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Measuring the Benefits and Burdens of Infrastructure in Disadvantaged Communities

New initiatives for targeted investment join longstanding efforts to improve wellbeing



In this report, the American Society of Civil Engineers (ASCE) highlights modern case studies where various states and localities targeted investments in disadvantaged communities prior to the White House Justice40 initiative framework. ASCE outlines possible methods for infrastructure stakeholders interested in assessing the benefits and burdens of legacy infrastructure investments to chart a more equitable, data-driven path into the future.





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Introduction

Infrastructure, or the built environment, is the foundation of a functional society. Basic physical structures and organizational facilities like roads, bridges, clean water, and dependable electricity are critical to public health and safety, national security, and economic growth. All communities should be able to experience the benefits of modern, reliable infrastructure. Many communities endure burdens from the lack of that infrastructure and more efforts are needed to achieve fair treatment, access, opportunity, and advancement for all people. Burdens have also taken the form of infrastructure designed and placed without equitable and inclusive engagement with affected communities.

To address these benefits and burdens, President Joe Biden issued Executive Order 14008, “Tackling the Climate Crisis at Home and Abroad,” in early 2021, which established the Justice40 Initiative, a requirement that 40% of federal spending from certain programs – including energy and infrastructure – go to disadvantaged communities.⁷ Since issuing the decree, the federal government has made significant strides toward identifying disadvantaged communities and directing resources to these populations.

To define disadvantaged communities, federal agencies worked with partners to collect and aggregate demographic and environmental data. The U.S. Environmental Protection Agency and the U.S. Department of Transportation were among the federal partners that published mapping tools to help interested grant applicants identify qualifying project areas. In February 2022, the White House also published the Climate and Economic Justice Screening Tool (CEJST), which generally defines “disadvantaged” as census tracts that have both environmental and socioeconomic challenges.⁸

Tools like the CEJST have helped agencies identify and prioritize projects that can help provide outsized benefits for disadvantaged populations. With the passage of two landmark bills – the 2021 Infrastructure Investment and Jobs Act (IIJA) and the 2022 Inflation Reduction Act (IRA) – record investments are now going to rural, economically distressed, and/or communities of color. With this funding, industrial contamination sites are being remediated, transit access is improving, and broadband service is expanding, among other benefits.

While the Justice40 program is new in name, it is not new in concept. The U.S. has a long history of directing federal infrastructure investments towards communities we would now identify as “disadvantaged.” To help rebuild the country after the Civil War, Congress passed the Pacific Railroad Act of 1862, which funded the construction of the Transcontinental Railroad.⁹ In the 1930s, the New Deal invested record amounts in infrastructure by creating the Tennessee Valley Authority, the Public Works Administration, and the Works Progress Administration. Included among these programs’ considerable accomplishments include the electrification of rural America, the construction of the Hoover Dam, the Upper Mississippi River locks and dams, and the laying of thousands of miles of storm drains and sewer lines.¹⁰ The New Deal’s investments in infrastructure targeted rural communities and unemployed Americans by providing jobs, spurring economic growth, and improving the quality of life for all Americans.

⁷ <https://www.whitehouse.gov/environmentaljustice/justice40/>

⁸ <https://www.whitehouse.gov/wp-content/uploads/2022/02/CEQ-CEJST-QandA.pdf>

⁹ <https://www.senate.gov/artandhistory/history/common/generic/PacificRailwayActof1862.htm>

¹⁰ <https://www.archives.gov/research/guide-fed-records/groups/069.html>

Today's Justice40 initiative is based on historical precedent but incorporates 21st-century capabilities. Investments in disadvantaged communities are made based on analysis of demographic data and environmental indicators, using GIS mapping. There's an expectation that funding decisions are made transparently and that investments yield returns. To that end, infrastructure owners across the U.S. must comprehensively assess the condition and capacity of infrastructure systems, consider whether historical underinvestment has taken place, and determine the extent to which increased funding can improve economic outcomes and quality of life.

ASCE is committed to engineering that recognizes, values, and addresses the unique needs of diverse demographic, social, economic, and cultural groups. Specifically, ASCE is committed to promoting accountability and the use of best practices for justice, equity, diversity, and inclusion (JEDI). The Society supports JEDI in the leadership of infrastructure investments, engagement with planning and infrastructure design, communication of infrastructure needs, and partnerships with stakeholder communities.

Furthermore, ASCE acknowledges the importance of social justice in the study and practice of civil engineering by incorporating its tenets into its Code of Ethics⁵, which calls on all members to “acknowledge the diverse historical, social, and cultural needs of the community, and incorporate these considerations in their work,” and to “consider and balance societal, environmental, and economic impacts, along with opportunities for improvement, in their work.



