CUY-90-19.50/21.30 SAFETY STUDY
INTERSTATE ROUTE 90
ODOT DISTRICT 12

November 30, 2015

PREPARED FOR:

Ohio Department of Transportation
District 12

5500 Transportation Blvd.
Bldg. 2201
Garfield Heights, OH 44125

PREPARED BY:

LJB Inc.

2500 Newmark Drive
Miamisburg, OH 45342
(937) 259-5000

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EXECUTIVE SUMMARY

STUDY AREA

Interstate 90 is an east/west freeway facility that traverses the east side of downtown Cleveland, Ohio in northern Cuyahoga County and continues east along Lake Erie. The study area includes a 1.8 mile segment of I-90 from SLM 19.50 to 21.30 that includes the three grade-separated interchanges: E. 55th Street, E. 72nd Street (State Route 283), and Martin Luther King Jr. Drive (MLK Drive). A project location map is provided in **Figure 1** with a study area map as **Figure 2**.

FIGURE 1: PROJECT LOCATION MAP

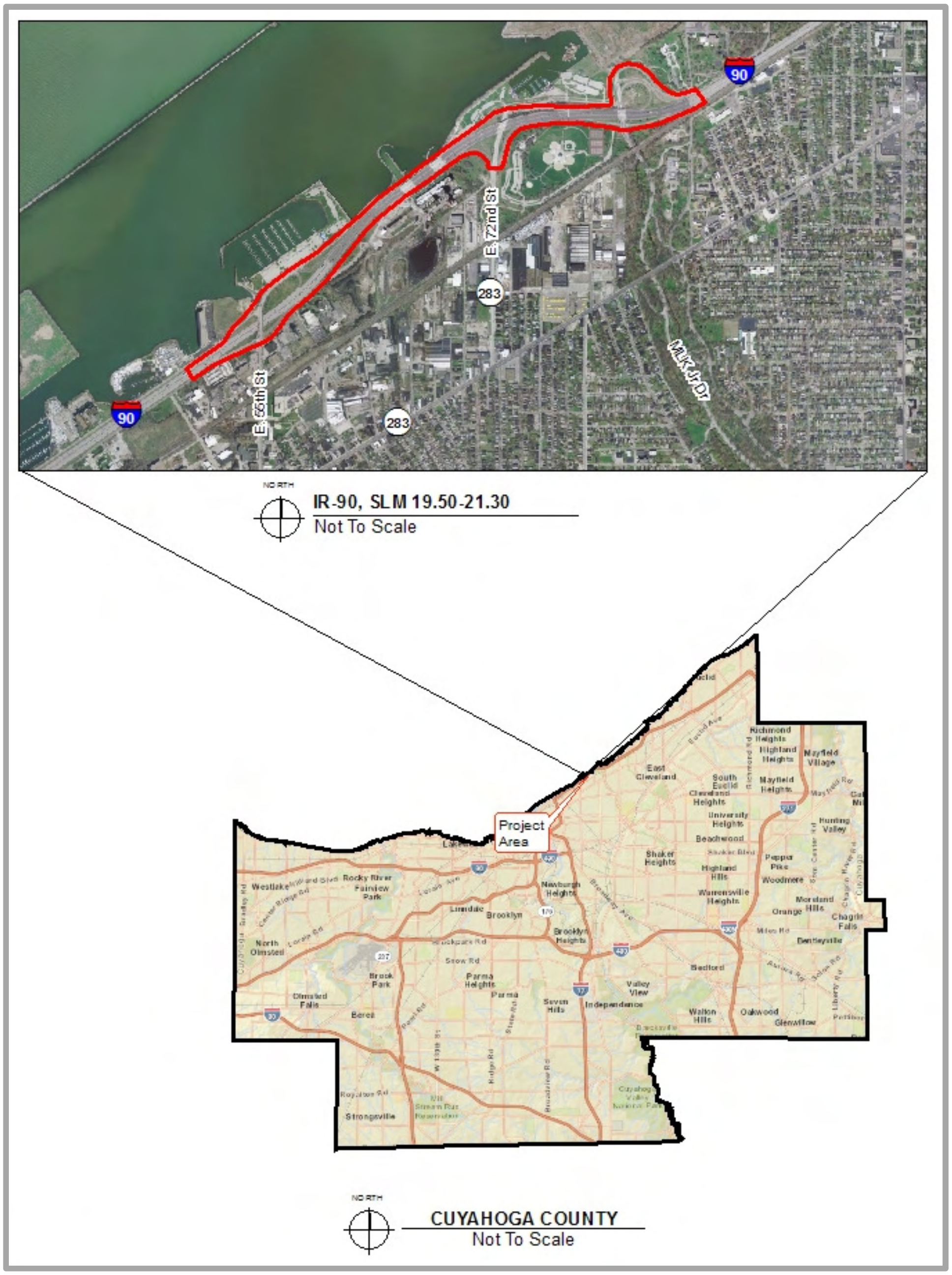


FIGURE 2: STUDY AREA MAP

BACKGROUND

The I-90 study corridor and associated interchanges encompass several lakeshore recreational facilities including the Cleveland Lakefront State Park and Nature Preserve, Intercity Yacht Club, E. 55th Street Marina and Gordon Park. Access to these recreational amenities is provided from N. Marginal Road and Lakeshore Boulevard, forming a collector street network parallel to I-90. Many of the local streets in the study area have pedestrian and bicycle facilities to the various recreational areas from points south of I-90. Details of recent studies or projects in the project vicinity are briefly described below.

Lakefront Greenway and Downtown Connector Study

The Lakefront Greenway and Downtown Connector Study is a concurrent planning study focused on Interstate 90 and the parallel local routes of North and South Marginal Road. The E.55th Street, E. 72nd Street, and MLK Drive interchanges are included within the limits of the Lakefront Greenway Study. The goals of the Lakefront Greenway study are summarized below. Presentation slides from the June 4, 2015 public meeting are included in **Appendix A.**

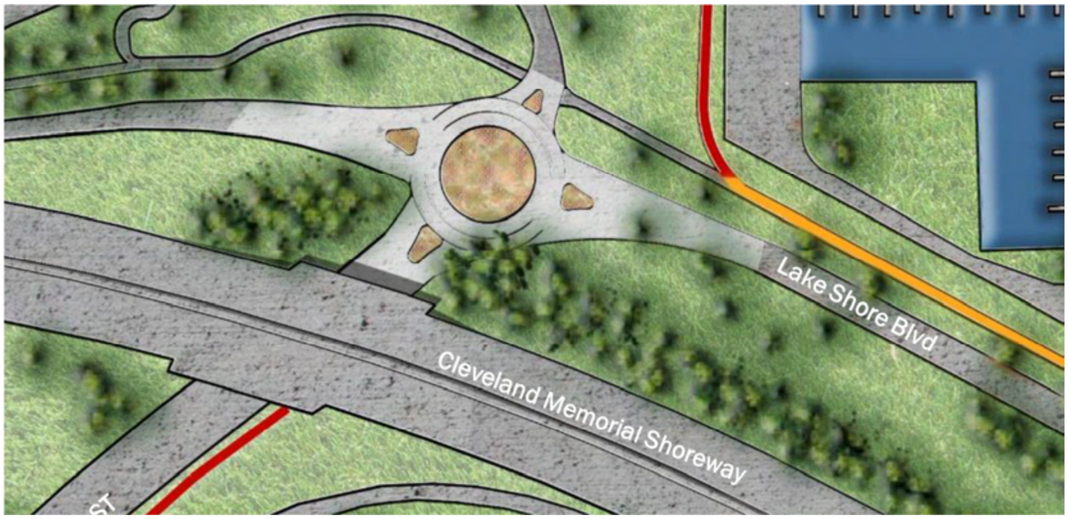
> Improve North and South Marginal Road for bicyclists and pedestrians

> Strengthen connections between lakefront and the near eastside neighborhoods

The Greenway study includes concepts for the E. 72nd Street and MLK Drive interchange areas. These concepts include the following transportation improvements:

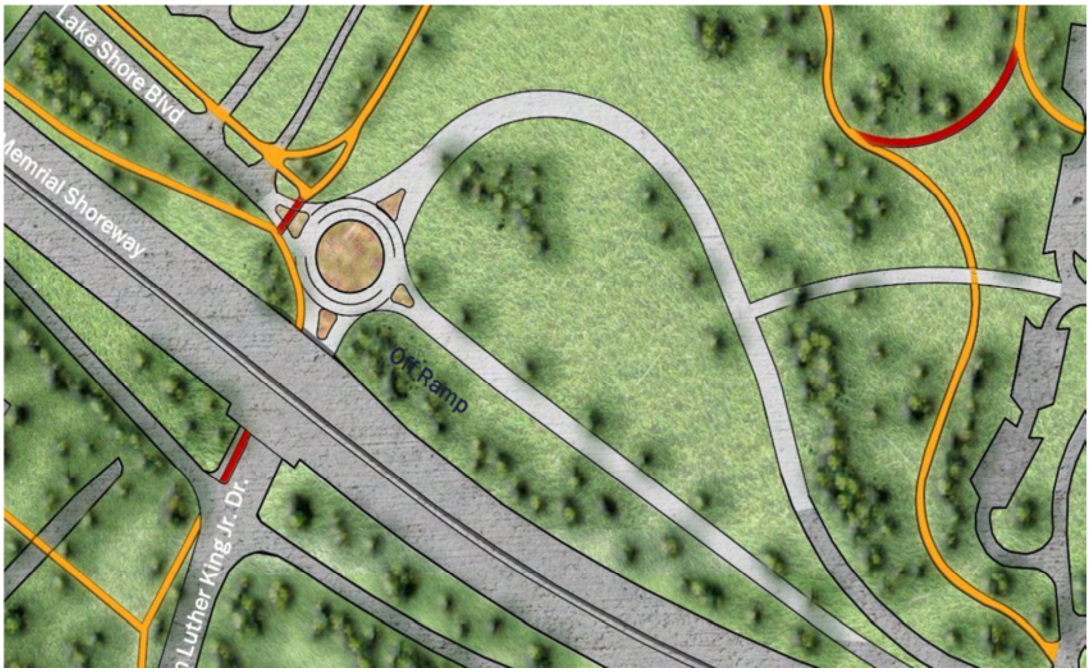
> Closure of the westbound exit ramp to E. 72nd Street and construction of a roundabout at the E. 72nd Street and North Marginal Road/Lake Shore Blvd intersection

FIGURE 3A: E.72ND STREET CONCEPT (LAKEFRONT GREENWAY)



> Closure of the loop ramp from MLK Drive to westbound I-90 and construction of a roundabout at the MLK Drive/Lake Shore Blvd and WB I-90 exit ramp intersection. Traffic destined to westbound I-90 from MLK Drive would use North Marginal Road/Lakeshore Blvd to access the westbound entrance ramp at the E. 72nd Street intersection.

FIGURE 3B: MLK DRIVE CONCEPT PLAN (LAKEFRONT GREENWAY)



North and South Marginal Road Projects

The city of Cleveland has identified rehabilitation projects for North and South Marginal Roads within the study area. These projects have been recently added to the NOACA's Long Range Transportation Plan by Resolution 2015-025. Excerpts from the NOACA's resolution are also included in **Appendix A**.

E.55th Street/Inner-belt CCG4 Project

ODOT has identified a future project, PID 77613 for the widening of E.55th Street and reconstruction of the existing railroad crossing overpass with E.55th Street located just south of I-90. This bridge replacement is required to widen E.55th Street from the existing two-lane section to a four-lane section with bike lanes and to increase the vertical clearance under the bridge.

PROJECT PURPOSE AND SAFETY NEED

The purpose of this study is to evaluate existing safety performance and to identify potential countermeasures to reduce traffic crashes on I-90 and at the interchanges with E. 55th Street, 72nd Street and MLK Drive. The following three segments of I-90 are identified on the 2013 Urban Freeway Excess Locations list based on crashes from 2011 to 2013.

- Rank #32: SLM 21.01 to 21.11 (MLK Drive interchange)
- Rank #69: SLM 19.63 to 19.73 (E. 55th Street interchange)
- Rank #96: SLM 20.61 to 20.71 (E. 72nd Street interchange)

A review of crash data yielded a total of 405 crashes in the study area during a 3-year period between 2011 and 2013. There were two fatal injury crashes in the study area, both occurring on mainline I-90. The following crash types and conditions are over represented in the study area compared to statewide averages for the state highway system, freeway locations (statewide averages shown in parenthesis). Note the statewide crash averages are based on 2008-2012 data whereas the project data encompasses years 2011 to 2013.

- Fatal crashes: 1 crash or 0.2 percent (0.3 percent)
- Injury crashes: 122 crashes or 30.1 percent (23.8 percent)
- Rear end crashes: 179 crashes or 44.2 percent (29.3 percent)
- Sideswipe - passing crashes: 90 crashes or 22.2 percent (18.7 percent)

RECOMMENDED COUNTERMEASURES

The following countermeasures are recommended to improve safety performance. Estimated costs reflect construction, design contingency, and engineering contingency in 2015 dollars (not adjusted for inflation).

E. 55th Street

- Revise lane transition at the railroad crossing to align through traffic in the curb lane. Install overhead lane use signs in advance of pavement transition. The inside through lane in the southbound direction will operate as a defacto left turn lane at the interchange.
- Revise lane configuration northbound to drop right turn lane at the EB I-90 entrance ramp.
- Realign the EB I-90 exit ramp opposite Dick Goddard Way approach
- Signalize the S. Marginal Road intersection as a separate signal phase. Consider converting the S. Marginal Road intersection to RIRO as a medium or long term countermeasure.
- Estimated cost for short term countermeasures: $1,609,000.

Interstate 90 at E. 72nd Street

- Remove the I-90 EB entrance ramp and I-90 WB exit ramp at the E. 72nd Street interchange. Traffic will be diverted to N. Marginal Road to access the MLK Drive interchange.
- Change the alignment of State Route 283 to follow N. Marginal Road.
- Extend deceleration length of the EB I-90 exit ramp to MLK Drive.
- Extend taper length of WB I-90 entrance ramp from MLK Drive.
- Estimated cost for short term countermeasures: $677,000. Short term improvements to MLK Drive are required before the proposed improvements are implemented at the E. 72nd Street interchange.

Interstate 90 at MLK Drive

- **Short Term Countermeasures**
    - Extend two southbound through lanes on MLK Drive to the St. Clair Avenue bridge
    - Widen the WB I-90 exit ramp for dual left turn lanes to MLK Drive
    - Signalize the EB I-90 ramp terminal intersection
    - Provide dedicated left turn lanes on MLK Drive at the EB ramps and at the N. Marginal Road intersections
    - Restrict NB left turn movement at Broad Street intersection during peak hours
    - Conduct speed zone study on MLK Drive to determine the appropriate speed limit.
    - Estimated cost for short term countermeasures: $1,017,000

> **Long Term Countermeasures**

- Convert the WB exit ramp/ N. Marginal Road/Lakeshore Boulevard approaches to a modern roundabout intersection
- Realign Lakeshore Boulevard with future park access. Grade separate Lakeshore Boulevard and WB I-90 ramps with prefabricated arch structure.
- Estimated cost for long term countermeasures: $4,974,000

EXISTING CONDITIONS

INTERSTATE 90

Existing conditions on I-90 are summarized in **Table 1** with existing conditions diagrams provided in **Appendix B**.

TABLE 1: EXISTING ROADWAY CONDITIONS - I-90

		I-90 (W of E 55th)	I-90 (W of E 72nd)	I-90 (W of MLK Jr Dr)	I-90 (E of MLK Jr Dr)
ODOT Functional Classification		Urban Interstate	Urban Interstate	Urban Interstate	Urban Interstate
Posted Speed Limit		60 MPH	60 MPH	60 MPH	60 MPH
Roadway Section	**EB**	5 lanes	4 lanes	4 lanes	4 lanes
	WB	4 lanes	4 lanes	4 lanes	4 lanes
ADT		117,297	123,131	123,076	129,610

I-90 INTERCHANGES

Three grade separated interchanges exist on I-90 within the study limits.

- **E. 55th Street Interchange**: This interchange is formed with eastbound ramps terminating at E. 55th Street and westbound ramps terminating at N. Marginal Road. The eastbound ramps are configured as a standard diamond and form a signalized intersection on the south side of the I-90 corridor. The westbound ramps intersect N. Marginal Road at an unsignalized intersection on the north side of the I-90 corridor.
- **E. 72nd Street Interchange**: This interchange features directional, free flow eastbound ramps and westbound ramps configured as a standard diamond that terminate at a stop controlled intersection. Immediately north of the westbound ramp intersection is N. Marginal Road. N. Marginal Road functions as a collector-distributor between E. 72nd Street and MLK Drive in addition to providing access to lakeshore recreational facilities.
- **Martin Luther King Jr. (MLK) Drive Interchange:** This interchange features eastbound ramps that that are configured as a standard diamond and forms a stop controlled intersection at MLK Drive on the south side of the I-90 corridor. A loop ramp in the NW quadrant provides access to westbound I-90. Note that southbound traffic on MLK Drive must use N. Marginal Road to access I-90 westbound at the E. 72nd Street interchange.

A distinct feature of the I-90 study corridor is the spacing and configuration of the E. 72nd Street and MLK Drive interchanges. The interchanges do not accommodate all traffic movements thus requiring the use of N. Marginal Road as a collector-distributor roadway. The interchanges are spaced less than 2,000 feet apart which creates substandard weave lengths between ramps on I-90 in both the eastbound and westbound directions.

- The eastbound weave segment is formed by the EB entrance ramp from E. 72nd Street and the EB exit ramp to MLK Drive. The eastbound weave length is approximately 620 feet.
- The westbound weave segment is formed by the WB entrance ramp (loop ramp) from MLK Drive and the WB exit ramp to E. 72nd Street. The westbound weave length is approximately 500 feet.

Capacity analysis was performed to determine the operational performance of the weave areas. For the purpose of analysis, it was assumed that all traffic in the weave merge area crosses between the mainline and ramps. Results indicate that the eastbound weave performs at LOS E during the PM peak hour with a v/c ratio of 0.82. The westbound weave performs at LOS E during the AM peak hour with a v/c ratio of 0.84. Results are summarized in **Table 2.** The letter denotes level of service with the number value denoting density.

TABLE 2: FREEWAY WEAVING ANALYSIS RESULTS

Section	Period	2034 No Build
I-90 EB between E 72nd and MLK Jr Dr	AM	C / 22.3
	PM	**E / 35.8**
I-90 WB between MLK Jr Dr and E 72nd	AM	**E / 36.3**
	PM	C / 25.8

All freeway segments and ramp merge and diverge points operate at LOS D or better. Details of the No Build capacity analyses are included in **Appendix E**. However, queueing onto mainline I-90 is observed during the AM peak hour at the MLK Drive interchange on both the EB and WB exit ramps. The constrained conditions of MLK Drive corridor influence the queueing onto mainline, further details are provided under the MLK Drive section of the report (p10-14).

PHOTO 1 – I-90 WB RAMP TO MLK, AM PEAK QUEUES

PHOTO 2 – I-90 EB EXIT RAMP TO MLK, AM PEAK QUEUES

E. 55TH STREET

E. 55th Street is an Urban Minor arterial with a posted speed limit of 35 miles per hour. Through the interchange area, E. 55th Street is a four-lane, undivided section with directional, on-street bicycle lanes. The eastbound ramps to/from I-90 intersect E. 55th Street at a signalized intersection. Immediately south of the EB ramp terminal intersection is a second signalized intersection formed by S. Marginal Road (west leg) and Dick Goddard Way (east leg). The two intersections are operated with a single signal controller with the following features:

> Left turn movements from E. 55th Street to the EB entrance ramp, Dick Goddard Way and S. Marginal Road are made from the inside through lane. There are no dedicated left turn lanes on E. 55th Street.

> E. 55th Street narrows to a two-lane section 800 feet south of the I-90 interchange as it passes under a railroad overpass. South of the overpass, E. 55th Street transitions back to a four-lane section. The merge reduces capacity on E. 55th Street resulting in rolling queues during peak hours that extend through the I-90 EB ramp intersection.

> The westbound approach of Dick Goddard Way has a channelizing right turn movement that is not controlled by the traffic signal, rather is stop controlled. Vehicles were observed to make the westbound right turn from Dick Goddard Way and continue onto the eastbound entrance ramp to I-90 without stopping.

> The eastbound exit ramp from I-90 is channelized for right turn movements. The supplemental signal heads are positioned such that right turning vehicles at the stop bar do not have clear view of the signal heads. Additionally, the obtuse approach angle of the channelizing right turn lane obstructs the line of sight of vehicles approaching from the north.

> The westbound ramps to/from I-90 intersect N. Marginal Road on the north side of the interchange at an unsignalized intersection. The westbound exit ramp has a second left turn lane (100 ft length).

PHOTO 3: SOUTHBOUND E. 55TH STREET AT THE EB RAMP INTERSECTION

The combined signalized intersections on E. 55th Street currently operate with several approaches at LOS F indicating an over capacity condition. See Summary of Supplemental Traffic Studies section for additional details.

E. 72ND STREET (SR 283)

E. 72nd Street is an Urban Minor arterial with a posted speed limit of 35 miles per hour. Through the interchange area, E. 72nd Street is a two-lane, divided section with directional, on-street buffered bicycle lanes. This interchange features a directional exit ramp from EB I-90 to SB E. 72nd Street and a directional entrance ramp from NB E. 72nd Street to EB I-90. Traffic north of I-90 must use N. Marginal Road to access I-90 EB from the MLK Drive interchange. There are ramps configured as a standard diamond for WB I-90 traffic that form a stop controlled intersection. Immediately north of the westbound ramp intersection is N. Marginal Road.

PHOTO 4: NORTHBOUND E. 72ND STREET APPROCHING I-90 INTERCHANGE

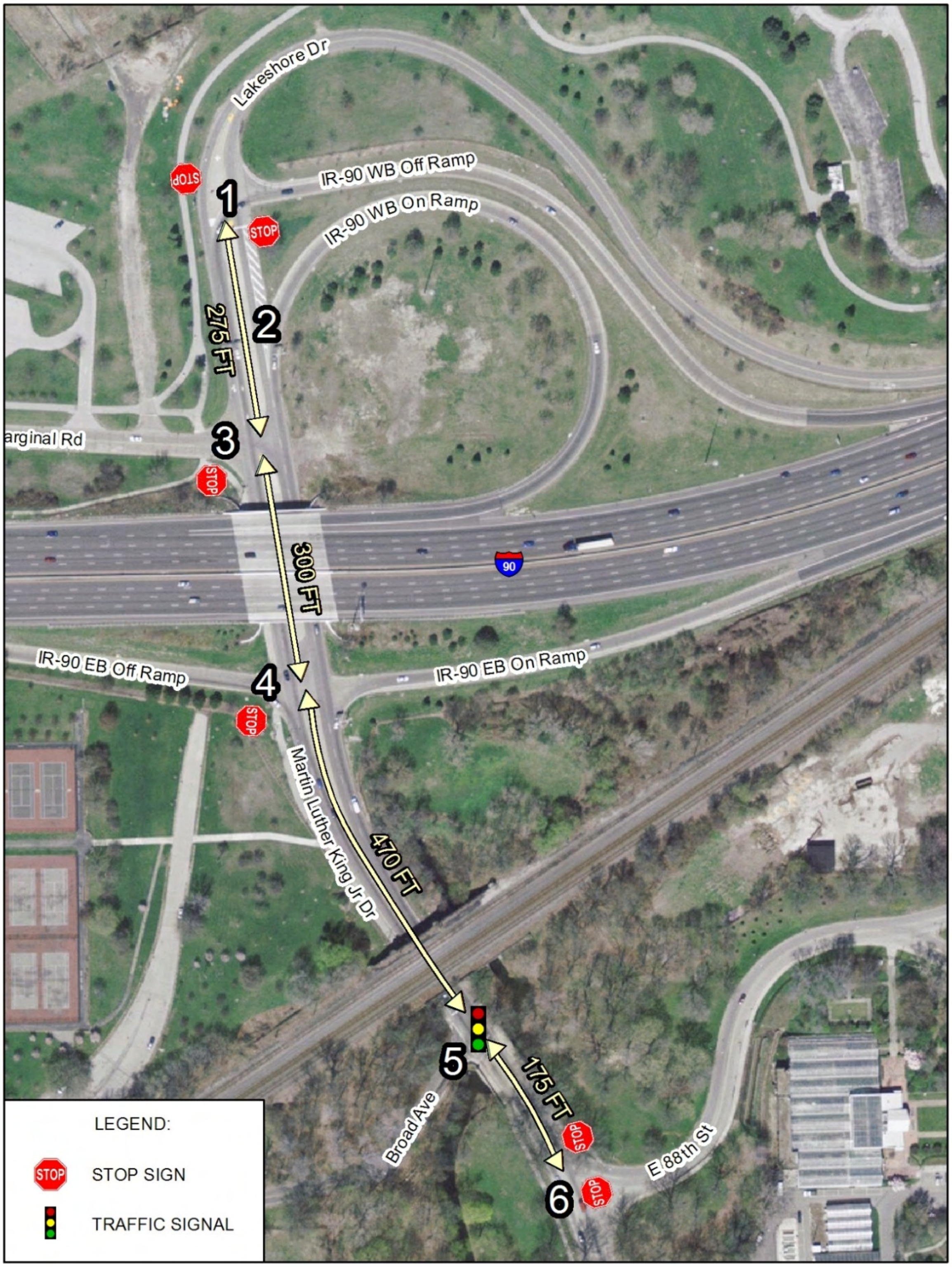
MARTIN LUTHER KING JR. (MLK) DRIVE

MLK Drive is an Urban Minor arterial with a posted speed limit of 35 miles per hour. The MLK Drive interchange serves as the primary connection between I-90 and the University Circle area.

Intersection Conditions

The MLK Drive interchange area is directly influenced by the following six intersections spaced within a distance of 1,300 feet, as shown in **Figure 4.**

FIGURE 4: MLK DRIVE INTERSECTION CONDITIONS



1. **I-90 WB exit ramp intersection**

   A three-leg intersection formed by MLK Drive as the south leg, Lakeshore Drive as the north leg, and the WB exit ramp as the east leg. The WB exit ramp is the free flow movement with MLK Drive and Lakeshore Drive approaches under stop sign control. The design of this intersection is nonstandard but right-of-way assignments are designed to accommodate peak hour traffic volumes.

2. **I-90 WB entrance ramp diverge**

   The loop ramp to WB I-90 diverges from MLK Drive just south of the WB exit ramp intersection. The ramp is a free flow movement from MLK Drive but can be impacted by NB queues that extend back from the WB exit ramp intersection.

3. **N. Marginal Road intersection**

   A three-leg intersection formed by MLK Drive as the north and south legs with N. Marginal Road as the west leg, positioned 275 feet south of the WB ramp terminal intersection. The EB approach of N. Marginal Road is under stop sign control. Left turn movements to N. Marginal Road from MLK Drive are made from the inside through lane.

4. **I-90 EB ramp terminal intersection**

   A four-leg intersection formed by MLK Drive as the north and south legs and the I-90 EB exit ramp and the I-90 EB entrance ramp as the east and west legs. The EB exit ramp operates under stop sign control with the MLK Drive approaches under free flow conditions.

5. **Broad Avenue intersection**

   A three-leg intersection formed by MLK Drive as the north and south legs and Broad Avenue as the west leg. There is a northbound left turn lane on MLK Drive at the Broad Avenue intersection. This intersection operates under traffic signal control. Broad Avenue is a low volume street connecting to E. 82nd Street and St. Clair Avenue. The traffic signal is actuated by vehicle calls on Broad Avenue.

6. **E. 88th Street intersection**

   A three leg intersection formed by MLK Drive and E. 88th Street as the east leg. E. 88th Street provides access to the Cleveland Cultural Gardens. The WB approach operates under stop sign control. There is a southbound left turn lane on MLK Drive at this intersection. The intersection is located 275 feet south of Broad Avenue.

Typical Section Conditions

Through the interchange area, MLK Drive is a four-lane, divided section with a center median island.

- The total pavement width is approximately 72 feet between N. Marginal Road and the EB ramp terminal intersections.
- Under the I-90 overpass, there is sidewalk on both sides of MLK Drive of varying width.
- South of the EB ramp terminal intersection, the pavement width begins to transition.
- Under the RR overpass, the total pavement width is approximately 42 feet. There is 10 foot wide sidewalk on both sides of MLK Drive south of the railroad overpass.

Operational Conditions

During field observations, queue spillback onto mainline I-90 extending from the WB exit ramp at MLK Drive was observed during the AM peak hour.

PHOTO 5 –I-90 WB EXIT RAMP APPROACHING MLK DRIVE, AM PEAK QUEUES

PHOTO 6 – I-90 WB MAINLINE AT MLK INTERCHANGE, AM PEAK QUEUES

Factors influencing performance of the WB exit ramp are tied directly to lane capacity of the ramp and downstream constraints on MLK Drive, as described below.

- Single lane conditions on the WB exit ramp restrict the amount of traffic serviced by the WB ramp intersection at MLK Drive. There are two southbound lanes on MLK Drive that could receive traffic flow from two lanes on the WB exit ramp.
- Traffic from the WB exit ramp was observed to stop to allow traffic northbound on MLK Drive or southbound on Lakeshore Boulevard to traverse the intersection. Since the north/south movements are stop controlled, queues form during peak hours as a result of the

continuous flow of traffic from the WB exit ramp to MLK Drive. Motorists from the WB ramp are stopping or slowing to provide a gap in the traffic flow.

> The most significant capacity constraint on MLK Drive is the southbound lane merge that occurs just south of the EB ramp intersection. Traffic from the WB exit ramp utilizes the inside southbound lane due to the downstream merge condition. Right turning traffic from the EB exit ramp fills the southbound curb lane only to merge with the southbound flow from the WB exit ramp. The result is a high volume of southbound traffic converging into a single lane just 300 feet south of the interchange.

> There is no dedicated turn lane on MLK Drive for southbound left turn movements onto the EB entrance ramp. Vehicles must wait in the median opening for a gap in opposing northbound traffic. If multiple left turning vehicles are waiting for a gap, southbound queues will form behind the waiting vehicles which impacts flow from the WB exit ramp.

> Traffic signal operation at Broad Avenue is side-street actuated. The AM peak hour volume on Broad Avenue is low; however, when the signal serves minor street traffic, southbound queues on MLK extend farther towards the I-90 interchange.

> Traffic on the EB exit ramp was observed to queue up the ramp toward mainline I-90. Traffic exiting EB I-90 at MLK Drive is forced to decelerate quickly through the I-90 weave segment to avoid extended queues on the ramp making this maneuver more challenging.

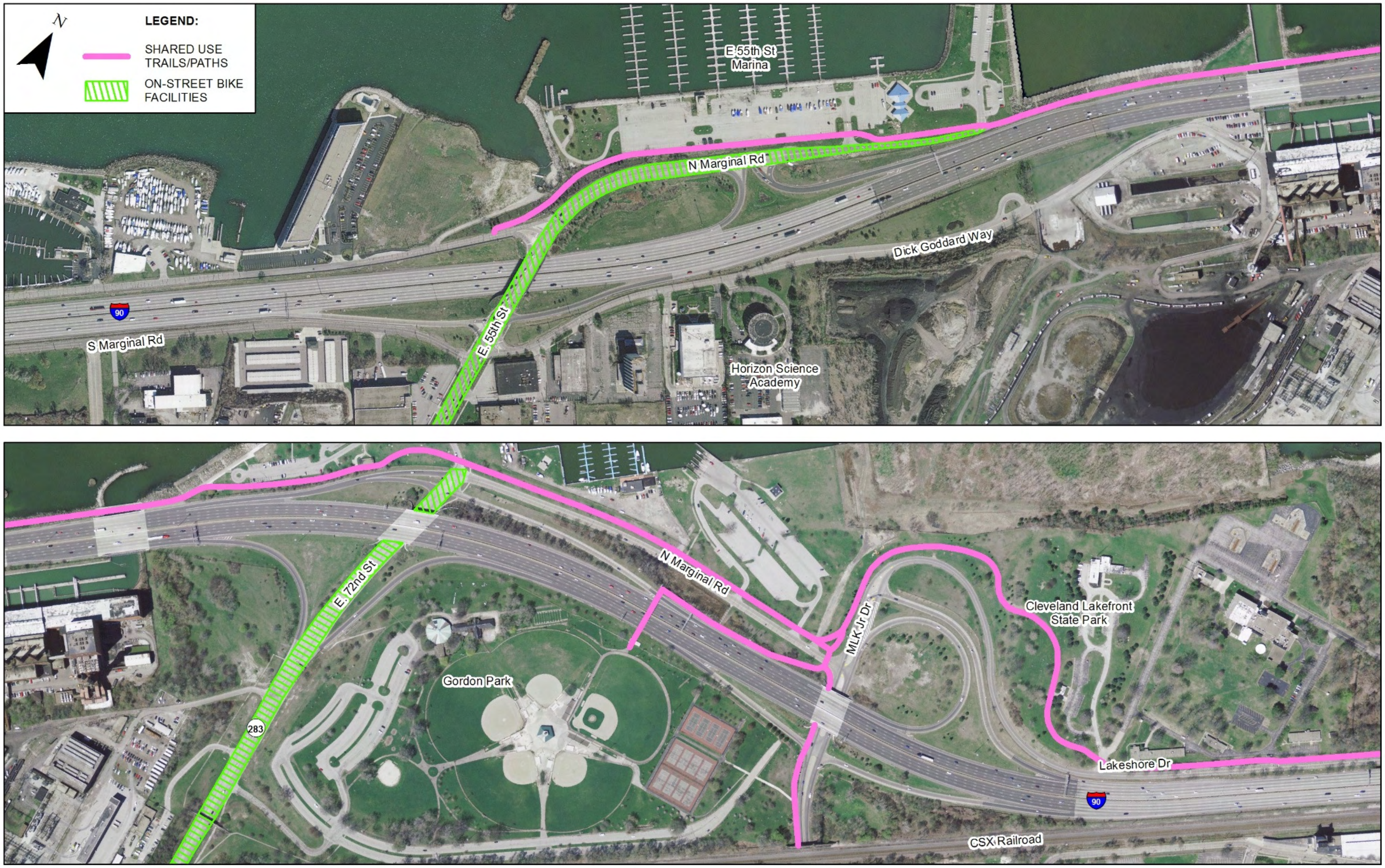
PHOTO 7 – I-90 EB EXIT RAMP TO MLK, AM PEAK QUEUES

The current conditions on MLK Drive result in poor levels of service for the stop controlled movements at the WB exit ramp and EB exit ramp intersections. Long queues also extend from the WB exit ramp intersection despite the free flow condition on the ramp approach. Additional details related to the No Build levels of service can be found in the Summary of Supplemental Traffic Studies section of this report.

TRAIL SYSTEM

Figure 5 shows the existing shared use/recreational paths and on-street bicycle facilities in the study area. There is a pedestrian bridge that spans I-90 between E. 72nd Street and MLK Drive, providing connection between Gordon Park and the lakeshore destinations. MLK Drive is the only local street in the study area without on-street bicycle facilities. Cyclists use the sidewalk/shared use paths along the west side of MLK Drive.

FIGURE 5: EXISTING MULIT-MODAL FACILITIES



DATA COLLECTION

Current traffic data was obtained from various sources for use in this study, as described below. AM and PM peak hour traffic volumes projected for design year 2034 are shown in **Figures 6A through 6D.** Traffic data reports used in preparation of this study are provided in **Appendix C.**

> **I-90 Mainline**: Directional ADT on mainline I-90 was obtained from a permanent count station located at SLM 24.33 (east of the study area). Data was from a weekday in May 2014. ADT within the project area was determined based on ODOT collected ramp counts (dated 2011, 2013) between the permanent count station and East 55th Street.

> **I-90 ramps**: Directional hourly ramp volumes were obtained from short term count stations. A total of 21 hourly ramp counts were obtained, all of which were collected by ODOT between 2011 and 2013. Each count includes a minimum of 24 consecutive hours of data.

> **E. 55th Street**: Turning movement counts were conducted on E. 55th Street in October 2014 as part of the Lakefront Greenway and Downtown Connector Study. Count data at the E. 55th Street intersections with N. Marginal Road, S. Marginal Road, and the I-90 EB ramps was used in preparation of this safety study.

> **MLK Drive**: A 24-hour turning movement count was conducted on October 30, 2014 at the intersection of MLK Drive and the I-90 EB ramps. Turning movement volumes at the I-90 WB ramp were estimated based on available ramp volumes and 15-minute volume counts conducted during field inspection.

> **N. Marginal Road**: Traffic count data was not available for specific locations on N. Marginal Road. Traffic volumes at intersections were estimated using ramp data and count data from adjacent intersections. Traffic on N.Marginal Road is expected to vary seasonally with recreational use of lakefront park facilities.

The following steps were included in the preparation of design year traffic volume forecasts:

> Existing volumes were used to determine the AM and PM peak hours.

> Existing volumes were adjusted to reflect seasonal conditions of the study area using ODOT recommended seasonal adjustment factors for all vehicle classes on an urban interstate route.

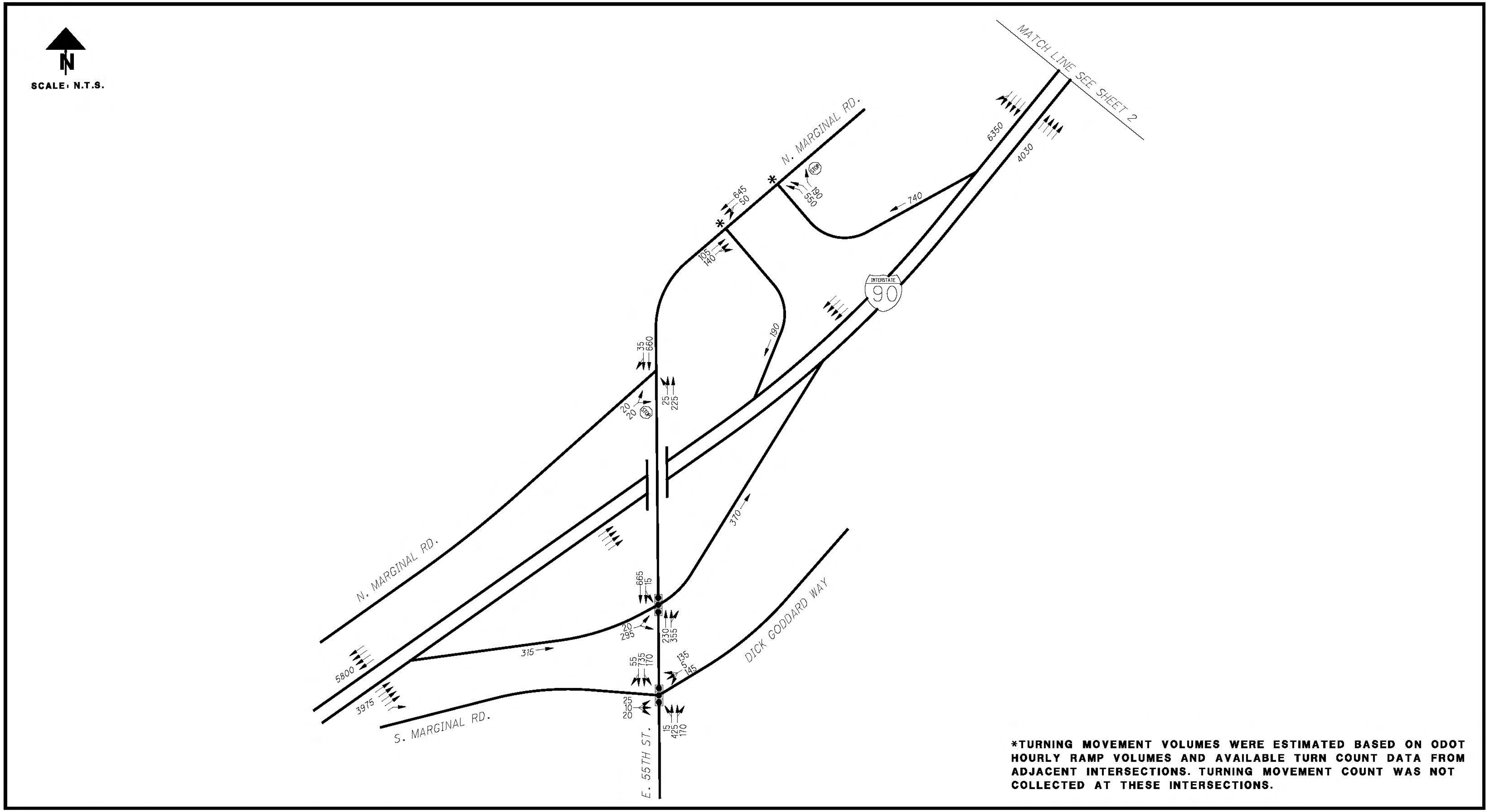
> Existing volumes were adjusted for seasonal variations and were then forecast to design year 2034 using growth factors provided by NOACA. Growth rates summarized in **Appendix C**, listed in percent growth per year, were applied to volumes in the study area to obtain design year volumes. Ramps and freeway segments not listed are projected to have no growth (0 percent). All service/local streets are projected with no growth.

Preliminary development of potential countermeasures identified in this study should be confirmed using existing traffic data at all locations. Estimated traffic volumes used at some locations within the study area should be supplemented with seasonal traffic data.

