Interstate-290 Carbon Monoxide Build vs No-build Analysis
For Individual Intersection Locations in Oak Park

Description

Carbon monoxide (CO) is an odorless, colorless gas that is somewhat lighter than air. CO is produced by the incomplete burning of fuels, including coal, wood, charcoal, oil, kerosene, propane, and natural gas. Products and equipment powered by these fuels, such as portable generators, cars, lawn mowers, and power washers, also produce CO. CO can cause harmful health effects by reducing the body's ability to deliver oxygen to the brain and other organs and tissues. ("Health Beat – Carbon Monoxide") [1]

Health Effects

The health effects of CO depend on the level of CO present and the length of exposure, as well as each individual's health condition. CO levels are measured in parts per million (ppm). Most healthy people will not experience any symptoms from prolonged exposure to CO levels up to 70 ppm, but some heart patients might experience an increase in chest pain at lower levels. As CO levels increase and remain above 70 ppm, symptoms become more noticeable and can include headache, fatigue and nausea. At sustained CO levels greater than 150 to 200 ppm, disorientation, unconsciousness, and death are possible. ("Carbon Monoxide Questions and Answers")[2]

Exposure

People are exposed to CO by inhaling it in the various locations where they spend their time. Studies of personal exposure have generally found that the largest portion of the day is generally spent indoors and the largest percentage of the time in which an individual is exposed to ambient CO occurs indoors. As a result, CO levels in indoor locations are an important factor in a person's total CO exposure. For example, persons who smoke and persons who breathe second-hand smoke indoors have much higher CO exposures than persons in non-smoking locations. ("Quantitative Risk and Exposure Assessment for Carbon Monoxide - Amended")[3]

Nationally, and particularly in urban areas, the majority of CO emissions to outdoor air come from vehicles. Typically, the highest CO exposure levels are from being inside vehicles. Because motor vehicle emissions contribute to outdoor CO levels, both the time spent in motor vehicles and the elevated CO levels occurring on and near roads with heavy traffic can affect human exposure. ("Quantitative Risk and Exposure Assessment for Carbon Monoxide - Amended")[4]

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[1] Health Beat - Carbon Monoxide. (n.d.). Retrieved April 2, 2015, from http://www.idph.state.il.us/public/hb/hbcarbon.htm

[2] Carbon Monoxide Questions and Answers. (2012, July 30). Retrieved April 2, 2015, from http://www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/Carbon-Monoxide-Information-Center/Carbon-Monoxide-Questions-and-Answers-/

[3] Quantitative Risk and Exposure Assessment for Carbon Monoxide - Amended. (2010, July 1). Retrieved April 2, 2015, from http://www.epa.gov/ttn/naaqs/standards/co/data/CO-REA-Amended-July2010.pdf

[4] Quantitative Risk and Exposure Assessment for Carbon Monoxide - Amended. (2010, July 1). Retrieved April 2, 2015, from http://www.epa.gov/ttn/naaqs/standards/co/data/CO-REA-Amended-July2010.pdf

Standards

According to the Policy Assessment for the Review of the Carbon Monoxide National Ambient Air Quality Standards (NAAQS) published by the USEPA,

> "EPA initially established NAAQS for carbon monoxide (CO), under section 109 of the Act, on April 30, 1971. The primary standards were established to protect against the occurrence of carboxyhemoglobin levels in human blood associated with health effects of concern. The standards were set at 9 parts per million (ppm), as an 8-hour average and 35 ppm, as a 1-hour average, neither to be exceeded more than once per year (36 FR 8186). In the 1971 decision, the Administrator judged that attainment of these standards would provide protection of public health with an adequate margin of safety and would also protect against known and anticipated adverse effects on public welfare, and accordingly set the secondary (welfare-based) standards identical to the primary (health-based) standards."
> ("Review of National Ambient Air Quality Standards for Carbon Monoxide; Final Rule")[5]

On August 12, 2011, USEPA issued a decision to retain the existing NAAQS for CO. After careful review of the available health science, USEPA concluded that the current standards provide the required level of public health protection, including protection for people with heart disease, who are especially susceptible to health problems associated with exposures to CO in ambient air.

There are no secondary (welfare-based) NAAQS for CO due to a lack of evidence of direct effects on public welfare at these low levels in the environment. USEPA has concluded that the current evidence does not provide support for establishing secondary CO standards. ("FACT SHEET NATIONAL AMBIENT AIR QUALITY STANDARDS FOR CARBON MONOXIDE – FINAL RULE ")[6]

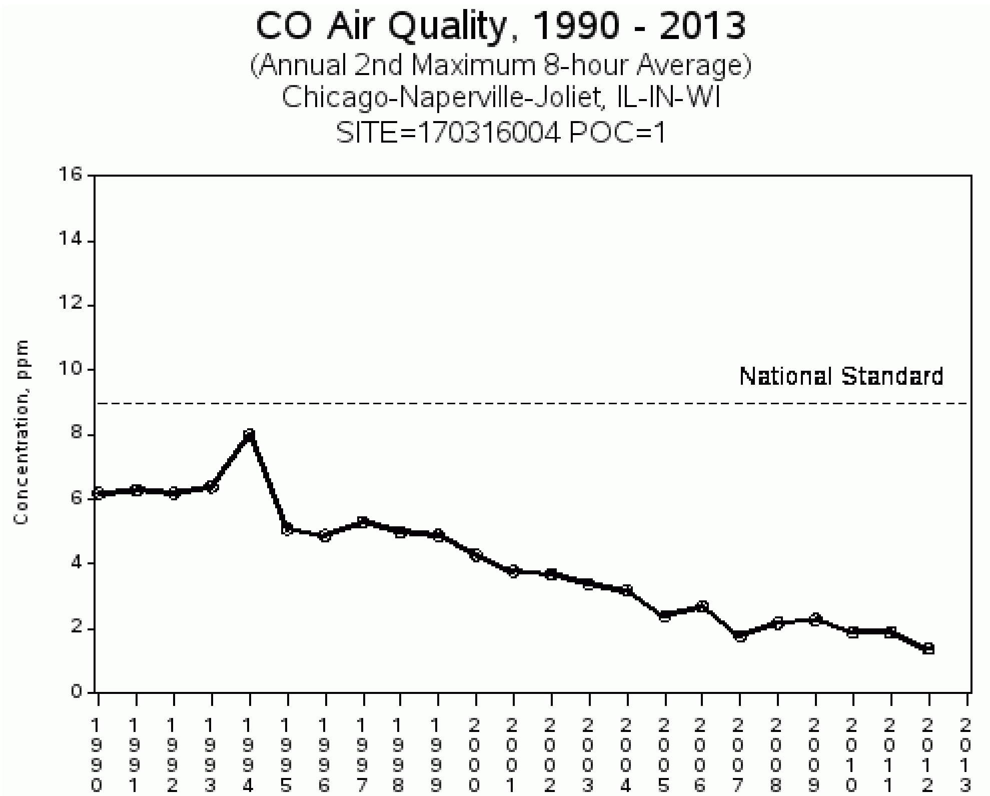
According to USEPA data, every location in the country has air quality that meets the current CO standards. Most sites have CO levels less than the NAAQS since the early 1990s. Since then, improvements in motor vehicle emissions controls have contributed to significant reductions in outdoor CO levels.

[5] Review of National Ambient Air Quality Standards for Carbon Monoxide; Final Rule. (2011, August 31). Retrieved April 2, 2015, from http://www.gpo.gov/fdsys/pkg/FR-2011-08-31/html/2011-21359.htm

[6] FACT SHEET NATIONAL AMBIENT AIR QUALITY STANDARDS FOR CARBON MONOXIDE – FINAL RULE. (2011, August 12). Retrieved April 2, 2015, from http://www.epa.gov/airquality/carbonmonoxide/pdfs/COFactSheetAugust12v4.pdf

Local Trends in CO Levels

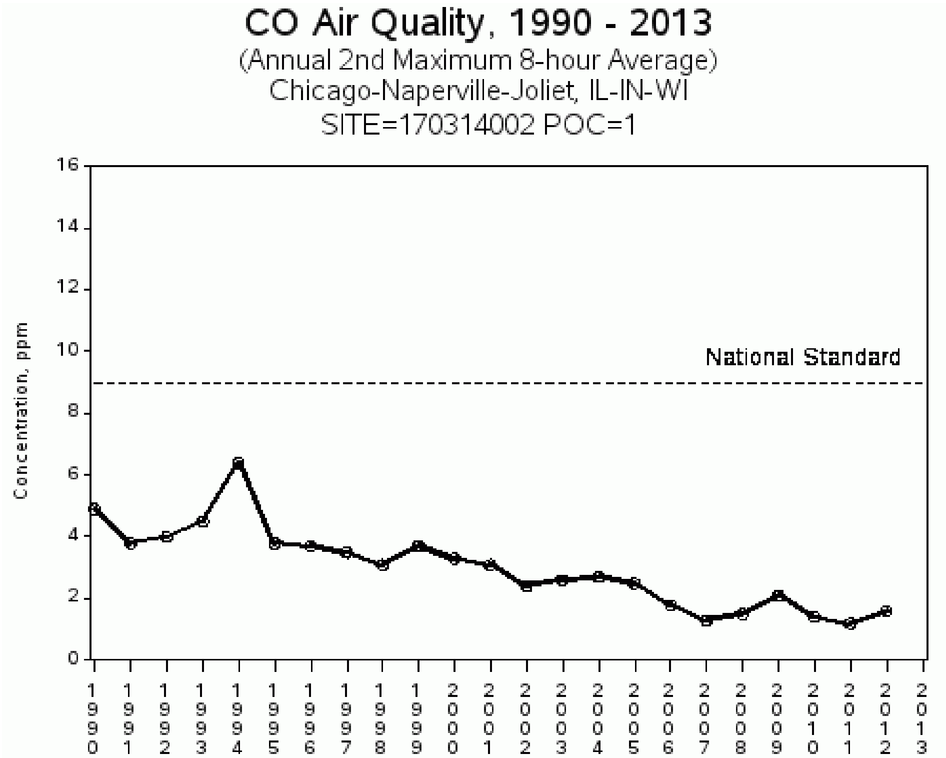
Trends in outdoor CO levels can vary from one area to another. Local trends can be viewed at individual monitoring locations as shown on the three graphs below. These three locations are the closest monitoring sites in the project area. ("Local Trends in CO Levels ")[7] Since there is no federal or state monitoring requirement for CO, monitoring at these three sites was discontinued in 2013.



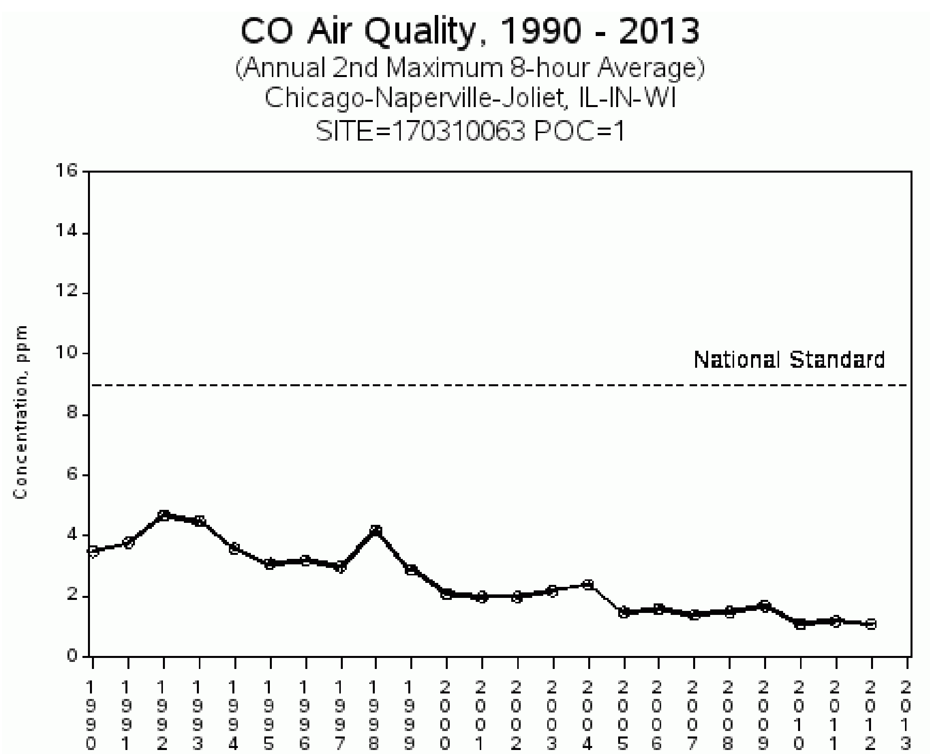
Location:

Cook County, Village of Maywood, 1505 S. First Ave., Com Ed Maintenance Bldg.

