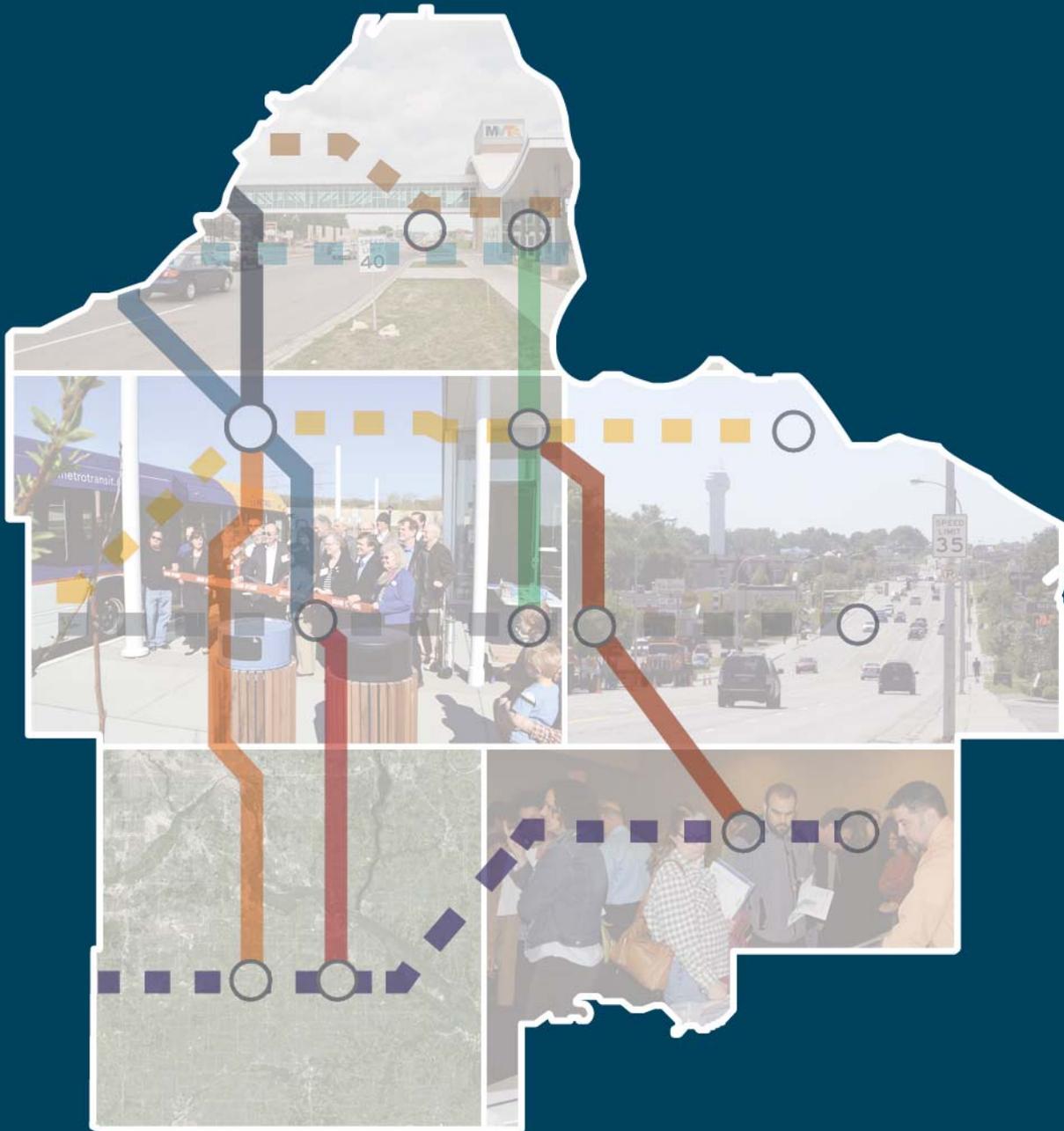




Dakota County East-West Transit Study EVALUATION FRAMEWORK MEMO

October 2016



Prepared for:



Prepared by:





Revision History

Revision Number	Date	Description
0	9/26/16	Initial draft to Dakota County for review & comment
1	10/4/16	Response to Dakota County's comments
2	11/15/16	Response to TAC's comments



Project Overview

East-west transit connectivity has come up frequently as an important topic for each transitway in Dakota County. As one nears the center of the Twin Cities Metropolitan Area, the ability to travel east-west becomes much easier than it is within and through Dakota County. With the primarily north-south orientation of the Red, Orange, and Blue Lines as well as the planned north-south orientation of the Robert Street and Red Rock corridors, all existing and planned transitway service in the area is largely designed to provide frequent service into the downtown cores of Minneapolis or Saint Paul and other areas north of Dakota County. However, many residents have few or no options to connect to transit centers, major destinations, and employment opportunities within and surrounding Dakota County. Improved service to MSP International Airport, Fort Snelling, Thomson Reuters, and Inver Hills Community College, to name a few, has been identified as a priority for several communities. Developing improved transit east-west service to provide a more comprehensive network for Dakota County, its cities, and the surrounding counties is critical to support these growing communities.

The Dakota County East-West Transit Service Study (East-West Transit Study) will review and identify existing and emerging needs for east-west oriented transit services and facilities in the county. The East-West Transit Study will look for opportunities to improve the reach and quality of transit service in Dakota County and improve connections to the regional transit system. Corridor-level recommendations will be developed to improve connections to employment, improve mobility to and from areas adjacent to the county, and expand the range of travel options for transit dependent populations. The study will also explore needs and opportunities to establish service that can provide continuity between the two separate service areas in the county operated by the Minnesota Valley Transit Authority (MVTA) and Metro Transit.

Purpose of Evaluation Framework Memo

The Evaluation Framework Memo details the goals of the East-West Transit Study, the measures used to evaluate each goal, and the rationale for including each goal or measure. A description of each measure, its data source, and its limitations are also included.

The quantitative measures will be used to prioritize the east-west corridors in Dakota County that best satisfy the study goals. Qualitative feedback collected from public outreach, public officials, the Technical Advisory Committee (TAC), and the Steering Committee will also be taken into consideration as east-west corridors are identified and evaluated. Ultimately, the goals and measures presented in this memo are intended to serve as a tool in the evaluation process.

Evaluation Assumptions

- **Buffer Distance:** Many measures are based on characteristics of the area surrounding each potential corridor. For these measures, a half-mile buffer was chosen as the extent of the analysis to allow for corridor-level comparisons without being too narrowly applied to a single route within the corridor. One limitation of the half-mile buffer is that it does not take into account travel distance to a transit stop on the street network; a destination that is a half-mile from a transit stop as the crow flies may be a mile or more on foot because of low intersection density. The inclusion of intersection density as a measure helps to address this limitation.
- **Uniform Distribution:** Many of the measures utilize data that is based on geographies that differ from the buffer used in this analysis. Data that is based on other geographies must be distributed to the area inside the buffer. In these cases, a uniform distribution of the data over the full original geography was assumed so that the portion contained within the buffer could be estimated.
- **Normalization:** In order to effectively compare corridors of different lengths (and therefore different buffer areas), all of the measures described in this memo are normalized based total corridor length or total buffer area, as appropriate.



Study Goals and Measures

The goals and measures outlined below were developed based on previous county transportation plans and transitway studies in the county and refined based on input from Dakota County staff, decision makers in the county at the Policymaker Workshop, the public at open houses, the Technical Advisory Committee, and the Steering Committee.

Goal 1: Identify east-west corridors that improve mobility for transit dependent populations

Providing transportation options for transit dependents populations, meaning people who are not able to drive for various reasons (lack of vehicle availability, cost of driving, disability, etc.), is key to identifying an east-west transit corridor that will benefit Dakota County’s most vulnerable residents.

