC has been involved in the plan development from the beginning, sharing their valuable expertise and reviewing plan drafts. Input from this seven-member public body has shaped the plan framework, its aspirations and its message, based on ideas generated at a number of meetings devoted to ensuring the plan reflects the character of Scottsdale – XX in all for 2021-2024.

COMMUNITY ENGAGEMENT

The city has been committed to a broad public input process with continued outreach to residents, boards and commissions and other stakeholders for their feedback. Staff and subject matter experts have provided their guidance and ideas along the way. Two sets of community meetings were held in 2022 in conjunction with a public questionnaire to elicit feedback on an early draft and on overall priorities.

COMMUNITY INPUT BY THE NUMBERS

May 2022 community meetings: More than 50 attendees; at least 450 actions identified
October 2022 community meetings: More than 40 individuals; 260 comments
November 2022 Questionnaire: Almost 300 responses, with over 220 individual comments
Outreach Spring 2024 (TBD)
Additional comments received by email
Presentations to and/or input from other Boards and Commissions

See Acknowledgments for more information on city departments and Boards and Commissions who contributed to the plan.

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FRAMEWORK & PRIORITIES

FOR A SUSTAINABLE, RESILIENT, & THRIVING SCOTTSDALE

Scottsdale has established five priority areas for becoming a sustainable, resilient, and thriving community: **Energy**, **Water**, **Waste**, **Air Quality**, and **Extreme Heat**. This framework supports the protection of the Sonoran Desert ecosystem and will help attract residents and visitors, providing economic benefits and ensuring a high quality of life.

The starting point for this framework was the 2035 General Plan, which set goals and policies for sustainability and environment (see Appendix A for a detailed list). For each priority, targets will be set and strategies and actions identified that help achieve the target. The action plan begins with existing plans (see Appendix B), but looks beyond what the city is doing and provides policy direction where efforts are newer or are now more urgent. The structure facilitates collaboration and reinforces the connections between the topics.

The Scottsdale Community Sustainability Plan helps us envision and realize our future as a sustainable, resilient, and thriving community. The five Priorities are Scottsdale's most pressing matters, and the section on each Priority includes Strategies, Indicators, Targets, and Actions.

Strategies are goal-oriented and provide general guidance to help us address the Priority. They are carried out through specific Actions.

Indicators allow baselines to be determined and progress to be measured. Indicators link Priorities and **Targets** – defining **where we are today** and **where we would like to be in the future**.

Actions provide specific direction to achieve the Targets.

Implementation sections for each Priority detail when work will be accomplished and who will lead the efforts.

In total, the XX strategies and more than XX actions in this plan reflect a comprehensive action plan for the next YY years. Some are extensions of programs and initiatives that are already well-developed, while others are completely new and need to be started from scratch.

ENERGY

Maximize the use of renewable energy resources, energy efficiency, and responses to climate challenges — **Energy**.

WATER

Conserve, protect, and deliver quality drinking water safely and reliably to the community, now and into the future — **Water**.

WASTE

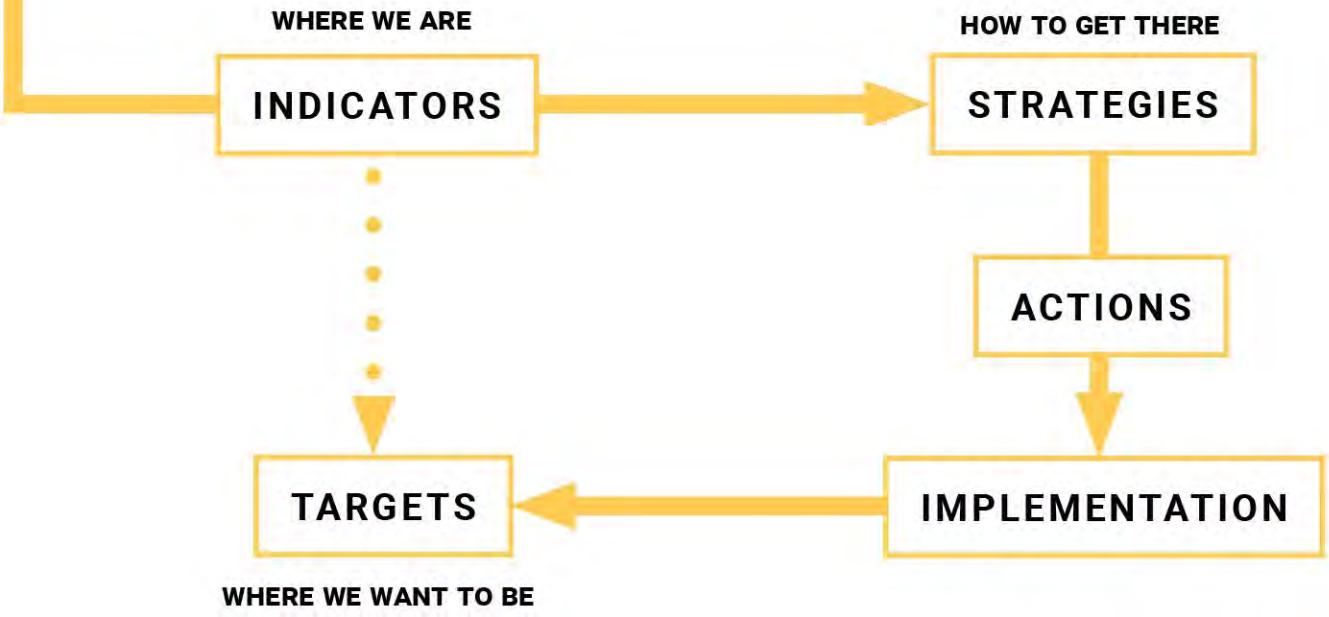
Develop a circular economy approach for materials management and effective citywide diversion of all waste streams — **Waste**.

AIR QUALITY

Reduce contaminants and pollutants to improve air quality and protect community health — **Air Quality**.

EXTREME HEAT

Ensure that the community prevents, is prepared for, responds to, and recovers from extreme heat and other natural hazards that diminish quality of life or impact the environment — **Extreme Heat**.



WHAT HAPPENS NEXT

IMPLEMENTATION

The city of Scottsdale will take the lead on implementation of this Community Sustainability Plan and be a catalyst for further action by the private sector, non-profits and community members. Achieving sustainability for Scottsdale requires a common vision and engagement from the whole community to prioritize effective solutions. Implementation of the plan will be strategic and strive to maximize the benefits for all Scottsdale residents and visitors. The plan is designed to be a living, working document that will focus our resources and collective action where it will be most impactful.

Of the XX strategies and XX actions, the implementation of some will begin immediately, while others will start later or evolve and be revised over time. Implementation will require that specific project plans be developed for each action, identifying costs, personnel needs, barriers and milestones. Timelines for completion of programs will vary, and the City Council may fund or not fund programs at any time. The city will seek funding for priority projects and identify possible City Code updates to address key strategies.

An implementation table for each priority shares four elements for each action:

Time Horizon: Quick Win, 1-3 years, 3-10 years or Ongoing

Lead Agencies & Partners: Additional partners will likely be added during project development

Costs: Costs are estimated and may change during project development or implementation
- $ -- **Low** ($0 - $50,000)
- $$ -- **Moderate** ($50,001 - $250,000)
- $$$ -- **High** (Over $250,000)

Benefits:

- Environmental (air quality, carbon emissions, waste reduction, drought relief)
- Economic ($ savings, attracting businesses and tourism)
- Social (health & safety, quality of life, equity)

City staff will also work to address capacity-building and cross-cutting efforts. Efforts are underway to identify staff and community champions for sustainability, increase awareness of sustainability solutions and expand community engagement. An employee Green Team is also working on specific projects to improve internal operations.

Implementation of the sustainability plan will focus on accountability and will be accomplished with a high level of transparency and stakeholder participation.

ADMINISTRATION

There will be three important ways the city administers the plan to ensure continuous evaluation and improvement:

1. Produce an annual report that includes updates on implementation of actions, progress toward sustainability goals including data on the indicators and a section specifically chronicling city achievements and data. The reports will be presented annually to City Council and will discuss possible amendments to the plan.

2. Formally update the Plan after every three years, providing an opportunity to include new strategies and actions and amend existing ones as well as update targets to reflect new opportunities and progress made.

3. Track operating and capital spending on sustainability-related work and operational savings and project rebates in partnership with the City Treasurer.

SCHEDULE OF ANNUAL REPORTS & PLAN UPDATES

YEAR 0	YEARS 1 & 2	YEAR 3	YEARS 4 & 5	YEAR 6
Adoption	Annual Reports	Annual Report	Annual Reports	Annual Report
		Plan Update		Plan Update

WHAT CAN YOU DO?

The city of Scottsdale hopes that residents, businesses and non-profits are also motivated to improve the world around them.

Work with us and support one of the actions in the plan or be innovative and start your own project! Here are some places to get started:

WHAT IS MY IMPACT?

The CoolClimate Network offers a simple tool to help you understand your personal environmental impact. They even have a version for businesses. Use the calculators to see what kinds of changes you can make to your travel, buildings and shopping and make a pledge take action.

TALK ABOUT IT!

Engage your family, neighbors and co-workers about sustainability. Ask them questions about what concerns them the most and tell them what you're doing to make an impact. According to one source, conversations about the environment "can help people connect over shared values including family, community, health and religion."

LEARN MORE ABOUT WHAT SCOTTSDALE IS DOING

Go to ScottsdaleAZ.gov and search "sustainability" to find out more about the latest initiatives and how you can be part of the solution.

SUGGESTIONS FROM THE COMMUNITY

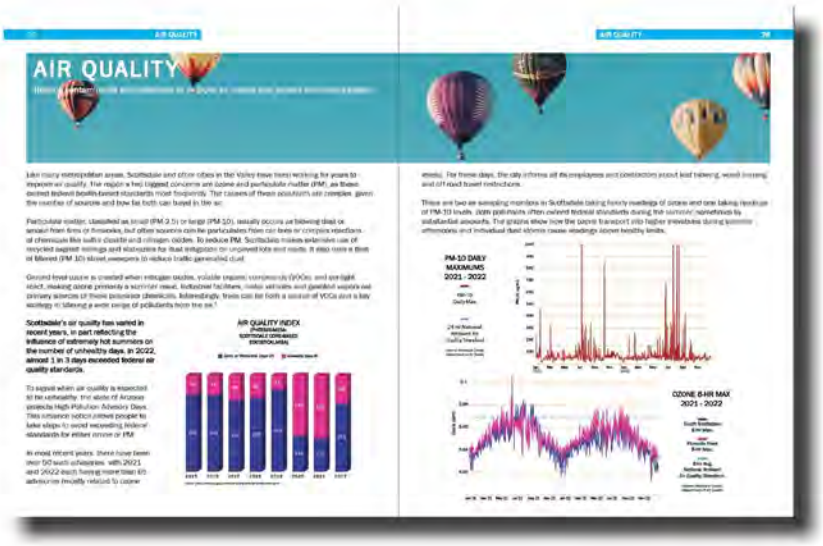
- Support farmers' markets
- Plant trees
- Use light colored roofs
- Replace non-porous pavement with porous pavement to absorb water
- Carpool or use alternative forms of transportation to get around the city
- Don't water lawns in the afternoon when most of it gets evaporated
- Install pool motor timers and variable speed pumps for pools
- Don't heat pools all winter long
- Donate to your favorite cause
- Volunteer in your neighborhood or for a city project

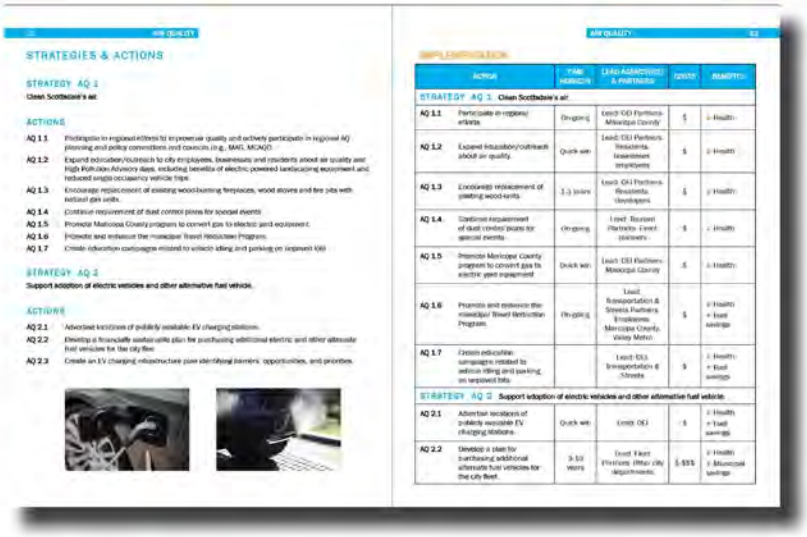
OTHER RESOURCES

Tips from ASU
Sustainable travel tips
Eco-tourism in the desert
Sustainable books to read
Ways to reduce food waste
Hiking in the desert
Sustainability health tips
Another good list of simple tips
Sustainable fashion tips

READ THE PLAN

The plan provides specific actions for achieving long-term goals and will require efforts by city government and members of the community. In each section, the "What Can You Do?" graphics will include more interesting tips and suggestions – check them out!





"Do all the good you can. By all the means you can. In all the ways you can. In all the places you can. At all the times you can. To all the people you can. As long as ever you can."

- Anonymous

ENDNOTES

1 "The National Community Survey: Scottsdale, AZ Report of Results 2023," p. 10; "essential" or "very important" responses = 85% in 2023.

2 Leadership in Energy and Environmental Design

3 "How Do We Know Climate Change is Real?" NASA Global Climate Change: Evidence..

4 "Is it too late to prevent climate change?" NASA Global Climate Change.

5 "Phoenix just posted the hottest month ever observed in a U.S. city," Washington Post.

6 "Arizona Then and Now: Summer heat," Arizona Republic.

7 "Do scientists agree on climate change?" NASA Global Climate Change, Questions.

8 "Yale Climate Opinion Maps 2021," February 23, 2022; Estimated % of adults who think global warming is happening for Congressional District 6 = 68%.

9 "Reducing US greenhouse gas emissions: How much at what cost?" McKinsey, December 1, 2007.

10 "Water Conservation Keeps Rates Low in Gilbert, Arizona," Alliance for Water Efficiency, June 2017.

11 TNC, 2021: Economic Assessment of Heat in the Phoenix Metro Area [deBoer, A. Schwimmer, E, McGregor, A. Adibi, S. Kapoor, A. Duong, S. Love, J. Bonham-Carter, C. Lindquist, J.] In Phoenix, AZ.

12 TNC, 2021: Economic Assessment of Heat in the Phoenix Metro Area [deBoer, A. Schwimmer, E, McGregor, A. Adibi, S. Kapoor, A. Duong, S. Love, J. Bonham-Carter, C. Lindquist, J.] In Phoenix, AZ.

13 "Estimating economic damage from climate change in the United States," Science, Hsiang et al, June 2017.

14 "Extreme heat: The economic and social consequences for the United States," Adrienne Arsht-Rockefeller Foundation Resilience Center, Atlantic Council, August 31, 2021.

15 "Scottsdale Tourism Study - Visitor Statistics," City of Scottsdale, September 2022.

16 "Longwoods Advertising Effectiveness Report," City of Scottsdale, May 2023.

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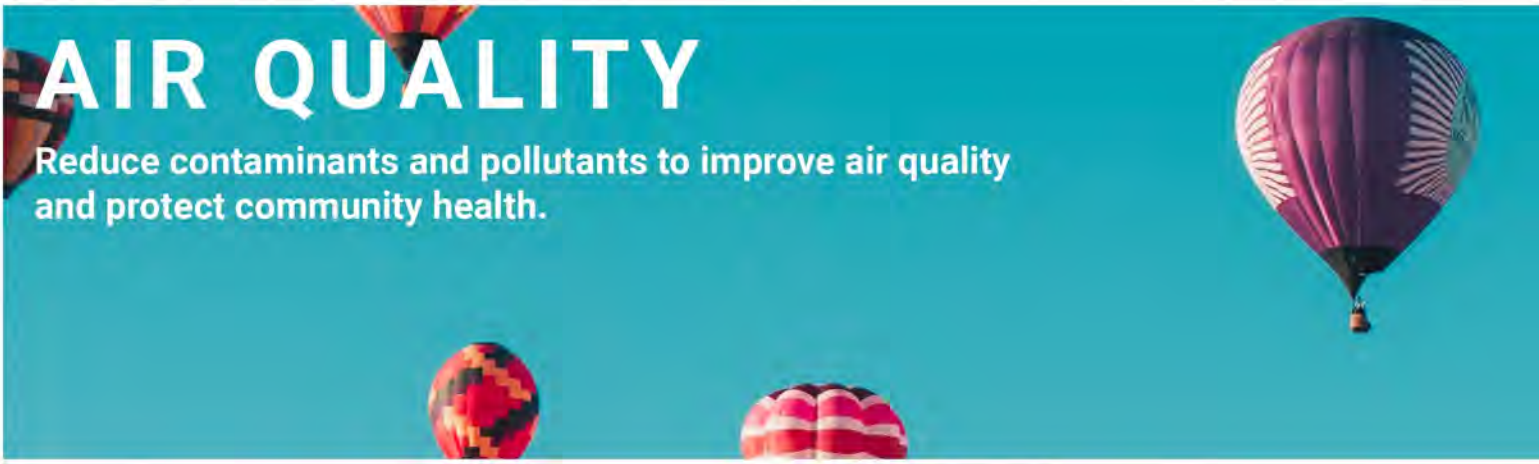
AIR QUALITY

Reduce contaminants and pollutants to improve air quality and protect community health.



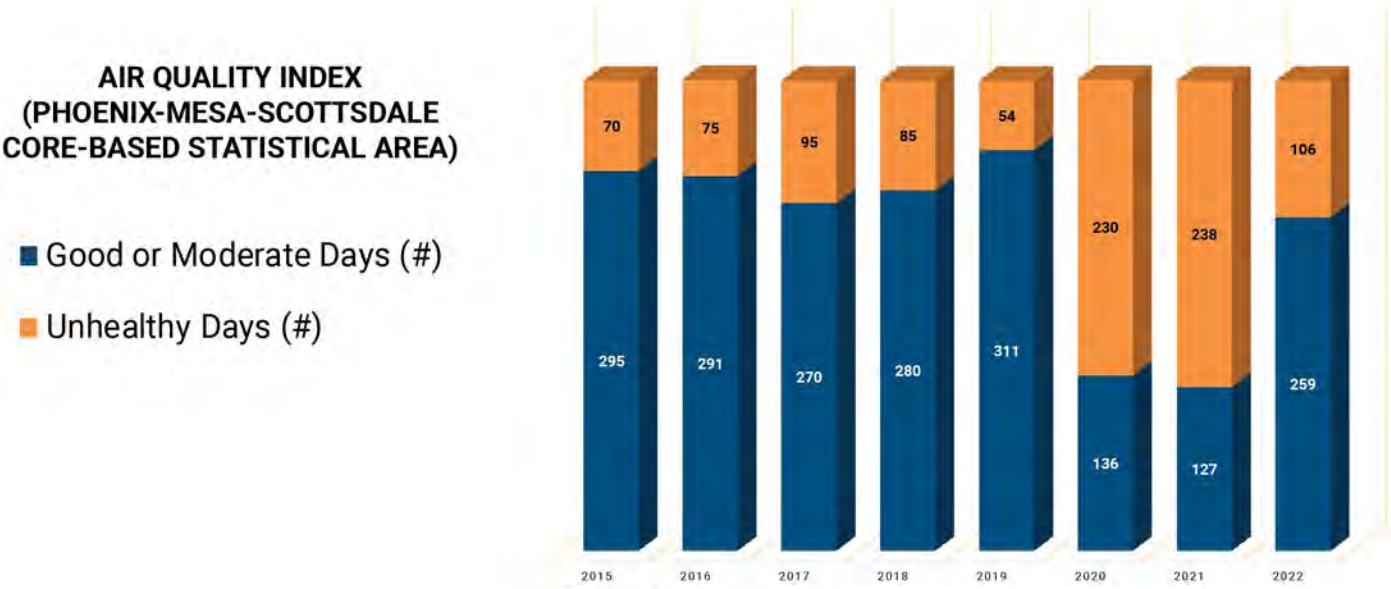
Like many metropolitan areas, Scottsdale and other cities in the Valley have been working for years to improve air quality. The region's two biggest concerns are ozone and particulate matter (PM), as these exceed federal health-based standards most frequently. The causes of these pollutants are complex, given the number of sources and how far both can travel in the air.

Particulate matter, classified as small (PM-2.5) or large (PM-10), usually occurs as blowing dust or smoke from fires or fireworks, but other sources can be particulates from car tires or complex reactions of chemicals like sulfur dioxide and nitrogen oxides. To reduce PM, Scottsdale makes extensive use of recycled asphalt millings and stabilizers for dust mitigation on unpaved lots and roads. It also uses a fleet of filtered (PM-10) street sweepers to reduce traffic-generated dust.

Ground-level ozone is created when nitrogen oxides, volatile organic compounds (VOCs), and sunlight react, making ozone primarily a summer issue. Industrial facilities, motor vehicles and gasoline vapors are primary sources of these precursor chemicals. Interestingly, trees can be both a source of VOCs and a key strategy in filtering a wide range of pollutants from the air.[1]

Regional air quality has varied in recent years, in part reflecting the influence of extremely hot summers on the number of unhealthy days. In 2022, almost 1 in 3 days exceeded federal air quality standards.

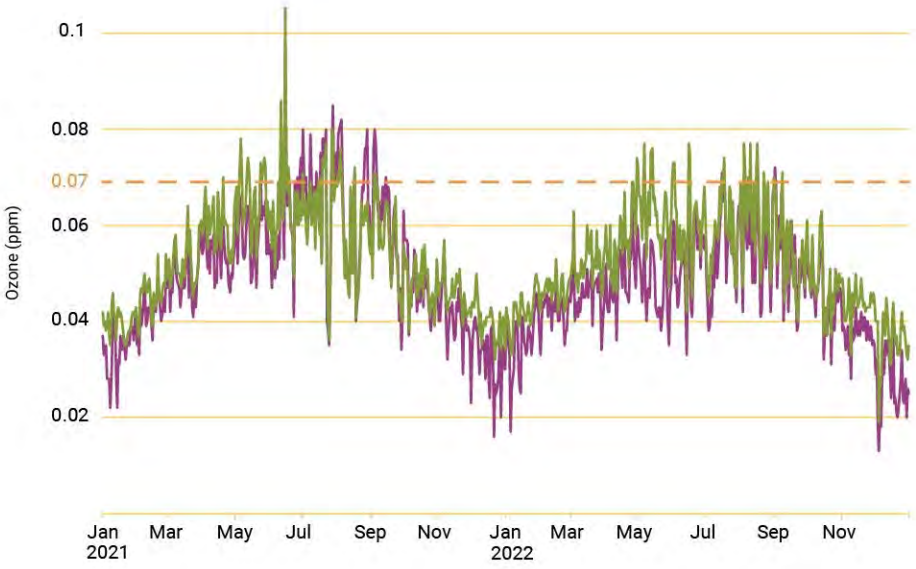
AIR QUALITY INDEX (PHOENIX-MESA-SCOTTSDALE CORE-BASED STATISTICAL AREA)



Source: EPA

To signal when air quality is expected to be unhealthy, the state of Arizona projects High Pollution Advisory Days. This advance notice allows people to take steps to avoid exceeding federal standards for either ozone or PM. In most recent years, there have been over 50 such advisories, with 2021 and 2022 each having more than 65 advisories (mostly related to ozone levels). For these days, the city informs all its employees and contractors about leaf blowing, wood burning and off-road travel restrictions.

There are two air sampling monitors in Scottsdale taking hourly readings of ozone and one taking readings of PM-10 levels. Both pollutants can exceed federal standards during the summer, sometimes by substantial amounts. There are also two monitors for PM-2.5 just outside Scottsdale boundaries. The graphs (Figures 1, 2 and 3) show how the ozone transport into higher elevations during summer afternoons, individual dust storms and holiday activities cause readings above healthy limits.



OZONE 8-HR MAXIMUMS 2021 - 2022

South Scottsdale 8-Hr Max.

Pinnacle Peak 8-Hr Max.

8-Hr Avg. National Ambient Air Quality Standard

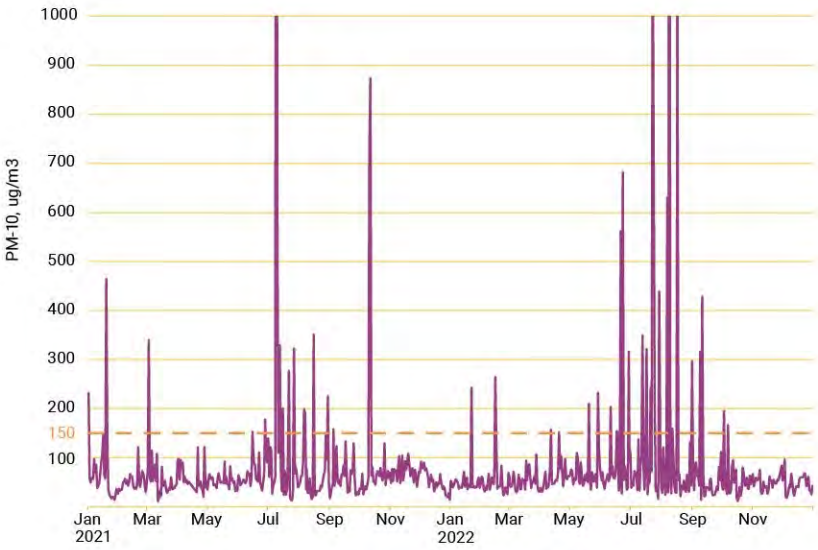
Figure 1.
Source: Maricopa County Department of Air Quality

PM-10 DAILY MAXIMUMS 2021 - 2022

South Scottsdale PM-10 Daily Max.

24-Hr National Ambient Air Quality Standard

Figure 2.
Source: Maricopa County Department of Air Quality



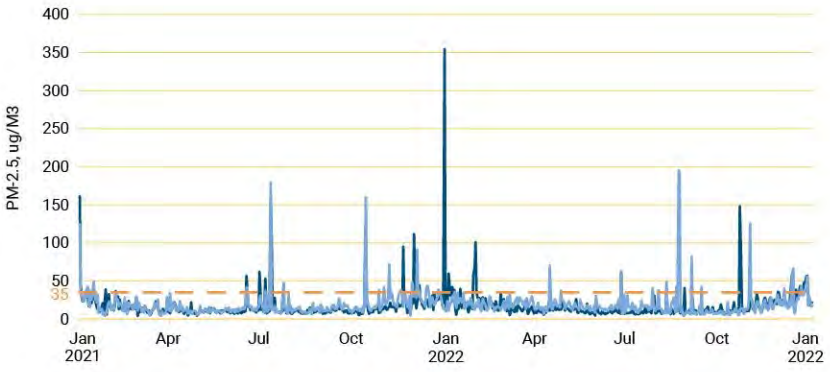
PM-2.5 DAILY MAXIMUMS 2021 - 2022

North Phoenix PM-2.5 Daily Max.

Tempe PM-2.5 Daily Max.

24-Hr National Ambient Air Quality Standard

Figure 3.
Source: Maricopa County Department of Air Quality



INDICATOR

Regional good to moderate air days (#)
(2022 = 106 days)

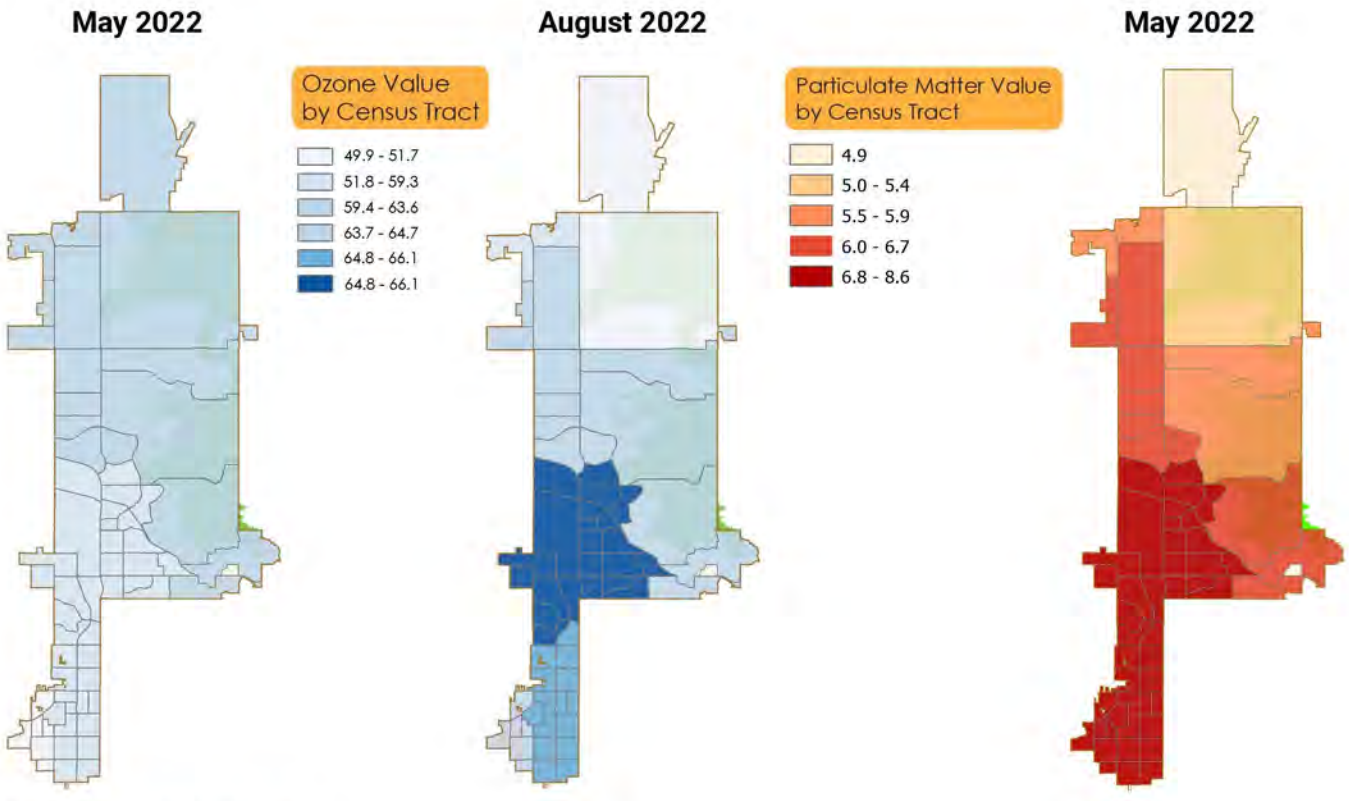
TARGET

Pending Council Direction

Eliminate unhealthy air days in Scottsdale
(*Staff Recommendation*)

Eliminate unhealthy air days in Scottsdale by 2030
(SEAC Recommendation)

Extensive modeling demonstrates that every part of the city can be exposed to poor air quality, although not always at the same time for the same pollutant.



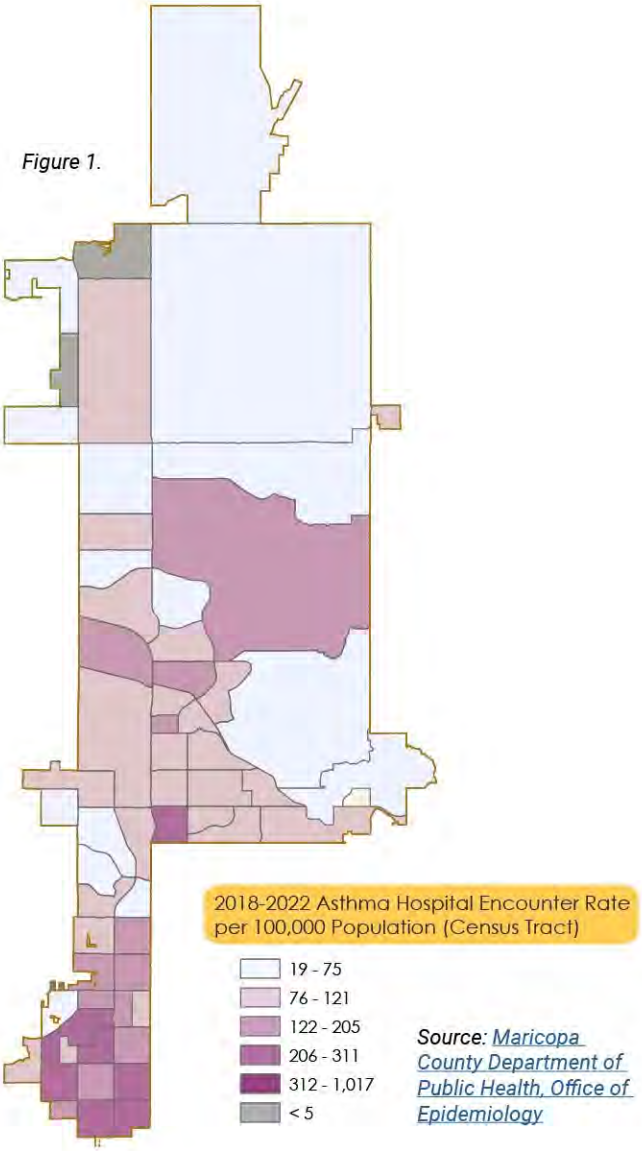
Source: City Health Dashboard

Ozone can aggravate a range of health issues, including asthma, COPD and heart disease, compounding how extreme heat can also influence their incidence and severity. **Maricopa County tracks illnesses and deaths for these disorders, which have fluctuated over time. Asthma illnesses in Scottsdale per 100,000 population are lower than in the rest of Maricopa County (Table 1), and hospital encounters (2018-2022) are concentrated in census tracts in south and central Scottsdale (Figure 1).**

Table 1. Incidents among Scottsdale residents, per 100,000 population

	2018	2019	2020	2021	2022
Asthma illnesses	210.1	196.7	115.3	121.6	156.1
COPD illnesses	335.7	287.7	185.5	148.2	163.5
COPD deaths	50.0	61.9	57.7	47.8	N/A
Heart disease illnesses	2,766.8	2,740.6	2,375.0	2,678.5	2,755.7
Heart disease deaths	217.5	224.3	231.0	251.0	N/A

Figure 1.



INDICATOR

Number of hospitalizations for pollution-related health events per 100,000 population in Scottsdale (2021 = 2,948.3)

TARGET

Pending Council Direction

Cut hospitalizations for pollution-related health events in Scottsdale in half (*Staff Recommendation*)

Cut hospitalizations for pollution-related health events (per 100,000 population) in Scottsdale by 50% from 2022 levels by 2035 (*SEAC Recommendation*)

Scottsdale has been an active partner with Maricopa County and neighboring cities to formulate, adopt and implement laws and codes that have dramatically improved air quality Valleywide. Even as population and vehicle travel has increased, ozone levels have decreased by 13 parts per billion since 2000, and precursor emissions have decreased by over 50 percent from 2011 through 2020 according to the Maricopa Association of Governments.

However, federal standards for ozone are tightening due to an improved understanding of the health effects, and Phoenix currently has the fifth-worst ozone levels in the country.[2] Because of the extended transport of air pollutants from outside the Valley, improving air quality requires regional cooperation and a long-term commitment to taking daily steps to reduce emissions. Failure to meet the Clean Air Act standards can have economic repercussions, since the tighter standards may trigger regulations that could discourage growth of new, large businesses.

The city follows and reinforces federal, state and county requirements. It also commits to additional steps to support cleaner air for residents and visitors related to vehicles. **Scottsdale has reduced the environmental impact of its municipal vehicles by switching to compressed natural gas (CNG) as a fuel source and by using less gasoline and diesel fuel. Total fleet fuel use is down 3% since 2016.** The Fleet and Solid Waste departments significantly reduce vehicle miles through sophisticated route optimizations. Relatedly, the Transportation and Streets Department champions the use of van pool and bus pass programs by employees.

INDICATOR

Gallons of gasoline, diesel and CNG used in municipal vehicles (2022 = 1,389,541 gallons)

TARGET

Pending Council Direction

Reduce municipal fleet fuel use by 10% from 2023 levels by 2030 & 40% by 2050 *(Staff recommendation)*

Reduce municipal fleet fuel use by 30% from 2023 levels by 2030 & 100% by 2040 *(SEAC recommendation)*

Supporting the regional transition to electric and other alternate fuel vehicles can also improve air quality. **The number of publicly available electric vehicle charging ports in Scottsdale has increased dramatically, up 18% in just one year, reflecting residents and business interest in this technology.** This trend reflects the economics of electric vehicles, which can be $50 less expensive for a full charge versus a tank of gasoline.[3]The city also plans to install electric vehicle (EV) charging stations in at least five locations.

INDICATOR

Number of publicly available electric vehicle charging ports (2022 = 306 ports)

TARGET

Quadruple number of publicly available charging ports from 2023 levels three years after adoption of plan; add 10x by 2030

BENEFITS

Environmental:
Improved air quality reduces harm to plants and animals; more trees also provide shade and cooling

Economic:
Fewer bad air quality days aid business operations/ development and attract tourists and lessens damage to buildings and infrastructure; electric vehicles can be less expensive to operate

Social:
The greatest impact of better air quality will be improved health and quality of life

WHAT CAN YOU DO?

- Switch to electric-powered blowers and other landscaping equipment
- Avoid idling unnecessarily and long drive-thru lines
- Fuel your vehicle after dark
- Eliminate or replace your wood-burning fireplace, wood stove or fire pit with natural gas units
- Plant a low-VOC emitting tree

For more tips, go to Maricopa.gov and search "air quality"

STRATEGIES & ACTIONS

STRATEGY AQ 1

Clean Scottsdale's air.

