REPORT TO BICYCLE AND PEDESTRIAN ADVISORY COMMITTEE

SUBJECT

Proposal for a Data-Driven Framework to Evaluate Bicycle & Pedestrian Projects in Santa Clara (Chan)

BACKGROUND

In July 2024, Bicycle and Pedestrian Advisory Committee (BPAC) Member Jenaro requested BPAC to discuss establishment of a data analysis working group that would measure the impact of BPAC on bike-friendly initiatives in Santa Clara (Attachment 1).

The City is committed to improving safety, mobility, and the use of active transportation. As the City develops its Vision Zero Plan, there is growing recognition of the need for a more expanded, data-driven approach that goes beyond traditional collision reports, which can underrepresent the full scope of safety concerns.

To address this, the BPAC member outlined a potential framework for evaluating bicycle and pedestrian projects using multiple data sources, including collision records, user counts, mobile GPS data, near-miss tracking, and other key performance indicators. This approach aligns with state and federal trends emphasizing proactive safety planning and outcome-based evaluation and could support measuring project effectiveness, guiding investment priorities, and strengthening future grant applications.

DISCUSSION

Current Approaches to Data-Driven Project Evaluation

To effectively evaluate bicycle and pedestrian projects, some jurisdictions have adopted practices that prioritize safety and data-informed planning. An expanded data strategy and evaluation framework could improve transparency, guide future investments, and help achieve active transportation and Vision Zero goals.

Key Data Collection Methods and Innovations

- Collision Data Integration
  Combine police collision reports with hospital trauma data and community reports to better capture underreported pedestrian and cyclist injuries. Tools such as public reporting maps and Intelligent Transportation Systems (ITS) sensors can supplement these efforts by tracking near-misses and risky behaviors.
- Bicycle & Pedestrian Counts
  Implement a mix of permanent automated counters and temporary manual counts to monitor usage trends and calculate collision rates. There is the potential to pilot emerging technologies

such as AI-enabled video counters prior to large-scale deployment.

- Multi-Modal Data Collection
  Include all micromobility users-bicycles, e-scooters, e-bikes, skateboards-by combining automated and manual classification counts. Have shared mobility providers submit anonymized trip data to better understand travel patterns.
- Mobile Phone and GPS Data
  Leverage anonymized smartphone data from providers like StreetLight to analyze walking and biking patterns citywide. Calibrate this data with on-the-ground counts to enhance accuracy and track post-project changes.
- Crowdsourcing and Surveys
  Use online tools and community surveys (e.g., BikeMaps.org) to collect feedback on near-misses, perceived safety, and user behavior. These sources can help identify issues not captured in official records.
- Automated Conflict Detection
  Apply video analytics at high-risk locations to detect and analyze near-misses using metrics such as time-to-collision. Partner with agencies or vendors to pilot this technology in a cost-effective way.
- Close Call Reporting and Sensor-Based Tools
  Encourage the public to report near-misses through web-based maps or forms. Explore dynamic sensing pilots using smartphones or micromobility devices to detect risky conditions in real time.

Potential Framework for Project Evaluation

- Baseline Data Collection
  Prior to implementation, collect key data such as multi-day bike/ped counts, five-year collision history, speed and volume data, and community surveys to establish a robust “before” baseline.
- During Implementation
  Use mobile counters, cameras, or integrated GPS systems to monitor temporary or pilot installations in real time. Telematics data from micromobility devices can provide insights into user behavior and compliance.
- Post-Implementation Monitoring
  Collect “after” data at regular intervals (potentially at 3, 6, and 12 months) to track changes in usage, speeds, collisions, and near-misses. Ensure consistent methodology for accurate comparisons. Use mobile data for broader system-wide insights.
- All-Mode Impact Assessment
  Expand evaluations to include impacts on motor vehicles, transit, and micromobility. Analyze mode shift and traffic diversion using origin-destination data or travel demand models, in coordination with agencies such as VTA and MTC.
- Community Feedback
  Conduct surveys, walking/biking audits, and public workshops post-implementation so that community feedback can assist with understanding project successes and areas for improvement that may not be evident in quantitative data alone.

Illustrative Case Studies and Best Practices

The following case studies and guidance illustrate the benefits of robust, data-informed evaluation

and planning:

- San Francisco used counts, GPS data, and surveys to link new bikeways to a 14 percent cycling increase, showing how mixed data sources can evaluate impact.
- Santa Barbara/Santa Cruz demonstrated that local before/after counts strengthen statewide tools like the Active Transportation Benefit-Cost Tool.
- Los Angeles collected trip data from e-scooter providers to address equity and improve infrastructure planning-highlighting the value of public-private data sharing.
- Vision Zero Cities (for example, NYC and DC) use collision data, near-miss reports, and community feedback to prioritize interventions, an approach aligned with Santa Clara's goals.
- NACTO's Guide recommends structured data programs and public dashboards to track trends and support transparent decision-making.

Institutionalizing the Framework

To support long-term success, the City can benefit from establishing an expanded data framework that promotes consistent collection, analysis, and use of transportation data across programs.

