MEMORANDUM

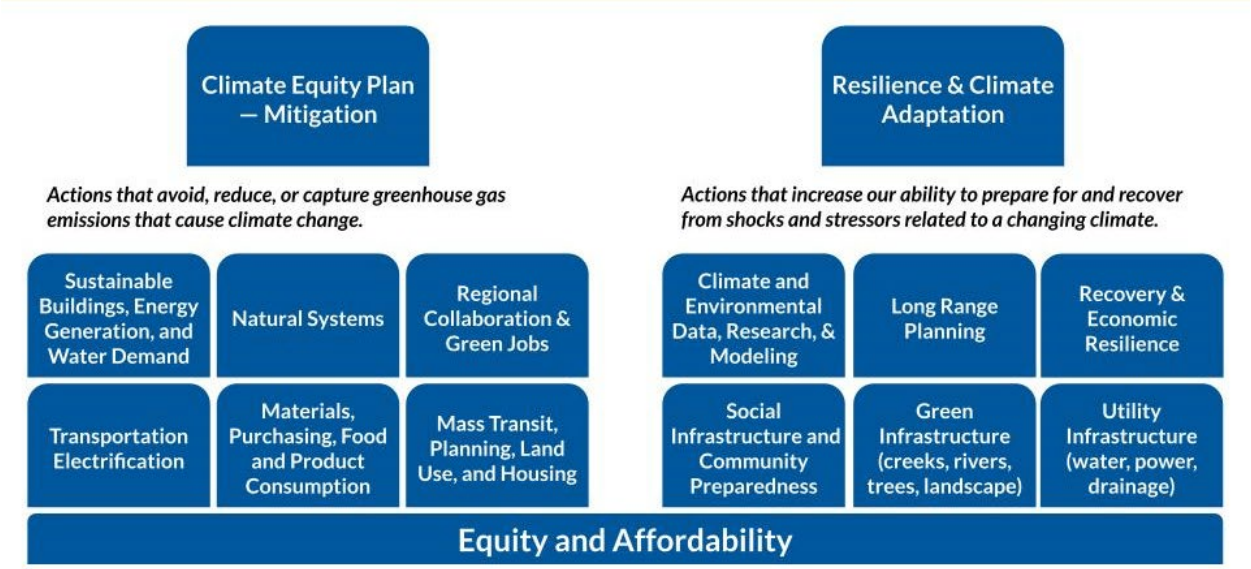
TO: Mayor and Council Members

FROM: Jesús Garza, Interim City Manager

DATE: February 14, 2024

SUBJECT: **Climate Equity and Resilience Framework**

For more than 15 years, the City of Austin has actively taken steps to address climate change, but there is a clear and pressing need to elevate the urgency in tackling all aspects of this challenge. Therefore, a key initiative for the City in 2024 is to establish a Climate Equity and Resilience Framework. The framework simplifies and clarifies our approach to the challenge of climate change, ensuring that we are addressing all angles of the problem across the City organization while balancing three critical components through the lens of equity: environmental sustainability through the reduction of emissions towards net-zero by 2040, increasing our resilience to shocks and stressors, and affordability. This framework, illustrated in the graphic below with 12 areas of activity, will also help us ensure that City projects and plans already underway and going forward are addressed with a holistic approach to create synergy, achieve balance, and deliver effective solutions to such large challenges.



The framework's "Climate Equity Plan – Mitigation" section includes actions that avoid, reduce, or capture greenhouse gas emissions that cause climate change and is guided by the Austin Climate Equity Plan, adopted by the Austin City Council in September 2021. The "Resilience and Climate Adaptation" section focuses on actions that increase our ability to prepare for and recover from shocks and stressors like extreme heat, drought, flooding, wildfire, and severe winter weather related to a changing climate and is guided by the Climate Resilience Plan for City Assets and Operations. Finally, our approach to addressing these two challenges is underpinned by addressing inequities and increasing affordability, so we can keep Austin a safe and livable City for everyone.

Finally, it's important to remember that the City doesn't hold all of the levers to solve these global challenges. In some areas we have direct control, others we can influence and incentivize change, and in many areas our influence is small. Keeping focused on the programs, projects, and investments where we can leverage our actions to deliver the largest result is key to ensuring we're being as efficient and as effective as possible.

Current staff memos and framework alignment:
Attached to this memo are four updates on recent staff responses to City Council direction that highlight current efforts that connect across the Climate Equity and Resilience Framework.

- **Response to Resolution 20230126-054, Analysis of the Kunming-Montreal Global Biodiversity Framework**
  - *Framework Alignment: Climate Equity: Natural Systems; Resilience: Green Infrastructure*
- **Update on the State of the Environment Report**
  - *Framework Alignment: Climate Equity: Natural Systems; Resilience: Green Infrastructure*
- **Final Staff Report on Resolution 20230420-024, Plan to Transition All Future City Contracts and Projects to Low Embodied Carbon Concrete**
  - *Framework Alignment: Climate Equity: Materials, Purchasing, Food and Product Consumption; Resilience: Utility Infrastructure*
- **Staff Update on Meeting with TxDOT about Greenhouse Gas Reduction Strategies for the I-35 Central Project (Resolution 20231019-045)**
  - *Framework Alignment: Climate Equity: Transportation, Planning, Land Use & Housing; Resilience: Utility Infrastructure*

Going forward, we will bring quarterly presentations to City Council Work Sessions on topics that align with this framework. In addition, staff will update Mayor and Council regarding efforts in areas related to the framework such as the Austin Energy Resource, Generation, and Climate Protection Plan to 2030 and Austin Water's Water Forward Plan, demonstrating our commitment and focus on making progress in both areas with increased urgency.

cc: Susana Carbajal, Chief of Staff
Robert Goode, Assistant City Manager
Zach Baumer, Interim Chief Sustainability Officer

Attachments

MEMORANDUM

TO: Mayor and Council Members

THROUGH: Robert Goode, P.E., Assistant City Manager

FROM: Jorge L. Morales, P.E., CFM, Director
Watershed Protection Department

DATE: February 14, 2024

SUBJECT: **Analysis of Kunming-Montreal Global Biodiversity Framework** (Resolution Number 20230126-054)

Background

Resolution Number 20230126-054 directs the City Manager to analyze elements of the Kunming-Montreal Global Biodiversity Framework's 23 Targets with the goal of aligning Strategic Direction 28 (SD28) and relevant existing and proposed plans with applicable elements of the 23 targets. Analysis was conducted by the Watershed Protection Department (WPD) with coordination supportfrom the Office of Sustainability.

A list of the 23 Global Biodiversity Targets is available at Press Release: Nations Adopt Four Goals, 23 Targets for 2030 In Landmark UN Biodiversity Agreement - United Nations Sustainable Development.

City of Austin Plans and Kunming-Montreal Global Biodiversity Framework Analysis Summary and Recommendations

The resolution specified five City of Austin plans to include in the study. Staff also identified eight additional plans to include in this study.

- Identified in Resolution
  - Austin Climate Equity Plan
  - Rain to River Strategic Plan (currently being developed)

        - Austin Urban Forest Plan
        - Climate Resilience Action Plan for City Assets and Operations
        - Imagine Austin
    - Additional plans identified by staff
        - U.S. Fish and Wildlife Service's Habitat Conservation Plan
        - Invasive Species Management Plan
        - Balcones Canyonlands Preserve Land Management Plan
        - Water Quality Protection Lands Land Management Plan
        - Water Forward
        - Our Parks, Our Future
        - Watershed Protection Strategic Plan (this plan was used in place of the Rain to River Strategic Plan which is currently being developed)
        - Urban Trails Plan
        - Austin/Travis County Community Wildfire Protection Plan

- Findings:
    - All of the Biodiversity Targets were referenced in at least one of the City plans evaluated. Some of the references were more directly related to the intent of the Biodiversity Targets while some were only partially reflected.
    - Of the 23 UN Biodiversity Targets: seven were reflected in more than one City Plan, ten were reflected in at least one City plan, and six were only partially reflected in plans.
    - Biodiversity Targets with the least correlation with existing City Plans either have elements that may be beyond the zone of control for City government or have a stronger focus on equity centered representation in decision-making than existing City plans.

- Recommendations
    - The City of Austin's Environmental Officer, Katie Coyne, will share the results of this analysis with the Environmental Commission.
    - WPD and the Office of Sustainability will share the cross comparison of existing plans to the UN Biodiversity Targets with departments whose plans were studied and will recommend that the plans incorporate applicable biodiversity targets as they are updated.
    - Relevant departments should invite the Equity Office to participate in the review process of plan updates to lead with racial equity and to determine the ability to incorporate targets from the UN Biodiversity Targets that include a focus on indigenous peoples, local communities, gender-responsive practices, persons with disabilities, and people in vulnerable situations.
    - The Environmental Officer and Sustainability Officer will establish a cross-departmental Biodiversity work group.
    - City scientists should explore options like statistical modeling, remote sensing and eDNA methods to develop a citywide biodiversity monitoring method.

cc: Jesús Garza, Interim City Manager
Zach Baumer, Interim Chief Sustainability Officer
Joel Baker, Fire Chief, Austin Fire Department
Shay Roalson, Director, Austin Water Department
José Roig, Director, Development Services Department
Kimberly Mcneeley, Director, Parks and Recreation Department
Richard Mendoza, Director, Transportation and Public Works Department
Katie Coyne, Environmental Officer, Assistant Director, Watershed Protection Department

M E M O R A N D U M

TO: Mayor and Council Members

THROUGH: Robert Goode, P.E., Assistant City Manager

FROM: Jorge L. Morales, P.E., CFM, Director
Watershed Protection Department

DATE: February 14, 2024

SUBJECT: **Update on the State of Our Environment Report**

This memo is to provides an update on the State of Our Environment Report.

Background

On June 13, 1996, the City Council approved an ordinance directing the City Manager to appoint an Environmental Officer to ensure that environmental protection is given the highest priority and to produce an annual report regarding the state of Austin's environment. This requirement is codified in Austin City Code 25-1-45(C).

From 1997 to 2009, the report was produced as a highly technical printed and bound document. It focused on issues including air quality, water quality, open space, solid waste/hazardous wastedisposal, energy, and water and contained detailed summaries about the programs and initiatives on these topics.

From 2010 to 2017, there was an effort to streamline the content into a condensed booklet with more photos and graphics about key environmental indicators. During that time, topics focused on Austin's water, urban forest, open space, and air quality.

From 2018 to 2021, a web-based version of the report was piloted to make the report more accessible and dynamic. It included a dashboard with charts and graphs about key environmental indicators for Austin's natural resources and how they have changed over time, plus a feature story focusing on an important environmental topic or issue impacting residents each year. A Spanish version was also made available online. The online platform and content have continued to evolve based ontechnological updates and feedback from our interdepartmental contributors and community stakeholders. The most recent online update was conducted in 2021 and is available at austintexas.gov/environment2021.

2022 and Future Plans

In 2022, staff began exploring options to automate data on the online platform and revisited the content and format. Currently, an interdepartmental team is working on a new pilot version of the online dashboard that will be available in early summer 2024.

A memo and presentation to Mayor and Council highlighting key components of the annual State of Our Environment will be available each spring. Staff have started developing the 2023 State of our Environment plans to be complete in May 2024.

To advance an opportunity for vision and planning for climate and environmental issues cross-departmentally, we are considering a Climate and Environmental Summit to be conducted with City senior and executive staff on an annual basis. A vision and planning document focused on the City's cross-departmental environmental goals would be produced through the Summit and updated every five years to help guide what is included in future State of Our Environment Reports.

The enclosed presentation highlights information for 2022 including climate change, air quality, parks and open space, ecological restoration, urban forest, water, biodiversity, and endangered species.

If you would like additional information or have feedback on the report, please contact Katie Coyne at 512-968-5176 or Katie.Coyne@austintexas.gov.

cc: Katie Coyne, Environmental Officer, Assistant Director, Watershed Protection Department

2022 State of Our Environment

Content

- Climate Change
- Air Quality
- Parks and Open Space
- Ecological Restoration
- Urban Forest
- Water
- Biodiversity
- Endangered Species

New Climate Projections

The City recently released updated climate projections around future **heat, cold, rainfall, and wind** impacts.

Discover the latest climate projections to understand how climate change will shape the city's future weather patterns.

Recent projections for Austin indicate a future characterized by hotter summers, more frequent heatwaves, and longer cold spells. As the climate shifts, we can anticipate a decrease in the number of cold days while heatwaves become more common. Additionally, Austin will likely experience more extreme rainfall and fewer calm days, making way for windier conditions.

