

ACTION CALENDAR

December 2, 2025

To: Honorable Members of the Berkeley City Council
From: Mayor Adena Ishii

Subject: Sharing the Final Report of the Mayor's Vision 2050 Task Force, *Realize Vision 2050: Update to the Vision 2050 and Recommendations to Address Berkeley's Infrastructure*

RECOMMENDATION

Invite City Council to review *Realize Vision 2050: An Update to Vision 2050 and Recommendations to Address Berkeley's Infrastructure*, a report completed by the Mayor's Vision 2050 Task Force in October 2025.

BACKGROUND

This Report includes important updates to [Vision 2050](#), a 30-year plan that was adopted by Berkeley's City Council on September 29, 2020. Vision 2050 was developed by a multi-disciplinary citizen task force and calls for greater financial and institutional support for the infrastructure that is needed to support a safe, vibrant and resilient Berkeley, both now and into a future challenged by extreme weather and other changes.

In February 2025, the Mayor reconvened the Vision 2050 Task Force (Mayor's Task Force) and was joined by two Council colleagues, Councilmembers Tregub and Taplin. Mayor Ishii requested a brief update to consider the significant changes since 2020, both the good (e.g. passage of Measure FF, progress in repair and delivery of infrastructure) and bad (e.g. the devastating Eaton and Palisades fires.) She also asked the Task Force to provide concrete recommendations for key actions Berkeley should take in the near term to support infrastructure that meets the challenges laid out in Vision 2050.

The Task Force took up the challenge and met throughout 2025 and worked to distill a large amount of information into this concise and clear report with detailed appendices. On October 23, 2025, the Mayor's Task Force submitted their final report, *An Update to Vision 2050 and Recommendations to Address Berkeley's Infrastructure*, which we are pleased to share with members of the City Council.

The report makes persuasive arguments for the City of Berkeley to comprehensively address the infrastructure we all rely on. Key recommendations include ensuring cost-effective maintenance, multi-disciplinary project planning and design, support for

integration of innovative technologies, discipline in addressing the City's structural financial deficits, and more transparent information and a greater focus on public engagement.

Join me in appreciating the invaluable work of this Task Force. Appendix B of the report lists both the 2020 and 2025 Task Force members.

FINANCIAL IMPLICATIONS

There are no financial implications to sharing this report. However, the report does offer information and recommendations that members of the City Council may consider in our deliberations regarding future infrastructure financing.

ENVIRONMENTAL SUSTAINABILITY

There are no environmental impacts associated with sharing this report. However, the report does call for major actions and expenditures that could have significant impacts on the City's environmental sustainability.

CONTACT PERSON

Mayor Adena Ishii
510-981-7100

Attachment A: Realize Vision 2050: An Update to Vision 2050 and Recommendations to Address Berkeley's Infrastructure

MEMORANDUM

TO: Mayor Adena Ishii
City of Berkeley

FROM: Ray Yep, Co-chair
Margo Schueler, Co-chair
Mayor Ishii's Realize Vision 2050 Task Force

SUBJECT: Realize Vision 2050:
An Update to Vision 2050 and Recommendations to Address Berkeley's Infrastructure

DATE: October 23, 2025

Dear Mayor Ishii:

We are writing to thank you for convening the Mayor's Realize Vision 2050 Task Force. On behalf of the entire Task Force, we appreciate the opportunity to provide our expertise and knowledge of Berkeley to support your leadership to address the City of Berkeley's infrastructure needs.

The Task Force met several times during this year and produced a concise report with details in appendices. We are proud to provide you with the Task Force's report: *An Update to Vision 2050 and Recommendations to Address Berkeley's Infrastructure*. We believe that our recommendations are comprehensive and include considerations on integrated planning, using new technologies, improving maintenance, providing new funding to address needs, and better engagement with the public. Our updated vision for Berkeley's infrastructure in the future is:

Our City is an eco-city. Our streets are significant contributors to our resilience, which should incorporate technologies such as sustainable, permeable surfaces that work with nature. All City departments and partner agencies coordinate seamlessly to manage infrastructure as one interconnected system. Greenery, native flora, and urban wildlife are fully and rightfully integrated into the city's design, making Berkeley a living ecosystem where infrastructure and nature thrive together. The City maintains systems that enable continuous adaptation of infrastructure to evolving fire safety, traffic safety and climate resilience needs, ensuring a safe and sustainable future for all.

The Task Force recommends these top 5 actions:

- A. **Have a Unified Approach Across City Departments and Other Agencies** – All parts of the City must work together effectively to plan for and to implement improvements to our infrastructure, as well as collaborate with other infrastructure agencies.
- B. **Prepare an Infrastructure Program Plan** – We recommend preparing an Infrastructure Program Plan by Spring 2026, in conjunction with an updated Capital Improvement Plan (CIP) and the next budget, to help the City Council discuss the timing and what should be included in a future funding measure. This should be sensitive of the City's current budget constraints. Therefore, a

prioritization process is critical, using Envision criteria, should be included to address the \$2+ billion of infrastructure needs.

- C. **Implement an Asset Management Program (AMP)** – Support the ongoing implementation of a life cycle maintenance management program, commonly called an Asset Management Program, that will keep our infrastructure working properly from their inception to the end of its useful life. We recognize that condition assessment work has started and the City’s NexGen asset management software is fully implemented. This start to an AMP is being embraced in the Public Works Department.
- D. **Gain Support for New Funding** – New funding measures will be needed in the future. City Council should discuss public polling and funding options for a potential funding measure in 2026 or 2028.
- E. **Promote Urgency in Addressing Infrastructure** – Improving our infrastructure needs to be treated with urgency as environmental stressors increase and our infrastructure ages. We need to use new technologies and engage the public.

Our task force members are available to continue to support you in implementing the recommended actions.

Appendices

- A. Infrastructure needs in Berkeley
- B. Realize Vision 2050 task force members
- C. Realize Vision 2050 implementation plan
- D. Future trends and drivers
- E. Asset categories used for prioritization in the 2022 infrastructure program plan
- F. Glossary of terms

Realize Vision 2050: An Update to Vision 2050 and Recommendations to Address Berkeley's Infrastructure

Introduction

The City of Berkeley's (City) streets, storm drains, and sewers, date to the early decades of the 20th century. Numerous civic facilities were built during the Great Depression to serve this fast-growing population, including Aquatic Park, the Rose Garden, Civic Center, and the Community Theater on the Berkeley High campus. A description of Berkeley's complex infrastructure systems and how it is important to the quality of our lives is in Appendix A. In the five years since the City Council (Council) accepted the Vision 2050 report, our infrastructure has benefited from significant investments. However, climate change continues at an accelerating pace, construction costs have risen, national political changes threaten funding, and income disparity undermines our quest for equity. Locally, the threat of wildfire, sea level rise, storm intensity, rising temperatures increase stresses on our aging infrastructure.

To build upon previous efforts to focus on the City's infrastructure needs, Mayor Ishii organized the Realize Vision 2050 Task Force to review and update the previously completed Vision 2050 recommendations. The Task Force was comprised of subject matter experts who worked on the previous initiative along with new members to provide both continuity and new input to the process. For more information on the Task Force members, please refer to Appendix B.

What is Vision 2050?

Former Mayor Jesse Arreguin chose the year 2050, and organized the Vision 2050 initiative, to reorient the City's infrastructure planning beyond a five-year horizon. The initiative asked what steps must we take now to address Berkeley's aging infrastructure and create a vibrant city for the next generation of Berkeley residents.

The initiative grew out of Measure R, approved by voters in November 2018, advising the mayor to engage a panel of citizen experts to identify and guide implementation of a plan to bring climate smart, technologically advanced, integrated and efficient infrastructure to support a safe, vibrant and resilient future for Berkeley. The City Council accepted the Vision 2050 report in 2020, which included the recommendations summarized in Table 1.



Table 1
Vision 2050 Recommendations

PRINCIPLES, STRATEGIES, AND RECOMMENDED ACTIONS	
PRINCIPLE ONE SUPPORT VIBRANT AND SAFE COMMUNITIES Infrastructure shall take equity into account and improve the quality of life of all Berkeley residents, including having green open spaces, safe modes of mobility, and being prepared for fires and earthquakes. PRINCIPLE TWO HAVE EFFICIENT AND WELL-MAINTAINED INFRASTRUCTURE Infrastructure shall be long lasting, use advanced technologies, and be maintained to provide efficient service. PRINCIPLE THREE FACILITATE A GREEN BERKELEY AND CONTRIBUTE TO SAVING OUR PLANET Infrastructure shall accelerate the transition to carbon neutrality and include electrification, develop natural streetscapes using green infrastructure, and prioritize human-powered and public transportation.	STRATEGY ONE: Use Integrated and Balanced Planning A: Use multi-criteria decision-making B: Use adaptive planning C: Prepare and implement a Dig Once policy
	STRATEGY TWO: Manage Infrastructure from Cradle to Grave A: Institute structured master planning B: Develop an Asset Management Program
	STRATEGY THREE: Adopt Sustainable and Safe Technologies A: Accelerate the transition to clean energy and electrification B: Implement Complete Streets to provide sustainable and healthy transportation C: Develop natural streetscapes that provide ecosystem services D: Use sensors, data, and advanced technologies E: Prepare a wildfire mitigation and safety plan
	STRATEGY FOUR: Invest in Our Future A: Take advantage of a strong financial position to address infrastructure needs and commit to reducing large unfunded infrastructure liability by doubling capital expenditures
	STRATEGY FIVE: Prepare the City's Organization to Implement a Major Capital Program A: Develop an organization that is integrated and has capacity to deliver B: Prepare a program approach with management tools C: Provide independent oversight and reporting

The
Realize 2050 Task Force reviewed
Vision 2050 objectives and
developed an updated objective statement, as follows:

the

Our City is an eco-city. Our streets are significant contributors to our resilience, which should incorporate technologies such as sustainable, permeable surfaces that work with nature. All City departments and partner agencies coordinate seamlessly to manage infrastructure as one interconnected system. Greenery, native flora, and urban wildlife are fully and rightfully integrated into the city's design, making Berkeley a living ecosystem where infrastructure and nature thrive together. The City maintains systems that enable continuous adaptation of infrastructure to evolving fire safety, traffic safety and climate resilience needs, ensuring a safe and sustainable future for all.

Building on Successes Underway

The City maintains an extensive portfolio of capital assets and infrastructure that contribute to the City's vibrancy and enhance the community's quality of life, including 215 miles of streets and 53 miles of bicycle infrastructure; 50 acres of Marina harbor, 54 parks, 63 play areas, 38 public restrooms, 4 community centers, 3 resident camps and 2 pools. The City has developed a detailed Electric Mobility Roadmap to achieve a fossil fuel-free transportation system, while simultaneously improving traffic safety towards its commitment to Vision Zero. Further, the City advances its street pavement condition through a long-term commitment to funding pavement maintenance and rehabilitation programs. In 2022, the Council adopted a Street Maintenance and Rehabilitation Policy, which supports the ongoing creation of the Five-Year

Paving Plan to support sustainable paving efforts. The Green Infrastructure Plan, Climate Action Plan, Electrification Strategy and upcoming Stormwater Master Plan all address elements of Berkeley's infrastructure portfolio. The adopted 5- year (FY 2025 – FY 2029) CIP provides a sound basis for planning infrastructure improvements. The infrastructure categories in the CIP include:

- City facilities
- Equipment and fleet
- Information technology
- Parks, recreation and waterfront
- Sanitary sewers
- Storm drains
- Sidewalks
- Streets
- Transportation
- Other infrastructure



The CIP is a description of the condition of our infrastructure and their deficiencies. It is the “what” of our infrastructure. This Realize Vision 2050 Implementation Plan attempts to describe the “how”. We are proposing that an Infrastructure Program Plan be prepared to prioritize the work components; to consider funding options and to evaluate the organization and staffing needs to deliver the work. We are also proposing to implement a life cycle maintenance management program (Asset Management Program) so that our systems are kept at a proper operating condition. This type of coordinated and comprehensive approach to infrastructure management was started in 2021. The Public Works Department presented to Council: [Turning Vision 2050 into Reality: Public Works Capital Improvement Plan for Fiscal Year 2022](#), on March 16, 2021. That report stated:

This is the first CIP work session report to incorporate Vision 2050. In future iterations, the Vision 2050 elements and CIP will be intertwined so that neither is distinguishable from the other. A shorter version of the City's CIP book will be produced and completed by May 15, 2021 titled Turning Vision 2050 into Reality: CIP in Brief. That document will identify particular CIP projects with the Vision 2050's values of equity, public health & safety, strong local economy, and resiliency & sustainability.