[7] Local Trends in CO Levels. (n.d.). Retrieved April 2, 2015, from http://www.epa.gov/airtrends/carbon.html#coloc



Location: Cook County, Town of Cicero 1820 S. 51st Ave., Cook County Trailer



Location: Cook County, City of Chicago, 321 S. Franklin, CTA Building

The graphs above show that CO levels have dropped considerably over the past 20 plus years and are well below the NAAQS. As a result, traffic volumes have little ability to raise the outdoor CO levels to approach or exceed the NAAQS; especially the traffic volumes that are projected for the study area intersections.

The 2040 traffic volumes (worst case) projected for the intersections, in this case the highest volumes were projected for the General Purpose (GP) Lane alternative, were much lower than the threshold for requiring a CO micro-scale analysis. Typically, projected intersection traffic volumes are exempt from micro-scale CO analysis under current IDOT policy when the highest design-year approach volume on the busiest leg of the intersections is less than 5,000 vehicles per hour or 62,500 vehicles per day average daily traffic. This is true at all intersection locations associated with the I-290 interchanges. These COSIM traffic volume limits have been established because at low traffic volumes, the results of the analysis predict CO levels that are well below the threshold for public health concern.

A detailed discussion of the individual intersections in Oak Park, including the receptor locations and traffic operations, is included in Appendices A and B.

Appendix A
COSIM Results for Individual Intersections in Oak Park

The Illinois Department of Transportation (IDOT) currently uses the computer screening model Illinois Carbon Monoxide (CO) Screen for Intersection Modeling (COSIM) to estimate worst-case CO levels for proposed roadway projects affecting signalized intersections. The purpose of this memo is to compare the results of the COSIM Analysis of the I-290 intersections under two scenarios; the year 2040 Build and the Year 2040 No-build scenarios. This comparison identifies the sensitivity of CO levels under the 2040 Build conditions when compared to the 2040 No-build conditions.

Intersections were analyzed using Year 2040 intersection traffic volumes. Since a preferred alternative has not been determined at this time, the projected intersection traffic data for the General Purpose Lane alternative was used since it represents the highest intersection traffic volumes under Build conditions. The proposed geometry was used to identify the intersection configurations in 2040 Build condition. Existing intersection configurations were assumed to represent the 2040 No-build configuration. Micro-scale carbon monoxide (CO) analysis was performed using COSIM 4.0.

The 2040 traffic volumes projected for the subject intersections are much lower than the threshold for requiring microscale analysis. Typically, projected intersection traffic volumes are exempt from micro-scale CO analysis under current Department policy when the highest design-year approach volume on the busiest leg of the intersections is less than 5,000 vehicles per hour or 62,500 average daily traffic. (ADT) This is true at all intersection locations associated with the I-290 interchanges in Oak Park. However, it was decided that in COSIM should still be used to test the sensitivity of design changes with respect to air quality, based upon stakeholder concerns.

For each intersection, COSIM 4.0 was used and traffic volumes, approach speeds, signal cycle lengths, and receptor locations were input for the No-build and Build scenarios (See Appendix B). A conservative background CO concentration of 3 parts per million (ppm) for the entire corridor was used; which is likely high given that the 2012 Illinois Environmental Protection Agency Annual Air Quality Report suggests that this value is less than 2 ppm.

At each interchange/intersection, values representing the highest average CO level predicted within a one hour time interval and within an 8-hour time interval are provided and arranged by receptor. Receptors are identified by interchange/intersection quadrant and given a general description. Additional information on the existing and proposed conditions and existing and proposed traffic operations are provided to assist with the understanding of the improved intersection level of service and improved operating conditions typically provided by the proposed improvements.

<u>**Harlem Avenue and I-290 Ramps**</u>

Existing Conditions

Harlem Avenue lies within the village boundaries of Forest Park and Oak Park. The existing Harlem Avenue interchange consists of four ramps that exit/enter from/to I-290 on the left and intersect a single location at Harlem Avenue. Thus, the Harlem Avenue interchange is described as a single-point, left-hand ramp interchange. Harlem Avenue is also designated as a Class II Truck route. The existing interchange is shown in the figure below.

Existing and No-Build Traffic Operations

The existing ADT on Harlem Avenue ranges between 28,900 and 39,500 vehicles per day, consisting of 4 to 8 percent trucks. Operationally, Harlem Avenue currently functions at poor levels of service for both the AM and PM peak periods due, in part, to insufficient turn lane storage and poor lane channelization. Current signal phasing allows the right-turning traffic from the ramps to turn on the same phases as the left turning traffic from the opposite ramp. Due to the tight geometric design at this location, these movements conflict as they move into the accepting lanes.

Proposed Improvements

The proposed interchange type for this location is a Modified SPUI that retains the tight intersection geometry in the center of Harlem Avenue. The interchange is shown in the figure below:

Proposed Interchange Traffic Operations

The SPUI configuration results in improved interchange operations. Dual left-turn lanes on the ramps increase operational efficiency as opposing left turn lane movements can occur simultaneously. Additional storage is also provided on the I-290 off-ramps. This allows a longer green time to be allotted to the Harlem Avenue approaches.

In general, the following operational improvements are expected with the Modified SPUI concept at Harlem Avenue:

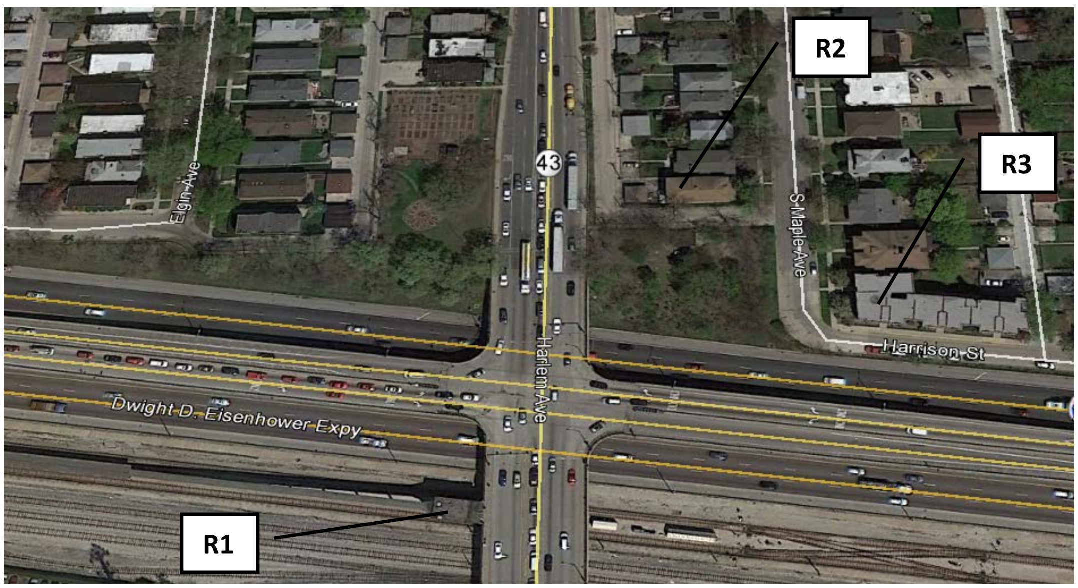
- Level of service improvements
- Improved pedestrian crossing times and locations
- Overall delay and queue reductions
- Improved driver expectation with right-side exit/entrance ramps

Much of the queue and delay improvements along Harlem Avenue can be attributed to the improved ramp connections and improved storage capacity on the ramps. During peak periods, the improved ramp geometry can store more traffic without ramp backups on to the expressway. This improved ramp storage allows more green time to be allotted to the north south traffic, thus reducing delay and traffic queues along Harlem Avenue. In addition, dual left turn lanes from the ramps clear the stored ramp traffic faster, which contributes to improved north-south traffic operations. Stopped traffic turning from the ramps at the intersection, will accelerate from a relatively flat ramp profile grade resulting in improve sight distance and acceleration times through the intersection. The delay and queue reduction provides additional benefit to the local east-west routes north and south of the expressway as the queues along Harlem Avenue will be less likely to back up across adjacent intersections, improving access to and from Harrison Street/Garfield Street on the south and to Jackson Boulevard on the north.

COSIM Results

Harlem Avenue receptors were identified as: a house in the northeast quadrant (R2); the CTA station head house at the southwest quadrant (R1); and the condo building on the corner of Harrison St and Maple Ave (R3). The results of the COSIM Analysis (see table below) indicate that the CO levels will vary only slightly, and remain significantly below the 8 hr. and 1 hr. standards.

PROPOSED RECEPTOR LOCATIONS



Harlem Ave & I-290 Ramps						
Receptor #	No-Build 1 hr. Ave (PPM)	Build 1 hr. Ave (PPM)	Standard 1 hr. Ave (PPM)	No-Build 8 hr. Ave (PPM)	Build 8 hr. Ave (PPM)	Standard 8 hr. Ave (PPM)
R1	4.5	5.0	35.0	4.0	4.4	9.0
R2	4.1	4.2	35.0	3.8	3.8	9.0
R3	3.6	3.7	35.0	3.4	3.5	9.0

Austin Boulevard and I-290 Ramps

Existing Conditions

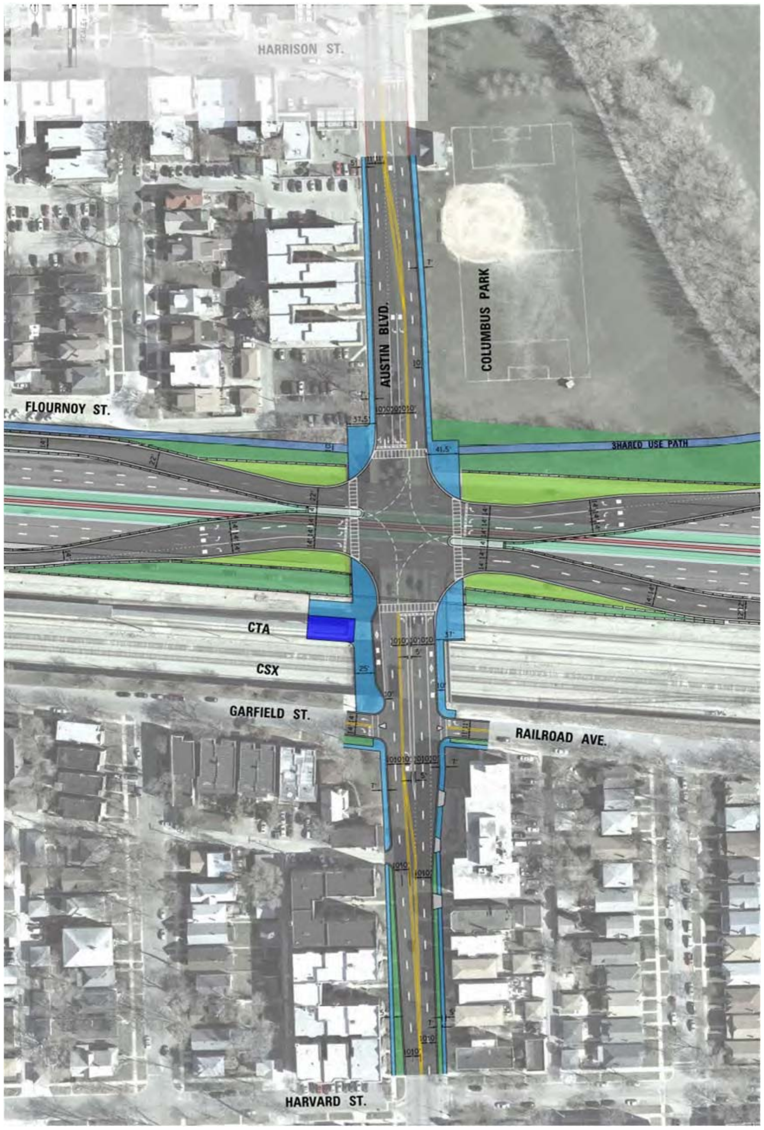
The existing Austin Boulevard interchange consists of four ramps that exit/enter from/to I-290 on the left and intersect at a single location at Austin Boulevard (see figure below). Thus, the Austin Boulevard interchange can be described as a single-point, left-hand ramp interchange.

