

City of Harrisburg Transportation Master Plan

Final Report

March 2011

Completed For:

The City of Harrisburg, South Dakota




In Cooperation With:



By:



	<p>I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of South Dakota.</p>
	<p><u><i>Philip L. Gundvaldson</i></u> Date: <u>2/22/11</u> PHILIP L. GUNDVALDSON, P.E. License No. 9234 My renewal date is June 30, 2011 Pages or sheets covered by this seal: Entire Document.</p>

This report was funded in part through grant[s] from the Federal Highway Administration [and Federal Transit Administration], U.S. Department of Transportation. The views and opinions of the authors [or agency] expressed herein do not necessarily state or reflect those of the U.S. Department of Transportation.

Table of Contents

INTRODUCTION.....	1
Purpose and Study Objective	1
BACKGROUND	2
EXISTING CONDITIONS	3
Existing Land Use.....	3
Existing Roadway Network	4
Existing Traffic Volumes	6
Crash History	9
PROPOSED LAND USE.....	11
Population Projections.....	11
Parks and Trails Master Plan	14
Planned Capital Improvements.....	15
Proposed Traffic Volumes.....	17
INTERSECTION CAPACITY ANALYSIS.....	18
“Existing” Intersection Capacity Analysis	19
“No Build” Intersection Capacity Analysis	20
Improvements Identification	21
Traffic Signal Control.....	21
Addition of a Left-Turn to the Major Street.....	22
Addition of a Right-Turn to the Major Street	23
“Build” Intersection Capacity Analysis.....	23
IMPROVEMENTS ANALYSIS	28
Summary of Key Issues	28
“Build-Improved” Intersection Capacity Analysis.....	29
ELEMENTARY SCHOOL TRAFFIC IMPACT STUDY	31
Purpose and Study Objective	31
Trip Generation and Distribution	32
Proposed Traffic Volumes.....	35
Intersection Capacity Analysis	38
Summary of Elementary School Traffic Impact Study	40
TRAFFIC ANALYSIS CONCLUSIONS AND RECOMMENDATIONS	40
FUTURE ROADWAY IMPROVEMENT PROJECTS.....	45
Top Two Priority Projects.....	45
Remaining Prioritized Projects	46
FUNDING ALTERNATIVES.....	48
Preliminary Assessment Schedule for Top Two Priority Projects	49
Appendix A – Existing Roadway Pictures	A
Appendix B – Traffic Count Data.....	B
Appendix C – Crash Diagrams	C
Appendix D – Capacity Analysis Reports.....	D
Appendix E – Future Roadway Improvements Plan Sheets, Cost Estimates, and Preliminary Assessment Schedules	E

Appendix F – Miscellaneous Harrisburg City MapsF
Appendix G – Comments from Draft Report G

List of Exhibits

Exhibit 1 – Study Area Map2
Exhibit 2 – Existing Roadway Details4
Exhibit 3 – Existing Roadway Network Lane Configurations.....6
Exhibit 4 – Existing Average Daily Traffic (ADT).....7
Exhibit 5 – Existing AM and PM Peak Hour Traffic Volumes8
Exhibit 6 - Historical Census Data for Harrisburg, SD..... 12
Exhibit 7 - Annual Building Permits and Estimated Population 12
Exhibit 8 - Annual Projected Population for Harrisburg, SD 13
Exhibit 9 - Population Projection for Harrisburg, SD 14
Exhibit 10 – 2035 AM and PM Peak Hour Traffic Volumes 18
Exhibit 11 – Level of Service vs. Control Delay (unsignalized intersections)..... 19
Exhibit 12 – Level of Service vs. Control Delay (signalized intersections)..... 19
Exhibit 13 – Existing Conditions Operational Analysis Results20
Exhibit 14 – 2035 No Build Operational Analysis Results21
Exhibit 15 – 2035 Build Lane Geometry, Control Type, and LOS27
Exhibit 16 – 2035 Build Operational Analysis Results.....28
Exhibit 17 – 2035 Build-Improved Turn Lane Lengths, Lane Geometry, Control Type,
and LOS..... 30
Exhibit 18 – 2035 Build-Improved Operational Analysis Results.....31
Exhibit 19 – Opening Day Trip Generation Freedom Elementary School.....32
Exhibit 20 – 2035 Trip Generation Freedom Elementary School32
Exhibit 21 – Trip Distribution Percentage.....34
Exhibit 22 – Opening Day AM and PM Trip Distribution.....35
Exhibit 23 – Opening Day AM and PM Peak Hour Traffic Volumes36
Exhibit 24 – 2035 AM and PM Peak Hour Traffic Volumes w/out Elementary School....37
Exhibit 25 – 2035 Build-Improved AM and PM Peak Hour Traffic Volumes w/ Elementary
School38
Exhibit 26 – Level of Service – Cliff Avenue & Laura Street Intersection39
Exhibit 27 – Level of Service – 272nd Street & United Avenue Intersection39
Exhibit 28 – Level of Service – Minnesota Avenue & Future Street Access.....39
Exhibit 29 – 2035 Build-Improved Operational Analysis Results w/ Future Elementary
School and High School Accesses onto Minnesota Avenue40

INTRODUCTION

Purpose and Study Objective

This Transportation Master Plan was completed by HR Green, Inc. (HR Green) for the City of Harrisburg, South Dakota (City) to provide the City with a 25-year planning guide for its transportation needs. The report recommendations are based on traffic data collected in 2010 and expected growth. The report was completed in conjunction with information provided by the City of Harrisburg, City of Sioux Falls, Sioux Falls Metropolitan Planning Organization (MPO) and with assistance from the South Dakota Department of Transportation (SDDOT).

The objective of this study is to document and prioritize the transportation improvements needed in the City of Harrisburg to serve the current and anticipated (2035) users including pedestrians and bicyclists. Preliminary opinions of project costs for the top two priority projects are included as part of the report. The City intends to use the information for capital improvement planning purposes and to seek funding assistance for select projects.

The report includes recommendations for the following arterial street roadway segments:

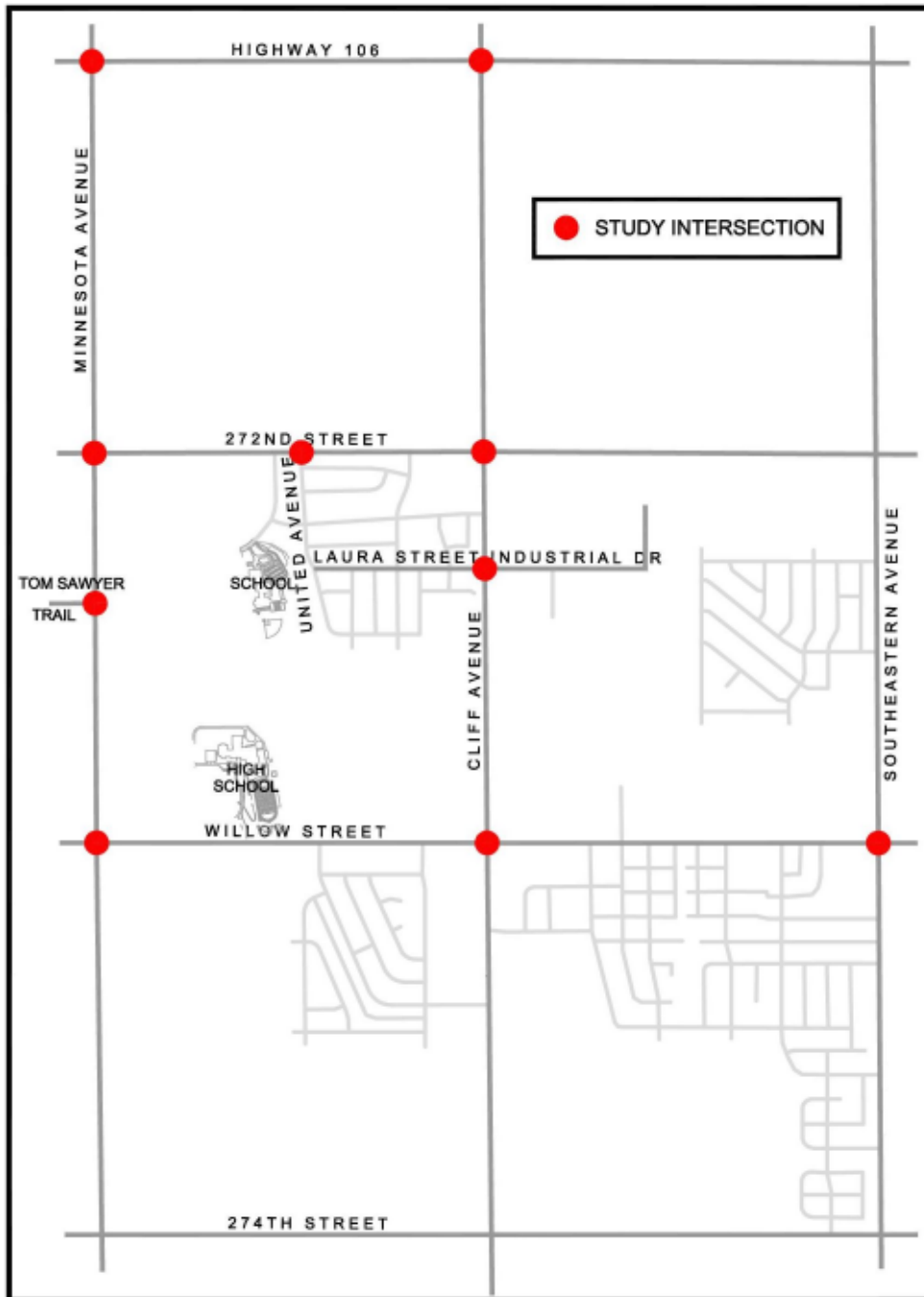
- Cliff Avenue from 274th Street to the proposed SD Hwy 100
- SD Hwy 115 (Minnesota Avenue) from County Hwy 110 (Willow Street) to the proposed SD Hwy 100
- Willow Street from Minnesota Avenue to Southeastern Avenue
- Southeastern Avenue from 274th Street to 272nd Street
- 272nd Street from Minnesota Avenue to Southeastern Avenue

The report includes recommendations for the following ten (10) intersections:

- Cliff Avenue and Willow Street
- Cliff Avenue and Laura Street/Industrial Drive
- Cliff Avenue and 272nd Street
- Cliff Avenue and Lincoln County Hwy 106
- Minnesota Avenue and Willow Street
- Minnesota Avenue and Tom Sawyer Trail
- Minnesota Avenue and 272nd Street
- Minnesota Avenue and Lincoln County Hwy 106
- Southeastern Avenue and Willow Street
- 272nd Street and United Avenue

This report also includes a traffic impact study for the new Harrisburg elementary school, Freedom Elementary, which is currently under construction. The findings of the traffic impact study for the school are included in a separate section of the report.

Exhibit 1 – Study Area Map



BACKGROUND

The City of Harrisburg is located approximately two and one-half (2½) miles south of the City of Sioux Falls in Lincoln County in eastern South Dakota. Harrisburg is a bedroom community to Sioux Falls, and has seen significant growth due to the strong economic conditions that occurred early in the past decade. In fact, the City has more than quadrupled in size in the past ten (10) years. With this growth has come new businesses, additional schools, and more traffic. FactFinder census data for the

community indicates that the average travel time to work for a Harrisburg resident is 19.1 minutes, indicating that most people travel to Sioux Falls for employment.

The City of Harrisburg has long been aware that their existing transportation system is in need of improvements to address growth and traffic volumes. Two major rural highways cross the community. These rural two-lane roads have few turn lanes and can be prone to queuing at intersections during peak travel times. The City is completing this Master Plan to help determine which roads and intersections are in most need of improvement, and the type of improvements needed.

EXISTING CONDITIONS

Existing Land Use

The existing zoning map is provided in Appendix F. The City of Harrisburg serves an area of approximately 1,800 acres.

Single- and multi-family residential land uses comprise the greatest amount of land area in Harrisburg. They vary from low/medium density to high density with the majority of the existing residential development being low/medium density. Residential land use is segmented into the following four areas within the City:

- The area south of Willow Street between Cliff Avenue and Southeastern Avenue
- The quarter section southwest of the intersection of Cliff Avenue and Willow Street
- The quarter section southwest of the intersection of Cliff Avenue and 272nd Street
- The area east of the Burlington Northern Santa Fe Railroad, north of Willow Street, and west of Southeastern Avenue

Commercial development is located primarily along Willow Street between Cliff Avenue and the Burlington Northern Santa Fe Railroad. There is also some commercial land use along Cliff Avenue in the Industrial Park, and near the intersection of Cliff Avenue and 272nd Street.

The City's Industrial Park is located in the quarter section southeast of the intersection of Cliff Avenue and 272nd Street. Current and anticipated businesses are considered dry industrial companies. In discussions with the City, no significant industrial development or expansion is anticipated. However, several lots remain available, and over time these areas are expected to fill in with additional dry industrial companies.

Harrisburg also has two elementary schools, a middle school, and a high school. Liberty Elementary is located on the north side of Willow Street, just west of the Burlington Northern Santa Fe Railroad. Freedom Elementary is currently under construction and is located in the southeast corner of the quarter section southeast of Minnesota Avenue and 272nd Street. It is scheduled to open in the fall of 2011. The Middle School is located on the east side of Cliff Avenue, a quarter mile south of the intersection of Cliff Avenue and Willow Street. The high school, including athletic facilities, is located on the north side of Willow Street, just east of Minnesota Avenue. There are also several churches scattered throughout the community.

Several undeveloped areas exist within city limits. They include lots and undeveloped parcels within existing developments. They also include the following areas:

- Southern half of the Greyhawk Addition (area east of the existing wastewater lagoons and northwest of the intersection of 274th Street and Southeastern Avenue)
- The undeveloped area on either side of Cliff Avenue on the south side of the City
- Portions of the undeveloped quarter section northeast of the intersection of Cliff Avenue and Willow Street
- Land adjacent to the north side of Willow Street, east of the Burlington Northern Santa Fe Railroad, and south of the Legendary Estates Addition

The quarter section located northwest of the intersection of Cliff Avenue and Willow Street is not currently within the city limits. However, this area will likely be developed within the next 25 years.

The current land use also includes parks, drainage ways, and the cemetery. These uses are scattered about the City. Detention ponds are considered part of the drainage ways.

Existing Roadway Network

Exhibit 2 shows the speed limit, section, and surfacing type of the study roadway sections. Pictures of the study arterial roadway sections and intersections are included in Appendix A.

Exhibit 2 – Existing Roadway Details

INTERSECTION Primary and Cross Street	POSTED SPEED LIMIT (MPH)		TYPICAL SECTION		SIDEWALK		SURFACE TYPE	
	Primary	Cross Street	Primary	Cross Street	Primary	Cross Street	Primary	Cross Street
Cliff Avenue and Willow Street	35	35	24' Rural	24' Rural	No	No	Asphalt w/ Sealcoat	Asphalt w/ Sealcoat
Cliff Avenue and Laura Street/Industrial Drive	45	20	24' Rural	Urban-36' B-B	No	North & South	Asphalt w/ Sealcoat	Asphalt w/ Sealcoat
Cliff Avenue and 272nd Street	55	35	24' Rural	24' Rural	No	South	Asphalt w/ Sealcoat	New Asphalt-East Gravel-West
Cliff Avenue and Lincoln County HWY 106	55	55	24' Rural	24' Rural	No	No	Asphalt w/ Sealcoat	Asphalt w/ Sealcoat
Minnesota Avenue and Willow Street	55	55	24' Rural	24' Rural	No	No	Asphalt w/ Sealcoat	Asphalt w/ Sealcoat
Minnesota Avenue and Tom Sawyer Trail	55	Not Posted	24' Rural	Urban-Residential	No	No	Asphalt w/ Sealcoat	Asphalt w/ Sealcoat
Minnesota Avenue and 272nd Street	55	35	24' Rural	24' Rural	No	No	Asphalt w/ Sealcoat	Asphalt w/ Sealcoat
Minnesota Avenue and Lincoln County HWY 106	55	55	24' Rural	24' Rural	No	No	Asphalt w/ Sealcoat	Asphalt w/ Sealcoat
Southeastern Avenue and Willow Street	35	35	24' Rural	24' Rural	No	No	Asphalt w/ Sealcoat	New Asphalt
272nd Street and United Avenue	35	20	24' Rural	Urban-Residential	No	East & West	Gravel	Asphalt w/ Sealcoat

Willow Street is a rural section two-lane roadway. The speed limit is 55 mph at Minnesota Avenue, 35 mph east of Minnesota Avenue, transitions to 25 mph just east of Cliff Avenue, and returns to 55 mph east of Southeastern Avenue. Willow Street has one westbound right-turn lane entering into the high school and no other turn lanes within the study area. The intersection of Cliff Avenue and Willow Street is an all-way stop controlled intersection, and the intersection of Willow Street and Southeastern Avenue is two-way stop controlled with traffic stopping on Southeastern Avenue.

Minnesota Avenue is a rural section two-lane roadway with left-turn lanes at Willow Street. The intersection of Minnesota Avenue and Willow Street is an all-way stop controlled intersection. The speed limit on Minnesota Avenue is 55 mph north of Willow Street and 55 mph south of Willow Street. Tom Sawyer Trail is a residential dead-end street connecting to Minnesota Avenue’s west side and is stop controlled with traffic stopping on Tom Sawyer Trail. The intersection of Minnesota Avenue and 272nd Street is two-way stop controlled with traffic stopping on 272nd Street. The speed limits on both Minnesota Avenue and 272nd Street are 55 mph in all directions. The intersection of Minnesota Avenue and Lincoln County Hwy 106 is all-way stop controlled, and the

speed limits on both Minnesota Avenue and Lincoln County Hwy 106 are 55 mph in all directions.

Cliff Avenue is an urban section two-lane roadway from ½ mile south of Willow Street to Willow Street with left-turn lanes at the Middle School for southbound traffic and a speed limit of 35 mph. Cliff Avenue is a rural section two-lane roadway from Willow Street north to Lincoln County Hwy 106. The intersection of Willow Street and Cliff Avenue is all-way stop controlled with left-turn lanes on Cliff Avenue. The speed limit on Cliff Avenue is 35 mph north of Willow Street and increases to 45 between Willow Street and Laura Street. The speed limit increases to 55 mph towards 272nd Street and remains 55 mph to Lincoln County Hwy 106.

The Laura Street/Industrial Drive and Cliff Avenue intersection is two-way stop controlled with traffic stopping on Laura Street/Industrial Drive. Laura Street is a residential urban section roadway and intersects with Cliff Avenue and Industrial Drive. Industrial Drive is an urban section roadway with a left-turn lane at Cliff Avenue.

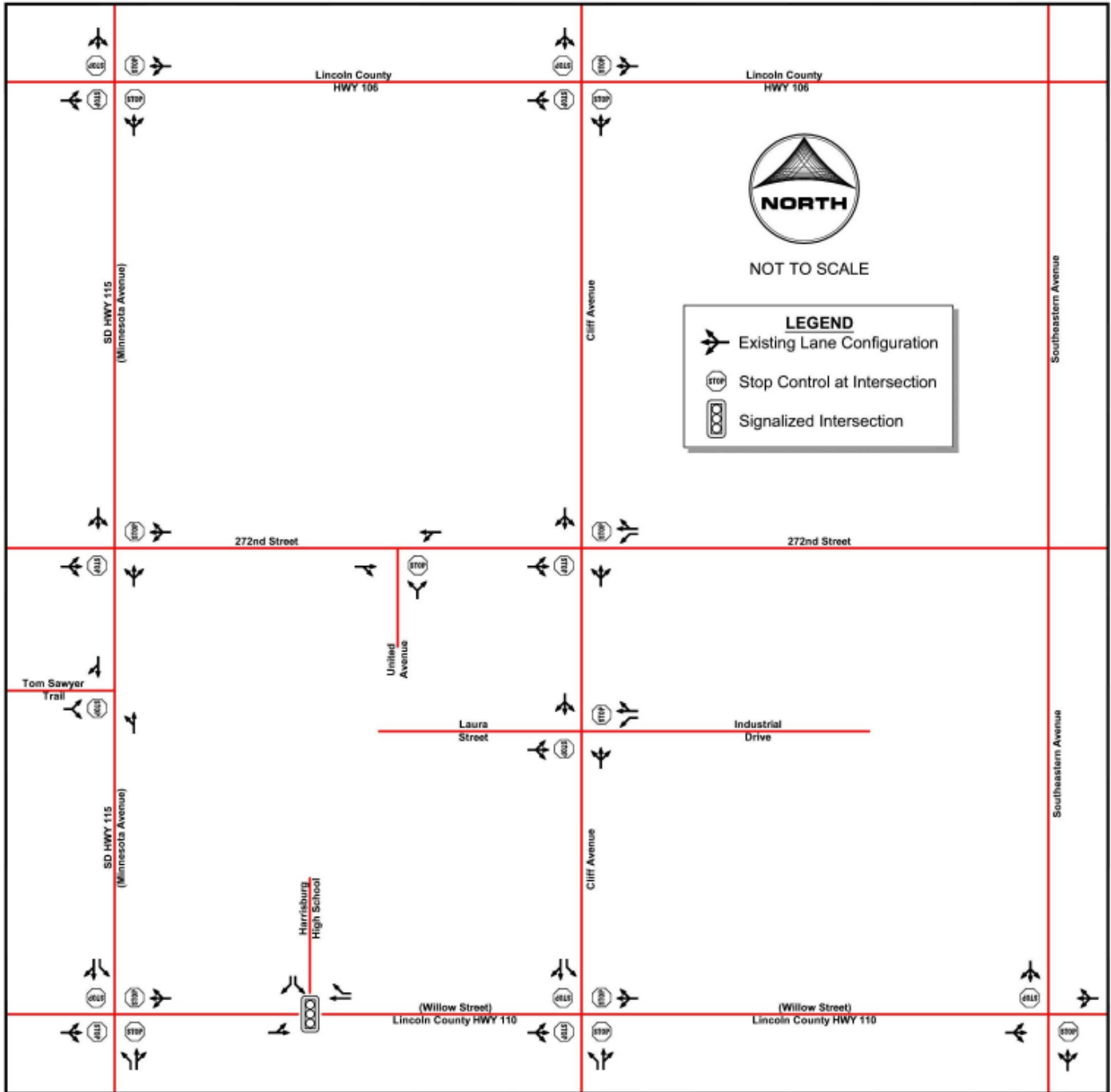
272nd Street is a gravel surfaced rural section two-lane roadway from Minnesota Avenue to Cliff Avenue with a speed limit of 55 mph. 272nd Street from Cliff Avenue east approximately 1,000 feet was reconstructed to an urban two-lane section in 2010 and includes a left-turn lane at Cliff Avenue. The intersection of Cliff Avenue and 272nd Street is two-way stop controlled with traffic stopping on 272nd Street.

Lincoln County Hwy 106 is a rural section two-lane roadway with a speed limit of 55 mph. Both intersections of Lincoln County Hwy 106 and Minnesota Avenue and Lincoln County Hwy 106 and Cliff Avenue are all-way stop controlled.

Southeastern Avenue from 274th Street to Willow Street is a gravel surfaced rural section two-lane roadway with a speed limit of 35 mph. Southeastern Avenue from Willow Street to Legendary Drive is an asphalt-surfaced rural section two-lane roadway with a speed limit of 35 mph. The half mile section of Southeastern Avenue from Legendary Drive to 272nd Street is a gravel surface rural section two-lane roadway with a speed limit of 55 mph.

Exhibit 3 shows the current lane configurations at the study intersections.

Exhibit 3 – Existing Roadway Network Lane Configurations



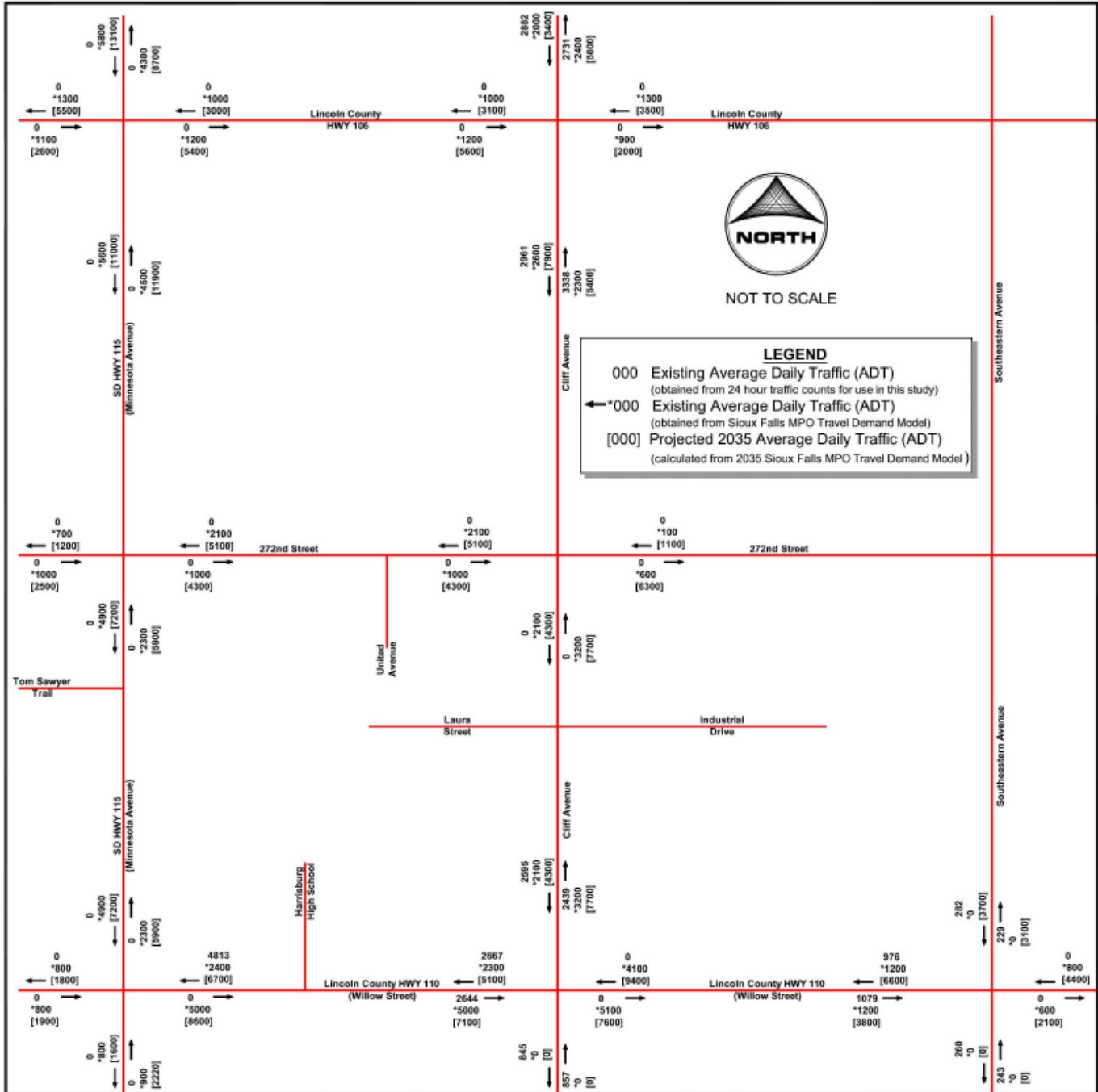
Existing Traffic Volumes

Twenty-four hour traffic counts were collected by HR Green on the arterial roadway sections within the study area. The average daily traffic (ADT) was determined from the 24-hour traffic counts and are shown in **Exhibit 4**. A very high percentage of the ADT occurs during the AM and PM peak hours at the intersections of Cliff Avenue with Lincoln County Hwy 106, Laura Street/Industrial Drive, and Willow Street. An average of 9% of the southbound ADT and 19% of the northbound ADT on Cliff Avenue occurs

during the AM peak hour. An average of 14% of the southbound ADT and 13% of the northbound ADT on Cliff Avenue occurs during the PM peak hour. These percentages are indicative of commuter traffic from Harrisburg to Sioux Falls.

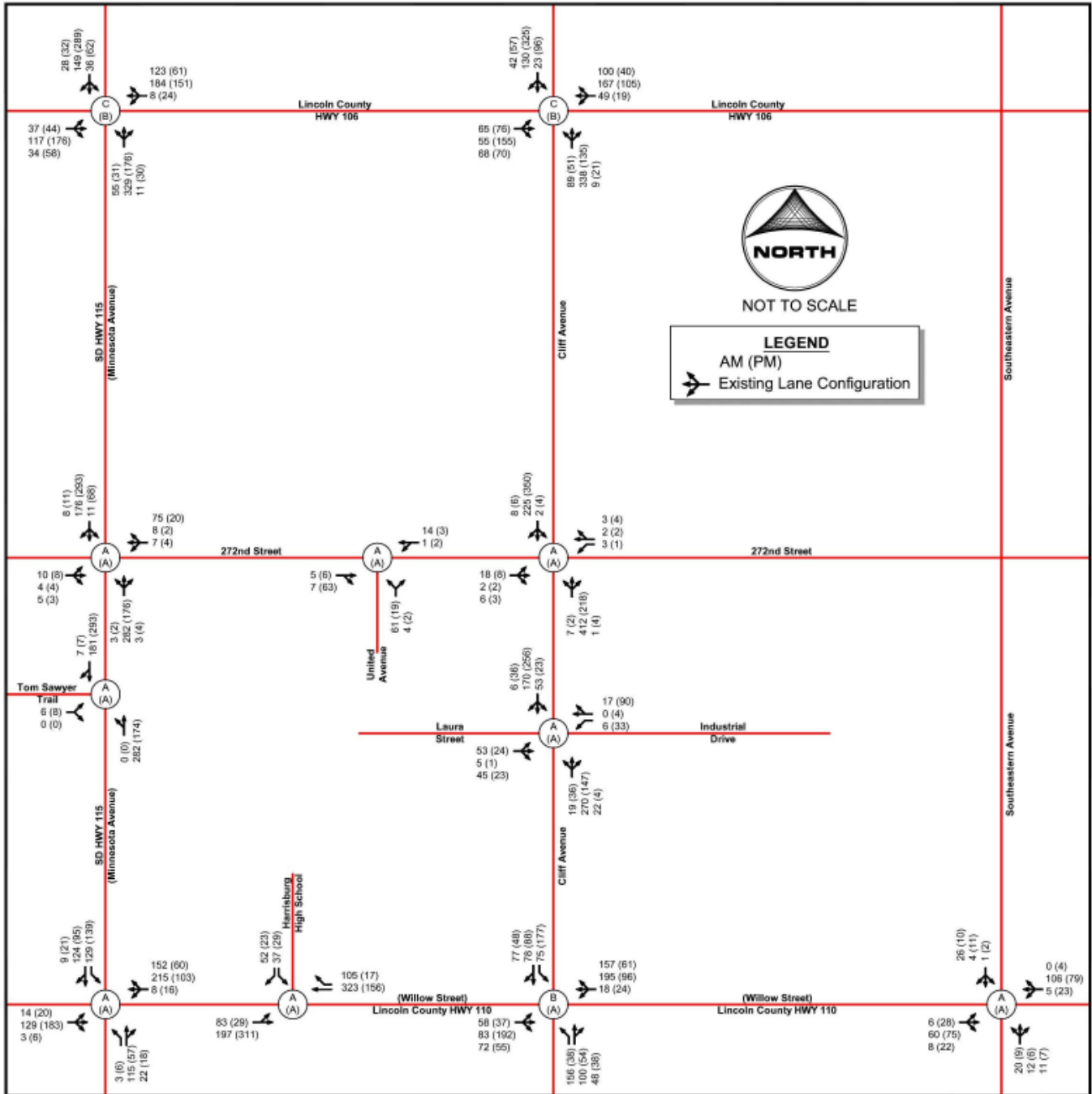
A comparison of the ADT derived from the Sioux Falls MPO Travel Demand Model with the ADT determined from current traffic counts performed in the field, identifies areas where the model is under/over reporting the volumes.

Exhibit 4 – Existing Average Daily Traffic (ADT)



Intersection turning movement traffic counts were collected by HR Green at the ten study intersections in the fall of 2010. The traffic counts yielded an average of 4% trucks within the study area. The 2010 AM and PM peak hour counts and Level of Service (LOS) are shown in **Exhibit 5**. The existing conditions operational analysis is further discussed in the "Intersection Capacity Analysis" section of the report. Raw data for these counts is included in Appendix B.

Exhibit 5 – Existing AM and PM Peak Hour Traffic Volumes



Crash History

The City of Sioux Falls provided 2004 to 2010 crash data for the ten intersections included in the study area. Following is a summary of the crash history for these intersections. Crash diagrams for these intersections are contained in Appendix C.

- Minnesota Avenue and Willow Street Intersection
 - 17 Total crashes
 - 5/17 = Injury Crashes
 - 0/17 = Fatal Crashes
 - 8/17 = Broadside Crashes (4 northbound/westbound, 2 northbound/eastbound, 1 southbound/eastbound and 1 southbound/westbound)
 - 1/17 = Head-on (northbound/southbound)
 - 1/17 = Sideswipe opposite directions (eastbound/westbound)
 - 2/17 = Angle-on coming left turn (southbound left with northbound through and northbound left with eastbound through)
 - 2/17 = Angle-right turn (southbound right with eastbound through and eastbound right with northbound through)
 - 2/17 = Rear-end collision (both westbound)
 - 1/17 = Miscellaneous accident (northbound)

- Willow Street and Cliff Avenue Intersection
 - 7 Total crashes
 - 1/7 = Injury Crash
 - 0/7 = Fatal Crashes
 - 2/7 = Broadside (southbound with westbound and northbound with eastbound)
 - 1/7 = Angle-left turn (southbound left with eastbound through)
 - 1/7 = Angle-right turn (westbound right with eastbound through)
 - 2/7 = Rear-end collision (both westbound through, one collision involved three vehicles)
 - 1/7 = Backing (southbound)

- Willow Street and Southeastern Avenue Intersection
 - 1 Total crashes
 - 0/1 = Injury Crash
 - 0/1 = Fatal Crashes
 - 1/1 = Broadside (northbound through with eastbound through)

- 272nd Street and Minnesota Avenue Intersection
 - 2 Total crashes
 - 1/2 = Injury Crash
 - 0/2 = Fatal Crashes
 - 2/2 = Rear-end collision (both southbound)

- 272nd Street and United Avenue Intersection
 - 1 Total crashes
 - 0/1 = Injury Crash
 - 0/1 = Fatal Crashes
 - 1/1 = U-Turn collision (eastbound with westbound)

- 272nd Street and Cliff Avenue Intersection
 - 3 Total crashes
 - 2/3 = Injury Crash
 - 0/3 = Fatal Crashes
 - 1/3 = Head-on (northbound/southbound overtaking a third vehicle)
 - 1/3 = Angle collision with left turn (southbound left with southbound through)
 - 1/3 = Backing (northbound)

- Lincoln County Hwy 106 and Minnesota Avenue Intersection
 - 17 Total crashes
 - 7/17 = Injury Crash
 - 0/17 = Fatal Crashes
 - 9/17 = Broadside Crashes (3 northbound/westbound, 2 southbound/eastbound, and 4 southbound/westbound)
 - 1/17 = Head-on (northbound/southbound)
 - 1/17 = Sideswipe same direction (westbound)
 - 1/17 = Angle-on coming left turn (westbound left with eastbound through)
 - 4/17 = Rear-end collision (1 westbound, 3 southbound)
 - 1/17 = Animal collision (northbound)

- Lincoln County Hwy 106 and Cliff Avenue Intersection
 - 12 Total crashes
 - 4/12 = Injury Crash
 - 0/12 = Fatal Crashes
 - 3/12 = Broadside Crashes (3 northbound/eastbound)
 - 2/12 = Angle-on coming left turn (eastbound left with westbound through and northbound left with southbound through)
 - 1/12 = Angle-right turn (westbound right with southbound through)
 - 2/12 = Rear-end collision (1 eastbound, 1 southbound)
 - 1/12 = Backing (northbound)
 - 3/12 = Miscellaneous accident (2 northbound and 1 westbound)

- Laura Street/Industrial Drive and Cliff Avenue Intersection
 - 2 Total crashes
 - 1/2 = Injury Crash
 - 0/2 = Fatal Crashes
 - 1/2 = Sideswipe same direction (northbound)
 - 1/2 = Rear-end collision (westbound)

- Tom Sawyer Trail and Minnesota Avenue Intersection
 - 1 Total crashes
 - 0/1 = Injury Crash
 - 0/1 = Fatal Crashes
 - 1/1 = Collision with tree/pole (southbound)

Even though the number of crashes at the intersections is considered low, the main crash type along Minnesota Avenue and Cliff Avenue was broadside. Broadside crashes are typically more severe than the other crash types.

PROPOSED LAND USE

The City, in conjunction with the South Eastern Council of Governments (SECOG), is currently in the process of revising the City's Future Land Use Map. A copy of the draft Future Land Use Map is provided in Appendix F. It shows anticipated land uses as part of the projected growth for the next 25+ years. The City anticipates most of the growth occurring to the north and west of the existing City. These areas either already have sanitary sewer service, or will be the next to receive sanitary sewer service. Growth to the south and east will be limited by the topography and the high cost to provide sewer service for this area.

Future residential development is anticipated to occur within areas currently annexed into the City, including:

- The remaining lots in the Green Meadows Addition (quarter section southwest of the intersection of Cliff Avenue and Willow Street)
- The remaining lots in the Greyhawk Addition (area east of the existing wastewater lagoons and northwest of the intersection of 274th Street and Southeastern Avenue)
- The undeveloped area on either side of Cliff Avenue on the south side of the City
- The remaining lots in the Harvest Acres Addition (southeast corner of the quarter section southeast of the intersection of Cliff Avenue and Willow Street)
- The remaining lots in the Legendary Estates Addition and annexed land to the south of it (area north of Willow Street and east of the Industrial Park)
- Portions of the undeveloped quarter sections northeast and northwest of the intersection of Cliff Avenue and Willow Street

Additional Commercial development is anticipated at the following intersections:

- Cliff Avenue and Willow Street
- Minnesota Avenue and Willow Street
- Minnesota Avenue and 272nd Street
- Cliff Avenue and 272nd Street
- Southeastern Avenue and Willow Street

Other anticipated land uses include:

- Mixed use along Minnesota Avenue between Willow Street and 272nd Street
- Mixed use in the quarter section southeast of the intersection of Minnesota Avenue and Willow Street
- Industrial use in the quarter sections north and northeast of the existing Industrial Park

The remaining land in the floodplain along drainage ways is anticipated to be used for parks, recreation, and open space areas.

Population Projections

The City of Harrisburg has experienced a significant increase in population over the past ten years. Until this recent surge, the population in Harrisburg had remained fairly steady. **Exhibit 6** lists the historical population based on census data for the past 40 years.

Exhibit 6 - Historical Census Data for Harrisburg, SD

Year	Population
1960	313
1970	338
1980	558
1990	727
2000	958

In 1999, a number of developers began to show an interest in Harrisburg, and since then, the population has grown dramatically. Considerable population increases during a short time period make it difficult to accurately project the population of a community. Census information cannot be used since it does not reflect the recent population increase. In this instance, building permit information provides the most accurate data for population projections. **Exhibit 7** shows the number of annual building permits issued and the City's estimated population during the past ten years.

Exhibit 7 - Annual Building Permits and Estimated Population

Year	Building Permits Issued	Population*	Percent Increase
1960		313	
1970		338	
1980		558	
1990		727	
2000**	11	991	
2001	14	1,034	4.3%
2002	34	1,137	10.0%
2003	115	1,487	30.7%
2004	144	1,924	29.4%
2005	198	2,564	33.2%
2006	295	3,425	33.6%
2007	139	3,856	12.6%
2008	130	4,256	10.4%
2009	93	4,550	6.9%
2010	80	4,772	4.9%

*NOTE: Population has been projected for 2000 to 2010 using building permit data. For 2000-2004, a density of 3.04 for single-family housing, and 2.5 for apartment unit housing. For 2005-2010, a density of 3.23 for single-family housing, and 2.5 for apartment unit housing. This information indicates population of Harrisburg as of December 31st for each year.

**NOTE: Census data indicates the population as of April 1, 2000 was 958. The population is projected to have increased to 991 by the end of the year based on the number of building permits issued.

From 2003 to 2006, the City of Harrisburg experienced an average population increase close to 30% per year based on the number of building permits issued. Fewer building permits have been requested during the past four years, but the City continues to see growth in the current economy.

Much of the population increase is due to Harrisburg’s proximity to the City of Sioux Falls, which has experienced a strong growth rate for the last several decades. It is important to keep in mind that this level of growth is highly dependent on the economy of the region, and as shown in the past few years, downturns in the economy have a significant impact on building and population increases.

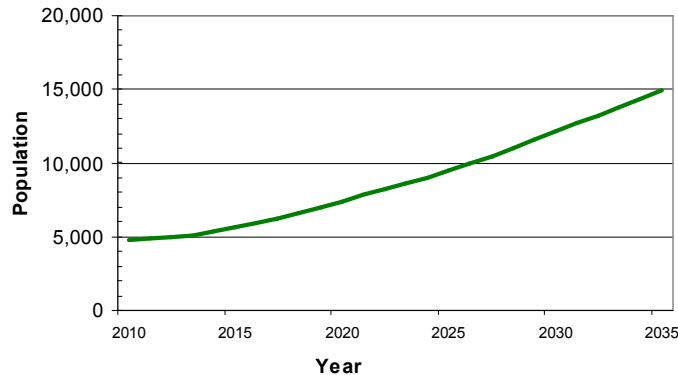
The City of Harrisburg is not expected to encounter population increases of over 10% in the future for two reasons. First, as the population increases, the annual percentage increase will naturally decline. Secondly, current economic conditions are projected to continue to keep Harrisburg’s growth at a slower rate for the foreseeable future.

Percent increases were assumed to estimate Harrisburg’s population for the next 25 years. These assumptions and the projected population for each year are listed in **Exhibit 8**. The projections indicate Harrisburg’s population could reach 14,880 in 2035. **Exhibit 9** illustrates the population projection.

Exhibit 8 - Annual Projected Population for Harrisburg, SD

Year	Projected Population	Percent Increase
2011	4,844	1.5%
2012	4,941	2%
2013	5,089	3%
2014	5,343	5%
2015	5,610	5%
2016	5,891	5%
2017	6,185	5%
2018	6,556	6%
2019	6,950	6%
2020	7,367	6%
2021	7,809	6%
2022	8,199	5%
2023	8,609	5%
2024	9,040	5%
2025	9,492	5%
2026	9,966	5%
2027	10,465	5%
2028	10,988	5%
2029	11,537	5%
2030	12,114	5%
2031	12,720	5%
2032	13,229	4%
2033	13,758	4%
2034	14,308	4%
2035	14,880	4%

Exhibit 9 - Population Projection for Harrisburg, SD



Assuming 2.5 homes per acre and 3.23 people per home, the expected increase from the 2010 population to the 2035 population will require approximately 1,252 acres of additional residential land. This land projection does not take into account commercial, institutional, governmental, or industrial land needs.

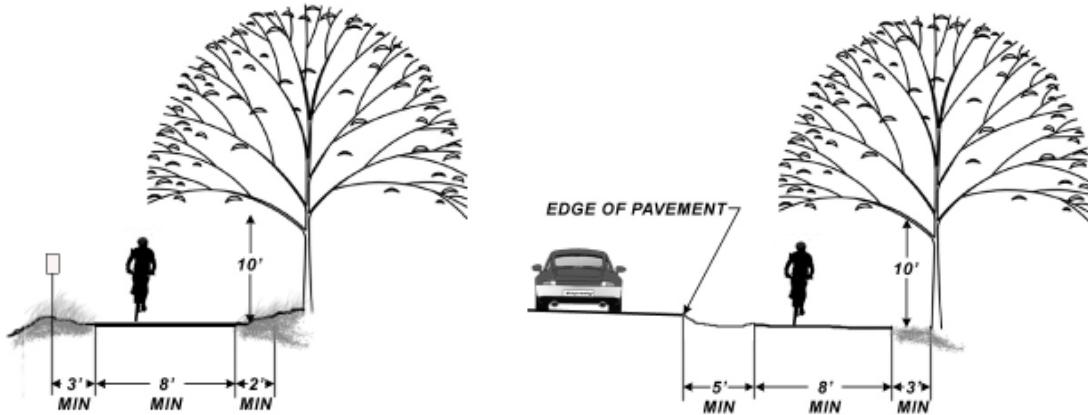
Parks and Trails Master Plan

In 2004, the City of Harrisburg completed a Parks and Trails Master Plan. The document provided the City with recommendations for park and trail locations, as well as their size, the areas they would serve, amenities to include, opinions of probable cost, implementation strategies, and possible funding sources. In 2007, an addendum was completed, evaluating the parks and trails need for an expanded area to address and prepare for growth.

Trails and greenbelts are recommended to provide safe and efficient routes connecting recreational areas within a community, as well as to link a community to the recreational resources beyond its City limits. It is recommended that trails be implemented to allow these types of connections and encourage an increase in the use of both new and existing parks. There are three (3) types of recreational trails shown on the Master Plan Graphic provided in Appendix F:

- Off-street trails (widened sidewalks with minimum 8' trail width - indicated in blue on the updated graphic)
- Off-street trail running through a greenway, parkway, or some other unpaved area (minimum 8-foot trail width with 2-foot shoulders on either side - indicated in gold on the updated graphic)
- Proposed Sioux Falls Trail System (indicated in red on the updated graphic)

The images below show the recommended cross-sections for each of these types of trails. It is recommended for all trail development, that the community work with whichever governmental agency oversees the roadway where the proposed trail goes, i.e., a joint planning effort with Lincoln County, SDDOT, City of Sioux Falls, and the MPO. It is also recommended that proposed trail development adhere to AASHTO guidelines for trail development whenever possible.



Off-Street Trail (Greenbelt)

Off-Street Trail (widened sidewalk)

Trails and greenbelts can serve as many neighborhoods and communities as they can connect. It is recommended that trails connect each park to at least one (1) other park within the City limits of Harrisburg. It is also recommended that planning for new or expanded roadways within the community include incorporation of 8-foot to 10-foot recreational trails (widened sidewalk) on either side of the roadway as indicated on the Amended Master Plan Graphic included in Appendix F. If appropriate right-of-way can be established at the early stages of roadway development, it will make the incorporation of recreational trails and their connective nature easier to implement. It is also recommended that street crossing designs take trail crossing into account as roadways are planned and developed. Even if traffic counts do not warrant a traffic control signal or stop sign at the time of implementation, if there is to be a major trail or pedestrian crossing at that intersection, it would be wise for the City to plan accordingly. Critical crossing intersections are shown on the graphic for the Amended Master Plan.

Amenities that would be appropriately sited along a trail or greenbelt may include:

- Hard surfaced, paved trails
- Directional, distance, and interpretive signage
- Trail head parking and access
- Visual and physical separation from highly-used vehicular paths
- Benches, litter receptacles, bike racks, or other appropriate trail site furnishings

Planned Capital Improvements

The City of Harrisburg adopted a formal 5-year Capital Improvements Plan (CIP) in 2005 to help the City identify and prioritize needed improvements. The City updated the CIP in 2009 to address delays in completing projects due to funding, changes in project priorities, and to remove projects from the CIP that had been completed. The projects listed below are not a complete summary of the projects listed in the 2009 – 2013 CIP. However, these projects will have the greatest impact to the transportation and trails systems in the City Harrisburg.

The City has identified several capital improvements related to streets and transportation. The uncompleted projects along with the years that the City was hoping to have them completed are listed below. Funding shortfalls have led to delays for several of the projects. In addition, the City is looking to this Transportation Master Plan to help them identify which projects are most needed and help prioritize remaining projects. Costs for these projects are included later in the report.

- High School Left-turn Lane - Construction of an eastbound left-turn lane at the entrance of the new Harrisburg High School (2009).
- Cliff Avenue and Willow Street Turning Lanes - Construction of an eastbound left-turn lane and a westbound right-turn lane at the intersection of Cliff Avenue and Willow Street (2010).
- Southeastern Avenue (Willow Street to 274th Street) – Reconstruction of Southeastern Avenue as an urban section from Willow Street south to 274th Street and includes new curb and gutter, asphalt surfacing, storm water, and sidewalk (2010).
- Willow Street (Cliff Avenue to Railroad Tracks) – Reconstruction of Willow Street as an urban section from Cliff Avenue east to the railroad tracks, and includes new curb and gutter, asphalt surfacing, storm water improvements, water main and sanitary sewer replacement, and sidewalk installation (2011).
- Cliff Avenue (272nd Street to Willow Street) – Reconstruction of Cliff Avenue as an urban section from 272nd Street to Willow Street, and includes completion of a new driving surface with curb and gutter, storm water improvements, and sidewalk installation (2013).
- 274th Street (Southeastern Avenue to WWTP) – Reconstruction of 274th Street as an urban section from Southeastern Avenue west to the Wastewater Treatment Plant and includes new curb and gutter, asphalt surfacing, storm water collection improvements, sidewalk, and water main (future project).
- 272nd Street (Cliff Avenue to west end of Homesites Addition) – Reconstruction of 272nd Street as an urban section from Cliff Avenue west to United Avenue, and includes new curb and gutter, asphalt surfacing, storm water, and sidewalk (future project).
- 272nd Street from Existing Asphalt to East End of Industrial Park – Reconstruction of 272nd Street as an urban section from the existing asphalt east to the railroad tracks, and includes new curb and gutter, asphalt surfacing, storm water, and sidewalk (future project).
- Southeastern Avenue (Miah Street to Willow Street) – Reconstruction of Southeastern Avenue as an urban section from Miah Street south to Willow Street, and includes new curb and gutter, asphalt surfacing, storm water, water main crossing, and sidewalk. (This was constructed as a rural section in 2008/2009, and the City would eventually like to convert it to an urban section.)
- Minnesota Avenue from County Hwy 110 (Willow Street) north to 270th Street/85th Street.
- The SDDOT currently has in the Statewide Transportation Improvement Program (STIP) for 2015 plans to construct Minnesota Avenue from the southern limits of the City of Sioux Falls to Willow Street as a four-lane section with a median.

The City has also identified the following CIP projects related to parks and trails that impact this Transportation Master Plan.

- Bike Path/Safe Trails – This project consists of acquiring land and building bike/walking trails to connect the current parks with the schools. Construction of the trail will be in phases as land becomes available, with long-term goals of connecting to Sioux Falls, Lake Alvin, and Spring Creek golf course. It is anticipated that the trails will be 6-8 foot wide paved or gravel paths.
- Community Park – The purpose of this project is to begin saving for a 30-35 acre community park at a yet to be determined central location. The City realizes this

will take years before this park can become a reality. In 2009, a tentative target date was set to have the land secured by 2013.

Finally, the City has identified other needed projects that will impact the design of the City's Transportation system. The City is looking to construct a new City Hall at a location yet to be determined. The City Hall may also include other community amenities. Traffic into and out of the City Hall site may require turn lanes. This should be evaluated at the time a site is selected.

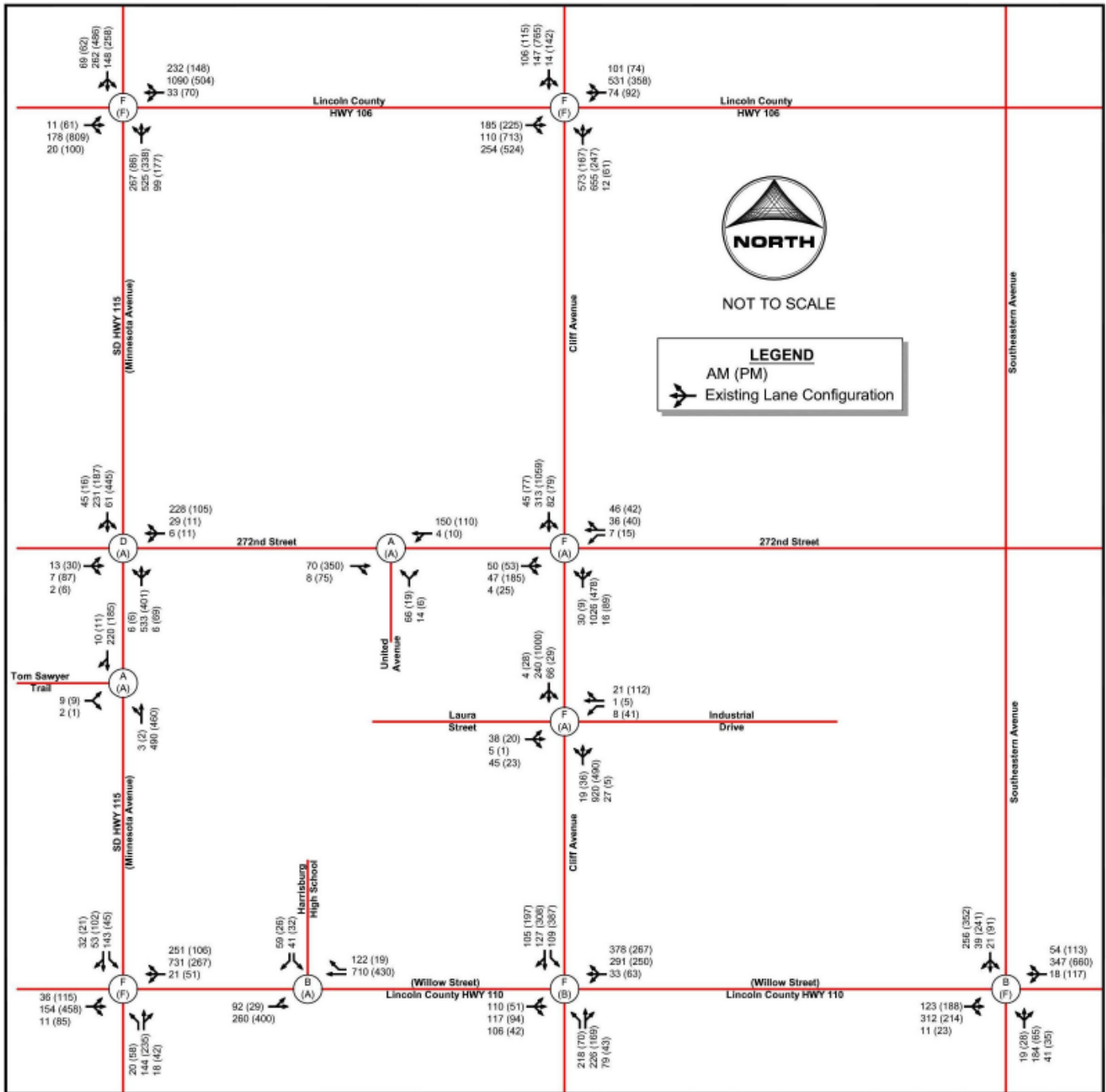
The projects listed will be re-prioritized as a part of this report. Some of the projects will be included as part of a larger identified project. Refer to the "Future Roadway Improvements" section later in this report for additional information.

Proposed Traffic Volumes

The Sioux Falls MPO Travel Demand Model was obtained for 2035 traffic numbers for both the AM and PM volumes. The Travel Demand Model (TDM) was used to accommodate additional growth of other land uses (i.e., residential, commercial, etc.) in the area. The volumes obtained from the model were converted to turning movement counts at each of the study intersections for analysis in both the AM and PM peak hours. The accuracy of the forecasted (2035) model is highly dependent upon the calibration of the base (2010) model to local traffic count data. It is typical of these models to show greater deviations along the outer fringes of the network. Thus while the TDM is the best available tool for predicting future traffic, variations in the model can be expected due to the base model under or over reporting traffic volumes when compared to actual traffic counts. An iterative process was used to identify and account for such under/over reporting during the calculation of the 2035 AM and PM peak hour turning movement traffic projections.

Exhibit 10 shows the projected 2035 AM and PM peak hour volumes and LOS for the 2035 "No Build" conditions analysis results, which is further discussed in the "Intersection Capacity Analysis" section of the report.

Exhibit 10 – 2035 AM and PM Peak Hour Traffic Volumes



INTERSECTION CAPACITY ANALYSIS

Level of service (LOS) at intersections is primarily a function of peak hour turning movement volumes, intersection lane configuration, and traffic control. For intersection analysis, the Highway Capacity Manual (HCM) defines LOS in terms of the average control delay at the intersection in seconds per vehicle. The results of an HCM analysis are typically presented in the form of a letter grade (A-F) that provides a qualitative

estimate of the operational efficiency or effectiveness of the corridor. Much like an academic report card, LOS A represents the best range of operating conditions (i.e., motorists experiencing little delay or congestion) and LOS F represents the worst (i.e., extreme delay or severe congestion). **Exhibit 11** defines the control delay range for each LOS for unsignalized intersections.

Exhibit 11 – Level of Service vs. Control Delay (Unsignalized Intersections)

Level of Service	Average Control Delay (s/veh)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Exhibit 12 defines the control delay range corresponding to each LOS for signalized intersection locations.

Exhibit 12 – Level of Service vs. Control Delay (Signalized Intersections)

Level of Service	Average Control Delay (s/veh)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Synchro™, Version 7, Software was used to complete the capacity analysis of the study area intersections. Analysis reports for both signalized and unsignalized intersection locations have been created using the reporting function in Synchro’s companion software, SimTraffic™. Analysis reports show delay per vehicle by approach, movement and queue lengths. Intersection reports from the SimTraffic™ software are available in Appendix D.

“Existing” Intersection Capacity Analysis

The “Existing” traffic capacity analysis shows the existing traffic volumes on the existing roadways.

Exhibit 5 shows the existing traffic volumes and LOS that currently occur at the intersections within the study area. **Exhibit 13** shows the delay/vehicle and LOS by movement and approach at each intersection.

Exhibit 13 – Existing Conditions Operational Analysis Results

Intersection	AM/PM	Intersection Control	MOE	Intersection Movement																Overall	
				EBL	EBT	EBR	EB APPROACH	WBL	WBT	WBR	WB APPROACH	NBL	NBT	NBR	NB APPROACH	SBL	SBT	SBR	SB APPROACH		
Willow St/ Minnesota Ave	AM	4-way STOP	Delay (s/veh)	5.3	10.6	3.4	9.9	11.5	11.9	8.1	10.4	7.3	11.1	3.8	10.0	7.1	6.1	0.0	6.8	9.4	
			LOS	A	B	A	A	B	B	A	B	A	B	A	A	A	A	A	A	A	
			Delay (s/veh)	5.3	11.3	3.9	10.6	7.9	9.6	5.6	8.0	5.2	9.7	3.2	8.1	8.2	9.5	5.7	8.6	8.9	8.9
Willow St/ Cliff Ave	AM	4-way STOP	Delay (s/veh)	10.7	10.2	7.5	9.4	11.3	14.2	10.0	12.3	8.6	10.8	5.9	8.8	8.7	12.2	7.4	9.6	10.2	
			LOS	B	B	A	A	B	B	A	B	A	B	A	A	A	B	A	A	B	
			Delay (s/veh)	11.2	10.9	9.7	10.8	8.4	10.5	5.7	8.8	6.0	9.0	4.0	6.7	9.7	12.0	6.6	9.9	9.6	9.6
Willow St/ Southeastern Ave	AM	2-way STOP	Delay (s/veh)	4.9	3.0	3.3	3.0	2.5	0.6	0.0	0.7	5.7	6.9	3.3	5.7	7.1	5.3	3.0	3.4	2.7	
			LOS	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
			Delay (s/veh)	8.0	4.4	4.9	4.7	2.2	1.0	0.4	1.2	5.8	6.7	3.3	4.9	6.2	7.1	2.8	4.6	4.0	4.0
272nd St/ Minnesota Ave	AM	2-way STOP	Delay (s/veh)	4.3	8.3	1.3	4.4	4.4	9.6	3.1	3.7	1.1	1.3	0.1	1.3	6.8	6.4	6.9	6.4	3.4	
			LOS	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
			Delay (s/veh)	5.2	11.4	2.5	6.0	3.6	10.8	2.2	3.2	1.0	0.7	0.0	0.7	7.5	7.9	6.9	7.8	5.4	5.4
272nd St/ United Ave	AM	1-way STOP	Delay (s/veh)		2.2	0.6	1.5	0.0	0.3		0.3	4.6		3.0	4.5					3.2	
			LOS		A	A	A	A	A	A		A	A		A	A					A
			Delay (s/veh)		1.0	0.7	0.8	2.4	0.3		0.5	4.3		2.1	4.1						
272nd St/ Cliff Ave	AM	2-way STOP	Delay (s/veh)	7.4	10.2	2.8	6.3	5.4	5.9	3.1	4.1	4.0	1.8	0.9	1.8	7.1	5.8	5.8	5.8	3.4	
			LOS	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
			Delay (s/veh)	7.3	5.0	3.8	5.8	0.0	7.8	2.2	4.0	3.1	1.0	0.5	1.0	8.1	7.6	6.2	7.5	5.0	5.0
Lincoln County HWY 106/ Minnesota Ave	AM	4-way STOP	Delay (s/veh)	7.8	12.1	4.9	9.8	11.6	19.2	12.1	16.3	14.3	20.4	10.6	19.4	7.4	12.1	5.2	10.4	15.1	
			LOS	A	B	A	A	B	C	B	C	B	C	B	C	A	B	A	B	C	C
			Delay (s/veh)	8.0	13.9	6.3	11.3	11.2	16.5	8.8	13.8	8.9	15.4	7.1	13.4	11.2	16.2	8.7	14.6	13.4	13.4
Lincoln County HWY 106/ Cliff Ave	AM	4-way STOP	Delay (s/veh)	12.9	17.5	10.5	13.4	10.0	15.4	8.3	12.2	17.3	22.8	16.3	21.6	7.4	12.4	5.5	10.4	15.7	
			LOS	B	C	B	B	A	C	A	B	C	C	A	B	A	B	A	B	C	C
			Delay (s/veh)	14.0	18.5	11.0	15.7	6.6	11.8	3.9	9.4	9.0	12.9	6.7	11.6	13.1	18.8	11.8	16.9	14.5	14.5
Tom Sawyer Tr/ Minnesota Ave	AM	1-way STOP	Delay (s/veh)	5.1		0.0	5.1					0.0	4.2		4.2		0.9	0.5	0.9	2.9	
			LOS	A		A	A					A	A		A		A	A	A	A	A
			Delay (s/veh)	5.8		0.0	5.8					0.0	3.1		3.1		1.5	0.7	1.5	2.1	2.1
Laura-Industrial/ Cliff Ave	AM	2-way STOP	Delay (s/veh)	7.6	9.0	3.8	6.1	7.3	0.0	3.7	4.5	4.8	4.1	3.8	4.1	2.8	1.8	1.2	2.0	3.7	
			LOS	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
			Delay (s/veh)	7.8	4.0	4.1	5.9	7.7	9.2	4.2	5.1	4.1	3.0	1.6	3.2	2.3	1.8	1.0	1.8	3.0	3.0
Willow St/ High School Entrance	AM	Signalized	Delay (s/veh)	7.6	5.7		6.2		6.2	5.0	5.9					10.9		7.2	8.8	6.3	
			LOS	A	A		A		A	A	A					B		A	A	A	A
			Delay (s/veh)	5.5	4.9		4.9		4.8	3.3	4.6					8.5		6.5	7.6	5.1	5.1
Willow St/ High School Entrance	PM	Signalized	Delay (s/veh)																		
			LOS																		
			Delay (s/veh)																		

As shown in **Exhibit 13**, all intersections currently operate at an acceptable LOS C or better for all movements in both the AM and PM peak hour.

“No Build” Intersection Capacity Analysis

The “No Build” traffic capacity analysis assumes the projected 2035 traffic volumes with no improvements to the existing roadways.

Exhibit 10 shows the 2035 traffic volumes and LOS that would occur if there were no improvements made to the intersections within the study area. **Exhibit 14** shows the delay/vehicle and LOS by movement and approach at each intersection.

Exhibit 14 – 2035 No Build Operational Analysis Results

Intersection	AM/PM	Intersection Control	MOE	Intersection Movement																Overall	
				EBL	EBT	EBR	EB APPROACH	WBL	WBT	WBR	WB APPROACH	NBL	NBT	NBR	NB APPROACH	SBL	SBT	SBR	SB APPROACH		
Willow St/ Minnesota Ave	AM	4-way STOP	Delay (s/veh)	9.1	13.0	5.6	12.0	589.3	643.0	681.5	651.6	8.1	14.2	6.6	12.8	10.1	11.8	6.6	9.9	353.8	
			LOS	A	B	A	B	F	F	F	F	A	B	A	B	B	B	A	A	F	
			Delay (s/veh)	156.8	153.0	140.9	152.2	14.3	13.3	11.8	13.0	11.0	18.0	10.3	15.9	7.6	10.3	4.6	9.1	77.8	
Willow St/ Cliff Ave	AM	4-way STOP	Delay (s/veh)	29.8	29.1	25.3	28.0	624.9	586.5	605.0	597.3	31.9	41.3	38.9	37.1	12.4	16.4	11.4	13.6	221.3	
			LOS	D	D	D	D	F	F	F	F	D	E	E	E	B	C	B	B	F	
			Delay (s/veh)	10.5	4.7	6.8	5.5	21.5	12.3	20.8	15.0	8.9	12.5	8.5	11.0	13.0	10.6	9.5	11.3	11.6	
Willow St/ Southeastern Ave	AM	2-way STOP	Delay (s/veh)	10.0	8.0	6.8	8.5	8.0	5.2	3.9	5.1	34.5	31.8	24.9	30.9	32.1	30.2	21.8	23.6	14.9	
			LOS	A	A	A	A	A	A	A	A	D	D	C	D	D	C	C	C	B	
			Delay (s/veh)	16.7	8.7	10.6	11.6	8.5	8.6	6.5	8.3	73.5	74.7	52.0	67.8	3140.6	2753.3	2805.9	2815.1	544.7	
272nd St/ Minnesota Ave	AM	2-way STOP	Delay (s/veh)	58.0	22.4	24.7	41.7	155.6	130.0	105.4	109.2	6.2	9.1	10.7	9.1	8.8	8.0	6.7	7.9	30.7	
			LOS	F	C	C	E	F	F	F	F	A	A	B	A	A	A	A	A	D	
			Delay (s/veh)	19.3	23.8	11.6	22.2	10.2	12.6	5.6	6.8	1.4	3.0	0.7	2.7	11.0	11.4	9.6	11.1	8.4	
272nd St/ United Ave	AM	1-way STOP	Delay (s/veh)		1.3	0.5	1.2	0.2	1.6		1.5	5.4		3.0	5.0					2.5	
			LOS		A	A	A	A	A	A	A	A	A	A	A	A					A
			Delay (s/veh)		2.7	2.5	2.7	3.0	2.9		2.9	5.9		3.5	5.3						
272nd St/ Cliff Ave	AM	2-way STOP	Delay (s/veh)	689.1	579.8	670.8	632.4	112.7	472.4	475.1	439.8	342.3	334.4	445.3	336.3	9.0	7.8	6.2	7.8	244.8	
			LOS	F	F	F	F	F	F	F	F	F	F	F	F	A	A	A	A	A	F
			Delay (s/veh)	26.6	18.9	16.7	19.9	15.4	15.3	6.6	11.4	6.7	3.6	2.3	3.4	3.4	9.9	8.6	7.8	8.7	8.6
Lincoln County HWY 106/ Minnesota Ave	AM	4-way STOP	Delay (s/veh)	13.6	16.0	8.3	15.1	1095.5	962.0	907.2	953.4	935.6	908.0	945.1	918.7	79.9	84.4	80.8	82.5	616.4	
			LOS	B	C	A	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F
			Delay (s/veh)	2282.6	2618.6	2548.3	2581.8	380.4	368.7	366.2	368.5	399.6	386.4	405.5	392.8	1546.4	1614.5	1694.9	1591.2	1182.8	
Lincoln County HWY 106/ Cliff Ave	AM	4-way STOP	Delay (s/veh)	82.7	84.8	80.3	82.0	1111.6	1097.6	1115.7	1104.3	1364.1	1381.9	1356.0	1373.3	15.8	23.9	18.1	21.2	736.3	
			LOS	F	F	F	F	F	F	F	F	F	F	F	F	C	C	C	C	F	
			Delay (s/veh)	1298.8	1492.8	1445.3	1445.5	349.4	346.3	330.2	344.5	81.5	61.1	77.4	66.4	2524.4	2544.0	2433.5	2534.2	1088.1	
Tom Sawyer Tr/ Minnesota Ave	AM	1-way STOP	Delay (s/veh)	6.6		3.1	5.7					2.7	4.2		4.2		1.2	0.3	1.2	3.2	
			LOS	A		A	A					A	A		A		A	A	A	A	A
			Delay (s/veh)	5.8		3.0	5.2					3.5	5.5		5.5		2.2	1.6	2.1	4.9	
Laura-Industrial/ Cliff Ave	AM	2-way STOP	Delay (s/veh)	411.5	413.3	332.7	365.3	281.1	496.1	450.6	400.2	374.7	461.4	460.9	459.0	5.3	2.6	3.0	3.2	326.5	
			LOS	F	F	F	F	F	F	F	F	F	F	F	F	A	A	A	A	A	F
			Delay (s/veh)	12.6	11.4	5.1	8.5	12.6	8.4	6.7	8.1	6.9	5.0	3.6	5.1	4.0	2.1	1.6	2.1	4.4	
Willow St/ High School Entrance	AM	Signalized	Delay (s/veh)	8.8	2.8		4.3		9.1	7.2	8.8					54.2		87.5	74.3	12.9	
			LOS	A	A		A		A	A	A					D		F	E	B	
			Delay (s/veh)	6.0	3.6		3.7		3.8	3.8	3.8					8.3		7.6	8.0	4.1	
Willow St/ High School Entrance	PM	Signalized	Delay (s/veh)																		
			LOS	A	A		A		A	A	A					A		A	A	A	A
			Delay (s/veh)																		

As shown in **Exhibit 14**, in 2035 the only intersections that would still maintain an acceptable LOS D or better for all movements in the AM and PM are 272nd Street and Minnesota Avenue, 272nd Street and United Avenue, Tom Sawyer Trail and Minnesota Avenue, and the entrance to the high school on Willow Street. Of those intersections, the intersection of 272nd Street and Minnesota Avenue has several eastbound and westbound movements operating at a LOS F and the high school entrance has the southbound right turn out of the high school operating at a LOS F. The other intersections all experience a LOS F for several movements in either the AM or PM peak hour.

Improvements Identification

One tool used to identify intersection alternatives is the National Cooperative Highway Research Program (NCHRP) Report 457, "Evaluating Intersection Improvements: An Engineering Study Guide." This document provides guidance on appropriate improvement alternatives for intersections based on traffic volumes and existing intersection safety concerns.

The projected peak hour traffic volumes were evaluated using NCHRP Report 457 and the South Dakota DOT Design Manual to identify possible corridor improvements which would improve the safety and efficiency of operations. Possible improvements evaluated include intersection signalization, the addition of left- and/or right-turn lanes, and the addition of deceleration lanes.