NO BUILD CAPACITY ANALYSIS

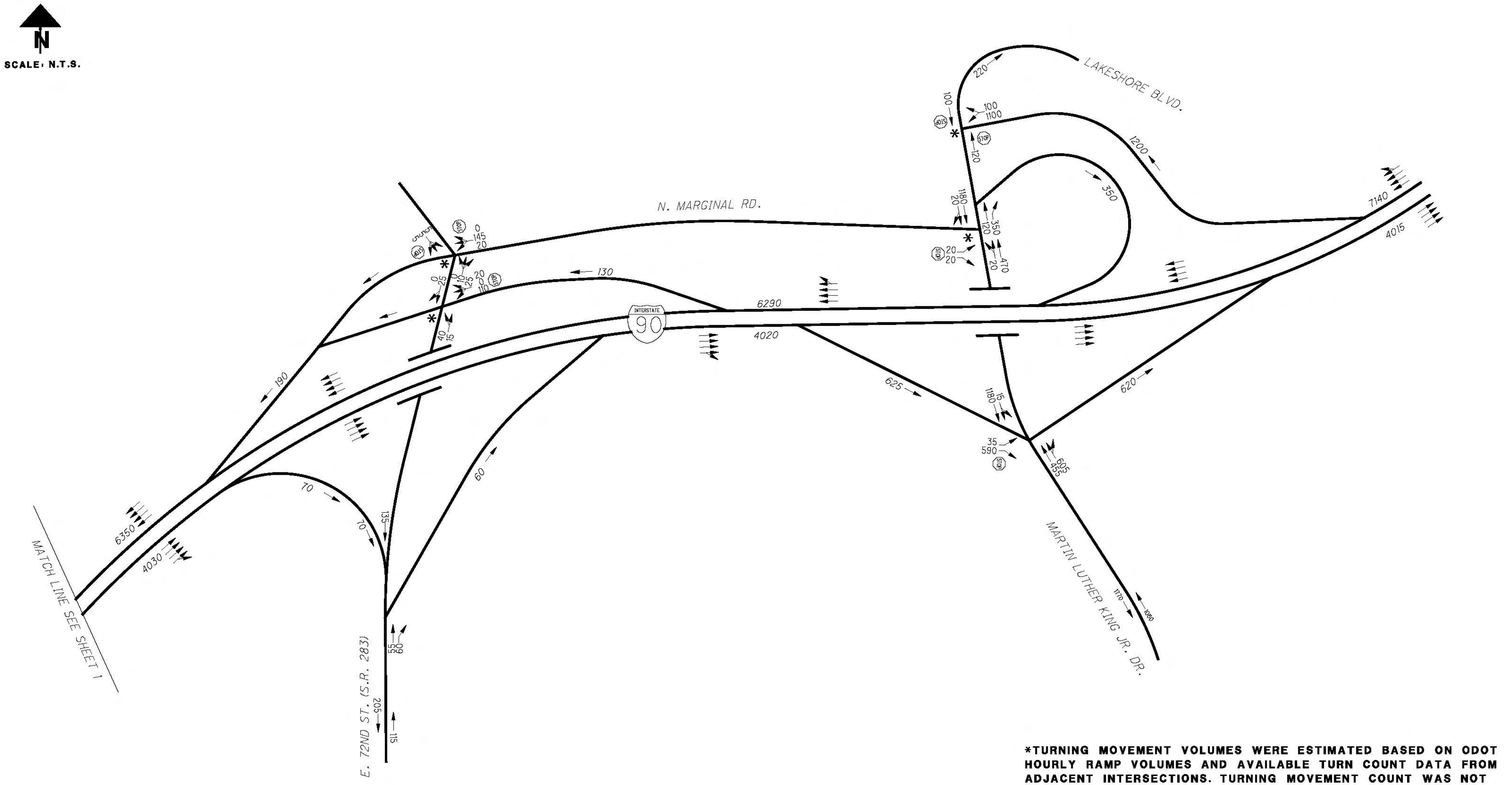
Capacity analyses were performed at key locations in the study area to assess existing operations and to identify critical deficiencies that may contribute to safety issues. Analyses were prepared for No Build conditions using 2034 AM and PM peak hour volumes for the analysis modules listed below. Analysis methodology and detailed output reports for all capacity analyses are included in **Appendix E.**

FIGURE 6A: 2034 AM PEAK HOUR TRAFFIC VOLUMES



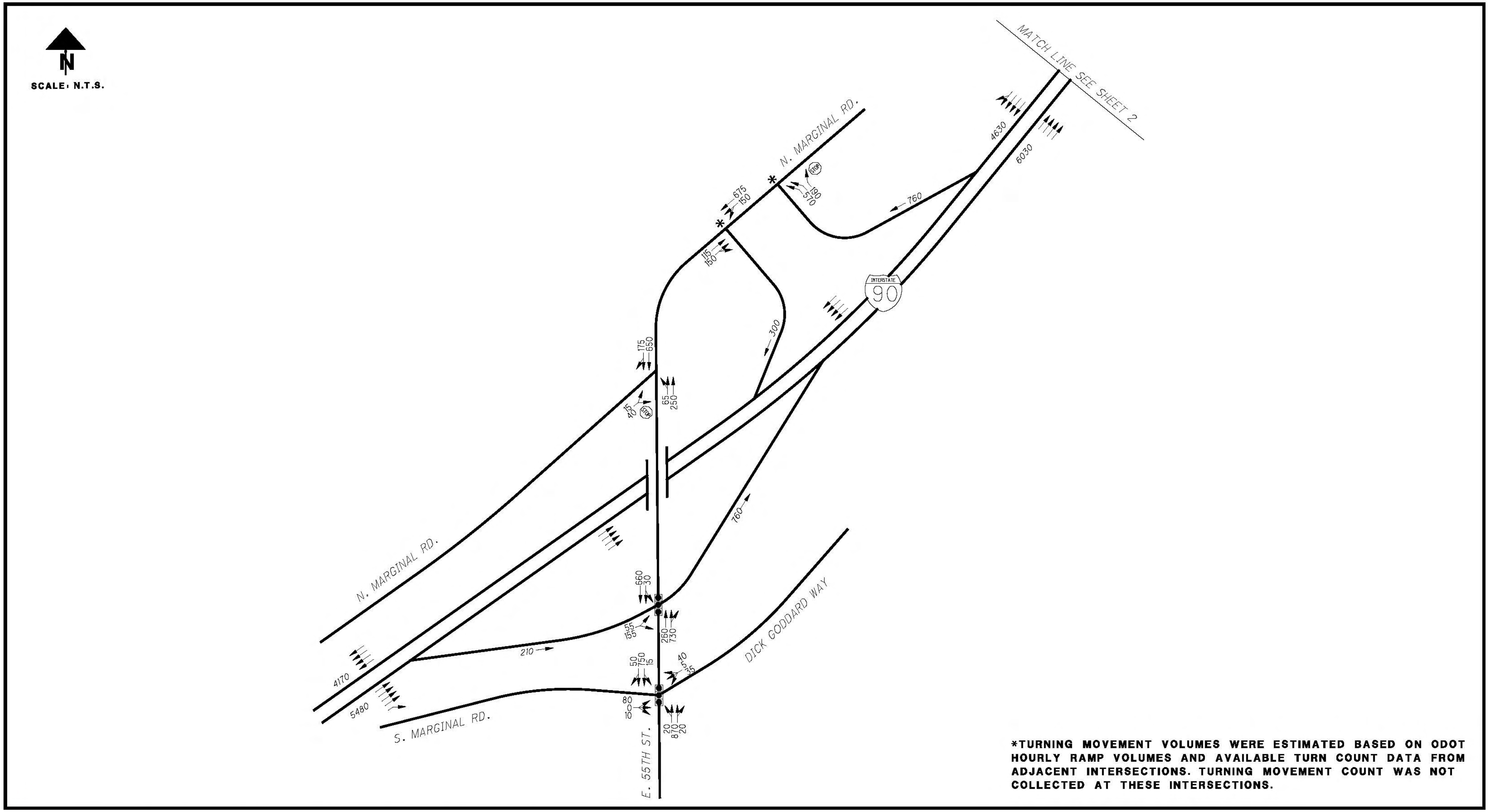
***TURNING MOVEMENT VOLUMES WERE ESTIMATED BASED ON ODOT HOURLY RAMP VOLUMES AND AVAILABLE TURN COUNT DATA FROM ADJACENT INTERSECTIONS. TURNING MOVEMENT COUNT WAS NOT COLLECTED AT THESE INTERSECTIONS.**

FIGURE 6B: 2034 AM PEAK HOUR TRAFFIC VOLUMES



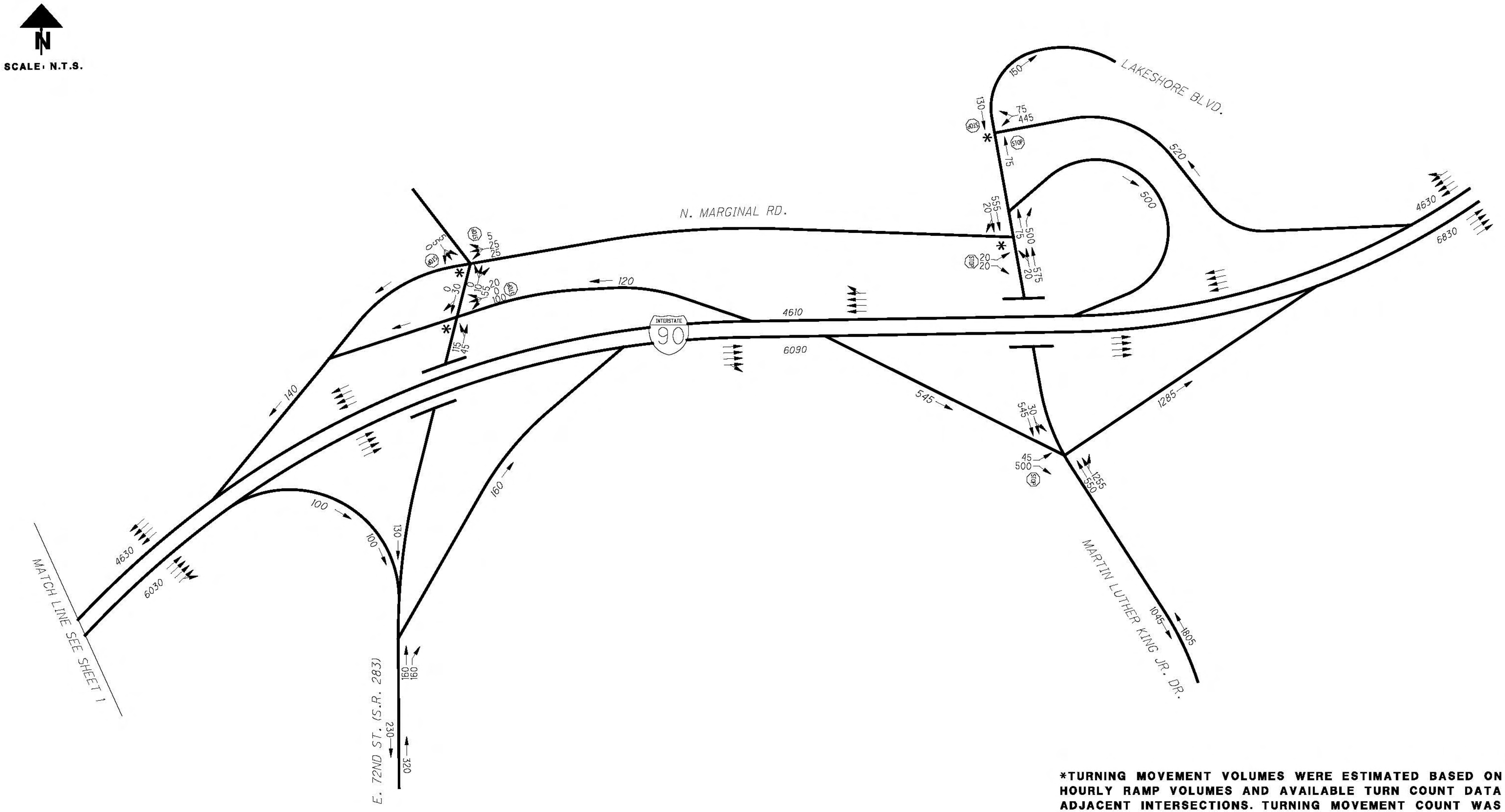
***TURNING MOVEMENT VOLUMES WERE ESTIMATED BASED ON ODOT HOURLY RAMP VOLUMES AND AVAILABLE TURN COUNT DATA FROM ADJACENT INTERSECTIONS. TURNING MOVEMENT COUNT WAS NOT COLLECTED AT THESE INTERSECTIONS.**

FIGURE 6C: 2034 PM PEAK HOUR TRAFFIC VOLUMES



***TURNING MOVEMENT VOLUMES WERE ESTIMATED BASED ON ODOT HOURLY RAMP VOLUMES AND AVAILABLE TURN COUNT DATA FROM ADJACENT INTERSECTIONS. TURNING MOVEMENT COUNT WAS NOT COLLECTED AT THESE INTERSECTIONS.**

FIGURE 6D: 2034 PM PEAK HOUR TRAFFIC VOLUMES



*TURNING MOVEMENT VOLUMES WERE ESTIMATED BASED ON ODOT HOURLY RAMP VOLUMES AND AVAILABLE TURN COUNT DATA FROM ADJACENT INTERSECTIONS. TURNING MOVEMENT COUNT WAS NOT COLLECTED AT THESE INTERSECTIONS.

CRASH ANALYSIS

CRASH DATA

Crash data was furnished by the Ohio Department of Transportation for the study area, encompassing a three-year period between 2011 and 2013. The OH-1 crash report for each documented crash was reviewed to confirm accuracy and to locate crashes properly within the study limits. Crash diagrams are provided in **Appendix F.** Noteworthy crash statistics for the three-year period are summarized below.

> Total crashes: 405 total crashes	
> Fatal crashes: 1 crash or 0.2 percent	(0.3 percent)
> Injury crashes: 122 crashes or 30.1 percent	(23.8 percent)
> Rear end crashes: 179 crashes or 44.2 percent	(29.3 percent)
> Sideswipe - passing crashes: 90 crashes or 22.2 percent	(18.7 percent)

HIGHWAY SAFETY MANUAL

The predictive method described in Part C of the Highway Safety Manual provides steps to estimate the expected average crash frequency of a site for a given time period, geometric design, traffic control features, and traffic volumes. The expected average crash frequency (Nexpected) is estimated using a predictive model estimate of crash frequency for a specific site type (Npredicted) together with observed crash frequency (where available).

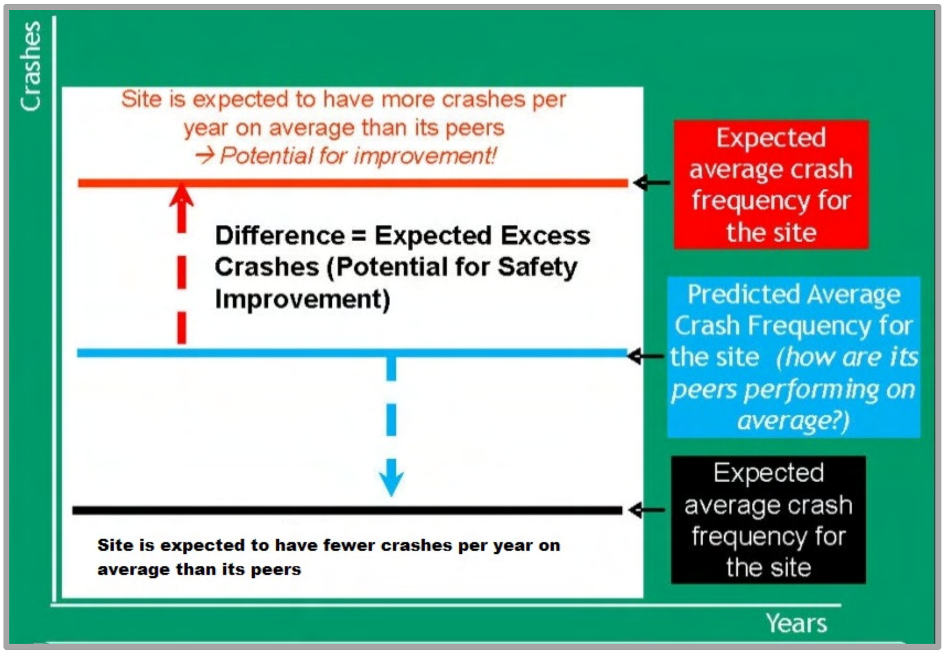
> **Predicted average crash frequency**: This step involves determination of the predicted crash frequency which reflects how a site would be expected to perform relative to 1,000 similar sites. Calculation of predicted crash frequency utilizes Safety Performance Functions (SPF) for a base condition. Crash Modification Factors (CMF) are applied to account for specific site characteristics that differ from the base condition. A state-level calibration factor is then applied to normalize the base condition to localized conditions. The resulting value is the Predicted Crash Frequency (Npredicted)

> **Expected average crash frequency:** The next step involves calculation of the expected average crash frequency which reflects average performance of the site over an extended period of time based on actual crash history. This step incorporates the Empirical Bayes (EB) method which combines actual (observed) crash history of the study site with predicted average crash frequency. These values are weighted based on an over-dispersion parameter (k) that is the measure of the strength of the model (safety performance factors). The resulting value is the expected average crash frequency (Nexpected)

EXPECTED EXCESS CRASH RESULTS

The difference between the predicted and expected average crash frequencies is termed the “Expected Excess Crashes” for the site, as shown in **Graph 1**. If the expected average crash frequency is greater than the predicted average crash frequency, then the site has potential for safety improvement. If expected frequency is less than predicted frequency, then the site is expected to experience fewer crashes per year on average than its peers.

GRAPH 1: EXPECTED EXCESS CRASHES



The HSM predictive method for urban/suburban arterials was applied to E. 55th Street and to MLK Drive, as described below. A detailed overview of the Highway Safety Manual procedures and HSM output reports are provided in **Appendix G.**

- E. 55th Street: One (1) intersection element for the I-90 EB ramp/Goddard Way/S. Marginal Road intersection. Results summarized in **Table 3** conclude that the expected crash frequency at this intersection is greater than predicted, indicative of the potential for safety improvement.

TABLE 3: HSM RESULTS FOR EXISTING CONDITIONS – E. 55TH STREET

	E 55th Street @ I-90 EB ramp/Goddard Way/S. Marginal
Predicted Average Crash Frequency ($N_{predicted}$)	12.81
Expected Average Crash Frequency – Existing Conditions ($N_{expected, existing}$)	13.87
Expected Excess Crashes	1.06
Potential for Safety Improvement?	**Yes**

- MLK Drive: Two (2) intersection elements for the I-90 WB ramp/N. Marginal and I-90 EB ramp intersection and one segment for MLK Drive between the EB I-90 ramp intersection and E. 88th Street. Results summarized in **Table 4** conclude that the expected crash frequency is greater than predicted for the EB ramp intersection and the segment south of the intersection, suggesting the potential for safety benefit.

  Crash frequency is slightly below the predicted crash frequency for the WB ramp intersection.

TABLE 4: HSM RESULTS FOR EXISTING CONDITIONS – MLK DRIVE

	MLK Drive Total	Intersection: MLK Drive @ I-90 WB Ramp/N.Marginal	Intersection: MLK Drive @ I-90 EB Ramp	Segment: MLK Drive south of I-90 EB Ramp intersection
Predicted Average Crash Frequency ($N_{predicted}$)	14.24	7.94	5.85	0.45
Expected Average Crash Frequency – Existing Conditions ($N_{expected, existing}$)	20.89	7.42	12.67	0.81
Expected Excess Crashes	6.65	-0.52	6.82	0.36
Potential for Safety Improvement?	**Yes**	**No**	**Yes**	**Yes**

OBSERVED CRASH HISTORY

The 405 total reported crashes were distributed within the study area as follows:

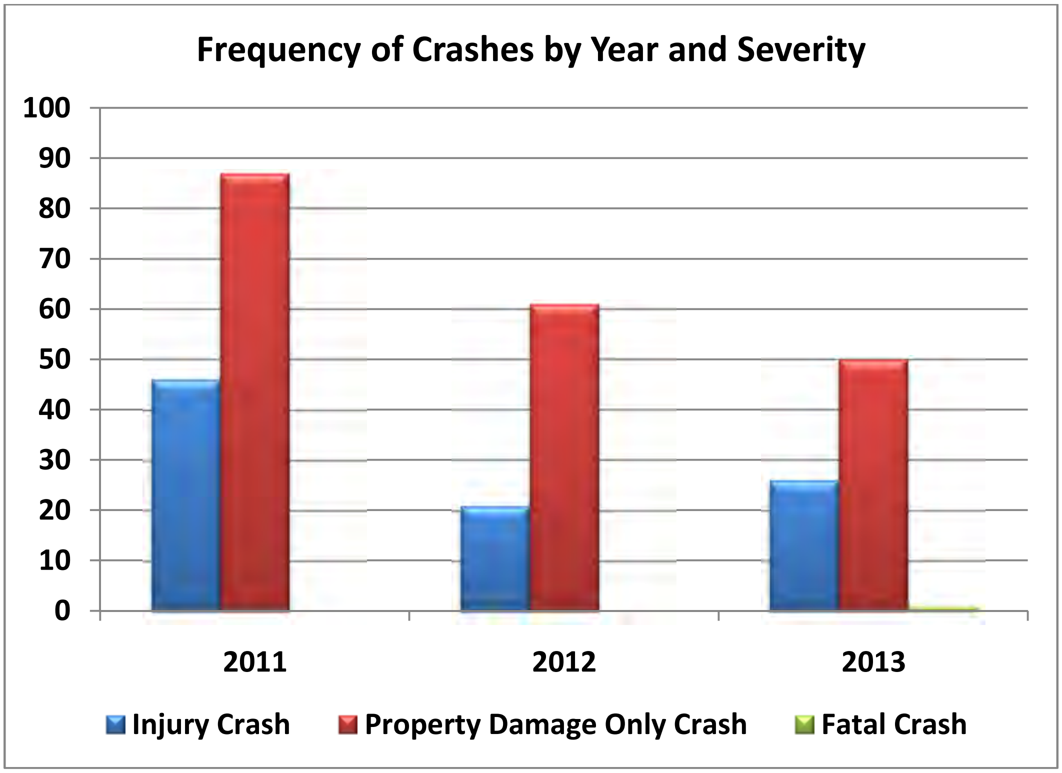
- I-90 Mainline (including ramp crashes not intersection related): 292 crashes
- E 55th Street (including N. Marginal Road): 39 crashes
- E 72nd Street: 14 crashes
- MLK Drive: 60 crashes

I-90 corridor

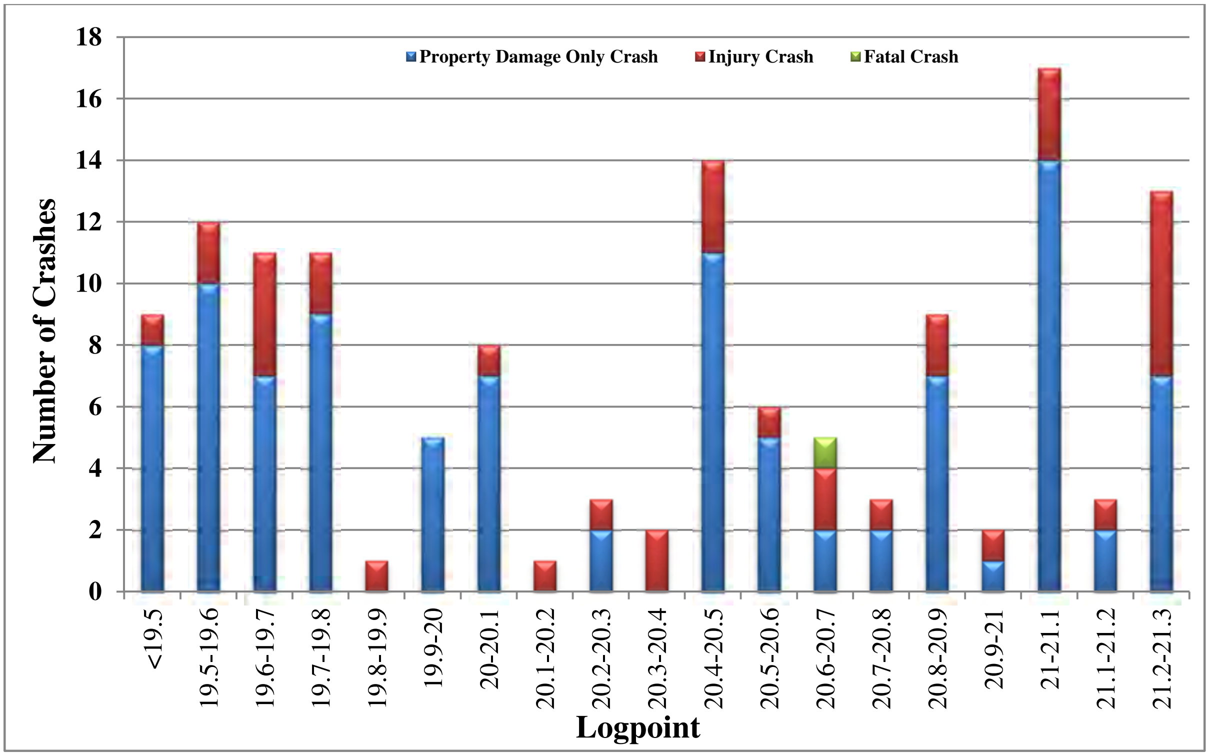
There were 292 crashes reported on mainline I-90 during the three-year analysis period. Noteworthy statistics are summarized below.

- 91% of the mainline crashes were one of three types of crashes: rear end (102 or 35%), fixed object (87 or 30%) or sideswipe passing (77 or 26%).
- A disproportionate high percentage of crashes (46 percent or 133 crashes) occurred in 2011. The other two years experienced 28 percent and 26 percent of the total crashes
- 42 percent of crashes on mainline I-90 occurred on non-dry pavement surface (wet, snow or ice).
- Two percent of crashes involved speeds greater than 65 miles per hour
- A fatal injury crash was reported on eastbound I-90 at SLM 20.64, between the ramps at the E. 72nd Street interchange. The crash occurred on Thursday, May 30, 2013 during the 10AM hour under clear and dry conditions. The crash involved a pedestrian that was struck while attempting to assist a stalled vehicle from the travel lanes. The OH-1 report is provided in **Appendix F.**
- 32 percent of mainline crashes resulted in injury. **Graph 2** shows the distribution of crash severity over the 3-year period.

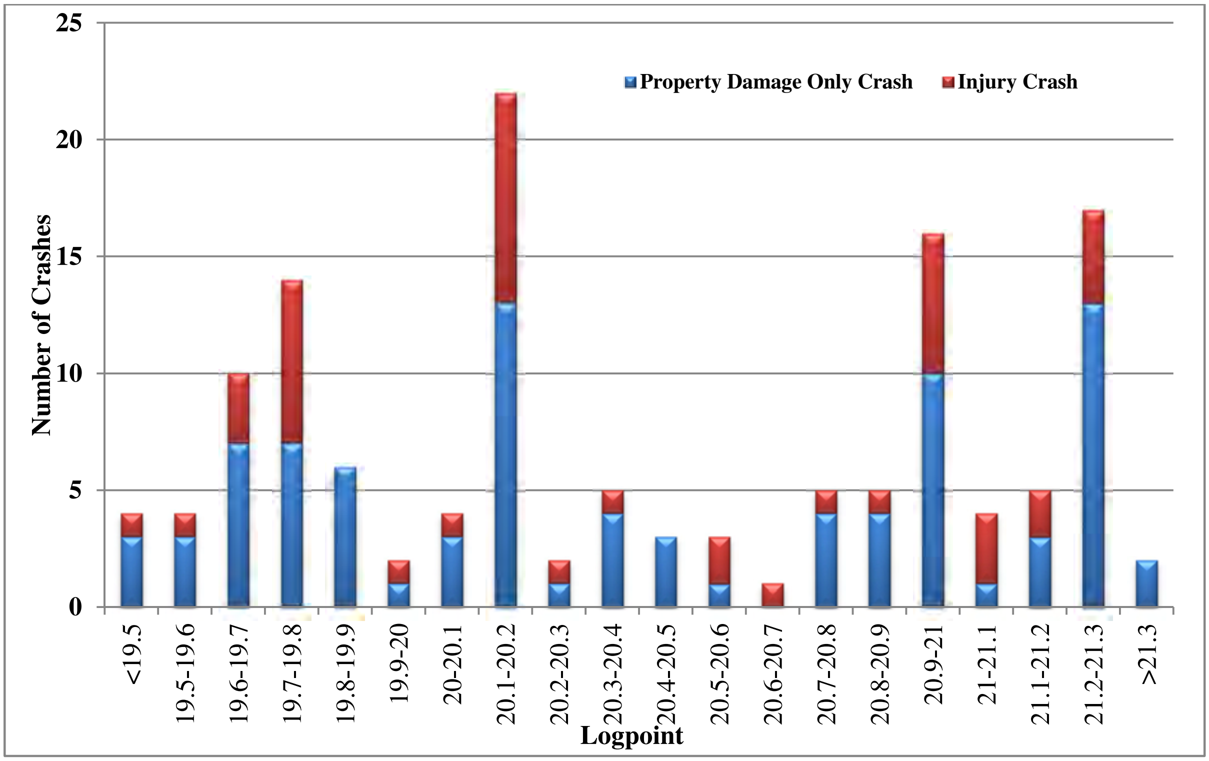
GRAPH 2: MAINLINE I-90 CRASHES BY YEAR AND SEVERITY



GRAPH 3: MAINLINE I-90 EASTBOUND CRASHES



GRAPH 4: MAINLINE I-90 WESTBOUND CRASHES



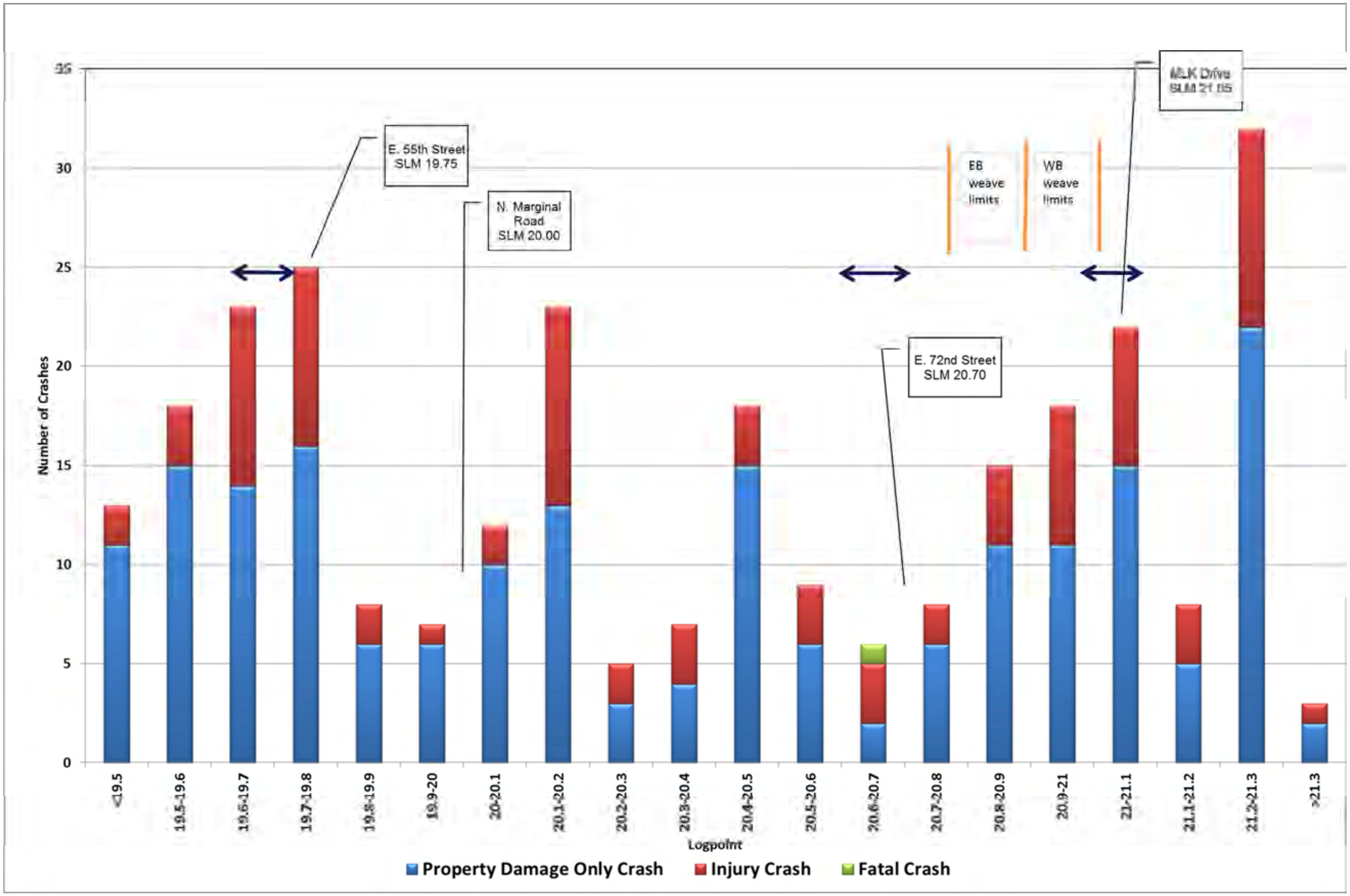
The locations of crashes on the I-90 corridor changed as a result of the crash review process. The following three segments of I-90 are identified on the 2013 Urban Freeway Excess Locations list based on crashes from 2011 to 2013:

- Rank #32: SLM 21.01 to 21.11 (MLK Drive interchange)
- Rank #69: SLM 19.63 to 19.73 (E. 55th Street interchange)
- Rank #96: SLM 20.61 to 20.71 (E. 72nd Street interchange)

Graph 5 shows the revised crashes by location. The horizontal arrows (blue) indicate the high priority locations from the 2013 Urban Freeway Excess location analysis listed above. The EB and WB weaves between MLK Drive and E. 72nd Street are shown as vertical lines (orange).

The high crash locations based on the histogram are east and west of the MLK interchange and the E. 55th Street interchange. The weave between MLK Drive and E. 72nd Street may create congestion that contributes to crashes near SLM 20.45 and at SLM 21.25.

GRAPH 5: MAINLINE I-90 CRASH LOCATION

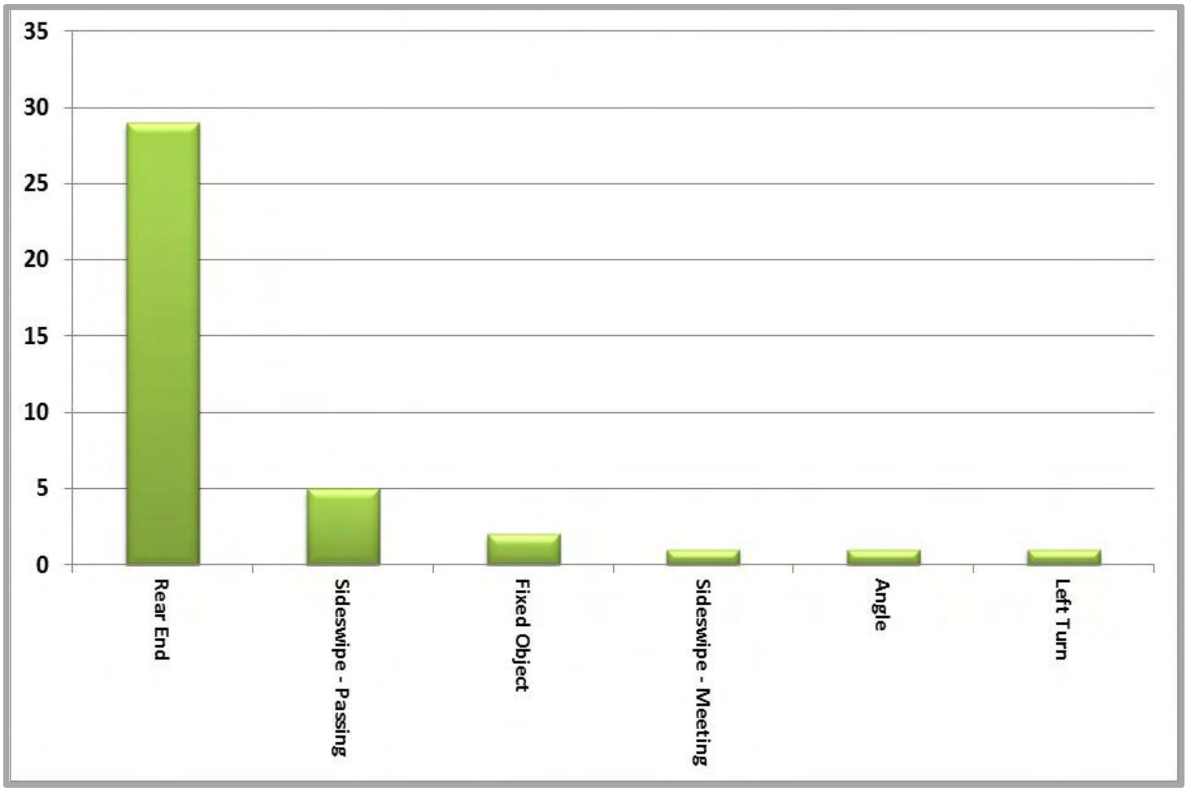


E. 55th Street

There were 39 crashes reported on E. 55th Street during the three-year analysis period. Noteworthy statistics are summarized below.

- 75 percent of crashes on E. 55th Street were rear end crashes.
- Crashes were evenly distributed by year and day of week
- 75 percent of crashes occurred during daylight hours, 61 percent occurred during clear weather and 69 percent on dry pavement
- 87 percent of the crashes occurred at an intersection with 80 percent occurring at the E. 55th Street intersection with the EB ramp/Goddard Way/S. Marginal Road. The remaining 7 percent of intersection crashes occurred at the WB ramp intersection with N. Marginal Road.

GRAPH 6: E. 55TH STREET FREQUENCY OF CRASHES BY CRASH TYPE

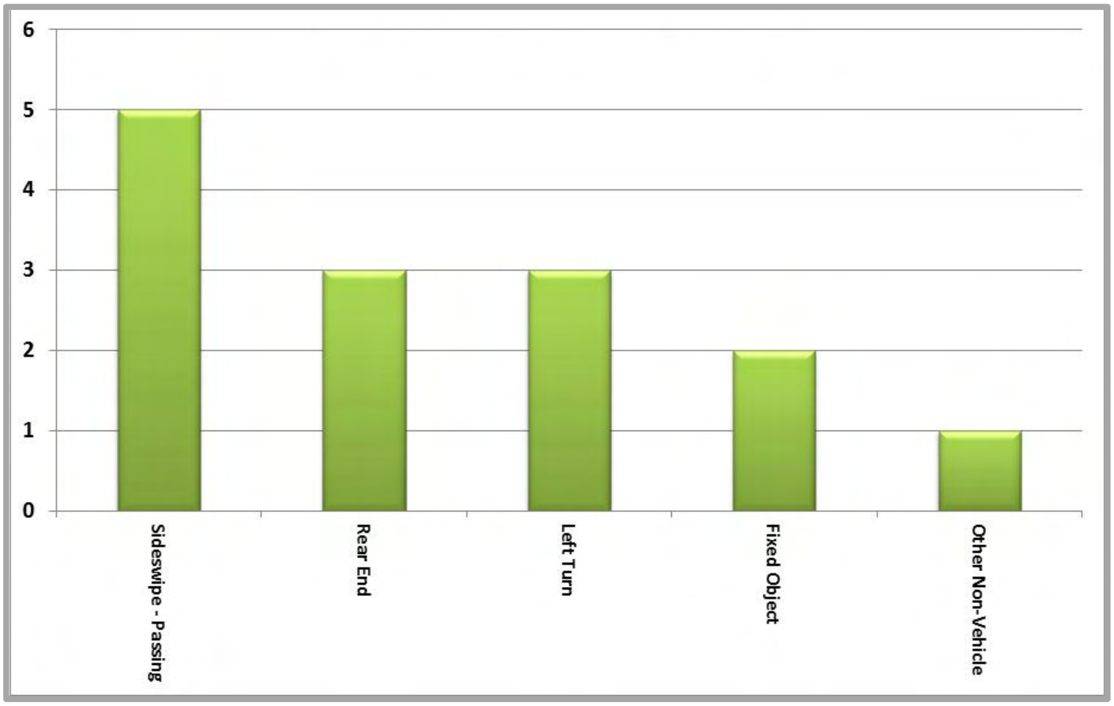


E. 72nd Street

There were 14 crashes reported on E. 72nd Street during the three-year analysis period. Noteworthy statistics are summarized below.

- 42 percent of crashes resulted in injury
- 35 percent of crashes occurred on Monday
- Crash types included sideswipe passing, rear end, left turn, and fixed object
- Greater than 70 percent of crashes occurred during daylight hours with clear weather and dry pavement.
- 6 of the 14 crashes (43 percent) occurred on E. 72nd Street at the driveway to Gordon Park. A concrete median allows ingress/egress but left turn lanes on E. 72nd Street do not exist.

GRAPH 7: E 72ND STREET FREQUENCY OF CRASHES BY CRASH TYPE



MLK Drive

There were 60 crashes reported on MLK Drive during the three-year analysis period. Noteworthy statistics are summarized below.

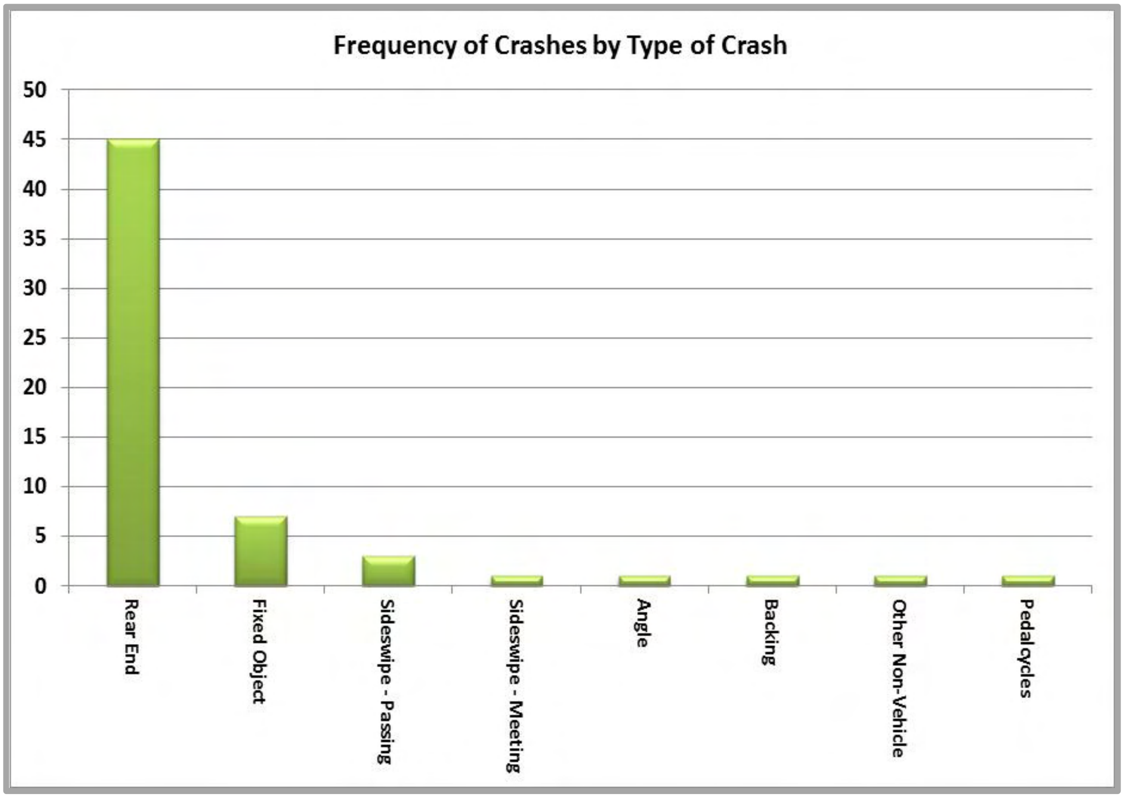
- 75 percent of crashes were rear end crashes (45 crashes). The rear end crashes were distributed at the following locations
  - 32 rear end crashes at the EB ramp terminal intersection. 30 of those crashes occurred on the EB ramp approaching the intersection. 2 occurred southbound on MLK Drive approaching the intersection
  - 7 rear end crashes at or between the Broad Avenue and E. 88th Street intersections

  - 4 rear end crashes at or between the WB ramp terminal and N. Marginal Road intersection
  - 2 rear end crashes at the SB lane merge
  - MLK Drive experiences queueing during weekday peak hours, primarily in the southbound direction during the AM peak and northbound direction during the PM peak. 3 rear-end crashes were observed in the southbound direction of MLK drive during weekday AM peak hours. No rear-end crashes were observed in the northbound direction during weekday PM peak hours.

> 12 percent of crashes were fixed object (7 crashes). 3 of the 7 fixed object crashes involved the center concrete median island.

> A bicycle crash was reported on MLK Drive near the intersection with E. 88th Street. This was a non-injury crash.

GRAPH 8: MLK DRIVE FREQUENCY OF CRASHES BY TYPE



COUNTERMEASURES

Mitigation of safety issues on I-90 is to be accomplished by improving ramp capacity and eliminating substandard weave conditions that exist on the I-90 corridor. Due to the proximity of the intersections on the local roadway network and the extended queues that impact adjacent intersections, safety countermeasures are expected to be a corridor-level improvement at specific interchanges. Capacity upgrades that add lanes to mainline I-90 are not a part of this scope of work.

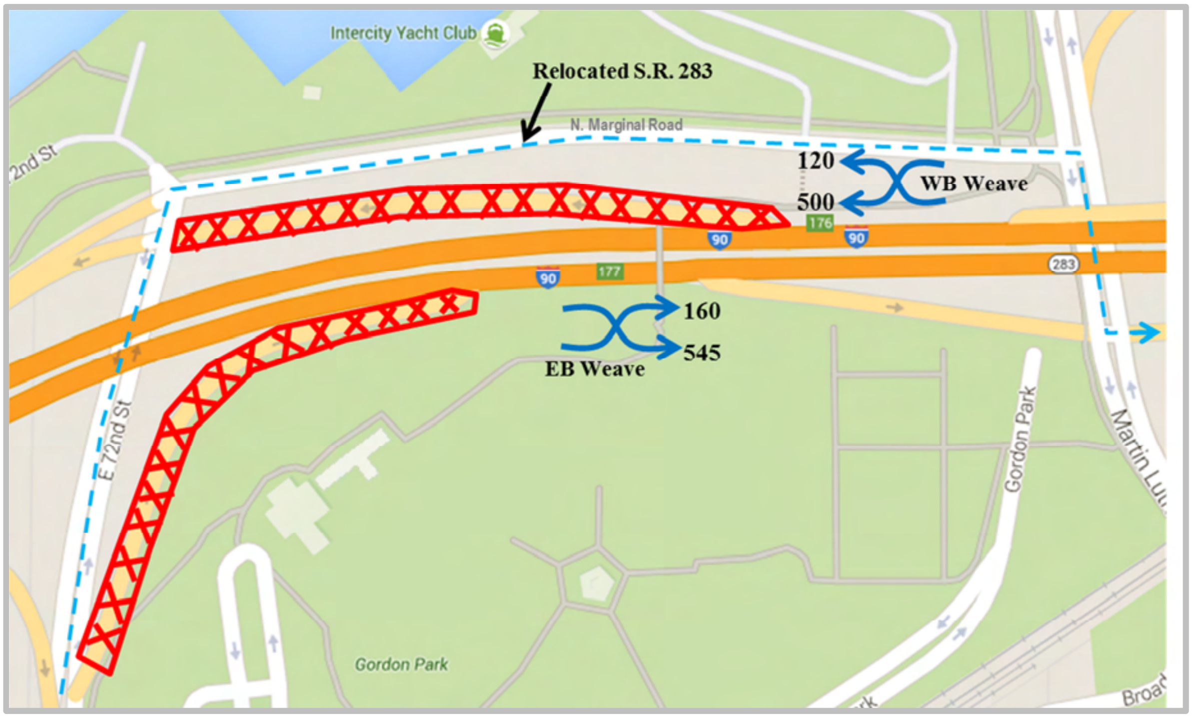
I-90 CORRIDOR

The distance between the MLK Drive interchange and the E. 72nd Street interchange is less than 2,000 feet, resulting in substandard lengths for weaving movement to/from I-90.

Countermeasures are proposed to mitigate crashes in the weave segments of I-90 between E. 72nd Street and MLK Drive. A total of 12 westbound crashes and 17 eastbound crashes are expected to be mitigated by removing the EB entrance ramp and the WB exit ramp at the E. 72nd Street interchange. Removal of the EB entrance ramp and WB exit ramp at E. 72nd Street is proposed to eliminate the substandard weave on I-90 as shown in **Figure 7**. Justification for this recommendation includes the following:

- Ramp volumes. The peak hour volume (PM) on the EB entrance ramp is 160 vehicles per hour. The peak hour volume (AM) on the WB exit ramp is 130 vehicles.
- Movements not accommodated at the E. 72nd Street interchange are provided at the MLK Drive interchange via N. Marginal Road. The 130 vehicles per hour (VPH) on the WB exit ramp will be redirected to exit at MLK Drive and travel west on N. Marginal Road to E. 72nd Street. Similarly, the 160 VPH on the EB entrance ramp will be redirected east on N. Marginal Road to MLK Drive where they will access I-90 from the EB entrance ramp.
- Diversion of traffic to the MLK Drive is expected to increase congestion at the MLK Drive interchange unless capacity improvements are implemented. See the MLK Drive countermeasure discussion for additional information.
- Extend deceleration length of the EB exit ramp and acceleration length of the WB entrance ramp at the MLK Drive interchange. With closure of the ramps at the E. 72nd Street interchange, additional deceleration and acceleration lengths can be provided. With the EB entrance ramp from E. 72nd Street closed, the deceleration length can be extended from 475 feet to 800 feet with use of the existing pavement.
- The closure of the I-90EB entrance ramp from E.72nd Street requires relocation of S.R. 283 to N. Marginal Road. Figure 7 shows the proposed relocation of S.R. 283. This relocation to establish new alignment for a State Route will require action by the ODOT Director.

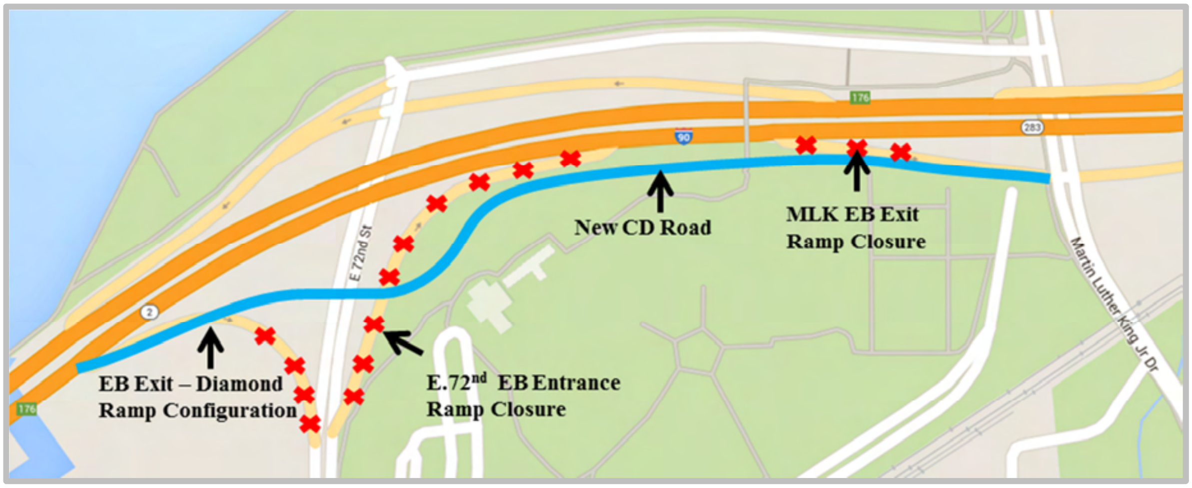
FIGURE 7: E. 72ND RAMP CLOSURES



Note: Weave volumes (estimated) are shown for PM peak hour; all ramp traffic is assumed to weave.

An alternative to the eastbound ramp closure at E. 72nd Street was evaluated which included converting the EB ramps at E. 72nd Street to a diamond ramp configuration and constructing an EB collector-distributor roadway between E. 72nd Street and MLK Drive (**Figure 8**). This would eliminate the mainline weave segment by forcing all traffic destined to E. 72nd Street and to MLK Drive to exit at the E. 72nd Street interchange. Traffic destined to MLK Drive would continue through the at-grade intersection on E. 72nd Street onto the C-D roadway to access MLK Drive.

FIGURE 8: C-D ROAD BETWEEN E.72ND AND MLK



This alternative is not further evaluated in this study due to higher costs and impacts to Gordon Park. This alternative may be considered if other alternatives are determined not to be feasible. Preliminary engineering is needed to develop an alignment and profile to estimate the construction costs of reconfiguring the EB ramps at E. 72nd Street, construction of a CD roadway parallel to I-90, reconstruction of the pedestrian bridge over I-90, and potential impacts to Gordon Park property.