ACTIONS

AQ 1.1 Participate in regional efforts to improve air quality and actively participate in regional AQ planning and policy committees and councils (e.g., MAG, MCAQD).

AQ 1.2 Expand education/outreach to city employees, businesses and residents about air quality and High Pollution Advisory days, including benefits of electric-powered landscaping equipment and reduced single occupancy vehicle trips.

AQ 1.3 Encourage replacement of existing wood-burning fireplaces, wood stoves and fire pits with cleaner options.

AQ 1.4 Continue requirement of dust control plans for special event using unpaved parking.

AQ 1.5 Promote Maricopa County program to convert gas to electric yard equipment.

AQ 1.6 Promote and enhance the municipal Travel Reduction Program.

AQ 1.7 Create education campaigns related to vehicle idling and parking on unpaved lots.

STRATEGY AQ 2

Support adoption of electric vehicles and other alternative fuel vehicle.

ACTIONS

AQ 2.1 Advertise locations of publicly available EV charging stations.

AQ 2.2 Develop a financially sustainable plan for purchasing additional electric and other alternate fuel vehicles for the city fleet.

AQ 2.3 Create an EV charging infrastructure plan identifying barriers, opportunities, and priorities.

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY AQ 1 Clean Scottsdale's air.					
AQ 1.1	Participate in regional efforts.	On-going	**Lead**: OEI **Partners**: Maricopa County	$	Health
AQ 1.2	Expand education/outreach about air quality.	Quick win	**Lead**: OEI **Partners**: Residents, businesses, employees	$	Health
AQ 1.3	Encourage replacement of existing wood-burning units.	1-3 years	**Lead**: OEI **Partners**: Residents, developers	$	Health
AQ 1.4	Continue requirement of dust control plans for special events.	On-going	**Lead**: Tourism **Partners**: Event planners	$	Health
AQ 1.5	Promote Maricopa County program to convert gas to electric yard equipment.	Quick win	**Lead**: OEI **Partners**: Maricopa County	$	Health
AQ 1.6	Promote and enhance the municipal Travel Reduction Program.	On-going	**Lead**: Transportation & Streets **Partners**: Employees, Maricopa County, Valley Metro	$	Health Fuel savings
AQ 1.7	Create education campaigns related to vehicle idling and parking on unpaved lots.	On-going	**Lead**: OEI, Transportation & Streets	$	Health Fuel savings

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY AQ 2 **Support adoption of electric vehicles and other alternative fuel vehicle.**					
AQ 2.1	Advertise locations of publicly available EV charging stations.	Quick win	**Lead**: OEI	$	Health Fuel savings
AQ 2.2	Develop a plan for purchasing additional alternate fuel vehicles.	3-10 years	**Lead**: Fleet **Partners**: Other city departments	$-$$$	Health Municipal savings
AQ 2.3	Create an EV charging infrastructure plan.	1-3 years	**Lead**: OEI **Partners**: Other city departments	$-$$	Health Fuel savings

ENDNOTES

1 Read more about the benefits of trees and Scottsdale's strategies to increase tree canopy in the Heat section.

2 "Phoenix ranks 5th in ozone pollution, but a new report finds fewer bad air days overall," Updated April 22, 2023, Arizona Republic.

3 "Is it cheaper to refuel your EV battery or gas tank? We did the math in all 50 states," Updated August 14, 2023, Washington Post.

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WATER

Conserve, protect and deliver quality drinking water safely and reliably to the community, now and into the future.

Providing quality drinking water and ensuring adequate water supplies has been a long-standing priority in Scottsdale. As reflected in the recently adopted "Sustainable Water Management Principles," Scottsdale Water thinks and acts strategically with its water resources – from supply, quality, and conservation to recycling and recharge. Staff works around the clock to ensure your drinking water surpasses all federal, state and local water quality regulations. In fact, water from your tap must pass much more stringent standards than bottled water.

The city has a long record of substantial infrastructure investments and community water conservation programs. Staff administers several residential and commercial incentive rebate programs, offers residential outdoor efficiency checks, commercial audit program, manages ordinance compliance like water waste complaints, and offers water efficiency educational opportunities. Demand for these services has been growing since the activation of stage 1 of the city's Drought Management Plan.

In fiscal year 2023 residential and commercial turf conversion rebates incentivized removal of 440,000 square feet of grass – an almost 425% increase from the previous year and a 250% increase over the five-year average. In the same year, participation by homeowner associations (HOAs) in consultations and recommendations grew by 175%. Residential outdoor water efficiency checks grew by 160% when compared to the previous five years, and HOA consultations have proven to yield significant water savings. With the large number of HOAs in Scottsdale, a target of 100% consultation is ambitious and prudent.

When looking at total potable water demand data over the last decade and a half, a steady slight decrease in total demand and an increase in the number of accounts tells the story of conservation and increased efficiency.

In 2021 the city enacted Stage 1 of its Drought Management Plan and in doing so also requested all customers to voluntarily reduce water consumption by at least 5%.[1] The conservation work has paid off. Even during the hottest month on record (July 2023), water use dropped in Scottsdale, saving 7% when compared to July 2022 and nearly 18 million gallons of water.[2]

While these accomplishments have placed the city in a positive position related to its water resources, addressing the challenges of the future will require an even more substantial effort. The over-allocation of Colorado River water supplies, coupled with trends of a hotter and drier climate make protecting water resources essential. The current megadrought, which started in 2000, is the worst in 1,200 years and has impacted reservoir levels on the Colorado River[3] and Central Arizona Projects water supplies.

In 2022, Scottsdale Water delivered potable water of more than 74,000 acre-feet or 62 million gallons per day of safe, reliable drinking water to its customers. **Total water use is on a downward trend even as the number of connections has increased by 9% (Figure 1).**

SCOTTSDALE WATER TRENDS
POTABLE WATER DELIVERIES (ACRE-FEET)

Figure 1. Source: Scottsdale Water

In 2022, the average residential customer (which comprise of almost 90 percent of the active water accounts) used 13% less water than in 2000 or 199 gallons per capita per day (gpcd) for residential water use (Figure 2).

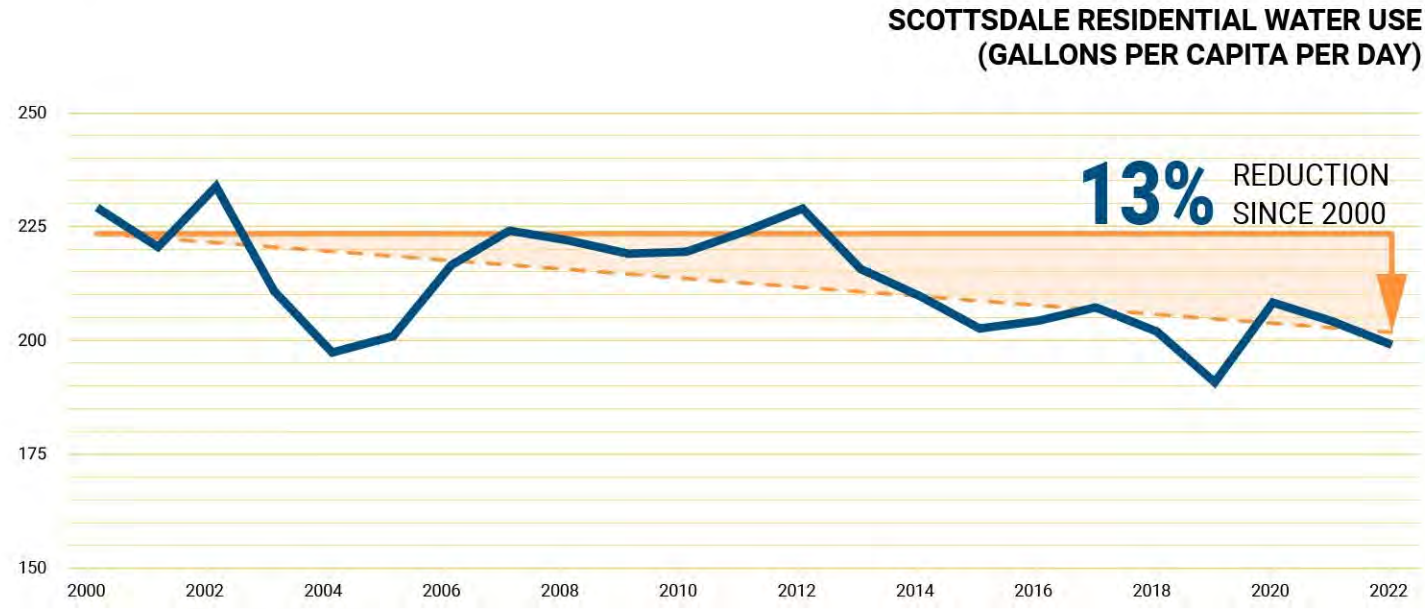


Figure 2. Source: Scottsdale Water

INDICATOR

Gallons per capita per day of residential water use (2022 = 199 gpcd)

TARGET

Reduce residential water use (gallons per capita per day) to 170 by 2033

Municipal water use represents around 2% of total potable city use and has dropped almost 10% since 2017. Scottsdale Facilities and Parks & Recreation have been proactively working to reach optimal and efficient water use in city-owned buildings and in the provision of services to the community.

INDICATOR

Gallons of municipal water use (2022 = 438,172,762 gallons)

TARGET

Reduce municipal potable water use by an additional 5% relative to 2022 by 2027

Scottsdale Water has targeted improvements in the amount of water used by homeowners' associations (HOAs) to irrigate their common areas with water-use budgets, rebates, and tips for overall water efficiency.

INDICATOR

Gallons of irrigation water use for HOA properties
(2022 = TBD)

TARGET

Reduce irrigation water use for HOA properties by 10% from 2022 levels by 2033

Commercial water use has been relatively stable even during periods of economic growth. Future efforts will focus on developing strategies for efficiencies for existing users without affecting the ability to build Scottsdale's economy.

INDICATOR

Gallons of commercial water use
(2022 = 3,818,311,019)

TARGET

Reduce commercial water use by 10% from 2022 levels by 2033

INDICATOR

TBD

TARGET

Pending Council Direction

Reduce municipally sourced potable water use by golf courses by 10% from 2022 levels by 2033 (*SEAC Recommendation*)

This overall conservation trends hold no matter the size of the meter for the single-family homes. Average residential water use varies by meter size and by season. **The number of total customers has grown since 2014, but demand has decreased, showing that growth has not affected water use (Figure 3).**

AVERAGE WATER USE, SINGLE-FAMILY RESIDENTIAL (GALLONS USED PER METER SIZE)

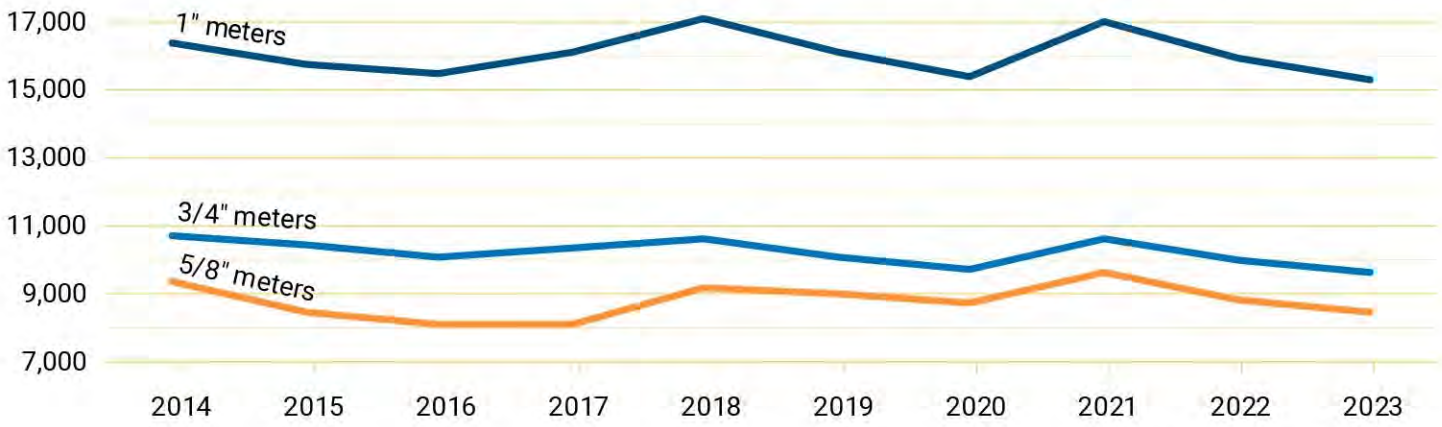
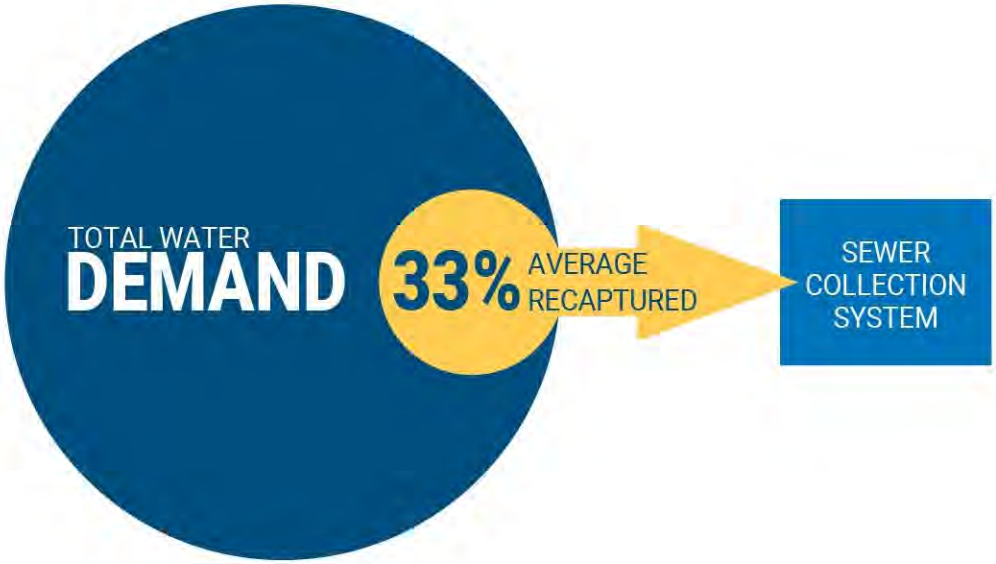


Figure 3. Source: Scottsdale Water

Scottsdale's reclamation system has approximately 1,500 miles of sewer collection lines and over 40 lift stations. For decades, Scottsdale has used 100 percent of its recycled wastewater for beneficial, non-potable reuse or recharge. As a part of Scottsdale water resources portfolio, a portion of Advanced Water Purification (AWP) recycled water is recharged into the WTR uifer as a kind of savings account to be able to recover it in groundwater wells in times of prolonged drought and shortage. Another portion of the AWP recycled water is delivered to turf facilities through the Reclaimed Water Distribution System (RWDS). A final portion is delivered to the 91st Avenue Wastewater Treatment where it is used for the cooling tower at Palo Verde Nuclear Generating station and the Tres Reos Wetlands.

Of the total amount of water that is delivered to customers, approximately 33% is currently "returned" to the sewer system. Future decreases in outdoor use and increases in irrigation efficiency would lead to a high percentage of overall "return" flow. As an indicator of conservation for all customers, the city seeks to increase the return flow percentage over what has been seen in the last 10 years.



INDICATOR

Return flow or wastewater captured in the sewer collection system (2022 = 33% of total potable water demand)

TARGET

Increase return flow percentage by 10% by 2033, capturing indoor/outdoor efficiency for both residential and commercial customers

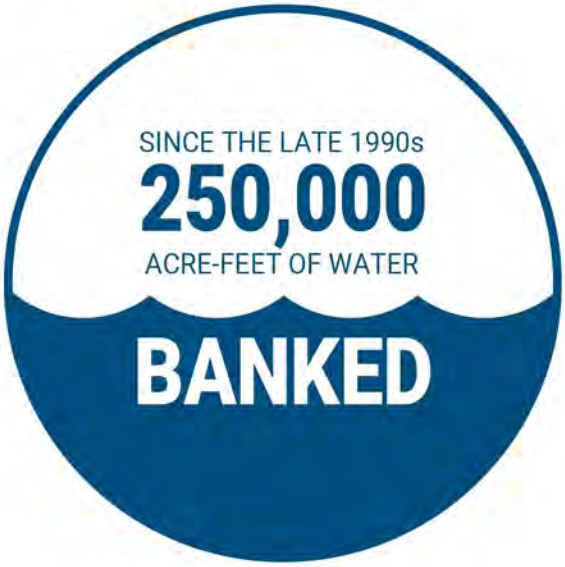
Scottsdale has excelled at proactive long-range planning to ensure safe and adequate water supplies and best management practices on water conservation efforts, total wastewater reuse, and water banking. Scottsdale helps ensure quality water supplies by reclaiming or reusing water, recharging excess to the WTR uifer, and treating groundwater. **The amount of groundwater treated has remained fairly constant and kept low, at approximately 5% of total water and kept to an internal target of Safe Yield.**

INDICATOR

Gallons of groundwater treated (2022 = 1,823 million gallons)

TARGET

Maintain treated groundwater deliveries to Safe Yield levels



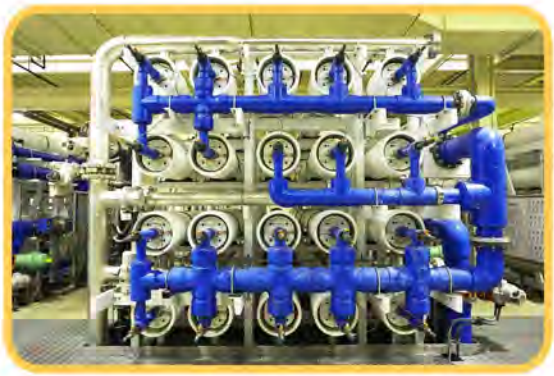
INDICATOR

Gallons of water recharged in aquifer (2022 = 250,000 acre feet)

TARGET

Maximize annual water banking

Scottsdale Water was the first Arizona water utility to implement indirect potable reuse with the Advanced Water Purification (AWP) at the treatment facility (AWT). The AWT is one of the largest and most sophisticated indirect potable reuse facilities in the world and, in 2019, became the third plant in the nation and the first in Arizona to be permitted for direct potable reuse.



BENEFITS

Environmental:
Using water efficiently brings a level of relief from the drought and reduced carbon emissions by using less energy to pump and treat water

Economic:
More secure water supplies aid business operations/ development and attract tourists; conservation means lower water bills for customers

Social:
Clean and secure drinking water for all residents supports health & equity

WHAT CAN YOU DO?

- Use the WaterSmart app monitor use and leak notifications
- Convert non-function turf (grass) areas to desert adaptive landscapes
- Consider a WaterSense Smart Irrigation controller upgrade
- Understand your landscape water needs
- Plant native and drought tolerant plants
- Replace faucets, showerheads, and toilets with WaterSense labeled fixtures

For more tips, go to ScottsdaleAZ.gov and search "water"

STRATEGIES & ACTIONS

STRATEGY WTR 1

Ensure water system resiliency.

ACTIONS

WTR 1.1 Communicate the leak detection benefits of registering for the online visualization portal and leak alerts (WaterSmart), aiming to double participation by 2025.

WTR 1.2 Encourage removal of privately-owned non-functional/non-recreational turf through education and turf removal rebates.

WTR 1.3 Promote improvements to irrigation equipment and plumbing fixtures for residential and commercial customers.

WTR 1.4 Expand water conservation programs focused on homeowner associations.

WTR 1.5 Review water use and conservation in development projects through the framework of the Scottsdale Sustainable Water Management Principles.

WTR 1.6 Showcase and benchmark best practices of water efficient buildings & landscaping.

WTR 1.7 Encourage site development strategies that incorporate green infrastructure, low impact development, and stormwater harvesting.

WTR 1.8 Develop strategies to encourage commercial water efficient business practices.

WTR 1.9 Ensure all water meters converted to Automatic Meter Infrastructure.

WTR 1.10 Conduct water efficiency consultations with all HOAs by 2033.

STRATEGY WTR 2

Reduce municipal water use.

ACTIONS

WTR 2.1 Remove non-functional/non-recreational turf at city facilities and retrofit municipal irrigation systems to smart controllers.

WTR 2.2 Monitor leaks and implement advanced drip irrigation systems.

WTR 2.3 Maintain high-efficiency toilets and faucets in city buildings.

WTR 2.4 Install new cooling tower controllers in all municipal facilities by 2025.

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY WTR 1 **Ensure water system resiliency.**					
WTR 1.1	Communicate the benefits of registering for WaterSmart.	On-going	**Lead**: Water **Partners**: Customers	$	Customer savings
WTR 1.2	Encourage removal of privately-owned turf.	On-going	**Lead**: Water **Partners**: Customers, HOAs, landscapers	$-$$	Customer savings
WTR 1.3	Promote improvements to irrigation equipment and plumbing fixtures.	On-going	**Lead**: Water **Partners**: Customers, HOAs, landscapers	$	Customer savings
WTR 1.4	Expand HOA water conservation programs.	On-going	**Lead**: Water **Partners**: HOAs	$-$$	Customer savings
WTR 1.5	Utilize Scottsdale Sustainable Water Management Principles in development review.	Quick win	**Lead**: Water **Partners**: Developers	$	Customer savings
WTR 1.6	Showcase and benchmark water efficient buildings & landscaping.	On-going	**Lead**: Water **Partners**: Customers, developers, landscapers	$	Customer savings
WTR 1.7	Encourage sustainable site development strategies.	On-going	**Lead**: Water, OEI **Partners**: Residents, developers	$	Nature Reduced flooding
WTR 1.8	Develop commercial water efficient business practice.	1-3 years	**Lead**: Water **Partners**: Commercial customers	$-$$	Customer savings
WTR 1.9	Convert water meters to Automatic Meter Infrastructure.	On-going	**Lead**: Water **Partners**: Customers	$	Municipal savings
WTR 1.10	Conduct HOA water efficiency consultations.	5-10 years	**Lead**: Water **Partners**: HOAs	$	Customer savings

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY WTR 2 Reduce municipal water use.					
WTR 2.1	Remove non-functional/ non-recreational turf at city facilities and retrofit municipal irrigation systems to smart controllers.	On-going	**Lead**: Parks & Rec	$-$$	Ⓢ Municipal savings
WTR 2.2	Monitor leaks and implement advanced drip irrigation systems.	On-going	**Lead**: Parks & Rec	$	Ⓢ Municipal savings
WTR 2.3	Maintain high-efficiency toilets and faucets in city buildings.	On-going	**Lead**: Facilities	$	Ⓢ Municipal savings
WTR 2.4	Install new cooling tower controllers in municipal facilities.	Quick win	**Lead**: Facilities	$	Ⓢ Municipal savings

ENDNOTES

1 "Scottsdale asks residents to use five percent less water and conserve more," City of Scottsdale, January 11, 2022.

2 "Scottsdale shows reduced water use during hottest month on record," City of Scottsdale, August 14, 2023.

3 "Rapid intensification of the emerging southwestern North American megadrought in 2020–2021," Nature Climate Change, Williams, Cook and Smerdon, Vol 12, March 2022.

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CITIZEN PETITIONS ITEM 16

Citizen Petitions: This portion of the agenda is reserved for the submission and/or consideration of citizen petitions. There is no limit on the number of petitions a citizen may submit; however, **each citizen is limited to a total time of three minutes to speak to his/her petition(s)**. A Request to Speak **form** must be submitted, together with the petition(s), ***before*** the second Public Comment period begins.

16. Receipt of Citizen Petitions – None
Request: Accept and acknowledge receipt of citizen petitions. Any member of the Council may make a motion, to be voted on by the Council, to: (1) Direct the City Manager to agendize the petition for further discussion; (2) direct the City Manager to investigate the matter and prepare a written response to the Council, with a copy to the petitioner; or (3) take no action.
Staff Contact(s): Ben Lane, City Clerk, 480-312-2411, blane@scottsdaleaz.gov

WORK STUDY SESSION

Work Study Sessions: Work study sessions provide a less formal setting for the Mayor and Council to discuss specific topics, at length, with each other and City staff. Work study sessions provide an opportunity for staff to receive direction from the Council and for the public to observe these discussions.

Public Comment: To provide an opportunity for public input yet continue to maximize the amount of time available for the Council to have focused discussions, spoken comment (maximum of five speakers) is being accepted on the item(s) on tonight's work study session agenda. To sign up to speak, please click **here**. **Request to speak forms must be submitted no later than 90 minutes before the start of the meeting.**

- **Scottsdale Environmental Advisory Commission Vice Chair Natalie Chrisman Lazarr spoke in support of revisions made to the scope and framework of the Sustainability Plan, endorsed incorporation of the net zero energy strategic plan, and engagement of the community.**
- **Scottsdale Environmental Advisory Commissioner Andrew Scheck expressed support for the Sustainability Plan and proposed taking aggressive steps to make a significant difference in lowering temperatures, lessening drought conditions, and improving air quality.**
- **Scottsdale resident Dan Ishac suggested three significant changes to the Sustainability Plan: simplify the language and focus on energy water and waste; eliminate the secondary and tertiary goals and activities; and include benchmarking/measurements, including a cost-benefit analysis.**

If you have thoughts or suggestions on the work study session item(s) you would like the Council to consider, you are encouraged to submit your written comment(s) electronically by clicking **here**. Written comments that are submitted electronically at least 90 minutes before the meeting will be emailed to the Council and posted online prior to the meeting.

1. Sustainability, Net Zero Energy, and Heat Mitigation Plans Update
Request: Presentation, discussion, and possible direction to staff regarding the development of the Community Sustainability, Net Zero Energy, and Heat Mitigation Plans.
Presenter(s): Lisa McNeilly, Sustainability Director

Staff Contact(s): Erin Perreault, Planning, Economic Development, and Tourism Executive Director, 480-312-7093, eperreault@scottsdaleaz.gov

– Sustainability Director Lisa McNeilly gave a PowerPoint presentation.

– There was consensus by the Council on the following:

- **Focus on these pathways: energy, heat, air quality, water, and waste.**
- **Use narratives that will tell a story about why sustainability is important as it explains the "what, why, when, where and how" that is necessary to establish an understanding of the situation and the importance of addressing it.**
- **Avoid repetition of items already discussed in other documents, such as the General Plan.**
- **Need to do community outreach to obtain support for the Sustainability Plan.**

– Councilmembers made the following suggestions:

- **Use simple or plain language instead of focusing on priorities, strategies, actions, and flowcharts.**
- **Use examples focusing on children and pets in the narratives.**
- **Every section of the Sustainability Plan should have an educational component.**
- **Provide data for quantitative results rather than qualitative results.**
- **Identify future goals for one year, two years, three years, five years, 10 years, 20 years, and 50 years.**
- **In any type of return-on-investment analysis, need to factor in quality of life in addition to the financial component.**
- **Continue focusing on priorities, strategies, actions, and flowcharts.**
- **Identify potential obstacles related to plan implementation and determine methods for addressing these obstacles.**
- **Focus on the urgent issues and identify key indicators to assess baseline conditions and monitor progress.**
- **Incorporate the engagement and education strategies and actions within each priority with citizens, the Scottsdale Environmental Advisory Commission, and other community groups.**
- **Invest in creating a digital platform that facilitates dynamic modeling and future projections.**
- **Be mindful of the implementation timeline and do not let perfection stand in the way of progress.**
- **Include benefits provided by treating wastewater for potability purposes; increasing covered walkways; encouraging light-colored roofs; and avoiding water overspray from sprinklers.**
- **The General Plan 2035 is an aspirational document supported by separate plans, such as the Transportation Action Plan, Character Area Plans, and Drought Management Plan that are regularly updated. It is important to adopt a Sustainability Plan that will also be regularly updated and support the General Plan 2035.**

Adjournment – 7:38 P.M.

– Councilmember Graham made a motion to adjourn the Regular Meeting and Work Study Session. Councilwoman Janik seconded the motion, which carried 7/0, with Mayor Ortega; Vice Mayor Littlefield; and Councilmembers Caputi, Durham, Graham, Janik, and Whitehead voting in the affirmative.

Public Comment time is also the designated time for presenting a citizen petition. There is no limit on the number of petitions a citizen may present; however, each citizen is limited to a total time of three minutes to present and speak to the petition(s). A Request to Speak **form** must be submitted together with the petition(s) before the Mayor announces the second Public Comment period.

Speakers may address the Council once under Public Comment at the beginning or the end of the meeting, but not both. Public Comment is limited to a total of 15 minutes at the beginning and 15 minutes at the end of the meeting. **Speakers are limited to three minutes to address the Council during "Public Comment."**

CITIZEN PETITIONS ITEM 12

Citizen Petitions: This portion of the agenda is reserved for the submission and/or consideration of citizen petitions. There is no limit on the number of petitions a citizen may submit; however, **each citizen is limited to a total time of three minutes to speak to his/her petition(s)**. A Request to Speak **form** must be submitted, together with the petition(s), ***before*** the second Public Comment period begins.

12. **Receipt of Citizen Petitions – None**
Request: Accept and acknowledge receipt of citizen petitions. Any member of the Council may make a motion, to be voted on by the Council, to: (1) Direct the City Manager to agendize the petition for further discussion; (2) direct the City Manager to investigate the matter and prepare a written response to the Council, with a copy to the petitioner; or (3) take no action.
Staff Contact(s): Ben Lane, City Clerk, 480-312-2411, blane@scottsdaleaz.gov

WORK STUDY SESSION

Work Study Sessions: Work study sessions provide a less formal setting for the Mayor and Council to discuss specific topics, at length, with each other and City staff. Work study sessions provide an opportunity for staff to receive direction from the Council and for the public to observe these discussions.

Public Comment: To provide an opportunity for public input yet continue to maximize the amount of time available for the Council to have focused discussions, spoken comment (maximum of five speakers) is being accepted on the item(s) on tonight's work study session agenda. To sign up to speak, please click **here**. **Request to speak forms must be submitted no later than 90 minutes before the start of the meeting. – Phillip David Allsop said the sustainability plan should include benchmarks to evaluate where we are, how we are doing, encourages a sense of accountability, communicates what is going on, and how people can participate. Ute Brady asked the Council to not adopt the plan as it lacks four critical components, including additional baseline metrics on how to measure success, identify goals, inform strategies, and determine success. She proposed the establishment of a task force to assist with creation of a sustainability plan. Alisa McMahon stated the plan lacks defined goals, goals are not quantified or prioritized, and the plan lacks compelling messaging and acknowledgement of challenges. Anthony Leavy spoke against the proposed plan noting it was too reliant on multi-modal transportation and disparately impacted South Scottsdale and Old Town Scottsdale. Bob Pejman noted concerns about the plan's street elements, including replacing vehicular lanes with bicycle lanes, and requested additional public outreach. French Thompson spoke for the need for fiscal responsibility and against the removal of vehicular lanes for bicycle lanes.**

If you have thoughts or suggestions on the work study session item(s) you would like the Council to consider, you are encouraged to submit your written comment(s) electronically by clicking **here**. Written comments that are submitted electronically at least 90 minutes before the meeting will be emailed to the Council and posted online prior to the meeting.

1. **Scottsdale Community Sustainability Plan**

Request: Presentation, discussion, and possible direction to staff regarding the Scottsdale Community Sustainability Plan.

Presenter(s): Lisa McNeilly, Sustainability Director

Staff Contact(s): Erin Perreault, Planning, Economic Development, and Tourism Executive Director, 480-312-7093, eperreault@scottsdaleaz.gov

– Sustainability Director Lisa McNeilly gave a PowerPoint presentation.

– Councilmembers made the following suggestions:

- **Several mobility elements related to increasing bicycle lanes and sidewalks and reducing vehicular lanes, should not be included in a sustainability plan, rather they should be associated with transportation plans. These elements relate to Goal 3.1, which should be removed from the Sustainability Plan.**
- **The Sustainability Plan should not conflict with the Transportation Action Plan.**
- **It is essential to involve planning- and development-related board and commissions and the public to obtain additional input for the implementation of a successful sustainability plan.**
- **Additional data is needed on identifiers for success, measurements, and concrete goals.**
- **Continue working on the plan with the Scottsdale Environmental Advisory Commission and identified experts and return to the Council in six months with a revised draft plan.**
- **The proposed plan does not have the endorsement of the Scottsdale Environmental Advisory Commission or the McDowell Sonoran Preserve Commission and should be tabled until the plan is properly vetted by boards, commissions, and additional public outreach.**
- **Shaded walkways, tree canopies and open space should all be central tenets of the Sustainability Plan.**
- **Additional public outreach is not needed, but firm timelines are needed.**
- **Do not delay with moving forward with the implementation of the Sustainability Plan.**
- **The plan proposes several initiatives and affordable housing; however, it provides no information on financial resources.**
- **Provide additional information related to energy, including a list of meters; what the meters are powering, for example buildings, landscaping, etc.; how much energy the meters are measuring, and a timeline for the measurements.**
- **Include the proposed timeline in the plan, create a steering committee of experts to work with the Scottsdale Environmental Advisory Commission to provide quantitative data, and verify assumptions which may impact the timeline.**
- **Costs need to be in context with fiscal sustainability; therefore, it is important to provide information related to costs associated with initiatives.**
- **Slow the process down and review information and data, noting the current and future states and how items will be measures and benefits quantified.**
- **Related to Page 22 (Built Environment and Housing), invite staff to return to give a presentation on costs and impacts to the Planning and Development Department on the Green Building Code requirements.**
- **Related to Page 25 (Waste as a Resource), provide more information on Item 1.8, "pay as you throw" rate structure.**
- **Related to Page 13 (Water Resources), include regulations for golf courses using five acre-feet of water per acre.**
- **Related to Page 14 (Open Space & Land Management), include provision for wildlife corridors as suggested by the McDowell Sonoran Preserve Commission.**
- **Related to Page 18 (Economic Vitality), include metrics about the impacts of water and lower urban heat has on economic viability.**

- **Related to Page 22 (Built Environment and Housing), include a guide for utility bill reduction.**
- **Related to Page 25, (Waste as a Resource), include residential compost programs.**
- **Page 27 (Food Systems), include zero-food tourist destination as a strategy and indicator.**
- **Include an aspirational fruit tree program to assist citizens in harvesting fruit trees so food does not go to waste.**
- **Related to Page 22 (Build Environment and Housing), do not make Policy 1.3 mandatory for residents to install solar panels as part of a remodel.**
- **Use the guidelines provided by Ute Brady's letter, which was provided to the Council and was included in the supporting materials for the council meeting packet.**

Adjournment – 9:41 P.M.
– Councilmember Graham made a motion to adjourn the Regular Meeting and Work Study Session. Councilwoman Janik seconded the motion, which carried 7/0, with Mayor Ortega; Vice Mayor Littlefield; and Councilmembers Caputi, Durham, Graham, Janik, and Whitehead voting in the affirmative.

Ute Brady, Ph.D.
Chair, Scottsdale Environmental Advisory Commission (SEAC)

Honorable Mayor Ortega
Scottsdale City Council members

July 7, 2023

Re: Feedback on the updated draft Sustainability Plan framework – July 10, 2023 work study session

Dear Mayor and city council,

I am hereby providing feedback on the updated Sustainability Plan framework in my role as a citizen and as the chair of the Scottsdale Environmental Advisory Commission (SEAC). I will be traveling out-of-country to an academic conference in Europe at the time of the work study session and regrettably will be unable to give feedback in person. In my stead, SEAC's vice chair, Natalie Chrisman Lazarr, will represent SEAC. These comments are intended to complement and supplement SEAC's position.

First, I would like to commend city staff on the revised Sustainability Plan framework which outlines a much improved foundation upon which the final Sustainability Plan can be built. The outline of the Sustainability Plan, as depicted in Ms. McNeilly's presentation, is more cohesively organized and links priorities (goals?) with strategies and actions that can be measured and monitored with indicators to ensure desired target goals are reached. These structural revisions set us on a path to more implementable Sustainability Plan and I am pleased to see these changes.

Looking forward, while I generally support the revised Sustainability Plan framework, it is important to note that the framework is a scaffolding that requires considerably more input to become an implementable policy guide to a more sustainable future. With that in mind, as you consider the proposed framework, **I strongly encourage you to ensure that the final version of the Sustainability Plan includes the following elements in each of its three pathways**:

1. **It tells a compelling and easily understood story**
    a. Where we are now with regard to a key issue of concern (e.g. urban heat)?
    b. What is changing (e.g., it is getting hotter)?
    c. How are we going to address the issue?
    d. Why is this important?

    Telling a story allows the City to make the case why the sustainability plan is important. It explains the "what, why, where, and how" that is necessary to establish an understanding of the situation and importance of addressing it.
2. **It identifies a desired future goal(s)** that we want to reach in 5, 10, 15 years from now. Doing so provides specific targets for city staff and the community to work toward. By

reporting progress on reaching those future goal(s), the city holds itself accountable to its citizens, thus building trust and buy-in.

3. **It outlines obstacles that may be encountered** along the way (e.g., trees take a while to mature). Anticipating potential obstacles allows city staff to imagine and prepare for potential setbacks. Reporting on potential and actual setbacks, again, provides accountability and builds trust and buy-in with citizens.
4. **It provides measurable indicators** that will allow us to monitor where we are in terms of reaching the desired future goal. Regular monitoring allows staff to assess progress toward the desired future goal and rapidly identify ineffective strategies and actions.
5. **It incorporates engagement and education strategies and actions <u>within</u> each priority**, rather than keeping it as a separate priority which is how it is presented in the current Sustainability Plan framework. Engagement and education are key factors for each priority listed in the three pathways. As we move into a future where environmental conditions are less stable, it is crucial that the city engage its citizens in its efforts to move toward a sustainable future. A sense of place and community are powerful motivators of change, and empowering citizens to contribute to a sustainable future will foster the buy-in and support that is necessary to reach the desired future goal(s).