These projections have been meticulously calculated and analyzed by a team at the Jackson School of Geosciences at the University of Texas at Austin. Using both high and low-emission scenarios, these experts have outlined the potential outcomes based on different paths of human activity. A "high-emission scenario" refers to a situation where emissions from human activities keep increasing rapidly. A "low-emission scenario" envisions a path where our emissions decrease instead.

Explore the information below or read the full technical report to understand how climate change will impact Austin.

Heat

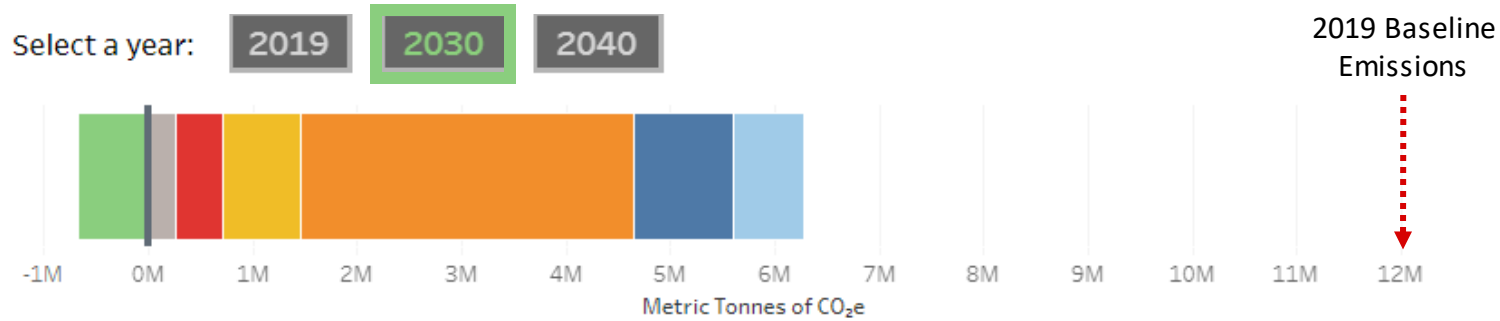
Average, minimum, and maximum daily temperatures are projected to rise.

Cold

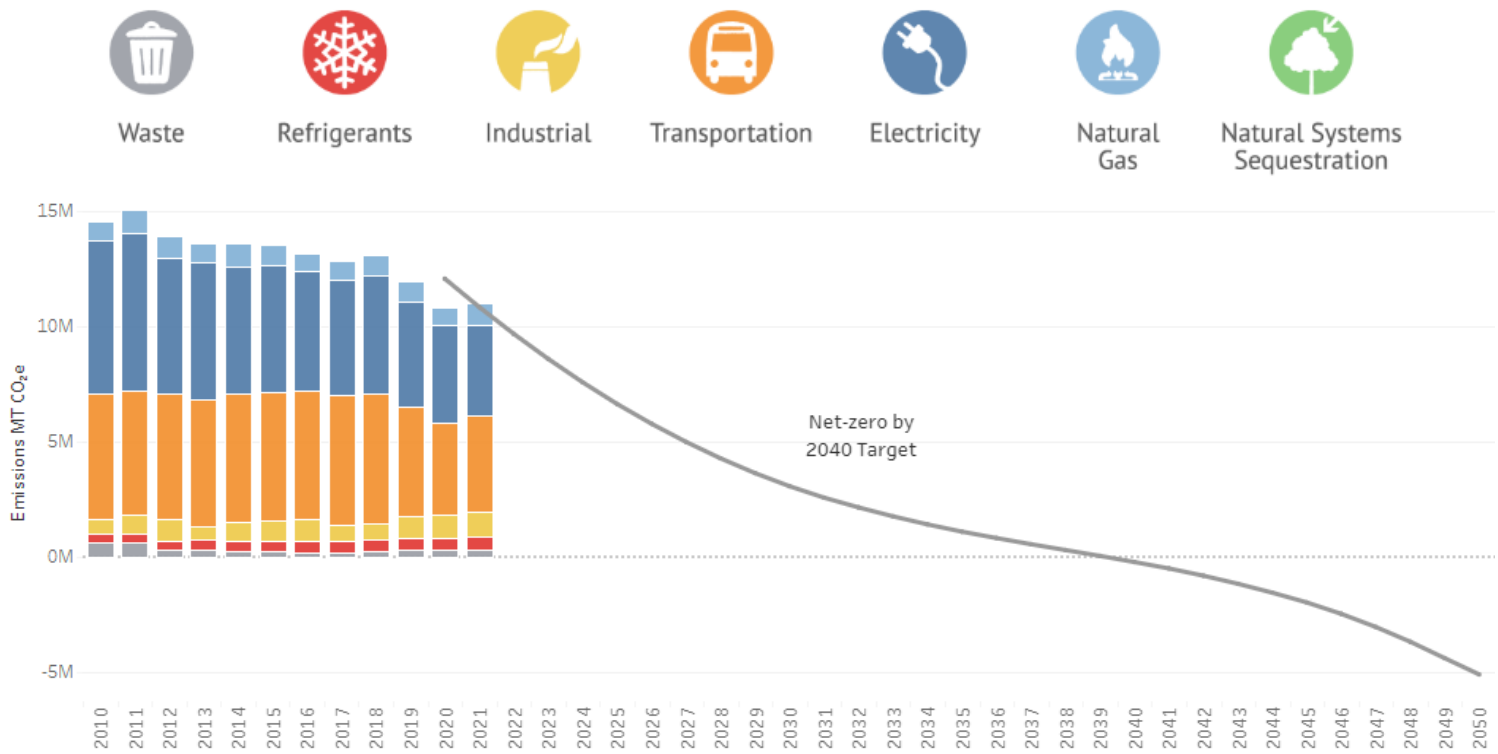
Fewer cold spells are expected, but they are projected to last longer.

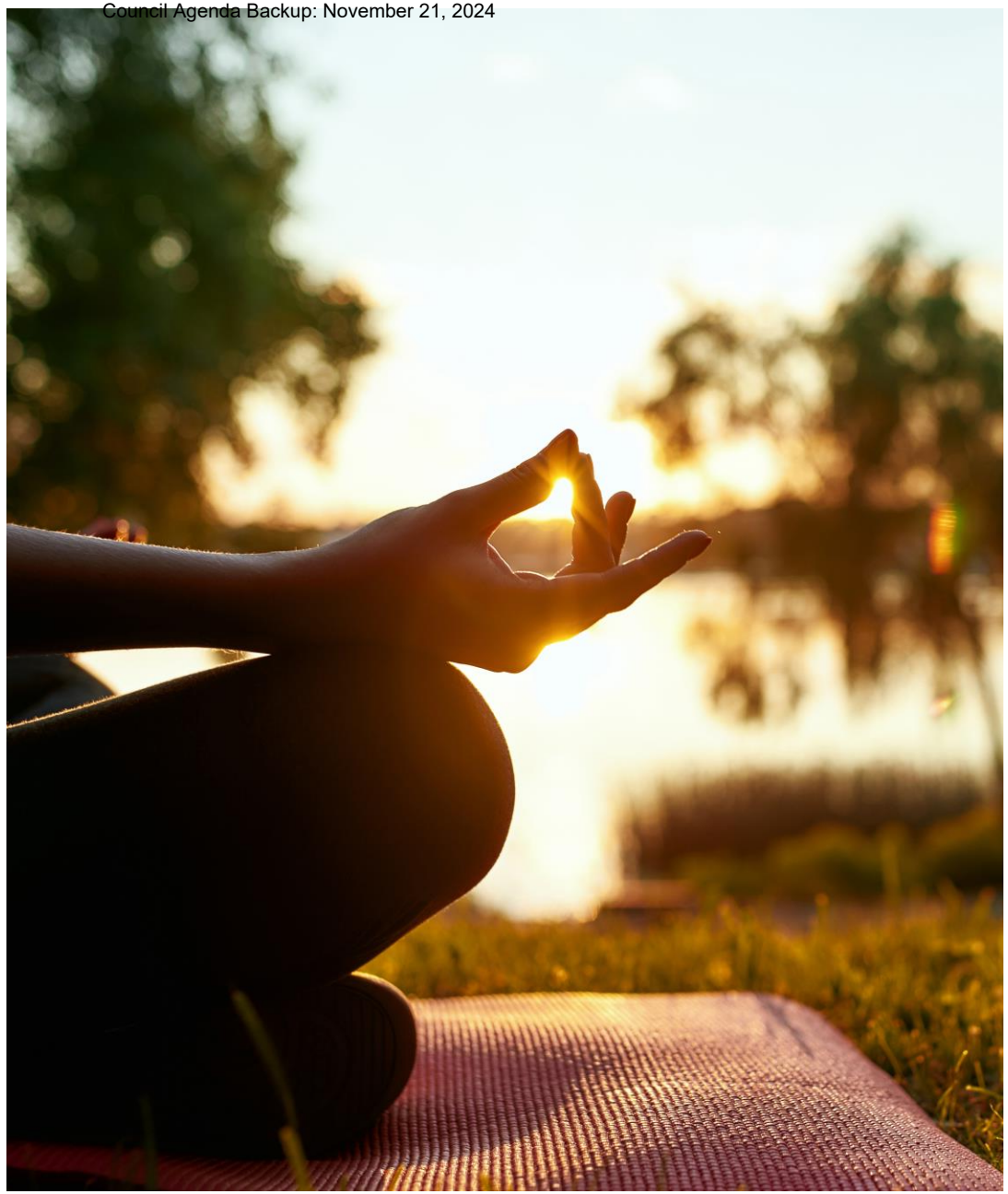
Visualizing Net-Zero by 2040

Since energy use in our city is becoming cleaner, **transportation has become our number one source of emissions.**



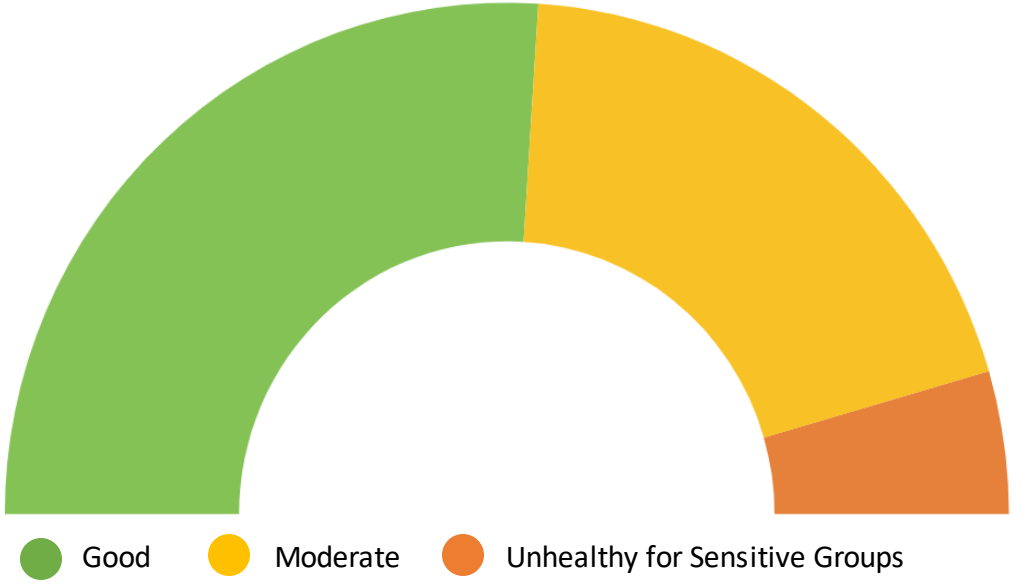
CO_2e Emissions in 2030: 5.6M Metric Tonnes CO_2e