- Standardized Data Protocols
  Develop consistent procedures for collecting before-and-after data, including collision, count, and survey metrics.
- Invest in Counting Infrastructure
  Install permanent or mobile devices at key locations. Where feasible, integrate smart sensor technology into new infrastructure projects.
- Leverage Partnerships and Data Tools
  Collaborate with universities, research institutions, and vendors to access advanced tools and reduce staff burden. Ensure all data collection complies with privacy standards.
- Analyze and Report
  Publish clear, visual reports comparing pre- and post-project data. Highlight usage trends, safety outcomes, and community input. Share findings to inform future projects.
- Use Data to Guide Future Investments
  Incorporate evaluation results into funding decisions, capital improvement planning, and grant applications. Prioritize high-impact projects where data shows the greatest need or opportunity.

Other Considerations

Establishing an expanded data-driven framework will require the City to supplement its current data collection efforts. While some projects already include pre and post construction evaluations, often tied to grant requirements, a consistent citywide system for tracking vehicular and active transportation data will require additional staffing and funding, subject to City Council approval.

To begin addressing this need, the City has secured a one-year subscription to StreetLight, funded through a Vision Zero grant. Using anonymized mobile data, StreetLight monitors vehicle, bicycle, and pedestrian activity, providing valuable insights into travel patterns and safety trends at a broad scale.

Data collection strategies can be phased in over time. Lower cost tools such as community surveys

and manual counts can be deployed incrementally, while more advanced technologies such as ITS sensors and integrated data platforms will require greater investment. Some costs may be offset through regional partnerships or external grants.

As data from multiple sources is gathered, consolidating it into a centralized, accessible platform will be essential for maintaining consistency, improving coordination, and promoting transparency. A unified system would allow City staff and decision makers to monitor performance, minimize duplication, and better align future initiatives across departments and partner agencies. Additional hardware and software may be required to create a centralized platform.

Long-term planning should anticipate future growth and latent demand, meaning residents who would walk, bike, or use micromobility options if safer, more connected infrastructure were available. Realizing this potential is important to supporting population growth, advancing climate action goals, and adapting to evolving transportation preferences. Together, these elements could form the foundation for an improved strategy, as reflected in the City's pedestrian, bicycle, and creek trail master plans, as well as various specific plans.

RECOMMENDATION

To advance a data-driven investment approach, BPAC could place on a future agenda consideration for the creation of a data analysis subcommittee to serve in an advisory role. Working with City staff, this group could identify cost-effective, scalable data collection strategies and develop a key performance indicator framework aligned with available resources and city policies. The subcommittee's recommendations could help guide a more informed, performance-based approach to future active transportation projects. It is important to note that current staffing levels and funding does not support implementation of this proposal beyond the current one-year subscription to Streetlight. Any additional staffing or funding to support this effort requires the approval of the City and City Council.

Written by: Steve Chan, Transportation Manager, Public Works
Approved by: Michael Liw, Assistant Director/City Engineer, Public Works

ATTACHMENT

1. Work Plan Topic Request Form - Member Jenaro

City of Santa Clara
The Center of What's Possible

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Bi y le nd P destri n A visory Committ
Annu l Work Plan Topic Request Form

Requestor ame:	Guillermo Jenaro Rabadan	ate:	07/26/2024
Proposed Topic Title:	BPAC projects data collection and analysis		

ackground and Discussion: Please rovide justification regarding how this topic pertains to the Bicycle and Pedestrian dvisory Committee's roles and responsibilities:

Motion: Establishment of a Data Analysis Team for Project Impact Assessment
Objective: To set up a dedicated data analysis working group that will develop and implement an analytical framework for measuring the impact of BPAC projects on the bike-friendly initiatives in Santa Clara.
Background: The BPAC reviews several project proposals aimed at making Santa Clara a bike-friendly city. These projects include bike lanes, bike storage, and other related infrastructure improvements. However, decisions often require trade-offs regarding motor traffic impact, parking availability, investments, and prioritization. To make informed decisions and optimize resource allocation, it is essential to have a robust data-driven approach.
Cities renowned for their bike-friendly infrastructure, such as those in the Netherlands, have successfully implemented data-driven decision-making processes that highlights the efficiency and discipline in using data to drive urban transformation.
Proposal: This member proposes the establishment of a data analysis working group tasked with developing a comprehensive analytical framework. This framework will focus on measuring various impacts of BPAC projects, such as:

1 Increase in Bike Transit: i) Implementation of regular bike counts ii) Analysis of bike usage patterns over time.
2 Survey Integration: i) Conducting surveys to gather feedback from residents on bike infrastructure and its usability. ii) Assessing the satisfaction and needs of the biking community.
3 City Response to BPAC Initiatives: i) Monitoring city responses to BPAC recommendations and initiatives. ii) Evaluating the effectiveness of implemented projects.
4 Resource Utilization: i) Measuring the return on investment (ROI) for BPAC projects. ii) Analyzing the cost-effectiveness of different initiatives.