5 <https://www.asce.org/career-growth/ethics/code-of-ethics>

ASCE Report Card: Staggering Infrastructure Needs with Opportunities for Benefits

ASCE’s *Report Card for America’s Infrastructure*, released in 2021 and every four years prior, has identified stark needs across the built environment.⁶ Assigning letter grades from data-driven, replicable analysis, the Society has also shined a spotlight on opportunities from investment in resilient infrastructure. The Report Card issued most recently included grades in 17 categories, such as bridges, drinking water, roads, stormwater, transit, and wastewater. Overall, 11 of 17 category grades were stuck in the “D” range, a clear signal that our overdue bill on infrastructure is a long way from being paid off. Statistics below from our 2021 Report Card show some of the most pressing infrastructure challenges faced by American communities.

 **BRIDGES** 

In 2020, 42% of U.S. bridges were at least 50 years old, and 46,154, or 7.5%, were considered structurally deficient, meaning they are in “poor” condition. 178 million trips were taken across these structurally deficient bridges every day.

 **ROADS** 

Over 40% of America’s road system was found to be in poor or mediocre condition in 2021. As the backlog of rehabilitation needs grew, motorists were forced to pay over \$1,000 annually in wasted time and fuel. Traffic fatalities had declined when writing the 2021 Report Card, but even the pre-COVID low amounted to more than 36,000 people dying on the nation’s roads every year. The number of pedestrian fatalities was rising at that time and has continued to climb in recent years.

 **DRINKING WATER** 

There is a water main break every two minutes in communities across the country, and an estimated 6 billion gallons of treated water are lost each day in the U.S., enough to fill over 9,000 swimming pools. 9.3 million service lines contain lead, including more than 10% of drinking water lines in Illinois and Florida.

 **STORMWATER** 

Impervious surfaces in cities and suburbs are expanding, exacerbating urban flooding, which has resulted in \$9 billion in damages annually. Stormwater also affects water quality as polluted runoff from areas such as pavement and agricultural fields enters water bodies. Nearly 600,000 miles of rivers and streams and more than 13 million acres of lakes, reservoirs, and ponds were considered impaired.

The Report Card issued most recently included grades in 17 categories.

6 <https://infrastructurereportcard.org/>



TRANSIT



45% of Americans had no access to transit. Meanwhile, much of the existing system is aging, and transit agencies often lack sufficient funds to keep their existing systems in good working order. Over a 10-year period across the country, 19% of transit vehicles, and 6% of fixed guideway elements like tracks and tunnels were rated in “poor” condition.