Equally important, I recommend **city council direct staff to ensure that** in the final Sustainability Plan:

1. **Actions are specific** (e.g. "reduce the area of exposed dark surfaces within the city by 30% by 2030" instead of "Support private and public strategies to reduce the area of exposed dark asphalt, dark roofs and other hot surfaces"). Research has consistently shown that greater specificity of actions leads to more effective implementation.
2. **Each priority (goal?) itemizes the environmental, economic, health and safety, and equity benefits associated with accomplishing that priority**. As a hypothetical example, reaching a goal of 70% energy use reduction could result in the following benefits:
    a. Environment: Reduces air pollution and carbon emissions from fossil fuel burning
    b. Economic: Creates green jobs, generates tax revenues, reduces healthcare costs, reduces lost productivity
    c. Health & Safety: Improves health and well-being by reducing incidences of cardiovascular and respiratory disease, including asthma.
    d. Equity: Ensures stable and affordable energy costs for Scottsdale residents

    Assessing each goal based on the complex suite of benefits that can be gained from reaching it will allow city staff and city council to better identify, categorize, and pursue those goals based on their contributions to our community.
3. **Focus on three key pathways: 1) energy (including heat and air quality), 2) water, and 3) waste.** By framing the Sustainability Plan around key issues of concern to Scottsdale citizens, we ensure that the priorities (goals?), strategies, actions, and related indicators better align with those concerns. This structure will also streamline the

indicators to those that more effectively measure key environmental and social conditions while eliminating those which do not. For example, measuring the number of green businesses and green events tells us nothing about the energy consumption associated with those businesses and events. Relatedly, the number of meals/food boxes delivered is not an indicator of social or economic conditions. Focusing the sustainability plan on urgent issues and identifying key indicators to assess baseline conditions and monitor progress will be more effective than spending time collecting data of questionable value to the city's sustainability goals.

4. **Invest in creating a digital platform that facilitates dynamic modeling and future projections** of key indicators to evaluate the effect of proposed policy actions. The ability to tinker with indicators in a digital environment to simulate how policy adjustments in one area may influence other areas will increase the city's predictive capacity of potential policy outcomes and enhance its ability to reach sustainability goals. For example, an indicator that monitors tree cover can be manipulated in a model to show the long-term effects that incentivizing or de-incentivizing tree planting may have on the heat island effect and human health by taking into account the effect of increased tree cover on average nighttime temperature, air quality, and hospitalizations for cardiovascular and respiratory disease.

Last, but not least, I recommend the city council ensure that **SEAC is given regular opportunities to review and provide feedback** on drafts of the Sustainability Plan as it is being developed. The pool of expertise represented in SEAC commissioners is a valuable asset that can contribute meaningfully to the Sustainability Plan process.

In summary, I am happy to see the changes to the Sustainability Plan framework that have been made since the last city council work study session. I think staff is moving in the right direction. Looking forward, however, much more work is needed to fill in the details of the Sustainability Plan to create an effective and implementable document that inspires, engages, and, most importantly, guides staff and the community to collectively move toward a sustainable future. As SEAC's chair and a Scottsdale resident, I remain committed to assisting in this process and advance the recommendations outlined above for your consideration as you provide further guidance and direction to city staff.

Kind regards,

Ute Brady

Ute Brady, Ph.D.

From: yango <lylay00@icloud.com>
Sent: Monday, August 7, 2023 6:30 PM
To: Mayor David D. Ortega <DOrtega@Scottsdaleaz.gov>
Subject: Community Choice Energy for Scottsdale!

Dear Mayor Ortega,
I live in Scottsdale and am affiliated with Arizona Youth Climate Coalition. I'm writing to you today to urge you and the Scottsdale City Council to pass a resolution of interest for a feasibility study for Community Choice Energy for Scottsdale. I am very concerned about the future of Arizona in the face of our climate crisis. Without a full and just transition to renewable energy before 2050, Scottsdale will suffer underneath
extreme heat, wildfires, drought, etc. Community Choice Energy (CCE) is a proven path to making this urgently needed transition while also lowering electricity bills, giving consumers power, and raising money to re-invest into our city.

On behalf of Arizona's youth, thank you for your time and consideration,
Lyla Yango :)

To: Honorable Mayor and City Council, City of Scottsdale, Arizona

cc: Lisa McNeilly, Sustainability Director, Ute Brady, Chair, SEAC
Date: August 15, 2023
From: Philip D. Allsopp, D.Arch., M.S.(Public Health), RIBA, CSBA
(480) 276-7707
pallsopp@orbisdynamics.com (www.orbisdynamics.com)
philip.allsopp@asu.edu

RE: Observations on Scottsdale's sustainability and its plan for achieving it

Honorable Mayor and City Council Members:

As a 17-year resident of Scottsdale, I have a vital interest in the livability of the city and its future ability to attract and retain new generations of entrepreneurs, artists, scientists, and teachers who are able, with ease, to make their home here and enjoy the life-sustaining benefits of a city designed for people and community. I also have a keen appreciation for the enormous efforts and long hours that each of you, City staff and citizen Commissioners devote to the significant and complex work at hand.

My professional work has long been engaged in the use and creation of advanced simulation and analysis systems for dealing with highly complex urban, business, environmental and public health situations. Not least of these are the multifaceted dynamics of the ever-changing social, economic, mobility and natural (and man-made) environmental characteristics that shape cities and their capacity to thrive. This inevitably means paying attention to the details of why something works or behaves the way it does (See Page 2 of attached PDF Document). For "Big pictures" to be useful they must be grounded with sufficiently granular detail. It is from this perspective from which my comments arise; they are not critiques of the professional efforts and capabilities that are being deployed daily to frame and implement a "flight path" for the City's future.

Perspectives (Pages 3, 4 & 5 of attached PDF document)

As I have stated publicly before, cities are similar in their complexity to a human being. Any healthy human form is configured to enable life-giving nutrients to be conducted via intricate networks of lymphatic, vein, or arterial highways for transporting oxygen to the brain, other vital organs and the person's physical structures which keep these highways and flows efficient and alive. Cities are similar. Change something about any part of the organism and ripple effects will manifest themselves in others.

When we design and build aircraft, we create accurate digital twins of them that we can test to arrive at optimal combinations of materials, aerodynamic shapes, and power plants for the aircraft to fly safely and efficiently for many years of service life. Cities undergo major efforts involving the public, elected representatives, and municipal staff to develop and obtain approval for a variety of different plans. Yet the application of user-friendly advanced tools for rapidly analyzing the status quo and visualizing future outcomes based on one or more courses of action is not yet commonplace or routine. Because of this there is an understandable

tendency to constrain the number of variables included in any hard-copy plan document to meet milestones while receiving varied public input.

However, whether included in a hard-copy plan or not, interdependencies among the social, economic, human health, mobility, economic growth, and environmental characteristics of the city remain in play and will potentially reduce the effectiveness of policy decisions constrained to a narrower view. They may even involve time-consuming re-work and more capital expenditures to deal with the ripple effects arising from actions stemming from the implementation of other, equally constrained city plans.

Air and Water (Pages 6 and 7 of attached PDF document)

Air Quality is influenced by many factors, one of which for the purposes of illustration is how people get from A to B. Whether by bus or automobile, shared or individual ride, tires meet road surfaces and abrasion occurs. This abrasion releases dust and particles of tire, some of which are microscopic, are airborne and are inhalable. Substantial on-going research is being conducted into this feature of urban life, air quality and human health. There's unlikely to be a simple answer but reducing tread wear, and removing certain types of plastics from tire manufacture may provide ways to mitigate this aspect of air pollution.

Mitigating Heat Impacts (Pages 8, 9 and 10 of attached PDF document)

The three examples illustrated are from work previously conducted in this region. One identifies the human health consequences of inadequate housing as overly hot bedrooms create disturbed patterns of sleep. The other deals with EV charging when temperatures are excessive leading to long charging times and reduced range, and thus more frequent charging. The third slide illustrates how key metrics and connected to causal data.

Bio of the author - Phil Allsopp, CEO, ORBIS Dynamics, Inc.

Phil leads the company's technology and professional services development including the delivery of advanced Urban Observatories to clients globally. He is also a Senior Scientist with Arizona State University's Global Futures Laboratory and holds professional qualifications in architecture from Kingston University London. Following post graduate research in energy conservation and environmental physics at the University of Wales, Phil served with Britain's National Health Service developing computational design and mapping systems for health services and facilities planning. For his work he received a Queen Elizabeth II Silver Jubilee Award which took him to Columbia University where he earned a Master of Science degree in the public health field and a US Public Health Service Fellowship with the Office of the Surgeon General in Washington DC. His private sector experience includes practice directorships and officer roles with Electronic Data Systems, A.T. Kearney, SAIC and Perkins & Will; as Chief Analytics Officer with a major US health insurance company; and as CEO with the Frank Lloyd Wright Foundation based at Taliesin West in Scottsdale. Before co-founding ORBIS Dynamics, Phil worked extensively with the City of Barcelona Mayor's office on their Smart City Campus initiative, the WHO's Healthy Cities Initiative (Australia, New Zealand & SE Asia Region), and the Gila River Indian Community on tribal challenges encompassing inadequate rural and urban housing and its impact on chronic disease and disconnected youth.

City of Scottsdale
Sustainability Plan Development

Some Observations :

- Heat Impacts and Mitigation – Inadequate Housing Example
- Energy Implications of EV charging in Hot Climates
- Water and Air Sections of the Sustainability Plan

Phil Allsopp

August 14, 2023

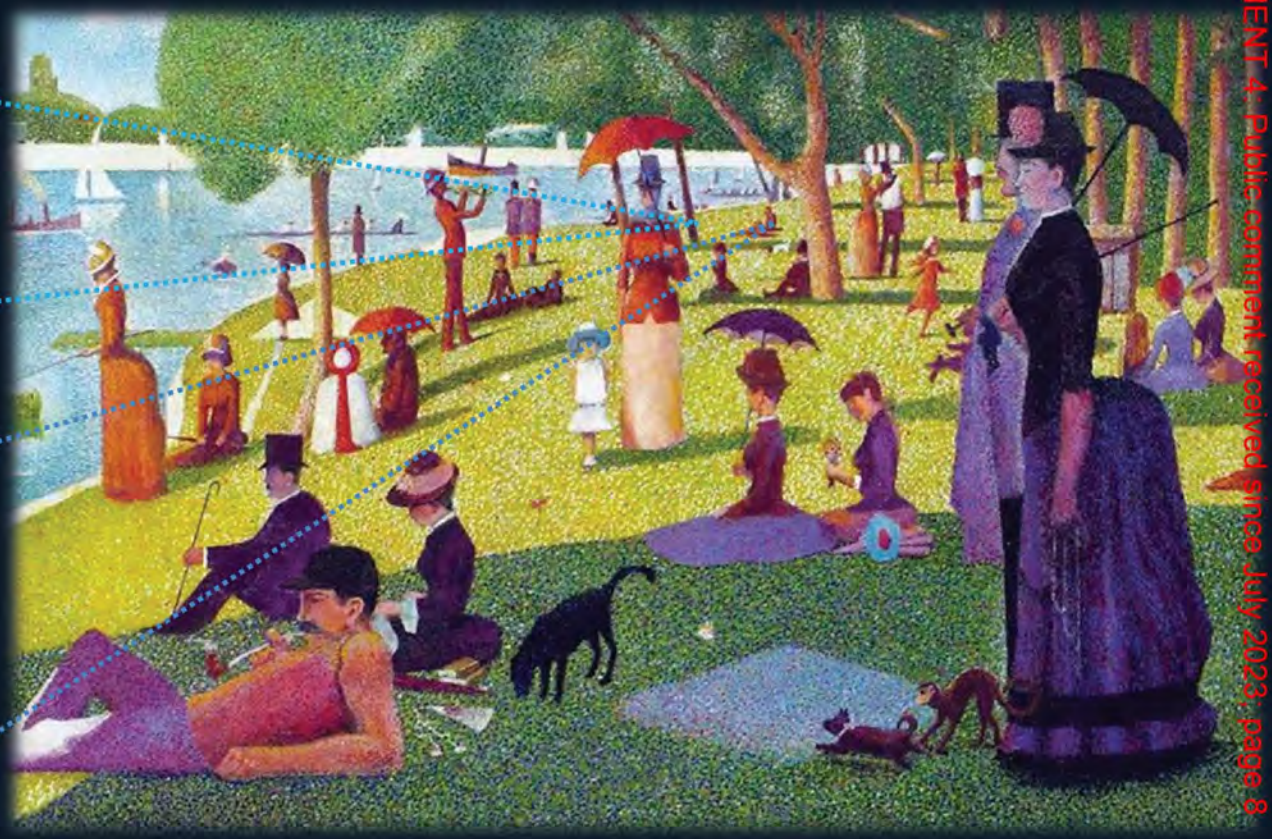
Collaborative Discovery for Urban Futures

www.orbisdynamics.com
info@orbisdynamics.com

Painting "Big Pictures" of city performance – connecting the dots:

requires knowing how detailed human, environmental & economic sub-systems work, interact & why

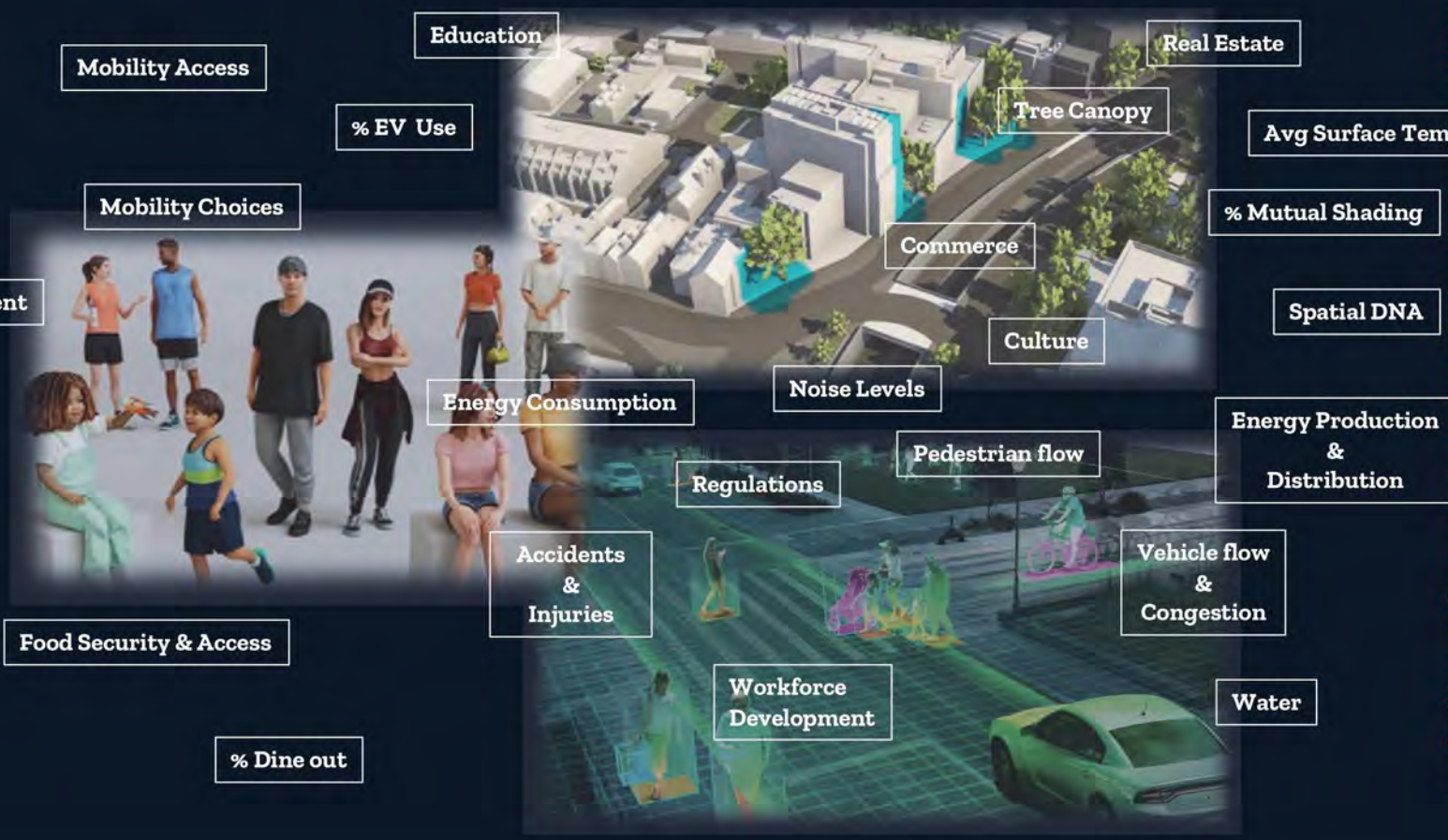
ORBIS DYNAMICS



Governing Dynamics of Urban Regions

Characteristics of sustained livability and complex, interrelated, knowable and usable

ORBIS DYNAMICS



The City as an interrelated dynamic system

Navigating the future requires persistent instrumentation, insight and communications

ORBIS DYNAMICS

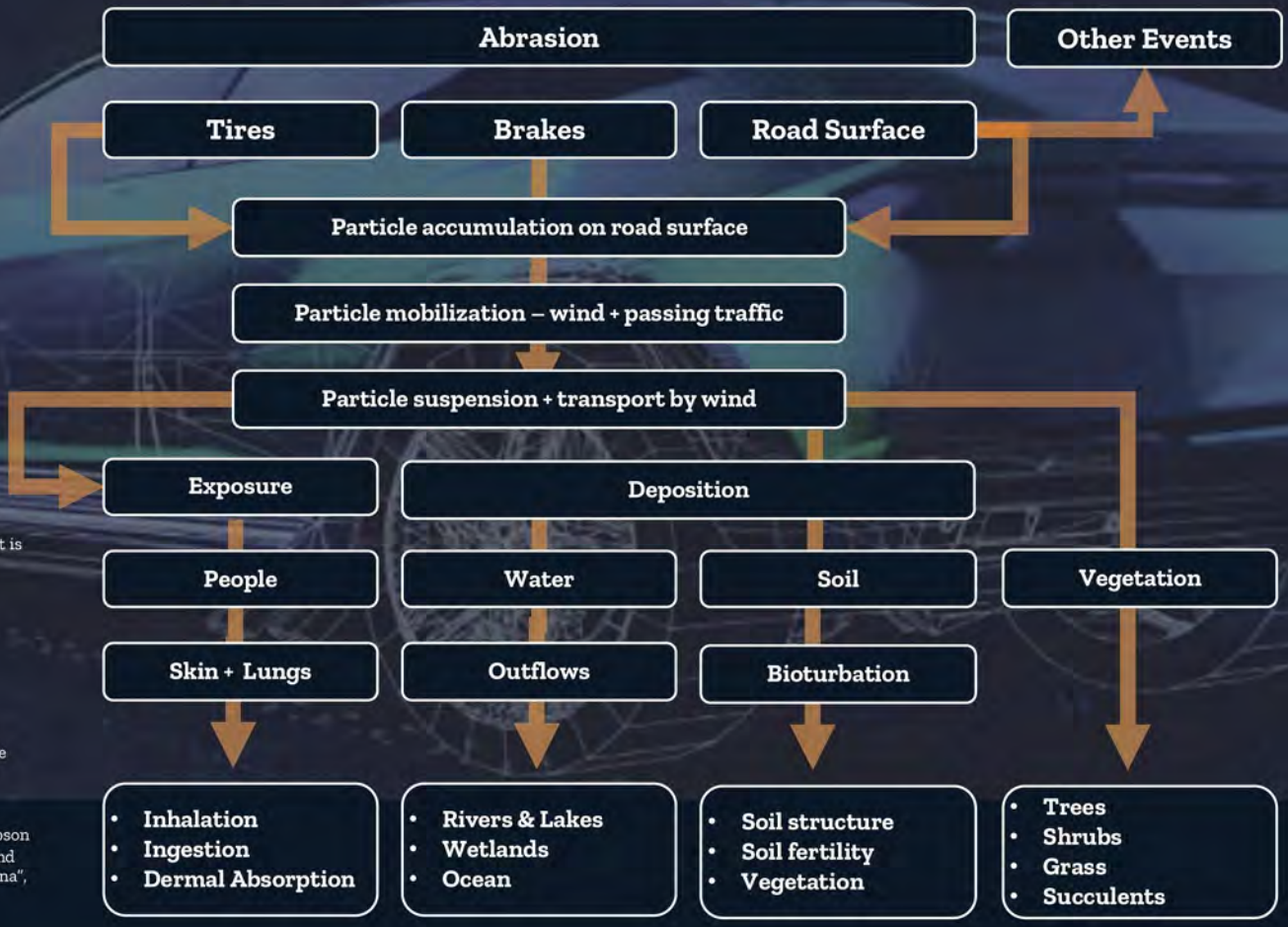
ORBIS DYNAMICS

Observations

Whether included in a hard-copy plan or not, interdependencies among the social, economic, human health, mobility, growth and environmental characteristics of the city remain in play and will likely impact the success of policy decisions constrained to a narrower view

Air Quality – an illustrative example:

Tires and Particulates – vehicles on highways[1]



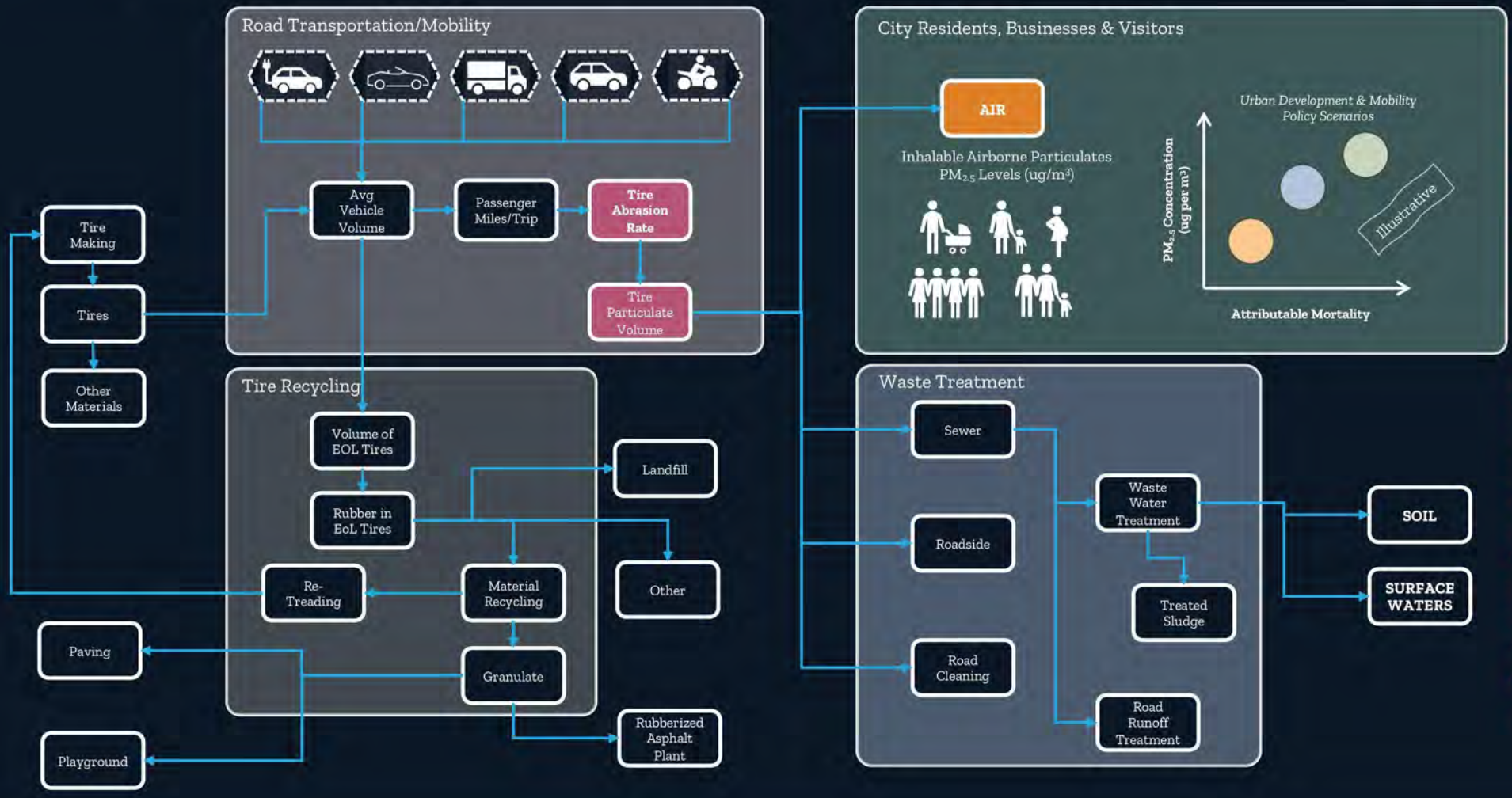
1: Peer reviewed published scientific research includes but is not limited to:

Sommer, F., Dietze, V., Baum, A., Sauer, J., Gilge, S., Maschowski, C., Gier´e, R., 2018.
Tire abrasion as a major source of microplastics in the environment. Aerosol Air Qual. Res. 18, 2014–2028. https://doi.org/10.4209/aaqr.2018.03.0099.

Sieber, R.,Kawecki, D, Nowak, B., "Dynamic probabilistic material flow analysis of rubber release from tires into the environments". Swiss federal Laboratories for Materials Science & Technology, Nov 6 2019

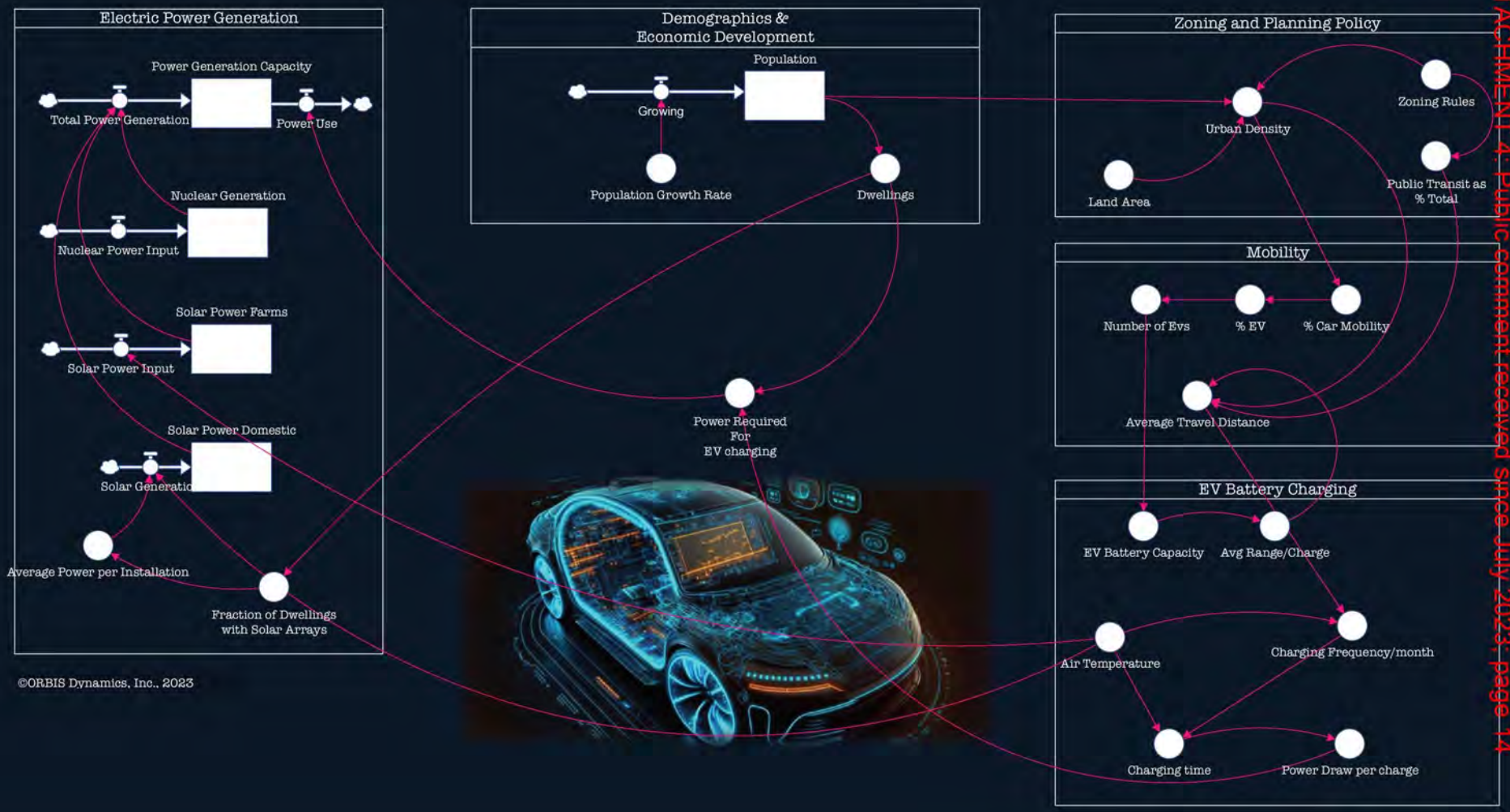
Manfield TJ, Rodriquez, D.A., Huegy, J and MacDinald-Gibson J, "The Effects of Urban Form on Ambient Air Pollution and Public Health Risk: A Case Study in Raleigh, North Carolina", 2014. The Society for Risk Analysis.

An example of an Air Quality driver- from vehicle volumes to airborne particulates

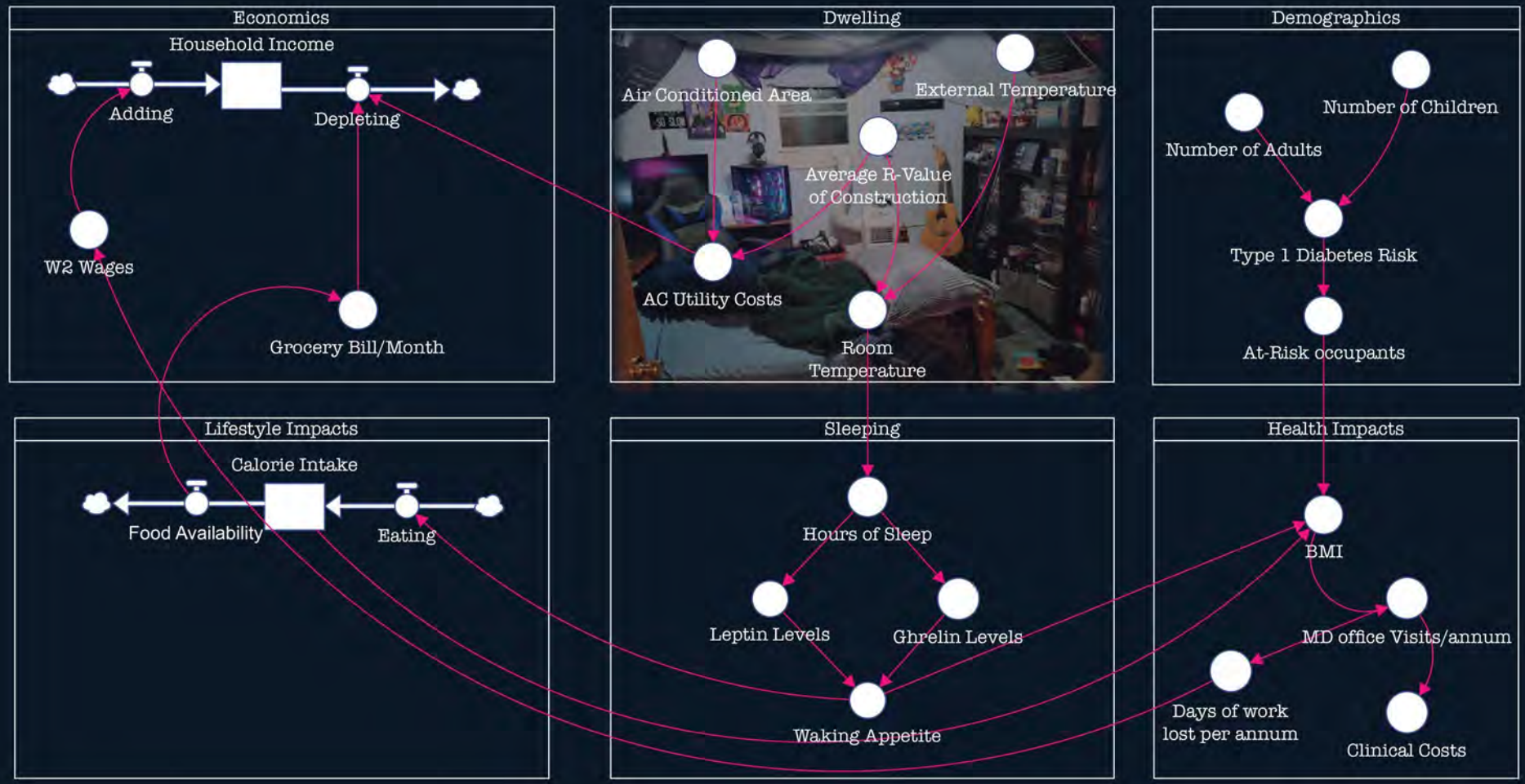


The Governing Dynamics of EV Charging and Utility Capacity

ORBIS DYNAMICS

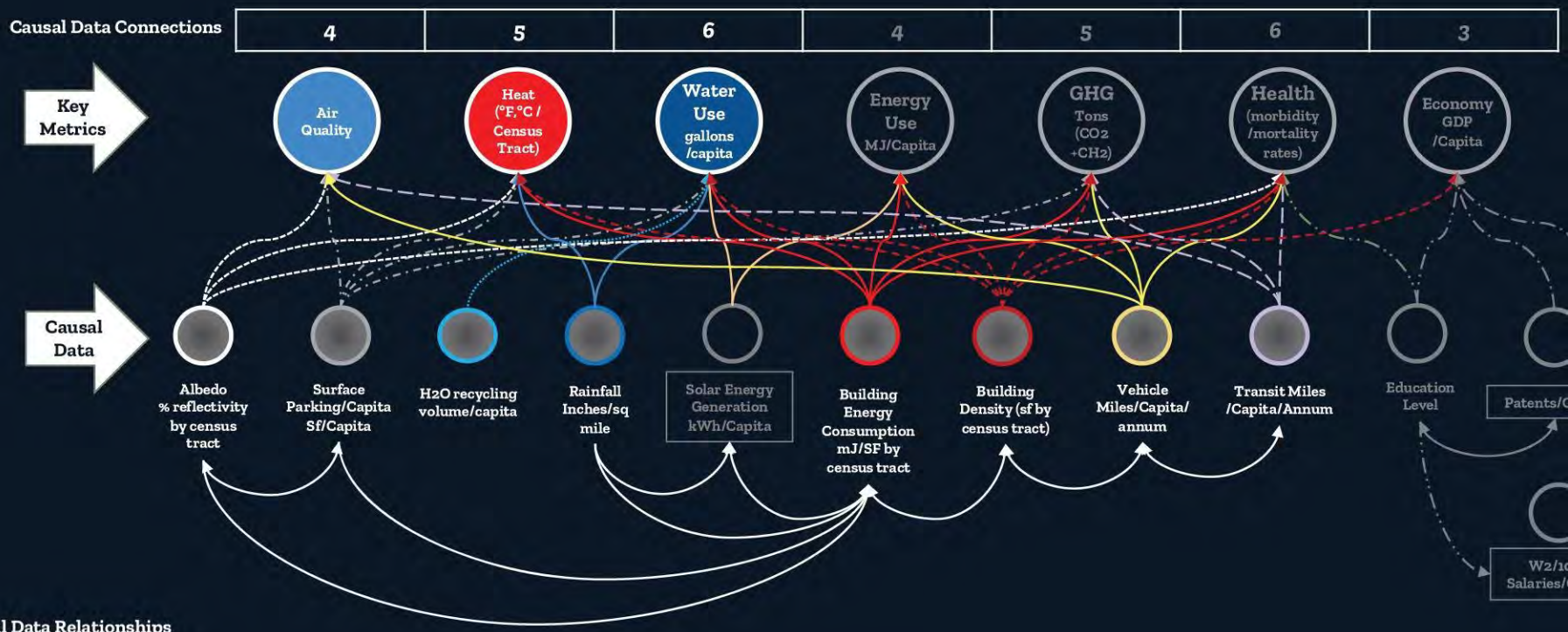


The dynamics of sleeping in over-heated bedroom environments



Water, Heat and Air Quality

Connections among leading indicators, causal data sources and dependencies



Causal Data Relationships

Metrics Connections	3	4	1	2	2	5	6	4	3	2	1
Data Dependencies	2	2	0	2	2	5	2	2	1	1	1

City of Scottsdale
Sustainability Plan Development

Some Observations :

- Heat Impacts and Mitigation – Inadequate Housing Example
- Energy Implications of EV charging in Hot Climates
- Water and Air Sections of the Sustainability Plan

Phil Allsopp

August 14, 2023

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Collaborative Discovery for Urban Futures

www.orbisdynamics.com
info@orbisdynamics.com

CITY OF SCOTTSDALE

To: Scottsdale Environmental Advisory Commission (SEAC)
From: Lisa McNeilly, Sustainability Director
cc: Cindi Eberhardt, Planning & Development Area Director

Meeting Date: August 16, 2023
Re: **Item 4: Scottsdale Community Sustainability Plan**

To continue the productive discussions and input on the sustainability plan by Commissioners, this memo and attachments focus on two aspects of the sustainability plan: (A) a revised outline for the plan and (B) the baseline data, strategies and actions, and potential targets. **Commissioners are requested to review the enclosed documents and identify input/suggested changes for discussion on August 16.**

A. Attachment 1 "Sustainability Plan – Outline"
This new draft outline of the plan was revised by staff to reflect input from City Council and SEAC.