The Vision 2050 report stated that its focus is on infrastructure within the public right-of-way. It stated:

This report focuses on the infrastructure systems over, on, and beneath the public streets and right of ways. Most of our current infrastructure systems are located here and they provide service to the largest number of people. We view this area as part of our Public Commons.

This was a good starting point and its focus led to the creation of the Sustainable and Accountable Funding for Equitable Street Transformation, Revitalization, Enhancements, and Essential Traffic Safety (SAFE STREETS) Initiative, or Measure FF. The task force continues to ponder the needs in the public right-of-way as the discussion expands to all the physical infrastructure needs in the City, including buildings, facilities, fleet and waste management. We will defer this question to the Public Works Department as they prepare the next update to the CIP.

Capital project funding comes from various sources including the discretionary General Fund (including the CIP Fund), as well as sources with spending and use restrictions comprising several special revenue funds, enterprise funds, grants and bonds. Important recent contributions to funding infrastructure improvements include:

- **Measure T1 Infrastructure GO Bond:** Measure T1 was approved by Berkeley voters in November 2016. It consists of General Obligation Bonds not-to-exceed \$100 million, for use to repair, renovate, replace, or reconstruct the City's aging infrastructure and facilities.
- **General Fund** annual contribution of approximately \$9.9 million to street paving.
- **Measure FF sidewalk and street repair parcel tax:** Measure FF will provide an estimated \$15 million annually for 14 years (estimated \$267 million over the 14-year duration, including inflation) to improve streets, sidewalks, safety, and the environment. Berkeley voters passed Measure FF in November 2024.

During the first phase of the Measure T1 projects, between 2017-2022, the City invested \$42.7 million on 40 priority projects. Combined with funding from grants and special funds, the City was able to invest \$65.7 million in infrastructure improvements. During the second phase of Measure T1 projects, between 2021-2026, the City plans to spend \$60 million on 30 different projects. Examples of innovative projects completed by the City are shown in Appendix A

Prioritization Process for Infrastructure Improvements

The Public Works Department prepared an Infrastructure Program Plan in 2022 that was submitted to Council. The Plan provided information on outcome objectives, program elements, community input, the funding plan, prioritization criteria, program implementation, and program oversight and reporting. The Plan was prepared to provide the public with an understanding of the "big picture" for Vision 2050 in advance of voting for new funding. This approach was an improvement from prior approaches. The Plan described the work at the asset category level (see descriptions in Appendix E). It was not a project-by-project prioritization. That will happen after voters approve funding.

The work to improve all of Berkeley's infrastructure systems is complex. An objective and understandable prioritization process is needed to sequence the work. A proposed scoring system is as follows:

- Envision criteria, 60% weighting
- Community input criteria, 40% weighting

The Vision 2050 report recommended the use of multi-criteria decision-making and suggested using the Envision criteria as a prioritization tool. The Envision framework includes 64 sustainability and resilience indicators organized around five categories: quality of life, leadership, resource allocation, natural world, and climate and resilience. Envision is now widely applied to civil infrastructure projects much in the way that LEED certification is applied to buildings. For more information, see www.sustainableinfrastructure.org. Other relevant criteria are in Berkeley's Street Maintenance and Rehabilitation Policy. The City may add other criteria or consider other prioritization tools. This criterion is given a weighting of 60%.

The other criteria comprise community input from public polling, online feedback and community meetings. What the community wants for Berkeley is important and this criterion is given a weighting of 40%. The resulting criteria and score sheet is shown on Table 2.

Table 2 – Prioritization Score Sheet

Envision Criteria (Weight 60%)	
Quality of Life 	
Public Health and Safety	
Equity	
Public Space	
Leadership 	
Integrated Planning	
Lifecycle Maintenance	
Local Economy	
Resource Allocation 	
Sustainable and Durable Materials	
Reduces Energy Use	
Preserves Water Resources	
Ready to Implement	
Natural World 	
Green Infrastructure	
Open Space and Habitats	
Climate and Resilience 	
Reduces Greenhouse Gas Emissions	
Extreme Climate Impacts	
Resilience Strategy	
Total Envision Points	
Community Input Criteria (Weight 40%)	
Complies with Community Survey Input	
Complies with Commissions and Public Input	
Total Community Input Points	



Each asset category was rated using the score sheet and an initial scoring was completed by managers in the Public Works and Parks, Recreation and Waterfront departments in 2022. We recommend that City department leaders and subject matter experts conduct another scoring, as well as modifications they find necessary, to determine infrastructure prioritization.

The Realize Vision 2050 Implementation Plan

The current Task Force used a Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis to review the Vision 2050 recommendations and to determine what is still relevant and what needs to be updated. We compared the conclusions of the SWOT analysis to the Vision 2050 recommendations and developed an updated set of goals and strategies. The following Realize Vision 2050 Implementation Plan describes 5 infrastructure goals, the strategies to implement them and the performance metrics. These are summarized below and are described in more detail in Appendix C.

Goal No. 1 – Improve our planning to realize Vision 2050

Improve infrastructure planning to be sure that our systems have a regular assessment of their condition and that deficiencies are identified and improvements needed are described. This should be done through scheduling updates to infrastructure master plans, integrating planning across City departments and using new AI tracking tools.

Strategies for achieving goal:

- A. Implement the comprehensive planning policy in City departments.
- B. Integrate project planning across City departments for all infrastructure capital project.
- C. Involve the Planning Department to consider new policies that will help the City meet its climate action goals.

Performance metrics:

- Prepare a master schedule for preparing and updating planning studies by July 2026.
- Department heads to coordinate planning during annual budget reviews.
- Prepare a new policy by July 2026 for post disaster reconstruction to comply with the City's climate action goals. An example is requiring the use of electrification instead of allowing for reconstruction using natural gas.

Goal No. 2 – Create a technology hub in the City

Create an organizational structure (i.e. a technology hub) where new infrastructure technologies can be identified, evaluated and utilized in the City's projects. This will be shared among City departments and will link us closer with the academic resources nearby.

Strategies for achieving goal:

- A. Collaborate with universities, research organizations, professional organizations and other cities for new technologies and approaches.
- B. Apply new technologies and Envision processes on pilot projects to assess their usefulness in Berkeley.
- C. Maximize the use of nature-based solutions and green infrastructure.
- D. Establish parameters for the use of AI to provide efficiency in project preparation and implementation.

Performance metrics:

- Establish collaboration with U.C. Berkeley and U.C. Davis by April 2026.
- Prepare a plan to incorporate new technologies, with an emphasis on green infrastructure, in the implementation of Measure FF by April 2026.

Goal No. 3 – Implement a life cycle maintenance management program

Implement a program that will maintain our infrastructure systems from its inception to the end of its useful life (i.e. an Asset Management Program). This is a pro-active approach that will maintain operating efficiency and avoids unplanned failures.

Strategies for achieving goal:

- A. Continue implementation of an AMP that will maintain infrastructure over its life cycle. This program shall include condition assessment, risk assessment and planned repairs and replacement. We recognize that condition assessment work has started and the City's NexGen asset

management software is fully implemented. This start to an AMP is being embraced in the Public Works Department.

Performance metrics:

- Establish an AMP steering committee by July 2026. The steering committee should include a representative from the Mayor's office, City Manager's office, Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Policy Committee and subject matter experts.
- Begin condition assessment of infrastructure systems by July 2026.
- Implement an AMP for facilities, street paving, sidewalks and sewers by July 2027.
- Prepare an annual maintenance plan by Q1 of each fiscal year and a report of the maintenance work completed by the following Q1 of the next fiscal year.

Goal No. 4 – Invest in our future

Invest in our future by providing funding to make the necessary infrastructure improvements and to create the organizational structure to deliver the infrastructure projects. The unfunded infrastructure need is approximately \$2 billion.

Strategies for achieving goal:

- A. Prioritize infrastructure needs using a multi-criteria scoring system that involves staff and public input. We recommend using the Envision criteria.
- B. Conduct polling and evaluate funding options for a funding measure in 2026 or 2028.
- C. Develop an organization structure and staffing needed to deliver the projects.

Performance metrics:

- City Council to conduct polling in early 2026 to evaluate public support for funding infrastructure improvements.
- City staff to develop a long-term strategy by Spring 2026 for the City's bonding capacity and the scheduling of issuing bonds.
- Complete an Infrastructure Program Plan by Spring 2026. This will help with prioritizing the funding needs, will consider organizational requirements and other considerations.
- City Council to discuss a funding measure in 2026 or 2028.

Goal No. 5 – Engage the Public

Improve public support by communicating effectively with the public and gain their trust and support for funding infrastructure improvements.

Strategies for achieving goal:

- A. Provide more opportunities for the public to learn about infrastructure and to participate with decision making.
- B. Communicate the City's infrastructure work and project successes.
- C. Hold workshops with U.C. Berkeley and other community organizations on engagement for Vision 2050.
- D. Successfully implement Measure FF.

Performance metrics:

- Initiate public tours of infrastructure projects in April 2026 and hold a tour once a quarter.

- Initiate an annual report to the public of public works success stories.
- Hold a public kickoff meeting for Measure FF in 2026 Q1.
- Develop a strategy to utilize social media more effectively by Spring 2026.

Recommended Next Actions

This report was prepared by a task force of dedicated subject matter experts. We hope that it will serve as a catalyst to implement an action plan to restore Berkeley's infrastructure to a proper working condition and ensure core infrastructure is able to meet future challenges. We recommend the following actions by the Mayor and City leaders.

1. Inform Council of the Realize Vision 2050 Implementation Plan -- Lead: Mayor Ishii

This report is submitted to Mayor Ishii. We recommend that this report be shared with City Council.

2. Communicate with applicable commissions and Council Policy Committees-- Lead: Mayor's office

We recommend that this report be presented to the FITES Policy Committee and the Health, Life Enrichment, and Equity & Community Policy Committee (HLEECs) and the following commissions:

- Transportation and Infrastructure commission
- Parks, Recreation and Waterfront commission
- Energy and Climate commission
- Zero Waste commission
- Commission on Disability
- Disaster and Fire Safety commission
- Commission on Aging

3. Consider a ballot funding measure in 2026 or 2028 -- Lead: Mayor Ishii, with City Council and City Manager

We recommend that City Council discuss a future ballot funding measure in 2026 or 2028. The discussion shall be coordinated with the Council's budget and finance committee and the Finance Department. There are many considerations on the timing of the funding measure, including readiness and prioritization of the work, gauging public support with polling, the economy, other funding measures that will be on the ballot, and other factors.

4. Work on implementing the recommendations and report on its progress -- Lead: Public Works Department

We recommend that a core team be formed to implement the recommended actions. The team should be led by the Public Works Director. Progress reports shall be submitted to Council and commissions annually or as needed. The work shall include developing infrastructure prioritization, preparing an Infrastructure Program Plan, implementing an Asset Management Program and other activities.