Traffic Signal Control

According to *NCHRP Report 457*, an intersection with a properly designed and operated traffic signal will have one or more of the following benefits:

- More orderly movement of traffic



- Increased intersection capacity
- Reduced frequency of certain types of collisions (e.g., right-angle)
- Continuous or nearly continuous movement of traffic along the through route
- Reduced delay to minor vehicular and pedestrian movements by interrupting heavy traffic at periodic intervals¹

The Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition, provides warrants to justify installation of a traffic control signal to improve intersection safety, operations, or both. The following intersections will likely require traffic signals to adequately accommodate the 2035 traffic volumes:

- Cliff Avenue and Willow Street
- Cliff Avenue and 272nd Street
- Cliff Avenue and Lincoln County Hwy 106
- Minnesota Avenue and Willow Street
- Minnesota Avenue and Lincoln County Hwy 106
- Southeastern Avenue and Willow Street

Adequate spacing allows traffic signals to be effectively interconnected and synchronized. Adequate spacing will also tend to reduce rear-end collisions and “stop and go” driving that increases congestion, delay and air pollution. Typically, minimum $\frac{1}{4}$ mile spacing between traffic signals on minor arterials and major collectors is recommended, and $\frac{1}{2}$ mile spacing on major suburban/urban arterials. The distance between the proposed signalized intersections in Harrisburg is one (1) mile, which is more than the desired signal spacing.

The installation of traffic control signals is typically warranted based on existing traffic volumes at an intersection. Based on the current traffic volumes, the study found that traffic signals are currently not warranted at the intersections stated above. It is recommended that the City monitor traffic volumes at these intersections as additional growth occurs and plan for future traffic signal installation as the traffic volumes near the warrant thresholds.

Consideration should be given to constructing a roundabout in lieu of a traffic signal at those intersections whose entry traffic volumes are similar such as Lincoln County Hwy 106 and Cliff Avenue. Roundabouts offer increased traffic safety for both vehicles and pedestrians over a signalized intersection and are aesthetically pleasing. They typically require more right-of-way than a standard intersection, so current planning for right-of-way acquisition should begin ahead of development.

Addition of a Left-turn to the Major Street

The addition of a left-turn lane to the major street at two-way Stop controlled intersections reduces delay by separating the movements and allowing through traffic to continue through the intersection without having to slow for turning vehicles. This separation of traffic movements increases the overall safety of the intersection by minimizing turn-related crashes. *Chapter 12 of the South Dakota Department of Transportation Road Design Manual* contains a guideline for the treatment of left-turn lanes. The volume threshold is based on left-turn volume and opposing volume thresholds.

¹ National Cooperative Highway Research Program, Report 457 “Evaluating Intersection Improvements: An Engineering Study Guide”, Washington, D.C., 2001, page 15.

An eastbound left-turn lane is currently warranted at the high school entrance. A temporary traffic signal has been installed in lieu of the turn lane until Willow Street is reconstructed.

In 2035, a southbound left-turn lane is warranted at the Minnesota Avenue and 272nd Street intersection.

Northbound and southbound left-turn lanes are warranted in 2035 at the intersection of Cliff Avenue and Laura Street/Industrial Drive.

Addition of a Right-Turn to the Major Street

Chapter 12 of the South Dakota Department of Transportation Road Design Manual also contains guidelines for treatment of right-turn lanes to the major street at two-way STOP controlled intersections. Use of the guideline requires the determination of the turn movement volume, the major-road volume, and the operating speed.

Currently, a westbound right-turn lane is warranted at the high school entrance. This turn lane was constructed with the opening of the high school. When Willow Street is reconstructed, in lieu of the temporary traffic signal, a westbound right-turn lane and eastbound left-turn lane should be constructed.

“Build” Intersection Capacity Analysis

The “Build” traffic capacity analysis assumes the projected 2035 traffic volumes with the above recommended improvements to the existing roadways.

Exhibit 15 shows the projected 2035 AM and PM peak hour volumes, lane geometry, intersection control type, and LOS for the 2035 “Build” conditions analysis results. Descriptions of these improvements are listed below.

- The SDDOT plans to reconstruct Minnesota Avenue from Willow Street north to the Sioux Falls city limits as a four-lane roadway section with a median
- Cliff Avenue reconstructed as a two-lane section
- Southeastern Avenue reconstructed as a two-lane section
- Willow Street reconstructed as a two-lane section
- 272nd Street reconstructed as a two-lane section
- Lincoln County Hwy 106 reconstructed as a four-lane section. A four-lane section is necessary to maintain an adequate LOS due to high traffic volumes and turning movements

The intersection geometry and control for the study intersections are shown on the following pages.

Cliff Avenue and Willow Street (signalized):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Northbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Cliff Avenue and Laura Street/Industrial Drive (two-way stop controlled):

- Eastbound Approach
 - A single shared through, left, and right lane
- Westbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Cliff Avenue and 272nd Street (signalized):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Cliff Avenue and Lincoln County Hwy 106 (signalized):

- Eastbound Approach
 - One left-turn lane
 - Two through lanes
 - One right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Minnesota Avenue and Willow Street (signalized):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane

Minnesota Avenue and Tom Sawyer Trail (one-way stop controlled):

- Eastbound Approach
 - A single shared through, left, and right lane
- Northbound Approach
 - One through lane
 - A shared through/left-turn lane
- Southbound Approach
 - One through lane
 - A shared through/right-turn lane

Minnesota Avenue and 272nd Street (two-way stop controlled):

- Eastbound Approach
 - A single shared through, left, and right lane
- Westbound Approach
 - A single shared through, left, and right lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane

Minnesota Avenue and Lincoln County Hwy 106 (signalized):

- Eastbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - Two through lanes
 - One right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane

Southeastern Avenue and Willow Street (signalized):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Northbound Approach
 - A single shared through, left, and right lane
- Southbound Approach
 - One shared through/left-turn lane
 - One right-turn lane

Exhibit 15 – 2035 Build Lane Geometry, Control Type, and LOS

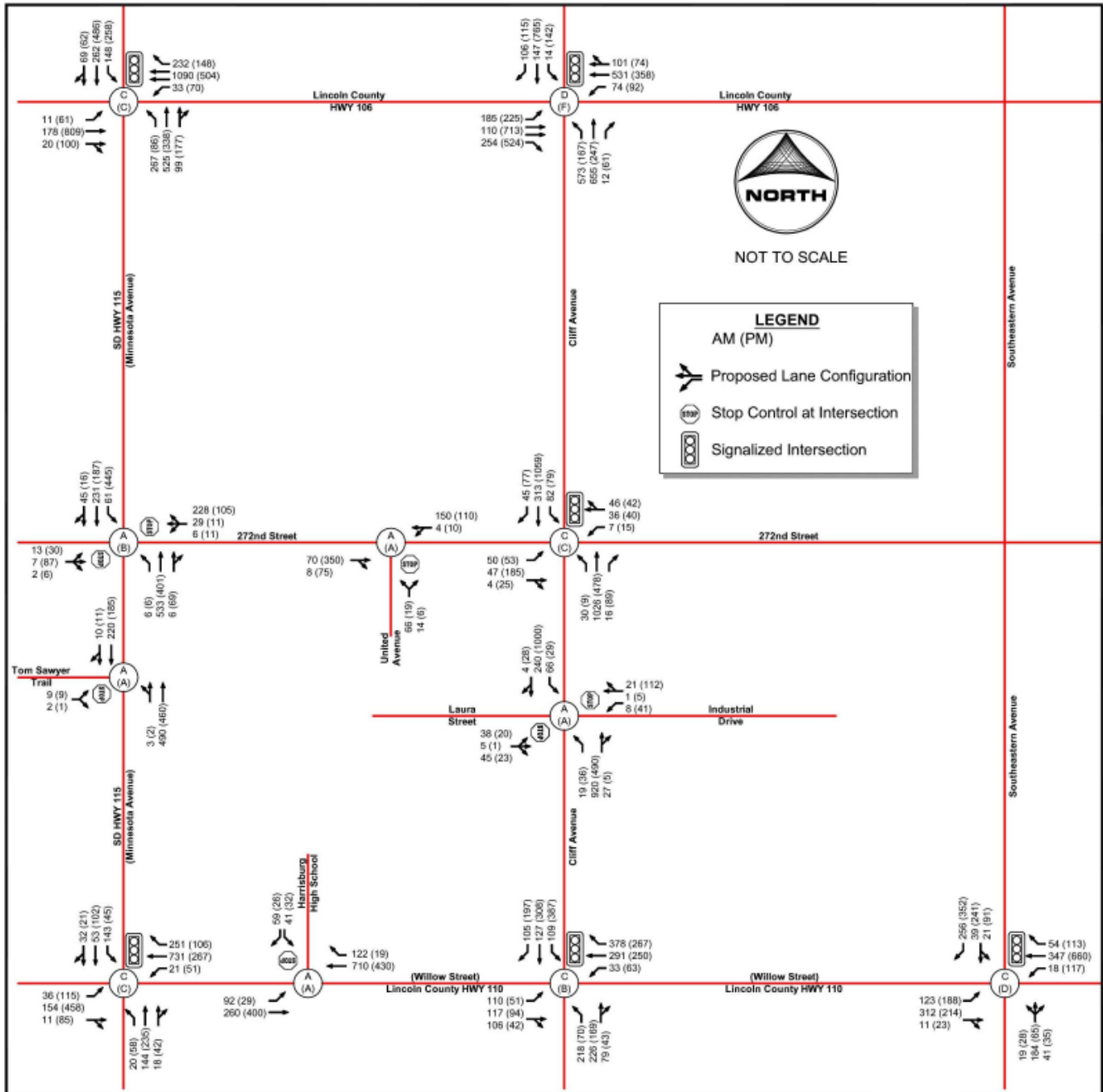


Exhibit 16 shows the delay/vehicle and LOS by movement and approach at each intersection.

Exhibit 16 – 2035 Build Operational Analysis Results

AM/PM	Intersection Control	MOE	Intersection Movement																Overall
			EBL	EBT	EBR	EB APPROACH	WBL	WBT	WBR	WB APPROACH	NBL	NBT	NBR	NB APPROACH	SBL	SBT	SBR	SB APPROACH	
AM	Signalized	Delay (s/veh)	53.1	18.2	11.8	24.0	27.3	28.4	24.2	18.7	21.6	9.1	19.6	32.9	21.0	16.7	28.0	24.2	
		LOS	D	B	B	C	C	C	B	C	B	C	A	B	C	C	B	C	
PM	Signalized	Delay (s/veh)	41.5	43.1	39.1	42.3	40.9	33.0	6.1	27.6	23.8	17.1	15.3	18.1	23.9	16.3	10.8	17.2	
		LOS	D	D	D	D	D	C	A	C	C	B	B	B	C	B	B	C	
AM	Signalized	Delay (s/veh)	42.1	33.1	20.6	32.3	50.7	54.6	24.9	38.4	20.9	22.5	15.1	20.7	22.0	22.6	11.1	18.7	
		LOS	D	C	C	C	D	D	C	D	C	C	B	C	C	C	B	B	
PM	Signalized	Delay (s/veh)	34.5	12.5	20.3	15.7	50.1	23.4	15.9	23.2	15.8	20.4	12.8	18.1	21.1	12.0	10.8	15.1	
		LOS	C	B	C	B	D	C	B	C	B	C	B	B	C	B	B	B	
AM	Signalized	Delay (s/veh)	36.9	31.4	36.0	33.0	34.0	37.6	9.9	34.2	22.8	18.1	13.4	17.6	23.6	14.4	9.8	11.3	
		LOS	D	C	D	C	C	D	A	C	C	B	B	B	C	B	A	B	
PM	Signalized	Delay (s/veh)	74.1	26.2	22.5	42.3	58.6	59.8	36.1	56.5	50.1	47.1	28.0	42.1	47.7	43.3	32.4	38.2	
		LOS	E	C	C	D	E	E	D	E	D	C	D	D	D	C	D	D	
AM	2-way STOP	Delay (s/veh)	7.8	11.7	2.3	8.3	14.0	17.0	9.1	10.2	2.5	1.3	0.4	1.3	6.9	5.4	4.6	5.6	
		LOS	A	B	A	A	B	C	A	B	A	A	A	A	A	A	A	A	
PM	2-way STOP	Delay (s/veh)	56.8	48.0	49.6	50.9	37.7	25.5	14.1	17.5	2.2	2.3	1.3	2.2	17.2	6.9	5.7	13.9	
		LOS	F	E	E	F	E	D	B	C	A	A	A	C	A	A	A	B	
AM	1-way STOP	Delay (s/veh)		1.4	0.3	1.2	4.1	1.6		1.7	5.8		3.7	5.5				2.5	
		LOS		A	A	A	A	A		A	A		A	A				A	
PM	1-way STOP	Delay (s/veh)		3.6	3.6	3.6	5.2	2.1		2.3	7.1		3.6	6.3				3.5	
		LOS		A	A	A	A	A		A	A		A	A				A	
AM	Signalized	Delay (s/veh)	45.8	42.3	27.9	43.2	43.6	44.1	26.4	34.8	21.5	19.6	16.1	19.6	38.0	9.2	8.0	13.6	
		LOS	D	D	C	D	D	D	C	C	C	B	B	B	D	A	A	B	
PM	Signalized	Delay (s/veh)	69.6	58.1	73.5	60.9	67.0	55.8	14.8	38.3	17.8	6.8	4.7	6.6	25.8	20.0	16.5	20.1	
		LOS	E	E	E	E	E	E	B	D	B	A	A	A	C	B	B	C	
AM	Signalized	Delay (s/veh)	36.2	20.4	10.5	20.3	31.5	37.5	21.6	34.7	27.8	30.1	25.3	28.8	27.6	29.0	23.1	27.7	
		LOS	D	C	B	C	C	D	C	C	C	C	C	C	C	C	C	C	
PM	Signalized	Delay (s/veh)	46.5	42.6	39.1	42.5	67.4	41.8	16.6	38.8	22.6	31.0	25.7	28.2	27.1	22.3	14.4	23.3	
		LOS	D	D	D	D	E	D	B	D	C	C	C	C	C	C	B	C	
AM	Signalized	Delay (s/veh)	62.8	34.3	8.7	32.3	33.5	47.5	46.9	45.8	59.6	51.7	33.9	55.0	36.4	35.7	10.0	25.4	
		LOS	E	C	A	C	C	D	D	D	E	D	C	D	D	D	A	C	
PM	Signalized	Delay (s/veh)	76.5	69.1	190.7	112.8	579.4	58.9	45.4	131.6	159.6	27.1	24.9	63.3	102.7	105.4	85.0	102.7	
		LOS	E	E	F	F	F	E	D	F	F	C	C	E	F	F	F	F	
AM	1-way STOP	Delay (s/veh)	6.2		2.2	4.9					2.6	2.4		2.4		0.5	0.2	0.4	
		LOS	A		A	A					A	A		A		A	A	A	
PM	1-way STOP	Delay (s/veh)	4.1		3.3	3.9					5.7	3.0		3.0		0.6	0.5	0.6	
		LOS	A		A	A					A	A		A		A	A	A	
AM	2-way STOP	Delay (s/veh)	19.8	14.3	8.1	13.5	18.2	15.7	15.4	16.2	8.2	6.8	5.5	6.8	10.8	2.4	1.8	3.9	
		LOS	C	B	A	B	C	C	C	C	A	A	A	A	B	A	A	A	
PM	2-way STOP	Delay (s/veh)	32.1	25.7	18.8	24.9	31.8	32.9	15.6	19.7	13.2	4.8	3.7	5.3	6.9	4.7	3.7	4.8	
		LOS	D	D	C	C	D	D	C	C	B	A	A	A	A	A	A	A	
AM	1-way STOP	Delay (s/veh)	10.6	3.0		4.9		6.8	7.2	6.9					16.8		11.7	13.9	
		LOS	B	A		A		A	A	A					C		B	B	
PM	1-way STOP	Delay (s/veh)	6.9	4.3		4.5		5.1	4.4	5.0					10.6		8.4	9.5	
		LOS	A	A		A		A	A	A					B		A	A	

As shown in **Exhibit 16**, in 2035 the only intersection that operates at a LOS F is Cliff Avenue and Lincoln County Hwy 106 in the PM. Several other intersections have various movements operating at LOS E or F but maintain an acceptable overall LOS.

IMPROVEMENTS ANALYSIS

Summary of Key Issues

The following key issues were identified from the “Build” operational analysis:

- Cliff Avenue was analyzed as a two-lane section with turn lanes at the intersections. Several movements along Cliff Avenue operate at a LOS E or F in 2035. An additional analysis was completed with Cliff Avenue as a four-lane section. The results showed all movements along Cliff Avenue operating at LOS C or better with most operating at LOS B or above. Cliff Avenue between Willow Street and 272nd Street is planned to be reconstructed in 2013. It is recommended to construct a two-lane roadway section at this time since the majority of the operational issues are at the Lincoln County Hwy 106 intersection. If Cliff Avenue is reconstructed as a two-lane roadway, left- and right-turn lanes at the intersections are very important to maintaining acceptable LOS at the intersections.
- Various eastbound and westbound movements at the intersection of Southeastern Avenue and Willow Street operate at a LOS E. These could be improved with modifying the signal timings. However, the 2035 City of Sioux Falls Travel Demand Model identified a large increase in southbound and westbound traffic at this intersection. The model was updated in 2008 with the

Harrisburg Land Use Plan available at that time which showed commercial and residential growth to the northwest and west sides of Harrisburg. The land use plan has recently been updated and Harrisburg is planning for minimal growth in these directions. Because of this, it is possible that the 2035 traffic volumes calculated from the model are higher than what the intersection will realize in the future.

- An additional analysis was performed to determine if Cliff Avenue and 272nd Street can accommodate increased traffic volumes from the new Harrisburg elementary school. The details and results of this analysis are given in the “Elementary School Traffic Impact Study” section of this report.

“Build-Improved” Intersection Capacity Analysis

Recommended turn-lane lengths obtained from a queue length analysis were code into Synchro™ along with a separate westbound right-turn lane on Industrial Drive and a left-turn lane on Laura Street. **Exhibit 17** shows the necessary turn-lane lengths, lane geometry, intersection control type, and LOS for the 2035 “Build-Improved” conditions analysis results. **Exhibit 18** shows the delay/vehicle and LOS by movement and approach at each intersection.

Descriptions of these improvements are listed below.

Cliff Avenue and Laura Street/Industrial Drive (two-way stop controlled):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Exhibit 17 – 2035 Build-Improved Turn Lane Lengths, Lane Geometry, Control Type, and LOS

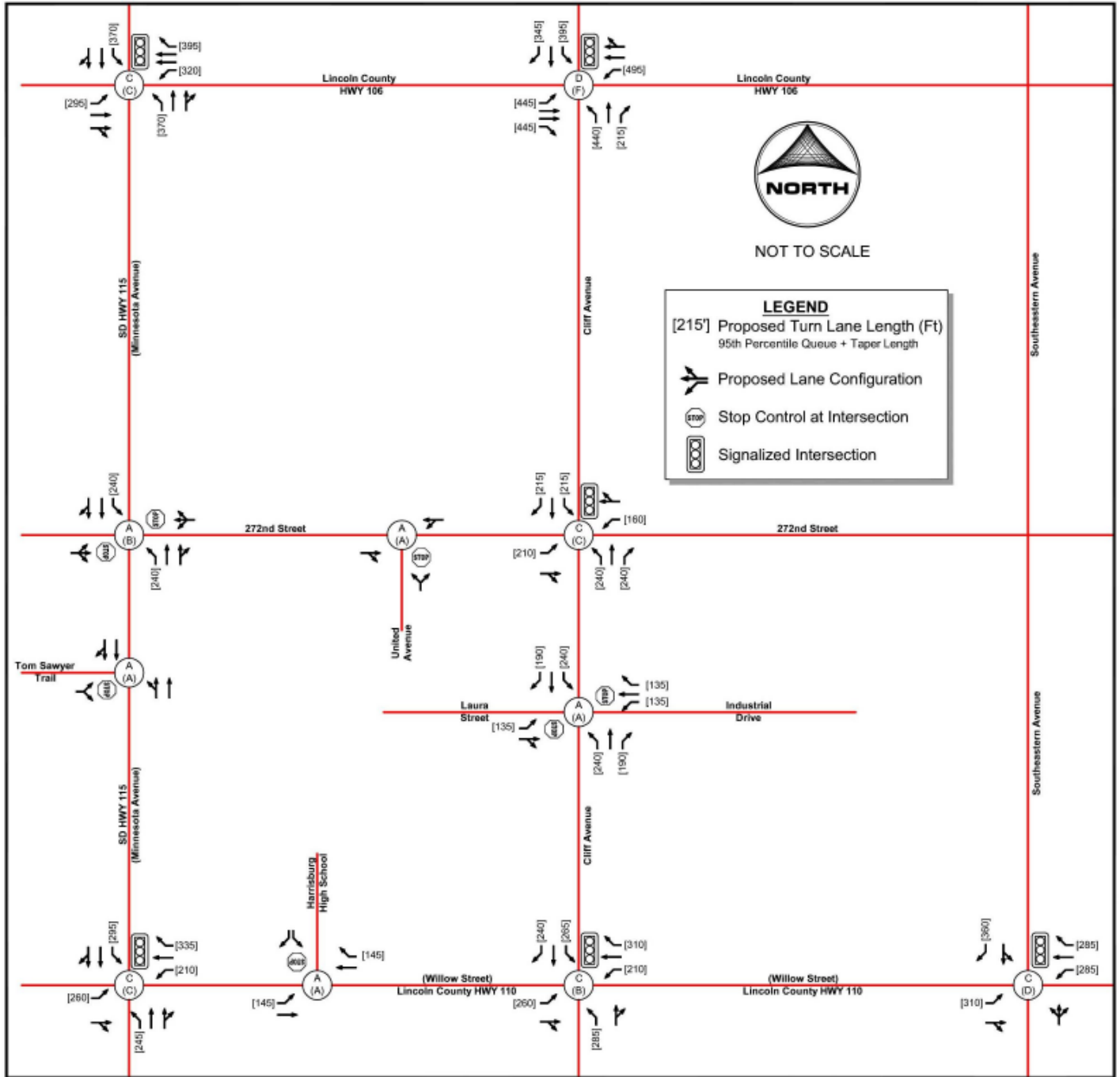


Exhibit 18 – 2035 Build-Improved Operational Analysis Results

AM/PM	Intersection Control	MOE	Intersection Movement																Overall
			EBL	EBT	EBR	EB APPROACH	WBL	WBT	WBR	WB APPROACH	NBL	NBT	NBR	NB APPROACH	SBL	SBT	SBR	SB APPROACH	
AM	Signalized	Delay (s/veh)	51.7	18.0	9.4	23.5	28.4	27.7	12.7	23.8	17.9	22.2	7.6	20.2	32.8	23.4	15.0	27.9	23.9
		LOS	D	B	A	C	C	C	B	C	B	C	A	C	C	C	B	C	C
PM	Signalized	Delay (s/veh)	39.4	44.2	36.4	42.3	43.7	35.5	6.4	29.7	25.1	20.4	15.0	20.6	26.3	17.5	11.9	18.9	31.9
		LOS	D	D	D	D	D	D	A	C	C	C	B	C	C	B	B	B	C
AM	Signalized	Delay (s/veh)	44.4	34.0	21.3	33.4	46.7	52.7	24.2	36.9	20.5	23.4	15.8	21.1	21.1	20.6	10.2	17.8	28.7
		LOS	D	C	C	C	D	D	C	D	C	C	B	C	C	C	B	B	C
PM	Signalized	Delay (s/veh)	34.6	12.2	19.8	15.4	51.0	23.3	15.9	23.2	16.1	20.2	13.7	18.2	20.0	11.4	11.0	14.5	18.3
		LOS	C	B	B	B	D	C	B	C	B	C	B	B	B	B	B	B	B
AM	Signalized	Delay (s/veh)	34.7	32.1	29.6	32.8	28.4	36.9	8.8	33.2	22.1	17.4	12.0	16.8	21.0	14.5	9.3	10.6	25.2
		LOS	C	C	C	C	C	D	A	C	C	B	B	B	C	B	A	B	C
PM	Signalized	Delay (s/veh)	74.1	22.8	24.7	40.8	47.9	49.2	24.8	45.8	48.6	37.4	24.3	35.8	43.1	39.3	27.1	33.6	40.3
		LOS	E	C	C	D	D	D	C	D	D	C	D	D	D	D	C	C	D
AM	2-way STOP	Delay (s/veh)	8.1	11.0	3.3	8.7	13.3	17.4	9.7	10.6	1.5	1.3	0.7	1.3	7.1	5.3	4.9	5.6	4.7
		LOS	A	B	A	A	B	C	A	B	A	A	A	A	A	A	A	A	A
PM	2-way STOP	Delay (s/veh)	63.2	58.2	48.1	59.2	47.9	34.3	18.4	22.9	1.7	2.3	1.3	2.1	17.6	6.5	6.8	14.1	14.7
		LOS	F	F	E	F	E	D	C	C	A	A	A	A	C	A	A	B	B
AM	1-way STOP	Delay (s/veh)		1.5	0.8	1.4	3.4	1.5		1.6	5.7			3.2	5.2				2.5
		LOS		A	A	A	A	A		A	A			A	A				A
PM	1-way STOP	Delay (s/veh)		3.8	3.5	3.7	4.4	2.1		2.3	7.3			3.0	6.2				3.6
		LOS		A	A	A	A	A		A	A			A	A				A
AM	Signalized	Delay (s/veh)	46.6	45.2	23.4	44.9	41.6	51.7	31.5	40.5	22.2	21.0	17.6	21.0	44.6	8.7	6.9	14.6	21.6
		LOS	D	D	C	D	D	D	C	D	C	C	B	C	D	A	A	B	C
PM	Signalized	Delay (s/veh)	71.7	59.8	79.0	62.6	67.1	57.8	14.4	39.3	20.4	7.0	4.8	6.9	27.2	20.9	18.1	21.1	24.3
		LOS	E	E	E	E	E	E	B	D	C	A	A	A	C	C	B	C	C
AM	Signalized	Delay (s/veh)	34.4	20.4	11.1	20.0	31.2	38.2	19.7	34.9	26.5	29.8	24.2	28.1	25.4	27.7	21.6	26.2	30.3
		LOS	C	C	B	B	C	D	B	C	C	C	C	C	C	C	C	C	C
PM	Signalized	Delay (s/veh)	44.2	42.0	38.3	41.8	69.3	41.8	15.7	38.8	21.3	30.8	24.7	27.6	27.4	22.9	15.0	23.7	33.6
		LOS	D	D	D	D	E	D	B	D	C	C	C	C	C	C	B	C	C
AM	Signalized	Delay (s/veh)	68.9	35.3	8.0	33.7	28.5	48.0	47.5	45.9	45.0	30.6	17.4	37.0	39.1	37.2	9.9	26.3	37.6
		LOS	E	D	A	C	C	D	D	D	D	C	B	D	D	D	A	C	D
PM	Signalized	Delay (s/veh)	78.3	66.0	211.6	119.4	509.4	54.9	43.0	117.9	203.0	23.2	19.6	71.9	85.1	94.2	64.9	89.6	102.9
		LOS	E	E	F	F	F	D	D	F	F	C	B	E	F	F	E	F	F
AM	1-way STOP	Delay (s/veh)	4.7		2.4	4.0					2.8	2.5		2.5		0.5	0.2	0.5	1.9
		LOS	A		A	A					A	A		A		A	A	A	A
PM	1-way STOP	Delay (s/veh)	5.7		2.6	5.0					5.6	3.0		3.0		0.5	0.4	0.5	2.3
		LOS	A		A	A					A	A		A		A	A	A	A
AM	2-way STOP	Delay (s/veh)	30.4	19.4	4.2	16.6	17.3	16.6	16.0	16.5	8.1	6.3	5.3	6.3	11.8	2.4	1.2	4.3	6.7
		LOS	D	C	A	C	C	C	C	C	A	A	A	A	B	A	A	A	A
PM	2-way STOP	Delay (s/veh)	44.5	14.8	14.5	28.2	31.9	32.7	11.7	17.1	13.1	4.8	4.8	5.3	7.3	4.2	3.4	4.3	6.3
		LOS	E	B	B	D	D	D	B	C	B	A	A	A	A	A	A	A	A
AM	1-way STOP	Delay (s/veh)	11.6	3.1		5.3		6.7	6.6	6.7					16.0		12.1	13.6	6.8
		LOS	B	A		A		A	A	A					C		B	B	A
PM	1-way STOP	Delay (s/veh)	7.9	4.4		4.6		5.2	5.3	5.2					10.4		8.2	9.3	5.1
		LOS	A	A		A		A	A	A					B		A	A	A

The results of the “Build-Improved” analysis shown in **Exhibit 18** are very close to those obtained from the “Build” scenario in **Exhibit 16**. The overall LOS for all intersections remains the same as the “Build” scenario and several of the turning movements LOS has increased or decreased by one level.

ELEMENTARY SCHOOL TRAFFIC IMPACT STUDY

Purpose and Study Objective

Harrisburg’s new elementary school, Freedom Elementary, is currently under construction and is located in the southeast corner of the quarter section southeast of Minnesota Avenue and 272nd Street. It is scheduled to open in the fall of 2011.

HR Green has performed an analysis of opening year (assumed to be 2011) and horizon year (assumed to be 2035) traffic at the following intersections:

- Cliff Avenue and Laura Street/Industrial Drive
- 272nd Street and United Avenue
- One development access location on Minnesota Avenue (Tom Sawyer Trail)

The future development access onto Minnesota Avenue was assumed to connect with Minnesota Avenue at the intersection of Tom Sawyer Trail and Minnesota Avenue. The final location of this access shall be coordinated with and approved by the SDDOT.

This section of the report summarizes the traffic impacts resulting from the school on both the opening day and on the 2035 “Build-Improved” scenario and will identify any recommendations for improvements.



Trip Generation and Distribution

Trip generation rates for the elementary school were based on the Trip Generation, 8th Edition, as published by the *Institute of Transportation Engineers* (ITE). Trip ends for the site were calculated for the AM and PM peak hour of the adjacent street traffic. **Exhibits 19 and 20** show the potential trip generation for the elementary school. It is anticipated that opening day enrollment will be 275 students with full build out of the school to be 550 students.

Exhibit 19 – Opening Day Trip Generation Freedom Elementary School

Trip Generation Freedom Elementary School-Opening Day								
Land Use Code	Use	Total Students	Students Minus Homesites	Factor	Percent	Entering	Percent	Exit
ADT								
520	Elementary School	275	160	1.29	50%	103	50%	103
AM Peak								
520	Elementary School	275	160	0.45	55%	40	45%	32
PM Peak								
520	Elementary School	275	160	0.15	49%	12	51%	12

Exhibit 20 – 2035 Trip Generation Freedom Elementary School

Trip Generation Freedom Elementary School-2035								
Land Use Code	Use	Total Students	Students Minus Homesites	Factor	Percent	Entering	Percent	Exit
ADT								
520	Elementary School	550	435	1.29	50%	281	50%	281
AM Peak								
520	Elementary School	550	435	0.45	55%	108	45%	88
PM Peak								
520	Elementary School	550	435	0.15	49%	32	51%	33

Typically the PM peak hour of adjacent street traffic does not fall during the dismissal of school. The above trip generation represents the amount of trips entering and exiting the school during the peak hour of adjacent roadway traffic. The PM factor used in the trip generation represents the PM traffic during the peak hour of adjacent roadway traffic (5:00 PM to 6:00 PM). A separate analysis of the PM peak hour for the dismissal of school (assumed to be 3:00 PM to 4:00 PM) was not completed as part of this report.

The generated trips were assigned to the existing roadway network. Assignments were based on assumed travel behaviors, location of trip destinations, accessibility to/from various routes, and consistency of travel patterns from existing traffic counts. **Exhibit 21** illustrates the site generated trip percentage distributions onto the existing roadway network.

The boundaries for Freedom Elementary are to be as follows: north to Lincoln County Hwy 106, east to Cliff Avenue, and west and south boundaries to the present School District borders. Liberty Elementary will then have the following boundaries: west to Cliff Avenue, north to Lincoln County Hwy 106 moving east to Highway 11 then north to 57th Street, and east and south boundaries to the present School District borders.

The distribution assumptions used in this study are:

- On opening day, the entrance onto 272nd Street on United Avenue and the entrance onto Cliff Avenue on Laura Street are the two entrances to the elementary school,
- On opening day, 115 students will be from Harrisburg Homesites Addition and will not enter or exit from Laura Street or United Avenue, the calculation is as follows:

342 single-family lots exist in Harrisburg Homesites Addition

Average family size in Harrisburg is 3.35 persons according to US Census Bureau (1.35 children per household)

Assume 25% of children are elementary school age

342 X 1.35 = 462 children

462 X 25% = 115 elementary school age children

- In the AM, 85% of the trips will enter from Laura Street and 15% will enter from United Avenue,
- In the AM, 60% of the trips will exit from Laura Street and 40% will exit from United Avenue,
- In the PM, 60% of the trips will enter from Laura Street and 40% will enter from United Avenue, and
- In the PM, 70% of the trips will exit from Laura Street and 30% will exit from United Avenue.
- In 2035, 115 students will be from Harrisburg Homesites Addition and will walk to and from school,
- In the AM, 60% of the trips will enter from Laura Street and 40% will enter from United Avenue,
- In the AM, 50% of the trips will exit from Laura Street and 50% will exit from United Avenue,
- In the PM, 40% of the trips will enter from Laura Street and 60% will enter from United Avenue, and
- In the PM, 40% of the trips will exit from Laura Street and 60% will exit from United Avenue.

Exhibit 21 – Trip Distribution Percentage

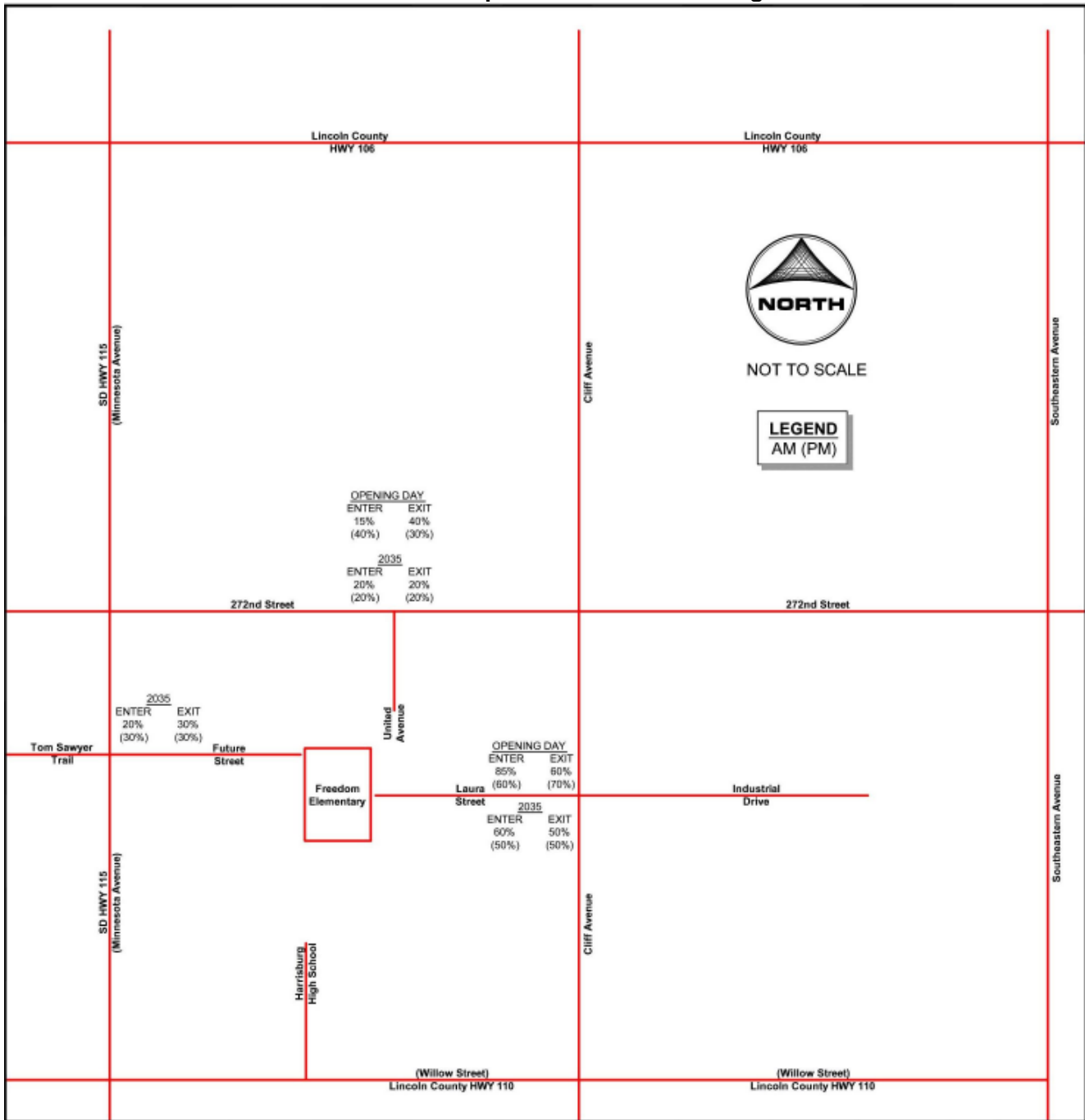
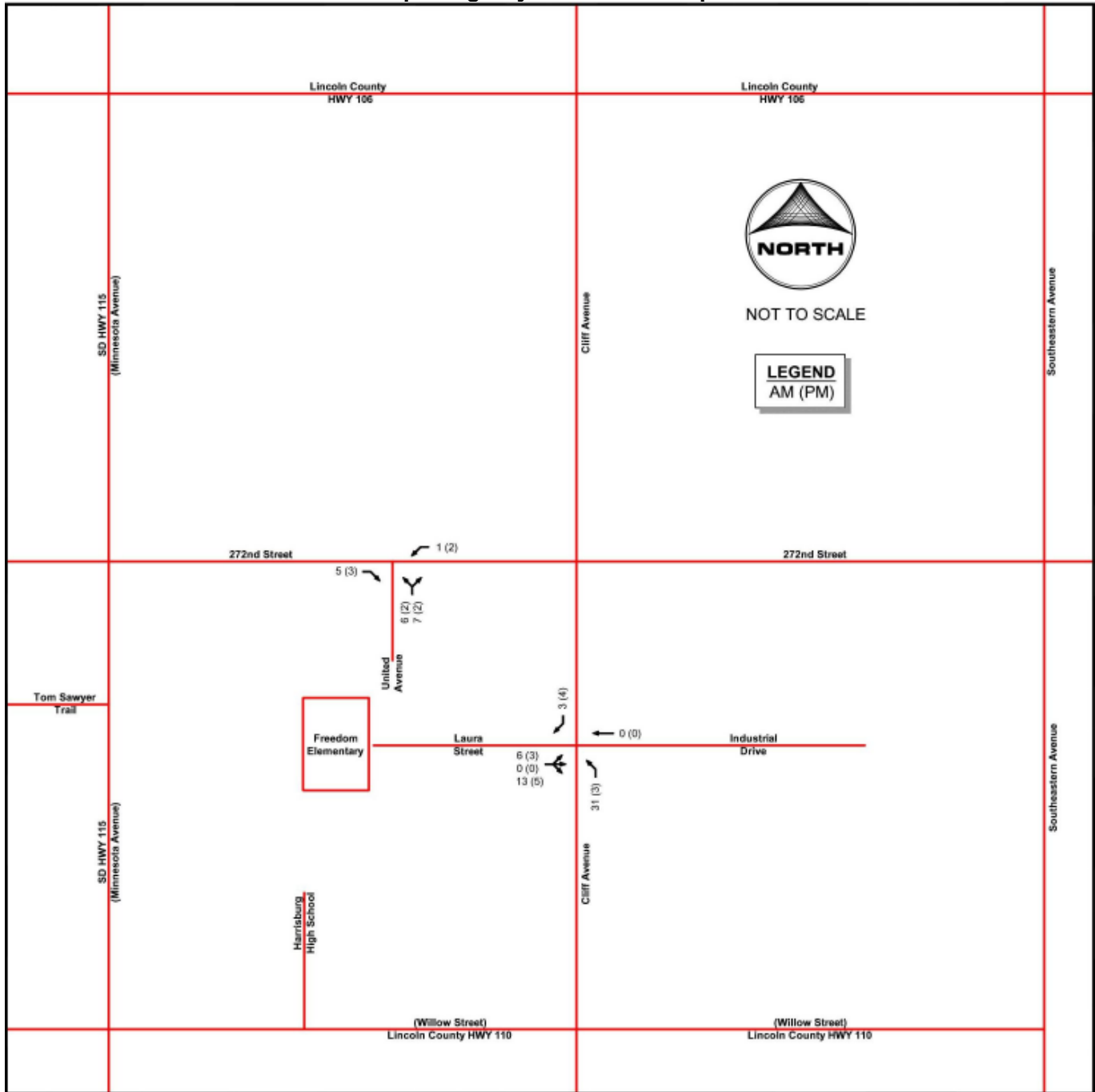


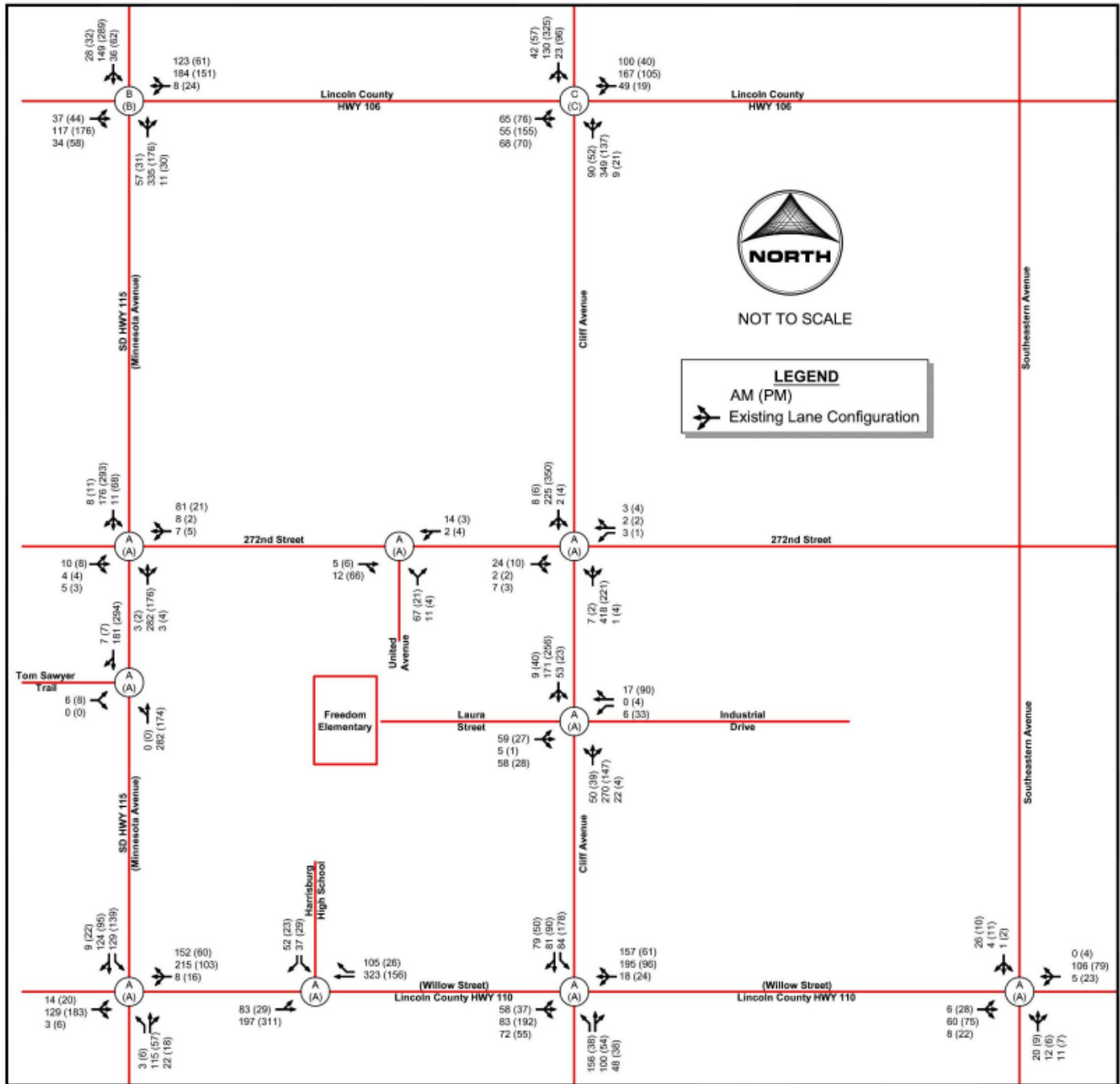
Exhibit 22 – Opening Day AM and PM Trip Distribution



Proposed Traffic Volumes

The trips generated by the elementary school were added to the base traffic volumes for both the AM and PM peak hours for the opening day (2010) volumes. The resulting traffic volumes are shown in **Exhibit 23**. These figures show the AM and PM peak hour volumes at the key intersections.

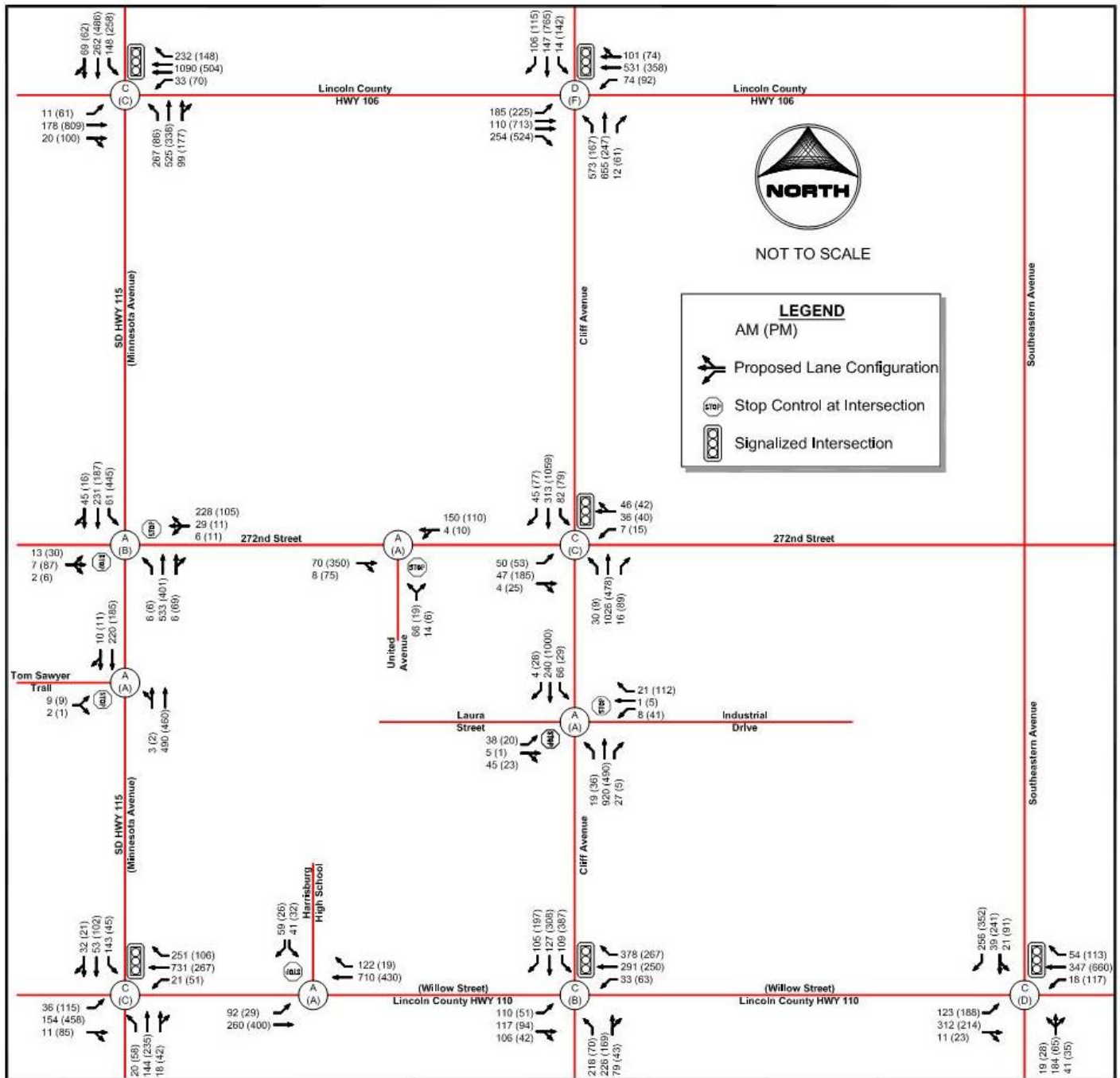
Exhibit 23 – Opening Day AM and PM Peak Hour Traffic Volumes



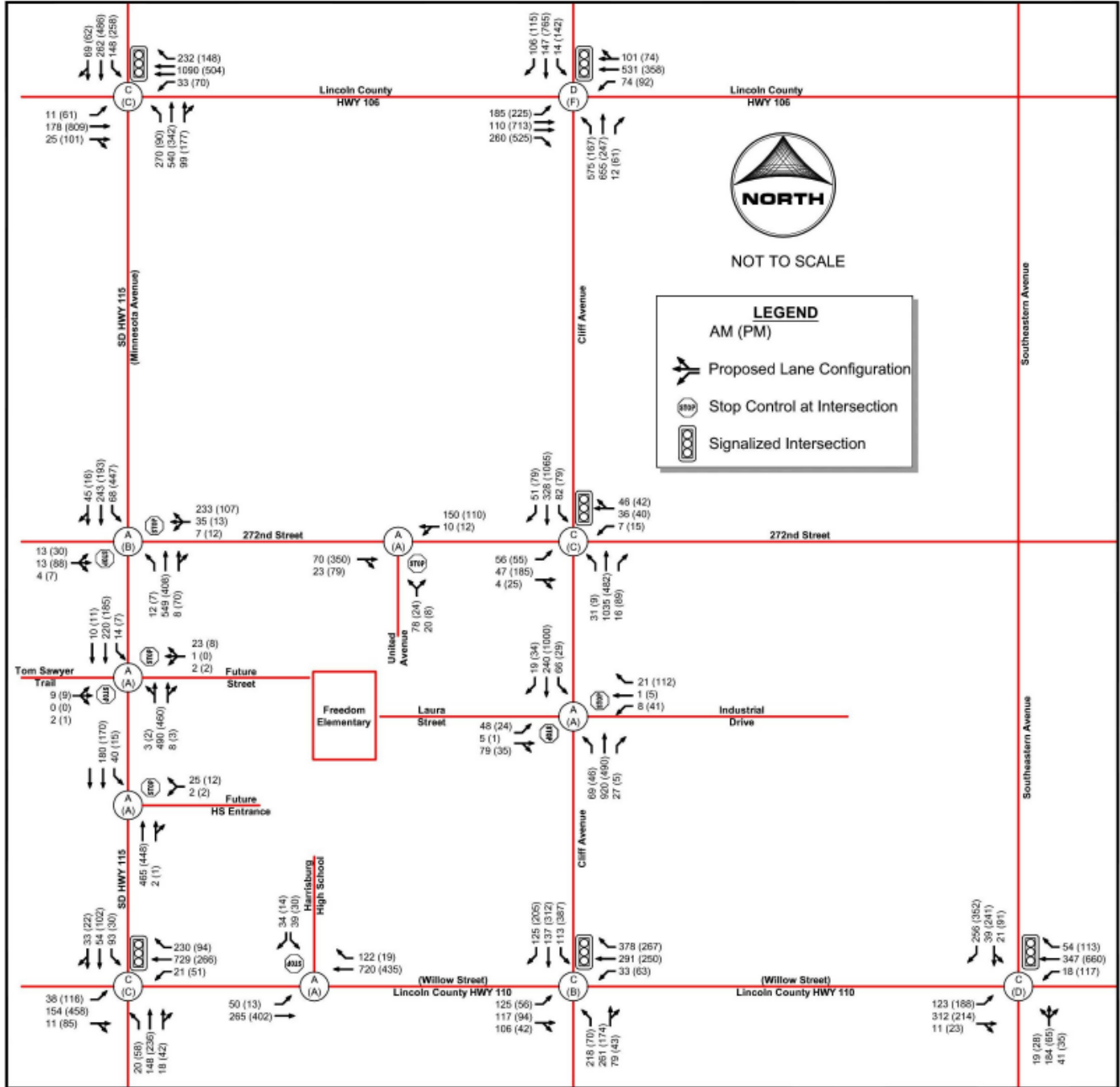
The City of Sioux Falls Travel Demand Model was obtained for 2035 traffic numbers without the elementary school for both the AM and PM volumes. **Exhibit 24** shows the 2035 AM and PM peak hour traffic volumes without the elementary school. The trips generated by the elementary school were added to the traffic volumes for both the AM and PM peak hours for the future (2035) volumes. The resulting traffic volumes are shown in **Exhibit 25**. These exhibits show the AM and PM peak hour volumes at the key intersections. In 2035, a second access location at Minnesota Avenue is proposed and was analyzed with the 2035 Build-Improved scenario. As can be seen in these

exhibits, there is little change in future traffic volumes at the intersections with or without the elementary school.

Exhibit 24 – 2035 AM and PM Peak Hour Traffic Volumes w/out Elementary School



**Exhibit 25 – 2035 Build-Improved AM and PM Peak Hour Traffic Volumes w/
Elementary School**



Intersection Capacity Analysis

A capacity analysis was performed on the 2035 Improved Build AM and PM traffic volumes. **Exhibits 26 and 27**, on the following page, shows the delay/vehicle and LOS by movement at each intersection.

Exhibit 26 – Level of Service – Cliff Avenue & Laura Street Intersection

Level of Service Analysis Cliff Avenue and Laura Street				
	Eastbound	Westbound	Northbound	Southbound
Existing Volumes - AM	A	A	A	A
Existing Volumes - PM	A	A	A	A
"No Build" Opening Day of School - 275 Students - AM	A	A	A	A
"No Build" Opening Day of School - 275 Students - PM	A	A	A	A
"Build" 2035 with School - 550 Students - AM	C	C	A	A
"Build" 2035 with School - 550 Students - PM	C	C	A	A
"Build" 2035 without School - 550 Students - AM	C	C	A	A
"Build" 2035 without School - 550 Students - PM	D	C	A	A

Exhibit 27 – Level of Service – 272nd Street & United Avenue Intersection

Level of Service Analysis 272nd Street and United Avenue				
	Eastbound	Westbound	Northbound	Southbound
Existing Volumes - AM	A	A	A	A
Existing Volumes - PM	A	A	A	A
"No Build" Opening Day of School - 275 Students - AM	A	A	A	A
"No Build" Opening Day of School - 275 Students - PM	A	A	A	A
"Build" 2035 with School - 550 Students - AM	A	A	A	A
"Build" 2035 with School - 550 Students - PM	A	A	A	A
"Build" 2035 without School - 550 Students - AM	A	A	A	A
"Build" 2035 without School - 550 Students - PM	A	A	A	A

As shown in the above exhibits, both of the intersections currently experience high levels of service with LOS A for all movements in the AM and PM. In 2035, the intersection of Cliff Avenue and Laura Street experiences a LOS C for AM eastbound and LOS D for PM eastbound without the elementary school. With the addition of the elementary school, the eastbound movements maintain a LOS C in both the AM and PM. These slight variations are likely due to variations in the model.

A proposed future elementary school access location along Minnesota was analyzed for the 2035 projected traffic scenarios. The entrance was modeled assuming a two-lane roadway with a single-lane exiting and a single-lane entering. The results are shown in **Exhibit 28**.

Exhibit 28 – Level of Service – Minnesota Avenue & Future Street Access

Level of Service Analysis Minnesota Avenue and Future Access				
	Eastbound	Westbound	Northbound	Southbound
"Build" 2035 with School - 550 Students - AM		A	A	A
"Build" 2035 with School - 550 Students - PM		A	A	A

Exhibits 26, 27, and 28 show the proposed elementary school access locations are anticipated to have acceptable traffic operations under the projected traffic scenarios. **Exhibit 29** shows the operational analysis results of the 2035 Build-Improved scenario with the addition of the elementary school's future secondary access to Minnesota Avenue and the High School's future secondary access to Minnesota Avenue.

Exhibit 29 – 2035 Build-Improved Operational Analysis Results w/ Future Elementary School and High School Accesses onto Minnesota Avenue

Intersection	AM/PM	Intersection Control	MOE	Intersection Movement																Overall		
				EBL	EBT	EBR	EB APPROACH	WBL	WBT	WBR	WB APPROACH	NBL	NBT	NBR	NB APPROACH	SBL	SBT	SBR	SB APPROACH			
Willow St/ Minnesota Ave	AM	Signalized	Delay (s/veh)	46.3	17.6	10.2	22.5	27.1	30.4	13.9	26.4	25.6	19.2	11.3	18.9	29.4	20.2	16.3	24.0	24.7		
			LOS	D	B	B	C	C	C	B	C	C	B	B	C	C	B	C	B	C		
			Delay (s/veh)	38.0	39.8	33.6	38.6	44.1	32.8	6.5	28.6	24.6	21.6	14.5	21.0	18.1	12.3	6.0	12.3	29.4	29.4	
Willow St/Cliff Ave	AM	Signalized	Delay (s/veh)	43.0	35.5	21.1	33.5	47.1	53.1	25.1	37.8	21.5	23.6	17.2	22.0	21.0	22.5	10.3	17.7	28.8		
			LOS	D	D	C	C	D	D	C	D	C	C	B	C	C	C	B	A	B	C	
			Delay (s/veh)	40.2	11.6	17.2	15.7	60.0	23.6	16.5	23.8	15.1	20.4	12.7	18.2	20.4	11.8	10.4	14.6	18.6	18.6	
Willow St/ Southeastern Ave	AM	Signalized	Delay (s/veh)	35.0	30.9	23.0	31.8	30.1	36.5	9.0	32.8	27.3	20.1	15.2	19.7	19.6	15.4	9.3	10.7	25.4		
			LOS	C	C	C	C	C	C	D	A	C	C	C	B	B	B	A	B	C	C	
			Delay (s/veh)	64.0	23.3	25.0	38.3	56.7	57.8	33.0	54.4	55.6	43.7	29.3	42.1	42.1	41.6	27.0	34.1	43.8	43.8	
272nd St/ Minnesota Ave	AM	2-way STOP	Delay (s/veh)	7.8	11.9	3.5	8.5	17.2	18.4	10.8	11.7	2.0	1.4	0.8	1.4	8.1	5.2	5.1	5.7	5.1		
			LOS	A	B	A	A	C	C	B	B	A	A	A	A	A	A	A	A	A	A	
			Delay (s/veh)	42.4	44.7	19.2	42.2	54.5	38.2	20.6	24.4	1.6	2.3	1.4	2.2	16.4	7.1	5.1	13.2	13.0	13.0	
272nd St/ United Ave	AM	1-way STOP	Delay (s/veh)	1.9	1.4	1.8	1.8	3.0	1.8		1.9	5.9			3.6	5.5				2.9		
			LOS	A	A	A	A	A	A		A	A			A	A				A	A	
			Delay (s/veh)		3.5	3.3	3.5	4.8	1.7		2.0	7.6			5.4	7.0					3.4	3.4
272nd St/Cliff Ave	AM	Signalized	Delay (s/veh)	45.2	43.5	11.1	42.7	54.3	44.7	26.8	35.7	21.7	19.4	10.4	19.3	46.1	10.0	7.9	15.9	20.6		
			LOS	D	D	B	D	D	C	D	C	C	B	B	D	A	A	B	C	C	C	
			Delay (s/veh)	55.6	42.6	51.1	45.0	50.9	52.3	22.7	38.8	46.3	9.1	5.1	9.1	34.8	25.2	20.9	25.4	24.6	24.6	
Lincoln County HWY 106/ Minnesota Ave	AM	Signalized	Delay (s/veh)	35.6	20.1	6.8	19.4	32.1	38.5	19.9	35.2	27.3	30.3	25.6	29.0	27.0	25.5	23.7	25.6	30.5		
			LOS	A	A	A	B	C	D	B	D	C	C	C	C	C	C	C	C	C	C	
			Delay (s/veh)	41.6	39.9	34.6	39.4	67.6	40.4	13.9	37.8	19.9	31.2	26.1	28.0	30.5	22.6	17.8	24.9	33.0	33.0	
Lincoln County HWY 106/Cliff Ave	AM	Signalized	Delay (s/veh)	60.8	32.7	8.4	30.0	31.9	45.3	43.1	43.5	51.9	35.1	21.1	42.7	37.1	38.8	8.4	26.9	38.8		
			LOS	E	C	A	C	C	D	D	D	D	D	C	D	D	D	A	C	D	D	
			Delay (s/veh)	98.3	69.6	224.3	127.8	618.3	52.9	43.1	139.6	251.7	51.7	63.3	109.0	69.9	73.6	46.9	70.1	109.6	109.6	
Tom Sawyer Tr/ Minnesota Ave	AM	1-way STOP	Delay (s/veh)	5.9	0.0	3.7	5.5	4.5	6.2	3.9	4.0	0.6	0.9	1.4	0.9	3.1	0.5	0.5	0.6	1.0		
			LOS	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
			Delay (s/veh)	5.3	0.0	2.3	4.8	7.2	0.0	3.8	4.6	1.4	0.9	0.9	0.9	2.3	0.6	0.7	0.7	0.9	0.9	
Laura-Industrial/ Cliff Ave	AM	2-way STOP	Delay (s/veh)	37.0	14.9	4.4	15.9	37.6	26.7	17.3	22.3	8.9	7.0	6.6	7.1	12.9	2.7	2.3	4.7	7.5		
			LOS	E	B	A	C	E	D	C	C	A	A	A	A	B	A	A	A	A	A	
			Delay (s/veh)	40.6	39.1	14.5	24.7	34.6	34.9	11.4	17.7	14.5	5.0	4.2	5.8	8.1	4.8	4.0	4.9	7.0	7.0	
Willow St/High School Entrance	AM	1-way STOP	Delay (s/veh)	11.5	2.9		5.1		6.7	7.0	6.8				23.2			11.3	17.4	6.9		
			LOS	B	A		A		A	A	A					B			C	A	A	
			Delay (s/veh)	7.6	4.2		4.3		5.0	4.7	5.0					9.5			8.6	9.2	4.8	
Minnesota Ave/ Future High School Entrance	AM	1-way STOP	Delay (s/veh)					6.8		4.0	4.1			1.8	1.2	1.8	2.4	0.5		0.8	1.5	
			LOS					A		A	A			A	A	A	A	A			A	A
			Delay (s/veh)					2.3		3.8	3.7				2.4	2.6	2.4	2.3	0.6		0.7	1.9
			LOS					A		A	A			A	A	A	A		A	A	A	

The results of the “Build-Improved Operational Analysis with the future elementary school and high school accesses onto Minnesota Avenue” in **Exhibit 29** are very close to those obtained from the “Build-Improved” scenario in **Exhibit 18**. The overall LOS for all intersections remains the same as the “Build-Improved”. The most noticeable change is at the intersection of Minnesota Avenue and 272nd Street where all eastbound movements experienced an increased LOS, but the westbound left LOS dropped from an E to F.

Summary of Elementary School Traffic Impact Study

The results of the analysis show no improvements to the study intersections are necessary to accommodate the additional traffic generated by the addition of the elementary school. Necessary improvements made to the intersections and arterial roadways to accommodate the projected 2035 traffic volumes of the study area are adequate to carry the additional traffic produced by the elementary school.

TRAFFIC ANALYSIS CONCLUSIONS AND RECOMMENDATIONS

This report analyzed the need for roadway improvements and the potential traffic impacts for the construction of new elementary school in Harrisburg, South Dakota. The study area focused on the following intersections and arterial roadways:

- Cliff Avenue and Willow Street
- Cliff Avenue and Laura Street/Industrial Drive
- Cliff Avenue and 272nd Street



- Cliff Avenue and Lincoln County Hwy 106
- Minnesota Avenue and Willow Street
- Minnesota Avenue and Tom Sawyer Trail
- Minnesota Avenue and 272nd Street
- Minnesota Avenue and Lincoln County Hwy 106
- Southeastern Avenue and Willow Street
- 272nd Street and United Avenue

The Sioux Falls MPO Travel Demand Model was obtained for 2035 traffic numbers for both the AM and PM volumes. The TDM was used to accommodate additional growth of other land uses (i.e., residential, commercial, etc.) in the area. The volumes obtained from the model were converted to turning movement counts at each of the study intersections for analysis in both the AM and PM peak hours. Trip generation rates for the elementary school were projected using ITE Trip Generation procedures.

Existing and 2035 traffic projections were analyzed using Synchro™ and SimTraffic™ software to determine intersection capacity and LOS for the study intersections.

Based on this study, the following recommendations are made:

The intersection geometry and control for the study intersections should be constructed as follows:

Cliff Avenue and Willow Street (signalized):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Northbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Cliff Avenue and Laura Street/Industrial Drive (two-way stop controlled):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Cliff Avenue and 272nd Street (signalized):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Cliff Avenue and Lincoln County Hwy 106 (signalized):

- Eastbound Approach
 - One left-turn lane
 - Two through lanes
 - One right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane

Minnesota Avenue and Willow Street (signalized):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane

Minnesota Avenue and Tom Sawyer Trail (one-way stop controlled):

- Eastbound Approach
 - A single shared through, left, and right lane
- Northbound Approach
 - One through lane
 - A shared through/left-turn lane
- Southbound Approach
 - One through lane
 - A shared through/right-turn lane

Minnesota Avenue and 272nd Street (two-way stop controlled):

- Eastbound Approach
 - A single shared through, left, and right lane
- Westbound Approach
 - A single shared through, left, and right lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane

Minnesota Avenue and Lincoln County Hwy 106 (signalized):

- Eastbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - Two through lanes
 - One right-turn lane
- Northbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane
- Southbound Approach
 - One left-turn lane
 - One through lane
 - A shared through/right-turn lane

Southeastern Avenue and Willow Street (signalized):

- Eastbound Approach
 - One left-turn lane
 - A shared through/right-turn lane
- Westbound Approach
 - One left-turn lane
 - One through lane
 - One right-turn lane
- Northbound Approach
 - A single shared through, left, and right lane
- Southbound Approach
 - One shared through/left-turn lane
 - One right-turn lane

Other conclusions from the analysis include:

- The high school access along Willow Street does not require a traffic signal. When this portion of Willow Street is reconstructed, an eastbound left-turn lane and westbound right-turn lane should be provided, and the existing traffic signal removed.
- The proposed high school access along Minnesota Avenue should be designed to provide a southbound left-turn lane and a northbound right-turn lane into the proposed high school. Separate left- and right-turn lanes should be provided for exiting traffic.
- Cliff Avenue between Willow Street and 272nd Street is planned to be reconstructed in 2013. It is recommended to construct Cliff Avenue between Willow Street and 272nd Street as a two-lane roadway section with a median at this time since the majority of the operational issues are at the Lincoln County Hwy 106 intersection. Left- and right-turn lanes must be provided at the intersections to maintain acceptable LOS at the intersections.
- Currently, a traffic signal is not warranted at the intersection of Willow Street and Cliff Avenue. The City may elect to install the signal with the reconstruction of Cliff Avenue in 2013 but, at a minimum, should make provisions for the

- installation of the signal in the future. This includes installing the necessary conduits and detector loops during roadway construction.
- Prior to the reconstruction of the intersection of Southeastern Avenue and Willow Street, existing and future traffic volumes should be analyzed again to determine the required intersection improvements. The current model was built using Harrisburg's 2008 Land Use Plan which showed residential and commercial growth to the northwest and west of the current City limits. Harrisburg's current growth plan shows limited growth in those directions which will likely affect future traffic volumes at the intersection of Southeastern Avenue and Willow Street.
 - The addition of the new elementary school does not adversely affect the intersections of 272nd Street and United Avenue, 272nd Street and Cliff Avenue, or Cliff Avenue and Laura Street/Industrial Drive. Improvements to the existing intersections are not necessary to accommodate increased traffic from the elementary school. The roadway improvements required to accommodate the 2035 traffic volumes of the study area are also sufficient to handle the 2035 traffic volumes from the elementary school.
 - Additional future access points on Cliff Avenue and Willow Street should be aligned with the current access points for improved safety and operation.
 - Right- and left-turn lanes to future developments may not be needed for capacity reasons but the City should request the addition of the lanes to preserve operations of the Cliff Avenue and Willow Street corridors to improve progression and reduce crashes.
 - Existing traffic volumes do not warrant the installation of traffic signals. Traffic volumes should be monitored and the signals should be installed when volume warrants are satisfied, or when the roadways are reconstructed.
 - Bicycle and pedestrian facilities should be constructed along the future improvements on Cliff Avenue, Willow Street, and the other arterial roadways.

FUTURE ROADWAY IMPROVEMENT PROJECTS

Top Two Priority Projects

This report analyzed the need for roadway and intersection improvements within the study area. Results of the traffic analysis show that all intersections analyzed currently operate at a LOS C or better. With the 2035 traffic volumes, several intersections will operate at a LOS E and F. The four intersections along Cliff Avenue all experience a LOS F in either the AM or PM peak hour in 2035. Because of the anticipated poor operations at these intersections, Cliff Avenue from Willow Street north to 272nd Street should be the City's top priority project at this time.

The intersections of Minnesota Avenue and Willow Street and Cliff Avenue and Willow Street will both operate at a LOS F in either the AM or PM peak hour in 2035 or earlier. Future growth is planned along this portion of Willow Street which will likely cause operations to decline. For these reasons, this portion of Willow Street should be considered the second priority project for the City.

Both roadways should be constructed as two-lane urban sections with a 16-foot wide median. The median provides several benefits, but most importantly it is necessary to control access along the corridors. The City's access standards state the first full movement access or intersection cannot be within 660 feet of an arterial roadway intersection. Any access located within 660 feet shall be right-in/right-out, approved by the Engineer, and may warrant a traffic analysis. The only way to enforce right-in/right-out access points is with the use of a raised median. Several existing access locations

near the Cliff Avenue and Willow Street intersection will become right-in/right-out. If a two-lane section with a continuous center-turn lane was constructed in lieu of a median section, access management could not be enforced which in turn would cause the operations of the entire roadway to decrease.

Since these roadway sections have only one (1) through lane in each direction, left- and right-turn lanes must be included at the intersections and development access locations. Failure to install these turn lanes will cause operations of the entire roadway to decrease.