MEASURES

Low-income Population Prevalence

- **Definition:** Density of persons under the 185% poverty line living within the corridor¹
- **Units:** Persons per acre

Vehicle Availability

- **Definition:** Number of persons over age 16 divided by the number of automobiles available within the corridor¹
- **Units:** Adults per available vehicle

Low-Wage Job Proximity

- **Definition:** Number of regional concentrations of low-wage jobs within the corridor divided by the area of the half-mile buffer
- **Units:** Low-wage job concentrations per acre

Disabled Population Prevalence

- **Definition:** Density of persons with disabilities within the corridor¹
- **Units:** Persons with disabilities per acre

Proposed measures	Defined as	Dataset
<ul style="list-style-type: none"> ■ Low-income population prevalence 	<ul style="list-style-type: none"> ■ Number of persons under the 185% poverty line in the census block groups within a half-mile of the corridor divided by the area of the half-mile buffer 	<ul style="list-style-type: none"> ■ 2014 ACS 5-year estimates; Metropolitan Council
<ul style="list-style-type: none"> ■ Vehicle availability 	<ul style="list-style-type: none"> ■ Number of people over age 16 divided by the number of vehicles available in the census block groups within a half-mile of the corridor 	<ul style="list-style-type: none"> ■ 2014 ACS 5-year estimates
<ul style="list-style-type: none"> ■ Low-wage job proximity 	<ul style="list-style-type: none"> ■ Number of regional concentrations of low-wage jobs within a half-mile of the corridor roadway divided by the area of the half-mile buffer 	<ul style="list-style-type: none"> ■ 2010 LEHD Data (compiled by the Metropolitan Council)

¹ Assuming equal distribution across the census block groups selected, applied to the corridor area.



- Disabled population prevalence
- Number of persons with disabilities in the census block groups within a half-mile of the corridor divided by the area of the half-mile buffer
- 2014 ACS 5-year estimates

NOTES & LIMITATIONS

People who are not able to drive due to age could also be considered transit dependent. However, based on direction from the Steering Committee, age was not included as a measure because of the high degree of personal variation in the impact of age on transit dependence. Additionally, the abilities of people with disabilities vary greatly. While many people with disabilities are able to ride fixed-route transit, some people with disabilities require Metro Mobility service.

Goal 2: Identify east-west corridors that are cost-effective and efficient

Cost-effectiveness and efficiency are important considerations for selecting east-west corridors where transit service is financially feasible. While total transit ridership is a key metric for assessing cost-effectiveness, various other measures serve as a proxy for potential ridership (population density, job density, etc.) and a separate measure is not included within this goal.

MEASURES

Operational Costs

- **Definition:** Qualitative assessment of relative operational costs (*applied to the highest performing corridors only*)
- **Units:** Cost tiers (to be determined)

Capital Costs

- **Definition:** Qualitative assessment of relative capital costs (*applied to the highest performing corridors only*)
- **Units:** Cost tiers (to be determined)

NOTES & LIMITATIONS

Without planning transit service operations, true cost estimates cannot be generated. Therefore, it was decided that this measure would not be numerically defined. Instead, it will be considered at a high-level in a later phase that includes service development along the highest performing corridors of this study.

Goal 3: Identify east-west corridors that maximize regional transit connectivity

Effective east-west transit corridors should maximize regional transit connectivity in order to provide access to destinations around the region, not just within the county.

MEASURES

Transitway Connections

- **Definition:** Number of existing or future transitways with stations within the corridor²
- **Units:** Number of connecting transitways per mile

Local Transit Route Connections

- **Definition:** Number of connecting local or express transit route trips within the corridor
- **Units:** Connecting transit trips per weekday per mile

² Based on the funded list of transitways in the 2040 Transportation Policy Plan.



Proposed measures	Defined as	Dataset
<ul style="list-style-type: none"> Transitway connections 	<ul style="list-style-type: none"> Number of distinct existing or future transitways with stations within a half-mile of the corridor roadway 	<ul style="list-style-type: none"> 2040 Transportation Policy Plan Current Revenue Transitways
<ul style="list-style-type: none"> Local transit route connection 	<ul style="list-style-type: none"> Number of distinct local or express transit route trips with bus stops within a quarter-mile of the corridor roadway 	<ul style="list-style-type: none"> Metro Transit & MVTA route data

NOTES & LIMITATIONS

Only local transit routes that currently have one or more bus stops within the corridor are included. The total number of trips by local transit route connections serves as a method of taking into account frequency of connecting service.