5. Successfully implement Measure FF -- Lead: Public Works Department

It is imperative that Measure FF get off to a good start and will achieve the goals stated in the ballot measure.

Appendix A

Infrastructure Needs in Berkeley

The Complexity of Berkeley's Infrastructure Systems

Infrastructure keeps our city functioning. It is beneath our feet, over our heads and all around us. Some parts of this critical infrastructure are controlled by the City of Berkeley while other important components are controlled by our partners such as EBMUD, PG&E, AVA Community Energy, AC Transit, and BART.

Surface infrastructure is most familiar to everyone – and includes our streets, sidewalks and bikeways. The quality of these systems is very important for public safety, mobility for all people and the conduct of our daily lives.

Above the street are power and streetlight poles that support electric and communications hardware, while trees and plants invite us to slow down and enjoy life, providing habitat for our wildlife, sequestering carbon and water, cooling our streets, protecting pedestrians and improving the air we breathe. The future may see drones overhead delivering packages.

Beneath our feet is an extensive world of cables, pipes, tunnels and vaults providing essential services we rarely think about. This infrastructure delivers water and natural gas to our homes and businesses, and takes away storm water and sewage. It also hosts part of the electric and communications grids and Berkeley's underground BART system.

Table A-1 summarizes the major infrastructure systems in Berkeley.

Table A-1
Major Infrastructure Systems in Berkeley

Major Infrastructure Systems in Berkeley		
Infrastructure System	Controlled by City	Controlled by Others
Streets, sidewalks, paths, bikeways, and tunnels	216 miles of streets 300 miles of sidewalks 50 miles of paths and bikeways	AC Transit buses BART system AMTRAK and trains Taxis, Lyft, Uber and rideshare ZipCar, Bicycles and Micro-Mobility
Power and communication systems	7,000 street lights	PG&E, Ava electricity and natural gas delivery systems Private and Public telecommunications and Internet services
Parks, street trees and public plantings	38,000 street trees 52 parks and play grounds	East Bay Regional Parks
Water supply system	11 creek watersheds	EBMUD potable and recycled water
Sanitary sewers	380 miles of sewers	EBMUD sewage treatment

Major Infrastructure Systems in Berkeley		
Infrastructure System	Controlled by City	Controlled by Others
Stormwater system	93 miles of storm sewers, 4 miles of creek culverts and 0.5 miles of open creeks 6,000 storm drain facilities	Small privately developed culverts and drains on private property throughout the City
Solid waste management	7-acre transfer/recycling station Curbside collection services Commercial food waste collection	Alameda County landfill Alameda County household hazardous waste services Alameda County construction & demolition debris services
Public buildings	95 public buildings	BUSD Buildings, UC Berkeley Buildings, Transportation Hubs e.g. Bart Plazas, Berkeley City College
Berkeley marina	Berkeley marina Municipal pier	State of California

By building upon Berkeley's resources and historic leadership on tough issues, we can meet the significant environmental and social challenges of the next decades. We have done it before: from the Key trolley line that linked San Francisco to Berkeley bringing growth and prosperity, undergrounding BART throughout our city to ensure that segregation did not impact our south Berkeley neighborhoods, bussing to provide equity in education, sustainable city recognition by the Rockefeller Foundation to our innovative and the award-winning Center Street Garage. Through thoughtful planning, new technologies, modernized management practices and innovative financing approaches, we can do it again.

The following are examples of innovative projects being carried out by the City.

Allston Way Permeable Paver Demonstration Project

Installed in 2014, the City implemented a full width one block long permeable pavement demonstration project on Allston Way in downtown Berkeley. The project was promoted by the Public Works Commission and was seen as a test of a long-lasting durable technology as compared to traditional asphalt paving. Using life cycle cost analysis, the total cost for the two alternatives is comparable over a 40-year life. Permeable pavement also has multiple benefits, including the infiltration of surface waters to replenish the groundwater, pre-filtering of contaminants in the stormwater and attenuation of high stormwater flows. The project has been in use for over 10 years and is an example of applying innovative and green technologies to Berkeley's infrastructure needs.



University Avenue Reconstruction at the Marina

With funding from Measure T1, the Marina Roadway Project was completed in 2023. Major improvements were made to University Avenue (between the West frontage road and Marina Blvd), Marina Boulevard and Spinnaker Way. The project included many innovations:

- Realigning University Avenue to avoid the old railroad trestle
- Use of a roundabout to facilitate traffic flow
- Permeable surface in the parking area along Spinnaker Way
- Use of native vegetation



The project is an excellent example of innovation to provide long lasting use, mitigating environmental effects and providing better benefits to the public

Aquatic Park Roadway Improvements

It is the practice of the Parks, Recreation and Waterfront Department to involve the public in park maintenance, where feasible, and to hold a Ribbon Cutting Special Event when a project is completed. A good example was the Bolivar Drive Landscape & Streetscape Improvements Project.

The department also involves the community in shoreline cleanups, tree planting, pollinator gardens and dog park maintenance.

Multiple tree planting events were held at Aquatic Park. At one event 300 volunteers participated.



A suggested best practice by the City would be:

- To involve the public in projects where feasible
- To hold a ribbon cutting event to celebrate the completion of every infrastructure project

What other innovations await us, in the not-too-distant future: delivery by drone, driverless cars, surface subways, air travel?

A key component of Vision 2050 must be to assure that the infrastructure serves the entire City, correcting many inequities in the distribution of resources from our past and provide a source of good, local jobs that can be equitably filled and provide excellent training for long-term employment opportunities.

Working together, we can design and build the new, resilient Berkeley that will serve our children and grandchildren for years to come and cost us less in the long run.

Improving the Quality of Our Lives

All decisions made in infrastructure planning must include how they will impact the community's quality of life, today and in a sustainable future. There are many things to consider such as adding trees to both cool and beautify our streets and sidewalks; managing stormwater differently in areas with a higher water table; using alternate paving materials to reduce the heat-island effect; creating dry utility tunnels in lower lying areas; ensuring safety of elders and seniors during a heat wave; and much more.

In addition, with the projected increase in population, we need transportation systems that can move people more effectively throughout our community while also reducing our Greenhouse Gas (GHG) emissions. While electric vehicles can help lower carbon emissions, they are not a panacea, partly because of the limited space available and also the issues of battery and vehicle production and disposal. It is also unknown what other alternative forms of transportation might emerge and how personal transportation behaviors might change, including artificial intelligence and autonomous vehicles.

It is important to provide more prioritized spaces for transit systems and safe, generous and lovely spaces for people walking or riding in wheelchairs, on bikes, on electric scooters and more. Many of these modes of transportation, such as walking, are proven to increase both physical and emotional health, while also fostering stronger community relations by increasing interactions in our Public Commons. This will also reduce automotive traffic for those who may need to use private vehicles. Regardless, infrastructure planning should be adaptive and nimble, to the greatest extent possible. Just look at how transportation and its related behavior have changed over the past 30 years.

Welcoming public spaces are important also as a destination for people to gather and connect for civic, commercial, cultural, educational and recreational purposes, building community with planned and spontaneous activities. This is increasingly important with growing loneliness and digital isolation.

If we want to increase the likelihood that our future infrastructure decisions will protect and enhance our quality of life, then we must ensure that quality of life considerations have equal, formalized footing with all the other factors that comprise our infrastructure decisions, and that they are part of an iterative, coordinated planning process that is adaptive and regularly updated as our demographics and behaviors change over time.

Our infrastructure is critical to our quality of life, including our health and social relationships. Strong, effective, and resilient infrastructure supports a higher quality of life, such as:

- Safe and efficient travel
- Healthy and joyful spaces to live, work, play, and connect with one another
- Utilities, such as electricity, water and fast internet
- GHG reductions and stormwater filtration through street trees and native plantings

Core Values Guide our Planning

As we plan for an uncertain and changing future, our infrastructure decisions should be thoughtful and guided by a set of core community values.

- **Equity** – The equity core value is to ensure that the benefits of improved infrastructure are

distributed equitably throughout the entire community. Equity may mean that disadvantaged citizens with more pressing needs experience benefits sooner than others and receive benefits particularly tailored to their unique needs. For example, equity for street paving might move from equal allocation among council districts to paving streets of highest needs (i.e. areas of historic disinvestment, bicycle routes, areas of safety concerns, areas of heavy load conditions, etc.).

- **Public health and safety** – “Safety” means different things to different people. This core value considers safe and convenient access to greenspaces, public services, clean air, and our social support network, all of which can have a big impact on our emotional and physical health. Well planned infrastructure that is thoughtfully designed to address the needs of every user plays a critical role in strengthening the health and safety of the community. A good example of this is the Vision Zero program, which will move us from congested and dangerous street travel to safer street designs for all road users, including those trying to walk or bike.
- **A strong local economy** – A strong local economy provides resources to our citizens and creates an opportunity to build local skills and employment opportunities that support a diversity of people within Berkeley. Businesses are attracted to areas where there is easy, high-speed internet and other strong, modern infrastructure. Ensuring that Berkeley has the right amount of resources, distributed equally throughout the city, will support its population and can also reduce the amount of carbon-producing travel.
- **Resiliency and sustainability** – “Resilience” refers to systems and structures that are able to recover quickly from temporary and, sometimes, catastrophic events. For example, we need to consider what changes we need to make so that Berkeley can recover quickly from a major earthquake, wildland fire and the inevitable sea-level rise. “Sustainability” refers to the ability to minimize our impacts on the environment while still supporting biodiversity and the survival of other ecosystems. Both resiliency and sustainability are important to maintain our quality of life and our planet over the long-term.
- **Joyful community** – this includes the creation and support of public spaces where the community can come together, both formally and informally, to share and enjoy civic life, culture, arts, commerce and recreation. Joyful communities also support arts, cultural and community non-profits, and commercial businesses, that serve our diverse community, attracting local residents, workers and visitors. They also provide infrastructure in parks, streets and plazas, that enable the community to celebrate nature, beauty, culture and art that surprise and delight us in multiple ways.

Vision 2050 is asking all infrastructure projects to respect these core values and anticipate environmental and socio-economic impacts. Together, we can prepare for inevitable disasters before they occur, help reduce their impacts and protect our quality of life. Through this process and using the Vision 2050 framework, we can strengthen equity and inclusion in Berkeley, and enhance important determinants of our emotional and physical health while strengthening Berkeley as a place for joy and thriving.

A Street Corner View of Berkeley in 2050

Investing in infrastructure is not always an exciting prospect. The systems are not highly visible and the payoff often takes years. Stories can help us overcome our tendency to focus on what is short term and in front of us. The Vision 2050 Task Force used our core values and attempted to transport ourselves into the

future and tell a story about Berkeley in 2050. This story could have many other versions, and the future we create will depend on the plans and investments we make together in the years to come.

Picture yourself standing on a street corner in Berkeley in 2050. What will our city look like? Will our infrastructure adapt to make our lives safer, more productive and enjoyable?

Hi, I'm Maria. It's already a warm morning as I ride my bike down the bike path, calling out to neighbors who are walking their kids to school or getting ready for work. I continue down the street, thankful for the protected and pothole-free bike lanes. What a difference the safe streets initiative (Vision Zero) has made to bike and pedestrian safety! I'm glad that these new protected pathways are wide enough for first responder access in an emergency. I'm on my way to the South Berkeley co-op where my great aunt Lizzie lives. She is 85 and asked me if I would like to join her at a habitat restoration workshop at the updated Berkeley Marina. She wants to learn how to improve the shared open area in her community.

My watch pings to let us know that the accessible shuttle, now celebrating its 20th year of electrified operation, will pick us up in five minutes. After we board, I take a moment to check my phone and see that my home's smart energy system has turned on my dishwasher and washing machine to take advantage of the strong output from our solar panels. It also notifies me that the window shades have been drawn on the sunny south side of the house.