It is recommended to provide a five-foot wide gutter section along the outside lanes to serve as an on-street bicycle lane. If a typical two-foot wide gutter is used, a longitudinal joint exists in the center of the bicycle lane between the concrete gutter and the asphalt roadway. Increasing the width of the gutter section to five feet eliminates this joint and also provides a contrast in color and type of pavement which helps further delineate the bicycle lane. The addition of the bicycle lane also provides motorists with additional width to pass stalled or pulled-over vehicles without adversely affecting traffic flow.

Both corridors should be constructed with an eight-foot wide multi-use use trail on one (1) side and a five-foot wide sidewalk on the other. The trail along these two corridors is planned for in the Harrisburg Parks and Trails Master Plan and in the Multi-Use Trail Corridor Study currently under development by the MPO. The trail along Cliff Avenue should be on the east side of Cliff Avenue and should extend the entire length of the project. The trail along Willow Street should be installed on the north side of Willow Street and should extend to Minnesota Avenue.

The completion of these two (2) projects will provide the City with two (2) new arterial roadways serving as gateways into the City. They provide the City an opportunity to provide aesthetically pleasing corridors to motorists, pedestrians and bicyclists as they enter and exit the City. Within the median section, trees, flowers, and an entrance sign or columns could be constructed to dress up the roadway corridors and provide a grand entrance to the City.

Plan sheets illustrating the geometric layout of the two (2) above described projects are included in Appendix E along with their associated cost estimates.

Remaining Prioritized Projects

Willow Street from Cliff Avenue to Southeastern Avenue

Willow Street from Cliff Avenue to Southeastern Avenue serves as the main arterial roadway through the original community of Harrisburg and should be considered the third priority project for the City. It is abutted by both commercial and residential properties with the majority of them having their own individual access onto Willow Street. The roadway is currently a two-lane rural section with drainage ditches along both sides. Many of these ditches drainage are extremely flat resulting in standing water following rain events. Also, the intersection of Willow Street and Southeastern Avenue may operate at a LOS F in the PM peak hour in 2035 or possibly at an earlier date. Future traffic operations should be monitored to determine if additional intersection improvements may be required.

The new roadway section should be a two-lane urban section with a continuous center-turn lane due to the high number of access points. Access management techniques should be implemented along this corridor to limit the number of access points. This will mainly consist of eliminating accesses to properties with multiple access points and

creating shared access points for adjacent properties. Both sidewalk and a trail should be included within the corridor to accommodate pedestrians and bicyclists.

272nd Street from Minnesota Avenue to Cliff Avenue

272nd Street from Minnesota Avenue to Cliff Avenue should be constructed as dictated by development and traffic volumes. It is currently a gravel roadway that will experience a LOS F at the intersections with Cliff Avenue and Minnesota Avenue in the AM peak hour in 2035 or possibly earlier. 272nd Street from Cliff Avenue west to either United Street or the future elementary school access point will likely be the first portion constructed. The roadway section should be a two-lane urban section and could contain a median if necessary to control access. This will likely depend on the type of development (i.e., commercial, residential, etc.) that is constructed along the roadway. Both sidewalk and a trail should be included within the corridor to accommodate pedestrians and bicyclists.

Southeastern Avenue from 274th Street to Willow Street

Southeastern Avenue from 274th Street to Willow Street should be constructed as dictated by development and traffic volumes. It is currently a gravel roadway that will experience a LOS F at the intersection with Willow Street in the PM peak hour in 2035 or possibly earlier. The major development to take place along this roadway in the future will be the completion of the Greyhawk Addition. The new roadway section should be a two-lane urban section with sidewalk at least on the west side.

Southeastern Avenue from Willow Street to 272nd Street

Southeastern Avenue from Willow Street to Legendary Drive is an asphalt surfaced, rural section, two-lane roadway. The half-mile section of Southeastern Avenue from Legendary Drive to 272nd Street is a gravel surfaced, rural section, two-lane roadway. The intersection with Willow Street will experience a LOS F in the PM peak hour in 2035 or possibly earlier. This entire mile stretch of Southeastern Avenue should be constructed as dictated by development and traffic volumes. When constructed, it should be a two-lane urban section with sidewalk at least on the west side.

Cliff Avenue from 272nd Street to Lincoln County Hwy 106

Cliff Avenue from 272nd Street to Lincoln County Hwy 106 will experience LOS F at the Hwy 106 intersection with the 2035 traffic volumes. This portion of Cliff Avenue should be constructed as a two-lane section with a median to accommodate the future traffic volumes. This portion of Cliff Avenue should include an eight-foot wide multi-use use trail on the east side and a five-foot wide sidewalk on the west side. The City of Harrisburg may not experience growth this direction within the next 10 to 15 years, so future traffic volumes should be monitored to determine if additional intersection or roadway improvements may be required.

Lincoln County Hwy 106 from Minnesota Avenue to Cliff Avenue

Lincoln County Hwy 106 will experience LOS F for most movements at both the intersections with Minnesota Avenue and Cliff Avenue with the 2035 traffic volumes. It should be constructed as a four-lane section with a median to accommodate the future traffic volumes. The City of Harrisburg will likely not experience growth this far north within the next 15 to 20 years. Many other improvements such as the new SD 100 roadway corridor and future Sioux Falls growth may require improvements to this roadway prior to Harrisburg expanding and incorporating the highway into the City.

Minnesota Avenue from County Hwy 110 (Willow Street) north to 270th Street/85th Street

The SDDOT has plans to construct Minnesota Avenue from the southern limits of the City of Sioux Falls to Willow Street as a four-lane section with a median. This project is

currently in the Statewide Transportation Improvement Program (STIP) for 2015. Intersections along this portion of Minnesota Avenue currently have a LOS C or better. With the 2035 traffic volumes, the intersections with Willow Street, 272nd Street, and Lincoln County Hwy 106 all experience LOS F in either the AM or PM peak hour or both.

FUNDING ALTERNATIVES

The City of Harrisburg is looking to construct their top priority street improvement project as soon as possible. In order to make that goal a reality, funding will need to be secured for the project. Potential funding sources for the top priority project, as well as the other projects include:

- Street assessments
- Enact platting fees
- General fund
- Tax Increment Financing (TIF) district
- Community Access Grant from the SDDOT (population less than 5,000)
- Industrial Park Road Grant
- Federal appropriation funds
- Request Lincoln County participation
- General Obligation Bond
- Loan

The City can assess adjacent property owners along the project for the cost of a 2-lane, residential-width type street. The remaining portion of the project has to be paid for from other sources. The City can use monies from the General Fund. They can also obtain a General Obligation Bond or Loan from a local bank, pledging money from the General Fund.

The City could look for funds from other sources too. Platting fees could be enacted to help fund street improvements. The City could also set up a TIF district if an area abutting the project will see development within the next five years. A TIF district pledges the increased property tax from new development to help fund improvements that benefit the property.

The City could also request grant funding from other agencies. If the City's population is less than 5,000, a Community Access Grant or Industrial Park Road Grant could be requested from the SDDOT. The Community Access Grant program funds major street improvements, such as roads to the elevator, schools, etc. This program provides for 60% of the construction costs of the project, up to \$400,000, and does not include engineering or utility work. The Industrial Park Road Grant requires that 40% of the construction costs be paid for by the applicant and that at least five (5) jobs are generated because of the improvements. The City could also request funds from Lincoln County or request a federal appropriation (earmark) through South Dakota's Congressional Delegation.

The trail portion of the street projects can also be funded with the above sources. However, the following options could be evaluated to obtain additional funding:

- Transportation Enhancement Grant through the SDDOT
- Safe Routes to School Grant through the SDDOT
- Recreational Trails Grant through Game Fish and Parks

The Transportation Enhancement Grant may be the most likely trail funding option, especially if the trail contains a direct future connection to the Sioux Falls trail network. The Safe Routes to School Grants can only be used for schools at least 5 years old, so it could not be used to fund sidewalks/trails that will connect to the new elementary school. High schools are also not eligible. The Recreational Trails Grant has historically gone more towards trails in State Parks; however, it may be worth looking into.

If additional study is needed along a street corridor, MPO funds may be available. The study could not include survey work, but could provide additional traffic count data and preliminary design.

Finally, to assist with the maintenance of City streets, the City currently charges a 40-cent per front foot tax assessment that is collected each year. This is the maximum fee the State allows. The revenue generated by this charge is insufficient for current maintenance needs. The City may want to consider working with their legislative representatives to have the law amended to increase the allowable front foot assessment.

Preliminary Assessment Schedule for Top Two Priority Projects

The City of Harrisburg may consider assessing property owners to fund a portion of proposed arterial street improvements. As part of the Transportation Master Plan, assessment schedules were prepared for the following top two priority projects:

- Cliff Avenue from Willow Street north to 272nd Street
- Willow Street from Minnesota Avenue to Cliff Avenue

The assessment schedules were prepared by compiling the property information, and dividing the cost of a typical residential street by the front footage along the project corridor. The cost of a typical residential street is estimated at \$180.00 per foot and was used instead of the full project cost because this is deemed as a fair alternative to assessing the full cost of the project. Adjacent properties are only assessed for the half of the street adjacent to them. The roadways proposed for improvements are arterial streets where all users throughout the community benefit from them. Therefore, the cost for oversizing the street and for items such as medians, turning lanes, and traffic signals would be paid for from other funding sources. Opinions of probable cost for a typical residential street were prepared using the following assumptions:

- Street section width (back of curb to back of curb) – 33 feet
- Street Section – Two, 2-inch lifts of asphalt; 6-inches of base course
- Sidewalk – 5 foot sidewalk on each side

The preliminary assessment schedules in Appendix E list the entire front footage of each property adjacent to the roadway improvements. This front footage is multiplied by the residential street cost of \$90.00 per foot (\$180.00 for the entire street, but divided by two to account for only half the street) to determine the amount that could be collected by assessment.

Appendix A – Existing Roadway Pictures



272nd Street and United Ave. (Looking SW)



272nd Street and United Ave. (Looking SW)



272nd Street and United Ave. (Looking West)



272nd Street and Cliff Ave. (Looking East)



272nd Street and Cliff Ave. (Looking SE)



272nd Street and Minnesota Ave. (Looking NW)



272nd Street and Minnesota Ave. (Looking South)



Pavement on Minnesota Ave. at 272nd Street



HWY 106 and Cliff Ave. (Looking NW)



HWY 106 and Cliff Ave. (Looking SW)



HWY 106 and Cliff Ave. (Looking West)



Pavement on HWY 106 East of Cliff Ave.



Pavement on Cliff Ave. North of HWY 106



Laura Street/Industrial Drive and Cliff Ave. (Looking East)



Laura Street/Industrial Drive and Cliff Ave. (Looking South)



Minnesota Ave. and Tom Sawyer Trail (Looking NW)



Willow Street and Cliff Ave. (Looking NW)



HWY 106 and Minnesota Ave. (Looking SE)



Willow Street and Minnesota Ave. (Looking SE)



Pavement on Willow Street West of Minnesota Ave.



Willow Street and Southeastern Ave. (Looking North)



Willow Street and Southeastern Ave. (Looking West)

Appendix B – Traffic Count Data

Willow Street and Minnesota Avenue

All Vehicles (Average)														
Time	Willow Eastbound			Willow Westbound			Minnesota Northbound			Minnesota Southbound			15-Min. Total	60-Min. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:30 AM														
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	0	24	0	2	32	21	1	21	5	10	7	3	124	
7:15 AM	4	25	1	5	49	39	1	34	5	19	4	1	183	307
7:30 AM	3	36	1	2	56	49	0	39	3	36	7	2	233	539
7:45 AM	4	37	1	1	76	29	2	24	8	46	7	4	237	776
8:00 AM	4	32	1	1	34	35	1	18	7	30	6	2	167	819
8:15 AM	3	14	1	2	26	29	1	22	3	14	8	2	125	761
8:30 AM	0	12	1	2	28	21	1	17	2	10	13	2	107	635
8:45 AM	1	13	1	3	28	10	1	14	1	10	9	2	90	489
Total	18	191	5	17	328	231	6	189	32	173	60	16	1264	
Peak Total	14	129	3	8	215	152	3	115	22	129	24	9	819	
PHF	0.88	0.87	0.63	0.44	0.71	0.77	0.42	0.73	0.72	0.71	0.84	0.61	0.87	
% Trucks	7%	7%	0%	19%	2%	1%	0%	2%	0%	4%	0%	0%	3%	
11:00 AM	2	17	1	2	15	11	0	15	3	9	5	2	80	
11:15 AM	4	15	2	1	12	8	1	11	1	11	7	1	71	
11:30 AM	3	15	0	1	13	8	3	12	5	9	5	2	74	
11:45 AM	3	13	2	0	20	15	1	19	4	10	8	3	96	320
12:00 PM	1	14	2	2	13	8	0	10	2	6	9	2	67	307
12:15 PM	1	14	1	2	18	13	0	12	1	11	10	2	82	318
12:30 PM	3	15	1	2	17	11	1	14	3	10	11	3	88	332
12:45 PM	2	13	1	2	19	10	1	13	2	10	10	1	82	318
Total	18	114	8	10	126	82	6	105	20	75	63	13	638	
Peak Total	8	56	5	6	67	46	2	54	9	36	37	9	332	
PHF	0.63	0.93	0.83	0.69	0.84	0.78	0.38	0.71	0.56	0.85	0.88	0.85	0.87	
% Trucks	0%	20%	10%	18%	16%	4%	0%	1%	17%	0%	4%	0%	9%	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	2	27	0	4	34	25	0	14	2	16	14	2	140	
3:30 PM	3	23	1	5	32	22	0	17	5	19	11	3	141	
3:45 PM	3	29	3	2	37	11	1	11	0	24	22	7	150	431
4:00 PM	4	26	0	2	34	12	1	7	1	19	19	6	131	562
4:15 PM	2	26	4	7	27	21	1	13	1	24	18	2	146	568
4:30 PM	6	36	3	6	27	26	0	16	3	22	21	3	167	594
4:45 PM	5	41	2	4	23	14	1	16	6	31	22	2	164	607
5:00 PM	6	39	1	4	37	15	2	10	4	38	27	7	188	664
5:15 PM	5	57	1	5	24	15	1	15	4	39	26	10	200	718
5:30 PM	4	46	2	4	20	17	2	16	4	32	20	3	169	720
5:45 PM	6	47	1	4	22	14	1	13	2	29	22	4	163	719
6:00 PM														
Total	46	396	17	45	316	191	10	147	32	292	222	48	1757	
Peak Total	20	183	6	16	103	60	6	57	18	139	95	21	720	
PHF	0.81	0.80	0.69	0.80	0.70	0.90	0.69	0.88	0.75	0.90	0.89	0.54	0.90	
% Trucks	0%	1%	0%	3%	3%	2%	0%	3%	0%	0%	0%	0%	1%	

Willow Street and Cliff Avenue

All Vehicles (Average)														
Time	Willow			Willow			Cliff			Cliff			15-Min. Total	60-Min. Total
	Eastbound			Westbound			Northbound			Southbound				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:30 AM														
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	19	12	4	3	39	41	11	14	4	8	10	14	177	
7:15 AM	17	13	12	4	44	41	21	24	6	20	18	15	232	409
7:30 AM	16	23	24	4	55	48	45	32	8	17	28	21	319	728
7:45 AM	12	20	25	4	57	35	62	26	15	18	22	31	325	1052
8:00 AM	13	27	12	6	40	34	28	19	20	21	11	11	238	1113
8:15 AM	9	20	4	16	35	39	8	17	12	27	9	6	200	1082
8:30 AM	8	16	3	3	25	19	6	17	5	12	8	5	125	887
8:45 AM	5	11	3	3	14	10	10	12	3	9	6	7	90	652
Total	99	140	85	42	307	265	190	160	71	130	110	108	1704	
Peak Total	58	83	72	18	195	157	156	100	48	75	78	77	1113	
PHF	0.85	0.76	0.73	0.73	0.86	0.82	0.63	0.79	0.61	0.91	0.69	0.63	0.86	
% Trucks	4%	2%	16%	0%	2%	0%	2%	0%	0%	1%	1%	7%	3%	
11:00 AM	6	6	3	4	9	8	2	10	3	3	8	6	68	
11:15 AM	3	11	8	1	15	4	2	6	2	10	4	5	71	
11:30 AM	1	10	4	1	5	14	6	11	3	12	7	4	78	
11:45 AM	6	16	5	4	10	9	5	10	2	10	9	5	91	308
12:00 PM	1	10	10	4	11	7	5	4	3	11	6	9	81	321
12:15 PM	2	13	6	0	10	10	6	6	3	4	9	2	71	321
12:30 PM	5	7	4	1	8	8	5	13	3	4	8	5	71	314
12:45 PM	4	8	7	1	12	13	4	4	0	6	6	0	65	288
Total	28	81	47	16	80	73	35	64	19	60	57	36	596	
Peak Total	11	47	27	10	41	34	18	31	10	43	26	23	321	
PHF	0.46	0.73	0.68	0.63	0.68	0.61	0.75	0.70	0.83	0.90	0.72	0.64	0.88	
% Trucks	18%	6%	4%	0%	5%	3%	11%	0%	10%	0%	0%	9%	4%	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	6	30	11	6	25	31	13	19	13	36	10	9	205	
3:30 PM	12	21	7	5	25	21	16	13	5	26	11	11	171	
3:45 PM	9	27	11	2	18	13	8	13	4	22	16	6	145	520
4:00 PM	8	30	17	5	24	16	11	13	5	27	16	10	178	698
4:15 PM	13	36	17	3	18	18	8	10	7	26	22	11	185	678
4:30 PM	9	32	14	4	20	14	12	17	8	44	24	24	220	728
4:45 PM	10	42	14	4	17	12	9	10	8	34	22	6	186	769
5:00 PM	12	45	15	8	26	20	9	16	10	48	21	18	245	836
5:15 PM	9	58	15	6	25	16	13	12	12	50	20	16	249	900
5:30 PM	8	49	15	7	26	11	8	12	8	41	23	8	214	893
5:45 PM	8	41	11	4	21	15	8	14	9	38	25	7	198	905
6:00 PM														
Total	101	409	145	50	241	184	114	147	85	390	207	123	2194	
Peak Total	37	192	55	24	96	61	38	54	38	177	88	48	905	
PHF	0.79	0.83	0.92	0.75	0.94	0.78	0.72	0.86	0.82	0.89	0.89	0.67	0.91	
% Trucks	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	1%	0%	

272nd Street and Minnesota Avenue

All Vehicles (Average)														
Time	272nd St Eastbound			272nd St Westbound			Minnesota Northbound			Minnesota Southbound			15-Min. Total	60-Min. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:30 AM														
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	1	0	0	1	0	14	0	47	0	1	19	1	83	
7:15 AM	4	1	2	2	1	16	0	73	1	4	41	3	144	227
7:30 AM	3	1	2	3	4	29	0	85	1	3	60	4	192	419
7:45 AM	2	2	2	2	1	23	1	60	2	4	50	2	148	567
8:00 AM	2	1	0	1	2	7	2	64	0	1	25	0	104	588
8:15 AM	1	0	1	1	1	9	2	50	1	1	19	1	85	529
8:30 AM	2	1	1	1	1	6	2	43	1	1	38	2	97	433
8:45 AM	1	1	1	1	2	4	0	32	0	2	20	3	64	349
Total	15	5	6	10	11	107	6	453	5	16	270	14	915	
Peak Total	10	4	5	7	8	75	3	282	3	11	176	8	588	
PHF	0.68	0.67	0.75	0.54	0.54	0.64	0.42	0.83	0.42	0.79	0.73	0.57	0.76	
% Trucks	11%	38%	0%	8%	20%	1%	0%	1%	0%	5%	3%	13%	2%	
11:00 AM														
11:15 AM														
11:30 AM														
11:45 AM														
12:00 PM														
12:15 PM														
12:30 PM														
12:45 PM														
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peak Total	0	0	0	0	0	0	0	0	0	0	0	0	0	
PHF														
% Trucks														
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	1	1	1	1	1	3	1	38	1	5	31	2	83	
3:30 PM	1	2	2	0	3	6	1	44	2	8	46	6	117	
3:45 PM	2	0	1	1	0	4	3	29	2	8	47	1	97	297
4:00 PM	1	1	1	1	1	5	1	35	2	7	56	2	110	407
4:15 PM	1	1	1	0	1	6	1	29	2	6	58	5	107	431
4:30 PM	1	1	1	2	0	9	1	44	2	9	63	4	136	449
4:45 PM	2	1	1	1	0	2	1	42	1	15	64	3	130	482
5:00 PM	3	1	1	1	1	3	1	39	0	15	74	2	138	510
5:15 PM	3	2	1	2	1	9	0	46	2	18	80	5	168	571
5:30 PM	0	1	1	1	0	6	1	49	2	18	76	2	155	590
5:45 PM	4	3	0	3	1	5	0	36	1	19	59	1	128	589
6:00 PM														
Total	17	11	9	10	7	55	9	430	15	125	652	30	1367	
Peak Total	8	4	3	4	2	20	2	176	4	66	293	11	590	
PHF	0.63	0.50	0.75	0.50	0.38	0.54	0.50	0.90	0.50	0.91	0.92	0.55	0.88	
% Trucks	7%	0%	0%	0%	0%	0%	0%	1%	13%	0%	0%	0%	1%	

272nd Street and United Avenue

All Vehicles (Average)														
Time	272nd St			272nd St			United Ave			0			15-Min. Total	60-Min. Total
	Eastbound			Westbound			Northbound			Southbound				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:30 AM														
6:45 AM														
7:00 AM		0	1	0	1	0	11	0	0	0	0	0	13	
7:15 AM		0	2	0	4		17		1				24	
7:30 AM		1	2	0	5		23		1				32	
7:45 AM		3	0	1	3		12		2				21	90
8:00 AM		1	3	0	2		9		0				15	92
8:15 AM		1	0	0	2		8		0				11	79
8:30 AM		0	1	1	5		9		0				16	63
8:45 AM		2	0	0	2		4		1				9	51
Total		8	9	2	24		93		5				141	
Peak Total		5	7	1	14		61		4				92	
PHF		0.42	0.58	0.25	0.70		0.66		0.50				0.72	
% Trucks		0%	0%	0%	0%		0%		0%				0%	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peak Total														
PHF														
% Trucks														
3:00 PM														
3:15 PM														
3:30 PM														
3:45 PM														
4:00 PM		1	8	1	0		1		2				13	
4:15 PM		0	6	0	1		3		0				10	
4:30 PM		1	3	0	0		4		1				9	
4:45 PM		2	4	1	4		5		0				16	48
5:00 PM		2	21	1	1		5		1				31	66
5:15 PM		2	13	1	1		4		0				21	77
5:30 PM		0	16	0	0		6		1				23	91
5:45 PM		2	13	0	1		4		0				20	95
6:00 PM														
Total		10	84	4	8		32		5				143	
Peak Total		6	63	2	3		19		2				95	
PHF		0.75	0.75	0.50	0.75		0.79		0.50				0.77	
% Trucks		17%	0%	0%	0%		0%		0%				1%	

272nd Street and Cliff Avenue

All Vehicles (Average)														
Time	272nd St			272nd St			Cliff			Cliff			15-Min. Total	60-Min. Total
	Eastbound			Westbound			Northbound			Southbound				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:30 AM														
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	4	0	1	1	0	1	2	86	0	1	35	0	130	
7:15 AM	10	1	1	1	1	1	1	113	0	0	53	1	180	310
7:30 AM	2	1	2	0	1	1	4	122	1	1	69	4	203	513
7:45 AM	3	1	3	1	1	1	1	92	0	0	69	4	174	686
8:00 AM	2	0	1	0	1	0	0	71	1	0	43	1	119	675
8:15 AM	2	0	2	1	1	1	4	59	0	1	24	0	92	587
8:30 AM	2	0	3	0	0	0	0	37	1	0	16	0	58	442
8:45 AM	3	0	1	1	0	1	2	30	0	1	18	0	54	322
Total	25	2	13	4	4	4	12	608	2	3	325	9	1008	
Peak Total	18	2	6	3	2	3	7	412	1	2	225	8	686	
PHF	0.46	0.75	0.50	0.63	0.50	0.75	0.50	0.85	0.25	0.50	0.82	0.54	0.84	
% Trucks	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%	2%	
11:00 AM	2	1	2	1	0	0	2	25	0	0	25	1	59	
11:15 AM	4	0	0	0	0	0	1	26	0	0	26	3	60	
11:30 AM	1	0	1	0	1	0	1	34	0	0	27	0	65	
11:45 AM	1	1	0	0	2	0	0	19	0	1	27	0	51	235
12:00 PM	0	0	2	0	0	0	0	24	0	0	42	1	69	245
12:15 PM	1	0	0	0	0	0	0	19	0	1	18	1	40	225
12:30 PM	1	0	0	0	2	1	0	28	2	1	20	0	55	215
12:45 PM	1	0	0	0	0	1	0	30	0	0	29	2	63	227
Total	11	2	5	1	5	2	4	205	2	3	214	8	462	
Peak Total	6	1	3	0	3	0	2	103	0	1	122	4	245	
PHF	0.38	0.25	0.38		0.38		0.50	0.76		0.25	0.73	0.33	0.89	
% Trucks	33%	0%	0%		0%		50%	6%		0%	4%	25%	6%	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	2	0	3	1	0	1	3	50	1	1	52	2	113	
3:30 PM	4	1	1	0	0	2	2	72	0	0	45	2	128	
3:45 PM	0	1	1	1	1	1	1	64	1	1	56	2	126	366
4:00 PM	1	1	1	0	1	1	1	78	1	1	58	2	142	508
4:15 PM	2	1	0	0	0	0	1	60	1	1	59	4	127	522
4:30 PM	1	2	0	0	1	0	2	74	2	0	49	4	134	528
4:45 PM	1	0	2	0	0	2	1	45	1	1	67	2	120	523
5:00 PM	3	1	0	1	1	2	1	75	2	1	87	5	177	557
5:15 PM	4	1	0	1	1	0	0	45	0	2	101	4	156	586
5:30 PM	1	1	1	0	1	1	0	54	1	1	96	6	160	612
5:45 PM	2	0	1	0	1	1	0	30	1	0	79	3	116	608
6:00 PM														
Total	19	6	8	3	4	8	10	644	10	7	747	32	1496	
Peak Total	8	2	3	1	2	4	2	218	4	4	350	16	612	
PHF	0.57	0.50	0.31	0.50	0.75	0.50	0.38	0.73	0.50	0.50	0.87	0.70	0.87	
% Trucks	0%	0%	0%	0%	0%	0%	33%	1%	0%	0%	0%	0%	1%	

Minnesota Avenue and HWY 106

All Vehicles (Average)														
Time	106			106			Minnesota			Minnesota			15-Min. Total	60-Min. Total
	Eastbound			Westbound			Northbound			Southbound				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:30 AM														
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	5	19	5	1	28	19	12	49	1	9	23	3	170	
7:15 AM	7	22	9	2	42	33	14	87	1	10	22	6	254	424
7:30 AM	10	33	10	2	53	34	16	97	1	9	42	5	309	733
7:45 AM	13	35	10	4	50	32	14	84	7	11	51	11	320	1053
8:00 AM	8	27	6	1	40	24	11	62	2	6	34	7	224	1107
8:15 AM	7	22	5	2	27	21	10	56	2	4	15	10	178	1030
8:30 AM	14	16	4	2	34	24	7	41	1	3	17	4	165	886
8:45 AM	8	15	5	2	16	13	8	29	2	5	15	6	122	689
Total	71	187	52	14	288	199	90	504	16	57	218	50	1741	
Peak Total	37	117	34	8	184	123	55	329	11	36	149	28	1107	
PHF	0.74	0.83	0.88	0.50	0.87	0.91	0.85	0.85	0.40	0.81	0.73	0.65	0.87	
% Trucks	4%	13%	6%	6%	2%	1%	1%	1%	10%	0%	2%	4%	3%	
11:00 AM	6	14	3	1	21	7	4	27	3	6	19	4	112	
11:15 AM	7	13	4	1	22	11	3	20	2	6	19	4	110	
11:30 AM	9	19	5	2	13	10	6	29	3	8	18	6	124	
11:45 AM	6	21	6	1	19	8	4	18	3	5	21	7	116	461
12:00 PM	8	15	4	1	17	10	6	23	1	7	14	6	109	459
12:15 PM	5	11	7	4	19	10	6	24	1	9	19	8	121	470
12:30 PM	6	20	7	1	17	9	5	25	2	3	22	7	123	468
12:45 PM	9	15	7	1	21	9	4	20	1	10	27	5	126	478
Total	53	126	42	10	147	73	37	186	15	53	158	43	939	
Peak Total	27	60	25	6	73	38	21	92	5	29	82	24	478	
PHF	0.79	0.77	0.88	0.43	0.86	0.94	0.85	0.92	0.56	0.75	0.75	0.80	0.95	
% Trucks	4%	8%	8%	8%	7%	4%	2%	3%	0%	2%	3%	4%	5%	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	7	33	7	3	25	12	5	42	2	12	41	6	192	
3:30 PM	8	20	9	7	41	19	13	43	2	13	44	8	225	
3:45 PM	6	33	13	4	29	12	7	39	1	12	49	4	207	623
4:00 PM	13	28	7	2	24	14	5	27	4	12	42	4	179	802
4:15 PM	7	38	8	3	33	10	5	37	2	18	59	5	223	833
4:30 PM	11	34	12	2	43	15	10	33	4	12	60	10	243	851
4:45 PM	7	48	10	6	42	11	8	49	5	13	49	8	252	896
5:00 PM	9	39	14	5	45	14	5	45	6	15	74	8	278	995
5:15 PM	16	47	20	6	33	19	10	39	10	20	88	8	315	1087
5:30 PM	13	43	15	7	31	18	9	44	10	15	79	8	288	1132
5:45 PM	7	29	12	4	24	12	8	35	5	15	55	4	208	1088
6:00 PM														
Total	101	390	125	48	368	154	83	429	48	154	637	71	2607	
Peak Total	44	176	58	24	151	61	31	176	30	62	289	32	1132	
PHF	0.70	0.93	0.73	0.84	0.84	0.80	0.78	0.91	0.75	0.79	0.82	0.98	0.90	
% Trucks	0%	1%	1%	0%	4%	1%	0%	0%	0%	0%	0%	5%	1%	

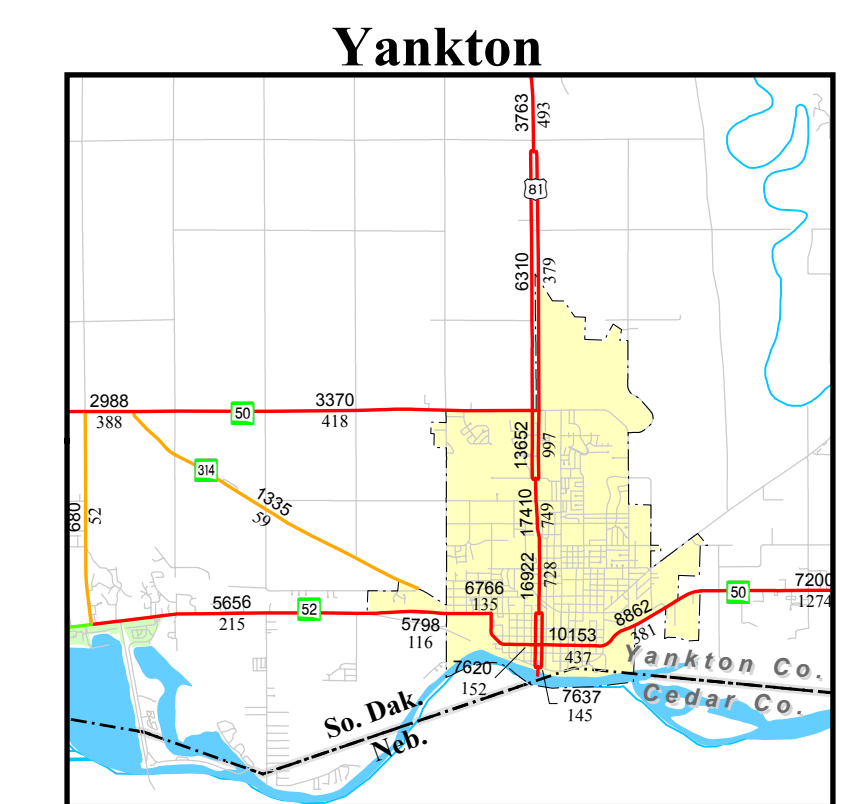
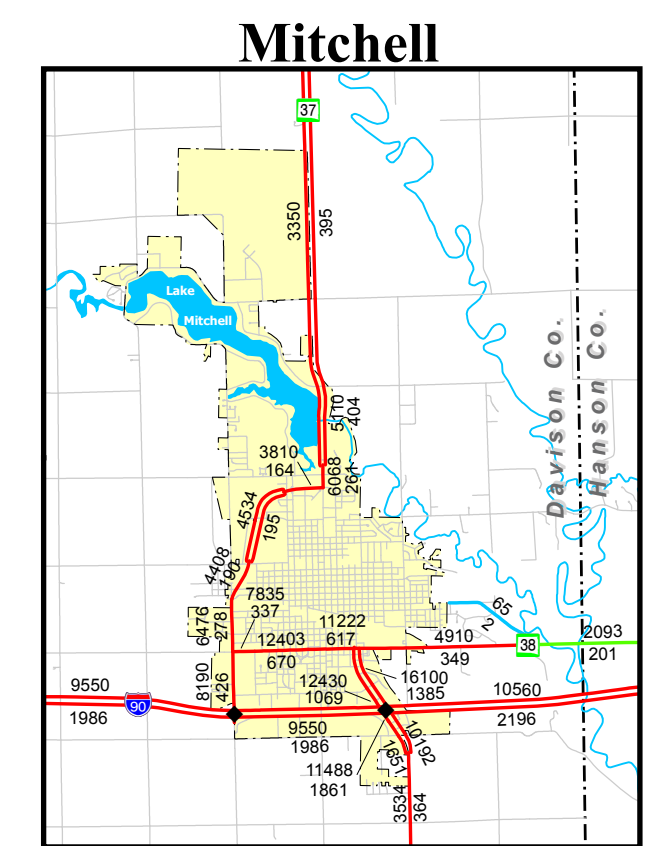
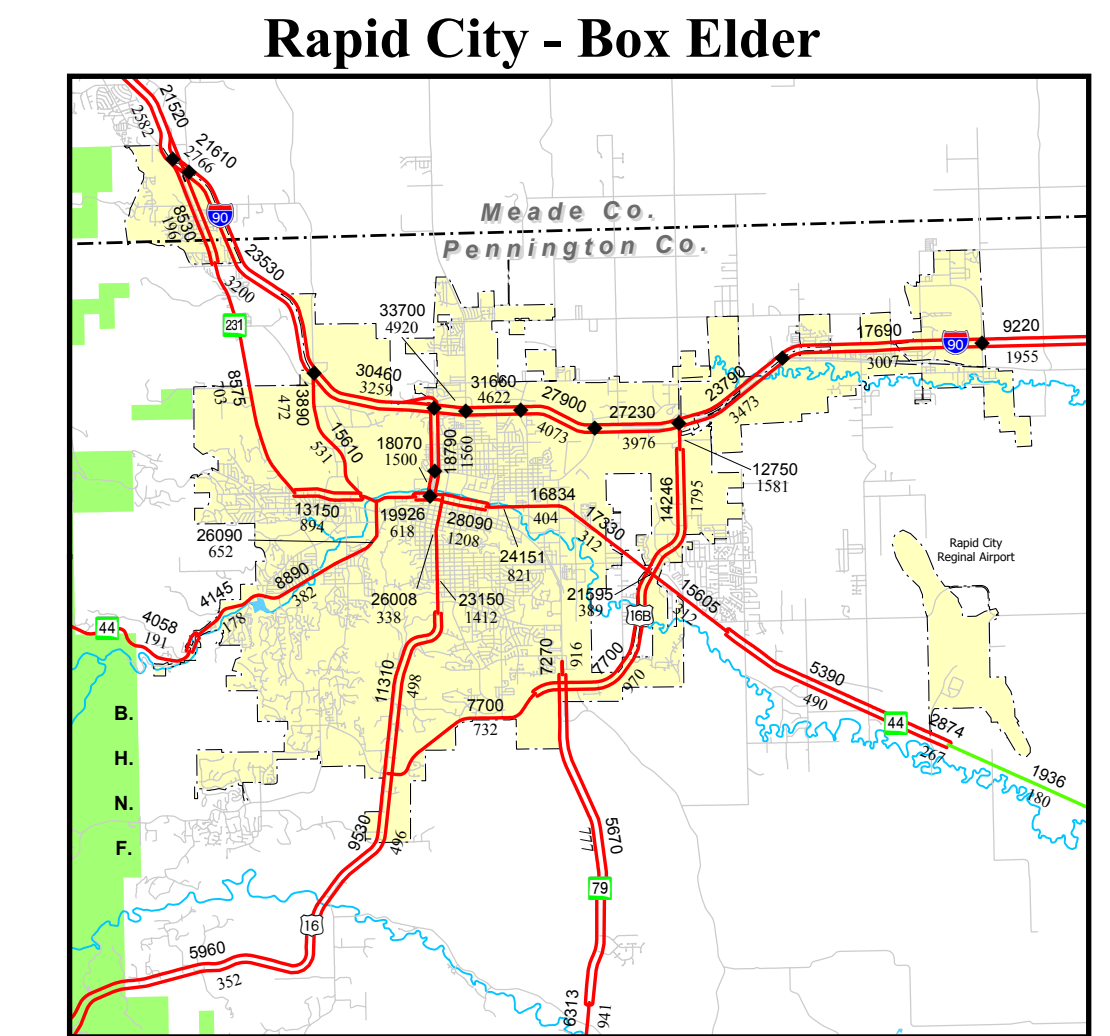
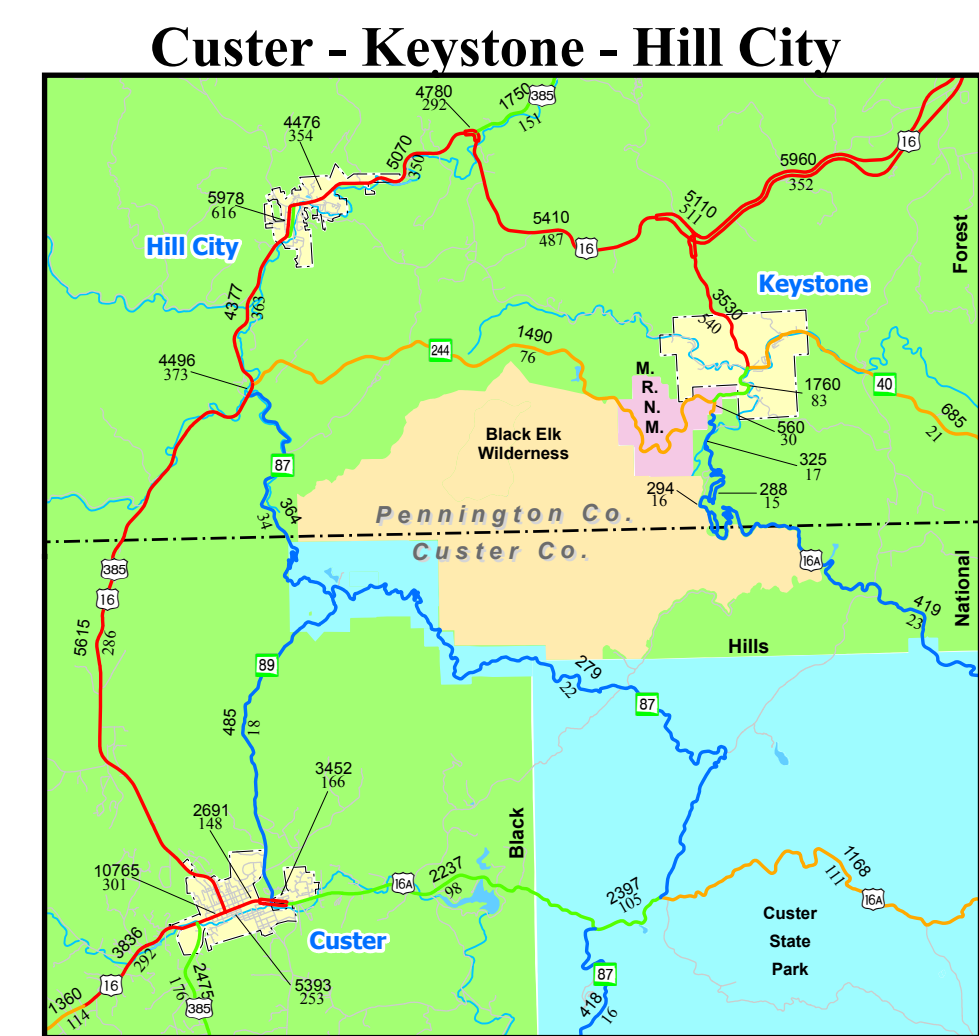
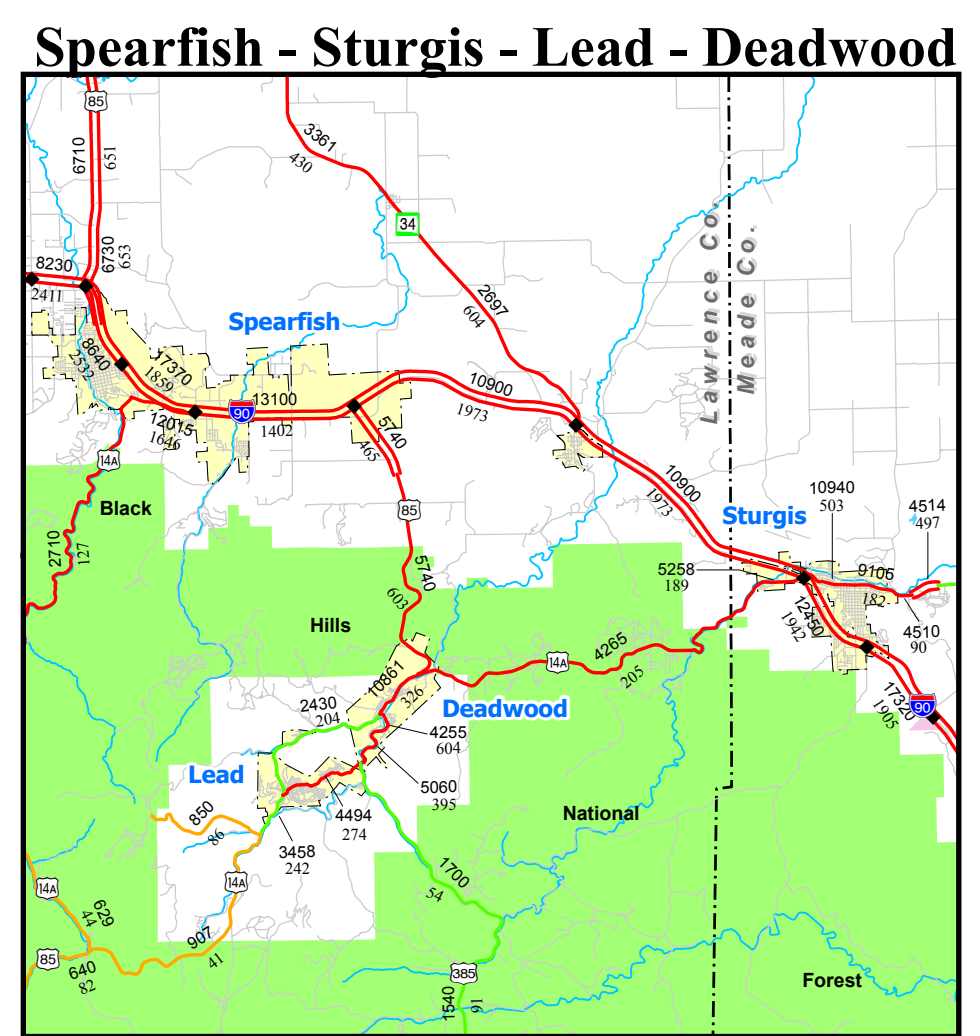
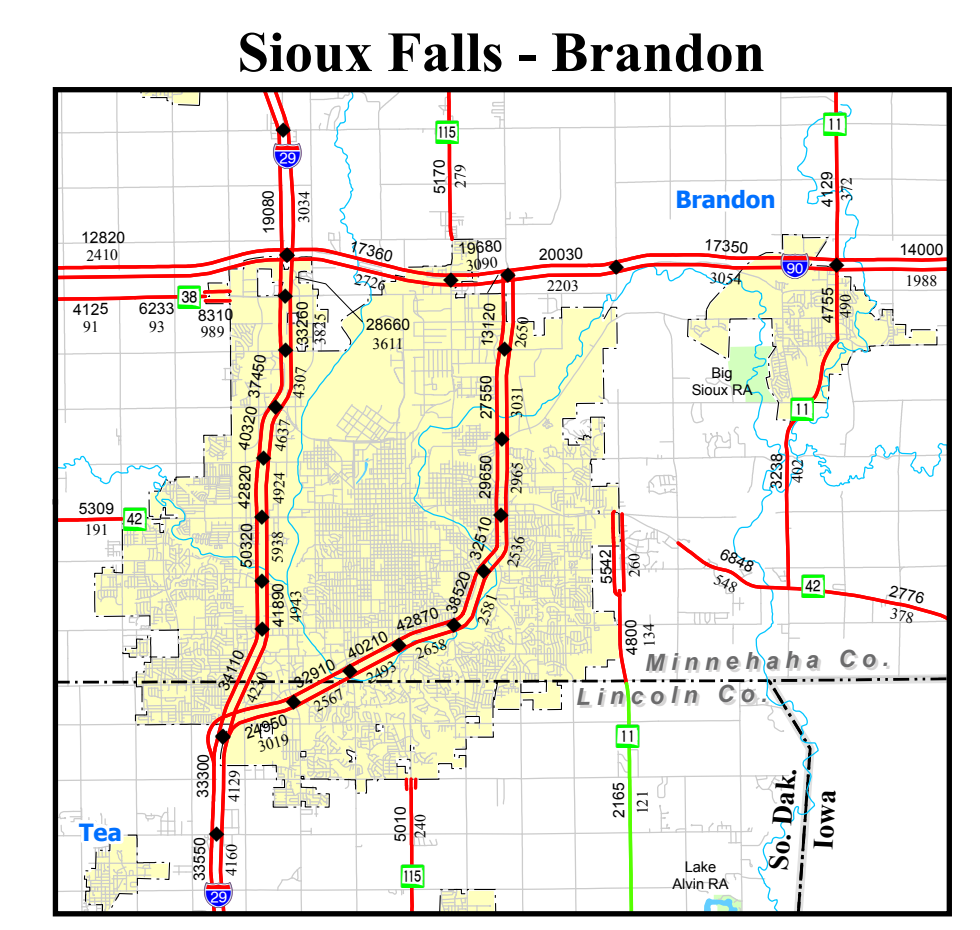
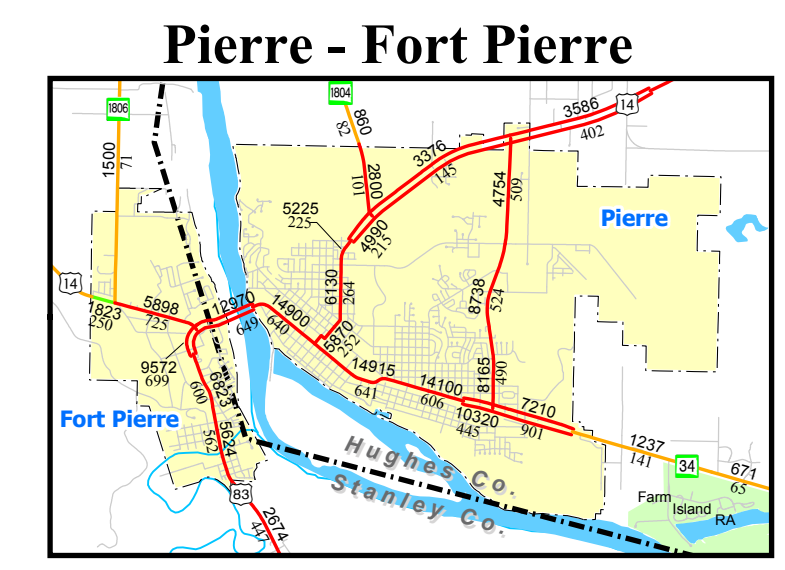
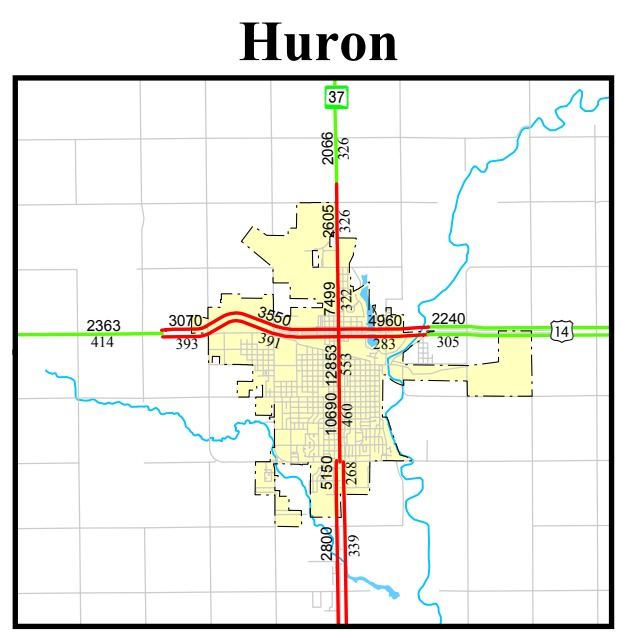
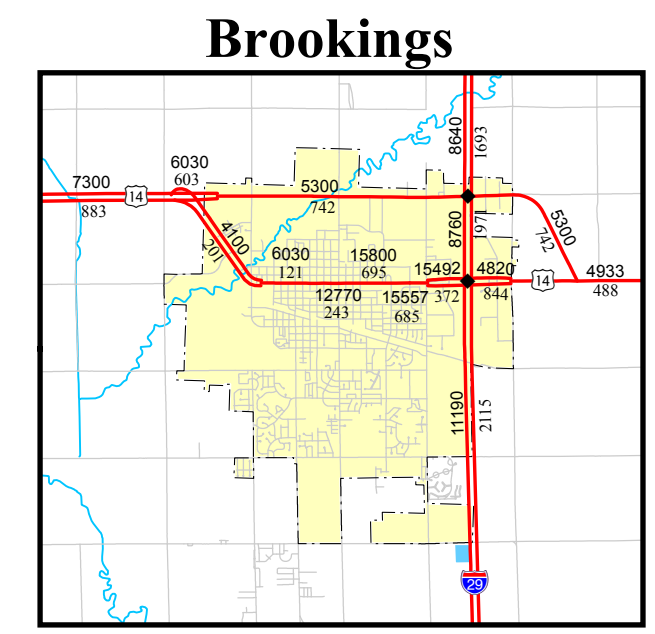
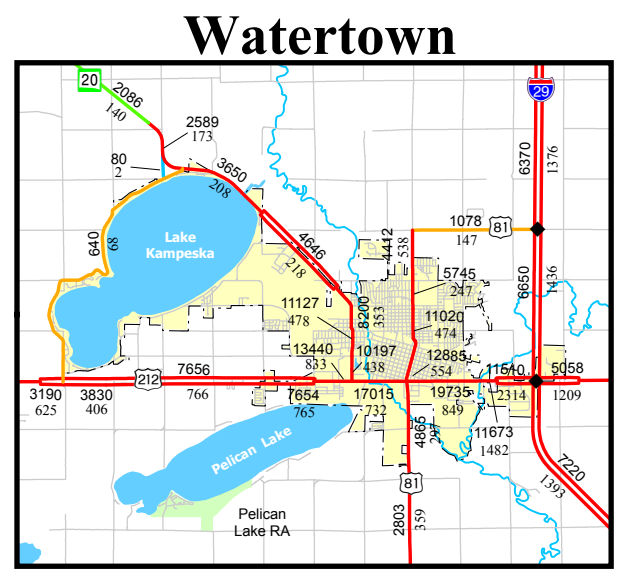
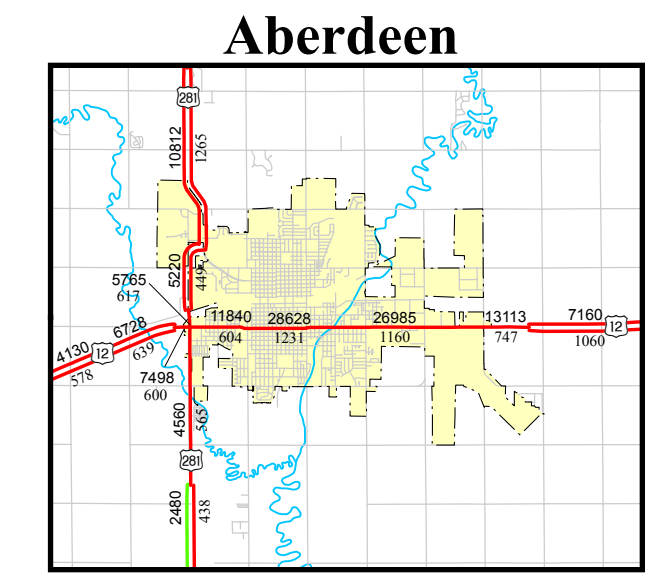
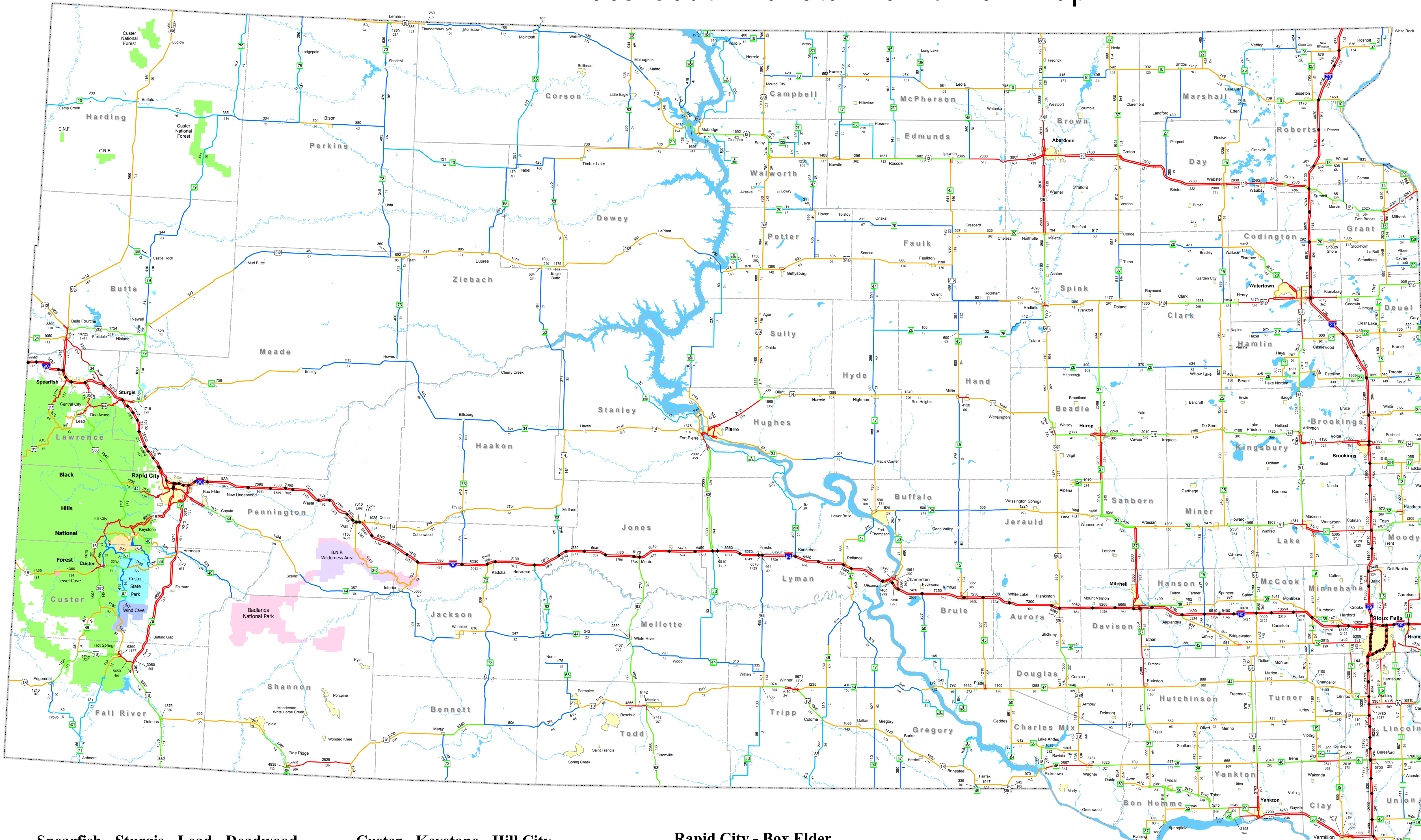
Cliff Avenue and HWY 106

All Vehicles (Average)														
Time	106			106			Cliff			Cliff			15-Min. Total	60-Min. Total
	Eastbound			Westbound			Northbound			Southbound				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:30 AM														
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	9	11	11	9	38	14	17	76	1	3	28	6	220	
7:15 AM	12	14	20	10	44	27	17	90	3	8	39	9	291	510
7:30 AM	20	13	17	14	47	32	27	101	3	8	27	10	316	826
7:45 AM	25	18	21	17	39	28	29	72	3	5	37	17	308	1134
8:00 AM	10	15	6	2	37	13	21	64	3	9	22	13	212	1126
8:15 AM	14	16	6	3	26	9	19	47	3	8	23	7	179	1014
8:30 AM	8	13	4	3	28	7	14	33	2	8	21	12	151	849
8:45 AM	7	6	6	3	25	6	13	18	2	9	15	10	120	661
Total	103	104	90	60	282	135	155	499	18	56	211	84	1794	
Peak Total	65	55	68	49	167	100	89	338	9	23	130	42	1134	
PHF	0.66	0.79	0.81	0.72	0.90	0.78	0.77	0.84	0.85	0.72	0.83	0.62	0.90	
% Trucks	14%	10%	7%	4%	0%	1%	4%	2%	6%	0%	3%	1%	3%	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peak Total														
PHF														
% Trucks														
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	12	20	12	3	20	7	10	36	8	20	41	10	195	
3:30 PM	7	31	11	2	20	5	28	62	7	15	40	16	240	
3:45 PM	13	25	11	2	17	7	20	50	7	14	48	12	223	658
4:00 PM	15	28	10	2	14	11	14	41	4	15	39	11	202	859
4:15 PM	11	28	12	4	19	5	22	49	6	16	57	11	235	899
4:30 PM	12	28	7	6	20	8	16	43	4	20	50	14	225	884
4:45 PM	20	41	15	4	24	6	10	34	4	22	68	13	257	918
5:00 PM	19	39	14	5	26	15	21	37	9	25	76	15	298	1014
5:15 PM	22	45	24	6	31	11	12	28	7	23	97	19	323	1102
5:30 PM	16	30	17	5	25	10	8	36	2	27	85	11	269	1146
5:45 PM	12	28	19	4	23	8	14	31	3	22	70	11	243	1132
6:00 PM														
Total	157	341	151	40	236	88	173	444	58	215	667	140	2708	
Peak Total	76	155	70	19	105	40	51	135	21	96	325	57	1146	
PHF	0.88	0.86	0.72	0.77	0.85	0.69	0.62	0.91	0.62	0.90	0.84	0.76	0.89	
% Trucks	5%	0%	3%	0%	5%	0%	6%	1%	0%	1%	0%	7%	2%	

Laura St/Industrial Dr. and Cliff Ave.

All Vehicles (Average)														
Time	Laura			Industrial			Cliff			Cliff			15-Min. Total	60-Min. Total
	Eastbound			Westbound			Northbound			Southbound				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
6:30 AM														
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 AM	11	1	7	2	0	3	3	55	3	15	23	2	123	
7:15 AM	15	4	10	2	0	5	5	90	3	11	50	3	195	318
7:30 AM	18	0	14	3	0	8	6	64	6	12	48	1	177	495
7:45 AM	10	0	15	0	0	2	6	61	11	15	50	2	169	664
8:00 AM	7	1	7	1	0	3	7	54	7	10	24	1	121	662
8:15 AM	5	1	9	1	0	7	9	52	4	7	24	1	117	584
8:30 AM	2	0	3	2	0	4	3	38	1	5	14	1	73	480
8:45 AM	2	0	1	1	0	0	1	17	1	2	16	1	42	353
Total	69	6	65	11	0	31	38	431	35	76	248	9	1017	
Peak Total	53	5	45	6	0	17	19	270	22	53	170	6	664	
PHF	0.76	0.32	0.75	0.50		0.57	0.84	0.75	0.51	0.88	0.86	0.60	0.85	
% Trucks	1%	0%	7%	50%		15%	3%	2%	5%	4%	2%	0%	3%	
11:00 AM	4	0	1	9	2	2	2	20	5	5	20	3	69	
11:15 AM	3	1	2	2	1	6	2	20	7	5	17	3	68	
11:30 AM	2	0	1	10	2	5	5	24	4	4	20	2	77	
11:45 AM	3	1	3	5	0	4	3	14	4	5	29	2	70	284
12:00 PM	1	1	3	4	0	5	1	14	2	5	28	1	65	280
12:15 PM	3	1	2	2	0	3	4	19	3	4	19	3	63	275
12:30 PM	4	0	3	0	0	6	2	25	1	5	11	4	61	259
12:45 PM	2	0	1	1	0	2	5	24	1	2	16	1	55	244
Total	22	4	15	32	5	33	24	159	26	34	159	18	528	
Peak Total	12	2	6	25	5	17	12	77	19	18	85	9	284	
PHF	0.72	0.50	0.55	3.13	0.56	0.69	0.58	0.80	0.71	0.88	0.75	0.75	0.92	
% Trucks	0%	0%	0%	6%	0%	18%	0%	5%	11%	20%	5%	0%	6%	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15 PM	4	1	4	10	1	12	10	33	2	3	50	6	133	
3:30 PM	8	1	4	13	1	27	11	35	4	5	35	3	143	
3:45 PM	4	0	7	11	1	33	6	35	3	6	60	4	167	442
4:00 PM	4	1	3	8	2	35	6	30	3	4	47	6	146	588
4:15 PM	3	1	3	10	2	27	7	32	2	6	45	7	142	597
4:30 PM	5	1	4	18	2	49	6	36	2	4	41	8	173	628
4:45 PM	5	0	8	4	1	9	10	37	2	3	66	8	151	611
5:00 PM	9	0	7	10	1	24	11	37	0	7	72	6	181	646
5:15 PM	6	1	5	2	0	9	9	38	1	9	78	16	170	674
5:30 PM	5	1	4	1	2	8	10	37	1	5	65	14	149	650
5:45 PM	5	1	7	1	0	4	5	28	0	3	70	10	132	631
6:00 PM														
Total	54	5	54	85	11	234	88	375	17	52	627	84	1684	
Peak Total	24	1	23	33	4	90	35	147	4	23	256	36	674	
PHF	0.69	0.50	0.77	0.47	0.44	0.46	0.83	0.96	0.50	0.66	0.82	0.58	0.93	
% Trucks	2%	0%	0%	3%	0%	1%	0%	1%	13%	9%	1%	0%	1%	

2009 South Dakota Traffic Flow Map



Legend

- ◆ Interchanges

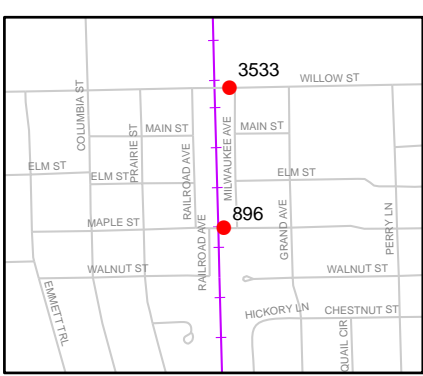
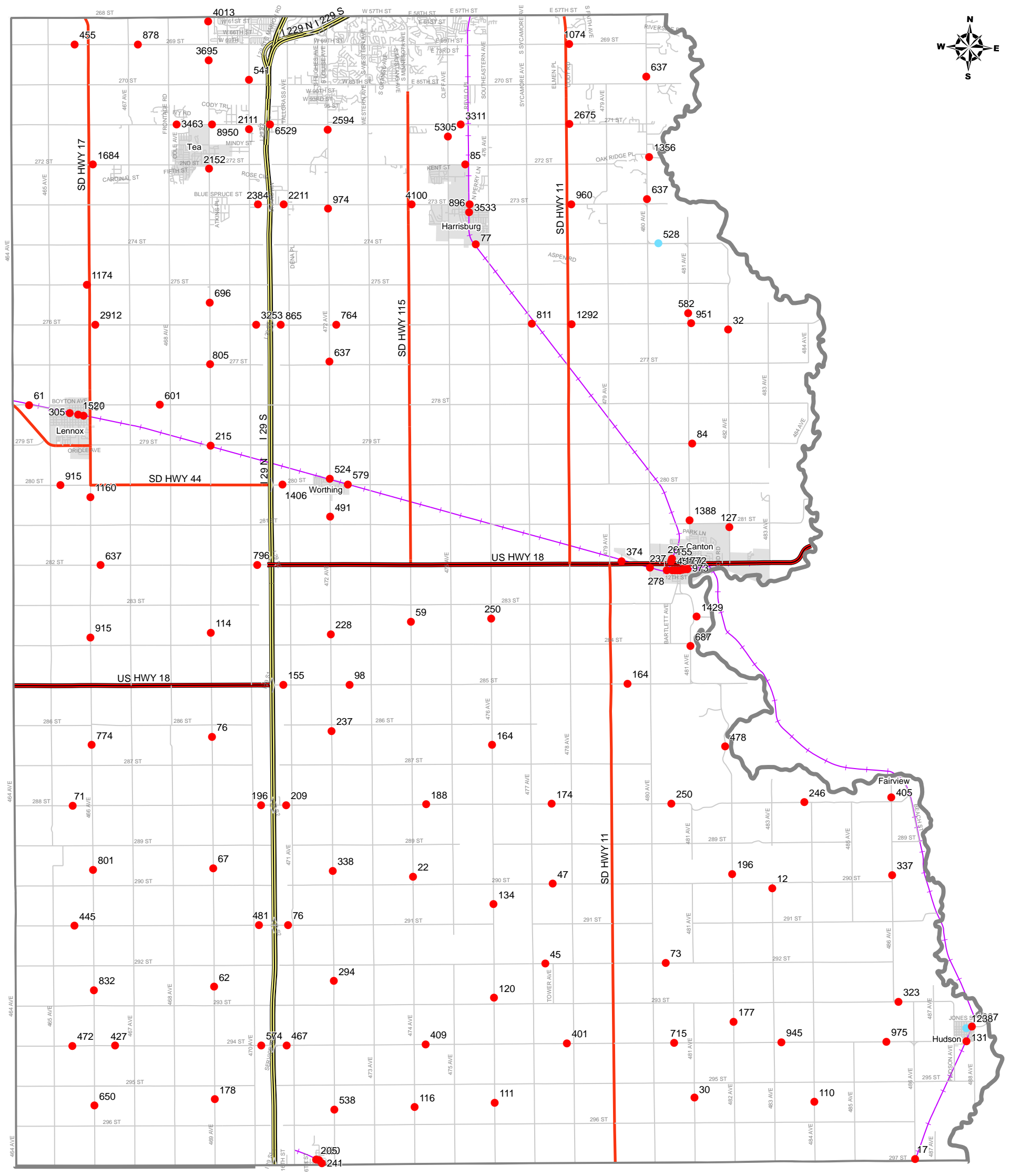
Average Daily Traffic (ADT)

- 0 - 250
- 251 - 550
- 551 - 1500
- 1501 - 2500
- Greater than 2500

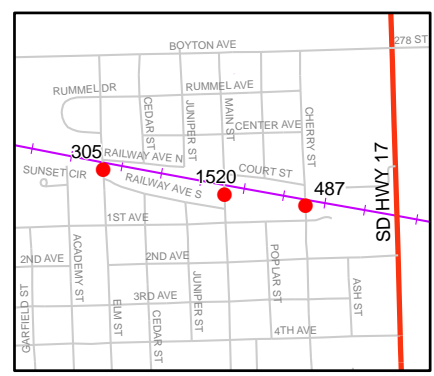
Dept. of Revenue City Limits

Total Traffic Volume: 375

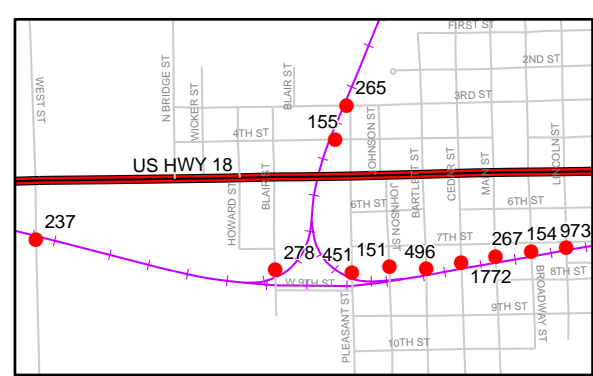
Total Truck Volume: 42



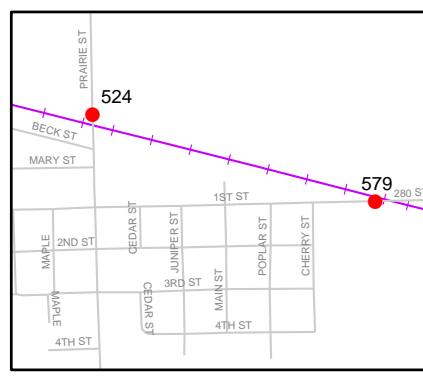
Harrisburg



Lennox



Canton



Worthing

Lincoln County

Legend

- Local Roads
- Interstate Highways
- US Numbered Highways
- State Numbered Highways
- Railroads

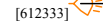
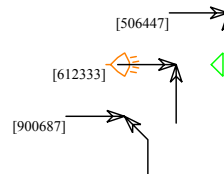
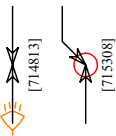
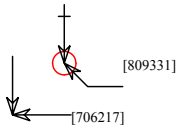
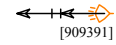
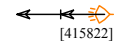
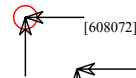
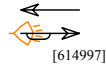
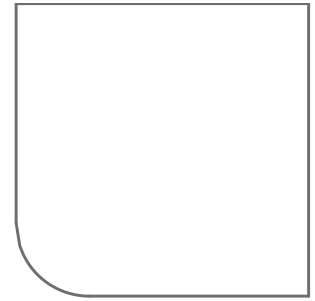
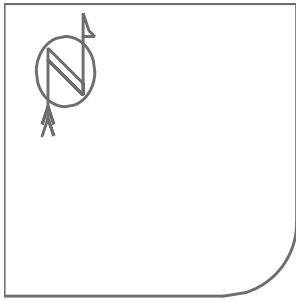
CountLocations