Existing and No-Build Traffic Operations

The existing ADT on Austin Boulevard ranges between 20,000 and 22,000 vehicles per day, consisting of 4 to 7 percent trucks. Operationally, Austin Boulevard currently functions at substandard levels of services for both AM and PM peak periods. Overall operations are degraded because the existing off ramp left turn movements are split phased to prevent collisions due to overlapping turning paths. In addition, only single left turn lanes are provided, requiring extended green times to clear the ramp traffic. Current signal phasing allows the right- turning traffic from the ramps to turn on the same phases as the left turning traffic from the opposite ramp. Due to the tight geometric design at this location, these movements conflict as they move into the accepting lanes.

Proposed Improvements

The proposed interchange will retain some similarities to the existing interchange and is described as a modified SPUI (See figure below). The interchange ramps will be shifted to the right side of the expressway but will intersect in the center of the cross-street bridge in the same vicinity of the existing intersection.



Proposed Interchange Traffic Operations

The proposed ramp design also allows for increased storage on the ramps, allowing more cars to queue up during peak periods and preventing backups onto the mainline. This additional queue storage allows more green time to be allotted to the Austin Boulevard approaches while still reducing the risk of traffic backing up onto mainline I-290 from the ramps.

In general, the following operational improvements are expected with the Modified SPUI concept at Austin Boulevard:

- Improved Level of Service
- Improved pedestrian crossing times and locations
- Overall delay and queue reduction
- Improved driver expectation with right-side exit/entrance ramps

Queue and delay improvements along Austin Boulevard can be attributed to the improved ramp design. Dual left turn lanes on the ramps allow ramp traffic to clear the ramp faster than a single lane, reducing queues on the ramps. This prevents backups to the mainline, improving both safety and operations on both the ramps and the mainline. Stopped traffic turning from the ramps at the intersection, will accelerate from a relatively flat ramp profile grade resulting in improve sight distance and acceleration times through the intersection.

Clearing the ramp queue faster means shorter phasing for the ramp movements. This allows for the split phasing of the signal and more green time to be allotted to the north-south movements reducing queues and delay for motorists.

COSIM results

The Austin Boulevard receptor was identified as the CTA station head house in the immediate southwest quadrant of the Austin Boulevard/I-290 ramp intersection. The results of the COSIM Analysis (see table below) indicate that the CO levels will vary slightly, and will remain significantly below the 8 hr. and 1 hr. standards.

Austin Blvd and I-290 Ramps						
Receptor #	**No-Build 1 hr. Ave (PPM)**	**Build 1 hr. Ave (PPM)**	**Standard 1 hr. Ave (PPM)**	**No-Build 8 hr. Ave (PPM)**	**Build 8 hr. Ave (PPM)**	**Standard 8 hr. Ave (PPM)**
R1	4.1	4.3	35.0	3.8	3.9	9.0

Austin Boulevard and Harrison Street

COSIM results

There are no physical improvements proposed for the Austin Boulevard/Harrison Street intersection, however, operationally this intersection is closely tied to the operations of the

Austin Boulevard interchange at I-290. Improvements at the interchange should also reduce delay and queuing at this intersection.

Austin Boulevard receptors at Harrison Street were identified as the Columbus Park bicycle path on the east side of Austin Boulevard (R1 & R2) and gas stations on the northwest (R3) and southwest quadrants (R4) of the intersection. The results of the COSIM Analysis (see table below) indicate that the CO levels will vary slightly, and will remain significantly below the 8 hr. and 1 hr. standards.

Austin Blvd and Harrison St						
Receptor #	No-Build 1 hr. Ave (PPM)	Build 1 hr. Ave (PPM)	Standard 1 hr. Ave (PPM)	No-Build 8 hr. Ave (PPM)	Build 8 hr. Ave (PPM)	Standard 8 hr. Ave (PPM)
R1	4.1	4	35.0	3.8	3.7	9.0
R2	3.9	3.8	35.0	3.6	3.6	9.0
R3	3.7	3.9	35.0	3.5	3.6	9.0
R4	3.9	4.1	35.0	3.6	3.8	9.0

Summary

Using a conservative background CO level of 3 ppm for outdoor air (this is likely high based on the Local CO Trends in the graphs above), the greatest predicted 1-hr CO exposure level for any receptor in Oak Park was 5.0 ppm; well below the 1-hr standard of 35.0 ppm. For 8-hr CO exposure, the highest maximum level of 4.4 ppm is less than half of the 8-hr standard of 9.0 ppm. At these levels, no noticeable effect on human health would be expected.

Appendix B
COSIM Input Sheets

Illinois CO Screen for Intersection Modeling 4.0

07-21-15

02:06 PM

I-290 Ramps at Harlem Ave. No-Build - District 1 - Cook County

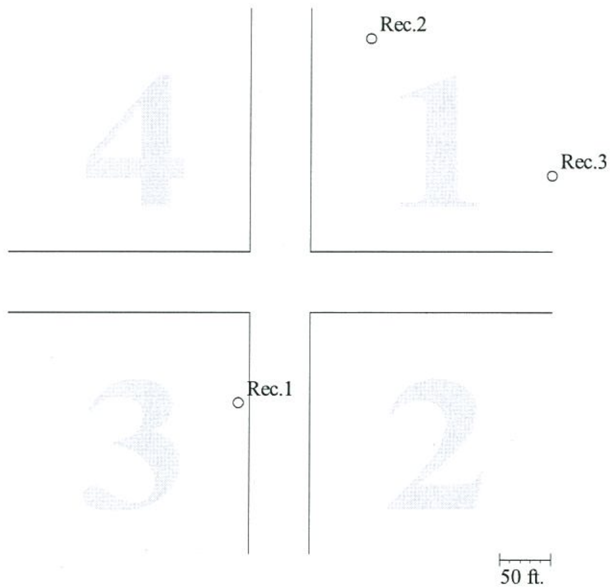
Performed by: **KDR**

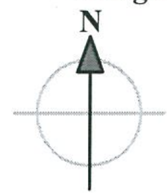
Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns**

A-B Street Name: **Harlem Ave.**

C-D Street Name: **I-290 Ramps**

0 degrees





RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	1-hour ave. Conc. (ppm)	8-hour ave. Conc. (ppm)	Pass/Fail*
1	**3**	**10**	**90**	**4.5**	**4.0**	**Pass**
2	**1**	**60**	**210**	**4.1**	**3.8**	**Pass**
3	**1**	**240**	**75**	**3.6**	**3.4**	**Pass**

*Project **PASSES** 8-hr NAAQS. Largest 8-hr concentration is **4.0** ppm, at **receptor 1**

NOTES:

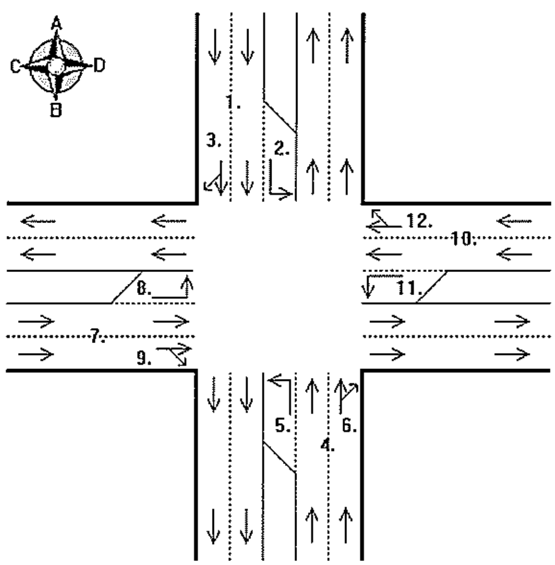
- All concentrations include a background concentration of **3.0** ppm.
- 8-hr average concentrations are calculated by multiplying the 1-hr average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	**A-B Thru**	**913**
2	**A-D Left Turn**	**450**
3	**A-C Right Turn**	**463**
4	**B-A Thru**	**955**
5	**B-C Left Turn**	**376**
6	**B-D Right Turn**	**672**
7	**C-D Thru**	**3**
8	**C-A Left Turn**	**526**
9	**C-B Right Turn**	**170**
10	**D-C Thru**	**3**
11	**D-B Left Turn**	**267**
12	**D-A Right Turn**	**294**



Emission Factors Based On:

District: **1**
County: **Cook**
Township: **Not Relevant For Analysis**
Year: **2014**

MOVES2010b Emission Factors:

Idle Emission Factor (g/hr): **22.20**

Approach	Speed (mph)	EF (g/mile)
Leg A	**30**	**3.75**
Leg B	**30**	**3.75**
Leg C	**30**	**3.75**
Leg D	**30**	**3.75**

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **80**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**50**
Leg A Left Turn	**62**
Leg B Thru & Rt	**50**
Leg B Left Turn	**62**
Leg C Thru & Rt	**34**
Leg C Left Turn	**58**
Leg D Thru & Rt	**32**
Leg D Left Turn	**58**

User Comments:

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Illinois CO Screen for Intersection Modeling 4.0

07-21-15

02:08 PM

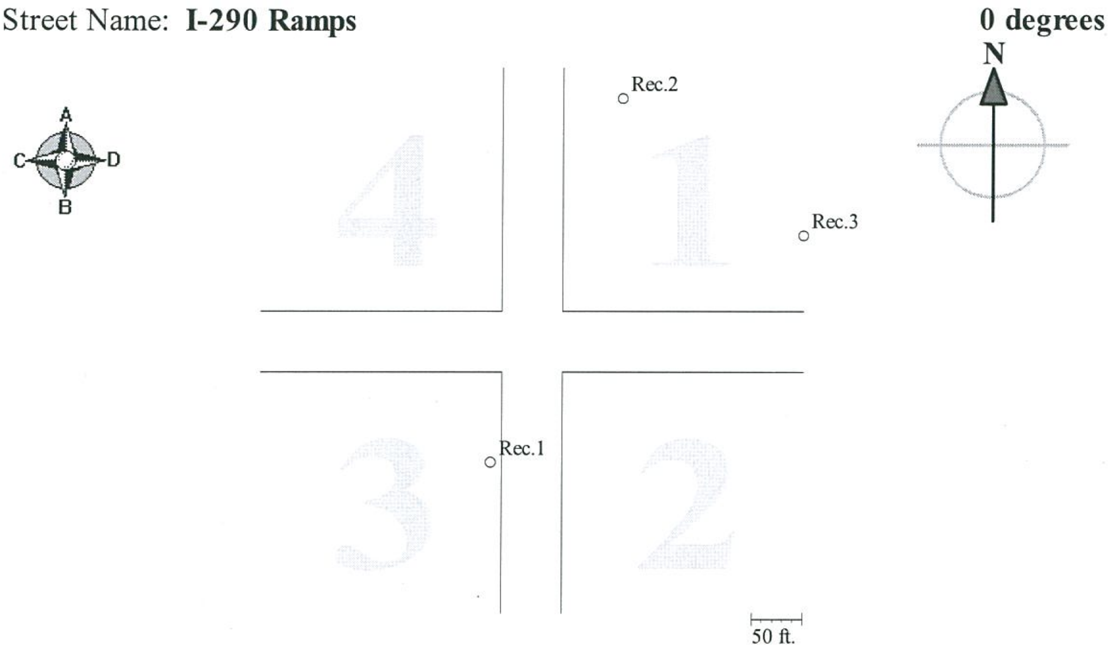
I-290 Ramps at Harlem Ave. Build - District 1 - Cook County

Performed by: **KDR**

Intersection Type: **Four-Way Intersection, 4 x 4 w/4 Lt Turns**

A-B Street Name: **Harlem Ave.**

C-D Street Name: **I-290 Ramps**



RESULTS:

Receptor#	Quadrant	Distance from A-B roadway (feet)	Distance from C-D roadway (feet)	1-hour ave. Conc. (ppm)	8-hour ave. Conc. (ppm)	Pass/Fail*
1	**3**	**10**	**90**	**5.0**	**4.4**	**Pass**
2	**1**	**60**	**210**	**4.2**	**3.8**	**Pass**
3	**1**	**240**	**75**	**3.7**	**3.5**	**Pass**

*Project **PASSES** 8-hr NAAQS. Largest 8-hr concentration is **4.4** ppm, at **receptor 1**

NOTES:

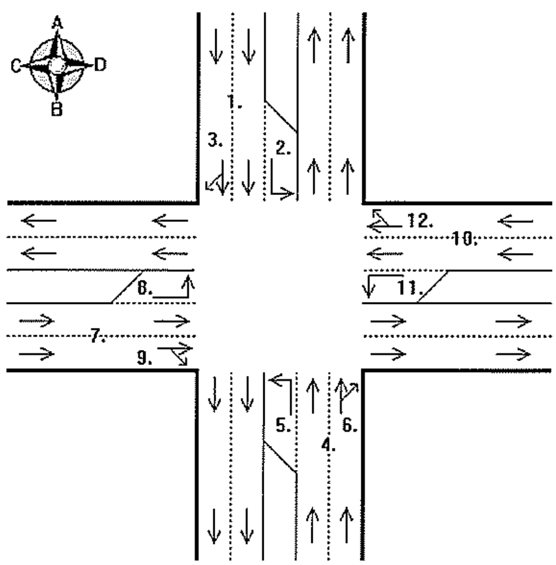
- All concentrations include a background concentration of **3.0** ppm.
- 8-hr average concentrations are calculated by multiplying the 1-hour average concentrations (without background) by a persistence factor of 0.7 and then adding the background concentration.