Potential discussion questions:

- Are there elements of city leadership or of a compelling narrative that are missing?
- For the proposed 'testimonials'– are there projects or people who should be included?
- What are good resources for what residents/businesses can do (or other sections)?

B. Attachment 2 "Scottsdale Sustainability Plan Target/Strategy/Action Review Matrices"
These tables were drafted to aid discussion on possible targets, baseline data, and on revisions to strategies and actions. For each of the 5 Priorities – Air Quality, Water, Energy, Waste, and Heat – the most recent draft text was adjusted to match the new framework and to reflect input since January from City Council, SEAC, and staff. **The focus in August will be on Air Quality and Water** since text for these priorities will be shared with City Council in November. The remaining three Priorities are included for completeness and will be on future SEAC agendas.

Potential discussion questions:

Air Quality (pp. 1-3 in Attachment 2):

- What should be the city's role in mitigating ozone and other pollutants?
- What should be the city's role in promoting electric vehicles?
- Who might be some new partners for improving air quality?
- What are other elements of the air quality "story"?

Promote ride share/non-car based transport; reduce idling, promote composting; promote alternatives to gas-powered equipment; discourage wood burning; Scottsdale Ordinance?

Water (pp. 4-6 in Attachment 2):

- Should the description of the Water priority be expanded to highlight more water sustainability connections (e.g., mention stormwater or overall water supply)?
- Who might be some additional partners for encouraging water conservation?
- What are other elements of the water "story"?

Background and Next Steps: At the July meeting, a timeline (Attachment 3) was presented for receiving additional Commission input on the draft sustainability plan. At that same meeting, the new plan framework and a mock-up of the extreme heat priority was shared (Attachment 4).

At the September meeting, a full draft of the plan introduction and the Air Quality and Water Priorities will be shared for review and input.

Attachments:
1) Sustainability Plan – Outline *(August 2023)*
2) Scottsdale Sustainability Plan Target/Strategy/Action Review Matrices *(August 2023)*
3) Timeline for SEAC input *(August 2023)*
4) Plan Framework and Mock-up of Extreme Heat priority *(July 2023)*

Commission Action: Information/Discussion/Possible Action

SUSTAINABILITY PLAN -- OUTLINE

Updated August 16, 2023

This new draft outline of the plan was revised by staff to reflect input from City Council and SEAC. It builds on the existing text and includes some notes on changes that will be made and when draft text is expected to be developed.

A. Cover

B. Table of Contents (include visual elements)

C. Letter from Mayor Ortega (developed later in process)

D. Executive Summary (developed later in process)
   Include framework and list of targets

E. Introduction
   a. "Why a sustainability plan?"
      Overall purpose of plan
      City Council-driven process
      Connection to 2035 General Plan; other related plans
      Definition of sustainability
      Scope of plan – community effort; Connect to Net Zero and Extreme Heat plans
      Benefits: environmental, $ savings, attracting businesses and tourism, health & safety, equity
      Testimonial/quote
   b. "Sustainability is not new to Scottsdale"
      City leadership; graphic timeline of past accomplishments; preview some baseline data
      Include: Preserve, IBW, Water Campus, aquifer storage and recovery wells, Xeriscape garden, green building program and codes, seed bank
   c. "The Science of Sustainability"
      Description and graphic on climate change
      Highlight connections between heat, drought, and air quality
      Testimonial/quote from resident (TBD) about impacts or health
   d. "The Economics of Sustainability"
      Concept of the triple bottom line
      Relationship between a healthy economy and the environment
      Benefits to consumers of lowered energy and water bills
      Impact on jobs and tourism
      Connection between role of cities and economic benefits ("keep people moving")
      Testimonial/quote from company (TBD) re: economic reasons for action
   e. "Our Community Values"
      List of 7 from 2035 General Plan
      Connect values to sustainability

F. "How The Plan Was Developed" (with additional detail)

G. Framework and Priorities
   Describe and connect to a "sustainable, resilient, and thriving city"
   Reference existing plans (listed in appendix)

H. "What Happens Next?"
   a. Administration: frame as accountability and transparency
      Describe annual progress reports: focused on updates on implementation and updated data; presented annually to City Council
      Include process for revisiting and updating plan – a time to add more actions to achieve longer term goals
      Schedule of annual reporting plan updates (graphic)
   b. Implementation:
      Include implementation strategy and action steps
      Mention possible funding sources
      Describe implementation tables after each Priority and provide 'key'/legend (time horizon, costs, benefits)

I. "How to Read the Plan"
   Discuss 'flow chart' Flow chart is not intuitive to me
   List all strategies?

J. "What Can You Do?
   High level; what residents, business, and non-profits can do – both to reduce their impacts and to help implement the plan
   Reference other resources (including Sustainable Scottsdale webpage)
   Testimonials and examples

K. For each Topic:
   a. Tell a compelling and easily understood story (referencing baseline data)
      - Where we are now? (including stories of completed projects)
      - What is changing?
      - How are we going to address the issue? What can residents/businesses do?
      - Why is this important? / Science / Implications of trends
      - Benefits of achieving targets
   b. Indicators and Targets
   c. Strategies and Actions
   d. Implementation table Short term and long term?
      Columns: action, time horizon, lead agencies & partners, costs, benefits

L. Glossary
M. Acknowledgements
N. Appendix A: Related Scottsdale GP 2035 Goals
O. Appendix B: Synergy with Existing Plans
P. Appendix C: Additional information on data and indicators

SCOTTSDALE SUSTAINABILITY PLAN TARGET/STRATEGY/ACTION REVIEW MATRIX: AIR QUALITY PRIORITY (08/16/2023)

AIR QUALITY: Reduce contaminants and pollutants to improve air quality and protect community health		
Indicator	***Possible Target***	**Notes/Comments/Questions/Edits**
Air pollution levels: • Regional good to moderate air days (#) • Track Scottsdale pollutant levels (ozone and particulates) ~~Number of good to moderate air days plus Maricopa County air quality indices (ozone, carbon monoxide and particulates)~~	*Eliminate unhealthy air days by 2050* Should tie to Scottsdale	Staff edit for clarity and updated source
Number of hospitalizations on high pollution advisory days by pollution-related health event (e.g., asthma, heart disease, etc.)	in Scottsdale *Cut hospitalizations for pollution-related health events in half by 2050*	SEAC addition (March 2023)
Number and location of publicly available electric vehicle charging stations, by type of charger	*Double number of publicly available charging stations in next three years; Add 10x by 2050*	SEAC addition
Gallons of gasoline and diesel and CNG used in municipal vehicles	*Reduce the gallons of gasoline and diesel used in municipal vehicles by xx% by 2050*	Staff edit; also report number of city fleet powered by alternate energy sources
~~Number of city fleet powered by alternate energy sources~~		Staff edit; combined with another indicator

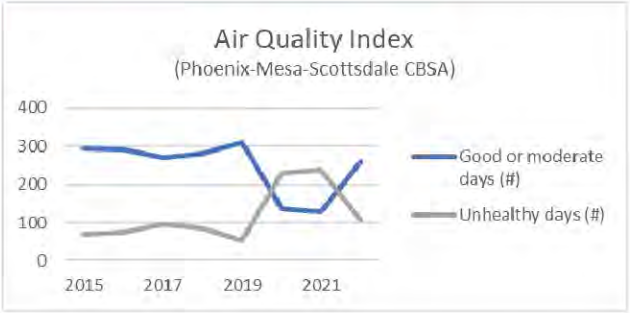
Residential and commercial charging installations

- Edits in blue reflect SEAC input
- Edits in green reflect staff edits (including from other departments)
- Edits in red reflect City Council input

SCOTTSDALE SUSTAINABILITY PLAN TARGET/STRATEGY/ACTION REVIEW MATRIX: AIR QUALITY PRIORITY (08/16/2023)

Because of the extended transport of air pollutants into and within the Valley, improving air quality requires regional cooperation and a long-term commitment to taking daily steps to reduce emissions. The city follows federal and state requirements as well as those set by Maricopa County (for example, for dust or burning), but also commits to additional steps to support cleaner air for residents and visitors. **[Additional text – pending.]** Scottsdale Ordinance? Other cities in the region regulate fireplaces/wood stoves, parking on non-dust free lots

Regional air quality has fluctuated in recent years, in part reflecting the influence of extremely hot summers on the number of unhealthy days. In 2022, almost 1 in 3 days exceeded federal air quality standards – 30% or 106 days.
(Source: EPA)

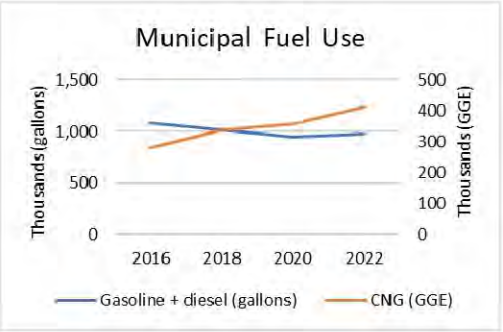


Data on hospitalizations related to air quality – pending
(Source: Maricopa County Department of Health)

The number of publicly available electric vehicle charging stations in Scottsdale has been increasing dramatically, up 18% in just one year. [Map of current location is pending; there is no current source for private charging stations. Reflects the number of charging ports available since some charging stations have more than one.]
(Source: Alternative Fuels Data Center)

	2022 (July)	2023 (July)
Level 2	260	311
DC Fast	46	49
TOTAL	306	360

Scottsdale has reduced the environmental impact of its municipal vehicles by switching to compressed natural gas (CNG) as a fuel source and by using less gasoline and diesel (down 4%).
(Source: City of Scottsdale data)



SCOTTSDALE SUSTAINABILITY PLAN TARGET/STRATEGY/ACTION REVIEW MATRIX: AIR QUALITY PRIORITY (08/16/2023)

Implementation table for each priority will include (for each Action):

(a) Time Horizon (Quick Win, 1-3 years, 3-10 years, Ongoing)
(b) Lead Agency(ies) & Partners
(c) Costs ($, $$, $$$)
(d) Benefits (TBD)

AIR QUALITY PRIORITY Strategies & Actions	Notes/Comments/Questions/Edits
Air Quality 1 Clean Scottsdale's air (e.g., MAG, MCAQD)	
AQ 1.1 Participate in regional efforts to improve air quality ~~xxxxxxxxxx~~ that address the sources of green house gas and particulate emissions in Scottsdale's air	
AQ 1.2 Expand education/outreach to city employees, businesses, and residents about air quality and High Pollution Advisory days, including benefits of electric-powered landscaping equipment and reduced single occupancy vehicle trips	SEAC addition
AQ 1.3 ~~Support county and state 'burn better' programs, 'no burn' restrictions, and fireworks restrictions~~ Adopt ordinance ~~restricting burning and fireworks on high pollution days~~ that places limits on fireplaces, wood stoves, and other solid-fuel burning devices (new construction/installations) - adopt an ordinance and/or public education program that addresses parking in non-dust free areas (e.g., unpaved lots) Maricopa County's Ordinance P-26	SEAC input
Air Quality 2 support adoption of electric vehicles and other alternative fuel vehicles	
AQ 2.1 ~~Double number of~~ Advertise locations of publicly available EV charging stations ~~to 600 by 2030~~	Staff edit (see related Target)
AQ 2.2 Develop a financially sustainable plan for purchasing additional electric and alternate fuel vehicles for the city fleet	
AQ 2.3 Create a municipal EV charging infrastructure plan ~~policy~~	Staff edit for clarity
AQ 2.4 Foster program to expand the use of e-bicycles for commute trips	

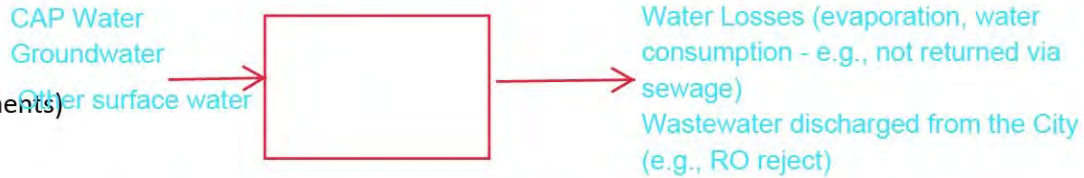
- Edits in blue reflect SEAC input
- Edits in green reflect staff edits (including from other departments)
- Edits in red reflect City Council input

SCOTTSDALE SUSTAINABILITY PLAN TARGET/STRATEGY/ACTION REVIEW MATRIX: WATER PRIORITY (08/16/2023)

WATER: Conserve, protect, and deliver quality drinking water safely and reliably to the community, now and into the future.		
Indicator	***Possible Target***	**Notes/Comments/Questions/Edits**
Total water use (gallons) • Track by residential, industrial/commercial, municipal • Per capita per day (residential)	Water reuse goal Water per capita goal City water use reduction goal	Staff edit for clarity; SEAC input
Average water use in single family residential by meter size		Staff addition
~~Total residential daily use~~		Staff edit; combined with another indicator
~~Gallons of~~ Reclaimed water recycled (gallons)		Staff edit for clarity
~~Gallons of~~ Groundwater treated (gallons)		Staff edit for clarity
~~Gallons of~~ Water recharged into aquifer (gallons)		Staff edit for clarity; SEAC input
~~Square feet of turf removed~~		Staff edit (insufficient data)
~~Number of customers registered on WaterSmart~~ ~~Percentage of water meters converted to Automatic Meter Infrastructure~~ ~~Number of HOAs participating in conservation program~~ ~~Number of customers contacted through water conservation engagement activities~~		SEAC recommendation

Municipal water use

- Edits in blue reflect SEAC input
- Edits in green reflect staff edits (including from other departments)
- Edits in red reflect City Council input



Reuse would be defined as how much of the total water we get from all sources is retained in Scottsdale for reuse (basically in minus out divided by in) - water reinjected is stored and does not leave the system - reclaimed water that is used in landscaping is a water loss

From: TammyBosse@BossProperties.com
To: McNeilly, Lisa; Ute Brady
Subject: Sustainability Plan
Date: Friday, September 22, 2023 8:10:30 AM

External Email: Please use caution if opening links or attachments!

Hi Lisa. Here are the items that you asked me to email you about.

Here is the wording that SEAC was supportive of regarding the commercial water action item.
Add: Develop Strategies to encourage commercial water efficient business practices

Recap of what was discussed In the economic section.
Add at the beginning. "In order to sustain our economy, it is essential that we take actions to insure that our ecosystem is healthy"

First paragraph: third line: add ".." ….can help us understand "how out ecosystem fuels our economy" and how to get started.
Second paragraph last sentence …electric vehicles, "renewable energy" and batteries

Third paragraph first sentence: …..that make financial sense, "including the cost of doing nothing".

The source for the Dr. Crow quote came straight from a google search for ASU School of Sustainability plans. It was in one of their documents that outlines their Sustainability goals and plans. I don't have time to chase that down today. Full day of work deadlines and meetings.

Tammy Bosse, BOSS PROPERTIES
Designated Broker, EcoBroker, GREEN,
REALTOR, GRI, ePRO, SFR, CNE
Certified Sustainable Building Advisor
Green Living Magazine's 2022 AZ Best Green REALTOR
TammyBosse@BossProperties.com
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-

Tammy Bosse, Independent Solar Consultant & Market Leader
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602-697-0003 TammyBosse@BossProperties.com
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https://powur.com/tammy.bosse/education/top-10-questions
Become our SOLAR AMBASSADOR & earn extra income
https://powur.com/tammy.bosse/ambassador
Ambassador Video: https://vimeo.com/581302936/9ce318a1e1
Ask Me if Solar Could be Right for YOU.

CITY OF SCOTTSDALE

To: Scottsdale Environmental Advisory Commission (SEAC)
From: Lisa McNeilly, Sustainability Director
cc: Cindi Eberhardt, Planning & Development Area Director

Meeting Date: October 18, 2023
Re: **Item 2: Scottsdale Community Sustainability Plan**

This memo and attachments for SEAC's October meeting again focuses focus on two aspects of the sustainability plan: the introductory sections of the plan and the Air Quality and Water priorities. This draft text (Attachment 1) reflects input received at previous meetings on these same sections of the plan, as well as additional staff input. **Commissioners are requested to review the enclosed draft text in preparation for the discussion at the October 18th meeting.**

Potential Targets (Pending Direction from Council)
There was considerable discussion at the September meeting about possible targets in the Air Quality and Water chapters. Staff presented recommendations, and Commissioners proposed alternatives, sometimes more than one for each target. Potential SEAC recommendations that were discussed are summarized below and will be considered further at the October meeting to achieve consensus by the Commission. Due to layout constraints, not all options are currently reflected in the draft text but will be in the next version.

Indicator: Air pollution levels	
Staff recommendation	*Eliminate unhealthy air days in Scottsdale*
SEAC recommendations	*A. Eliminate unhealthy air days in Scottsdale by 2035 (Bosse)* *B. Cut number of unhealthy days in Scottsdale by 50% by 2035 (Chrisman Lazarr, Johnson)* *C. Reduce $PM_{2.5}$, PM_{10}, and Ozone levels in Scottsdale by 50% from 2022 levels by 2030 (Brady – added 10/17/23)*
Indicator: Illness/hospitalizations	
Staff recommendation	*Cut hospitalizations for pollution-related health events in Scottsdale in half*
SEAC recommendation	*Reduce hospitalizations for pollution-related health events (per 100,000 population) in Scottsdale by 50% from 2022 levels by 2035 (multiple) (Brady suggested modification)*
Indicator: EV charging ports	
Staff recommendation	*Double number of publicly available charging ports in next three years; Add 10x by 2040*

SEAC recommendation	*Quadruple number of charging ports from 2022 baseline by 2026; add a further10-fold increase in number of charging ports from the 2026 baseline by 2030* *(Bosse, Scheck; suggested modification by Brady)*
Indicator: Municipal fleet fuel use	
Staff recommendation	*Reduce municipal fleet fuel use by 10% by 2030 & 40% by 2050*
SEAC recommendations	A. *Reduce municipal fleet fuel use by 100% from 2022 levels by 2030 (Bosse; suggested modification by Brady))* *) This doesn't correspond with my recollection, please delete option.Reduce municipal fleet fuel use by 30% by 2030 & 100% by 2040 from 2022 levels (multiple, suggested modification by Brady)*
Indicator: Total water use (commercial)	
Staff recommendation	• *Reduce irrigation water use for HOA properties by 10% relative to 2022* • *Increase sewer return flow percentage by 10% in 10 years capturing indoor/outdoor efficiency for both residential and commercial customers*
SEAC recommendations	A. *Reduce commercial water use by 10% from 2022 levels by 2030 (Bosse, Scheck, Brady – suggested modification by Brady)* B. *Reduce water use by HOAs by 30% from 2022 levels by 2030 (multiple, Brady suggested modification* C. *Transition all Scottsdale golf course water use to reclaimed water use only by 2030 (Brady additional suggestion)* D. *Reduce golf course water use by 50% from 2022 levels by 2030 (Brady additional suggestion)*
Indicator: Total water use (municipal)	
Staff recommendation	*Reduce municipal potable water use by an additional 5% relative to 2022 by 2027*
SEAC recommendation	*Reduce municipal water use by 20% from 2022 levels by 2030 (multiple; suggested modification by Brady))*

Background and Next Steps: At the July meeting, a timeline (Attachment 2) was presented for receiving additional Commission input on the draft sustainability plan.

At the November 13th Work Study Session, the plan introduction and the Air Quality and Water Priorities will be presented for Council input and direction. The Energy, Waste, and Water priorities will be discussed at the November, December, and January SEAC meetings.

Commissioner Bosse's written comments from last month are also included as Attachment 3.

Attachments:

1) DRAFT Introductory sections, Air Quality and Water Priorities
2) Timeline for SEAC input *(September 2023)*

3) Written comments from Commissioner Bosse (*received 9/22/2023*)

Commission Action: Information/Discussion/Possible Action

AIR QUALITY

Reduce contaminants and pollutants to improve air quality and protect community health.

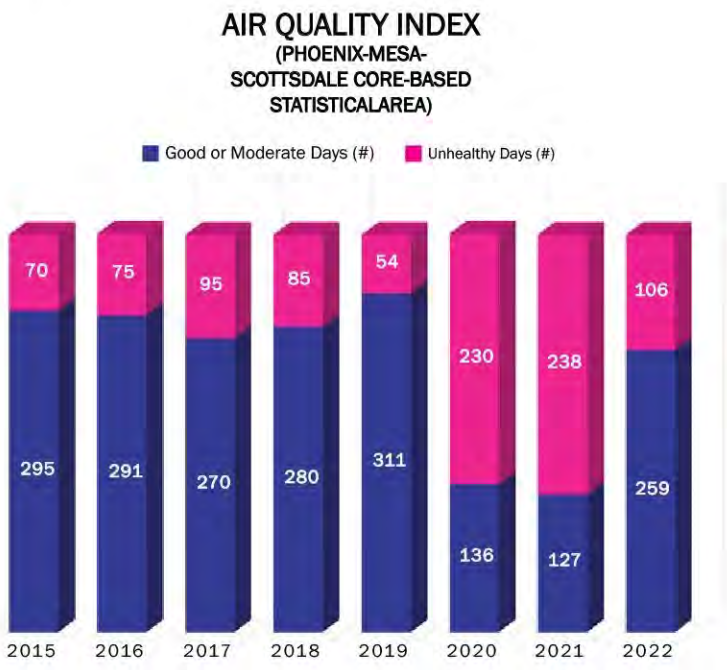
Like many metropolitan areas, Scottsdale and other cities in the Valley have been working for years to improve air quality. The region's two biggest concerns are ozone and particulate matter (PM), as these exceed federal health-based standards most frequently. The causes of these pollutants are complex, given the number of sources and how far both can travel in the air.

Particulate matter, classified as small (PM-2.5) or large (PM-10), usually occurs as blowing dust or smoke from fires or fireworks, but other sources can be particulates from car tires or complex reactions of chemicals like sulfur dioxide and nitrogen oxides. To reduce PM, Scottsdale makes extensive use of recycled asphalt millings and stabilizers for dust mitigation on unpaved lots and roads. It also uses a fleet of filtered (PM-10) street sweepers to reduce traffic-generated dust.

Ground-level ozone is created when nitrogen oxides, volatile organic compounds (VOCs), and sunlight react, making ozone primarily a summer issue. Industrial facilities, motor vehicles and gasoline vapors are primary sources of these precursor chemicals. Interestingly, trees can be both a source of VOCs and a key strategy in filtering a wide range of pollutants from the air.[1]

Regional air quality has varied in recent years, in part reflecting the influence of extremely hot summers on the number of unhealthy days. In 2022, almost 1 in 3 days exceeded federal air quality standards.

To signal when air quality is expected to be unhealthy, the state of Arizona projects High Pollution Advisory Days. This advance notice allows people to take steps to avoid exceeding federal standards for either ozone or PM. In most recent years, there have been over 50 such advisories, with 2021 and 2022 each having more than 65 advisories (mostly related to ozone levels). For these days, the city informs all its employees and contractors about leaf blowing, wood burning and off-road travel restrictions.



Source: EPA

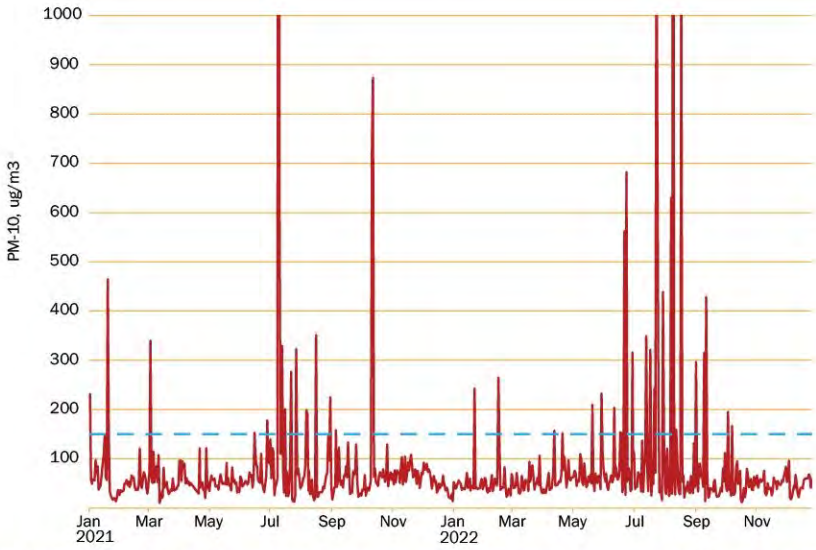
There are two air sampling monitors in Scottsdale taking hourly readings of ozone and one taking readings of PM-10 levels. Both pollutants often exceed federal standards during the summer, sometimes by substantial amounts. The graphs show how the ozone transport into higher elevations during summer afternoons and individual dust storms cause readings above healthy limits.

PM-10 DAILY MAXIMUMS 2021 - 2022

South Scottsdale PM-10 Daily Max

24-Hr National Ambient Air Quality Standard

Source: Maricopa County Department of Air Quality



Recommend labeling EPA NAAQS standard in both graphs. For PM-10 that would be 150 µg/m3 over a 24-hour period.

Recommend also adding information on PM-2.5. I realize we don't have a monitoring station for PM-2.5 in Scottsdale but recommend including one extrapolated from Maricopa County data or data from an adjacent city (e.g., Tempe). Also recommend providing information on the need to not exceed the EPA NAAQS standard for PM-2.5 (35 µg/m3 over a 24-hour period, as PM-2.5 is more likely to cause illnesses because of its particle size which can more easily infiltrate our lungs than PM-10.

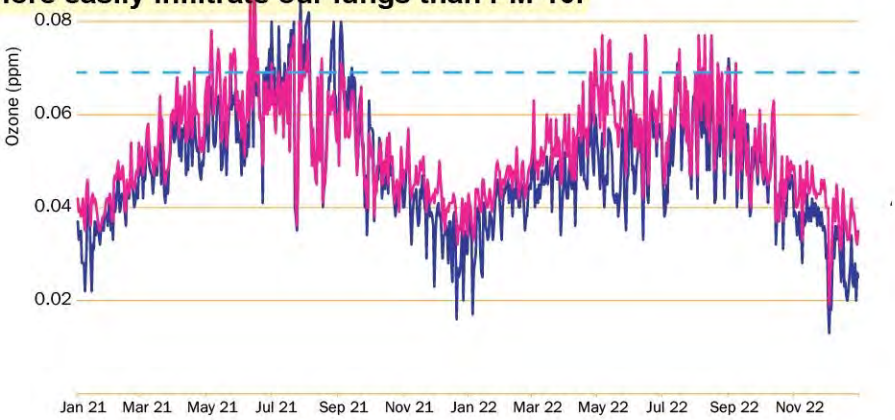
OZONE 8-HR MAX 2021 - 2022

South Scottsdale 8-Hr Max.

Pinnacle Peak 8-Hr Max.

8-Hr Avg. National Ambient Air Quality Standards

Source: Maricopa County Department of Air Quality



Recommend labeling EPA NAAQS standard in both graphs. For Ozone, this would be 0.070 ppm 8-hr max.

Extensive modeling demonstrates that every part of the city can be exposed to poor air quality, although not always at the same time for the same pollutant.

What was in the Indicator box (see below) reflects the current air quality status; NOT an indicator.

INDICATORS

Levels of PM-2.5, PM-10 in µg/m3/24 hours, and ozone in ppm/8hr max

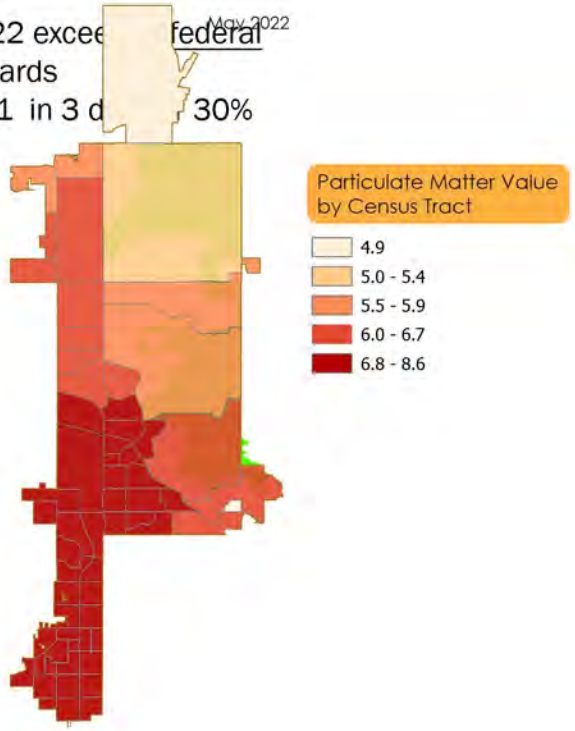
TARGET

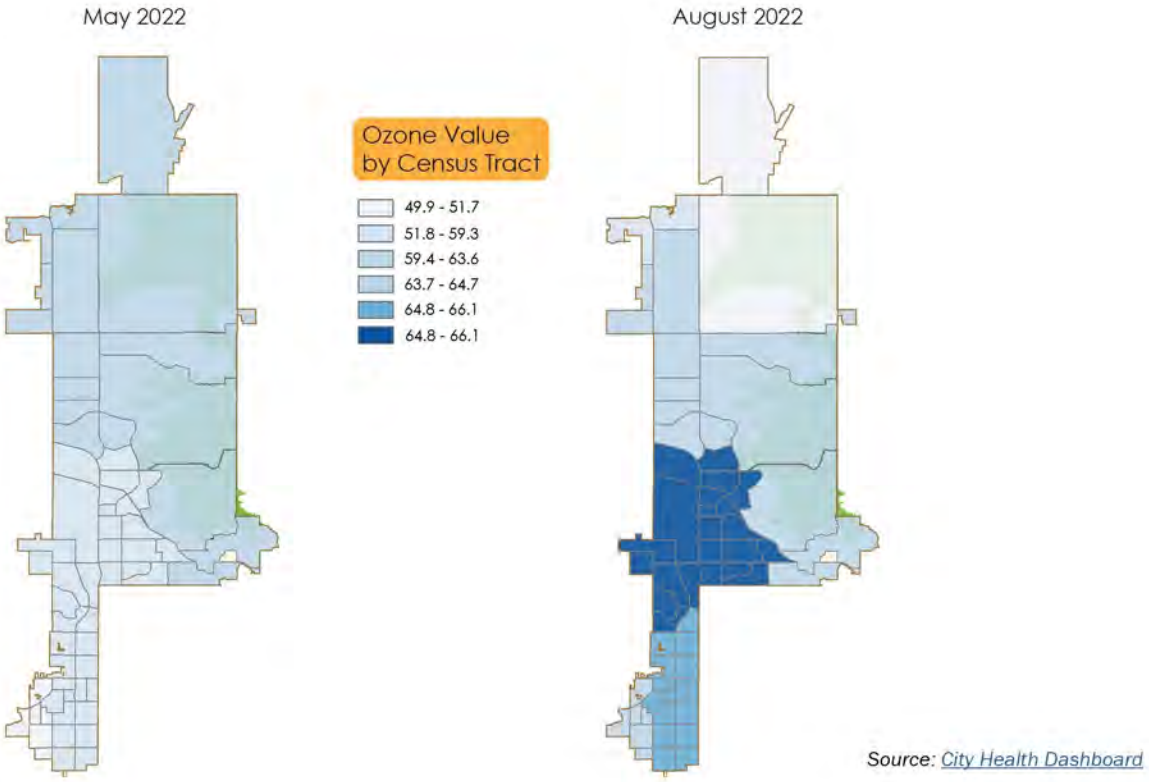
Pending Council Direction

Eliminate unhealthy air days in Scottsdale (Staff recommendation)

Reduce PM2.5, PM10, and Ozone levels in Scottsdale by 50% from 2022 levels by 2030 (suggestested target)

106 days in 2022 exce federal air quality standards — nearly one in 1 in 3 d 30%





Source: City Health Dashboard

Ozone can aggravate a range of health issues, including asthma, COPD and heart disease, compounding how extreme heat can also influence their incidence and severity. **Maricopa County tracks illnesses and deaths for these disorders, which have fluctuated over time. Asthma illnesses in Scottsdale per 100,000 population are lower than in the rest of Maricopa County (*Table 1*), and hospital encounters (2018-2022) are concentrated in census tracts in south and central Scottsdale (*Figure 1*).**

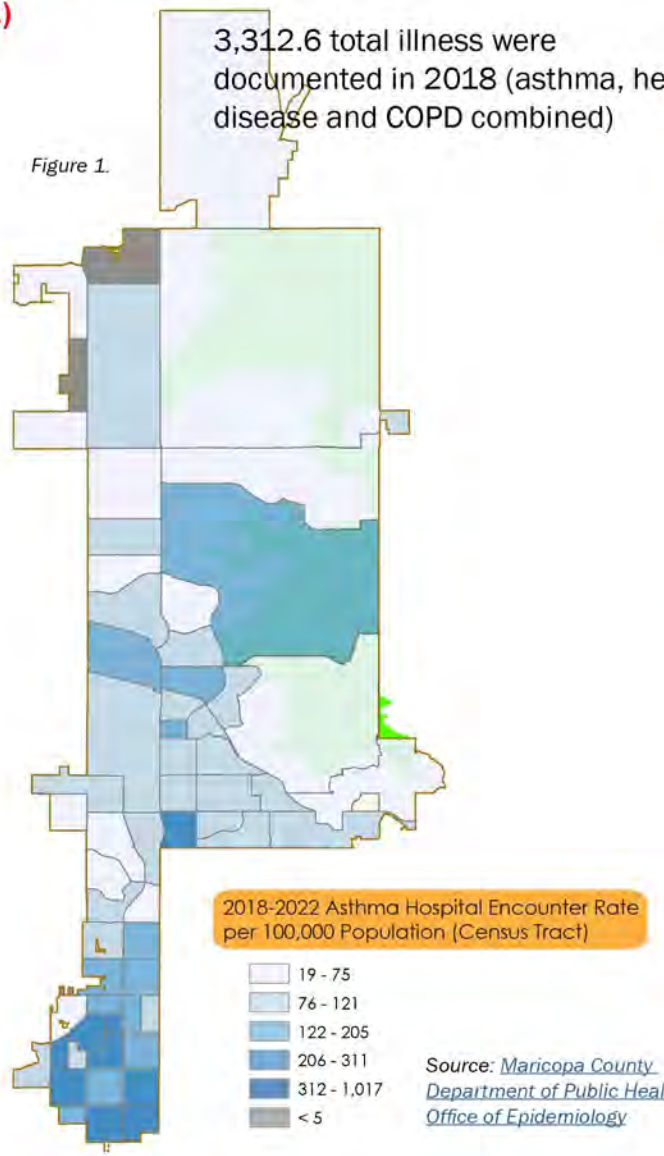
Recommend replacing this table with one that includes data based on ICD-10 codes collected in partnership with Scottsdale hospital providers (e.g., Mayo, Banner, etc.)

Table 1.

Incidents among Scottsdale residents, per 100,000 population					
	2018	2019	2020	2021	2022
Asthma illnesses	210.1	196.7	115.3	121.6	156.1
COPD illnesses	335.7	287.7	185.5	148.2	163.5
COPD deaths	50.0	61.9	57.7	47.8	N/A
Heart disease illnesses	2,766.8	2,740.6	2,375.0	2,678.5	2,755.7
Heart disease deaths	217.5	224.3	231.0	251.0	N/A

3,312.6 total illness were documented in 2018 (asthma, heart disease and COPD combined)

Figure 1.



INDICATOR

Total hospitalizations for pollution-related health events per 100,000 population in Scottsdale

TARGET

Pending Council Direction

Cut hospitalizations for pollution-related health events in Scottsdale in half

(Staff recommendation)

Reduce hospitalizations for pollution-related health events (per 100,000 population) in Scottsdale by 50% from 2022 levels by 2035 (suggestested target)

Scottsdale has been an active partner with Maricopa County and neighboring cities to formulate, adopt and implement laws and codes that have dramatically improved air quality Valleywide. Even as population and vehicle travel has increased, ozone levels have decreased by 13 parts per billion since 2000, and precursor emissions have decreased by over 50 percent from 2011 through 2020 according to the Maricopa Association of Governments.

However, federal standards for ozone are tightening due to an improved understanding of the health effects, and Phoenix currently has the fifth-worst ozone levels in the country.[2] Because of the extended transport of air pollutants from outside the Valley, improving air quality requires regional cooperation and a long-term commitment to taking daily steps to reduce emissions. Failure to meet the Clean Air Act standards can have economic repercussions, since the tighter standards may trigger regulations that could discourage growth of new, large businesses.

The city follows and reinforces federal, state and county requirements. It also commits to additional steps to support cleaner air for residents and visitors related to vehicles. **Scottsdale has reduced the environmental impact of its municipal vehicles by switching to compressed natural gas (CNG) as a fuel source and by using less gasoline and diesel fuel. Total fleet fuel use is down 3% since 2016.** The Fleet and Solid Waste departments significantly reduce vehicle miles through sophisticated route optimizations. Relatedly, the Transportation and Streets Department champions the use of van pool and bus pass programs by employees.