Count Year

- 2009
- 2008
- 2007
- 2006
- 2005
- 2004
- 2003
- 2002

Appendix C – Crash Diagrams

17 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

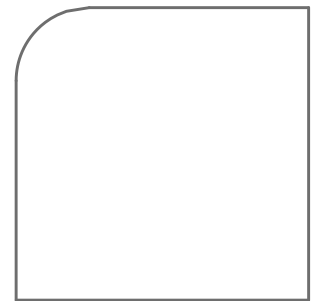
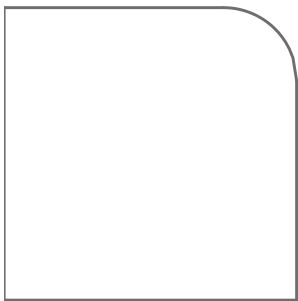
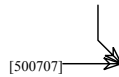
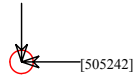
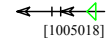
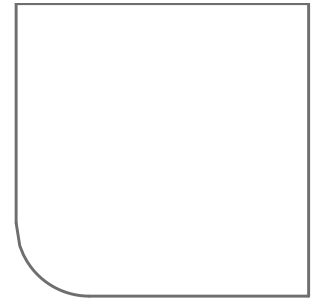
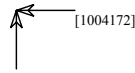
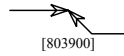
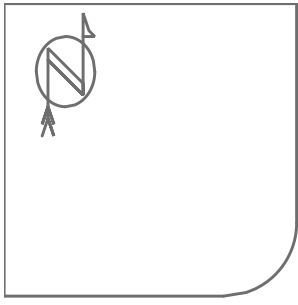
- ▭ Parked
- ←~ Erratic
- ←~ Out of control
- ↘ Right turn
- ↙ Left turn
- ↻ U-turn

- × Pedestrian
- ⊗ Bicycle
- Injury
- ⊙ Fatality
- 🚗 Nighttime
- 🚲 DUI

Fixed objects:

- General
- ▣ Signal
- ▣ Tree
- ▣ Pole
- ▣ Curb
- 🐾 Animal
- ◀ 3rd vehicle
- * Extra data

7 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

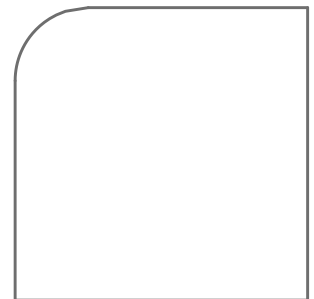
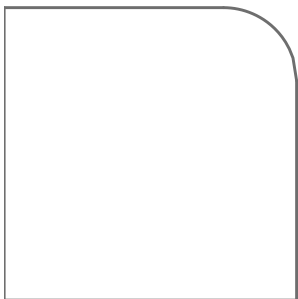
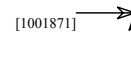
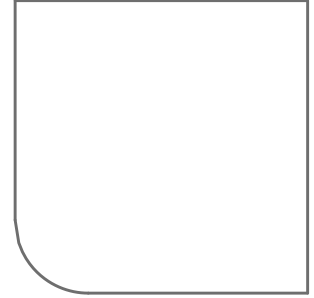
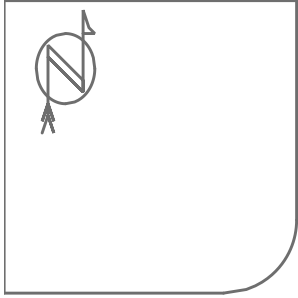
- Parked
- Erratic
- Out of control
- Right turn
- Left turn
- U-turn

- Pedestrian
- Bicycle
- Injury
- Fatality
- Nighttime
- DUI

Fixed objects:

- General
- Signal
- Tree
- Pole
- Curb
- Animal
- 3rd vehicle
- Extra data

1 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ↔↔ Overtaking
- ←| Sideswipe

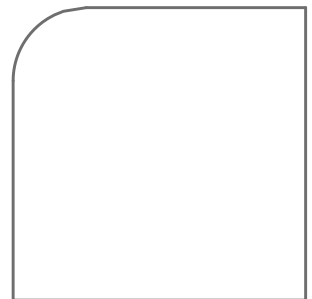
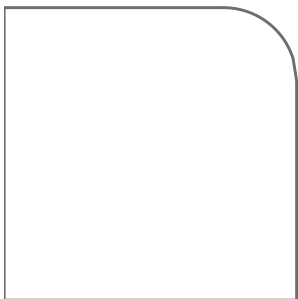
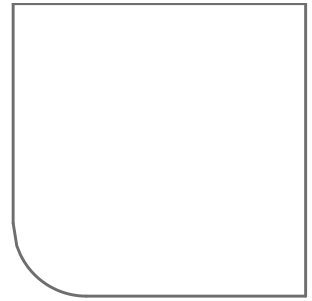
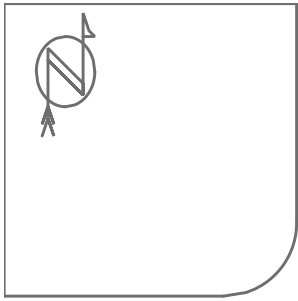
- Parked
- ←~ Erratic
- ←~ Out of control
- ↘ Right turn
- ↙ Left turn
- ↺ U-turn

- × Pedestrian
- ⊗ Bicycle
- Injury
- ⊙ Fatality
- 🔦 Nighttime
- 🚫 DUI

Fixed objects:

- General
- Signal
- Tree
- Pole
- Curb
- Animal
- ◁ 3rd vehicle
- * Extra data

2 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

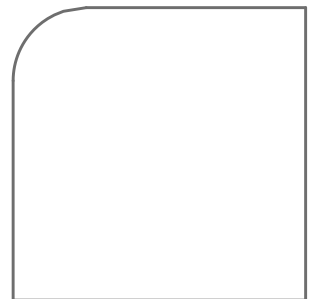
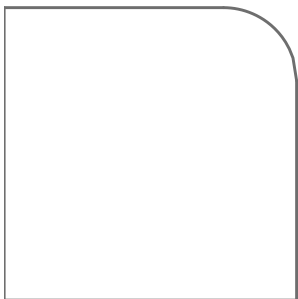
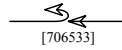
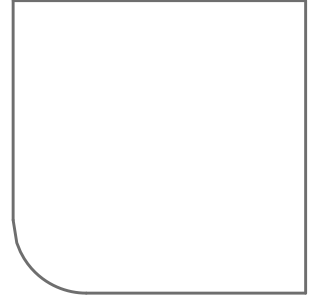
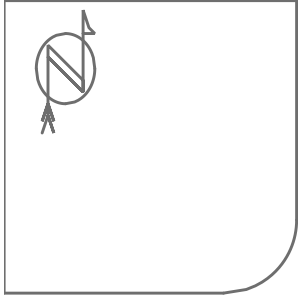
- Parked
- Erratic
- Out of control
- Right turn
- Left turn
- U-turn

- Pedestrian
- Bicycle
- Injury
- Fatality
- Nighttime
- DUI

Fixed objects:

- General
- Signal
- Tree
- Pole
- Curb
- Animal
- 3rd vehicle
- Extra data

1 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

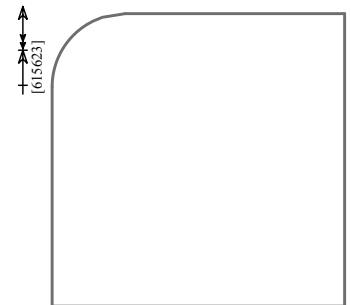
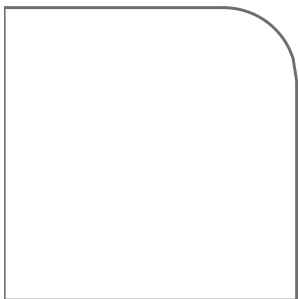
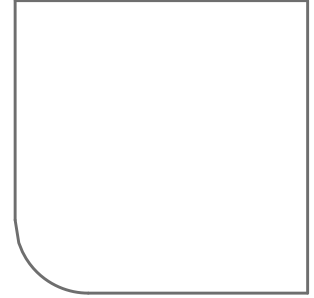
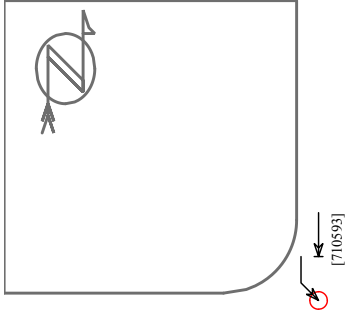
- Parked
- ←~ Erratic
- ←~ Out of control
- ↘ Right turn
- ↙ Left turn
- ↻ U-turn

- × Pedestrian
- ⊗ Bicycle
- Injury
- ⊙ Fatality
- 🔦 Nighttime
- 🚫 DUI

Fixed objects:

- General
- Signal
- Tree
- Pole
- Curb
- Animal
- ◁ 3rd vehicle
- * Extra data

3 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

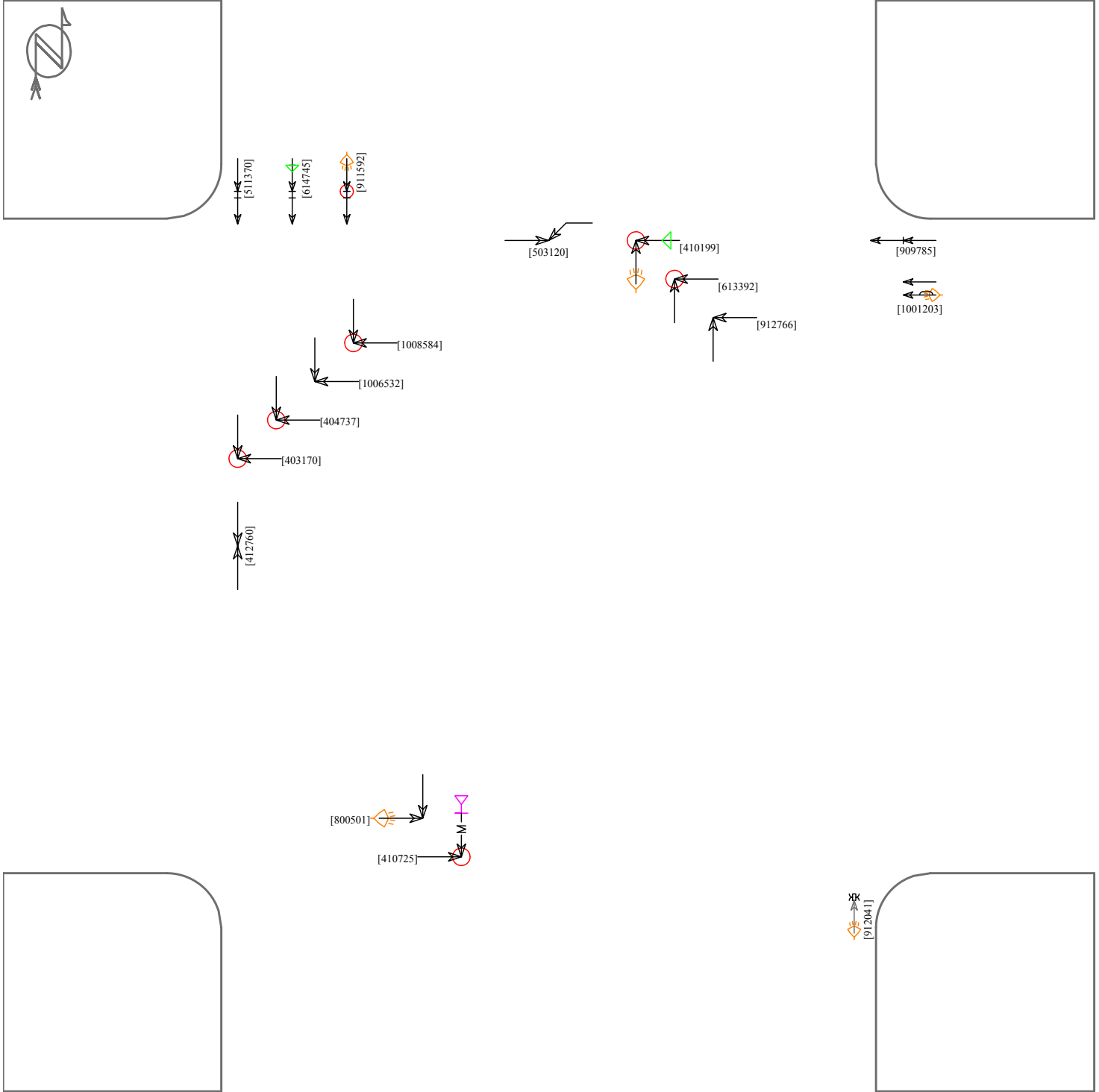
- ▭ Parked
- ←~ Erratic
- ←~ Out of control
- ↗ Right turn
- ↖ Left turn
- ↻ U-turn

- × Pedestrian
- ⊗ Bicycle
- Injury
- ⊙ Fatality
- ⚡ Nighttime
- ⚠ DUI

Fixed objects:

- General
- ▣ Signal
- ⊠ Tree
- ▣ Pole
- ▣ Curb
- ⊠ Animal
- ◁ 3rd vehicle
- * Extra data

17 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

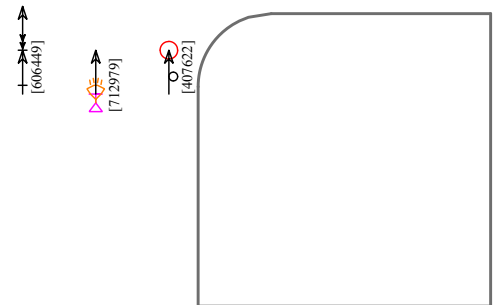
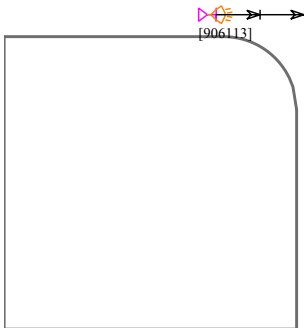
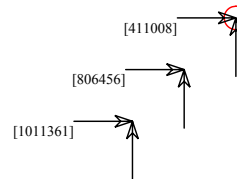
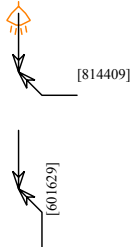
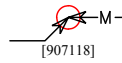
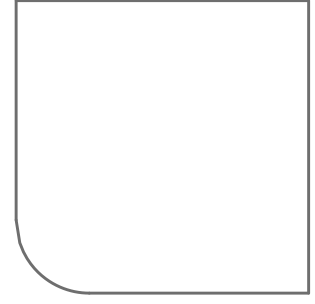
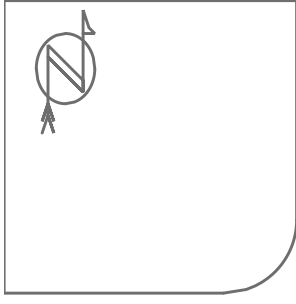
- ▭ Parked
- ←~ Erratic
- ←~ Out of control
- ↗ Right turn
- ↖ Left turn
- ↻ U-turn

- × Pedestrian
- ⊗ Bicycle
- Injury
- ⊙ Fatality
- ⚡ Nighttime
- ⚠ DUI

Fixed objects:

- General
- ▣ Signal
- ⊠ Tree
- ▣ Pole
- ▣ Curb
- ⊠ Animal
- ◁ 3rd vehicle
- * Extra data

12 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

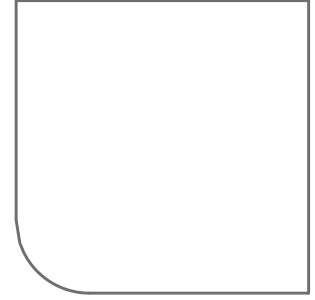
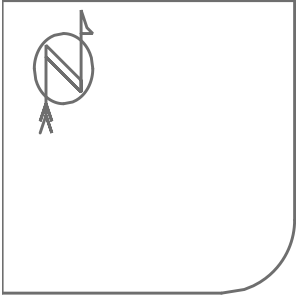
- ▭ Parked
- ←~ Erratic
- ←~ Out of control
- ↘ Right turn
- ↙ Left turn
- ↻ U-turn

- × Pedestrian
- ⊗ Bicycle
- Injury
- ⊙ Fatality
- 👤 Nighttime
- 🚦 DUI

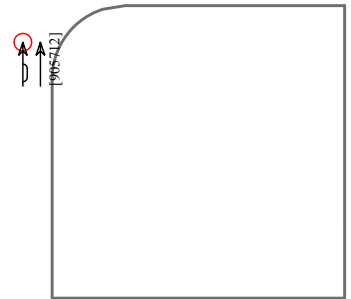
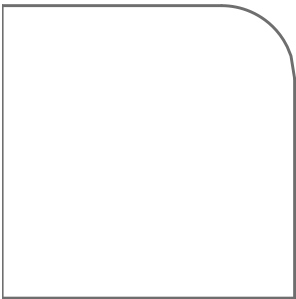
Fixed objects:

- General
- ▣ Signal
- ⊠ Tree
- ▣ Pole
- ▣ Curb
- 🐾 Animal
- ◀ 3rd vehicle
- * Extra data

2 Crashes



← [813247]



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

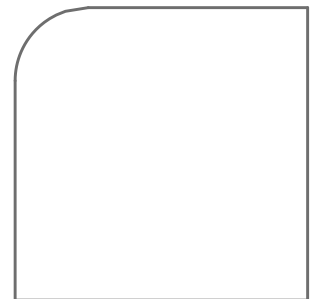
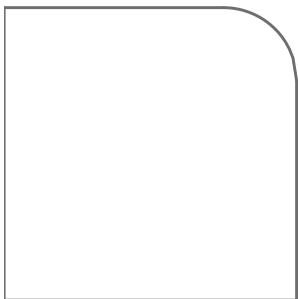
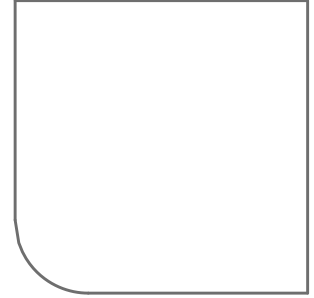
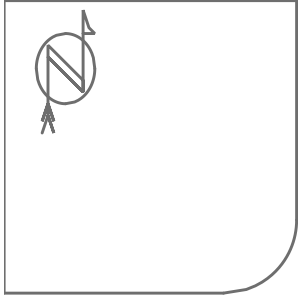
- Parked
- Erratic
- Out of control
- Right turn
- Left turn
- U-turn

- Pedestrian
- Bicycle
- Injury
- Fatality
- Nighttime
- DUI

Fixed objects:

- General
- Signal
- Tree
- Pole
- Curb
- Animal
- 3rd vehicle
- Extra data

1 Crashes



(0) crashes could not be placed in this schematic

- ← Straight
- ←| Stopped
- ← Unknown
- ↔ Backing
- ←← Overtaking
- ←| Sideswipe

- Parked
- ←~ Erratic
- ←~ Out of control
- ↘ Right turn
- ↙ Left turn
- ↻ U-turn

- × Pedestrian
- ⊗ Bicycle
- Injury
- ⊙ Fatality
- ⚡ Nighttime
- ⚠ DUI

Fixed objects:

- General
- Signal
- Tree
- Pole
- Curb
- Animal
- ◁ 3rd vehicle
- * Extra data

Appendix D – Capacity Analysis Reports

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.4	1.0	0.4	0.3	2.2
Delay / Veh (s)	9.9	10.4	10.0	6.8	9.4

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.6	1.2	0.8	0.6	3.2
Delay / Veh (s)	9.4	12.3	8.8	9.6	10.2

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.5	1.4	2.0	0.6	4.5
Delay / Veh (s)	9.8	16.3	19.4	10.4	15.1

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.7	1.1	2.6	0.6	4.9
Delay / Veh (s)	13.4	12.2	21.6	10.4	15.7

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.2	0.0	0.1	0.0	0.3
Delay / Veh (s)	3.0	0.7	5.7	3.4	2.7

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.1	0.1	0.3	0.6
Delay / Veh (s)	4.4	3.7	1.3	6.4	3.4

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.2	0.4	0.7
Delay / Veh (s)	6.3	4.1	1.8	5.8	3.4

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.0	0.0
Delay / Veh (s)	2.0	2.6	0.1	2.4

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.5	0.7	0.2	1.4
Delay / Veh (s)	6.2	5.9	8.8	6.3

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.2	0.0	0.4	0.1	0.7
Delay / Veh (s)	6.1	4.5	4.1	2.0	3.7

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.3	0.0	0.4
Delay / Veh (s)	5.1	4.2	0.9	2.9

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.0	0.1	0.1
Delay / Veh (s)	1.5	0.3	4.5	3.2

Total Network Performance

Total Delay (hr)	21.2
Delay / Veh (s)	31.7

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.4	0.0	0.0	0.7	0.3	0.0	0.4	0.0	0.3	0.1	0.0
Delay / Veh (s)	5.3	10.6	3.4	11.5	11.9	8.1	7.3	11.1	3.8	7.1	6.1	4.3

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	2.2
Delay / Veh (s)	9.4

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.3	0.2	0.1	0.7	0.4	0.4	0.3	0.1	0.2	0.3	0.1
Delay / Veh (s)	10.7	10.2	7.5	11.3	14.2	10.0	8.6	10.8	5.9	8.7	12.2	7.4

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	3.2
Delay / Veh (s)	10.2

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.0	0.0	1.0	0.4	0.2	1.8	0.0	0.1	0.5	0.0
Delay / Veh (s)	7.8	12.1	4.9	11.6	19.2	12.1	14.3	20.4	10.6	7.4	12.1	5.2

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	4.5
Delay / Veh (s)	15.1

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.3	0.2	0.1	0.7	0.2	0.4	2.1	0.0	0.0	0.5	0.1
Delay / Veh (s)	12.9	17.5	10.5	10.0	15.4	8.3	17.3	22.8	16.3	7.4	12.4	5.5

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	4.9
Delay / Veh (s)	15.7

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	All
Total Delay (hr)	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Delay / Veh (s)	4.9	3.0	3.3	2.5	0.6	5.7	6.9	3.3	7.1	5.3	3.0	2.7

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.3	0.0
Delay / Veh (s)	4.3	8.3	1.3	4.4	9.6	3.1	1.1	1.3	0.1	6.8	6.4	6.9

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	0.6
Delay / Veh (s)	3.4

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.0
Delay / Veh (s)	7.4	10.2	2.8	5.4	5.9	3.1	4.0	1.8	0.9	7.1	5.8	5.8

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	0.7
Delay / Veh (s)	3.4

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	EBR	NBL	NBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	2.4	1.9	2.6	2.7	0.1	2.4

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.2	0.3	0.5	0.1	0.1	0.1	1.4
Delay / Veh (s)	7.6	5.7	6.2	5.0	10.9	7.2	6.3

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Total Delay (hr)	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.7
Delay / Veh (s)	7.6	9.0	3.8	7.3	3.7	4.8	4.1	3.8	2.8	1.8	1.2	3.7

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.3	0.0	0.0	0.4
Delay / Veh (s)	5.1	4.2	0.9	0.5	2.9

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.1
Delay / Veh (s)	2.2	0.6	0.3	4.6	3.0	3.2

Total Network Performance

Total Delay (hr)	21.2
Delay / Veh (s)	31.7

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	10.6	44.7	0.5	41	41	10.1
High School Entrance	24	6.2	41.4	0.4	32	33	5.7
Cliff Avenue	2	10.3	66.9	0.6	34	33	10.1
Southeastern Avenue	15	4.2	86.9	1.0	42	42	3.2
Total		31.2	239.9	2.5	38	38	29.1

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
Minnesota Avenue	42	9.6	41	10.7	41	11.2	41
High School Entrance	31	6.3	32	6.4	32	6.1	32
Cliff Avenue	34	10.1	33	10.8	36	9.9	34
Southeastern Avenue	40	4.9	41	4.7	45	3.8	42
Total	37	30.8	37	32.7	39	31.0	38

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	0.6	55.1	0.5	30	30	0.6
Cliff Avenue	2	14.2	83.4	1.0	44	43	15.2
High School Entrance	24	8.0	72.8	0.6	31	31	8.0
Minnesota Avenue	1	12.1	50.1	0.4	26	26	13.0
Total		34.8	261.3	2.5	34	34	36.9

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
Southeastern Avenue	31	0.6	30	0.5	29	0.8	30
Cliff Avenue	44	13.5	44	13.4	45	14.3	43
High School Entrance	31	7.5	31	7.8	31	7.6	31
Minnesota Avenue	27	11.5	26	12.2	27	11.1	26
Total	34	33.1	34	33.9	34	33.8	34

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	11.1	49.5	0.6	42	42	10.9
Tom Sawyer Trail	29	7.5	59.8	0.8	48	48	7.8
272nd Street	18	1.3	14.9	0.2	51	51	1.2
HWY 106	5	21.3	84.6	1.0	43	43	21.4
Total		41.2	208.9	2.6	45	45	41.2

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
HWY 110 (Willow St)	42	11.1	41	12.3	42	10.3	42
Tom Sawyer Trail	48	7.2	48	8.4	48	6.5	48
272nd Street	51	1.2	50	1.7	51	1.2	51
HWY 106	43	19.5	41	24.9	43	20.9	43
Total	45	39.0	44	47.3	45	38.9	45

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	12.1	47.6	0.5	40	40	12.5
272nd Street	18	7.5	72.9	1.0	49	49	7.1
Tom Sawyer Trail	29	0.9	14.6	0.2	52	52	0.9
HWY 110 (Willow St)	1	6.1	55.7	0.8	51	54	6.5
Total		26.7	190.8	2.5	48	48	27.0

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
HWY 106	41	11.6	41	12.1	40	12.5	40
272nd Street	49	7.6	49	8.2	49	7.7	50
Tom Sawyer Trail	52	0.8	53	0.9	52	1.0	51
HWY 110 (Willow St)	56	4.5	51	6.1	52	6.0	46
Total	49	24.5	48	27.4	48	27.2	47

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	10.8	65.8	0.5	29	29	11.4
Industrial Drive	25	5.9	67.5	0.7	38	37	6.0
272nd Street	19	1.9	25.7	0.3	42	43	1.6
HWY 106	8	22.9	89.6	1.0	40	41	21.1
Total		41.5	248.5	2.5	37	37	40.1

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
HWY 110 (Willow St)	29	11.2	29	10.2	30	9.6	29
Industrial Drive	38	6.2	38	5.0	38	6.2	37
272nd Street	42	2.0	42	1.8	41	2.3	44
HWY 106	38	27.3	42	19.9	41	21.6	40
Total	36	46.6	38	36.9	37	39.7	37

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	12.4	48.4	0.5	40	41	11.7
272nd Street	19	8.5	72.9	1.0	50	50	8.8
Laura Street	25	1.8	28.7	0.3	38	37	2.4
HWY 110 (Willow St)	2	12.8	74.2	0.7	34	35	12.9
Total		35.6	224.2	2.5	41	41	35.7

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
HWY 106	38	14.2	40	12.3	41	11.6	40
272nd Street	49	8.9	49	8.6	51	8.3	49
Laura Street	38	1.8	38	1.6	38	1.6	38
HWY 110 (Willow St)	34	14.4	35	11.7	33	12.7	34
Total	40	39.2	41	34.1	41	34.3	41

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	12.1	46.0	0.5	39	39	12.3
Cliff Avenue	8	19.4	80.2	1.0	45	44	17.3
Total		31.4	126.1	1.5	43	42	29.6

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
Minnesota Avenue	40	11.3	39	12.8	39	12.0	40
Cliff Avenue	44	19.6	47	18.7	45	19.3	46
Total	42	30.9	44	31.5	43	31.3	44

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	15.4	49.1	0.5	37	37	15.2
Minnesota Avenue	5	20.9	82.6	1.0	44	43	19.6
Total		36.3	131.7	1.5	41	41	34.8

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
Cliff Avenue	36	16.6	38	14.5	37	15.2	37
Minnesota Avenue	44	19.3	44	22.6	43	21.2	43
Total	41	35.9	42	37.2	41	36.4	41

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	6.9	111.8	0.9	28	29	5.9
272nd Street	20	4.1	81.3	1.0	44	48	4.2
Total		10.9	193.1	1.9	35	37	10.1

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
HWY 110 (Willow St)	28	6.3	25	8.4	28	7.4	28
272nd Street	47	4.3	45	4.4	27	4.7	45
Total	36	10.6	33	12.9	28	12.1	35

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
272nd Street	20	0.1	41.9	0.5	43	47	0.1
HWY 110 (Willow St)	15	6.5	73.3	1.0	49	57	5.8
Total		6.6	115.2	1.5	47	53	5.9

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
272nd Street	1811	0.0	61	0.1	52	0.1	52
HWY 110 (Willow St)	59	6.0	54	5.5	3607	0.0	50
Total	86	6.0	56	5.6	150	0.1	50

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	8.3	39.7	0.5	46	47	6.9
United Avenue	31	6.4	42.3	0.5	45	64	5.7
Cliff Avenue	19	7.3	30.4	0.5	56	1686	0.0
Southeastern Avenue	20	2.4	84.7	1.0	43	3610	0.0
Total		24.3	197.1	2.5	46	129	12.6

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
Minnesota Avenue	43	9.4	47	7.4	36	9.3	40
United Avenue	52	6.4	62	5.5	50	4.8	29
Cliff Avenue	43	14.7	52	8.1	51	7.8	35
Southeastern Avenue	51	4.9	54	6.3	54	0.2	52
Total	48	35.4	54	27.4	48	22.2	39

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	5.9	94.0	1.0	38	3610	0.0
United Avenue	31	2.1	38.5	0.5	44	41	0.1
Minnesota Avenue	18	9.2	32.0	0.5	60	67	10.5
Total		17.2	164.5	2.0	44	102	10.6

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 5 Speed	Run 5 Delay	Run Speed
Cliff Avenue	3610	0.0	3610	0.0	32	6.4	29
United Avenue	36	0.1	34	0.1	33	2.4	19
Minnesota Avenue	38	9.6	42	13.6	48	8.1	58
Total	73	9.8	75	13.7	36	16.9	29

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	83	122	23	77	94	54
Average Queue (ft)	41	70	3	37	39	19
95th Queue (ft)	68	106	17	58	67	45
Link Distance (ft)	2670	1866		2994		4150
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			240		300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	133	140	76	72	66	86
Average Queue (ft)	61	76	45	43	34	48
95th Queue (ft)	100	120	69	65	58	77
Link Distance (ft)	3262	5237		2798		3670
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			115		130	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	107	111	178	85
Average Queue (ft)	53	59	80	45
95th Queue (ft)	89	94	143	71
Link Distance (ft)	2609	5220	5230	2772
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	107	121	242	95
Average Queue (ft)	52	61	100	45
95th Queue (ft)	85	98	181	74
Link Distance (ft)	5220	2639	5239	2812
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	18	29	67	54
Average Queue (ft)	1	1	26	18
95th Queue (ft)	8	12	54	45
Link Distance (ft)	5237	2385	4526	5228
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	47	66	17	36
Average Queue (ft)	13	29	1	2
95th Queue (ft)	39	51	12	16
Link Distance (ft)	2623	2735	1048	5230
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	36	30	29	54	15
Average Queue (ft)	17	2	4	4	1
95th Queue (ft)	41	13	20	29	7
Link Distance (ft)	2422		5238	1523	5239
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		150			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	LT	T	R	L	R
Maximum Queue (ft)	116	74	49	53	52
Average Queue (ft)	42	25	12	18	18
95th Queue (ft)	90	65	38	45	40
Link Distance (ft)	1866	3262		244	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			85		200
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LR	LTR	LTR
Maximum Queue (ft)	78	58	38	58
Average Queue (ft)	38	21	2	13
95th Queue (ft)	63	53	16	45
Link Distance (ft)	871	849	3670	1523
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	5
95th Queue (ft)	24
Link Distance (ft)	291
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: 272nd Street & United Avenue

Movement	NB
Directions Served	LR
Maximum Queue (ft)	54
Average Queue (ft)	29
95th Queue (ft)	48
Link Distance (ft)	964
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.6	0.4	0.2	0.7	1.8
Delay / Veh (s)	10.6	8.0	8.1	8.6	8.9

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.0	0.4	0.2	0.8	2.5
Delay / Veh (s)	10.8	8.8	6.7	9.9	9.6

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.9	0.9	0.9	1.6	4.2
Delay / Veh (s)	11.3	13.8	13.4	14.6	13.4

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.3	0.4	0.7	2.2	4.6
Delay / Veh (s)	15.7	9.4	11.6	16.9	14.5

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.5	0.0	0.0	0.0	0.6
Delay / Veh (s)	4.7	1.2	4.9	4.6	4.0

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.0	0.8	0.9
Delay / Veh (s)	6.0	3.2	0.7	7.8	5.4

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.1	0.9	1.0
Delay / Veh (s)	5.8	4.0	1.0	7.5	5.0

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	1.5	1.5	0.9	0.1	1.1

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.5	0.2	0.1	0.8
Delay / Veh (s)	4.9	4.6	7.6	5.1

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.1	0.2	0.2	0.2	0.6
Delay / Veh (s)	5.9	5.1	3.2	1.8	3.0

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.1	0.1	0.3
Delay / Veh (s)	5.8	3.1	1.5	2.1

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.0	0.0	0.0
Delay / Veh (s)	0.8	0.5	4.1	1.3

Total Network Performance

Total Delay (hr)	19.0
Delay / Veh (s)	28.9

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.5	0.0	0.0	0.3	0.1	0.0	0.2	0.0	0.3	0.4	0.0
Delay / Veh (s)	5.3	11.3	3.9	7.9	9.6	5.6	5.2	9.7	3.2	8.2	9.5	5.7

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	1.8
Delay / Veh (s)	8.9

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.1	0.1	0.3	0.1	0.1	0.1	0.0	0.5	0.3	0.1
Delay / Veh (s)	11.2	10.9	9.7	8.4	10.5	5.7	6.0	9.0	4.0	9.7	12.0	6.6

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	2.5
Delay / Veh (s)	9.6

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.1	0.1	0.7	0.2	0.1	0.7	0.1	0.2	1.3	0.1
Delay / Veh (s)	8.0	13.9	6.3	11.2	16.5	8.8	8.9	15.4	7.1	11.2	16.2	8.7

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	4.2
Delay / Veh (s)	13.4

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.8	0.2	0.0	0.3	0.0	0.1	0.6	0.0	0.3	1.7	0.2
Delay / Veh (s)	14.0	18.5	11.0	6.6	11.8	3.9	9.0	12.9	6.7	13.1	18.8	11.8

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	4.6
Delay / Veh (s)	14.5

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	8.0	4.4	4.9	2.2	1.0	0.4	5.8	6.7	3.3	6.2	7.1	2.8

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	0.6
Delay / Veh (s)	4.0

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.0
Delay / Veh (s)	5.2	11.4	2.5	3.6	10.8	2.2	1.0	0.7	0.0	7.5	7.9	6.9

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	0.9
Delay / Veh (s)	5.4

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.8	0.0
Delay / Veh (s)	7.3	5.0	3.8		7.8	2.2	3.1	1.0	0.5	8.1	7.6	6.2

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	1.0
Delay / Veh (s)	5.0

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	2.2	1.3	1.5	0.7	1.0	0.1	1.1

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.4	0.2	0.0	0.1	0.0	0.8
Delay / Veh (s)	5.5	4.9	4.8	3.3	8.5	6.5	5.1

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0
Delay / Veh (s)	7.8	4.0	4.1	7.7	9.2	4.2	4.1	3.0	1.6	2.3	1.8	1.0

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	0.6
Delay / Veh (s)	3.0

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.1	0.1	0.0	0.3
Delay / Veh (s)	5.8	3.1	1.5	0.7	2.1

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	1.0	0.7	2.4	0.3	4.3	2.1	1.3

Total Network Performance

Total Delay (hr)	19.0
Delay / Veh (s)	28.9

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	11.3	45.4	0.5	41	41	11.1
High School Entrance	24	5.7	42.8	0.4	31	31	5.9
Cliff Avenue	2	11.2	69.5	0.6	33	32	11.7
Southeastern Avenue	15	5.4	79.9	1.0	45	45	5.8
Total		33.5	237.6	2.5	38	38	34.5

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	41	11.4	40	11.6	41	11.3	40
High School Entrance	31	5.5	31	5.4	31	5.8	31
Cliff Avenue	33	11.3	33	10.5	34	10.3	32
Southeastern Avenue	46	5.4	47	4.5	45	5.6	43
Total	39	33.6	39	32.0	38	33.0	37

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	1.0	55.5	0.5	30	30	1.3
Cliff Avenue	2	10.6	89.1	1.0	41	41	9.5
High School Entrance	24	5.8	68.6	0.6	33	33	5.8
Minnesota Avenue	1	9.9	47.9	0.4	28	27	10.3
Total		27.2	261.1	2.5	34	34	26.9

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	30	0.4	30	1.1	29	1.1	29
Cliff Avenue	42	9.5	39	11.0	42	11.4	39
High School Entrance	33	6.1	34	6.0	33	5.8	33
Minnesota Avenue	28	10.1	28	9.4	28	9.7	27
Total	34	26.1	34	27.5	34	28.1	33

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	9.7	47.6	0.6	43	43	9.7
Tom Sawyer Trail	29	4.6	47.1	0.8	61	63	4.6
272nd Street	18	0.7	14.4	0.2	52	52	0.7
HWY 106	5	15.9	76.9	1.0	47	47	15.7
Total		31.0	186.0	2.6	50	50	30.7

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	43	9.4	44	9.3	43	10.4	42
Tom Sawyer Trail	63	4.4	62	4.7	59	5.1	60
272nd Street	52	0.7	53	0.7	52	0.7	52
HWY 106	47	15.6	48	15.4	48	15.0	46
Total	51	30.1	51	30.0	50	31.2	49

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	16.2	51.5	0.5	37	37	16.0
272nd Street	18	9.0	75.7	1.0	48	48	8.9
Tom Sawyer Trail	29	1.5	15.1	0.2	50	50	1.3
HWY 110 (Willow St)	1	9.5	64.8	0.8	44	46	9.0
Total		36.2	207.1	2.5	44	45	35.2

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	37	16.6	37	16.9	38	15.7	38
272nd Street	48	8.6	48	8.8	48	9.3	47
Tom Sawyer Trail	51	1.4	50	1.5	50	1.7	49
HWY 110 (Willow St)	44	9.0	44	9.6	44	10.1	43
Total	44	35.6	44	36.8	44	36.7	44

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	9.0	64.2	0.5	30	31	9.4
Industrial Drive	25	3.8	54.0	0.7	47	46	4.2
272nd Street	19	1.1	25.8	0.3	42	42	1.4
HWY 106	8	13.0	76.0	1.0	48	47	14.4
Total		26.9	220.0	2.5	42	41	29.3

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	30	9.4	29	8.6	30	8.1	30
Industrial Drive	46	3.8	47	3.8	47	3.4	48
272nd Street	43	0.9	41	1.1	41	1.0	42
HWY 106	49	11.9	48	12.3	48	12.1	46
Total	42	26.0	42	25.7	42	24.6	41

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	18.8	54.7	0.5	36	36	18.1
272nd Street	19	8.8	71.5	1.0	51	51	9.1
Laura Street	25	1.8	27.3	0.3	40	39	1.9
HWY 110 (Willow St)	2	12.4	76.2	0.7	33	33	13.0
Total		42.0	229.7	2.5	40	40	42.1

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	35	19.7	36	18.5	35	19.4	36
272nd Street	51	8.9	50	8.7	50	8.6	51
Laura Street	40	1.9	40	1.8	40	1.8	40
HWY 110 (Willow St)	34	13.0	33	13.2	34	11.6	34
Total	40	43.4	40	42.2	40	41.4	40

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	13.9	47.2	0.5	38	38	14.6
Cliff Avenue	8	20.5	82.0	1.0	44	44	21.1
Total		34.3	129.2	1.5	42	42	35.7

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	39	13.7	38	13.9	39	13.4	38
Cliff Avenue	43	20.0	43	19.4	45	20.9	45
Total	42	33.7	41	33.3	42	34.2	42

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	11.8	45.6	0.5	40	39	12.5
Minnesota Avenue	5	18.5	76.8	1.0	47	49	17.4
Total		30.3	122.4	1.5	44	45	29.9

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	41	11.1	40	11.5	40	11.5	39
Minnesota Avenue	47	19.5	47	18.3	47	18.7	44
Total	45	30.6	44	29.8	45	30.2	42

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	6.7	106.2	0.9	29	27	7.7
272nd Street	20	0.7	79.9	1.0	45	45	3.5
Total		7.4	186.0	1.9	36	34	11.1

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	30	6.6	26	6.0	27	8.8	25
272nd Street	48	0.3	52	0.7	51	4.8	47
Total	37	6.8	36	6.7	36	13.6	34

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
272nd Street	20	0.1	33.9	0.5	54	57	0.1
HWY 110 (Willow St)	15	7.1	67.7	1.0	53	58	8.2
Total		7.2	101.7	1.5	53	58	8.3

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
272nd Street	1811	0.0	52	0.1	51	0.1	1811
HWY 110 (Willow St)	53	7.1	55	7.5	53	7.5	49
Total	78	7.1	54	7.6	53	7.6	73

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	11.4	50.0	0.5	36	39	11.5
United Avenue	31	1.7	17.7	0.5	107	46	0.7
Cliff Avenue	19	4.6	33.3	0.5	51	52	2.9
Southeastern Avenue	20	4.0	58.3	1.0	62	55	5.8
Total		21.7	159.4	2.5	57	48	20.9

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	38	13.5	45	7.3	34	9.6	48
United Avenue	47	0.9	60	2.7	68	3.5	67
Cliff Avenue	65	2.4	39	9.1	47	4.3	41
Southeastern Avenue	3610	0.0	44	0.7	44	3.9	51
Total	78	16.7	46	19.7	45	21.3	50

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	20	1.5	41.7	0.4	39	53	1.0
Cliff Avenue	19	7.8	107.1	1.0	34	30	8.5
United Avenue	31	4.1	52.1	0.5	32	43	2.6
Minnesota Avenue	18	11.3	41.2	0.5	46	39	9.3
Total		24.7	242.1	2.4	36	37	21.5

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	60	1.2	50	0.9	60	1.2	54
Cliff Avenue	3610	0.0	28	11.3	31	7.4	3610
United Avenue	59	0.1	40	3.5	28	5.8	50
Minnesota Avenue	72	9.4	74	9.3	39	7.9	34
Total	106	10.7	39	25.0	35	22.2	73

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	62	92	28	59	69	64
Average Queue (ft)	39	50	5	29	38	38
95th Queue (ft)	58	78	21	51	61	59
Link Distance (ft)	2670	1866		2994		4150
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			240		300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	120	86	50	59	88	72
Average Queue (ft)	65	49	22	33	45	40
95th Queue (ft)	100	75	47	53	72	65
Link Distance (ft)	3262	5237		2798		3670
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			115		130	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	98	111	112	127
Average Queue (ft)	52	50	53	69
95th Queue (ft)	82	84	91	112
Link Distance (ft)	2609	5220	5230	2772
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	118	80	94	203
Average Queue (ft)	58	41	51	84
95th Queue (ft)	96	65	85	146
Link Distance (ft)	5220	2639	5239	2812
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	34	25	54	49
Average Queue (ft)	2	1	17	19
95th Queue (ft)	17	11	46	46
Link Distance (ft)	5237	2385	4526	5228
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	41	35	10	53
Average Queue (ft)	11	16	0	8
95th Queue (ft)	36	36	5	33
Link Distance (ft)	2623	2735	1048	5230
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	40	12	29	11	16
Average Queue (ft)	11	0	6	0	1
95th Queue (ft)	35	6	25	6	9
Link Distance (ft)	2422		5238	1523	5239
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		150			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	LT	T	R	L	R
Maximum Queue (ft)	87	63	28	71	22
Average Queue (ft)	25	12	2	18	11
95th Queue (ft)	69	45	14	47	29
Link Distance (ft)	1866	3262		244	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			85		200
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	60	82	56	38
Average Queue (ft)	26	39	9	3
95th Queue (ft)	51	64	36	21
Link Distance (ft)	871	849	3670	1523
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	35
Average Queue (ft)	7
95th Queue (ft)	28
Link Distance (ft)	291
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	36
Average Queue (ft)	0	16
95th Queue (ft)	4	42
Link Distance (ft)	2422	964
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.4	1.1	0.4	0.4	2.2
Delay / Veh (s)	9.8	11.1	9.9	7.3	9.8

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.6	1.1	0.7	0.6	3.0
Delay / Veh (s)	8.9	11.9	8.8	9.2	9.9

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.5	1.4	1.8	0.7	4.4
Delay / Veh (s)	9.7	16.1	17.9	10.9	14.6

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.6	1.1	2.6	0.5	4.8
Delay / Veh (s)	12.6	12.5	21.4	10.0	15.5

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.2	0.0	0.1	0.0	0.3
Delay / Veh (s)	3.1	0.8	5.4	3.4	2.8

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.1	0.1	0.4	0.6
Delay / Veh (s)	4.2	3.7	1.2	6.3	3.5

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.2	0.4	0.6
Delay / Veh (s)	6.9	6.7	1.8	5.6	3.3

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.0	0.0
Delay / Veh (s)	2.5	3.1	0.1	2.8

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.5	0.7	0.2	1.4
Delay / Veh (s)	6.6	6.2	8.8	6.6

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.2	0.0	0.4	0.1	0.8
Delay / Veh (s)	7.0	4.8	4.2	2.1	4.0

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.3	0.1	0.4
Delay / Veh (s)	5.8	4.1	0.9	2.8

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.0	0.1	0.1
Delay / Veh (s)	1.2	0.8	4.4	3.3

Total Network Performance

Total Delay (hr)	21.0
Delay / Veh (s)	31.4

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.4	0.0	0.0	0.7	0.3	0.0	0.3	0.0	0.3	0.1	0.0
Delay / Veh (s)	5.0	10.5	3.0	11.1	12.7	8.6	4.9	11.0	4.2	7.6	6.9	4.8

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	2.2
Delay / Veh (s)	9.8

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.3	0.1	0.0	0.7	0.4	0.4	0.3	0.1	0.2	0.3	0.2
Delay / Veh (s)	10.0	9.4	7.3	11.5	14.0	9.3	8.8	10.5	6.0	8.0	12.6	7.0

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	3.0
Delay / Veh (s)	9.9

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.0	0.0	1.0	0.4	0.2	1.6	0.0	0.1	0.5	0.0
Delay / Veh (s)	7.5	12.1	4.4	12.5	18.9	12.0	12.6	19.1	10.8	7.8	12.7	4.6

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	4.4
Delay / Veh (s)	14.6

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.2	0.2	0.1	0.7	0.2	0.4	2.1	0.0	0.0	0.4	0.1
Delay / Veh (s)	12.0	17.3	9.7	9.7	15.5	8.7	16.9	22.8	14.4	7.6	12.4	5.0

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	4.8
Delay / Veh (s)	15.5

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	All
Total Delay (hr)	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Delay / Veh (s)	7.1	3.1	3.2	2.0	0.7	5.6	7.6	3.3		6.5	3.0	2.8

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.3	0.0
Delay / Veh (s)	3.8	8.9	1.3	5.6	9.9	3.0	0.9	1.2	0.2	6.7	6.3	5.5

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	0.6
Delay / Veh (s)	3.5

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.0
Delay / Veh (s)	7.8	10.4	3.0	5.7	13.2	3.1	4.5	1.7	2.5	5.7	5.6	5.7

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	0.6
Delay / Veh (s)	3.3

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	EBR	NBL	NBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	2.6	2.4	3.0	3.2	0.1	2.8

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.2	0.3	0.5	0.2	0.1	0.1	1.4
Delay / Veh (s)	8.0	6.0	6.5	5.3	10.7	7.4	6.6

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Total Delay (hr)	0.1	0.0	0.1	0.0	0.0	0.1	0.3	0.0	0.0	0.1	0.0	0.8
Delay / Veh (s)	8.8	11.2	4.6	8.7	4.2	4.1	4.3	3.8	2.9	1.9	0.6	4.0

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.3	0.1	0.0	0.4
Delay / Veh (s)	5.8	4.1	1.0	0.4	2.8

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Delay / Veh (s)	1.9	0.7	1.4	0.7	4.6	3.0	3.3

Total Network Performance

Total Delay (hr)	21.0
Delay / Veh (s)	31.4

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	10.5	45.0	0.5	41	41	10.3
High School Entrance	24	6.5	42.3	0.4	31	32	5.8
Cliff Avenue	2	9.8	65.3	0.6	35	35	9.7
Southeastern Avenue	15	4.5	83.4	1.0	43	42	4.9
Total		31.3	236.0	2.5	38	38	30.7

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	41	10.5	41	10.8	41	10.3	41
High School Entrance	31	6.2	32	5.7	31	7.4	30
Cliff Avenue	36	9.3	35	9.7	35	9.7	33
Southeastern Avenue	44	4.1	46	3.5	42	5.2	44
Total	39	30.1	39	29.7	38	32.6	38

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	0.7	55.5	0.5	30	30	0.5
Cliff Avenue	2	13.9	82.1	1.0	44	44	15.2
High School Entrance	24	7.9	72.2	0.6	31	31	8.4
Minnesota Avenue	1	13.0	50.9	0.4	26	26	12.7
Total		35.6	260.7	2.5	34	34	36.7

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	29	0.9	29	0.9	30	0.4	29
Cliff Avenue	44	12.9	43	14.6	46	12.5	44
High School Entrance	31	8.3	31	7.9	32	7.0	32
Minnesota Avenue	26	13.4	26	12.5	25	14.0	26
Total	34	35.6	34	35.8	35	33.9	34

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	11.0	48.8	0.6	42	42	11.4
Tom Sawyer Trail	29	7.2	58.7	0.8	49	48	7.4
272nd Street	18	1.2	14.8	0.2	51	51	1.3
HWY 106	5	19.9	82.3	1.0	44	43	20.4
Total		39.4	204.7	2.6	45	45	40.5

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	43	10.9	42	11.1	42	11.0	43
Tom Sawyer Trail	49	7.3	49	7.2	49	7.4	49
272nd Street	52	1.2	51	1.4	51	1.3	51
HWY 106	44	19.1	44	19.7	45	19.8	43
Total	46	38.4	45	39.4	46	39.3	45

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	12.7	48.0	0.5	40	40	13.0
272nd Street	18	7.5	73.1	1.0	49	49	7.4
Tom Sawyer Trail	29	1.0	14.6	0.2	52	51	1.0
HWY 110 (Willow St)	1	6.9	58.0	0.8	49	46	8.4
Total		28.1	193.6	2.5	47	46	29.7

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	40	12.9	41	12.6	40	12.0	40
272nd Street	50	7.6	50	7.8	50	7.6	49
Tom Sawyer Trail	51	1.1	53	0.8	52	0.9	51
HWY 110 (Willow St)	53	5.2	49	6.9	50	7.2	50
Total	48	26.8	48	28.1	47	27.6	47

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	10.5	65.8	0.5	29	29	10.8
Industrial Drive	25	5.8	63.3	0.7	40	40	6.1
272nd Street	19	1.8	25.3	0.3	43	42	1.8
HWY 106	8	22.8	89.7	1.0	40	41	19.9
Total		41.0	244.1	2.5	38	38	38.6

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	30	9.5	29	10.8	30	9.4	29
Industrial Drive	39	6.7	41	5.3	40	5.5	41
272nd Street	44	1.6	43	2.1	44	1.9	44
HWY 106	42	20.0	39	24.8	41	23.2	39
Total	38	37.8	37	43.0	38	39.9	37

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	12.4	48.5	0.5	40	40	12.0
272nd Street	19	8.3	72.9	1.0	50	50	7.8
Laura Street	25	1.9	29.1	0.3	37	37	1.8
HWY 110 (Willow St)	2	13.1	67.9	0.7	37	36	14.6
Total		35.8	218.4	2.5	42	42	36.2

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	39	12.5	41	12.7	41	11.5	40
272nd Street	49	7.8	50	8.5	50	7.7	49
Laura Street	37	1.5	37	2.0	38	1.9	37
HWY 110 (Willow St)	38	12.1	38	12.1	39	12.1	38
Total	42	33.9	43	35.2	43	33.4	42

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	12.1	45.7	0.5	40	39	12.0
Cliff Avenue	8	18.8	80.5	1.0	45	47	18.1
Total		30.9	126.2	1.5	43	44	30.1

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	40	11.6	39	12.8	41	11.3	39
Cliff Avenue	43	20.3	43	19.7	46	16.2	45
Total	42	31.9	41	32.5	44	27.6	43

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	15.5	49.2	0.5	37	38	14.5
Minnesota Avenue	5	21.0	84.2	1.0	43	43	20.4
Total		36.6	133.4	1.5	41	41	34.8

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	38	14.8	36	16.4	38	15.3	37
Minnesota Avenue	42	21.1	43	20.8	42	22.1	44
Total	41	35.9	41	37.2	41	37.4	41

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	7.6	112.5	0.9	28	28	9.5
272nd Street	20	3.9	75.7	1.0	48	50	4.3
Total		11.5	188.2	1.9	36	36	13.8

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	26	8.1	28	6.6	28	7.5	29
272nd Street	46	3.8	46	3.1	48	4.1	49
Total	34	11.8	35	9.7	36	11.6	37

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
272nd Street	20	0.1	42.1	0.5	43	56	0.1
HWY 110 (Willow St)	15	6.2	60.0	1.0	60	54	6.9
Total		6.3	102.0	1.5	53	54	7.0

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
272nd Street	55	0.1	47	0.1	50	0.1	1811
HWY 110 (Willow St)	72	7.8	55	5.7	53	7.0	57
Total	65	7.9	52	5.8	52	7.1	84

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	8.9	42.6	0.5	43	43	8.1
United Avenue	31	4.6	43.5	0.5	44	38	5.2
Cliff Avenue	19	10.3	47.9	0.5	35	26	14.3
Southeastern Avenue	20	3.9	57.9	1.0	62	50	5.0
Total		27.7	191.9	2.5	47	39	32.6

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	43	10.0	41	8.7	38	10.4	40
United Avenue	38	3.8	58	2.9	48	7.1	67
Cliff Avenue	30	13.1	36	7.6	44	10.8	38
Southeastern Avenue	53	5.5	47	4.4	50	3.4	52
Total	42	32.4	45	23.7	46	31.6	48

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	13.2	128.8	1.0	28	34	7.8
United Avenue	31	4.3	57.1	0.5	30	35	3.7
Minnesota Avenue	18	8.0	30.1	0.5	65	36	9.3
Total		25.5	216.0	2.0	33	35	20.8

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	32	13.4	30	12.1	27	20.0	33
United Avenue	32	5.5	32	3.7	31	3.1	35
Minnesota Avenue	102	7.6	59	7.9	58	8.9	60
Total	39	26.6	35	23.6	33	32.1	38

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	76	152	23	69	85	40
Average Queue (ft)	39	74	2	37	42	23
95th Queue (ft)	62	119	13	57	70	44
Link Distance (ft)	2670	1866		2994		4150
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			240		300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	133	169	91	88	58	86
Average Queue (ft)	61	73	45	42	31	44
95th Queue (ft)	105	126	73	67	52	70
Link Distance (ft)	3262	5237		2798		3670
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			115		130	
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	97	125	149	90
Average Queue (ft)	49	59	72	48
95th Queue (ft)	78	96	120	74
Link Distance (ft)	2609	5220	5230	2772
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	86	134	202	86
Average Queue (ft)	48	61	97	45
95th Queue (ft)	76	102	175	72
Link Distance (ft)	5220	2639	5239	2812
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	6	57	55
Average Queue (ft)	0	26	22
95th Queue (ft)	4	52	49
Link Distance (ft)	5237	4526	5228
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	59	64	5	25
Average Queue (ft)	15	30	0	2
95th Queue (ft)	42	50	4	14
Link Distance (ft)	2623	2735	1048	5230
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	47	23	35	55	10
Average Queue (ft)	18	2	5	4	1
95th Queue (ft)	43	12	23	27	7
Link Distance (ft)	2422		5238	1523	5239
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		150			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	LT	T	R	L	R
Maximum Queue (ft)	122	74	44	52	54
Average Queue (ft)	47	28	12	19	20
95th Queue (ft)	96	69	37	43	39
Link Distance (ft)	1866	3262		244	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			85		200
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LR	LTR	LTR
Maximum Queue (ft)	98	76	64	66
Average Queue (ft)	44	19	9	11
95th Queue (ft)	77	55	41	43
Link Distance (ft)	871	849	3670	1523
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	6
95th Queue (ft)	25
Link Distance (ft)	291
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: 272nd Street & United Avenue

Movement	NB
Directions Served	LR
Maximum Queue (ft)	50
Average Queue (ft)	29
95th Queue (ft)	48
Link Distance (ft)	964
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.7	0.4	0.2	0.7	2.0
Delay / Veh (s)	11.4	8.5	7.7	8.5	9.2

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.0	0.4	0.2	0.9	2.6
Delay / Veh (s)	10.8	8.8	6.8	10.5	9.8

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.9	0.9	0.8	1.6	4.3
Delay / Veh (s)	11.7	13.5	12.9	15.1	13.5

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.4	0.4	0.8	2.9	5.5
Delay / Veh (s)	15.7	9.5	11.5	22.0	16.6

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.5	0.0	0.0	0.0	0.6
Delay / Veh (s)	4.7	1.3	5.6	5.0	4.1

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.0	0.8	0.9
Delay / Veh (s)	4.5	3.8	0.7	7.9	5.5

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.1	0.9	1.0
Delay / Veh (s)	5.8	3.8	0.9	7.5	5.0

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	1.9	1.1	0.9	0.1	1.1

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.5	0.2	0.1	0.8
Delay / Veh (s)	5.2	4.6	7.2	5.2

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.1	0.2	0.2	0.2	0.7
Delay / Veh (s)	6.2	5.0	3.4	2.0	3.2

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.1	0.1	0.3
Delay / Veh (s)	7.0	2.9	1.4	2.0

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.0	0.0	0.1
Delay / Veh (s)	0.9	1.4	3.9	1.7

Total Network Performance

Total Delay (hr)	20.4
Delay / Veh (s)	30.3

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.6	0.0	0.0	0.3	0.1	0.0	0.1	0.0	0.3	0.3	0.0
Delay / Veh (s)	6.6	12.2	4.4	8.3	10.0	6.3	5.2	9.6	2.8	8.0	9.5	5.8

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	2.0
Delay / Veh (s)	9.2

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.2	0.1	0.3	0.1	0.1	0.1	0.0	0.5	0.3	0.1
Delay / Veh (s)	12.4	10.8	10.2	9.8	10.7	5.4	6.0	8.8	4.8	10.4	12.2	7.7

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	2.6
Delay / Veh (s)	9.8

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.7	0.1	0.1	0.6	0.2	0.1	0.7	0.1	0.2	1.4	0.1
Delay / Veh (s)	8.8	14.0	6.5	11.0	16.0	9.0	8.8	14.8	7.7	10.9	16.5	10.2

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	4.3
Delay / Veh (s)	13.5

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.8	0.3	0.0	0.3	0.0	0.1	0.6	0.1	0.5	2.3	0.2
Delay / Veh (s)	13.5	18.9	12.1	7.6	11.9	3.9	10.0	12.4	8.0	18.5	24.4	14.2

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	5.5
Delay / Veh (s)	16.6

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	7.8	4.4	6.6	2.4	1.0	0.2	6.4	7.8	2.5	4.9	6.4	3.7

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	0.6
Delay / Veh (s)	4.1

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.0
Delay / Veh (s)	4.0	10.1	2.1	6.8	12.0	2.4	1.0	0.7	0.1	7.5	8.0	7.1

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	0.9
Delay / Veh (s)	5.5

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.0
Delay / Veh (s)	6.6	6.3	3.1	5.2	6.3	1.6	3.2	0.9	0.9	5.4	7.5	7.1

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	1.0
Delay / Veh (s)	5.0

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	EBR	WBT	NBL	NBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delay / Veh (s)	1.9	2.0	1.1	0.6	1.0	0.1	1.1

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.5	0.2	0.0	0.1	0.0	0.8
Delay / Veh (s)	6.0	5.2	4.7	3.4	7.5	6.7	5.2

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.2	0.0
Delay / Veh (s)	7.3	8.1	4.7	7.8	8.1	4.0	4.7	3.1	2.7	2.8	2.1	1.2

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	0.7
Delay / Veh (s)	3.2

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.1	0.1	0.0	0.3
Delay / Veh (s)	7.0	2.9	1.4	0.7	2.0

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Delay / Veh (s)	1.1	0.9	2.8	0.5	4.4	2.2	1.7

Total Network Performance

Total Delay (hr)	20.4
Delay / Veh (s)	30.3

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	12.2	46.2	0.5	40	40	12.5
High School Entrance	24	6.2	43.3	0.4	30	30	6.3
Cliff Avenue	2	10.9	68.2	0.6	33	33	11.2
Southeastern Avenue	15	5.3	77.5	1.0	47	48	5.2
Total		34.6	235.2	2.5	39	39	35.3

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	40	12.8	40	11.8	40	11.9	40
High School Entrance	31	6.6	30	6.1	31	6.0	30
Cliff Avenue	33	10.7	32	12.0	35	10.7	33
Southeastern Avenue	49	4.8	46	5.3	45	5.9	45
Total	39	34.9	38	35.2	39	34.5	38

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	1.0	55.8	0.5	30	29	1.4
Cliff Avenue	2	10.7	89.9	1.0	40	39	10.4
High School Entrance	24	6.1	69.5	0.6	33	32	5.3
Minnesota Avenue	1	10.2	48.4	0.4	27	27	10.6
Total		28.1	263.6	2.5	34	33	27.7

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	29	0.8	30	0.9	30	0.9	30
Cliff Avenue	39	11.2	40	10.2	41	10.3	42
High School Entrance	32	6.8	34	5.8	32	5.9	32
Minnesota Avenue	27	10.3	28	9.5	27	10.8	28
Total	33	29.0	34	26.4	33	27.9	34

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	9.6	48.3	0.6	43	43	10.4
Tom Sawyer Trail	29	4.3	47.1	0.8	61	60	4.8
272nd Street	18	0.7	14.5	0.2	52	52	0.8
HWY 106	5	15.0	75.0	1.0	48	49	14.9
Total		29.6	184.9	2.6	50	50	30.9

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	42	10.3	44	8.5	42	9.5	43
Tom Sawyer Trail	60	4.7	63	4.0	60	4.2	64
272nd Street	52	0.5	52	0.7	52	0.7	52
HWY 106	49	15.3	49	14.0	47	15.5	48
Total	50	30.7	51	27.1	50	29.9	51

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	16.5	51.7	0.5	37	37	16.1
272nd Street	18	9.2	75.3	1.0	48	48	9.2
Tom Sawyer Trail	29	1.5	15.0	0.2	51	50	1.6
HWY 110 (Willow St)	1	9.5	65.7	0.8	44	44	9.1
Total		36.6	207.7	2.5	44	44	36.1

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	36	17.4	37	16.3	37	16.8	38
272nd Street	47	9.2	48	8.5	48	9.7	48
Tom Sawyer Trail	50	1.5	52	1.2	51	1.6	50
HWY 110 (Willow St)	42	10.5	47	8.1	42	10.2	43
Total	43	38.6	45	34.2	44	38.3	44

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	8.8	63.6	0.5	30	31	9.1
Industrial Drive	25	4.0	53.2	0.7	48	49	3.9
272nd Street	19	1.1	26.5	0.3	41	41	1.1
HWY 106	8	12.6	75.6	1.0	48	48	12.8
Total		26.5	218.8	2.5	42	43	26.8

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	30	9.3	30	8.1	30	8.3	29
Industrial Drive	47	4.7	46	4.5	49	3.5	50
272nd Street	41	1.1	40	1.5	40	0.8	41
HWY 106	48	12.7	46	14.4	50	10.6	49
Total	42	27.8	41	28.6	43	23.2	42

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	24.4	60.2	0.5	32	37	17.1
272nd Street	19	8.9	71.0	1.0	51	51	8.5
Laura Street	25	2.1	27.6	0.3	39	39	1.8
HWY 110 (Willow St)	2	12.5	76.1	0.7	33	33	12.6
Total		47.8	234.9	2.5	39	40	40.1

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	31	28.2	33	22.9	35	19.7	28
272nd Street	52	8.7	51	9.0	50	9.3	51
Laura Street	40	1.9	39	2.0	40	2.1	38
HWY 110 (Willow St)	33	12.5	33	12.3	34	11.8	34
Total	39	51.3	39	46.1	40	42.9	38

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	14.0	47.4	0.5	38	38	13.9
Cliff Avenue	8	20.7	82.6	1.0	44	42	20.5
Total		34.6	130.0	1.5	42	41	34.4

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	38	14.3	38	13.6	37	14.9	39
Cliff Avenue	44	19.7	43	20.8	44	21.9	44
Total	42	34.0	41	34.4	41	36.7	42

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	11.9	45.9	0.5	40	39	12.8
Minnesota Avenue	5	18.8	77.4	1.0	47	49	17.9
Total		30.7	123.3	1.5	44	45	30.8

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	40	11.1	40	11.5	39	12.1	39
Minnesota Avenue	45	18.2	46	19.3	48	19.5	45
Total	43	29.2	44	30.9	45	31.6	43

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	7.8	110.5	0.9	28	33	5.9
272nd Street	20	0.6	71.3	1.0	51	46	0.3
Total		8.4	181.8	1.9	37	39	6.2

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	27	9.9	29	5.8	27	9.1	28
272nd Street	46	0.2	44	0.3	46	3.2	46
Total	35	10.1	36	6.1	34	12.3	35

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
272nd Street	20	0.1	37.5	0.5	48	1811	0.0
HWY 110 (Willow St)	15	6.0	62.1	1.0	58	55	7.2
Total		6.1	99.6	1.5	55	81	7.2

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
272nd Street	47	0.1	47	0.1	52	0.1	48
HWY 110 (Willow St)	54	5.5	55	6.9	57	6.3	50
Total	51	5.6	52	7.0	55	6.4	49

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	10.1	42.4	0.5	43	40	10.5
United Avenue	31	1.1	48.9	0.5	39	39	0.2
Cliff Avenue	19	5.6	36.3	0.5	46	60	3.2
Southeastern Avenue	20	1.8	47.8	1.0	76	3610	0.0
Total		18.5	175.5	2.5	51	73	13.9

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	40	9.7	42	8.9	39	14.5	57
United Avenue	37	0.1	59	3.1	37	0.5	34
Cliff Avenue	42	2.6	40	10.5	40	5.7	43
Southeastern Avenue	53	0.1	45	2.6	45	4.2	46
Total	44	12.5	45	25.2	41	24.9	44

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	20	1.1	29.4	0.4	55	1612	0.0
Cliff Avenue	19	6.3	109.2	1.0	33	30	7.5
United Avenue	31	1.5	23.3	0.5	72	29	2.4
Minnesota Avenue	18	12.0	51.6	0.5	37	35	15.1
Total		20.9	213.5	2.4	41	38	25.0

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	61	1.1	55	1.1	52	1.0	1612
Cliff Avenue	3610	0.0	32	8.3	3610	0.0	29
United Avenue	51	0.7	61	2.4	36	0.0	53
Minnesota Avenue	42	7.9	36	9.9	37	8.9	41
Total	84	9.7	39	21.7	68	9.8	43

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	92	99	29	61	75	80
Average Queue (ft)	43	51	5	29	39	39
95th Queue (ft)	71	83	22	50	62	62
Link Distance (ft)	2670	1866		2994		4150
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			240		300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	128	78	49	59	88	75
Average Queue (ft)	65	47	23	34	46	43
95th Queue (ft)	101	74	47	55	73	66
Link Distance (ft)	3262	5237		2798		3670
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			115		130	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	110	103	102	159
Average Queue (ft)	53	49	50	69
95th Queue (ft)	85	79	82	121
Link Distance (ft)	2609	5220	5230	2772
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	104	86	85	314
Average Queue (ft)	58	42	52	111
95th Queue (ft)	89	70	79	249
Link Distance (ft)	5220	2639	5239	2812
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	35	35	53	44
Average Queue (ft)	3	3	17	14
95th Queue (ft)	18	17	46	40
Link Distance (ft)	5237	2385	4526	5228
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	40	39	10	38
Average Queue (ft)	11	16	0	7
95th Queue (ft)	33	37	5	26
Link Distance (ft)	2623	2735	1048	5230
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	38	24	30	24	5
Average Queue (ft)	13	1	4	1	0
95th Queue (ft)	37	10	21	16	3
Link Distance (ft)	2422		5238	1523	5239
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		150			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	LT	T	R	L	R
Maximum Queue (ft)	91	66	27	58	31
Average Queue (ft)	29	13	1	16	11
95th Queue (ft)	75	46	13	44	30
Link Distance (ft)	1866	3262		244	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			85		200
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	70	83	48	50
Average Queue (ft)	29	39	9	5
95th Queue (ft)	55	66	34	30
Link Distance (ft)	871	849	3670	1523
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	35
Average Queue (ft)	8
95th Queue (ft)	30
Link Distance (ft)	291
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: 272nd Street & United Avenue

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	4	6	36
Average Queue (ft)	0	0	19
95th Queue (ft)	3	4	44
Link Distance (ft)	2735	2422	964
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.7	122.2	0.7	0.6	124.1
Delay / Veh (s)	12.0	651.6	12.8	9.9	353.6

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	2.4	93.2	5.1	1.1	101.9
Delay / Veh (s)	28.0	597.3	37.1	13.6	221.3

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.8	151.7	145.2	10.4	308.2
Delay / Veh (s)	15.1	953.4	918.7	82.5	616.4

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	10.8	142.6	197.6	1.6	352.6
Delay / Veh (s)	82.0	1104.3	1373.3	21.2	736.3

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.0	0.6	2.1	2.1	5.7
Delay / Veh (s)	8.5	5.1	30.9	23.6	14.9

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.3	6.4	1.2	0.7	8.5
Delay / Veh (s)	41.7	109.2	9.1	7.9	30.7

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	13.7	9.0	55.0	0.9	78.7
Delay / Veh (s)	632.4	439.8	336.3	7.8	244.8

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.1	0.3	0.4
Delay / Veh (s)	2.0	3.1	2.8

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.4	1.7	1.9	4.0
Delay / Veh (s)	4.3	8.8	74.3	12.9

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	7.8	2.9	81.7	0.2	92.7
Delay / Veh (s)	365.3	400.2	459.0	3.2	326.5

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.5	0.1	0.6
Delay / Veh (s)	5.7	4.2	1.2	3.2

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.1	0.1	0.2
Delay / Veh (s)	1.2	1.5	5.0	2.5

Total Network Performance

Total Delay (hr)	1080.7
Delay / Veh (s)	910.7

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.5	0.0	1.8	88.9	31.4	0.0	0.6	0.0	0.4	0.2	0.1
Delay / Veh (s)	9.1	13.0	5.6	589.3	643.0	681.5	8.1	14.2	6.6	10.1	11.8	6.6