MLK DRIVE CORRIDOR

The MLK Drive corridor experiences congestion during the AM and PM peak periods. **Appendix E** contains the detailed analyses and summary for the No Build condition. Locations with LOS E or LOS F are considered capacity deficient for the purposes of this evaluation. Note that the design period for MLK Drive corridor is the AM peak. All level of service results are for the AM peak hour, unless stated otherwise.

> **MLK Drive at I-90 WB ramp intersection**: LOS F on northbound and southbound approaches. Although the WB ramp approach shows acceptable level of service (LOS B), the high volumes result in a queue length of 1,539 feet. The length of the queue can extend onto mainline I-90 due in part to the capacity constraints of the single lane approach at MLK Drive.

> **MLK Drive at N. Marginal Road intersection**: LOS E on the eastbound approach of N. Marginal Road.

> **MLK Drive at I-90 EB ramp intersection:** LOS F on eastbound approach of the EB exit ramp.

The primary capacity constraint on the MLK Drive corridor is the southbound merge at the railroad bridge. Queues that form on both exit ramps are attributed in part to the capacity of the single southbound lane on MLK Drive south of the I-90 interchange. Two countermeasures are proposed to mitigate existing capacity constraints of MLK Drive. The metrics used to evaluate the various improvement alternatives are a combination of intersection LOS and 95th percentile queue lengths derived by SimTraffic software.

> **Alternative 1: Provide two southbound lanes on MLK Drive south of the interchange and widen WB exit ramp to two lanes**

The first Build alternative includes continuation of two southbound lanes on MLK Drive south of the railroad overpass. Presently, the southbound lanes of MLK Drive merge to a single lane just north of the railroad overpass, resulting in a capacity constraint. Additionally, a second lane on the WB exit ramp is included in this alternative such that two lanes from the ramp can feed into two receiving lanes on MLK Drive and extend south of the RR overpass.

The northbound left turn movement at the Broad Street intersection is to be prohibited during peak hours (7-9 AM and 3-7PM).

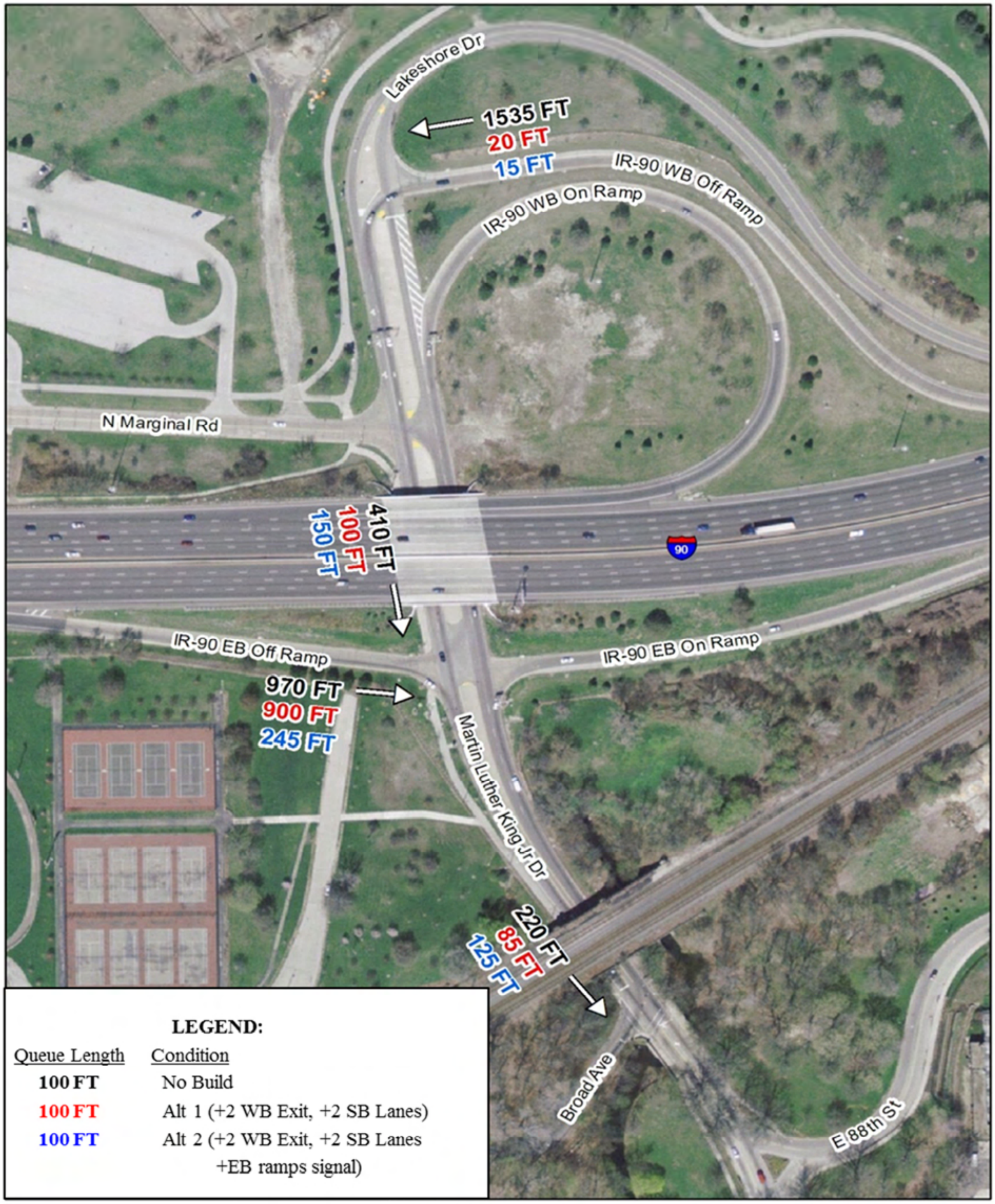
> **Alternative 2: Alternative 1 plus traffic signal at the EB ramp intersection**

The second Build alternative includes improvements from Alternative 1 plus a traffic signal at the EB ramp intersection. This alternative was evaluated separately to discern the additional benefits of assigning right of way at the EB ramp intersection with a traffic signal. The addition of a traffic signal at the EB ramp intersection is expected to improve operations from LOS F to LOS B. Analyses included additional volumes resulting from modifications to the E. 72nd Street interchange.

The 95th percentile queue lengths for No Build (black), Alternative 1 (red), and Alternative 2 (blue) are graphically shown in **Figure 9.** Results show queues on the WB exit ramp are reduced-- 1,535 feet in the No Build condition to less than 100 feet with Alternative 1. Alternative 2 reduces queues on the EB exit ramp while still maintaining short queue lengths on southbound MLK Drive. The addition of a protected/permissive left turn phase may be considered in the AM peak period to minimize queue lengths of the SB left turn movement.

An interim improvement of only signalizing the EB I-90 ramp intersection without increasing southbound capacity on MLK Drive will increase delays to traffic exiting I-90 WB. In addition to the re-allocation of approach delays, the capacity of the traffic signal is expected to be adversely affected by the queues extending from the railroad bridge unless the second lane is extended on MLK Drive.

FIGURE 9: QUEUE LENGTH COMPARISON, AM PEAK HOUR



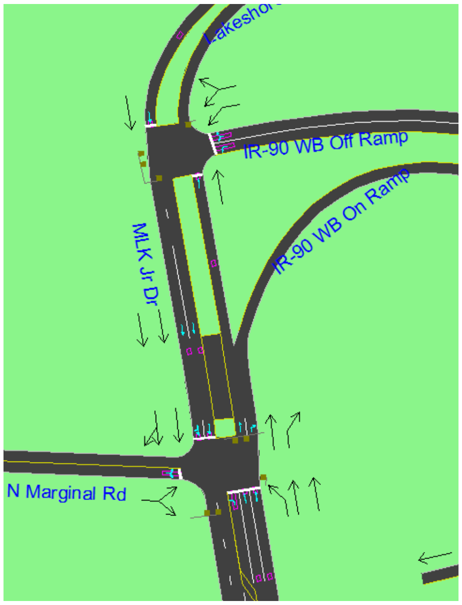
> **Alternative 3: Signalize WB exit ramp**

The WB I-90 exit ramp on MLK Drive also was evaluated with traffic signal control. The intersection configuration matches the existing condition, with the WB exit ramp forming the east leg of the signalized intersection. The N. Marginal Road approach is to be equipped with vehicle detection to force the traffic signal at the WB I-90 exit ramp to cycle and create gaps in the traffic flow during peak periods. With traffic signal control and lane geometry described below and shown in **Figure 10**, the intersection is expected to operate at LOS C or better during the AM and PM peak hours.

- 2 WB approach lanes on the WB exit ramp (L, LR)
- 1 EB approach lanes on N. Marginal (LR)
- 1 NB approach lane on MLK Drive (T)
- 1 SB approach lane on Lakeshore Blvd (T)

While levels of service are expected to be good, the queue length on the WB ramp approach is expected to extend 1,475 feet -- a marginal improvement over the existing condition (1,535 feet). Signalization of the WB I-90 exit ramp is not recommended.

FIGURE 10: ALTERNATIVE 3 - MLK CORRIDOR

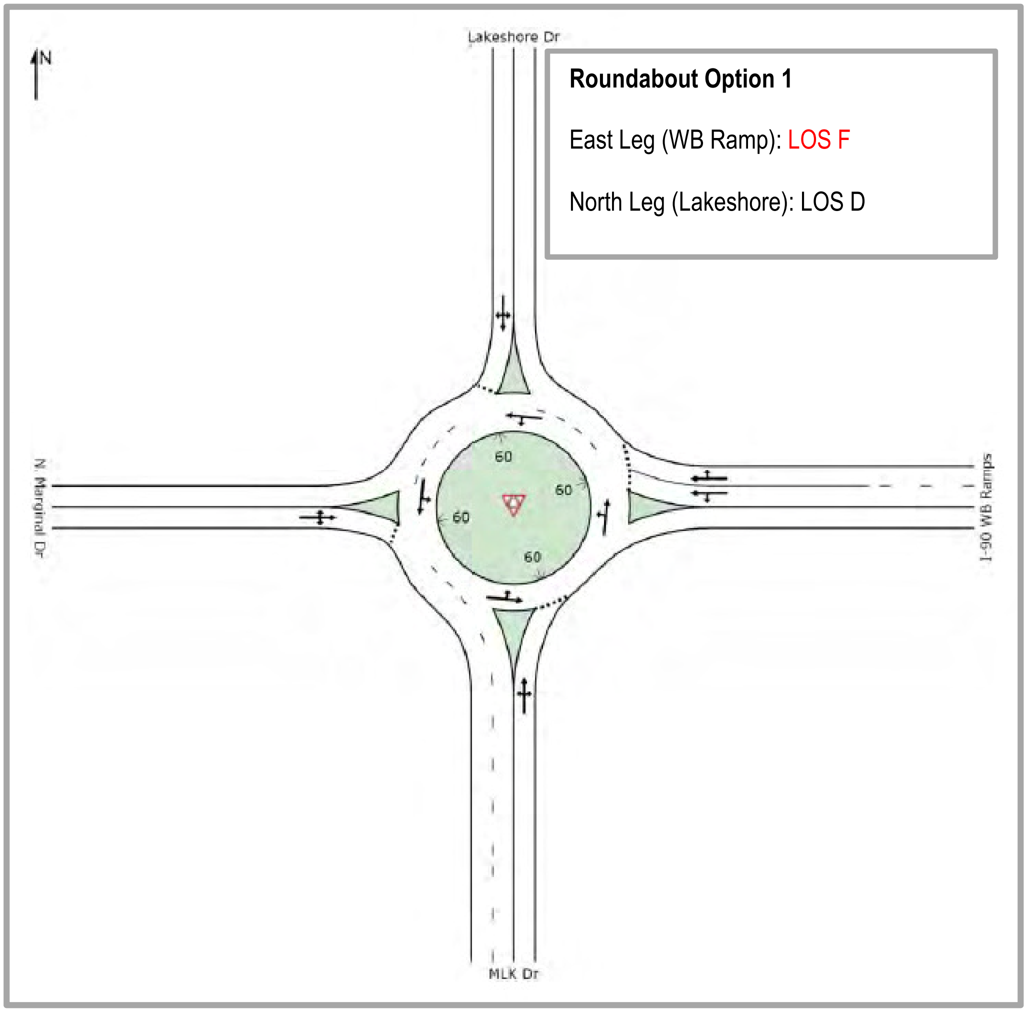


Various alternatives were evaluated to assess converting the WB I-90 exit ramp intersection and the N. Marginal Road intersection on MLK Drive into a roundabout configuration. Three configurations for a roundabout intersection were evaluated. Roundabout capacity was evaluated using SIDRA analysis software to forecast levels of service based on various lane conditions. The roundabout alternatives are shown in **Figures 11A through 11C** with level of service/queue summary included in **Table 6.**

> **Roundabout Option 1:** This option retains the basic configuration of the existing intersection with the WB exit ramp as the east leg, Lakeshore Blvd as the north leg, N. Marginal Road as the west leg, and MLK Drive as the south leg. It is concluded that keeping the WB exit ramp as the east leg of the roundabout will operate at poor level of service due to the high left turn demand from the ramp to southbound MLK Drive. As the east leg, the ramp volume would need to yield to NB traffic destined to Lakeshore Drive or N. Marginal Road resulting in LOS F for the ramp.

The SIDRA software estimates the queue on the east leg to be 2,437 feet. The available length of the existing exit ramp configuration between the roundabout and the deceleration lane of the exit ramp is estimated to be 1,600 feet. This option is not considered to be feasible with a roundabout at the ramp intersection at MLK Drive. Signalization would be required to avoid queues from extending past the ramp gore.

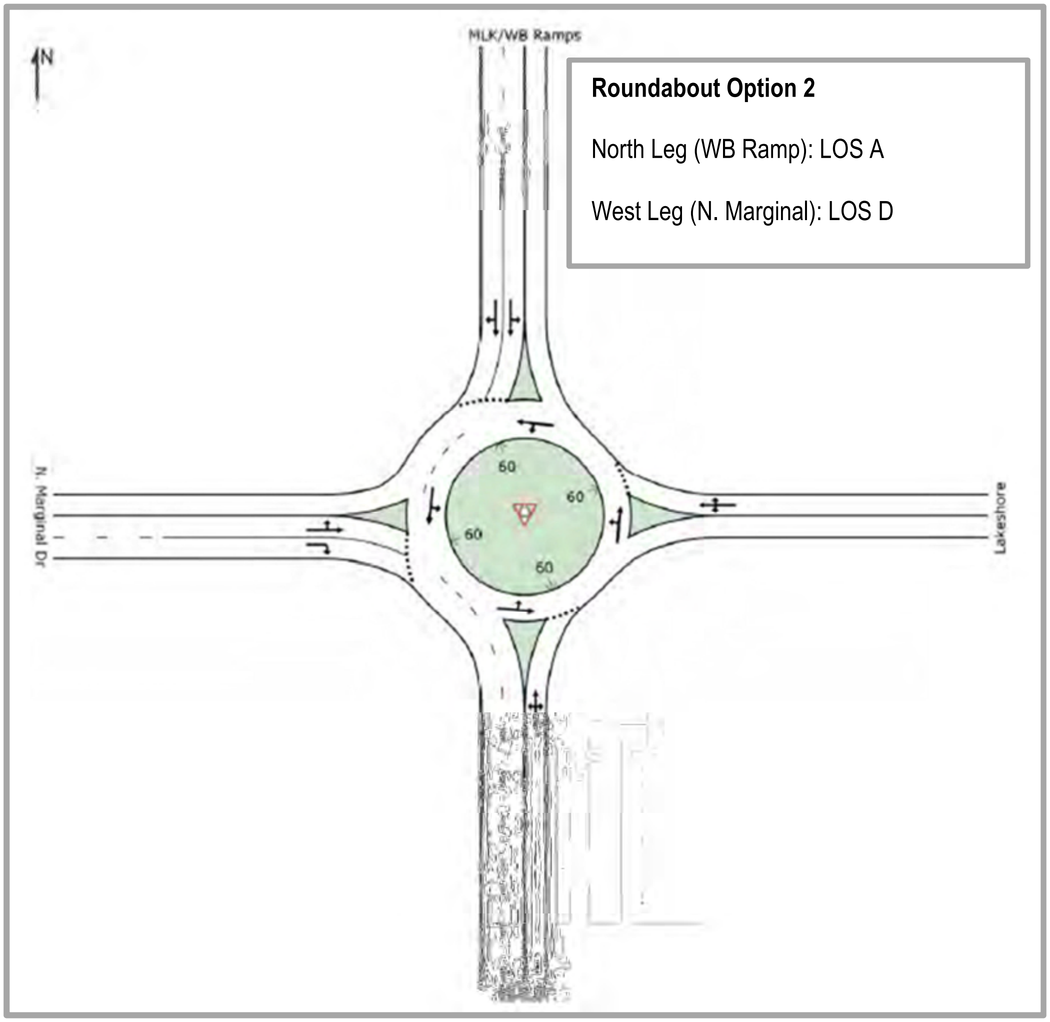
FIGURE 11A: ROUNDABOUT OPTION 1, AM PEAK



> **Roundabout Option 2:** This option features realignment of Lakeshore Boulevard to form the east leg of the roundabout and the WB exit and entrance ramps to form the north leg of the roundabout. Lakeshore Boulevard would be designed to cross over the existing WB loop ramps or the ramp profiles raised to cross over realigned Lakeshore Boulevard. The benefit of Option 2 is that it provides acceptable levels of service for all approaches.

The feasibility of the profile changes to the ramps or to Lakeshore Blvd will need to be evaluated in greater detail. Topography of the park property supports a realignment of Lakeshore Boulevard with future plans to revise the park entrance. Sufficient field survey data is needed to confirm profile grades meet L&D criteria and determine the need and/or size of retaining walls.

FIGURE 11B: ROUNDABOUT OPTION 2, AM PEAK



Roundabout Option 2

North Leg (WB Ramp): LOS A

West Leg (N. Marginal): LOS D

> **Roundabout Option 3:** This option reflects the Greenways concept that includes removal of the loop ramp from MLK Drive to I-90 WB. Traffic is routed across N. Marginal Road to access the existing WB I-90 entrance ramp at the E. 72nd Street interchange. The analysis shows that a single westbound lane is sufficient to accommodate demand traffic. Congestion can be expected on the N. Marginal Road when seasonal traffic is a part of the traffic mix (recreational vehicles, boat trailers, etc).

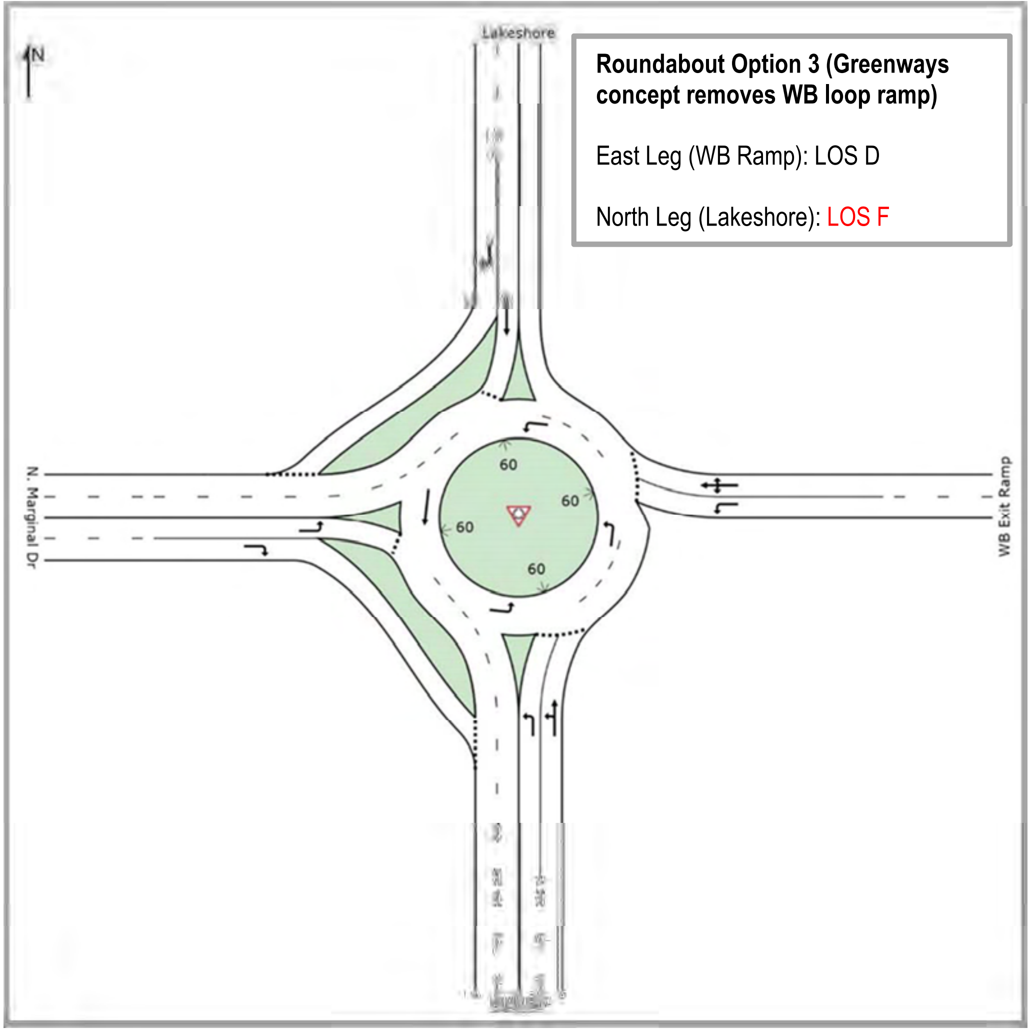
The SIDRA software estimates the queue on the east leg to be 580 feet. The available length of the proposed exit ramp between the roundabout and the ramp is estimated to be 800 feet. This option is considered to be feasible with a roundabout at the ramp intersection at MLK Drive.

The changes are expected to increase traffic on N. Marginal Road by nearly 800 vehicles during the PM peak hour. Traffic diversion to N. Marginal Road will likely necessitate improvements to N. Marginal Road, the intersection of E. 72nd Street and N. Marginal Road, and the WB entrance ramp to I-90 from E. 72nd Street. Removal of the loop ramp combined with the ramp removals recommended as short term countermeasures will redirect traffic to N. Marginal Road as summarized in **Table 5.**

TABLE 5: EXPECTED TRAFFIC DIVERSION TO N. MARGINAL ROAD

From	To	To	Countermeasure Implementation	AM Peak Volume	PM Peak Volume
I-90 WB exit to E. 72nd	I-90 WB exit to MLK	N. Marginal	Short Term	130 vph	120 vph
I-90 EB entrance from E. 72nd	N. Marginal	I-90 EB entrance from MLK	Short Term	60 vph	160 vph
I-90 WB entrance from MLK	N. Marginal	I-90 WB entrance from E. 72nd	Medium Term	350 vph	500 vph
Traffic Added to N. Marginal Road				**540 vph**	**780 vph**

FIGURE 11C: ROUNDABOUT OPTION 3, AM PEAK



Roundabout Option 3 (Greenways concept removes WB loop ramp)

East Leg (WB Ramp): LOS D

North Leg (Lakeshore): LOS F

TABLE 6: SIDRA CAPACITY ANALYSIS – MLK/N.MARGINAL/LAKESHORE/WB RAMPS INTERSECTION, AM PEAK

Performance Measure	North leg	South leg	West leg	East leg	Intersection
Alternative 1					
LOS/Delay (secs)	D / 37.9	A / 5.0	C / 30.2	**F /89.2**	**E/ 63.0**
Queue	125'	130'	100'	2440'	
Alternative 2					
LOS/Delay (secs)	A / 6.5	A / 6.6	D / 38.7	B / 11.7	**A / 8.4**
Queue	170'	125'	75'	25'	
Alternative 3					
LOS/Delay (secs)	**F / 82.3**	A / 8.3	C / 26.9	D / 36.7	**C / 31.5**
Queue	100'	40'	75'	580'	

E. 55TH STREET CORRIDOR

The following countermeasures were evaluated to quantify the benefits of revising the merge configuration on E. 55th Street and consolidating the two signalized intersections to one signalized intersection. Features of the Build alternative include the following countermeasures, also shown in **Figure 12**. The level of service summary based on Synchro analysis is shown in **Table 7**.

> **Revise lane configuration of the SB merge at the railroad bridge**

- Revise the pavement markings on E. 55th Street at the railroad bridge to drop the inside, southbound through lane as an exclusive left turn lane at a private driveway opposite Lake Court. This lane configuration converts the existing curb lane into a through lane that continues south to St. Clair Avenue. The changes to pavement markings will reduce the number of southbound conflicts between through vehicles and left turning vehicles at the signalized intersections (EB I-90 ramp and S. Marginal Road/Dick Goddard Way.
- The inside lane on E. 55th Street in the southbound direction will operate as a defacto left turn lane during peak periods. Through vehicles are permitted, especially those that may be destined to other closely spaced intersections within the study area. Weaving of through vehicles destined to St. Clair Avenue is minimized.
- Add overhead lane-use signs to enable motorists advance notice of the drop lane condition at the Lake Court/private driveway intersection.

> **Revised signalized intersection on E. 55th Street formed by the EB exit ramp and Dick Goddard Way**

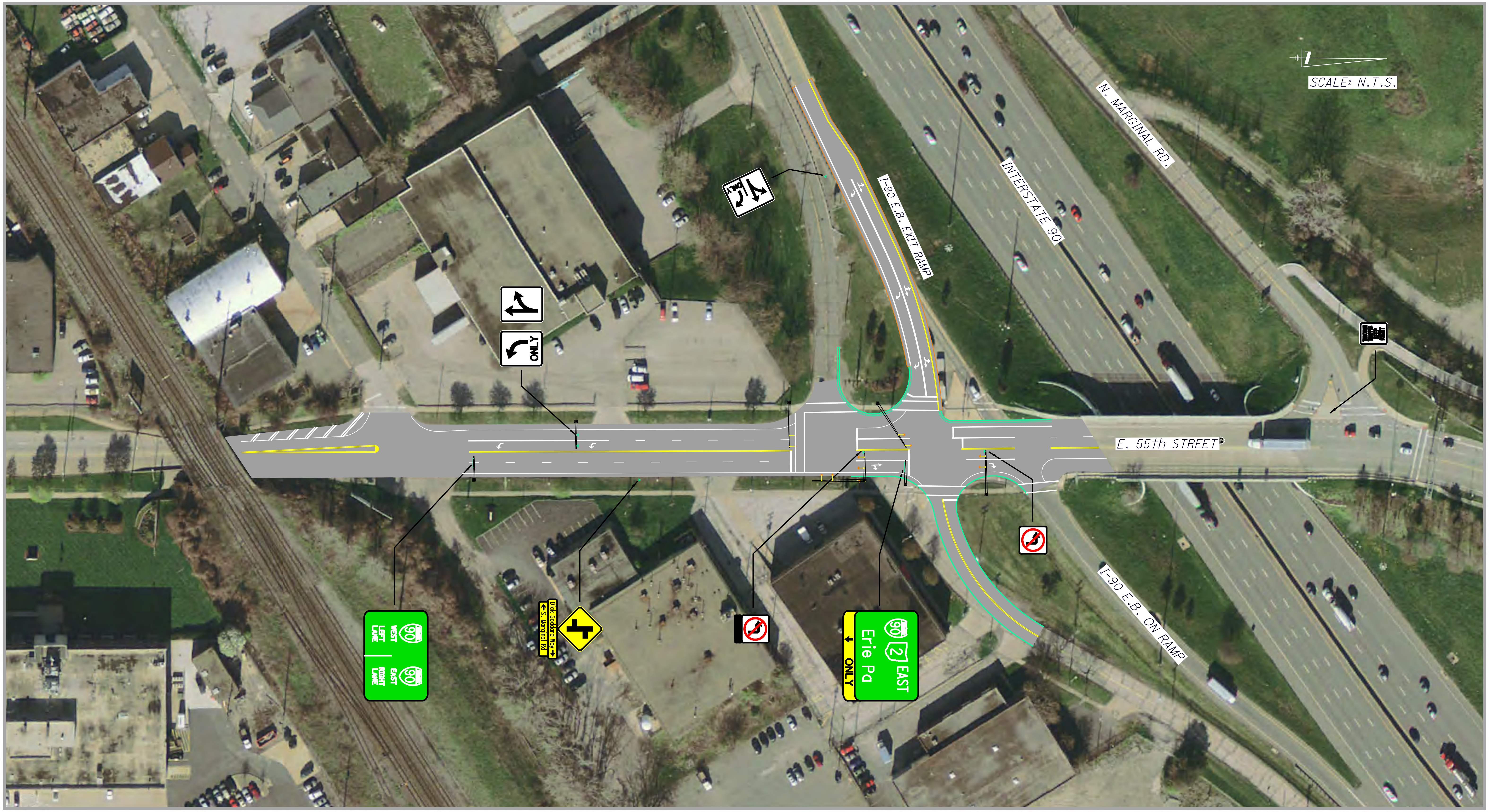
- Realign the EB I-90 exit ramp opposite Dick Goddard Way to form a primary, signalized intersection on E. 55th Street. The overall size of the combined intersections is reduced to improve operational efficiency and intersection alignment.
- Operate the S. Marginal Road intersection as an exclusive phase that can be skipped when vehicles are not present. Improved levels of service can be achieved with a 4-phase sequence in the AM peak period and a 3-phase sequence in the PM peak period. During PM peak, the SB protected left turn phase can be eliminated due to lower SB left turn demand onto Dick Goddard Way.

- Convert the NB curb lane to be exclusive right turn lane to the EB I-90 entrance ramp. Improved pedestrian facilities can be implemented on the bridge structure over I-90, consistent with the Greenway study.
- The EB I-90 entrance ramp operates as an unsignalized intersection

TABLE 7: CAPACITY ANALYSIS – 55TH STREET CORRIDOR

	EB APPROACH	WB APPROACH	NB APPROACH	SB APPROACH
E. 55th Street at I-90 EB Ramps				
2034 AM No Build	**F / 118.0**	-	A / 0.0	D / 42.3
2034 PM No Build	D / 52.4	-	A / 2.0	C / 31.5
E. 55th Street at S. Marginal Road/Dick Goddard Way				
2034 AM No Build	C / 32.7	**F / 160.6**	E / 75.8	A / 2.2
2034 PM No Build	D / 37.0	D / 39.2	D / 41.9	A / 0.5
E. 55th Street at I-90 EB Exit Ramp/Dick Goddard Way (signalized)				
2034 AM Build	C / 25.5	C / 32.9	A / 2.5	C / 33.6
2034 PM Build	C / 28.9	C / 28.0	A / 2.0	C / 29.1
E. 55th Street at S. Marginal Road (signalized)				
2034 AM Build	C / 33.1	-	C / 33.2	A / 1.5
2034 PM Build	C / 30.2	-	C / 29.0	A / 1.3

Numerical values represent delay in seconds per vehicle



> ODOT - DISTRICT 12

FIGURE 13 - E. 55th STREET CONCEPT PLAN

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RECOMMENDATIONS

Countermeasures to mitigate crashes on I-90 will require improvements to interchanges and local roadways. The following have been identified as the contributing factors to safety performance on Interstate 90.

- Closely spaced interchanges
- Short weave segments between E. 72nd Street and MLK Drive

The following have been identified as the contributing factors to safety performance on MLK Drive.

- Single lane WB exit ramp from I-90 contributes to queue formation on the exit ramp and spillback onto I-90 during peak morning hours.
- Downstream capacity constraint where the two southbound lanes merge to a single lane at the RR overpass results in queue spillback on the WB and EB exit ramps.
- Stop sign control for the EB ramp terminal intersection causes queues to form on the exit ramp that extend to mainline I-90. These queues aggravate the poor weaving conditions that exist on I-90 EB between E.72nd Street and MLK by reducing weave length further. Also, these queues leave no room to decelerate from I-90 EB travel lanes.

The focus of improvements to the I-90 corridor requires modifications to the MLK Drive interchange and to the E. 72nd Street interchange. The modifications recommended below are not conducive to multiple construction phases due, in part, to the existing capacity constraints and safety performance of the MLK Drive corridor. Most safety countermeasures route additional traffic to the MLK Drive interchange, thus capacity and geometric improvements are required on the local street network.

The proposed countermeasures are expected to mitigate 29 crashes on the I-90 corridor (12 westbound crashes and 17 eastbound crashes). The proposed countermeasures are expected to mitigate an additional 51 crashes on the MLK Drive corridor. The proposed countermeasures are described below and are shown in **Figure 13**.

1. **Revise MLK Drive to imbalanced 3-lane section**. Revise the lane configuration of MLK Drive from the WB exit ramp to the St. Clair Avenue bridge. Revise southbound MLK Drive to have 2 southbound lanes extending south under the railroad bridge until merging back to a single lane prior to the St. Clair Avenue bridge. Continuation of the two southbound through lanes on MLK Drive past the RR overpass is recommended to eliminate capacity constraints downstream of the interchange. An additional southbound lane can be provided within the existing pavement (edge lines) without widening. The available vertical clearance under the existing railroad bridge is 16.5 feet or higher for existing travel lanes and meets the design criteria for the proposed widening. Other features of this countermeasure include the following:
    - **Widen the WB I-90 exit ramp to provide an additional left turn lane to MLK Drive**. An additional lane on the WB exit ramp to MLK Drive is recommended to minimize queue spillback onto mainline I-90. Dual lanes from the ramp will be received by the dual southbound through lanes on MLK Drive.
    - **Provide dedicated left turn lanes on MLK Drive.** The cross section of MLK Drive under I-90 is to be reconstructed as a 5-lane section without a raised median. A 10 ft bike path on the west side of MLK Drive is accommodated under I-90 with a 5 ft tree lawn. Left turn lanes are recommended on MLK Drive for the NB left turn movement at the N. Marginal Road intersection and for the SB left turn movement at the EB I-90 ramp intersection. These lanes

can be accommodated by removal of the center median island on MLK Drive under the I-90 overpass. This improvement will remove left turning vehicles from the through lane.

> **Signalize the EB I-90 ramp intersection**. An 8-hour traffic signal warrant is met at the EB ramp intersection with current traffic demand. **Appendix D** includes details of the signal warrant analysis. Gaps in the southbound traffic flow are inadequate to service the high right turn volumes from the EB exit ramp to MLK Drive, which results in queue spillback onto mainline I-90. Signalization of the EB ramp is only feasible with the addition of a second SB lane on MLK Drive for 2 reasons: 1) queues extend from the merge at the railroad overpass through the EB ramp intersection making signalization ineffective during the peak periods, and 2) signalization would cause longer queues to extend onto I-90 WB mainline during the AM peak hour without additional capacity on MLK Drive.

> **Restricted movement at Broad Street intersection**. Prohibit the northbound left turn movement at the Broad Street intersection between 7-9 AM and 3-7 PM. The traffic signal is to remain for pedestrian crossings and egress from Broad Street.
>
> Left turns to E. 88th Street and to East Road are to occur from a shared left-through lane.

> **Pavement resurfacing.** Mill/fill of pavement surface proposed to a point 500 feet south of the railroad bridge. The remaining distance (1,400 feet) is to install the revised pavement markings by removing the existing pavement markings and restriping the corridor as a 3-lane section.

> **Speed Zone study:** Conduct a speed zone study on MLK Drive to determine the appropriate speed limit for the corridor.

2. **Eliminate substandard weave on I-90 between E. 72nd Street and MLK Drive interchanges**. Removal of the EB entrance ramp and WB exit ramp at the E. 72nd Street interchange is recommended to eliminate the substandard weave on I-90 and its associated crash pattern. The entrance ramp tapers of the WB I-90 entrance ramp from MLK Drive and the deceleration length of the I-90 EB exit ramp to MLK Drive are to be increased to meet current L&D standards. Removal of the EB entrance ramp would require the realignment of S.R. 283, to follow N. Marginal Road and back onto I-90 via I-90 EB entrance ramp from MLK Drive.

Along with the above listed short term improvements, in order to emphasize the existing shared use/recreational paths and on-street bicycle facilities in the area, it is recommended that signs as well as pavement markings denoting pedestrian/bicycle crossings be upgraded within the study area.

A long term plan converts the WB I-90 exit ramp/N. Marginal Road/Lakeshore Drive intersection to a modern roundabout. A roundabout intersection is recommended to replace the two unsignalized intersections on MLK Drive (north of I-90). Other features of this countermeasure include the following:

> A roundabout intersection at this location would retain the loop ramp from MLK Drive to WB I-90. The existing loop ramp reduces the frequency of ped/vehicle conflicts with the bike path on the west side of MLK Drive and avoids the need for widening of N. Marginal Road.

> The roundabout should incorporate the WB I-90 exit and entrance ramps as the north leg (through movement) to achieve acceptable levels of service.

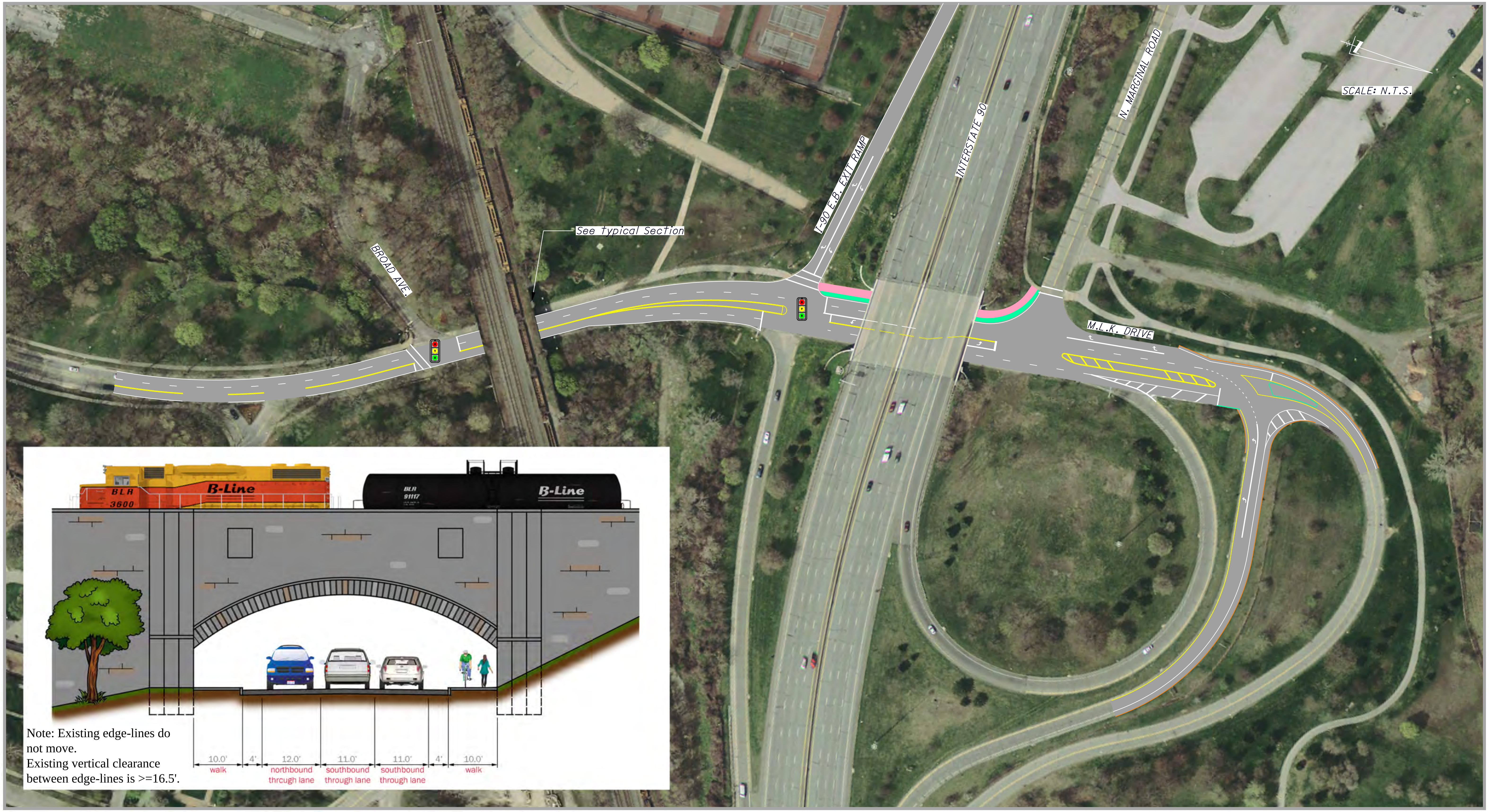
> Realignment of Lakeshore Boulevard is proposed to form the east leg of the roundabout intersection and N. Marginal Road will form the west leg. Lakeshore Drive crosses over the WB I-90 ramps with a culvert structure to minimize the roadway elevation over the WB I-90 ramps and to match the aesthetic treatments of MLK Drive south of I-90. The proposed

alignment also is compatible with future plans to revise access to the Lakefront State Park. Right of way negotiations with the park should include the swap of property that is currently occupied by Lakeshore Boulevard.

A hybrid design, featuring two entry lanes for the WB exit ramp and N. Marginal Road approach and a single lane for the MLK Drive and Lakeshore Boulevard approaches, is expected to provide sufficient capacity through the roundabout. See **Figure 14**.

The countermeasures summarized in **Figure 12** for the E. 55th Street corridor are expected to mitigate 31 crashes. The pavement marking and signing changes proposed south of I-90 could be implemented prior to intersection reconstruction of the EB I-90 exit ramp/Dick Goddard Way intersection if phased construction improves the feasibility of project implementation. Note also that the conversion of the S. Marginal Road intersection to right in/right out operation should be considered as a long term countermeasure if safety performance continues to be an issue in the future.

Also, emphasizing the existing shared use/recreational paths and on-street bicycle facilities in the area, regulatory and directional signage for bicyclists and pedestrians as well as pavement markings denoting crossings should be part of the safety improvements.

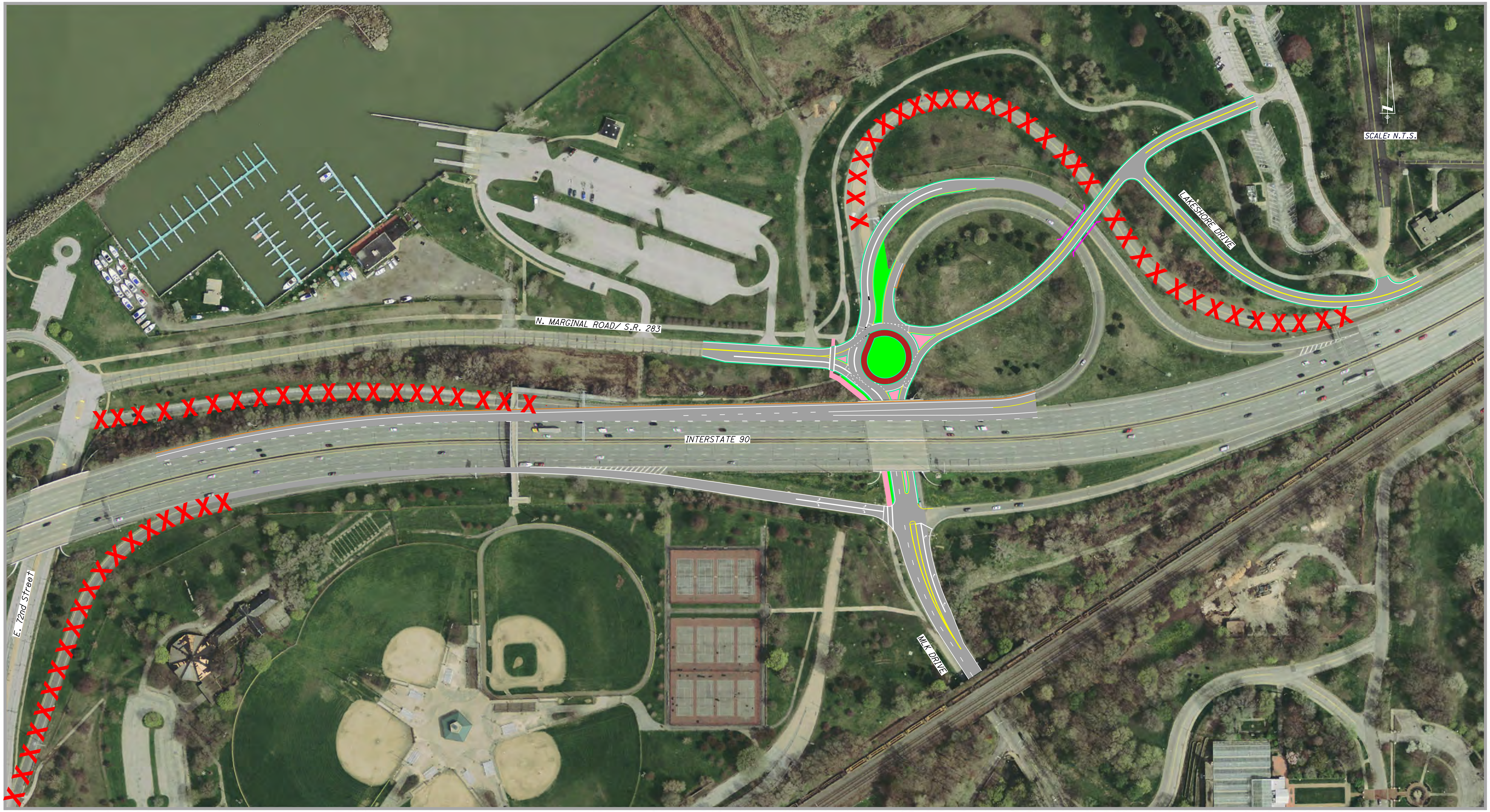


Note: Existing edge-lines do not move.
Existing vertical clearance between edge-lines is >=16.5'.

> ODOT - DISTRICT 12

FIGURE 14 - MLK DRIVE SHORT TERM CONCEPT PLAN

Innovative Facility and Infrastructure Design™



> ODOT - DISTRICT 12

FIGURE 15 MLK DRIVE LONG TERM PLAN

BENEFIT COST ANALYSIS

Benefit cost analysis is a tool to determine the financial benefits of a project by comparing the net present value (NPV) of a project to NPV of the safety benefit provided by that project. Benefit cost values greater than one indicate a positive return on the original investment. Preferred countermeasures are those having the highest NPV of safety benefits.

COST ESTIMATES

Project costs were estimated separately for improvements on E. 55th Street, MLK Drive and the I-90 interchange ramps. Detailed construction cost estimates are included in **Appendix H** and assume the following:

- 35 percent design risk
- 8.6 percent inflation rate for an estimated 2018 construction year.
- Right of way impact is expected with construction of a roundabout intersection on MLK Drive at N. Marginal Road/WB ramp intersection.

TABLE 8: COST ESTIMATE SUMMARY

Location	Improvements	Construction Subtotal	Design contingency & Inflation	Total Estimated Cost
E. 55th Street Countermeasures	Realign EB exit ramp, install new traffic signal, pavement overlay and markings	$1,036,000	$573,000	$1,609,000
I-90 / MLK Drive Short Term Countermeasures	MLK Drive improvements plus ramp removals at E. 72nd Street interchange	$1,154,000	$540,000	$1,694,000
I-90 / MLK Drive Long Term Countermeasures	Roundabout intersection and realignment of Lakeshore Drive	$3,392,000	$1,582,000	$4,974,000

BENEFIT COST ANALYSIS

A benefit cost analysis was prepared using the ODOT ECAT analysis tool for improvements on E. 55th Street and on I-90/MLK Drive (short term countermeasures only). The benefit cost of the ramp improvements at E.72nd interchange are attributed to improved intersection operations at the MLK Drive interchange. Cost estimates and benefit cost analysis reports from the ECAT tool are included in **Appendix H.**

E. 55th Street

The following crash modification factors were applied for improvements recommended on E. 55th Street. **Table 9** summarizes the benefit cost analysis results for the E.55th street improvements.