As we stroll down the waterfront, we see people coming and going from the bustling ferry terminal. Aunt Lizzie stops for a moment to remember what this area was like before Berkeley restored the wetlands to help protect the waterfront from sea-level rise and storm surges. It is thrilling to see the snowy egrets hunting in the restored, climate-buffering wetlands.

On the way to lunch, we spot solar panels and wind turbines producing a significant portion of the city's power needs, and I particularly enjoy easy access to the strong secure Wi-Fi now available throughout the city. I am still trying to convince Aunt Lizzie to get an Easy Access watch, but she prefers the old method of text messaging on her phone.

After lunch, I return home and see the Berkeley Fire Department hard at work. They are inspecting homes in the neighborhood to be sure that debris is cleared away from our houses and that we are doing everything we can to prevent an urban wildland fire. It's the time of year that the Diablo winds kick up. We are thankful for the City staff that has undergrounded the overhead wires on Ashby and other evacuation routes.

At around 4 pm, my friend Devin knocks on the door – time for our outdoor concert downtown. Fortunately, the plaza has lots of benches and tables in the shade or we certainly wouldn't be here! Summer and fall temperatures have been steadily rising in Berkeley over the last few decades. We pick our favorite spot under a leafy oak tree, close to the Mist Maker and watch children playing in the interactive fountain. It's all recycled water, so we don't worry about wasting water in this long-lasting drought. We have a fun time shopping at local craft vendor booths, delight in getting ice cream from a local merchant. And we have a great time catching up with neighbors that we have not seen in a couple years.

After the concert, Devin and I head over to the nearby park for our Tai Chi class. At the corner, we notice a neighbor with his young children pressing the "Extra Time to Walk" button. It's so much safer having a little extra time to cross between the high-visibility crosswalk demarcation. After class, we walk to the shuttle stop in the soft down-glow of LED lights, mounted hip-level on the pathway's stanchions. New rain gardens now prevent those flooded intersections and provide a little green oasis at every other corner. Devin and I

look forward to the cool evening breezes. As we watch the moon rise over the East Bay hills, we feel fortunate to live in Berkeley where, over the past 30 years, the city started implementing long-term changes that make such a positive impact to our quality of life. Berkeley is still an amazing and charming city that we are proud to call home.

Appendix B

Realize Vision 2050 Task Force Members

Background Areas	Task Force Member	Affiliation
Project sponsors	Adena Ishii Terry Taplin Matt Nichols Terrance Davis	Mayor of Berkeley Councilmember, District 2 Mayor's advisor on infrastructure Public Works Director
Task force leads	Ray Yep Margo Schueler	Co-chair Co-chair
Creating a safe and vibrant Berkeley	<u>Former Vision 2050 task force:</u> - Karen Parolek <u>New members:</u> - John Caner - Weldon Bradstreet	Former Transportation & Infrastructure commissioner Downtown Business Association Disaster & fire safety commissioner
Environmental challenges	<u>Former Vision 2050 task force:</u> - Kristina Hill - Margo Schueler <u>New members:</u> - Alison LaBonte - Igor Tregub - Olga Bolotina	U.C Berkeley professor of environmental planning Vision 2050 Co-chair Energy & climate commissioner Councilmember, District 4 Chief of Staff to Councilmember Tregub
Technology trends	<u>Former Vision 2050 task force:</u> - Sachu Constantine - John Elliott <u>New members:</u> - Kenichi Soga - Chrise de Tournay Birkhahn	Vote Solar Lawrence Berkeley National Lab UC Berkeley professor of civil engineering Zero Waste commissioner
Financing and management topics	<u>Former Vision 2050 task force:</u> - Gordon Wozniak - Sophia Skoda - Ray Yep <u>New members:</u> - Dan Lindheim	Former Councilmember, District 8 EBMUD Vision 2050 Co-chair U. C. Berkeley Goldman School professor

Appendix C

Realize Vision 2050 Implementation Plan

Realize Vision 2050 Implementation Plan

The following Implementation Plan describes 5 infrastructure goals (i.e. desired outcomes), the strategies to implement them, challenges to overcome, specific action items and the performance metrics. These are crafted to be near term, actionable and to produce tangible results.

Infrastructure Goal No. 1 – Improve Our Planning to Realize Vision 2050	
Improve infrastructure planning to be sure that our systems have a regular assessment of their condition and that deficiencies are identified and improvements needed are described. This should be done through scheduling updates to infrastructure master plans, integrating planning across City departments and using new AI tracking tools.	
Strategies for Achieving Goal	
1. Implement the comprehensive planning policy in City Departments. 2. Integrate project planning across City departments for all infrastructure capital project. 3. Involve the Planning Department to consider new policies that will help the City meet its climate action goals.	
Challenges to Overcome	
Adopted plans are not systematically reviewed and updated on a regular basis to determine opportunities for integration or innovation.	Environmental stressors are changing fast and need to be incorporated in planning.
Planning should be integrated across City departments. Also, there are many plans that compete for resources and staff capacity for implementation.	
Action Items	
1. Prepare a list of the planning documents used by the Public Works and Parks, Recreation and Waterfront Departments. Create a master schedule for when these should be prepared or updated. Provide rationale on the issues that would trigger an update. 2. City department heads shall meet regularly to discuss coordination on planning studies. The discussion shall include environmental stressors, priority issues, integration issues and other topics.	
Performance Metrics	
• Prepare a master schedule for preparing and updating planning studies by July 2026. • Department heads to coordinate planning during annual budget reviews. • Prepare a new policy by July 2026 for post disaster reconstruction to comply with the City's climate action goals. An example is requiring the use of electrification instead of allowing for reconstruction using natural gas.	

Infrastructure Goal No. 2 – Create a Technology Hub in the City	
Create an organizational structure (i.e. a technology hub) where new infrastructure technologies can be identified, evaluated and utilized in the City’s projects. This will be shared among City departments and will link us closer with the academic resources nearby.	
Strategies for Achieving Goal	
1. Collaborate with universities, research organizations, professional organizations and other cities for new technologies and approaches. 2. Apply new technologies and Envision processes on pilot projects to assess their usefulness in Berkeley 3. Maximize the use of nature-based solutions and green infrastructure. 4. Establish parameters for the use of AI to provide efficiency in project preparation and implementation.	
Challenges to Overcome	
Post Covid trends, the emergence of AI, and other issues are changing the workplace.	Staff vacancies and heavy workload limit the time to conduct research on new technologies.
Action Items	
1. Establish collaboration with universities to create a learning environment and to access new technologies. The collaboration shall include: • <u>U.C. Berkeley Center for Smart Infrastructure</u> -- The center develops and tests emerging technologies such as intelligent systems and networks, remote sensing and monitoring, and data analytics for decision-making. The center has a computer simulation and data analytics facility to examine the resiliency of infrastructure systems. • <u>U.C. Davis Pavement Research Center</u> -- Dedicated to providing knowledge, the Pavement Research Center uses innovative research and sound engineering principles to improve pavement structures, materials, and technologies. There is also expertise on the use of life cycle cost analysis. The collaboration may include advice on infrastructure projects, the involvement of student interns and other topics. 2. Utilize the Envision sustainable infrastructure framework, use pilot projects and use life cycle cost analysis to apply new technologies. An example is the applicability of permeable pavement to improve street surface durability and to meet stormwater permit requirements.	
Performance Metrics	
• Establish collaboration with U.C. Berkeley and U.C. Davis by April 2026. • Prepare a plan to incorporate new technologies, with an emphasis on green infrastructure, in the implementation of Measure FF by April 2026.	

Infrastructure Goal No. 3 – Implement a Life Cycle Maintenance Management Program

Implement a program that will maintain our infrastructure systems from its inception to the end of its useful life (i.e. an Asset Management Program). This is a pro-active approach that will maintain operating efficiency and avoids unplanned failures. We recognize that condition assessment work has started and the City's NexGen asset management software is fully implemented. This start to an AMP is being embraced in the Public Works Department.

Strategies for Achieving Goal

1. Implement an Asset Management Program (AMP) that will modernize the way that we evaluate, maintain, and replace infrastructure over its life cycle. Components of an AMP include:
 - Asset inventory
 - Condition assessment of assets
 - Setting level of service
 - Risk assessment
 - Scheduling repairs and replacement
 - Cost projections

Challenges to Overcome

The City has limited resources to complete comprehensive maintenance.	There is limited forecasting of needed maintenance, repairs, and rehabilitation.
The organization and community require education and buy-in to shift its paradigm on capital investments to make AMP part of the regular funding allocation decision making process	

Action Items

1. Organize an AMP steering committee that includes a representative from the Mayor's office, City Manager's office, FITES committee and subject matter experts.
2. Initially implement an AMP for facilities, street paving, sidewalks and sewers.
3. Prepare annual maintenance reports and share with the community to monitor progress and support ongoing education.
4. Analyze cost details on innovative projects and compare costs/benefits to standard operations and infrastructure costs, such as:
 - Permeable pavers vs. asphalt paving
 - Stormwater basins and bioswales vs conventional storm drain piping

Performance Metrics

- Establish an AMP steering committee by July 2026.
- Begin condition assessment of infrastructure systems by July 2026.
- Implement an AMP for facilities, street paving, sidewalks and sewers by July 2027.
- Prepare an annual maintenance plan by Q1 of each fiscal year and a report of the maintenance work completed by the following Q1 of the next fiscal year.

Infrastructure Goal No. 4 – Invest in Our Future	
Invest in our future by providing funding to make the necessary infrastructure improvements and to create the organizational structure to deliver the infrastructure projects. The unfunded infrastructure need is approximately \$2 billion.	
Strategies for Achieving Goal	
1. Prioritize infrastructure needs using a multi-criteria scoring system that involves staff and public input. We recommend using the Envision criteria. 2. Conduct polling and evaluate funding options for a funding measure in 2026 or 2028. 3. Develop an organization structure and staffing needed to deliver the projects.	
Challenges to Overcome	
Measure T1 funding is almost exhausted. Measure FF and dedicated enterprise funding is insufficient to fulfill the \$2+ billion of unfunded infrastructure needs.	There is a current high staff workload and broad community priorities that make prioritization challenging with limited resources.
A review of organizational structure, funding priorities, and investments in technology is needed to address the large capital needs.	Limited Envision knowledge and certification of City staff or consultants.
Action Items	
1. Complete the Infrastructure Program Plan that was prepared in 2022 for prioritizing infrastructure improvement needs. This shall incorporate recent infrastructure planning studies, such as for the transfer station and recycling center and the civic center improvements. 2. Prepare a recommendation for an infrastructure ballot funding measure in 2026 or 2028. 3. Evaluate the organization of other cities implementing major capital programs and adapt the learning to Berkeley's needs. Include training of staff on the use of Envision.	
Performance Metrics	
• City Council to conduct polling in early 2026 to evaluate public support for funding infrastructure improvements. • City staff to develop a long-term strategy by Spring 2026 for the City's bonding capacity and the scheduling of issuing bonds. • Complete an Infrastructure Program Plan by Spring 2026. This will help with prioritizing the funding needs, will consider organizational requirements and other considerations. • City Council to discuss a funding measure in 2026 or 2028.	