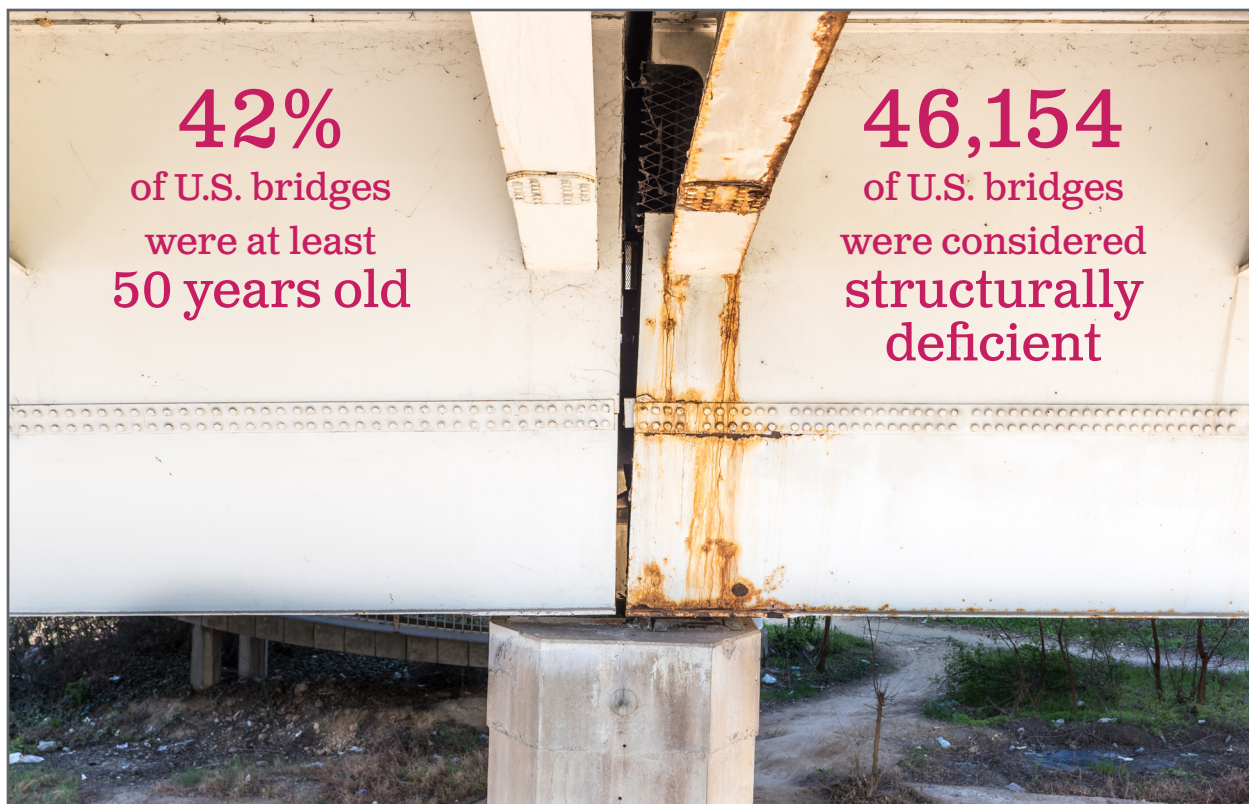


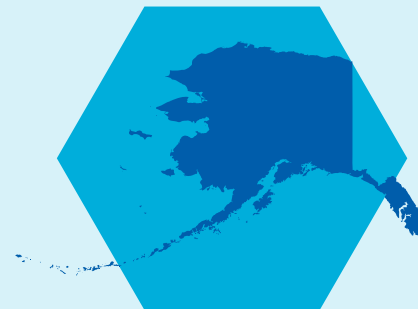
WASTEWATER



The nation’s more than 16,000 wastewater treatment plants are functioning, on average, at 81% of their design capacities, while 15% have reached or exceeded it. Growing urban environments signal a trend that these facilities will increasingly accommodate a larger portion of the nation’s wastewater demand. However, 20% of Americans were served in 2021 by on-site systems such as septic tanks.

The 2021 Infrastructure Investment and Jobs Act provides nearly \$550 billion in new federal spending over five years for a wide range of infrastructure categories and allocates some \$650 billion for existing infrastructure programs during the same five-year period. At the same time, the IIJA reauthorizes such key federal efforts as the surface transportation program and the Clean Water and Drinking Water state revolving funds.





Alaska: The Denali Commission Brings Broadband and Other Infrastructure Assets to Rural Communities

Key Takeaway: The Denali Commission has invested in rural Alaskan communities since 1998. In more recent years, it has developed ranking systems to identify priorities. Economically distressed communities are typically given higher priority during the grant application process.

Key Result: Investments in rural Alaska have resulted in outsized benefits for residents of more rural and often disconnected communities. In 2022, expanded broadband infrastructure resulted in some of the most rural parts of the state gaining access to high-speed internet, allowing locals to access jobs remotely.

Case Study:

The Denali Commission is an independent federal agency that provides infrastructure, utilities, economic support, and workforce development for communities throughout rural Alaska. It was first authorized by Congress via the Denali Commission Act of 1998. Today, the agency is led by seven commissioners appointed by the U.S. Secretary of Commerce: the Federal Co-Chair; the State Co-Chair (represented by the Governor of Alaska); and the Presidents of the University of Alaska, Alaska Municipal League, Alaska Federation of Natives, AFL-CIO Alaska, and Associated General Contractors of Alaska.

At the time of its inception in 1998, the Denali Commission's main priorities were climate adaptation, energy production, upgrading bulk fuel facilities, and ensuring rural villages could comply with the Oil Pollution Act of 1990. In 2019, the Commission returned to some of its legacy programs, including transportation, housing, water, and sanitation, and established a broadband program.

To improve the quality of life for rural Alaskans, the Denali Commission creates strategic partnerships between key federal, state, community, tribal, and private entities to leverage funds for projects. Because of the Commission's connections and leveraging of funds, worthy projects get funding. The Commission maintains a particular focus on stakeholders, such as village councils, municipal governments, and corporations. Funding is sourced from federal congressional appropriations through the Appropriations Committee for Energy and Water Development and Related Agencies, the State of Alaska, other federal agencies, and donations from non-federal entities. **From 1998 through 2022, the Commission has invested more than \$1.2 billion and leveraged over \$900 million from other sources to fund projects in over 300 Alaskan communities. Eighty to ninety percent of Commission funds go to majority indigenous communities, unserved communities, and historically underserved or unserved communities.**

Due to the geography of rural Alaska, the traditional block grant model used for similar projects in the rest of the United States does not work effectively. Community and Economic Development Program Manager Erik

Obrien describes the Denali Commission as the glue that simultaneously helps clients to understand the federal government and its often-complicated funding processes and helps the federal government to understand rural Alaska and the unique challenges and needs not seen in the lower 48 states (e.g., complex land rights) that may accompany a project.

To balance significant needs with limited funding, the Denali Commission uses various methods to make funding decisions. The first method is through a series of priority lists. For example, in the case of energy, the Commission works with partners like the Alaska Energy Authority, the Alaska Village Electric Cooperative, and the U.S. Coast Guard to create priority lists based on needs. With its partners, the Commission visits bulk fuel storage facilities to assess maintenance needs, whether due to excessive flooding, permafrost thaw, or other factors.

A similar priority list was developed based on Alaska's climate and resilience needs after the 2009 Government Accountability Office (GAO) report saying that limited progress has been made on relocating native villages threatened by flooding and erosion.⁷ The Denali Commission's Village Infrastructure Protection (VIP) Program focuses on rural Alaskan communities affected by erosion, flooding, and permafrost degradation. The Commission's 2019 Statewide Threat Assessment updated the GAO report to construct a combination score of these three threats on particular villages, thus allowing the Commission to numerically determine Alaska's most threatened communities.