- **Provide a left turn lane on one major road approach**: A CMF of 0.61 was applied to all crashes. This CMF was obtained from the FHWA Crash Clearinghouse and has a 3 star quality rating. While exclusive left turn lanes are not being constructed on E. 55th Street, the change of pavement markings that encourage through traffic to use the curb lane will result in the operation of the inside lane (southbound) as a defacto left turn lane during peak periods.

- **Improve visibility of signal heads (approach realignment/compact intersection)**: A CMF of 0.93 was applied to all crashes; This CMF was obtained from the FHWA Crash Clearinghouse and has a 4 star quality rating.
- **Road Diet - convert 4-lane to 2-lane plus turn lanes**: The road diet CMF of 0.71 was applied to all crashes. This CMF was obtained from the FHWA Crash Clearinghouse and has a 5 star quality rating.

TABLE 9: BENEFIT COST ANALYSIS: 55TH STREET COUNTERMEASURES

Countermeasures with CMF values used in ECAT Tool	• Provide defacto left turn lanes • Improve signal visibility • Road diet
Expected annual crash adjustment	-8.6
Net present value of project	$1,502,200
Net present value of safety benefit	$3,709,900
Benefit / Cost Ratio	**2.47**

MLK Drive

The following crash modification factors were applied for both short and medium term countermeasures on MLK Drive. While the ECAT tool does not specifically calculate the safety benefit of interstate facilities, a total of 29 of the 292 crashes on I-90 were assigned to the MLK Drive improvements which is considered to be a conservative estimate since queues extend to mainline I-90 from the WB exit ramp. **Table 10** summarizes the benefit cost analysis results for MLK Drive.

- **Install traffic signal**: A CMF of 0.83 was applied to all crashes. This CMF was obtained from the FHWA Crash Clearinghouse and has a 3 star quality rating.
- **Provide a left turn lane on one major road approach**: A CMF of 0.61 was applied to all crashes. This CMF was obtained from the FHWA Crash Clearinghouse and has a 3 star quality rating.
- **Add through lane**: A CMF of 0.675 (factored) was applied to all crashes. This CMF was obtained from a University of Central Florida/Florida DOT research report titled 'Validation and Application of HSM (Part D) in Florida' published in May 2014. Excerpts of the proposed CMFs are included in Appendix H.

TABLE 10: BENEFIT COST ANALYSIS: MLK DRIVE SHORT TERM COUNTERMEASURES

Countermeasures with CMF values used in ECAT Tool	• Provide left turn lanes • Install traffic signal • Add through lane
Expected annual crash adjustment	-10.15
Net present value of project	$1,673,300
Net present value of safety benefit	$3,632,700
Benefit / Cost Ratio	**2.17**

APPENDIX A
PROJECT DOCUMENTATION

LAKEFRONT GREENWAY and DOWNTOWN CONNECTOR STUDY

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development corporation

CAMPUS DISTRICT

WAREHOUSE DISTRICT

Public Meeting

March 5, 2015

Michael Baker INTERNATIONAL

Environmental Design Group

Agenda

- Study area
- Project goals and objectives
- Plan development process & project team
- Existing conditions & challenges
- Design concepts and opportunities
- Public input

Study Area


Lake Erie
I-90
I-90
2
Study Area
Legend
Study Area
Parks
Interstates
N
stclair superior development corporation
WAREHOUSE DISTRICT
NORTHEAST OHIO
CAMPUS DISTRICT
Michael Baker INTERNATIONAL
Environmental Design Group

Goals and Objectives

- *Goals:*
  - Improve North and South Marginal Roads for travel by bicyclists and pedestrians
  - Strengthen connection between lakefront, downtown, and near eastside neighborhoods
- *Objectives:*
  - Establish a lakefront greenway Marginal Road corridor
  - Create north-south connections to the Lakefront Greenway
  - Facilitate east-west connectivity

Study Area - Priority Connections

Plan Development Process

- Project Scope, Goals & Objectives
- Existing Conditions Assessment
- Concept Development
- Concept Evaluation and Feasibility Assessment
- Recommendations
- Steering Committee Meeting 4
- Report

Community Engagement

Concept Development

- Steering Committee Meeting 1
- Project Team Workshop
- Steering Committee Meeting 2
- Public Meeting #1 (March 2015)

Concept Evaluation & Assessment

- Steering Committee Meeting 3

Recommendations

- Public Meeting #2 (May 2015)

Project Team

Project Sponsors

James Amendola – St. Clair Superior CDC
Michael Fleming – St. Clair Superior CDC
Bobbi Reichtell – Campus District
Tom Starinsky – Historic Warehouse District & Gateway District

Consultant Team

Nancy Lyon-Stadler – Michael Baker Intl.
Michelle Johnson – Environmental Design Group
Jeff Kerr – Environmental Design Group
Travis Mathews – Environmental Design Group
Jim Shea – Michael Baker Intl.
Kim Guice – Michael Baker Intl.

Steering Committee

Radhika Reddy – Ariel Ventures
Ren Camacho – Cleveland Airport Systems
Arthur Schmidt – Cleveland City Planning
Sharonda Watley – Cleveland City Planning
Michelle Harvanek – Cleveland City Sustainability
Linda Sternheimer – Cleveland Cuyahoga County Port Authority
Ed Rybka – Cleveland Lakefront Development
Kelly Coffman – Cleveland Metroparks
Sara Burns Maier – Cleveland Metrparks
Amy Snell – GCRTA
Ryan Noles – NOACA
Melissa Thompson – NOACA
Mark Coffin – property owner
John Motl – ODOT District 12 Planning
Brian Blayney – ODOT Dist. 12, Traffic Engineering
Scott Knebel - LJB
April Bleakney – Resident, Campus District
Rachel DuFresne – Resident, Campus District
Maureen Haden – Resident, St. Clair Superior
Jim Kastelic – Trust for Public Lands
Larry Orlowski – Lakeside Yacht Club
Barb Clint – YMCA & Bike Cleveland

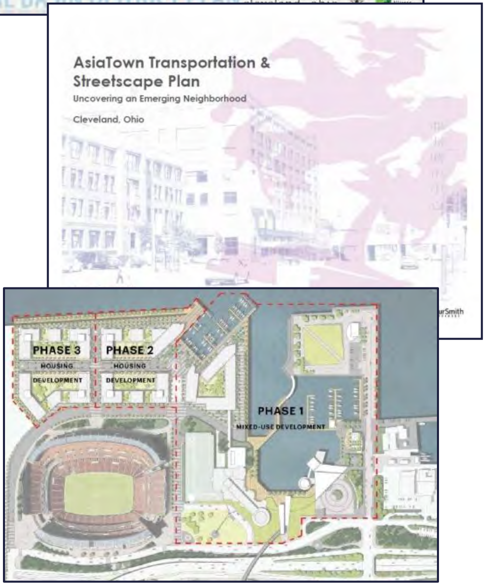
Other Plans & Projects

- Build upon on-going efforts
  - City plans
  - TLCI plans
  - Private developer initiatives
  - Bikeway plans
  - Cleveland Metroparks Lakefront Plan

Project Overview

Purpose & Need

CANAL BASIN DISTRICT PLAN



AsiaTown Transportation & Streetscape Plan
Uncovering an Emerging Neighborhood
Cleveland, Ohio

ST 22ND STREET CORRIDOR / CAMPUS DISTRICT
TRANSPORTATION AND REDEVELOPMENT PLAN

Cleveland Downtown Lakefront Plan
April 2012

Cleveland Metroparks Waterfront Plan

SHADED OVERLOOKS WITH PLANTERS

WATERFRONT TRAIL

FIRE FEATURE / LAKE OVERLOOK

CREATIVE SITE LIGHTING

ENHANCED PLANTINGS

E.55th Marina

PLAZA WITH FOUNTAIN/ WATER PLAY/FIRE FEATURE/ SEATING AND PLAY AREA

SHELTER WITH SEASONAL FEATURES (I.E. GLASS GARAGE DOORS)

YEAR-ROUND RESTROOM WITH FISH CLEANING STATION

RECONFIGURED PARKING

FLOATING DOCKS

MARSH HABITAT ALONG SHORELINE

GREEN INFRASTRUCTURE FEATURE

IMPROVE ACCESS TRAIL, SUPPLEMENT HABITAT, AND ADD COUNCIL RING WITH LIGHT BOLLARDS

UNDERWATER AERATING FOUNTAINS TO MAINTAIN OPEN WATER YEAR ROUND FOR FISH AND WILDLIFE

LAKE SHORE POWER PLANT - SLATED TO CLOSE 9/14 LACK OF WARM WATER RELEASE WILL IMPACT BIRDS AND FISH

ADD PLANTINGS

RECONFIGURE PARKING ADD MOUNDING, LANDSCAPE IMPROVEMENTS, VOLLEYBALL AND BOCCE BALL COURTS AND SIGNAGE

ADDITIONAL IMPROVEMENTS AND CONNECTIONS AT E. 55TH MARINA BUILDING - IMPROVE CIRCULATION THROUGH BUILDING, ADD OUTDOOR DECK, CONSIDER SNACK BAR ITEMS

LEGEND

- - - ALL-PURPOSE TRAIL
······ INTERNAL TRAIL
▬ MAIN USE AREA
▭ BUILDING
❋ ACTIVITY CENTER
▭ ROADWAY/PARKING
K KAYAK/PADDLE ACCESS
F FISHING ACCESS

Cleveland Metroparks
COME OUT AND PLAY

DRAFT CONCEPTUAL MASTER PLAN
EAST 55TH MARINA
LAKEFRONT RESERVATION
NOVEMBER 2014

PLAZA WITH FOUNTAIN/WATER PLAY

DOCK AND MARSH HABITAT

TERRACED SEATING

WATERFRONT CAFE

Cleveland Metroparks Waterfront Plan

E.72nd / Gordon Park / CLNP Lakefront Resvn

HABITAT ENHANCEMENT & KAYAK ACCESS

LARGE RESERVE SHELTER

WATER FEATURE & NATURE PLAY

WATERFRONT/GATHERING AREA

Existing Conditions: North Marginal

Existing Conditions: South Marginal

Challenges

- Poor pavement condition on both Marginal Roads
- Limited connections across SR-2 / I-90

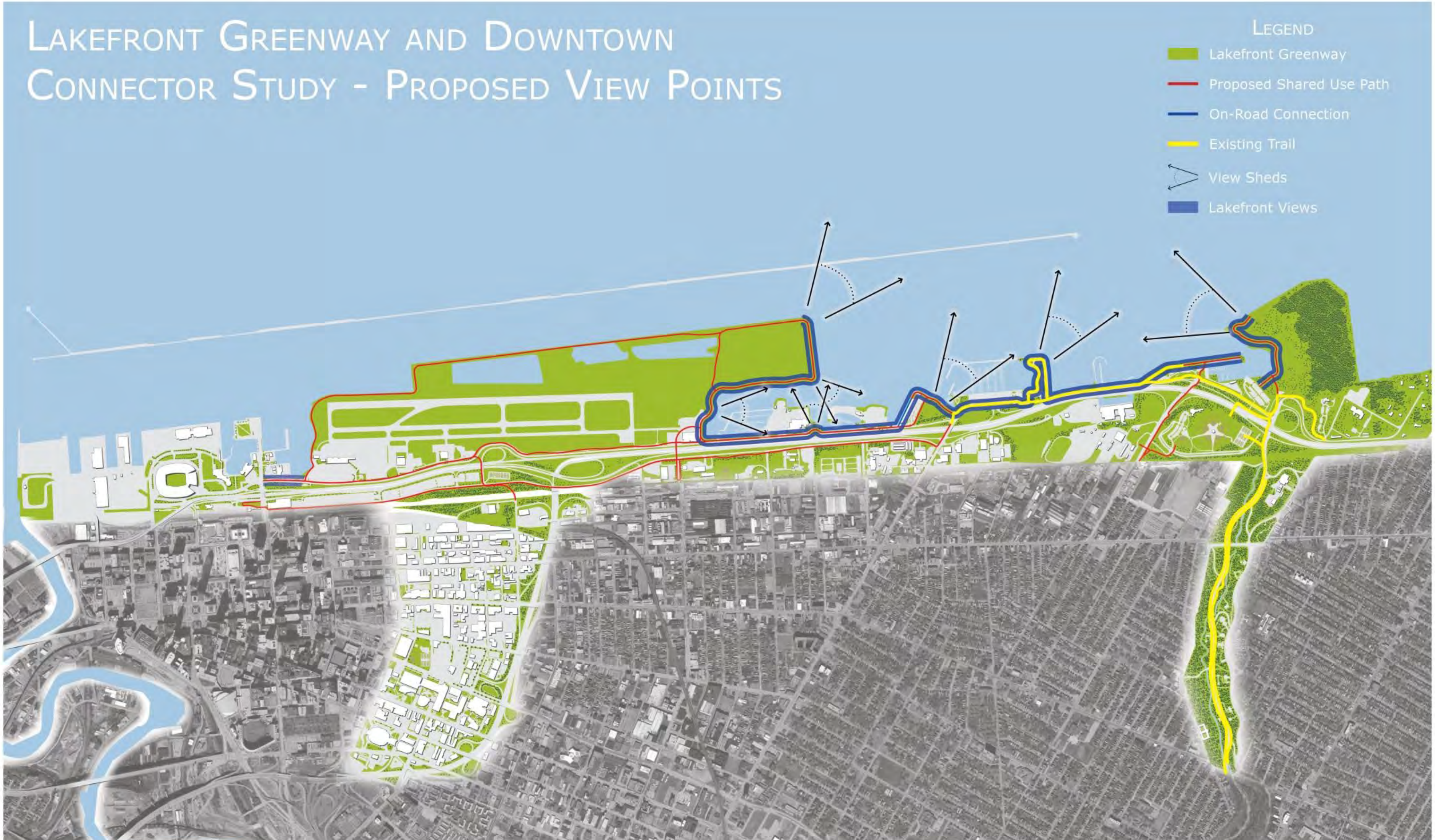
North Marginal Road

- Substandard shared use path
  - Narrow
  - Obstacles
  - Pinch Points
- Unattractive infrastructure
  - Chain link fence
  - Highway scale lighting
  - Lack of landscaping
  - No buffer between North Marginal Road and Shoreway

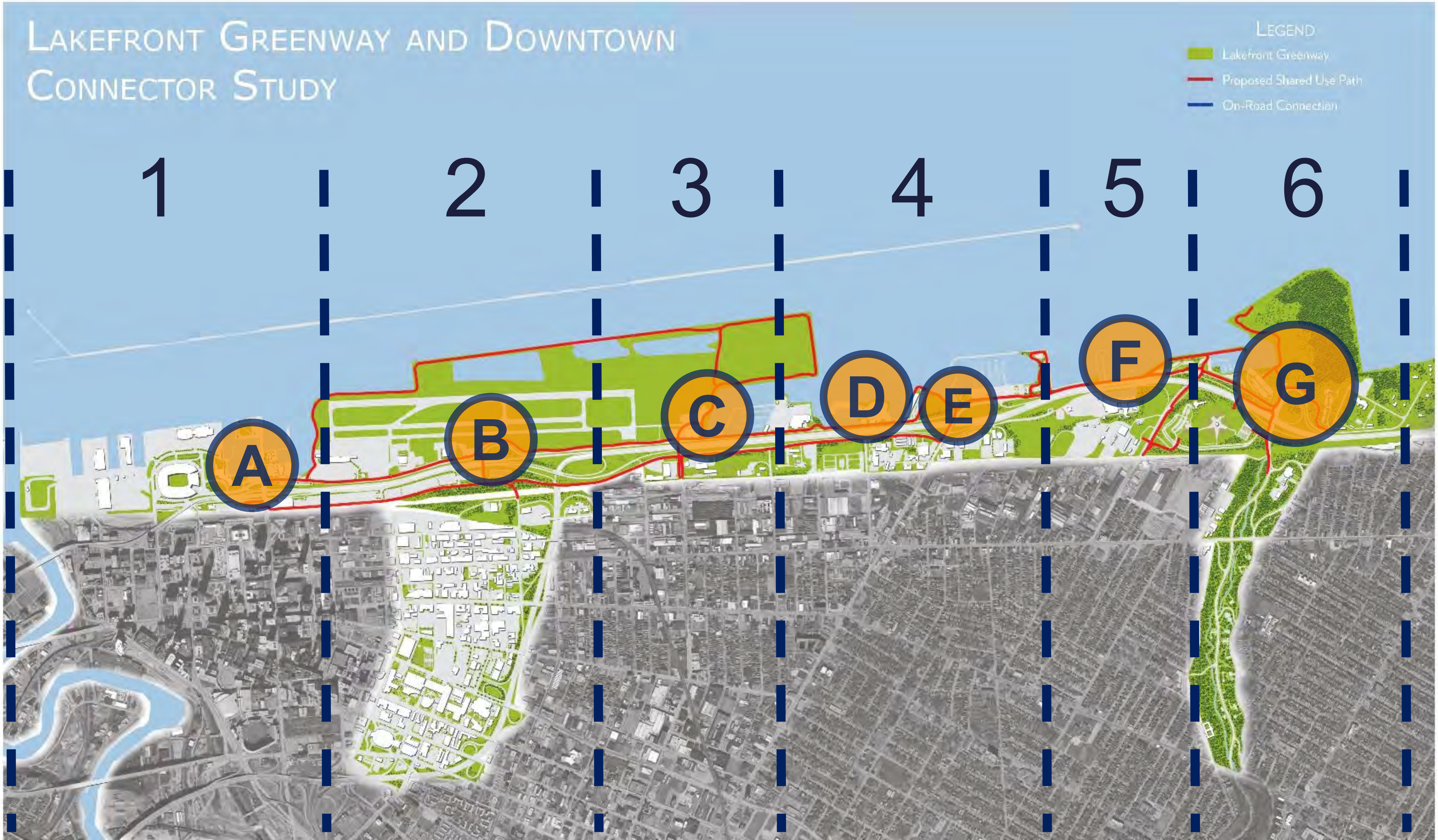
South Marginal Road

- Isolated
- Lacks bicycle and pedestrian infrastructure
- Does not traverse entire study area

Existing Trails & View Points



Trail Segments & Nodes



Site Plan Nodes

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CAMPUS DISTRICT

WAREHOUSE DISTRICT

Lakefront Greenway Concept Development
Public Meeting, March 5, 2015

Michael Baker INTERNATIONAL

Environmental Design Group

Constraints

- Burke
  - Ongoing operations
  - FAA regulations
  - 20 year horizon (minimum)
- CDF: Port managing active site for sediment processing
  - Ongoing generation of urban soils
  - Intense industrial use
  - Different than USACE management
  - 50 year horizon
- Influences implementation of concepts/opportunities

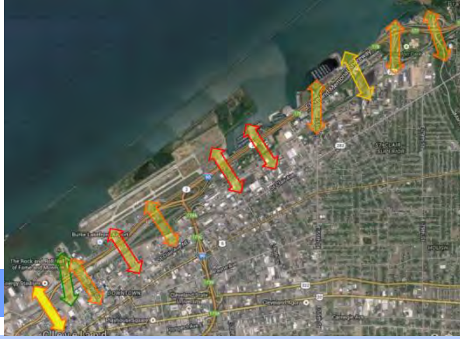
North-South Connections

Existing, Planned & Potential

Gordon Park Pedestrian Bridge

E. 72nd Street Bike Lanes

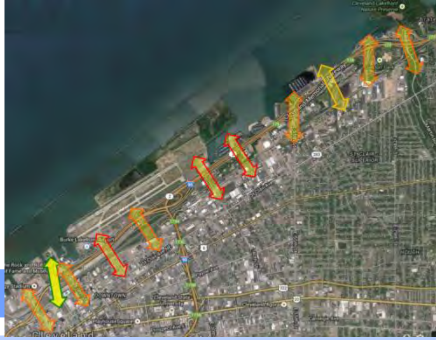
W.3rd Street



Existing

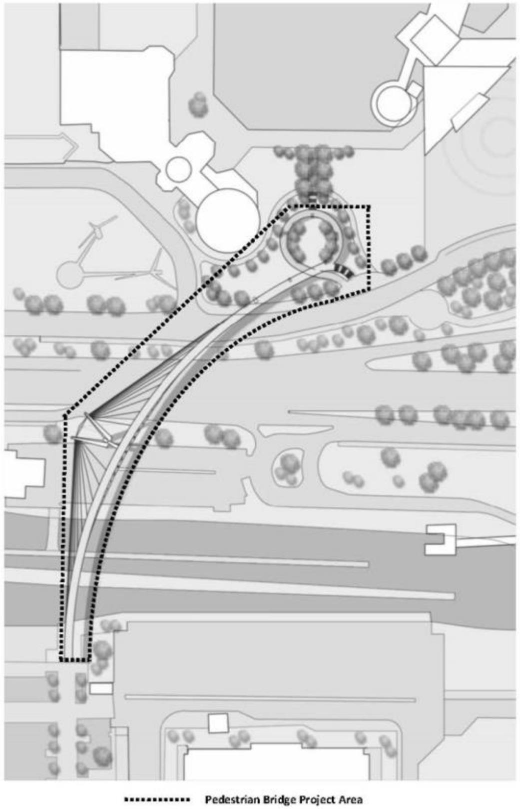
- Potential to reconfigure roadway
- City is studying feasibility

North Coast Harbor Ped Bridge

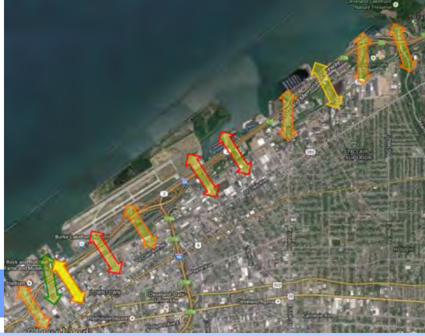


Planned

- Will connect Mall C with North Coast Harbor
- Construct for RNC in 2016

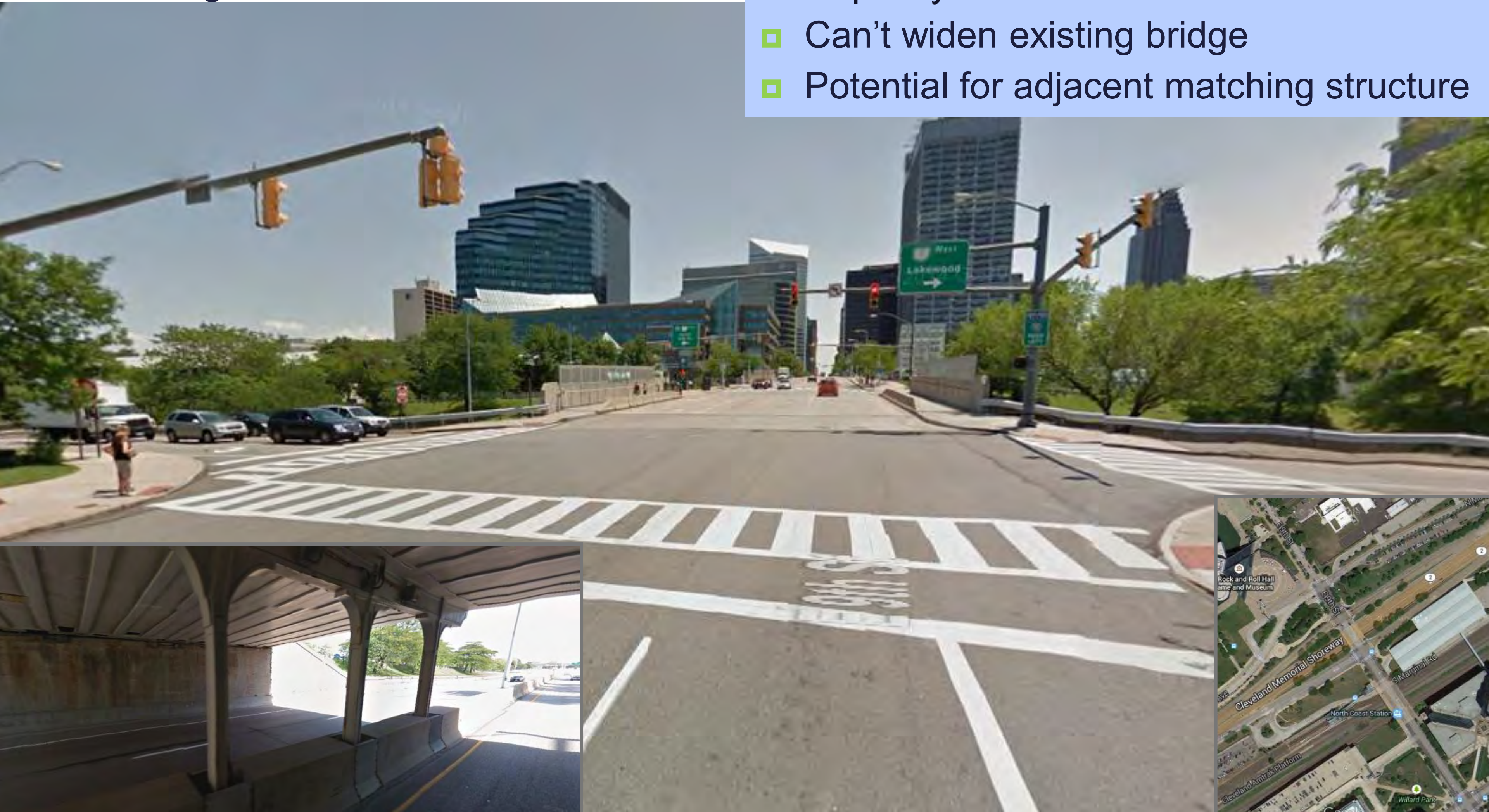


E.9th Street

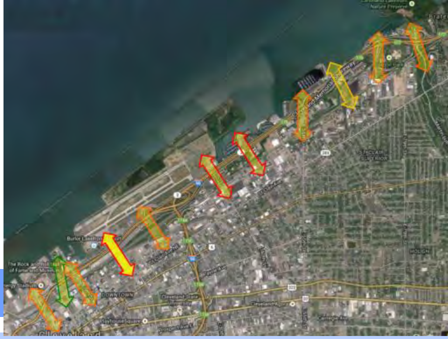


Existing

- Capacity reduction on E.9th not feasible
- Can't widen existing bridge
- Potential for adjacent matching structure

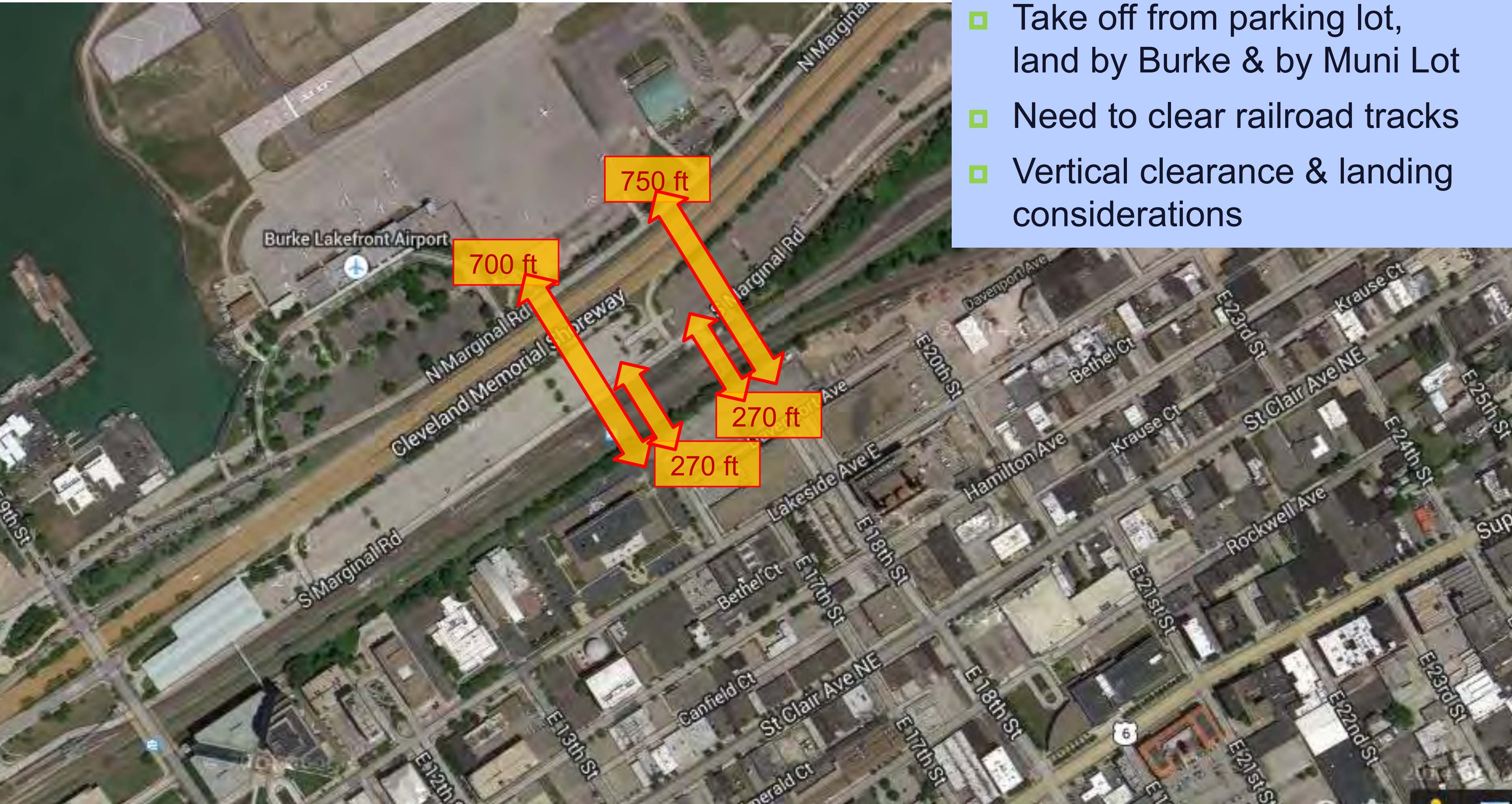


E. 16th/18th Street

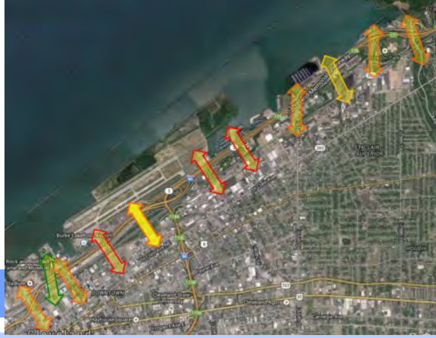


Potential

- Campus District connection
- Take off from parking lot, land by Burke & by Muni Lot
- Need to clear railroad tracks
- Vertical clearance & landing considerations

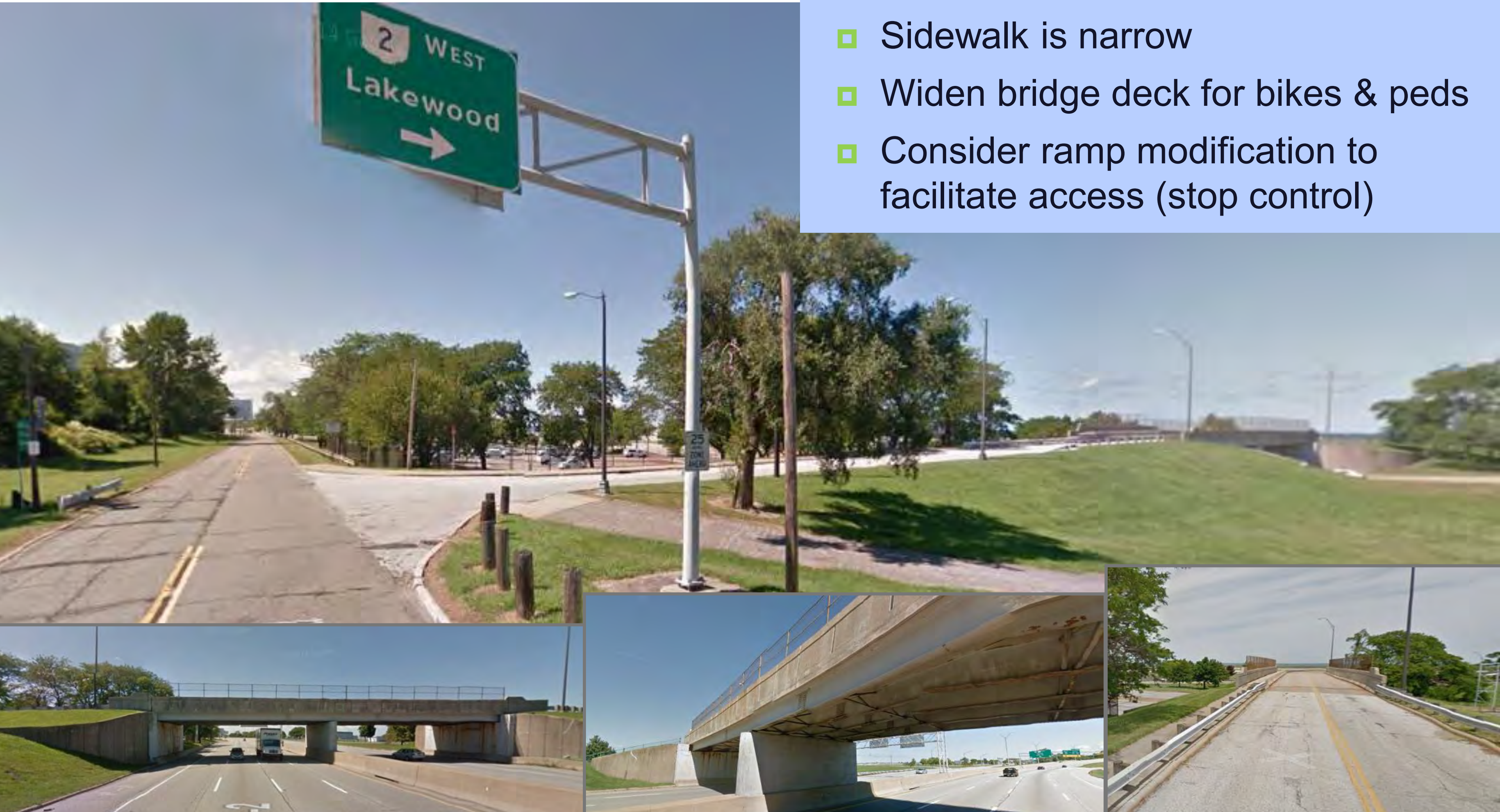


Muni Lot Bridge

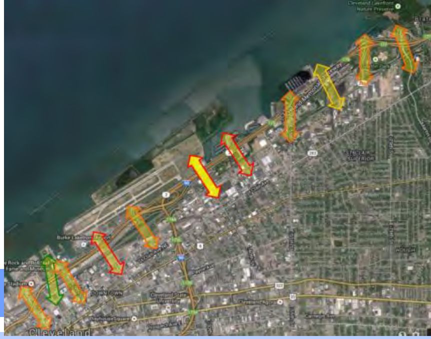


Existing

- Access via SR-2 WB ramps
- Sidewalk is narrow
- Widen bridge deck for bikes & peds
- Consider ramp modification to facilitate access (stop control)



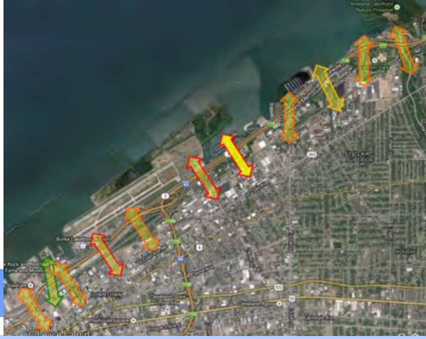
E. 40th Street



Potential

- Take off north of railroad tracks and land by Aviation HS
  - No ramp needed on south end
- 300 ft great size for prefab bridge
- Easiest 'new' location
- E.40th connects to Woodland
  - Neighborhood connectivity

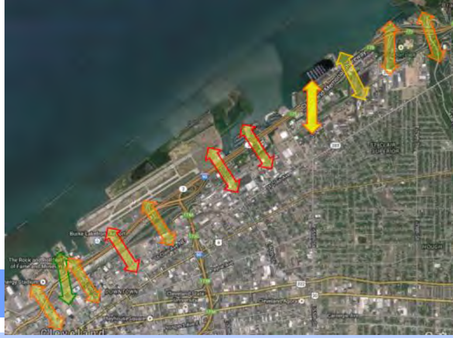
E. 49th Street



Potential

- Take off north of railroad tracks and land by marina
  - No ramp needed on south end
  - Landing challenge - marina impact
- 300 ft great size for prefab bridge
- E.49th activates Kirtland Park

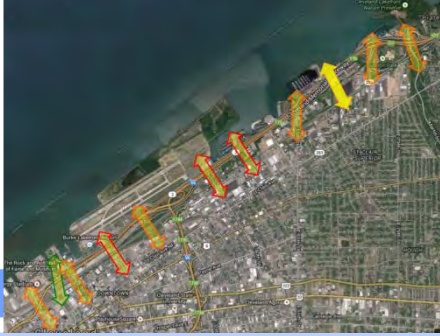
E. 55th Street



Existing

- Bike lanes & sidewalks on bridge
- Lots of pavement at intersections
  - South Marginal
  - I-90 EB ramps
  - North Marginal

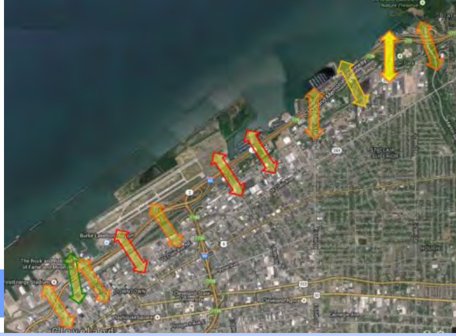
E. 72nd Street



Existing

- Buffered bike lanes
- Sidewalks, east side of road
- Connects to lakefront

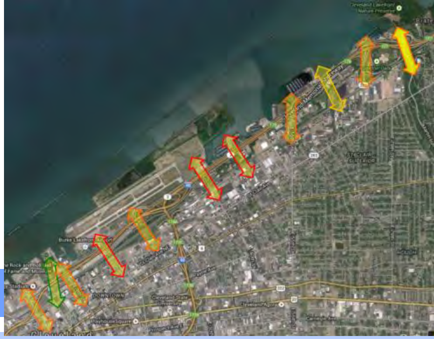
Gordon Park Pedestrian Bridge



Existing

- Bridge over I-90
- Connects Gordon Park with lakefront
- Stairs or long ped ramp (north side)

MLK (Lake-to-Lakes Trail)



Existing

- I-90 underpass
- Uncomfortable for bikes & peds
  - Doesn't quite get to the lake

Big Ideas

- ☐ E.72nd-MLK
- ☐ E.55th Street
- ☐ North Marginal (E.9th St to E.55th St)
- ☐ Muni Lot Bridge

ODOT Safety Study

- E.72nd Street & MLK interchange areas
- E.55th Street interchange area

E.72nd - MLK Opportunities

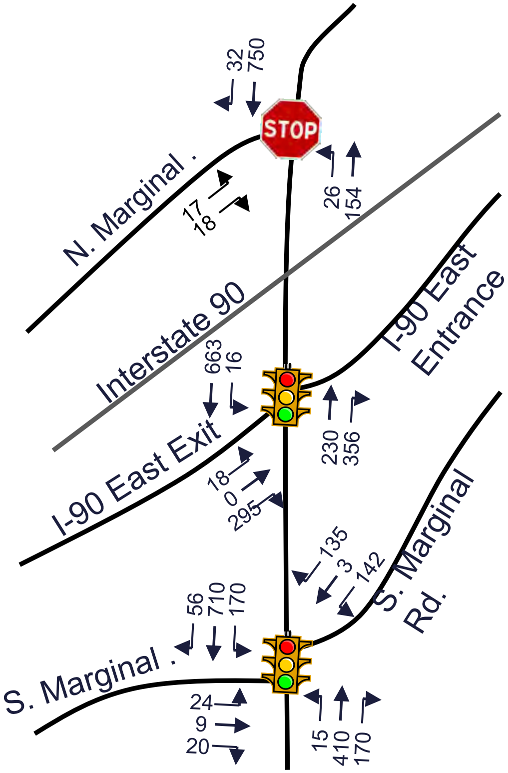
ODOT safety study

- Study crash data to identify problem areas
- Potential reconfiguration of ramps as single interchange
- Potential changes to ramp intersections
- Modify MLK cross section to improve trail under bridge

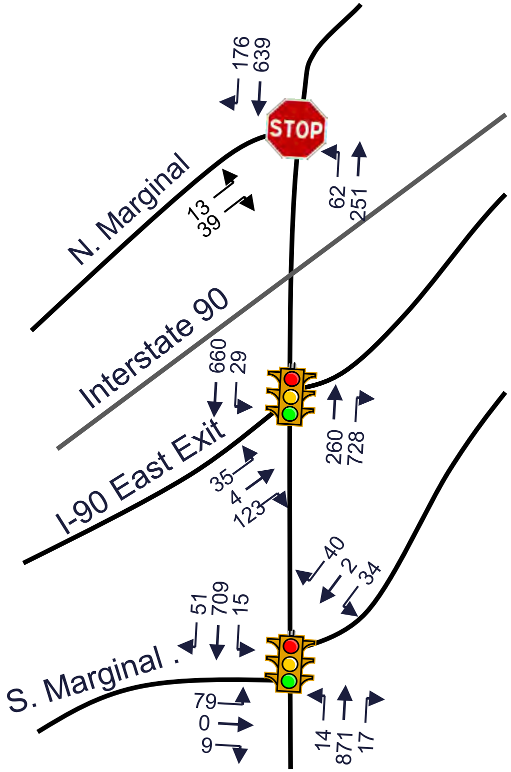
Traffic: E.55th St – Peak Hours

ODOT safety study

AM Peak



PM Peak



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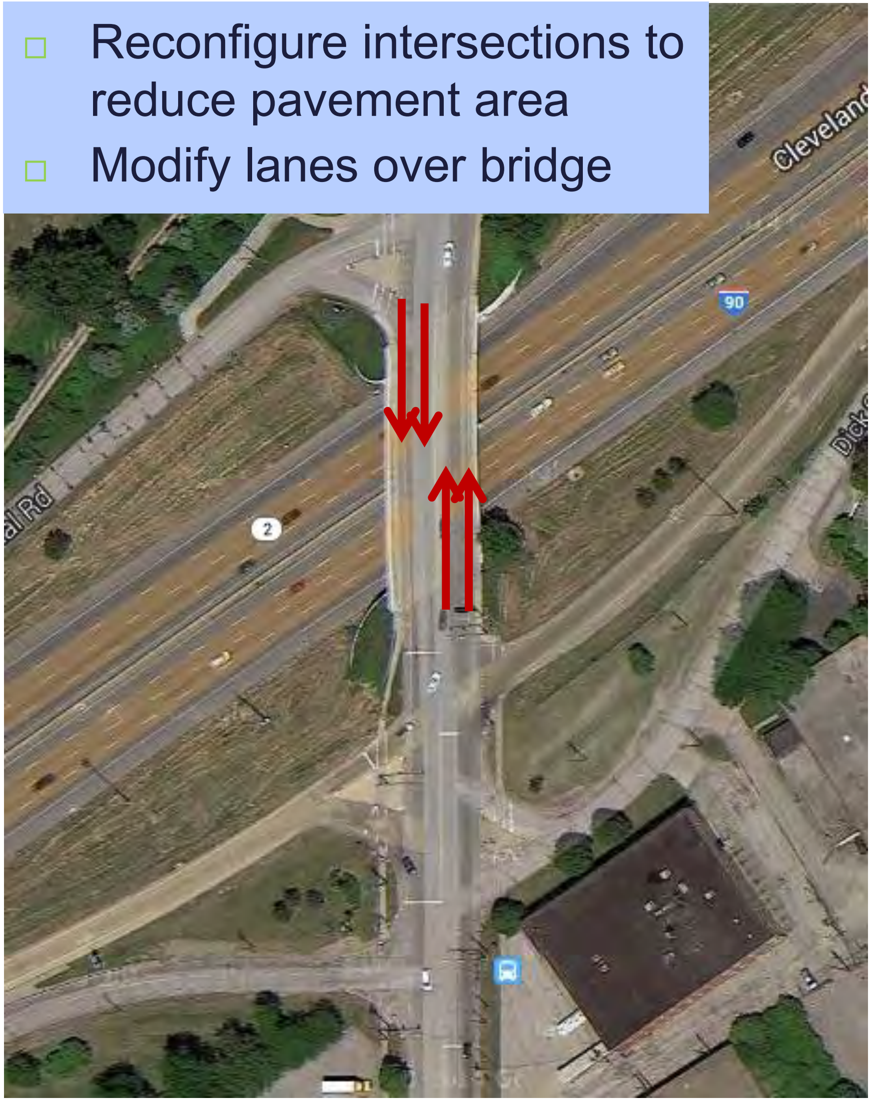
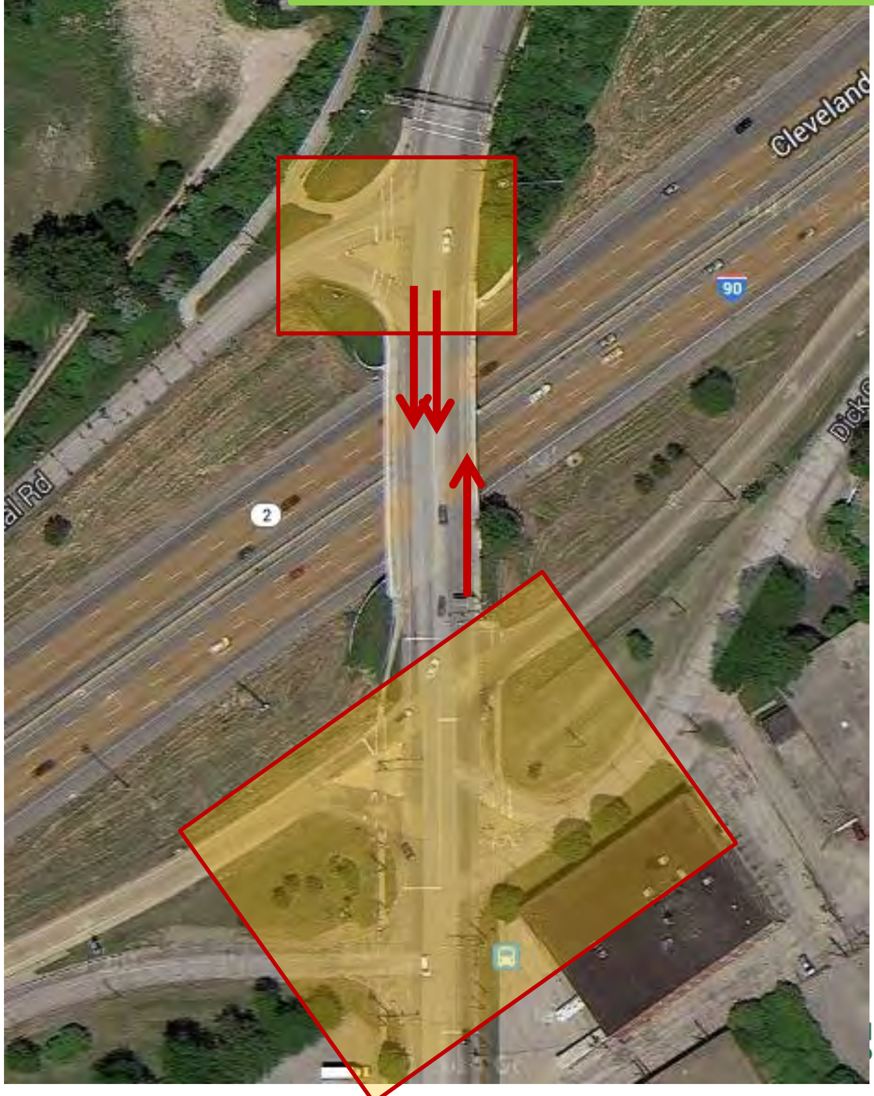
E.55th St Opportunities