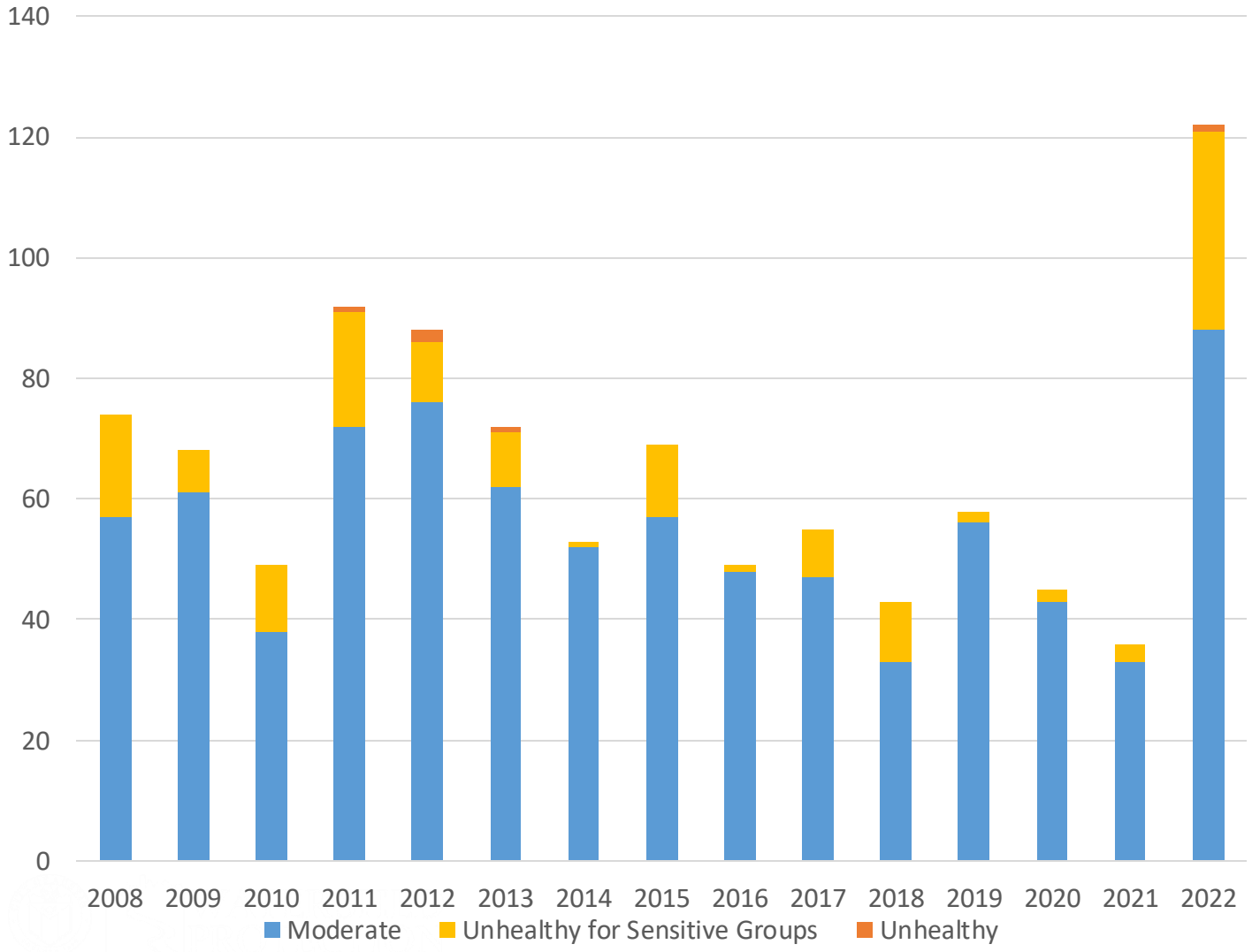


Air Quality Data

2022 Austin-Round Rock-Georgetown Air Quality Index, by percentage



Number of Days with Moderate or Worse Ozone in the Austin-Round Rock-Georgetown MSA, by year

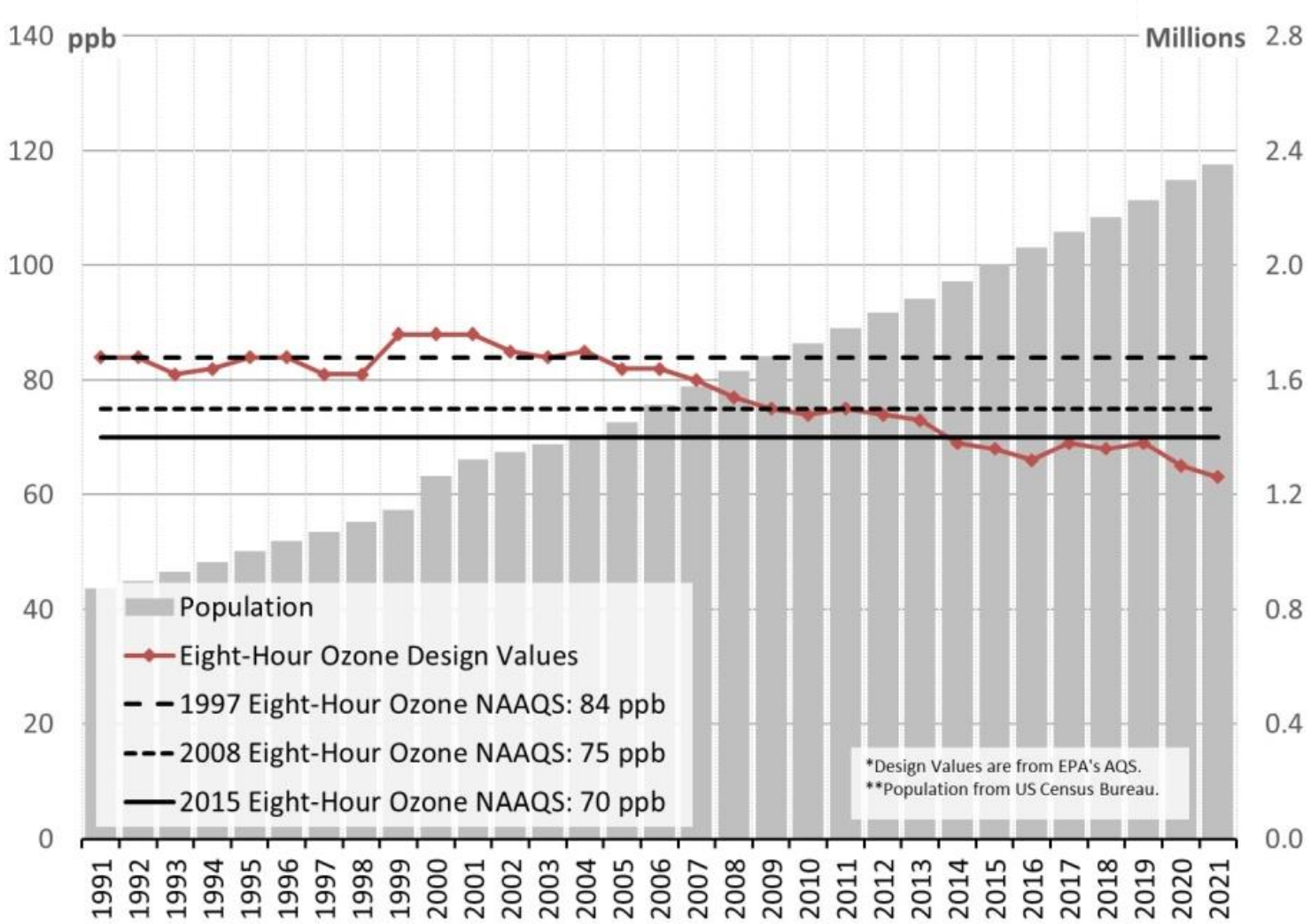


Air Quality

2022 was a standout year for poor air quality due to ozone:

- 88 days that were moderate
- 33 days that were unhealthy for sensitive groups
- 1 day that was unhealthy for everyone

Ozone Design Values and Population in the Austin-Round Rock Area



Air Quality

For the last 20 years, our **population has increased, but our ozone levels have decreased.**

Parks

New Parks Added:

- 74 new acres of parkland added since 2021
- 29 acres of parkland added in 2022
- 14 new or enlarged parks added in 2022
- Major contribution to park growth was parkland dedication supplemented through bond funding

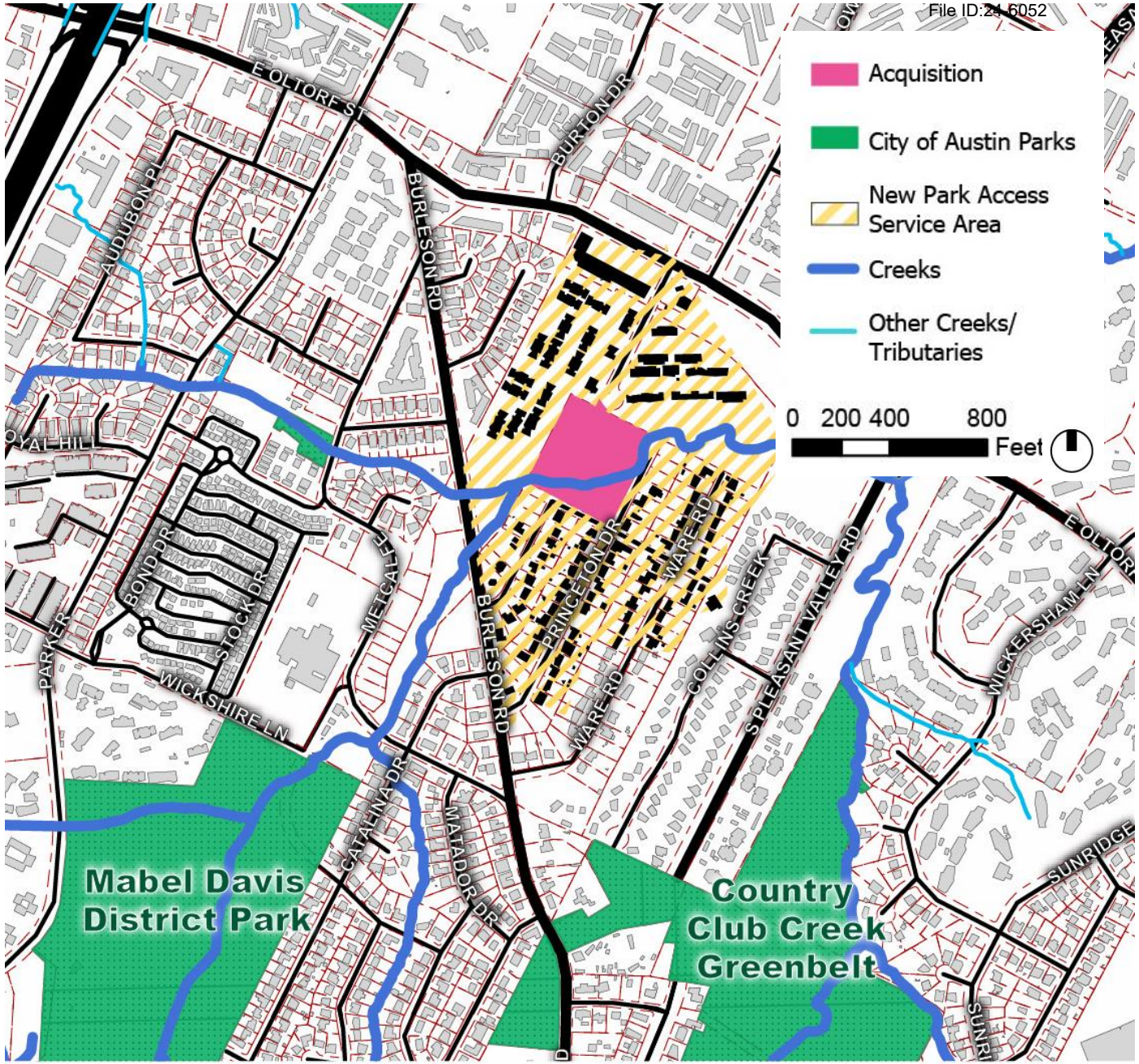
Pictured: Bull Creek Bluff Neighborhood Park on Spicewood Springs Road, 2022

Parks

Added Residents Within Walking Distance of Parks:

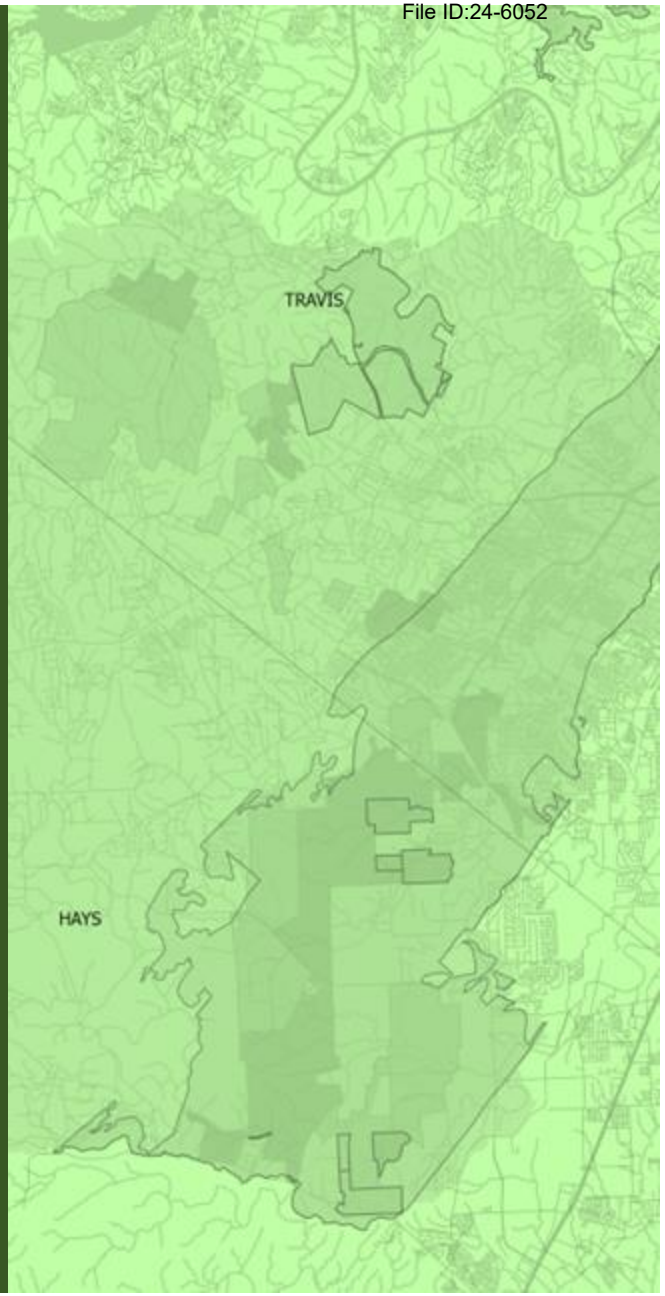
- 10,000 residents added to park service areas in 2022
- 69 percent of Austin residents now within walking stance of a park

Map: New Country Club Creek Neighborhood Park recently acquired, which serves an additional 1,000 residents



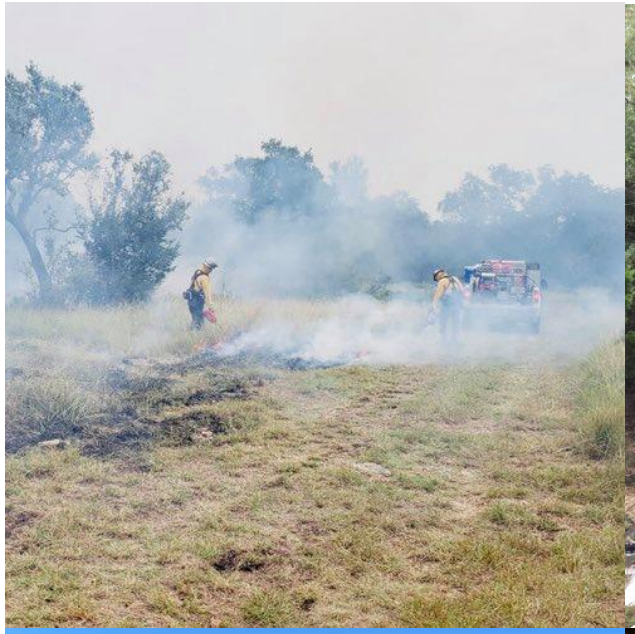
Open Space

- **5,827 acres** acquired using 2018 bond funds
- **34,000 acres in total** fee simple & conservation easements
- Little Bear Recharge Enhancement CIP (Breaking ground 2024)



Ecological Restoration

- 1,092 acres of the Water Quality Protection Lands were treated with ecological restoration techniques
- Volunteers contributed over 4,000 hours of time to restoration activities
- More than 1,000 native trees & shrubs planted in restoration berms & swales
- Subsurface restoration in cave habitat of six caves



Canopy is not evenly distributed across income and race

Wealthier neighborhoods typically have more trees. Median household income in Austin was $79K in 2021.

Tree Canopy

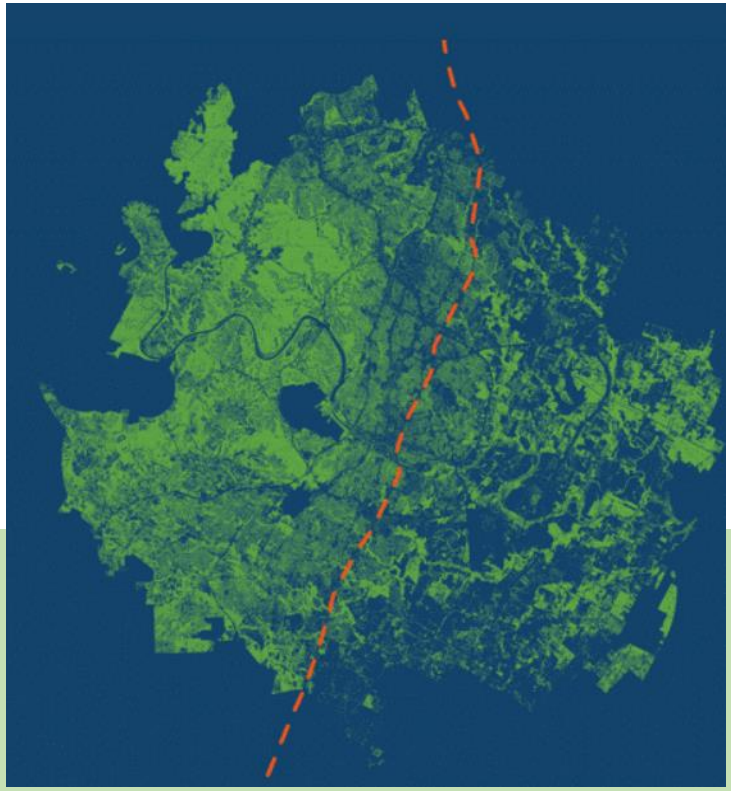
2022 Canopy Cover: 41% of land covered by tree canopy. Austin's tree canopy has increased 5-percentage points since it was last measured in 2018 (36%).

Canopy Goal: Achieve at least 50% citywide tree canopy cover by 2050, focusing on increasing canopy cover equitably (Austin Climate Equity Plan goal).

Highlights:

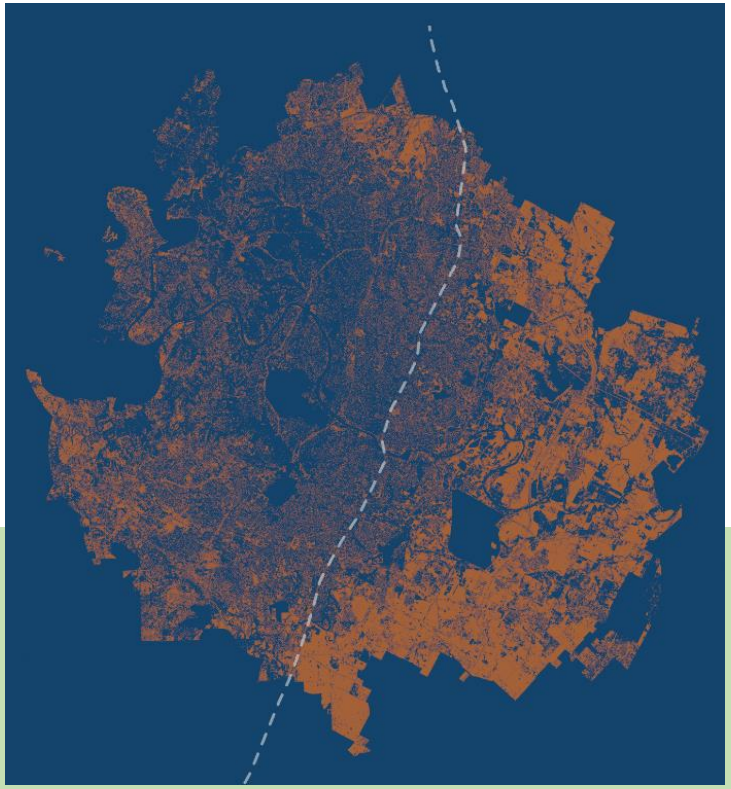
- Canopy is not evenly distributed across income and race. Wealthier neighborhoods typically have more trees. There tends to be less trees and more roads and buildings where people of color reside.
- Canopy is not evenly distributed across land uses. Much of Austin is private, residential land. Residential (36%) and open space (30%) land uses contain the most tree canopy in Austin

2022 Tree Canopy & Plantable Space



41%

CANOPY COVER



36K

ACRES OF NEW CANOPY NEEDED TO MEET 50% CANOPY COVER GOAL

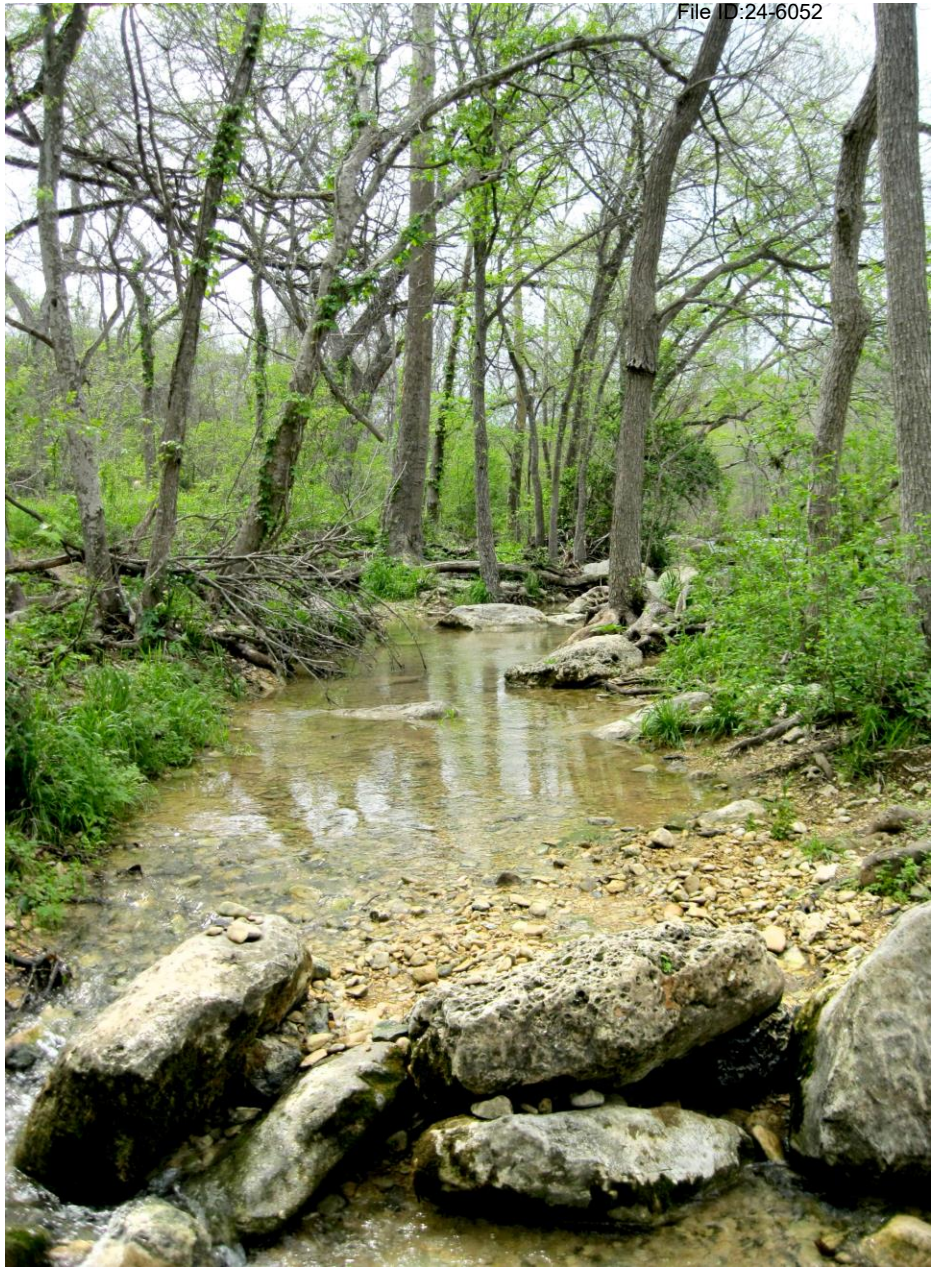
Blackland Prairie Study

- Blackland Prairie ecosystems historically made up much of East Austin.
- Blackland Prairie streams have much lower levels of development, yet their condition is poor.
- Streams have very low canopy cover levels: ~25%
- Blackland Prairie Streams have very low woody species diversity (1-3 species) compared to urban streams in the transition between ecoregions (7-10 in reference sites)

Remnant Blackland Prairie (The Nature Conservancy, 2021)

Riparian Mitigation Fund

- Qualifying projects to pay into the fund when unable to provide 100% on-site mitigation for floodplain modifications
- Ordinance originally gave staff the ability to use funds to purchase mitigation land.
- City Council approved a clarification that the fund can be used for floodplain restoration projects in July 2023.
- **Next step:** Create a project identification and prioritization process



Green Infrastructure

- In Fall 2022, Council approved a series of code changes including:
  - Require GSI for sites with less than 90% impervious cover
  - Carve outs for sites that treat existing impervious cover with an area greater than 10 acres or for sites that may generate highly contaminated runoff
  - Allow administrative variance with conditions
- Green Stormwater Infrastructure is now required as the primary method of stormwater pollution prevention for most site plans and subdivisions.
- Stormwater within parking lots is required to drain to parking lot islands and medians where feasible.