Infrastructure Goal No. 5 – Engage the Public	
Improve public support by communicating effectively with the public and gain their trust and support for funding infrastructure improvements.	
Strategies for Achieving Goal	
1. Provide more opportunities for the public to learn about infrastructure and to participate with decision making. 2. Communicate the City’s infrastructure work and project successes. 3. Successfully implement Measure FF.	
Challenges to Overcome	
The public lacks trust in the City’s ability to complete projects and provide transparency on the status.	The public lacks knowledge of current work being accomplished and completed projects.
The public did not approve Measure L.	There is a sense of the public feeling tax fatigue.
Action Items	
1. Provide more opportunities for the public to learn about infrastructure and to participate with decision making. 2. Communicate the City’s infrastructure work and project successes. 3. Hold workshops with U.C. Berkeley on community engagement for Vision 2050 4. Successfully implement Measure FF.	
Performance Metrics	
• Initiate public tours of infrastructure projects in April 2026 and hold a tour once a quarter. • Initiate an annual report to the public of public works success stories. • Hold a public kickoff meeting for Measure FF in 2026 Q1. • Develop a strategy to utilize social media more effectively by Spring 2026.	

Appendix D

Future Trends and Drivers

Environmental Challenges

In the past we have planned for sustainability by trying to match land uses to the building capacity of a site. We have planned for resilience by seeking to increase our capacity to recover quickly from events like earthquakes, fires, and temporary flooding. We have begun to plan for sustainability by trying to minimize our impacts on the environment, while supporting biodiversity and other ecosystem services. In our new era of infrastructure planning, planning will have to contend with changes in the environment that we had not previously foreseen.

Our City has declared a Climate Emergency. According to the 4th California Climate Assessment, new climate conditions will lead to: more frequent more severe heatwaves and intense precipitation events; major fires; reduce our air quality and regional biodiversity; and gradually flood the coastal highways, parks, landfills/toxic sites and neighborhoods of cities around the Bay Area. Road systems, sewer systems, new construction, and land use decisions will need to adapt to this changing environment. The 5th California Climate Assessment will be completed in 2026 with data indicating that climate change, impacts and hazards increasing in intensity.

Increasing heat, rainfall extremes, wildfires and rising sea levels, as well as increasing population density will affect where people live, public health and will increase maintenance costs. The City needs a vision that reflects how these trends are connected. Our shared public investments, policies and actions must work to mitigate climate impact and adapt to long-term environmental changes, as well as build our resilience to short-term events, such as a heat waves, wildfires and extreme precipitation.

Increasing Heat

Since Vision 2050 was adopted in 2020, the past five years have been increasingly the hottest years on record. Hotter air leads to more intense rainfall, drier vegetation and air quality problems that impact people's health. More heat means higher maintenance costs and lower performance of our infrastructure. Berkeley can expect continuing increase in air temperature, along with boom-and-bust rainfall years.

Observations since 1950 show a decrease in the number of foggy days. In dry years, Berkeley has, and will, experience less fog and lower humidity and more days with reduced air quality. This ongoing change will cause an increase in the mortality of trees that cool our homes and remove carbon dioxide from our air throughout the city. It is resulting in more frequent days of higher air temperatures and energy demand in buildings. Dead and dry vegetation is more dangerous as a fuel for fire in the hills of Berkeley. Increased air temperatures can also lead to increased health problems, will impact outdoor recreation and can lead to death for those who are medically fragile. Additionally, there is evidence that hotter streets need more frequent maintenance, and that they are associated with breaks in underground water pipes.

Significant Changes in Precipitation

“Boom and bust” years — both very wet and very dry conditions — are a certainty in the coming decades. Our largest winter storms, called “atmospheric rivers,” have become more intense. High intensity storms challenge Berkeley’s stormwater system and lead to more and deeper potholes as well as increased flooding. Longer droughts — like the 2012-16 drought which led to the most severe moisture deficits in the last 1,200 years — will parch our precious parks and open spaces. As rainfall totals decrease, higher temperatures and longer heatwaves will dry out vegetation significantly, increasing fire danger and degrading streetscapes and green areas.

Warmer temperatures are predicted to make a substantial change in the Sierra snowpack, which is the source of the vast proportion of EBMUD’s water supply. Under a high emissions scenario in California’s 4th Climate Assessment, the average overall Sierra snowpack will decline by 20% in the next few decades, 30%-60% in mid-century, and over 80% in the late 21st century. Consecutive years of low or no snowpack are especially worrisome. In addition, warmer temperatures are producing a shift to earlier snowmelt in the Sierra, posing storage and supply problems for high water demand periods that occur in hot summers and falls.

Wildland Fire Risk

2024 saw very hot months in California. The drought of 2011-2017 killed over 100 million trees in California. Seventeen of the twenty most destructive wildfires in the state’s history have occurred since 2015, destroying over 1 million acres, thousands of homes, and taking dozens of lives. The IBHS white paper “Return of Conflagration to the Built Environment” examines how modern suburban communities, especially those in the wildland-urban interface (WUI), are increasingly vulnerable to wildfire-driven conflagrations due to factors such as drought, high winds

Development adapts to our higher fire risk climate by improving vegetation management to create defensible space, creating viable escape routes in high hazard areas, requesting that residents voluntarily evacuate at risk neighborhoods — before a fire starts - when Berkeley experiences extreme fire weather, expanding pre-fire education and outreach programs, improving emergency warning systems, undergrounding overhead utility wires, creating “smoke-free” community centers during major smoke events, and taking other significant steps to protect our residents.

Additionally, the City of Berkeley adopted the EMBER (Effective Mitigation for Berkeley’s Ember Resistance) Program in 2025 to focus on specific neighborhoods where more enhanced fire prevention methods should be implemented. Among those methods is Zone Zero, where nearly all hazardous vegetation is removed from a zone extending out to a five-foot perimeter around structures. Considering the January 2024 Palisades Fire and Eaton Fire, local fire officials learned that concentrating fire readiness in Berkeley’s most vulnerable hillside neighborhoods can enhance wildfire safety for the entire city. This is the focus of EMBER.

For the sake of life safety, it is of critical importance that vegetation must be addressed in the Berkeley Hills- in Tilden Regional Park as well as in the city itself. Parking regulations for fire season should be developed that keep evacuation routes clear for residents and for emergency vehicles. Alert systems must be expanded and tested regularly. Evacuations must be practiced so that people know what will be in their “go bag,” as well as where they are going and how they are going to get there. Residents need to practice plans that are realistic for unexpectedly blocked streets, low light, and other extreme conditions. Evacuation plans must work with different mobility needs, including children and people with walking disabilities.

A critically important action will be to work with PG&E, the California Public Utilities Commission and other agencies to ensure that any Public Safety Power Shutoff activity (PSPS) does not block Berkeley's emergency services, keep basic infrastructure from functioning or adversely affect residents who require electric power in their homes for medical support. This work will be essential as Berkeley makes a major transition from natural gas to electricity for buildings and from gasoline-powered cars to electric vehicles.

Sea Level Rise

Both California's 4th Climate Assessment and the State of California's recent guidance to public agencies on sea level rise tell us that Berkeley can expect to see significant sea level changes over the next 20-80 years, and beyond. Although no one knows exactly how much and how rapidly the Bay will rise, the State of California Sea Level Rise Guidance (2024) has provided a range of estimates to show the low, intermediate-low, intermediate, intermediate-high, and high risk scenarios.

By 2050, the State has identified a range of likely sea level rises between 0.5 to 1.2 feet. By 2100, many scientists believe that the amount of carbon and methane in the atmosphere today has committed us to an eventual rise in sea level up to 6.6 feet. As scientists have learned more about the dynamics of ice sheet melting, they have developed scenarios for even greater levels of sea rise until some equilibrium is reached between the elevated levels of CO₂ present and the amount of heat trapped in the ocean.

California's Sea Level Rise Policy guidance recommends that local jurisdictions consider multiple Sea Level Scenarios, "intermediate", "intermediate-high", and "high" scenarios when planning facilities. Governments should then consider the risks associated with various Sea Level Scenarios and determine their tolerance for, or aversion to, those risks (i.e., over or underestimating the amount of sea level rise) to inform which of the scenarios to use in project infrastructure planning. For investments meant to last beyond 50 years, the State suggests a medium-high risk aversion category, for which planning to be resilient to the intermediate-high scenario is recommended. Many scientists think that we will know a lot more about which sea level trend is occurring in the next decade or two.

We need to consider the expected lifetime of our infrastructure, as well as the rate and timing of sea level change. It is imperative that new investments in longer lived assets are designed to withstand potential high sea level rise.

Rising coastal groundwater, and any pumping that happens on public or private property, will create impacts before tidal flooding. As groundwater rises, sewers can be infiltrated and lose capacity to function. Earthquake liquefaction zones will likely expand in extent. And contaminated soils may be mobilized in ways that put people at risk of indoor air contamination, as well as increase the risk of Bay pollution. Low-lying streets are vulnerable to groundwater flooding, like the combination of rain and groundwater that floods Ashby Avenue where it passes under the railroad near I-880. "Compound flooding" - in which rain, groundwater and high tides combine to cause more serious flooding- needs to be studied, rather than each individual source of floodwater alone. Flood maps are all underestimating future risk if they do not consider the potential for compound flooding to occur. The City's transfer station at Gilman Street will be vulnerable to sea level rise.

Coastal parks and bike trails will be affected – both by sea level rise directly, storm surges increasing in frequency and intensity, and by increased erosion from wave action that reaches higher areas of the land. This potential impact will push us to decide where we locate public access (and private facilities that pay fees to the City), and where improvements will be lost or need to be reconfigured. Intertidal wetlands will

be lost unless investments are made to raise the surface elevation of the wetlands or they are allowed to migrate inland onto lands that are now roads, parking, or other uses.

Earthquakes and Landslides

Berkeley's Local Hazard Mitigation Plan identifies earthquake and rainfall triggered landslides as likely hazards with catastrophic severity of impact.

Most of our thinking about acute land changes centers on the destruction of hundreds of building structures. However, the impacts to our infrastructure range from rupture and blockage of water, sewer and gas pipelines to toppling of power and communication poles and overhead structures and could result in the loss of power for weeks and destruction of 5,000 water lines, most of which will not be repaired for months. Streets and sidewalk buckling and failure has the potential to impede emergency responders and evacuation routes. Although the earthquake fault runs through the eastern portion of Berkeley and there may be extensive damage from shaking and landslides, most of the seismic vulnerable buildings are in central, south and west Berkeley. In addition, the gas pipelines and transportation network are centered in central, south & west Berkeley.

The reality of such a cataclysmic event will result in hundreds of people that will be forced to move out of town or need to live in shelters. School will close. Businesses will fail. Plans must be developed and action taken soon to make the city as resilient as possible in the face of these threats.

Combined Effects

Sea level rise is very likely to produce unexpected impacts through networks of cause-and-effect. The US Geological Survey has shown that rising sea levels will cause groundwater to rise within a few miles of the shoreline. Loss of marshes will devastate biodiversity historically hosted in vegetated bay shores. This change could flood sewer and stormwater lines and basements. It could also move soil and cause the spread of groundwater pollution, creating serious health threats. Other concerns are possible corrosion of the pipes that hold underground electrical and communication utilities. Street pavement is more prone to cracking in a high-groundwater environment. High groundwater can also increase the risk of extreme shaking in an earthquake, resulting in greater damage to property and loss of life.

We can adapt to this challenge, but we need to understand the cause-and-effect network connections to determine the best investment and design strategies.

While other lower lying communities around the Bay will experience serious impacts from sea level rise before Berkeley, we will all be affected within the life span of many of our infrastructure investments. As Berkeley seeks to redevelop our Marina and Bay Parks opportunities abound for increased adaptation and resilience against sea level rise. regional wastewater, transportation, refineries and pipelines, will require significant adaptive investment. Many regional facilities will need to be relocated. Our bay shoreline, roadways and western neighborhoods already suffer flooding impacts of rising sea and groundwater levels when combined with severe storms and king tides. Long term infrastructure investments should be evaluated frequently against evolving sea level rise data and projections.