- Reconfigure intersections to reduce pavement area
- Modify lanes over bridge



ODOT safety study



Eastern Concept (MLK-E.72nd & E.55th)

stclair superior
development corporation

CAMPUS DISTRICT

WAREHOUSE DISTRICT

Lakefront Greenway Concept Development
Public Meeting, March 5, 2015

Michael Baker
INTERNATIONAL

Environmental Design Group

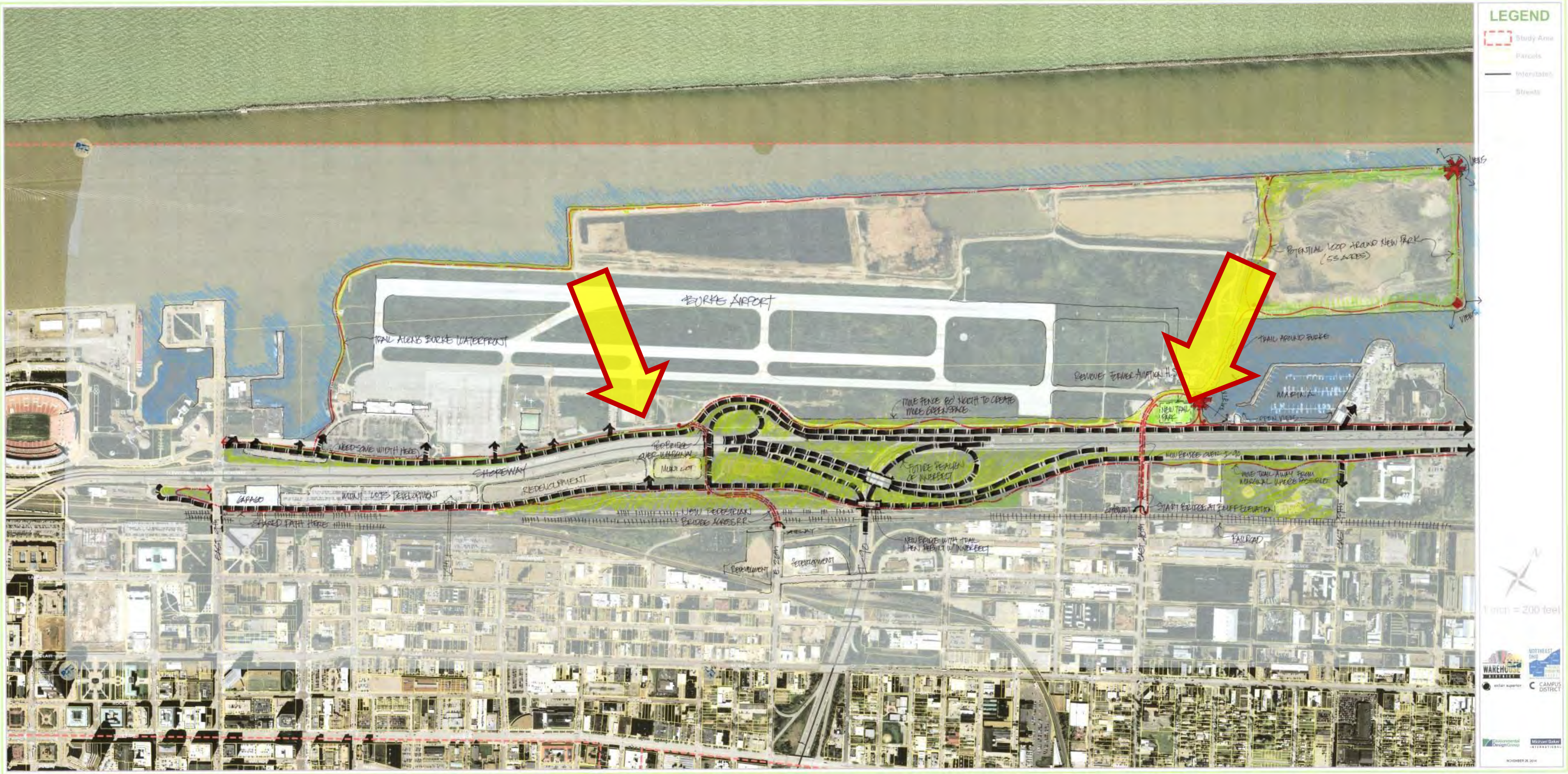
North Marginal by Burke

North Marginal – Existing

North Marginal – Existing

- ☐ Constrained width
- ☐ Proximity to Shoreway
- ☐ Unpleasant bike/ped experience

Central Concept



Options for North Marginal by Burke

Option 1: Two-Lane

- Add 8 ft wide trail next to North Marginal

Option 2: One-Way

- Reduce North Marginal to one-way road for 10 ft trail and more buffer space

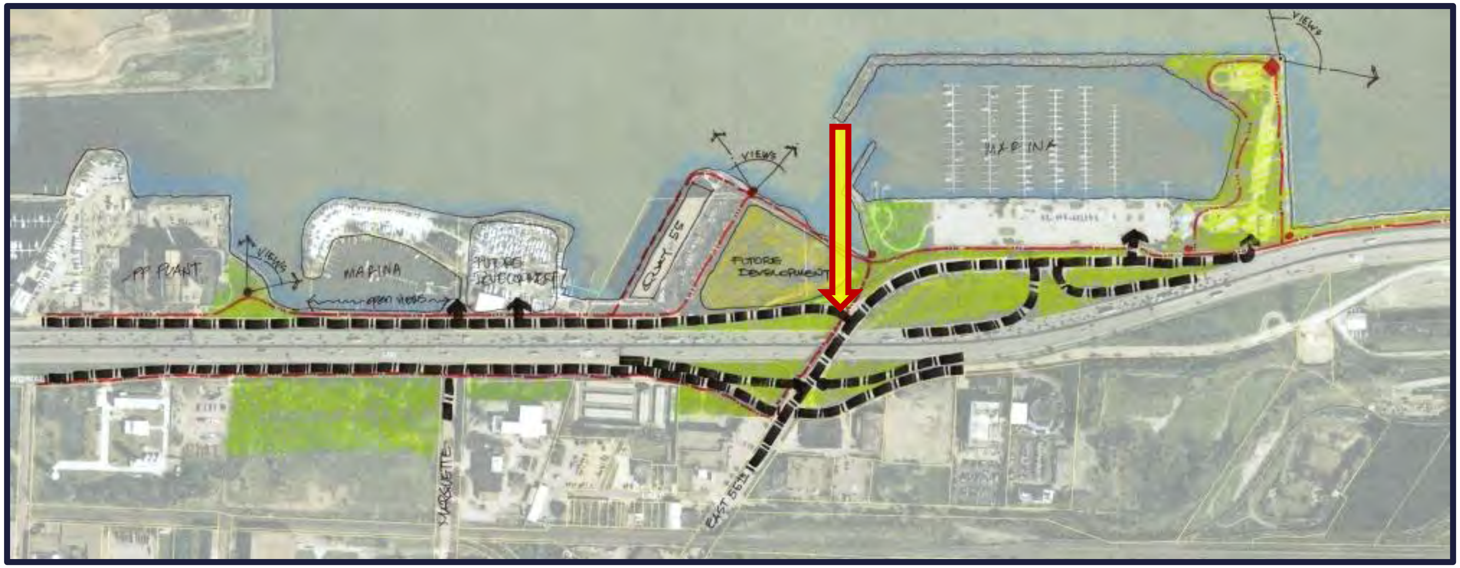
Option 3: Bike/Ped (Trail Only)

- Close section of North Marginal
  - Potential modification to Muni Lot Bridge access could help circulation

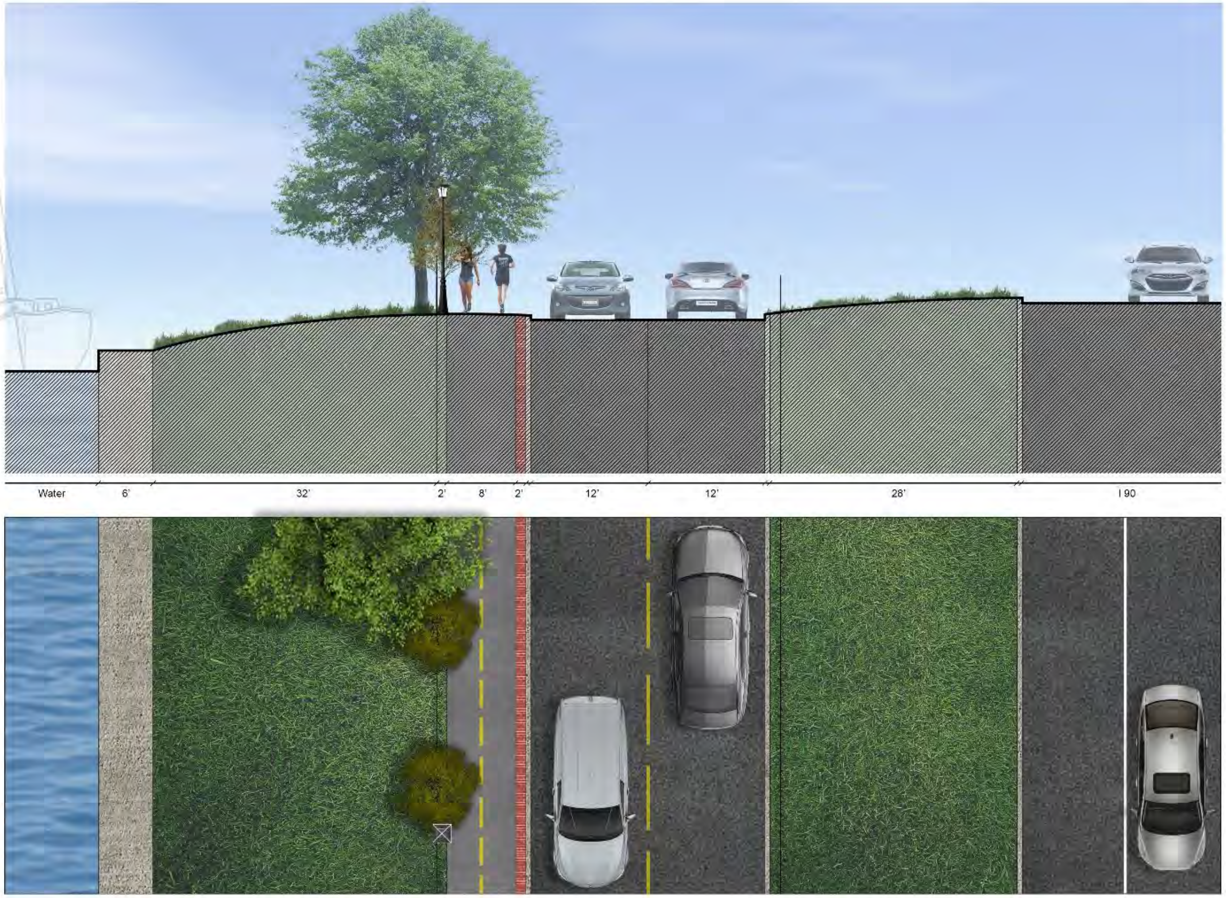
North Marginal Traffic at E.55th St

- North Marginal Traffic volumes at E.55th Street
  - AM Peak: 93 vph (35 EB + 58 WB)
  - PM Peak: 290 vph (52 EB + 238 WB)

(Lower volumes betw Burke parking and Aviation HS)

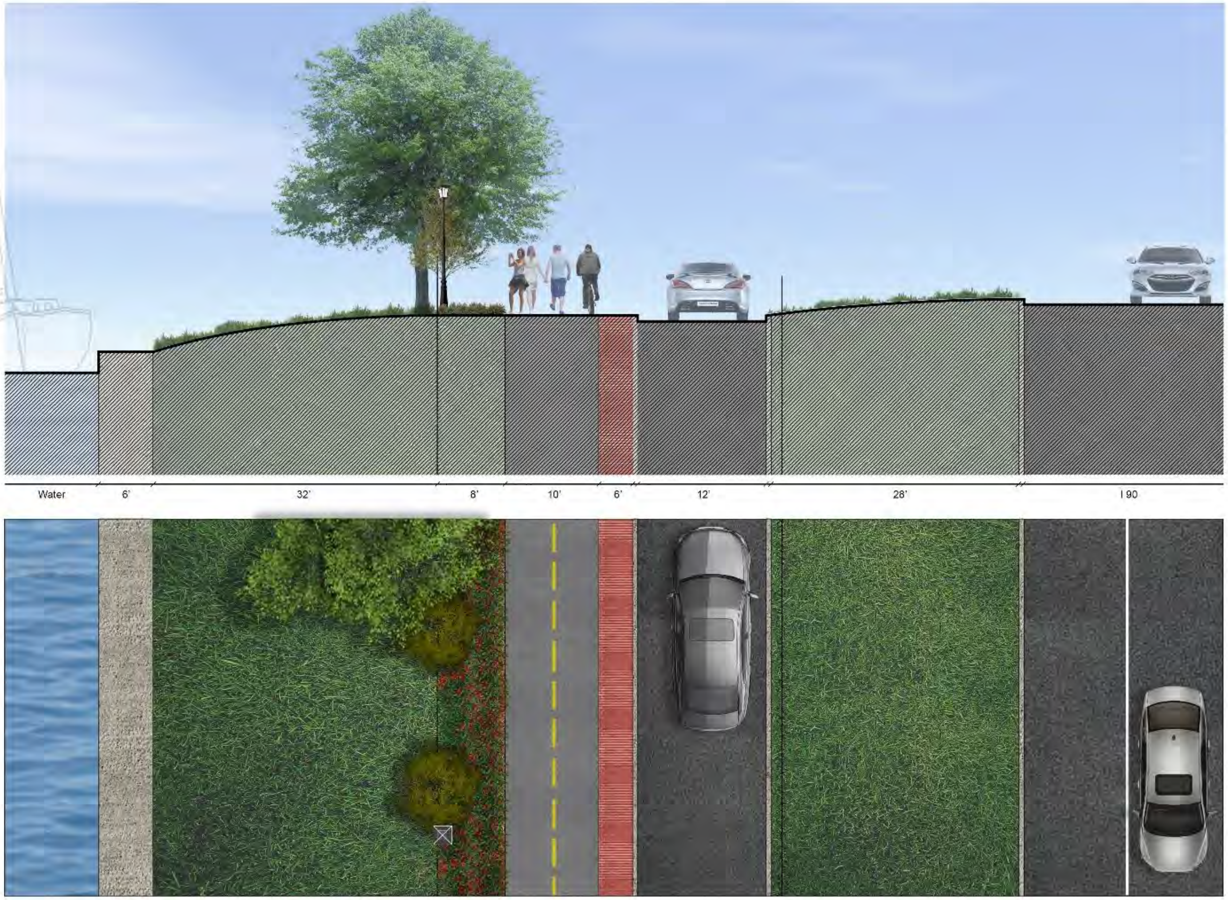


North Marginal as Two-Lane



North Marginal as Two-Lane

North Marginal as One-Way

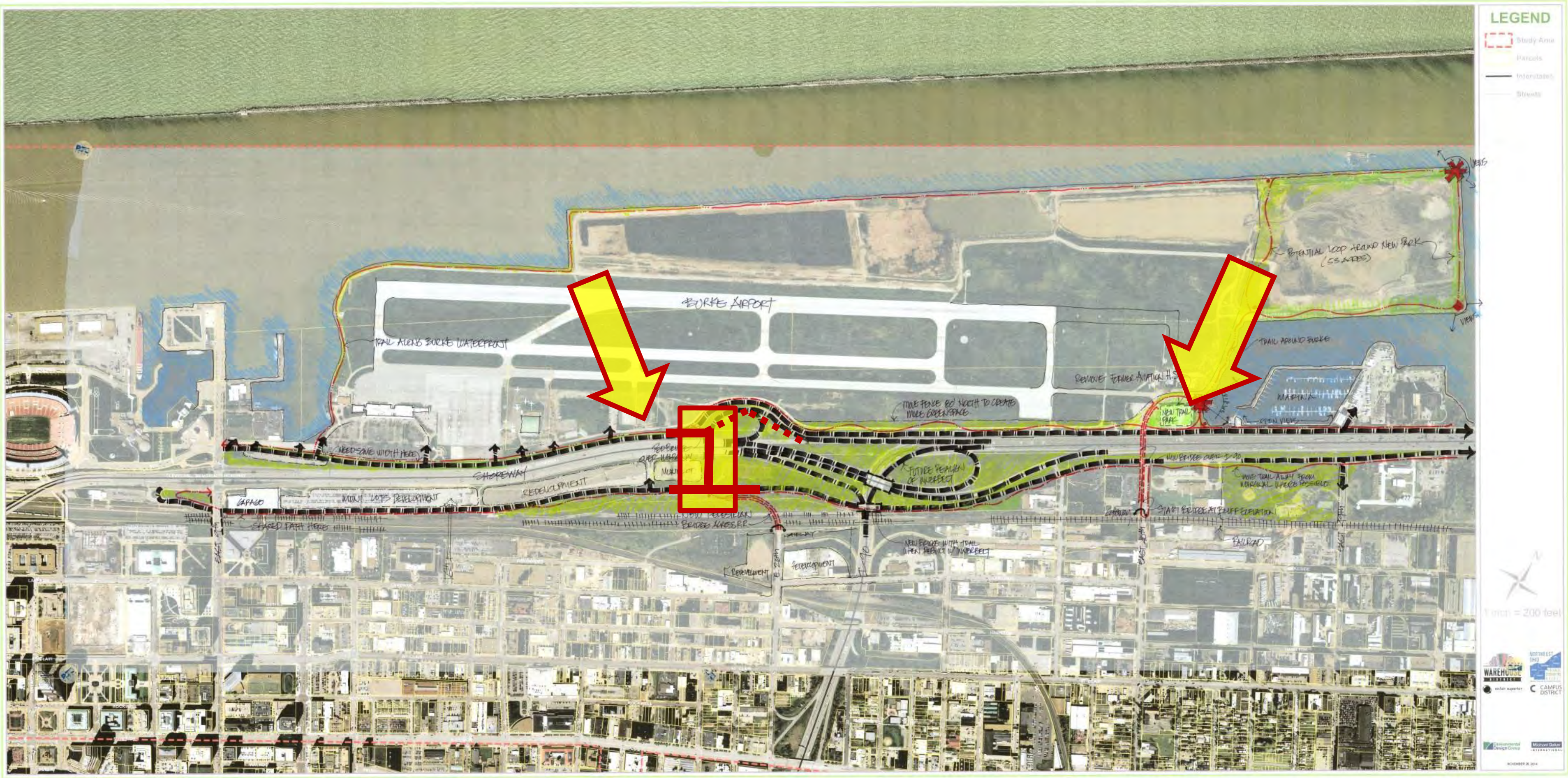


North Marginal as One-Way

North Marginal Bike/Ped Only (Trail)

North Marginal Bike/Ped Only (Trail)

Central Concept



stclair superior development corporation

CAMPUS DISTRICT

WAREHOUSE DISTRICT

Lakefront Greenway Concept Development
Public Meeting, March 5, 2015

Michael Baker INTERNATIONAL

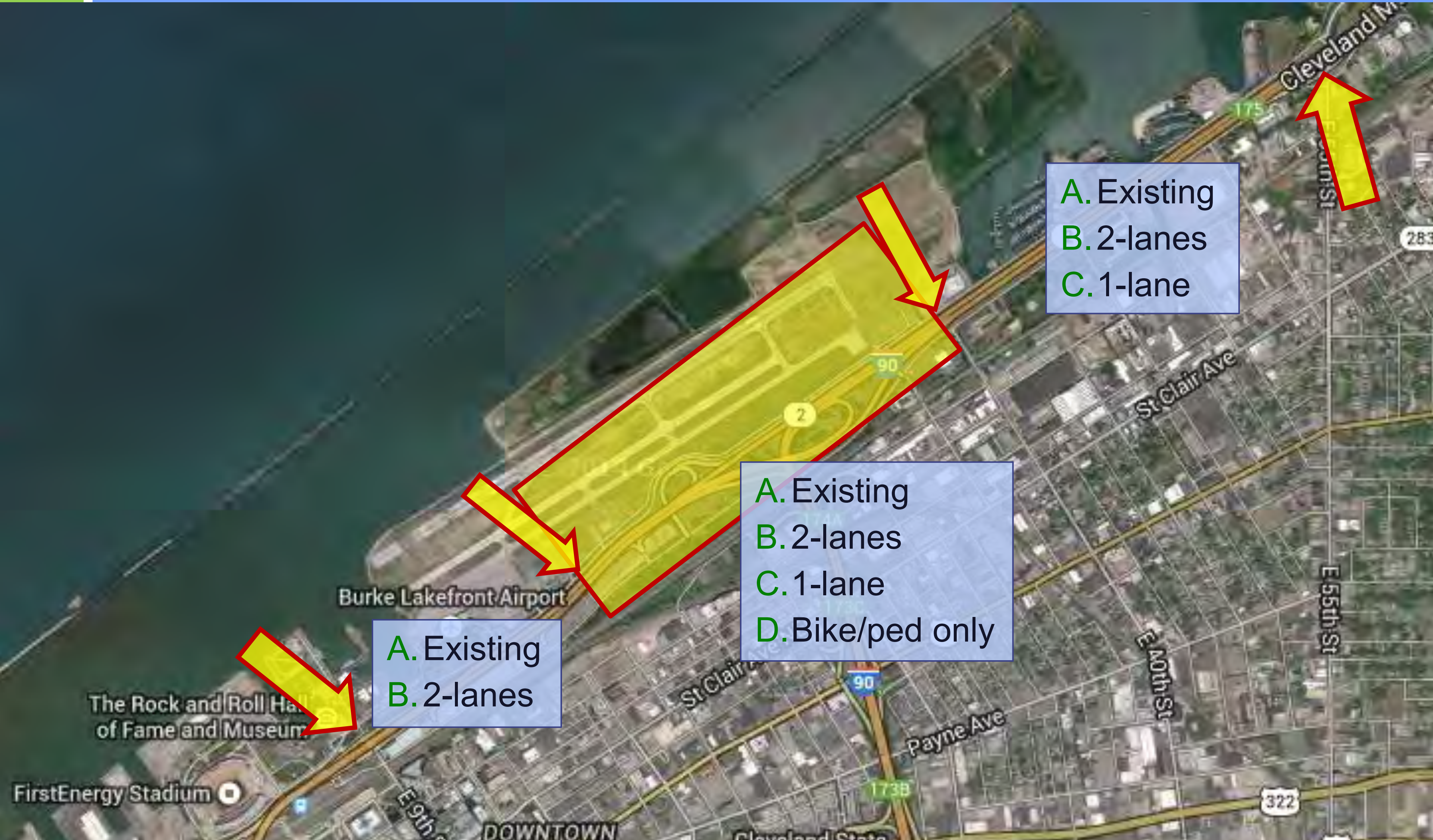
Environmental Design Group

Muni Lot Bridge

- Reconfigure WB off ramp to clarify end of ramp and facilitate bike/ped accommodations
- Provide connection to North Marginal for bikes/peds (and maybe vehicles)
- Consider grade issues

Muni Lot Bridge

Central Concept Combinations



A. Existing
B. 2-lanes
C. 1-lane

A. Existing
B. 2-lanes
C. 1-lane
D. Bike/ped only

A. Existing
B. 2-lanes

Plan Development: Next Steps

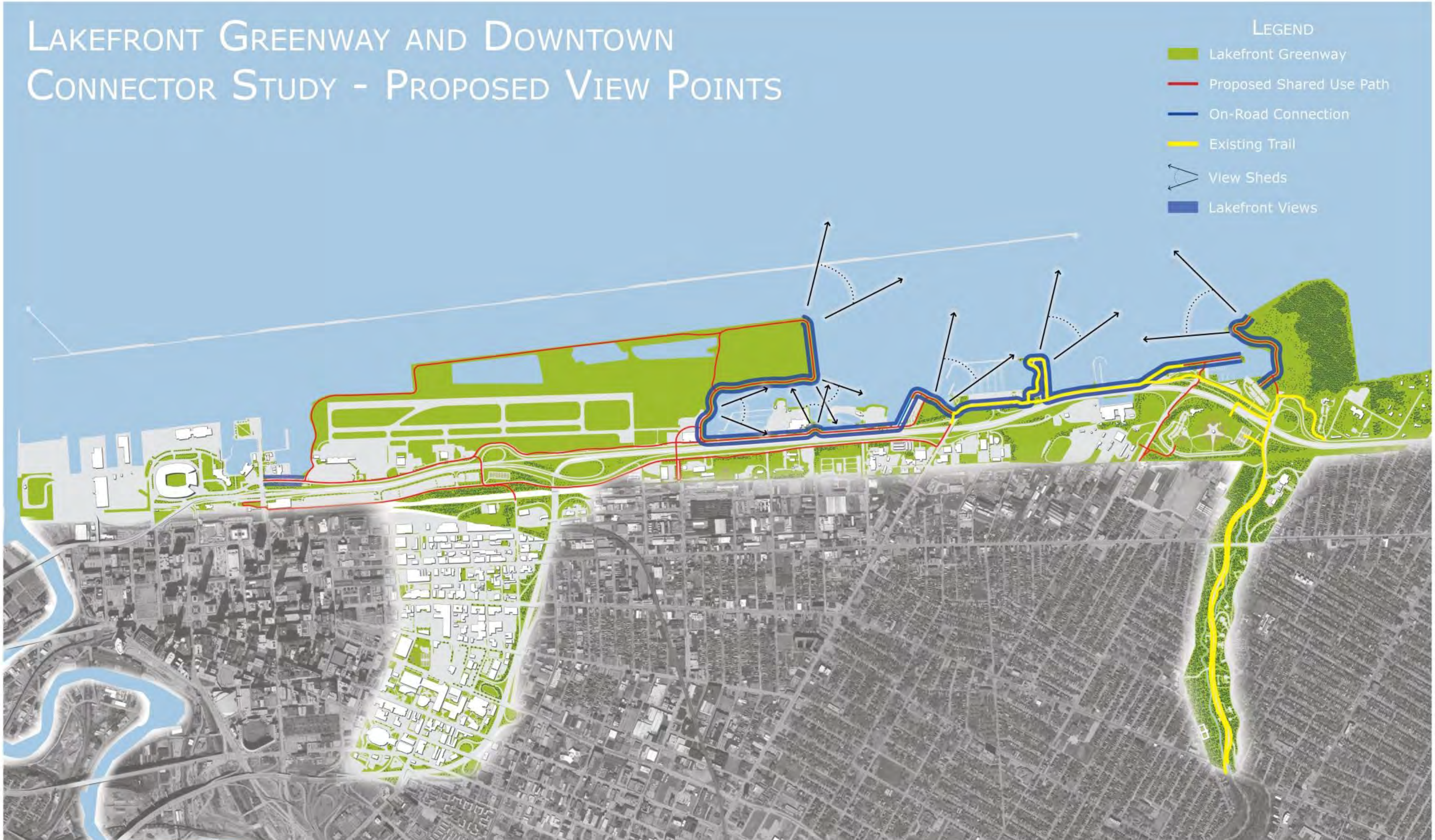
- Gather public input
- Concept evaluation & feasibility assessment
- Develop recommendations
- Present recommendations (public mtg May 2015)
- Prepare report

Your Input Matters!

BOARDS

- What should this park look like?
  (6 green dots + 6 red dots)
  - 3 boards with lots of photos
- Pedestrian bridge locations
  (2 green dots + 2 red dots)
  - Existing bridges / crossing locations
  - Potential pedestrian bridge crossing locations
- North Marginal (between E.9th and E.55th Streets)
  (1 green dot + 1 red dot)
  - Two-way road with multi-use trail
  - One-way road with wider multi-use trail
  - Bike/pedestrian access only (widened linear park for non-motorized use)

THANK YOU!


Lakefront Greenway and Downtown Connector Study - Proposed View Points
Legend
Lakefront Greenway
Proposed Shared Use Path
On-Road Connection
Existing Trail
View Sheds
Lakefront Views

NORTHEAST OHIO AREAWIDE COORDINATING AGENCY

MEMORANDUM

TO: NOACA Board of Directors

FROM: Grace Gallucci, Executive Director

DATE: March 6, 2015

RE: **Resolution No. 2015-026 – Plan and TIP Amendments – 3rd Quarter State Fiscal Year (SFY) 2015**

ACTION REQUESTED

The Board of Directors is asked to approve **Resolution No. 2015-026** which directs that NOACA's long-range transportation plan (Plan) and the Transportation Improvement Program (TIP) be amended to include the proposed projects as indicated. Please note that some of the projects listed are to be amended to the Plan, some to the TIP and others to both the Plan and TIP.

PREVIOUS ACTION

The Transportation Subcommittee (TS), Planning and Programming Committee, and Executive Committee have recommended this item for approval.

BACKGROUND/JUSTIFICATION FOR CURRENT ACTION

The proposed amendments to the Plan and the state fiscal year (SFY) 2014 – 2017 TIP have all been processed through project planning review (PPR). The projects include bridge, roadway and transit projects sponsored by various entities. The amendments also include projects currently programmed in the TIP that, per federal regulations, require an MPO resolution because the amounts of their respective cost decrease or increase exceeds the cost estimate threshold or new funding has been added to a project.

FINANCIAL IMPACT

The estimated total cost of the proposed projects is approximately $22.2 million, which includes approximately $9.4 million of NOACA controlled funds. Funding for these projects is being provided from a variety of federal, state, and local sources. Federal funding is provided by the Federal Highway Administration and Federal Transit Administration and is administered through NOACA and the Ohio Department of Transportation.

CONCLUSION/NEXT STEPS

Following Board approval, the amendments will be incorporated into the statewide TIP amendment in April 2015.

SFY 2014 - 2017 Transportation Improvement Program

Resolution No. 2015-025

Highway and Bikeway Element

Amendments

3/6/15

PID	Project Description	Type of Work	Funding Data				AQ required?
95930	CUY D12 PPM FY2015	Preventive Maintenance	CE	ODOT	$9,600	2015	*exempt*
	Various routes and sections throughout District 12 Microsurface the following IR-77 locations: SR-82 EB Loop to IR-77 NB, IR-77 SB Exit to Pleasant Valley (Loop), and IR-77 NB Exit to Pleasant Valley (Loop)		CE	NHPP	$38,400	2015	
			CE	ODOT	$404	2015	
			CE	HSIP	$3,636	2015	
	THE AMOUNT OF THE COST DECREASE EXCEEDS THE COST ESTIMATE THRESHOLD		CO	ODOT	$33,000	2015	
			CO	NHPP	$297,000	2015	
			CO	ODOT	$9,700	2015	
			CO	HSIP	$87,300	2015	
					$479,040		
	CUY FULTON RD / W 28TH ST	Repair, rehabilitate and resurface	PEDD	Cleve	$175,000	2016	*exempt*
	Cleveland: Clark Ave to Detroit Rd	1.40 miles	PEPD	Cleve	$175,000	2016	
			CE	Cleve	$85,800	Plan	
			CE	STP	$343,200	Plan	
			CO	Cleve	$772,200	Plan	
			CO	STP	$3,088,800	Plan	
					$4,640,000		
98548	CUY MLK BLVD	Rehabilitate structure	PEDD	Cleve	$333,900	2015	*exempt*
	Cleveland: MLK Blvd over Doan Brook Creek approximately 1/3 mile south of IR 90 and just south of East Blvd		PEPD	Cleve	$333,900	2015	
			CO	STP	$172,000	Plan	
			CE	STP	$267,200	Plan	
			CO	Cleve	$66,800	Plan	
			CO	Cleve	$668,000	Plan	
			CO	MBR	$2,500,000	Plan	
					$4,341,800		

PE=preliminary engineering, RW=right of way, C=construction, CE=construction engineering, CO=construction contract, PEDD=preliminary engineering detailed design, PEPD=preliminary engineering preliminary development, AR=archeological recovery

SFY 2014 - 2017 Transportation Improvement Program

Resolution No. 2015-025

Highway and Bikeway Element

Amendments

3/6/15

PID	Project Description	Type of Work	Funding Data				AQ required?
	CUY N MARGINAL	Rehabilitation	PEDD	Cleve	$50,000	2015	*exempt*
	Cleveland: E 72nd St to Cleveland ECL Involves three segments: E 72nd St to MLK Jr Dr; MLK Jr Dr - N Marginal Rd to Lakeshore Blvd; Lakeshore Blvd - MLK Jr Dr to Cleveland ECL	1.20 miles	PEPD	Cleve	$125,000	2015	
			CE	Cleve	$45,618	Plan	
			CE	STP	$182,474	Plan	
			CO	Cleve	$410,566	Plan	
			CO	STP	$1,642,262	Plan	
					$2,455,920		
	CUY N MARGINAL RD / S MARGINAL RD	Rehabiltate	PEDD	Cleve	$50,000	2015	*exempt*
	Cleveland: N Marginal Rd - IR-90 WB access ramp at West Blvd to Lorain Ave; and S Marginal Rd - Western Ave to W 98th St N Marginal Rd from West Blvd to W 98th St is functionally classified as a local road and will be funded with local funds	0.61 mile	PEPD	Cleve	$75,000	2015	
			CE	Cleve	$84,084	Plan	
			CE	STP	$75,416	Plan	
			CO	Cleve	$756,760	Plan	
		0.06 mile	CO	STP	$678,740	Plan	
					$1,720,000		
	CUY S MARGINAL RD	Rehabilitate	PEDD	Cleve	$50,000	2015	*exempt*
	Cleveland: E 9th St to E 55th St	2.75 miles	PEPD	Cleve	$100,000	2015	
			CE	Cleve	$66,960	Plan	
			CE	STP	$267,840	Plan	
			CO	Cleve	$602,640	Plan	
			CO	STP	$2,410,560	Plan	
					$3,498,000		
94367	CUY /LAK IR271-13.16/00.00 NOISE	Noise Wall Replacement & Repair	CE	ODOT	$5,100	2015	*exempt*
	CUY IR 271-13.16 (US 322) to 16.65 (Mayfield/Highland Hts Corporation Line): Mayfield Hts, Highland Hts LAK IR 271-00.00 (Cuyahoga/Lake County Line) to 1.75 (IR 90): Willoughby Hills Replace deteriorated concrete panels and reuse existing steel posts	3.49 miles	CE	NHPP	$45,900	2015	
			CO	ODOT	$260,000	2015	
			CO	NHPP	$2,340,000	2015	
					$2,651,000		
		1.75 miles					
	COST INCREASE OVER THE COST ESTIMATE THRESHOLD						

PE=preliminary engineering, RW=right of way, C=construction, CE=construction engineering, CO=construction contract, PEDD=preliminary engineering detailed design, PEPD=preliminary engineering preliminary development, AR=archeological recovery

RESOLUTION NO. 2015-026
(PLAN AND TIP AMENDMENTS
3rd QUARTER SFY 2015)

RESOLUTION OF THE BOARD OF DIRECTORS
OF THE
NORTHEAST OHIO AREAWIDE COORDINATING AGENCY

WHEREAS, the Northeast Ohio Areawide Coordinating Agency (NOACA) is the Metropolitan Planning Organization (MPO) for the counties of Cuyahoga, Geauga, Lake, Lorain, and Medina, and the areawide water quality management agency for the same region; and

WHEREAS, the Congress of the United States, through law, and the U.S. Department of Transportation, through regulation, have determined that MPOs shall create a long-range, 20-year transportation plan and a four-year Transportation Improvement Program (TIP) that list federal-aid transportation projects expected to be implemented in each of the program years; and

WHEREAS, the NOACA Board of Directors' Regional Transportation Investment Policy requires that all proposed federal-aid transportation projects be processed through project planning review in order to meet transportation plan goals and federal requirements; and

WHEREAS, the following projects are proposed amendments to the NOACA long-range transportation plan (Connections$^+$ 2035):

a) City of Cleveland: CUY FULTON RD/W 28TH ST – This project involves rehabilitation and resurfacing along Fulton Road, from Clark Avenue to Franklin Avenue and West 28th Street from, Franklin Avenue to Detroit Avenue, in Cleveland.

b) City of Cleveland: CUY MLK BLVD: PID No. 98548 – This project involves either relining or removing and replacing the two corrugate metal plate dual arch structures on Martin Luther King Jr. Drive over Doan Brook Creek, approximately one-third of a mile south of IR-90 and just south of East Boulevard in the City of Cleveland.

c) City of Cleveland: CUY NORTH MARGINAL RD – This project involves rehabilitation along North Marginal Road, from East 72nd Street to Martin Luther King Jr. Drive; Martin Luther King Jr. Drive, from North Marginal Road to Lakeshore Boulevard; and Lakeshore Boulevard, from Martin Luther King Jr. Drive to the eastern corporate limit, in Cleveland.

d) City of Cleveland: CUY NORTH MARGINAL RD/SOUTH MARGINAL RD – This project involves rehabilitation along North Marginal Road, from West Boulevard to Lorain Avenue; and along South Marginal Road, from Western Avenue to West 98th Street, in Cleveland.

e) City of Cleveland: CUY SOUTH MARGINAL RD – This project involves rehabilitation along South Marginal Road, from the east end of IR-90 South Marginal Road at the IR-90 eastbound exit ramp to East 9th Street to East 55th Street, in Cleveland.

f) Greater Cleveland Regional Transit Authority (GCRTA): PID No. 99619: GCRTA Trolley Bus Replacement Program - This project involves the replacement of four 35-foot GCRTA trolley buses in 2015.

WHEREAS, the following projects are proposed amendments to the state fiscal year (SFY) 2014 - 2017 TIP:

a) Ohio Department of Transportation (ODOT) District 12: CUY D12 PPM FY2015: PID No. 95930 – This project involves preventative maintenance on various routes and sections throughout District 12. Microsurfacing at the following IR-77 locations: SR-82 EB Loop to IR-77 NB, IR-77 SB exit to Pleasant Valley (Loop), and IR-77 NB exit to Pleasant Valley (Loop).

b) City of Cleveland: CUY FULTON RD/W 28TH ST – The preliminary engineering preliminary development (PEPD) phase and preliminary engineering detailed design (PEDD) phase of a project that involves rehabilitation and resurfacing along Fulton Road, from Clark Avenue to Franklin Avenue and West 28th Street from, Franklin Avenue to Detroit Avenue, in Cleveland.

c) City of Cleveland: CUY MLK BLVD: PID No. 98548 – The preliminary engineering preliminary development (PEPD) phase and preliminary engineering detailed design (PEDD) phase of a project that involves either relining or removing and replacing the two corrugate metal plate dual arch structures on Martin Luther King Jr. Drive over Doan Brook Creek, approximately one-third of a mile south of IR-90 and just south of East Boulevard in the City of Cleveland.

d) City of Cleveland: CUY NORTH MARGINAL RD – The preliminary engineering preliminary development (PEPD) phase and preliminary engineering detailed design (PEDD) phase of a project that involves rehabilitation along North Marginal Road, from East 72nd Street to Martin Luther King Jr. Drive; Martin Luther King Jr. Drive, from North Marginal Road to Lakeshore Boulevard; and Lakeshore Boulevard, from Martin Luther King Jr. Drive to the eastern corporate limit, in Cleveland.

e) City of Cleveland: CUY NORTH MARGINAL RD/SOUTH MARGINAL RD – The preliminary engineering preliminary development (PEPD) phase and preliminary engineering detailed design (PEDD) phase of a project that involves rehabilitation along North Marginal Road, from West Boulevard to Lorain Avenue; and along South Marginal Road, from Western Avenue to West 98th Street, in Cleveland.

f) City of Cleveland: CUY SOUTH MARGINAL RD – The preliminary engineering preliminary development (PEPD) phase and preliminary engineering detailed design (PEDD) phase of a project that involves rehabilitation along South Marginal Road, from the east end of IR-90 South Marginal Road at the IR-90 eastbound exit ramp to East 9th Street to East 55th Street, in Cleveland.

g) Ohio Department of Transportation (ODOT): CUY/LAK IR-271-13.16/00.00 NOISE: PID No. 94367 – This project involves noise wall replacement and repair from US Route 322 to Mayfield/Highland Heights corporation line in Mayfield Heights and Highland Heights. LAK IR-271-00.00 (Cuyahoga/Lake County Line) to IR-90 in Willoughby Hills.

h) Greater Cleveland Regional Transit Authority (GCRTA): PID No. 99619: GCRTA Trolley Bus Replacement Program - This project involves the replacement of four 35-foot GCRTA trolley buses in 2015.

i) Laketran: Laketran Bus Improvement Program: PID No. 89669 – This project involves the replacement of four Laketran paratransit vans in 2015.

WHEREAS, all above projects are excluded from regional emissions analysis and as such do not affect the existing plan and TIP's air quality conformity determination; and

WHEREAS, the above projects are consistent with current financial forecasts and plans; and

WHEREAS, it is expected that the project sponsors will, in good faith, endeavor to address comments and recommendations raised during project planning review and will provide evidence of such, prior to the project advancing; and

WHEREAS, the above projects are recommended by the Transportation Subcommittee (TS), Planning and Programming Committee and the Executive Committee as amendments to the Plan and TIP as appropriate.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Northeast Ohio Areawide Coordinating Agency, consisting of 45 principal officials serving general purpose local governments throughout and within the counties of Cuyahoga, Geauga, Lake, Lorain, and Medina that:

Section 1: The referenced projects have had appropriate review and are recommended for approval.

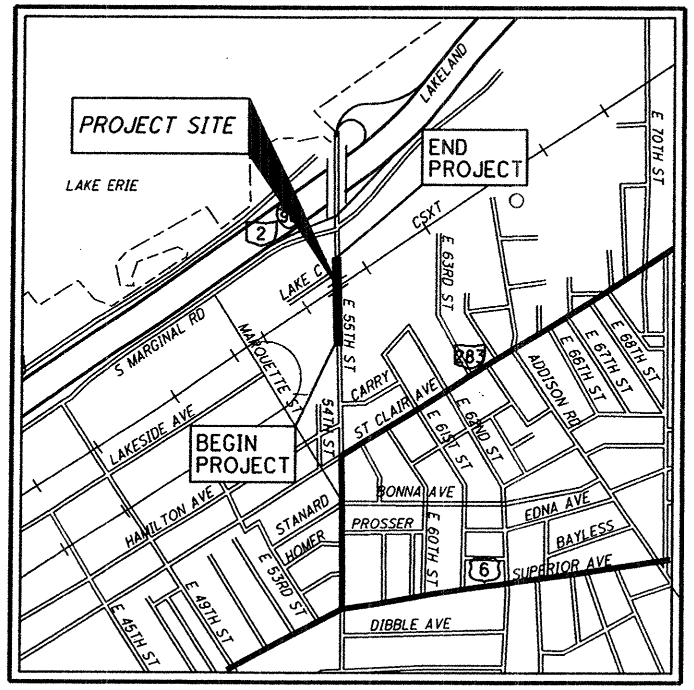
Section 2: The NOACA transportation plan and TIP are amended to include the projects for project development and processing review purposes.

Section 3: The Executive Director is authorized to transmit certified copies of this resolution to appropriate federal, state, and local agencies.

Certified to be a true copy of a Resolution of the Board of Directors of the Northeast Ohio Areawide Coordinating Agency adopted this 13th day of March 2015.

Secretary: Michael P

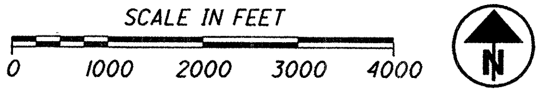
Date Signed: 3-13-15



LOCATION MAP

LATITUDE: N41°31′40″   LONGITUDE: W81°39′10″

SCALE IN FEET



PORTION TO BE IMPROVED	▬
INTERSTATE & DIVIDED HIGHWAY	═
UNDIVIDED STATE & FEDERAL ROUTES	━
OTHER ROADS	═
DETOUR ROUTE	⇄

DESIGN DESIGNATION

CURRENT ADT (2005)	15050
DESIGN YEAR ADT (2025)	15050
DESIGN HOURLY VOLUME (2025)	1505
DIRECTIONAL DISTRIBUTION	66%
TRUCKS (24 HOUR B&C)	9%
DESIGN SPEED	40 MPH
LEGAL SPEED	35 MPH

DESIGN FUNCTIONAL CLASSIFICATION: - URBAN MINOR ARTERIAL

NHS PROJECT	NO

DESIGN EXCEPTIONS

NONE REQUIRED

UNDERGROUND UTILITIES
TWO WORKING DAYS
BEFORE YOU DIG
CALL **1-800-362-2764** (TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

PLAN PREPARED BY:

BURGESS & NIPLE, INC.
SUITE 612
1300 E. 9TH ST.
CLEVELAND, OH 44114

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
CUY - E. 55TH ST.
RECONSTRUCTION OF EXISTING SEPARATED CROSSING WITH THE CSX RAILROAD
CITY OF CLEVELAND
CUYAHOGA COUNTY

RECEIVED
FEB 03 2006
PRODUCTION DEPT.

INDEX OF SHEETS:

STANDARD CONSTRUCTION DRAWINGS					SUPPLEMENTAL SPECIFICATIONS
					SPECIAL PROVISIONS

ENGINEERS SEAL:	ENGINEERS SEAL:
SIGNED: DATE:	SIGNED: DATE:

PROJECT DESCRIPTION

IMPROVEMENT OF 0.23 MILES OF EAST 55TH STREET BY WIDENING FROM 2 LANES TO 4 LANES, INCREASING THE VERTICAL CLEARANCE UNDER THE CSX RAILROAD BY REPLACEMENT OF THE BRIDGE STRUCTURE AND 0.42 MILES OF TRACK ON A REVISED PROFILE.

PROJECT EARTH DISTURBED AREA:	3.18 ACRES
ESTIMATED CONTRACTOR EARTH DISTRUBED AREA:	1.75 ACRES
NOTICE OF INTENT EARTH DISTURBED AREA:	4.93 ACRES

2005 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT DETOURS WILL BE PROVIDED AS INDICATED ON SHEET 6.

STAGE I

APPROVED
DATE   MAYOR, CITY OF CLEVELAND

APPROVED
DATE   DISTRICT DEPUTY DIRECTOR

APPROVED
DATE   DIRECTOR, DEPARTMENT OF TRANSPORTATION

FEDERAL PROJECT NO.