Cistern at Reilly Elementary

Watershed's Green Infrastructure Team

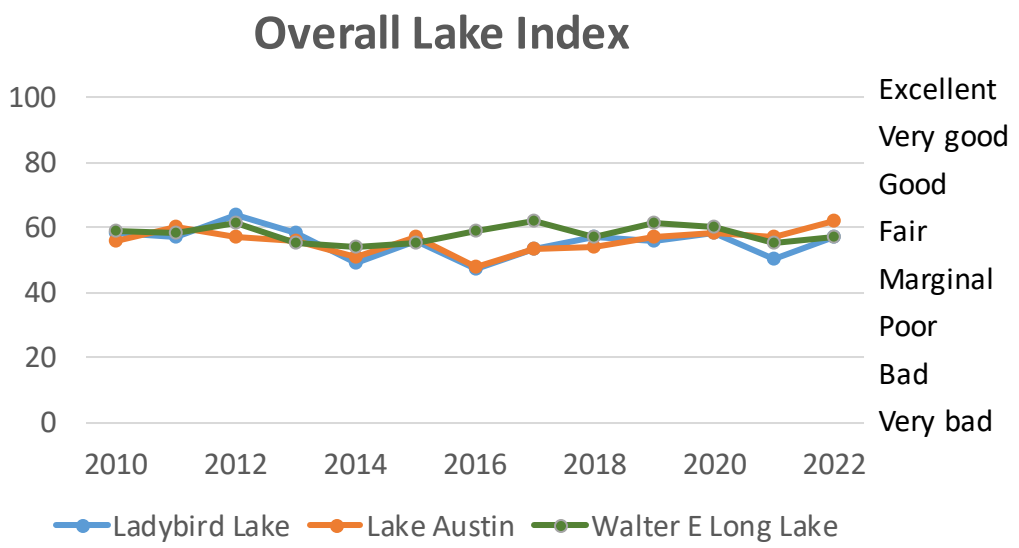
- 50% increase of city-maintained green stormwater infrastructure assets since FY21
- Next 3 years we expect that rate to be closer to 100% (doubling) based on recent policy changes

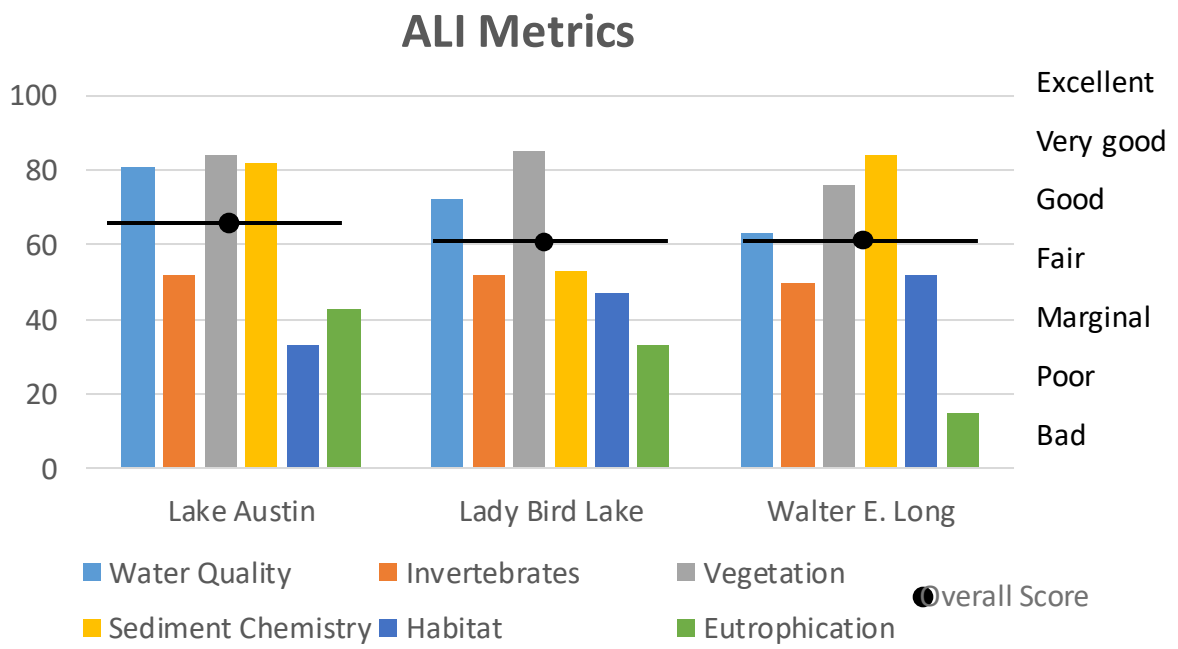
Picture: crews maintaining a rain garden

Austin Lakes Index

Reservoirs maintaining "fair-to-good" condition

- Over-development of Lake Austin shoreline; aquatic vegetation starting to come back
- Excess nutrients in Lady Bird and Walter Long; plenty of aquatic vegetation in each reservoir



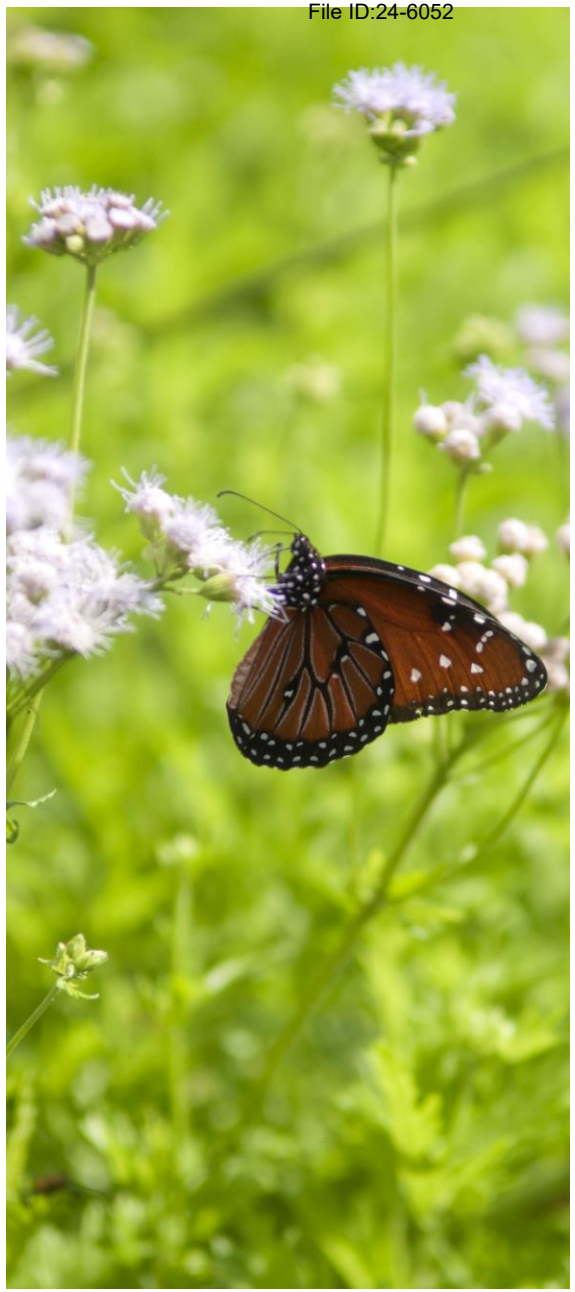


Biodiversity

- Biodiversity is an emerging topic that the City is discussing.
- **Resolution Number 20230126-054:** analyze elements of the Kunming-Montreal Global Biodiversity Framework's 23 Targets with the goal of aligning existing and proposed plans with applicable elements of the targets.
- Staff identified 9 existing plans in addition to the 5 plans identified in the resolution. All Biodiversity Targets were reference in at least one of the City plans evaluated.

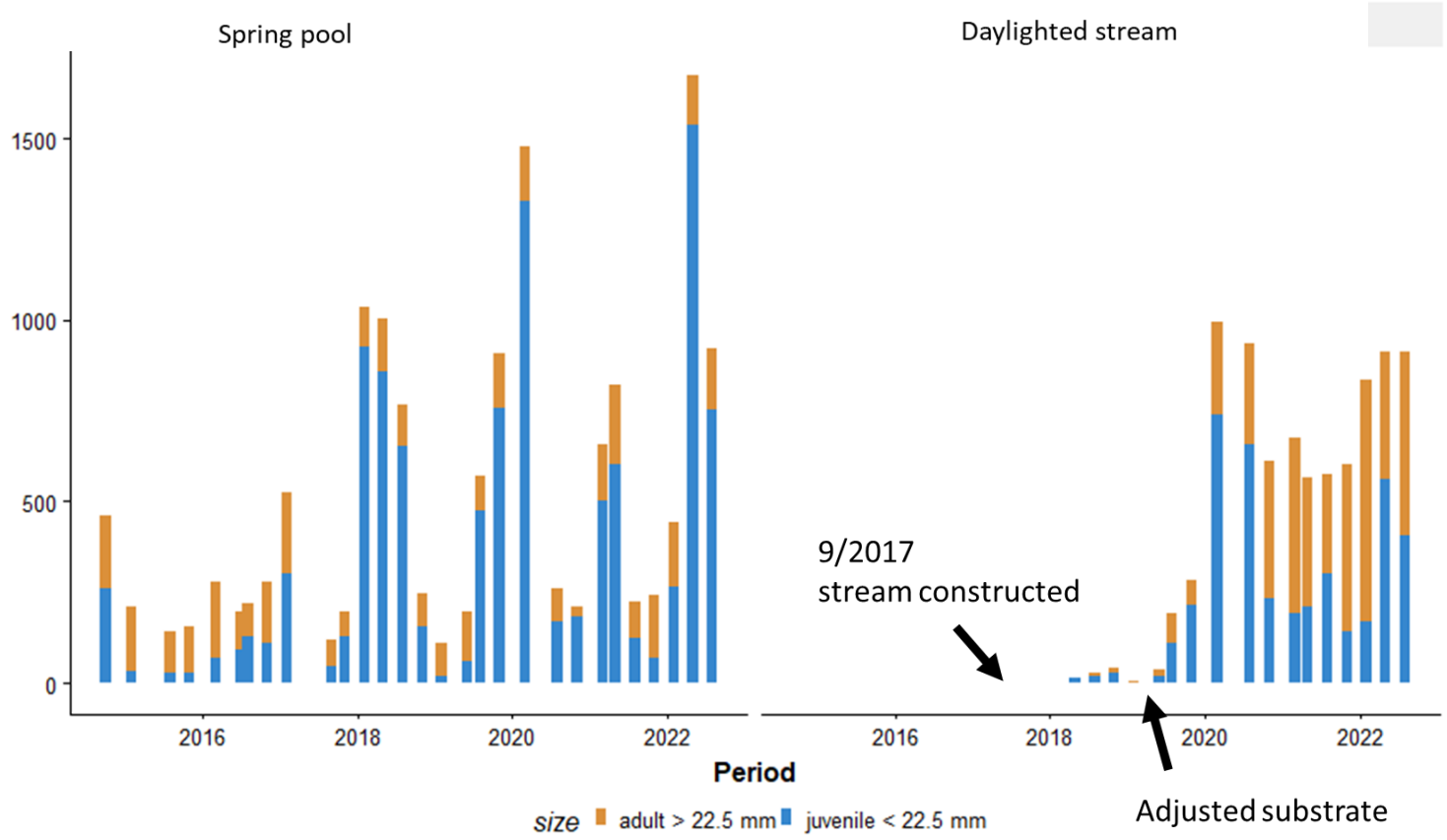
Biodiversity Recommendations

- Departments should incorporate applicable biodiversity targets in strategic plan updates.
- The Equity Office should be invited to participate in plan update processes with a lens on racial equity and a focus on indigenous peoples, local communities, gender-responsive practices, persons with disabilities, and people in vulnerable situations.
- A cross-departmental Biodiversity work group should be implemented.
- City scientists should explore options like statistical modeling, remote sensing, and eDNA methods to develop a citywide biodiversity monitoring method.