1,480,462 gallons of gasoline, diesel and CNG used in municipal vehicles in 2016

INDICATOR

Annual fossil fuel use by municipal fleet (in gallons and/or GGE (gallon of gasoline equivalent) for CNG

TARGET

Pending Council Direction

Reduce municipal fleet fuel use by 10% by 2030 & 40% by 2050 (Staff recommendation)

Reduce municipal fleet fuel use by 30% by 2030 & 100% by 2040 from 2022 levels (suggestested target)

Supporting the regional transition to electric and other alternate fuel vehicles can also improve air quality. **The number of publicly available electric vehicle charging ports in Scottsdale has increased dramatically, up 18% in just one year, reflecting residents and business interest in this technology.** This trend reflects the economics of electric vehicles, which can be $50 less expensive for a full charge versus a tank of gasoline.[3]The city also plans to install electric vehicle (EV) charging stations in at least five locations.

306 publicly available electric vehicle charging ports in Scottsdale in July 2022

INDICATOR

Number of public electric vehicle charging ports

TARGET

Pending Council Direction

Double number of publicly available charging ports in next three years; Add 10x by 2040 (Staff recommendation)

Quadruple number of charging ports from 2022 baseline by 2026; add a further 10-fold increase in number of charging ports from the 2026 baseline by 2030 (suggestested target)

Additional Indicator:

Estimated annual vehicle tire and break wear based on vehicle miles commuted (suggestested target)

Target

Reduce annual vehicle miles commuted from 2022 baseline by 50% by 2030 (suggestested target)

Benefits	What Can You Do?
Environmental: Improved air quality reduces harm to plants and animals; more trees also provide shade and cooling	▪ Switch to electric-powered blowers and other landscaping equipment ▪ Avoid idling unnecessarily and long drive-thru lines ▪ Fuel your vehicle after dark ▪ Eliminate or replace your wood-burning fireplace, wood stove or fire pit with natural gas units ▪ Plant a low-VOC emitting tree For more tips, go to Maricopa.gov and search "air quality"
Economic: Fewer bad air quality days aid business operations/development and attract tourists and lessens damage to buildings and infrastructure; electric vehicles can be less expensive to operate	
Social: The greatest impact of better air quality will be improved health and quality of life	

STRATEGIES & ACTIONS

STRATEGY AQ 1

Clean Scottsdale's air.

ACTIONS

AQ 1.1 Participate in regional efforts to improve air quality and actively participate in regional AQ planning and policy committees and councils (e.g., MAG, MCAQD).

AQ 1.2 Expand education/outreach to city employees, businesses and residents about air quality and High Pollution Advisory days, including benefits of electric-powered landscaping equipment and reduced single occupancy vehicle trips.

AQ 1.3 Encourage replacement of existing wood-burning fireplaces, wood stoves and fire pits with cleaner options.

AQ 1.4 Continue requirement of dust control plans for special event using unpaved parking.

AQ 1.5 Promote Maricopa County program to convert gas to electric yard equipment.

AQ 1.6 Promote and enhance the municipal Travel Reduction Program.

AQ 1.7 Create education campaigns related to vehicle idling and parking on unpaved lots.

STRATEGY AQ 2

Support adoption of electric vehicles and other alternative fuel vehicle.

ACTIONS

AQ 2.1 Advertise locations of publicly available EV charging stations.

AQ 2.2 Develop a financially sustainable plan for purchasing additional electric and other alternate fuel vehicles for the city fleet.

AQ 2.3 Create an EV charging infrastructure plan identifying barriers, opportunities, and priorities.

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY AQ 1 Clean Scottsdale's air.					
AQ 1.1	Participate in regional efforts.	On-going	**Lead**: OEI **Partners**: Maricopa County	$	Health
AQ 1.2	Expand education/outreach about air quality.	Quick win	**Lead**: OEI **Partners**: Residents, businesses, employees	$	Health
AQ 1.3	Encourage replacement of existing wood-burning units.	1-3 years	**Lead**: OEI **Partners**: Residents, developers	$	Health
AQ 1.4	Continue requirement of dust control plans for special events.	On-going	**Lead**: Tourism **Partners**: Event planners	$	Health
AQ 1.5	Promote Maricopa County program to convert gas to electric yard equipment.	Quick win	**Lead**: OEI **Partners**: Maricopa County	$	Health
AQ 1.6	Promote and enhance the municipal Travel Reduction Program.	On-going	**Lead**: Transportation & Streets **Partners**: Employees, Maricopa County, Valley Metro	$	Health Fuel savings
AQ 1.7	Create education campaigns related to vehicle idling and parking on unpaved lots.	On-going	**Lead**: OEI, Transportation & Streets	$	Health Fuel savings

Suggest also including a mix of regulations and incentives to increase affordable housing in general within Scottsdale city limits in order to reduce vehicle miles driven by people commuting to Scottsdale for work. For example:
- Mandating and incentivizing affordable housing units through mandatory inclusionary zoning, which requires developers to set aside a share of apartments that are affordable to households at different income bands
- Implementation of density bonuses which incentivize (but don't require) the production of affordable housing in exchange for increases in allowable building heights
- Rezoning single-family neighborhoods as "residential small lot" areas, which allows smaller, denser multifamily housing that preserves the neighborhood's look and feel while providing more affordable options.
(Source: https://www.urban.org/urban-wire/how-communities-are-rethinking-zoning-improve-housing-affordability-and-access-opportunity)

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY AQ 2	**Support adoption of electric vehicles and other alternative fuel vehicle.**				
AQ 2.1	Advertise locations of publicly available EV charging stations.	Quick win	**Lead**: OEI	$	Health Fuel savings
AQ 2.2	Develop a plan for purchasing additional alternate fuel vehicles.	3-10 years	**Lead**: Fleet **Partners**: Other city departments	$-$$$	Health Municipal savings
AQ 2.3	Create an EV charging infrastructure plan.	1-3 years	**Lead**: OEI **Partners**: Other city departments	$-$$	Health Fuel savings

ENDNOTES

1 Read more about the benefits of trees and Scottsdale's strategies to increase tree canopy in the Heat section.

2 "Phoenix ranks 5th in ozone pollution, but a new report finds fewer bad air days overall," Updated April 22, 2023, Arizona Republic.

3 "Is it cheaper to refuel your EV battery or gas tank? We did the math in all 50 states," Updated August 14, 2023, Washington Post.

WATER

Conserve, protect and deliver quality drinking water safely and reliably to the community, now and into the future.

Providing quality drinking water and ensuring adequate water supplies has been a long-standing priority in Scottsdale. As reflected in the recently adopted "Sustainable Water Management Principles," Scottsdale Water thinks and acts strategically with its water resources – from supply, quality, and conservation to recycling and recharge. Staff works around the clock to ensure your drinking water surpasses all federal, state and local water quality regulations. In fact, water from your tap must pass much more stringent standards than bottled water.

The city has a long record of substantial infrastructure investments and community water conservation programs. Staff administers several residential and commercial incentive rebate programs, offers residential outdoor efficiency checks, commercial audit program, manages ordinance compliance like water waste complaints, and offers water efficiency educational opportunities. Demand for these services has been growing since the activation of stage 1 of the city's Drought Management Plan.

In fiscal year 2023 residential and commercial turf conversion rebates incentivized removal of 440,000 square feet of grass – an almost 425% increase from the previous year and a 250% increase over the five-year average. In the same year, participation by homeowner associations (HOAs) in consultations and recommendations grew by 175%. Residential outdoor water efficiency checks grew by 160% when compared to the previous five years, and HOA consultations have proven to yield significant water savings. With the large number of HOAs in Scottsdale, a target of 100% consultation is ambitious and prudent. Scottsdale will also target a 10% reduction in irrigation water use by HOA irrigation accounts.

When looking at total potable water demand data over the last decade and a half, a steady slight decrease in total demand and an increase in the number of accounts tells the story of conservation and increased efficiency.

In 2021 the city enacted Stage 1 of its Drought Management Plan and in doing so also requested all customers to voluntarily reduce water consumption by at least 5%.[1] The conservation work has paid off. Even during the hottest month on record (July 2023), water use dropped in Scottsdale, saving 7% when compared to July 2022 and nearly 18 million gallons of water.[2]

While these accomplishments have placed the city in a positive position related to its water resources, addressing the challenges of the future will require an even more substantial effort. The over-allocation of Colorado River water supplies, coupled with trends of a hotter and drier climate make protecting water resources essential. The current megadrought, which started in 2000, is the worst in 1,200 years and has impacted reservoir levels on the Colorado River[3] and Central Arizona Projects water supplies.

In 2022, Scottsdale Water delivered potable water of more than 74,000 acre-feet or 62 million gallons per day of safe, reliable drinking water to its customers. **Total water use is on a downward trend even as the number of connections has increased by 9% (Figure 1).**

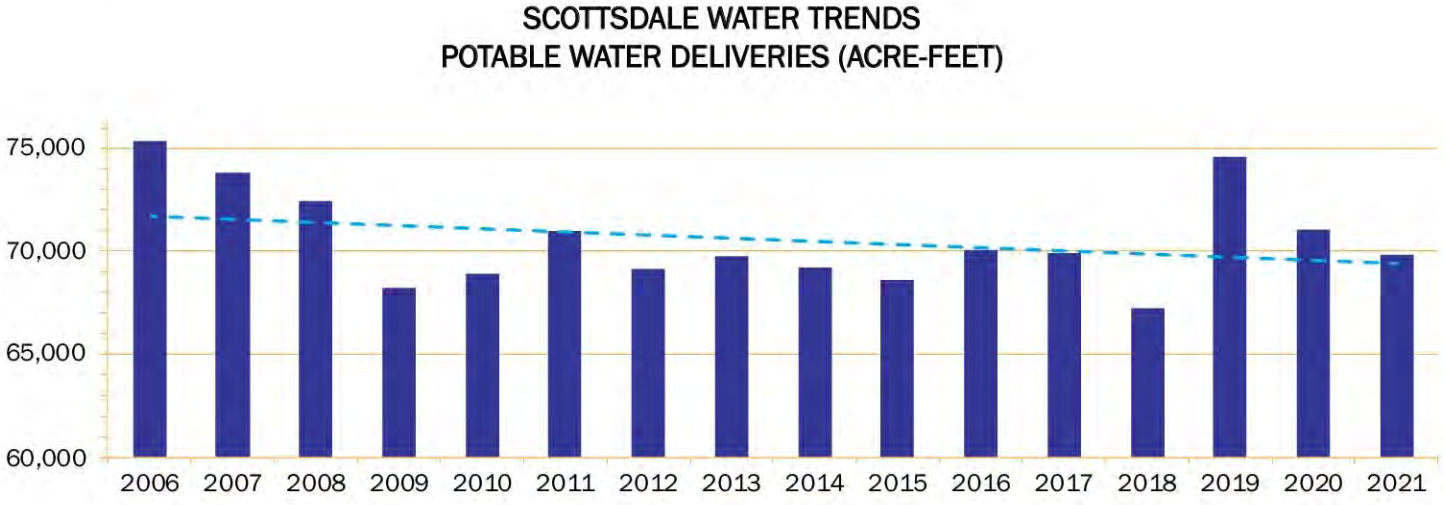


Figure 1. Source: Scottsdale Water

In 2022, the average residential customer (which comprise of almost 90 percent of the active water accounts) used 13% less water than in 2000 or 199 gallons per capita per day (gpcd) for residential water use (Figure 2).

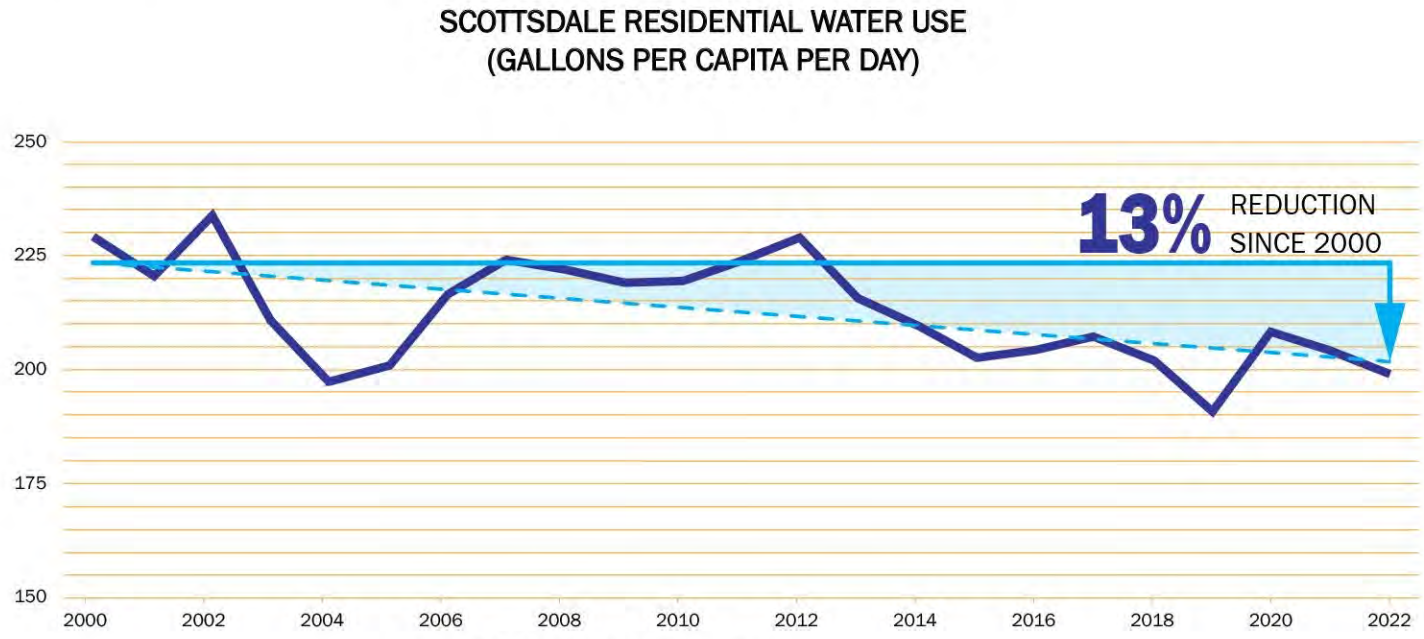


Figure 2. Source: Scottsdale Water

In 2022, residential water use, measured as the average number of gallons used per person per day, totaled 199 gallons

INDICATOR

Residential water use in gallons used per person/day

TARGET

Pending Council Direction

Reduce residential water use (gallons per capita per day) to 170 by 2033 (Staff recommendation)

Reduce residential water use by 20% from 2022 levels by 2030 (suggestested target)

Municipal water use represents around 2% of total potable city use and has dropped almost 10% since 2017. Commercial water use has been relatively stable even during periods of economic growth.

INDICATOR

Potable and groundwater use by golf courses

TARGET

Pending Council Direction

Reduce potable water use by an additional 5% relative to 2022 by 2027 Staff recommendation)

1. Transition all Scottsdale golf course water use to reclaimed water use only by 2030 (suggestested target)

2. Reduce golf course water use by 50% from 2022 levels by 2030 (suggestested target)

RECOMMEND DELETING

In 2022, municipal water use totaled 438,172,762 gallons

This overall conservation trends hold no matter the size of the meter for the single-family homes. Average residential water use varies by meter size and by season. **The number of total customers has grown since 2014, but demand has decreased, showing that growth has not affected water use (Figure 3).**

AVERAGE WATER USE, SINGLE-FAMILY RESIDENTIAL
(GALLONS USED PER METER SIZE)

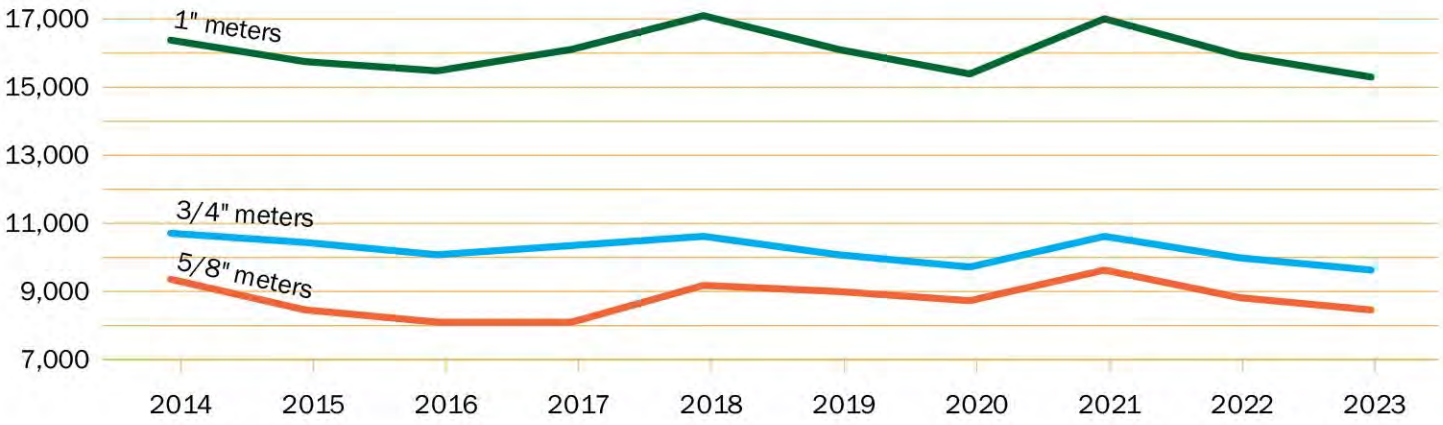


Figure 3. Source: Scottsdale Water

HOA irrigation water use contribute to total potable water deliveries

INDICATOR

HOA irrigation water use in gallons/sq.ft irrigated

TARGET

Pending Council Direction

Reduce irrigation water use for HOA properties by 10% relative to 2022

(Staff recommendation)

Reduce irrigation water use by HOAs by 30% from 2022 levels by 2030. (suggestested target)

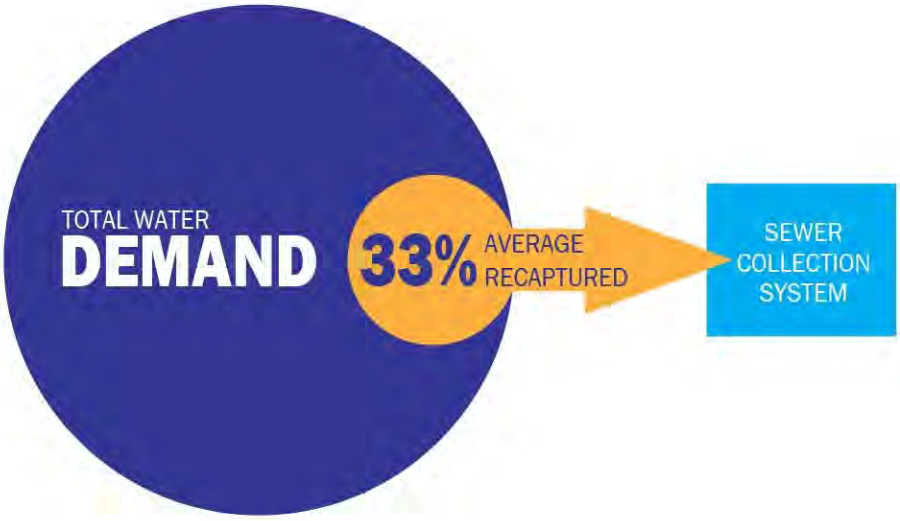
INDICATOR
Commercial water use in gallons/sq.ft

Reduce commercial water use by 10% from 2022 levels by 2030 (suggestested target)

INDICATOR
Municipal water use in gallons/sq.ft

Reduce municipal water use by 20% from 2022 levels by 2030 (suggestested target)

Scottsdale's reclamation system has approximately 1,500 miles of sewer collection lines and over 40 lift stations. For decades, Scottsdale has used 100 percent of its recycled wastewater for beneficial, non-potable reuse or recharge. As a part of Scottsdale water resources portfolio, a portion of AWP recycled water is recharged into the WTR uifer as a kind of savings account to be able to recover it in groundwater wells in times of prolonged drought and shortage. Other beneficial uses of the AWP reclaimed water include utilization on turf facilities through the Reclaimed Water Distribution System (RWDS). **Of the total amount of water that is delivered to customers, approximately 33% is currently "returned" to the sewer system.** Future decreases in outdoor use and increases in irrigation efficiency would lead to a high percentage of overall "return" flow. As an indicator of conservation for all customers, the city will set a target of increase return flow percentage by an order of magnitude over what has been seen in the last 10 years.



INDICATOR

Return flow or wastewater captured in the sewer collection system has been consistently around 33% of total potable water demand

TARGET

Pending Council Direction

Increase return flow percentage by 10% in 10 years capturing indoor/outdoor efficiency for both residential and commercial customers

(Staff recommendation)

Scottsdale has excelled at proactive long-range planning to ensure safe and adequate water supplies and best management practices on water conservation efforts, total wastewater reuse, and water banking. Scottsdale helps ensure quality water supplies by reclaiming or reusing water, recharging excess to the WTR uifer, and treating groundwater. **The amount of groundwater treated has remained fairly constant and kept low, at approximately 4-5% of total water.** Volume increased in 2022 during a test of operational performance.

INDICATOR

1,823 million gallons of groundwater were treated in 2022

TARGET

Pending Council Direction

Maintain treated groundwater deliveries at 5% (Staff recommendation)

INDICATOR

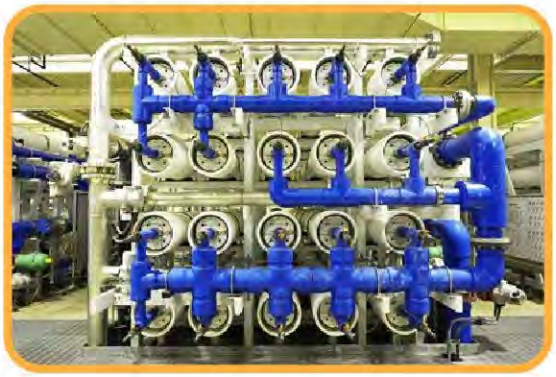
SINCE THE LATE 1990s
250,000
ACRE-FEET OF WATER
BANKED

TARGET

Pending Council Direction

Maximize annual water banking (Staff recommendation)

Scottsdale Water was the first Arizona water utility to implement indirect potable reuse with the Advanced Water Purification (AWP) at the treatment facility (AWT). The AWT is one of the largest and most sophisticated indirect potable reuse facilities in the world and, in 2019, became the third plant in the nation and the first in Arizona to be permitted for direct potable reuse.



Benefits	What Can You Do?
Environmental: Using water efficiently brings a level of relief from the drought and reduced carbon emissions by using less energy to pump and treat water	▪ Use the WaterSmart app monitor use and leak notifications ▪ Convert non-function turf (grass) areas to desert adaptive landscapes ▪ Consider a WaterSense Smart Irrigation controller upgrade ▪ Understand your landscape water needs ▪ Plant native and drought tolerant plants ▪ Replace faucets, showerheads, and toilets with WaterSense labeled fixtures For more tips, go to ScottsdaleAZ.gov and search “water”
Economic: More secure water supplies aid business operations/ development and attract tourists; conservation means lower water bills for customers	
Social: Clean and secure drinking water for all residents supports health & equity	

STRATEGIES & ACTIONS

STRATEGY WTR 1

Ensure water system resiliency.

ACTIONS

WTR 1.1 Communicate the leak detection benefits of registering for the online visualization portal and leak alerts (WaterSmart), aiming to double participation by 2025.

WTR 1.2 Encourage removal of privately-owned non-functional/non-recreational turf through education and turf removal rebates.

WTR 1.3 Promote improvements to irrigation equipment and plumbing fixtures for residential and commercial customers.

WTR 1.4 Expand water conservation programs focused on homeowner associations.

WTR 1.5 Review water use and conservation in development projects through the framework of the Scottsdale Sustainable Water Management Principles.

WTR 1.6 Showcase and benchmark best practices of water efficient buildings & landscaping.

WTR 1.7 Encourage site development strategies that incorporate green infrastructure, low impact development, and stormwater harvesting.

WTR 1.8 Develop strategies to encourage commercial water efficient business practices.

WTR 1.9 Ensure all water meters converted to Automatic Meter Infrastructure.

WTR 1.10 Conduct water efficiency consultations with all HOAs by 2033.

Recommend adding strategies to enhance water reductions by golf courses and HOAs through a combination of regulations and incentives.

STRATEGY WTR 2

Reduce municipal water use.

ACTIONS

WTR 2.1 Remove non-functional/non-recreational turf at city facilities and retrofit municipal irrigation systems to smart controllers.

WTR 2.2 Monitor leaks and implement advanced drip irrigation systems.

WTR 2.3 Maintain high-efficiency toilets and faucets in city buildings.

WTR 2.4 Install new cooling tower controllers in all municipal facilities by 2025.

Recommend providing incentives to increase existing residential solar installations (grants, loans, etc.) - solar power decreases overall utility water use in addition to energy savings.

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY WTR 1 Ensure water system resiliency.					
WTR 1.1	Communicate the benefits of registering for WaterSmart.	On-going	**Lead**: Water **Partners**: Customers	$	Customer savings
WTR 1.2	Encourage removal of privately-owned turf.	On-going	**Lead**: Water **Partners**: Customers, HOAs, landscapers	$-$$	Customer savings
WTR 1.3	Promote improvements to irrigation equipment and plumbing fixtures.	On-going	**Lead**: Water **Partners**: Customers, HOAs, landscapers	$	Customer savings
WTR 1.4	Expand HOA water conservation programs.	On-going	**Lead**: Water **Partners**: HOAs	$-$$	Customer savings
WTR 1.5	Utilize Scottsdale Sustainable Water Management Principles in development review.	Quick win	**Lead**: Water **Partners**: Developers	$	Customer savings
WTR 1.6	Showcase and benchmark water efficient buildings & landscaping.	On-going	**Lead**: Water **Partners**: Customers, developers, landscapers	$	Customer savings
WTR 1.7	Encourage sustainable site development strategies.	On-going	**Lead**: Water, OEI **Partners**: Residents, developers	$	Nature Reduced flooding
WTR 1.8	Encourage commercial water efficient business practice.	1-3 years	**Lead**: Water **Partners**: Commercial customers	$-$$	Customer savings
WTR 1.9	Convert water meters to Automatic Meter Infrastructure.	On-going	**Lead**: Water **Partners**: Customers	$	Municipal savings
WTR 1.10	Conduct HOA water efficiency consultations.	5-10 years	**Lead**: Water **Partners**: HOAs	$	Customer savings

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY WTR 2 Reduce municipal water use.					
WTR 2.1	Remove non-functional/ non-recreational turf at city facilities and retrofit municipal irrigation systems to smart controllers.	On-going	**Lead**: Parks & Rec	$-$$	Municipal savings
WTR 2.2	Monitor leaks and implement advanced drip irrigation systems.	On-going	**Lead**: Parks & Rec	$	Municipal savings
WTR 2.3	Maintain high-efficiency toilets and faucets in city buildings.	On-going	**Lead**: Facilities	$	Municipal savings
WTR 2.4	Install new cooling tower controllers in municipal facilities.	Quick win	**Lead**: Facilities	$	Municipal savings

Further suggested strategies related to large water users:

Suggestion 1: Add City reporting requirements for the large water users, including in particular outdoor water users, such as HOAs and golf courses, e.g., top X% of water users, or any customer using in excess of X gallons/year. This would provide the City with annual usage to track over time.
Suggestion 2: Set conservation targets for golf courses and HOAs with a significant amount of grass.
Suggestion 3: Set targets for septic to sewer conversions (an outdoor water usage issue. Septic sewage does not come back into the system and is lost). There are 5,000 septic homes. Based on calculations based on Scottsdale Water estimates that indicate converting to sewer would bring in – 700K-800K per day in water savings.

ENDNOTES

1 "Scottsdale asks residents to use five percent less water and conserve more," City of Scottsdale, January 11, 2022.

2 "Scottsdale shows reduced water use during hottest month on record," City of Scottsdale, August 14, 2023.

3 "Rapid intensification of the emerging southwestern North American megadrought in 2020–2021," Nature Climate Change, Williams, Cook and Smerdon, Vol 12, March 2022.

"Allsopp_ScottsdaleGIS_Stored Traffic_Counts&Calculations.xlsx"

BRAKE WEAR

Average PM2.5 and PM10 brake wear PM emission rates for the MOVES source types from a national-scale run inventory for calendar year 2017 using MOVES3

SourceTypeID	Source Type	PM2.5		PM10	
		mg/veh-mile	mg/veh-km	mg/veh-mile	mg/veh-km
11	Motorcycle	1.58	0.98	12.61	7.83
21	Passenger Car	2.77	1.72	22.17	13.78
31	Passenger Truck	2.88	1.79	23.08	14.34
32	Light Commercial Truck	3.08	1.91	24.64	15.31
41	Intercity Bus	15.5	9.63	123.98	77.04
42	Transit Bus	9.45	5.87	75.62	46.99
43	School Bus	9.94	6.18	79.55	49.43
51	Refuse Truck	13.35	8.29	106.77	66.34
52	Single Unit Short-haul Truck	8.24	5.12	65.89	40.94
53	Single Unit Long-haul Truck	6.88	4.28	55.04	34.2
54	Motor Home	10.66	6.62	85.26	52.98
61	Combination Short-haul Truck	9.52	5.91	76.13	47.3
62	Combination Long-haul Truck	7.96	4.94	63.64	39.55

39.55

"Allsopp_ScottsdaleGIS_Stored Traffic_Counts&Calculations.xlsx"

ID	POINT_X	POINT_Y	N_S_STREET	E_W_STREET	MONTH	EB	WB	NB	SB	TOTAL	MF	Y14_Total	Y14_Final	Y14_RND_VO	Change_12	Y12_RND_VO	Y10_RND_VO	Y08_RND_VO	Y06_RND_VO	Y04_RND_VO	Y02_RND_VO	Y00_RND_VO	Y98_RND_VO	Y14_COL
58	697356	966998	SCOTTSDALE	101 FREEWAY	None	16744	10636	24500	19500	71,380	1	71380	71380	71400	-1%	72000	75600	82500	85200	89000	85100		0	23
60	697353	987032	SCOTTSDALE	HAPPY VALLEY	None	0	2640	15000	15000	32,640	1	32040	32040	32000	IND	0	0	0	0	0			0	5
140	707778	936385	101 FWY	SHEA	None	21500	31000	13557	17446	83,502	1	83502	83502	83500	3%	81000	84800	97800	96200	96400	89700		0	20
141	707850	944550	101 FWY	CACTUS	None	17000	10000	11511	6994	45,205	1	45205	45205	45200	7%	42200	46000	50800	50300	49800	51200		64600	6
142	707708	952483	101 FWY	RAINTREE	None	16000	13000	14821	3702	47,523	1	47523	47523	47500	-1%	48000	63400	38500	42500	38000	35800		39400	27
143	707988	956639	101 FWY	FRANK LLOYD WRIGHT	None	25000	22000	18095	19180	84,274	1	84274	84274	84300	-3%	87000	91200	74500	76000	74000	69800		77900	51
144	708000	960413	101 FRONTAGE ROAD	BELL	None	7000	9000	10474	5747	32,220	1	32220	32220	32200	5%	30700	28000	26800	27100	27100	17200		43300	7
145	707177	962880	101 FWY	PIMA/PRINCESS	None	6000	20500	22682	9211	58,393	1	58393	58393	58400	22%	48000	66000	65200	63000	60000	56700		0	13
202	702640	965683	HAYDEN	101 FREEWAY	None	8087	6918	7000	14500	36,505	1	36505	36505	36500	IND	0	0	0	0	0			0	10
27	695826	939330	70TH	SHEA	14-Dec	21710	18877	5379	1582	47,548	1	48017	48017	48000	0%	48200	48300	59400	0	0			0	11
34	697101	902286	SCOTTSDALE	THOMAS	14-Dec	13097	11408	21033	18712	64,248	1	64882	64882	64900	13%	57600	57000	73700	78000	83100	81400	78800	89300	34
35	697109	904042	SCOTTSDALE	OSBORN	14-Dec	3634	5438	12154	13562	34,688	1	35030	35030	35000	13%	31000	33300	36100	42400	45800	48400	49300	57500	13
55	697358	965906	SCOTTSDALE	MAYO	14-Dec	11474	814	20178	19738	52,004	1	52517	52517	52500	5%	49800	52600	0	0	0			0	23
76	699746	907584	MILLER	INDIAN SCHOOL	14-Dec	18394	18770	6255	7047	50,466	1	50964	50964	51000	6%	47900	42700	51300	55100	46600	47900	52001	49600	12
86	702366	999640	HAYDEN	OAK	14-Dec	1148	1384	14187	15164	31,883	1	32198	32198	32200	15%	28000	29400	33300	32200	34300	30500	32100	52300	6
94	703104	925731	HAYDEN	MCCORMICK	14-Dec	2946	4392	14718	14041	36,097	1	36453	36453	36500	3%	35500	35600	36500	39100	42000	38200	38700	75100	9
96	704261	933831	HAYDEN	VIA LINDA	14-Dec	2148	2342	12462	12797	29,749	1	30043	30043	30000	17%	25600	30300	29500	29000	30100	30700	36300	61500	4
97	703171	936806	HAYDEN	MOUNTAIN VIEW	14-Dec	3614	5486	13469	12363	34,932	1	35277	35277	35300	16%	30400	35300	36400	34500	48600	38100	47400	68800	5
100	702479	947235	HAYDEN	SWEETWATER	14-Dec	1420	0	10883	10037	22,320	1	22540	22540	22500	IND	0	0	0	0	0			0	0
129	708925	965597	PIMA	LEGACY	14-Dec	408	4875	10309	17483	42,075	1	42460	42460	42500	14%	37200	38300	46600	40600	52100	42200		30500	4
130	707923	968529	PIMA	HUALAPAI	14-Dec	1020	671	16787	16342	34,820	1	35164	35164	35200	3%	34200	25500	29500	0	0			32600	2
196	731462	939449	124TH	SHEA	14-Dec	19836	18438	1106	2637	42,019	1	42434	42434	42400	1%	42000	44000	43900	44700	42100	41400	42900	42900	10
197	731457	942088	124TH	VIA LINDA	14-Dec	7337	6364	2687	1323	17,711	1	17886	17886	17900	23%	14500	18000	18200	17800	17300	18300	19100	17800	2
36	697116	907600	SCOTTSDALE	INDIAN SCHOOL	13-Dec	11064	13803	8039	10149	43,055	1	43460	43460	43500	-6%	46200	47400	46300	46200	45900	42900	41200	57700	23
37	697120	910256	SCOTTSDALE	CAMELBACK	13-Dec	13171	9802	14328	13283	50,584	1	51063	51063	51100	-2%	52300	59100	52500	56800	50600	57800	55700	64400	16
77	699750	910235	MILLER	CAMELBACK	13-Dec	12039	9857	5484	3651	30,831	1	31135	31135	31100	23%	25300	29400	30800	30300	34300	38100	39000	38000	15
86	702364	904933	HAYDEN	OSBORN	13-Dec	7262	2492	15616	15202	40,572	1	40972	40972	41000	10%	37300	39900	46700	42800	45600	34600	47400	75900	15
92	702404	918138	HAYDEN	MCDONALD	13-Dec	11127	11363	14086	13463	50,019	1	50513	50513	50500	6%	46700	47200	49100	49100	55300	51000	56200	83100	10
200	739376	942088	136TH	VIA LINDA	13-Dec	2696	1187	2519	1913	8,315	1	8397	8397	8400	-5%	8800	9600	10100	9600	7900	7900	6600	0	1
9	691836	899585	84TH	OAK	14-Nov	1600	251	9760	7614	19,225	1	19387	19387	19400	29%	15000	18000	18100	17000	17200	17000	11401	14300	4
42	697146	928234	SCOTTSDALE	MCCORMICK	14-Nov	0	2688	20372	19278	42,318	1	42674	42674	42700	15%	37100	43800	45300	40400	52000	57900	59900	62700	4
43	697148	933991	SCOTTSDALE	DOUBLETREE	14-Nov	3152	7115	19515	20657	50,339	1	50762	50762	50800	13%	44900	52300	53700	55300	51500	57200	61700	70700	7
44	697133	938662	SCOTTSDALE	MOUNTAIN VIEW	14-Nov	2848	3648	21385	18692	46,573	1	46965	46965	47000	-5%	49600	52400	42300	55100	54500	60700	66200	67600	12
46	697160	941988	SCOTTSDALE	CHOLLA	14-Nov	1081	827	20563	19257	41,728	1	42079	42079	42100	9%	38700	36500	34600	49700	45000	47300	59100	64800	9
48	697192	947275	SCOTTSDALE	SWEETWATER	14-Nov	1246	2421	21174	21527	46,368	1	46758	46758	46800	9%	42800	43200	40600	55500	49600	51500	63300	63100	6
72	699730	896981	MILLER	MCDOWELL	14-Nov	16332	17700	4140	4370	42,542	1	42900	42900	42900	-3%	44100	43000	41400	42900	42600	38900	42701	50300	14
73	699729	899633	MILLER	OAK	14-Nov	1192	0	3871	4632	9,695	1	9777	9777	9800	15%	8500	9400	11800	11400	11900	10200	10600	14800	1
84	702317	894348	HAYDEN	ROOSEVELT	14-Nov	1392	2814	14047	13792	32,045	1	32314	32314	32300	10%	29300	31400	34300	32400	33600	30700	28100	44700	5
112	704980	902290	GRANITE REEF	THOMAS	14-Nov	11786	10708	1368	919	24,781	1	24989	24989	25000	-10%	27700	31800	30900	31000	32100	38700	28001	26200	1
114	704991	907567	GRANITE REEF	INDIAN SCHOOL	14-Nov	18540	16352	557	2469	39,916	1	40254	40254	40300	2%	39400	39400	38500	41700	38700	32800	40801	28200	4
118	705110	944575	84TH	CACTUS	14-Nov	16269	16751	379	1186	34,585	1	34876	34876	34900	3%	33800	0	0	0	0			0	6
121	705760	952464	NORTHSIGHT	RAINTREE	14-Nov	9133	14932	5891	6492	36,448	1	36754	36754	36800	8%	34000	35100	40000	37300	37500	27300	23001	11300	8
136	707761	1002509	PIMA	DIXILETA	14-Nov	649	0	7838	7510	16,197	1	16333	16333	16300	7%	15200	13100	0	0	0			0	1
137	707741	1007791	PIMA	LONE MOUNTAIN	14-Nov	2367	0	7268	6750	16,385	1	16523	16523	16500	9%	15100	14800	16600	17400	15000	19000	8600	10800	0
138	707739	1015717	PIMA	WESTLAND/LEGEND TR	14-Nov	2077	1846	6771	5881	16,375	1	16513	16513	16500	9%	15100	14400	17700	15200	15600			8100	5
139	707738	1023641	PIMA	STAGECOACH PASS	14-Nov	722	1233	5195	4617	11,767	1	11866	11866	11900	3%	11600	11000	14200	13300	12700	10600	10600	8100	3
146	708973	934563	90TH	VIA LINDA	14-Nov	3482	12937	17454	10750	44,623	1	44998	44998	45000	0%	44800	47000	51100	52500	51100	50400	59800	57600	7
160	711704	952835	THOMPSON PEAK	RAINTREE	14-Nov	9315	4366	6739	8315	28,735	1	28977	28977	29000	0%	28900	29400	31600	31000	23700	21300	25800	0	8
161	712528	953795	THOMPSON PEAK	FRANK LLOYD WRIGHT	14-Nov	14278	11677	8973	9606	44,534	1	44908	44908	44900	-4%	47000	47400	49300	48000	46200	45800	35501	28300	7
162	713034	954603	THOMPSON PEAK	100TH	14-Nov	2181	4220	11257	15996	33,654	1	33937	33937	33900	2%	33300	32200	30800	29000	27300	25300	27000	3100	2
163	716247	956459	THOMPSON PEAK	MCDOWELL MTN RANCH	14-Nov	2998	9072	13877	8033	33,980	1	34266	34266	34300	3%	33200	33600	0	0	0			0	14
165	715184	966362	THOMPSON PEAK	UNION HILLS/LEGACY	14-Nov	4337	895	6050	6500	17,782	1	17932	17932	17900	25%	14300	13300	12200	0	0			13600	2
166	715772	968638	THOMPSON PEAK	HORSESHOE CANYON	14-Nov	796	2298	4722	4883	12,699	1	12796	12796	12800	11%	11500	11400	10200	0	0			13600	1
174	712989	944754	98TH	CACTUS	14-Nov	7516	4881	3838	2091	18,126	1	18278	18278	18300	14%	16100	13100	16700	14900	21200	20500	20300	17600	5
178	715631	944748	100TH	CACTUS	14-Nov	4660	3210	0	1944	9,814	1	9897	9897	9900	18%	8500	9600	6900	9300	10200	11200	11500	11500	3
181	702844	930557	VIA LINDA	VIA DE VENTURA	14-Nov	8148	5960	309	2491	17,908	1	18059	18059	18100	1%	17900	18400	22300	21900	21900	22500	24800	22100	2
183	710508	939458	VIA LINDA	SHEA	14-Nov	16435	18371	7246	5255	49,307	1	49722	49722	49700	6%	46900	49700	52300	56600	45000	44200	56400	49000	9
186	716273	944742	104TH	CACTUS	14-Nov	3229	2153	921	520	6,823	1	6880	6880	6900	13%	6100	6200	5600	3900	7000	8100	9000	7400	1
193	722379	944871	FRANK LLOYD WRIGHT	CACTUS	14-Nov	2339	868	15207	14327	32,741	1	33016	33016	33000	9%	30400	30600	31200	29500	32000	25600	31800	26100	9
38	697125	912913	SCOTTSDALE	CHAPARRAL	13-Nov	3085	8093	18468	16726	46,372	1	46762	46762	46800	-19%	57700	49800	54500	61700	57600	84100	65100	74200	9
39	697179	918225	SCOTTSDALE	MCDONALD	13-Nov	3542	8772	19744	20872	52,930	1	53375	53375	53400	-6%	56600	54800	61800	61700	59600	67800	64401	78100	17
120	708057	960419	PERIMETER	BELL	13-Nov	4707	5360	2079	1829	13,995	1	14113	14113	14100	IND	0	0	0	0	0			0	3
125	707631	912846	PIMA	CHAPARRAL	13-Nov	13292	13289	3876	4617	35,074	1	35369	35369	35400	0%	35400	27500	32600	41100	38100	39200	28701	25300	9
127	707676	923417	PIMA	INDIAN BEND	13-Nov	10423	11277	4607	5865	32,172	1	32443	32443	32400	0%	32300	29600	31500	33900	34200	39100	60100	66000	9
128	707699	928709	PIMA	VIA DE VENTURA	13-Nov	11768	5885	4814	9907	32,374	1	32646	32646	32600	14%	28700	30700	34200	37200	36700	38700	46700	54700	14
147	709333	936772	90TH	MOUNTAIN VIEW	13-Nov	5944	7808	9981	8722	32,455	1	32728	32728	32700	9%	30000	35000	37100	35300	34400	32700	68500	51600	15
151	710944	937134	92ND	MOUNTAIN VIEW	13-Nov	744	5267	8668	5872	20,551	1	20724	20724	20700	18%	17500	19500	21700	21100	20100	18000	32901	24900	1
156	711472	955242	92ND	FRANK LLOYD WRIGHT	13-Nov	16087	19007	996	4140	40,320	1	40659	40659	40700	14%	35600	37700	39100	37800	39800	42800	37101	23000	6
203	736734	942090	132ND	VIA LINDA	13-Nov	3732	2538	1287	491	8,046	1	8114	8114	8100	IND	0	0	0	0	0			0	0
24	694500	910212	68TH	CAMELBACK	14-Oct	15618	16212	6895	3805	42,530	1	43420	43420	43400	16%	37400	38400	37300	44400	42500	47600	48200	53800	18
28	695805	907581	GOLDWATER	INDIAN SCHOOL	14-Oct	14160	11234	5923	9279	40,596	1	41446	41446	41400	12%	37100	36600	42900	48500	47700	44601	44300	43600	9
29	695725	910233	GOLDWATER	CAMELBACK	14-Oct	15937	10796	8131	11223	46,087	1	47052	47052	47100	9%	43200	43000	47400	56600	55400	59100	50900	55400	18