Intersection Data:

Predominant Surroundings: **Smooth**

Traffic Volumes:

Vol. Index	Movement	Volume (vph)
1	**A-B Thru**	**911**
2	**A-D Left Turn**	**485**
3	**A-C Right Turn**	**508**
4	**B-A Thru**	**916**
5	**B-C Left Turn**	**412**
6	**B-D Right Turn**	**645**
7	**C-D Thru**	**3**
8	**C-A Left Turn**	**542**
9	**C-B Right Turn**	**176**
10	**D-C Thru**	**3**
11	**D-B Left Turn**	**292**
12	**D-A Right Turn**	**320**



Emission Factors Based On:

District: **1**
County: **Cook**
Township: **Not Relevant For Analysis**
Year: **2014**

MOVES2010b Emission Factors:

Idle Emission Factor (g/hr): **22.20**

Approach	Speed (mph)	EF (g/mile)
Leg A	**30**	**3.75**
Leg B	**30**	**3.75**
Leg C	**30**	**3.75**
Leg D	**30**	**3.75**

***Note: Local roadways should be modeled using an approach speed of 15 mph or less. Highway ramps should be modeled using an approach speed of 5 mph.**

Traffic Signal Timing:

Total Cycle Length (sec): **140**

Red Times:

Type of Movement	Red Times (sec)
Leg A Thru & Rt	**103**
Leg A Left Turn	**108**
Leg B Thru & Rt	**103**
Leg B Left Turn	**105**
Leg C Thru & Rt	**72**
Leg C Left Turn	**113**
Leg D Thru & Rt	**85**
Leg D Left Turn	**113**

Illinois COSIM 4.0

USER COMMENTS

I-290 Ramps at Harlem Ave. Build - District 1 - Cook County

User Comments:

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Illinois COSIM Input Worksheet

Project Name: Eisenhower Expressway (I-290)

Years of Interest: 2040 No-Build

Intersection Location:

IDOT District (1-9): 1

County: Cook

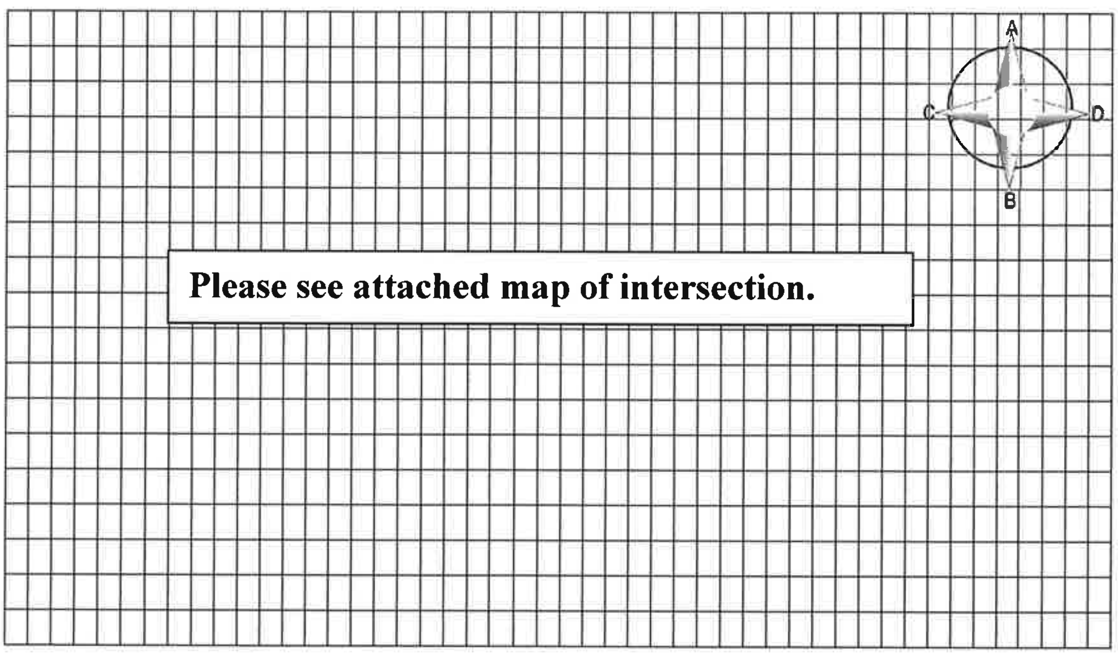
Predominant Surroundings: Urban Transit + Highway

Background Concentration (0.0-9.0 ppm): 3.0

(Recommended Values: 3.0 Urban Setting, 2.0 Rural Setting)

Intersection Sketch

Align the road with the greater number of lanes vertically (A-B direction)



Estimate the CW angle between leg A and North (0-359°) 0

Street Names:

A-B Street: Austin Blvd.

C-D Street: I-290 Ramps

COSIM A4

Traffic Volumes (2 – 9,999 vph)

	Type of Movement	Volume (vph) Maximum	am	pm
SB Austin	A-B Thru	505	491	505
	A-D Left Turn	937	937	511
	A-C Right Turn	320	320	274
NB Austin	B-A Thru	355	324	355
	B-C Left Turn	267	267	203
	B-D Right Turn	476	476	364
EB Off-Ramp	C-D Thru	—	—	—
	C-A Left Turn	161	161	132
	C-B Right Turn	95	58	95
WB Off-Ramp	D-C Thru	—	—	—
	D-B Left Turn	311	196	311
	D-A Right Turn	500	397	500

Approach Speeds (5 – 55 mph)

Approach	Speed (mph)
Leg A	30
Leg B	30
Leg C	30
Leg D	30

Total Cycle length (sec): AM:80 PM:80

Red Times (if unknown, first try Quick and Easy button in program)

Type of Movement	Red Time (sec) AM	PM
Leg A Thru & Rt.	47	51
Leg A Left Turn	47	51
Leg B Thru & Rt.	51	51
Leg B Left Turn	51	51
Leg C Thru & Rt.	35	31
Leg C Left Turn	65	61
Leg D Thru & Rt.	31	31
Leg D Left Turn	65	61

Illinois COSIM Input Worksheet

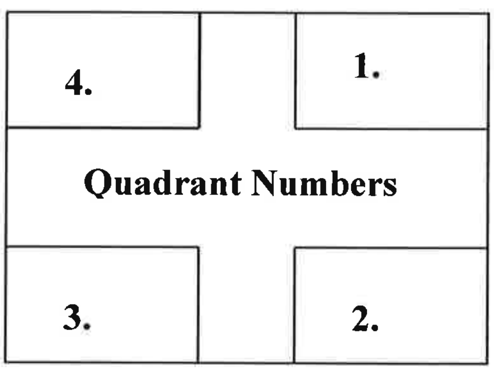
Receptor Locations

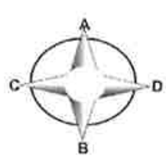
Number of Receptors (1-10): 1

Receptor #	Receptor Description (e.g., hospital, school, house)	Quadrant #	Dist. From A-B (feet)	Dist. From C-D (feet)
1	Train Station	3	10	85
2				
3				
4				
5				
6				
7				
8				
9				
10				

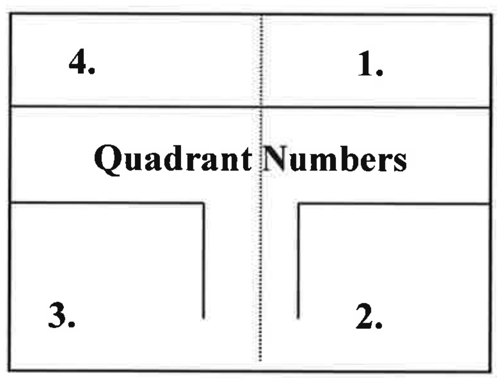
For receptor distances, use horizontal and vertical distances from quadrant boundaries (edge of roadway). For T-type intersections, quadrant 1 and 4, use horizontal distance from leg B centerline. Refer to the intersection drawings below.

Four-way Intersections





T-type Intersections



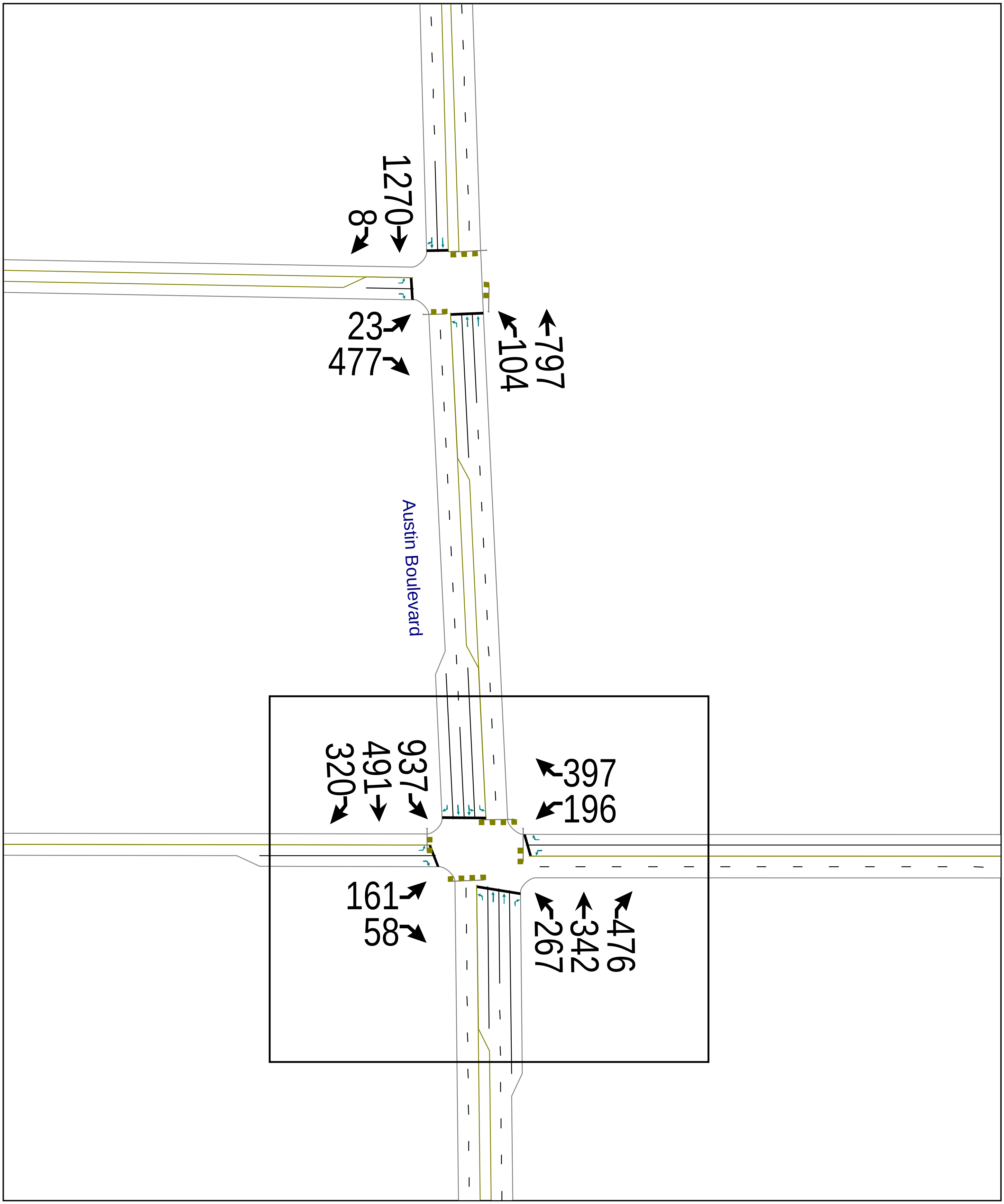
OPTIONAL

NOTES and/or COMMENTS:

Please see attached map of intersection.