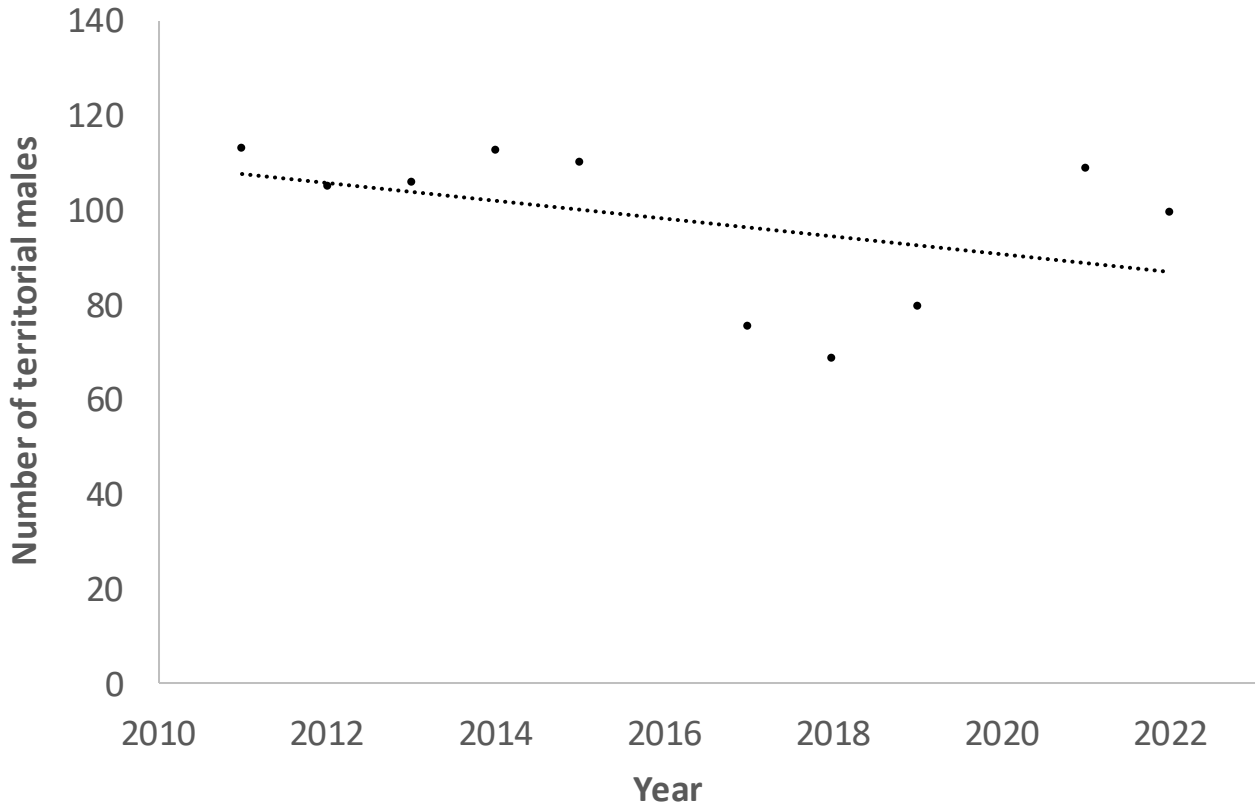


Barton Springs Salamanders in Eliza Stream

- In the 1920's, the Eliza Spring outflow was diverted to a concrete pipe
- In 2017, the failing drainage infrastructure was replaced by "daylighting" the stream
- New habitat was colonized by Barton Springs Salamanders



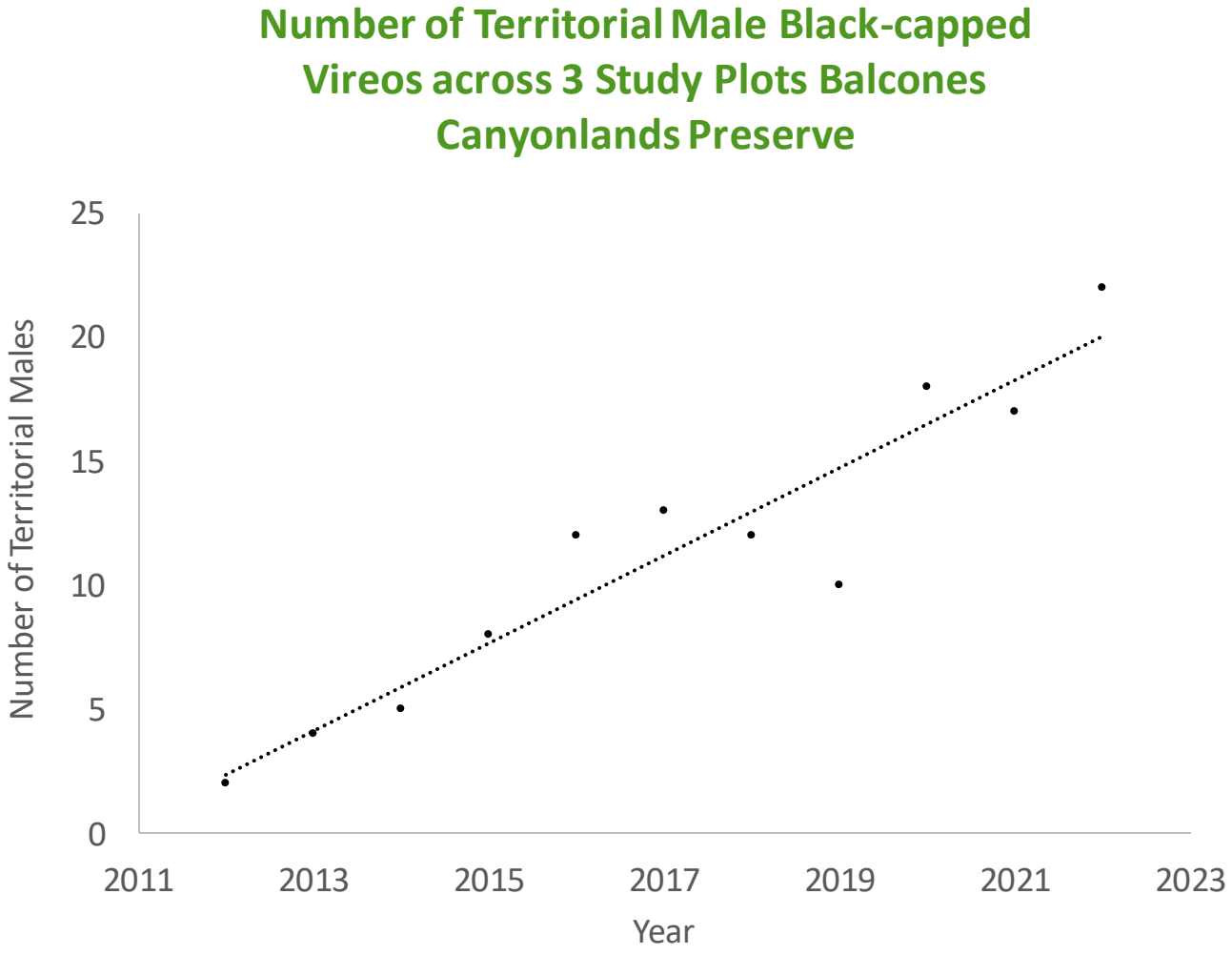
Number of Territorial Male Golden-cheeked Warblers across 10 Study Plots: Balcones Canyonlands Preserve



Note: 2020 data is excluded from the above analysis because it is not comparable to past data due to limited 2020 survey efforts on account of the COVID-19 stay-at-home order.

Golden-cheeked Warbler *(Endangered)*

- Golden-cheeked Warbler abundance monitoring has occurred since 2011



Black-capped Vireo *(Rare)*

First nest observed on the Vireo Preserve/Wild Basin since 1997

- Produced four fledglings
- Once supported the largest known Black-capped Vireo colony


Thank You
CITY OF AUSTIN
FOUNDED 1839

MEMORANDUM

TO: Mayor and City Council Members

THROUGH: Robert Goode, P.E., Assistant City Manager

FROM: Richard Mendoza, P. E., M.P.A., Director
Austin Transportation and Public Works Department (TPW)

DATE: February 14, 2024

SUBJECT: **Final Staff Report regarding Resolution No. 20230420-024 – Plan to Transition All Future City Contracts and Projects to Low-Embodied-Carbon Concrete**

This memorandum serves as the response to Resolution No. 20230420-024. It addresses the resolution's directive to provide Council with a plan and implementation schedule.

In collaboration with multiple City departments, the Transportation and Public Works Department (TPW), Office of the City Engineer developed the attached Plan to Transition to Low-Embodied Carbon Concrete in Pursuit of a Carbon Neutral Austin. This Plan:

- Establishes a protocol to track the City's concrete usage to understand Austin's environmental footprint and influence future designs, specification, and decisions.
- Introduces a path to require Environmental Product Declarations by concrete producers.
- Sets a timeline to begin developing a review and acceptance process to approve alternative mix designs that are more environmentally friendly.
- Describes the steps TPW will take to update concrete standards and specifications that lead to a more sustainable concrete mix design.
- Provides the first annual report to Council on the City's progress in using alternative concrete mix designs.

The attached Plan is a living document. It is subject to annual updates on the basis of new information discovered, materials and processes piloted and tested, and concrete industry developments. TPW will implement the Plan in FY24. The next annual progress report to Council is expected by December 1, 2024.

Attachment: Transition Plan

xc: Edward Van Eenoo, Chief Financial Officer, FSD
Anne Morgan, City Attorney
Zack Baumer, Interim Chief Sustainability Officer
Ghizlane Badawi, ABIA Interim CEO
James Snow, CDS Director
Jorge Morales, P.E., WPD Director
Shay Roalson, AW Director
Bob Kahn, AE General Manager
Kimberly McNeeley, PARD Director

City of Austin

Plan to Transition to Low-Embodied Carbon Concrete in pursuit of a Carbon Neutral Austin

Disclaimer: *This plan is the first official attempt to establish a reporting structure/protocol of concrete usage on the city projects to ensure that concrete volumes and cement usage are being tracked to establish the COA carbon footprint and is a living document. The current draft may miss some internal stakeholders that use concrete due to limited knowledge of personnel working on the plan.*

Note: This plan is subject to annual updates based on new information discovered, materials and processes piloted and tested, and concrete industry developments.

Transportation and Public Works Department

Office of the City Engineer

January 2024

Table of Contents

Executive Summary

This plan is a product of collaboration between multiple City departments based on City Council direction pursuant to Resolution #20230420-024 adopted on April 20th, 2023 (see **Appendix A**).

The Resolution directed the City Manager "to explore a plan to transition all future City contracts and projects to low-embodied-carbon concrete" by addressing the following tasks:

Resolution Tasks

1. Create procedures for tracking concrete that:
    a. Identify how much concrete is used on City projects and projects that will be owned and maintained by the City to better understand Austin's environmental footprint and influence our future designs, specifications and decisions.
    b. Require submittal of Environmental Product Declarations by concrete producers to encourage and influence more sustainable concrete production; and
    c. Develop a strategy, process and schedule for City staff to review, comment, pilot and approve alternative mix designs proposed by local concrete producers.
2. Establish a standard and/or definition for low-embodied-carbon concrete that may include, but not be limited to, one or more of the following strategies: carbon dioxide ($C0_2$)-injected concrete allowing for reduced cement use; reducing cement used in concrete by limiting the concrete specified to having only the characteristics needed for a reliable design life and performance; extensive use of more blended cement, Supplementary Cementitious Materials, and alternative binders; potential for using performance-based specifications and Performance Engineered Mixtures and numerous other strategies, alternatives and innovations under development in the industry.
3. Provide City Council with an annual report on the progress in reducing our concrete's carbon footprint and the use of alternative mix designs.

This proposed plan addresses the City Council's direction by outlining the following specifics:

General Plan of Action

1. Establish a protocol to track the City of Austin's (COA) carbon footprint on an annual basis moving forward – Resolution Task (1a).
2. Introduce the Transportation and Public Works Department Office of the City Engineer (OCE) proposed plan to implement Environmental Product Declaration (EPD) requirements and a preliminary proposed schedule of EPD implementation with a perspective goal to carbon neutral concrete – Resolution Task (1b).
3. Develop a review and acceptance process to allow for low-embodied, sustainable, and innovative concrete mix designs, materials, aggregates, and admixtures to be submitted by concrete vendors to OCE – Resolution Task (1c).
4. Implement a plan to update the concrete mix design Standard Specifications to encourage concrete mix designer to develop environmentally friendly mixes – Resolution Task (2).
5. Provide an annual report to Council on the progress of alternative mix designs. This report is the first of those reports. Towards the end of the report, a summary of FY-23 progress of the alternative concrete mix designs and total concrete/cement usage is provided – Resolution Task (3).