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	124.1
Delay / Veh (s)	353.6

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.8	0.9	0.7	4.5	37.1	51.6	1.8	2.5	0.8	0.3	0.5	0.3
Delay / Veh (s)	29.8	29.1	25.3	624.9	586.5	605.0	31.9	41.3	38.9	12.4	16.4	11.4

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	101.9
Delay / Veh (s)	221.3

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.8	0.0	3.7	122.4	25.7	43.7	85.0	16.5	3.1	5.9	1.5
Delay / Veh (s)	13.6	16.0	8.3	1095.5	962.0	907.2	935.6	908.0	945.1	79.9	84.4	80.8

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	308.2
Delay / Veh (s)	616.4

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.4	2.2	5.1	15.1	104.9	22.6	91.7	103.6	2.3	0.1	1.0	0.5
Delay / Veh (s)	82.7	84.8	80.3	1111.6	1097.6	1115.7	1364.1	1381.9	1356.0	15.8	23.9	18.1

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	352.6
Delay / Veh (s)	736.3

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.6	0.0	0.0	0.5	0.1	0.2	1.6	0.3	0.2	0.3	1.6
Delay / Veh (s)	10.0	8.0	6.8	8.0	5.2	3.9	34.5	31.8	24.9	32.1	30.2	21.8

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	5.7
Delay / Veh (s)	14.9

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.0	0.0	0.2	0.8	5.4	0.0	1.2	0.0	0.1	0.5	0.1
Delay / Veh (s)	58.0	22.4	24.7	155.6	130.0	105.4	6.2	9.1	10.7	8.8	8.0	6.7

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	8.5
Delay / Veh (s)	30.7

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	6.7	6.4	0.6	0.2	3.8	5.0	1.5	52.4	1.1	0.2	0.7	0.1
Delay / Veh (s)	689.1	579.8	670.8	112.7	472.4	475.1	342.3	334.4	445.3	9.0	7.8	6.2

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	78.7
Delay / Veh (s)	244.8

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.1	0.3	0.4
Delay / Veh (s)	2.0	3.1	2.8

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.2	0.2	1.5	0.2	0.6	1.4	4.0
Delay / Veh (s)	8.8	2.8	9.1	7.2	54.2	87.5	12.9

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.7	0.5	3.7	0.6	0.1	2.1	1.2	78.0	2.4	0.1	0.2	0.0
Delay / Veh (s)	411.5	413.3	332.7	281.1	496.1	450.6	374.7	461.4	460.9	5.3	2.6	3.0

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	92.7
Delay / Veh (s)	326.5

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.5	0.1	0.0	0.6
Delay / Veh (s)	6.6	3.1	2.7	4.2	1.2	0.3	3.2

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.1	0.1	0.0	0.2
Delay / Veh (s)	1.3	0.5	0.2	1.6	5.4	3.0	2.5

Total Network Performance

Total Delay (hr)	1080.7
Delay / Veh (s)	910.7

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	13.0	47.4	0.5	39	39	13.6
High School Entrance	24	3.6	37.5	0.4	35	35	3.9
Cliff Avenue	2	28.6	90.8	0.6	25	24	31.9
Southeastern Avenue	15	7.8	93.5	1.0	39	37	9.9
Total		53.0	269.3	2.5	34	33	59.3

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	39	12.7	39	12.8	39	13.5	39
High School Entrance	35	3.3	34	3.7	37	3.6	35
Cliff Avenue	28	18.2	27	23.2	21	45.8	25
Southeastern Avenue	40	5.8	37	8.5	42	6.8	40
Total	35	40.0	34	48.1	32	69.8	34

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	5.2	60.1	0.5	28	28	3.7
Cliff Avenue	2	518.0	603.5	1.0	7	8	443.7
High School Entrance	24	9.9	58.0	0.6	40	43	5.2
Minnesota Avenue	1	679.2	716.0	0.4	5	6	609.7
Total		1212.3	1437.6	2.5	10	11	1062.3

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	25	10.7	28	3.3	28	4.0	28
Cliff Avenue	5	767.1	8	416.6	7	466.6	7
High School Entrance	45	5.5	44	4.8	30	27.3	42
Minnesota Avenue	6	799.6	6	583.3	5	755.2	5
Total	8	1582.9	11	1008.1	10	1253.0	10

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	14.2	52.2	0.6	40	40	14.9
Tom Sawyer Trail	29	6.3	51.1	0.8	56	58	6.2
272nd Street	18	9.1	22.5	0.2	34	29	14.0
HWY 106	5	926.0	986.3	1.0	5	4	1038.6
Total		955.7	1112.0	2.6	10	10	1073.6

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	40	13.9	41	12.8	39	14.7	39
Tom Sawyer Trail	58	6.4	57	6.4	55	6.5	57
272nd Street	35	8.6	38	6.9	40	6.0	33
HWY 106	5	806.6	5	884.1	5	868.0	4
Total	12	835.6	10	910.2	11	895.2	9

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	84.4	120.3	0.5	16	13	112.2
272nd Street	18	8.5	72.1	1.0	50	50	8.6
Tom Sawyer Trail	29	1.2	14.8	0.2	51	51	1.3
HWY 110 (Willow St)	1	11.8	74.9	0.8	38	38	12.4
Total		106.0	282.1	2.5	32	29	134.4

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	27	35.7	19	62.9	26	38.6	10
272nd Street	51	7.8	50	8.5	49	9.4	51
Tom Sawyer Trail	52	1.0	51	1.2	50	1.5	52
HWY 110 (Willow St)	39	11.6	38	11.7	38	11.4	38
Total	40	55.9	35	84.3	38	61.0	25

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	41.3	97.7	0.5	20	16	60.6
Industrial Drive	25	474.6	519.3	0.7	10	9	507.8
272nd Street	19	340.6	367.0	0.3	5	5	333.9
HWY 106	8	1362.3	1426.5	1.0	3	3	1335.7
Total		2218.7	2410.6	2.5	5	5	2237.9

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	22	31.5	21	35.7	19	46.7	22
Industrial Drive	10	451.3	10	466.8	9	513.2	10
272nd Street	4	337.2	5	338.6	5	362.0	4
HWY 106	3	1361.2	3	1360.0	3	1327.9	3
Total	6	2181.2	5	2201.2	5	2249.9	5

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	23.9	59.8	0.5	33	34	21.9
272nd Street	19	11.9	74.4	1.0	49	48	13.4
Laura Street	25	2.6	29.2	0.3	37	37	2.5
HWY 110 (Willow St)	2	16.7	68.6	0.7	37	37	16.6
Total		55.2	232.1	2.5	40	40	54.5

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	32	24.9	36	19.1	33	23.3	29
272nd Street	50	11.4	48	12.7	49	11.3	49
Laura Street	37	2.1	37	2.7	36	3.3	37
HWY 110 (Willow St)	37	16.7	38	16.4	38	14.4	35
Total	40	55.1	41	50.9	40	52.2	38

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	16.0	49.8	0.5	36	36	15.2
Cliff Avenue	8	84.2	136.6	1.0	26	25	94.9
Total		100.2	186.4	1.5	29	28	110.1

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	35	16.6	36	16.0	37	15.5	36
Cliff Avenue	40	39.3	22	106.9	21	117.3	31
Total	38	55.9	26	122.9	25	132.7	33

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	1097.6	1131.3	0.5	3	3	1012.2
Minnesota Avenue	5	989.8	1043.4	1.0	5	6	950.6
Total		2087.3	2174.7	1.5	4	4	1962.8

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	3	1056.6	3	1145.9	3	986.3	3
Minnesota Avenue	6	883.2	5	936.6	6	975.1	5
Total	4	1939.8	4	2082.5	4	1961.4	4

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	31.8	136.3	0.9	23	24	28.8
Total		31.8	136.3	0.9	23	24	28.8

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	22	35.8	21	39.2	23	31.7	25
Total	22	35.8	21	39.2	23	31.7	25

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	30.2	91.2	1.0	40	42	25.9
Total		30.2	91.2	1.0	40	42	25.9

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	34	42.6	42	27.5	40	29.3	44
Total	34	42.6	42	27.5	40	29.3	44

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	22.4	55.9	0.5	32	30	25.6
United Avenue	31	2.6	48.6	0.5	39	38	2.9
Cliff Avenue	19	537.8	584.7	0.5	3	4	430.7
Total		562.8	689.2	1.5	8	9	459.1

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	38	11.9	34	17.8	39	11.6	15
United Avenue	46	2.1	37	2.4	40	3.6	45
Cliff Avenue	3	507.2	2	717.6	9	150.3	2
Total	8	521.2	6	737.9	19	165.5	5

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	472.4	532.6	1.0	7	6	542.5
United Avenue	31	2.4	24.7	0.5	69	69	2.4
Minnesota Avenue	18	112.1	144.3	0.5	13	8	216.0
Total		586.9	701.7	2.0	10	8	760.9

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	7	449.4	4	849.7	8	394.1	12
United Avenue	65	2.6	80	1.7	68	2.5	65
Minnesota Avenue	34	20.7	22	54.9	32	27.5	5
Total	12	472.7	7	906.3	13	424.1	10

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	98	1724	50	92	92	65
Average Queue (ft)	48	1262	16	48	47	34
95th Queue (ft)	79	1954	42	78	77	59
Link Distance (ft)	2670	1865		2988		4144
Upstream Blk Time (%)		4				
Queuing Penalty (veh)		31				
Storage Bay Dist (ft)			240		300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	363	4734	145	805	81	129
Average Queue (ft)	123	2486	80	172	40	60
95th Queue (ft)	280	4656	147	562	68	102
Link Distance (ft)	3263	5237		2798		3670
Upstream Blk Time (%)		1				
Queuing Penalty (veh)		8				
Storage Bay Dist (ft)			115		130	
Storage Blk Time (%)			1	17		0
Queuing Penalty (veh)			3	38		0

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	117	5198	5249	617
Average Queue (ft)	57	3312	3344	335
95th Queue (ft)	92	5801	6090	778
Link Distance (ft)	2609	5220	5230	2772
Upstream Blk Time (%)		3	10	
Queuing Penalty (veh)		37	74	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	690	2692	5260	177
Average Queue (ft)	340	2248	4390	86
95th Queue (ft)	671	3450	6908	151
Link Distance (ft)	5220	2639	5239	2812
Upstream Blk Time (%)		58	32	
Queuing Penalty (veh)		0	361	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	175	209	290	355
Average Queue (ft)	49	19	111	126
95th Queue (ft)	115	122	220	257
Link Distance (ft)	5237	2385	4526	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	93	857	364	74
Average Queue (ft)	20	197	36	17
95th Queue (ft)	61	782	173	52
Link Distance (ft)	2623	2735	1048	5230
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	873	267	642	1548	124
Average Queue (ft)	358	19	240	981	27
95th Queue (ft)	866	118	572	2145	84
Link Distance (ft)	2422			1523	5239
Upstream Blk Time (%)				33	
Queuing Penalty (veh)				327	
Storage Bay Dist (ft)		150			
Storage Blk Time (%)			51		
Queuing Penalty (veh)			4		

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	R	L	R
Maximum Queue (ft)	73	116	57	109	93
Average Queue (ft)	28	37	13	31	40
95th Queue (ft)	60	231	72	105	135
Link Distance (ft)		3263		238	
Upstream Blk Time (%)				1	1
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)	85		85		200
Storage Blk Time (%)	0	5			7
Queuing Penalty (veh)	0	6			3

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	714	252	3685	114
Average Queue (ft)	221	84	1566	21
95th Queue (ft)	611	264	4131	69
Link Distance (ft)	871	849	3670	1523
Upstream Blk Time (%)	1		9	
Queuing Penalty (veh)	0		64	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	30	5
Average Queue (ft)	10	0
95th Queue (ft)	33	4
Link Distance (ft)	291	4144
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 31: 272nd Street & United Avenue

Movement	NB
Directions Served	LR
Maximum Queue (ft)	74
Average Queue (ft)	35
95th Queue (ft)	62
Link Distance (ft)	964
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 954

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	27.0	1.1	1.5	0.2	29.9
Delay / Veh (s)	152.2	13.0	15.9	9.1	77.8

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.6	3.4	0.9	1.4	6.3
Delay / Veh (s)	5.5	15.0	11.0	11.3	11.6

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	308.4	53.4	50.7	206.4	619.0
Delay / Veh (s)	2581.8	368.5	392.8	1591.2	1182.8

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	211.6	45.5	9.5	329.4	596.0
Delay / Veh (s)	1445.5	344.5	68.4	2534.2	1088.1

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.0	2.0	2.3	237.7	243.0
Delay / Veh (s)	11.6	8.3	67.8	2815.1	544.7

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.8	0.2	0.3	1.1	2.3
Delay / Veh (s)	22.2	6.8	2.7	11.1	8.4

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.3	0.3	0.5	1.3	3.5
Delay / Veh (s)	19.9	11.4	3.4	8.7	8.6

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.2	0.2	0.4
Delay / Veh (s)	3.1	2.0	2.5

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.5	0.4	0.1	1.0
Delay / Veh (s)	3.7	3.8	8.0	4.1

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.1	0.4	0.7	0.3	1.4
Delay / Veh (s)	8.5	8.1	5.1	2.1	4.4

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.7	0.1	0.7
Delay / Veh (s)	5.2	5.5	2.1	4.9

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.3	0.1	0.0	0.4
Delay / Veh (s)	2.7	2.9	5.3	2.8

Total Network Performance

Total Delay (hr)	1506.7
Delay / Veh (s)	1103.1

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	5.3	18.7	3.0	0.1	0.8	0.2	0.2	1.2	0.1	0.0	0.2	0.0
Delay / Veh (s)	156.8	153.0	140.9	14.3	13.3	11.8	11.0	18.0	10.3	7.6	10.3	4.6

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	29.9
Delay / Veh (s)	77.8

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.4	0.1	0.3	1.9	1.2	0.2	0.6	0.1	0.6	0.6	0.2
Delay / Veh (s)	10.5	4.7	6.8	21.5	12.3	20.8	8.9	12.5	8.5	13.0	10.6	9.5

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	6.3
Delay / Veh (s)	11.6

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	19.0	258.2	31.1	4.8	37.8	10.9	6.9	28.8	15.1	64.4	126.9	15.1
Delay / Veh (s)	2282.6	2618.6	2548.3	380.4	368.7	366.2	399.6	386.4	405.5	1546.4	1614.5	1594.9

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	619.0
Delay / Veh (s)	1182.8

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	29.9	107.0	74.7	7.3	31.9	6.2	3.2	5.1	1.2	45.6	248.0	35.8
Delay / Veh (s)	1298.8	1492.8	1445.3	349.4	346.3	330.2	81.5	61.1	77.4	2524.4	2544.0	2433.5

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	596.0
Delay / Veh (s)	1088.1

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	0.4	0.0	0.3	1.5	0.2	0.5	1.3	0.5	29.7	84.1	123.9
Delay / Veh (s)	16.7	8.7	10.6	8.5	8.6	6.5	73.5	74.7	52.0	3140.6	2753.3	2805.9

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	243.0
Delay / Veh (s)	544.7

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.6	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.7	0.3	0.0
Delay / Veh (s)	19.3	23.8	11.6	10.2	12.6	5.6	1.4	3.0	0.7	11.0	11.4	9.6

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	2.3
Delay / Veh (s)	8.4

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	1.0	0.1	0.0	0.2	0.1	0.0	0.5	0.1	0.1	1.2	0.1
Delay / Veh (s)	26.6	18.9	16.7	15.4	15.3	6.6	6.7	3.6	2.3	9.9	8.6	7.8

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	3.5
Delay / Veh (s)	8.6

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.2	0.2	0.4
Delay / Veh (s)	3.1	2.0	2.5

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.5	0.4	0.0	0.1	0.1	1.0
Delay / Veh (s)	6.0	3.6	3.8	3.8	8.3	7.6	4.1

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.0	0.0	0.1	0.0	0.2	0.1	0.6	0.0	0.0	0.2	0.0
Delay / Veh (s)	12.6	11.4	5.1	12.6	8.4	6.7	6.9	5.0	3.6	4.0	2.1	1.6

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	1.4
Delay / Veh (s)	4.4

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.7	0.1	0.0	0.7
Delay / Veh (s)	5.8	3.0	3.5	5.5	2.2	1.6	4.9

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.3	0.0	0.0	0.1	0.0	0.0	0.4
Delay / Veh (s)	2.7	2.5	3.0	2.9	5.9	3.5	2.8

Total Network Performance

Total Delay (hr)	1506.7
Delay / Veh (s)	1103.1

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	1	153.0	188.0	0.5	10
High School Entrance	24	3.9	37.9	0.4	35
Cliff Avenue	2	4.7	47.2	0.6	48
Southeastern Avenue	15	9.0	108.4	1.0	33
Total		170.6	381.5	2.5	24

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southeastern Avenue	15	8.6	63.4	0.5	26
Cliff Avenue	2	12.8	84.3	1.0	43
High School Entrance	24	5.0	66.0	0.6	34
Minnesota Avenue	1	13.5	49.4	0.4	27
Total		39.9	263.1	2.5	34

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	1	18.0	55.9	0.6	37
Tom Sawyer Trail	29	8.1	59.8	0.8	48
272nd Street	18	3.0	16.8	0.2	45
HWY 106	5	375.2	437.6	1.0	8
Total		404.3	570.1	2.6	16

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 106	5	1614.5	1649.6	0.5	3
272nd Street	18	12.3	77.3	1.0	47
Tom Sawyer Trail	29	2.3	15.9	0.2	48
HWY 110 (Willow St)	1	10.4	69.3	0.8	41
Total		1639.5	1812.1	2.5	10

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	2	12.5	67.7	0.5	29
Industrial Drive	25	6.2	63.4	0.7	40
272nd Street	19	4.0	30.1	0.3	36
HWY 106	8	60.4	119.3	1.0	30
Total		83.0	280.5	2.5	33

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 106	8	2544.0	2578.9	0.5	2
272nd Street	19	11.0	72.5	1.0	50
Laura Street	25	2.1	29.0	0.3	37
HWY 110 (Willow St)	2	10.7	57.3	0.7	44
Total		2567.8	2737.6	2.5	10

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	5	2618.6	2651.1	0.5	2
Cliff Avenue	8	1627.7	1683.9	1.0	4
Total		4246.3	4335.0	1.5	3

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cliff Avenue	8	346.3	381.3	0.5	5
Minnesota Avenue	5	351.4	411.1	1.0	9
Total		697.7	792.4	1.5	7

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	15	74.7	179.5	0.9	17
Total		74.7	179.5	0.9	17

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	15	2753.3	2813.4	1.0	3
Total		2753.3	2813.4	1.0	3

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	18	23.8	57.7	0.5	31
United Avenue	31	4.8	49.7	0.5	38
Cliff Avenue	19	19.1	58.9	0.5	29
Total		47.8	166.3	1.5	33

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cliff Avenue	19	15.3	67.8	1.0	53
United Avenue	31	5.4	37.1	0.5	45
Minnesota Avenue	18	11.6	40.9	0.5	47
Total		32.3	145.8	2.0	49

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	1700	168	64	162	43	76
Average Queue (ft)	850	82	30	68	15	33
95th Queue (ft)	1873	137	55	114	40	60
Link Distance (ft)	2670	1865		2988		4144
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			240		300	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	109	270	85	123	105	109
Average Queue (ft)	54	121	35	60	51	58
95th Queue (ft)	88	216	61	97	87	92
Link Distance (ft)	3263	5237		2798		3670
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			115		130	
Storage Blk Time (%)				0	0	0
Queuing Penalty (veh)				0	0	0

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	2663	2550	3084	2822
Average Queue (ft)	2522	1479	1402	2565
95th Queue (ft)	3118	2853	2880	3434
Link Distance (ft)	2609	5220	5230	2772
Upstream Blk Time (%)	80			68
Queuing Penalty (veh)	0			0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	5236	2338	554	2870
Average Queue (ft)	3836	1291	295	2718
95th Queue (ft)	6201	2478	645	3367
Link Distance (ft)	5220	2639	5239	2812
Upstream Blk Time (%)	9	5		79
Queuing Penalty (veh)	115	0		0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	171	118	268	2663
Average Queue (ft)	59	36	104	2462
95th Queue (ft)	125	93	238	3225
Link Distance (ft)	5237	2385	4526	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	148	88	26	96
Average Queue (ft)	57	30	2	46
95th Queue (ft)	112	59	12	80
Link Distance (ft)	2623	2735	1048	5230
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	L	TR	LTR	LTR
Maximum Queue (ft)	198	39	83	89	73
Average Queue (ft)	79	10	37	9	16
95th Queue (ft)	148	34	66	48	51
Link Distance (ft)	2422			1523	5239
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		150			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	42	47	34
Average Queue (ft)	8	19	13
95th Queue (ft)	31	42	33
Link Distance (ft)		238	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	85		200
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	68	97	73	76
Average Queue (ft)	25	51	11	7
95th Queue (ft)	54	82	44	37
Link Distance (ft)	871	849	3670	1523
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	30	5
Average Queue (ft)	8	0
95th Queue (ft)	29	4
Link Distance (ft)	291	4144
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	20	49
Average Queue (ft)	1	17
95th Queue (ft)	11	46
Link Distance (ft)	2422	964
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 116

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.3	6.6	1.0	1.8	10.7
Delay / Veh (s)	24.0	24.2	19.8	28.0	24.2

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	2.9	7.5	2.9	1.7	15.1
Delay / Veh (s)	32.3	38.4	20.7	18.7	29.0

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.2	12.3	6.9	3.6	24.1
Delay / Veh (s)	20.3	34.7	28.8	27.7	30.7

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	4.8	8.8	17.9	1.8	33.3
Delay / Veh (s)	32.3	45.8	55.0	25.4	45.2

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	4.0	3.9	1.2	1.0	10.2
Delay / Veh (s)	33.0	34.2	17.6	11.3	25.8

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.1	0.7	0.2	0.5	1.5
Delay / Veh (s)	8.3	10.2	1.3	5.6	4.6

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.2	0.8	5.6	1.8	9.4
Delay / Veh (s)	43.2	34.8	19.6	13.8	20.2

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.1	0.4	0.5
Delay / Veh (s)	2.9	3.8	3.6

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.5	1.6	0.4	2.4
Delay / Veh (s)	4.9	6.9	13.9	6.8

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.3	0.1	1.8	0.3	2.6
Delay / Veh (s)	13.5	16.2	6.8	3.9	6.8

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.3	0.0	0.4
Delay / Veh (s)	4.9	2.4	0.4	1.8

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.1	0.1	0.2
Delay / Veh (s)	1.2	1.7	5.5	2.5

Total Network Performance

Total Delay (hr)	117.5
Delay / Veh (s)	74.6

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	0.8	0.0	0.1	5.7	0.8	0.1	0.9	0.1	1.3	0.3	0.1
Delay / Veh (s)	53.1	18.2	11.8	27.3	28.4	12.1	18.7	21.6	9.1	32.9	21.0	16.7

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	10.7
Delay / Veh (s)	24.2

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.3	1.0	0.6	0.5	4.4	2.6	1.2	1.4	0.3	0.6	0.7	0.3
Delay / Veh (s)	42.1	33.1	20.6	50.7	54.6	24.9	20.9	22.5	15.1	22.0	22.6	11.1

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	15.1
Delay / Veh (s)	29.0

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	1.0	0.1	0.3	10.7	1.3	2.0	4.2	0.7	1.1	2.1	0.4
Delay / Veh (s)	36.2	20.4	10.5	31.5	37.5	21.6	27.8	30.1	25.3	27.6	29.0	23.1

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	24.1
Delay / Veh (s)	30.7

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.2	1.0	0.6	0.7	6.8	1.3	8.8	9.0	0.1	0.1	1.4	0.3
Delay / Veh (s)	62.8	34.3	8.7	33.5	47.5	46.9	59.6	51.7	33.9	36.4	35.7	10.0

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	33.3
Delay / Veh (s)	45.2

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.3	2.6	0.1	0.2	3.6	0.1	0.1	0.9	0.2	0.1	0.2	0.7
Delay / Veh (s)	36.9	31.4	36.0	34.0	37.6	9.9	22.8	18.1	13.4	23.6	14.4	9.8

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	10.2
Delay / Veh (s)	25.8

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.2	0.0	0.1	0.3	0.1
Delay / Veh (s)	7.8	11.7	2.3	14.0	17.0	9.1	2.5	1.3	0.4	6.9	5.4	4.6

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	1.5
Delay / Veh (s)	4.6

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	0.6	0.0	0.1	0.4	0.3	0.2	5.4	0.1	0.8	0.9	0.1
Delay / Veh (s)	45.8	42.3	27.9	43.6	44.1	26.4	21.5	19.6	16.1	38.0	9.2	8.0

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	9.4
Delay / Veh (s)	20.2

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.1	0.4	0.5
Delay / Veh (s)	2.9	3.8	3.6

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.3	0.2	1.3	0.2	0.2	0.2	2.4
Delay / Veh (s)	10.6	3.0	6.8	7.2	16.8	11.7	6.8

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.0	0.1	0.0	0.0	0.1	0.0	1.7	0.0	0.2	0.2	0.0
Delay / Veh (s)	19.8	14.3	8.1	18.2	15.7	15.4	8.2	6.8	5.5	10.8	2.4	1.8

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	2.6
Delay / Veh (s)	6.8

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.3	0.0	0.0	0.4
Delay / Veh (s)	6.2	2.2	2.6	2.4	0.5	0.2	1.8

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.1	0.1	0.0	0.2
Delay / Veh (s)	1.4	0.3	4.1	1.6	5.8	3.7	2.5

Total Network Performance

Total Delay (hr)	117.5
Delay / Veh (s)	74.6

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	1	18.2	71.0	0.5	26
High School Entrance	24	3.3	37.8	0.4	35
Cliff Avenue	2	33.6	96.1	0.6	24
Southeastern Avenue	15	35.0	121.9	1.0	30
Total		90.1	326.9	2.5	28

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southeastern Avenue	15	37.6	92.4	0.5	18
Cliff Avenue	2	56.1	150.4	1.0	24
High School Entrance	24	7.7	58.2	0.6	40
Minnesota Avenue	1	28.6	61.6	0.4	22
Total		130.0	362.6	2.5	25

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	1	21.6	67.9	0.6	30
Tom Sawyer Trail	29	3.2	57.2	0.8	50
272nd Street	18	1.2	17.4	0.2	43
HWY 106	5	30.1	103.7	1.0	35
Total		56.2	246.3	2.6	38

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 106	5	29.0	71.8	0.5	27
272nd Street	18	6.1	83.9	1.0	43
Tom Sawyer Trail	29	0.4	17.1	0.2	44
HWY 110 (Willow St)	1	21.0	83.6	0.8	34
Total		56.6	256.4	2.5	36

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	2	22.5	78.1	0.5	25
Industrial Drive	25	7.8	54.4	0.7	48
272nd Street	19	19.7	45.6	0.3	25
HWY 106	8	51.5	138.0	1.0	26
Total		101.5	316.0	2.5	29

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 106	8	35.7	78.9	0.5	25
272nd Street	19	9.7	96.0	1.0	38
Laura Street	25	2.4	29.3	0.3	37
HWY 110 (Willow St)	2	23.5	82.2	0.7	31
Total		71.4	286.3	2.5	32

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	5	20.4	60.6	0.5	30
Cliff Avenue	8	40.7	105.8	1.0	34
Total		61.1	166.4	1.5	32

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cliff Avenue	8	47.5	88.0	0.5	21
Minnesota Avenue	5	39.5	110.5	1.0	33
Total		87.0	198.5	1.5	27

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	15	18.1	122.0	0.9	26
Total		18.1	122.0	0.9	26

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	15	14.4	74.6	1.0	49
Total		14.4	74.6	1.0	49

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	18	11.7	62.4	0.5	29
United Avenue	31	2.7	46.1	0.5	41
Cliff Avenue	19	41.3	85.3	0.5	20
Total		55.8	193.7	1.5	28

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cliff Avenue	19	44.1	96.1	1.0	38
United Avenue	31	2.4	37.5	0.5	45
Minnesota Avenue	18	19.0	69.5	0.5	28
Total		65.4	203.1	2.0	36

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	120	191	114	717	350	74	91	101	188	44	92
Average Queue (ft)	34	72	10	327	87	12	32	45	81	5	23
95th Queue (ft)	82	150	59	580	268	45	73	85	154	23	61
Link Distance (ft)		2658		1853			2988	2988		4131	4131
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150		200	240			300		
Storage Blk Time (%)		1		23							
Queuing Penalty (veh)		0		62							

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	147	213	120	680	290	239	268	129	133	87
Average Queue (ft)	66	92	29	218	136	88	111	47	46	31
95th Queue (ft)	122	184	80	473	259	174	207	98	99	67
Link Distance (ft)		3250		5224			2792		3652	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		200		200	150		150		150
Storage Blk Time (%)		1		10	1	1	3	0	0	
Queuing Penalty (veh)		1		40	4	3	7	0	0	

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	44	85	108	173	427	444	290	249	249	300	174	142
Average Queue (ft)	10	40	50	29	261	285	110	118	125	157	68	61
95th Queue (ft)	34	74	93	101	394	421	265	211	218	258	131	120
Link Distance (ft)		2591	2591		5183	5183			5212	5212		2742
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150			200	200			200	
Storage Blk Time (%)					23	20	0	2	1		0	
Queuing Penalty (veh)					7	46	0	4	2		0	

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	158
Average Queue (ft)	90
95th Queue (ft)	149
Link Distance (ft)	2742
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	R	L	T
Maximum Queue (ft)	258	113	81	113	133	325	342	290	1560	69	60	156
Average Queue (ft)	127	27	35	44	46	179	202	230	573	6	12	85
95th Queue (ft)	227	102	70	87	100	282	307	355	1464	53	43	140
Link Distance (ft)		5183	5183			2620	2620		5208			2794
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			200	200			200		150	200	
Storage Blk Time (%)	5					6		18	15			0
Queuing Penalty (veh)	3					4		117	91			0

Intersection: 8: HWY 106 & Cliff Avenue

Movement	SB
Directions Served	R
Maximum Queue (ft)	100
Average Queue (ft)	39
95th Queue (ft)	72
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	150
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (ft)	164	415	131	435	202	189	133	194
Average Queue (ft)	75	149	16	212	34	89	30	61
95th Queue (ft)	133	289	68	353	118	166	81	134
Link Distance (ft)		5224		2385		4520		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	150		150		150			150
Storage Blk Time (%)	0	9		18				1
Queuing Penalty (veh)	1	12		13				0

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	48	150	20	4	68	9
Average Queue (ft)	18	70	1	0	16	0
95th Queue (ft)	45	116	9	3	45	5
Link Distance (ft)	2605	2717		1050		5212
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			150		150	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	88	88	33	111	86	642	113	115	129	42
Average Queue (ft)	31	33	5	46	14	253	7	49	39	7
95th Queue (ft)	68	74	21	94	63	534	63	94	102	29
Link Distance (ft)		2403				1523			5208	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150		150		150		150	150		150
Storage Blk Time (%)						11		0	0	
Queuing Penalty (veh)						5		0	0	

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	R	L	R
Maximum Queue (ft)	96	4	36	65	61
Average Queue (ft)	34	0	4	25	22
95th Queue (ft)	74	3	21	53	46
Link Distance (ft)		3250		238	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	85		85		200
Storage Blk Time (%)	0		0		
Queuing Penalty (veh)	1		0		

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	107	63	38	9	66
Average Queue (ft)	44	24	4	0	24
95th Queue (ft)	83	56	22	4	57
Link Distance (ft)	871	849		3652	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			150		150
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	30	16
Average Queue (ft)	8	1
95th Queue (ft)	30	9
Link Distance (ft)	279	4131
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	11	82
Average Queue (ft)	0	35
95th Queue (ft)	7	63
Link Distance (ft)	2403	958
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 426

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	7.9	3.3	1.7	0.9	13.7
Delay / Veh (s)	42.3	27.6	18.1	17.2	30.6

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.9	6.6	1.4	4.0	13.9
Delay / Veh (s)	15.7	23.2	18.1	15.1	18.6

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	11.1	7.4	4.4	5.3	28.2
Delay / Veh (s)	42.5	38.8	28.2	23.3	33.8

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	43.8	18.6	9.5	28.8	100.7
Delay / Veh (s)	112.8	131.6	63.3	102.7	104.8

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	5.6	13.8	1.5	7.2	28.1
Delay / Veh (s)	42.3	56.5	42.1	38.2	46.8

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.7	0.5	0.3	2.5	5.0
Delay / Veh (s)	50.9	17.5	2.2	13.9	13.3

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	6.0	0.9	1.1	7.1	15.1
Delay / Veh (s)	60.9	38.3	6.6	20.1	23.4

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.4	0.4	0.8
Delay / Veh (s)	4.0	4.4	4.2

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.7	0.7	0.2	1.5
Delay / Veh (s)	4.5	5.0	9.5	5.0

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.3	0.9	0.8	1.3	3.2
Delay / Veh (s)	24.9	19.7	5.3	4.8	6.8

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.4	0.0	0.4
Delay / Veh (s)	3.9	3.0	0.6	2.3

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.6	0.1	0.0	0.7
Delay / Veh (s)	3.6	2.3	6.3	3.5

Total Network Performance

Total Delay (hr)	216.8
Delay / Veh (s)	111.2

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.5	5.5	0.9	0.5	2.6	0.2	0.4	1.1	0.2	0.3	0.5	0.1
Delay / Veh (s)	41.5	43.1	39.1	40.9	33.0	6.1	23.8	17.1	15.3	23.9	16.3	10.8

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	13.7
Delay / Veh (s)	30.6

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	1.2	0.2	0.9	4.6	1.1	0.3	0.9	0.2	2.0	1.4	0.5
Delay / Veh (s)	34.5	12.5	20.3	50.1	23.4	15.9	15.8	20.4	12.8	21.1	12.0	10.8

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	13.9
Delay / Veh (s)	18.6

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.8	9.3	1.1	1.1	5.6	0.7	0.5	2.7	1.2	2.0	3.1	0.2
Delay / Veh (s)	46.5	42.6	39.1	67.4	41.8	16.6	22.6	31.0	25.7	27.1	22.3	14.4

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	28.2
Delay / Veh (s)	33.8

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	4.4	13.4	25.9	11.7	5.9	0.9	6.6	2.5	0.4	4.0	22.2	2.7
Delay / Veh (s)	76.5	69.1	190.7	579.4	58.9	45.4	159.6	27.1	24.9	102.7	105.4	85.0

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	100.7
Delay / Veh (s)	104.8

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.4	2.1	0.1	1.9	10.7	1.1	0.4	0.8	0.3	1.2	2.9	3.2
Delay / Veh (s)	74.1	26.2	22.5	58.6	59.8	36.1	50.1	47.1	28.0	47.7	43.3	32.4

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	28.1
Delay / Veh (s)	46.8

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.4	1.2	0.1	0.1	0.1	0.4	0.0	0.3	0.0	2.1	0.4	0.0
Delay / Veh (s)	56.8	48.0	49.6	37.7	25.5	14.1	2.2	2.3	1.3	17.2	6.9	5.7

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	5.0
Delay / Veh (s)	13.3

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.0	4.5	0.4	0.2	0.5	0.2	0.0	1.0	0.1	0.5	6.3	0.3
Delay / Veh (s)	69.6	58.1	73.5	67.0	55.8	14.8	17.8	6.8	4.7	25.8	20.0	16.5

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	15.1
Delay / Veh (s)	23.4

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.4	0.4	0.8
Delay / Veh (s)	4.0	4.4	4.2

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.6	0.7	0.0	0.1	0.1	1.5
Delay / Veh (s)	6.9	4.3	5.1	4.4	10.6	8.4	5.0

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.0	0.1	0.3	0.0	0.5	0.1	0.6	0.0	0.0	1.3	0.0
Delay / Veh (s)	32.1	25.7	18.8	31.8	32.9	15.6	13.2	4.8	3.7	6.9	4.7	3.7

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	3.2
Delay / Veh (s)	6.8

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.4	0.0	0.0	0.4
Delay / Veh (s)	4.1	3.3	5.7	3.0	0.6	0.5	2.3

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.5	0.1	0.0	0.1	0.0	0.0	0.7
Delay / Veh (s)	3.6	3.6	5.2	2.1	7.1	3.6	3.5

Total Network Performance

Total Delay (hr)	216.8
Delay / Veh (s)	111.2

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	43.1	95.6	0.5	19	19	45.3
High School Entrance	24	4.9	39.1	0.4	34	34	5.0
Cliff Avenue	2	12.3	54.7	0.6	42	40	14.8
Southeastern Avenue	15	21.5	121.0	1.0	30	33	20.0
Total		81.8	310.3	2.5	29	30	85.1

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	19	46.2	19	42.8	20	40.4	20
High School Entrance	34	4.8	34	5.0	34	4.7	33
Cliff Avenue	40	13.7	41	11.9	42	11.1	44
Southeastern Avenue	31	14.9	33	12.7	27	31.6	27
Total	29	79.6	30	72.3	28	87.8	29

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	59.8	114.7	0.5	15	16	46.8
Cliff Avenue	2	22.5	93.9	1.0	38	39	21.1
High School Entrance	24	7.6	68.6	0.6	33	33	7.6
Minnesota Avenue	1	33.0	68.7	0.4	19	18	35.3
Total		122.9	345.9	2.5	26	27	110.8

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	16	48.3	13	71.1	12	81.1	16
Cliff Avenue	40	21.2	38	21.6	38	24.2	37
High School Entrance	34	6.8	32	8.2	34	7.4	33
Minnesota Avenue	20	30.2	21	28.5	18	37.6	19
Total	27	106.5	25	129.4	24	150.4	26

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	17.1	63.1	0.6	33	32	18.5
Tom Sawyer Trail	29	4.1	67.0	0.8	43	42	4.2
272nd Street	18	2.3	19.1	0.2	40	39	2.3
HWY 106	5	30.0	104.2	1.0	35	36	27.1
Total		53.5	253.5	2.6	37	37	52.0

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	34	15.8	32	17.7	33	16.1	33
Tom Sawyer Trail	43	3.7	43	3.9	43	4.1	43
272nd Street	39	2.3	40	2.3	40	2.3	39
HWY 106	34	30.0	35	29.0	36	28.7	33
Total	37	51.8	37	52.9	37	51.2	36

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	22.3	64.6	0.5	30	30	22.5
272nd Street	18	8.5	89.2	1.0	40	43	7.4
Tom Sawyer Trail	29	0.6	17.3	0.2	44	45	0.4
HWY 110 (Willow St)	1	16.2	75.1	0.8	38	38	16.3
Total		47.6	246.2	2.5	37	38	46.5

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	31	20.3	29	23.8	29	23.1	30
272nd Street	40	8.8	40	8.3	40	8.8	41
Tom Sawyer Trail	44	0.5	44	0.4	43	0.8	44
HWY 110 (Willow St)	36	18.2	40	14.3	40	14.3	38
Total	37	47.7	37	46.7	37	47.1	37

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	20.4	76.0	0.5	25	25	21.4
Industrial Drive	25	5.9	62.7	0.7	41	41	5.8
272nd Street	19	7.4	33.7	0.3	32	32	7.3
HWY 106	8	28.2	106.3	1.0	34	36	20.6
Total		61.9	278.7	2.5	33	34	55.2

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	27	16.8	26	19.4	25	20.8	24
Industrial Drive	40	6.1	41	5.9	42	5.5	41
272nd Street	31	8.1	32	7.6	33	6.8	32
HWY 106	37	19.6	29	46.5	38	16.9	31
Total	34	50.6	31	79.3	34	50.0	31

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	105.4	148.5	0.5	13	16	78.9
272nd Street	19	21.6	105.3	1.0	34	34	22.6
Laura Street	25	4.9	31.7	0.3	34	35	4.3
HWY 110 (Willow St)	2	12.0	64.4	0.7	39	40	11.8
Total		143.8	349.8	2.5	26	28	117.5

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	17	72.8	11	147.6	9	166.2	19
272nd Street	35	20.1	34	21.7	35	20.9	34
Laura Street	34	4.9	33	5.6	34	4.8	34
HWY 110 (Willow St)	41	11.1	37	14.2	40	10.2	40
Total	29	108.9	24	189.2	23	202.1	30

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	42.6	82.6	0.5	22	22	43.3
Cliff Avenue	8	73.0	145.3	1.0	25	25	73.2
Total		115.5	227.9	1.5	24	24	116.5

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	21	46.6	22	41.1	23	39.1	22
Cliff Avenue	26	70.0	24	77.2	27	59.9	23
Total	24	116.6	23	118.3	26	99.1	23

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	58.9	99.4	0.5	18	18	58.3
Minnesota Avenue	5	52.3	126.6	1.0	28	29	49.2
Total		111.2	225.9	1.5	24	24	107.6

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	19	57.7	20	52.8	19	57.9	17
Minnesota Avenue	28	56.0	29	50.6	28	54.3	28
Total	24	113.7	25	103.5	24	112.2	23

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	47.1	150.5	0.9	21	21	41.2
Total		47.1	150.5	0.9	21	21	41.2

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	21	43.6	21	44.8	22	40.5	18
Total	21	43.6	21	44.8	22	40.5	18

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	43.3	103.9	1.0	35	37	38.2
Total		43.3	103.9	1.0	35	37	38.2

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	38	34.8	34	45.3	33	49.8	33
Total	38	34.8	34	45.3	33	49.8	33

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	48.0	99.0	0.5	18	22	31.4
United Avenue	31	5.4	49.8	0.5	38	39	5.2
Cliff Avenue	19	58.4	98.3	0.5	17	19	50.8
Total		111.8	247.1	1.5	22	24	87.5

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	21	37.1	20	39.6	12	100.7	21
United Avenue	36	5.9	40	5.4	39	5.6	38
Cliff Avenue	16	68.9	18	53.4	15	74.7	20
Total	22	111.9	23	98.4	17	181.0	24

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	55.8	108.4	1.0	33	33	57.0
United Avenue	31	4.8	53.0	0.5	32	34	3.5
Minnesota Avenue	18	25.1	72.1	0.5	26	26	27.1
Total		85.6	233.5	2.0	31	31	87.6

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	35	50.1	33	58.1	32	60.4	34
United Avenue	32	4.8	34	3.5	31	7.8	31
Minnesota Avenue	23	34.4	26	24.7	34	9.5	25
Total	30	89.3	31	86.3	32	77.7	30

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	239	770	193	359	184	125	114	136	64	80	93
Average Queue (ft)	106	360	44	152	37	32	44	66	23	16	29
95th Queue (ft)	226	628	113	295	117	84	95	116	58	52	72
Link Distance (ft)		2658		1853			2988	2988		4131	4131
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150		200	240			300		
Storage Blk Time (%)	1	31	0	13							
Queuing Penalty (veh)	4	36	0	20							

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	85	198	113	304	260	119	218	216	179	87
Average Queue (ft)	31	79	45	154	66	38	100	96	56	25
95th Queue (ft)	70	154	92	261	144	84	185	174	128	61
Link Distance (ft)		3250		5224			2792		3652	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		200		200	150		150		150
Storage Blk Time (%)		1		6		0	2	2	0	
Queuing Penalty (veh)		0		20		0	1	10	1	

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	214	420	470	141	235	229	124	114	216	248	248	198
Average Queue (ft)	53	257	283	50	97	114	48	43	106	150	123	111
95th Queue (ft)	138	381	409	106	183	193	91	89	187	227	224	179
Link Distance (ft)		2591	2591		5183	5183			5212	5212		2742
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150			200	200			200	
Storage Blk Time (%)	0	26		0	5	2			0		2	0
Queuing Penalty (veh)	0	16		0	4	3			0		4	0

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	223
Average Queue (ft)	121
95th Queue (ft)	197
Link Distance (ft)	2742
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	R	L	T
Maximum Queue (ft)	288	1389	1432	290	290	597	534	280	596	95	289	2047
Average Queue (ft)	167	772	856	285	219	295	235	200	188	19	105	1194
95th Queue (ft)	275	1505	1576	319	353	633	477	331	568	61	258	2482
Link Distance (ft)		5183	5183			2620	2620		5208			2794
Upstream Blk Time (%)												2
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	200			200	200			200		150	200	
Storage Blk Time (%)	8	15	15	62	60	3		30	3		0	40
Queuing Penalty (veh)	30	33	81	220	107	2		93	7		3	103

Intersection: 8: HWY 106 & Cliff Avenue

Movement	SB
Directions Served	R
Maximum Queue (ft)	240
Average Queue (ft)	78
95th Queue (ft)	225
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	150
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (ft)	239	394	239	1157	240	222	698	240
Average Queue (ft)	136	123	87	662	74	91	263	180
95th Queue (ft)	247	288	214	1229	210	180	521	284
Link Distance (ft)		5224		2385		4520		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	150		150		150			150
Storage Blk Time (%)	14	5	0	39			20	11
Queuing Penalty (veh)	33	9	1	90			70	36

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	NB	NB	SB
Directions Served	LTR	LTR	L	T	TR	L
Maximum Queue (ft)	211	149	26	4	30	222
Average Queue (ft)	82	54	2	0	7	103
95th Queue (ft)	189	112	14	3	26	183
Link Distance (ft)	2605	2717		1050	1050	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			150			150
Storage Blk Time (%)						2
Queuing Penalty (veh)						2

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	237	412	43	117	44	187	61	168	410	202
Average Queue (ft)	50	179	10	38	7	91	15	38	210	19
95th Queue (ft)	145	355	34	87	28	175	46	111	352	91
Link Distance (ft)		2403				1523			5208	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150		150		150		150	150		150
Storage Blk Time (%)		30		0		1			8	
Queuing Penalty (veh)		16		0		1			12	

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	SB	SB
Directions Served	L	R	L	R
Maximum Queue (ft)	35	12	55	52
Average Queue (ft)	7	0	19	16
95th Queue (ft)	28	7	45	40
Link Distance (ft)			238	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	85	85		200
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	84	154	57	37	4
Average Queue (ft)	29	70	17	8	0
95th Queue (ft)	64	126	45	31	3
Link Distance (ft)	871	849			1523
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			150	150	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	35
Average Queue (ft)	9
95th Queue (ft)	32
Link Distance (ft)	279
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	45	54
Average Queue (ft)	4	18
95th Queue (ft)	25	47
Link Distance (ft)	2403	958
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1070

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.3	6.4	1.0	1.8	10.5
Delay / Veh (s)	23.5	23.8	20.2	27.9	23.9

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	3.0	7.2	3.0	1.6	14.8
Delay / Veh (s)	33.4	36.9	21.1	17.8	28.7

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.1	12.5	6.8	3.4	23.9
Delay / Veh (s)	20.0	34.9	28.1	26.2	30.3

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	5.0	8.9	12.2	1.9	27.9
Delay / Veh (s)	33.7	45.9	37.0	26.3	37.6

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	4.0	3.9	1.1	0.9	9.9
Delay / Veh (s)	32.8	33.2	16.8	10.6	25.2

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.1	0.8	0.2	0.5	1.5
Delay / Veh (s)	8.7	10.6	1.3	5.6	4.7

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.2	0.9	6.1	1.9	10.1
Delay / Veh (s)	44.9	40.5	21.0	14.6	21.6

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.1	0.4	0.5
Delay / Veh (s)	2.9	3.9	3.6

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.5	1.5	0.4	2.4
Delay / Veh (s)	5.3	6.7	13.6	6.8

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.4	0.1	1.7	0.4	2.6
Delay / Veh (s)	16.6	16.5	6.3	4.3	6.7

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.3	0.0	0.4
Delay / Veh (s)	4.0	2.5	0.5	1.9

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.1	0.1	0.2
Delay / Veh (s)	1.4	1.6	5.2	2.5

Total Network Performance

Total Delay (hr)	112.0
Delay / Veh (s)	70.9

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	0.8	0.0	0.1	5.4	0.9	0.1	0.9	0.0	1.3	0.4	0.1
Delay / Veh (s)	51.7	18.0	9.4	28.4	27.7	12.7	17.9	22.2	7.6	32.8	23.4	15.0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	10.5
Delay / Veh (s)	23.9

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.3	1.1	0.6	0.5	4.2	2.6	1.2	1.5	0.3	0.6	0.7	0.3
Delay / Veh (s)	44.4	34.0	21.3	46.7	52.7	24.2	20.5	23.4	15.8	21.1	20.6	10.2

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	14.8
Delay / Veh (s)	28.7

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	1.0	0.1	0.3	11.0	1.2	1.9	4.2	0.7	1.0	2.0	0.4
Delay / Veh (s)	34.4	20.4	11.1	31.2	38.2	19.7	26.5	29.8	24.2	25.4	27.7	21.6

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	23.9
Delay / Veh (s)	30.3

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.4	1.0	0.6	0.6	6.9	1.4	6.8	5.3	0.1	0.1	1.5	0.3
Delay / Veh (s)	68.9	35.3	8.0	28.5	48.0	47.5	45.0	30.6	17.4	39.1	37.2	9.9

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	27.9
Delay / Veh (s)	37.6

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.2	2.7	0.1	0.2	3.6	0.1	0.1	0.9	0.1	0.1	0.2	0.7
Delay / Veh (s)	34.7	32.1	29.6	28.4	36.9	8.8	22.1	17.4	12.0	21.0	14.5	9.3

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	9.9
Delay / Veh (s)	25.2

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.2	0.0	0.1	0.3	0.1
Delay / Veh (s)	8.1	11.0	3.3	13.3	17.4	9.7	1.5	1.3	0.7	7.1	5.3	4.9

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	1.5
Delay / Veh (s)	4.7

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	0.6	0.0	0.1	0.5	0.4	0.2	5.8	0.1	1.0	0.8	0.1
Delay / Veh (s)	46.6	45.2	23.4	41.6	51.7	31.5	22.2	21.0	17.6	44.6	8.7	6.9

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	10.1
Delay / Veh (s)	21.6

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.1	0.4	0.5
Delay / Veh (s)	2.9	3.9	3.6

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.3	0.2	1.3	0.2	0.2	0.2	2.4
Delay / Veh (s)	11.6	3.1	6.7	6.6	16.0	12.1	6.8

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	0.0	0.0	0.0	0.0	0.1	0.0	1.6	0.0	0.2	0.2	0.0
Delay / Veh (s)	30.4	19.4	4.2	17.3	16.6	16.0	8.1	6.3	5.3	11.8	2.4	1.2

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	2.6
Delay / Veh (s)	6.7

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.3	0.0	0.0	0.4
Delay / Veh (s)	4.7	2.4	2.8	2.5	0.5	0.2	1.9

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.1	0.1	0.0	0.2
Delay / Veh (s)	1.5	0.8	3.4	1.5	5.7	3.2	2.5

Total Network Performance

Total Delay (hr)	112.0
Delay / Veh (s)	70.9

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	18.0	70.8	0.5	26	27	17.4
High School Entrance	24	3.4	37.8	0.4	35	36	3.2
Cliff Avenue	2	34.6	97.0	0.6	23	24	31.9
Southeastern Avenue	15	35.5	121.7	1.0	30	29	36.6
Total		91.4	327.3	2.5	28	28	89.2

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	25	19.2	26	17.6	27	16.4	25
High School Entrance	35	3.0	34	3.4	35	4.2	35
Cliff Avenue	24	33.6	23	36.4	23	37.2	23
Southeastern Avenue	30	34.0	30	34.1	32	32.5	29
Total	28	89.8	27	91.6	29	90.3	27

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	36.9	91.7	0.5	18	18	37.9
Cliff Avenue	2	53.2	147.3	1.0	25	25	53.8
High School Entrance	24	7.6	58.3	0.6	40	39	7.8
Minnesota Avenue	1	27.7	60.4	0.4	22	23	25.5
Total		125.4	357.6	2.5	25	25	125.0

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	18	36.1	18	38.3	18	35.9	18
Cliff Avenue	23	59.5	26	44.3	24	54.3	25
High School Entrance	40	7.7	41	7.0	39	7.9	39
Minnesota Avenue	22	28.3	24	23.8	22	28.9	21
Total	25	131.7	26	113.4	25	127.0	25

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	22.2	68.4	0.6	30	31	21.6
Tom Sawyer Trail	29	3.3	58.0	0.8	49	49	3.4
272nd Street	18	1.2	17.5	0.2	43	43	1.2
HWY 106	5	29.4	102.9	1.0	35	34	31.5
Total		56.2	246.7	2.6	38	37	57.8

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	31	21.3	29	23.8	29	24.3	32
Tom Sawyer Trail	50	3.1	50	3.3	49	3.4	50
272nd Street	43	1.2	44	1.2	43	1.2	43
HWY 106	35	28.9	36	27.8	35	29.5	35
Total	38	54.5	38	56.1	37	58.4	38

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	27.7	70.3	0.5	27	27	27.3
272nd Street	18	6.0	83.6	1.0	43	42	6.5
Tom Sawyer Trail	29	0.5	17.1	0.2	44	44	0.4
HWY 110 (Willow St)	1	23.5	86.9	0.8	33	34	21.8
Total		57.8	257.8	2.5	35	36	55.9

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	28	25.2	27	28.3	28	26.0	26
272nd Street	44	5.8	44	5.5	43	5.9	42
Tom Sawyer Trail	44	0.5	45	0.5	44	0.4	44
HWY 110 (Willow St)	32	28.3	34	19.7	33	23.8	33
Total	35	59.8	36	54.0	36	56.0	35

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	23.4	78.9	0.5	25	24	26.5
Industrial Drive	25	7.3	53.8	0.7	49	48	7.1
272nd Street	19	21.3	47.3	0.3	24	26	18.2
HWY 106	8	30.0	116.5	1.0	31	31	29.0
Total		82.0	296.5	2.5	32	31	80.9

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	24	23.8	25	23.7	25	23.3	25
Industrial Drive	50	7.9	49	7.1	49	7.2	48
272nd Street	22	26.5	26	17.6	29	12.1	21
HWY 106	29	37.8	32	27.0	32	25.9	31
Total	30	96.0	32	75.4	33	68.6	31

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	37.2	80.5	0.5	24	23	42.0
272nd Street	19	9.2	95.9	1.0	38	38	9.5
Laura Street	25	2.4	29.0	0.3	37	37	2.4
HWY 110 (Willow St)	2	21.5	80.4	0.7	32	31	22.9
Total		70.3	285.7	2.5	32	32	76.8

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	24	37.0	24	37.5	27	30.7	24
272nd Street	38	9.9	38	8.3	38	9.4	37
Laura Street	37	2.3	38	2.0	37	2.7	37
HWY 110 (Willow St)	31	24.6	32	21.0	33	19.4	32
Total	32	73.8	33	68.8	34	62.2	32

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	20.4	60.8	0.5	30	30	18.8
Cliff Avenue	8	41.4	105.2	1.0	34	34	44.6
Total		61.8	166.0	1.5	33	32	63.4

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	30	19.6	29	22.8	29	21.9	30
Cliff Avenue	32	45.3	35	40.6	36	37.7	36
Total	32	64.9	33	63.4	33	59.6	34

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	48.0	88.6	0.5	21	20	49.7
Minnesota Avenue	5	40.3	111.7	1.0	32	30	46.7
Total		88.3	200.3	1.5	27	26	96.5

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	19	53.9	21	47.0	22	40.9	21
Minnesota Avenue	34	37.3	31	42.3	34	36.9	33
Total	27	91.1	27	89.3	29	77.8	27

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	17.4	120.7	0.9	26	26	17.3
Total		17.4	120.7	0.9	26	26	17.3

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	25	19.4	25	17.8	26	15.3	26
Total	25	19.4	25	17.8	26	15.3	26

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	14.5	74.9	1.0	48	49	15.4
Total		14.5	74.9	1.0	48	49	15.4

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	48	13.9	49	15.5	47	14.5	48
Total	48	13.9	49	15.5	47	14.5	48

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	11.0	62.1	0.5	29	30	8.1
United Avenue	31	2.3	47.8	0.5	40	38	2.6
Cliff Avenue	19	46.0	89.4	0.5	19	19	44.1
Total		59.3	199.4	1.5	27	28	54.9

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	29	11.6	27	9.3	26	17.7	28
United Avenue	46	2.3	44	1.1	37	2.9	33
Cliff Avenue	19	45.3	19	45.7	19	42.8	18
Total	28	59.2	27	56.1	26	63.3	25

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	51.7	104.4	1.0	35	35	48.6
United Avenue	31	2.3	37.2	0.5	46	44	2.7
Minnesota Avenue	18	18.3	66.7	0.5	29	31	19.6
Total		72.2	208.2	2.0	35	36	70.9

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	33	59.3	36	48.7	34	53.3	36
United Avenue	44	2.7	49	2.1	45	2.1	47
Minnesota Avenue	26	26.5	31	14.6	28	16.8	28
Total	32	88.5	37	65.4	34	72.1	35

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	83	210	109	825	335	71	77	98	178	36	81
Average Queue (ft)	33	70	12	325	83	12	31	45	75	6	25
95th Queue (ft)	72	153	57	622	252	46	66	84	148	23	64
Link Distance (ft)		2658		1853			2988	2988		4131	4131
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	200		150		275	125			175		
Storage Blk Time (%)		0		21		0			0		
Queuing Penalty (veh)		0		56		0			0		

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	184	255	127	688	306	214	240	132	118	73
Average Queue (ft)	68	95	30	209	133	81	121	49	45	26
95th Queue (ft)	128	192	86	454	263	150	219	99	96	58
Link Distance (ft)		3250		5224			2792		3646	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		150		250	225		175		150
Storage Blk Time (%)	0	1		17	0	0	0	0		
Queuing Penalty (veh)	0	1		69	0	0	1	0		

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	30	89	106	117	426	448	362	252	242	272	148	146
Average Queue (ft)	9	40	50	24	262	285	77	118	121	153	66	59
95th Queue (ft)	29	77	92	75	390	403	183	206	213	249	127	119
Link Distance (ft)		2591	2591		5183	5183			5212	5212		2742
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			200			275	250			250	
Storage Blk Time (%)					15	9		0	0			
Queuing Penalty (veh)					5	21		1	0			

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	171
Average Queue (ft)	84
95th Queue (ft)	152
Link Distance (ft)	2742
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	R	L	T
Maximum Queue (ft)	329	61	82	105	102	321	344	433	588	59	66	168
Average Queue (ft)	134	21	35	41	39	178	204	245	203	5	13	86
95th Queue (ft)	268	51	70	79	82	287	313	415	490	35	45	150
Link Distance (ft)		5183	5183			2620	2620		5208			2794
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	325			325	375			350		125	275	
Storage Blk Time (%)	1					0		3	14			0
Queuing Penalty (veh)	1					0		19	84			0

Intersection: 8: HWY 106 & Cliff Avenue

Movement	SB
Directions Served	R
Maximum Queue (ft)	95
Average Queue (ft)	38
95th Queue (ft)	73
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	225
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (ft)	152	359	142	402	193	203	76	171
Average Queue (ft)	71	154	18	206	32	88	25	55
95th Queue (ft)	131	287	76	342	121	172	63	116
Link Distance (ft)		5224		2385		4520		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	250		225		225			300
Storage Blk Time (%)		1		7				
Queuing Penalty (veh)		2		5				

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	53	164	26	4	55	15
Average Queue (ft)	19	72	1	0	17	1
95th Queue (ft)	48	127	10	3	45	8
Link Distance (ft)	2605	2717		1050		5212
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			150		150	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	89	90	33	123	87	673	171	109	122	46
Average Queue (ft)	32	33	5	45	18	272	9	54	39	9
95th Queue (ft)	71	73	22	96	68	584	71	105	99	32
Link Distance (ft)		2403				1505			5208	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150		100		150		150	125		125
Storage Blk Time (%)				1		11		0	0	
Queuing Penalty (veh)				0		5		1	0	

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	R	L	R
Maximum Queue (ft)	111	4	26	67	69
Average Queue (ft)	37	0	5	25	25
95th Queue (ft)	77	3	20	54	53
Link Distance (ft)		3250		238	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	85		85		200
Storage Blk Time (%)	0				
Queuing Penalty (veh)	1				

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	TR	LT	R	L	R	L
Maximum Queue (ft)	74	58	28	53	35	24	67
Average Queue (ft)	26	20	7	11	4	1	25
95th Queue (ft)	61	41	26	34	22	11	58
Link Distance (ft)		858	837				
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	75			75	75	75	75
Storage Blk Time (%)	1	0		0			1
Queuing Penalty (veh)	0	0		0			1

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	30	11
Average Queue (ft)	9	0
95th Queue (ft)	31	6
Link Distance (ft)	279	4131
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	6	83
Average Queue (ft)	0	34
95th Queue (ft)	4	62
Link Distance (ft)	2403	958
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 275

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	8.0	3.6	1.9	0.9	14.4
Delay / Veh (s)	42.3	29.7	20.6	18.9	31.9

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.9	6.6	1.5	3.9	13.8
Delay / Veh (s)	15.4	23.2	18.2	14.5	18.3

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	11.0	7.4	4.3	5.3	28.0
Delay / Veh (s)	41.8	38.8	27.6	23.7	33.6

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	46.5	16.8	10.8	25.7	99.8
Delay / Veh (s)	119.4	117.9	71.9	89.6	102.9

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	5.5	11.1	1.2	6.4	24.3
Delay / Veh (s)	40.8	45.8	35.8	33.6	40.3

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	2.0	0.7	0.3	2.5	5.5
Delay / Veh (s)	59.2	22.9	2.1	14.1	14.7

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	6.2	0.9	1.2	7.5	15.8
Delay / Veh (s)	62.6	39.3	6.9	21.1	24.3

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.4	0.4	0.8
Delay / Veh (s)	4.0	4.3	4.1

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.7	0.7	0.2	1.6
Delay / Veh (s)	4.6	5.2	9.3	5.1

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.3	0.8	0.8	1.2	3.0
Delay / Veh (s)	28.2	17.1	5.3	4.3	6.3

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.4	0.0	0.4
Delay / Veh (s)	5.0	3.0	0.5	2.3

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.6	0.1	0.0	0.7
Delay / Veh (s)	3.7	2.3	6.2	3.6

Total Network Performance

Total Delay (hr)	213.7
Delay / Veh (s)	109.1

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.4	5.8	0.8	0.6	2.8	0.2	0.4	1.3	0.2	0.3	0.6	0.1
Delay / Veh (s)	39.4	44.2	36.4	43.7	35.5	6.4	25.1	20.4	15.0	26.3	17.5	11.9

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	14.4
Delay / Veh (s)	31.9

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	1.2	0.2	0.9	4.5	1.1	0.3	1.0	0.2	2.0	1.3	0.6
Delay / Veh (s)	34.6	12.2	19.8	51.0	23.3	15.9	16.1	20.2	13.7	20.0	11.4	11.0

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	13.8
Delay / Veh (s)	18.3

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.7	9.3	1.0	1.2	5.6	0.6	0.5	2.7	1.2	2.0	3.1	0.3
Delay / Veh (s)	44.2	42.0	38.3	69.3	41.8	15.7	21.3	30.8	24.7	27.4	22.9	15.0

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	28.0
Delay / Veh (s)	33.6

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	4.6	12.8	29.2	10.3	5.5	0.9	8.3	2.2	0.3	3.5	20.2	2.1
Delay / Veh (s)	78.3	66.0	211.6	509.4	54.9	43.0	203.0	23.2	19.6	85.1	94.2	64.9

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	99.8
Delay / Veh (s)	102.9

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.5	1.9	0.1	1.5	8.8	0.8	0.4	0.6	0.2	1.1	2.6	2.6
Delay / Veh (s)	74.1	22.8	24.7	47.9	49.2	24.8	48.6	37.4	24.3	43.1	39.3	27.1

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	24.3
Delay / Veh (s)	40.3

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	1.5	0.1	0.1	0.1	0.5	0.0	0.2	0.0	2.2	0.3	0.0
Delay / Veh (s)	63.2	58.2	48.1	47.9	34.3	18.4	1.7	2.3	1.3	17.6	6.5	6.8

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	5.5
Delay / Veh (s)	14.7

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.0	4.7	0.5	0.2	0.6	0.2	0.1	1.0	0.1	0.5	6.6	0.4
Delay / Veh (s)	71.7	59.8	79.0	67.1	57.8	14.4	20.4	7.0	4.8	27.2	20.9	18.1

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	15.8
Delay / Veh (s)	24.3

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.4	0.4	0.8
Delay / Veh (s)	4.0	4.3	4.1

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.6	0.7	0.0	0.1	0.1	1.6
Delay / Veh (s)	7.9	4.4	5.2	5.3	10.4	8.2	5.1

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.0	0.1	0.3	0.0	0.4	0.1	0.7	0.0	0.0	1.1	0.0
Delay / Veh (s)	44.5	14.8	14.5	31.9	32.7	11.7	13.1	4.8	4.8	7.3	4.2	3.4

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	3.0
Delay / Veh (s)	6.3

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.4	0.0	0.0	0.4
Delay / Veh (s)	5.7	2.6	5.6	3.0	0.5	0.4	2.3

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.6	0.1	0.0	0.1	0.0	0.0	0.7
Delay / Veh (s)	3.8	3.5	4.4	2.1	7.3	3.0	3.6

Total Network Performance

Total Delay (hr)	213.7
Delay / Veh (s)	109.1

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	44.2	96.7	0.5	19	20	41.6
High School Entrance	24	4.9	39.2	0.4	34	34	4.9
Cliff Avenue	2	12.0	54.7	0.6	41	41	12.8
Southeastern Avenue	15	15.7	115.6	1.0	31	35	13.3
Total		76.8	306.2	2.5	30	31	72.7

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	19	43.7	19	43.2	19	44.7	19
High School Entrance	34	4.8	33	5.4	34	4.7	33
Cliff Avenue	40	13.3	41	12.5	42	12.1	44
Southeastern Avenue	30	16.7	34	14.3	30	16.1	29
Total	29	78.6	30	75.3	29	77.6	29

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	49.2	103.9	0.5	16	16	50.6
Cliff Avenue	2	22.2	93.5	1.0	39	38	23.3
High School Entrance	24	7.7	68.8	0.6	33	33	8.0
Minnesota Avenue	1	35.7	71.6	0.4	18	19	34.3
Total		114.7	337.8	2.5	26	26	116.2

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	17	42.2	14	61.3	16	47.9	17
Cliff Avenue	39	22.1	38	24.0	39	20.2	38
High School Entrance	33	7.0	33	8.3	34	6.9	33
Minnesota Avenue	19	32.8	19	33.2	18	37.8	17
Total	27	104.0	25	126.7	26	112.7	26

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	20.4	66.6	0.6	31	31	19.7
Tom Sawyer Trail	29	4.1	66.6	0.8	43	43	4.3
272nd Street	18	2.3	19.1	0.2	40	40	2.3
HWY 106	5	30.2	104.9	1.0	34	36	26.5
Total		57.1	257.1	2.6	36	37	52.7

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	31	20.1	31	21.3	30	22.3	32
Tom Sawyer Trail	43	4.0	43	3.8	43	4.3	43
272nd Street	39	2.2	39	2.4	40	2.1	39
HWY 106	33	33.0	34	30.8	36	27.0	33
Total	36	59.4	36	58.3	37	55.6	36

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	22.9	65.5	0.5	29	30	22.6
272nd Street	18	8.0	88.1	1.0	41	42	7.1
Tom Sawyer Trail	29	0.5	17.2	0.2	44	44	0.5
HWY 110 (Willow St)	1	17.5	76.6	0.8	37	36	19.3
Total		48.9	247.3	2.5	37	37	49.5

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	30	21.7	29	23.9	29	23.1	29
272nd Street	40	8.2	40	7.6	41	8.5	41
Tom Sawyer Trail	45	0.4	44	0.4	44	0.6	44
HWY 110 (Willow St)	36	17.9	39	16.1	38	16.0	38
Total	37	48.3	37	48.0	37	48.2	37

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	20.2	75.5	0.5	26	26	19.8
Industrial Drive	25	5.9	62.6	0.7	41	41	5.8
272nd Street	19	7.6	33.8	0.3	32	32	7.8
HWY 106	8	23.4	102.4	1.0	35	33	29.4
Total		57.1	274.2	2.5	33	32	62.7

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	27	17.6	25	21.7	26	18.4	24
Industrial Drive	39	6.1	41	5.6	41	6.2	41
272nd Street	31	8.0	33	6.7	32	7.5	32
HWY 106	38	16.5	35	25.1	36	20.6	35
Total	34	48.2	33	59.1	34	52.7	33

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	94.2	137.3	0.5	15	17	72.2
272nd Street	19	22.9	106.9	1.0	34	33	24.0
Laura Street	25	4.3	30.9	0.3	35	35	4.3
HWY 110 (Willow St)	2	11.3	63.6	0.7	40	40	11.1
Total		132.8	338.7	2.5	27	29	111.6

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	15	86.0	14	99.0	11	142.3	17
272nd Street	35	21.1	34	23.6	35	21.4	33
Laura Street	35	4.3	35	4.4	35	4.3	35
HWY 110 (Willow St)	41	11.2	39	11.7	40	10.6	40
Total	28	122.6	27	138.8	25	178.5	29

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	42.0	82.1	0.5	22	22	42.5
Cliff Avenue	8	68.0	140.2	1.0	26	26	64.6
Total		110.0	222.3	1.5	24	25	107.1

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	21	46.4	23	40.6	23	38.9	22
Cliff Avenue	26	65.5	27	62.8	28	57.7	22
Total	24	111.8	25	103.3	26	96.6	22

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	54.9	95.5	0.5	19	18	59.7
Minnesota Avenue	5	50.7	125.2	1.0	29	29	50.0
Total		105.6	220.7	1.5	25	24	109.7

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	20	50.1	21	47.2	18	61.9	19
Minnesota Avenue	29	50.3	29	51.6	28	51.4	29
Total	25	100.4	25	98.8	24	113.3	25

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	37.4	141.4	0.9	22	23	34.7
Total		37.4	141.4	0.9	22	23	34.7

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	22	39.5	22	35.8	22	41.6	22
Total	22	39.5	22	35.8	22	41.6	22

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	39.3	99.7	1.0	37	36	40.5
Total		39.3	99.7	1.0	37	36	40.5

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	38	34.6	35	43.0	36	40.2	37
Total	38	34.6	35	43.0	36	40.2	37

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	58.2	110.0	0.5	16	20	40.2
United Avenue	31	5.5	50.4	0.5	38	39	4.9
Cliff Avenue	19	60.0	100.0	0.5	17	17	60.7
Total		123.7	260.4	1.5	21	22	105.8

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	20	39.0	20	39.6	10	132.6	20
United Avenue	36	5.9	39	5.9	38	5.3	36
Cliff Avenue	15	71.3	20	42.9	15	72.0	18
Total	21	116.2	24	88.4	16	209.8	23

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	57.8	111.5	1.0	32	33	58.5
United Avenue	31	4.6	52.4	0.5	32	34	3.7
Minnesota Avenue	18	33.5	84.4	0.5	23	25	29.6
Total		95.9	248.3	2.0	29	31	91.7

