

Lab Report

Title: Final Project

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Project Repository: <https://github.com/greg-kohler/GIS5571/tree/main/Final>

Google Drive Link: N/A

Time Spent: 10

Abstract

Will summarize the different sections of this final project here.

Problem Statement

Urban freeway removal is becoming a relevant topic for transportation departments, governments, and community stakeholders. According to (*Alternatives | Rethinking I-94 — Minneapolis to St. Paul | Let's Talk Transportation - MnDOT*, 2023), in the Twin Cities, one of MnDOT's alternatives for I-94 is the removal of the freeway between the two downtowns and replacing it with an at-grade boulevard and urban development. The main argument against this is an increase in travel time and loss of convenience. In this project, I would like to explore how great this impact is.

Table 1 - Required Resources

#	Requirement	Defined As	(Spatial) Data	Attribute Data	Dataset	Preparation
1	MnGeospatial Commons	Open data used to download data	Road geometry	Speed limit, segment length, elevation	<u>Mn GeoSpatial Commons</u>	Calculated new fields
2	ArcGIS Pro Network Analysis	ArcGIS Pro tools used to define travel attributes of network	N/A	Time and length	Metro Road Network	Needed to adjust travel attributes
3	ArcGIS Pro Notebooks	Jupyter Notebooks used to store code for analysis	N/A	N/A	N/A	N/A

Input Data

The main source of data used in this project was the Road Centerlines from the Minnesota Geospatial Commons. This is line data of all roads in the Twin Cities metro and follows the Geospatial Advisory Council's Schema. It contains several attributes needed to generate a network dataset, including elevation, speed limit, road type, and one-way. This data

had to be altered slightly to calculate length in miles, and if the road is prohibited from private vehicles.

Table 2 - Input Data

#	Title	Purpose in Analysis	Link to Source
1	Road Centerlines (Geospatial Advisory Council Schema)	Raw input dataset for creating network dataset from MetroGIS	Mn GeoSpatial Commons
2	I-94 Removal	Line feature used to represent how I-94 will be removed.	Created locally

Methods



Figure 1 - Portion of I-94 Removed

The biggest piece of this project is the actual removal of I-94 from the network. For the removal of I-94, I chose to follow MnDOT's Rethinking I-94 guidelines, which extend from I-35W in downtown Minneapolis to Marion Street near downtown Saint Paul. I also chose to remove all ramps that connect to it. See Figure 1 for an overview of the pieces of I-94 that were removed.

Data flow diagrams will go here to show the process of downloading data, putting it into feature datasets, creating network datasets, and creating a service analysis layer. This will also show how it creates the service area based on an input feature.

Results

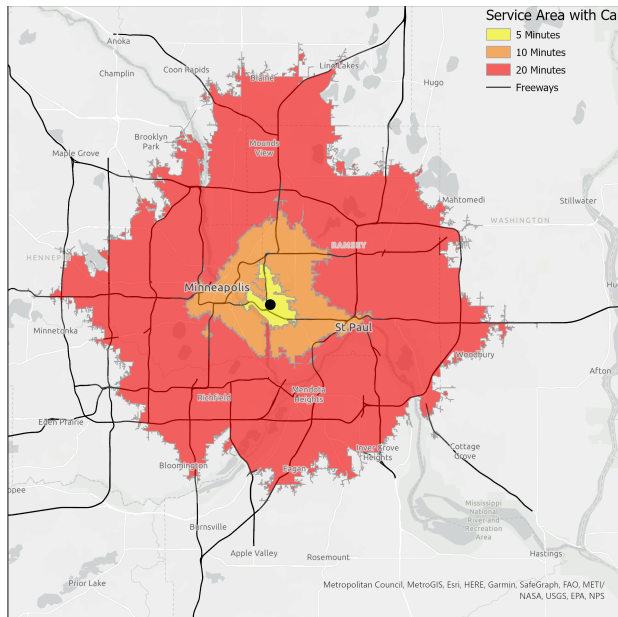


Figure 2 - Service Area With 94

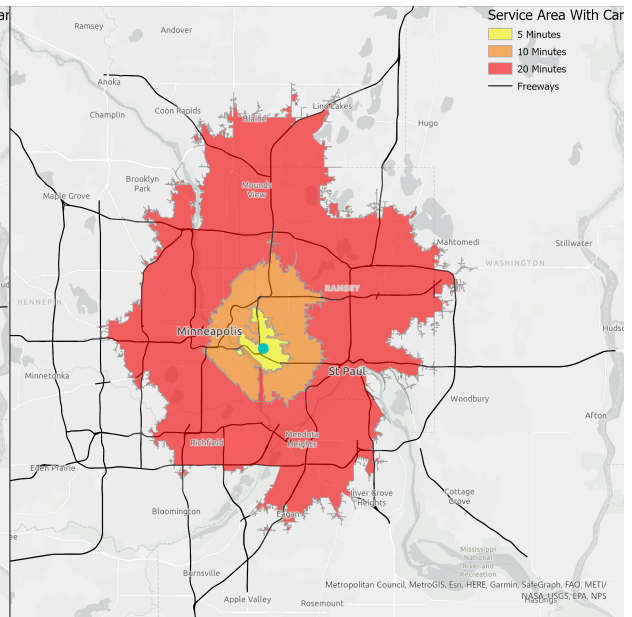


Figure 3 - Service Area Without 94

Here you can see two service area maps, Figure 2 shows the farthest you can go in 5, 10, and 20 minutes in a car from a point with I-94 in existence. Figure 3 shows the same but without I-94. This section will have more results with various points and travel times. It may also contain a mathematical comparison to calculate the average decrease in service area after the removal of I-94. This will be done by running a random sample of points around 94, calculating the service area, and doing a comparison of the polygon sizes.

Results Verification

Will compare my results to an ESRI network dataset to ensure the network was built correctly. This may also showcase the code used to build the network and verification of the math used to calculate the average decrease in service area.

Discussion and Conclusion

This section will discuss my thoughts on the impact of removing I-94 on travel time and service area. Once I know more results I will be able to formulate a longer discussion.

References

Alternatives | Rethinking I-94 — Minneapolis to St. Paul | Let's Talk Transportation - MnDOT. (2023, July 18). ; Minnesota Department of Transportation. https://talk.dot.state.mn.us/rethinking-i94/news_feed/alternatives

Self-score

Category	Description	Points Possible	Score
Structural Elements	All elements of a lab report are included (2 points each): Title, Notice: Dr. Bryan Runck, Author, Project Repository, Date, Abstract, Problem Statement, Input Data w/ tables, Methods w/ Data, Flow Diagrams, Results, Results Verification, Discussion and Conclusion, References in common format, Self-score	28	
Clarity of Content	Each element above is executed at a professional level so that someone can understand the goal, data, methods, results, and their validity and implications in a 5 minute reading at a cursory-level, and in a 30 minute meeting at a deep level (12 points). There is a clear connection from data to results to discussion and conclusion (12 points).	24	
Reproducibility	Results are completely reproducible by someone with basic GIS training. There is no ambiguity in data flow or rationale for data operations. Every step is documented and justified.	28	
Verification	Results are correct in that they have been verified in comparison to some standard. The standard is clearly stated (10 points), the method of comparison is clearly stated (5 points), and the result of verification is clearly stated (5 points).	20	
		100	