A second decision-making tool is the Commission's annual appropriations process. It is uniquely and intentionally designed such that the Commission-based funds can be used as non-federal matches for other federal programs. Because of the Denali Commission's prominence in Alaska, partners often directly approach the organization with community and funding needs.

Thirdly, for decision-making, the Denali Commission keeps its application process relatively simple for those looking to secure funding through the initiative. Funding opportunity announcements (FOAs) are posted with an emphasis on a project's basic facts, such as scope, schedule, budget, target, and sustainability. The Commission allows for phased approaches to projects, recognizing that competitive opportunities are not always easy for small communities to apply for. Communities on certain priority lists like the Statewide Threat Assessment or those who are considered environmentally threatened or economically distressed through the criteria of screening tools, may be given higher preference points.

The Denali Commission has successfully invested in rural Alaskan communities, most recently by expanding broadband throughout the state. Investments from the Infrastructure Investment and Jobs Act, coupled with other federal pandemic relief programs, helped fund the build-out of fiber connections and stronger wireless internet capabilities.⁸ For example, Kodiak Station in Southwest Alaska, population 1,673, recently completed a broadband installation. This investment helped grow the population and provide new economic opportunities for long-time residents, some of whom report being able to work remotely and contribute to the local economy instead of relocating to larger cities.

7 <https://www.gao.gov/products/gao-09-551>

8 <https://www.murkowski.senate.gov/press/release/alaska-to-receive-100-million-in-additional-funding-for-rural-broadband-projects#:~:text=In%20addition%20to%20the%20%241,by%20the%20bipartisan%20infrastructure%20law.>



Texas: Investment in Disadvantaged and Border Communities: How Water Infrastructure Contributes to Improved Health Outcomes

Key Takeaway: Colonias are rural communities on the U.S.-Mexico border that are defined as lacking adequate water, sewer, and/or decent housing. They qualify as disadvantaged communities under the Justice40 initiative, but targeted investment programs date back several decades. Texas, home to more colonias than any other border state, has directed investment toward these communities with a combination of state and federal funding.

Key Result: Nearly \$1 billion in water and wastewater investments in Texas colonias resulted in a 24% reduction in hepatitis A incidence rates. Investments garnered significant improvements in other health outcomes and improved the quality of life for residents.

Case Study:

The U.S.-Mexico border is the home to over 2,000 *colonias*, defined by the U.S. Department of Housing and Rural Development as “rural communities that lack adequate water, sewer, or decent housing, or a combination of all three.” Colonias stem from practices in the 1950s where landowners would subdivide lots that lacked access to basic infrastructure and sold contract deeds to individuals seeking the American Dream. Of the border states, Texas has the most colonias, with over 500,000 residents, according to Texas’s Office of the Attorney General. According to the 1990 Census, the most recent tally to include these data, 36.6% of colonia residents are children. El Paso County alone is home to over 300 colonias.

As informal communities, every colonia looks different and is categorized under different jurisdictions: they may be incorporated under the city, unincorporated under the county, or even considered extra-jurisdictional territories of cities shared with the county. Due to their unique jurisdictional positioning, projects to improve their infrastructure may combine funding from federal, non-federal, and local sources.

One funding source for colonias is the Texas Water Development Board (TWDB). Established by the Texas legislature in 1957, the TWDB leads efforts to ensure a secure water future for the whole state. One of the TWDB’s main responsibilities is to “[administer] cost-effective financial programs for constructing water supply, wastewater treatment, flood control, and agricultural water conservation projects.” Accordingly, the TWDB runs more than ten financial assistance programs, including the Economically Distressed Areas Program (EDAP).

EDAP provides statewide funding for “projects serving economically distressed residential areas where water or sewer services do not exist, or existing systems do not meet minimum state standards.” Eligible EDAP projects must meet specific requirements, including: a median household income that is less than 75% of the state median, facilities that are inadequate to meet residents’ minimal needs, financial resources that are inadequate to provide water supply or sewer services to satisfy minimal needs, and the area was an established residential subdivision as of June 1, 2005. EDAP funding takes the form of a 70% grant and a 30% loan. A full-time, three-member Board appointed by the Governor considers all TWDB loan applications and awards grants. Since the inception of the program EDAP, along with other EDAP-related programs, has committed over \$950 million to projects in Texas.

While EDAP is not a border-only program, border colonias have often met these qualifications due to their vulnerability and general lack of infrastructure. Under 2019 Texas legislation, the TDWB is required to maintain formal prioritization criteria for projects in areas that address public health and safety and for projects in areas under enforcement actions. Projects are highly regulated from start to finish and include outlay reports so constituents can see where the money goes.

In addition to special agencies and commissions directing new investments to underserved communities – shepherding benefits – governments can evaluate previous investments in their communities and craft data-driven strategies to allay the burdens of infrastructure.