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	35	53.0	34	52.9	30	65.7	33
United Avenue	33	4.9	32	3.8	31	6.7	31
Minnesota Avenue	21	41.8	20	37.0	22	37.4	27
Total	29	99.6	28	93.7	28	109.9	30

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	259	814	169	338	144	104	126	149	84	91	93
Average Queue (ft)	98	367	43	161	33	32	48	68	25	17	29
95th Queue (ft)	220	651	106	302	90	77	104	128	68	56	69
Link Distance (ft)		2658		1853			2988	2988		4131	4131
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	200		150		275	125			175		
Storage Blk Time (%)	0	24	0	16		0	0				
Queuing Penalty (veh)	1	28	0	25		0	0				

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	97	224	163	341	271	97	214	202	147	102
Average Queue (ft)	33	79	51	155	71	36	99	94	53	26
95th Queue (ft)	74	163	123	268	159	75	182	171	121	66
Link Distance (ft)		3250		5224			2792		3646	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		150		250	225		175		150
Storage Blk Time (%)		1	0	14			0	1	0	0
Queuing Penalty (veh)		0	0	45			0	4	1	0

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	258	484	499	123	207	226	126	102	215	259	243	202
Average Queue (ft)	53	256	283	49	99	116	46	41	103	149	124	112
95th Queue (ft)	146	385	417	103	180	196	90	83	187	238	223	173
Link Distance (ft)		2591	2591		5183	5183			5212	5212		2742
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			200			275	250			250	
Storage Blk Time (%)		21			1	0			0			0
Queuing Penalty (veh)		13			1	0			0			1

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	222
Average Queue (ft)	122
95th Queue (ft)	192
Link Distance (ft)	2742
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	R	L	T
Maximum Queue (ft)	324	1640	1697	445	368	460	453	413	688	89	394	2089
Average Queue (ft)	173	806	893	414	245	212	206	250	150	17	133	1033
95th Queue (ft)	298	1762	1843	523	477	516	425	453	531	56	344	2150
Link Distance (ft)		5183	5183			2620	2620		5208			2794
Upstream Blk Time (%)												2
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	325			325	375			350		125	275	
Storage Blk Time (%)	1	1	2	55	19			14	4		0	35
Queuing Penalty (veh)	2	3	9	197	34			44	9		1	91

Intersection: 8: HWY 106 & Cliff Avenue

Movement	SB
Directions Served	R
Maximum Queue (ft)	345
Average Queue (ft)	96
95th Queue (ft)	296
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	225
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (ft)	287	277	284	1136	285	178	428	344
Average Queue (ft)	145	91	85	527	85	84	204	176
95th Queue (ft)	256	192	223	1019	252	151	341	317
Link Distance (ft)		5224		2385		4520		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	250		225		225			300
Storage Blk Time (%)	2	1		28	0		1	1
Queuing Penalty (veh)	6	1		64	0		5	3

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T	TR
Maximum Queue (ft)	255	170	20	35	222	54	4
Average Queue (ft)	93	61	1	6	102	2	0
95th Queue (ft)	221	132	11	24	178	38	3
Link Distance (ft)	2605	2717		1050		5212	5212
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150		150		
Storage Blk Time (%)					2		
Queuing Penalty (veh)					2		

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	170	395	46	133	35	220	68	214	404	181
Average Queue (ft)	49	185	9	40	8	95	16	42	218	26
95th Queue (ft)	136	352	34	92	29	189	50	125	361	112
Link Distance (ft)		2403				1505			5208	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150		100		150		150	125		125
Storage Blk Time (%)	0	32		2		1		0	9	
Queuing Penalty (veh)	0	17		0		1		0	15	

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	SB	SB
Directions Served	L	R	L	R
Maximum Queue (ft)	48	4	48	53
Average Queue (ft)	9	0	18	15
95th Queue (ft)	34	3	42	37
Link Distance (ft)			238	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	85	85		200
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	LT	R	L	L	R
Maximum Queue (ft)	45	49	77	87	62	34	2
Average Queue (ft)	14	11	27	33	17	9	0
95th Queue (ft)	40	33	59	64	46	30	1
Link Distance (ft)		858	837				
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	75			75	75	75	75
Storage Blk Time (%)	0	0	0	0	0		
Queuing Penalty (veh)	0	0	0	0	1		

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	35
Average Queue (ft)	8
95th Queue (ft)	31
Link Distance (ft)	279
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	44	54
Average Queue (ft)	3	18
95th Queue (ft)	22	48
Link Distance (ft)	2403	958
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 624

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.8	6.7	1.0	1.3	9.8
Delay / Veh (s)	15.2	25.0	20.3	20.5	22.6

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	2.0	5.7	2.7	1.2	11.7
Delay / Veh (s)	22.5	29.4	19.6	13.5	22.8

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.0	8.2	6.6	3.3	19.0
Delay / Veh (s)	18.0	22.6	27.4	25.3	24.2

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	4.3	7.6	13.4	1.6	26.8
Delay / Veh (s)	29.9	39.2	40.2	21.4	36.1

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	3.4	3.1	1.1	0.9	8.5
Delay / Veh (s)	27.7	28.0	16.3	10.1	21.8

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.7	0.2	0.5	1.5
Delay / Veh (s)	7.0	10.0	1.2	5.9	4.6

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.8	0.6	2.1	1.2	4.8
Delay / Veh (s)	31.1	25.5	7.3	9.6	10.2

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.1	0.4	0.5
Delay / Veh (s)	2.4	3.8	3.4

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.4	1.5	0.3	2.2
Delay / Veh (s)	4.6	6.7	12.0	6.5

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.2	0.1	0.8	0.3	1.4
Delay / Veh (s)	8.5	9.9	3.1	3.1	3.6

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.3	0.0	0.4
Delay / Veh (s)	4.2	2.5	0.5	1.9

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.1	0.1	0.2
Delay / Veh (s)	1.5	1.6	5.3	2.6

Total Network Performance

Total Delay (hr)	93.1
Delay / Veh (s)	59.1

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.6	0.0	0.1	5.7	0.9	0.1	0.8	0.1	1.0	0.2	0.1
Delay / Veh (s)	24.2	14.1	4.4	24.1	29.3	13.0	23.8	21.2	10.9	24.8	14.5	11.0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	9.8
Delay / Veh (s)	22.6

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.8	0.8	0.4	0.3	3.7	1.8	1.4	1.1	0.3	0.6	0.4	0.2
Delay / Veh (s)	26.0	26.2	14.5	34.2	45.1	17.0	24.0	18.3	11.8	20.4	12.8	6.6

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	11.7
Delay / Veh (s)	22.8

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.8	0.1	0.2	7.0	1.0	2.1	3.9	0.6	1.2	1.7	0.4
Delay / Veh (s)	36.4	17.8	9.3	21.7	24.0	16.0	28.9	27.7	22.0	29.4	24.1	21.2

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	19.0
Delay / Veh (s)	24.2

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.1	0.8	0.4	0.5	5.8	1.2	9.9	3.4	0.1	0.1	1.1	0.4
Delay / Veh (s)	63.8	27.4	6.7	25.6	40.9	40.3	64.7	19.3	12.2	22.3	26.3	14.4

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	26.8
Delay / Veh (s)	36.1

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.1	2.2	0.1	0.1	2.9	0.1	0.1	0.9	0.1	0.1	0.1	0.7
Delay / Veh (s)	32.8	26.0	19.0	23.7	30.9	8.2	20.0	16.9	11.8	14.7	12.8	9.3

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	8.5
Delay / Veh (s)	21.8

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.2	0.0	0.1	0.4	0.1
Delay / Veh (s)	6.7	9.6	2.6	13.2	15.6	9.2	2.0	1.2	0.2	7.7	5.6	5.3

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	1.5
Delay / Veh (s)	4.6

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.4	0.4	0.0	0.1	0.4	0.2	0.1	2.0	0.0	0.5	0.6	0.1
Delay / Veh (s)	33.0	31.3	8.2	35.0	39.9	14.1	10.3	7.3	5.3	23.2	7.0	5.1

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	4.8
Delay / Veh (s)	10.2

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.1	0.4	0.5
Delay / Veh (s)	2.4	3.8	3.4

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.2	0.2	1.3	0.2	0.1	0.2	2.2
Delay / Veh (s)	10.5	2.7	6.7	6.8	14.8	10.4	6.5

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.8	0.0	0.1	0.1	0.0
Delay / Veh (s)	12.4	15.9	4.7	15.3	34.0	6.8	4.2	3.1	3.2	7.7	1.9	2.2

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	1.4
Delay / Veh (s)	3.6

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.3	0.0	0.0	0.4
Delay / Veh (s)	4.8	1.9	2.7	2.5	0.5	0.2	1.9

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.1	0.1	0.0	0.2
Delay / Veh (s)	1.6	0.7	2.3	1.6	5.8	3.4	2.6

Total Network Performance

Total Delay (hr)	93.1
Delay / Veh (s)	59.1

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	14.1	67.4	0.5	27	28	12.4
High School Entrance	24	3.1	37.3	0.4	35	36	3.2
Cliff Avenue	2	26.3	88.3	0.6	26	27	23.3
Southeastern Avenue	15	24.2	111.4	1.0	33	32	26.0
Total		67.7	304.4	2.5	30	30	64.9

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	27	16.1	27	14.2	29	11.8	27
High School Entrance	35	3.0	35	3.0	35	3.3	36
Cliff Avenue	26	25.0	26	25.9	25	27.9	25
Southeastern Avenue	33	20.2	32	23.3	33	25.5	32
Total	30	64.3	30	66.3	30	68.5	29

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	30.9	85.7	0.5	19	19	31.2
Cliff Avenue	2	49.4	143.6	1.0	25	26	48.4
High School Entrance	24	7.6	58.8	0.6	39	39	7.6
Minnesota Avenue	1	29.4	62.4	0.4	22	24	24.4
Total		117.3	350.5	2.5	26	26	111.7

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	19	32.3	19	30.9	20	29.1	19
Cliff Avenue	25	50.7	26	45.5	25	49.6	25
High School Entrance	40	7.0	39	8.3	40	7.7	38
Minnesota Avenue	21	31.2	22	31.0	21	31.0	22
Total	25	121.3	26	115.7	25	117.3	25

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	21.2	67.3	0.6	31	30	23.8
Tom Sawyer Trail	29	3.4	57.0	0.8	50	51	3.7
272nd Street	18	1.2	17.3	0.2	44	43	1.2
HWY 106	5	27.7	100.2	1.0	36	36	28.0
Total		53.5	241.8	2.6	38	38	56.7

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	31	20.4	30	22.0	32	17.9	31
Tom Sawyer Trail	50	3.6	52	2.9	49	3.5	50
272nd Street	43	1.3	44	1.1	43	1.2	44
HWY 106	35	29.0	37	26.4	35	29.1	37
Total	38	54.3	39	52.4	38	51.6	39

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	24.1	66.7	0.5	29	28	24.9
272nd Street	18	6.3	83.7	1.0	43	42	7.0
Tom Sawyer Trail	29	0.5	17.1	0.2	44	44	0.5
HWY 110 (Willow St)	1	14.3	77.5	0.8	37	38	12.7
Total		45.1	244.9	2.5	37	37	45.1

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	29	24.1	28	24.8	29	23.5	29
272nd Street	43	6.2	43	6.4	43	5.9	44
Tom Sawyer Trail	44	0.4	44	0.7	44	0.4	45
HWY 110 (Willow St)	38	12.8	34	19.2	37	15.5	37
Total	38	43.5	36	51.0	37	45.3	38

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	18.3	73.7	0.5	26	27	16.7
Industrial Drive	25	2.7	49.3	0.7	52	52	2.4
272nd Street	19	7.4	33.2	0.3	33	32	8.2
HWY 106	8	18.9	104.9	1.0	34	34	19.5
Total		47.2	261.2	2.5	35	35	46.8

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	27	17.6	25	21.8	26	18.7	27
Industrial Drive	52	2.7	51	2.8	51	2.8	52
272nd Street	31	8.8	33	7.4	34	6.3	34
HWY 106	34	19.7	34	20.5	35	18.6	35
Total	35	48.8	34	52.4	35	46.4	36

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	26.3	69.7	0.5	28	28	25.5
272nd Street	19	11.0	97.2	1.0	37	38	11.3
Laura Street	25	1.9	28.6	0.3	38	38	2.2
HWY 110 (Willow St)	2	12.6	70.8	0.7	36	36	11.0
Total		51.8	266.3	2.5	34	35	49.9

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	28	26.1	26	29.7	28	25.3	28
272nd Street	38	11.4	36	10.4	37	10.6	37
Laura Street	37	1.8	38	1.9	38	1.7	38
HWY 110 (Willow St)	36	12.6	36	12.7	36	12.7	35
Total	35	52.0	34	54.7	35	50.3	34

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	17.8	58.4	0.5	31	30	19.7
Cliff Avenue	8	32.1	97.6	1.0	37	37	32.8
Total		49.9	156.0	1.5	35	35	52.6

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	34	12.0	31	18.2	29	20.7	31
Cliff Avenue	38	29.1	37	32.3	38	31.6	37
Total	36	41.1	34	50.4	34	52.2	34

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	40.9	81.5	0.5	22	22	42.6
Minnesota Avenue	5	19.9	90.9	1.0	40	40	19.7
Total		60.9	172.4	1.5	32	31	62.3

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	23	40.0	23	37.9	22	42.0	22
Minnesota Avenue	41	19.1	38	20.9	40	19.1	39
Total	32	59.1	32	58.8	32	61.1	31

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	16.9	120.6	0.9	26	27	13.5
Total		16.9	120.6	0.9	26	27	13.5

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	24	23.2	25	19.0	26	15.2	26
Total	24	23.2	25	19.0	26	15.2	26

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	12.8	72.0	1.0	50	51	13.6
Total		12.8	72.0	1.0	50	51	13.6

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	49	14.2	49	15.3	48	13.5	54
Total	49	14.2	49	15.3	48	13.5	54

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	9.6	60.5	0.5	30	29	10.7
United Avenue	31	2.4	45.1	0.5	42	37	2.9
Cliff Avenue	19	32.4	76.8	0.5	22	24	26.3
Total		44.5	182.4	1.5	30	30	39.8

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	30	7.5	29	9.1	27	12.0	33
United Avenue	49	1.7	45	2.4	47	2.4	45
Cliff Avenue	23	28.1	21	35.3	21	35.8	21
Total	31	37.3	29	46.8	29	50.3	31

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	39.9	91.8	1.0	39	40	37.3
United Avenue	31	2.3	37.3	0.5	45	42	2.5
Minnesota Avenue	18	16.4	64.6	0.5	30	31	18.7
Total		58.6	193.7	2.0	37	38	58.5

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	42	34.7	38	43.6	40	39.9	37
United Avenue	42	2.8	47	2.1	44	2.6	50
Minnesota Avenue	30	15.4	28	17.1	29	17.3	33
Total	38	53.0	36	62.8	37	59.9	38

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	62	152	120	799	350	66	88	109	154	49	72
Average Queue (ft)	25	60	13	341	90	15	31	49	63	7	21
95th Queue (ft)	57	125	63	638	269	47	67	90	127	29	54
Link Distance (ft)		2658		1853			2988	2988		4131	4131
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150		200	240			300		
Storage Blk Time (%)		0		22							
Queuing Penalty (veh)		0		61							

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	TR
Maximum Queue (ft)	171	256	113	416	287	145	334	124	61	96
Average Queue (ft)	65	98	21	174	81	89	108	47	14	37
95th Queue (ft)	124	185	68	311	170	152	232	98	42	78
Link Distance (ft)		3251		5212			2792		3652	3652
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		200		200	115		130		
Storage Blk Time (%)		1		6		4	5	0		
Queuing Penalty (veh)		1		23		13	10	0		

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	43	86	107	131	334	400	257	237	217	240	158	127
Average Queue (ft)	10	32	43	17	153	175	62	121	114	145	63	51
95th Queue (ft)	34	69	83	69	258	297	147	212	195	227	125	102
Link Distance (ft)		2591	2591		5183	5183			5212	5212		2742
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150			200	200			200	
Storage Blk Time (%)					5	4		1	0			0
Queuing Penalty (veh)					2	9		4	1			0

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	145
Average Queue (ft)	79
95th Queue (ft)	134
Link Distance (ft)	2742
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	TR	L	T
Maximum Queue (ft)	257	124	77	74	156	319	341	290	944	602	65	115
Average Queue (ft)	125	22	37	42	44	155	186	235	326	161	12	40
95th Queue (ft)	223	94	66	67	98	259	287	352	853	467	43	83
Link Distance (ft)		5183	5183			2621	2621		5208	5208		2794
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			200	200			200			200	
Storage Blk Time (%)	5						4	32				
Queuing Penalty (veh)	3						3	104				

Intersection: 8: HWY 106 & Cliff Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	165
Average Queue (ft)	74
95th Queue (ft)	132
Link Distance (ft)	2794
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (ft)	161	316	93	368	126	185	120	152
Average Queue (ft)	59	125	15	187	25	82	24	60
95th Queue (ft)	119	235	57	308	74	151	77	121
Link Distance (ft)		5212		2385		4520		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	150		150		150			150
Storage Blk Time (%)	0	5		12				0
Queuing Penalty (veh)	1	6		9				0

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	TR
Maximum Queue (ft)	43	172	21	7	4	57	13
Average Queue (ft)	16	68	2	0	0	18	1
95th Queue (ft)	43	123	12	5	3	47	6
Link Distance (ft)	2605	2717		1050	1050		5212
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150			150	
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	95	110	39	124	68	219	225	95	90	85
Average Queue (ft)	35	39	7	49	13	77	91	44	24	33
95th Queue (ft)	71	82	29	97	46	175	190	85	69	72
Link Distance (ft)		2404				1523	1523		5208	5208
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150		150		150			150		
Storage Blk Time (%)		0		0		1				
Queuing Penalty (veh)		0		0		0				

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	R	L	R
Maximum Queue (ft)	86	4	29	58	60
Average Queue (ft)	34	0	4	22	24
95th Queue (ft)	70	3	19	47	48
Link Distance (ft)		3251		238	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	85		85		200
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	92	54	32	13	72
Average Queue (ft)	39	21	4	0	26
95th Queue (ft)	71	48	20	5	59
Link Distance (ft)	859	837		3652	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			150		150
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	30	5
Average Queue (ft)	8	0
95th Queue (ft)	29	4
Link Distance (ft)	279	4131
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	12	86
Average Queue (ft)	0	37
95th Queue (ft)	6	65
Link Distance (ft)	2404	958
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 250

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	4.9	2.4	1.5	0.6	9.5
Delay / Veh (s)	26.8	20.3	16.4	12.3	21.3

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.5	5.5	1.5	4.0	12.5
Delay / Veh (s)	12.7	19.2	18.1	14.1	16.2

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	8.4	4.7	4.1	4.5	21.6
Delay / Veh (s)	31.4	23.6	25.4	20.3	25.5

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	12.9	4.0	4.0	9.5	30.4
Delay / Veh (s)	32.4	27.0	25.9	32.9	30.7

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	5.5	10.9	1.0	5.6	23.0
Delay / Veh (s)	39.2	44.4	27.9	29.3	37.6

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.9	0.5	0.3	2.4	5.1
Delay / Veh (s)	57.7	14.4	2.1	13.4	13.4

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	2.5	0.6	1.3	5.8	10.1
Delay / Veh (s)	24.9	22.3	7.4	15.2	14.9

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.4	0.4	0.7
Delay / Veh (s)	3.8	4.0	3.9

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.6	0.7	0.1	1.5
Delay / Veh (s)	4.3	4.9	9.0	4.8

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.1	0.6	0.5	1.1	2.2
Delay / Veh (s)	12.5	12.3	3.1	3.7	4.5

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	NB	SB	All
Total Delay (hr)	0.0	0.4	0.0	0.4
Delay / Veh (s)	4.3	3.1	0.5	2.4

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.6	0.1	0.0	0.7
Delay / Veh (s)	3.6	2.0	6.0	3.4

Total Network Performance

Total Delay (hr)	122.6
Delay / Veh (s)	62.0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.9	3.5	0.5	0.3	1.9	0.2	0.3	1.1	0.1	0.2	0.3	0.0
Delay / Veh (s)	25.4	28.1	21.8	24.8	24.8	5.6	20.8	16.2	10.7	18.9	11.0	6.0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	9.5
Delay / Veh (s)	21.3

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.3	1.0	0.2	0.6	3.9	1.0	0.4	0.9	0.2	2.3	1.2	0.5
Delay / Veh (s)	25.4	10.8	15.5	36.3	19.6	14.2	22.1	17.9	12.7	21.6	9.7	10.0

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	12.5
Delay / Veh (s)	16.2

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	7.0	0.8	0.8	3.5	0.4	0.4	2.6	1.1	1.7	2.6	0.2
Delay / Veh (s)	37.4	31.3	28.5	43.8	25.0	10.3	19.1	28.0	23.6	23.9	19.2	13.3

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	21.6
Delay / Veh (s)	25.5

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	2.1	6.7	4.2	0.7	2.9	0.4	2.2	1.5	0.3	1.3	7.2	1.0
Delay / Veh (s)	34.2	34.0	29.3	27.3	28.2	20.6	53.2	15.7	15.8	30.7	33.5	31.4

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	30.4
Delay / Veh (s)	30.7

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.5	1.9	0.1	1.5	8.6	0.9	0.3	0.5	0.2	1.0	2.4	2.3
Delay / Veh (s)	71.4	22.0	23.6	44.7	47.3	27.6	39.2	30.3	15.4	38.1	35.3	23.2

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	23.0
Delay / Veh (s)	37.6

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	1.3	0.1	0.1	0.1	0.3	0.0	0.3	0.0	2.1	0.3	0.0
Delay / Veh (s)	62.0	56.4	55.3	29.9	29.6	11.0	1.8	2.2	1.2	16.8	6.3	5.2

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	5.1
Delay / Veh (s)	13.4

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.4	1.9	0.2	0.1	0.3	0.1	0.0	1.1	0.2	0.3	5.1	0.3
Delay / Veh (s)	30.2	23.8	27.4	35.8	34.6	8.6	9.9	7.5	6.5	15.7	15.2	15.3

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	10.1
Delay / Veh (s)	14.9

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.4	0.4	0.7
Delay / Veh (s)	3.8	4.0	3.9

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.1	0.6	0.7	0.0	0.1	0.1	1.5
Delay / Veh (s)	7.8	4.1	4.9	4.5	9.5	8.5	4.8

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	0.0	0.0	0.2	0.0	0.3	0.1	0.4	0.0	0.0	1.0	0.0
Delay / Veh (s)	16.3	23.6	8.3	20.8	29.8	8.9	7.5	2.9	1.9	5.5	3.7	3.7

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	2.2
Delay / Veh (s)	4.5

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.4	0.0	0.0	0.4
Delay / Veh (s)	4.6	3.2	2.9	3.1	0.6	0.4	2.4

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.5	0.1	0.0	0.1	0.0	0.0	0.7
Delay / Veh (s)	3.6	3.4	4.4	1.8	6.8	3.9	3.4

Total Network Performance

Total Delay (hr)	122.6
Delay / Veh (s)	62.0

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	1	28.1	80.5	0.5	23
High School Entrance	24	4.6	38.7	0.4	34
Cliff Avenue	2	10.9	53.9	0.6	42
Southeastern Avenue	15	20.0	115.9	1.0	31
Total		63.6	288.9	2.5	31

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Southeastern Avenue	15	47.3	102.1	0.5	16
Cliff Avenue	2	22.6	94.1	1.0	38
High School Entrance	24	7.2	67.2	0.6	34
Minnesota Avenue	1	25.2	60.7	0.4	22
Total		102.2	324.1	2.5	27

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	1	16.2	62.2	0.6	33
Tom Sawyer Trail	29	4.3	67.6	0.8	42
272nd Street	18	2.2	19.0	0.2	40
HWY 106	5	28.1	102.7	1.0	35
Total		50.8	251.5	2.6	37

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 106	5	19.2	61.4	0.5	31
272nd Street	18	7.6	87.4	1.0	41
Tom Sawyer Trail	29	0.5	17.2	0.2	44
HWY 110 (Willow St)	1	11.0	69.5	0.8	41
Total		38.3	235.5	2.5	39

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	2	17.9	73.2	0.5	26
Industrial Drive	25	3.2	60.6	0.7	42
272nd Street	19	7.8	33.9	0.3	32
HWY 106	8	14.6	92.7	1.0	39
Total		43.4	260.3	2.5	35

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 106	8	33.5	76.7	0.5	25
272nd Street	19	17.4	101.1	1.0	36
Laura Street	25	3.8	30.5	0.3	36
HWY 110 (Willow St)	2	9.7	61.9	0.7	41
Total		64.4	270.1	2.5	34

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	5	31.3	71.3	0.5	25
Cliff Avenue	8	36.4	108.8	1.0	33
Total		67.7	180.0	1.5	30

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cliff Avenue	8	28.2	68.6	0.5	27
Minnesota Avenue	5	25.3	99.2	1.0	36
Total		53.5	167.8	1.5	32

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	15	30.3	132.2	0.9	24
Total		30.3	132.2	0.9	24

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
HWY 110 (Willow St)	15	35.3	95.6	1.0	38
Total		35.3	95.6	1.0	38

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Minnesota Avenue	18	56.4	108.5	0.5	17
United Avenue	31	5.7	50.4	0.5	38
Cliff Avenue	19	23.8	63.7	0.5	26
Total		86.0	222.6	1.5	24

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Cliff Avenue	19	34.6	86.6	1.0	42
United Avenue	31	4.1	52.1	0.5	32
Minnesota Avenue	18	27.2	77.8	0.5	25
Total		65.9	216.5	2.0	33

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	237	628	140	309	70	91	109	134	75	56	68
Average Queue (ft)	76	254	33	124	29	33	44	65	21	9	20
95th Queue (ft)	182	446	87	243	60	74	88	108	54	33	50
Link Distance (ft)		2658		1853			2988	2988		4131	4131
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150		150		200	240			300		
Storage Blk Time (%)	0	17		7							
Queuing Penalty (veh)	1	19		11							

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	TR
Maximum Queue (ft)	84	177	92	271	169	138	209	189	280	209
Average Queue (ft)	32	77	37	135	56	43	86	111	54	65
95th Queue (ft)	69	142	73	223	106	98	167	190	188	144
Link Distance (ft)		3251		5212			2792		3652	3652
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		200		200	115		130		
Storage Blk Time (%)		0		2		0	4	7	0	
Queuing Penalty (veh)		0		8		1	3	12	0	

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	239	328	363	106	199	198	99	86	214	260	210	177
Average Queue (ft)	53	187	215	51	84	97	38	39	89	135	98	79
95th Queue (ft)	137	290	327	96	152	163	72	77	174	224	169	140
Link Distance (ft)		2591	2591		5183	5183			5212	5212		2742
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	150			150			200	200			200	
Storage Blk Time (%)		13			1	0			0		1	0
Queuing Penalty (veh)		8			1	0			0		1	0

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	188
Average Queue (ft)	87
95th Queue (ft)	151
Link Distance (ft)	2742
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	TR	L	T
Maximum Queue (ft)	176	241	289	289	94	174	189	220	135	123	240	353
Average Queue (ft)	103	132	151	181	49	86	114	102	40	56	79	194
95th Queue (ft)	163	205	233	283	85	149	174	196	95	102	155	300
Link Distance (ft)		5183	5183			2621	2621		5208	5208		2794
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			200	200			200			200	
Storage Blk Time (%)	0	1	2	5		0		3				7
Queuing Penalty (veh)	1	2	11	18		0		4				10

Intersection: 8: HWY 106 & Cliff Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	382
Average Queue (ft)	225
95th Queue (ft)	342
Link Distance (ft)	2794
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (ft)	239	407	239	1102	240	154	547	240
Average Queue (ft)	132	111	103	503	92	66	182	141
95th Queue (ft)	238	265	237	959	245	134	367	250
Link Distance (ft)		5212		2385		4520		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	150		150		150			150
Storage Blk Time (%)	15	2	0	34			13	5
Queuing Penalty (veh)	36	5	0	79			48	17

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	T
Maximum Queue (ft)	259	124	16	41	217	63
Average Queue (ft)	90	50	1	6	102	2
95th Queue (ft)	205	94	10	25	181	41
Link Distance (ft)	2605	2717		1050		5212
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			150		150	
Storage Blk Time (%)					2	
Queuing Penalty (veh)					2	

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	85	216	48	127	30	125	140	74	204	224
Average Queue (ft)	34	117	12	44	6	49	67	29	111	136
95th Queue (ft)	73	195	40	89	26	101	121	61	189	220
Link Distance (ft)		2404				1523	1523		5208	5208
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150		150		150			150		
Storage Blk Time (%)		4		0		0			1	
Queuing Penalty (veh)		2		0		0			1	

Intersection: 20: 272nd Street & Southeastern Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	56	48	43
Average Queue (ft)	10	17	15
95th Queue (ft)	36	41	37
Link Distance (ft)		238	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	85		200
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	WB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	L	T	TR
Maximum Queue (ft)	49	126	52	41	14	9
Average Queue (ft)	26	57	13	8	0	0
95th Queue (ft)	53	104	40	30	10	4
Link Distance (ft)	859	837			1523	1523
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			150	150		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	8
95th Queue (ft)	30
Link Distance (ft)	279
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	45	57
Average Queue (ft)	3	18
95th Queue (ft)	21	48
Link Distance (ft)	2404	958
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 299

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.4	7.0	0.9	1.2	10.5
Delay / Veh (s)	22.5	26.4	18.9	24.0	24.7

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	3.3	7.2	3.4	1.8	15.6
Delay / Veh (s)	33.5	37.8	22.0	17.7	28.8

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.2	12.5	7.1	3.4	24.2
Delay / Veh (s)	19.4	35.2	29.0	25.6	30.5

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	4.5	8.3	14.0	2.0	28.8
Delay / Veh (s)	30.0	43.5	42.7	26.9	38.8

12: Future HS Entrance & Minnesota Avenue Performance by approach

Approach	WB	NB	SB	All
Total Delay (hr)	0.0	0.2	0.0	0.3
Delay / Veh (s)	4.1	1.8	0.8	1.5

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	3.8	3.7	1.3	0.9	9.7
Delay / Veh (s)	31.8	32.8	19.7	10.7	25.4

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.1	0.9	0.2	0.6	1.7
Delay / Veh (s)	8.5	11.7	1.4	5.7	5.1

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.2	0.9	5.6	2.1	9.8
Delay / Veh (s)	42.7	35.7	19.3	15.9	20.6

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.1	0.4	0.5
Delay / Veh (s)	2.9	4.1	3.7

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.5	1.6	0.3	2.4
Delay / Veh (s)	5.1	6.8	17.4	6.9

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.6	0.2	2.0	0.4	3.1
Delay / Veh (s)	15.9	22.3	7.1	4.7	7.6

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.1	0.0	0.2
Delay / Veh (s)	5.5	4.0	0.9	0.6	1.0

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.0	0.1	0.1	0.3
Delay / Veh (s)	1.8	1.9	5.5	2.9

Total Network Performance

Total Delay (hr)	114.3
Delay / Veh (s)	70.7

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	0.8	0.0	0.2	5.9	0.9	0.1	0.8	0.1	0.7	0.3	0.2
Delay / Veh (s)	46.3	17.6	10.2	27.1	30.4	13.9	25.6	19.2	11.3	29.4	20.2	16.3

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	10.5
Delay / Veh (s)	24.7

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.4	1.2	0.6	0.4	4.2	2.5	1.3	1.7	0.3	0.6	0.8	0.4
Delay / Veh (s)	43.0	35.5	21.1	47.1	53.1	25.1	21.5	23.6	17.2	21.0	22.5	10.3

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	15.6
Delay / Veh (s)	28.8

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.1	1.0	0.0	0.3	11.0	1.2	2.0	4.5	0.7	1.1	1.9	0.5
Delay / Veh (s)	35.6	20.1	6.8	32.1	38.5	19.9	27.3	30.3	25.6	27.0	25.5	23.7

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	24.2
Delay / Veh (s)	30.5

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	2.9	1.0	0.6	0.7	6.5	1.2	7.9	6.0	0.1	0.1	1.6	0.2
Delay / Veh (s)	60.8	32.7	8.4	31.9	45.3	43.1	51.9	35.1	21.1	37.1	38.8	8.4

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	28.8
Delay / Veh (s)	38.8

12: Future HS Entrance & Minnesota Avenue Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Total Delay (hr)	0.0	0.0	0.2	0.0	0.0	0.0	0.3
Delay / Veh (s)	6.8	4.0	1.8	1.2	2.4	0.5	1.5

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.2	2.6	0.1	0.1	3.5	0.1	0.1	1.0	0.2	0.1	0.1	0.6
Delay / Veh (s)	35.0	30.9	23.0	30.1	36.5	9.0	27.3	20.1	15.2	19.6	15.4	9.3

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	9.7
Delay / Veh (s)	25.4

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.7	0.0	0.2	0.0	0.1	0.4	0.1
Delay / Veh (s)	7.8	11.9	3.5	17.2	18.4	10.8	2.0	1.4	0.8	8.1	5.2	5.1

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	1.7
Delay / Veh (s)	5.1

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	0.6	0.0	0.1	0.5	0.3	0.2	5.4	0.0	1.0	0.9	0.1
Delay / Veh (s)	45.2	43.5	11.1	54.3	44.7	26.8	21.7	19.4	10.4	46.1	10.0	7.9

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	9.8
Delay / Veh (s)	20.6

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.1	0.4	0.5
Delay / Veh (s)	2.9	4.0	3.7

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.3	0.2	1.3	0.2	0.2	0.1	2.4
Delay / Veh (s)	11.5	2.9	6.7	7.0	23.2	11.3	6.9

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.5	0.0	0.1	0.1	0.0	0.1	0.2	1.7	0.1	0.2	0.2	0.0
Delay / Veh (s)	37.0	14.9	4.4	37.6	26.7	17.3	8.9	7.0	6.6	12.9	2.7	2.3

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	3.1
Delay / Veh (s)	7.6

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2
Delay / Veh (s)	5.9	3.7	4.5	6.2	3.9	0.6	0.9	1.4	3.1	0.5	0.5	1.0

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.0	0.0	0.0	0.1	0.1	0.0	0.3
Delay / Veh (s)	1.9	1.4	3.0	1.8	5.9	3.6	2.9

Total Network Performance

Total Delay (hr)	114.3
Delay / Veh (s)	70.7

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	17.6	69.6	0.5	27	26	20.8
High School Entrance	24	3.3	34.4	0.4	39	40	3.5
Cliff Avenue	2	36.1	97.4	0.6	23	24	34.0
Southeastern Avenue	15	36.0	125.9	1.0	29	29	33.8
Total		93.0	327.2	2.5	28	28	92.1

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	27	18.0	27	16.2	26	17.7	27
High School Entrance	40	2.8	39	3.1	38	3.9	37
Cliff Avenue	24	34.6	22	42.5	24	34.4	23
Southeastern Avenue	28	41.0	29	39.6	30	31.5	29
Total	28	96.4	27	101.5	28	87.6	28

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	36.5	91.2	0.5	18	18	38.6
Cliff Avenue	2	53.9	148.2	1.0	24	25	51.1
High School Entrance	24	7.6	58.9	0.6	39	40	7.6
Minnesota Avenue	1	30.4	63.5	0.4	21	21	31.4
Total		128.4	361.8	2.5	25	25	128.7

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	19	34.0	18	36.1	18	35.8	18
Cliff Avenue	24	51.1	24	57.7	24	61.2	26
High School Entrance	39	7.8	40	7.4	40	7.6	39
Minnesota Avenue	22	28.2	20	37.7	22	29.3	23
Total	25	121.1	24	139.0	24	133.9	25

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	19.2	65.3	0.6	32	30	22.4
Future HS Entrance	12	2.7	34.3	0.5	48	46	3.1
Future Street	29	0.9	28.3	0.3	44	44	0.9
272nd Street	18	1.4	17.7	0.2	43	43	1.4
HWY 106	5	30.1	104.0	1.0	35	34	30.0
Total		54.4	249.7	2.6	37	37	57.8

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	33	17.0	32	18.9	32	18.5	32
Future HS Entrance	47	2.7	48	2.8	49	2.6	47
Future Street	43	1.0	43	1.0	44	0.8	44
272nd Street	42	1.4	43	1.5	43	1.5	43
HWY 106	35	29.9	34	31.6	35	30.5	35
Total	37	52.0	37	55.7	38	53.9	37

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	25.5	67.9	0.5	28	28	26.7
272nd Street	18	5.9	82.0	1.0	44	44	5.9
Tom Sawyer Trail	29	0.5	17.1	0.2	44	44	0.5
Future HS Entrance	12	0.5	28.1	0.3	44	43	0.7
HWY 110 (Willow St)	1	20.2	56.2	0.5	29	30	18.4
Total		52.5	251.3	2.5	36	36	52.2

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	28	25.9	28	25.6	29	24.8	29
272nd Street	44	5.5	45	5.1	44	5.9	42
Tom Sawyer Trail	44	0.5	44	0.4	45	0.5	44
Future HS Entrance	44	0.5	44	0.5	44	0.3	45
HWY 110 (Willow St)	28	20.2	30	18.7	30	19.8	27
Total	36	52.6	37	50.3	37	51.4	35

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	23.6	79.1	0.5	25	25	23.6
Industrial Drive	25	8.1	56.2	0.7	47	47	8.2
272nd Street	19	19.6	45.7	0.3	25	25	18.2
HWY 106	8	34.8	121.5	1.0	30	32	27.1
Total		86.0	302.5	2.5	31	32	77.1

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	24	23.5	25	22.1	24	24.6	25
Industrial Drive	47	7.4	47	7.9	46	8.8	48
272nd Street	25	19.2	25	18.7	25	19.9	25
HWY 106	31	29.8	27	49.6	31	31.7	30
Total	31	80.0	30	98.3	31	85.0	31

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	38.8	81.9	0.5	24	23	39.6
272nd Street	19	10.7	98.6	1.0	37	37	10.4
Laura Street	25	2.7	29.0	0.3	37	37	3.3
HWY 110 (Willow St)	2	23.4	82.2	0.7	31	32	21.3
Total		75.6	291.7	2.5	32	32	74.6

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	24	38.5	22	43.9	26	32.9	24
272nd Street	36	10.8	36	11.1	37	11.3	37
Laura Street	36	2.7	38	2.6	37	2.6	38
HWY 110 (Willow St)	31	23.6	30	24.2	32	22.7	30
Total	31	75.5	31	81.8	33	69.5	31

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	20.1	60.4	0.5	30	30	19.4
Cliff Avenue	8	39.9	103.8	1.0	35	35	39.3
Total		60.1	164.1	1.5	33	33	58.7

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	29	20.9	29	21.0	30	20.1	31
Cliff Avenue	35	41.7	33	39.8	35	39.9	36
Total	33	62.6	32	60.8	33	60.0	34

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	45.3	85.9	0.5	21	21	45.8
Minnesota Avenue	5	40.4	111.9	1.0	32	33	39.3
Total		85.7	197.8	1.5	27	28	85.1

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	22	41.4	21	46.0	23	39.3	19
Minnesota Avenue	33	38.8	33	39.6	32	40.1	31
Total	28	80.2	27	85.5	28	79.5	26

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	20.1	123.5	0.9	25	25	21.8
Total		20.1	123.5	0.9	25	25	21.8

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	25	18.5	25	19.5	25	21.3	25
Total	25	18.5	25	19.5	25	21.3	25

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	15.4	74.1	1.0	49	52	11.5
Total		15.4	74.1	1.0	49	52	11.5

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	47	18.9	45	20.2	48	13.7	53
Total	47	18.9	45	20.2	48	13.7	53

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	11.9	63.1	0.5	29	28	14.4
United Avenue	31	3.6	53.8	0.5	36	35	3.8
Cliff Avenue	19	43.8	88.8	0.5	19	19	38.3
Total		59.3	205.7	1.5	26	26	56.5

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	29	11.7	29	9.9	29	11.9	28
United Avenue	38	3.4	36	4.0	32	3.4	38
Cliff Avenue	18	50.4	18	46.2	19	45.6	20
Total	26	65.6	26	60.2	26	61.0	27

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	44.7	97.0	1.0	37	36	46.0
United Avenue	31	2.5	39.3	0.5	43	41	2.3
Minnesota Avenue	18	18.7	66.6	0.5	29	29	17.2
Total		65.9	202.9	2.0	36	35	65.5

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	38	43.0	37	43.7	38	42.7	37
United Avenue	43	2.6	43	2.9	44	2.6	46
Minnesota Avenue	32	14.2	26	21.9	30	21.9	31
Total	37	59.8	34	68.4	37	67.2	37

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	91	172	111	803	335	47	78	106	134	43	76
Average Queue (ft)	35	73	13	355	110	10	28	47	50	7	25
95th Queue (ft)	77	141	65	682	315	36	65	90	105	27	58
Link Distance (ft)		2658		1853			2988	2988		2312	2312
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	200		150		275	125			175		
Storage Blk Time (%)		0		23	0		0		0		
Queuing Penalty (veh)		0		59	0		0		0		

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	209	287	123	539	309	201	273	136	168	98
Average Queue (ft)	75	105	29	195	134	95	131	48	52	33
95th Queue (ft)	154	217	89	375	251	175	235	99	122	74
Link Distance (ft)		3250		5224			2792		3646	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		150		250	225		175		150
Storage Blk Time (%)	0	2		19	0	0	1	0	0	
Queuing Penalty (veh)	1	2		79	1	0	3	0	1	

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	35	95	100	81	405	436	393	268	285	302	155	130
Average Queue (ft)	10	43	50	24	255	276	88	119	134	162	64	58
95th Queue (ft)	31	84	90	60	376	398	234	223	242	272	121	111
Link Distance (ft)		2591	2591		5183	5183			5212	5212		2742
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			200			275	250			250	
Storage Blk Time (%)					15	9		0	0			
Queuing Penalty (veh)					5	20		1	1			

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	175
Average Queue (ft)	83
95th Queue (ft)	144
Link Distance (ft)	2742
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	R	L	T
Maximum Queue (ft)	238	62	84	108	116	272	284	430	845	59	51	195
Average Queue (ft)	123	19	34	45	42	164	190	261	297	6	13	89
95th Queue (ft)	218	50	70	86	92	250	280	459	843	37	39	164
Link Distance (ft)		5183	5183			2620	2620		5208			2794
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	325			325	375			350		125	275	
Storage Blk Time (%)	0							6	16			0
Queuing Penalty (veh)	0							40	93			0

Intersection: 8: HWY 106 & Cliff Avenue

Movement	SB
Directions Served	R
Maximum Queue (ft)	70
Average Queue (ft)	35
95th Queue (ft)	61
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	225
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: Future HS Entrance & Minnesota Avenue

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	50	46
Average Queue (ft)	19	9
95th Queue (ft)	46	33
Link Distance (ft)	1248	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		75
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (ft)	190	292	61	408	200	269	82	167
Average Queue (ft)	68	144	13	211	32	95	23	60
95th Queue (ft)	132	254	44	351	115	195	60	125
Link Distance (ft)		5224		2385		4520		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	250		225		225			300
Storage Blk Time (%)		1		8				
Queuing Penalty (veh)		1		6				

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	52	158	26	68	18
Average Queue (ft)	22	75	2	20	1
95th Queue (ft)	49	128	14	52	7
Link Distance (ft)	2605	2717			5212
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			150	150	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	102	97	38	124	162	618	84	139	140	31
Average Queue (ft)	37	32	5	48	15	254	7	59	45	7
95th Queue (ft)	83	76	24	98	73	521	47	121	113	26
Link Distance (ft)		2403				1505			5208	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150		100		150		150	125		125
Storage Blk Time (%)	0			1		11		2	1	
Queuing Penalty (veh)	0			0		5		7	1	

Intersection: 20: 272nd Street & Southeastern Avenue

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	R	L	R
Maximum Queue (ft)	90	4	34	75	58
Average Queue (ft)	36	0	4	24	17
95th Queue (ft)	72	3	20	56	43
Link Distance (ft)		3250		238	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	85		85		200
Storage Blk Time (%)	0				
Queuing Penalty (veh)	1				

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB
Directions Served	L	TR	LT	R	L	T	R	L
Maximum Queue (ft)	83	65	28	41	66	6	14	78
Average Queue (ft)	30	27	6	11	14	0	1	28
95th Queue (ft)	65	51	23	31	43	4	9	62
Link Distance (ft)		858	837			3646		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	75			75	75		75	75
Storage Blk Time (%)	1	0			0			0
Queuing Penalty (veh)	1	0			0			1

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LR	LTR	LT	L
Maximum Queue (ft)	39	45	5	40
Average Queue (ft)	9	13	0	5
95th Queue (ft)	33	35	3	22
Link Distance (ft)	279	2045	1758	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				75
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 31: 272nd Street & United Avenue

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	25	76
Average Queue (ft)	1	38
95th Queue (ft)	10	61
Link Distance (ft)	2403	958
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 330

1: HWY 110 (Willow St) & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	7.2	3.4	2.0	0.6	13.1
Delay / Veh (s)	38.6	28.6	21.0	12.3	29.4

2: HWY 110 (Willow St) & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.9	6.8	1.4	4.0	14.1
Delay / Veh (s)	15.7	23.8	18.2	14.6	18.6

5: HWY 106 & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	10.5	7.2	4.5	5.6	27.8
Delay / Veh (s)	39.4	37.8	28.0	24.9	33.0

8: HWY 106 & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	50.5	19.4	16.1	20.0	106.0
Delay / Veh (s)	127.8	139.6	109.0	70.1	109.6

12: Future HS Entrance & Minnesota Avenue Performance by approach

Approach	WB	NB	SB	All
Total Delay (hr)	0.0	0.3	0.0	0.4
Delay / Veh (s)	3.7	2.4	0.7	1.9

15: HWY 110 (Willow St) & Southeastern Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	5.0	13.5	1.5	6.5	26.5
Delay / Veh (s)	38.3	54.4	42.1	34.1	43.8

18: 272nd Street & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	1.5	0.8	0.3	2.4	5.0
Delay / Veh (s)	42.2	24.4	2.2	13.2	13.0

19: 272nd Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	4.3	1.1	1.5	9.1	16.0
Delay / Veh (s)	45.0	38.8	9.1	25.4	24.6

20: 272nd Street & Southeastern Avenue Performance by approach

Approach	EB	NB	All
Total Delay (hr)	0.4	0.4	0.8
Delay / Veh (s)	3.9	4.4	4.2

24: HWY 110 (Willow St) & High School Entrance Performance by approach

Approach	EB	WB	SB	All
Total Delay (hr)	0.6	0.7	0.1	1.4
Delay / Veh (s)	4.3	5.0	9.2	4.8

25: Laura Street & Cliff Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.4	0.8	0.8	1.4	3.4
Delay / Veh (s)	24.7	17.7	5.8	4.9	7.0

29: Tom Sawyer Trail & Minnesota Avenue Performance by approach

Approach	EB	WB	NB	SB	All
Total Delay (hr)	0.0	0.0	0.1	0.0	0.2
Delay / Veh (s)	4.8	4.6	0.9	0.7	0.9

31: 272nd Street & United Avenue Performance by approach

Approach	EB	WB	NB	All
Total Delay (hr)	0.6	0.1	0.1	0.7
Delay / Veh (s)	3.5	2.0	7.0	3.4

Total Network Performance

Total Delay (hr)	220.9
Delay / Veh (s)	111.8

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	1.3	5.1	0.8	0.6	2.7	0.2	0.4	1.4	0.2	0.1	0.4	0.0
Delay / Veh (s)	38.0	39.8	33.6	44.1	32.8	6.5	24.6	21.6	14.5	18.1	12.3	6.0

1: HWY 110 (Willow St) & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	13.1
Delay / Veh (s)	29.4

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.6	1.1	0.2	0.9	4.7	1.2	0.3	1.0	0.1	2.0	1.5	0.6
Delay / Veh (s)	40.2	11.6	17.2	60.0	23.6	16.5	15.1	20.4	12.7	20.4	11.8	10.4

2: HWY 110 (Willow St) & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	14.1
Delay / Veh (s)	18.6

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.7	8.8	1.0	1.2	5.4	0.5	0.5	2.8	1.3	2.3	3.1	0.3
Delay / Veh (s)	41.6	39.9	34.6	67.6	40.4	13.9	19.9	31.2	26.1	30.5	22.6	17.8

5: HWY 106 & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	27.8
Delay / Veh (s)	33.0

8: HWY 106 & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	6.0	13.6	30.9	13.4	5.2	0.8	10.4	4.7	1.0	2.7	15.7	1.5
Delay / Veh (s)	98.3	69.6	224.3	618.3	52.9	43.1	251.7	51.7	63.3	69.9	73.6	46.9

8: HWY 106 & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	106.0
Delay / Veh (s)	109.6

12: Future HS Entrance & Minnesota Avenue Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Total Delay (hr)	0.0	0.0	0.3	0.0	0.0	0.0	0.4
Delay / Veh (s)	2.3	3.8	2.4	2.6	2.3	0.6	1.9

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	3.1	1.8	0.1	1.9	10.5	1.1	0.4	0.8	0.3	1.0	2.9	2.7
Delay / Veh (s)	64.0	23.3	25.0	56.7	57.8	33.0	55.6	43.7	29.3	42.1	41.6	27.0

15: HWY 110 (Willow St) & Southeastern Avenue Performance by movement

Movement	All
Total Delay (hr)	26.5
Delay / Veh (s)	43.8

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.4	1.1	0.0	0.1	0.1	0.6	0.0	0.3	0.0	2.0	0.4	0.0
Delay / Veh (s)	42.4	44.7	19.2	54.5	38.2	20.6	1.6	2.3	1.4	16.4	7.1	5.1

18: 272nd Street & Minnesota Avenue Performance by movement

Movement	All
Total Delay (hr)	5.0
Delay / Veh (s)	13.0

19: 272nd Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.8	3.2	0.4	0.2	0.6	0.3	0.1	1.3	0.1	0.6	8.0	0.4
Delay / Veh (s)	55.6	42.6	51.1	50.9	52.3	22.7	46.3	9.1	5.1	34.8	25.2	20.9

19: 272nd Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	16.0
Delay / Veh (s)	24.6

20: 272nd Street & Southeastern Avenue Performance by movement

Movement	EBT	NBT	All
Total Delay (hr)	0.4	0.4	0.8
Delay / Veh (s)	3.9	4.4	4.2

24: HWY 110 (Willow St) & High School Entrance Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Delay (hr)	0.0	0.6	0.7	0.0	0.1	0.0	1.4
Delay / Veh (s)	7.6	4.2	5.0	4.7	9.5	8.6	4.8

25: Laura Street & Cliff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay (hr)	0.2	0.0	0.1	0.4	0.0	0.4	0.2	0.7	0.0	0.1	1.3	0.0
Delay / Veh (s)	40.6	39.1	14.5	34.6	34.9	11.4	14.5	5.0	4.2	8.1	4.8	4.0

25: Laura Street & Cliff Avenue Performance by movement

Movement	All
Total Delay (hr)	3.4
Delay / Veh (s)	7.0

29: Tom Sawyer Trail & Minnesota Avenue Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2
Delay / Veh (s)	5.3	2.3	7.2	3.8	1.4	0.9	0.9	2.3	0.6	0.7	0.9

31: 272nd Street & United Avenue Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Total Delay (hr)	0.5	0.1	0.0	0.1	0.1	0.0	0.7
Delay / Veh (s)	3.5	3.3	4.8	1.7	7.6	5.4	3.4

Total Network Performance

Total Delay (hr)	220.9
Delay / Veh (s)	111.8

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	1	39.8	92.2	0.5	20	20	39.7
High School Entrance	24	4.8	38.9	0.4	34	35	4.4
Cliff Avenue	2	11.7	54.4	0.6	42	44	9.5
Southeastern Avenue	15	17.8	116.8	1.0	31	31	13.3
Total		74.1	302.2	2.5	30	30	66.9

Arterial Level of Service: EB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	20	38.3	20	40.1	20	40.3	20
High School Entrance	33	5.1	34	5.0	34	4.8	34
Cliff Avenue	41	12.3	39	13.5	43	10.8	41
Southeastern Avenue	28	25.5	31	20.1	31	20.2	34
Total	29	81.2	30	78.7	30	76.2	31

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Southeastern Avenue	15	57.8	112.6	0.5	15	15	59.2
Cliff Avenue	2	22.8	93.0	1.0	39	40	20.5
High School Entrance	24	7.6	68.5	0.6	33	34	7.6
Minnesota Avenue	1	33.1	68.7	0.4	19	20	31.4
Total		121.3	342.8	2.5	26	26	118.7

Arterial Level of Service: WB HWY 110 (Willow St)

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Southeastern Avenue	12	88.5	17	42.5	17	43.6	15
Cliff Avenue	38	24.1	39	22.5	38	24.8	40
High School Entrance	34	7.4	33	7.3	33	7.7	33
Minnesota Avenue	20	31.3	19	34.6	20	31.4	18
Total	24	151.3	27	106.9	27	107.6	26

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	1	21.6	67.7	0.6	31	29	24.7
Future HS Entrance	12	3.5	39.7	0.5	41	40	3.8
Future Street	29	0.9	28.4	0.3	44	43	0.8
272nd Street	18	2.3	19.1	0.2	40	40	2.2
HWY 106	5	30.5	105.7	1.0	34	34	31.5
Total		58.8	260.4	2.6	36	35	63.0

Arterial Level of Service: NB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	29	25.6	32	19.3	31	20.9	33
Future HS Entrance	40	3.9	42	3.3	41	3.4	42
Future Street	43	0.9	43	1.0	44	0.8	44
272nd Street	40	2.3	39	2.5	40	2.4	40
HWY 106	35	29.3	35	27.1	34	31.6	33
Total	35	61.9	36	53.2	36	59.1	36

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	5	22.6	65.0	0.5	30	29	24.0
272nd Street	18	8.7	89.9	1.0	40	39	9.6
Tom Sawyer Trail	29	0.6	17.2	0.2	44	44	0.7
Future HS Entrance	12	0.6	28.1	0.3	44	44	0.7
HWY 110 (Willow St)	1	12.3	45.4	0.5	36	36	13.3
Total		44.9	245.6	2.5	37	37	48.3

Arterial Level of Service: SB Minnesota Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	30	22.3	30	22.9	31	20.9	30
272nd Street	40	7.7	40	9.7	40	8.4	40
Tom Sawyer Trail	44	0.6	44	0.6	44	0.6	45
Future HS Entrance	43	0.7	44	0.6	44	0.7	45
HWY 110 (Willow St)	35	12.4	36	11.9	34	14.0	38
Total	37	43.7	37	45.6	37	44.6	38

Arterial Level of Service: NB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	2	20.4	75.8	0.5	26	26	19.5
Industrial Drive	25	6.2	63.7	0.7	40	40	6.4
272nd Street	19	9.8	36.1	0.3	30	31	9.2
HWY 106	8	50.8	127.2	1.0	28	41	12.8
Total		87.3	302.7	2.5	30	35	47.9

Arterial Level of Service: NB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	26	18.5	25	21.1	25	21.8	25
Industrial Drive	42	6.1	40	5.9	39	6.3	39
272nd Street	30	9.9	30	10.2	30	9.4	29
HWY 106	15	158.3	39	14.0	41	14.0	26
Total	23	192.8	34	51.2	34	51.5	29

Arterial Level of Service: SB Cliff Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 106	8	73.6	116.8	0.5	17	17	71.8
272nd Street	19	29.4	113.6	1.0	32	32	27.5
Laura Street	25	5.0	31.7	0.3	34	34	4.9
HWY 110 (Willow St)	2	11.7	64.5	0.7	39	38	12.7
Total		119.7	326.5	2.5	28	29	116.9

Arterial Level of Service: SB Cliff Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 106	15	91.7	17	74.4	18	67.0	19
272nd Street	31	31.1	32	28.2	32	28.0	31
Laura Street	34	5.3	34	4.9	34	4.9	34
HWY 110 (Willow St)	40	11.5	40	11.0	38	12.6	40
Total	27	139.5	28	118.5	29	112.6	29

Arterial Level of Service: EB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	5	39.9	79.8	0.5	23	23	40.0
Cliff Avenue	8	73.3	145.7	1.0	25	25	72.5
Total		113.2	225.5	1.5	24	24	112.6

Arterial Level of Service: EB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	23	37.3	23	39.7	23	39.4	22
Cliff Avenue	26	65.7	22	90.7	26	63.9	25
Total	25	103.1	22	130.4	25	103.3	24

Arterial Level of Service: WB HWY 106

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	8	52.9	93.6	0.5	19	18	58.2
Minnesota Avenue	5	49.7	123.3	1.0	29	29	52.3
Total		102.6	216.8	1.5	25	24	110.5

Arterial Level of Service: WB HWY 106

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	21	46.9	20	50.3	19	58.1	20
Minnesota Avenue	29	50.1	28	53.7	30	48.2	31
Total	26	97.0	25	104.0	25	106.3	26

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	43.7	148.4	0.9	21	22	39.9
Total		43.7	148.4	0.9	21	22	39.9

Arterial Level of Service: NB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	19	57.6	21	41.6	21	40.1	21
Total	19	57.6	21	41.6	21	40.1	21

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
HWY 110 (Willow St)	15	41.6	102.4	1.0	36	36	38.8
Total		41.6	102.4	1.0	36	36	38.8

Arterial Level of Service: SB Southeastern Avenue

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
HWY 110 (Willow St)	37	39.4	38	35.6	31	57.8	39
Total	37	39.4	38	35.6	31	57.8	39

Arterial Level of Service: EB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Minnesota Avenue	18	44.7	96.7	0.5	19	22	33.3
United Avenue	31	5.4	50.3	0.5	38	37	6.1
Cliff Avenue	19	42.5	83.4	0.5	20	21	40.0
Total		92.7	230.4	1.5	23	25	79.4

Arterial Level of Service: EB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Minnesota Avenue	18	49.4	18	49.8	17	51.7	20
United Avenue	38	5.4	39	5.3	38	5.0	39
Cliff Avenue	20	45.0	19	46.9	22	37.1	20
Total	23	99.8	23	102.0	23	93.9	24

Arterial Level of Service: WB 272nd Street

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Cliff Avenue	19	52.3	103.8	1.0	35	35	53.1
United Avenue	31	3.9	50.4	0.5	33	33	3.6
Minnesota Avenue	18	34.7	87.5	0.5	22	23	34.3
Total		90.9	241.6	2.0	30	30	91.1

Arterial Level of Service: WB 272nd Street

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Cliff Avenue	36	51.5	33	55.4	35	52.1	34
United Avenue	33	3.7	33	3.8	33	4.4	33
Minnesota Avenue	23	30.4	23	31.2	24	31.2	21
Total	31	85.5	30	90.4	31	87.6	29

Intersection: 1: HWY 110 (Willow St) & Minnesota Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	259	698	195	366	180	103	133	149	54	53	70
Average Queue (ft)	95	358	47	162	34	31	47	73	13	11	21
95th Queue (ft)	211	599	122	304	99	76	105	132	38	37	53
Link Distance (ft)		2658		1853			2988	2988		2312	2312
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	200		150		275	125			175		
Storage Blk Time (%)		20	0	13		0	0				
Queuing Penalty (veh)		24	0	19		0	0				

Intersection: 2: HWY 110 (Willow St) & Cliff Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	114	162	209	332	199	91	230	199	149	84
Average Queue (ft)	36	75	50	159	70	34	91	93	55	26
95th Queue (ft)	83	143	117	277	150	73	184	163	126	61
Link Distance (ft)		3250		5224			2792		3646	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		150		250	225		175		150
Storage Blk Time (%)		0	0	14		0	0	0		
Queuing Penalty (veh)		0	0	45		0	3	1		

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (ft)	189	384	432	132	225	235	103	100	211	263	293	217
Average Queue (ft)	46	251	277	51	97	112	39	43	104	151	138	114
95th Queue (ft)	120	356	390	110	187	200	78	82	182	230	239	183
Link Distance (ft)		2591	2591		5183	5183			5212	5212		2742
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	175			200			275	250			250	
Storage Blk Time (%)		20			1	0			0		1	0
Queuing Penalty (veh)		12			1	0			0		2	0

Intersection: 5: HWY 106 & Minnesota Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	221
Average Queue (ft)	118
95th Queue (ft)	189
Link Distance (ft)	2742
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: HWY 106 & Cliff Avenue

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	R	L	T
Maximum Queue (ft)	350	1768	1797	445	448	605	520	375	1050	86	394	1519
Average Queue (ft)	187	898	973	422	298	246	209	244	342	14	113	824
95th Queue (ft)	358	1989	2043	514	543	648	493	458	1425	50	292	1473
Link Distance (ft)		5183	5183			2620	2620		5208			2794
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	325			325	375			350		125	275	
Storage Blk Time (%)	7	1	1	58	31			20	2		0	35
Queuing Penalty (veh)	26	1	4	207	56			62	4		1	91

Intersection: 8: HWY 106 & Cliff Avenue

Movement	SB
Directions Served	R
Maximum Queue (ft)	345
Average Queue (ft)	91
95th Queue (ft)	292
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	225
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: Future HS Entrance & Minnesota Avenue

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	36	36
Average Queue (ft)	11	5
95th Queue (ft)	35	23
Link Distance (ft)	1248	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		75
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 15: HWY 110 (Willow St) & Southeastern Avenue

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (ft)	290	286	284	1237	285	213	492	355
Average Queue (ft)	125	96	85	634	92	96	213	172
95th Queue (ft)	240	220	211	1220	263	182	396	313
Link Distance (ft)		5224		2385		4520		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	250		225		225			300
Storage Blk Time (%)	1	1	0	31			3	0
Queuing Penalty (veh)	2	2	2	72			9	1

Intersection: 18: 272nd Street & Minnesota Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	194	206	16	44	214	4
Average Queue (ft)	79	63	1	7	94	0
95th Queue (ft)	151	155	9	30	174	3
Link Distance (ft)	2605	2717		1052		5212
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			150		150	
Storage Blk Time (%)					2	
Queuing Penalty (veh)					2	

Intersection: 19: 272nd Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R
Maximum Queue (ft)	184	328	58	169	86	299	58	209	583	245
Average Queue (ft)	42	146	13	47	12	122	20	42	305	42
95th Queue (ft)	115	272	41	110	52	239	49	113	523	170
Link Distance (ft)		2403				1505			5208	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150		100		150		150	125		125
Storage Blk Time (%)	0	16	0	2		2			14	
Queuing Penalty (veh)	0	9	0	0		2			22	

Intersection: 20: 272nd Street & Southeastern Avenue

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 24: HWY 110 (Willow St) & High School Entrance

Movement	EB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	35	48	35
Average Queue (ft)	5	18	10
95th Queue (ft)	23	42	29
Link Distance (ft)		238	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	85		200
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: Laura Street & Cliff Avenue

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	LT	R	L	L	R
Maximum Queue (ft)	47	56	77	74	64	46	5
Average Queue (ft)	16	20	26	32	22	9	0
95th Queue (ft)	42	45	59	61	53	32	3
Link Distance (ft)		858	837				
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	75			75	75	75	75
Storage Blk Time (%)		0	1	0	0	0	
Queuing Penalty (veh)		0	1	0	1	0	

Intersection: 29: Tom Sawyer Trail & Minnesota Avenue

Movement	EB	WB	NB	SB
Directions Served	LR	LR	LT	L
Maximum Queue (ft)	31	22	10	26
Average Queue (ft)	9	6	0	2
95th Queue (ft)	32	21	6	13
Link Distance (ft)	279	2045	1758	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				75
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 31: 272nd Street & United Avenue

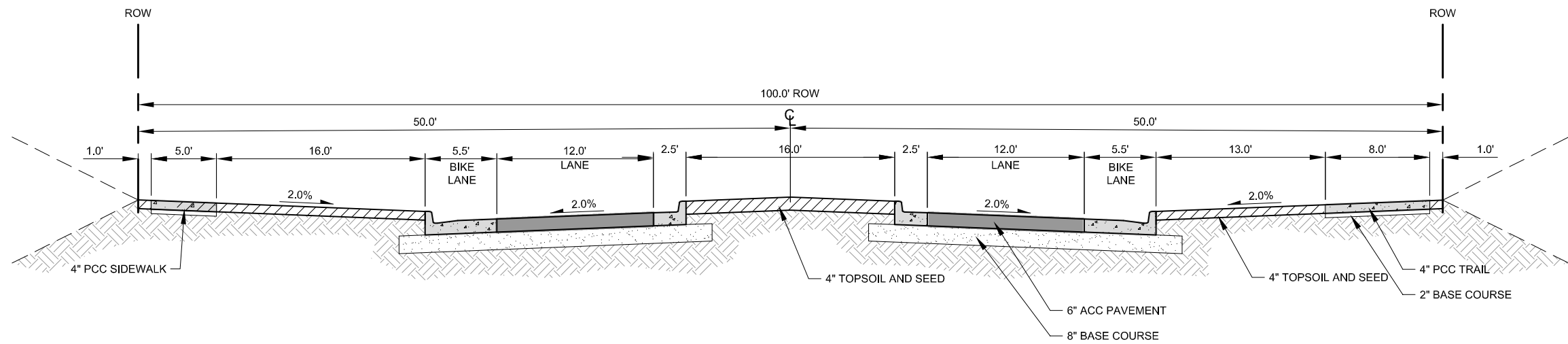
Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	4	34	66
Average Queue (ft)	0	3	22
95th Queue (ft)	3	21	50
Link Distance (ft)	2717	2403	958
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

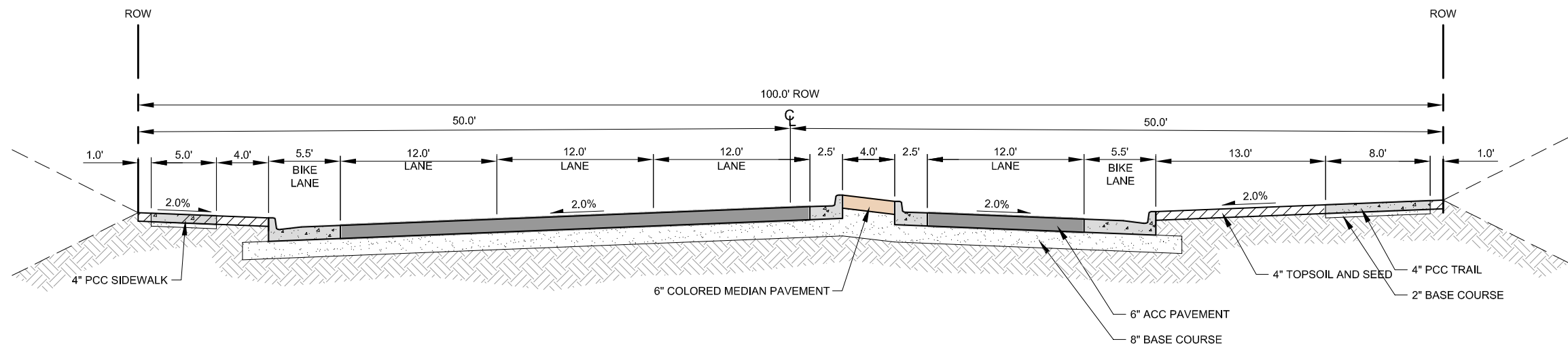
Network wide Queuing Penalty: 684

**Appendix E – Future Roadway Improvements Plan Sheets, Cost Estimates,
and Preliminary Assessment Schedules**

Page	
1	Typical Sections
2	Overview Map of Cliff Avenue Roadway Layout
3-10	Cliff Avenue from Willow Street to 272 nd Street Plan Sheets
11	Overview Map of Willow Street Roadway Layout
12-18	Willow Street from Minnesota Avenue to Willow Street Plan Sheets
19-25	Cost Estimates and Preliminary Assessment Schedules



TYPICAL SECTION - CLIFF AVENUE AND WILLOW STREET



TYPICAL TURN LANE SECTION - CLIFF AVENUE AND WILLOW STREET

DRAWN BY: HRC BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606680
 PLOT DATE: 2/20/2011 6:40 PM
 CAD FILE: O:\50100008\CAD\TYPICAL-SECTIONS-Bikelanes.dwg

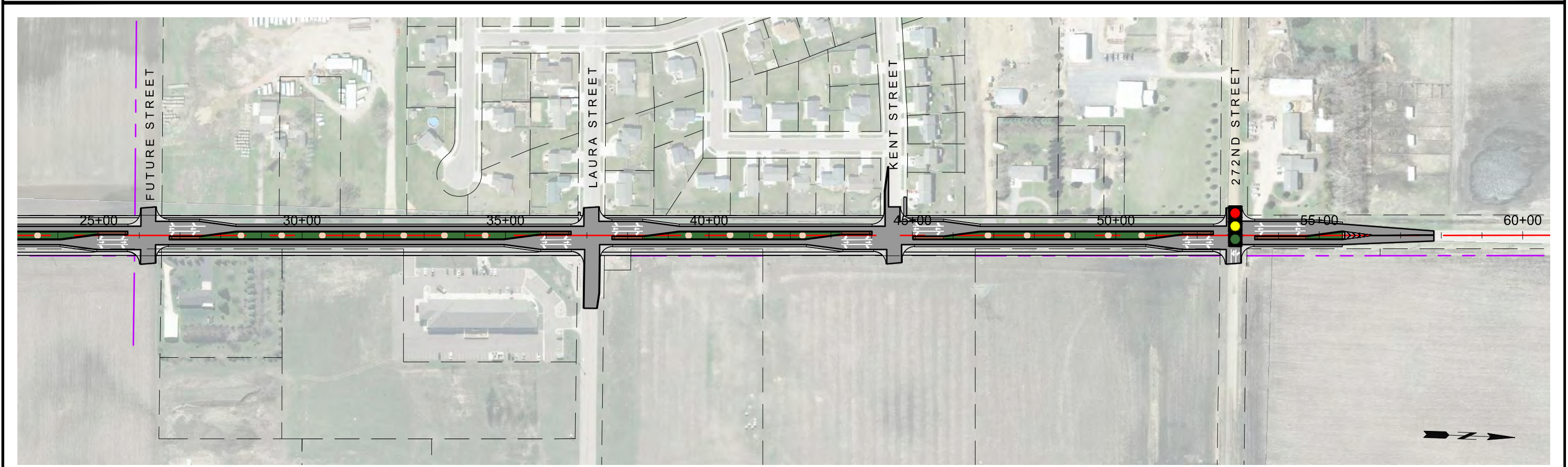
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
 CITY OF HARRISBURG
 HARRISBURG 2010

CLIFF AVENUE AND WILLOW STREET
 TYPICAL SECTIONS

SHEET NO.
1



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PG JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 6:21 PM
 CAD FILE: O:\50100008\CAD\CLIFF-OVERALL.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 0 1/2"
 IF NOT ADJUST SCALE
 ACCORDINGLY