Goal 4: Identify east-west corridors that maximize transit ridership

Effective and efficient transit corridor investments are those that serve the greatest number of users. Existing and future corridor population density, existing and future corridor job density, and intersection density are all indicators of potential corridor ridership and are the measures for this goal.

MEASURES

Existing Population Density

- Definition:** Existing population density within the corridor³
- Units:** Persons per acre

Forecasted Population Density

- Definition:** Forecasted 2040 population density within the corridor³
- Units:** Persons per acre

Existing Job Density

- Definition:** Existing job density within the corridor³
- Units:** Jobs per acre

Forecasted Job Density

- Definition:** Forecasted 2040 job density within the corridor³
- Units:** Jobs per acre

Intersection Density

- Definition:** Density of public street intersections within the corridor
- Units:** Intersections per acre

Proposed measures	Defined as	
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³ Assuming equal distribution across the TAZs selected, applied to the corridor area.



■ Existing corridor population density	■ The number of people per acre in TAZs within a half-mile of the corridor roadway	■ 2010 TAZ projections
■ Existing corridor job density	■ The number of jobs per acre in TAZs within a half-mile of the corridor roadway	■ 2010 TAZ projections
■ Future corridor population density	■ The number of people per acre in TAZs within a half-mile of the corridor roadway	■ 2040 TAZ projections
■ Future corridor job density	■ The numbers of jobs per acre in TAZs within a half-mile of the corridor roadway	■ 2040 TAZ projections
■ Intersection density	■ Number of intersections per acre within a half-mile of the corridor roadway	■ NCompass Technologies Street Centerline data

NOTES & LIMITATIONS

These measures do not encompass all of the factors that are indicative of transit ridership; however, other major factors are included in the measures for other goals. Additionally, the measures for this goal do not take into account existing ridership levels due to lack of consistent data for the study area.

Goal 5: Identify east-west corridors that respond to travel patterns

Examining travel patterns is key to identifying which east-west corridors have the most potential as a transit corridor.

MEASURES

Daily Trips

- **Definition:** Daily trips per day beginning and ending within a half-mile of the corridor
- **Units:** Trips per day per acre

Daily Trips by Transit

- **Definition:** Transit trips per day beginning and ending within a half-mile of the corridor
- **Units:** Transit trips per day per acre

Potential Daily Transit Trips by Corridor Residents

- **Definition:** Number of daily trips by corridor residents to and from transit-accessible locations⁴
- **Units:** Potential transit boardings per day

Potential Daily Transit Trips by Corridor Workers and Visitors

- **Definition:** Number of daily trips by corridor workers and visitors to and from transit-accessible locations⁴
- **Units:** Potential transit alightings per day

Proposed measures	Defined as	Dataset
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⁴ Locations within a mile of existing transit service.



<ul style="list-style-type: none"> Daily trips 	<ul style="list-style-type: none"> All trips taken daily within a half-mile of the corridor roadway 	<ul style="list-style-type: none"> INRIX
<ul style="list-style-type: none"> Daily trips by transit 	<ul style="list-style-type: none"> All daily transit trips beginning and ending within a half-mile of the corridor 	<ul style="list-style-type: none"> On-Board Survey
<ul style="list-style-type: none"> Potential Daily Transit Trips by Corridor Residents 	<ul style="list-style-type: none"> Number of trips originating within the corridor that have transit-accessible destinations (both within and outside the county) 	<ul style="list-style-type: none"> INRIX, Home Interview Survey
<ul style="list-style-type: none"> Potential Daily Transit Trips by Corridor Workers and Visitors 	<ul style="list-style-type: none"> Number of trips originating from transit accessible locations (both within and outside the county) that have destinations in the corridor 	<ul style="list-style-type: none"> INRIX, Home Interview Survey