81	697288	991939	SCOTTSDALE	JOMAX	14-Oct	998	756	15070	13711	30,435	1	31072	31072	31100	-4%	32400	31300	33200	34000	31300	25700	27600	21100	4
82	697186	997224	SCOTTSDALE	DYNAMITE	14-Oct	5131	4288	13758	11446	34,623	1	35348	35348	35300	-4%	36600	35500	38800	34400	36900	32000	33300	27700	10
83	697185	1002509	SCOTTSDALE	DIXILETA	14-Oct	2148	1354	12001	11541	27,044	1	27610	27610	27600	2%	27000	29000	29200	30400	26600			27700	5
84	697188	1007790	SCOTTSDALE	LONE MOUNTAIN	14-Oct	4294	3102	11527	11591	30,514	1	31153	31153	31200	6%	29300	31200	29300	32200	26000	29600	23400	19300	8
87	696527	1018358	SCOTTSDALE	CAREFREE	14-Oct	7496	893	8825	6746	23,960	1	24462	24462	24500	0%	24500	24600	24500	26300	23700	29500	23200	17900	7
89	698448	907592	DRINKWATER	INDIAN SCHOOL	14-Oct	12940	19536	7541	4536	44,553	1	45486	45486	45600	12%	40500	37800	46000	43600	42600	43100	41800	30100	13
90	702403	910213	HAYDEN	CAMELBACK	14-Oct	10698	2653	14039	14683	42,073	1	42954	42954	43000	2%	42100	47000	46600	49300	49300	44900	56300	78300	18
123	707585	902291	PIMA	THOMAS	14-Oct	12845	10668	1988	3340	28,839	1	29443	29443	29400	-2%	29900	29900	31500	34200	33500	40600	20500	21200	2
124	707608	907567	PIMA	INDIAN SCHOOL	14-Oct	18341	17019	2689	4651	42,700	1	43594	43594	43600	3%	42300	38100	45400	47300	45000	41400	25600	26400	11
167	716252	970480	THOMPSON PEAK	WINDGATE PASS	14-Oct	778	1745	5995	4649	13,167	1	13443	13443	13400	22%	11000	11900	12500	0	0			13600	1
11	692011	904875	64TH	OSBORN	13-Oct	0	1983	5929	3842	11,754	1	12000	12000	12000	IND	0	0	0	0	0			0	3
12	692025	905979	64TH	INDIAN SCHOOL	13-Oct	10224	11608	5266	0	27,098	1	27665	27665	27700	5%	26500	26800	31300	28700	26700	28800	27401	18400	8
23	694494	907553	68TH	INDIAN SCHOOL	13-Oct	13682	13114	5415	5482	37,693	1	38482	38482	38500	11%	34600	36200	41000	39000	39200	44000	44001	47300	9
54	697350	962816	SCOTTSDALE	PRINCESS	13-Oct	2312	3368	19860	19501	45,041	1	45984	45984	46000	6%	43300	40100	41600	43900	46700			0	14
91	702449	912854	HAYDEN	CHAPARRAL	13-Oct	6690	12482	16893	14297	50,162	1	51212	51212	51200	6%	48500	51200	52500	62300	57400	52200	54700	85800	14
126	707654	918126	PIMA	MCDONALD	13-Oct	11395	8682	4056	6585	30,898	1	31545	31545	31500	11%	28500	28000	30600	32500	33000	33000	23501	51500	4
182	715834	936351	VIA LINDA	MOUNTAIN VIEW	13-Oct	2860	4089	9408	5721	22,078	1	22540	22540	22500	-28%	31200	24400	24000	27800	26700	26000	23900	27400	0
189	718211	986629	ALMA SCHOOL	HAPPY VALLEY	13-Oct	7401	3371	271	4265	15,328	1	15547	15547	15500	3%	15000	14600	16300	16400	16400	14600	11400	9400	4
190	722532	997836	ALMA SCHOOL	DYNAMITE	13-Oct	4519	5141	2550	662	12,872	1	13142	13142	13100	-4%	13600	13600	16400	15200	12300	8800	7100	6200	1
192	724496	941908	FRANK LLOYD WRIGHT	VIA LINDA	13-Oct	8596	5875	9948	14507	38,726	1	39537	39537	39500	1%	39100	40600	44200	41900	40500	38300	38800	37700	10
194	714701	950641	FRANK LLOYD WRIGHT	THUNDERBIRD	13-Oct	2554	292	13400	12555	28,801	1	29404	29404	29400	4%	28400	28700	31500	29800	26200	24000	23400	22800	3
195	713132	952967	FRANK LLOYD WRIGHT	RAINTREE	13-Oct	1014	3894	9699	11324	25,931	1	26474	26474	26500	-9%	29100	29800	32900	27500	27300	27400	23100	27100	5
160	716125	950268	100TH	FRANK LLOYD WRIGHT	11-Oct	13551	13778	1564	4650	33,543	1	34245	34245	34200	2%	33600	36800	34900	33100	29000	29400	29201	17600	6
191	724861	939451	FRANK LLOYD WRIGHT	SHEA	11-Oct	16261	18767	1829	11110	47,967	1	48971	48971	49000	1%	48500	54900	57300	54900	58400	50000	48700	52600	14
198	735419	939451	130TH	SHEA	11-Oct	15160	14764	430	1717	32,061	1	32733	32733	32700	1%	32400	36300	42800	42500	38500	38600	39600	37400	1
199	739378	939450	136TH	SHEA	11-Oct	14286	13184	391	2127	29,987	1	30615	30615	30600	-1%	30900	35400	38600	37800	38000	38700	36500	34600	3
33	697092	899627	SCOTTSDALE	OAK	14-Sep	1666	1496	17797	16773	37,732	1	38662	38662	38700	14%	33900	36000	42100	49400	46000	50200	49701	57400	10
40	697250	920879	SCOTTSDALE	LINCOLN	14-Sep	10376	1600	19199	21000	52,375	1	53694	53694	53700	0%	53500	57200	58400	66900	64500	72900	91500	98600	18
113	704981	904931	GRANITE REEF	OSBORN	14-Sep	1808	736	905	0	3,449	1	3536	3536	3500	3%	3400	3800	3600	3800	3900	4500	6201	5000	0
122	707562	897010	PIMA	MCDOWELL	14-Sep	16815	15594	0	2114	34,523	1	35392	35392	35400	15%	30900	28000	33300	36200	34800	23900	29000	30900	0
19	694459	896918	68TH	MCDOWELL	12-Sep	15424	13291	4193	2759	35,667	1	36565	36565	36600	-5%	38400	39800	47800	46600	45100	49200	51000	62400	11
74	699727	902293	MILLER	THOMAS	12-Sep	15416	14995	4888	6685	41,983	1	43020	43020	43000	3%	41900	43100	44800	49300	49400	52300	44401	56300	8
30	697008	891690	SCOTTSDALE	MCKELLIPS	14-Aug	3512	6097	17715	16074	43,398	1	45605	45605	45600	9%	41800	43000	45400	54800	50200	51800	27800	33100	0
31	697045	894330	SCOTTSDALE	ROOSEVELT	14-Aug	2152	2029	15710	16539	36,430	1	38282	38282	38300	3%	37200	38000	40200	45200	42800	45400	45400	49300	5
82	699918	950909	76TH	REDFIELD	14-May	9262	8080	1016	1834	20,202	0	20056	20056	20100	7%	18800	17800	0	0	0			0	2
107	702797	971918	HAYDEN	THOMPSON PEAK	14-May	5882	7107	14179	8860	36,028	0	35771	35771	35800	12%	32000	35300	36600	28200	11500			62800	11
108	701143	974169	HAYDEN	GRAYHAWK	14-May	1722	1031	9473	7865	20,091	0	19947	19947	19900	7%	18600	22500	21400	16000	6400			62800	1
131	707923	973822	PIMA	THOMPSON PEAK	14-May	7098	5806	13471	17321	43,698	0	43386	43386	43400	10%	39500	43100	51400	51000	48500	61600		0	7
133	707925	967024	PIMA	HAPPY VALLEY	14-May	2033	8528	16973	10302	37,836	0	37566	37566	37600	1%	37400	41500	42200	43200	38000	42600	26700	27500	4
134	707927	991961	PIMA	JOMAX	14-May	528	298	9428	8570	18,734	0	19663	19563	19600	IND	0	0	0	0	0			0	0
135	707761	997233	PIMA	DYNAMITE	14-May	3500	7457	9171	7734	27,862	0	27663	27663	27700	-2%	28300	27900	30300	33500	30300	30900	21400	13600	11
201	706392	955766	HAYDEN	NORTHSIGHT	14-May	3405	9554	15673	8644	37,276	0	37010	37010	37000	11%	33400	0	0	0	0			0	7
65	697192	1010432	SCOTTSDALE	ASHLER HILLS	13-May	977	2743	12246	9439	25,405	0	25224	25224	25200	-13%	28800	25300	27800	0	0			27700	1
66	698412	904939	DRINKWATER	OSBORN	13-May	4062	5000	6552	4710	20,324	0	20179	20179	20200	-4%	21100	22000	25800	27800	25100	24300	31000	27300	6
75	699737	904936	MILLER	OSBORN	13-May	5585	5169	5571	6308	22,633	0	22471	22471	22500	-2%	23000	24300	27500	27200	29300	39100	26700	37700	11
78	699753	912884	MILLER	CHAPARRAL	13-May	7932	9136	3500	1507	22,075	0	21917	21917	21900	-3%	22600	24800	24200	24800	26300	29700	27300	26200	2
81	699998	891750	MILLER	PINNACLE PEAK	13-May	6938	7570	7052	574	22,134	0	21976	21976	22000	-3%	22600	21800	25400	24500	17900			26200	4
116	705009	912851	GRANITE REEF	CHAPARRAL	13-May	11548	12576	2444	2726	29,294	0	29085	29085	29100	-2%	29800	29700	26900	33800	27400	31900	35300	32000	8
117	705027	918134	GRANITE REEF	MCDONALD	13-May	10575	10029	3174	1824	25,602	0	25419	25419	25400	1%	25200	25300	24600	26000	24800	32700	29101	30200	10
170	712993	935509	96TH	VIA LINDA	13-May	11523	8701	201	3134	23,559	0	23391	23391	23400	-3%	24200	23400	27400	26400	27300	31300	36700	30800	7
171	712995	936824	96TH	MOUNTAIN VIEW	13-May	3035	3383	2541	4613	13,572	0	13475	13475	13500	0%	13500	13800	16100	14300	15100	14900	23201	15900	1
32	697083	896967	SCOTTSDALE	MCDOWELL	14-Apr	14676	15069	15290	18361	63,396	0	60594	60594	60600	-5%	64000	64000	68800	79300	82200	78500	68000	91900	32
49	697213	949921	SCOTTSDALE	THUNDERBIRD	14-Apr	9301	9474	21043	21354	61,172	0	58468	58468	58500	33%	44100	57500	53700	71200	80000	79800	68200	72800	19
50	697257	954108	SCOTTSDALE	BUTHERUS	14-Apr	11488	5827	21494	17618	56,427	0	53933	53933	53900	3%	52100	52700	47500	59100	59900	64400	68600	58200	5
51	697280	955208	SCOTTSDALE	GREENWAY-HAYDEN	14-Apr	5697	9228	19794	17823	52,332	0	50019	50019	50000	IND	0	0	0	0	0			0	12
59	697353	981751	SCOTTSDALE	PINNACLE PEAK	14-Apr	6136	8299	19328	15469	49,230	0	47054	47054	47100	-2%	48300	48200	48900	51000	50000	47600	53700	47400	15
83	702255	991703	HAYDEN	MCKELLIPS	14-Apr	6582	9804	13195	12771	42,452	0	40575	40575	40600	-3%	41800	43700	45300	40500	41900	46800	46300	48400	15
85	702378	996993	HAYDEN	MCDOWELL	14-Apr	17583	14941	13254	14089	59,847	0	57201	57201	57200	6%	53800	55000	56900	64200	63800	63000	62500	80400	29
95	705496	929239	HAYDEN	VIA DE VENTURA	14-Apr	7871	7645	14943	11437	41,896	0	40044	40044	40000	-8%	43300	46500	47400	53300	57800	52000	59100	91500	8
99	702463	944590	HAYDEN	CACTUS	14-Apr	17008	16984	10252	9991	54,233	0	51838	51838	51800	12%	46200	51400	54000	56100	56200	56200	56700	69400	18
104	702703	958370	GREENWAY-HAYDEN	FRANK LLOYD WRIGHT	14-Apr	20410	21237	6681	11171	59,499	0	56869	56869	56900	-12%	65000	58400	62000	67800	62800	75600		0	17
132	707923	981743	PIMA	PINNACLE PEAK	14-Apr	8820	4724	17846	17551	48,741	0	46586	46586	46600	17%	39700	38000	41400	48300	51000	52500	42100	37300	5
52	697318	957849	SCOTTSDALE	PARADISE	13-Apr	2092	3795	18028	17492	41,405	0	39575	39575	39600	-4%	41100	37300	41000	47500	45000			0	3
57	697355	971189	SCOTTSDALE	THOMPSON PEAK	13-Apr	0	6330	15334	17811	39,475	0	37730	37730	37700	-23%	49000	51200	43200	49700	59900	41500	37200	23600	10
58	697354	973829	SCOTTSDALE	GRAYHAWK	13-Apr	0	2096	16696	17164	35,956	0	34366	34366	34400	-18%	41700	44000	32200	42100	44300	33700	38000	29000	3
101	702508	950690	HAYDEN	REDFIELD	13-Apr	8129	0	11858	13955	33,942	0	32442	32442	32400	17%	27600	25400	35500	23500	21700	33000	46900	41300	3
102	702696	962976	HAYDEN	RAINTREE	13-Apr	1085	8119	11993	7422	28,619	0	27354	27354	27400	18%	23700	25200	32200	34500	32900	30200	45800	33000	5
105	702780	960452	HAYDEN	BELL	13-Apr	0	5920	11834	9928	27,682	0	26458	26458	26500	21%	21900	25500	28100	0	0			62900	4
109	704905	994356	GRANITE REEF	ROOSEVELT	13-Apr	2353	1619	637	1344	5,953	0	5690	5690	5700	4%	5500	5300	6000	5400	6300	6800	6700	10400	1
110	704927	997002	GRANITE REEF	MCDOWELL	13-Apr	14183	14512	3030	2333	34,058	0	32552	32552	32600	-7%	35200	34900	39000	36700	34300	39600	31201	40200	11
111	704955	999644	GRANITE REEF	OAK	13-Apr	836	846	1765	1508	4,975	0	4755	4755	4800	4%	4600	5200	6200	4100	5200	5600	6000	6800	2
204	727449	936807	117TH	MOUNTAIN VIEW	13-Apr	1584	802	0	1165	3,551	0	3394	3394	3400	-8%	3700	3700	0	0	0			0	0
205	697352	976470	SCOTTSDALE	DEER VALLEY	13-Apr	0	1713	16654	16009	34,376	0	32856	32856	32900	-19%	40400	37600	0	0	0			0	1

41	697230	923523	SCOTTSDALE	INDIAN BEND	12-Apr	1397	8420	24530	20471	54,817	0	52394	52394	52400	5%	49800	52600	48500	48300	59200	67200	69900	78000	13
45	697149	939338	SCOTTSDALE	SHEA	14-Mar	17998	17996	18875	17871	72,829	0	68951	68951	69000	-8%	74700	76200	70900	82800	80000	98800	102100	91500	25
47	697169	944628	SCOTTSDALE	CACTUS	14-Mar	14149	15765	20603	21392	71,909	0	68361	68361	68400	9%	62500	68600	67500	83100	77800	77600	100200	81600	27
53	697337	959703	SCOTTSDALE	FRANK LLOYD WRIGHT	14-Mar	16990	15359	20604	22472	75,425	0	71704	71704	71700	1%	70700	64100	72000	77500	75100	87700	88800	75200	19
87	702348	902299	HAYDEN	THOMAS	14-Mar	10537	13148	15505	18027	57,217	0	54394	54394	54400	-10%	60300	64100	65900	61200	62200	63500	64800	77900	32
89	702375	907566	HAYDEN	INDIAN SCHOOL	14-Mar	21561	20713	16060	16420	74,754	0	71066	71066	71100	4%	66300	67800	72400	72300	70000	61600	72200	73700	27
98	702409	939299	HAYDEN	SHEA	14-Mar	22676	21762	12192	9699	66,329	0	63057	63057	63100	2%	61600	61600	74800	74400	74100	74500	94600	98000	15
103	707162	956815	HAYDEN	FRANK LLOYD WRIGHT	14-Mar	22177	21700	13054	887	57,808	0	54956	54956	55000	-8%	60100	56100	66300	72300	71500	73000	83001	62800	17
148	709298	939473	90TH	SHEA	14-Mar	31938	29646	10429	2353	74,366	0	70697	70697	70700	-1%	71300	77700	73500	72000	75900	74200	69100	71300	34
157	711668	944755	94TH	CACTUS	14-Mar	10076	6833	5924	6968	29,801	0	26331	26331	26300	6%	26800	25300	26500	31100	30500	36000	37500	30200	9
164	715918	960417	THOMPSON PEAK	BELL	14-Mar	5350	2148	5702	2170	15,370	0	14612	14612	14600	-20%	18200	19100	17200	10200	9800	8400	9300	13600	4
3	686604	997191	56TH	DYNAMITE	13-Mar	6467	5093	380	890	13,030	0	12387	12387	12400	-8%	13500	13800	0	0	0			0	0
4	686743	1018111	56TH	CAREFREE	13-Mar	8325	8231	656	0	17,212	0	16363	16363	16400	3%	15600	16900	18100	20200	16000	17000	17500	0	1
7	686257	1018333	60TH	CAREFREE	13-Mar	8534	7824	1986	0	18,344	0	17439	17439	17400	1%	17300	16700	19000	19000	17500	18200	20500	16800	3
14	691883	939314	64TH	SHEA	13-Mar	22488	22254	3686	3240	51,567	0	49023	49023	49000	-5%	51600	51000	56800	54400	50800	60500	65800	67500	6
15	691891	942013	64TH	CHOLLA	13-Mar	0	1182	3235	3267	7,684	0	7305	7305	7300	9%	6700	8200	8400	7400	11100	10000	9800	12700	0
16	691881	944658	64TH	CACTUS	13-Mar	14570	13056	3574	4787	35,987	0	34212	34212	34200	-7%	36800	36700	40800	37800	38700	42500	45000	37700	6
17	691896	997205	64TH	DYNAMITE	13-Mar	4737	4666	408	493	10,314	0	9805	9805	9800	-9%	10800	11100	12400	11200	10600			37700	1
20	694468	899602	68TH	OAK	13-Mar	108	791	4318	5013	10,230	0	9725	9725	9700	-8%	10600	9700	12900	11900	12100	12400	21101	19200	0
21	694480	902256	68TH	THOMAS	13-Mar	13292	13310	4884	6661	38,147	0	36265	36265	36300	-7%	39100	39400	45300	44300	44800	46800	58001	58200	11
22	694487	904908	68TH	OSBORN	13-Mar	2442	2857	5687	6371	17,357	0	16501	16501	16500	15%	14400	14500	17900	17300	17700	18800	28201	0	6
25	694504	912858	68TH	CHAPARRAL	13-Mar	1401	1885	4637	1862	9,785	0	9302	9302	9300	11%	8400	8900	10000	10200	11500	12900	15000	15900	1
26	694048	939322	68TH	SHEA	13-Mar	22763	22929	277	333	46,302	0	44018	44018	44000	1%	43400	46100	50000	45300	49200	47400		0	2
158	711666	947396	94TH	SWEETWATER	13-Mar	1370	1142	6201	3812	12,525	0	11907	11907	11900	-18%	14600	14900	13700	16600	12500	15600	28600	10700	2
159	711664	950038	94TH	THUNDERBIRD	13-Mar	3226	2901	5970	5532	17,629	0	16759	16759	16800	-3%	17400	18400	17000	19100	17200	19600	24900	10400	3
168	711634	960415	94TH	BELL	13-Mar	8862	7077	1942	2715	20,596	0	19570	19570	19600	13%	17400	18400	17600	16500	0			13600	5
169	711635	965229	94TH	UNION HILLS/LEGACY	13-Mar	4651	3111	1683	1677	11,122	0	10573	10573	10600	7%	9900	9300	6100	0	0			13600	2
177	714276	960416	98TH	BELL	13-Mar	8276	6023	1491	365	16,155	0	15358	15358	15400	6%	14300	13800	14400	15800	0			13600	2
179	715629	947390	100TH	SWEETWATER	13-Mar	794	952	1217	1508	4,471	0	4250	4250	4300	-22%	5500	5500	5200	5000	5200	5800	6000	5800	2
66	697193	1015716	SCOTTSDALE	TERRAVITA/WESTLAND	12-Mar	1688	3642	11745	10473	27,548	0	26189	26189	26200	0%	26100	27200	26600	0	0			19300	4
206	697353	979110	SCOTTSDALE	WILLIAMS	11-Mar	0	1856	18309	19170	39,344	0	37403	37403	37400	-7%	40200	37600	0	0	0			0	4
71	699873	894339	MILLER	ROOSEVELT	14-Feb	1387	1988	3056	3196	9,624	0	9208	9208	9200	3%	8900	9500	11700	11000	11300	12000	11300	14000	0
79	699995	976470	MILLER	DEER VALLEY	14-Feb	1043	746	8378	7025	17,692	0	16927	16927	16900	5%	16100	20500	18300	13700	0			26200	0
80	699995	979109	MILLER	WILLIAMS	14-Feb	1771	978	7873	5434	16,056	0	15361	15361	15400	5%	14600	14600	14500	0	0			26200	1
106	702729	961507	HAYDEN	PRINCESS	14-Feb	2032	2813	8433	8985	20,263	0	19386	19386	19400	-10%	21600	16800	20400	17500	5600			33000	1
115	705000	910211	GRANITE REEF	CAMELBACK	14-Feb	1375	812	2013	2322	6,522	0	6240	6240	6200	-5%	6500	6800	7400	7800	8000	8900	17201	11000	2
119	705756	962085	PERIMETER	PRINCESS	14-Feb	3109	5739	1650	1056	11,554	0	11054	11054	11100	8%	10300	9000	9800	7400	9400	11400	16601	5300	2
8	691771	897021	64TH	MCDOWELL	13-Feb	14434	15373	6206	7486	43,501	0	41619	41619	41600	-7%	44600	46900	53000	50400	49600	50500	57100	59400	2
10	691912	902226	64TH	THOMAS	13-Feb	12789	12773	7334	4920	37,816	0	36180	36180	36200	-3%	37400	37900	42900	42300	41300	43200	48501	40500	19
13	691876	910165	64TH	CAMELBACK	13-Feb	15881	15915	849	4522	37,167	0	35559	35559	35600	10%	32400	34000	40700	39500	37500	50100	43000	42100	9
18	694399	894282	68TH	ROOSEVELT	13-Feb	970	784	3680	3756	9,190	0	8792	8792	8800	5%	8400	7300	10200	8500	10400	10000	14301	6600	0
149	709023	950038	90TH	THUNDERBIRD	13-Feb	3977	2442	1476	478	8,373	0	8011	8011	8000	-1%	8100	8500	0	0	0			0	0
150	709078	952676	90TH/REDFIELD	RAINTREE	13-Feb	13054	10562	2501	2916	29,033	0	27777	27777	27800	-11%	31300	31900	31900	35900	31700	26521	22100	0	7
154	710343	950038	92ND	THUNDERBIRD	13-Feb	3423	2909	812	2625	9,769	0	9346	9346	9300	24%	7500	8400	7500	8500	7700	7800	9700	9300	1
155	710341	952679	92ND	RAINTREE	13-Feb	10839	10239	1304	1197	23,579	0	22559	22559	22600	-5%	23800	24400	23700	23800	18700	13700	4200	6000	2
173	712960	942113	96TH	CHOLLA	13-Feb	608	422	4510	4335	9,875	0	9448	9448	9400	22%	7700	10500	8900	7200	8000	8100	12300	11000	1
175	712967	947396	96TH	SWEETWATER	13-Feb	1138	1381	1960	1489	5,968	0	5739	5739	5700	6%	5400	6500	6400	5800	6500	6200	6200	9900	2
176	712965	950039	96TH	THUNDERBIRD	13-Feb	2406	2070	1880	446	6,802	0	6508	6508	6500	7%	6100	6600	6500	6200	5600	6500	6400	5700	3
93	702442	923449	HAYDEN	INDIAN BEND	12-Feb	9527	11499	14910	16099	52,034	0	49783	49783	49800	5%	47400	42500	51500	53800	53800	49100	57200	65000	16
152	710349	939472	92ND	SHEA	11-Feb	27274	26000	9086	7942	70,282	0	67241	67241	67200	0%	67200	71000	67100	74600	69520	67000	74200	65400	23
153	710348	942114	92ND	CHOLLA	11-Feb	1431	709	7385	6731	16,256	0	15553	15553	15600	7%	14600	15600	14200	19800	17500	15700	27900	17000	2
172	712991	939472	96TH	SHEA	11-Feb	24415	22975	5083	4077	56,550	0	54104	54104	54100	3%	52500	55300	53200	59100	57600	55500	54800	58000	6
70	699516	891696	MILLER	MCKELLIPS	14-Jan	5683	6888	2055	2954	17,580	0	17339	17339	17300	2%	17000	18500	18000	19900	20000	21100	22100	19900	1
1	686476	899525	56TH	OAK	13-Jan	1329	1119	0	1388	3,836	0	3783	3783	3800	12%	3400	4300	5100	4900	5400	5700		0	0
2	686490	902167	56TH	THOMAS	13-Jan	12791	11190	2146	4538	30,666	0	30245	30245	30200	-4%	31600	32500	36500	37800	36000	37500		0	3
5	689151	899557	60TH	OAK	13-Jan	1213	1190	0	481	2,884	0	2845	2845	2800	6%	2600	2600	3300	3100	3300	3700		0	0
6	689174	902197	60TH	THOMAS	13-Jan	11512	11490	697	483	24,182	0	23851	23851	23900	-3%	24700	26200	28400	29400	27900	31200	29900	36600	5
167	716273	947383	104TH	SWEETWATER	13-Jan	777	743	556	0	2,076	0	2048	2048	2000	-9%	2200	2500	2400	1700	2500	1900	2100	2300	0
					Total Daily Traffic Flow	1,593,368	1,600,828	1,776,399	1,680,526	6,651,114														
					Hourly Traffic Flow	66,390	66,701	74,017	70,022	277,130														
					Average Traffic Flow per minute	1,107	1,112	1,234	1,167	4,619														
					Daily Tire Abrasion @ 20mg/km for LDVs	7,966,840	8,004,140	8,881,995	8,402,630	33,255,570														
					Dail Tire Abrasion in Ounces	281	282	313	296	1,173														
					Daily Tire Abrasion in Pounds (LDVs)	17.56	17.65	19.58	18.52	73.32														
					Annual abrasion weight (lbs)	6,410.84	6,440.85	7,147.25	6,761.51	26,760.43														
					Average Daily Traffic Flow/Intersection	**7,849**	**7,886**	**8,751**	**8,278**	**32,764**														
					Average Hourly Traffic Flow/intersection	**327**	**329**	**365**	**345**	**1,365**														
					Average Traffic Flow per minute	**5.45**	**5.48**	**6.08**	**5.75**	**22.75**														
					Daily Tire Abrasion @ 20mg/km for LDVs	**156,982.07**	**157,717.04**	**175,014.68**	**165,569.06**	**655,282.17**														
					Dail Tire Abrasion in Ounces	**5.54**	**5.56**	**6.17**	**5.84**	**23.11**														
					Daily Tire Abrasion in Pounds (LDVs)	**0.35**	**0.35**	**0.39**	**0.37**	**1.44**														
										527														

"Allsopp_ScottsdaleGIS_Stored Traffic_Counts&Calculations.xlsx"