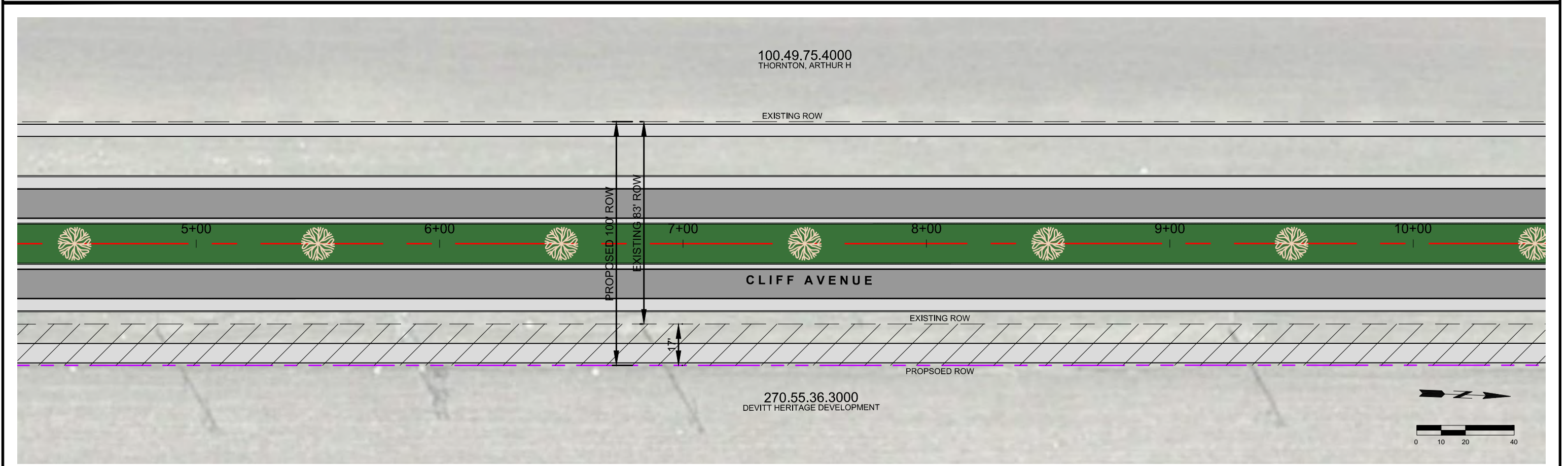
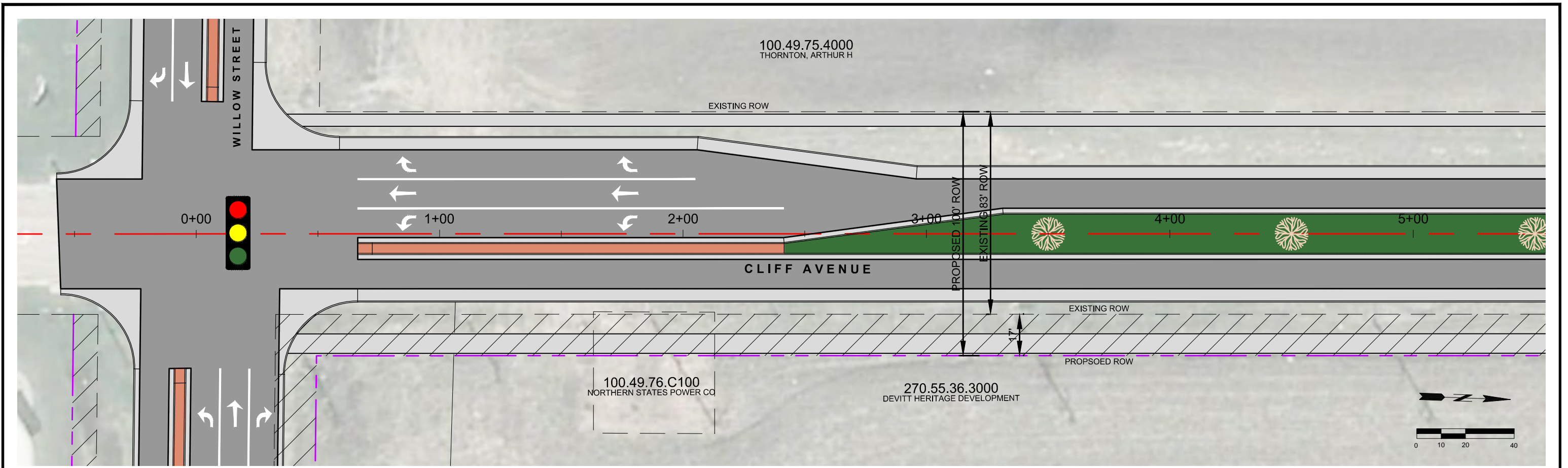
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

CLIFF AVENUE
FROM WILLOW STREET TO 272ND STREET

SHEET NO.
2



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PG JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 9:54 AM
 CAD FILE: O:\50100008\CAD\CLIFF-BIKE LANE.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 0 1/2"
 IF NOT ADJUST SCALE
 ACCORDINGLY

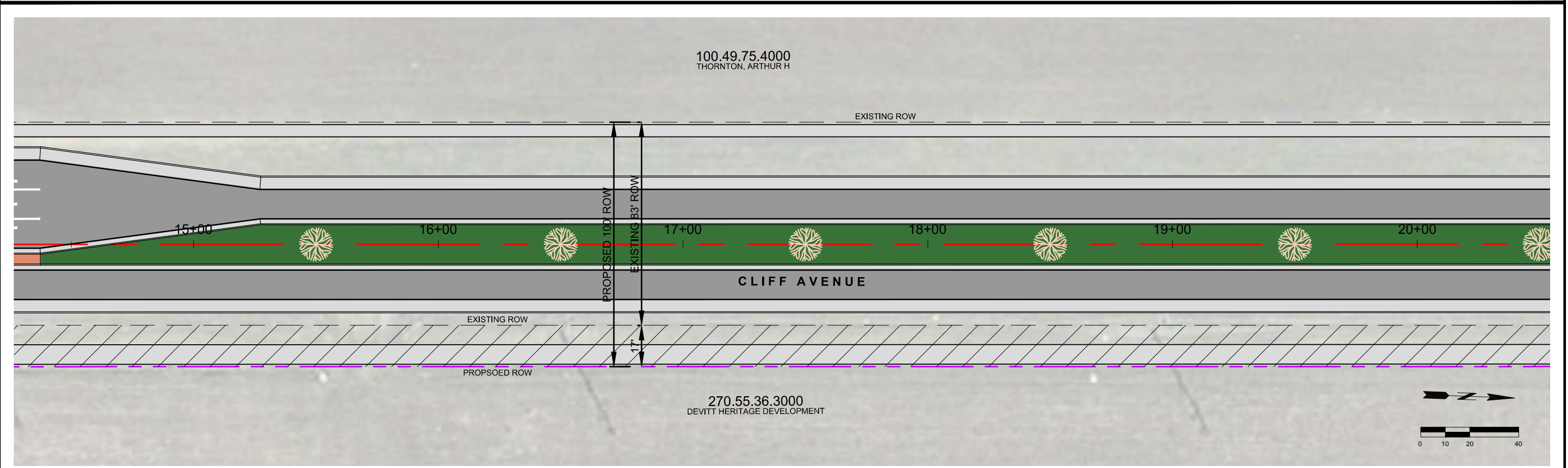
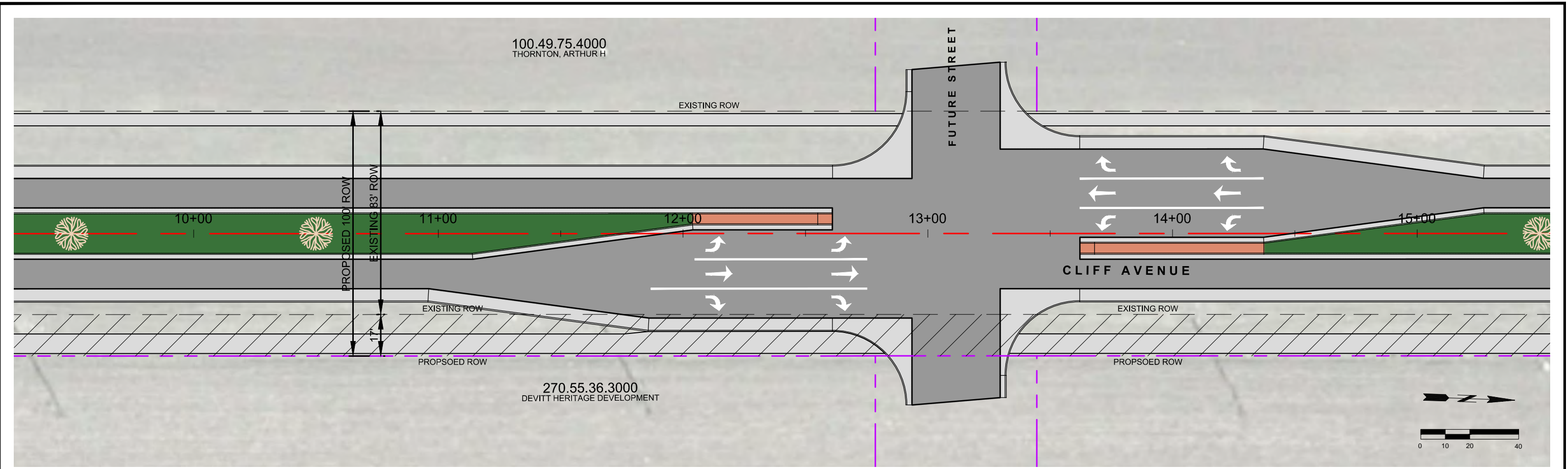
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

CLIFF AVENUE
FROM WILLOW STREET TO 272ND STREET

SHEET NO.
3



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PG JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 9:54 AM
 CAD FILE: O:\50100008\CAD\CLIFF-BIKE LANE.dwg

BAR IS ONE HALF INCH
ON OFFICIAL DRAWINGS
0 1/2"
IF NOT ADJUST SCALE
ACCORDINGLY

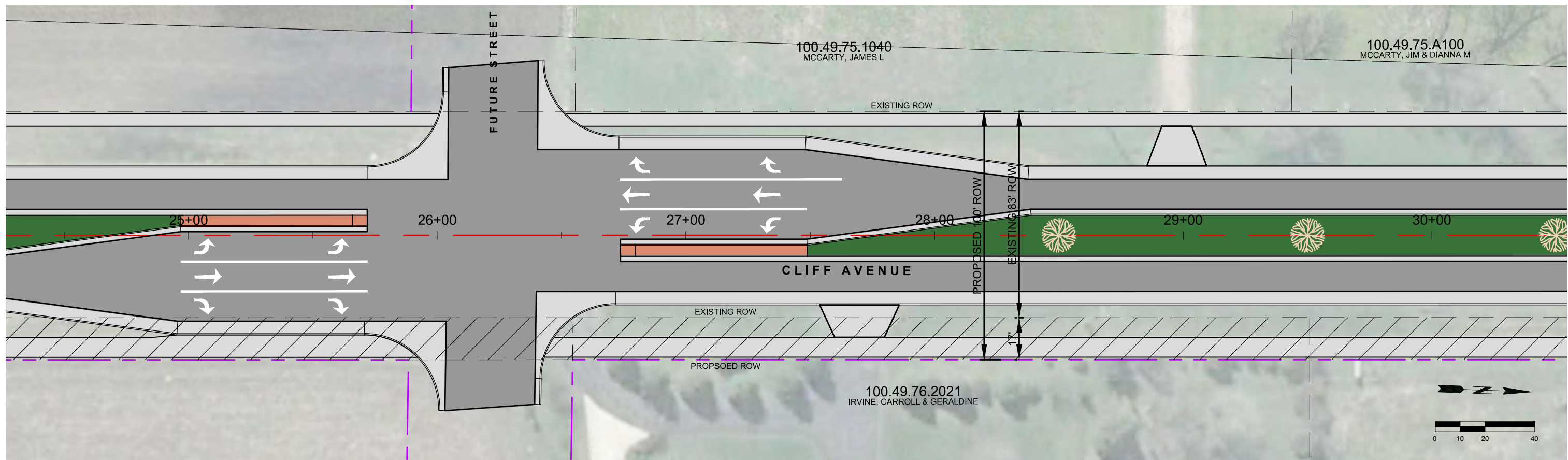
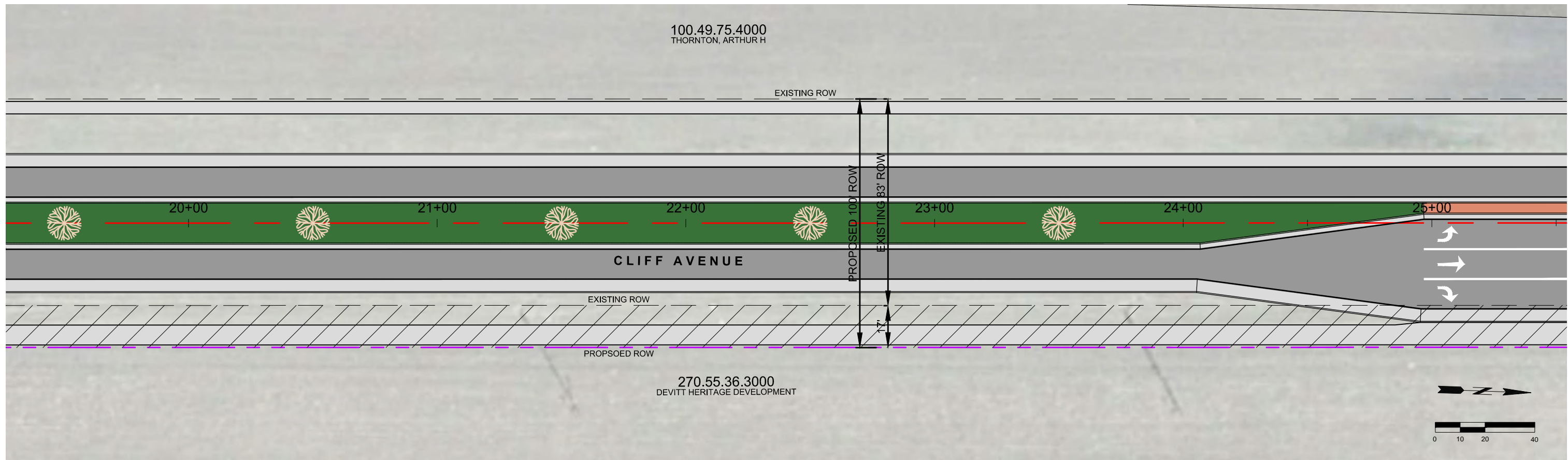
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
 CITY OF HARRISBURG
 HARRISBURG 2010

CLIFF AVENUE
 FROM WILLOW STREET TO 272ND STREET

SHEET NO.
4



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PG JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 9:55 AM
 CAD FILE: O:\50100008\CAD\CLIFF-BIKE LANE.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 0 1/2"
 IF NOT, ADJUST SCALE
 ACCORDINGLY

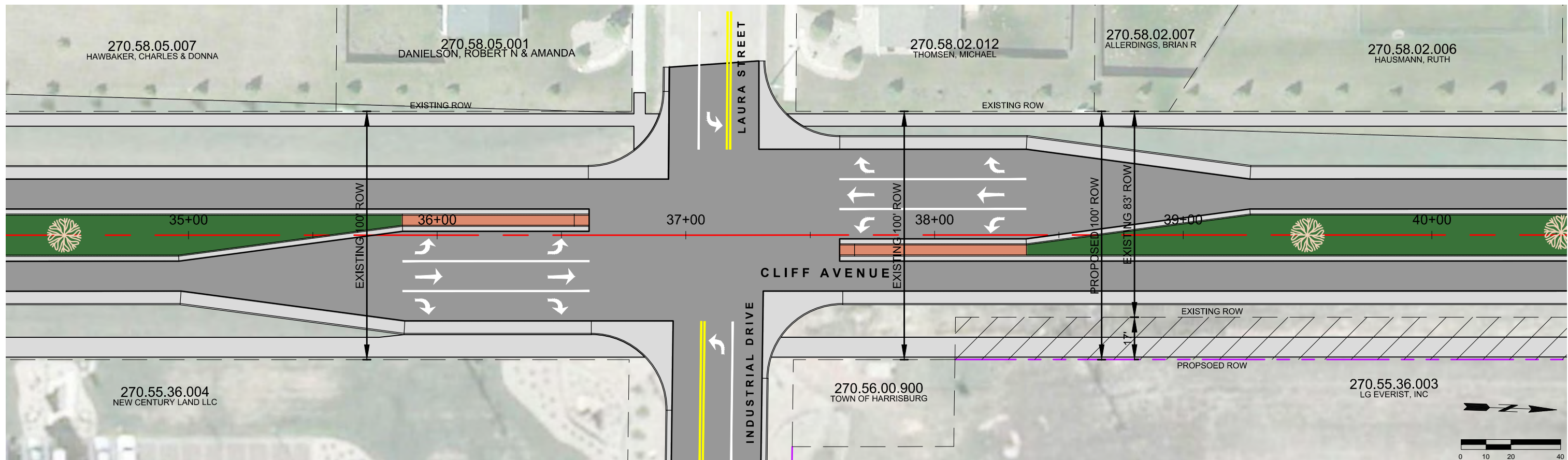
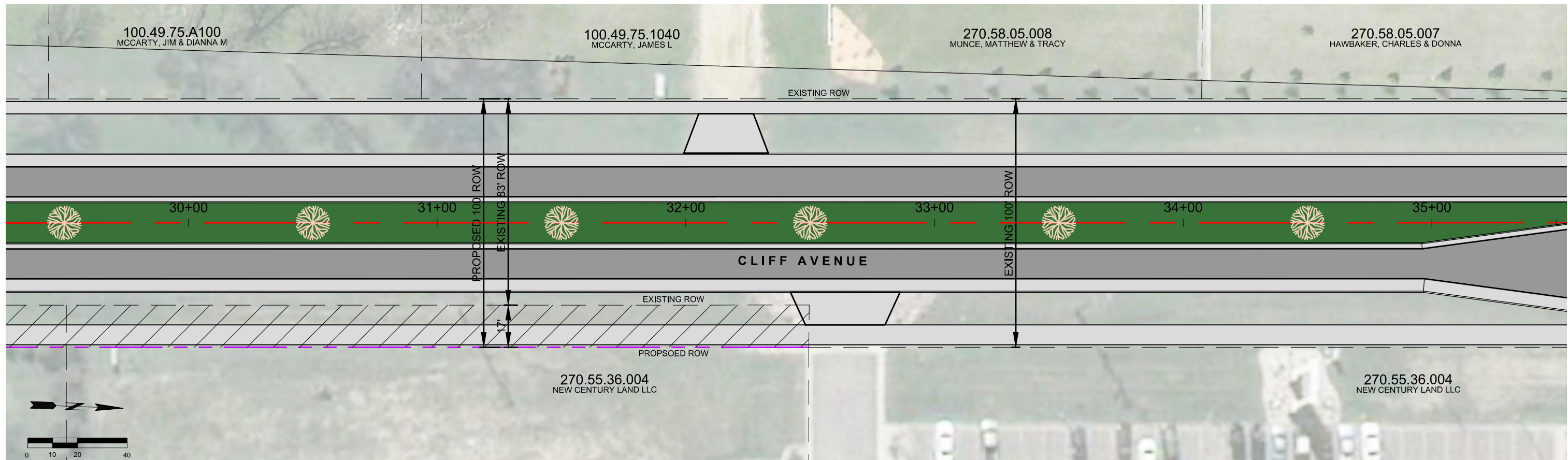
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
HARRISBURG 2010

CLIFF AVENUE
FROM WILLOW STREET TO 272ND STREET

SHEET NO.
5



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 9:55 AM
 CAD FILE: O:\50100008\CAD\CLIFF-BIKE LANE.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 1/2"
 IF NOT ADJUST SCALE
 ACCORDINGLY

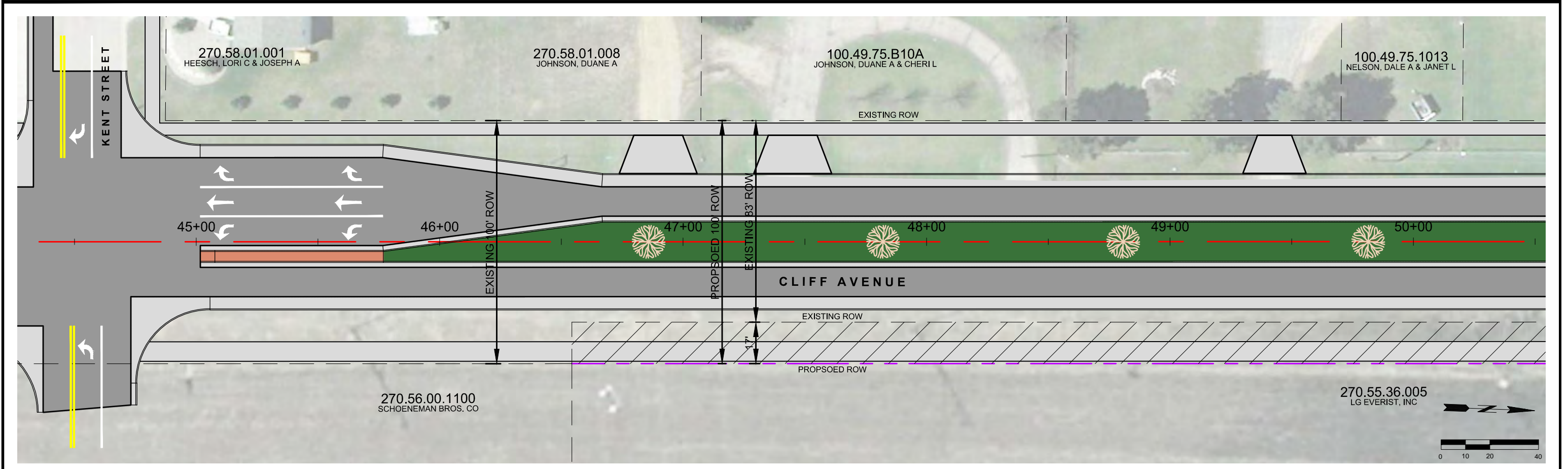
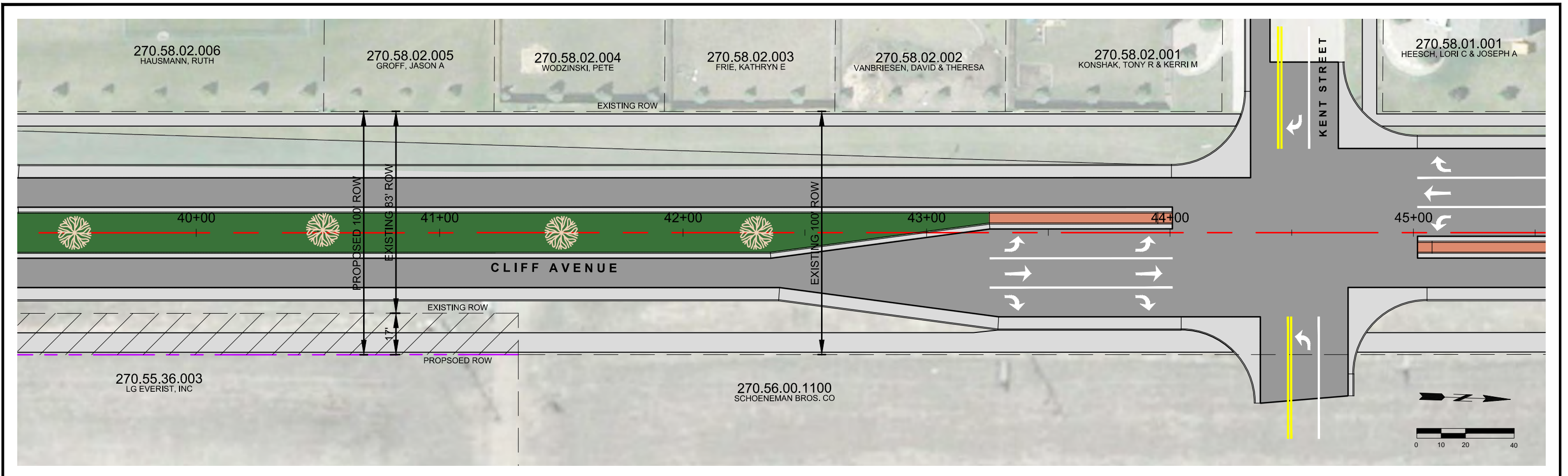
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

CLIFF AVENUE
FROM WILLOW STREET TO 272ND STREET

SHEET NO.
6



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PG JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 9:55 AM
 CAD FILE: O:\50100008\CAD\CLIFF-BIKE LANE.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 0 1/2"
 IF NOT ADJUST SCALE
 ACCORDINGLY

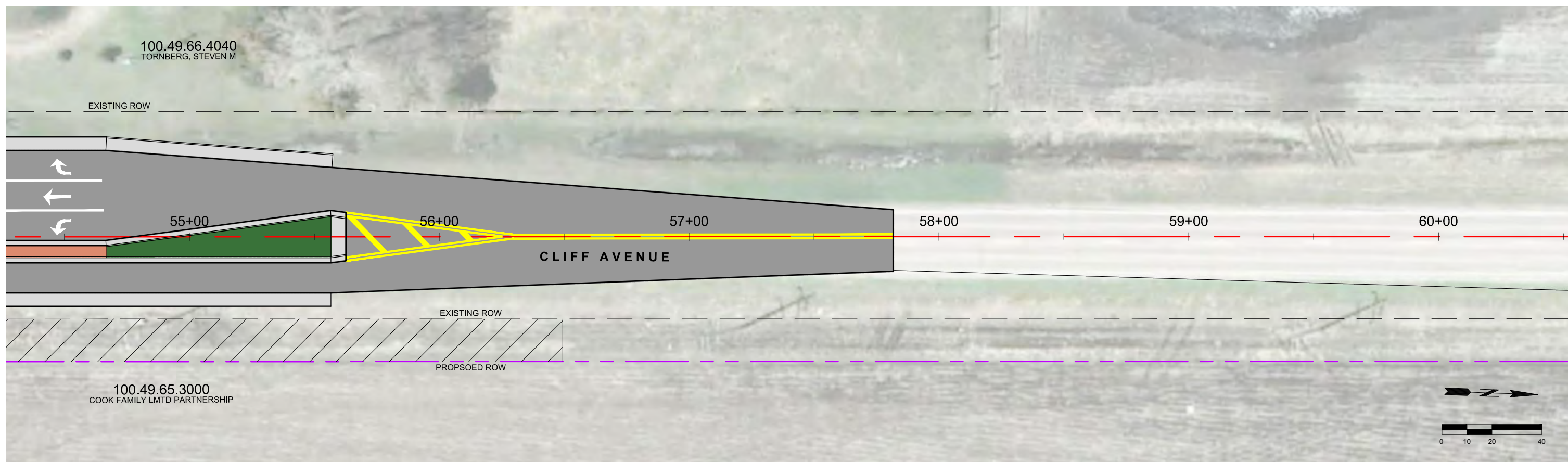
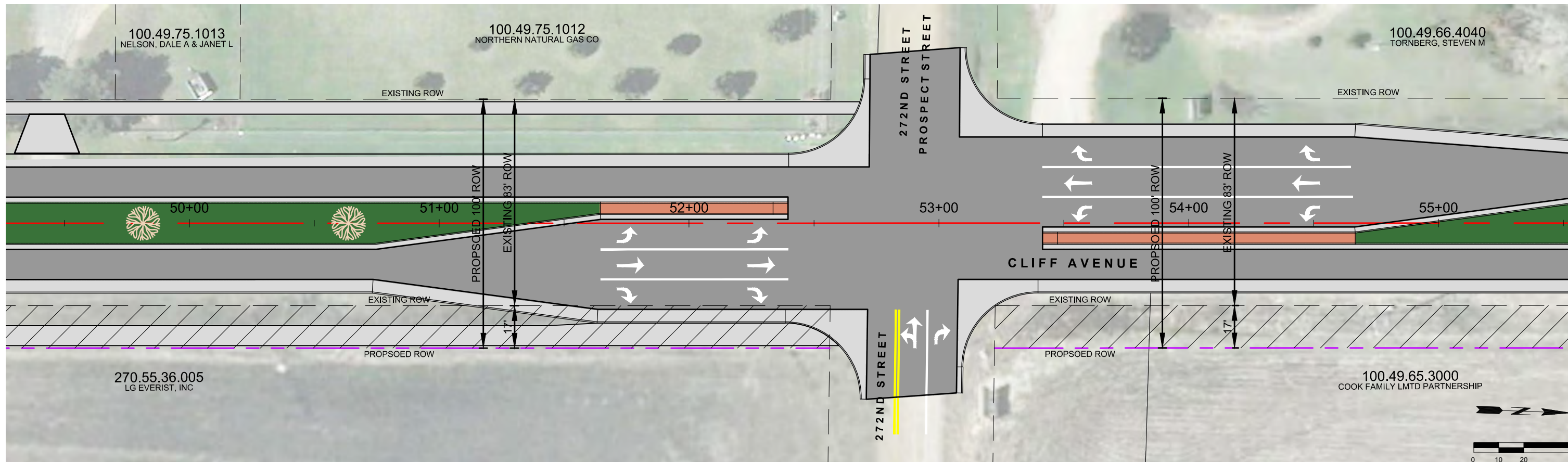
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
HARRISBURG 2010

CLIFF AVENUE
FROM WILLOW STREET TO 272ND STREET

SHEET NO.
7



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PG JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 9:56 AM
 CAD FILE: O:\50100008\CAD\CLIFF-BIKE LANE.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 0 1/2"
 IF NOT ADJUST SCALE
 ACCORDINGLY

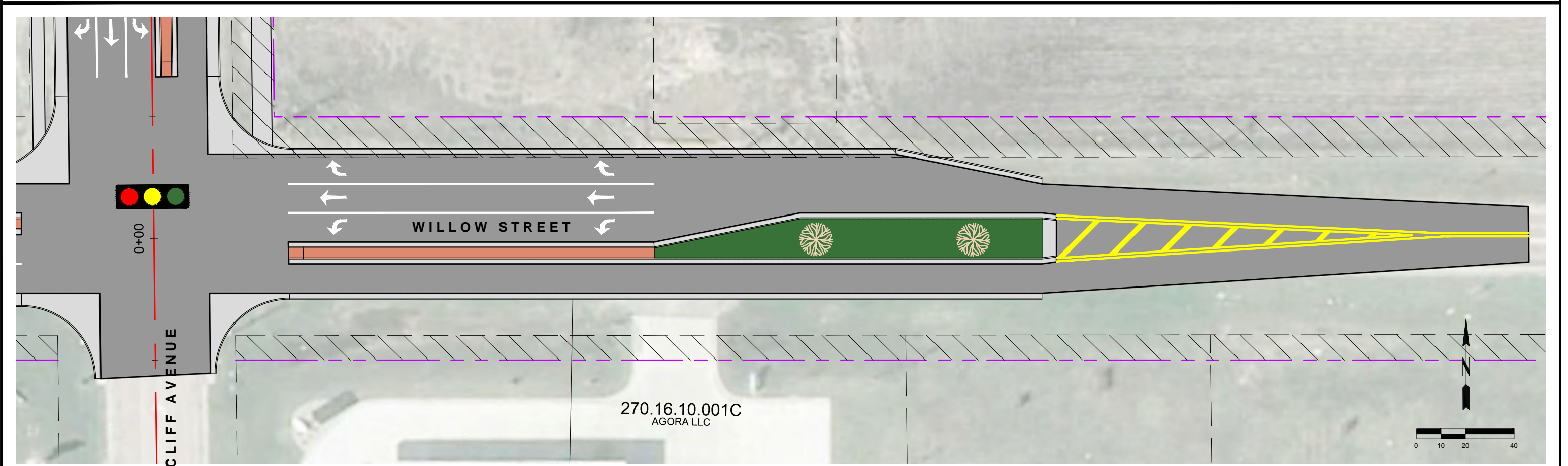
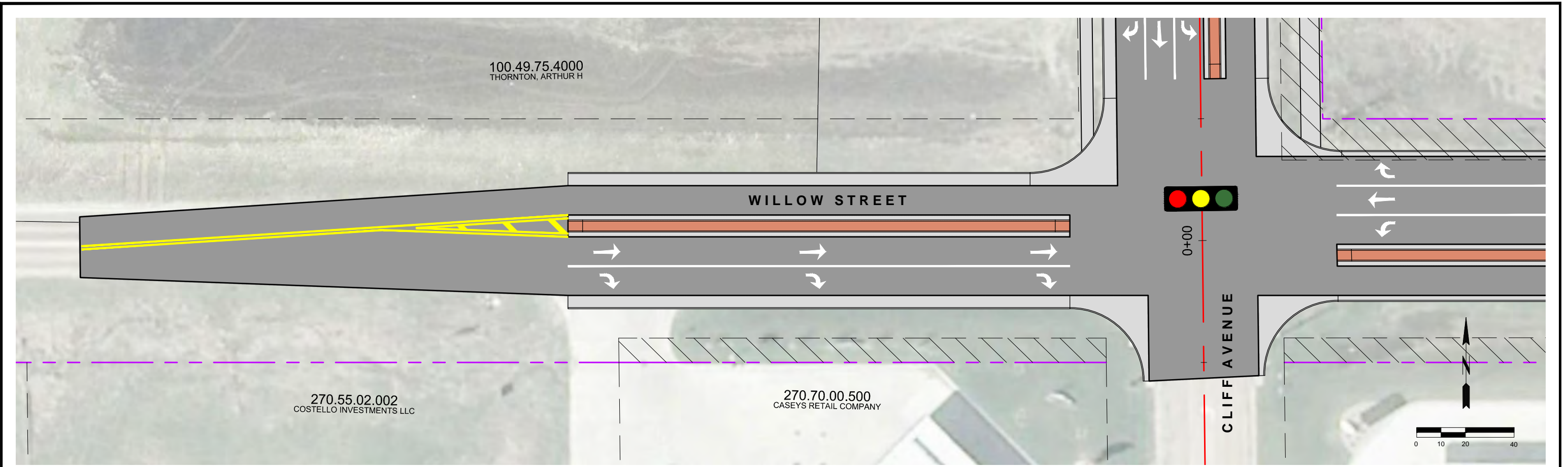
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

CLIFF AVENUE
FROM WILLOW STREET TO 272ND STREET

SHEET NO.
8



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PG JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 9:56 AM
 CAD FILE: O:\50100008\CAD\CLIFF-BIKE LANE.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 0" = 10' 1/2" = 10'
 IF NOT, ADJUST SCALE
 ACCORDINGLY

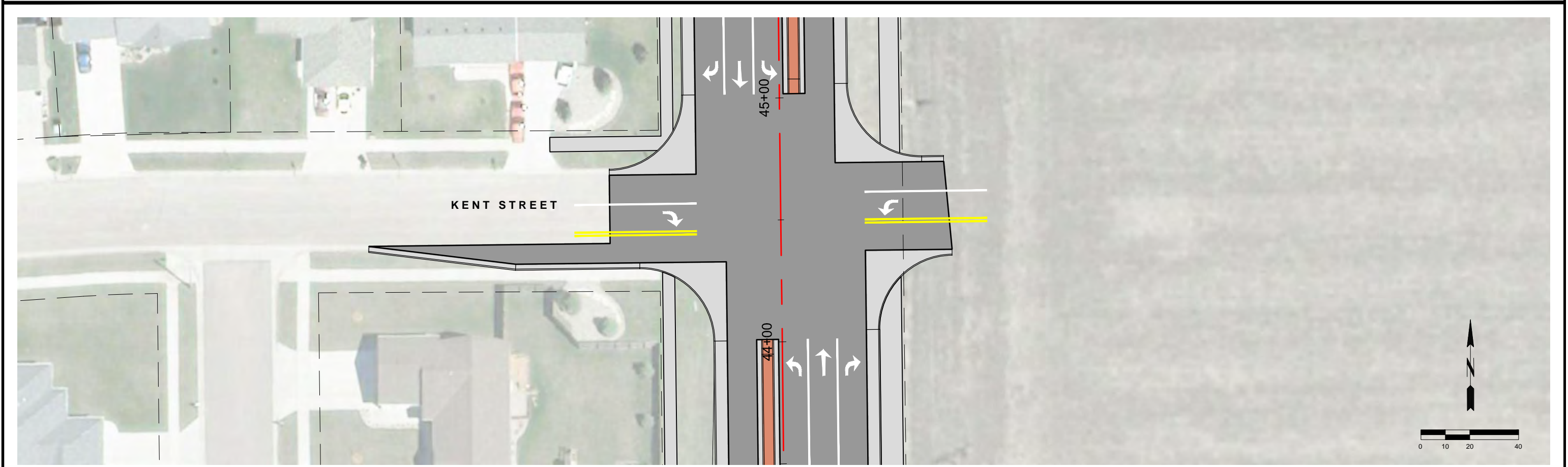
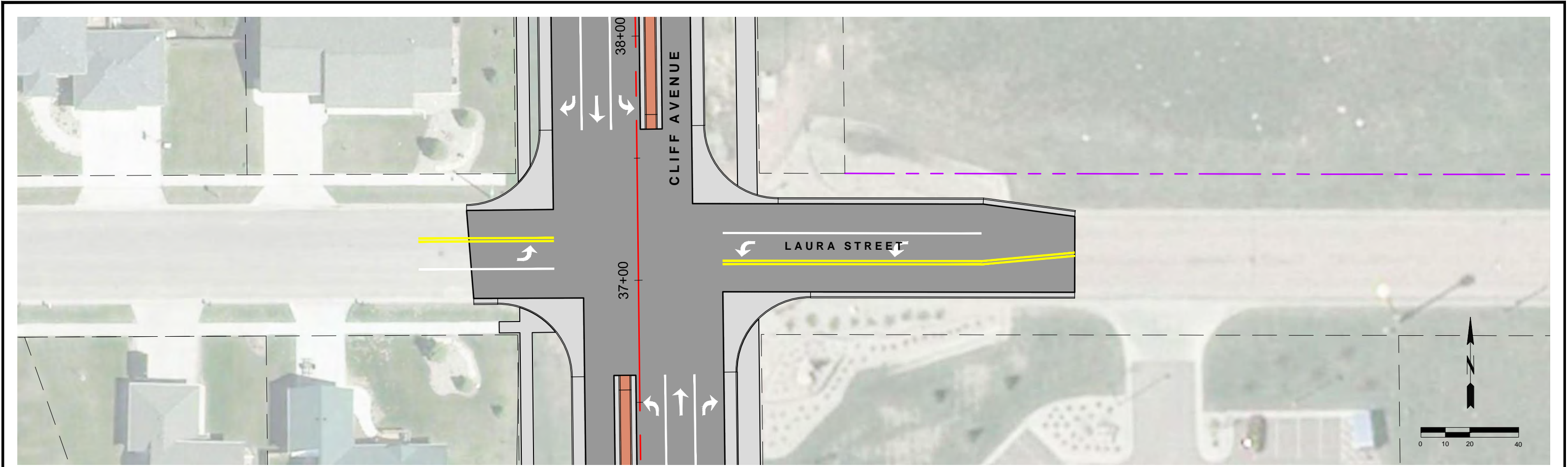
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

CLIFF AVENUE
FROM WILLOW STREET TO 272ND STREET

SHEET NO.
9



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606880
 PLOT DATE: 2/20/2011 9:56 AM
 CAD FILE: O:\50100008\CAD\CLIFF-BIKE LANE.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 0 1/2"
 IF NOT, ADJUST SCALE
 ACCORDINGLY

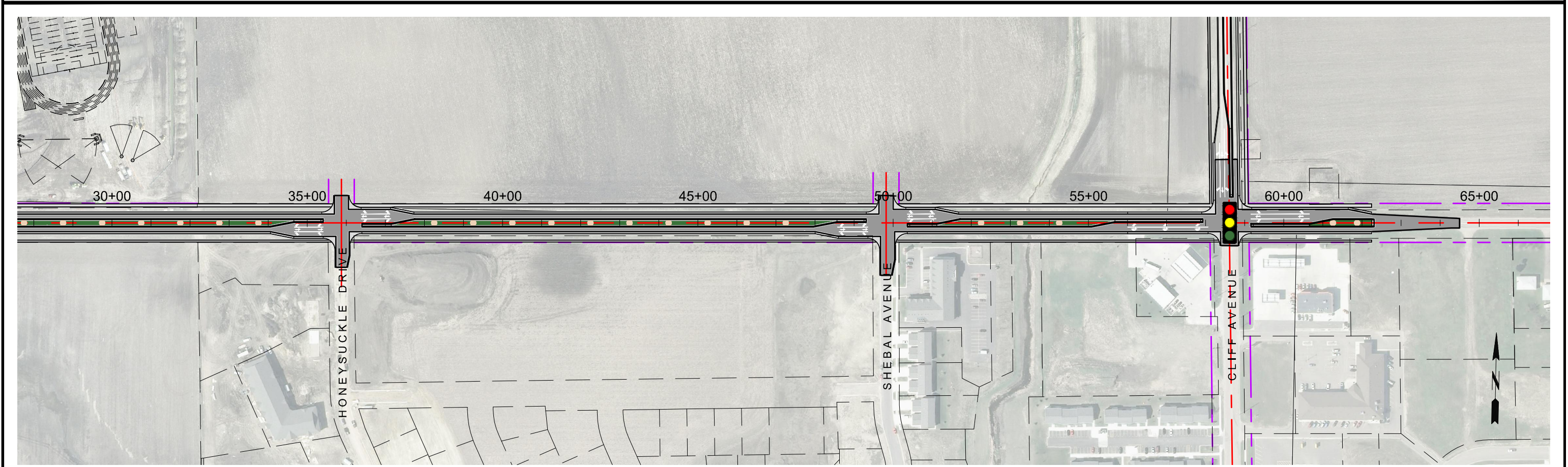
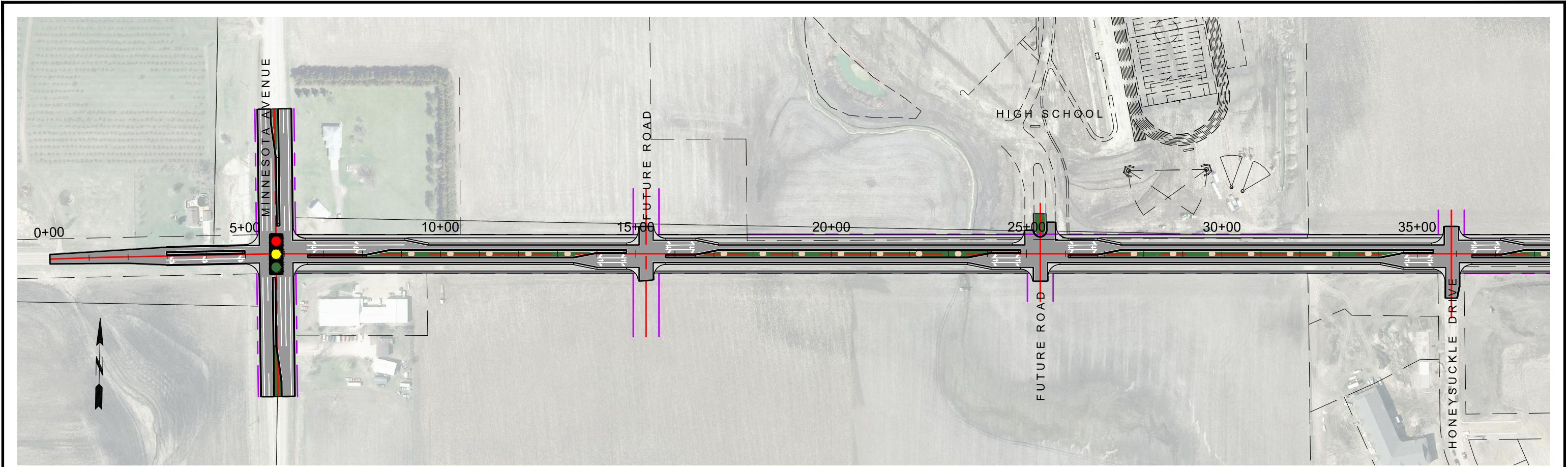
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
 CITY OF HARRISBURG
 HARRISBURG 2010

CLIFF AVENUE
 FROM WILLOW STREET TO 272ND STREET

SHEET NO.
 10



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PG JOB NUMBER: 606880
 PLOT DATE: 2/22/2011 10:14 AM
 CAD FILE: O:\50100008\CAD\WILLOW-OVERALL.dwg

BAR IS ONE HALF INCH
 ON OFFICIAL DRAWINGS
 0" = 1/2"
 IF NOT ADJUST SCALE
 ACCORDINGLY

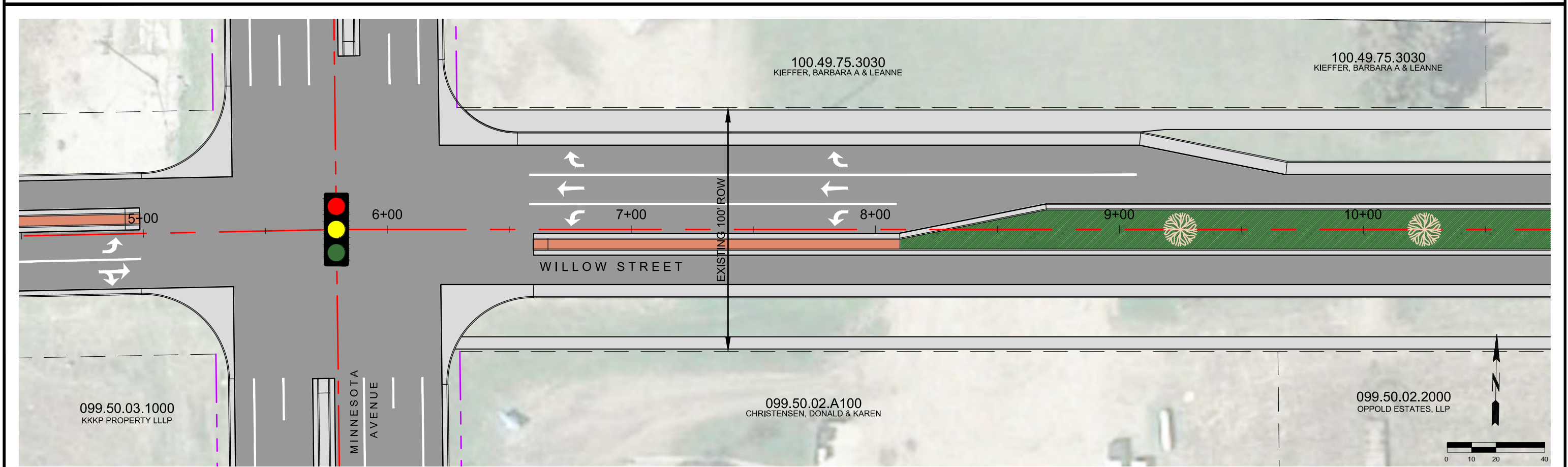
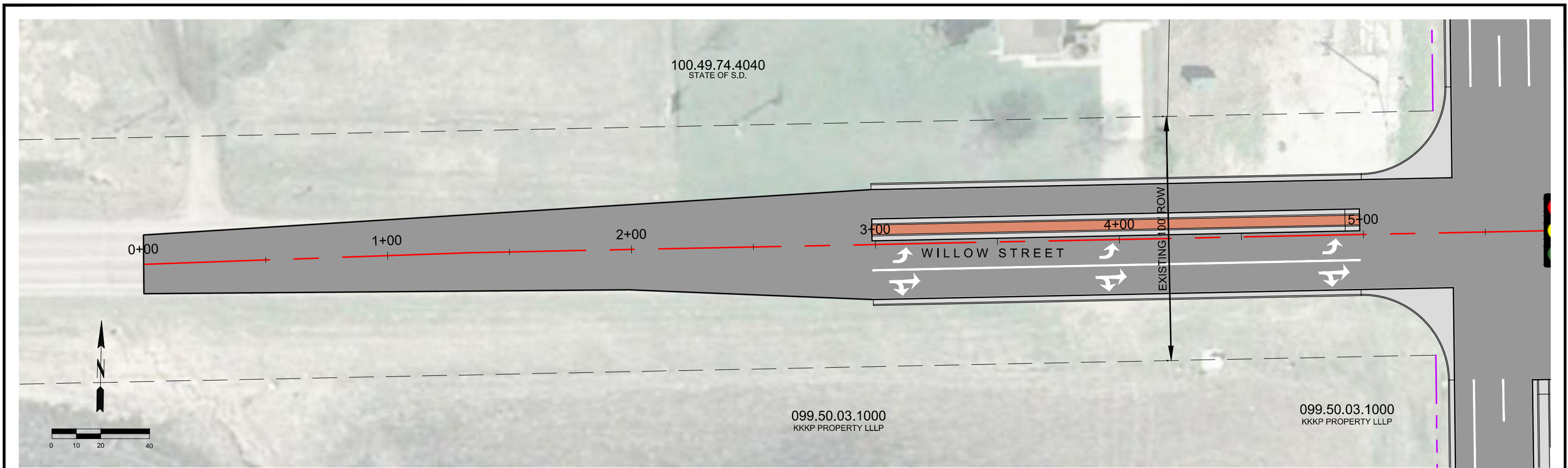
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
HARRISBURG 2010

WILLOW STREET
FROM CLIFF AVE TO MINNESOTA AVE

SHEET NO.
11



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606680
 PLOT DATE: 2/21/2011 11:37 AM
 CAD FILE: O:\50100008\CAD\WILLOW-BIKE LANE.dwg

BAR IS ONE HALF INCH ON OFFICIAL DRAWINGS
 IF NOT, ADJUST SCALE ACCORDINGLY

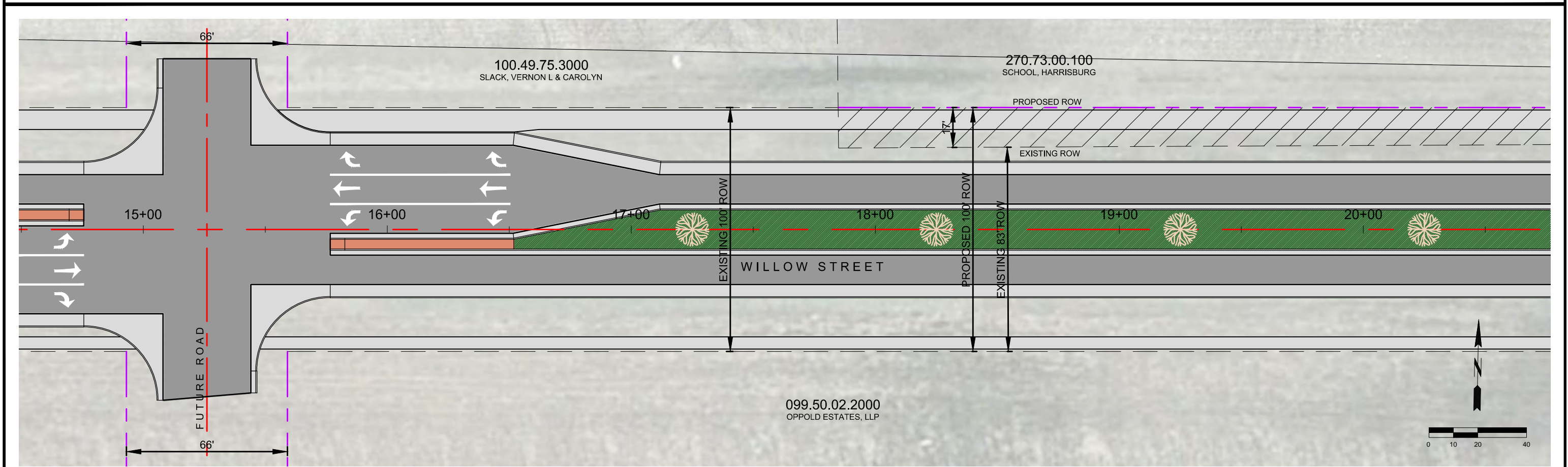
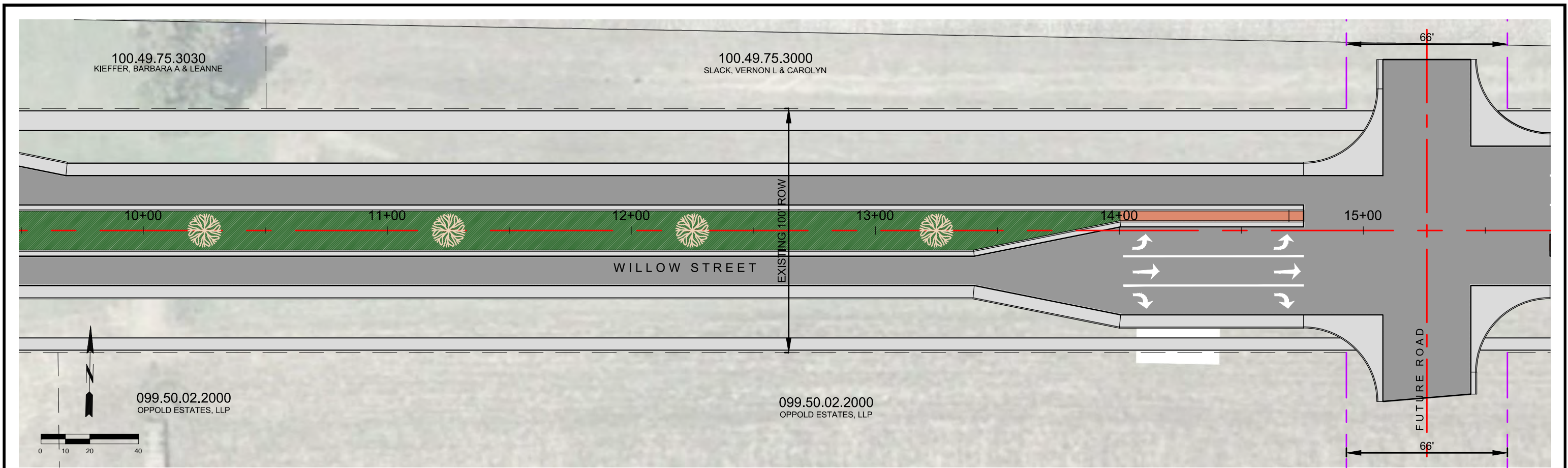
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

WILLOW STREET
FROM CLIFF AVE TO MINNESOTA AVE

SHEET NO.
12



DRAWN BY: HRG
 APPROVED: PC
 PLOT DATE: 2/21/2011 11:38 AM
 CAD FILE: O:\50100008\CAD\WILLOW-BIKE LANE.dwg

BID DATE: 2010
 JOB NUMBER: 606680

BAR IS ONE HALF INCH ON OFFICIAL DRAWINGS
 IF NOT, ADJUST SCALE ACCORDINGLY

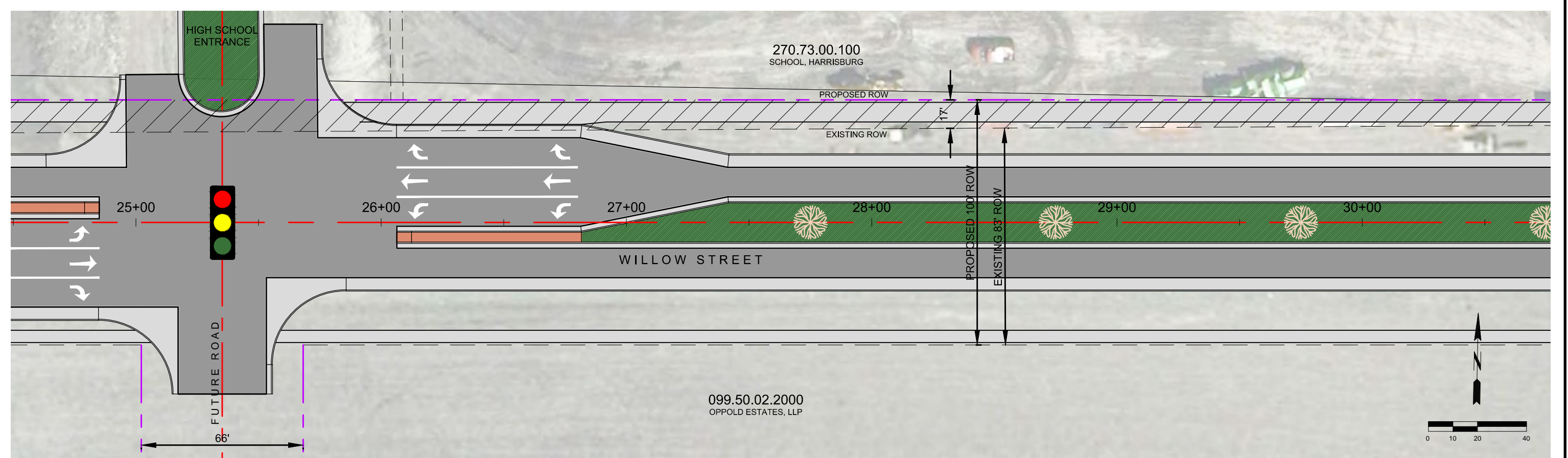
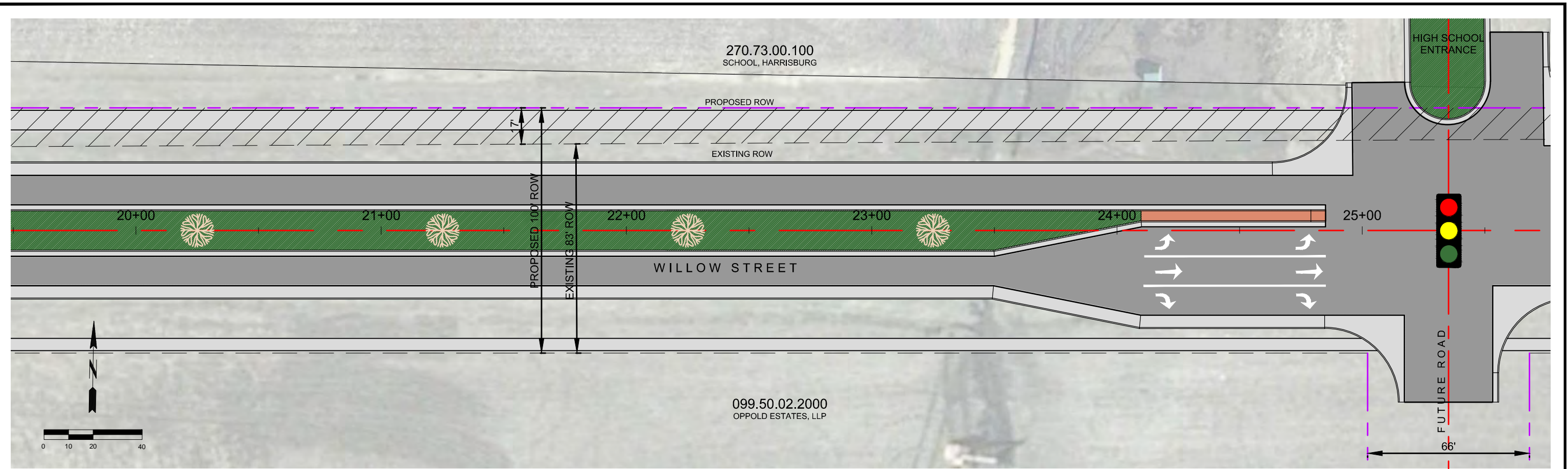
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

WILLOW STREET
FROM CLIFF AVE TO MINNESOTA AVE

SHEET NO.
13



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606680
 PLOT DATE: 2/21/2011 11:38 AM
 CAD FILE: O:\50100008\CAD\WILLOW-BIKE LANE.dwg

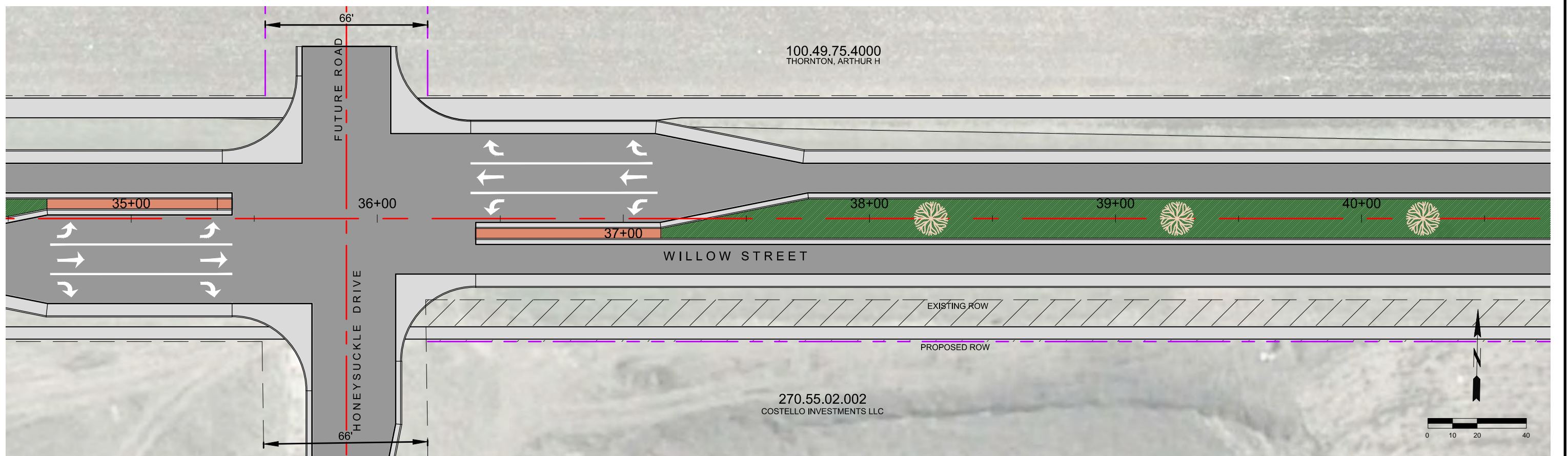
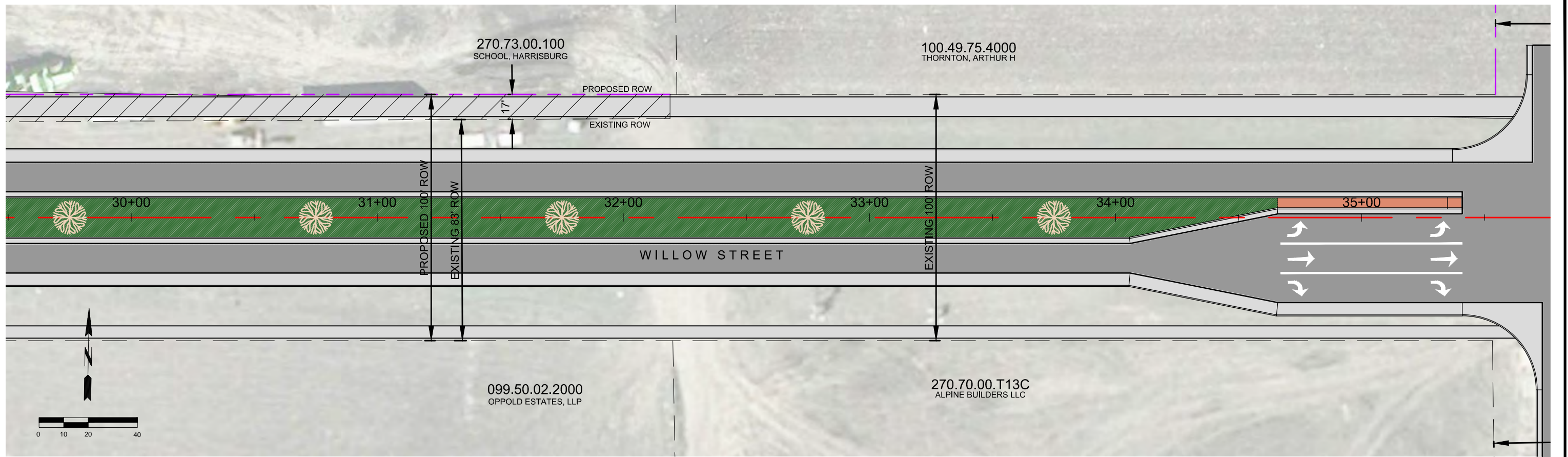
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

WILLOW STREET
FROM CLIFF AVE TO MINNESOTA AVE

SHEET NO.
14



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606680
 PLOT DATE: 2/21/2011 11:38 AM
 CAD FILE: O:\50100008\CAD\WILLOW-BIKE LANE.dwg

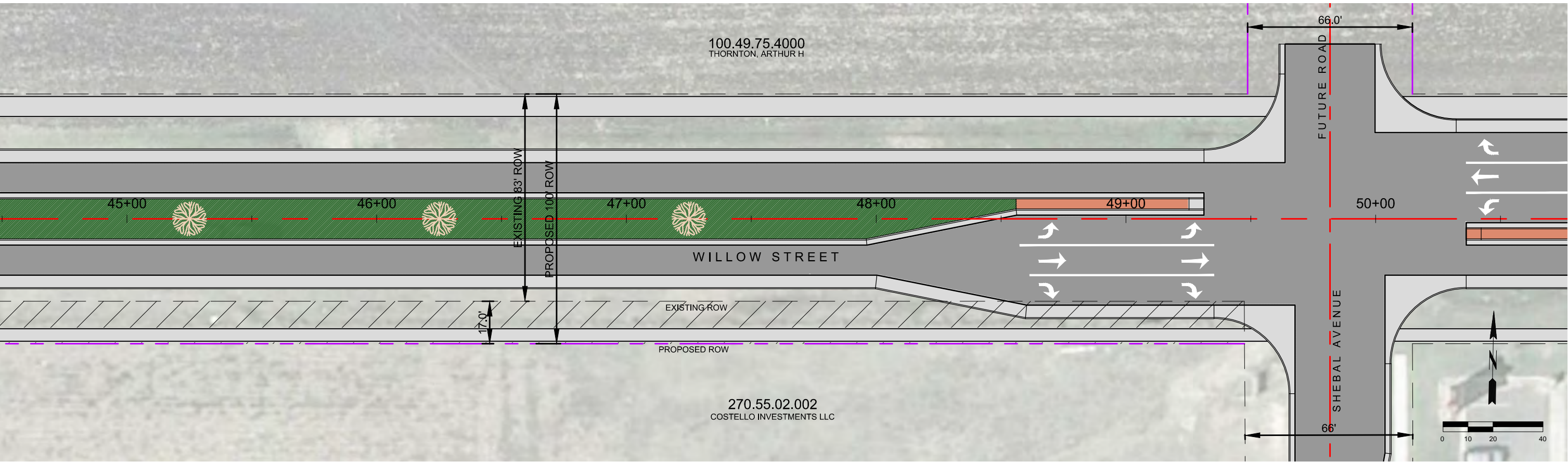
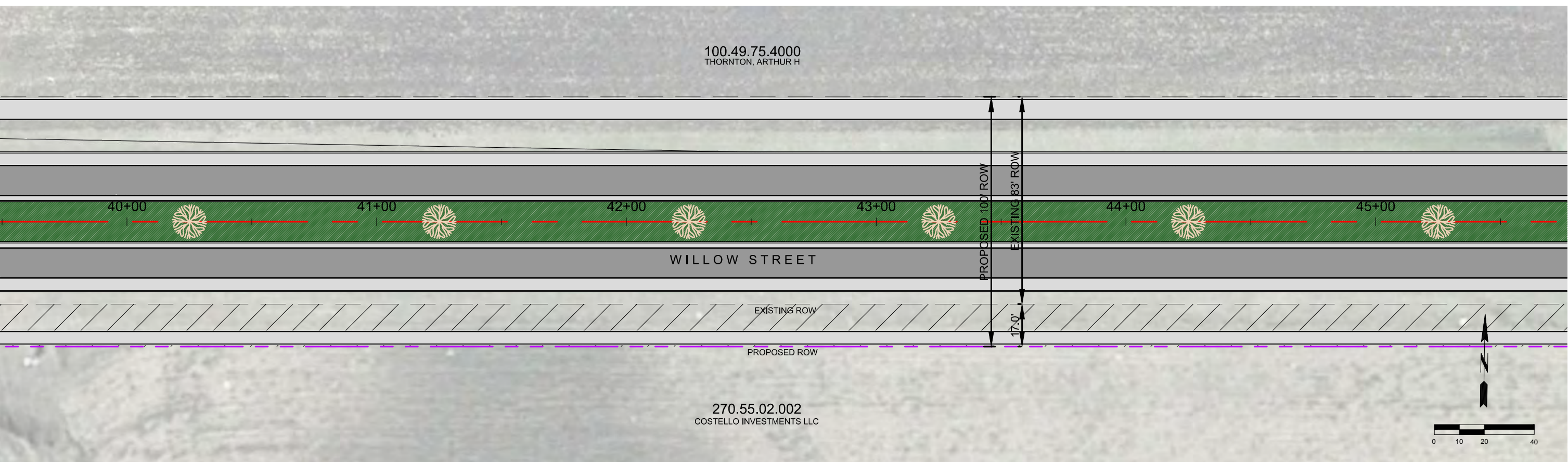
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

WILLOW STREET
FROM CLIFF AVE TO MINNESOTA AVE

SHEET NO.
15



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606680
 PLOT DATE: 2/21/2011 11:38 AM
 CAD FILE: O:\50100008\CAD\WILLOW-BIKE LANE.dwg