There is not one answer for Berkeley

Our infrastructure corridors connect us, providing transportation, water, waste, power and communication networks. Berkeley grew in the 19th century along the shipping corridors on the bay with the pier and the railroads moving goods and people north and south from farms and factories. With the establishment of

the University, the center of town shifted east from Oceanview, at the shore, and Berkeley developed the 20th century grid of water, sewer, gas, telephone and power along the streets from the bay to the hills. From an infrastructure and climate point of view, Berkeley has three different “zones” each with its own unique challenges. These different zones of Berkeley have unique needs. Infrastructure planning and implementation must recognize historic and present inequalities, and avoid using “equality” (i.e., giving everyone the same thing) as a substitute for “equity” (which is making sure people have access to what they need).

- **The hills** have the highest risk of fires and landslides. Earthquakes on faults (e.g. Hayward fault) in the hills will result in land displacement across fault lines and seismic shaking. Steep slopes and narrow, winding roads make evacuation difficult. Adaptation will require careful management of vegetation, and finding opportunities to shelter in place when evacuation is impractical. Water pressure needs to be high for fire-fighting, and electric utilities should be placed underground.
- **The flatlands** have the highest flooding risks as climate change and development increase runoff from higher elevations. Rising sea levels and groundwater will keep water from seeping into the soil and flowing into the Bay. Poorer air quality impacts neighborhoods along Interstate 880, University, Ashby and San Pablo Avenues due to heavy and increasing traffic. Below surface infrastructure will need to be waterproofed and sensed to locate breaks and leaks with seismic events, and the already greatest risk of seismic shaking in the flats may increase to extremes as groundwater rises. These neighborhoods have the least amount of tree canopy yet they have the highest traffic impacts. Efforts should be made to increase green infrastructure to reduce and disperse the airborne particulate matter of carbon emissions in heavily impacted traffic corridors.
- **Downtown and South Berkeley** are particularly vulnerable to heat and has high traffic demand due to population density. Pedestrians and bicycles must have safer streets and sidewalks. Additionally, these neighborhoods need greener infrastructure (trees and rain gardens) to help manage both storm water and air quality. Since they sit at the base of the hills, storm water and groundwater can emerge as springs and flood basements. Infrastructure and sidewalks need to be enlarged and re-designed to handle growth and development, support street-tree canopies, and become more people-friendly.

Technology Trends

Technology affects the way we use Berkeley’s infrastructure and is challenging the ability of existing infrastructure to meet future needs. While technology offers many opportunities to improve infrastructure, the City will need to work proactively to:

- Explore, understand and incorporate new beneficial technologies
- Take steps to prevent potential negative impacts
- Ensure that benefits of improved technology are shared widely and equitably

We consider seven areas of technology that will affect the services provided by the City: buildings, energy, transportation, information technology, water, waste reduction and management, and emergency services. Technology in each of these areas has changed dramatically, and will continue changing over the next 25 years. While it is impossible to predict exactly what technologies will be available in five years, let alone 25 years from now, we can identify general trends and the challenges they pose to current infrastructure approaches. Our local partners, including UC Berkeley and Lawrence Berkeley National Laboratory, will be

important collaborators in this process to help the City stay abreast of current research, projections, and innovations.

Buildings

Berkeley has approximately 50,000 residences, over 3.4 million square feet of commercial building space, and approximately 100 public buildings within the direct control of the City. Taken together, these buildings account for just under 40% of the GHG emissions in Berkeley.

To meet state climate action targets through 2050 (and for the City to meet its Climate Action Plan goals), these buildings will need to become more energy and water efficient. They will also need to move off natural gas and rely on the increasingly clean electricity grid, which the state has committed to make zero carbon by 2045. This electrification effort involves replacing equipment like water heaters and furnaces with heat pump technologies, using electric induction cooktops, and relying on some limited electric resistance heating (e.g. in kitchen ovens). It will also involve taking steps to improve efficiency by adding insulation, sealing up cracks, and upgrading windows. Homeowners, designers, and contractors will need to learn about new products on the market and be part of this transformation in our buildings. In many cases, electrical panels will need to be upgraded to support electrification. The City can help develop a local market of installers for electrified technologies and help streamline permitting processes.

Buildings will increasingly include energy generation and energy storage that have been traditionally taken care of by central utilities. We will be seeing more solar panels batteries, and if current state and federal policies change, microgrids, and batteries. Our buildings may also be the site of more distributed water-related services such as storm water and domestic water capture, water treatment, and reuse. Since the COVID-19 pandemic, we have noticed significant shifts in work and shopping patterns. There are more vacant office and retail spaces in the City, creating a need to explore socio-technological solutions for effectively converting these office and retail spaces into residential areas or other purposes.

Transportation

Berkeley's transportation networks - including roadways, sidewalks, bicycle and pedestrian bike paths, public transit systems, fleets, as well as shared and private automobiles - move people, goods and services around the City. These transportation activities account for about 60% of Berkeley's GHG emissions. To meet climate mitigation targets, transportation will need to become electrified (or in some cases moved to alternative, zero-GHG emission fuels). Electrification will require new electric vehicle charging infrastructure distributed among private homes, commercial properties, and within the public rights-of-way.

Rapid changes in transportation technology, usage patterns and services are also likely to reduce the rate of private vehicle ownership and create changing demands for public infrastructure. For example, the proportion of physical space allocated to parking is likely to shift.

Transportation networks will have to support everyone - not just cars. "Complete streets" will enable a greater number of pedestrians and a variety of vehicle types, sizes and speeds to pass safely on the public roads and pathways. Private companies providing ride hailing services and micro-mobility solutions (such as pay-and-go bicycles, scooters, and cars) are more prevalent. There will be increasing demands for flexible public transportation solutions provided by our regional partners such as AC transit and BART to meet the diverse needs of the community and manage congestion.

A primary challenge for the City is that transportation technologies are significantly changing, altering the basic design and allocation of space within the public right-of-way. These changes in transportation modes

and demands impact congestion and pollution and will require that the City balance the needs of people's quality of life with changes to their mobility.

Energy

Energy demands in the City of Berkeley include the production, distribution, storage and consumption of energy used to meet residential, and commercial, and industrial needs. This energy consumption accounts for about 40% of our community GHG emissions. As identified in the City's Resilience Strategy and Climate Action Plan, Berkeley seeks an energy system that, by 2050, delivers carbon-free electricity across a highly distributed system. Multiple and multifaceted changes to existing infrastructure and its uses will be required to achieve carbon reduction goals. In general, these changes can be summarized as: 1) maximize energy efficiency, 2) electrify everything possible, 3) decarbonize and clean up the grid, 4) develop additional renewable (e.g., wind and solar) power sources on public land and 5) phase out use of fossil fuels.

While California has established a policy framework that will achieve a carbon-free grid by 2045, Berkeley has the ability to achieve a local carbon-free grid more quickly. The City has significant control and influence over local energy infrastructure and technology choices, particularly for public and city assets. From developing solar canopies over parking spaces in the public right-of-way in the Berkeley Marina to providing incentives for home electrification, including heat pump technology and induction cooking, there are many opportunities for the City to contribute to a carbon-free future. In addition, there is great potential for harnessing the wind power that pours through the Golden Gate directly towards the Berkeley Marina. Wind power is complementary to solar as the wind often blows, when the Sun doesn't shine. Embracing bird safe wind energy technologies will allow for development without further damage to our wild neighbors.



As impacts from wildfires become more commonplace, building more self-sufficiency and flexibility is an essential feature of Berkeley's resilient clean energy future. Critical facilities and services are vulnerable to power shut-offs caused by fires or other disasters. The transition from natural gas to electricity for space heating, along with the increased demand for space cooling (including more data center demands), necessitates greater reliance on electricity alone. This shift requires more resilient solutions for electricity supply. Clean energy microgrids, capable of providing electricity even when the larger grid is down, must be prioritized on public health and safety facilities, and encouraged elsewhere in the city. They can work in parallel with the grid, contributing to our state and national GHG reduction goals, but also harness local clean energy resources to provide power during extended outages. There may also be opportunities to underground more of the infrastructure, improving local safety and upgrading switches, relays, transformers and other essential elements of the grid. Berkeley must continue to engage in statewide and federal advocacy where policy barriers exist to the implementation of distributed energy resources such as microgrids.

Information

By 2050, information flows in Berkeley will increase dramatically and information technologies such as artificial intelligence will affect our daily lives. Automobiles, trucks, appliances, communication devices, entertainment devices, information infrastructure components, lighting devices will be able to communicate with each other. Major infrastructure components -- road surfaces, structural elements of buildings, load-bearing components of bridges and towers, all piping and pumping infrastructure for water, wastewater, airflow and air conditioning, all cabling and energy transport infrastructure -- will gradually incorporate sensing and communication for real-time information. The City must incorporate plans to manage this explosion of information, ensure equal access, address security risks, and manage the potential impacts from increased energy and water consumption from computing. Some information technologies can quickly become obsolete, so any technology implementation must be planned and executed with potential adaptations in mind. Public concerns about harms from electro-magnetic spectrums must be addressed with the best evidence available and weighed against public benefits. Related to the undergrounding of electricity infrastructure and a “dig-once” policy, the City must find a way to facilitate more widespread deployment and use of the public right of way for fiber-optic conduit or whatever future permutations of the hard-wired information grid require. The City cannot rely on the private sector alone to provide bandwidth in a way that ensures broad and equal access.

Water

Water services encompass the complete hydrological cycle: rain and storm water, surface flows and containment, subsurface groundwater flows, clean water use, and wastewater distribution and treatment. The primary technical challenge will be in renewing aging water infrastructure. The East Bay Municipal Utility District has a Pipeline Rehabilitation Program that will repair or replace water pipelines that are nearly a century old. Berkeley’s sewer pipelines are currently being repaired or replaced to reduce the amount of stormwater leaking into the system. New underground infrastructure assessment and replacement technologies are currently being developed for better economy and improved long-term reliability. This includes using new trenchless technologies, earthquake resilient pipelines, and data-driven assessment of pipeline longevity.

New opportunities for stormwater management lie with the use of green infrastructure (such as bio-swales and rain gardens) and the use of permeable surfaces. For example, permeable pavement offers multiple benefits, such as stormwater flow attenuation, trash capture that will improve water quality to the bay, and a longer lasting street surface.

In order to develop a sustainable water management strategy, increased efforts in wastewater treatment and reuse are anticipated. As we study the potential to provide supplemental water to our parks and median strips during drought conditions, there are opportunities to recharge with our groundwater by utilizing large residential and commercial buildings to install on-site wastewater capture and treatment systems.

Waste Prevention and Management

To be effective, waste management must address both upstream and downstream flows. In 2005, the City renamed its waste management division as the Zero Waste Division and established a goal of 90% diversion from landfill – a goal it has yet to meet. Diversion from landfill can be achieved through expanded practices of re-use, repair of existing goods, and effective recycling and composting services. While Berkeley continues to reduce the use of single-use products through ordinances and education, it will need to develop new policies, programs and infrastructure to meet its own goals, as well as those of state legislation mandates (SB 1383 that reduces greenhouse gas emissions by diverting organic waste from landfills and SB54 that prevents plastic pollution by requiring producers to ensure that plastic packaging

and food ware are recyclable or compostable). Increasing production of plastic and packaging from delivered goods will likely increase while unstable markets and lack of domestic recycling infrastructure will impede effective recycling of discards. Former off-shore markets that long recycled our materials (primarily China) no longer accept plastics, challenging local efforts due to weak domestic infrastructure. As technology for transportation and building continue to evolve, an influx of aging solar panels, batteries, and heat pumps/refrigerants are projected to enter the waste stream.

