Traffic Study on Intersection of Ranshaw Way & Penn Street

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Overview of the Traffic Study

A traffic study was performed on Penn Street & Ranshaw Way corridors to evaluate the effects on the transportation network. The figure below shows the site's location in North Liberty and highlights the areas experiencing traffic congestion during peak morning hours.

Figure 1. Location of Traffic Congestion.

Goals and Design Methods

Our goal is to alleviate the existing traffic build-up that occurs in the morning in Penn Street without impacting the rest of the network. We utilized advanced traffic optimization software, known as 'Synchro', which uses the capacity analysis from the Highway Capacity Manual to conduct an analysis of the transportation network in order to reduce the delays and increase the overall level of service for the intersection..

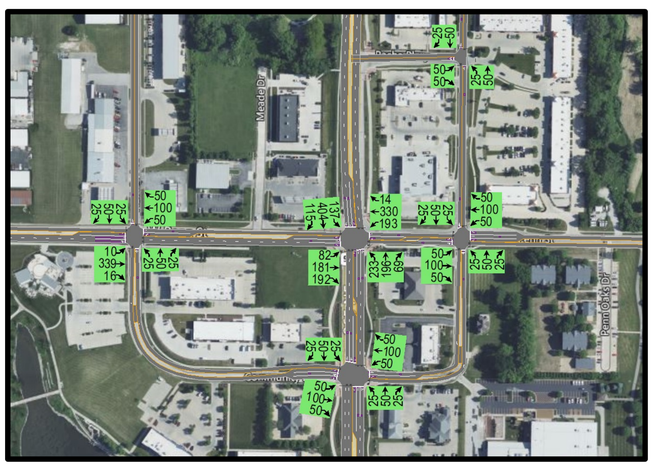

Figure 2. Synchro model.

References

1. https://iowadot.gov 2.https://iowasudas.org 3.https://intrans.iastate.edu

Final Design Alternatives

1. Phasing & Signal Timing Changes (Short-term Solution): We were able to improve the westbound approach level of service from D to C with a cycle length of 140 seconds. After forecasting this design alternative using Synchro, it was found to be suitable for 4 years.

2. Widening Penn Street (Long-term Solution): We analyzed this design alternative which consists of adding an additional lane to Penn Street. This solution was found to improve the overall level of service from C to B.

We recommend the City of North Liberty to implement the short-term solution of changing the phasing & signal timing to improve the current traffic congestion on Penn Street during the morning peak. Also, we recommend the City to consider widening Penn Street as a long-term solution.

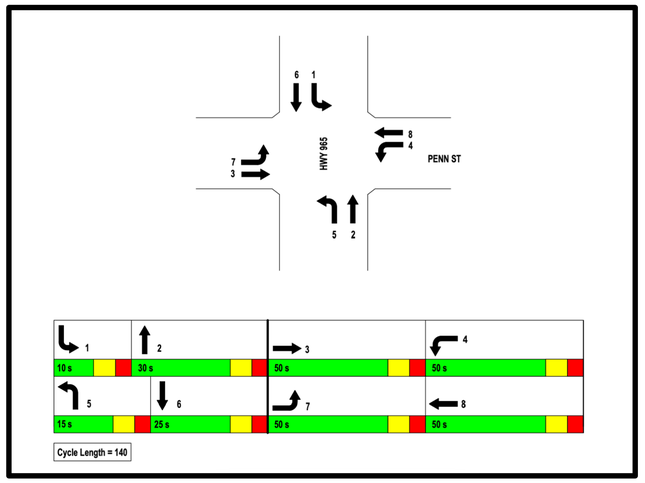

Figure 3. Proposed Phasing & Timing Changes.

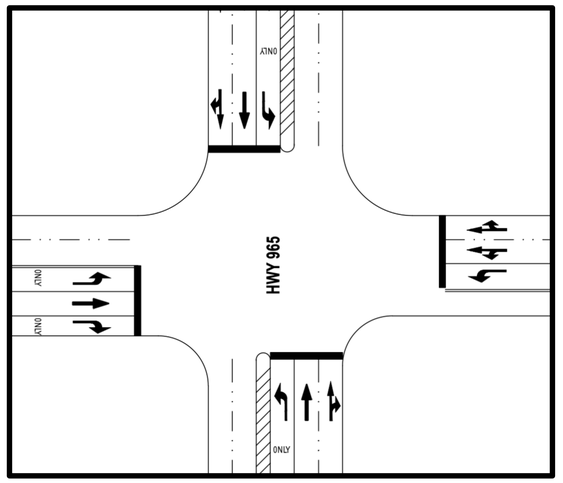

Figure 4. Proposed Widening Layout.

Project Cost Estimations

The project cost is estimated to be $275.00 for the short-term solution. The project can be done by a single engineer within a day of work. With also having a long-term solution in mind the cost estimate for widening is around $1,259,145.02 in the projected 10 years that widening would be needed.

Acknowledgements

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