I. Carbon Footprint

I.1. Definitions

Carbon Footprint – is a measure of how much greenhouse gas (GHG) emissions a person, organization, event or product produces.

Concrete – is a composite material composed of fine and coarse aggregate, Portland Cement, secondary cementitious materials, admixtures and water. It is the second most-used substance in the entire world after water and it is the most widely used building material.

Cement (aka Portland* Cement) – is the most widely used binder holding the concrete materials together. Cement consists of a fine powder produced by heating a mixture of limestone and clay minerals excavated from a quarry in a rotating kiln to form clinker. During the heating process a chemical reaction occurs as the limestone is transformed into a clinker. The clinker is ground and mixed with gypsum to become cement that is ready to deliver via bags or by bulk in hauling trucks. It is during this process that most of the CO_2 emissions are produced by the manufacture of cement. When evaluating the carbon footprint of concrete usage, it is important to recognize the difference between cement and concrete. While the cement binder in concrete is an energy and carbon-intensive product, concrete itself is actually one of the world's most CO_2 - efficient, sustainable, durable and useful construction materials. Concrete has been used by humans for thousands of years. Of course, there were different kinds of concrete mixtures then. The Industrial Revolution of the late 1800s and early 1900s and combustion engine invention prompted the concrete industry to take a historic step with the invention of Portland Cement in 1824 by Joseph Aspdin. Because of its low cost and versatility, Portland Cement has become one of the most widespread materials used in construction over the past few centuries.

Regardless, it must be noted that based on the Portland Cement Association (PCA), one (1) pound of cement produces on average 0.92 pounds of CO_2. This figure is from the current and valid industry wide EPD for general concrete mixes published by the PCA.

* Portland Cement is named after a quarry on Isle of Portland, England.

I.2. City of Austin Concrete/Cement Usage

The City of Austin (COA) has been using concrete for in-house projects and Capital Improvement projects since the beginning of its establishment. However, the total COA carbon footprint, generated by concrete (cement) usage is still to be determined.

Different City departments and divisions use concrete for their projects. Concrete usage by the City can be divided into two major sources: (A) Capital Improvement projects, (B) in-house projects by Field Operation crews of various City departments and two minor sources (C) and (D) as shown in Figure 1 below.

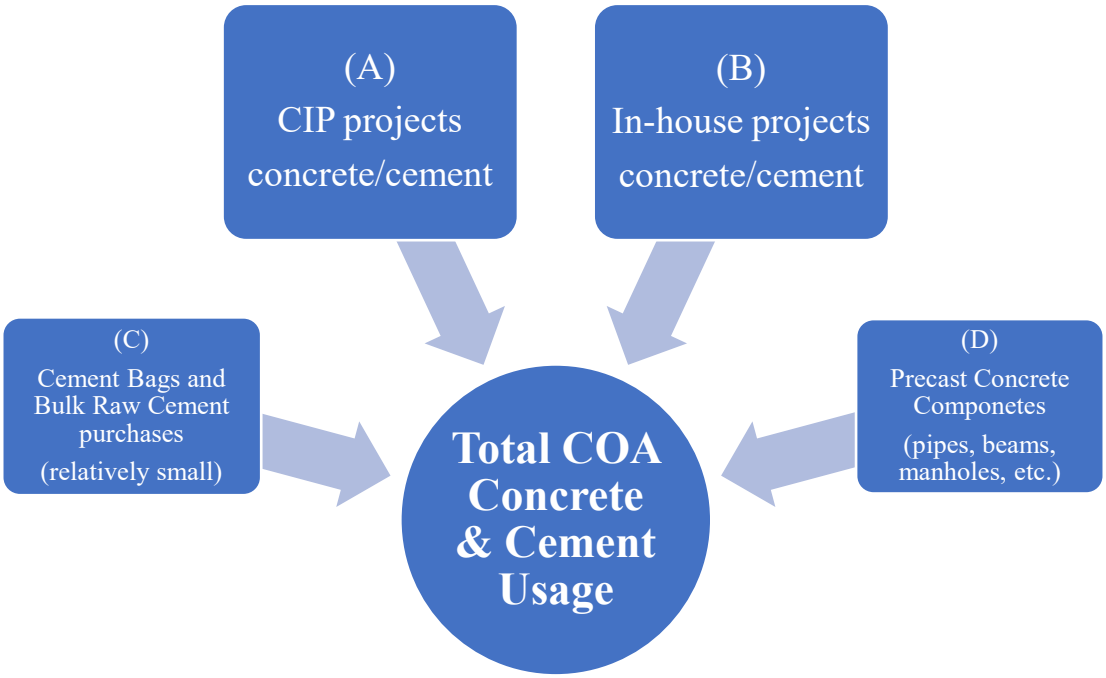


Fig.1 Major Components of Concrete Use

The Office of the City Engineer (OCE) is a division within the City of Austin Transportation and Public Works Department (TPW). OCE oversees the concrete mix design review and approval process in the City to be accepted for City business. OCE assumed responsibility for this process from the Quality Management Division (QMD) of the former Public Works Department (PWD) in 2017 and has been working closely with the concrete mix design providers and concrete industry experts since that time. Over the course of six years, OCE has established an effective and productive relationship with the concrete mix design providers. In the beginning of FY -23, OCE began requiring concrete mix providers to report concrete and cement usage for the City business on a quarterly basis.

In FY-22, OCE attempted to establish the City's carbon footprint by working with our inspectors and processing concrete tickets from the job sites. That means of tracking was found to be not feasible and inefficient due to inconsistency in printing, storing, collecting the tickets by different inspectors and labor-intensive processing. That first effort was triggered by City Council resolution #20210930-110 (Climate Equity Plan and fighting climate change).

Although most of the concrete providers addressed OCE's request, some of them presently do not provide quarterly updates. We believe that the concrete provider's reporting of concrete/cement usage for the city business would cover the COA Capital Improvement Projects' usage of concrete and cement (Fig. 1, A). This assumption could be verified with the help of the Capital Delivery Services Department (CDS) Project Managers or Construction inspectors.

However, to require that contractors track concrete and cement usage, Capital Contracting Office must revise the Capital Contracting documents to add a requirement for contractors to track concrete and cement usage on the City business and report quarterly to the assigned COA Project Manager.

The following City Departments have Field Operation crews who use the City Material Indefinite Delivery volumetric trucks and mix concrete in-house: Austin Water (AW), Transportation and Public Works (TPW), Watershed Protection Department (WPD) and Parks and Recreation Department (PARD). Concrete and cement usage tracking and reporting structure must be

developed within Operations of each Department. Field Operation staff within each department must report the concrete volumes and cement weight used quarterly (Fig. 1, B). Small cement purchases (Fig.1, C) happen in several departments and are estimated to be a low percentage (less than 1%) of total City concrete/cement usage. WPD, Austin Energy (AE) and AW use precast Reinforced Concrete Pipes (RCP), manholes, inlets, vaults, and other precast concrete elements (Fig.1, D). This is also estimated to be a relatively low percentage, approximately less than 5%. Considering the smaller volumes of both sources (Fig. 1, C and D), we recommend initially prioritizing the concrete and cement usage from the two major groups first in FY-24 (Fig.1, A and B).

I.3. Recommendations on Tracking Concrete Usage by the City

Considering all of the above, the following is recommended to establish the City of Austin's carbon footprint on an annual basis, starting in the second quarter of FY-24, as follows:

1. OCE shall collect reports on concrete and cement usage from concrete mix every quarter.
2. To ensure no delay in reporting concrete/cement usage by the concrete mix providers, OCE will work with the City Law Department to develop an agreement template that concrete providers will be required to sign for them to get approval for their mixes for the City business. This agreement will require concrete providers to report concrete and cement usage on the City business on a quarterly basis to OCE. Previous quarterly usage will be reported within the first month of the following quarter. Total usage of concrete in cubic yards and cement in pounds will be reported.
3. Every City department that has internal operation crews using concrete, e.g. Austin Water, Transportation and Public Works, Watershed Protection Department, Austin Energy, Parks and Recreation Department, shall develop an internal process reporting concrete and cement usage, keep track of the usage and report them to the Office of the City Engineer on a quarterly basis. Total usage of concrete in cubic yards and cement in pounds will be reported.
4. OCE will develop the reporting schedule. OCE will collect the quarterly data from both sources (Fig.1, A and B), keep them documented and report annually to the City Manager's Office (CMO) and Office of Sustainability. Previous Fiscal Year (FY) usage of concrete

and cement shall be reported by December 1st of the following FY to the CMO. Total usage of concrete in cubic yards and cement in pounds will be reported together with the estimated COA annual carbon footprint.

5. Annual COA CO_2 footprint (lbs.) will initially be calculated by multiplying total annual pounds of cement by 0.92 (per the industry wide EPD) for concrete created by Portland Cement Association (PCA) for FY-24.
6. Each COA department that has "single cement bag purchases" must analyze its internal processes in FY-24 to see how this source could be tracked, documented, and reported to the OCE starting FY-25 (Fig.1, C).
7. The Capital Contracting Office must revise the Capital contracting documents and add a clause that requires contractors to report concrete/cement usage quarterly on each City Capital Improvement project to the City Project Managers. Accordingly, the reporting structure in Fig.2 will be revised for FY-25.

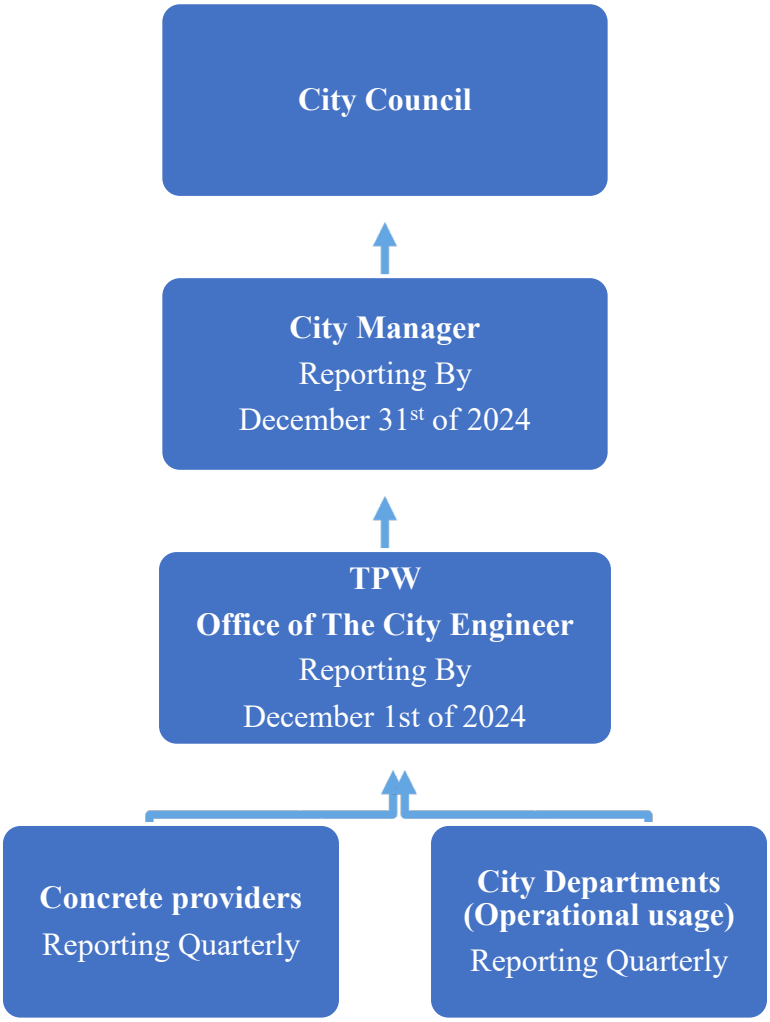


Fig.2 FY-24 Reporting Structure

II. COA Path to Environmental Product Declarations

II.1. Definition and Status of EPDs for Concrete Mixes in Austin

We recommend that the City requires **Type III Environmental Product Declaration (EPD)** as defined by the International Organization for Standardization (ISO), as defined in **ISO standard 14025.** This is a declaration that quantifies environmental information on the life cycle of a product to enable comparisons between products fulfilling the same function. EPDs are an internationally recognized sustainability tool, which results in transparent, verified reports used to communicate

the environmental impacts of construction and other materials. Standardized reporting would help the industry to confidently move forward in investing in the production of clean and reliable materials. EPDs are currently supported and promoted by the Federal Government, the US Department of Transportation and many U.S. States and municipalities. Each concrete mix design would require its own EPD document that ultimately summarizes how much CO_2 is produced per unit of concrete.