Another program supporting colonias is the U.S.-Mexico Border Water Infrastructure Program (BWIP), funded and administered by the U.S. Environmental Protection Agency (EPA). Created by the U.S. and Mexico in the 1990s, the BWIP oversees drinking water and wastewater projects in the region 100 kilometers north to 100 kilometers south of the shared border. Projects must “address existing conditions that will have a positive effect on health and environment in the U.S.,” and the EPA conducts a risk-based prioritization funding process every two years. Their criteria focuses on public health and environmental risk, cost-effectiveness, institutional capacity, and sustainability. Between 2003 and 2017, the BWIP provided access to safe drinking water to 70,000 homes and wastewater collection and treatment services to 673,000 homes for the first time.

The BWIP additionally partners with the North American Development Bank (NADBank), a bi-national institution that finances environmental infrastructure projects that impact both the U.S. and Mexico. Since its inception in 1994, the NADBank has financed 300 infrastructure projects and provided \$3.9 billion in loans and grants to benefit 19.8 million people on both sides of the border (100 kilometers north and 300 kilometers south). The NADBank’s Community Assistance Program and Border Environment Infrastructure Fund both prioritize water and wastewater infrastructure projects.

Dr. Maria-Elena Giner currently serves as the U.S. Commissioner of the International Boundary and Water Commission, United States and Mexico (IBWC), which applies boundary and water treaties between the two countries, and she previously served as General Manager of the Border Environment Cooperation Commission (BECC) in association with the NADBank. Dr. Giner’s dissertation research reports that residents in the eight counties with the largest colonia population experienced a 24% reduction in incidence of hepatitis A – a water-borne disease – after federal and state agencies invested about \$1 billion for first-time water and wastewater service in colonias between 1995 and 2017.⁹ Giner found that investments in water infrastructure contributed to significant improvements in health outcomes, thereby improving the quality of life for residents of American colonias. Despite significant progress, there are lessons to be learned and unintended consequences, such as the role of grant funding, the success of regional solutions, the inclusion of household connections in the projects, and oversized infrastructure due to the lack of expected growth.¹⁰

The Texas Department of Agriculture’s Community Development Block Grant program and Rural Development efforts from the U.S. Department of Agriculture also contribute resources to disadvantaged and rural communities. The Texas state water revolving funds represent a sixth source of support and capacity building for these areas.

9 Giner, M. E., Tellez-Cañas, S. A., & Giner, C. L. (2023). Assessing the impact of wastewater infrastructure along the Texas-Mexico Border: Did we make a difference on contagious diseases?. *Environmental Science & Policy*, 141, 126-137. <https://doi.org/10.1016/j.envsci.2022.12.008>

10 Giner, M.E., Pavon, M., 2021. A retrospective analysis of program outcomes and lessons learned on implementing first-time wastewater infrastructure in underserved communities in Texas from 1995 through 2017. In: *Environmental Challenges*. <https://doi.org/10.1016/j.envc.2021.100342>



California: LA County Public Works Prioritizes Data for Decision-Making

Key Takeaway: In its 2022-2027 Strategic Plan, Los Angeles County Public Works identified equity as one of five strategic focus areas. With support from the LA County Board of Supervisors, Public Works launched an “Equity in Infrastructure Initiative” to improve services and rethink how the agency can produce more equitable outcomes. The work intends to identify and reduce disparities that may be produced in the planning, delivery, and distribution of County investments and services; and to institutionalize this approach moving forward. The first step conducted a baseline equity assessment to establish a threshold understanding of potential disparities being created unintentionally by Public Works policies, practices, or investment decisions.

Key Result: The data-informed baseline equity assessment helped Los Angeles County Public Works, in partnership with key County leaders, identify critical systemic changes needed to ensure a more equitable distribution of resources and services in the future. The snapshot further helps the agency set realistic objectives and targets, develop necessary policy interventions, and monitor future performance against a clear starting point.

Case Study:

Los Angeles County is the most populous county in the United States. Nearly 10 million residents, or 27% of all Californians, live within county borders. If the jurisdiction were a nation, it would boast the 21st-largest economy in the world.¹¹ Los Angeles County Public Works agency (Public Works) is responsible for providing essential services, plus building and maintaining infrastructure across the 4,000-square-mile regional service area. This includes transportation, water resources, environmental services, and other core businesses. As of October 2023, the agency reported 714 active capital projects within its jurisdiction, with a construction value of more than \$3.13 billion.¹²

In recent years, Los Angeles County rethought how its Public Works Department provides services and makes investment decisions. Historical choices – including highway placement, stormwater infrastructure construction, and building industrial parks – adversely impacted certain communities, especially communities of color. Project implementation lacked an equitable decision framework.¹³

Equity is defined by the LA County Chief Executive Office as “the idea that differences matter and that systems must be balanced to distribute resources and opportunities needed to reach equal outcomes by treating everyone justly according to their circumstances.”

¹¹ https://file.lacounty.gov/SDSInter/lac/1139128_LACountyBytheNumbers.pdf

¹² <https://pw.lacounty.gov/landing/aboutus.cfm#:~:text=The%20agency%20also%20manages%20sustainable,value%20of%20over%20%243.3%20billion.>

¹³ <https://equity.pw.lacounty.gov/>



To improve the equitable distribution of the benefits and burdens of infrastructure, the Los Angeles County Board of Supervisors directed LA Public Works to make future decisions based on data, after extensive and authentic engagement with the community, and through a lens of equity.¹⁴ The Equity in Infrastructure Initiative was born, to create a “safer, more accessible, and resilient Los Angeles County.”¹⁵

To implement the Equity in Infrastructure Initiative, Public Works first took the critical step of assessing current benefits and burdens of infrastructure. The Baseline Equity Assessment consisted of four key questions, outlined below.