NOTES & LIMITATIONS

While quantitative data on future travel patterns is not available, data on future land use, forecasted population density, and forecasted job density is incorporated into this analysis as measures for goals four and six. Additionally, by defining the origination for Potential Daily Transit Trips by Corridor Residents and Potential Daily Transit Trips by Corridor Workers and Visitors as the trip’s home location, park-and-ride trips with homes outside the corridor are excluded. Furthermore, there are limitations with each of the datasets used for this goal. The Home Interview Survey (HIS) provides very specific information, but the survey sample is very small. The On-Board Survey (OBS) provides specific information, but the survey sample is fairly small and only captures existing transit riders. INRIX provides a very large data set of origin and destination information, but it only includes data from GPS devices and does not provide background demographic data. Lastly, measures three and four are based on areas currently served by transit and do not take into account any expansion of service in the future.

Goal 6: Identify east-west corridors that are supported by existing and planned land use

Some low-density land uses are unlikely to generate significant numbers of transit riders, such as low-density residential, agricultural land, large parks, and industrial areas. Effective transit service relies on high concentrations of potential users, such as high density residential and job centers. In addition to the specific land use, land use intensity is also related to ridership potential, which can be approximated based on the ratio of building coverage to overall parcel size; an office building covering most of a parcel is likely to generate more transit trips than a small building surrounded by open space.

MEASURES

Current Transit-Supportive Land Use Prevalence & Planned Transit-Supportive Land Use Prevalence

Transit-supportive land-use prevalence is defined as the percent of land within a half-mile of the corridor roadway that is a transit-supportive land use. Transit supportive uses include medium to high density residential, institutional, and commercial. Transit supportive land-use prevalence is measured for both 2010 and 2030.

Building-to-Parcel Ratio

- Definition:** Ratio of area covered by buildings to the total area within the corridor.
- Units:** Ratio

Proposed measures	Defined as	Dataset
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<ul style="list-style-type: none"> ■ Current transit-supportive land use prevalence 	<ul style="list-style-type: none"> ■ Percent of land within a half-mile of the corridor roadway that is currently a transit-supportive use. <ul style="list-style-type: none"> □ Transit supportive uses include medium to high density residential, institutional, and commercial 	<ul style="list-style-type: none"> ■ 2010 Generalized Planned Use from the Metropolitan Council
<ul style="list-style-type: none"> ■ Planned transit-supportive land use prevalence 	<ul style="list-style-type: none"> ■ Percent of land within a half-mile of the corridor roadway that is planned to be a transit-supportive use. <ul style="list-style-type: none"> □ Transit supportive uses include medium to high density residential, institutional, and commercial 	<ul style="list-style-type: none"> ■ 2030 Generalized Planned Land Use from the Metropolitan Council
<ul style="list-style-type: none"> ■ Building-to-parcel ratio 	<ul style="list-style-type: none"> ■ The average ratio between the finished square feet and overall parcel square footage for all parcels within a half-mile of the corridor roadway 	<ul style="list-style-type: none"> ■ 2015 Dakota County, Hennepin County, and Scott County parcel data

NOTES & LIMITATIONS

Land use designations are not standardized across municipalities, so there is likely some error in determining transit-supportive land uses. Additionally, industrial is assumed as a non-transit supportive land use. While this is generally accurate, there are some exceptions to this assumption. While these exceptions will not be captured by the transit-supportive land use measures, other measures, such as regional job or activity centers, sidewalk coverage, sidewalk density, intersection density, and building-to-parcel ratio will capture the benefit of the transit-supportive industrial developments.

Goal 7: Identify east-west corridors that improve access to employment, institutions, and services

Transit riders use transit to reach places of employment, institutions like schools and hospitals, and services like food shelves and government service centers. A corridor that serves several of these locations is likely to perform well as a transit corridor and benefit the community. Measuring opportunities for last-mile connections helps in identifying corridors that could serve a larger number of people if there were bike, walk, or shuttle connections available to activity centers just outside the half-mile buffer around the corridor.