Waste permeates daily life - in homes, streets and public spaces. Improvement in waste management requires people to change their behaviors, and businesses to make upstream changes in the way products are designed and shipped, in order to facilitate a closed-loop system. Neither behavior nor product design are in the direct control of the City, though in its purview are bans of “bad actor” materials (food-service expanded polystyrene/styrofoam use was banned 1986). The challenge for the City will be to allocate and secure funding to rebuild the aging Transfer Station as an interactive, community-accessible center that includes reuse, repair, and education portals. New and evolving technology, including phone apps, AI and robotic sorting, will need to be incorporated. Berkeley must also continue to evolve its services to encourage development of more local opportunities to impact the amount of waste the City generates and collects (routes and public self-haul), and prioritize reuse, repair, improved recycling, and composting, all while supporting its workforce and local jobs.

Emergency Services

Fire, police, medical and mental health assets must be deployed to resolve inevitable conflicts, disasters and disruptions to city life. Particular care must be taken to ensure that Emergency Services have full access to the flow of information. The City may consider adopting advanced digital technology tools to create a Common Operational Picture (COP) that enhances communication among different organizations. These tools can be utilized not only during disaster events but also for the operation, maintenance, and renewal of the City’s infrastructure systems. The City can help connect the dots – just as the City’s Resilience Strategy recognizes the value of having solar generation technologies that can still be used when the power grid has gone down. However, new technologies can introduce risks and challenges when they are damaged during disasters, such as the disposal of burned electric vehicles and batteries after a wildfire. The city must prepare not only short-term emergency plans after major natural disasters but also effective functional recovery strategies to minimize long-term financial and social impacts. A primary challenge is continuing to engage Berkeley’s diverse population so that they are prepared and empowered in the event of everyday emergencies as well as those life-changing ones such as large earthquakes and wildfires.

Finance for the future

The City’s unfunded infrastructure need is over \$2 billion. The infrastructure categories and the funding needs estimate will be updated in 2026 with the next edition of the City’s CIP. Capital project funding comes from various sources including the discretionary General Fund (including the CIP Fund), as well as sources with spending and use restrictions comprising a number of special revenue funds, enterprise funds, grants and bonds. Funding Sources Include:

- General Fund, CIP Fund
- Special Revenue Funds such as Measure BB Sales Tax (approved by Alameda County voters November 2014), Vehicle Registration Fee, State Transportation Tax (Gas Tax), Measure F (approved in November 2014 for parks facilities), Parks Tax, Playground Camp, Streetlight Assessment, UC Settlement
- Measure T1 Infrastructure GO Bond

- Enterprise Funds such as Zero Waste, Marina, Sanitary Sewer, Clean Storm Water
- Internal Service Funds such as Equipment Replacement Fund
- Federal, State, and Local funds and grants

Methods to fund the improvements have been discussed in the Vision 2050 report, the Infrastructure Program Plan and with various City funding measures. We will defer a detailed evaluation of the options to the City's Finance Department, Council's Budget and Finance Policy Committee and subject matter experts.

Based on peer practices and Berkeley's current assessed valuation growth, it is fiscally viable to issue a series of general obligation bonds totaling \$250 – \$300 million over the next 25 – 30 years, without breaching responsible debt thresholds. Doing so would allow the City to systematically address its backlog of infrastructure liabilities, minimizing cost escalation due to delays and creating a financially resilient public capital framework. In addition, Measure FF is demonstrating how financing infrastructure through parcel taxes is another viable option. This modifies the burden of who pays (i.e., removing funding from the perceived inequities from Prop 13-based assessed values) based on Prop 13) and lessens the interest costs of long-term bond issues.

Strategically leveraging investment earnings via a matching grant fund is a forward-looking mechanism that turns financial efficiency into external revenue, magnifying the City's capital resources. This model aligns with both fiduciary best practices and intergovernmental funding paradigms that increasingly prioritize local match capacity.

Geopolitical Landscape

Geopolitical and political forces directly shape Berkeley's infrastructure needs and funding. Global shifts in trade, energy, and migration patterns influence material availability, population growth, and regional service demand, requiring infrastructure that can scale and adapt. At the same time, changes in federal and state leadership affect funding priorities, grant eligibility, and local revenue streams, while ballot measures and political cycles determine the timing and scope of investments. Mandates often arrive without full funding, creating compliance pressures and diverting maintenance resources. To remain resilient and competitive, Berkeley must maintain shovel-ready projects, align with evolving state and federal priorities, and demonstrate measurable equity and climate benefits. By diversifying revenue through bonds, impact fees, public-private partnerships, and regional collaborations—and maintaining transparency in reporting—the city can build public trust and sustain the long-term infrastructure investments needed to serve a growing population in an unpredictable global environment.

Appendix E

Asset Categories Used for Prioritization in the 2022 Infrastructure Program Plan

Outcome 1 – Have Safe and Good Quality Streets

Streets are Safer, More Sustainable, Improved to a Good Condition, and Maintained

Having streets that are safer, use sustainable technologies, and are in “good” or better condition is a top priority from the community input, has been a subject of City audits, and is a priority of the Council. The asset categories to achieve this outcome are described below.

Asset Category 1.1 – Street Surface

The poor condition of Berkeley’s streets has been documented by the City Auditor’s report *Rocky Road: Berkeley Streets at Risk and Significantly Underfunded*, by residents’ complaints, and by an overall low Pavement Condition Index (PCI). On a scale of 0 to 100, streets in a “good” condition have a PCI between 70 – 79. Berkeley’s streets are “at risk” with an overall average PCI of 57. From a community survey conducted in the fall of 2021, improving the condition of Berkeley’s streets is one of the community’s highest infrastructure priorities. The target is to improve Berkeley’s streets to a PCI of more than 70.

Asset Category 1.2 - Sidewalks

Most Berkeley residents use a sidewalk daily, and many of us much more. Sidewalks in 2050 will be an even more important part of the transportation network. They will accommodate and promote the City’s trees and healthy urban forest, serve users of all levels of ability and accessibility, and use materials that help filter stormwater and reduce surface temperatures. At present, the City faces a backlog of thousands of sidewalk repairs that have been requested by residents.

Asset Category 1.3 – Bicycle and Pedestrian Plans

Eighty percent of the collisions that result in deaths or severe injuries on our streets involve someone riding a bike or walking. Making our streets safer means prioritizing bicycle and pedestrian safety. This is especially important to help more residents and workers choose these fossil fuel-free active transportation modes, and is why Berkeley’s vision for the future of its transportation network is to be multi-modal, fossil-fuel free, and equitably accessed. The City has adopted the 2017 Bicycle Plan and the 2020 Pedestrian Plan, and has identified projects to help to bring the City closer to these safe and accessible multi-modal goals. The City is transforming the City’s bicycle network into a low-stress experience with a goal of reducing motor vehicle conflicts and connecting cyclists with the most utilized portions of the City. At the end of the program, over 50 miles of city streets will comprise bikeways, with 15.8 miles of these streets being full bicycle boulevards that crisscross the City.

Asset Category 1.4 - Traffic Signals and Parking Meters

In support of creating safe and accessible intersections, the City of Berkeley is planning upgrades to existing traffic signals, including detection at 67 locations, ADA accessibility, pedestrian push buttons at 103 locations, and battery back-ups at 124 locations. Replacements and upgrades of 2,100 parking meters and 240 pay stations require attention as well.

Outcome 2 – Protect the Environment

Infrastructure is Resilient, Protects the Environment, and is Adapted to Climate Change Impacts

Global warming is a significant threat to communities globally and to the City of Berkeley. Berkeley's 2009 Climate Action Plan, 2016 Resilience Strategy, and 2019 Local Hazard Mitigation Plan establish city-wide actions to reduce greenhouse gas emissions and adapt to climate change impacts. The message is clear that the City's infrastructure must be resilient to prepare the City for these risks. Key goals of the City's climate action plans are to use energy more efficiently, transition to renewable energy as a power source for both buildings and transportation, improve access to sustainable transportation modes, recycle our waste, and build local food systems. The asset categories to achieve this outcome are described below.

Asset Category 2.1 - Stormwater and Watershed Management

The 2012 Watershed Management Plan (WMP) identified projects to improve storm drains, restore creeks, attenuate peak flows and to reduce pollutants entering San Francisco Bay. That project modelled the Potter and Codornices watersheds. The City is in the process of updating the WMP. The updated plan will consider flooding and drought caused by extreme storm events, sea level, and groundwater rise, implementation of the Green Infrastructure Plan, and modelling of all the watersheds. Infrastructure improvements will include storm drains, flow attenuation basins, permeable surfaces, bio-swales, and improvements at Aquatic Park.

The expected outcome is to have a stormwater system that addresses future climate impacts, reduces impervious surfaces, minimizes flooding, meets the City's stormwater discharge permit into San Francisco Bay, prevents pollution from reaching the San Francisco Bay, and revitalizes the urban watershed.

Asset Category 2.2 - Sewers

The City's wastewater collection system includes approximately 254 miles of City-owned sanitary sewers, 7,200 manholes and other sewer structures, seven pump stations, and approximately 31,600 service laterals. The City is responsible for maintenance and repair of the lower portion of the service laterals (located within the public right-of-way) from the property line cleanout to the connection to the City's sewer main. Wastewater generated in the City's collection system is conveyed to the East Bay Municipal Utility District (EBMUD) wastewater interceptor system and is treated at EBMUD's Main Wastewater Treatment Plant.

During the 1980s, EBMUD and the seven Satellite agencies conducted studies to address the problem of overflows and bypasses of untreated wastewater that occurred during large wet weather events due to excessive infiltration and inflow (I/I) into the collection systems. These studies resulted in a long-term program of construction of collection system relief sewers and sewer rehabilitation. The City has rehabilitated or replaced over 200 miles of its gravity sewers and associated lower laterals over the past 30 years. Since 2006, the City has also implemented a private sewer lateral (PSL) certification program requiring the inspection and/or repair or replacement of private (upper) sewer laterals at the time of property transfer or major building remodel.

The seven Satellites and EBMUD are in a Consent Decree with the U.S EPA, the State Water Resources Control Board, and the Regional Water Quality Control Board, which establishes requirements for achieving the elimination of untreated wastewater overflows and bypasses over the next 20 to 25 years.

The expected outcome is to comply with the City's requirements in the Consent Decree and seal the sewer system from storm water intrusion, thereby reducing the risk of untreated sewage reaching the Bay during wet weather. This will become even more important as storms intensify due to the climate crisis.

Asset Category 2.3 -- Undergrounding Overhead Utility Wires

The City of Berkeley's stated goal, as outlined in the General Plan, Disaster Preparedness and Safety Element, is to ensure the City's disaster related efforts are directed toward preparation, mitigation, response and recovery from disaster shocks. The Berkeley Local Hazard Mitigation Plan states that our two greatest disaster challenges are a Hayward Fault rupture and Wildland Urban Interface (WUI) fire. The climate crisis will result in periods of drought followed by very wet winters, producing heavy vegetation, dry summers, and hot easterly winds in the late summer. These conditions are known to create significant fires such as the 1991 Oakland Hills Tunnel Fire and fires in many parts of California in the past five years.

Methods to reduce the threat of overhead wires creating WUI fires include aggressive vegetation management and other fire hardening techniques. Overhead power lines, more so than undergrounded wires, can exacerbate unsafe conditions either by contributing to the disaster itself or hampering public safety efforts and evacuations. Earthquakes and landslides can knock over utility poles creating a special hazard. In an earthquake, poles tend to sway in opposite directions causing wires to snap and throw sparks. Some of California's biggest fires have started because of live wires in contact with combustible fuel.

The Public Works Commission led a three-phase study to underground overhead utility wires in Berkeley. The Phase 3 report recommended undergrounding along evacuation routes to support public safety through ingress of first responders and egress of community members in the event of a major disaster. The expected outcome is to implement the Phase 3 study recommendations to underground overhead utility wires along Berkeley's evacuation routes and to support neighborhoods in fire zones that choose to underground.