- 1) Investment Analysis: Are there disparities in the distribution of **recent and planned one-time built infrastructure project investments** within existing Public Works service areas?

To conduct its investment analysis, Public Works focused on transportation, water resources, and environmental service projects. It totaled investments made by compiling projects that were completed within the 5-year period prior to the analysis (2017–2022); projects under construction at the time of the analysis (2022);, along with planned projects going forward two years (2023–2024). To reach its conclusions, the agency omitted ongoing annual O&M expenditures and a few other categories of construction like vertical construction projects produced for other County departments.

Among the preliminary findings, Public Works reported that 51% – or 565 of recently completed or underway projects – are in disadvantaged communities, as defined by the White House’s Climate and Economic Justice Screening Tool (CEJST). However, just 32% of funding, or \$1 billion of the total \$3.13 billion available from 2017 to 2024, is being spent in those communities. Just over half of the total projects planned or recently completed by LA County Public Works are in disadvantaged communities, but those projects reflect only one-third of overall investment dollars made by Public Works.

- 2) Performance Analysis: Are there disparities in the **quality of infrastructure condition and services** currently provided within existing Public Works service areas (underserved areas)?

To answer this question, Public Works will continue to examine how it tracks project information including developing more sophisticated methods of determining quality discrepancies. The work of the Initiative revealed that when assessing projects and performance through a lens of equity, many aspects of current project information do not reflect a multi-dimensional collection of data. Industry markers for assessment more typically included cost, location, labor, and other aspects of that nature. However, working to accomplish more equitable outcomes will require tracking project elements not previously tracked and the ability to disaggregate data to uncover disparities according to equity-based criteria.

14 <https://equity-lacounty.hub.arcgis.com/>

15 <https://equity.pw.lacounty.gov/>

16 <https://file.lacounty.gov/SDSInter/bos/supdocs/160949.pdf>

3) Burden Analysis: Are there disparities in the **distribution of negative impacts** on communities within Public Works service areas (overburdened areas)?

Although data were limited in some regards, Public Works endeavored to better understand how its projects presented benefits and burdens beyond the specific geographic locations of projects. The analysis assessed benefits and burdens on a project-type basis rather than a per-project basis, which included project-types of water and transportation. Given this approach generalized the benefits and burdens by project-type, its important to note the analysis strived to be accurate on average and not project specific.

The analysis indicated high level general findings of the following trends:

- In general, more transportation projects were produced (507 transportation-type projects v. 207 water-type projects); however, more funding was provided to water-type projects than transportation-type projects.
- Residents within communities with concentrated and accumulated disadvantage generally receive some benefit from the 507 transportation-type projects, while residents in those same communities received less benefit from water-type projects.
- In general, investment per resident in communities with concentrated and accumulated disadvantage is lower (\$109 per resident) than in non-disadvantaged communities (\$154 per resident).
- Specific transportation projects within aviation or airport projects indicated the majority of both investment spending and project-related burdens occur in communities with concentrated and accumulated disadvantage.

This general analysis illustrated how further disaggregation of the data can reveal potential areas of disparity in investment, benefits, and burdens that require deeper reviews to better understand the circumstances contributing to the trend and to formulate an informed response to the trend.

4) Policy Review: Are any of LA Public Works' existing policies, procedures, or practices **functioning as system barriers** to achieving equitable outcomes?

LA County Public Works undertook a thorough review of Department-wide practices and procedures. It found substantive improvements have been made from previous decades, especially in the areas of recruitment, hiring, and contracting. However, not all equity-related policies were codified in writing, and efforts to advance equity were sometimes uncoordinated, especially among divisions. Importantly, advancing equity in Los Angeles County involves extensive and authentic stakeholder and community engagement.

Public Works created a starting point by which to measure future activities and policies by determining a baseline of existing disparities. Its snapshot further helps decision-makers set realistic objectives and targets, develop necessary policy interventions, and monitor future performance. Infrastructure owners across the country would benefit by conducting a similar analysis to make progress toward a more equitable distribution of resources.



Texas: Houston Public Works Looks at Equitable Investments to Prepare for Future Disasters

Key Takeaway: Houston’s resilience against future disasters hinges in part on equitable distribution of resources and availability of services in all communities, including those traditionally underserved or disadvantaged. To measure current weaknesses and identify

areas for improvement, decision makers utilized an equity indicators methodology first developed by the City University of New York. These equity indicators compare outcomes for two groups and measure their disparity, then aggregate outcomes into an overall score on a scale of 1 to 100, reflecting the disparity between the highest and lowest-scoring areas.