Y14_COL_RA	Change_121	Y12_COL	Y12_COL_RA	Y10_COL	Y10_COL_RA	Y08_COL	Y08_COL_RA	Y06_COL	Y06_COL_RA	Y04_COL	Y04_COL_RA	Y02_COL	Y02_COL_RA	Y00_COL	Y00_COL_RA	Y98_COL	Y98_COL_RA	Y96_COL_RA	Y94_COL_RA	Y92_COL_RA	Y90_COL_RA	Y88_COL_RA	Y86_COL_RA	INTRSCT_ID
0	78%	13	0	20	1	20	0	27	1	21	0	31	1		0	0	0	0	0	0	0		0	56
0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	60
0	21%	16	0	14	0	18	0	22	0	29	0	32	0		0	0	0	0	0	0	0		0	140
0	-30%	8	0	7	0	9	0	7	0	5	0	7	0		0	17	0	0	0	0	0	0	1	141
1	56%	22	1	28	1	16	1	26	1	10	0	6	0		0	3	0	0	0	0	0		0	142
1	32%	40	1	35	1	37	1	56	2	23	0	29	1		0	21	0	0	1	0	0		0	143
0	33%	5	0	5	0	8	0	12	1	4	0	4	0		0	10	0	0	0	0	0		0	144
0	-18%	13	0	3	0	6	0	12	0	16	0	8	0		0	0	0	0	0	0	0		0	145
0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	202
0	58%	7	0	9	0	10	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	27
1	1%	30	1	26	1	24	0	37	1	49	1	27	0	28	0	29	0	0	0	0	1	0	1	34
1	5%	11	0	10	0	9	0	13	0	9	0	15	0	17	0	14	0	0	0	0	0	0	0	35
1	68%	13	0	12	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	55
0	-25%	15	0	9	0	19	1	24	1	31	1	5	0	21	1	13	0	0	0	1	1	1	1	76
0	161%	2	0	1	0	3	0	4	0	8	0	6	0	1	0	5	0	0	0	0	0	0	0	86
0	9%	8	0	8	0	2	0	5	0	12	0	7	0	12	0	19	0	0	0	0	0	0	0	94
0	-15%	4	0	1	0	5	0	4	0	4	0	7	0	10	0	7	0	0	0	0	0	0	0	96
0	331%	1	0	9	0	6	0	5	0	6	0	11	0	8	0	19	0	0	0	0	0		0	97
0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	100
0	-12%	4	0	5	0	7	0	1	0	2	0	0	0		0	1	0	0	0	0	0		0	129
0	94%	1	0	0	0	2	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	130
0	24%	8	0	6	0	10	0	8	0	12	0	9	0	8	0	3	0	0	0	0	0		0	196
0	-19%	2	0	3	0	3	0	5	0	3	0	2	0	3	0	3	0	0	0	0	0		0	197
1	22%	20	1	14	0	16	0	32	1	18	1	19	1	11	0	20	0	0	1	0	0	0	0	36
0	-9%	18	0	19	0	22	1	24	1	21	1	19	0	16	0	18	0	0	0	0	0	0	0	37
1	36%	9	0	9	0	14	1	10	0	11	0	13	0	10	0	12	0	1	0	0	0	0	0	77
1	71%	8	0	7	0	7	0	10	0	13	0	11	0	12	0	17	0	0	0	0	0	1	1	88
0	-29%	13	0	6	0	12	0	19	1	18	0	9	0	9	0	13	0	0	0	0	0	0	0	92
0	5%	1	0	1	0	3	0	1	0	1	0	1	0	5	2	0	0	0	0	0	0		0	200
0	200%	1	0	1	0	4	0	3	0	2	0	2	0	2	0	2	0	0	0	0	0	0	0	9
0	16%	3	0	4	0	9	0	4	0	5	0	6	0	5	0	3	0	0	0	0	0	0	0	42
0	-23%	8	0	9	0	10	0	14	0	14	0	25	1	11	0	11	0	0	0	1	1	0	1	43
0	111%	6	0	14	0	9	0	3	0	13	0	11	0	15	0	15	0	0	0	0	0		0	44
0	38%	6	0	3	0	1	0	2	0	3	0	7	0	5	0	3	0	0	0	0	0		0	46
0	37%	4	0	4	0	8	0	7	0	12	0	8	0	10	0	2	0	0	0	0	0	0	0	48
0	106%	7	0	12	0	12	0	18	1	11	0	10	0	20	1	14	0	0	1	0	0	0	0	72
0	-13%	1	0	2	0	1	0	3	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	73
0	13%	4	0	8	0	9	0	9	0	7	0	7	0	13	1	10	0	0	0	0	0	0	0	84
0	11%	1	0	2	0	3	0	6	0	5	0	2	0	1	0	2	0	0	0	1	0	1	1	112
0	-35%	6	0	5	0	4	0	6	0	4	0	9	0	3	0	4	0	0	0	0	0	0	0	114
0	45%	4	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	118
0	146%	3	0	8	0	14	0	10	0	3	0	3	0	2	0	3	0	0	0	0	0		0	121
0	IND	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	136
0	IND	0	0	0	0	0	0	4	0	1	0	3	0	1	0	2	0	0	0	0	0		0	137
0	IND	0	0	1	0	1	0	1	0	4	0	0	0		0	0	0	0	0	0	0		0	138
0	192%	1	0	5	1	4	0	2	0	2	0	0	0	3	0	2	0	0	0	0	0		0	139
0	-50%	14	0	14	0	9	0	15	0	14	0	13	0	11	0	10	0	0	0	0	0		0	146
0	-20%	10	0	7	0	6	0	9	0	13	1	5	0	15	1	0	0	0	0	0	0		0	160
0	47%	5	0	9	0	7	0	15	0	15	0	11	0	13	1	6	0	0	0	0	0		0	161
0	-35%	3	0	11	0	6	0	1	0	3	0	4	0	6	0	0	0	0	0	0	0		0	162
1	126%	6	0	4	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	163
0	-47%	3	0	0	0	4	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	165
0	IND	0	0	0	0	1	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	166
0	120%	2	0	3	0	3	0	3	0	3	0	2	0	2	0	7	1	0	0	0	0		0	174
0	29%	2	0	4	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		0	178
0	98%	1	0	3	0	1	0	2	0	2	0	2	0	0	0	0	0	0	0	0	0		0	181
0	-8%	9	0	10	0	8	0	15	0	20	1	12	0	18	0	9	0	0	0	0	0		0	183
0	IND	0	0	0	0	3	1	2	1	0	0	0	0	7	2	2	0	1	0	0	0		0	186
0	-17%	10	0	8	0	7	0	8	0	6	0	8	0	5	0	5	0	0	0	0	0		0	193
0	-15%	13	0	10	0	18	0	17	0	18	0	12	0	15	0	17	0	0	0	0	0	0	1	38
0	13%	16	0	9	0	18	0	26	1	29	1	9	0	12	0	19	0	0	0	0	0	0	0	39
0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	120
0	50%	6	0	6	0	8	0	9	0	9	0	6	0	3	0	6	0	0	0	0	0	0	0	125
0	79%	5	0	0	0	3	0	4	0	7	0	3	0	2	0	11	0	0	0	0	0	0	0	127
1	37%	9	0	6	0	6	0	10	0	15	1	13	0	12	0	9	0	0	0	0	0	0	0	128
1	38%	10	0	7	0	10	0	4	0	6	0	9	0	6	0	14	0	0	0	0	0		0	147
0	-79%	4	0	6	0	4	0	1	0	6	0	3	0	2	0	6	0	0	0	0	0		0	151
0	76%	3	0	2	0	5	0	5	0	4	0	3	0	6	0	3	0	0	0	0	0		0	156
0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	203
1	29%	12	0	7	0	13	0	15	0	15	0	13	0	17	0	14	0	0	1	0	0	0	1	24
0	-27%	11	0	3	0	4	0	13	0	14	0	12	0	8	0	12	0	0	0	0	0		0	28
0	13%	13	0	8	0	13	0	20	0	16	0	15	0	22	1	14	0	0	0	0	0		0	29

"Allsopp_ScottsdaleGIS_Stored Traffic_Counts&Calculations.xlsx"

0	-31%	6	0	1	0	3	0	5	0	8	0	3	0	2	0	1	0	0	0	0	0		0	61
0	-42%	18	1	7	0	8	0	15	1	12	0	9	0	9	0	9	0	0	1	2	0		0	62
0	145%	2	0	6	0	2	0	4	0	9	0	0	0		0	0	0	0	0	0	0		0	63
0	25%	6	0	4	0	2	0	6	0	7	0	2	0	6	0	2	0	0	0	0	0		0	64
0	250%	2	0	5	0	9	1	5	0	4	0	4	0	6	0	7	1	0	0	0	0	0	0	67
0	5%	11	0	11	0	12	0	12	0	15	0	8	0	12	0	12	1	0	0	0	0		0	69
1	76%	10	0	14	0	12	0	19	1	37	2	14	0	5	0	17	0	0	0	0	0	0	0	90
0	-75%	8	0	4	0	11	0	17	1	13	1	15	1	9	1	13	1	0	0	0	0	0	0	123
0	78%	6	0	3	0	7	0	9	0	4	0	7	0	5	0	5	0	0	0	0	0	1	0	124
0	-18%	1	0	2	0	2	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	167
0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	11
0	91%	4	0	10	1	11	0	10	0	7	0	4	0	3	0	5	0	0	0	0	0		0	12
0	36%	6	0	7	0	8	0	8	0	10	0	8	0	10	0	6	0	0	0	0	0	0	0	23
0	1%	13	0	5	0	12	0	8	0	7	0	0	0		0	0	0	0	0	0	0		0	54
0	-49%	26	1	13	0	28	1	24	1	17	0	21	1	12	0	15	0	0	0	0	0	0	0	91
0	-28%	5	0	3	0	4	0	3	0	8	0	5	0	4	0	9	0	0	0	0	0	0	0	126
0	-100%	4	0	1	0	6	0	6	0	10	1	3	0	5	0	5	0	0	0	0	0		0	182
0	-3%	4	0	3	0	1	0	3	0	3	0	1	0	0	0	0	0	0	0	0	0		0	189
0	-79%	5	1	3	0	4	0	7	1	2	0	3	0	7	2	4	1	0	3	0	0		0	190
0	-10%	11	0	15	1	9	0	14	0	9	0	7	0	5	0	11	0	0	0	0	0		0	192
0	100%	1	0	2	0	1	0	7	0	3	0	0	0	1	0	1	0	0	0	0	0		0	194
0	37%	4	0	4	0	2	0	3	0	4	0	2	0	2	0	7	0	0	0	0	0		0	195
0	-13%	9	0	6	0	6	0	18	1	7	0	9	0	4	0	4	0	0	0	0	0		0	180
0	15%	12	0	13	0	18	0	16	0	20	0	7	0	8	0	6	0	0	0	0	0		0	191
0	-1%	1	0	5	0	5	0	5	0	7	0	3	0	4	0	1	0	0	0	0	0		0	198
0	-50%	6	0	3	0	2	0	6	0	5	0	6	0	4	0	4	0	0	0	0	0		0	199
0	9%	8	0	5	0	7	0	8	0	3	0	4	0	9	0	7	0	0	0	0	0	0	0	33
0	79%	10	0	14	0	14	0	18	0	16	0	17	0	13	0	5	0	0	0	0	0	0	0	40
0	IND	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	113
0	-100%	2	0	0	0	3	0	2	0	5	0	1	0	0	0	1	0	0	0	1	1	0	0	122
0	15%	10	0	10	0	13	0	14	0	19	1	16	0	15	0	14	0	1	1	0	1	0	0	19
0	-51%	16	1	17	1	19	1	25	1	22	1	12	0	17	1	15	0	0	0	1	0	1	1	74
0	IND	0	0	0	0	1	0	2	0	2	0	2	0	0	0	0	0	0	0	0	0		0	30
0	-39%	8	0	4	0	7	0	10	0	2	0	8	0	7	0	10	0	0	0	0	0	0	1	31
0	87%	1	0	2	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	82
0	23%	8	0	7	0	6	0	3	0	1	0	0	0		0	0	0	0	0	0	0		0	107
0	IND	0	0	5	0	4	0	3	0	1	0	0	0		0	0	0	0	0	0	0		0	108
0	6%	6	0	4	0	6	0	17	0	11	0	19	0		0	0	0	0	0	0	0		0	131
0	-1%	4	0	2	0	6	0	3	0	4	0	7	0	6	0	3	0	0	0	0	0		0	133
0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	134
1	87%	6	0	8	0	6	0	13	1	9	0	4	0	8	1	5	1	0	3	0	0		0	135
0	5%	6	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	201
0	-77%	5	0	2	0	3	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	65
0	4%	6	0	10	1	15	1	13	1	25	2	17	1	8	0	8	0	1	0	0	0		0	66
1	41%	8	0	8	0	7	0	5	0	5	0	9	0	6	0	16	1	0	0	0	0	0	1	75
0	-81%	11	1	2	0	6	0	5	0	8	0	12	1	7	0	7	0	0	0	0	0	0	0	78
0	105%	2	0	1	0	2	0	7	0	2	0	0	0		0	0	0	0	0	0	0		0	81
0	37%	6	0	6	0	7	0	9	0	6	0	11	0	4	0	4	0	1	0	0	0		0	116
1	10%	9	0	5	0	4	0	7	0	10	1	13	1	8	0	9	0	0	1	0	0	0	0	117
0	141%	3	0	4	0	2	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0		0	170
0	-67%	3	0	1	0	1	0	3	0	5	0	3	0	3	0	5	0	0	0	0	0		0	171
1	35%	25	1	18	0	34	1	35	1	36	1	31	1	29	0	23	0	0	0	1	1		0	32
0	-25%	19	1	17	0	19	0	15	0	19	0	13	0	18	0	8	0	0	0	0	0	0	0	49
0	-52%	10	0	7	0	15	0	12	0	14	0	8	0	5	0	12	0	0	0	0	0		0	50
0		0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	51
0	-15%	18	1	11	0	7	0	22	1	13	0	15	0	6	0	10	0	0	0	0	0	0	1	59
1	54%	10	0	9	0	10	0	16	1	13	0	8	0	12	0	6	0	0	0	0	0		0	83
1	14%	24	1	19	0	15	0	24	1	29	1	21	0	14	0	16	0	0	0	0	0	0	0	85
0	24%	7	0	6	0	11	0	7	0	14	0	6	0	10	0	19	0	0	0	0	0	0	0	95
0	7%	15	0	13	0	10	0	12	0	32	1	33	1	22	1	25	0	1	0	0	0	0	0	99
0	-26%	27	1	16	0	11	0	23	0	24	1	16	0		0	0	0	0	0	0	0		0	104
0	-70%	14	0	8	0	14	0	11	0	11	0	10	0	15	0	9	0	1	1	0	0		0	132
0	-22%	4	0	6	0	7	0	10	0	9	0	0	0		0	0	0	0	0	0	0		0	52
0	117%	6	0	5	0	9	0	9	0	9	0	8	0	7	0	4	0	0	0	0	0		0	57
0	264%	1	0	3	0	1	0	5	0	3	0	6	0	1	0	1	0	0	0	0	0		0	58
0	-57%	6	0	4	0	4	0	4	0	8	1	1	0	4	0	4	0	0	0	0	0		0	101
0	-14%	5	0	2	0	4	0	4	0	10	0	4	0	10	0	6	0	0	0	0	0		0	102
0	10%	3	0	3	0	3	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	105
0	-4%	1	0	0	0	0	0	1	0	2	0	0	0	1	0	1	0	0	0	0	0	0	0	109
0	19%	10	0	9	0	7	0	7	0	3	0	3	0	9	0	4	0	0	0	0	0	0	1	110
1	-4%	2	1	0	0	1	0	1	0	2	1	2	0	2	0	2	0	1	0	0	0	0	0	111
0	IND	0	0	1	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	204
0	-39%	2	0	3	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	205

0	-49%	24	1	14	0	8	0	21	1	25	1	10	0	14	0	15	0	0	0	0	0	0	0	41
0	80%	15	0	30	1	21	0	46	1	29	0	35	1	23	0	30	0	0	0	0	0	0	0	45
1	3%	24	1	31	1	24	0	33	1	39	1	42	1	38	1	34	1	0	0	1	0	0	0	47
0	-1%	19	0	13	0	16	0	30	1	30	1	39	1	21	0	14	0	0	0	1	0	1	1	53
1	-11%	40	1	25	1	32	1	50	2	53	2	34	1	27	1	18	0	0	0	0	1	1	0	87
1	37%	19	0	16	0	26	0	25	0	28	1	27	1	34	1	23	0	0	0	0	2	0	1	89
0	-8%	16	0	16	0	17	0	34	1	30	1	32	1	30	0	27	0	0	1	0	0	0	1	98
0	86%	10	0	8	0	10	0	22	0	21	0	14	0	23	0	8	0	0	0	0	0		0	103
1	32%	26	1	21	0	33	1	33	1	26	0	22	0	23	0	27	1	0	0	0	0		0	148
0	184%	3	0	4	0	10	1	8	0	7	0	10	0	12	0	2	0	0	0	0	0		0	157
0	399%	1	0	10	1	5	0	5	1	1	0	0	0	0	0	3	0	0	0	0	0		0	164
0	-100%	1	0	1	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	3
0	IND	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	4
0	49%	2	0	3	0	2	0	3	0	0	0	5	0	1	0	0	0	0	0	0	0		0	7
0	-21%	8	0	11	0	4	0	4	0	11	0	6	0	8	0	8	0	0	0	0	0		0	14
0	-100%	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		0	15
0	61%	4	0	3	0	6	0	6	0	10	0	8	0	3	0	13	0	0	0	0	0		0	16
0	10%	1	0	0	0	1	0	1	0	2	0	0	0		0	0	0	0	0	0	0		0	17
0	-100%	1	0	1	0	4	0	1	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	20
0	-41%	20	1	17	1	16	0	30	1	22	1	16	0	17	0	21	0	1	1	0	1	1	1	21
1	75%	3	0	3	0	4	0	3	0	3	0	5	0	2	0	7	0	0	0	0	0	0	0	22
0	IND	0	0	1	0	2	0	1	0	3	0	1	0	4	0	0	0	0	0	0	0	0	0	25
0	IND	0	0	1	0	2	0	0	0	3	0	2	0	2	0	0	0	0	0	0	0		0	26
0	-18%	3	0	1	0	4	0	3	0	1	0	1	0	2	0	5	1	0	0	0	0		0	158
0	55%	2	0	3	0	1	0	3	0	4	0	3	0	6	0	2	0	0	0	0	0		0	159
0	344%	1	0	3	0	6	0	5	0	0	0	0	0		0	0	0	0	0	0	0		0	168
0	IND	0	0	1	0	2	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	169
0	-7%	2	0	0	0	2	0	5	0	0	0	0	0		0	0	0	0	0	0	0		0	177
1	IND	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		0	179
0	298%	1	0	4	0	3	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	66
0	330%	1	0	2	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	206
0	-100%	1	0	2	0	0	0	4	1	5	1	3	0	3	0	2	0	0	0	0	0	0	0	71
0	-100%	1	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	79
0	-53%	2	0	2	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	80
0	IND	0	0	2	0	2	0	3	0	2	0	0	0		0	0	0	0	0	0	0		0	106
0	5%	2	0	1	0	1	0	1	0	1	0	3	0	1	0	3	0	0	0	0	0	0	0	115
0	86%	1	0	2	0	2	0	2	0	0	0	1	0	2	0	3	1	0	0	0	0		0	119
0	7%	2	0	3	0	3	0	4	0	4	0	2	0	2	0	0	0	0	0	0	0		0	8
1	96%	10	0	9	0	17	1	13	0	19	1	14	0	4	0	7	0	0	1	0	0	0	0	10
0	IND	0	0	1	0	3	0	2	0	5	0	5	0	6	0	6	0	0	0	0	0		0	13
0	IND	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		0	18
0	-100%	4	1	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0		0	149
0	31%	6	0	5	0	4	0	9	0	7	0	5	0	1	0	0	0	0	0	0	0		0	150
0	-19%	1	0	1	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0		0	154
0	111%	1	0	2	0	0	0	1	0	7	1	15	3	4	2	1	0	5	0	0	0		0	155
0	-18%	1	0	0	0	1	0	0	0	3	1	0	0	1	0	0	0	0	0	0	0		0	173
0	-5%	2	1	1	0	3	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0		0	175
1	182%	1	0	1	0	2	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0		0	176
0	-15%	18	1	8	0	19	1	23	1	22	1	9	0	16	0	16	0	0	0	0	0	0	1	93
0	-18%	28	1	18	0	22	0	38	1	36	1	34	1	37	1	20	0	0	0	0	0		0	152
0	-38%	3	0	3	0	5	0	1	0	1	0	2	0	6	0	2	0	0	0	0	0		0	153
0	-71%	20	1	13	0	11	0	15	0	14	0	12	0	9	0	16	0	0	0	0	0		0	172
0	-75%	4	0	10	1	7	1	5	0	6	0	2	0	1	0	7	0	0	0	0	0	0	0	70
0	IND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	1
0	57%	2	0	0	0	4	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0		0	2
0	IND	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		0	5
0	72%	3	0	4	0	6	0	10	0	2	0	4	0	2	0	4	0	0	0	0	0		0	6
0	IND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	187

"Allsopp_ScottsdaleGIS_Stored Traffic_Counts&Calculations.xlsx"

ADOT FAST FACTS DATA (Daily Vehicle Miles Travelled)

	FY2020	FY2021	FY2021
TOTAL daily VMT	179.6	179.7	*179,700,000*
Arterial roadways	75.1	75.2	*75,200,000*
Interstate highways	38.1	38.2	*38,200,000*
Other arterial roadways	21.1	21.1	*21,100,000*
Local roadways	17.8	17.8	*17,800,000*
Collector roadways	27.3	27.4	*27,400,000*

Arizona population (2022)	7,359,197	
Total Miles driven Daily per capita	24.418425	
Scottsdale Population	243,050	
Est. Miles Driven per day in Scottsdale	5,934,898	
AM Peak (6:00am - 10:00am)	989,149.70	618,218.56
Tire Abrasion Estimates		
Daily Tire Abrasion (LDV) ounces per m	**1,123.04**	701.90
Daily Tire Abrasion in Pounds (LDVs)	**70.19**	**43.87**
Airborne $PM_{2.5}$ as % of total wear	**1.20%**	1.20%
Daily Weight (pounds) of airporne inhalable particulates	**0.84**	**0.53**
Annual Weight (pounds) of airborne inhalable particulates	**307.43**	**192.15**
Annual tonnage of airborne inhalable particulates	**0.15**	**0.10**

Conversion				
1 milligram / kilometer = 5.6767939 x 10-5 ounces / mile				
20mg/kilometer =	0.001135359	ounces per mile		
1 ounce =	28349.5231	milligrams		
1 ounce =	28,350,000	micrograms		
1 square miles=	2,590,000	square meters	1609.344	2,589,988.11

	PM2.5		PM10	
Annual Average	24-Hour Average	Annual Average	24-Hour Average	Annual Average
National Ambient Air Quality Standard	12 µg/m3	35 µg/m3	None	150 µg/m3
California Ambient Air Quality Standard	12 µg/m3	None	20 µg/m3	50 µg/m3

SOURCE: https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health. (accesssed 08182023 11:00am Pacific)

Maricopa County Population (2019)	4,410,824
Deaths (total) Maricopa County 2019	32,637
Death Rate	0.740%
Est Total deaths in Scottsdale	1,798.40
	1.853960594

City of Scottsdale land area (square miles)	184.5
City of Scottsdale land area (square meters)	477,855,000
Volume at 2 meters measuring height	955,710,000
Milligrams of PM 2.5/day	382,051.71
Milligrams of PM 2.5/day.cubic meter	2501.520006
Microgramsd of PM 2.5 per 24 hour period	382058138.6
Micrograms per cublic meter	0.40
$PM_{2.5}$ (ug/m^3) =	37.93

"Allsopp_ScottsdaleGIS_Stored Traffic_Counts&Calculations.xlsx"

sourceType sourcetypename

		PM2.5		PM10	
		mg/veh-mile	mg/veh-km	mg/veh-mile	mg/veh-km
11	Motorcycle	0.64	0.4	4.29	2.66
21	Passenger Car	1.28	0.8	8.55	5.32
31	Passenger Truck	1.28	0.8	8.57	5.32
32	Light Commercial Truck	1.37	0.85	9.16	5.69
41	Intercity Bus	3.87	2.4	25.77	16.01
42	Transit Bus	2.35	1.46	15.68	9.74
43	School Bus	2.3	1.43	15.31	9.51
51	Refuse Truck	3.93	2.44	26.19	16.27
52	Single Unit Short-haul Truck	2.25	1.4	15.03	9.34
53	Single Unit Long-haul Truck	2.17	1.35	14.48	9
54	Motor Home	2.21	1.37	14.75	9.16
61	Combination Short-haul Truck	3.81	2.37	25.39	15.78
62	Combination Long-haul Truck	4.13	2.56	27.51	17.1

Source: Brake and Tire Wear Emissions from Onroad Vehicles in MOVES3
US EPA. EPA-420-R-20-014 November 2020

Table 4-2: Data from Luhana et al. (2004) with measurements of tire wear for a variety of trips

	Avg. trip speed	Tire Wt. Loss (per axle)	total wt. loss (per vehicle)	total wt. loss (per vehicle)		avg. speed
vehicle tests	km/hr	Front mean (g/km)	Rear Mean (g/km)	g/km	g/mi	mi/hr
test1-A	90.3	0.0202	0.0092	0.0589	0.0947	56.1
test2-A	90.6	0.0209	0.0126	0.0669	0.1076	56.3
test3-A	93.9	-	0.0069	-	-	58.4
test4-A	92.7	0.0172	0.0086	0.0516	0.083	57.6
test1-B	65.4	0.0298	0.0087	0.077	0.1239	40.6
test2-B	71.9	0.0262	0.0091	0.0705	0.1135	44.7
test3-B	74.4	0.019	0.004	0.0461	0.0742	46.2
test4-B	70.2	0.0297	0.007	0.0735	0.1183	43.6
test1-C	44.5	0.0312	0.0047	0.0718	0.1155	27.7
test2-C	42.9	0.0331	0.0132	0.0925	0.1489	26.7
test3-C	48.8	0.0284	0.0064	0.0697	0.1121	30.3
test4-C	50.4	0.0532	0.0045	0.1153	0.1855	31.3
test3-E	61.3	0.037	0.0104	0.0948	0.1525	38.1
test4-E	65.8	0.0265	0.0109	0.0749	0.1205	40.9

Note: Vehicles A and B were driven mainly on motorways (freeways) Vehicle C was driven on Suburban Roads and Vehicle E was driven mostly on Rural roads

"Scottsdale commuter PM-2.5 calculation.xlsx"

City of Scottsdale Commuters - Sample Data sourced from Sourced from the U.S. Census Bureau's American Community Survey

https://www.geostat.org/data/scottsdale-az/commute

Sample from Census Data

200,059 jobs and roughly 166,549 commute from outside the city

Average Commute Time is 22 minutes.

Average Commute Speed 32 MPH

Sample Size relative to total workforce 49%

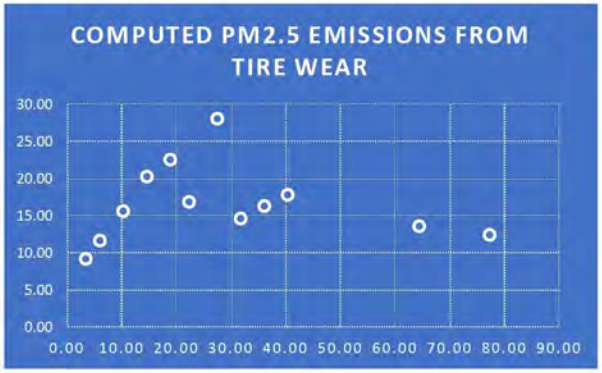
1 mile= 1.609344 **KM**

$PM_{2.5}$ = 8.69 + 0.0473 x VKT (Thousands)1

	Average Commute Time	Numer of commuters	Commuter Vehicle Miles Driven (one way)	One Way Commute Distance (Miles)	Commuter Vehicle KM Driven (one way)	Commuter Vehicle KM /Commuter	Computed $PM_{2.5}$ Emissions from Tire Wear
< 5	4	3097	6607	3.2	10,633	3.43	**9.19**
5-9	7	10378	38745	5.6	62,353	6.01	**11.64**
10-14	12	14215	90976	9.6	146,412	10.30	**15.62**
15-19	17	16774	152084	13.6	244,756	14.59	**20.27**
20-24	22	15498	181843	17.6	292,648	18.88	**22.53**
25-29	26	7721	107065	20.8	172,304	22.32	**16.84**
30-34	32	14878	253918	25.6	408,641	27.47	**28.02**
35-39	37	3927	77493	29.6	124,713	31.76	**14.59**
40-44	42	4456	99814	33.6	160,636	36.05	**16.29**
45-59	47	4774	119668	37.6	192,587	40.34	**17.80**
60-89	75	1610	64400	60	103,642	64.37	**13.59**
90+	90	1023	49104	72	79,025	77.25	**12.43**
		98,351	1,241,717		1,998,349		
	Total volume of $PM_{2.5}$ Inhalable Emissions (ug/m^3) <u>during morning commute hours</u>						**103.21**

https://www.geostat.org/data/scottsdale-az/commute (Accessed 09202023)

"Scottsdale commuter PM-2.5 calculation.xlsx"



CITY OF SCOTTSDALE

Scottsdale Community Sustainability Plan

Work Study Session – November 13, 2023

"Sustainability is a condition of living that enables the present generation to enjoy social wellbeing, a vibrant economy and a healthy environment, without compromising the ability of future generations to enjoy the same."

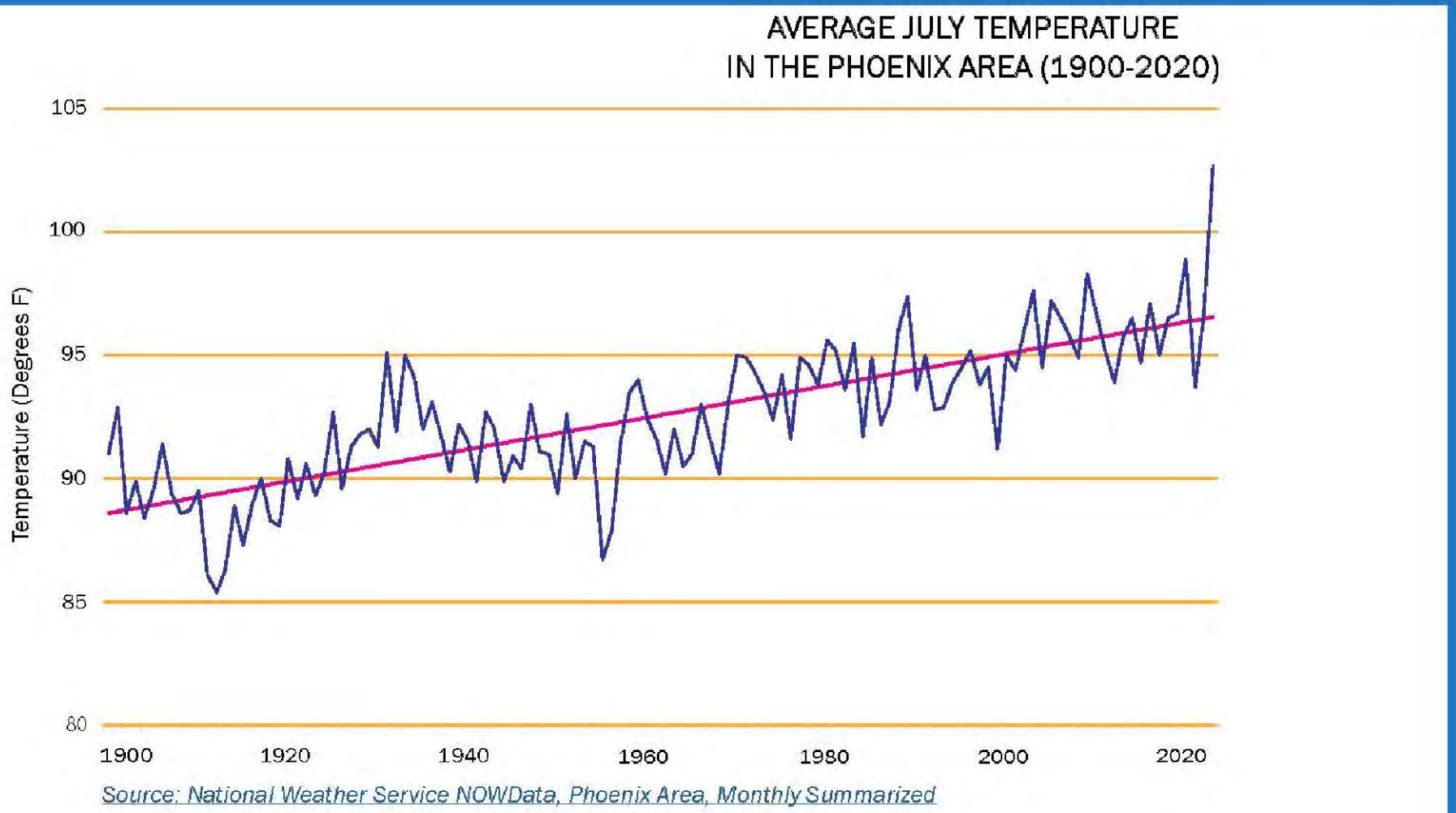
(Scottsdale General Plan 2035, page 280)




Sustainability is not new to Scottsdale

> *"Sustainability is a condition of living that enables the present generation to enjoy social wellbeing, a vibrant economy and a healthy environment, without compromising the ability of future generations to enjoy the same."*
>
> - *Scottsdale General Plan 2035, page 280*

Why A Community Sustainability Plan?


AVERAGE JULY TEMPERATURE
IN THE PHOENIX AREA (1900-2020)
Temperature (Degrees F)
105
100
95
90
85
80
1900
1920
1940
1960
1980
2000
2020
Source: National Weather Service NOWData, Phoenix Area, Monthly Summarized

DAILY AIR QUALITY INDEX (AQI) VALUES: OZONE
PHOENIX-MESA-SCOTTSDALE

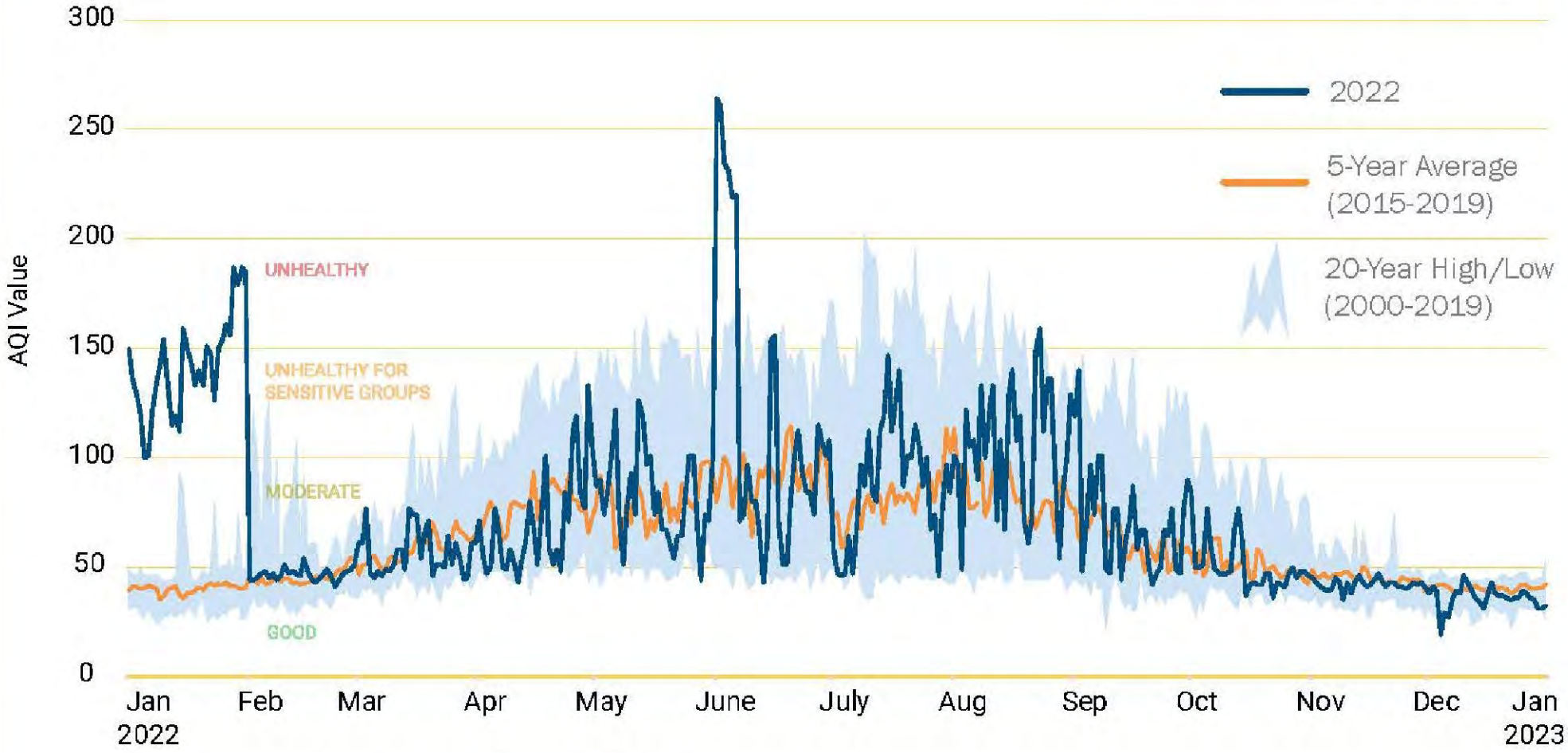
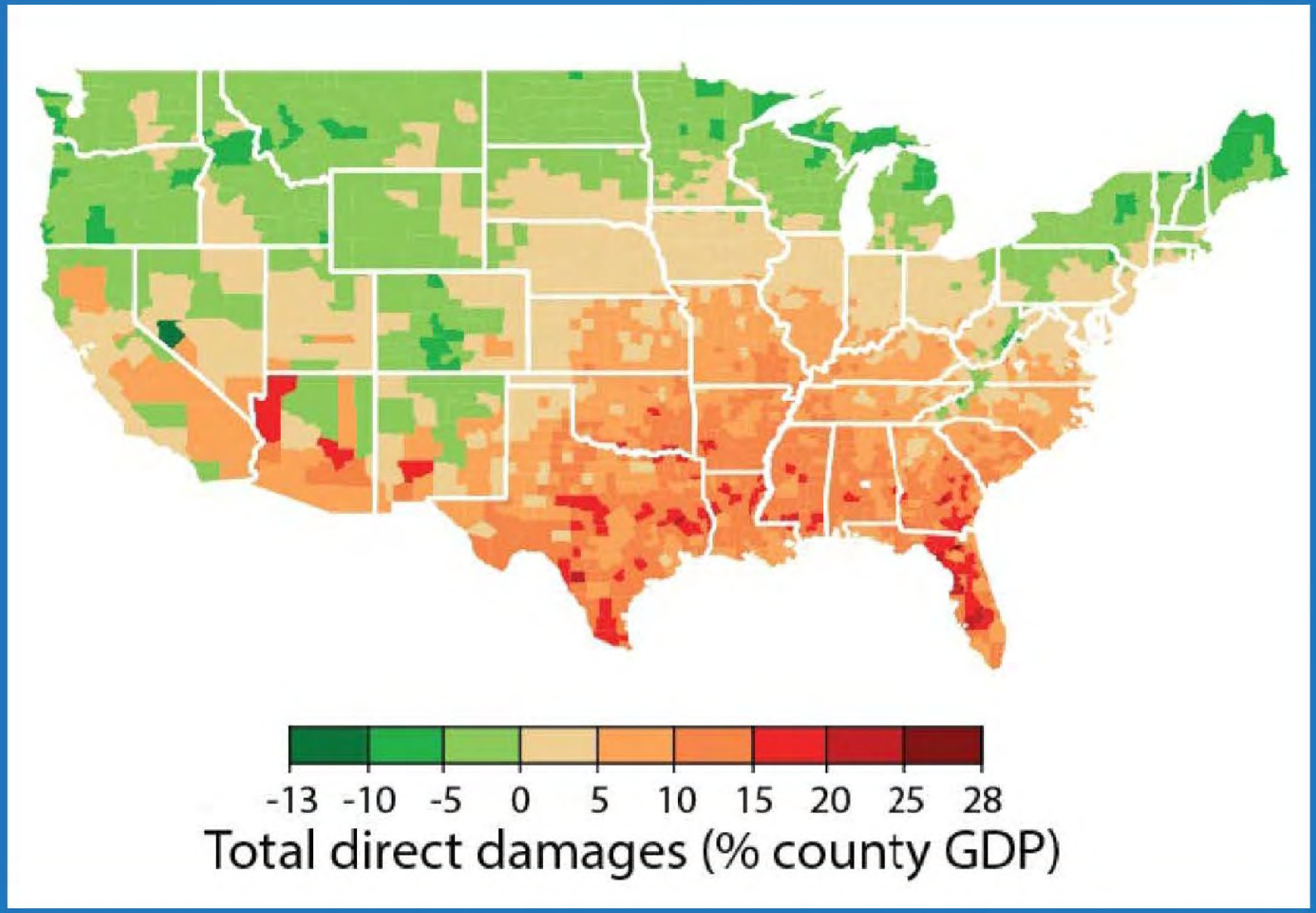


Figure 1. *Source: Air Data - Daily Air Quality Tracker*


-13 -10 -5 0 5 10 15 20 25 28
Total direct damages (% county GDP)

Framework for a Sustainable, Resilient & Thriving Scottsdale

ENERGY

Maximize the use of renewable energy resources, energy efficiency, and responses to climate challenges — **Energy**.