Map - I-290 - 2040 No Build - Austin

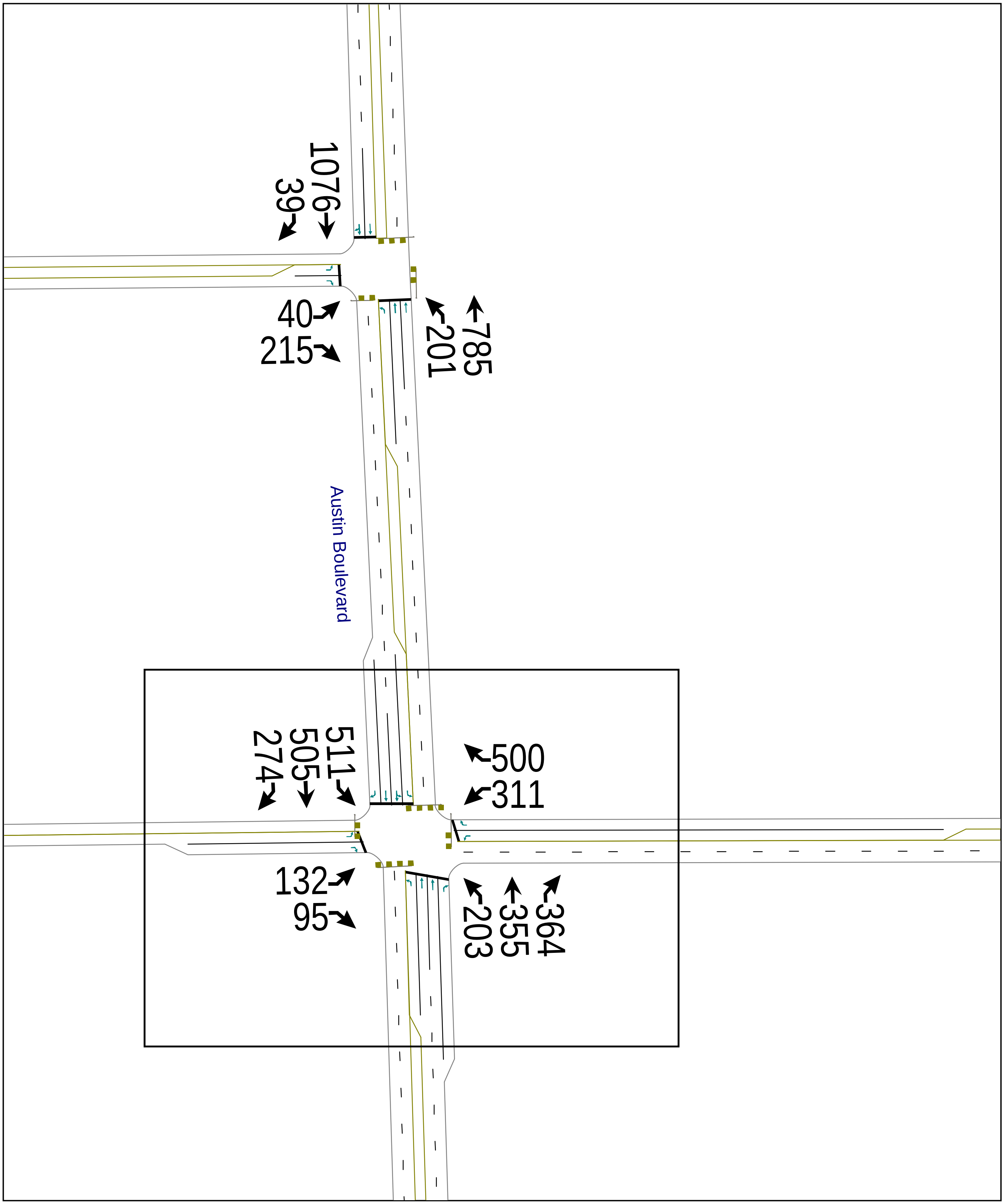
Volumes **11/20/2014**



AM

Map - I-290 - 2040 No Build - Austin PM

Volumes **11/20/2014**



PM

Illinois COSIM Input Worksheet

Project Name: Eisenhower Expressway (I-290)

Years of Interest: 2040 Build

Intersection Location:

IDOT District (1-9): 1

County: Cook

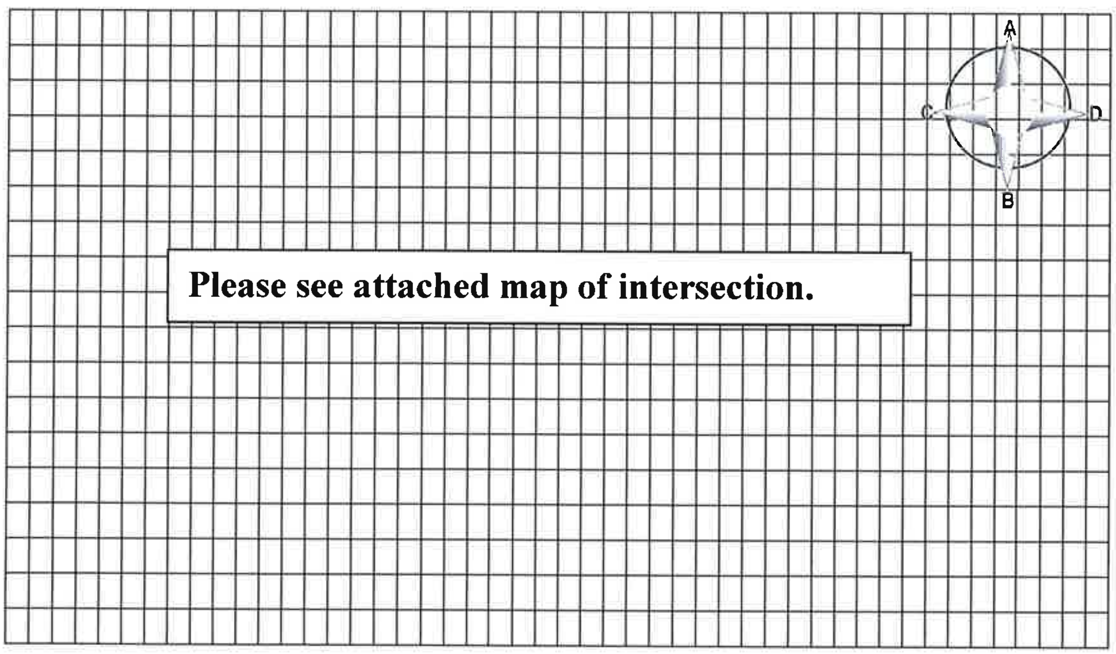
Predominant Surroundings: ____________

Background Concentration (0.0-9.0 ppm): 3.0

(Recommended Values: 3.0 Urban Setting, 2.0 Rural Setting)

Intersection Sketch

Align the road with the greater number of lanes vertically (A-B direction)



Estimate the CW angle between leg A and North (0-359°) 0

Street Names:

A-B Street: Austin Blvd

C-D Street: I-290 Ramps

Illinois COSIM Input Worksheet

COSIM A4

Traffic Volumes (2 – 9,999 vph)

	Type of Movement	Volume (vph)	am	pm
SB Austin	A-B Thru	352	352	317
	A-D Left Turn	768	768	425
	A-C Right Turn	549	549	464
NB Austin	B-A Thru	246	143	246
	B-C Left Turn	460	460	343
	B-D Right Turn	390	390	303
EB Off	C-D Thru	—	—	—
	C-A Left Turn	346	346	334
	C-B Right Turn	240	123	240
WB Off	D-C Thru	—	—	—
	D-B Left Turn	221	115	221
	D-A Right Turn	354	233	354

Approach Speeds (5 – 55 mph)

Approach	Speed (mph)
Leg A	30
Leg B	30
Leg C	30
Leg D	30

Total Cycle length (sec): AM: 150 PM: 140

Red Times (if unknown, first try Quick and Easy button in program)

Type of Movement	Red Time (sec) AM	PM
Leg A Thru & Rt.	104	100
Leg A Left Turn	104	100
Leg B Thru & Rt.	106	100
Leg B Left Turn	106	100
Leg C Thru & Rt.	82	100
Leg C Left Turn	122	112
Leg D Thru & Rt.	80	76
Leg D Left Turn	122	112

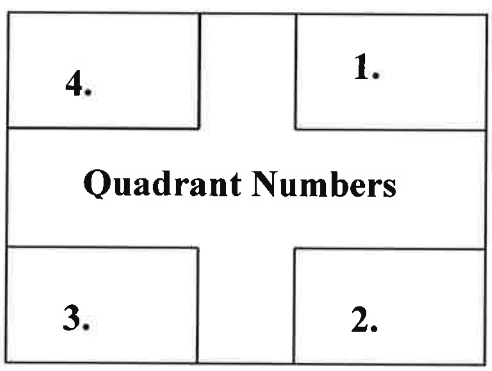
Receptor Locations

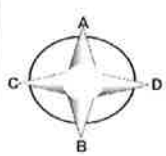
Number of Receptors (1-10): ______

Receptor #	Receptor Description (e.g., hospital, school, house)	Quadrant #	Dist. From A-B (feet)	Dist. From C-D (feet)
1	Train Station	3	10	85
2				
3				
4				
5				
6				
7				
8				
9				
10				

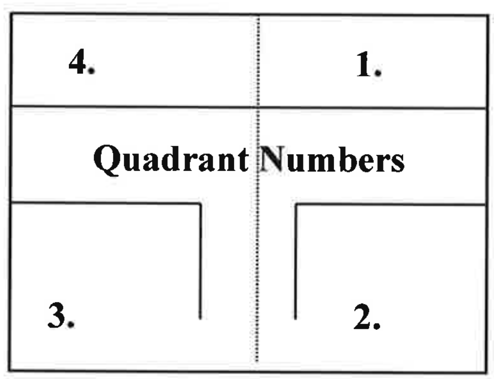
For receptor distances, use horizontal and vertical distances from quadrant boundaries (edge of roadway). For T-type intersections, quadrant 1 and 4, use horizontal distance from leg B centerline. Refer to the intersection drawings below.

Four-way Intersections





T-type Intersections



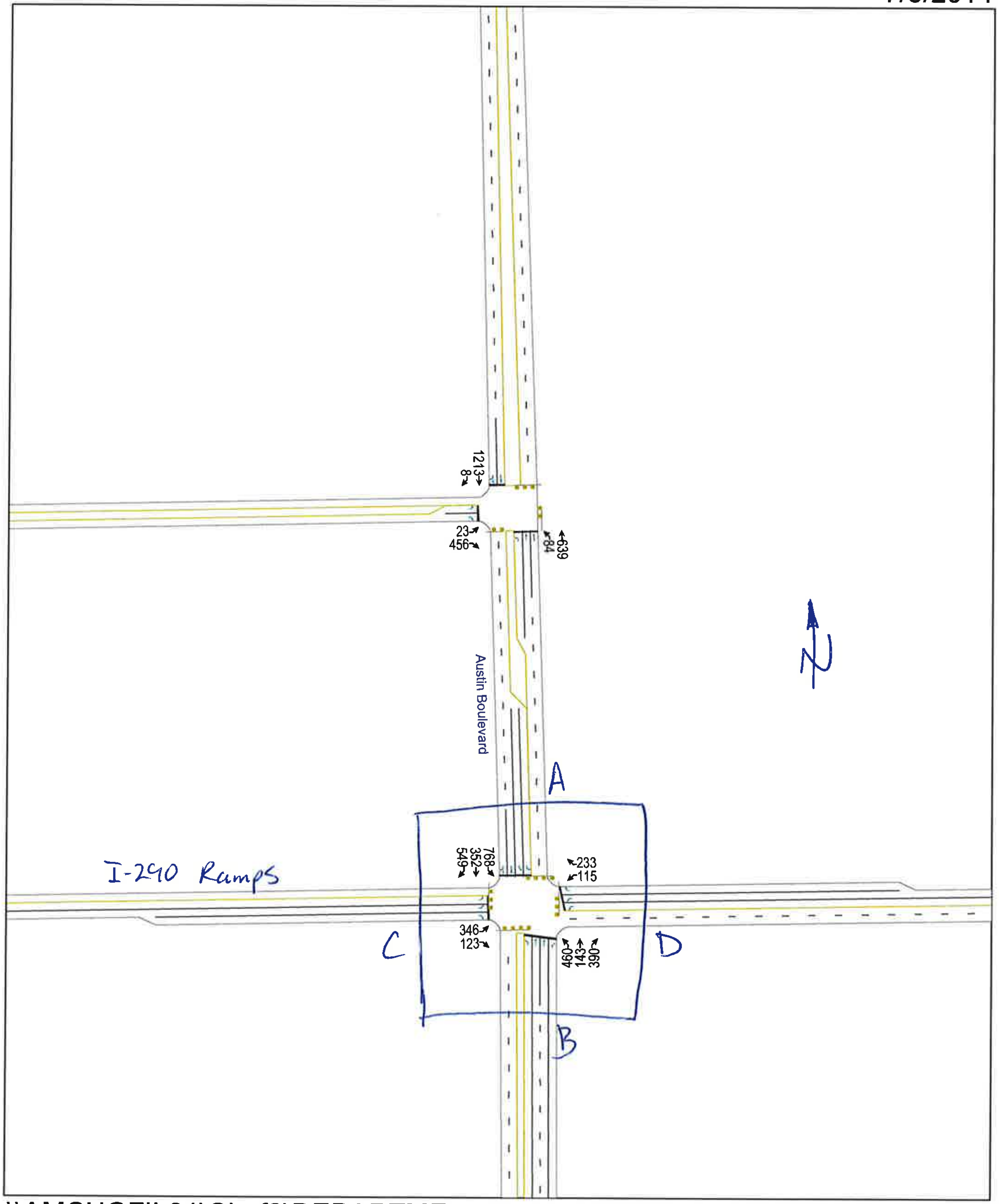
OPTIONAL

NOTES and/or COMMENTS:

Please see attached map of intersection.