PID NO. 77613

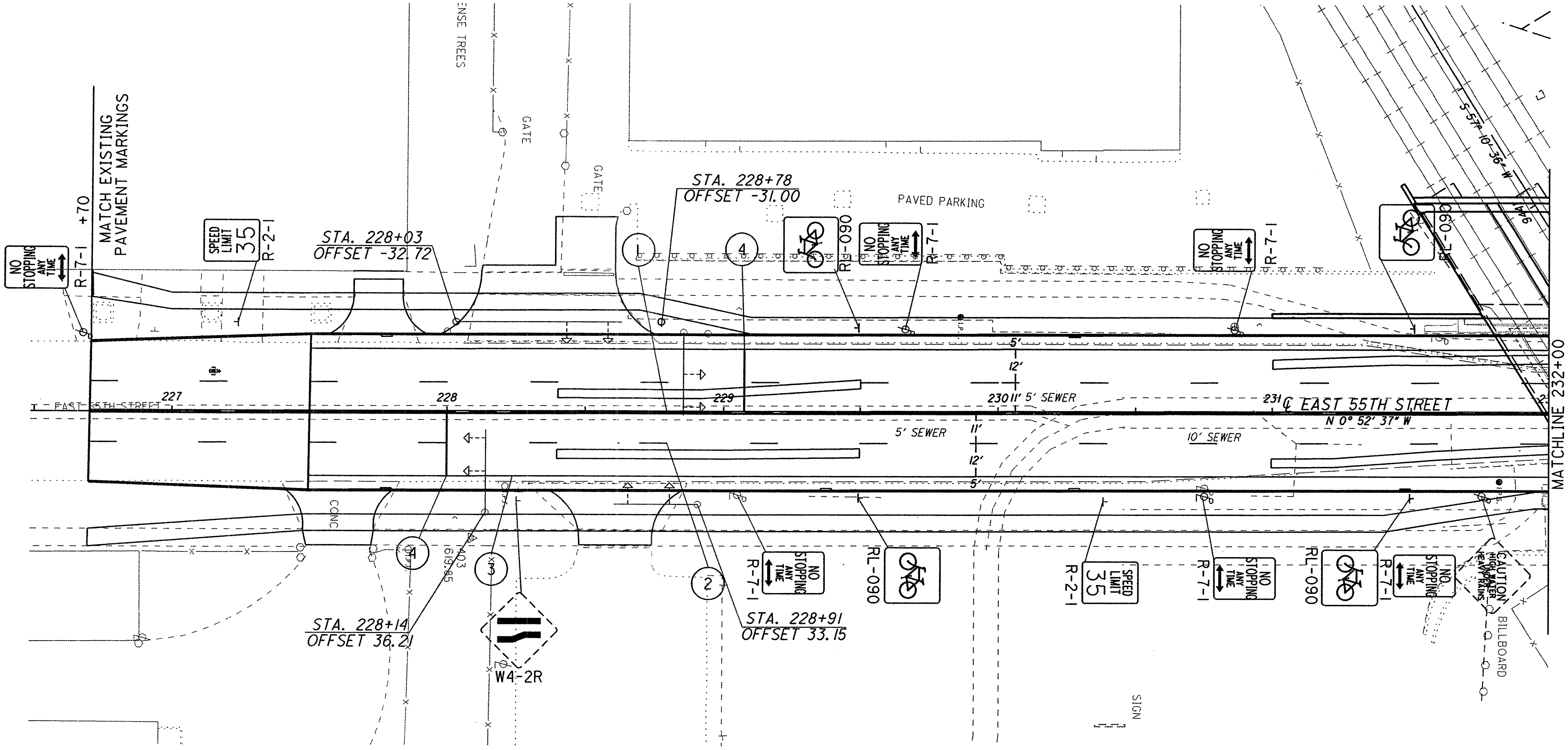
CONSTRUCTION PROJECT NO.

RAILROAD INVOLVEMENT
CSX RAILROAD

CUY - E. 55TH ST.

SIGNING AND PAVEMENT MARKING PLAN

CUY - E. 55th ST.

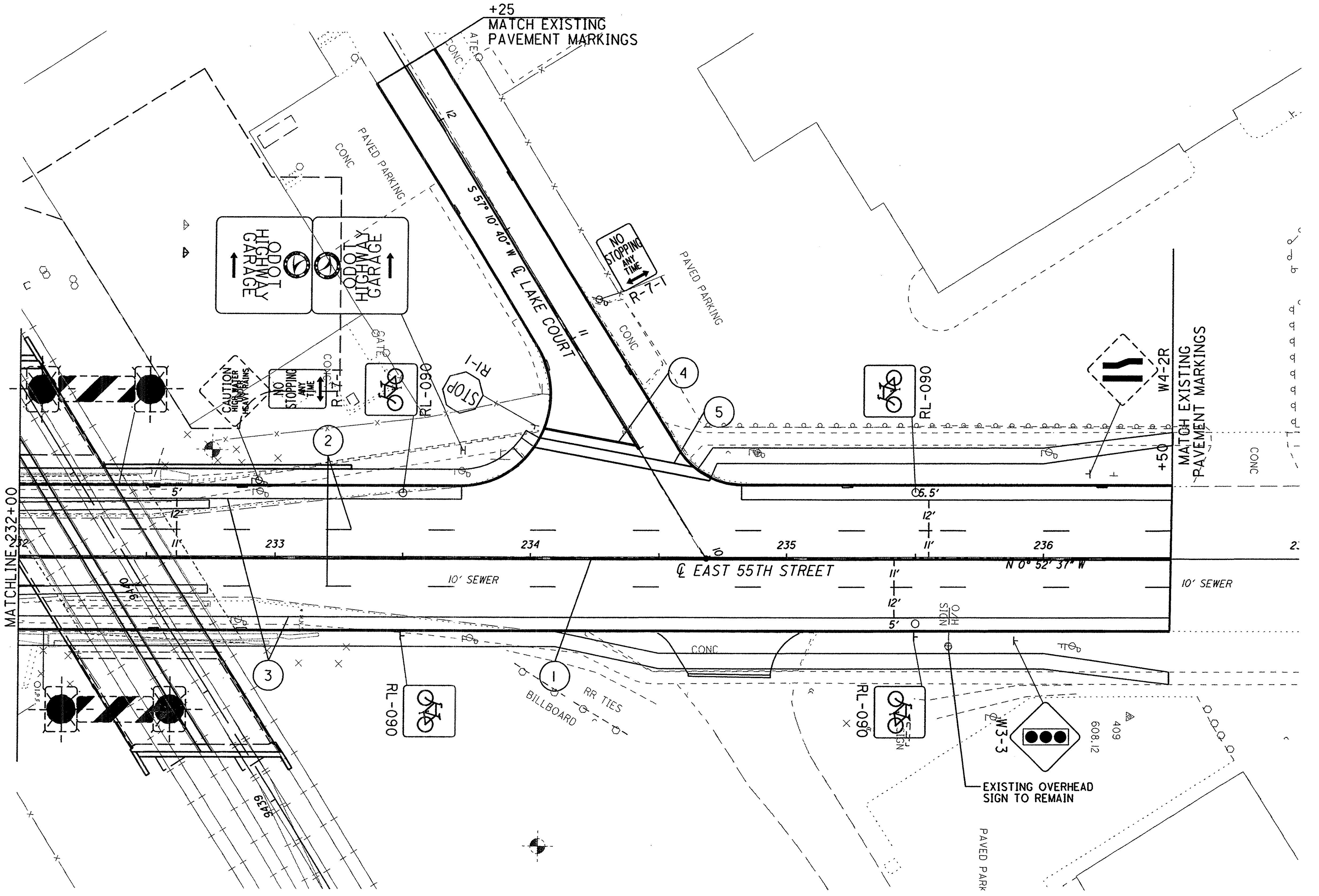


ITEM 642 - PAVEMENT MARKING

①	CENTERLINE, DOUBLE SOLID
②	LANE LINE
③	EDGE LINE
④	STOP LINE
⑤	CROSSWALK LINE

HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED RMS
CHECKED KRS



ITEM 642 - PAVEMENT MARKING

- ① - CENTERLINE, DOUBLE SOLID
- ② - LANE LINE
- ③ - EDGE LINE
- ④ - STOP LINE
- ⑤ - CROSSWALK LINE

N

0 10 20 40
HORIZONTAL SCALE IN FEET

CALCULATED RMS
CHECKED KRS

SIGNING AND PAVEMENT MARKING PLAN

CUY - E. 55th ST.

APPENDIX B
EXISTING CONDITIONS DIAGRAMS

EXISTING CONDITIONS DIAGRAM

0 25 50 100

HORIZONTAL SCALE IN FEET

CALCULATED MLS

CHECKED ELS

EXISTING CONDITIONS DIAGRAM

HORIZONTAL SCALE IN FEET
0 25 50 100

CALCULATED
MLS

CHECKED
ELS

EXISTING CONDITIONS DIAGRAM

HORIZONTAL SCALE IN FEET
0 25 50 100

CALCULATED
MLS

CHECKED
ELS

CALCULATED
MLS

CHECKED
ELS

EXISTING CONDITIONS DIAGRAM

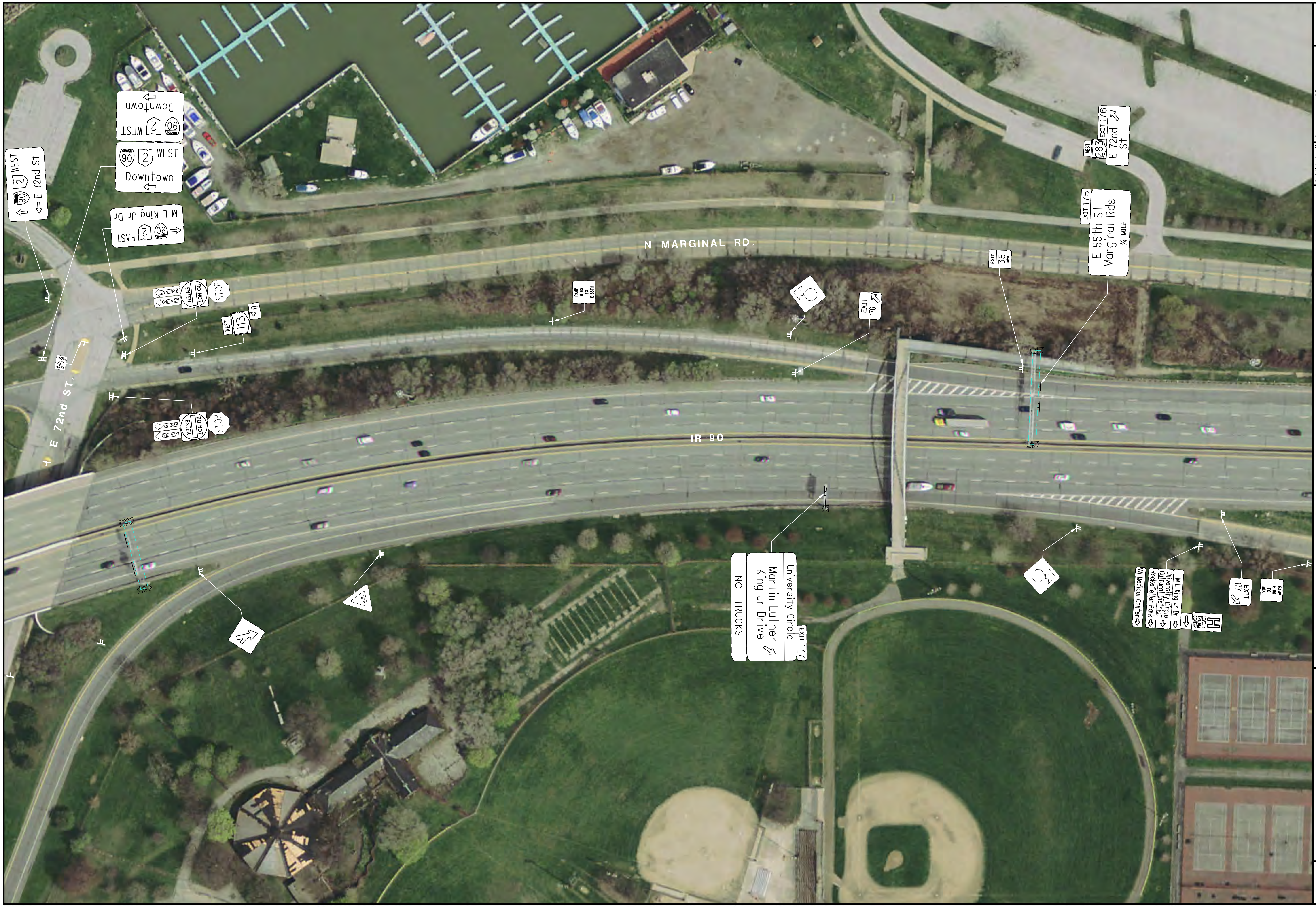
N

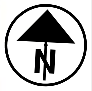
0 25 50 100
HORIZONTAL SCALE IN FEET

CALCULATED MLS
CHECKED ELS

EXISTING CONDITIONS DIAGRAM

EXISTING CONDITIONS DIAGRAM





0 25 50 100
HORIZONTAL
SCALE IN FEET

CALCULATED	CHECKED
MLS	ELS

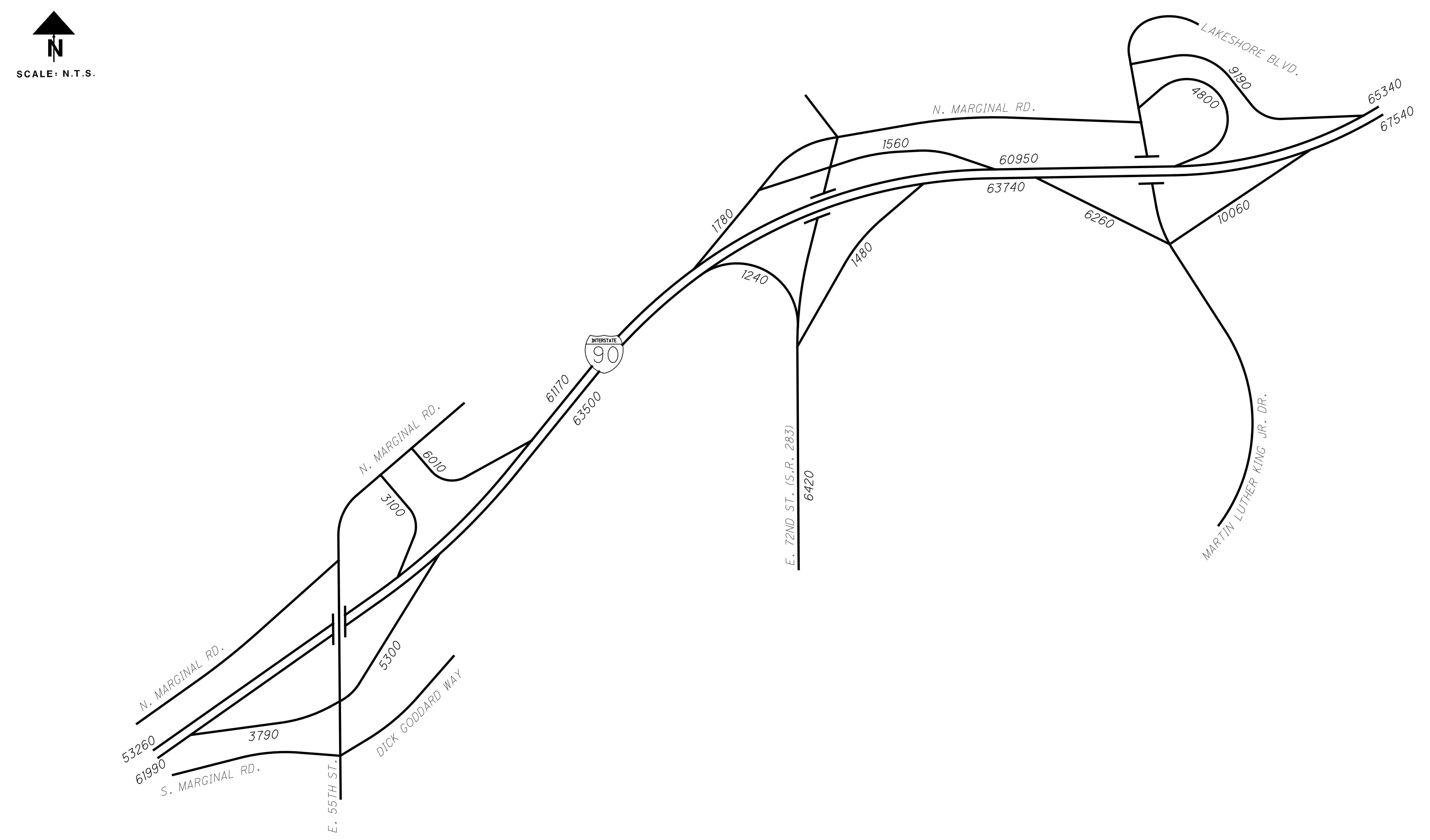
EXISTING CONDITIONS DIAGRAM

CALCULATED MLS

CHECKED ELS

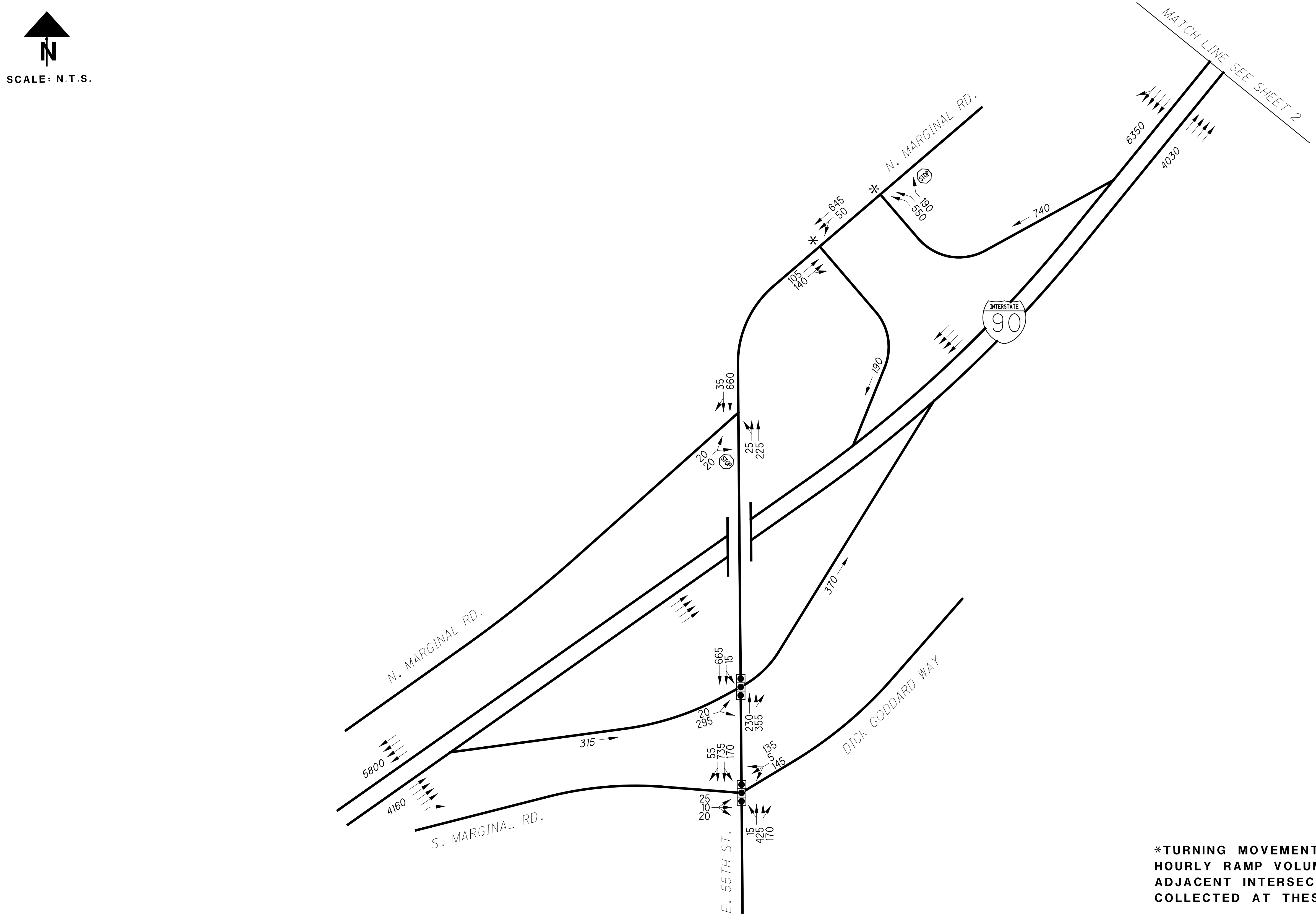
0 25 50 100
HORIZONTAL SCALE IN FEET

APPENDIX C
TRAFFIC DATA



> CUY-90-19.5/21.3 SAFETY STUDY

Design Year (2034) ADT

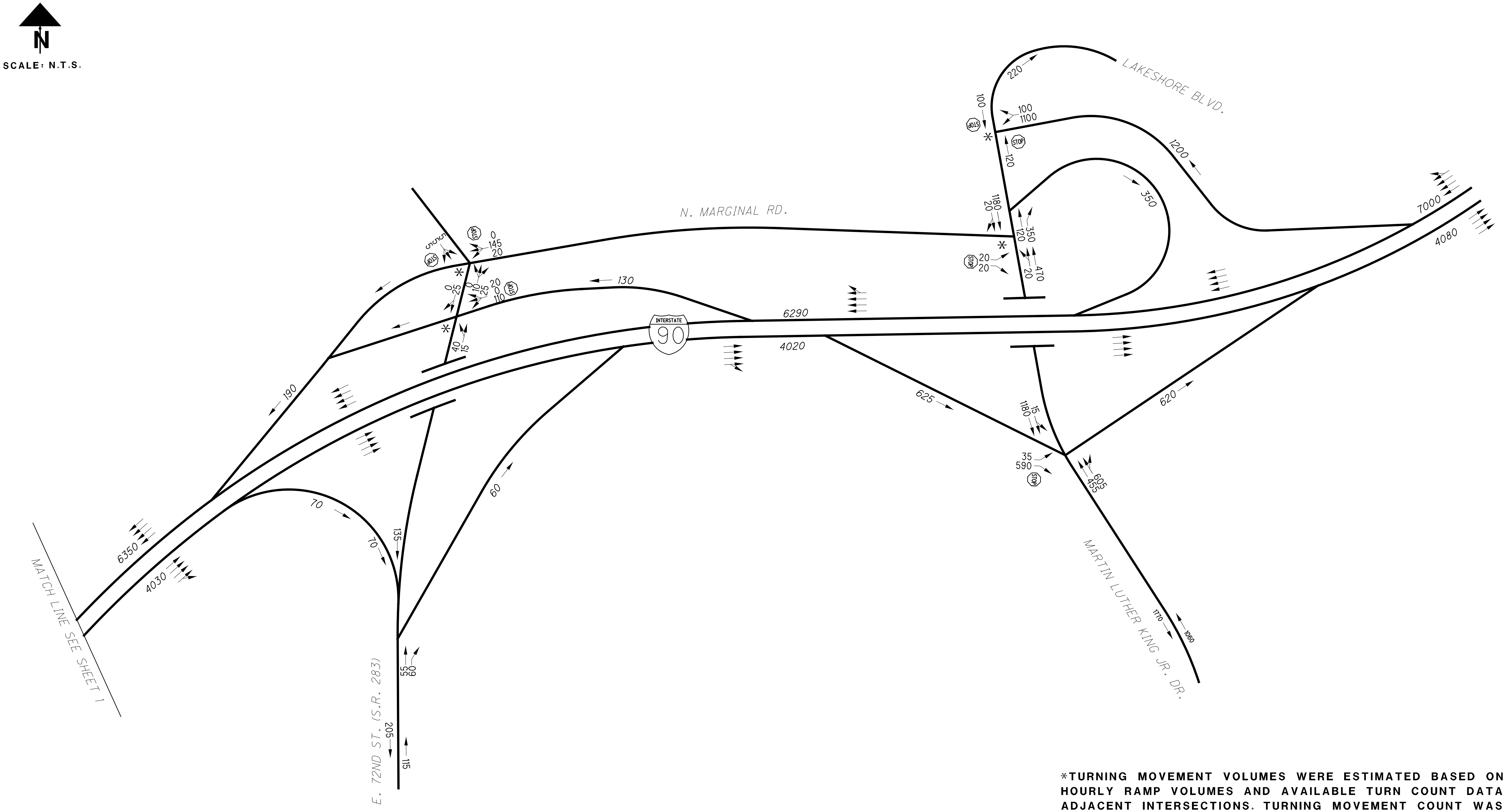


*TURNING MOVEMENT VOLUMES WERE ESTIMATED BASED ON ODOT HOURLY RAMP VOLUMES AND AVAILABLE TURN COUNT DATA FROM ADJACENT INTERSECTIONS. TURNING MOVEMENT COUNT WAS NOT COLLECTED AT THESE INTERSECTIONS.

> CUY-90-19.5/21.3 SAFETY STUDY

Design Year (2034) AM Peak Hour (1 of 2)

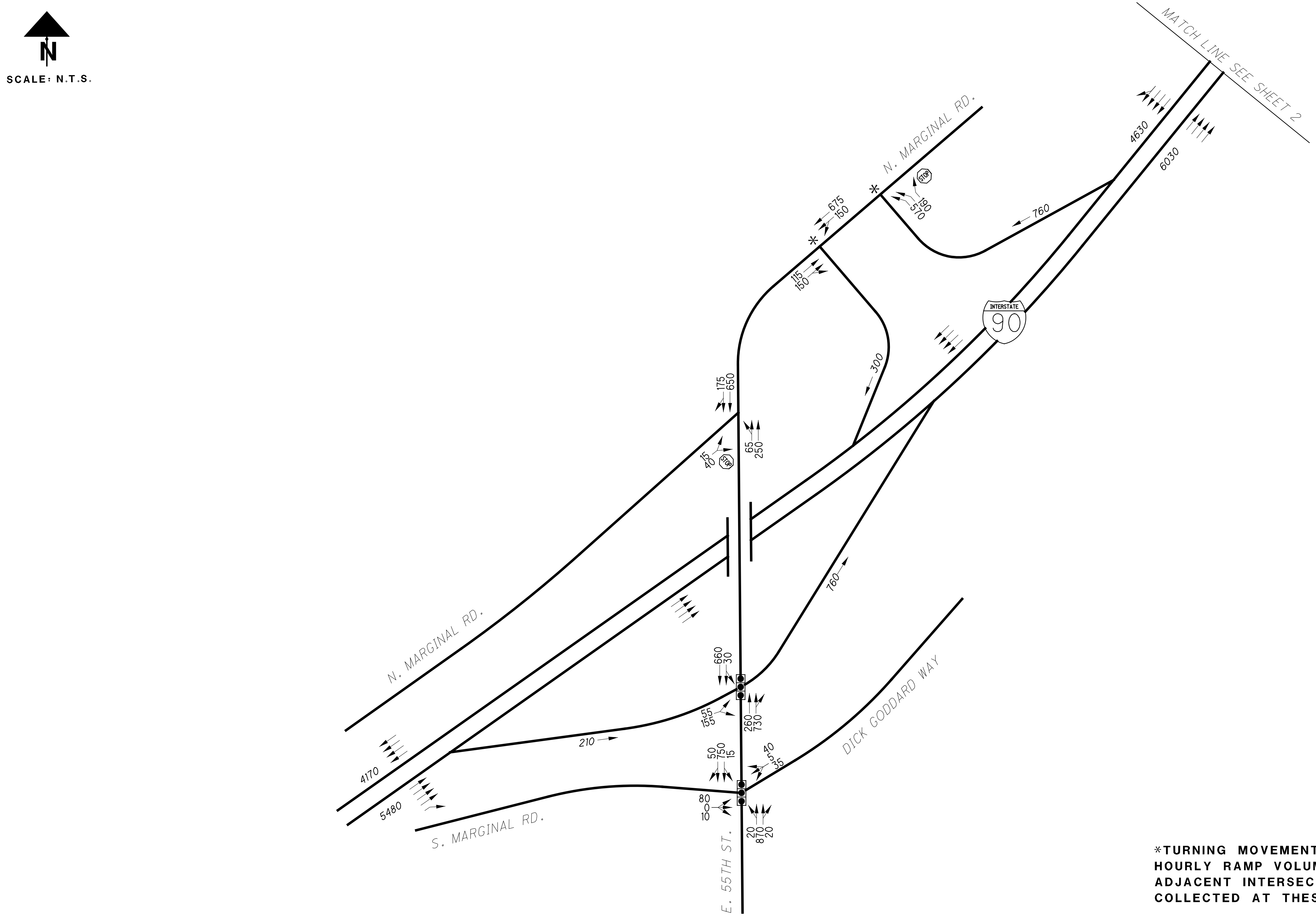
Innovative Facility and Infrastructure Design™



*TURNING MOVEMENT VOLUMES WERE ESTIMATED BASED ON ODOT HOURLY RAMP VOLUMES AND AVAILABLE TURN COUNT DATA FROM ADJACENT INTERSECTIONS. TURNING MOVEMENT COUNT WAS NOT COLLECTED AT THESE INTERSECTIONS.

> CUY-90-19.5/21.3 SAFETY STUDY

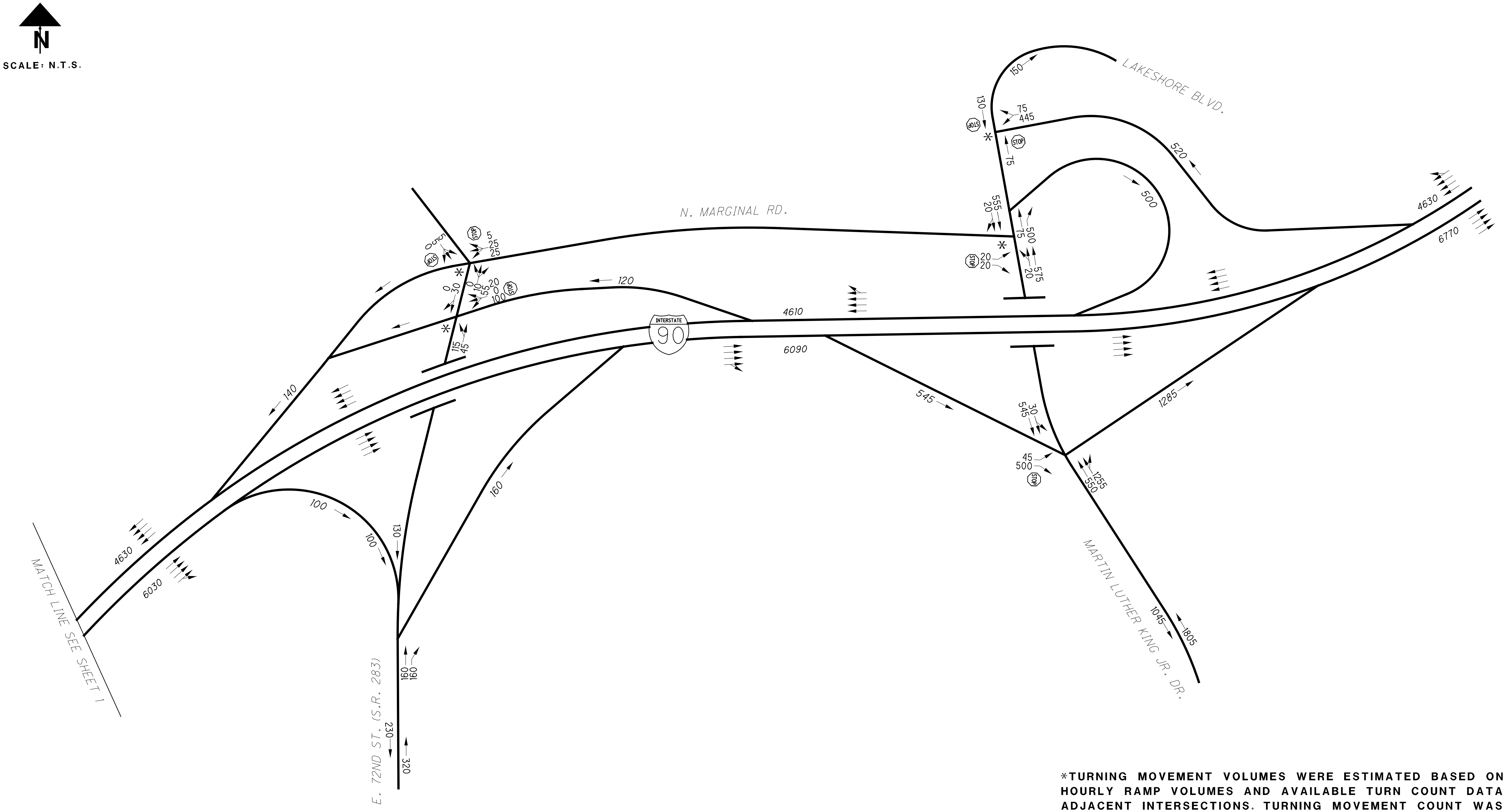
Design Year (2034) AM Peak Hour (2 of 2)



*TURNING MOVEMENT VOLUMES WERE ESTIMATED BASED ON ODOT HOURLY RAMP VOLUMES AND AVAILABLE TURN COUNT DATA FROM ADJACENT INTERSECTIONS. TURNING MOVEMENT COUNT WAS NOT COLLECTED AT THESE INTERSECTIONS.

> CUY-90-19.5/21.3 SAFETY STUDY

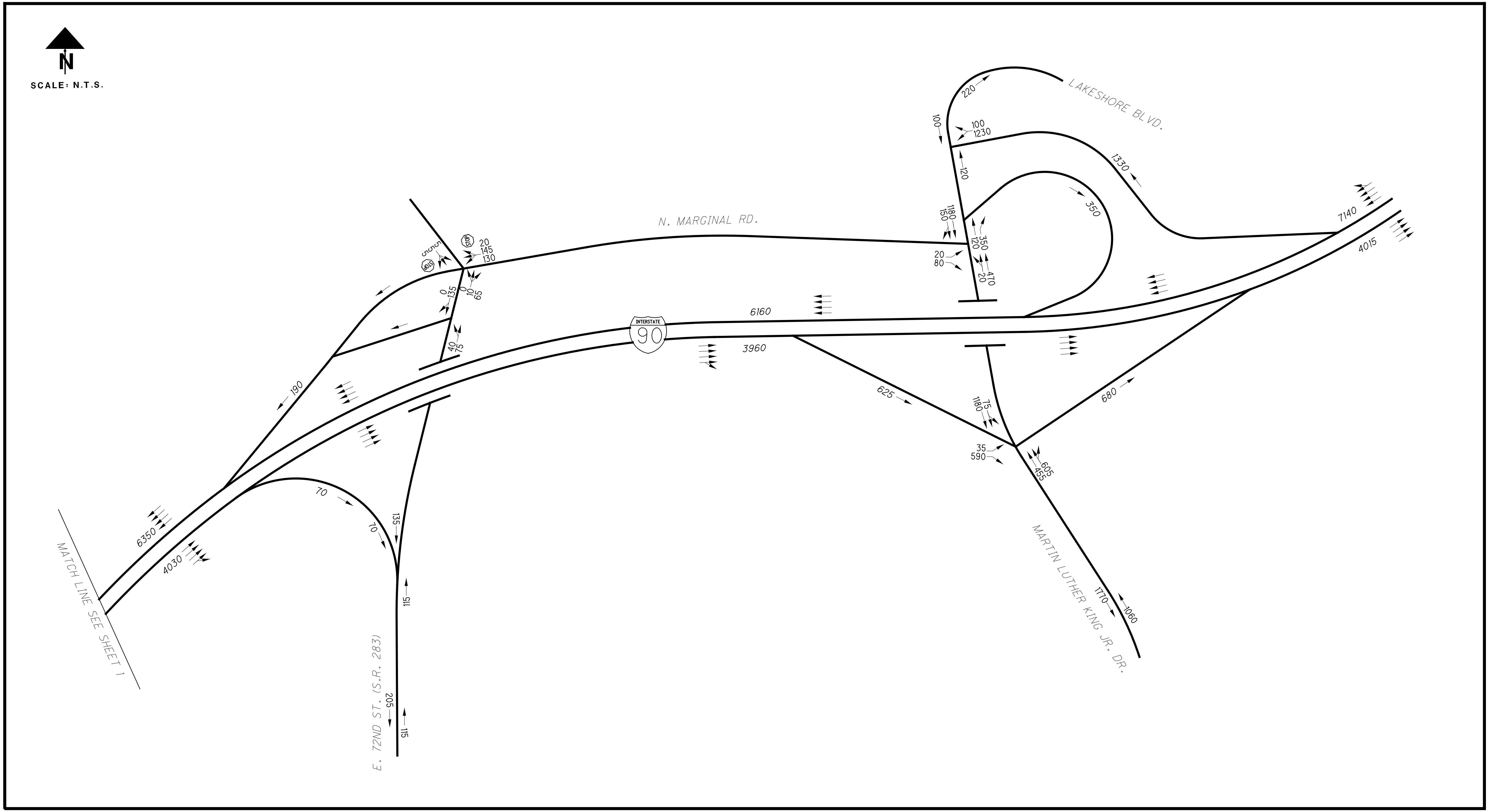
Design Year (2034) PM Peak Hour (1 of 2)



*TURNING MOVEMENT VOLUMES WERE ESTIMATED BASED ON ODOT HOURLY RAMP VOLUMES AND AVAILABLE TURN COUNT DATA FROM ADJACENT INTERSECTIONS. TURNING MOVEMENT COUNT WAS NOT COLLECTED AT THESE INTERSECTIONS.

> CUY-90-19.5/21.3 SAFETY STUDY

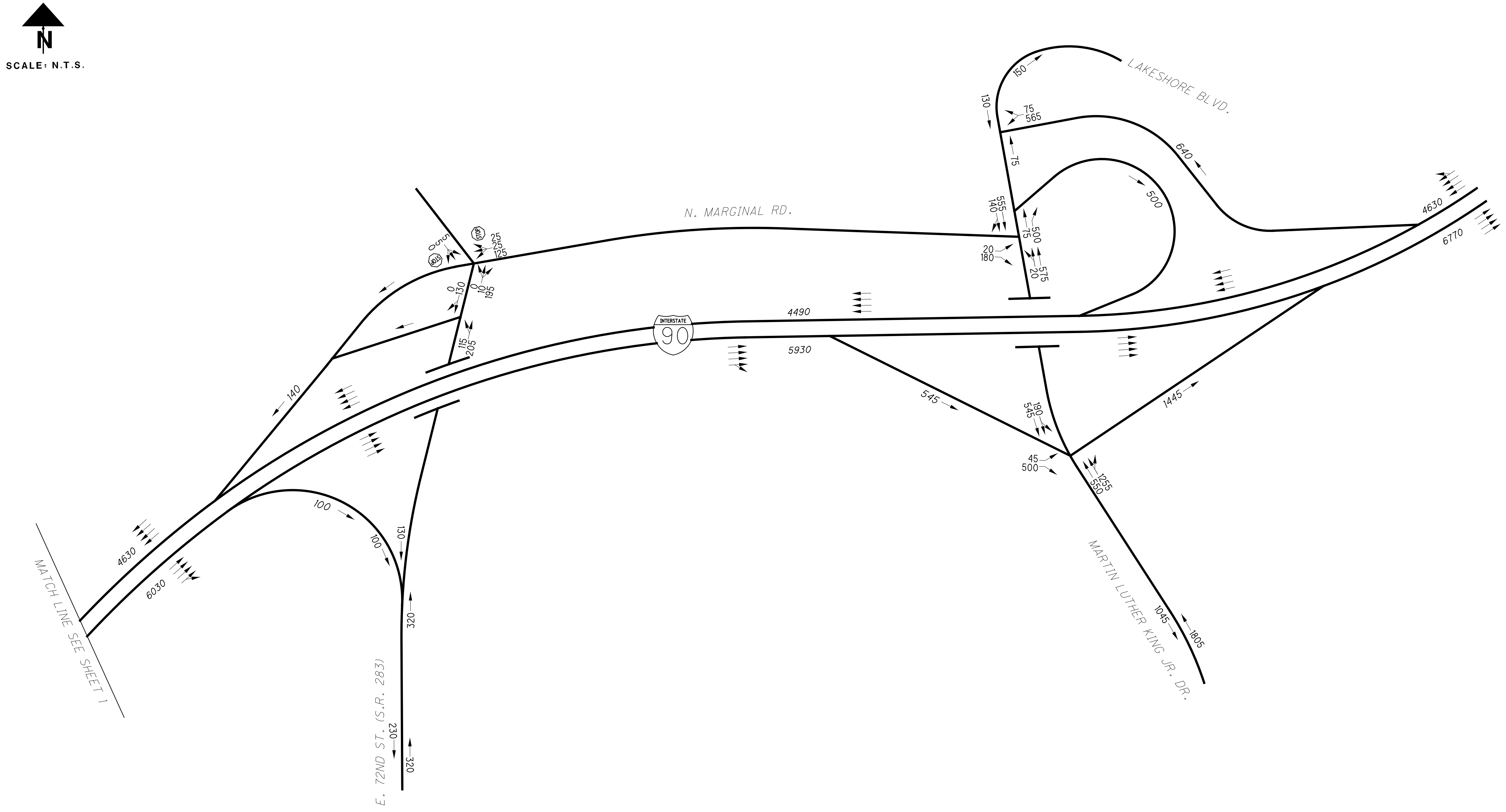
Design Year (2034) PM Peak Hour (2 of 2)



CUY-90-19.5/21.3 SAFETY STUDY

Design Year (2034) AM Peak Hour (Build Condition)

Innovative Facility and Infrastructure Design™



CUY-90-19.5/21.3 SAFETY STUDY

Design Year (2034) PM Peak Hour (Build Condition)

Innovative Facility and Infrastructure Design™

CUY-90 Data Collection Summary
Seasonally Adjusted Counts (2011-2014)

STATION ID		576	576	40318	40318	40218	41018	63318	63418	63718	63918	64018	64118	64218	64318	64418	64518	64618	64718	64818	66018	66118	66218	66318
LOCATION		PERMANENT COUNT STATION, SLM 24.33 (EASTBOUND)	PERMANENT COUNT STATION, SLM 24.33 (WESTBOUND)	LAKESHORE / SR-283 TO WB IR-90	EB IR-90 TO LAKESHORE / SR-283	E 72ND ST TO EB IR-90	WB IR-90 TO E 72ND ST	WATERLOO TO WB IR-90	EB IR-90 TO WATERLOO	EB IR-90 TO E 140TH ST	WB IR-90 TO EDDY DR	EDDY DR TO WB IR-90	EB IR-90 TO EDDY DR	EDDY DR TO EB IR-90	WB IR-90 TO MARTIN LUTHER KING JR DR	MARTIN LUTHER KING JR DR TO WB IR-90	EB IR-90 TO MARTIN LUTHER KING JR DR	MARTIN LUTHER KING JR DR TO EB IR-90	E 72ND ST TO WB IR-90	EB IR-90 TO E 72ND ST	WB IR-90 TO N MARGINAL RD	N MARGINAL RD TO WB IR-90	EB IR-90 TO E 55TH ST	E 55TH ST TO EB IR-90
DATE COLLECTED		05/07/14	05/07/14	08/08/13	08/08/13	08/06/13	08/06/13	10/06/11	10/06/11	10/06/11	08/06/13	10/12/11	10/12/11	10/12/11	10/24/11	10/24/11	10/25/11	11/16/11	10/19/11	10/19/11	11/16/11	11/16/11	08/06/13	08/06/13
SEASONAL FACTOR		0.916	0.916	0.857	0.857	0.907	0.907	0.896	0.896	0.896	0.907	0.927	0.927	0.927	0.962	0.962	0.939	0.910	0.927	0.927	0.910	0.910	0.907	0.907
SEASONALLY ADJUSTED VOLUMES, BY HOUR OF DAY	**0:00**	529	350	35	24	10	9	90	113	29	82	89	84	71	78	66	47	120	15	18	38	27	26	47
	1:00	320	232	3	13	5	6	67	57	16	44	50	68	41	33	35	38	73	13	15	22	8	16	28
	2:00	248	191	13	10	7	11	33	56	14	26	39	33	41	25	23	12	42	14	6	17	14	15	27
	3:00	223	287	9	7	12	5	40	29	8	30	44	43	30	35	23	23	32	6	4	25	5	13	19
	4:00	373	493	28	9	10	15	70	67	5	28	57	49	32	85	13	36	23	14	7	58	15	36	26
	5:00	1031	1679	37	14	15	26	164	211	25	57	172	79	80	296	39	123	110	40	15	125	30	73	25
	6:00	1977	4553	56	69	37	88	316	368	68	182	291	202	173	867	96	409	177	84	48	412	56	242	104
	7:00	3106	5929	79	45	57	128	520	574	116	337	445	392	256	659	239	415	446	191	58	740	147	286	190
	8:00	2795	5443	73	45	53	92	484	519	107	325	449	381	279	879	252	428	365	135	70	548	142	218	231
	9:00	2261	3136	45	41	54	62	378	426	82	284	351	324	247	586	228	452	278	106	59	374	107	174	231
	10:00	2001	2514	45	65	63	68	339	358	99	266	336	309	220	432	200	351	327	91	57	269	122	145	242
	11:00	2227	2345	61	48	75	71	332	383	111	284	351	343	278	392	247	307	375	77	54	277	171	179	285
	12:00	2343	2405	41	51	63	93	390	356	82	304	363	360	333	438	306	334	450	99	83	260	147	194	352
	13:00	2522	2514	69	63	69	83	401	384	89	317	350	364	307	440	255	337	473	95	61	263	170	180	378
	14:00	3320	2945	81	65	106	90	565	497	122	345	443	432	362	480	402	423	610	133	79	359	223	207	394
	15:00	4758	3357	87	86	138	109	603	544	145	400	478	509	460	473	440	428	891	142	93	763	195	209	481
	16:00	5803	3546	97	105	143	119	584	541	159	425	416	512	520	416	504	402	1030	124	102	447	238	156	614
	17:00	4910	3632	69	93	151	88	546	547	150	463	409	482	522	410	392	450	1017	114	95	453	166	168	561
	18:00	4231	2812	61	75	93	106	344	417	118	398	344	392	375	374	316	334	633	95	98	184	111	122	297
	19:00	2417	1858	39	69	86	70	277	341	101	344	243	321	291	254	231	251	501	66	51	113	106	83	180
	20:00	2206	1483	39	55	56	71	190	294	87	275	218	261	247	240	175	227	496	44	49	80	98	82	231
	21:00	1873	1340	44	42	57	44	166	246	77	278	176	210	186	186	125	173	298	28	48	86	56	107	163
	22:00	1575	1041	35	42	41	36	168	190	65	186	155	178	186	190	108	146	219	26	42	52	39	63	110
	23:00	1198	728	55	42	34	33	117	160	62	164	113	159	109	136	86	109	207	25	26	43	43	46	85
	TOTAL	**54244**	**54810**	**1201**	**1178**	**1438**	**1521**	**7184**	**7679**	**1934**	**5844**	**6383**	**6486**	**5645**	**8401**	**4801**	**6256**	**9190**	**1776**	**1238**	**6007**	**2436**	**3039**	**5302**

CUY-90 Data Collection Summary
Study Area Ramp Volumes

STATION ID		40218	41018	64318	64418	64518	64618	64718	64818	66018	66118	66218	66318
LOCATION		E 72ND ST TO EB IR-90	WB IR-90 TO E 72ND ST	WB IR-90 TO MARTIN LUTHER KING JR DR	MARTIN LUTHER KING JR DR TO WB IR-90	EB IR-90 TO MARTIN LUTHER KING JR DR	MARTIN LUTHER KING JR DR TO EB IR-90	E 72ND ST TO WB IR-90	EB IR-90 TO E 72ND ST	WB IR-90 TO N MARGINAL RD	N MARGINAL RD TO WB IR-90	EB IR-90 TO E 55TH ST	E 55TH ST TO EB IR-90
DATE COLLECTED		08/06/13	08/06/13	10/24/11	10/24/11	10/25/11	11/16/11	10/19/11	10/19/11	11/16/11	11/16/11	08/06/13	08/06/13
GROWTH RATE (%)		0.126	0.126	0.41	0	0	0.41	0	0	0	1.177	1.177	0
GROWTH PERIOD		21	21	23	23	23	23	23	23	23	23	21	21
DESIGN YEAR (2034) VOLUMES, BY HOUR OF DAY	**0:00**	10	9	85	66	47	131	15	18	38	35	33	47
	1:00	5	7	36	35	38	80	13	15	22	10	20	28
	2:00	7	11	27	23	12	46	14	6	17	17	19	27
	3:00	12	5	38	23	23	35	6	4	25	7	16	19
	4:00	10	15	93	13	36	25	14	7	58	19	45	26
	5:00	16	27	324	39	123	120	40	15	125	38	92	25
	6:00	38	90	948	96	409	193	84	48	412	71	302	104
	7:00	**59**	**131**	721	239	415	**488**	**191**	58	**740**	**186**	**356**	190 *
	8:00	54	94	**962**	**252**	**428**	399	135	**70**	548	180	271	**231**
	9:00	56	63	641	228	452	304	106	59	374	136	217	231
	10:00	65	70	473	200	351	357	91	57	269	155	181	242
	11:00	77	73	430	247	307	410	77	54	277	217	223	285
	12:00	65	96	479	306	334	492	99	83	260	186	242	352
	13:00	71	86	481	255	337	518	95	61	263	216	224	378
	14:00	109	92	525	402	423	667	133	79	359	283	258	394
	15:00	142	112	**518**	440	428	975	**142**	93	**763**	247	**260**	481
	16:00	147	**122**	455	**504**	402	**1127**	124	**102**	447	**303**	195	**614** *
	17:00	**155**	90	448	392	**450**	1113	114	95	453	210	209	561
	18:00	96	109	410	316	334	693	95	98	184	141	153	297
	19:00	88	72	278	231	251	548	66	51	113	135	103	180
	20:00	58	73	262	175	227	543	44	49	80	125	102	231
	21:00	59	45	203	125	173	326	28	48	86	72	133	163
	22:00	42	37	207	108	146	240	26	42	52	50	78	110
	23:00	34	34	148	86	109	226	25	26	43	54	58	85
	TOTAL	**1476**	**1561**	**9193**	**4801**	**6256**	**10057**	**1776**	**1238**	**6007**	**3096**	**3791**	**5302**

*VOLUMES ARE ALL SEASONALLY ADJUSTED

CUY-90 Data Collection Summary
Study Area Mainline Volumes

LOCATION		WEST OF E 55TH ST		BETWEEN E 55TH ST RAMPS		E 55TH ST TO E 72ND ST		BETWEEN E 72ND ST RAMPS		E 72ND ST TO MARTIN LUTHER KING JR DR		BETWEEN MARTIN LUTHER KING JR DR RAMPS		EAST OF MARTIN LUTHER KING JR DR		
DIRECTION		EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	
GROWTH RATE (%)		0.085	0.085	0.031	0.031	0.031	0.031	0.031	0.031	0.063	0.063	0.063	0.063	0.126	0.126	
GROWTH PERIOD		20	20	20	20	20	20	20	20	20	20	20	20	20	20	
DESIGN YEAR (2034) VOLUMES, BY HOUR OF DAY	**0:00**	632	473	599	441	646	479	629	464	643	476	595	409	726	494	
	1:00	404	308	383	297	411	319	397	305	404	314	365	279	444	316	
	2:00	284	251	266	234	293	252	287	238	296	250	284	227	330	255	
	3:00	261	325	245	316	264	341	261	335	274	342	250	319	286	358	
	4:00	500	513	458	493	485	552	477	538	491	556	454	542	483	636	
	5:00	1362	1685	1274	1637	1299	1763	1284	1723	1308	1760	1184	1720	1311	2045	
	6:00	2942	3969	2667	3871	2772	4286	2724	4201	2779	4316	2364	4219	2575	5160	
	7:00	**4112**	**5781**	**3781**	**5573**	**3972**	**6317**	**3913**	**6125**	**3996**	**6293**	**3575**	**6052**	**4077**	**6803**	*
	8:00	3695	5221	3437	5023	3669	5574	3600	5438	3676	5566	3242	5310	3657	6278	
	9:00	3060	3098	2852	2957	3085	3333	3025	3227	3099	3310	2642	3079	2960	3718	
	10:00	2575	2655	2402	2504	2646	2776	2588	2684	2668	2770	2313	2567	2677	3042	
	11:00	2683	2605	2474	2405	2761	2683	2707	2606	2800	2694	2489	2444	2905	2876	
	12:00	2648	2700	2425	2524	2779	2786	2696	2686	2777	2798	2439	2488	2930	2968	
	13:00	2820	2797	2610	2596	2990	2860	2929	2765	3017	2867	2676	2609	3194	3092	
	14:00	3735	3580	3488	3318	3884	3679	3804	3544	3936	3658	3508	3251	4177	3783	
	15:00	4883	3618	4621	3383	5105	4151	5012	4008	5183	4144	4750	3699	5722	4230	
	16:00	**5564**	**4173**	**5348**	**3889**	**5966**	**4338**	**5863**	**4213**	**6046**	**4360**	**5639**	**3850**	**6765**	**4324**	*
	17:00	4722	3978	4503	3769	5067	4225	4972	4111	5157	4226	4702	3829	5803	4297	
	18:00	4464	3073	4294	2929	4592	3114	4493	3018	4616	3144	4278	2824	4980	3242	
	19:00	2620	2074	2509	1945	2691	2059	2639	1992	2743	2076	2490	1842	3034	2125	
	20:00	2269	1609	2162	1493	2395	1573	2346	1530	2418	1611	2187	1434	2723	1697	
	21:00	2107	1365	1977	1293	2141	1380	2093	1352	2164	1405	1989	1278	2319	1485	
	22:00	1772	1127	1691	1076	1801	1128	1759	1102	1811	1146	1664	1036	1910	1244	
	23:00	1390	805	1329	754	1415	797	1389	771	1432	809	1321	723	1550	871	
	DIR. TOTAL	**61507**	**57784**	**57795**	**54720**	**63131**	**60764**	**61885**	**58977**	**63735**	**60892**	**57400**	**56030**	**67536**	**65340**	
	TOTAL	**119291**		**112515**		**123894**		**120862**		**124627**		**113430**		**132876**		

*VOLUMES ARE ALL SEASONALLY ADJUSTED

IR-90 Safety Study

E.55th Street, E. 72nd Street and Dr. Martin Luther King Blvd.