MEASURES

Regional Activity and Job Center Connections

- **Definition:** Density of regional activity centers and job centers within the corridor⁵
- **Units:** Regional activity and job centers per acre

Key Institution Connections

- **Definition:** Density of key institutions and services within the corridor, including key employers, colleges, food shelves, Dakota County Service Centers, hospitals, and libraries
- **Units:** Key institutions and services per acre

Opportunities for Last-Mile Connections

- **Definition:** Density of regional activity centers and job centers further than a half-mile but within two miles of the corridor⁵

⁵ The Metropolitan Council maintains a database of regional activity and job center, defined as a location with a concentration of 10 or more jobs per acre, or a regionally significant manufacturing and distribution center that has more than 1,000 jobs.



- **Units:** Regional activity and job centers per acre

Proposed measures	Defined as	Dataset
<ul style="list-style-type: none"> ■ Regional activity and job center connections 	<ul style="list-style-type: none"> ■ Number of regional activity and job centers within a half-mile of the corridor roadway 	<ul style="list-style-type: none"> ■ Activity centers defined by the Metropolitan Council
<ul style="list-style-type: none"> ■ Key institution connections 	<ul style="list-style-type: none"> ■ Number of institutions and services within a half-mile of the corridor roadway including key employers, colleges, food shelves, Dakota County Service Centers, hospitals, and libraries 	<ul style="list-style-type: none"> ■ Institutions identified by engagement findings and local research
<ul style="list-style-type: none"> ■ Opportunity for Last-Mile Connection 	<ul style="list-style-type: none"> ■ Number of activity and job centers further than a half-mile but within two miles of the corridor roadway 	<ul style="list-style-type: none"> ■ Activity centers defined by the Metropolitan Council

NOTES & LIMITATIONS

The list of key institutions is not comprehensive and does not include cultural and religious institutions due to lack of data.

Goal 8: Identify east-west corridors that incorporate safe, convenient, and multimodal access and facilities

Transit users reach transit stops by walking or bicycling. Safer, more convenient access by walking or biking means higher ridership and easier connection to transit.

MEASURES

Safe, convenient, and multimodal access is measured by the number of crossing opportunities per mile, sidewalk and trail density, and sidewalk and trail coverage.

Crossing Opportunities per Mile

- **Definition:** Number of pedestrian crossing opportunities per mile, including traffic signals and other permanently marked crossings
- **Units:** Pedestrian crossings per mile

Sidewalk and Trail Density

- **Definition:** Total linear miles of existing and proposed sidewalks and trails within the corridor
- **Units:** Miles of trails and sidewalk per acre

Sidewalk and Trail Coverage

- **Definition:** Percentage of sidewalk or trail coverage along the corridor⁶
- **Units:** Percent sidewalk or trail coverage

Proposed measures	Defined as	Dataset
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⁶ Full coverage indicates sidewalks on *both* sides of the roadway; a corridor with sidewalk coverage on one side only would measure 50%.



<ul style="list-style-type: none"> ■ Crossing opportunity 	<ul style="list-style-type: none"> ■ The number of pedestrian crossing opportunities in the corridor with a traffic signal and/or permanent crossing signage/stripping divided by total corridor length 	<ul style="list-style-type: none"> ■ Aerial images
<ul style="list-style-type: none"> ■ Sidewalk and trail density 	<ul style="list-style-type: none"> ■ Total linear miles of existing and proposed sidewalks and trails within a half-mile of the corridor roadway divided by the total corridor buffered area 	<ul style="list-style-type: none"> ■ 2016 Dakota County, Hennepin County, and Scott County sidewalk and/or trail data
<ul style="list-style-type: none"> ■ Sidewalk and trail coverage 	<ul style="list-style-type: none"> ■ Percent of bi-directional corridor length covered by sidewalk or trail 	<ul style="list-style-type: none"> ■ 2016 Dakota County, Hennepin County, and Scott County sidewalk and/or trail data

NOTES & LIMITATIONS

These measures do not take into account many other factors that influence pedestrian and bike safety and comfort, such as tree cover, lighting, separation from car traffic, speed of car traffic, and presence of street furniture. This information was excluded from the analysis due to a lack of reliable data.