Austin Build 2040 AM
Volumes

7/3/2014



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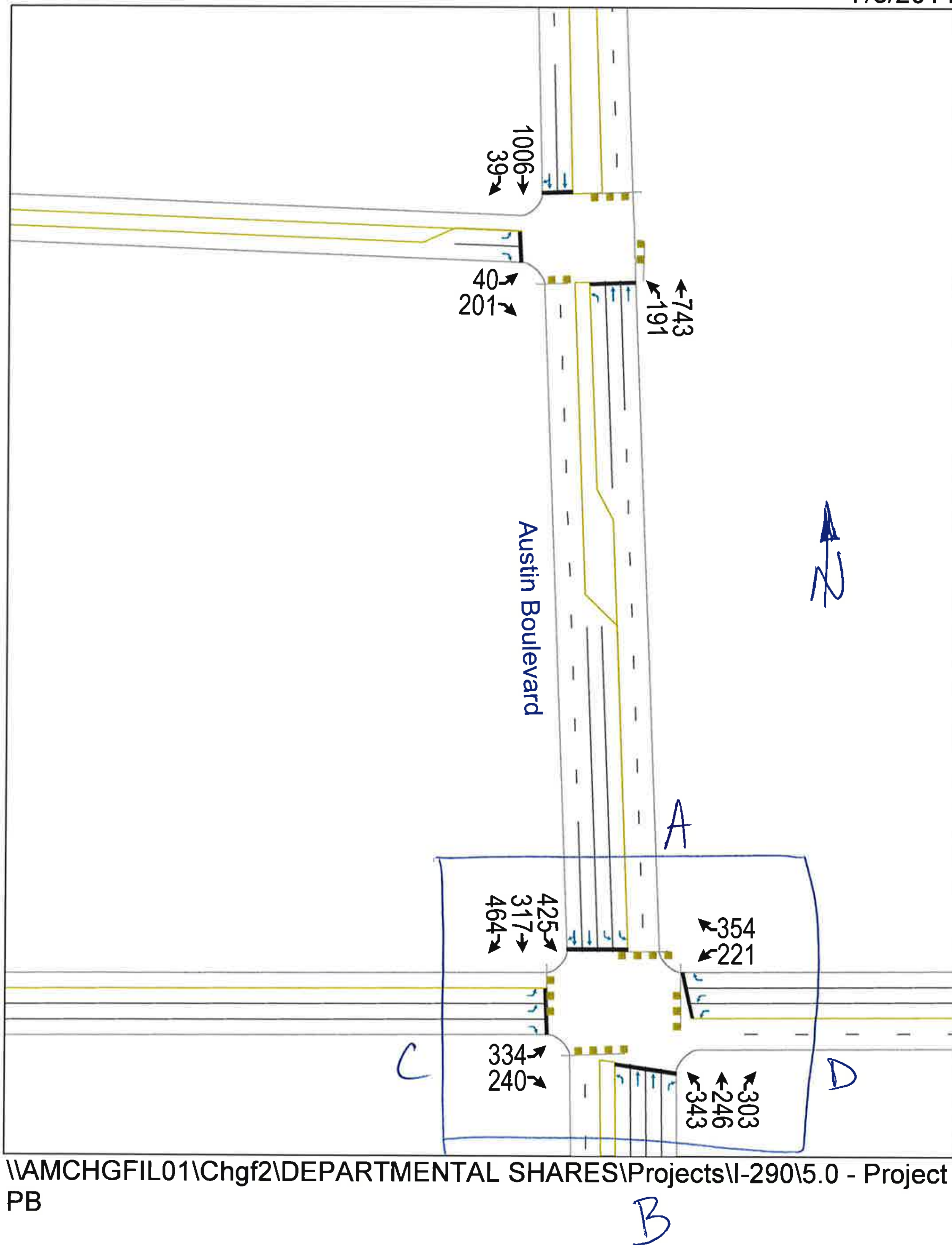
Austin Build 2040 PM
Volumes

7/3/2014



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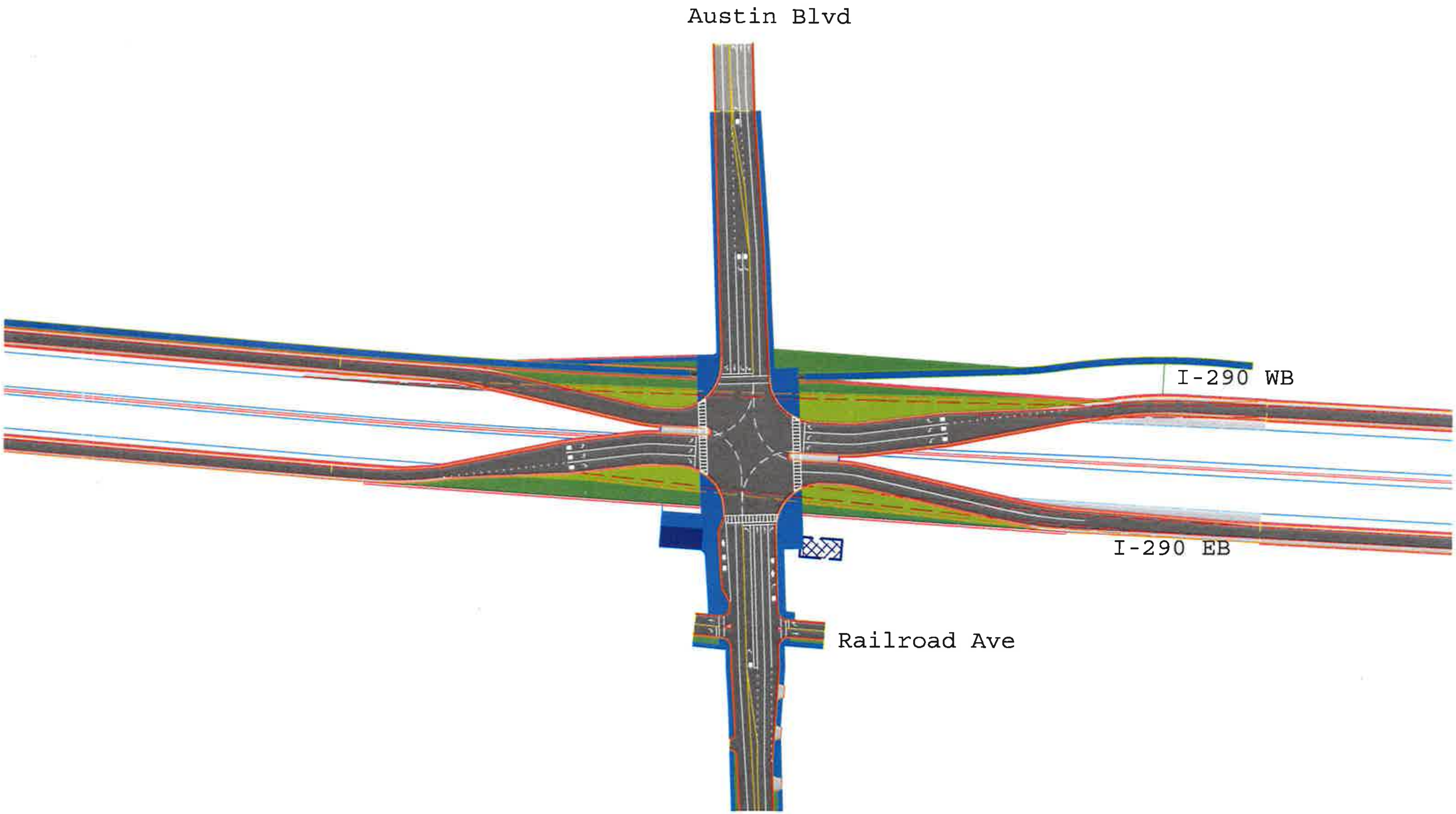
B


Austin Blvd
I-290 WB
I-290 EB
Railroad Ave

Illinois COSIM Input Worksheet

Project Name: Eisenhower Expressway (I-290)

Years of Interest: 2040 No-Build

Intersection Location:

IDOT District (1-9): 1

County: Cook

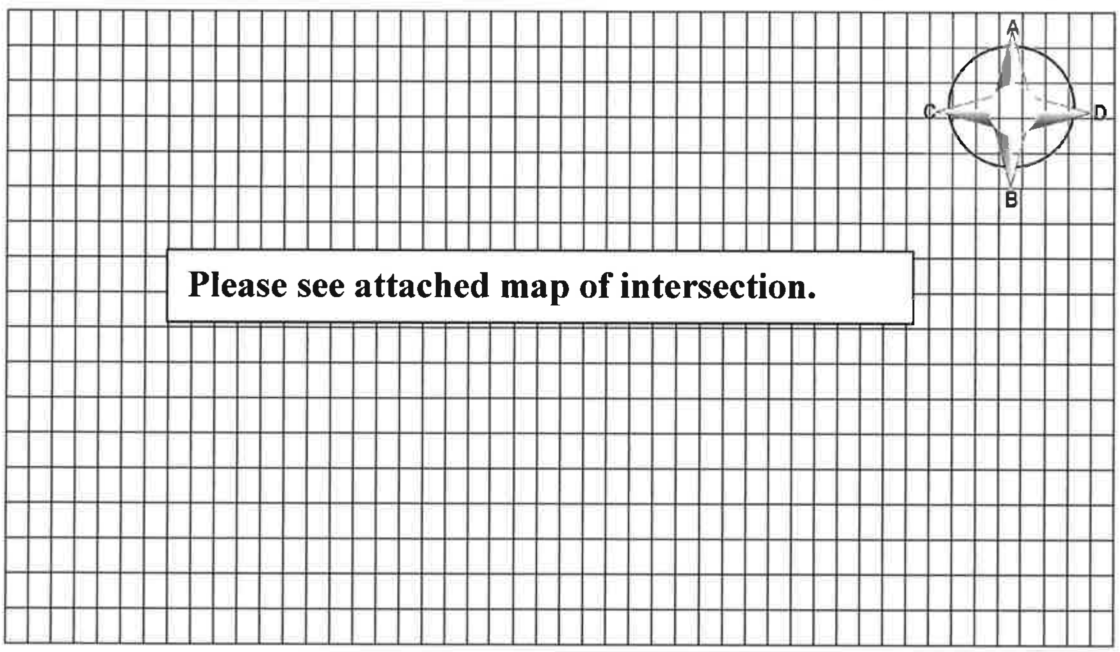
Predominant Surroundings: Urban – Commercial, Recreation, and Residential

Background Concentration (0.0-9.0 ppm): 3.0

(Recommended Values: 3.0 Urban Setting, 2.0 Rural Setting)

Intersection Sketch

Align the road with the greater number of lanes vertically (A-B direction)



Estimate the CW angle between leg A and North (0-359°) 0

Street Names:

A-B Street: Austin Blvd

C-D Street: Harrison St.