Asset Category 2.4 – Electrification of Buildings Neighborhoods and Transportation

A major goal of Vision 2050 is to decrease the City's overall climate impact. This effort requires both the reduction of City-wide energy use and transition away from fossil fuels to renewable energy. The *Existing Buildings Electrification Strategy* in 2021 transitions existing buildings in Berkeley from natural gas appliances to all-electric alternatives in a way that benefits all residents, especially members of historically marginalized communities. As identified in the City's Resilience Strategy and Climate Action Plan, Berkeley seeks an energy system that, by 2045, is carbon neutral and delivers carbon-free electricity across a highly distributed system. Multifaceted changes to existing infrastructure and its uses are required to achieve carbon neutrality. Improvements to the existing energy grid may include, among other items:

- Increasing electricity distribution capacity to accommodate neighborhood electrification and mobility charging, in coordination with streets and other infrastructure improvements
- Improving or expanding access to transformers, vaults, and switchgears
- Seeking opportunities to decommission gas pipes in areas where buildings or neighborhoods are transitioning to all-electric
- Supporting solar energy and storage for critical facilities that prioritizes renewable backup power over diesel generators, including mobile batteries and electric vehicle-to-building connections
- Increasing electric vehicle infrastructure for municipal fleet and distributed mobility charging for residents

Asset Category 2.5 – Urban Forest

The City's municipal forest includes approximately 42,000 street, park, and median trees. These are often referred to as "city trees" or "public trees." They are maintained by the Parks, Recreation, and Waterfront's Urban Forestry Unit, which performs pruning, removing, and planting trees. These trees are hard at work.

They remove pollutants and carbon dioxide from the air, help cool the City during the summer, absorb stormwater during storms, and help the City stay green and support a high quality of life.

However, there are approximately 10,000 vacant tree locations and many of these locations are in areas with higher proportions of low-income residents of color. Trees and greenery have traffic calming impacts and should be integrated in bike and pedestrian projects. The expected outcome is to increase our City's tree canopy by planting thousands more trees for the purpose of enhancing our urban forest, sequestering carbon, addressing equity, mitigating urban heat island impacts, reducing vehicle speeds, providing native wildlife habitat, and improving quality of life.

Asset Category 2.6 - Specific Resilience Infrastructure Assets

While limiting City-wide climate impact is necessary, the effects of global warming are already testing traditional infrastructure and will continue to push our resources to their limits. Worsening drought conditions, increased risk of extreme weather events such as flooding and sea level rise create major challenges for our water supplies, watershed management, and resilience of our underground infrastructure systems. These events also have implications on the safety, health, and well-being of the community. The City has identified several new technologies and infrastructure to build while working towards climate adaptation and resilience. Some of the new infrastructure and adaptation strategies include:

- Develop rainwater catchments, expanding the use of gray water and expanding the distribution and use of EDMUD recycled water (purple pipe) for landscaping irrigation.
- Use natural green infrastructure solutions including infiltration basins, wetlands, bioswales, permeable paving, etc. to mitigate flooding from the combined effects of groundwater, sea level rise, and extreme rain events.
- Increase the urban forestry canopy and use cool paving technologies to protect against extreme heat.
- Upgrade Community Resilience Centers and Resilience Hubs to ensure respite and evacuation capacity.
- Identify and manage urban – wildland forest canopy to mitigate wildfire risks.
- Install technologies such as air filtration to mitigate wildfire smoke impacts.
- Use “cool” paving and reduce dark asphalt street surfaces to combat urban heat island effects.
- Improve seismic safety systems in City facilities to reduce impacts from future earthquakes.
- Identify lighting improvements that enhance safety while minimizing damaging impacts of urban light pollution and net energy use.

Outcome 3 – Promote Quality of Life

Open Space, Parks, and Recreation Improve Our Quality of Life

A key outcome of the Vision 2050 initiative is to improve our overall quality of life through the promotion of open spaces, parks, and recreational opportunities. The asset categories to achieve this outcome are described below.

Asset Category 3.1 – Parks

The City has 52 parks that contain 15 athletic fields, 49 sports courts (basketball and tennis), and 63 play areas. Many parks need significant improvements to pathways, lighting, irrigation systems, play structures, and athletic fields. The expected outcome is to implement these improvements.

Asset Category 3.2 – Pools

The City has two swimming pools, one by King Middle School and the other at West Campus. The pools require improvements to the locker rooms and office areas, and improvements to piping, decking, tiling, and roofs. While the King pool has a 30-year lease, the West Campus site has a five-year lease with the possibility that a new pool will be built at San Pablo Park that serves south and west Berkeley residents.

Asset Category 3.3 – Park Buildings and Restrooms

The City has four community centers, 2 clubhouses, 29 restrooms, and outbuildings. Many of the required improvements have been made with funding from Measure T1. Future improvements include seismic/deferred maintenance at some park buildings, renovation of existing restrooms, and construction of new restrooms. The expected outcome is to implement the required improvements, including electrification, elimination of natural gas connections, and the addition of solar and battery storage, where feasible.

Asset Category 3.4 – Camps

The City of Berkeley's non-resident camps include Cazadero Camp located off the Russian River, Echo Lake Camp located just above South Lake Tahoe, and Berkeley Tuolumne Camp located just east of Yosemite Park. These camps include hundreds of facilities, amphitheaters, bridges, pathways, water systems, and swimming pools.

Two significant camp projects have been completed: 1) the rebuilding of Berkeley Tuolumne Camp, and 2) at Cazadero Camp, the Jensen Dorm, which was destroyed by a landslide in 2016, has been reconstructed. These projects are primarily funded by insurance.

Asset Category 3.5 – Waterfront

The Waterfront is the largest public marina in the Bay Area located on 125 acres of land and 50 acres of water, and includes approximately 1,040 berths, public access docks, pilings, channels, streets, pathways, parking lots, buildings, restrooms, buildings, and small boat launch ramps.

There are many funding needs at the Waterfront, where many of the facilities have reached the end of their useful life and are starting to fail. As documented in multiple reports, there is a diminishing ability to pay for the pressing capital needs in the Waterfront. The Marina Fund is the City's mechanism for managing all Waterfront revenues and expenditures. Revenues steeply declined in the last two years because of safety and security concerns and failing infrastructure. The combination of falling revenue and increasing expenditure needs have strained the relatively small Marina Fund to a breaking point.

The City has begun a long-term planning effort – the Berkeley Marina Area Specific Plan (Figure 9)– to establish the community's vision for the Waterfront and to plan for making the Marina Fund viable and stable. There is still a need to address urgent infrastructure repairs to finger docks, pilings, electrical systems, and restrooms. If these investments are not made, facilities and infrastructure will either require more costly emergency funding or be closed as in the case of the Berkeley Pier.

The goal is to make the urgent repairs, complete the Berkeley Marina Area Specific Plans, and to return the Marina Fund to solvency.

Outcome 4 – Have Safe Public Facilities

Public Facilities are Safe, Resilient, and Provide Community Placemaking

The City is responsible for maintenance of 95 facilities, not including Library facilities and facilities leased to other entities. These facilities include 39 facilities in the Parks, Recreation, and Waterfront inventory and 56 facilities in the Public Works inventory. These facilities house City staff and are places where residents receive public services. These facilities need to be safe, healthy, and resilient, and provide community placemaking, where the connection between people and these places is strengthened. The asset categories to achieve this outcome are described below.

Asset Category 4.1 – Public Buildings

In 2013, staff retained a consultant to perform assessments and provide updated condition reports and cost estimates for the City's facility inventory. The recommended improvements are extensive. All projects included in these assessments are considered either major maintenance or capital projects. Despite support from a variety of City funds, the cost for routine maintenance, major maintenance, and capital improvements far exceeds currently existing sources of funds.

The expected outcome is that condition assessments of the City's public buildings will be conducted regularly, and necessary improvements identified and completed. These improvements include electrification, elimination of natural gas connections, and addition of solar and battery storage, where feasible.

Asset Category 4.2 – Civic Center

The Civic Center comprises portions of the area surrounding Martin Luther King Jr. Civic Center Park including the Maudelle Shirek Building "Old City Hall" (1909) and the Veterans Memorial Building (1928). Presently, the historic buildings have decades of accumulated deferred maintenance and are seismically unsound. As part of the city's Measure T1 program, the Veterans Memorial Building and Old City Hall were slated for structural analysis and visioning of possible conceptual design alternatives, in concert with Civic Center Park. A consultant was retained to conduct a community outreach strategy, perform an assessment of the existing infrastructures, identify programs and functions for the two buildings, develop concepts for improvements for the Park. The consultant completed this work and presented a suite of financing and revenue generation strategies for the facility. City Council approved the following vision:

The Civic Center will be the heart of Berkeley's community. Civic Center will be the prime space for civic life, culture, and the arts. It will reflect the city's diverse identities, celebrate its history, and contribute to shaping its future. A place of shared resources and a platform for free expression accessible to all, Civic Center aims to manifest the city's values, advance social justice, and demonstrate the power of true public space.

Asset Category 4.3 – Transfer Station and Recycling Center

The city's current solid waste transfer station was opened in 1983. In the late 1980s, Berkeley's recycling operations relocated to the site to be operated by the Community Conservation Center. In the 1990s, the residential recyclable collection operator, the Ecology Center, was allocated an area at the site for its operations yard and office building. These facilities are not integrated and operations are not coordinated in a way that provides customers ease of use, access, or efficient drop-off of materials. These facilities do not meet current seismic requirements, have not been upgraded or improved since constructed, exceed their serviceable life, and cannot help meet the city's Zero Waste Goal.

The city retained a consultant to conduct a feasibility study to build a new solid waste transfer and recycling facility. Through active collaboration and community participation between November 2018 to May 2019, the city has developed a consensus around two conceptual facility designs.

The expected outcome is that the CEQA analysis and design of the approved project will be completed and a replacement facility constructed that helps the city achieve its Zero Waste goal.

Appendix F

Glossary of Terms

Term	Definition
AC Transit	Alameda Contra Costa Transit District
AMP	Asset Management Program
BART	Bay Area Rapid Transit
BUSD	Berkeley Unified School District
CIP	Capital Improvement Program
City	City of Berkeley
City staff	Employees of the City of Berkeley
Council	City Council of Berkeley
EBMUD	East Bay Municipal Utility District
Envision	The Envision Sustainable Infrastructure Framework is a comprehensive tool developed by the Institute for Sustainable Infrastructure to help infrastructure professionals plan, design, and deliver more sustainable infrastructure projects of all types and sizes. The Envision framework is a decision-making tool that allows infrastructure owners, engineers, designers, architects, planners, contractors, and other stakeholders to evaluate projects across a broad range of sustainability indicators that address environmental, social, and economic dimensions of sustainability to encourage systemic change. Envision not only asks <i>are we doing the project right</i>, but also <i>are we doing the right project</i>, and it is sensitive to resource constraints, as well as the diversity of mandates, schedules, budget cycles, and funding sources that may exist. Envision is intended for use during the planning, design, and construction stages of infrastructure development, while taking into account the project's operations, maintenance, and end-of-life phases.
FITES	Facilities, Infrastructure, Transportation, Environment and Sustainability Policy Committee
GF	General Fund
GO bond	General Obligation bond
GHG	Greenhouse gases
PG&E	Pacific Gas and Electric
Public commons	The area in the public right-of-way encompassing streets, sidewalks and related facilities.
PSPS	Public safety power shutoff
Vision Zero	Vision Zero is a data-driven strategy to eliminate all traffic fatalities and severe injuries while increasing safe, healthy, equitable mobility for all.