IR-90/E. 55th Street	**Growth Rate per Year %**
IR-90 west of E. 55th	0.085
Eastbound Exit Ramp	1.177
Westbound Entrance Ramp	1.177
Eastbound Entrance Ramp	0
Westbound Exit Ramp	0
E. 55th Street	0
IR-90/E. 72nd Street	
IR-90 West of E. 72nd	0.031
Eastbound Exit Ramp	0
Westbound Entrance Ramp	0
Eastbound Entrance Ramp	0.126
Westbound Exit Ramp	0.126
E. 72nd Street	0
IR-90/MLK	
IR-90 West of MLK	0.063
Eastbound Exit Ramp	0
Westbound Entrance Ramp	0
Eastbound Entrance Ramp	0.41
Westbound Exit Ramp	0.41
IR-90 East of MLK	0.126
Martin Luther King Blvd	0

Monthly Volume by Week (V2)

Date Range: 05/01/2014 - 05/31/2014
Station: 576
CUY - IR - 90 : 24.330
East / West
Location: 0.12 MI E OF EAST 140TH ST

Week 2 of May, 2014

Day	Sun, May 04		Mon, May 05		Tue, May 06		Wed, May 07		Thu, May 08		Fri, May 09		Sat, May 10		Hour Totals		
Hour	East	West	East	West	East	West	East	West	East	West	East	West	East	West	East	West	Both
0	1089	654	436	333	588	332	578	382	665	410	792	567	1023	692	5171	3370	8541
1	874	662	299	259	333	282	349	253	381	288	427	383	706	496	3369	2623	5992
2	806	525	232	199	262	224	271	208	299	228	369	285	620	363	2859	2032	4891
3	467	288	212	279	235	291	243	313	242	300	336	354	388	311	2123	2136	4259
4	307	215	390	541	421	570	407	538	438	569	435	567	349	332	2747	3332	6079
5	305	359	1141	1843	1138	1903	1125	1833	1117	1877	1043	1783	597	658	6466	10256	16722
6	476	901	2311	4948	2288	5020	2158	4970	2382	4988	2256	4743	1495	1365	13366	26935	40301
7	854	988	3473	7042	3504	6948	3391	6473	3472	7298	3462	6970	1698	1584	19854	37303	57157
8	1153	1260	2809	5476	2996	5738	3051	5942	2969	5676	2856	5144	1751	2391	17585	31627	49212
9	1437	1917	2417	3247	2396	3385	2468	3424	2519	3408	2391	3403	2039	2691	15667	21475	37142
10	1806	2386	2283	2512	2209	2656	2184	2744	2504	2990	2564	2903	2234	3135	15784	19326	35110
11	2134	2355	2299	2428	2424	2500	2431	2560	2564	2970	2711	2815	2689	3030	17252	18658	35910
12	2250	2509	2446	2570	2555	2607	2558	2625	2808	2773	3000	2869	3057	3233	18674	19186	37860
13	2701	2583	2560	2667	2796	2640	2753	2744	3045	2855	3293	3024	2934	3295	20082	19808	39890
14	2763	2661	3529	3042	3530	3175	3624	3215	3814	3390	4194	3395	2986	3165	24440	22043	46483
15	2861	2503	5060	3539	5307	3801	5194	3665	5804	3732	5462	3858	3249	2988	32937	24086	57023
16	2989	2576	6412	3644	6424	4019	6335	3871	6532	4076	6431	3998	3124	2916	38247	25100	63347
17	2567	2374	6811	3579	6859	4092	5360	3965	6705	4100	6331	4068	3149	2844	37782	25022	62804
18	2082	2224	3562	2794	3923	3193	4619	3070	3802	3227	3800	3366	2424	3083	24212	20957	45169
19	1973	1718	2319	1672	2449	1968	2639	2028	2787	2268	2602	2323	2189	2346	16958	14323	31281
20	1665	1539	1922	1359	2141	1649	2408	1619	2335	1777	2018	1887	1940	2037	14429	11867	26296
21	1520	1209	1569	1264	2137	1334	2045	1463	2149	1525	2025	1715	1982	1982	13427	10492	23919
22	1120	1016	1455	1082	1480	1092	1719	1136	1677	1298	1777	1512	2236	1721	11464	8857	20321
23	827	633	994	696	1232	804	1308	795	1569	946	1834	1196	2056	1389	9820	6459	16279
Direction	**37026**	**36055**	**56941**	**57015**	**59627**	**60223**	**59218**	**59836**	**62579**	**62969**	**62409**	**63128**	**46915**	**48047**	**384715**	**387273**	**771988**
Day	**73081**		**113956**		**119850**		**119054**		**125548**		**125537**		**94962**				

STA	DIR	LANE	YEAR	MNTH	DATE	HOUR	CLS_1	CLS_2	CLS_3	CLS_4	CLS_5	CLS_6	CLS_7	CLS_8	CLS_9	CLS_10	CLS_11	CLS_12	CLS_13
40218	3	1	13	8	5	15	0	114	29	0	0	0	0	0	1	1	0	0	0
40218	3	1	13	8	5	16	0	136	34	1	1	1	0	0	1	1	0	0	0
40218	3	1	13	8	5	17	0	150	38	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	5	18	0	65	16	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	5	19	1	67	17	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	5	20	1	62	16	0	1	0	0	0	0	0	0	0	0
40218	3	1	13	8	5	21	0	42	11	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	5	22	0	31	8	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	5	23	0	20	5	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	0	0	9	2	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	1	0	4	1	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	2	0	6	2	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	3	0	10	3	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	4	0	9	2	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	5	0	14	3	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	6	0	32	8	0	0	0	0	0	1	0	0	0	0
40218	3	1	13	8	6	7	0	50	13	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	8	0	43	11	0	0	0	0	0	4	0	0	0	0
40218	3	1	13	8	6	9	0	46	12	1	0	1	0	0	0	0	0	0	0
40218	3	1	13	8	6	10	0	54	13	1	1	1	0	0	0	0	0	0	0
40218	3	1	13	8	6	11	0	62	16	1	1	1	0	0	2	0	0	0	0
40218	3	1	13	8	6	12	0	52	13	0	1	0	1	0	3	0	0	0	0
40218	3	1	13	8	6	13	0	57	14	2	1	0	0	0	2	0	0	0	0
40218	3	1	13	8	6	14	1	90	23	0	1	0	0	0	2	0	0	0	0
40218	3	1	13	8	6	15	0	120	30	0	0	1	0	0	1	0	0	0	0
40218	3	1	13	8	6	16	0	126	31	0	0	0	0	0	0	1	0	0	0
40218	3	1	13	8	6	17	1	132	33	0	1	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	18	0	82	20	0	0	0	0	0	1	0	0	0	0
40218	3	1	13	8	6	19	3	74	18	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	20	0	50	12	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	21	0	50	13	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	22	0	36	9	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	6	23	0	30	7	0	0	0	0	0	0	0	0	0	0
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40218	3	1	13	8	7	1	0	10	3	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	7	2	0	6	2	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	7	3	0	11	3	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	7	4	0	6	2	0	0	0	0	0	1	0	0	0	0
40218	3	1	13	8	7	5	0	11	3	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	7	6	0	27	7	0	0	0	0	0	1	1	0	0	0
40218	3	1	13	8	7	7	0	50	12	0	0	0	0	0	0	0	0	0	0
40218	3	1	13	8	7	8	0	46	11	0	0	0	0	0	1	0	0	0	0
40218	3	1	13	8	7	9	0	50	12	0	1	0	0	0	1	0	0	0	0
40218	3	1	13	8	7	10	0	44	11	0	1	1	0	0	2	0	0	0	0
40218	3	1	13	8	7	11	0	61	15	1	1	0	0	0	2	1	0	0	0
40218	3	1	13	8	7	12	1	61	15	2	2	1	0	0	2	0	0	0	0
40218	3	1	13	8	7	13	0	56	14	0	1	0	0	0	2	0	0	0	0
40218	3	1	13	8	7	14	0	76	19	0	1	1	0	0	2	0	0	0	0

STA	DIR	LANE	YEAR	MNTH	DATE	HOUR	CLS_1	CLS_2	CLS_3	CLS_4	CLS_5	CLS_6	CLS_7	CLS_8	CLS_9	CLS_10	CLS_11	CLS_12	CLS_13
40318	1	1	13	8	8	6	0	63	16	0	0	0	0	0	2	0	0	0	0
40318	1	1	13	8	8	7	0	38	9	0	0	1	0	0	4	0	0	0	0
40318	1	1	13	8	8	8	0	40	10	1	1	0	0	0	0	0	0	0	0
40318	1	1	13	8	8	9	0	34	8	2	2	0	1	0	1	0	0	0	0
40318	1	1	13	8	8	10	0	57	14	2	2	0	1	0	0	0	0	0	0
40318	1	1	13	8	8	11	0	42	11	0	1	1	1	0	0	0	0	0	0
40318	1	1	13	8	8	12	0	44	11	2	1	1	0	0	0	0	0	0	0
40318	1	1	13	8	8	13	0	55	14	2	1	1	0	0	1	0	0	0	0
40318	1	1	13	8	8	14	0	59	15	1	1	0	0	0	0	0	0	0	0
40318	1	1	13	8	8	15	0	78	19	1	1	1	0	0	0	0	0	0	0
40318	1	1	13	8	8	16	0	98	24	0	0	0	0	0	0	0	0	0	0
40318	1	1	13	8	8	17	0	86	22	0	0	0	0	0	1	0	0	0	0
40318	1	1	13	8	8	18	0	70	17	0	0	0	0	0	1	0	0	0	0
40318	1	1	13	8	8	19	0	64	16	0	1	0	0	0	0	0	0	0	0
40318	1	1	13	8	8	20	0	50	13	0	1	0	0	0	0	0	0	0	0
40318	1	1	13	8	8	21	0	39	10	0	0	0	0	0	0	0	0	0	0
40318	1	1	13	8	8	22	1	38	9	0	0	0	0	0	1	0	0	0	0
40318	1	1	13	8	8	23	0	39	10	0	0	0	0	0	0	0	0	0	0
40318	1	1	13	8	9	0	0	21	5	1	1	0	0	0	0	0	0	0	0
40318	1	1	13	8	9	1	0	12	3	0	0	0	0	0	0	0	0	0	0
40318	1	1	13	8	9	2	0	10	2	0	0	0	0	0	0	0	0	0	0
40318	1	1	13	8	9	3	0	6	2	0	0	0	0	0	0	0	0	0	0
40318	1	1	13	8	9	4	0	8	2	0	1	0	0	0	0	0	0	0	0
40318	1	1	13	8	9	5	0	11	3	0	1	0	0	0	1	0	0	0	0
40318	5	1	13	8	8	6	0	24	0	0	0	0	0	0	1	0	0	0	0
40318	5	1	13	8	8	7	0	36	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	8	0	32	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	9	0	16	3	0	1	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	10	0	18	2	0	1	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	11	0	22	2	1	1	1	0	0	1	0	0	0	0
40318	5	1	13	8	8	12	0	14	5	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	13	0	26	3	1	1	1	0	0	0	0	0	0	0
40318	5	1	13	8	8	14	0	32	4	0	0	0	0	0	1	0	0	0	0
40318	5	1	13	8	8	15	1	31	6	0	1	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	16	0	35	6	1	1	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	17	0	22	9	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	18	0	25	3	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	19	0	18	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	20	0	18	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	21	0	20	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	22	0	16	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	8	23	0	23	1	0	0	0	0	0	1	0	0	0	0
40318	5	1	13	8	9	0	0	12	1	2	1	0	0	0	0	0	0	0	0
40318	5	1	13	8	9	1	0	1	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	9	2	0	6	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	9	3	0	4	0	0	0	0	0	0	0	0	0	0	0
40318	5	1	13	8	9	4	0	7	2	2	1	0	0	0	1	0	0	0	0
40318	5	1	13	8	9	5	0	11	3	0	1	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	6	0	30	8	1	0	0	0	0	1	0	0	0	0

40318	5	2	13	8	8	7	0	43	11	1	0	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	8	1	38	10	0	1	1	1	0	1	0	0	0	0
40318	5	2	13	8	8	9	0	25	6	0	1	0	0	0	0	0	0	0	0
40318	5	2	13	8	8	10	0	25	6	0	0	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	11	0	33	9	0	0	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	12	0	23	6	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	8	13	0	38	10	0	0	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	14	0	45	11	1	0	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	15	1	46	12	1	1	1	0	0	1	0	0	0	0
40318	5	2	13	8	8	16	2	51	13	2	1	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	17	0	37	10	1	0	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	18	0	33	9	0	0	0	0	0	1	0	0	0	0
40318	5	2	13	8	8	19	0	22	6	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	8	20	0	22	6	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	8	21	0	25	6	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	8	22	0	20	5	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	8	23	0	30	8	0	0	0	0	0	1	0	0	0	0
40318	5	2	13	8	9	0	0	20	5	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	9	1	0	2	0	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	9	2	0	7	2	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	9	3	0	5	1	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	9	4	0	16	4	0	0	0	0	0	0	0	0	0	0
40318	5	2	13	8	9	5	0	20	5	1	0	1	0	0	0	0	0	0	0

STA	DIR	LANE	YEAR	MNTH	DATE	HOUR	CLS_1	CLS_2	CLS_3	CLS_4	CLS_5	CLS_6	CLS_7	CLS_8	CLS_9	CLS_10	CLS_11	CLS_12	CLS_13
40918	5	1	13	7	25	9	1	57	14	0	1	0	0	0	2	0	0	0	0
40918	5	1	13	7	25	10	2	54	13	2	1	0	0	0	3	0	0	0	0
40918	5	1	13	7	25	11	1	82	20	3	1	0	0	0	5	1	0	0	0
40918	5	1	13	7	25	12	0	74	19	1	1	1	0	0	2	0	0	0	0
40918	5	1	13	7	25	13	0	78	20	1	1	1	1	0	1	1	0	0	0
40918	5	1	13	7	25	14	2	81	20	2	1	0	0	0	0	0	0	0	0
40918	5	1	13	7	25	15	1	84	21	1	0	0	0	0	2	0	0	0	0
40918	5	1	13	7	25	16	1	98	25	2	2	1	0	0	1	0	0	0	0
40918	5	1	13	7	25	17	0	86	21	3	1	1	1	0	0	0	0	0	0
40918	5	1	13	7	25	18	3	84	21	0	0	0	0	0	0	0	0	0	0
40918	5	1	13	7	25	19	0	79	20	2	1	0	0	0	3	0	0	0	0
40918	5	1	13	7	25	20	0	73	18	0	0	0	0	0	0	0	0	0	0
40918	5	1	13	7	25	21	1	58	15	0	1	0	1	0	1	0	0	0	0
40918	5	1	13	7	25	22	0	43	11	0	0	1	0	0	0	0	0	0	0
40918	5	1	13	7	25	23	1	30	7	0	0	0	0	0	0	0	0	0	0
40918	5	1	13	7	26	0	0	11	3	0	0	0	0	0	0	0	0	0	0
40918	5	1	13	7	26	1	0	10	3	0	0	0	0	0	0	0	0	0	0
40918	5	1	13	7	26	2	0	6	1	0	0	0	0	0	0	0	0	0	0
40918	5	1	13	7	26	3	0	7	2	0	0	0	0	0	0	0	0	0	0
40918	5	1	13	7	26	4	0	13	3	0	0	0	0	0	0	0	0	0	0
40918	5	1	13	7	26	5	0	30	8	0	0	0	0	0	0	1	0	0	0
40918	5	1	13	7	26	6	1	62	16	0	0	0	0	0	1	0	0	0	0
40918	5	1	13	7	26	7	0	106	27	0	0	0	0	0	2	0	0	0	0
40918	5	1	13	7	26	8	0	79	20	2	1	1	0	0	2	0	0	0	0
40918	5	1	13	7	26	9	1	51	13	2	1	0	0	0	1	0	0	0	0
40918	1	1	13	7	25	9	1	47	12	3	1	1	0	0	2	0	0	0	0
40918	1	1	13	7	25	10	1	42	11	0	1	1	0	0	2	0	0	0	0
40918	1	1	13	7	25	11	1	54	14	3	1	2	1	0	4	0	0	0	0
40918	1	1	13	7	25	12	2	74	18	5	5	1	0	0	4	0	0	0	0
40918	1	1	13	7	25	13	1	77	19	2	0	1	0	0	2	0	0	0	0
40918	1	1	13	7	25	14	0	104	26	5	1	3	0	0	6	0	0	0	0
40918	1	1	13	7	25	15	3	91	23	0	1	0	0	0	4	0	0	0	0
40918	1	1	13	7	25	16	2	121	30	2	1	1	0	0	1	0	0	0	0
40918	1	1	13	7	25	17	1	130	33	0	1	1	0	0	0	0	0	0	0
40918	1	1	13	7	25	18	2	86	21	0	1	0	0	0	2	0	0	0	0
40918	1	1	13	7	25	19	1	106	26	1	1	0	0	0	2	0	0	0	0
40918	1	1	13	7	25	20	2	101	25	0	0	1	0	0	1	0	0	0	0
40918	1	1	13	7	25	21	1	66	16	0	0	0	0	0	0	0	0	0	0
40918	1	1	13	7	25	22	0	68	17	0	1	1	0	0	0	0	0	0	0
40918	1	1	13	7	25	23	1	30	7	0	0	0	0	0	0	0	0	0	0
40918	1	1	13	7	26	0	0	15	4	0	1	0	0	0	0	0	0	0	0
40918	1	1	13	7	26	1	0	13	3	0	0	0	0	0	0	0	0	0	0
40918	1	1	13	7	26	2	0	6	1	0	0	0	0	0	0	0	0	0	0
40918	1	1	13	7	26	3	0	10	2	0	0	0	0	0	0	0	0	0	0
40918	1	1	13	7	26	4	0	6	1	0	0	0	0	0	0	0	0	0	0
40918	1	1	13	7	26	5	0	17	4	0	0	0	0	0	0	0	0	0	0
40918	1	1	13	7	26	6	1	37	9	1	0	1	0	0	1	0	0	0	0
40918	1	1	13	7	26	7	1	37	9	1	1	1	1	0	1	0	0	0	0
40918	1	1	13	7	26	8	0	34	9	4	1	4	0	0	3	0	0	0	0
40918	1	1	13	7	26	9	0	60	15	0	1	0	0	0	0	0	0	0	0

STA	DIR	LANE	YEAR	MNTH	DATE	HOUR	CLS_1	CLS_2	CLS_3	CLS_4	CLS_5	CLS_6	CLS_7	CLS_8	CLS_9	CLS_10	CLS_11	CLS_12	CLS_13
41018	7	1	13	8	5	15	0	100	25	2	1	0	0	0	1	0	0	0	0
41018	7	1	13	8	5	16	1	100	25	0	1	1	0	0	1	1	0	0	0
41018	7	1	13	8	5	17	0	88	22	1	1	1	0	0	0	0	0	0	0
41018	7	1	13	8	5	18	0	74	18	0	1	0	0	0	1	0	0	0	0
41018	7	1	13	8	5	19	0	66	16	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	5	20	1	65	16	0	1	0	0	0	1	0	0	0	0
41018	7	1	13	8	5	21	0	38	10	0	0	0	0	0	1	0	0	0	0
41018	7	1	13	8	5	22	0	32	8	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	5	23	0	32	8	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	0	0	8	2	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	1	0	6	1	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	2	0	10	2	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	3	0	4	1	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	4	0	13	3	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	5	0	22	6	0	0	0	0	0	1	0	0	0	0
41018	7	1	13	8	6	6	1	74	19	0	0	1	0	0	2	0	0	0	0
41018	7	1	13	8	6	7	0	110	27	1	1	1	0	0	1	0	0	0	0
41018	7	1	13	8	6	8	0	79	20	0	0	1	0	0	1	0	0	0	0
41018	7	1	13	8	6	9	0	50	13	2	2	0	0	0	1	0	0	0	0
41018	7	1	13	8	6	10	0	57	14	0	0	1	0	0	3	0	0	0	0
41018	7	1	13	8	6	11	0	59	15	1	1	1	0	0	1	0	0	0	0
41018	7	1	13	8	6	12	0	79	20	0	1	1	0	0	2	0	0	0	0
41018	7	1	13	8	6	13	0	70	17	2	1	0	0	0	2	0	0	0	0
41018	7	1	13	8	6	14	0	78	19	0	0	0	0	0	2	0	0	0	0
41018	7	1	13	8	6	15	1	90	22	0	0	1	0	0	5	1	0	0	0
41018	7	1	13	8	6	16	1	99	25	2	2	1	0	0	1	0	0	0	0
41018	7	1	13	8	6	17	0	78	19	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	18	1	90	23	1	1	0	0	0	1	0	0	0	0
41018	7	1	13	8	6	19	0	61	15	0	1	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	20	1	62	15	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	21	2	36	9	0	0	0	0	0	1	0	0	0	0
41018	7	1	13	8	6	22	0	32	8	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	6	23	0	29	7	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	7	0	0	17	4	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	7	1	0	6	2	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	7	2	0	6	1	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	7	3	0	10	2	0	0	0	0	0	1	0	0	0	0
41018	7	1	13	8	7	4	0	14	3	0	0	0	0	0	0	0	0	0	0
41018	7	1	13	8	7	5	0	26	7	0	0	0	0	0	0	1	0	0	0
41018	7	1	13	8	7	6	0	76	19	0	0	0	0	0	2	0	0	0	0
41018	7	1	13	8	7	7	0	114	29	0	1	0	0	0	4	0	0	0	0
41018	7	1	13	8	7	8	0	78	20	2	1	1	0	0	3	0	0	0	0
41018	7	1	13	8	7	9	0	56	14	2	3	0	0	0	2	0	0	0	0
41018	7	1	13	8	7	10	1	54	14	2	1	1	0	0	2	1	0	0	0
41018	7	1	13	8	7	11	0	59	15	2	3	1	0	0	1	0	0	0	0
41018	7	1	13	8	7	12	0	73	18	1	1	1	0	0	0	0	0	0	0
41018	7	1	13	8	7	13	0	60	15	1	1	1	0	0	1	0	0	0	0
41018	7	1	13	8	7	14	0	74	19	0	1	0	0	0	5	0	0	0	0

Data For Station: 63318

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/05/11	10:00	Axle	1	1	291	58	1	9	11	0	5	22	3	0	0	1
10/05/11	11:00	Axle	1	1	273	62	1	5	17	1	4	27	5	0	0	0
10/05/11	12:00	Axle	1	2	292	74	0	11	16	1	7	35	4	0	1	0
10/05/11	13:00	Axle	1	2	311	60	0	14	23	1	3	28	3	0	0	1
10/05/11	14:00	Axle	1	3	433	69	0	8	12	1	3	35	2	0	1	0
10/05/11	15:00	Axle	1	4	529	80	0	18	9	2	3	34	4	0	2	0
10/05/11	16:00	Axle	1	0	541	62	0	9	10	0	6	19	3	0	1	2
10/05/11	17:00	Axle	1	2	536	52	0	4	3	0	3	31	0	0	0	0
10/05/11	18:00	Axle	1	2	356	35	1	1	5	0	3	8	0	1	0	1
10/05/11	19:00	Axle	1	2	286	24	0	0	1	0	5	6	0	0	0	0
10/05/11	20:00	Axle	1	1	221	22	0	2	2	0	3	5	0	0	0	0
10/05/11	21:00	Axle	1	5	184	12	0	0	0	0	2	1	0	0	0	0
10/05/11	22:00	Axle	1	0	137	19	0	0	0	0	1	3	0	0	0	0
10/05/11	23:00	Axle	1	1	107	6	0	0	0	0	1	3	0	0	0	0
10/06/11	00:00	Axle	1	0	91	8	0	0	0	0	0	1	0	0	0	0
10/06/11	01:00	Axle	1	0	67	7	0	0	0	0	1	0	0	0	0	0
10/06/11	02:00	Axle	1	0	30	5	0	1	0	0	1	0	0	0	0	0
10/06/11	03:00	Axle	1	1	35	7	0	0	1	0	0	1	0	0	0	0
10/06/11	04:00	Axle	1	0	68	9	0	1	0	0	0	0	0	0	0	0
10/06/11	05:00	Axle	1	1	158	14	0	2	4	0	0	4	0	0	0	0
10/06/11	06:00	Axle	1	2	290	39	0	5	4	0	4	6	0	0	2	1
10/06/11	07:00	Axle	1	0	497	42	2	6	7	0	6	14	3	0	2	1
10/06/11	08:00	Axle	1	2	432	51	2	17	2	0	3	27	4	0	0	0
10/06/11	09:00	Axle	1	1	298	65	0	15	12	1	5	21	2	0	1	1
10/06/11	10:00	Axle	1	0	250	57	2	15	11	0	8	31	4	0	0	0
10/06/11	11:00	Axle	1	0	255	58	0	8	16	1	5	23	4	0	1	0
10/06/11	12:00	Axle	1	1	304	73	1	8	14	0	3	26	5	0	0	0
10/06/11	13:00	Axle	1	0	288	81	4	10	25	0	5	33	1	0	0	0
10/06/11	14:00	Axle	1	4	464	86	1	11	22	0	7	31	4	0	0	1
10/06/11	15:00	Axle	1	2	529	82	0	13	13	0	3	29	2	0	0	0
10/06/11	16:00	Axle	1	2	534	70	0	5	9	1	4	26	0	0	0	1
10/06/11	17:00	Axle	1	0	512	63	0	5	7	0	4	18	0	0	0	0
10/06/11	18:00	Axle	1	1	330	26	0	2	6	0	5	14	0	0	0	0
10/06/11	19:00	Axle	1	3	261	29	1	1	3	0	3	8	0	0	0	0
10/06/11	20:00	Axle	1	0	190	16	0	1	1	0	1	3	0	0	0	0
10/06/11	21:00	Axle	1	1	169	13	0	0	0	0	2	0	0	0	0	0
10/06/11	22:00	Axle	1	4	168	14	0	0	0	0	1	1	0	0	0	0
10/06/11	23:00	Axle	1	2	117	10	0	1	1	0	0	0	0	0	0	0
10/07/11	00:00	Axle	1	1	68	10	0	0	0	0	0	2	0	0	0	0
10/07/11	01:00	Axle	1	2	61	7	0	0	0	0	0	1	0	0	0	0
10/07/11	02:00	Axle	1	1	52	1	0	0	0	0	1	0	0	0	0	0
10/07/11	03:00	Axle	1	0	44	5	0	1	2	0	0	0	0	0	0	0
10/07/11	04:00	Axle	1	0	59	6	0	2	0	0	0	0	0	0	0	0
10/07/11	05:00	Axle	1	0	167	14	0	0	3	0	1	6	0	0	0	0
10/07/11	06:00	Axle	1	4	286	29	0	7	5	0	3	5	1	0	0	0
10/07/11	07:00	Axle	1	1	460	41	2	10	4	1	2	14	0	0	0	1
10/07/11	08:00	Axle	1	0	430	52	3	13	8	0	2	26	1	0	0	1

Data For Station: 63418

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/05/11	11:00	Axle	1	6	271	69	2	6	6	5	6	27	4	0	0	0
10/05/11	12:00	Axle	1	6	268	69	1	8	14	5	2	27	8	0	1	0
10/05/11	13:00	Axle	1	11	350	65	4	6	15	4	2	20	5	0	0	0
10/05/11	14:00	Axle	1	11	395	113	0	9	10	6	3	13	4	0	1	0
10/05/11	15:00	Axle	1	9	433	95	0	9	10	3	2	10	0	1	0	0
10/05/11	16:00	Axle	1	12	543	98	0	6	14	0	2	14	1	0	1	1
10/05/11	17:00	Axle	1	14	553	77	0	4	14	0	5	3	1	0	0	1
10/05/11	18:00	Axle	1	7	402	56	0	1	2	0	1	4	1	0	0	1
10/05/11	19:00	Axle	1	9	295	47	0	0	7	1	0	2	0	1	0	0
10/05/11	20:00	Axle	1	8	266	28	0	1	1	0	1	2	0	0	0	0
10/05/11	21:00	Axle	1	8	266	25	0	1	3	0	1	0	0	0	0	0
10/05/11	22:00	Axle	1	3	167	23	0	1	3	0	0	0	0	0	0	0
10/05/11	23:00	Axle	1	3	146	14	0	0	3	1	0	0	0	0	0	0
10/06/11	00:00	Axle	1	2	109	15	0	0	0	0	0	0	0	0	0	0
10/06/11	01:00	Axle	1	2	56	5	0	1	0	0	0	0	0	0	0	0
10/06/11	02:00	Axle	1	3	55	4	0	1	0	0	0	0	0	0	0	0
10/06/11	03:00	Axle	1	0	26	3	0	1	1	0	1	0	0	0	0	0
10/06/11	04:00	Axle	1	4	55	12	0	0	2	0	1	1	0	0	0	0
10/06/11	05:00	Axle	1	6	195	27	0	0	5	0	0	2	0	0	0	0
10/06/11	06:00	Axle	1	7	314	66	1	11	8	3	0	1	0	0	0	0
10/06/11	07:00	Axle	1	7	514	70	1	11	18	4	3	10	1	0	2	0
10/06/11	08:00	Axle	1	10	446	83	1	9	8	0	5	13	1	1	1	1
10/06/11	09:00	Axle	1	6	335	93	2	6	11	4	2	15	0	0	2	0
10/06/11	10:00	Axle	1	11	253	92	1	12	9	1	4	14	2	0	0	0
10/06/11	11:00	Axle	1	10	277	90	2	9	13	6	1	16	2	0	1	0
10/06/11	12:00	Axle	1	8	260	83	2	7	10	6	4	12	3	1	1	0
10/06/11	13:00	Axle	1	8	285	92	0	11	9	3	3	16	1	1	0	0
10/06/11	14:00	Axle	1	15	382	102	5	8	16	1	4	16	4	1	1	0
10/06/11	15:00	Axle	1	13	450	94	2	9	16	2	3	15	3	0	0	0
10/06/11	16:00	Axle	1	12	486	73	1	4	15	3	2	5	1	2	0	0
10/06/11	17:00	Axle	1	10	518	64	0	4	8	0	1	5	1	0	0	0
10/06/11	18:00	Axle	1	7	403	41	0	2	6	0	1	4	0	1	0	0
10/06/11	19:00	Axle	1	7	328	38	0	3	4	0	0	1	0	0	0	0
10/06/11	20:00	Axle	1	10	268	43	0	1	1	0	3	2	0	0	0	0
10/06/11	21:00	Axle	1	8	243	20	0	0	3	0	0	0	0	0	0	0
10/06/11	22:00	Axle	1	2	184	23	0	0	1	0	0	1	0	0	0	1
10/06/11	23:00	Axle	1	2	150	21	0	1	2	0	0	1	0	0	1	1
10/07/11	00:00	Axle	1	4	108	15	0	2	2	0	1	0	0	0	0	0
10/07/11	01:00	Axle	1	2	76	9	0	0	3	0	0	0	1	0	0	0
10/07/11	02:00	Axle	1	1	45	0	0	1	1	0	0	1	0	0	0	0
10/07/11	03:00	Axle	1	3	35	5	0	0	1	0	1	1	0	0	0	0
10/07/11	04:00	Axle	1	4	58	13	0	1	2	0	0	4	1	0	0	0
10/07/11	05:00	Axle	1	5	182	26	0	2	4	0	1	0	0	0	0	0
10/07/11	06:00	Axle	1	10	310	50	0	14	11	0	2	2	0	0	0	1
10/07/11	07:00	Axle	1	9	508	53	2	12	15	3	5	12	1	0	0	0
10/07/11	08:00	Axle	1	9	416	102	1	11	11	1	6	16	3	0	0	0
10/07/11	09:00	Axle	1	8	261	84	1	9	9	3	4	9	2	0	0	4
10/07/11	10:00	Axle	1	7	280	108	2	8	10	5	4	14	1	1	1	3
10/07/11	11:00	Axle	1	9	281	76	4	6	9	3	8	20	0	1	0	2

Data For Station: 63718

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/05/11	14:00	Axle	1	1	113	28	0	4	2	1	2	3	3	0	0	0
10/05/11	15:00	Axle	1	1	126	28	0	7	1	0	1	2	1	0	0	0
10/05/11	16:00	Axle	1	2	131	23	0	3	2	1	0	3	2	0	0	1
10/05/11	17:00	Axle	1	2	139	16	0	0	1	0	0	1	0	0	0	0
10/05/11	18:00	Axle	1	1	116	13	0	0	0	0	0	1	0	0	0	0
10/05/11	19:00	Axle	1	0	100	12	0	2	0	0	1	0	0	0	0	1
10/05/11	20:00	Axle	1	0	86	8	0	1	0	0	2	0	0	0	0	0
10/05/11	21:00	Axle	1	1	72	6	0	0	0	0	0	0	0	0	0	0
10/05/11	22:00	Axle	1	0	64	4	0	0	0	0	0	0	0	0	0	0
10/05/11	23:00	Axle	1	1	66	6	0	0	0	0	0	0	0	0	0	0
10/06/11	00:00	Axle	1	0	31	1	0	0	0	0	0	0	0	0	0	0
10/06/11	01:00	Axle	1	0	17	1	0	0	0	0	0	0	0	0	0	0
10/06/11	02:00	Axle	1	0	14	2	0	0	0	0	0	0	0	0	0	0
10/06/11	03:00	Axle	1	1	7	1	0	0	0	0	0	0	0	0	0	0
10/06/11	04:00	Axle	1	0	3	3	0	0	0	0	0	0	0	0	0	0
10/06/11	05:00	Axle	1	0	19	9	0	0	0	0	0	0	0	0	0	0
10/06/11	06:00	Axle	1	2	52	13	0	6	1	0	1	0	0	0	0	1
10/06/11	07:00	Axle	1	0	93	25	0	1	3	0	0	6	1	0	0	0
10/06/11	08:00	Axle	1	0	90	17	0	3	2	0	0	5	1	1	0	0
10/06/11	09:00	Axle	1	0	61	17	0	3	0	0	0	6	1	3	0	0
10/06/11	10:00	Axle	1	0	79	19	0	1	0	2	3	4	1	0	1	0
10/06/11	11:00	Axle	1	0	84	24	0	2	3	0	1	5	3	1	1	0
10/06/11	12:00	Axle	1	0	62	18	0	0	0	1	1	6	3	0	0	0
10/06/11	13:00	Axle	1	0	75	10	0	5	1	1	0	6	1	0	0	0
10/06/11	14:00	Axle	1	0	100	20	0	7	1	1	1	4	1	0	0	1
10/06/11	15:00	Axle	1	1	108	33	1	12	1	1	1	3	0	0	0	1
10/06/11	16:00	Axle	1	1	150	18	0	4	1	0	1	2	0	0	0	0
10/06/11	17:00	Axle	1	0	145	18	0	0	0	0	0	3	0	0	0	1
10/06/11	18:00	Axle	1	0	120	12	0	0	0	0	0	0	0	0	0	0
10/06/11	19:00	Axle	1	1	98	9	0	2	1	0	1	1	0	0	0	0
10/06/11	20:00	Axle	1	0	89	7	0	0	0	0	0	0	0	0	0	1
10/06/11	21:00	Axle	1	0	76	9	0	1	0	0	0	0	0	0	0	0
10/06/11	22:00	Axle	1	0	66	3	0	0	0	0	1	1	0	0	0	1
10/06/11	23:00	Axle	1	2	60	3	0	0	0	0	0	3	0	0	0	1
10/07/11	00:00	Axle	1	1	40	3	0	1	0	0	0	0	0	0	0	1
10/07/11	01:00	Axle	1	0	20	1	0	0	0	0	0	1	0	0	0	0
10/07/11	02:00	Axle	1	0	22	2	0	0	0	0	0	0	0	0	0	0
10/07/11	03:00	Axle	1	0	15	1	0	1	0	0	0	0	0	0	0	0
10/07/11	04:00	Axle	1	0	14	0	0	0	0	0	0	0	0	0	0	0
10/07/11	05:00	Axle	1	1	14	2	0	0	1	0	0	0	0	0	0	0
10/07/11	06:00	Axle	1	2	57	16	0	4	2	1	0	0	1	0	0	0
10/07/11	07:00	Axle	1	1	77	26	0	2	0	0	1	3	1	0	0	0
10/07/11	08:00	Axle	1	0	65	15	0	3	2	1	1	3	2	0	1	0
10/07/11	09:00	Axle	1	0	66	15	1	2	2	1	1	3	0	0	0	0
10/07/11	10:00	Axle	1	0	97	16	0	3	2	1	0	0	2	0	0	0
10/07/11	11:00	Axle	1	1	68	22	0	4	2	2	1	3	2	0	0	0
10/07/11	12:00	Axle	1	2	92	21	0	5	1	0	1	4	2	0	0	0

STA	DIR	LANE	YEAR	MNTH	DATE	HOUR	CLS_1	CLS_2	CLS_3	CLS_4	CLS_5	CLS_6	CLS_7	CLS_8	CLS_9	CLS_10	CLS_11	CLS_12	CLS_13
63918	7	1	13	8	5	14	2	310	78	2	1	1	0	0	8	0	0	0	0
63918	7	1	13	8	5	15	0	316	79	1	0	1	1	0	11	1	0	0	0
63918	7	1	13	8	5	16	0	346	87	0	1	1	0	0	8	0	0	0	0
63918	7	1	13	8	5	17	0	389	97	3	0	3	1	0	9	0	0	0	0
63918	7	1	13	8	5	18	1	326	82	2	1	1	0	0	4	0	0	0	0
63918	7	1	13	8	5	19	2	265	66	0	1	0	0	0	1	0	0	0	0
63918	7	1	13	8	5	20	1	215	54	0	0	0	0	0	2	0	0	0	0
63918	7	1	13	8	5	21	2	210	52	0	0	0	0	0	2	0	0	0	0
63918	7	1	13	8	5	22	1	149	37	0	0	0	0	0	1	0	0	0	0
63918	7	1	13	8	5	23	0	127	32	0	0	0	0	0	0	0	0	0	0
63918	7	1	13	8	6	0	0	71	18	0	1	0	0	0	0	0	0	0	0
63918	7	1	13	8	6	1	0	38	10	0	0	0	0	0	0	0	0	0	0
63918	7	1	13	8	6	2	2	22	5	0	0	0	0	0	0	0	0	0	0
63918	7	1	13	8	6	3	0	26	6	0	1	0	0	0	0	0	0	0	0
63918	7	1	13	8	6	4	0	25	6	0	0	0	0	0	0	0	0	0	0
63918	7	1	13	8	6	5	0	49	12	0	1	1	0	0	0	0	0	0	0
63918	7	1	13	8	6	6	0	157	39	0	1	1	0	0	3	0	0	0	0
63918	7	1	13	8	6	7	0	290	72	0	0	0	0	0	10	0	0	0	0
63918	7	1	13	8	6	8	1	281	70	2	1	1	0	0	2	0	0	0	0
63918	7	1	13	8	6	9	0	243	61	2	1	1	0	0	5	0	0	0	0
63918	7	1	13	8	6	10	0	228	57	2	1	1	0	0	4	0	0	0	0
63918	7	1	13	8	6	11	1	242	61	2	1	1	0	0	5	0	0	0	0
63918	7	1	13	8	6	12	2	260	65	2	2	0	0	0	4	0	0	0	0
63918	7	1	13	8	6	13	1	267	67	3	1	1	0	0	10	0	0	0	0
63918	7	1	13	8	6	14	1	297	74	1	1	1	0	0	5	0	0	0	0
63918	7	1	13	8	6	15	0	346	86	0	1	1	0	0	6	1	0	0	0
63918	7	1	13	8	6	16	1	366	91	1	1	1	0	0	8	0	0	0	0
63918	7	1	13	8	6	17	0	402	101	1	1	1	0	0	5	0	0	0	0
63918	7	1	13	8	6	18	3	346	86	0	0	1	0	0	3	0	0	0	0
63918	7	1	13	8	6	19	3	300	75	0	1	0	0	0	0	0	0	0	0
63918	7	1	13	8	6	20	1	239	60	0	1	0	0	0	2	0	0	0	0
63918	7	1	13	8	6	21	1	242	60	0	0	0	1	0	2	0	0	0	0
63918	7	1	13	8	6	22	0	162	41	0	0	0	0	0	2	0	0	0	0
63918	7	1	13	8	6	23	3	142	35	0	1	0	0	0	0	0	0	0	0
63918	7	1	13	8	7	0	0	86	22	1	1	0	0	0	0	0	0	0	0
63918	7	1	13	8	7	1	0	38	9	0	0	0	0	0	0	0	0	0	0
63918	7	1	13	8	7	2	1	31	8	0	0	0	0	0	0	0	0	0	0
63918	7	1	13	8	7	3	0	20	5	0	0	0	0	0	0	0	0	0	0
63918	7	1	13	8	7	4	0	19	5	0	0	0	0	0	0	0	0	0	0
63918	7	1	13	8	7	5	1	52	13	2	1	1	0	0	0	0	0	0	0
63918	7	1	13	8	7	6	1	153	38	2	1	1	0	0	0	0	0	0	0
63918	7	1	13	8	7	7	1	292	73	0	1	0	0	0	4	0	0	0	0
63918	7	1	13	8	7	8	1	259	65	2	1	1	1	0	3	0	0	0	0
63918	7	1	13	8	7	9	0	230	58	3	3	0	1	0	4	0	0	0	0
63918	7	1	13	8	7	10	0	226	57	0	1	1	2	0	5	0	0	0	0
63918	7	1	13	8	7	11	0	224	56	1	1	1	0	0	4	0	0	0	0
63918	7	1	13	8	7	12	1	262	65	4	1	1	1	0	5	0	0	0	0
63918	7	1	13	8	7	13	0	274	68	2	1	0	1	0	6	2	0	0	0