Key Result: The City of Houston received an equity score of 44.1 out of 100, indicating a need for improvement across the board. Overall, infrastructure received a score of 77.8 out of 100 in 2022, the highest score of the seven themes, indicating transit and mobility services are generally accessible, with fewer disparities between communities with resources and those that are defined as disadvantaged. The One Complete Houston report represents a roadmap forward with specific areas identified for focus and improvement.

Case Study:

Houston is Texas’ most populous city and the fourth most populous in the U.S. To support the city’s 2.3 million residents, Houston Public Works operates and maintains the city’s streets and drainage systems, the production and distribution of drinking water, the collection and treatment of wastewater, and permitting and regulation of public and private construction.¹⁸

In 2018, the City of Houston joined the Rockefeller Foundation’s 100 Resilient Cities, a network “helping cities around the world become more resilient to physical, social, and economic shocks and stresses.” In 2020, Houston published its official Resilience Strategy. “Link[ing] existing efforts with new ones that will collectively work to protect Houston against future disasters,” the strategy read, “—from hurricanes to extreme heat waves—and chronic stresses such as aging infrastructure, poor air quality, and flooding.” Goals included supporting equitable neighborhoods through community planning and programs, accelerating investments in inclusive housing and neighborhood development, and establishing recommendations for planning and land-use policies around clean air, clean drinking water, and pollution-free waterways. Resilient Houston also specifically called for an Equity Indicators program.¹⁹

¹⁸ <https://www.census.gov/quickfacts/fact/table/houstoncitytexas/PST045222>

¹⁹ <https://www.houstontx.gov/mayor/Resilient-Houston-20200518-single-page.pdf>

Houston released in 2023, “One Complete Houston: Understanding Our Equity Opportunities and Challenges.” The document resulted from collaboration between the Houston Planning and Development Department, the Mayor’s Office of Resilience and Sustainability, the Mayor’s Office of Complete Communities, and the Rice University Kinder Institute for Urban Research. One Complete Houston uses an equity indicators methodology developed by the City University of New York’s Institute for State and Local Governance. Equity indicators compare outcomes for two groups and measure their disparity. Then, all scores are aggregated into an overall score on a scale of 1 to 100, reflecting the disparity between the highest and lowest-scoring areas (the higher the score, the less disparity between groups). Other cities that have successfully used this methodology to develop their own equity reports include Dallas, New York City, Oakland, Pittsburgh, St. Louis, and Tulsa.

For Houston, the methodology uses data from 2021 and 2022 in 63 areas to measure whether opportunities are equally available to all residents. These areas are divided into seven broad themes: (1) Access & Inclusion; (2) Economic Opportunity; (3) Environmental & Climate Risks; (4) Health; (5) Housing; (6) Infrastructure; and (7) Public Safety. Each theme is subdivided into smaller topics with corresponding equity indicators. For example, the “Infrastructure” category includes the subtopics of transportation, connectivity & mobility, and green & resiliency infrastructure. The Houston methodology uses race and ethnicity, census tracts, and zip codes to differentiate comparison groups.

Under the “Infrastructure” theme, the report states that public infrastructure investments “can generate enormous community benefits—jobs, business opportunities, access to public transportation, and quality affordable housing.”

Overall, “Infrastructure” received a score of 77.8 out of 100 in 2022, which was the highest score of the seven themes but represented a drop of 4.3 points from 2021. Equity indicators examined access to a vehicle, public transportation access, commute time, street quality, sidewalk availability, traffic fatalities, drainage system adequacy, green stormwater infrastructure, and LEED certified buildings.

Though most “Infrastructure”-related indicators scored quite high, such as a 95 for public transportation access and a 98 for drainage system adequacy, the traffic fatalities indicator was distinctly low at 38 and had the largest drop in score between indicator years. This disparity is particularly notable due to Houston’s Vision Zero commitment to ending traffic deaths and serious injuries by 2030.

According to One Complete Houston, “equity is achieved when a Houstonian’s race, ethnicity, disability, gender identity, and/or sexual orientation, do not predict their outcomes or limit their choices.” The end goal of the report is to “help drive equitable policies, programs and services to meet communities where they are and allocate resources as needed to create better opportunities for all of Houston’s residents... to ensure limitless choices, opportunities, and freedoms, [the City] will invest and support historically underserved and marginalized communities.”

Overall, the City of Houston received an equity score of 44.1 out of 100, indicating a need for improvement across the board. One Complete Houston is the city’s first report focusing on equity and thus acts as a baseline for city leaders to reference.

Topic	Topic Equity Score	Equity Indicator	Equity Indicator Score
Transportation	85.3	Access to a Vehicle	83
		Public Transportation Access	95
		Commute Time	78
Connectivity & Mobility	63.0	Street Quality	70
		Sidewalk Availability	67
		Tragic Fatalities	52
Green & Resilient Infrastructure	85.0	Drainage System Adequacy	98
		Green Stormwater Infrastructure	80
		LEED Certified Buildings	77

Recommendations to Harness Benefits of Infrastructure Investment

Governments and other infrastructure stakeholders have many pathways to harness the benefits of infrastructure investment and address infrastructure burdens for disadvantaged residents and society. Modern, resilient infrastructure provides a stable platform for inclusive economic opportunity, public health, and thriving social connections. Many communities endure burdens from the lack of that infrastructure with historic underinvestment. Burdens have also taken the form of infrastructure designed and placed without equitable and inclusive engagement with affected communities.