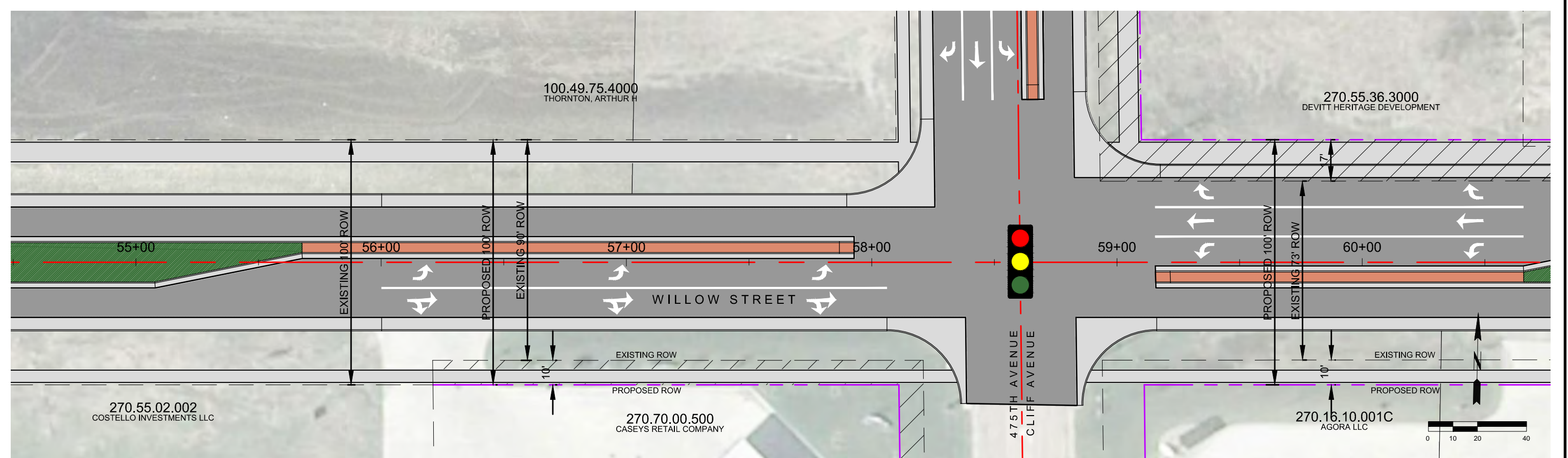
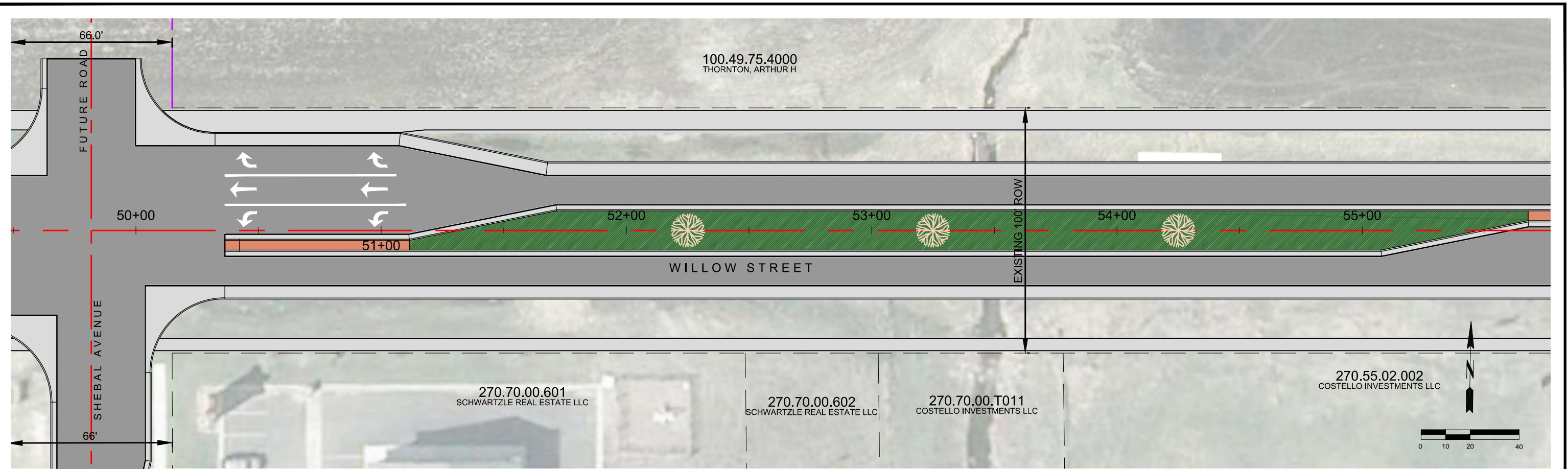
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
CITY OF HARRISBURG
 HARRISBURG 2010

WILLOW STREET
FROM CLIFF AVE TO MINNESOTA AVE

SHEET NO.
16



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606680
 PLOT DATE: 2/21/2011 11:38 AM
 CAD FILE: O:\50100008\CAD\WILLOW-BIKE LANE.dwg

BAR IS ONE HALF INCH ON OFFICIAL DRAWINGS
 IF NOT, ADJUST SCALE ACCORDINGLY

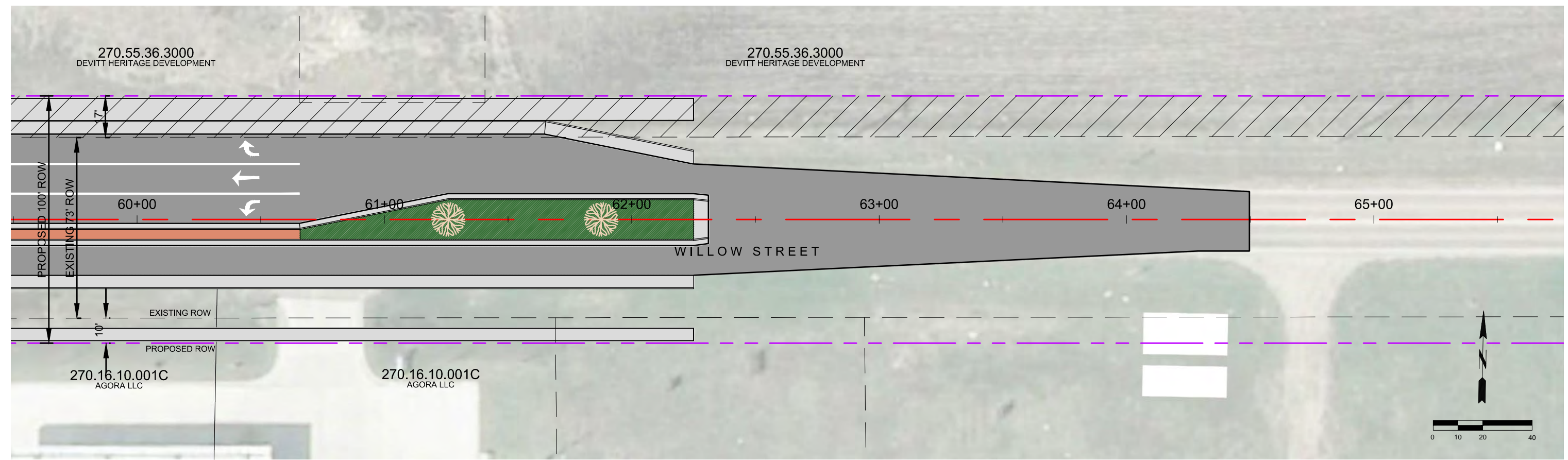
NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
 CITY OF HARRISBURG
 HARRISBURG 2010

WILLOW STREET
 FROM CLIFF AVE TO MINNESOTA AVE

SHEET NO.
17



DRAWN BY: HRG BID DATE: 2010
 APPROVED: PC JOB NUMBER: 606680
 PLOT DATE: 2/21/2011 11:39 AM
 CAD FILE: O:\50100008\CAD\WILLOW-BIKE LANE.dwg

NO.	DATE	BY	REVISION DESCRIPTION



TRANSPORTATION MASTER PLAN
 CITY OF HARRISBURG
 HARRISBURG 2010

WILLOW STREET
 FROM CLIFF AVE TO MINNESOTA AVE

SHEET NO.
18

**ENGINEER'S OPINION OF PROBABLE COST
CLIFF AVENUE - WILLOW STREET TO 272ND STREET
MARCH 2011**

Item No.	Item Description	Unit	Approx Qty	Unit Price	Total
Grading					
1	Mobilization	LS	1	\$170,000.00	\$170,000
2	Clear and Grub Tree	Each	5	\$400.00	\$2,000
3	Clearing	LS	1	\$1,000.00	\$1,000
4	Remove Concrete Curb and Gutter	Ft	440	\$4.00	\$1,760
5	Remove Drop Inlet	Each	4	\$350.00	\$1,400
6	Remove Storm Sewer Pipe	Ft	360	\$7.00	\$2,520
7	Remove Asphalt Concrete Pavement	SqYd	20,000	\$2.50	\$50,000
8	Remove Concrete Approach Pavement	SqYd	250	\$4.00	\$1,000
9	Remove Concrete Sidewalk	SqYd	70	\$4.00	\$280
10	Saw Existing Asphalt	LFt	350	\$4.00	\$1,400
11	Saw Existing PCC Concrete	LFt	75	\$6.00	\$450
12	Unclassified Excavation	CuYd	17,300	\$4.50	\$77,850
13	Unclassified Excavation, Digouts	CuYd	200	\$12.00	\$2,400
14	Unclassified Excavation, Grade Stabilization	CuYd	900	\$7.00	\$6,300
15	Scarify and Recompact Subgrade	SqYd	42,700	\$1.00	\$42,700
16	Water For Dust Control	MGal	100	\$12.00	\$1,200
17	Water For Granular Material	MGal	200	\$15.00	\$3,000
18	Water For Vegetation	MGal	85	\$30.00	\$2,550
19	Placing Topsoil	CuYd	5,000	\$4.00	\$20,000
20	Placing Contractor Furnished Topsoil	CuYd	600	\$16.00	\$9,600
21	Salvage Topsoil	CuYd	5,000	\$3.00	\$15,000
22	Incidental Work, Grading	LS	1	\$3,000.00	\$3,000
23	Base Course	Ton	21,600	\$12.00	\$259,200
24	Select Fill	Ton	500	\$6.00	\$3,000
25	Asphalt Concrete Composite	Ton	9,850	\$70.00	\$689,500
26	6" PCC Approach Pavement	SqYd	361	\$40.00	\$14,440
27	6" PCC Colored Median Pavement	SqYd	584	\$50.00	\$29,200
28	6" PCC Fillet Section	SqYd	1,005	\$50.00	\$50,250
29	Concrete Curb & Gutter Type SF66	Ft	11,590	\$12.00	\$139,080
30	Concrete Curb & Gutter w/ Bike Lane	Ft	11,000	\$25.00	\$275,000
31	Concrete Valley Gutter 6" Thick	SqYd	380	\$50.00	\$19,000
32	4" Concrete Sidewalk	SqFt	25,320	\$3.00	\$75,960
33	4" Concrete Trail	SqFt	40,330	\$3.50	\$141,155
34	Detectable Warning Surface	SqFt	160	\$40.00	\$6,400
35	Seeding	Lb	1400	\$10.00	\$14,000
36	Fertilizing	Lb	700	\$2.00	\$1,400
37	Mulching	Ton	14	\$225.00	\$3,150
38	Sodding	SqYd	1000	\$2.50	\$2,500
39	Erosion Control	LS	1	\$15,000.00	\$15,000
40	Silt Fence	Ft	1000	\$6.00	\$6,000
41	2" Caliper Deciduous Tree, Furnish and Plant	Each	35	\$300.00	\$10,500

**ENGINEER'S OPINION OF PROBABLE COST
CLIFF AVENUE - WILLOW STREET TO 272ND STREET
MARCH 2011**

Item No.	Item Description	Unit	Approx Qty	Unit Price	Total
42	Geotextile Fabric For Subgrade Stabilization	SqYd	1340	\$2.50	\$3,350
43	Adjust Manhole	Each	2	\$300.00	\$600
44	Locating Utility	Each	15	\$150.00	\$2,250
45	Verify Utility	Each	10	\$300.00	\$3,000
	Storm Sewer				
46	18" RCP Class 3, Furnish	Ft	1380	\$22.00	\$30,360
47	18" RCP, Install	Ft	1380	\$22.00	\$30,360
48	36" RCP Class 3, Furnish	Ft	2640	\$60.00	\$158,400
49	36" RCP, Install	Ft	2640	\$30.00	\$79,200
50	42" RCP Class 3, Furnish	Ft	2640	\$70.00	\$184,800
51	42" RCP, Install	Ft	2640	\$35.00	\$92,400
52	Storm Sewer Bedding Material	Ft	6660	\$4.00	\$26,640
53	Storm Sewer Intakes	Each	32	\$3,300.00	\$105,600
	Traffic Control				
54	Permanent Signing	LS	1	\$2,500.00	\$2,500
55	Pavement Markings	LS	1	\$7,000.00	\$7,000
56	Traffic Control	LS	1	\$15,000.00	\$15,000
57	Traffic Signal-Willow & Cliff	LS	1	\$175,000.00	\$175,000
58	Partial Traffic Signal-Cliff & 272nd	LS	1	\$25,000.00	\$25,000
	Total Items 1 Through 58				
	Subtotal of Construction				\$3,111,610.00
	Contingency (20%)				\$622,330.00
	Engineering, Construction Admin, and Legal (20%)				\$746,790.00
	Opinion of Probable Costs				\$4,480,730.00

**ENGINEER'S OPINION OF PROBABLE COST
WILLOW STREET - MINNESOTA AVENUE TO CLIFF AVENUE
MARCH 2011**

Item No.	Item Description	Unit	Approx Qty	Unit Price	Total
Grading					
1	Mobilization	LS	1	\$130,000.00	\$130,000
2	Clear and Grub Tree	Each	2	\$400.00	\$800
3	Clearing	LS	1	\$1,000.00	\$1,000
4	Remove Concrete Curb and Gutter	Ft	400	\$4.00	\$1,600
5	Remove Drop Inlet	Each	2	\$350.00	\$700
6	Remove Storm Sewer Pipe	Ft	200	\$7.00	\$1,400
7	Remove Asphalt Concrete Pavement	SqYd	14,200	\$2.50	\$35,500
8	Remove Concrete Sidewalk	SqYd	400	\$4.00	\$1,600
9	Saw Existing Asphalt	LFt	160	\$4.00	\$640
10	Saw Existing PCC Concrete	LFt	20	\$6.00	\$120
11	Unclassified Excavation	CuYd	15,250	\$4.50	\$68,625
12	Unclassified Excavation, Digouts	CuYd	200	\$12.00	\$2,400
13	Unclassified Excavation, Grade Stabilization	CuYd	900	\$7.00	\$6,300
14	Scarify and Recompact Subgrade	SqYd	25,700	\$1.00	\$25,700
15	Water For Dust Control	MGal	100	\$12.00	\$1,200
16	Water For Granular Material	MGal	145	\$15.00	\$2,175
17	Water For Vegetation	MGal	60	\$30.00	\$1,800
18	Placing Topsoil	CuYd	3,000	\$4.00	\$12,000
19	Placing Contractor Furnished Topsoil	CuYd	500	\$16.00	\$8,000
20	Salvage Topsoil	CuYd	3,000	\$3.00	\$9,000
21	Incidental Work, Grading	LS	1	\$3,000.00	\$3,000
22	Base Course	Ton	16,000	\$12.00	\$192,000
23	Select Fill	Ton	500	\$6.00	\$3,000
24	Asphalt Concrete Composite	Ton	4,550	\$70.00	\$318,500
25	6" PCC Colored Median Pavement	SqYd	333	\$50.00	\$16,650
26	6" PCC Fillet Section	SqYd	795	\$50.00	\$39,750
27	Concrete Curb & Gutter Type SF66	Ft	10,155	\$12.00	\$121,860
28	Concrete Curb & Gutter w/ Bike Lane	Ft	9,050	\$25.00	\$226,250
29	Concrete Valley Gutter 6" Thick	SqYd	380	\$50.00	\$19,000
30	4" Concrete Sidewalk	SqFt	23,500	\$3.00	\$70,500
31	4" Concrete Trail	SqFt	37,000	\$3.50	\$129,500
32	Detectable Warning Surface	SqFt	128	\$40.00	\$5,120
33	Seeding	Lb	1,150	\$10.00	\$11,500
34	Fertilizing	Lb	600	\$2.00	\$1,200
35	Mulching	Ton	12	\$225.00	\$2,700
36	Sodding	SqYd	400	\$2.50	\$1,000
37	Erosion Control	LS	1	\$15,000.00	\$15,000
38	Silt Fence	Ft	1,000	\$6.00	\$6,000
39	2" Caliper Deciduous Tree, Furnish and Plant	Each	34	\$300.00	\$10,200
40	Geotextile Fabric For Subgrade Stabilization	SqYd	1,340	\$2.50	\$3,350
41	Adjust Manhole	Each	2	\$300.00	\$600

**ENGINEER'S OPINION OF PROBABLE COST
WILLOW STREET - MINNESOTA AVENUE TO CLIFF AVENUE
MARCH 2011**

Item No.	Item Description	Unit	Approx Qty	Unit Price	Total
42	Locating Utility	Each	15	\$150.00	\$2,250
43	Verify Utility	Each	10	\$300.00	\$3,000
	Storm Sewer				
44	18" RCP Class 3, Furnish	Ft	920	\$22.00	\$20,240
45	18" RCP, Install	Ft	920	\$22.00	\$20,240
46	36" RCP Class 3, Furnish	Ft	2,450	\$60.00	\$147,000
47	36" RCP, Install	Ft	2,450	\$30.00	\$73,500
48	42" RCP Class 3, Furnish	Ft	2,450	\$70.00	\$171,500
49	42" RCP, Install	Ft	2,450	\$35.00	\$85,750
50	12' X 6' Precast Concrete Box Culvert, Furnish	Ft	100	\$720.00	\$72,000
51	12' X 6' Precast Concrete Box Culvert, Install	Ft	100	\$300.00	\$30,000
52	12' X 6' Precast Concrete Box Culvert End Section, Furnish	Each	2	\$7,000.00	\$14,000
53	12' X 6' Precast Concrete Box Culvert End Section, Install	Each	2	\$1,800.00	\$3,600
54	Storm Sewer Bedding Material	Ft	5,820	\$4.00	\$23,280
55	Storm Sewer Intakes	Each	26	\$3,300.00	\$85,800
	Traffic Control				
56	Permanent Signing	LS	1	\$2,500.00	\$2,500
57	Pavement Markings	LS	1	\$6,000.00	\$6,000
58	Traffic Control	LS	1	\$15,000.00	\$15,000
	Total Items 1 Through 58				
	Subtotal of Construction				\$2,282,900.00
	Contingency (20%)				\$456,580.00
	Engineering, Construction Admin, and Legal (20%)				\$547,900.00
	Opinion of Probable Costs				\$3,287,380.00

CLIFF AVENUE PRELIMINARY ASSESSMENT SCHEDULE

OWNER NAME	OWNER ADDRESS	LEGAL DESCRIPTION	PID	AREA	FRONT FOOTAGE	ASSESSMENT \$90.00/Ft
TORNBERG, STEVEN M & KATHLEEN	27263 476TH AVE HARRISBURG, SD 57032	S 530' OF E1/2SE1/4 16.06 AC 26 100 50	100.49.66.4040	16.04	143.50	\$12,915.00
AGORA LLC	PO BOX 128 HARRISBURG, SD 57032	HSGB-HARVEST ACRES LOT 1C AND 6B BLK 10 1 99 50	270.16.10.001C	2.39	275.02	\$24,751.80
CASEYS RETAIL COMPANY	1 CONVENIENCE BLVD ANKENY, IA 50021	HSBG - GREEN MEADOWS ADD - TR 5	270.70.00.500	0.95	200.00	\$18,000.00
THORNTON, ARTHUR H	C/O FARMERS NATIONAL CO PO BOX 542016 OMAHA, NE 68154	SE1/4 *EX .42 AC RD* 35 100 50	100.49.75.4000	157.71	2604.90	\$234,441.00
DEVITT HERITAGE DEVELOPMENT LLC	2201 FORD ST GOLDEN, CO 80401	HSBG - SW1/4 *EX PART SOLD* FKA 100.49.36.3000 36 100 50	270.55.36.3000	111.36	2555.22	\$229,969.80
MCCARTY, JIM & DIANNA M ACKMAN	1641 S CLEVELAND #305 SIOUX FALLS, SD 57103	ANDERSON'S ADD SE1/4 NE1/4 - TR 1 1.17 AC 35 100 50	100.49.75.A100	1.17	150.00	\$13,500.00
MCCARTY, JAMES L	1641 S CLEVELAND #305 SIOUX FALLS, SD 57103	S 600' OF E 726' OF SE1/4NE1/4 *EX ANDERSON'S ADD* 7.73 AC 35 100 50	100.49.75.1040	8.13	450.00	\$40,500.00
MUNCE, MATTHEW & TRACY	401 PHILLY CIR HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 8 - BLK 5	270.58.05.008	0.67	151.94	\$13,674.60
HAWBAKER, CHARLES & DONNA	400 PHILLY CR HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 7 - BLK 5 5	270.58.05.007	0.40	151.85	\$13,666.50
DANIELSON, ROBERT N & AMANDA	401 LAURA HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 1 - BLK 5 -LOT SIZE 12,252 SQ FT	270.58.05.001	0.29	118.95	\$10,705.50
NEW CENTURY LAND LLC	C/O HAGEN COMM REAL ESTATE PO BOX 1363 SIOUX FALLS, SD 57101	W 500' NW1/4 LYING S DEDICATED INDUSTRIAL DR ST ROW *EX PARTS SOLD* 8.309 AC	270.55.36.004	7.72	726.34	\$65,370.60
THOMSEN, MICHAEL	400 LAURA STREET HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 12 - BLK 2	270.58.02.012	0.30	120.00	\$10,800.00
ALLERDINGS, BRIAN R	403 THOMS ST HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 7 - BLK 2	270.58.02.007	0.37	30.00	\$2,700.00
HAUSMANN, RUTH	PO BOX 153 HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 6 - BLK 2	270.58.02.006	0.36	158.08	\$14,227.20
GROFF, JASON A	504 N PENNSYLVANIA AVENUE HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 5 - BLK 2	270.58.02.005	0.22	70.00	\$6,300.00
WODZINSKI, PETE	506 PENNSYLVANIA AVE HARRISBURG SD 57032	HSBG- HOMESITES ADD LOT 4 - BLK 2	270.58.02.004	0.22	70.99	\$6,389.10
FRIE, KATHRYN E	508 PENNSYLVANIA AVE HARRISBURG SD 57032	HSBG- HOMESITES ADD LOT 3 - BLK 2	270.58.02.003	0.22	70.00	\$6,300.00
VANBRIESEN, DAVID & THERESA	510 PENNSYLVANIA AVE HARRISBURG SD 57032	HSBG- HOMESITES ADD LOT 2 - BLK 2	270.58.02.002	0.22	70.00	\$6,300.00
KONSHAK, TONY R & KERRI M	512 PENNSYLVANIA AVE HARRISBURG SD 57032	HSBG- HOMESITES ADD LOT 1 - BLK 2	270.58.02.001	0.29	89.00	\$8,010.00

CLIFF AVENUE PRELIMINARY ASSESSMENT SCHEDULE

HEESCH, LORI C & JOSEPH A GUNN	400 KENT ST HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 1 - BLK 1	270.58.01.001	0.29	120.78	\$10,870.20
SCHOENEMAN BROS. CO	305 E 8TH ST SIOUX FALLS, SD 57103	HSBG-INDUSTRIAL PARK ADD -NW1/4 -TRACT 11 19.17 AC 36 100 50	270.56.00.1100	19.20	522.00	\$46,980.00
NELSON, DALE A & JANET L	27205 CLIFF AVE PO BOX 6 HARRISBURG, SD 57032	LOT 3 & S 50' OF N 320.01' OF W 237' OF E 270' NE1/4NE1/4 .88 AC 35 100 50	100.49.75.1013	0.82	163.00	\$14,670.00
TOWN OF HARRISBURG	PO BOX 26 HARRISBURG, SD 57032	HSBG-INDUSTRIAL PARK ADD - TRACT 9 .05 AC	270.56.00.900	0.05	65.00	\$5,850.00
LG EVERIST, INC	300 S PHILLIPS AVE - #200 SIOUX FALLS, SD 57104	HSBG - SW1/4NW1/4 - PARCEL A *EX PART SOLD* 36-100-50	270.55.36.003	5.31	324.11	\$29,169.90
JOHNSON, DUANE A	27209 475TH AVE HARRISBURG, SD 57032	HSBG- HOMESITES ADD LOT 8 - BLK 1	270.58.01.008	2.86	99.19	\$8,927.10
IRVINE, CARROLL & GERALDINE	27246 CLIFF AVE HARRISBURG, SD 57032	S 300' OF W 300' W1/2NW1/4 36 100 50	100.49.76.2021	2.08	296.44	\$26,679.60
LG EVERIST, INC	300 S PHILLIPS AVE #200 SIOUX FALLS, SD 57104	NW1/4NW1/4 & W 730' OF N 150' SW1/4NW1/4 *EX INDUSTRIAL PARK ADD* 36 100 50	270.55.36.005	12.42	601.96	\$54,176.40
JOHNSON, DUANE A & CHERI L	27209 CLIFF AVE HARRISBURG, SD 57032	LARSEN'S ADD TRACT 1A OF NE1/4NE1/4 35-100- 50 LOT .83 AC	100.49.75.B10A	0.83	149.95	\$13,495.50
NORTHERN NATURAL GAS CO	PO BOX 3330 OMAHA, NE 68103	LOTS 1 & 2 NE1/4 *EX.272 AC* 35 100 50	100.49.75.1012	6.10	236.54	\$21,288.60
NORTHERN STATES POWER CO		TRACT 1 OF SW1/4 *50X50' SW1/4SW1/4* 36 100 50	100.49.76.C100	0.06	49.80	\$4,482.00
COOK FAMILY LMTD PARTNERSHIP	C/O SCOTT, L GORDON TRUST 16391 530TH ST POCAHONTAS, IA 50574	SW1/4 *EX N 40 AC* 25 100 50	100.49.65.3000	121.76	144.15	\$12,973.50

\$988,083.90

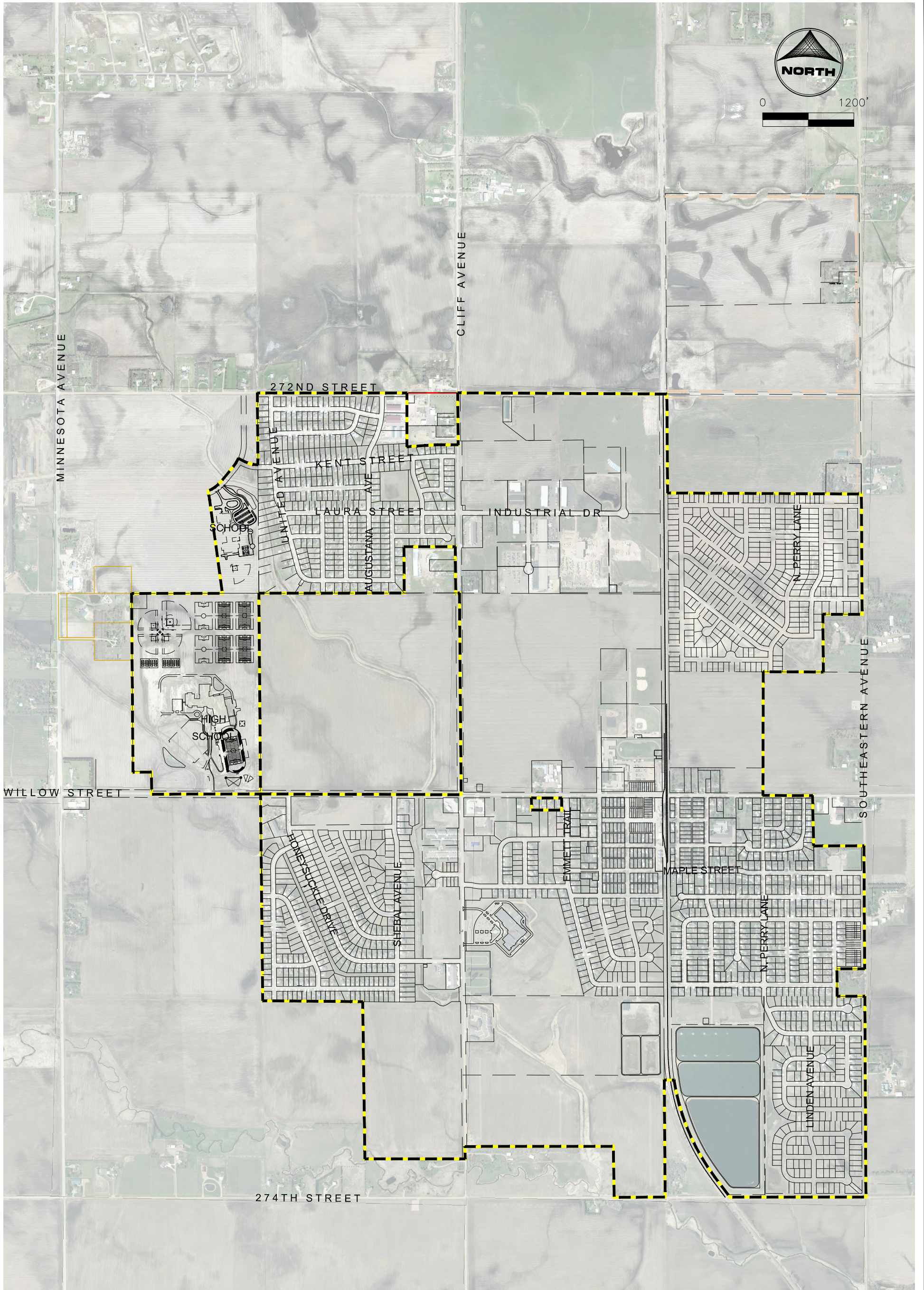
WILLOW STREET PRELIMINARY ASSESSMENT SCHEDULE

OWNER NAME	OWNER ADDRESS	LEGAL DESCRIPTION	PID	AREA	FRONT FOOTAGE	ASSESSMENT \$90.00/Ft
STATE OF S.D.	DEPT OF TRANS. 700 E BROADWAY PIERRE, SD 57501	E 165' OF S 543' OF SE1/4SE1/4 INCLUDING PART OF TR 1 & H-1* 34 100 50	100.49.74.4040	1.80	230.93	\$20,783.70
KKKP PROPERTY LLLP	47468 280TH ST WORTHING, SD 57077	LOTS 1 & 2 NE1/4 *EX LOT H-1* (.70 AC) 3 99 50	099.50.03.1000	159.95	231.04	\$20,793.60
KIEFFER, BARBARA A & LEANNE JUHNKE, & PATRICIA M DIRKS	47402 273RD ST HARRISBURG, SD 57032	5 AC IN SW1/4SW1/4 *EX .07 AC RD & LOT H-1* 35 100 50	100.49.75.3030	3.86	421.80	\$37,962.00
HARRISBURG SCHOOL DISTRICT 41-2	200 WILLOW ST HARRISBURG, SD 57032	SLACK HIGH SCHOOL ADD TR NO. 1 *EX LOT 1 OF TR 1 *- SW1/4 99.08 AC 35 100 50	270.73.00.100	99.44	1436.96	\$129,326.40
CHRISTENSEN, DONALD & KAREN	C/O DONS CUSTOM CABINETRY 27300 SD HWY 115 HARRISBURG, SD 57032	TRACT 1 NW1/4NW1/4 *EX LOT H-2* 2 99 50	099.50.02.A100	1.44	335.28	\$30,175.20
SCHWARTZLE REAL ESTATE LLC	801 RYAN DR SUITE A TEA, SD 57064	HSBG - GREEN MEADOWS ADD -LOT 1 OF TR 6 1.42 AC	270.70.00.601	1.43	233.66	\$21,029.40
THORNTON, ARTHUR H	C/O FARMERS NATIONAL CO PO BOX 542016 OMAHA, NE 68154	SE1/4 *EX .42 AC RD* 35 100 50	100.49.75.4000	157.71	2588.21	\$232,938.90
OPPOLD ESTATES, LLP	JAMES F OPPOLD - TRUSTEE 2470 TIMBERVIEW DR HASTINGS, MN 55033	LOTS 1 & 2 NW1/4 *EX TR 1 & 2 & PART SOLD* 2 99 50	099.50.02.2000	143.00	2255.09	\$202,958.10
SCHWARTZLE REAL ESTATE LLC	801 RYAN DR SUITE A TEA, SD 57064	HSBG - GREEN MEADOWS ADD - LOT 2 OF TR 6	270.70.00.602	0.43	54.26	\$4,883.40
COSTELLO INVESTMENTS LLC	PO BOX 2238 SIOUX FALLS, SD 57101	HSBG - GREEN MEADOWS ADD - TR 11 3.14 AC 1	270.70.00.T011	3.13	75.41	\$6,786.90
COSTELLO INVESTMENTS LLC	PO BOX 2238 SIOUX FALLS, SD 57101	HSBG-LOTS 1 & 2 NE1/4 -2 99 50 *EX PARTS SOLD & GREEN MEADOWS ADD* 2 99 50	270.55.02.002	19.58	1570.64	\$141,357.60
SLACK, VERNON L & CAROLYN AS TRUSTEES	47198 BAKKER CIR SIOUX FALLS, SD 57108	SW1/4 *EX 5 AC SW COR & .35 AC RD & 16.54 AC NW1/4SW1/4 & LOT H-1 & SLACK 35 100 50	100.49.75.3000	38.07	734.42	\$66,097.80
ALPINE BUILDERS LLC	27151 477TH AVE HARRISBURG, SD 57032	HSBG - GREEN MEADOWS ADD - TRACT 13C- NE1/4 .833 AC 2 99 50	270.70.00.T13C	0.83	333.07	\$29,976.30

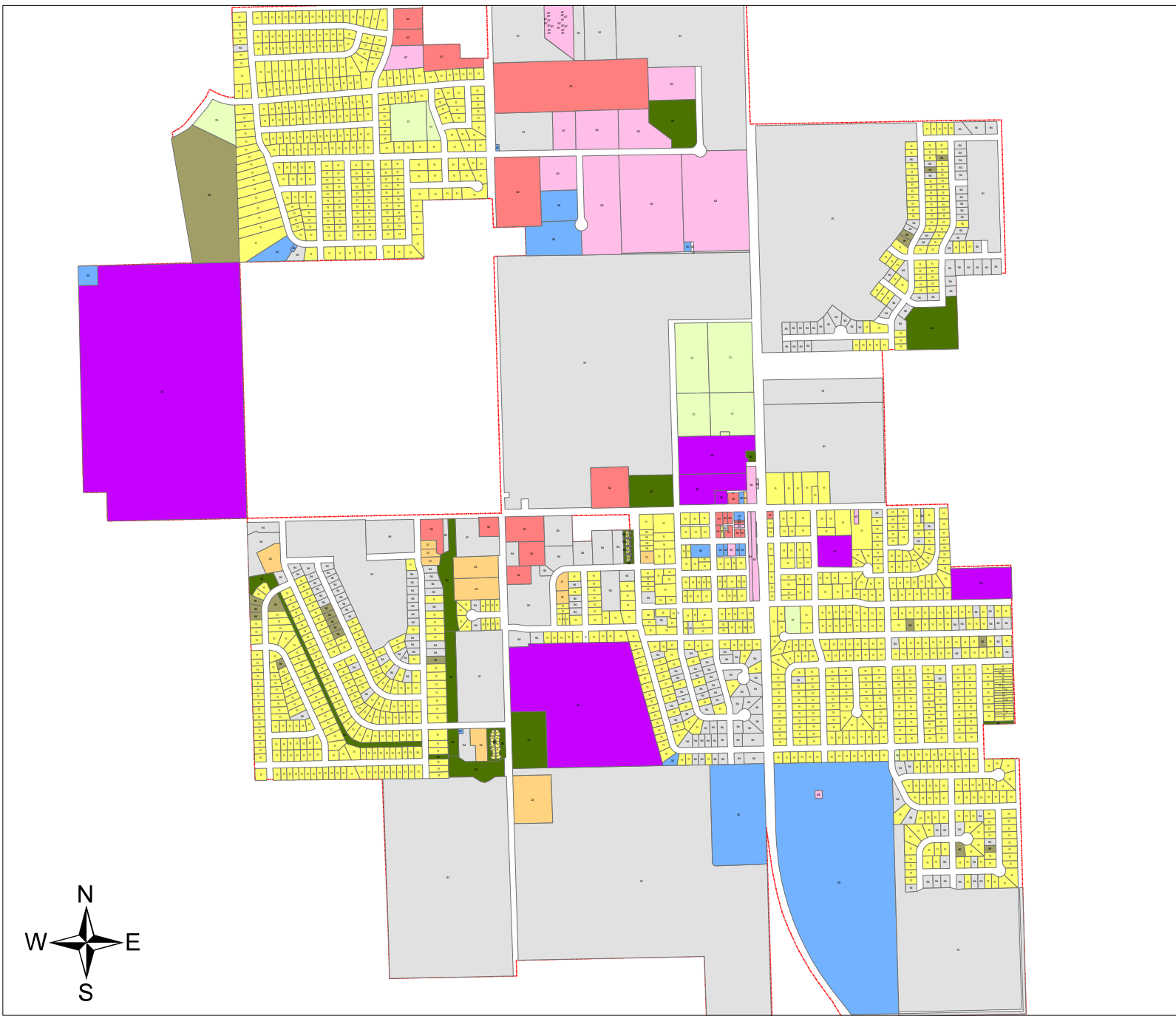
\$945,069.30

Appendix F – Miscellaneous Harrisburg City Maps

1. Official Harrisburg City Map
2. 2008 Future Land Use Map
3. Current Land Use Map
4. Current Zoning Map
5. Proposed Growth Areas Map
6. Proposed Future Land Use Map
7. Street Classification Map
8. Harrisburg School District Boundaries
9. Harrisburg Parks and Trails Master Plan
10. MPO Multi-Use Trail Corridor Study – Most Feasible Concept Map














City of Harrisburg, South Dakota



Current Land Use Map

Legend

2010 Land Use Codes

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Single Family; Two Family |  Churches; Primary, Secondary & Special Education |  Cemetery; Natural Drainage Facility or Dike; Private Common Space or Nature Area |
|  Townhouse; Apartments (>2 Units) |  Commercial |  Crop Land; Limited Development Potential; Developing Sites - New and Redeveloping |
|  Government Offices; Other Offices; Public Parking Lots; Public Service Facilities; Leased Private Parking Lots |  Assembly, Processing & Manufacturing; Warehousing; Distribution; Wholesale; Mini-storage |  Building Permit |
| |  Parks and Recreation |  City Limits |

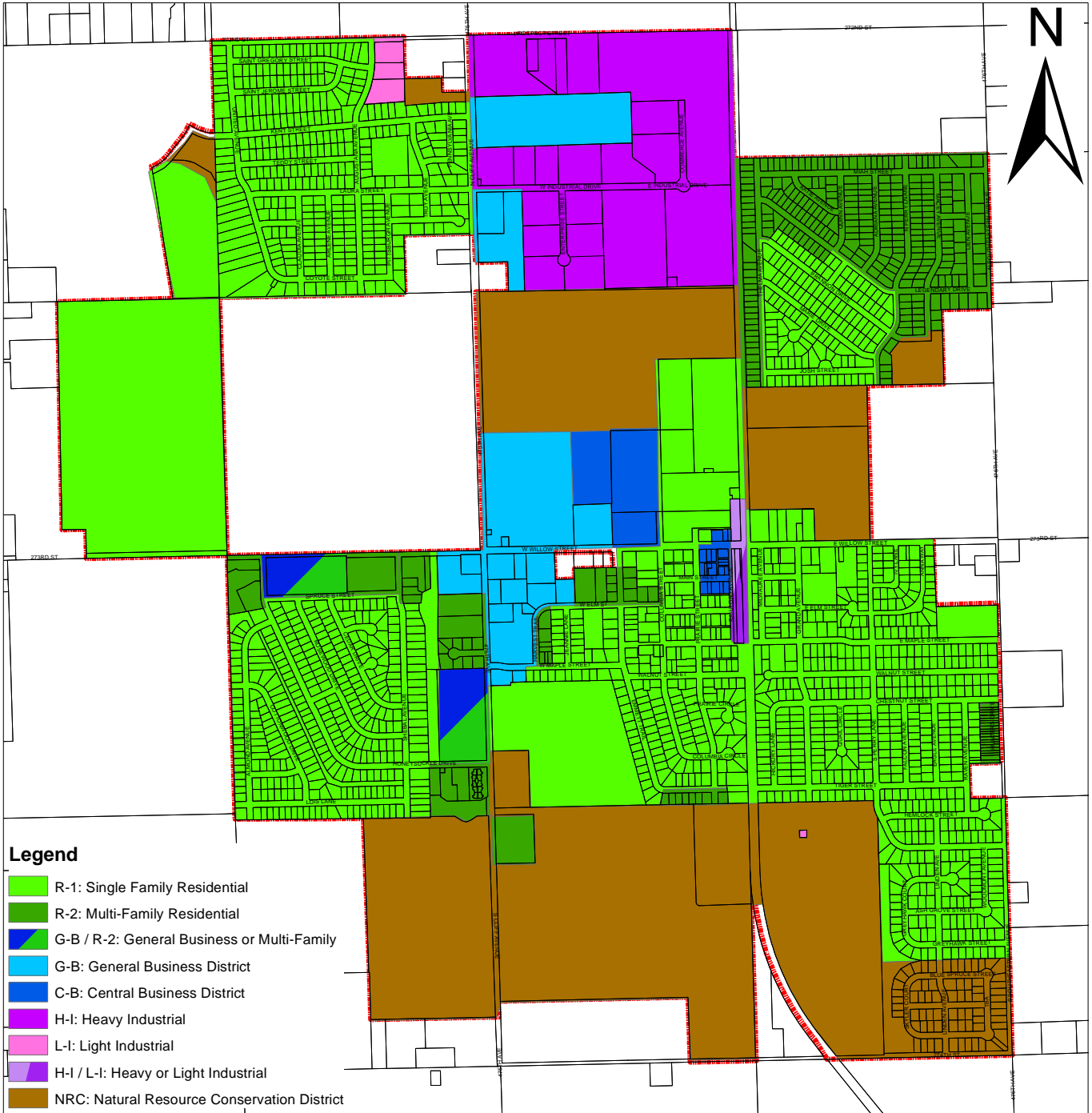


CITY OF HARRISBURG™

Official Zoning Map

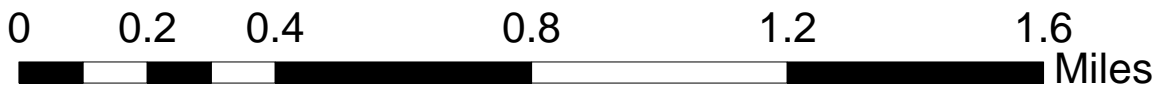


Updated: 9/29/10



Legend

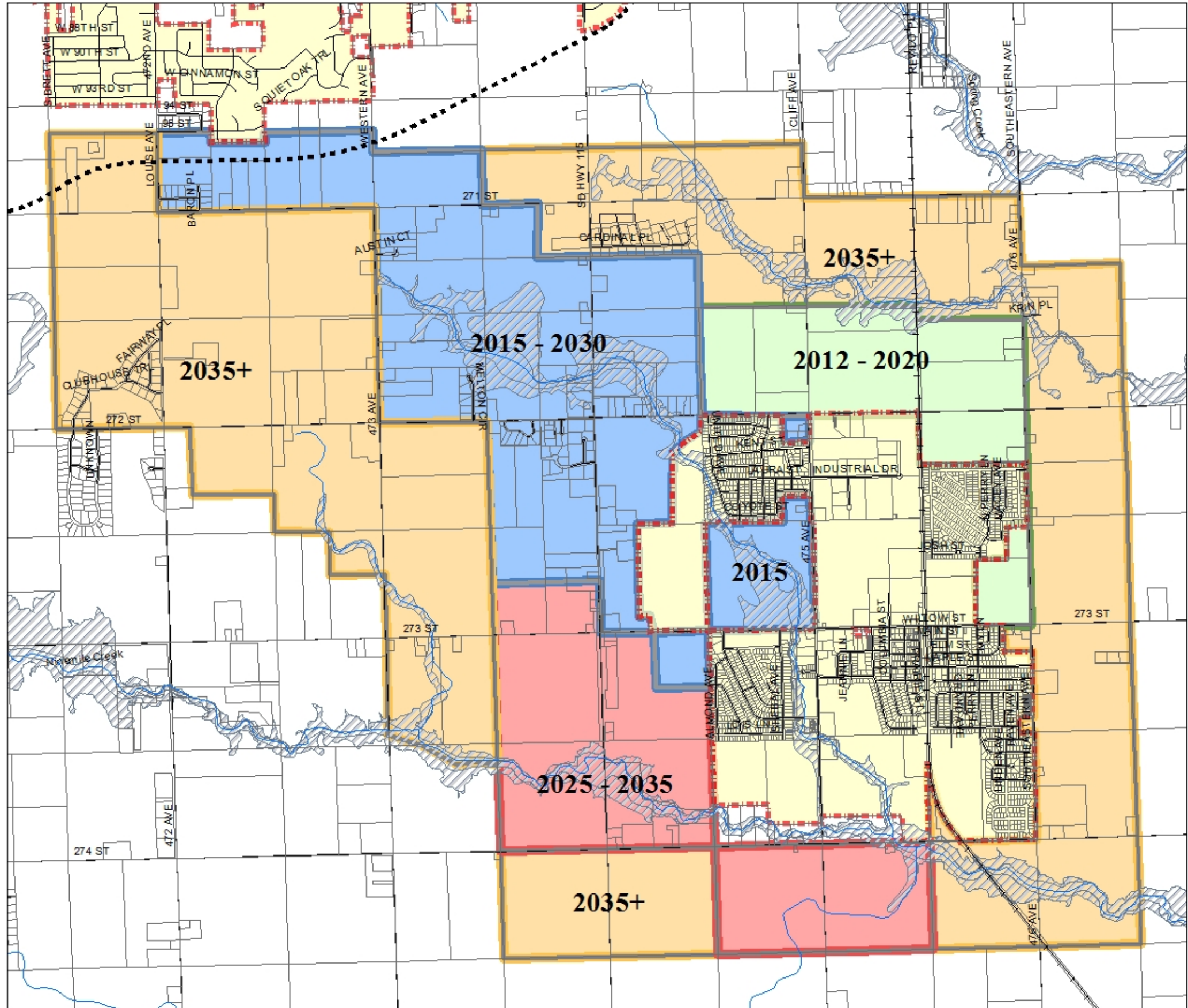
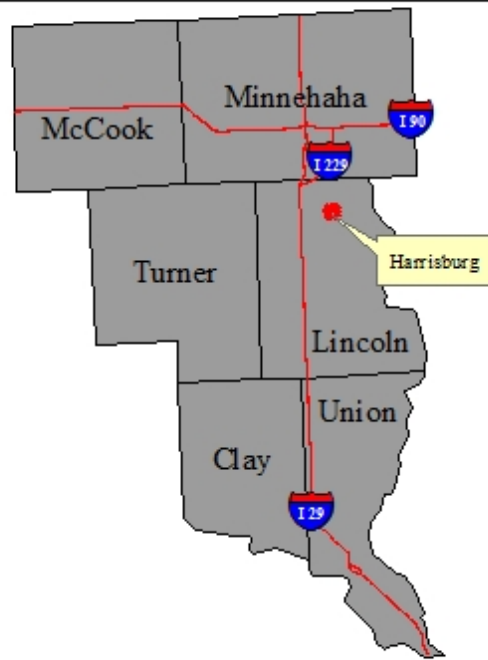
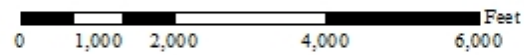
- R-1: Single Family Residential
- R-2: Multi-Family Residential
- G-B / R-2: General Business or Multi-Family
- G-B: General Business District
- C-B: Central Business District
- H-I: Heavy Industrial
- L-I: Light Industrial
- H-I / L-I: Heavy or Light Industrial
- NRC: Natural Resource Conservation District



Legend

Timeline

- 2012 - 2020
- 2015 - 2030
- 2025 - 2035
- 2025 - 2040
- 2035+
- Roads
- SD100(Planned)
- Rail
- Creeks, Rivers & Lakes
- 100-Year Floodplain
- City Limits



Map 5

City of Harrisburg

Growth Areas



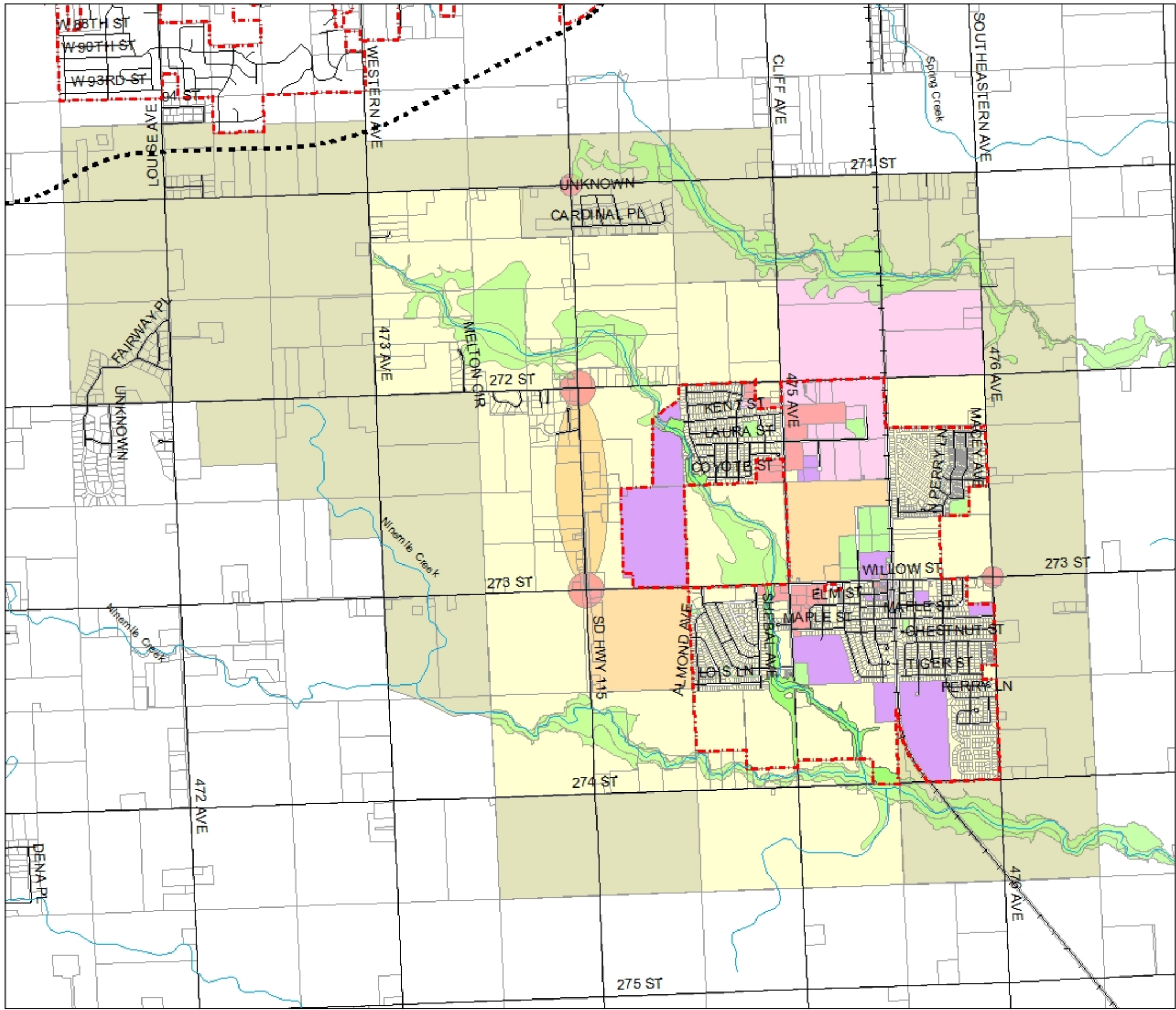
Disclaimer: Liability: This information has been secured from sources we believe to be reliable; however, we do not guarantee the accuracy of the information contained herein. This may be used for informational purposes only. It is not intended as a basis for an investment decision.

Legend

Future Land Use

- Residential
- Institutional
- Industrial
- Commercial
- Mixed Use
- Parks, Recreation & Open Space
- Urban Reserve
- Roads
- SD100(Planned)
- + Rail
- Creeks, Rivers & Lakes
- City Limits

0 1,000 2,000 4,000 6,000 Feet



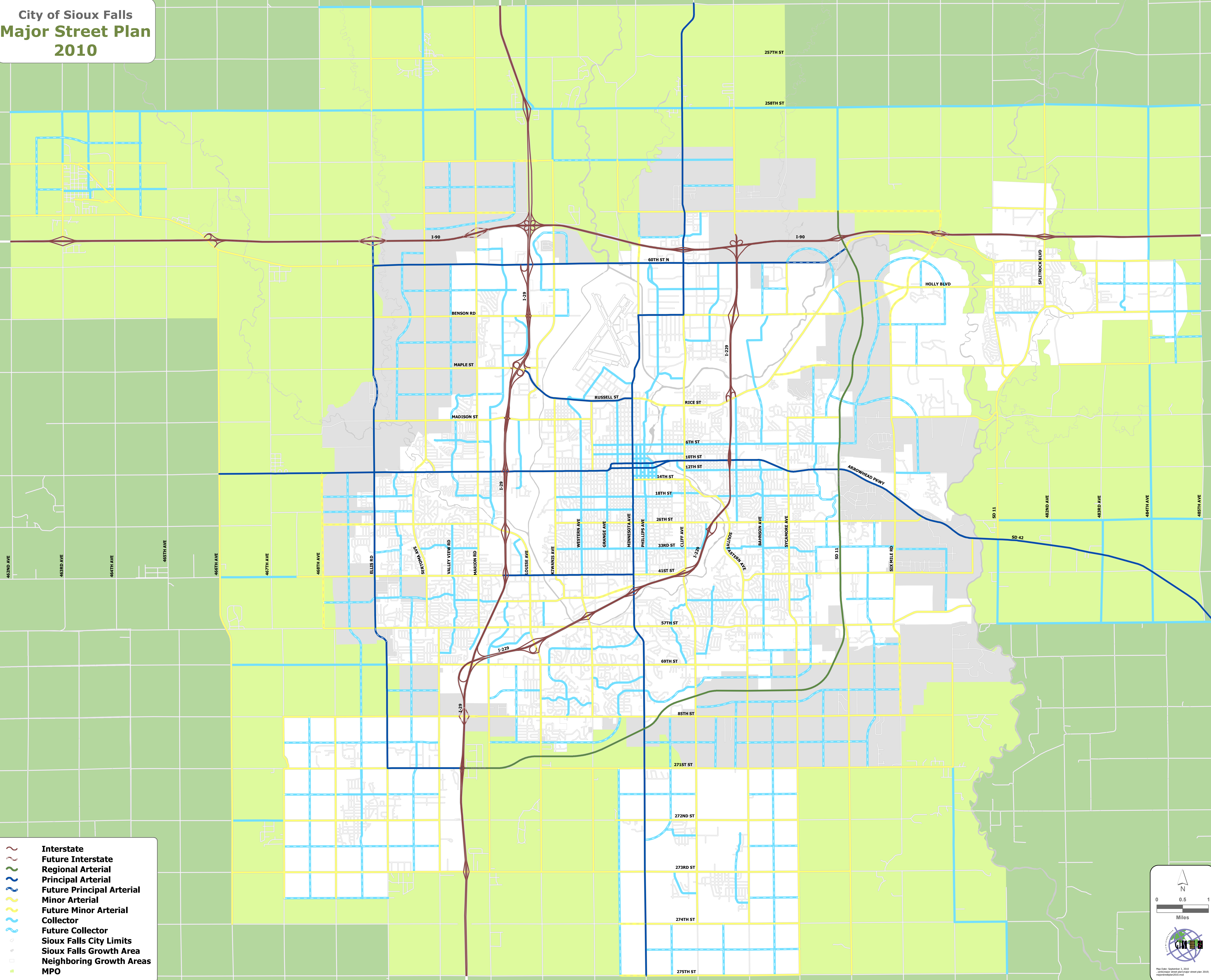
City of Harrisburg

Future Land Use

SECOG
SOUTHERN ENVIRONMENTAL COOPERATIVE ORGANIZATION

Disclaimer: This information has been derived from sources we believe to be reliable; however, we do not guarantee the accuracy of the information contained herein. This map does not eliminate the need for an onsite investigation.

**City of Sioux Falls
Major Street Plan
2010**




-  Interstate
-  Future Interstate
-  Regional Arterial
-  Principal Arterial
-  Future Principal Arterial
-  Minor Arterial
-  Future Minor Arterial
-  Collector
-  Future Collector
-  Sioux Falls City Limits
-  Sioux Falls Growth Area
-  Neighboring Growth Areas
- MPO

N

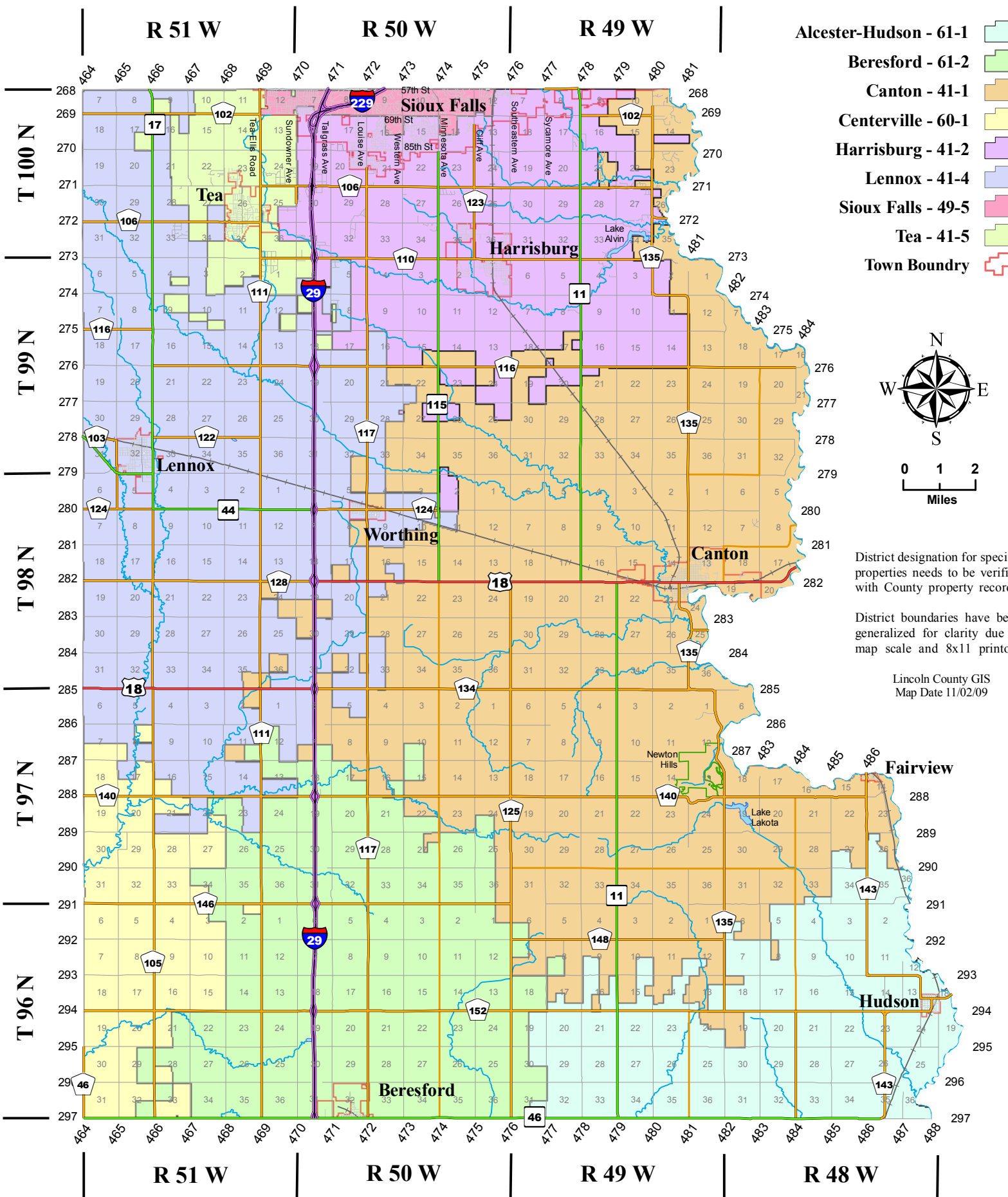
0 0.5 1

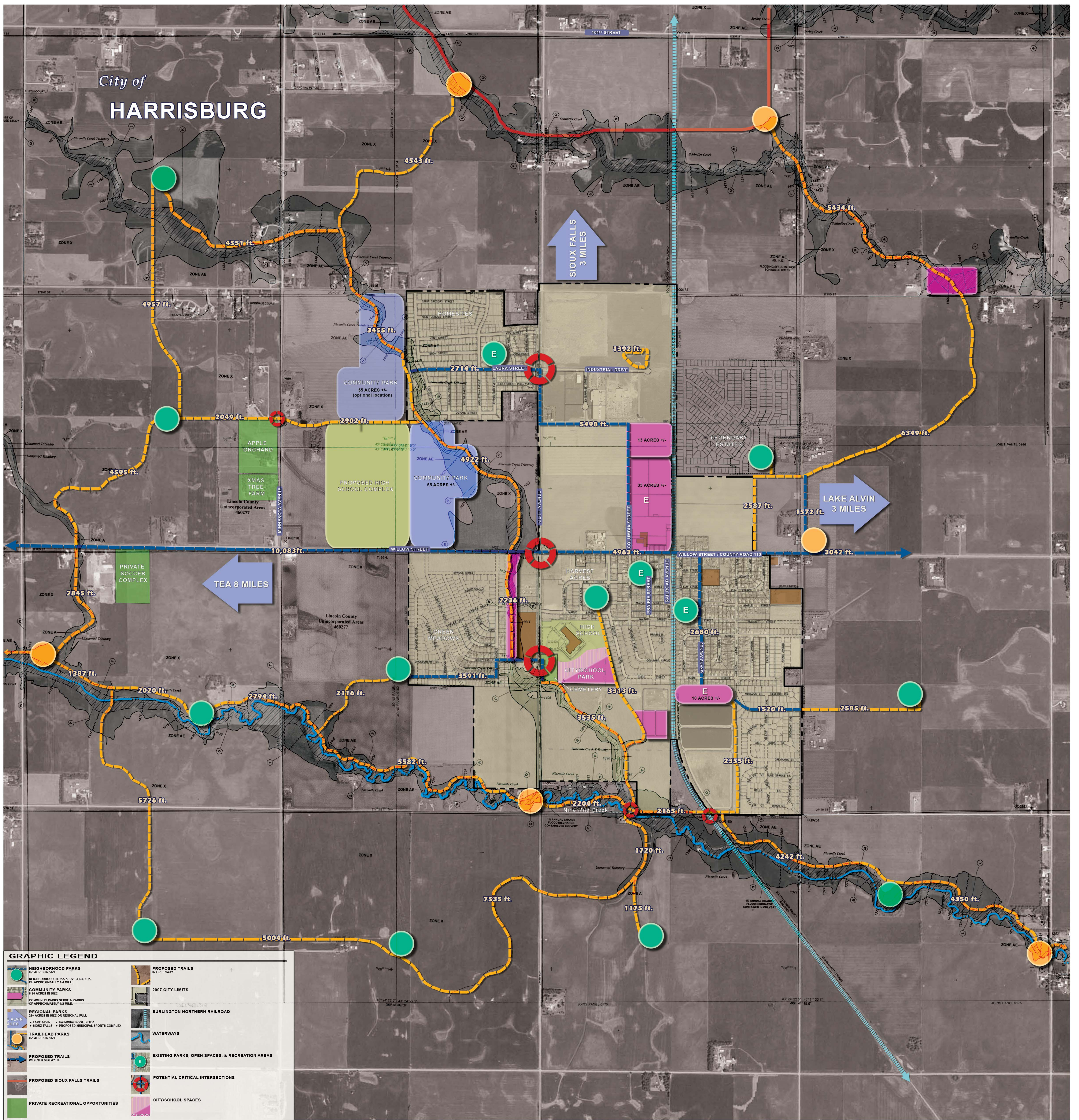
Miles



Map Date: September 3, 2010
 "Sioux Falls Metropolitan Planning Organization Street Plan 2010"
 www.sioxfallsmetroplanning.org

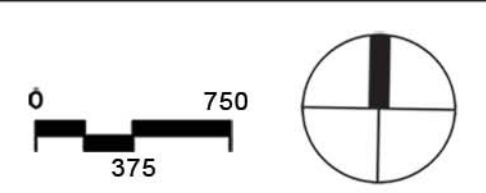
Lincoln County School Districts





HARRISBURG PARKS & TRAILS MASTER PLAN

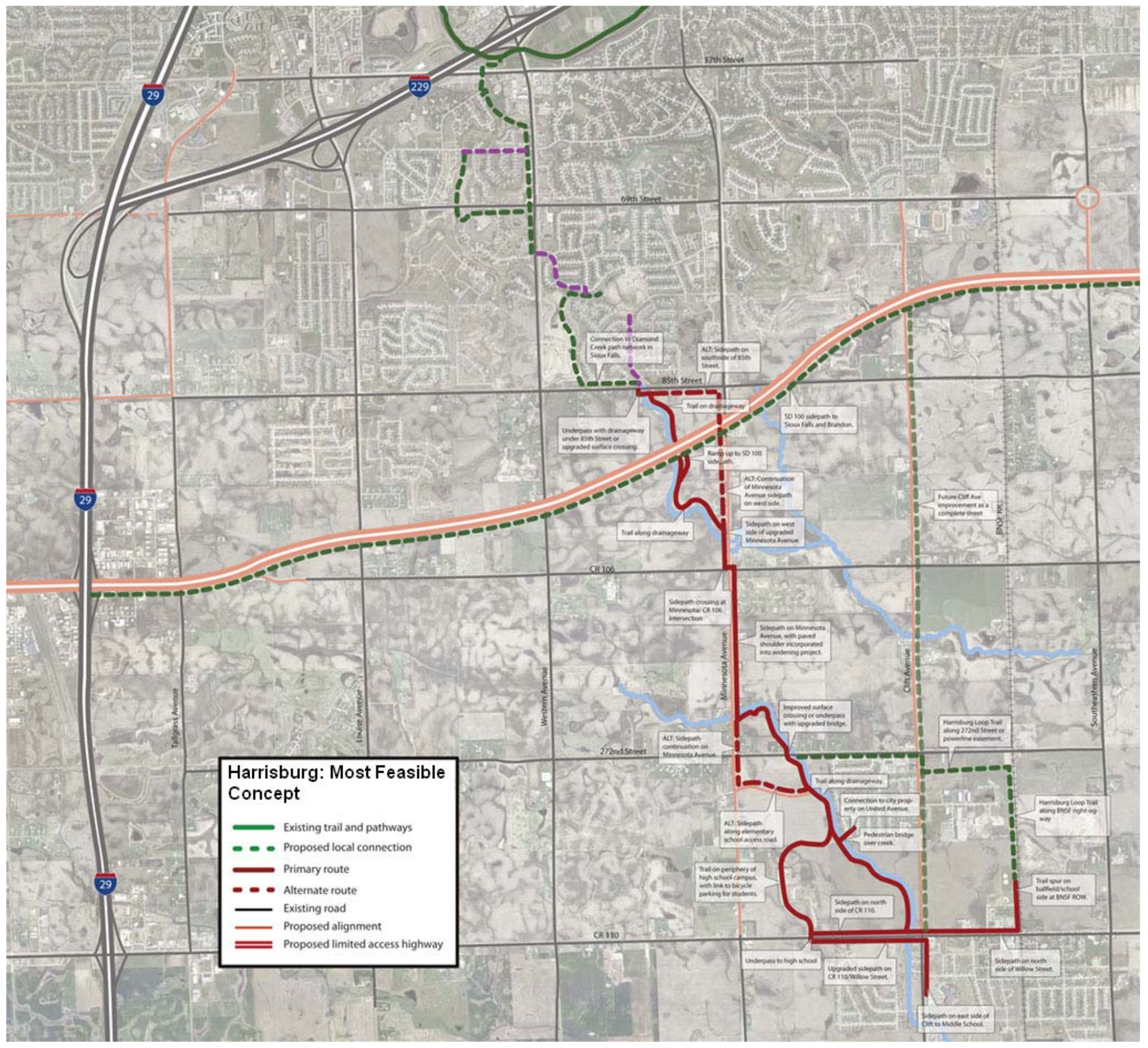
Concept Development
Scale: 1"=750'



Updated Recommendation
SUMMER 2007

Harrisburg: Most Feasible Concept

- Existing trail and pathways
- - - Proposed local connection
- Primary route
- - - Alternate route
- Existing road
- Proposed alignment
- = = = Proposed limited access highway



Appendix G – Comments from Draft Report

SDDOT Comments on Harrisburg Transportation Master Plan

1. The study only looks at the existing arterial routes and not at any future routes that could be used to improve traffic flows in the future. SDDOT would recommend that the study include any planned collector routes as part of the study analysis to show the planned networks impact to the system.
2. The study has projected traffic volumes on Cliff Ave much higher than for SD11 & SD115. With Cliff Ave being proposed as a two lane, roadway traffic will become very congested and will find alternative routes.
3. Exhibit 24 shows the level of service (LOS) for 2035 projected traffic volumes without the elementary school and has several of the intersections at a LOS of F for PM traffic. Exhibit 25 which are the 2035 projected traffic volumes with the elementary school included, has the intersections operating at a LOS of one at D, two at C and one at A along Cliff Ave. Traffic volumes at all four intersections along Cliff Ave only show changes in projected traffic volumes of less than 10 vehicles entering. The intersection changes between the two exhibits would not result in an improvement in LOS.
4. SDDOT compared results from this study with two software packages that use the Highway Capacity Manual methods to calculate LOS for intersections. The SDDOT results from these two software packages shows that Cliff Ave will operate at a LOS F for both the AM & PM peak hour projected traffic volumes, with Cliff Ave as a two lane road.
5. The Study mixes roadway designations throughout the report which makes it difficult to follow. They have a mixture of street numbers, local street names, and highway designations for roadways. Recommend making consistent throughout the study.
6. The SDDOT project reference on page 46 should read:

Minnesota Avenue from Co Hwy 110 north to 270th St./85th St.

(Second Sentence should read) This project is currently in the Statewide Transportation Improvement Program (STIP) for 2015.

7. Page 15: Include reference to SDDOT SD115 project above in the Planned Capital Improvements.
8. Street Classification Map: Add proposed Collector streets to the map from the major street plan.
9. Page 24: Is full access to Tom Sawyer and Minnesota consistent with the SDDOT Access Management plan for that corridor?

Responses to SDDOT Comments

1. The scope of the project was to analyze the arterial roadways. The Sioux Falls MPO Travel Demand Model was utilized for the projected 2035 traffic volumes and accounts traffic volumes from future land uses.
2. This is a general comment from the SDDOT. No action taken.
3. The incorrect graphic was shown in the draft report. The graphic in Exhibit 24 has been updated.
4. HR Green contacted the SDDOT and requested the results of their analysis. After further analysis, the SDDOT obtained similar results to what was shown in the draft report. The SDDOT is agreeable to using the level of services in the report.
5. Roadway names and designations were updated for consistency throughout the report.
6. Updated reference on page 46 as noted.
7. Added reference to SDDOT SD115 project as noted.
8. Included the City of Sioux Falls major street plan map from the MPO Long Range Transportation Plan which illustrates proposed collector streets within the study area.
9. HR Green contacted the SDDOT on this issue. After discussion, it was decided to state in the report that the future location of the development access onto Minnesota Avenue was assumed to connect with Minnesota Avenue at the intersection of Tom Sawyer Trail and Minnesota Avenue. The final location of this access shall be coordinated with and approved by the SDDOT.