Illinois COSIM Input Worksheet

Illinois COSIM A4

Traffic Volumes (2 – 9,999 vph)

	Type of Movement	Volume (vph) Maximum	am	pm
SB Austin	A-B Thru	1270	1270	1076
	A-D Left Turn	—	—	—
	A-C Right Turn	39	8	39
NB Austin	B-A Thru	797	797	785
	B-C Left Turn	201	104	201
	B-D Right Turn	—	—	—
EB Harrison	C-D Thru	—	—	—
	C-A Left Turn	40	23	40
	C-B Right Turn	477	477	215
N.A. (T-Intersect.)	D-C Thru	—	—	—
	D-B Left Turn	—	—	—
	D-A Right Turn	—	—	—

Approach Speeds (5 – 55 mph)

Approach	Speed (mph)
Leg A	30
Leg B	30
Leg C	30
Leg D	

Total Cycle length (sec): AM:80 PM: 80

Red Times (if unknown, first try Quick and Easy button in program)

Type of Movement	Red Time (sec) AM	PM
Leg A Thru & Rt.	41	39
Leg A Left Turn		
Leg B Thru & Rt.	30	21
Leg B Left Turn	70	63
Leg C Thru & Rt.	52	61
Leg C Left Turn	52	61
Leg D Thru & Rt.		
Leg D Left Turn		

Illinois COSIM Input Worksheet

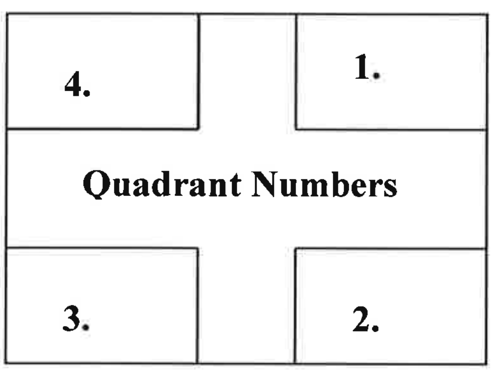
Receptor Locations

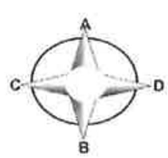
Number of Receptors (1-10): ______

Receptor #	Receptor Description (e.g., hospital, school, house)	Quadrant #	Dist. From A-B (feet)	Dist. From C-D (feet)
1	Columbus Park Bike Path	1	5	10
2	Gas Station	3	20	50
3	Gas Station	4	25	45
4				
5				
6				
7				
8				
9				
10				

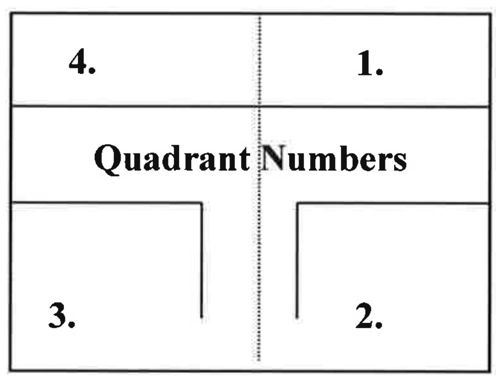
For receptor distances, use horizontal and vertical distances from quadrant boundaries (edge of roadway). For T-type intersections, quadrant 1 and 4, use horizontal distance from leg B centerline. Refer to the intersection drawings below.

Four-way Intersections





T-type Intersections



OPTIONAL

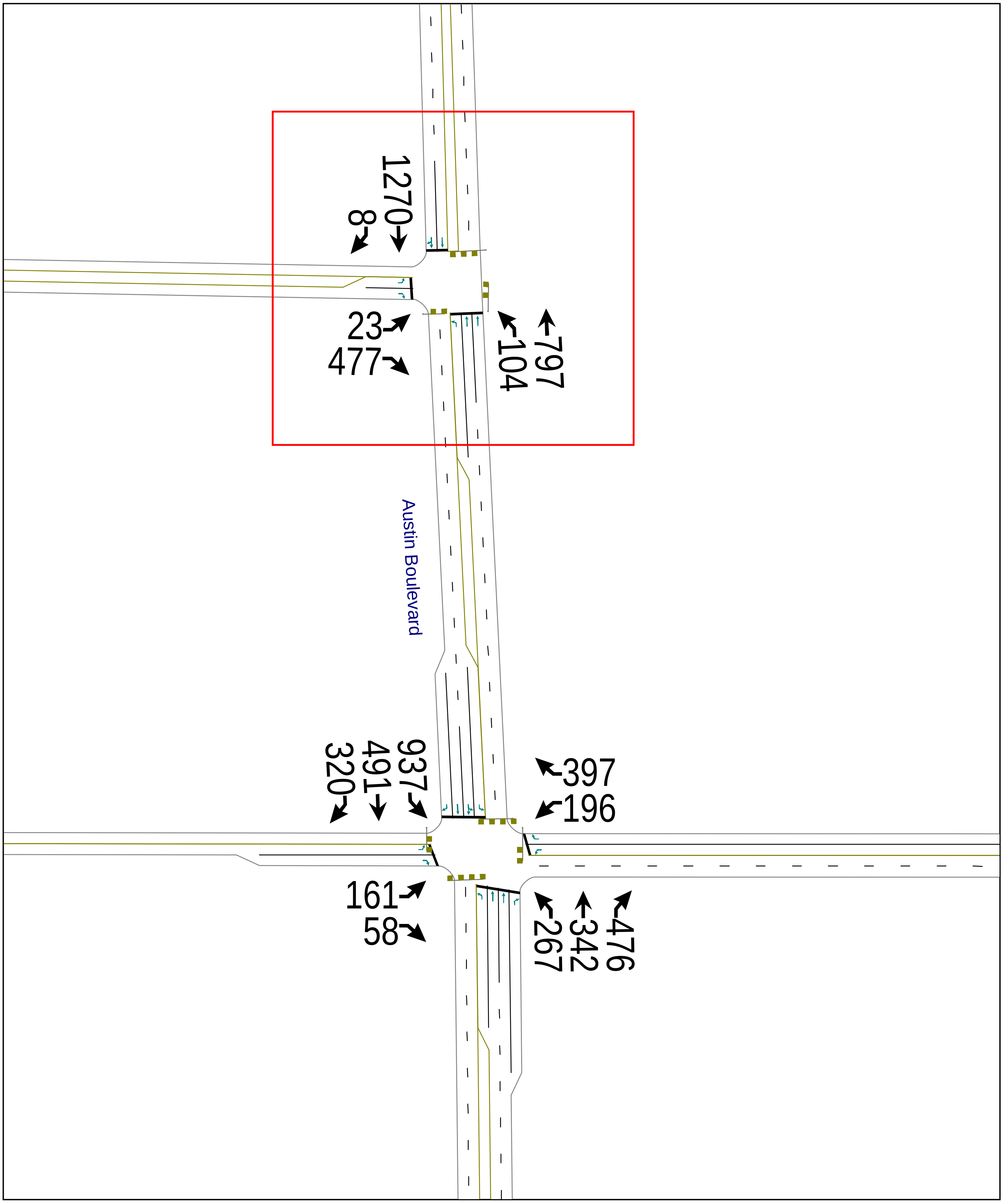
NOTES and/or COMMENTS:

Please see attached map of intersection.

Map - I-290 - 2040 No Build - Austin

Volumes

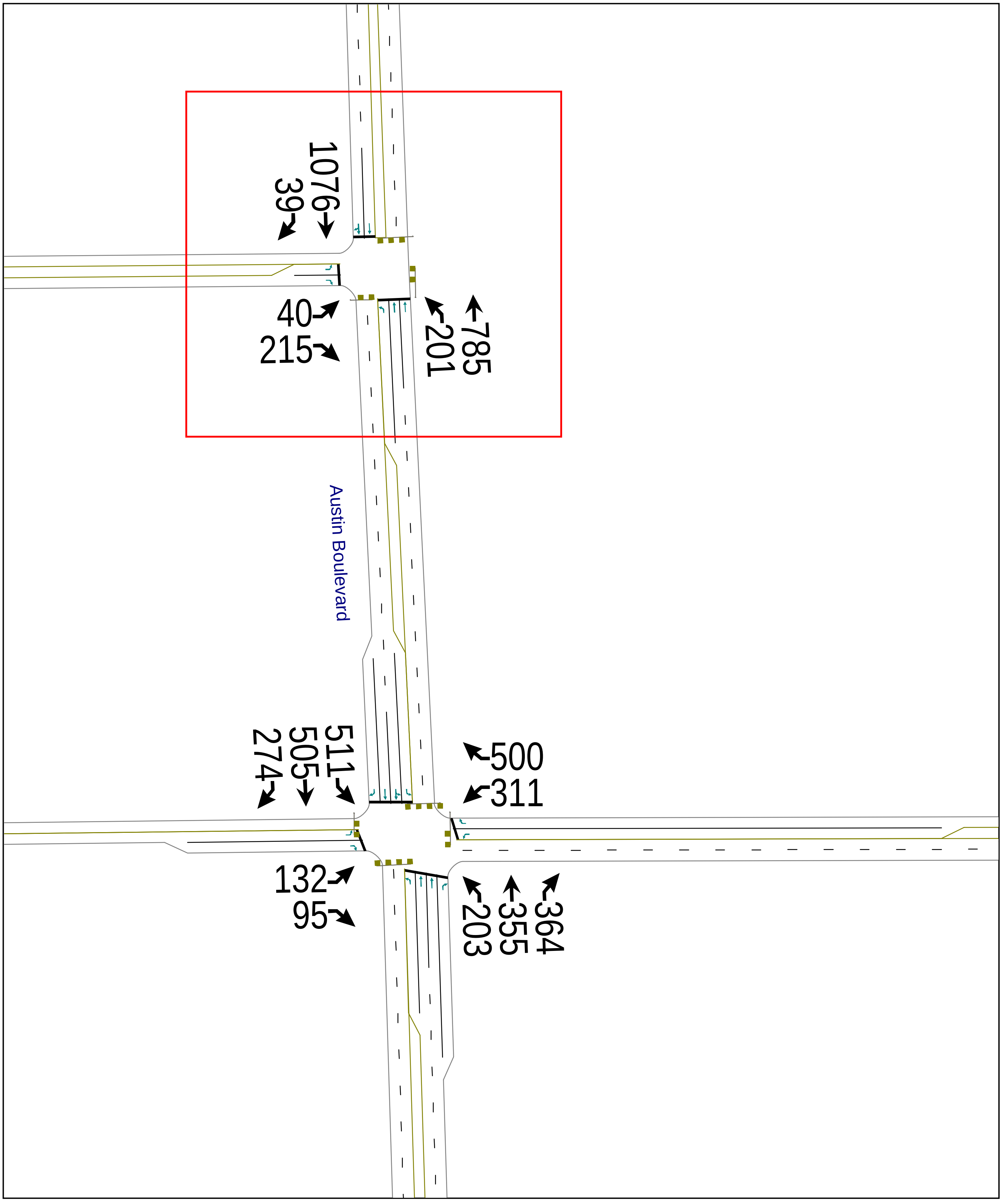
11/20/2014



AM

Map - I-290 - 2040 No Build - Austin PM

Volumes 11/20/2014



PM

Illinois COSIM Input Worksheet

Project Name: Eisenhower Expressway (I-290)

Years of Interest: 2040 Build

Intersection Location:

IDOT District (1-9): 1

County: Cook

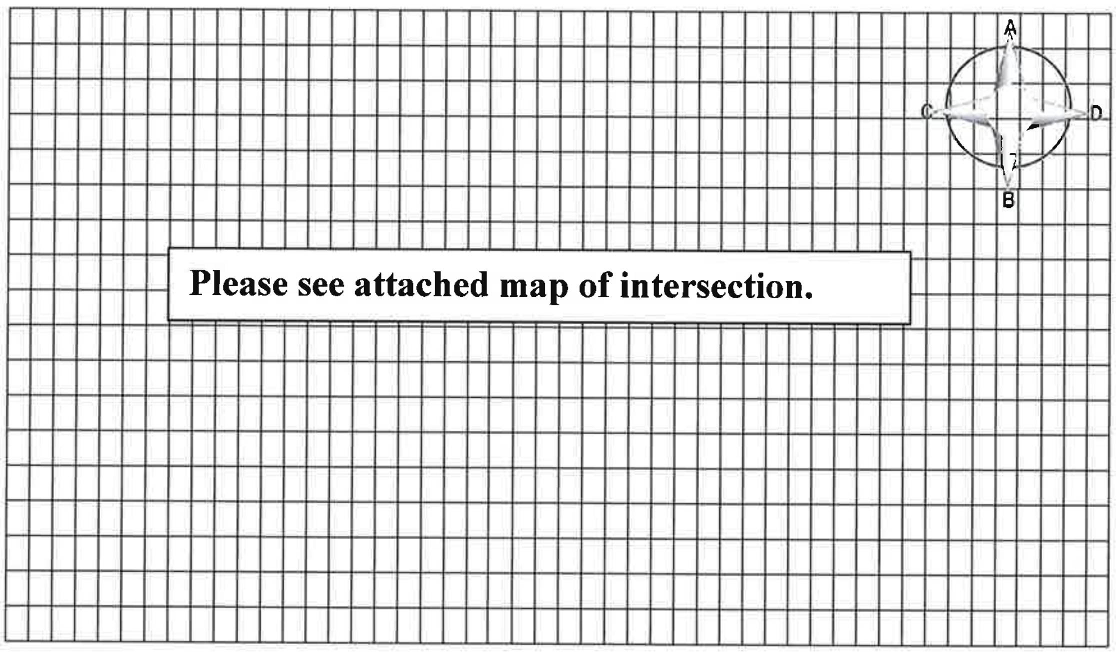
Predominant Surroundings: ______________

Background Concentration (0.0-9.0 ppm): 3.0

(Recommended Values: 3.0 Urban Setting, 2.0 Rural Setting)

Intersection Sketch

Align the road with the greater number of lanes vertically (A-B direction)



Please see attached map of intersection.

