

Assignment 6: Individual Indicator Report

1. Indicator Title (1 point)

- Provide a concise and descriptive title for your indicator that reflects its focus.

Equity in Streetlight Repair Response Times across Calgary Communities

2. Domain Description (1 point)

This indicator belongs to the Social Domain of sustainability. A socially sustainable city ensures the safety, well-being, and equitable quality of life for all its residents. Functional public infrastructure, such as street lighting, is a fundamental municipal service that directly impacts public safety, security, and the perception of neighborhood upkeep. Equitable access to timely repairs of this infrastructure is a critical measure of a city's commitment to fairness, ensuring that no community is left in the dark due to systemic delays in service delivery.

3. Indicator Description (1 point)

This indicator measures the Streetlight Repair Equity Score for communities in Calgary, based on the City's 311 service request system. The performance is gauged by the Days_to_Resolve for each request, categorized into performance tiers (Response_Category), and flagged if it is considered a slow response (is_slow = 1). A high-performing community has a high proportion of requests resolved "Same Day" or within "1 Day," indicating efficient and reliable service. A low-performing community has a high proportion of requests that take "Over 2 Weeks," suggesting systemic delays. This metric is a direct measure of social sustainability as it reflects the City's ability to provide a core, safety-critical service equitably, which affects residents' sense of security and trust in local government.

4. Summary of Methods (3 points)

The analysis was conducted using the provided streetlight_requests.csv dataset.

Primary Dataset: Historical 311 service requests specifically for streetlight issues, spanning the 2024 calendar year.

Key Metrics: Days_to_Resolve, Response_Category, is_slow, comm_name, comm_code.

The method to calculate community-level performance would involve the following steps in GIS software (ArcGIS Pro):

- Data Aggregation: The individual streetlight request points were aggregated by community (comm_name/comm_code).
- Performance Calculation: For each community, the following were calculated:
- Fast Rate: The percentage of requests resolved as "Same Day" or within "1 Day."
- Slow Rate: The percentage of requests flagged as slow (is_slow = 1), indicating they took "Over 2 Weeks."

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- Equity Score Derivation: A composite equity_score (ranging from 0% to 100%) was derived for each community. This score positively weights the fast_rate and penalizes the slow_rate, providing a single metric for cross-community comparison.
- Spatial Analysis: The resulting community-level scores were joined to Calgary's community boundary polygons to create a choropleth map for visualizing spatial patterns of service equity.

5. Results (3 points)

• **Present your findings clearly. Include quantitative and qualitative information where applicable. Make sure the results are relevant and directly tied to your indicator.**

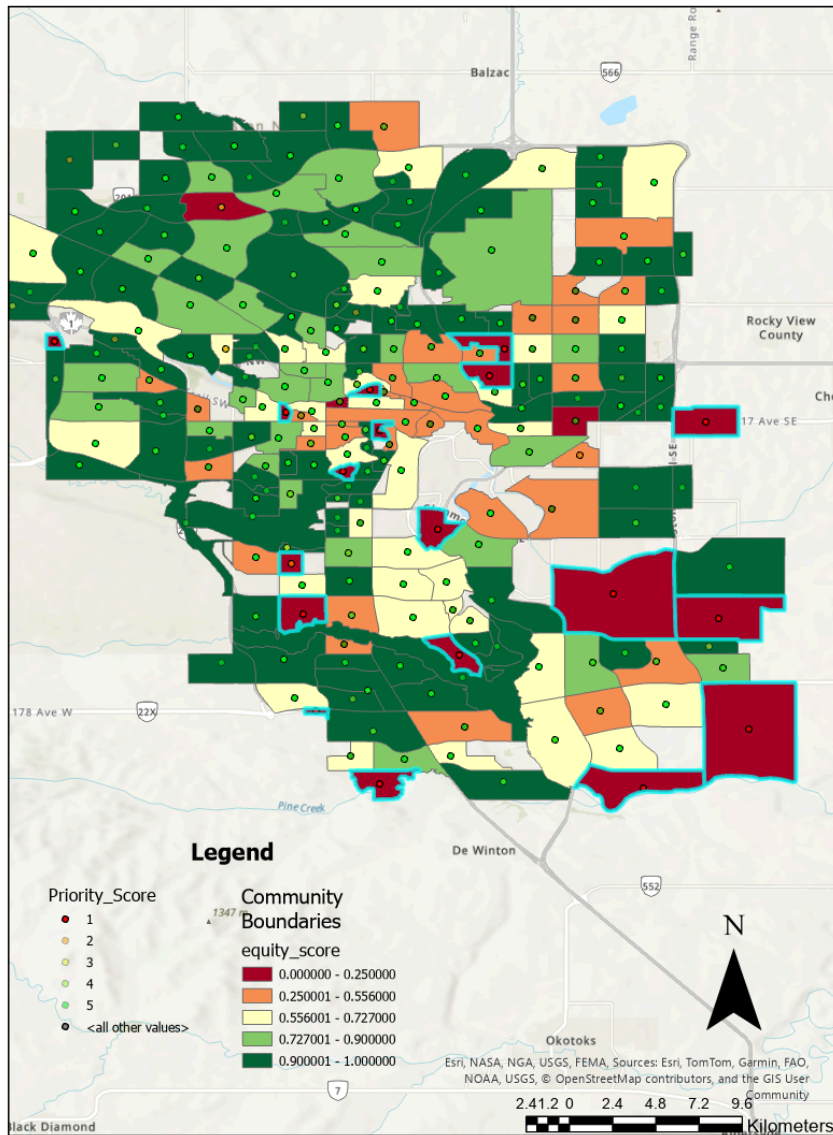
The analysis of 2024 streetlight repair requests reveals a stark disparity in service responsiveness across Calgary. Many communities, such as Thorncliffe (THO), Cambrian Heights (CAM), and Coventry Hills (COV), demonstrate high performance with a significant number of "Same Day" resolutions. However, several communities experience severe and persistent delays. Notable examples from the data include:

- A request in Bridgeland/Riverside (BRD) that took 100 days to resolve.
- A request in Downtown East Village (DNE) that took 292 days to resolve.
- A request in Inglewood (ING) that took 69 days.

Multiple requests in Oakridge (OAK), Forest Lawn (FLN), and Palliser (PAL) that remained open for over two months. The spatial pattern is not simply a core-periphery issue. While some inner-city communities like Inglewood and the Beltline (BLN) show delays, lengthy resolutions are also found in suburban communities, indicating a complex and patchwork distribution of service performance.

6. Visualizations and Maps (3 points)

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Map Explanation:

This choropleth map visualizes the Streetlight Repair Equity Score across Calgary. The stark contrast in colours immediately highlights the inequity in this essential municipal service. Communities shaded in red and orange are those where residents endure prolonged periods with malfunctioning streetlights, directly impacting nighttime safety and security. This visualization is critical for identifying neighborhoods that are systematically underserved. This map ultimately provides a clear, evidence-based tool for advocating for equitable resource allocation

7. Discussion of Results (3 points)

This indicator reveals that Calgary is trending away from social sustainability in the critical area of equitable streetlight maintenance. The existence of repair delays exceeding three months in multiple communities is unacceptable for a core public service that directly affects safety. Such inequity can perpetuate or worsen existing social and economic disadvantages. For example, consistently poor street

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lighting in a neighborhood can lead to increased fear of crime, reduced pedestrian activity after dark, and a decline in perceived neighborhood quality. The evidence from the dataset is unequivocal: the extreme range in repair times, from 0 days to over 400 days, signifies a profound failure in providing equitable service to all taxpayers and residents.

8. Conclusion and Recommendations (3 points)

In conclusion, there is a severe and unjust disparity in streetlight repair times across Calgary's communities, with some neighborhoods experiencing chronic neglect. To advance social sustainability and public safety, the City must take immediate and targeted action.

Recommendations:

Policy: Formally adopt a "Streetlight Service Standard" that mandates a maximum resolution time (e.g., 95% of repairs within 14 days) for all communities, with public reporting on performance against this standard.

Initiatives: Implement a "Priority Response Zone" program. Use historical equity score data to proactively identify and prioritize communities with a history of slow service. Allocate additional mobile crews or implement a different maintenance schedule for these zones to eliminate the backlog and prevent future delays.

Further Research: Conduct a root-cause analysis correlating slow response times with other datasets, such as community socioeconomic status (census data) or infrastructure age. This will help determine if delays are driven by resource allocation, parts availability, request volume, or other systemic factors.

9. Key Citations (1 point)

City of Calgary. (2025). 311 Service Requests. Open Data Portal. [Dataset used for derivative analysis: streetlight_requests.csv].

https://data.calgary.ca/Services-and-Amenities/311-Service-Requests/iahh-g8bj/about_data

City of Calgary. (2025). Community District Boundaries. Open Data Portal. [Community District Boundaries | Open Calgary](#)

Statistics Canada. (2023). 2021 Census Profile, Calgary [Census subdivision], Alberta.

<https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=Calgary>