This initiative aims to provide credible information on the environmental performance of concrete mixes within the City of Austin's jurisdiction. In the past, some City departments requested EPD from the concrete mix providers on specific projects; however, neither a centralized approach nor an Austin area concrete industry mix design EPD base line have been developed yet.

To be efficient in achieving the Net Zero initiative and to document progress, it is crucial to request concrete providers obtain EPD documents for each concrete mix design and to present them to the OCE while seeking approval for their mixes.

In May of 2023, OCE conducted a survey to assess the situation with EPD in Austin and the greater Austin area. The survey was sent to 10 concrete mix providers that supply concrete mixes to the City. Only three (3) providers (about 30%) participated and provided their feedback. Two (2) of the providers indicated that they already have EPDs in place for some mixes and are working to obtain the EPD documents for the rest of mixes. One (1) provider didn't have EPD. The biggest concern was the cost associated with the EPD documentation and that it would force the smaller businesses out of competition. Based on the producer's feedback, it would require from one to two years for them to implement the EPD requirements. OCE has considered the local concrete mix design provider's feedback in developing the recommendations described in section II.2.

OCE reached out to the National Ready Mixed Concrete Association (NRMCA), the organization that provides support to the concrete providers in obtaining EPD, and learned the following: for non-NRMCA members, single EPD for the concrete mix costs is about $ 2,000. It is lower for members and depends on the number of plans. Total time to prepare EPD is about 4 months. The expiration date for all EPDs is five years after their verification, to the day.

II.2. Recommendations on the EPD Implementation Timeline

The City of Austin, through OCE, plans to implement this new requirement for Environmental Product Declarations (EPDs) for concrete mixes used within the Austin area. OCE has notified all the concrete producers operating within the City of Austin on Low-Carbon Concrete Resolution # 20230420-024 adopted by the City Council and the City's plans to transition all future City contracts and projects to low-embodied carbon concrete. OCE has developed a schedule for the implementation of EPD which is as follows:

Proposed Plan of Action for FY-24

1. **Initial Communications with Industry** – OCE, in collaboration with the concrete industry leaders (NRMCA, American Concrete Institute and Cement Council of Texas) and the City Law Department will develop EPD guidelines for concrete outlining the specific requirements for EPDs for concrete mixes, including data collection, life cycle assessment (LCA) methodology and reporting format. The purpose of this action is defined below:
    a. Promote awareness of this initiative and sustainability goals

2. **Notice of EPD Requirements** – OCE will work with concrete producers to familiarize them with the EPD requirements, including the type of EPD, environmental impact categories and the EPD format. OCE will provide resources and guidance documents to assist them in understanding and preparing for this new requirement. OCE will work with the City Law Department on the official letter/notice to the concrete providers on the COA EPD implementation schedule.
    a. Set out a general path forward giving the providers enough time to prepare.
    b. Encourage awareness of environmental footprint and initiate a mindset shift in the Central Texas concrete industry towards sustainable future and taking the ownership of an environmental impact.

3. **EPD Development** – in collaboration with NRCMA, OCE will coordinate with the concrete producers in the development of EPDs for their concrete mixes. OCE will provide the necessary guidance to facilitate the development and submission of EPDs for concrete producers.

   a. Potentially offer some basic references and educational materials to concrete producers to get them started.
   b. Work with industry groups to have them offer support and assistance to stakeholders as needed to facilitate compliance.
4. **EPD Processes** – OCE will establish a process for concrete producers to submit their EPDs, ensuring compliance with established standards and regulations.

Proposed Plan of Action for FY-25 and FY-26:

1. **EPD Submittal Requirements** – OCE will encourage producers to submit the completed EPDs to the OCE by the end of FY-24. Mandatory EPD requirements are proposed to be implemented in FY- 25 and FY-26.
   a. Initial submittals will form our baseline condition and will influence goals.

2. **Enforcement** – OCE will work with other City departments to create noncompliance measures such as education, warnings or penalties for the concrete producer who does not submit the EPDs for concrete mixes.

3. **Tracking Progress and EPDs** - OCE will create a centralized EPD database to store and manage the EPDs for concrete products used in the City of Austin.

4. **Set Baselines and Initial Targets** – OCE will be working with NRCMA and ACI to establish the minimum EPD requirements (baseline) for concrete mixes used in the Austin area by end of the FY-25, that will be revised periodically and based on industry advancement. The expected outcomes are below.
   a. Set increasingly aggressive targets/goals over a period of years.
   b. Comparison against targets and competitors.
   c. Purchasing decisions are ultimately based on the form of a Buy Clean strategy.

5. **Measure Environmental Performance** – OCE will continually be using performance data and EPDs as a mechanism to measure progress and encourage better performance over time.

III. COA Standard Specifications Updates

OCE will oversee the COA Standard Specifications (Specs) and will identify all concrete-related Specs that need to be revised during the first half of FY-24 and start working on the update in the second part of FY-24 to allow concrete providers to design more sustainable concrete mixes and to enforce the EPD requirements. The detailed Specs update schedule is estimated to be developed by March 2024. The updated concrete specifications shall include the EPD requirements as a mandatory submission for concrete producers. This updated specification will clearly define the EPD submission process and deadlines.

OCE will continually update specifications and requirements to allow for more sustainable concrete production and use on City projects. Some of these changes may involve the following potential strategies:

- Reduce use of concrete where feasible
- Allow reduced use of cement in concretes where feasible
- Carefully specify project requirements as what's truly needed (reduce overdesign)
- Consider alternative binders (eliminate some cement use)
- Consider a major shift to performance-based specifications (from prescriptive Specs)
- Review and approve innovative products, additives, and processes:
  - Extensive allowance and use of pre-blended cement
  - Use of more Supplementary Cementitious Materials (SCMs)
  - Performance Engineered Mixtures (optimized mix designs)
  - Better use of aggregate gradations to reduce paste demand (and cement)
  - Continued review, evaluation, and approval of industry innovations

IV. Summary of FY-23 Progress on Alternative Concrete

Alternative Concrete Mix Designs Using Type IL Cement

The Office of the City Engineer (OCE) recognizes the goal of reducing the carbon footprint associated with concrete production. With this goal in mind, starting FY 2022, OCE has encouraged concrete producers to optimize their concrete mixes with the use of alternative

concrete mixes with lower carbon footprint. As a part of these initiatives, OCE allowed the use of Portland-Limestone Cement (IL) as an alternative to the traditional Portland Cement. Type IL cement is a blended cement that incorporates 5% to 15% limestone, resulting in a significant reduction in carbon footprint, estimated to be around 10%. It is also important to mention that Type IL provides consumers with a greener option for a given project. This requires essentially no modification to the mix design or placing procedures while maintaining the resilience and sustainability that is expected from Portland Cement concrete.

By encouraging the adoption of Type IL cement, OCE aims to begin the transition of concrete producers in Austin to more sustainable concrete mixes and to further explore alternative mixes that have a lesser environmental impact. Currently, out of the 12 concrete producers operating in Austin area, 6 producers (50%) have already adopted the use of Type IL cement in their concrete mixes.

Producers Using Type IL (limestone cement blend)	**Producer using Traditional Portland Cement**	
	Producers Using Type I/II	**Producers Using Type I**
Lauren Concrete	Alpha Ready Mix	Centex Materials
Texas Concrete (South Plant) *	TexMix	
Lonestar Concrete	MK1 (12/22/23)	
Martin Marietta	Texas Concrete (North Plant)*	
Alamo Concrete	Austin Underground	
Custom Crete	H&H Concrete	

*Texas Concrete uses IL cement for mixes produced from South plant and Ty I/II cement for mixes produced from North Plant

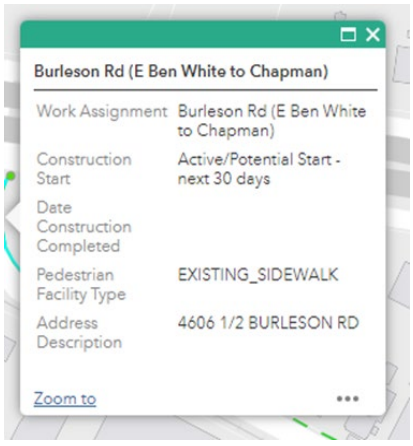
Sidewalk Pilot Project

The City of Austin Transportation and Public Works Department in partnership with Lauren Concrete, launched a sidewalk pilot project that uses a green concrete technology to reduce carbon emissions and improve the sidewalk network. The project, which is taken place on Burleson Road between Ben White Blvd. and Chapman Ln., start at the end of October and will last approximately 72 days. Project will result in placing new sidewalk (1,750 feet), curb ramps and driveways in the project limits.

The green concrete technology, developed by CarbonCure Technologies, injects captured carbon dioxide into concrete as it's being mixed. Once the concrete hardens, the carbon dioxide is sequestered forever, even if the project is torn down. The process also increases the concrete strength, allowing the use of less cement, which is a major source of global carbon emissions.

According to CarbonCure, each cubic yard of concrete made with this technology can save an average of 25 pounds of carbon dioxide emissions. The sidewalk pilot project will use about 100 cubic yards of green concrete, which means it will prevent about 2,500 pounds of carbon dioxide from entering the atmosphere.

The project is funded by existing IDIQ contracts and is part of the city's efforts to promote sustainability and innovation. The Office of the City Engineer has proposed the project to test out and start using this technology that benefits both the environment and the community.



V. Total Concrete and Cement Usage

Starting FY-23, OCE required all concrete mix design providers operating in Austin area to track City concrete and cement usage and to report that information to the OCE on a quarterly basis. OCE also prepared a reporting format for concrete and cement usage to ensure accurate and consistent reporting among different producers. At the end of each quarter, each producer is required to report their concrete usage. Below are statistics on concrete/cement usage for FY-23.

Table of Concrete Producers and Reporting

Fiscal Year	Total Concrete Producer Operating in City of Austin (Active)	Producer who reported Concrete Volume	% Reported
FY23 Q1 (Oct 22 to Dec 22)	12	11	92%
FY23 Q2 (Jan 23 to Mar 23)	12	11	92%
FY23 Q3 (Apr 23 to Jun 23)	12	11	92%
FY 23 Q4 (Jul 23 to Sept 23)	12	9	75%

Table of Concrete Production by Quarters

Quarterly Usage Reported by Concrete Producers & Volumetric Trucks	Q1	Q2	Q3	Q4	FY23
	2022	2023	2023	2023	YTD
	Oct – Dec	Jan – Mar	Apr – Jun	Jul – Sep	
Total Concrete (CY)	99,176	131,079	122,005	130,742	483,002
Total Cement (lbs)	40,669,218	50,553,471	48,516,637	49,675,800	189,415,126
Approx. CO_2 (lbs)	36,603,000	45,499,000	43,665,000	44,708,220	**170,475,220**

MEMORANDUM

TO: Mayor and Council Members

THROUGH: Susana Carbajal, Chief of Staff

FROM: Zach Baumer, Interim Chief Sustainability Officer

DATE: February 14, 2024

SUBJECT: **Staff Update on Meeting with TxDOT about Greenhouse Gas Reduction Strategies for the I-35 Central Project (Resolution 20231019-045)**

On October 19, 2023, the Austin City Council passed Resolution 20231019-045, requesting the Texas Department of Transportation (TxDOT) to "meet as soon as possible with the City of Austin Office of Sustainability and any other interested Austin MSA Climate Plan partners to collaborate on greenhouse gas reduction strategies for the I-35 Central project."

On January 4, 2024, Office of Sustainability and Transportation and Public Works Department staff met with staff from Capital Area Metropolitan Planning Organization (CAMPO) and TxDOT to discuss greenhouse gas reduction strategies for the I-35 Central project. The result of the meeting was the following:

- TxDOT answered City staff's questions about the project's Environmental Impact Statement.
- City staff shared resources with CAMPO and TxDOT on low-embodied carbon materials and a pilot program by the General Services Administration to advance these new technologies.
- City staff shared information on the Climate Pollution Reduction Grant program, ongoing planning process, and timeline for completing the Austin MSA Priority Climate Action Plan (March 1, 2024) and Implementation Grant applications (April 1, 2024).
- TxDOT staff agreed to participate in Climate Pollution Reduction Grant project meetings and determine if any projects related to the I-35 Central project could be included in the Priority Climate Action Plan or Implementation Grant application.

If you have any questions regarding the information included in this memo, please contact Zach Baumer, Interim Chief Sustainability Officer, at Zach.Baumer@austintexas.gov or 512-974-2836.

cc: Jesús Garza, Interim City Manager
Richard Mendoza, Director, Transportation and Public Works Department