Primary tasks for infrastructure decision-makers include identifying the burdens of inadequate facilities installed and designed without sufficient community input. New investments informed by those burdens can benefit communities to regenerate, grow, and thrive. The following are recommendations to consider as stakeholders pursue the goal of equitable investment of the built environment.

- 1) Any effort to assess the benefits and burdens from previous and proposed infrastructure investments needs to capture feedback from stakeholders and local communities. This engagement should be holistic in nature and based on ongoing relationships with resident communities lasting beyond individual project completions. Those bonds give a clearer picture of both the opportunities and shortcomings associated with projects that increase economic opportunity, improve health outcomes, and provide taxpayers with a return on investment.
- 2) Utilization of transparent and quantifiable metrics to increase the public's trust in the process of assessing infrastructure projects and making investment decisions. Written policies on equity that are promoted and publicized by leadership can further assist these efforts.
- 3) Post-project assessment methods are strongly encouraged. The public is more likely to support agency decisions when they can link previous decisions to improvements in their community. These assessment methods should measure and report on indicators like public health outcomes, economic opportunity, and the population reached.
- 4) Infrastructure owners looking to assess the burdens of historical infrastructure decisions and the benefits created by smarter investment decisions do not need to start from scratch. Existing tools like the White House's CEJST, USDOT's ETC Explorer, and EPA's EJScreen provide a strong foundation and can be customized with more local data and considerations.
- 5) Consideration of the benefits and burdens of historical infrastructure decisions does not stop at the analysis phase; subsequent infrastructure investment decisions should incorporate findings from the analysis and new data, tools, and values should inform future project decisions. This information should be used to develop projects for inclusion in master planning documents and capital investment programs.

Case Study Recap

Alaska: The Denali Commission Brings Broadband and Other Infrastructure Assets to Rural Communities

Key Takeaway: The Denali Commission has invested in rural Alaskan communities since 1998. In more recent years, it has developed ranking systems to identify priorities. Economically distressed communities are typically given higher priority during the grant application process.

Key Result: Investments in rural Alaska have resulted in outsized benefits for residents of more rural and often disconnected communities. In 2022, expanded broadband infrastructure resulted in some of the most rural parts of the state gaining access to high-speed internet, allowing locals to access jobs remotely.

Texas: Investment in Disadvantaged and Border Communities: How Water Infrastructure Contributes to Improved Health Outcomes

Key Takeaway: Colonias are rural communities on the U.S.-Mexico border that are defined as lacking adequate water, sewer, and/or decent housing. They qualify as disadvantaged communities under the Justice40 initiative, but targeted investment programs date back several decades. Texas, home to more colonias than any other border state, has directed investment toward these communities with a combination of state and federal funding.

Key Result: Nearly \$1 billion in water and wastewater investments in Texas colonias resulted in a 24% reduction in hepatitis A incidence rates. Investments garnered significant improvements in other health outcomes and improved the quality of life for residents.

California: LA County Public Works Prioritizes Data for Decision-Making

Key Takeaway: In its 2022-2027 Strategic Plan, Los Angeles County Public Works identified equity as one of five strategic focus areas. With support from the LA County Board of Supervisors, Public Works launched an “Equity in Infrastructure Initiative” to improve services and rethink how the agency can produce more equitable outcomes. The work intends to identify and reduce disparities that may be produced in the planning, delivery, and distribution of County investments and services; and to institutionalize this approach moving forward. The first step conducted a baseline equity assessment to establish a threshold understanding of potential disparities being created unintentionally by Public Works policies, practices, or investment decisions.

Key Result: The data-informed baseline equity assessment helped Los Angeles County Public Works, in partnership with key County leaders, identify critical systemic changes needed to ensure a more equitable distribution of resources and services in the future. The snapshot further helps the agency set realistic objectives and targets, develop necessary policy interventions, and monitor future performance against a clear starting point.

Texas: Houston Public Works Looks at Equitable Investments to Prepare for Future Disasters

Key Takeaway: Houston's resilience against future disasters hinges in part on equitable distribution of resources and availability of services in all communities, including those traditionally underserved or disadvantaged. To measure current weaknesses and identify areas for improvement, decision makers utilized an equity indicators methodology first developed by the City University of New York. These equity indicators compare outcomes for two groups and measure their disparity, then aggregate outcomes into an overall score on a scale of 1 to 100, reflecting the disparity between the highest and lowest-scoring areas.

Key Result: The City of Houston received an equity score of 44.1 out of 100, indicating a need for improvement across the board. Overall, infrastructure received a score of 77.8 out of 100 in 2022, the highest score of the seven themes, indicating transit and mobility services are generally accessible, with fewer disparities between communities with resources and those that are defined as disadvantaged. The One Complete Houston report represents a road-map forward with specific areas identified for focus and improvement.





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