Estimate the CW angle between leg A and North (0-359°) ________

Street Names:

A-B Street: Austin Blvd

C-D Street: Harrison St

Illinois COSIM Input Worksheet

Traffic Volumes (2 – 9,999 vph)

	Type of Movement	Volume (vph) Maximum	am	pm
SB Austin	A-B Thru	1213	1213	1006
	A-D Left Turn	—	—	—
	A-C Right Turn	39	8	39
NB Austin	B-A Thru	743	639	743
	B-C Left Turn	191	84	191
	B-D Right Turn	—	—	—
EB Harrison	C-D Thru	—	—	—
	C-A Left Turn	40	23	40
	C-B Right Turn	456	456	201
N.A. (T-Intersect.)	D-C Thru	—	—	—
	D-B Left Turn	—	—	—
	D-A Right Turn	—	—	—

Approach Speeds (5 – 55 mph)

Approach	Speed (mph)
Leg A	30
Leg B	30
Leg C	30
Leg D	

Total Cycle length (sec): AM:75 PM:70

Red Times (if unknown, first try Quick and Easy button in program)

Type of Movement	Red Time (sec) AM	PM
Leg A Thru & Rt.	39	38
Leg A Left Turn		
Leg B Thru & Rt.	28	21
Leg B Left Turn	65	54
Leg C Thru & Rt.	49	51
Leg C Left Turn	49	51
Leg D Thru & Rt.		
Leg D Left Turn		

Illinois COSIM Input Worksheet

Receptor Locations

Number of Receptors (1-10): ______

Receptor #	Receptor Description (e.g., hospital, school, house)	Quadrant #	Dist. From A-B (feet)	Dist. From C-D (feet)
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7				
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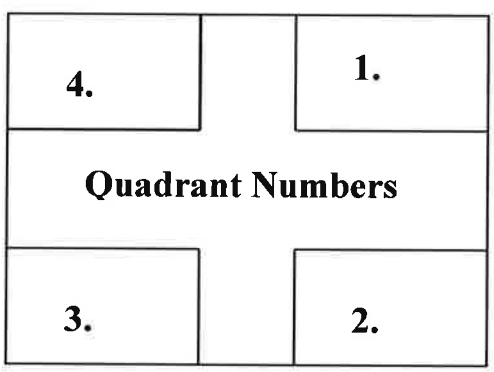
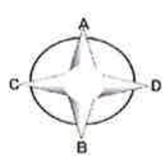
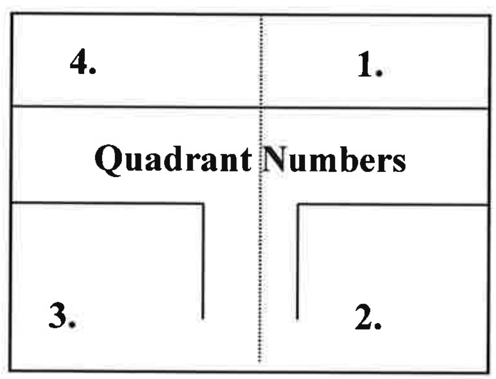
For receptor distances, use horizontal and vertical distances from quadrant boundaries (edge of roadway). For T-type intersections, quadrant 1 and 4, use horizontal distance from leg B centerline. Refer to the intersection drawings below.

Four-way Intersections





T-type Intersections



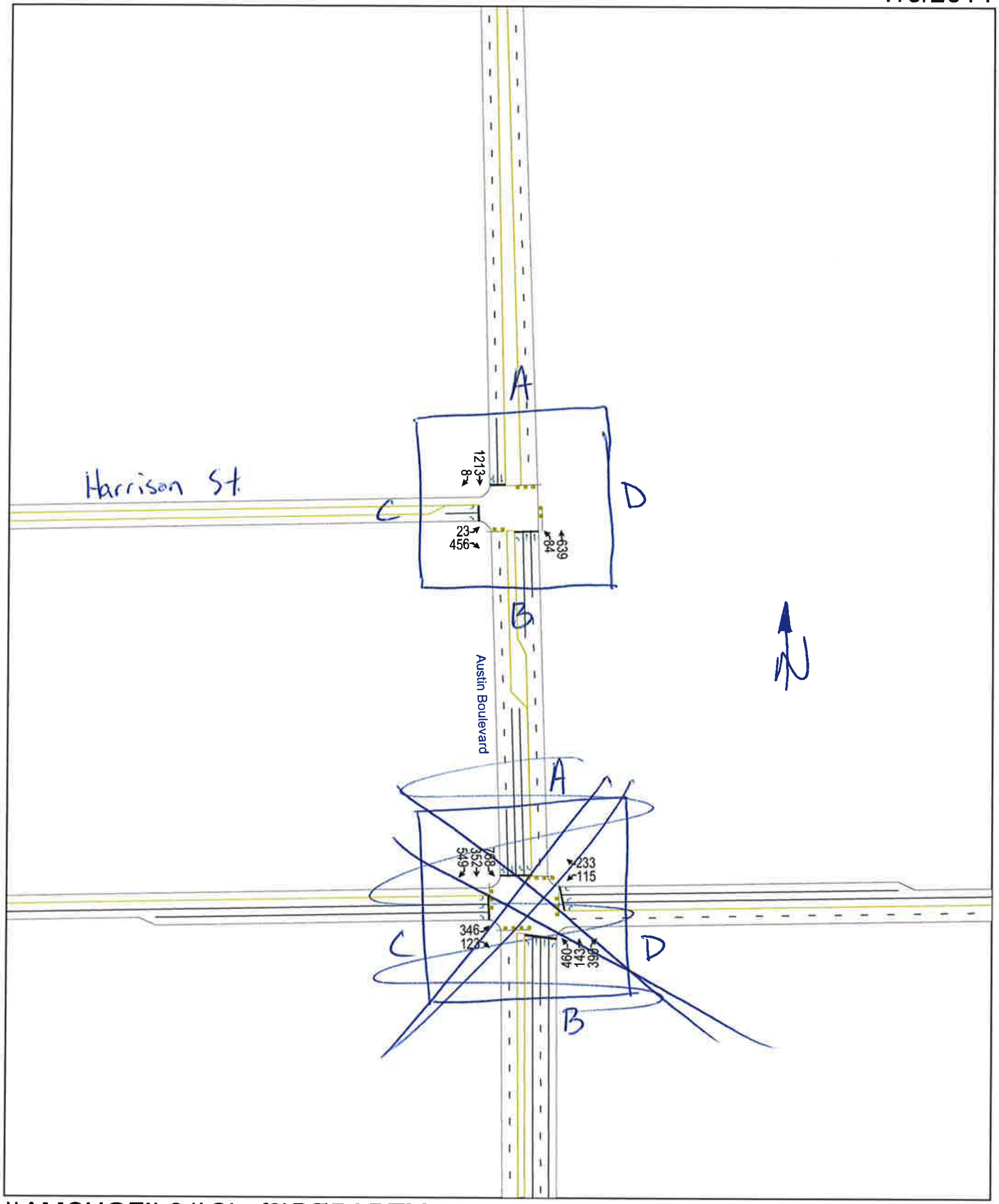
OPTIONAL

NOTES and/or COMMENTS:

Please see attached map of intersection.

Austin Build 2040 AM
Volumes

7/3/2014



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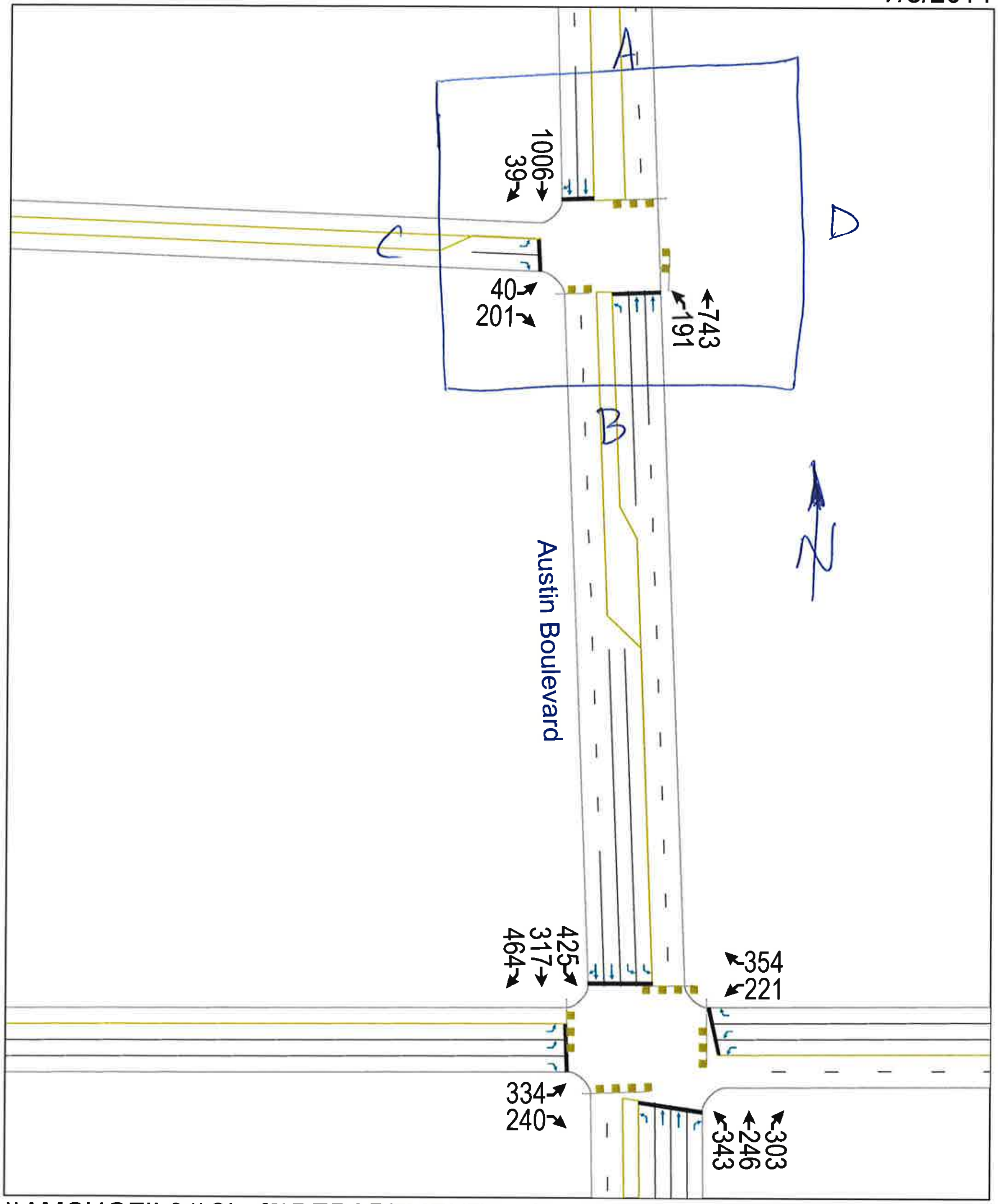
Austin Build 2040 PM
Volumes

7/3/2014



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