WATER

Conserve, protect, and deliver quality drinking water safely and reliably to the community, now and into the future — **Water**.

WASTE

Develop a circular economy approach for materials management and effective citywide diversion of all waste streams — **Waste**.

AIR QUALITY

Reduce contaminants and pollutants to improve air quality and protect community health — **Air Quality**.

EXTREME HEAT

Ensure that the community prevents, is prepared for, responds to, and recovers from extreme heat and other natural hazards that diminish quality of life or impact the environment — **Extreme Heat**.

Framework

Strategies are goal-oriented and provide general guidance to help us address the Priority. They are carried out through specific Actions.

Indicators allow baselines to be determined and progress to be measured. Indicators link Priorities and **Targets** – defining **where we are today** and **where we would like to be in the future**.

Actions provide specific direction to achieve the Targets.

Implementation sections for each Priority detail when work will be accomplished and who will lead the efforts.

What Happens Next

Time Horizon: Quick Win, 1-3 years, 3-10 years or Ongoing

Lead Agencies & Partners: Additional partners will likely be added during project development

Costs: Costs are estimated and may change during project development or implementation

$ -- **Low** ($0 - $50,000)
$$ -- **Moderate** ($50,001 - $250,000)
$$$ -- **High** (Over $250,000)

Benefits:

- Environmental (air quality, carbon emissions, waste reduction, drought relief)
- Economic ($ savings, attracting businesses and tourism)
- Social (health & safety, quality of life, equity)

What Can You Do?

WHAT IS MY IMPACT?

The CoolClimate Network offers a simple tool to help you understand your personal environmental impact. They even have a version for businesses. Use the calculators to see what kinds of changes you can make to your travel, buildings and shopping and make a pledge take action.

TALK ABOUT IT!

Engage your family, neighbors and co-workers about sustainability. Ask them questions about what concerns them the most and tell them what you're doing to make an impact. According to one source, conversations about the environment "can help people connect over shared values including family, community, health and religion."

LEARN MORE ABOUT WHAT SCOTTSDALE IS DOING

Go to ScottsdaleAZ.gov and search "sustainability" to find out more about the latest initiatives and how you can be part of the solution.

Targets

INDICATOR

Gallons of groundwater treated
(2022 = 1,823 million gallons)

TARGET

Maintain treated groundwater deliveries to Safe Yield levels

Water: Total Use

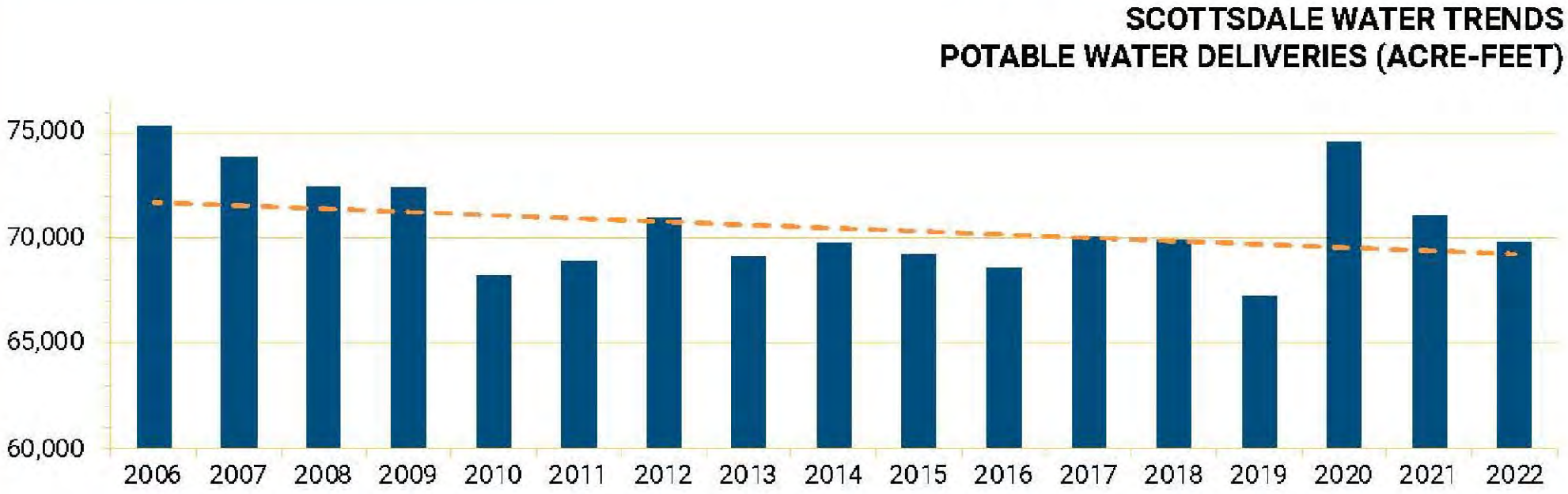


Figure 1. Source: Scottsdale Water

Water: Use by Customer Type

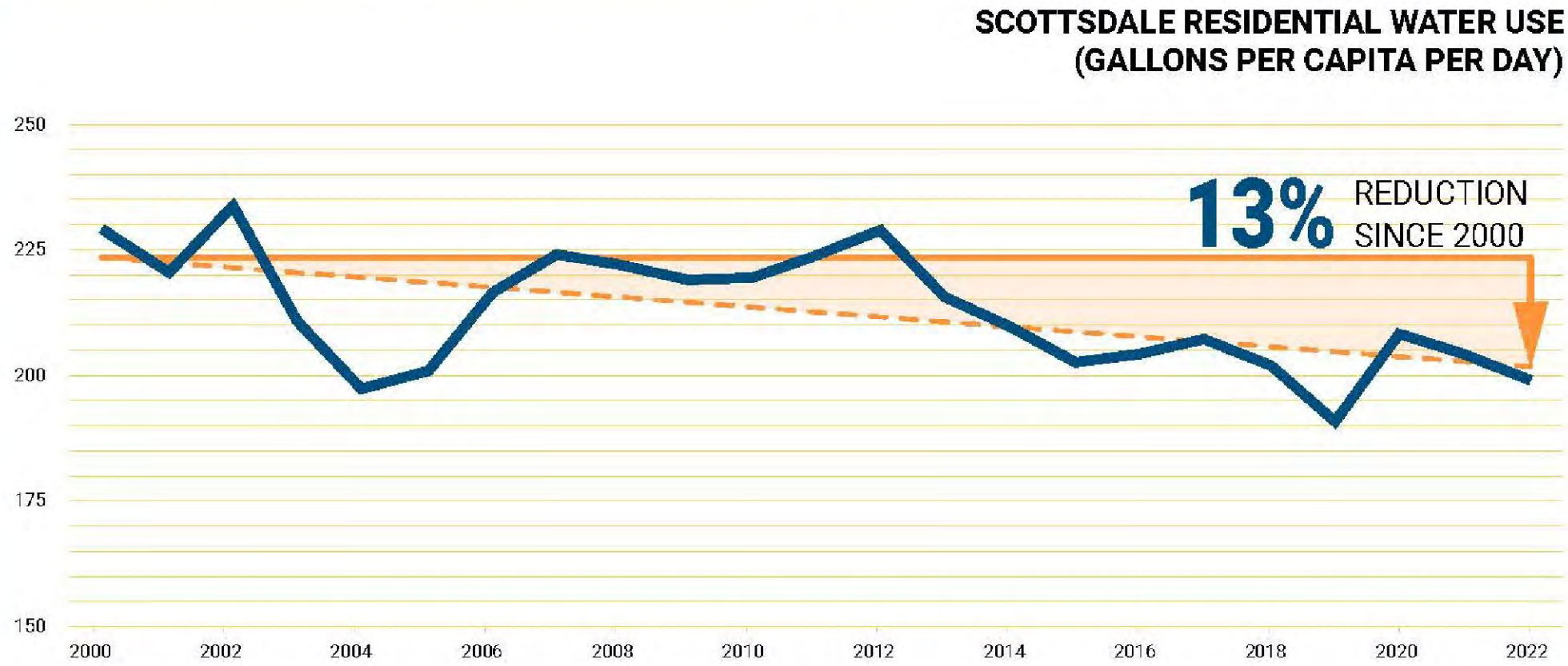
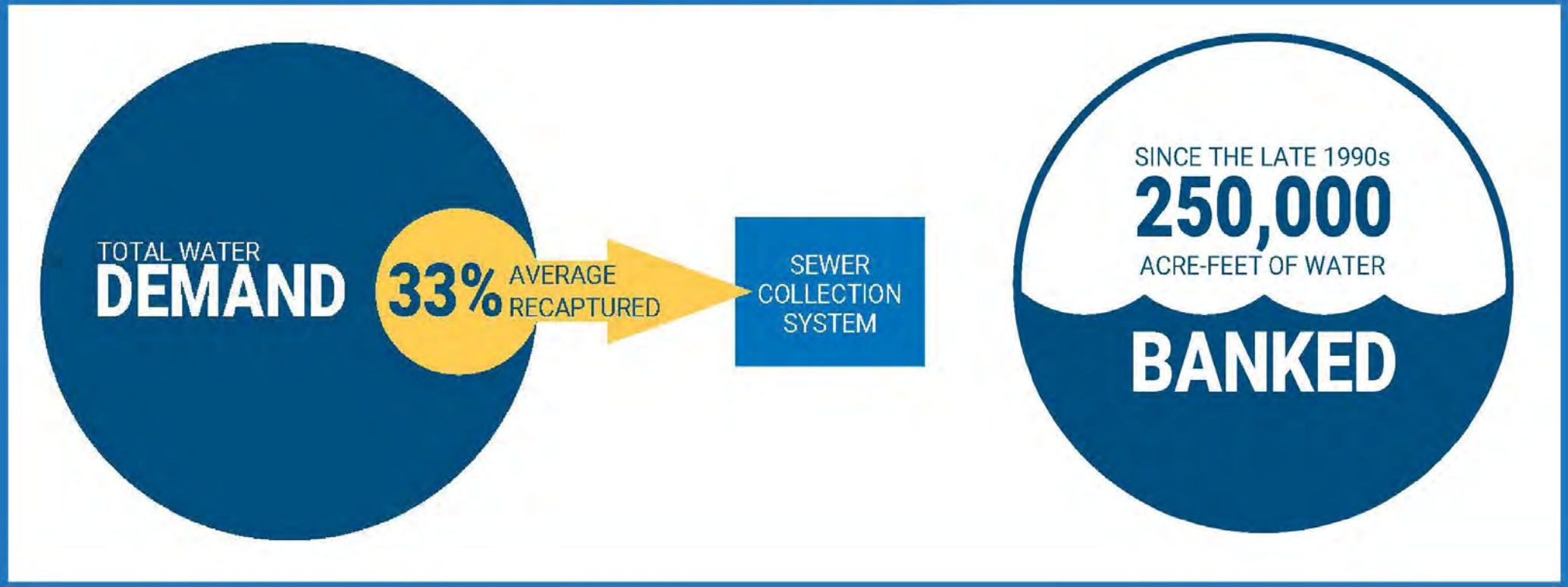
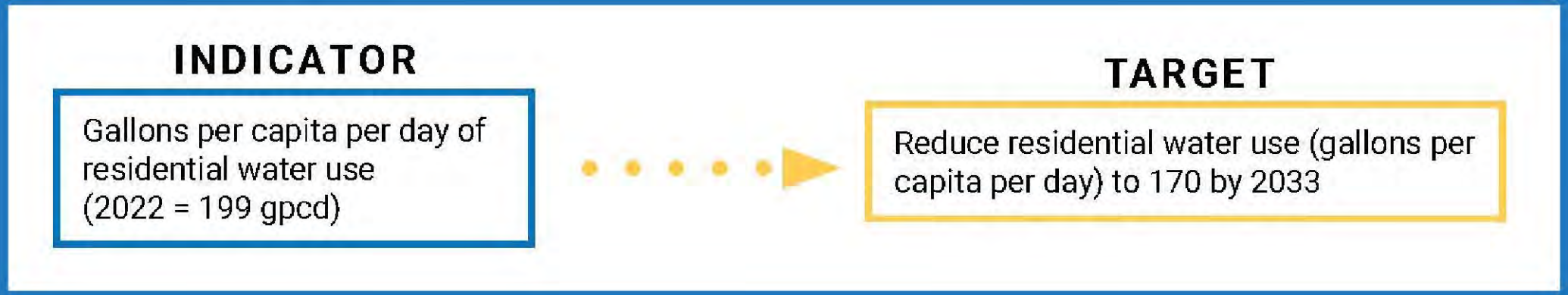


Figure 2. *Source: Scottsdale Water*

Water: Recharge & Banking



Water: Residential Use Target



Water: Municipal Use Target

INDICATOR	TARGET
Gallons of municipal water use (2022 = 438,172,762 gallons)	Reduce municipal potable water use by an additional 5% relative to 2022 by 2027

Water: HOA Irrigation Use Target

Water: Commercial Use Target

Water: Return Flow Target

INDICATOR

Return flow or wastewater captured in the sewer collection system (2022 = 33% of total potable water demand)

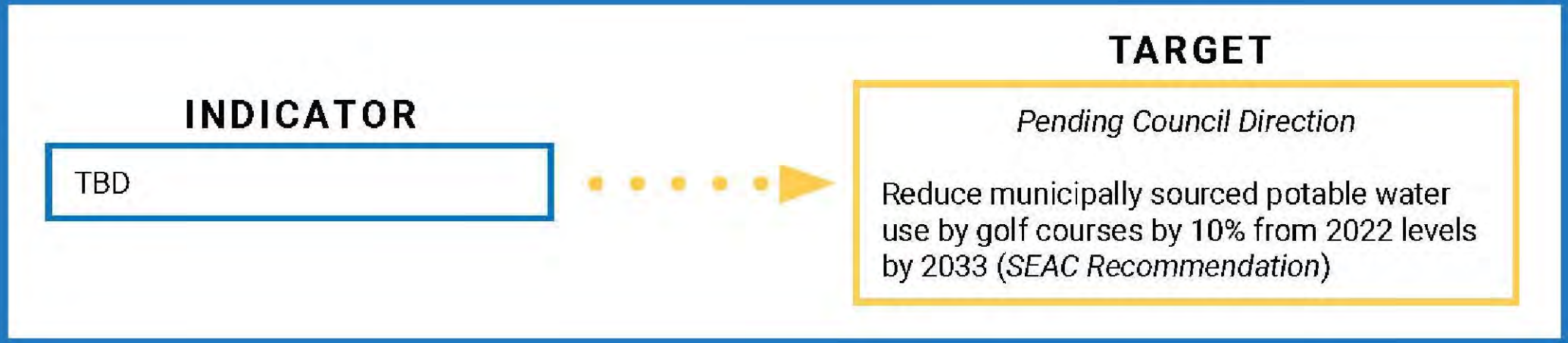
TARGET

Increase return flow percentage by 10% by 2033, capturing indoor/outdoor efficiency for both residential and commercial customers

Water: Banking & Treatment Targets

INDICATOR	TARGET
Gallons of water recharged in aquifer (2022 = 250,000 acre feet)	Maximize annual water banking
Gallons of groundwater treated (2022 = 1,823 million gallons)	Maintain treated groundwater deliveries to Safe Yield levels

Water: Golf Course Use Target



Water: Strategies & Actions

ACTION	TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY WTR 1 **Ensure water system resiliency.**				
WTR 1.1 Communicate the benefits of registering for WaterSmart.	On-going	**Lead**: Water **Partners**: Customers	$	Customer savings
WTR 1.2 Encourage removal of privately-owned turf.	On-going	**Lead**: Water **Partners**: Customers, HOAs, landscapers	$-$$	Customer savings

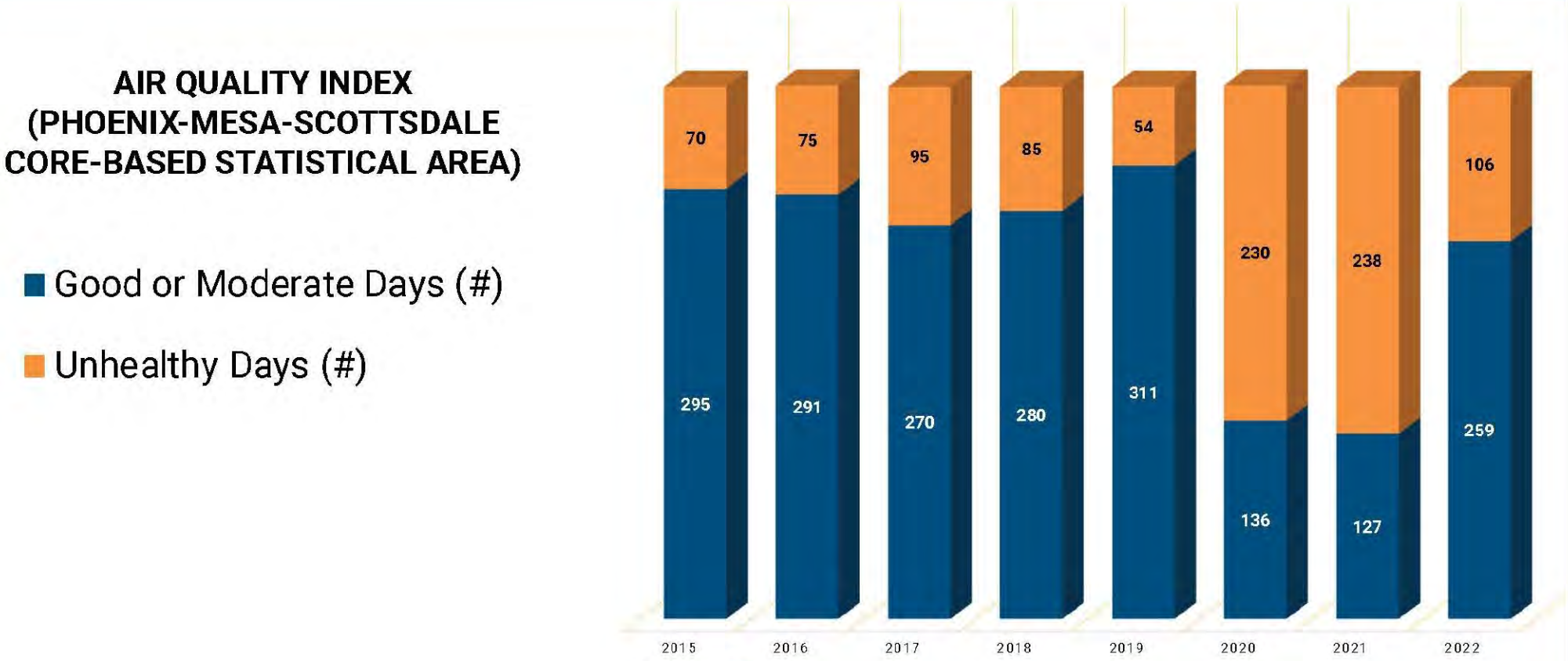
ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY WTR 1 **Ensure water system resiliency.**					
WTR 1.1	Communicate the benefits of registering for WaterSmart.	On-going	**Lead**: Water **Partners**: Customers	$	Customer savings
WTR 1.2	Encourage removal of privately-owned turf.	On-going	**Lead**: Water **Partners**: Customers, HOAs, landscapers	$-$$	Customer savings
WTR 1.3	Promote improvements to irrigation equipment and plumbing fixtures.	On-going	**Lead**: Water **Partners**: Customers, HOAs, landscapers	$	Customer savings
WTR 1.4	Expand HOA water conservation programs.	On-going	**Lead**: Water **Partners**: HOAs	$-$$	Customer savings
WTR 1.5	Utilize Scottsdale Sustainable Water Management Principles in development review.	Quick win	**Lead**: Water **Partners**: Developers	$	Customer savings

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY WTR 1 **Ensure water system resiliency.**					
WTR 1.6	Showcase and benchmark water efficient buildings & landscaping.	On-going	**Lead**: Water **Partners**: Customers, developers, landscapers	$	Customer savings
WTR 1.7	Encourage sustainable site development strategies.	On-going	**Lead**: Water, OEI **Partners**: Residents, developers	$	Nature Reduced flooding
WTR 1.8	Develop commercial water efficient business practice.	1-3 years	**Lead**: Water **Partners**: Commercial customers	$-$$	Customer savings
WTR 1.9	Convert water meters to Automatic Meter Infrastructure.	On-going	**Lead**: Water **Partners**: Customers	$	Municipal savings
WTR 1.10	Conduct HOA water efficiency consultations.	5-10 years	**Lead**: Water **Partners**: HOAs	$	Customer savings

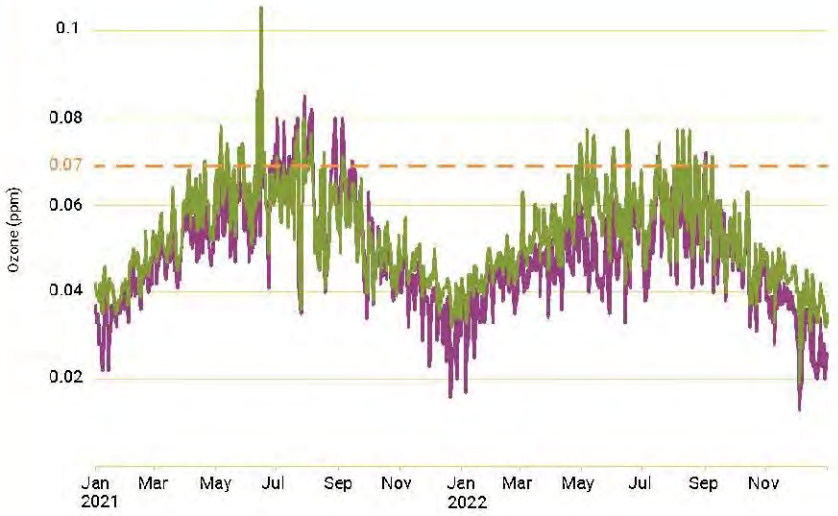
ACTION	TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY WTR 2 Reduce municipal water use.				
WTR 2.1 Remove non-functional/ non-recreational turf at city facilities and retrofit municipal irrigation systems to smart controllers.	On-going	**Lead**: Parks & Rec	$-$$	Municipal savings
WTR 2.2 Monitor leaks and implement advanced drip irrigation systems.	On-going	**Lead**: Parks & Rec	$	Municipal savings
WTR 2.3 Maintain high-efficiency toilets and faucets in city buildings.	On-going	**Lead**: Facilities	$	Municipal savings
WTR 2.4 Install new cooling tower controllers in municipal facilities.	Quick win	**Lead**: Facilities	$	Municipal savings

Air Quality: Unhealthy Air Days

AIR QUALITY INDEX (PHOENIX-MESA-SCOTTSDALE CORE-BASED STATISTICAL AREA)



Source: EPA



OZONE 8-HR MAXIMUMS 2021 - 2022

South Scottsdale 8-Hr Max.

Pinnacle Peak 8-Hr Max.

8-Hr Avg. National Ambient Air Quality Standard

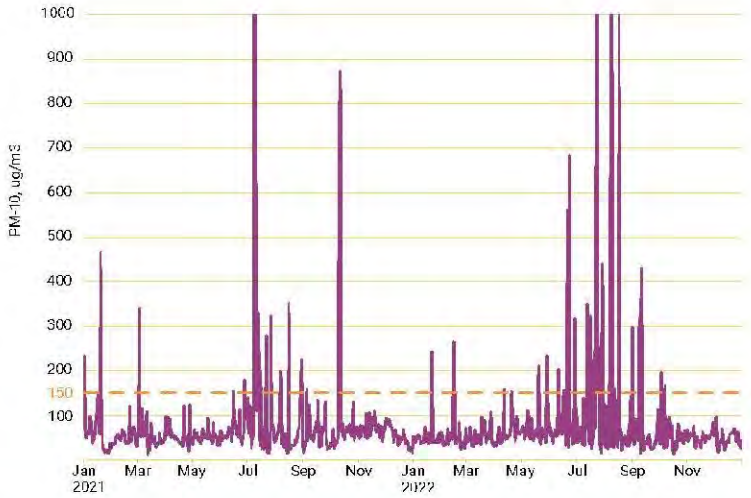
Figure 1.
Source: Maricopa County Department of Air Quality

PM-10 DAILY MAXIMUMS 2021 - 2022

South Scottsdale PM-10 Daily Max.

24-Hr National Ambient Air Quality Standard

Figure 2.
Source: Maricopa County Department of Air Quality

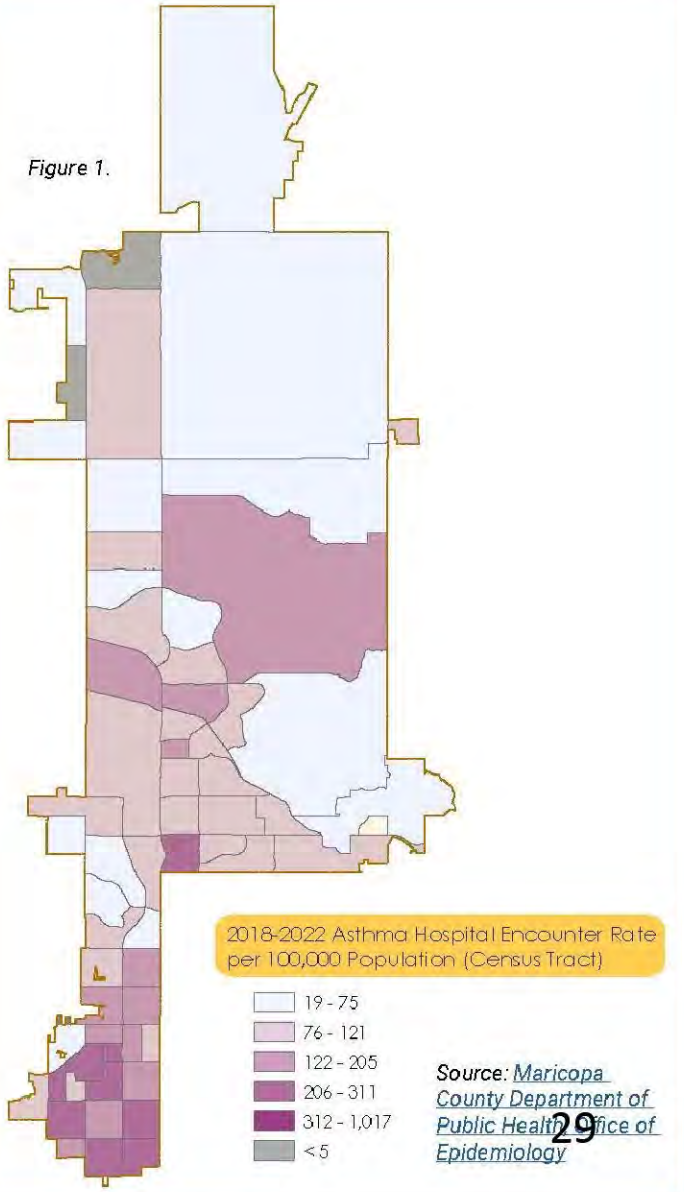


Air Quality: Health-Related

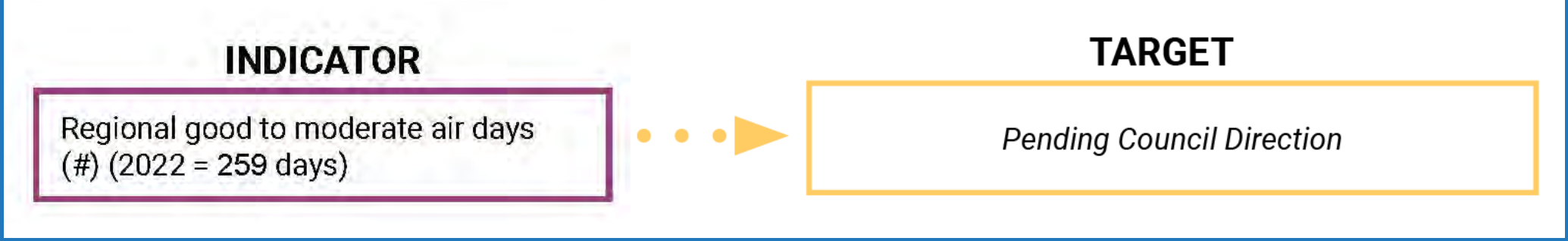
Table 1. Incidents among Scottsdale residents, per 100,000 population

	2018	2019	2020	2021	2022
Asthma illnesses	210.1	196.7	115.3	121.6	156.1
COPD illnesses	335.7	287.7	185.5	148.2	163.5
COPD deaths	50.0	61.9	57.7	47.8	N/A
Heart disease illnesses	2,766.8	2,740.6	2,375.0	2,678.5	2,755.7
Heart disease deaths	217.5	224.3	231.0	251.0	N/A

Figure 1.

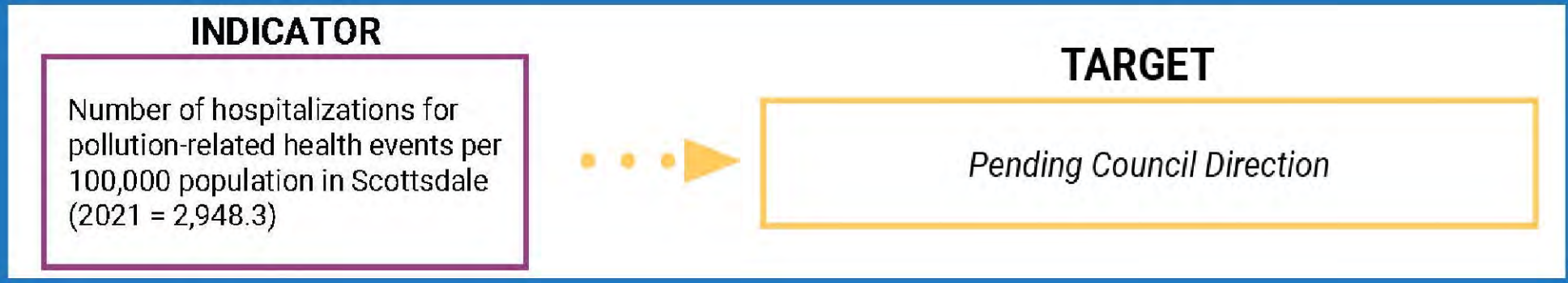


Air Quality: Unhealthy Air Days Target



Staff Recommendation	SEAC Recommendation
Eliminate unhealthy air days in Scottsdale	Eliminate unhealthy air days in Scottsdale by 2030

Air Quality: Health-Related Target



Staff Recommendation	SEAC Recommendation
Cut hospitalizations for pollution related health events in Scottsdale in half	Cut hospitalizations for pollution related health events (per 100,000 population) in Scottsdale by 50% from 2022 levels by 2035

Air Quality: Municipal Fleet Fuel Use Target

INDICATOR

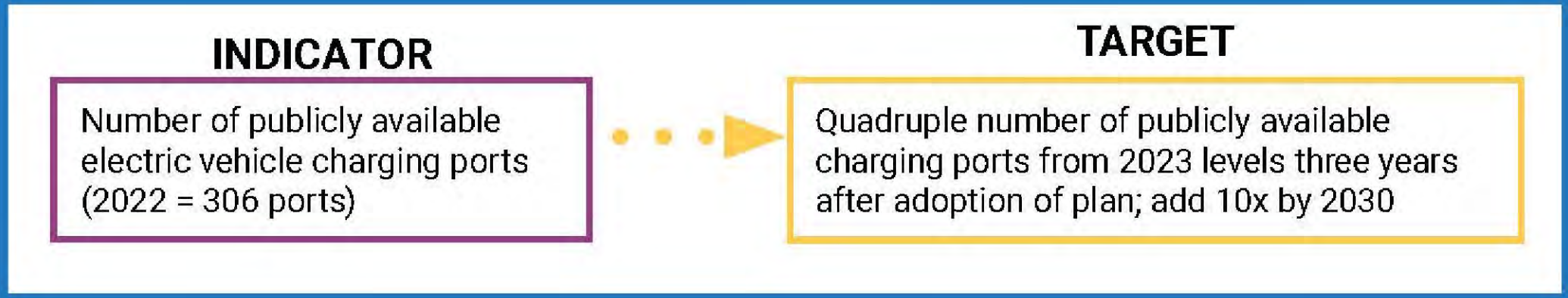
Gallons of gasoline, diesel and CNG used in municipal vehicles (2022 = 1,389,541 gallons)

TARGET

Pending Council Direction

Staff Recommendation	SEAC Recommendation
Reduce municipal fleet fuel use by 10% from 2023 levels by 2030 & 40% by 2050	Reduce municipal fleet fuel use by 30% from 2023 levels by 2030 & 100% by 2040

Air Quality: Electric Vehicle Charging Ports Target



Air Quality: Strategies & Actions

ATTACHMENT 1

DRAFT

36 IMPLEMENTATION - AIR QUALITY

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY AQ 1 **Clean Scottsdale's air.**					
AQ 1.1	Participate in regional efforts.	On-going	**Lead**: OEI **Partners**: Maricopa County	$	Health
AQ 1.2	Expand education/outreach about air quality.	Quick win	**Lead**: OEI **Partners**: Residents, businesses, employees	$	Health
AQ 1.3	Encourage replacement of existing wood-burning units.	1-3 years	**Lead**: OEI **Partners**: Residents, developers	$	Health

Air Quality: Strategies & Actions

ATTACHMENT 1

DRAFT

36 IMPLEMENTATION - AIR QUALITY

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY AQ 1 **Clean Scottsdale's air.**					
AQ 1.4	Continue requirement of dust control plans for special events.	On-going	**Lead**: Tourism **Partners**: Event planners	$	Health
AQ 1.5	Promote Maricopa County program to convert gas to electric yard equipment.	Quick win	**Lead**: OEI **Partners**: Maricopa County	$	Health
AQ 1.6	Promote and enhance the municipal Travel Reduction Program.	On-going	**Lead**: Transportation & Streets **Partners**: Employees, Maricopa County, Valley Metro	$	Health Fuel savings
AQ 1.7	Create education campaigns related to vehicle idling and parking on unpaved lots.	On-going	**Lead**: OEI, Transportation & Streets	$	Health Fuel savings

Air Quality: Strategies & Actions

DRAFT

ATTACHMENT 1

IMPLEMENTATION - AIR QUALITY 37

ACTION		TIME HORIZON	LEAD AGENCY(IES) & PARTNERS	COSTS	BENEFITS
STRATEGY AQ 2 **Support adoption of electric vehicles and other alternative fuel vehicle.**					
AQ 2.1	Advertise locations of publicly available EV charging stations.	Quick win	**Lead**: OEI	$	Health Fuel savings
AQ 2.2	Develop a plan for purchasing additional alternate fuel vehicles.	3-10 years	**Lead**: Fleet **Partners**: Other city departments	$-$$$	Health Municipal savings
AQ 2.3	Create an EV charging infrastructure plan.	1-3 years	**Lead**: OEI **Partners**: Other city departments	$-$$	Health Fuel savings

Sustainability Plan: Background & Timeline

2021

- Implementation priority of voter-approved General Plan 2035
- Groundwork by ASU's Walton Sustainability Solution Service

2022

- Input from Scottsdale Environmental Advisory Commission (SEAC)
- Community meetings in August & October and an online survey
- September City Council Work Study Session
- Presentations to and input from other Boards and Commissions

Sustainability Plan: Timeline (continued)

2023

- Council direction from March and July WSS included:
  - Focus on five areas: energy, heat, air quality, water, and waste
  - Collect baseline data and set concrete goals
  - Work with SEAC and internal staff team
  - Use narratives that will tell a story about why sustainability is important
  - Avoid repetition of items already discussed in other documents, such as the General Plan
  - Work toward a June 2024 adoption date, with draft plan sections vetted at 2 intervening Council work study sessions

Next Steps: Timeline and Process

Summer/Fall 2023

- Update plan and draft targets
- Complete data collection and analysis
- Continued Commission input

November 2023 – March 2024

- Review by Commission, staff, and external experts
- Updated plan vetted during 2 Council work study sessions

April – May 2024

- Additional public input
- Commission recommendation

June 2024: Council adoption

Questions/Direction to Staff

November 2, 2023

Lisa McNeilly
Sustainability Director
City of Scottsdale
3939 N. Drinkwater Blvd.
Scottsdale, AZ 85251

Dear Lisa,

Thank you for the opportunity to comment on the City of Scottsdale's Community Sustainability Plan. With the region's challenges in meeting the EPA National Ambient Air Quality Standards for ozone and dust (PM 10), the Maricopa County Air Quality Department (MCAQD) appreciates the inclusion of the Plan's Air Quality Section.

The collaboration between community members and government agencies is vital in safeguarding the well-being of residents and the environment. With shared goals of a cleaner and healthier future for our residents, we can work together to improve air quality through education, regulation, incentives, and initiatives.

Improving air quality requires collective action, and the inclusion of an Air Quality Section is an important step in raising awareness in the community and helps encourage people to embrace daily habits that contribute to cleaner air.

Sincerely,

Philip McNeely
Director

Air Quality Department
Office of the Director
301 W. Jefferson St., Suite 410
Phoenix, Arizona 85003

P: 602-506-6443
E: Philip.McNeely@maricopa.gov

Meeting Date: November 13, 2023

Item No. WS02 – Scottsdale Community Sustainability Plan

Additional Public Comments