Data For Station: 64018

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/11/11	10:00	Axle	1	0	274	56	0	5	6	1	3	11	1	0	1	0
10/11/11	11:00	Axle	1	0	291	51	0	7	6	0	3	5	0	0	1	0
10/11/11	12:00	Axle	1	2	321	61	0	4	5	0	1	10	0	0	0	0
10/11/11	13:00	Axle	1	0	315	57	0	15	4	0	7	8	0	0	1	0
10/11/11	14:00	Axle	1	1	379	70	0	26	7	0	6	10	1	1	1	2
10/11/11	15:00	Axle	1	2	421	56	0	2	10	0	6	13	1	0	5	4
10/11/11	16:00	Axle	1	0	373	60	0	6	2	0	5	13	2	0	1	1
10/11/11	17:00	Axle	1	0	400	57	0	2	2	0	2	8	0	1	3	0
10/11/11	18:00	Axle	1	0	269	41	0	2	0	0	1	4	0	0	0	0
10/11/11	19:00	Axle	1	1	284	29	0	1	0	0	1	4	0	0	0	0
10/11/11	20:00	Axle	1	1	207	20	0	0	0	0	0	3	0	0	1	0
10/11/11	21:00	Axle	1	1	153	13	0	0	0	0	0	2	0	0	0	0
10/11/11	22:00	Axle	1	0	190	14	0	0	0	0	0	1	0	0	0	0
10/11/11	23:00	Axle	1	0	123	7	0	0	0	0	0	1	0	0	0	0
10/12/11	00:00	Axle	1	2	84	9	0	0	0	0	1	0	0	0	0	0
10/12/11	01:00	Axle	1	0	49	4	0	0	0	0	0	1	0	0	0	0
10/12/11	02:00	Axle	1	0	39	2	0	1	0	0	0	0	0	0	0	0
10/12/11	03:00	Axle	1	0	38	5	0	3	1	0	0	0	0	0	0	0
10/12/11	04:00	Axle	1	0	51	5	0	6	0	0	0	0	0	0	0	0
10/12/11	05:00	Axle	1	0	159	20	0	6	0	0	0	1	0	0	0	0
10/12/11	06:00	Axle	1	1	273	31	0	2	1	0	1	4	1	0	0	0
10/12/11	07:00	Axle	1	0	409	44	0	3	2	0	3	16	0	0	3	0
10/12/11	08:00	Axle	1	0	411	45	0	4	2	0	5	14	0	0	3	0
10/12/11	09:00	Axle	1	0	317	43	0	6	2	0	3	6	0	0	1	1
10/12/11	10:00	Axle	1	0	283	52	0	7	5	0	5	6	0	1	2	1
10/12/11	11:00	Axle	1	0	296	57	0	4	4	0	3	14	0	0	0	1
10/12/11	12:00	Axle	1	0	321	50	0	5	5	0	3	7	0	0	0	1
10/12/11	13:00	Axle	1	0	286	54	0	13	4	0	3	15	1	0	2	0
10/12/11	14:00	Axle	1	1	350	68	1	23	6	0	5	22	1	0	1	0
10/12/11	15:00	Axle	1	0	418	69	0	6	6	0	5	11	0	0	0	1
10/12/11	16:00	Axle	1	0	361	62	0	8	3	0	3	10	1	0	1	0
10/12/11	17:00	Axle	1	0	380	44	0	5	1	0	4	5	0	0	2	0
10/12/11	18:00	Axle	1	0	330	33	1	0	0	0	1	6	0	0	0	0
10/12/11	19:00	Axle	1	0	234	22	0	1	0	0	2	2	0	0	1	0
10/12/11	20:00	Axle	1	0	213	18	0	0	0	0	0	3	0	0	1	0
10/12/11	21:00	Axle	1	0	177	11	1	0	0	0	1	0	0	0	0	0
10/12/11	22:00	Axle	1	0	150	12	0	1	0	0	0	4	0	0	0	0
10/12/11	23:00	Axle	1	0	110	11	0	0	0	0	0	1	0	0	0	0
10/13/11	00:00	Axle	1	0	84	2	0	0	0	0	0	1	0	0	0	0
10/13/11	01:00	Axle	1	0	47	2	0	0	0	0	0	0	0	0	0	0
10/13/11	02:00	Axle	1	0	39	2	0	1	0	0	1	0	0	0	0	0
10/13/11	03:00	Axle	1	0	41	4	0	3	0	0	0	0	0	0	0	0
10/13/11	04:00	Axle	1	0	59	4	0	5	0	0	0	1	0	0	0	0
10/13/11	05:00	Axle	1	0	164	12	0	7	0	0	1	0	0	0	0	0
10/13/11	06:00	Axle	1	1	272	32	0	2	1	0	4	6	1	0	1	0
10/13/11	07:00	Axle	1	1	444	44	0	4	0	0	3	9	0	0	3	0
10/13/11	08:00	Axle	1	0	411	42	0	2	14	0	6	12	0	0	4	1
10/13/11	09:00	Axle	1	0	320	63	0	8	4	0	4	8	1	0	3	0
10/13/11	10:00	Axle	1	0	270	37	0	5	2	0	4	10	0	0	1	0
10/13/11	11:00	Axle	1	2	298	49	1	3	6	0	5	7	0	0	3	0

Data For Station: 64118

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/11/11	10:00	Axle	1	2	270	70	0	6	7	0	1	6	0	0	0	0
10/11/11	11:00	Axle	1	1	280	57	0	8	10	0	2	6	0	0	0	0
10/11/11	12:00	Axle	1	2	293	57	0	8	7	0	2	8	2	0	0	0
10/11/11	13:00	Axle	1	2	303	57	1	5	2	0	2	6	2	0	0	1
10/11/11	14:00	Axle	1	1	395	75	0	6	3	1	5	8	1	0	0	0
10/11/11	15:00	Axle	1	4	519	94	1	6	4	1	3	8	2	0	0	0
10/11/11	16:00	Axle	1	1	498	66	0	4	1	0	2	4	0	0	0	0
10/11/11	17:00	Axle	1	1	525	64	0	3	0	0	1	7	0	0	0	0
10/11/11	18:00	Axle	1	4	360	45	2	8	1	0	0	4	0	0	0	0
10/11/11	19:00	Axle	1	0	307	32	2	5	1	0	1	3	0	0	0	0
10/11/11	20:00	Axle	1	3	248	22	0	1	0	0	1	1	0	1	0	0
10/11/11	21:00	Axle	1	0	223	19	0	2	0	0	1	1	0	0	0	0
10/11/11	22:00	Axle	1	0	202	21	0	0	0	0	1	0	0	0	0	0
10/11/11	23:00	Axle	1	0	144	13	0	0	0	0	0	1	0	0	0	0
10/12/11	00:00	Axle	1	0	75	12	1	2	0	0	0	1	0	0	0	0
10/12/11	01:00	Axle	1	0	67	3	0	3	0	0	0	0	0	0	0	0
10/12/11	02:00	Axle	1	1	28	4	0	2	0	0	0	1	0	0	0	0
10/12/11	03:00	Axle	1	0	39	5	1	1	0	0	0	0	0	0	0	0
10/12/11	04:00	Axle	1	1	34	15	0	2	0	0	0	1	0	0	0	0
10/12/11	05:00	Axle	1	0	63	18	0	0	1	0	0	3	0	0	0	0
10/12/11	06:00	Axle	1	0	181	31	0	4	2	0	0	0	0	0	0	0
10/12/11	07:00	Axle	1	1	343	57	6	7	2	0	3	4	0	0	0	0
10/12/11	08:00	Axle	1	0	318	66	8	4	8	0	1	5	1	0	0	0
10/12/11	09:00	Axle	1	0	257	67	5	7	4	0	3	6	0	0	0	0
10/12/11	10:00	Axle	1	0	246	65	2	7	3	0	3	7	0	0	0	0
10/12/11	11:00	Axle	1	0	297	53	0	4	1	0	4	11	0	0	0	0
10/12/11	12:00	Axle	1	1	302	63	0	5	6	0	2	6	1	1	0	1
10/12/11	13:00	Axle	1	0	316	53	0	7	7	0	4	6	0	0	0	0
10/12/11	14:00	Axle	1	0	364	76	1	6	9	0	2	7	0	0	0	1
10/12/11	15:00	Axle	1	1	452	72	1	5	8	0	3	7	0	0	0	0
10/12/11	16:00	Axle	1	1	460	73	0	4	6	1	2	5	0	0	0	0
10/12/11	17:00	Axle	1	0	472	43	0	1	0	0	1	3	0	0	0	0
10/12/11	18:00	Axle	1	1	369	40	4	4	3	0	0	2	0	0	0	0
10/12/11	19:00	Axle	1	0	304	32	5	2	0	0	0	3	0	0	0	0
10/12/11	20:00	Axle	1	0	254	25	0	1	0	0	0	2	0	0	0	0
10/12/11	21:00	Axle	1	0	194	31	1	1	0	0	0	0	0	0	0	0
10/12/11	22:00	Axle	1	0	171	19	0	1	0	0	1	0	0	0	0	0
10/12/11	23:00	Axle	1	1	152	18	0	0	0	0	0	0	0	0	0	0
10/13/11	00:00	Axle	1	0	75	15	0	4	0	0	0	0	0	0	0	0
10/13/11	01:00	Axle	1	0	56	5	2	1	0	0	0	0	0	0	0	0
10/13/11	02:00	Axle	1	0	47	4	0	2	0	0	0	0	0	0	0	0
10/13/11	03:00	Axle	1	0	23	3	1	1	0	0	0	0	0	0	0	0
10/13/11	04:00	Axle	1	0	27	10	0	1	0	0	0	1	0	0	0	0
10/13/11	05:00	Axle	1	0	68	19	0	1	0	0	1	0	0	0	0	0
10/13/11	06:00	Axle	1	0	203	34	1	2	4	0	0	2	0	0	0	0
10/13/11	07:00	Axle	1	0	369	56	4	5	7	0	4	4	0	0	0	0
10/13/11	08:00	Axle	1	0	311	69	7	7	1	0	3	7	2	0	0	1
10/13/11	09:00	Axle	1	0	300	58	2	10	5	0	4	7	1	1	0	0
10/13/11	10:00	Axle	1	0	256	61	1	5	5	0	3	6	1	0	0	0
10/13/11	11:00	Axle	1	0	267	68	0	6	4	0	5	7	1	0	0	0

Data For Station: 64218

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/11/11	10:00	Axle	1	1	204	48	0	3	3	0	4	9	0	0	0	0
10/11/11	11:00	Axle	1	0	258	33	1	8	2	0	2	3	1	0	0	0
10/11/11	12:00	Axle	1	0	285	43	0	3	3	0	5	3	0	0	0	0
10/11/11	13:00	Axle	1	2	278	51	0	3	2	0	2	5	0	0	0	0
10/11/11	14:00	Axle	1	5	367	59	0	9	4	1	0	5	0	0	0	0
10/11/11	15:00	Axle	1	5	395	63	1	0	1	0	3	6	1	0	0	1
10/11/11	16:00	Axle	1	6	483	68	1	3	1	0	2	5	1	0	0	0
10/11/11	17:00	Axle	1	3	507	60	0	1	1	1	1	3	0	0	0	0
10/11/11	18:00	Axle	1	2	398	43	0	0	0	0	0	3	0	1	0	0
10/11/11	19:00	Axle	1	6	368	31	0	0	0	0	1	0	0	0	0	0
10/11/11	20:00	Axle	1	3	243	18	0	3	0	0	0	0	0	0	0	0
10/11/11	21:00	Axle	1	0	196	18	0	1	0	0	1	0	0	0	0	0
10/11/11	22:00	Axle	1	0	184	14	0	0	0	0	0	0	0	0	0	0
10/11/11	23:00	Axle	1	2	119	10	0	0	0	0	0	0	0	0	0	0
10/12/11	00:00	Axle	1	0	72	5	0	0	0	0	0	0	0	0	0	0
10/12/11	01:00	Axle	1	1	43	0	0	0	0	0	0	0	0	0	0	0
10/12/11	02:00	Axle	1	0	36	7	0	1	0	0	0	0	0	0	0	0
10/12/11	03:00	Axle	1	0	32	0	0	0	0	0	0	0	0	0	0	0
10/12/11	04:00	Axle	1	0	32	3	0	0	0	0	0	0	0	0	0	0
10/12/11	05:00	Axle	1	0	75	11	0	0	0	0	0	0	0	0	0	0
10/12/11	06:00	Axle	1	1	166	17	0	1	1	0	0	1	0	0	0	0
10/12/11	07:00	Axle	1	1	243	26	0	2	2	0	1	1	0	0	0	0
10/12/11	08:00	Axle	1	6	251	27	0	6	1	0	2	5	0	1	1	1
10/12/11	09:00	Axle	1	2	214	33	0	3	7	0	2	4	1	0	0	0
10/12/11	10:00	Axle	1	1	176	39	0	5	8	1	3	4	0	0	0	0
10/12/11	11:00	Axle	1	0	236	40	0	6	13	0	0	3	1	0	0	1
10/12/11	12:00	Axle	1	1	301	40	0	0	7	1	3	5	0	0	0	1
10/12/11	13:00	Axle	1	0	269	43	0	7	3	0	2	6	0	0	0	1
10/12/11	14:00	Axle	1	1	335	35	0	10	2	0	2	5	0	0	0	0
10/12/11	15:00	Axle	1	0	413	63	0	5	2	0	4	7	1	0	0	1
10/12/11	16:00	Axle	1	1	476	69	0	5	0	1	2	3	2	0	0	2
10/12/11	17:00	Axle	1	3	502	54	0	2	0	0	0	2	0	0	0	0
10/12/11	18:00	Axle	1	1	355	35	0	4	1	0	2	7	0	0	0	0
10/12/11	19:00	Axle	1	0	282	30	0	0	0	0	0	2	0	0	0	0
10/12/11	20:00	Axle	1	1	244	21	0	0	0	0	0	0	0	0	0	0
10/12/11	21:00	Axle	1	0	179	20	0	0	0	0	1	1	0	0	0	0
10/12/11	22:00	Axle	1	2	185	11	0	1	0	0	2	0	0	0	0	0
10/12/11	23:00	Axle	1	0	112	6	0	0	0	0	0	0	0	0	0	0
10/13/11	00:00	Axle	1	0	70	4	0	0	0	0	0	0	0	0	0	0
10/13/11	01:00	Axle	1	0	42	6	0	0	0	0	1	0	0	0	0	0
10/13/11	02:00	Axle	1	0	41	5	0	0	0	0	1	1	0	0	0	0
10/13/11	03:00	Axle	1	0	28	1	0	1	0	0	0	0	0	0	0	0
10/13/11	04:00	Axle	1	0	39	3	0	0	0	0	0	0	0	0	0	0
10/13/11	05:00	Axle	1	0	88	9	0	0	1	0	0	0	0	0	0	0
10/13/11	06:00	Axle	1	0	159	19	0	2	0	0	0	0	0	0	0	0
10/13/11	07:00	Axle	1	0	272	38	0	5	2	0	1	3	0	0	0	0
10/13/11	08:00	Axle	1	0	263	39	0	6	2	0	1	2	0	0	0	0
10/13/11	09:00	Axle	1	0	248	35	0	7	1	0	0	1	0	0	0	0
10/13/11	10:00	Axle	1	0	239	48	0	5	4	0	2	4	0	0	0	0
10/13/11	11:00	Axle	1	1	264	36	0	7	1	0	5	9	0	0	0	0

Data For Station: 64318

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/24/11	13:00	Axle	1	0	383	56	0	5	0	0	2	10	0	0	1	0
10/24/11	14:00	Axle	1	0	417	64	0	4	1	0	1	10	0	0	0	2
10/24/11	15:00	Axle	1	0	431	50	0	5	0	0	0	5	0	0	1	0
10/24/11	16:00	Axle	1	0	391	30	1	5	0	0	0	5	0	0	0	0
10/24/11	17:00	Axle	1	0	376	40	0	2	0	0	3	5	0	0	0	0
10/24/11	18:00	Axle	1	0	346	33	0	0	0	0	4	5	0	0	1	0
10/24/11	19:00	Axle	1	0	234	25	0	1	0	0	0	3	0	1	0	0
10/24/11	20:00	Axle	1	0	222	23	0	0	0	0	0	4	0	0	0	0
10/24/11	21:00	Axle	1	0	183	7	0	1	0	0	0	2	0	0	0	0
10/24/11	22:00	Axle	1	0	184	11	0	0	0	0	0	1	0	0	0	1
10/24/11	23:00	Axle	1	0	134	6	0	0	0	0	0	1	0	0	0	0
10/25/11	00:00	Axle	1	0	72	8	0	0	0	0	1	0	0	0	0	0
10/25/11	01:00	Axle	1	0	32	2	0	0	0	0	0	0	0	0	0	0
10/25/11	02:00	Axle	1	0	22	4	0	0	0	0	0	0	0	0	0	0
10/25/11	03:00	Axle	1	0	32	4	0	0	0	0	0	0	0	0	0	0
10/25/11	04:00	Axle	1	0	81	7	0	0	0	0	0	0	0	0	0	0
10/25/11	05:00	Axle	1	1	282	19	0	0	0	0	0	6	0	0	0	0
10/25/11	06:00	Axle	1	0	771	91	0	0	0	0	10	25	1	0	3	0
10/25/11	07:00	Axle	1	1	559	69	1	1	1	0	8	35	5	2	3	0
10/25/11	08:00	Axle	1	1	786	82	0	1	1	1	2	30	3	1	6	0
10/25/11	09:00	Axle	1	0	521	68	0	3	0	0	4	10	0	1	1	1
10/25/11	10:00	Axle	1	0	381	56	0	1	0	0	4	5	0	0	2	0
10/25/11	11:00	Axle	1	0	348	50	0	1	0	0	3	5	0	0	1	0
10/25/11	12:00	Axle	1	1	381	55	0	5	0	0	4	8	0	0	1	0
10/25/11	13:00	Axle	1	0	380	63	0	5	0	0	0	5	0	1	0	1

Data For Station: 64418

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/24/11	13:00	Axle	1	0	187	72	0	3	0	0	0	2	0	0	1	0
10/24/11	14:00	Axle	1	0	298	114	1	2	0	0	0	3	0	0	0	0
10/24/11	15:00	Axle	1	0	383	67	0	1	1	0	0	5	0	0	0	0
10/24/11	16:00	Axle	1	0	466	50	0	0	0	0	0	7	0	0	1	0
10/24/11	17:00	Axle	1	0	361	36	0	0	0	0	3	5	1	0	1	0
10/24/11	18:00	Axle	1	0	287	36	0	1	0	0	0	4	0	0	1	0
10/24/11	19:00	Axle	1	0	219	16	0	0	0	0	0	5	0	0	0	0
10/24/11	20:00	Axle	1	0	170	10	0	0	0	0	0	2	0	0	0	0
10/24/11	21:00	Axle	1	0	115	7	0	1	0	0	0	7	0	0	0	0
10/24/11	22:00	Axle	1	0	104	6	0	1	0	0	1	0	0	0	0	0
10/24/11	23:00	Axle	1	0	87	2	0	0	0	0	0	0	0	0	0	0
10/25/11	00:00	Axle	1	0	66	3	0	0	0	0	0	0	0	0	0	0
10/25/11	01:00	Axle	1	0	35	1	0	0	0	0	0	0	0	0	0	0
10/25/11	02:00	Axle	1	0	23	1	0	0	0	0	0	0	0	0	0	0
10/25/11	03:00	Axle	1	0	22	1	0	0	0	0	1	0	0	0	0	0
10/25/11	04:00	Axle	1	1	13	0	0	0	0	0	0	0	0	0	0	0
10/25/11	05:00	Axle	1	0	37	1	0	0	0	0	0	2	1	0	0	0
10/25/11	06:00	Axle	1	0	89	5	0	1	0	0	0	4	1	0	0	0
10/25/11	07:00	Axle	1	3	207	20	0	3	0	0	5	5	1	0	4	0
10/25/11	08:00	Axle	1	0	224	24	0	2	0	0	2	5	2	1	2	0
10/25/11	09:00	Axle	1	0	195	32	0	1	0	0	2	5	1	0	1	0
10/25/11	10:00	Axle	1	0	169	28	0	2	0	1	0	5	2	0	0	1
10/25/11	11:00	Axle	1	1	212	33	0	2	0	0	0	5	1	1	2	0
10/25/11	12:00	Axle	1	0	259	42	0	2	3	0	3	5	2	0	1	1
10/25/11	13:00	Axle	1	0	243	44	0	4	1	0	0	4	1	0	7	1

Data For Station: 64518

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/24/11	14:00	Axle	1	1	355	32	0	5	0	0	0	3	0	0	1	0
10/24/11	15:00	Axle	1	0	365	35	0	1	0	0	0	1	0	0	0	0
10/24/11	16:00	Axle	1	0	370	32	0	5	1	0	0	2	0	0	0	0
10/24/11	17:00	Axle	1	0	381	33	0	3	0	0	0	2	1	0	1	0
10/24/11	18:00	Axle	1	2	318	27	0	2	0	0	0	1	0	0	1	0
10/24/11	19:00	Axle	1	0	210	21	0	0	0	0	0	2	0	0	0	0
10/24/11	20:00	Axle	1	0	196	8	0	1	0	0	0	0	0	0	0	0
10/24/11	21:00	Axle	1	1	144	16	0	1	0	0	0	0	0	0	0	0
10/24/11	22:00	Axle	1	0	110	9	0	0	0	0	0	0	0	0	0	0
10/24/11	23:00	Axle	1	0	118	8	0	0	0	0	0	0	0	0	0	0
10/25/11	00:00	Axle	1	1	48	1	0	0	0	0	0	0	0	0	0	0
10/25/11	01:00	Axle	1	0	40	1	0	0	0	0	0	0	0	0	0	0
10/25/11	02:00	Axle	1	0	12	1	0	0	0	0	0	0	0	0	0	0
10/25/11	03:00	Axle	1	0	24	1	0	0	0	0	0	0	0	0	0	0
10/25/11	04:00	Axle	1	0	35	3	0	0	0	0	0	0	0	0	0	0
10/25/11	05:00	Axle	1	0	116	13	0	1	0	0	1	0	0	0	0	0
10/25/11	06:00	Axle	1	2	366	61	0	2	0	0	0	5	0	0	0	0
10/25/11	07:00	Axle	1	0	389	34	0	1	0	0	0	9	1	3	5	0
10/25/11	08:00	Axle	1	1	374	55	0	2	0	0	0	9	3	3	9	0
10/25/11	09:00	Axle	1	0	417	48	0	5	1	1	0	7	1	1	0	0
10/25/11	10:00	Axle	1	0	310	52	0	6	0	0	0	3	0	2	1	0
10/25/11	11:00	Axle	1	1	274	46	0	2	1	0	0	2	0	0	1	0
10/25/11	12:00	Axle	1	1	312	39	0	2	0	0	0	2	0	0	0	0
10/25/11	13:00	Axle	1	0	306	42	0	8	1	0	0	2	0	0	0	0
10/25/11	14:00	Axle	1	1	393	44	0	5	0	0	0	6	0	0	1	0
10/25/11	15:00	Axle	1	2	399	48	0	5	0	0	0	2	0	0	0	0
10/25/11	16:00	Axle	1	1	381	38	0	5	0	0	0	3	0	0	0	0
10/25/11	17:00	Axle	1	3	434	37	0	2	0	0	0	2	0	1	0	0
10/25/11	18:00	Axle	1	1	330	23	0	1	0	0	1	0	0	0	0	0
10/25/11	19:00	Axle	1	1	246	19	0	1	0	0	0	0	0	0	0	0
10/25/11	20:00	Axle	1	0	227	12	0	1	0	0	2	0	0	0	0	0
10/25/11	21:00	Axle	1	0	176	7	0	0	0	0	1	0	0	0	0	0
10/25/11	22:00	Axle	1	0	143	12	0	0	0	0	0	0	0	0	0	0
10/25/11	23:00	Axle	1	0	108	8	0	0	0	0	0	0	0	0	0	0
10/26/11	00:00	Axle	1	1	57	6	0	0	0	0	0	0	0	0	0	0
10/26/11	01:00	Axle	1	0	28	0	0	0	0	0	0	0	0	0	0	0
10/26/11	02:00	Axle	1	0	34	1	0	0	0	0	0	0	0	0	0	0
10/26/11	03:00	Axle	1	0	29	4	0	1	0	0	0	0	0	0	0	0
10/26/11	04:00	Axle	1	0	26	2	0	0	0	0	0	0	0	0	0	0
10/26/11	05:00	Axle	1	0	108	16	0	1	0	0	1	0	0	0	0	0
10/26/11	06:00	Axle	1	0	350	68	0	3	0	0	3	5	0	2	1	0
10/26/11	07:00	Axle	1	0	416	57	0	2	0	0	1	5	5	4	7	0
10/26/11	08:00	Axle	1	1	441	50	0	1	0	1	1	4	4	6	4	0
10/26/11	09:00	Axle	1	0	411	70	0	4	0	0	0	3	1	0	0	1
10/26/11	10:00	Axle	1	0	283	47	0	4	0	0	0	2	0	0	0	0
10/26/11	11:00	Axle	1	1	270	43	0	3	0	0	0	2	0	0	1	0
10/26/11	12:00	Axle	1	0	353	54	0	1	1	0	0	4	0	0	0	1
10/26/11	13:00	Axle	1	1	317	51	0	6	1	0	0	3	0	0	0	0

Data For Station: 64618

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
11/16/11	00:00	Axle	1	1	122	7	0	2	0	0	0	0	0	0	0	0
11/16/11	01:00	Axle	1	0	74	6	0	0	0	0	0	0	0	0	0	0
11/16/11	02:00	Axle	1	0	42	3	0	1	0	0	0	0	0	0	0	0
11/16/11	03:00	Axle	1	0	30	5	0	0	0	0	0	0	0	0	0	0
11/16/11	04:00	Axle	1	0	23	2	0	0	0	0	0	0	0	0	0	0
11/16/11	05:00	Axle	1	0	108	12	0	1	0	0	0	0	0	0	0	0
11/16/11	06:00	Axle	1	0	175	17	0	2	0	0	0	0	0	0	0	0
11/16/11	07:00	Axle	1	0	432	48	0	4	0	0	1	5	0	0	0	0
11/16/11	08:00	Axle	1	1	354	38	0	2	0	0	1	5	0	0	0	0
11/16/11	09:00	Axle	1	0	262	36	0	2	0	0	0	5	0	0	0	0
11/16/11	10:00	Axle	1	0	287	65	0	2	1	0	0	4	0	0	0	0
11/16/11	11:00	Axle	1	0	344	60	0	4	0	0	0	4	0	0	0	0
11/16/11	12:00	Axle	1	0	424	61	0	5	0	0	0	4	0	0	0	0
11/16/11	13:00	Axle	1	0	442	67	1	4	0	0	2	4	0	0	0	0
11/16/11	14:00	Axle	1	2	583	77	0	2	0	0	1	5	0	0	0	0
11/16/11	15:00	Axle	1	1	841	121	0	4	0	0	1	10	0	0	0	1
11/16/11	16:00	Axle	1	0	1,000	115	0	2	1	0	1	10	1	0	2	0
11/16/11	17:00	Axle	1	0	922	175	0	1	0	0	6	12	0	0	2	0
11/16/11	18:00	Axle	1	0	610	76	0	1	0	0	4	5	0	0	0	0
11/16/11	19:00	Axle	1	0	487	55	0	1	0	0	0	6	1	0	0	0
11/16/11	20:00	Axle	1	0	490	49	0	1	0	0	0	5	0	0	0	0
11/16/11	21:00	Axle	1	0	287	34	0	1	0	0	0	5	0	0	0	0
11/16/11	22:00	Axle	1	0	210	29	0	1	0	0	1	0	0	0	0	0
11/16/11	23:00	Axle	1	0	200	24	0	1	0	0	1	0	0	0	1	0
11/17/11	00:00	Axle	1	0	120	23	0	0	0	0	2	0	0	0	0	0
11/17/11	01:00	Axle	1	0	50	6	0	0	0	0	0	0	0	0	0	0
11/17/11	02:00	Axle	1	0	30	7	0	0	0	0	0	0	0	0	0	0
11/17/11	03:00	Axle	1	0	30	11	0	0	0	0	0	0	0	0	0	0
11/17/11	04:00	Axle	1	0	18	3	0	1	0	0	0	0	0	0	0	0
11/17/11	05:00	Axle	1	0	95	12	0	1	0	0	1	0	0	0	0	0
11/17/11	06:00	Axle	1	0	173	18	0	0	0	0	1	0	0	0	0	0
11/17/11	07:00	Axle	1	0	428	46	0	2	1	0	0	9	0	0	0	0
11/17/11	08:00	Axle	1	0	333	45	1	2	0	0	0	5	0	0	0	0
11/17/11	09:00	Axle	1	0	292	50	0	3	1	0	0	4	0	0	0	0
11/17/11	10:00	Axle	1	0	289	48	0	4	1	0	1	0	0	0	0	0

Data For Station: 64718

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/18/11	15:00	Axle	1	0	129	35	0	6	0	0	2	2	0	0	0	0
10/18/11	16:00	Axle	1	0	136	31	0	3	1	0	1	0	0	0	0	0
10/18/11	17:00	Axle	1	0	91	23	0	1	0	0	0	0	0	0	0	0
10/18/11	18:00	Axle	1	0	71	10	0	2	1	0	0	0	0	0	0	0
10/18/11	19:00	Axle	1	0	60	4	0	0	0	0	0	0	0	0	0	0
10/18/11	20:00	Axle	1	0	49	2	0	0	0	0	0	2	0	0	0	0
10/18/11	21:00	Axle	1	0	34	0	0	1	0	0	0	1	0	0	0	0
10/18/11	22:00	Axle	1	0	37	5	0	0	1	0	0	1	0	0	0	0
10/18/11	23:00	Axle	1	0	33	2	0	0	0	0	0	0	0	0	0	0
10/19/11	00:00	Axle	1	0	15	1	0	0	0	0	0	0	0	0	0	0
10/19/11	01:00	Axle	1	0	13	1	0	0	0	0	0	0	0	0	0	0
10/19/11	02:00	Axle	1	0	15	0	0	0	0	0	0	0	0	0	0	0
10/19/11	03:00	Axle	1	0	5	1	0	0	0	0	0	0	0	0	0	0
10/19/11	04:00	Axle	1	0	11	3	0	0	0	0	0	1	0	0	0	0
10/19/11	05:00	Axle	1	0	37	5	0	1	0	0	0	0	0	0	0	0
10/19/11	06:00	Axle	1	0	76	11	0	2	1	0	0	1	0	0	0	0
10/19/11	07:00	Axle	1	0	180	17	0	4	2	0	0	2	1	0	0	0
10/19/11	08:00	Axle	1	0	117	13	0	8	2	1	1	3	0	0	0	1
10/19/11	09:00	Axle	1	0	83	23	0	4	1	0	2	1	0	0	0	0
10/19/11	10:00	Axle	1	0	74	21	0	0	0	0	1	2	0	0	0	0
10/19/11	11:00	Axle	1	0	69	8	0	0	3	0	0	2	0	1	0	0
10/19/11	12:00	Axle	1	1	75	19	0	6	3	0	0	3	0	0	0	0
10/19/11	13:00	Axle	1	0	82	12	1	5	1	0	0	1	0	0	0	0
10/19/11	14:00	Axle	1	0	111	31	0	1	0	0	0	1	0	0	0	0
10/19/11	15:00	Axle	1	0	112	36	0	4	0	0	0	0	1	0	0	0
10/19/11	16:00	Axle	1	0	106	25	0	0	0	0	1	2	0	0	0	0
10/19/11	17:00	Axle	1	0	107	14	0	2	0	0	0	0	0	0	0	0
10/19/11	18:00	Axle	1	0	93	8	0	0	1	0	1	0	0	0	0	0
10/19/11	19:00	Axle	1	0	65	5	0	1	0	0	0	0	0	0	0	0
10/19/11	20:00	Axle	1	0	41	6	0	0	0	0	0	0	0	0	0	0
10/19/11	21:00	Axle	1	0	26	3	0	0	0	0	0	1	0	0	0	0
10/19/11	22:00	Axle	1	0	23	4	0	0	1	0	0	0	0	0	0	0
10/19/11	23:00	Axle	1	0	26	1	0	0	0	0	0	0	0	0	0	0
10/20/11	00:00	Axle	1	0	14	2	0	1	0	0	0	0	0	0	0	0

10/20/11	01:00	Axle	1	0	14	2	0	0	0	0	0	0	0	0	0	0
10/20/11	02:00	Axle	1	1	11	0	0	0	0	0	0	0	0	0	0	0
10/20/11	03:00	Axle	1	0	8	1	0	0	0	0	0	0	0	0	0	0
10/20/11	04:00	Axle	1	0	4	5	0	0	0	0	0	1	0	0	0	0
10/20/11	05:00	Axle	1	0	36	6	0	2	0	0	0	2	0	0	0	0
10/20/11	06:00	Axle	1	0	66	16	0	2	0	0	0	1	0	0	0	0
10/20/11	07:00	Axle	1	0	175	12	0	4	0	0	0	1	0	0	0	0
10/20/11	08:00	Axle	1	1	118	18	0	3	1	0	1	4	0	0	0	0
10/20/11	09:00	Axle	1	0	84	20	0	3	2	0	1	2	0	0	0	0
10/20/11	10:00	Axle	1	0	77	12	0	3	1	0	0	1	1	0	0	0
10/20/11	11:00	Axle	1	0	87	24	0	3	0	0	0	2	1	0	0	0
10/20/11	12:00	Axle	1	0	69	17	0	2	1	0	0	1	0	0	0	0
10/20/11	13:00	Axle	1	0	93	21	0	1	1	0	0	2	0	0	0	0
10/20/11	14:00	Axle	1	0	125	29	0	2	1	0	0	1	1	0	0	0
10/20/11	15:00	Axle	1	0	147	35	0	9	1	0	1	1	0	0	0	0
10/20/11	16:00	Axle	1	0	133	28	0	2	0	0	0	1	0	0	0	0
10/20/11	17:00	Axle	1	0	90	14	0	1	0	0	0	0	0	0	0	0
10/20/11	18:00	Axle	1	0	83	10	0	2	1	0	0	0	0	0	0	0
10/20/11	19:00	Axle	1	0	47	4	0	1	0	0	0	1	0	0	0	0
10/20/11	20:00	Axle	1	0	51	4	0	0	0	0	0	0	0	0	0	0
10/20/11	21:00	Axle	1	0	49	2	0	0	0	0	0	0	0	0	0	0
10/20/11	22:00	Axle	1	0	42	8	0	0	0	0	0	0	0	0	0	0
10/20/11	23:00	Axle	1	0	30	4	0	0	1	0	0	0	0	0	0	0
10/21/11	00:00	Axle	1	0	16	1	0	0	0	0	0	0	0	0	0	0
10/21/11	01:00	Axle	1	0	16	0	0	0	0	0	0	0	0	0	0	0
10/21/11	02:00	Axle	1	0	12	1	0	0	0	0	0	0	0	0	0	0
10/21/11	03:00	Axle	1	0	5	0	0	0	0	0	0	0	0	0	0	0
10/21/11	04:00	Axle	1	0	6	4	0	0	0	0	0	2	0	0	0	0
10/21/11	05:00	Axle	1	0	33	6	0	1	0	0	0	3	0	0	0	0
10/21/11	06:00	Axle	1	0	68	12	0	2	0	0	1	2	0	0	0	0
10/21/11	07:00	Axle	1	0	155	15	0	2	0	0	2	3	1	0	0	0
10/21/11	08:00	Axle	1	0	140	14	0	2	2	0	0	2	0	0	0	0
10/21/11	09:00	Axle	1	0	76	16	0	3	0	0	1	1	0	0	0	0
10/21/11	10:00	Axle	1	0	73	17	0	3	2	0	0	1	0	0	0	0
10/21/11	11:00	Axle	1	0	59	9	0	2	1	0	1	1	0	0	0	0

Data For Station: 64818

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
10/19/11	10:00	Axle	1	0	47	14	0	0	1	0	0	0	0	0	0	0
10/19/11	11:00	Axle	1	0	54	3	0	0	0	1	0	0	0	0	0	0
10/19/11	12:00	Axle	1	0	66	18	0	4	1	0	0	0	0	0	0	0
10/19/11	13:00	Axle	1	0	54	9	0	2	0	0	0	1	0	0	0	0
10/19/11	14:00	Axle	1	1	71	11	0	1	0	0	0	1	0	0	0	0
10/19/11	15:00	Axle	1	0	86	13	0	0	0	0	0	0	1	0	0	0
10/19/11	16:00	Axle	1	0	100	9	0	1	0	0	0	0	0	0	0	0
10/19/11	17:00	Axle	1	0	83	16	0	0	0	0	0	3	0	0	0	0
10/19/11	18:00	Axle	1	0	95	11	0	0	0	0	0	0	0	0	0	0
10/19/11	19:00	Axle	1	0	50	5	0	0	0	0	0	0	0	0	0	0
10/19/11	20:00	Axle	1	0	52	1	0	0	0	0	0	0	0	0	0	0
10/19/11	21:00	Axle	1	0	48	4	0	0	0	0	0	0	0	0	0	0
10/19/11	22:00	Axle	1	0	41	4	0	0	0	0	0	0	0	0	0	0
10/19/11	23:00	Axle	1	0	25	3	0	0	0	0	0	0	0	0	0	0
10/20/11	00:00	Axle	1	0	18	1	0	0	0	0	0	0	0	0	0	0
10/20/11	01:00	Axle	1	0	16	0	0	0	0	0	0	0	0	0	0	0
10/20/11	02:00	Axle	1	0	6	1	0	0	0	0	0	0	0	0	0	0
10/20/11	03:00	Axle	1	0	4	0	0	0	0	0	0	0	0	0	0	0
10/20/11	04:00	Axle	1	0	6	1	0	0	0	0	1	0	0	0	0	0
10/20/11	05:00	Axle	1	0	12	3	0	0	0	0	0	1	0	0	0	0
10/20/11	06:00	Axle	1	0	38	10	0	2	0	0	0	2	0	0	0	0
10/20/11	07:00	Axle	1	0	57	3	0	0	1	0	0	2	0	0	0	0
10/20/11	08:00	Axle	1	0	63	8	0	2	0	0	1	1	0	0	0	0
10/20/11	09:00	Axle	1	0	51	8	0	2	1	0	0	2	0	0	0	0
10/20/11	10:00	Axle	1	0	39	17	0	0	1	0	0	1	1	0	0	0
10/20/11	11:00	Axle	1	0	54	14	0	2	1	0	0	0	1	0	0	0
10/20/11	12:00	Axle	1	1	58	6	0	0	0	0	0	1	0	0	0	0
10/20/11	13:00	Axle	1	0	69	8	0	1	1	0	0	2	0	0	0	0

Data For Station: 66018

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
11/15/11	13:00	Axle	1	0	237	47	0	7	5	0	2	5	0	0	0	0
11/15/11	14:00	Axle	1	1	290	52	1	11	2	1	2	5	0	0	0	0
11/15/11	15:00	Axle	1	1	305	58	0	5	5	0	1	7	0	0	0	0
11/15/11	16:00	Axle	1	1	257	43	1	7	3	0	2	7	0	0	1	0
11/15/11	17:00	Axle	1	0	262	29	0	4	2	0	1	3	0	0	0	0
11/15/11	18:00	Axle	1	0	186	22	0	2	0	0	1	2	0	0	0	0
11/15/11	19:00	Axle	1	0	104	12	0	3	0	0	0	2	0	0	0	0
11/15/11	20:00	Axle	1	0	82	8	0	2	0	0	0	0	0	0	0	0
11/15/11	21:00	Axle	1	0	68	6	0	0	0	0	0	0	0	0	0	0
11/15/11	22:00	Axle	1	0	62	3	0	0	0	0	0	0	0	0	0	0
11/15/11	23:00	Axle	1	0	60	2	0	0	0	0	0	0	0	0	0	0
11/16/11	00:00	Axle	1	0	34	6	0	1	1	0	0	0	0	0	0	0
11/16/11	01:00	Axle	1	1	20	3	0	0	0	0	0	0	0	0	0	0
11/16/11	02:00	Axle	1	0	14	4	0	0	0	0	1	0	0	0	0	0
11/16/11	03:00	Axle	1	0	22	3	0	1	1	0	0	0	0	0	0	0
11/16/11	04:00	Axle	1	0	59	2	0	1	0	0	0	2	0	0	0	0
11/16/11	05:00	Axle	1	0	110	23	0	3	0	0	1	0	0	0	0	0
11/16/11	06:00	Axle	1	0	353	84	0	2	4	0	3	7	0	0	0	0
11/16/11	07:00	Axle	1	0	683	103	0	5	1	0	2	14	1	0	3	1
11/16/11	08:00	Axle	1	1	499	79	0	4	3	0	5	10	0	0	0	1
11/16/11	09:00	Axle	1	0	307	80	0	10	3	0	3	7	0	1	0	0
11/16/11	10:00	Axle	1	0	220	54	0	10	2	1	4	5	0	0	0	0
11/16/11	11:00	Axle	1	0	220	64	0	11	3	0	2	3	1	0	0	0
11/16/11	12:00	Axle	1	0	219	54	0	6	2	0	1	4	0	0	0	0
11/16/11	13:00	Axle	1	0	213	55	0	11	3	0	1	6	0	0	0	0
11/16/11	14:00	Axle	1	0	280	87	0	16	1	0	4	5	1	0	0	0
11/16/11	15:00	Axle	1	2	623	154	0	15	4	0	8	18	6	0	8	0
11/16/11	16:00	Axle	1	1	390	63	0	7	6	0	4	18	0	0	1	1
11/16/11	17:00	Axle	1	1	418	62	0	4	2	0	4	6	0	0	0	1
11/16/11	18:00	Axle	1	0	177	21	0	0	0	0	2	1	0	0	1	0
11/16/11	19:00	Axle	1	0	110	13	0	1	0	0	0	0	0	0	0	0
11/16/11	20:00	Axle	1	0	79	9	0	0	0	0	0	0	0	0	0	0
11/16/11	21:00	Axle	1	0	84	9	0	1	0	0	0	1	0	0	0	0
11/16/11	22:00	Axle	1	0	50	7	0	0	0	0	0	0	0	0	0	0
11/16/11	23:00	Axle	1	0	44	3	0	0	0	0	0	0	0	0	0	0
11/17/11	00:00	Axle	1	0	28	5	0	0	0	0	0	1	0	0	0	0
11/17/11	01:00	Axle	1	0	11	2	0	1	0	0	0	0	0	0	0	0
11/17/11	02:00	Axle	1	0	12	3	0	0	0	0	1	0	0	0	0	0
11/17/11	03:00	Axle	1	0	27	4	0	0	0	0	0	1	0	0	0	0
11/17/11	04:00	Axle	1	0	58	6	0	3	1	0	0	2	0	0	0	0
11/17/11	05:00	Axle	1	0	123	25	0	2	0	0	1	1	0	0	0	0

11/17/11	06:00	Axle	1	0	327	98	0	3	0	0	2	6	0	0	0	0
11/17/11	07:00	Axle	1	0	611	98	0	4	4	0	2	20	0	0	3	1
11/17/11	08:00	Axle	1	0	516	90	1	10	1	0	5	12	0	0	0	1
11/17/11	09:00	Axle	1	0	277	45	1	15	2	1	3	4	0	0	0	0
11/17/11	10:00	Axle	1	0	201	54	0	6	3	0	5	3	0	0	0	0
11/17/11	11:00	Axle	1	0	205	52	0	6	3	1	2	5	0	0	0	0

Data For Station: 66118

Date	Time	Type	Lane	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7	Bin 8	Bin 9	Bin 10	Bin 11	Bin 12	Bin 13
11/15/11	13:00	Axle	1	0	143	45	0	5	5	0	2	7	0	1	0	0
11/15/11	14:00	Axle	1	0	146	35	0	5	3	0	3	9	0	0	0	0
11/15/11	15:00	Axle	1	1	248	46	0	2	0	0	5	8	0	0	0	0
11/15/11	16:00	Axle	1	2	250	37	0	1	0	0	2	9	0	0	4	0
11/15/11	17:00	Axle	1	2	208	23	0	0	0	0	1	5	0	0	0	1
11/15/11	18:00	Axle	1	0	139	9	0	0	0	0	0	3	1	0	0	0
11/15/11	19:00	Axle	1	0	126	10	0	1	0	0	0	4	1	0	0	0
11/15/11	20:00	Axle	1	0	80	8	0	0	0	0	0	1	1	0	0	0
11/15/11	21:00	Axle	1	0	63	3	0	0	0	0	0	1	0	0	0	0
11/15/11	22:00	Axle	1	0	62	0	0	0	0	0	0	1	0	0	0	0
11/15/11	23:00	Axle	1	0	41	3	0	0	0	0	0	0	0	0	0	0
11/16/11	00:00	Axle	1	0	27	3	0	0	0	0	0	0	0	0	0	0
11/16/11	01:00	Axle	1	0	8	1	0	0	0	0	0	0	0	0	0	0
11/16/11	02:00	Axle	1	0	15	0	0	0	0	0	0	0	0	0	0	0
11/16/11	03:00	Axle	1	0	5	0	0	0	1	0	0	0	0	0	0	0
11/16/11	04:00	Axle	1	0	15	1	0	0	0	0	0	0	0	0	0	0
11/16/11	05:00	Axle	1	0	30	3	0	0	0	0	0	0	0	0	0	0
11/16/11	06:00	Axle	1	0	50	4	0	3	0	0	1	2	0	0	0	1
11/16/11	07:00	Axle	1	0	132	14	0	3	1	1	2	7	0	0	0	1
11/16/11	08:00	Axle	1	1	116	26	0	2	0	1	1	7	0	1	0	1
11/16/11	09:00	Axle	1	1	83	22	0	5	1	0	1	4	1	0	0	0
11/16/11	10:00	Axle	1	1	88	32	0	2	0	0	5	5	0	0	0	1
11/16/11	11:00	Axle	1	0	137	35	0	4	1	0	3	7	0	0	0	1
11/16/11	12:00	Axle	1	0	107	33	0	4	8	0	2	6	1	0	0	0
11/16/11	13:00	Axle	1	1	141	28	0	5	3	0	3	4	2	0	0	0
11/16/11	14:00	Axle	1	0	189	39	0	2	2	0	1	8	3	0	0	1
11/16/11	15:00	Axle	1	1	174	28	0	3	1	1	0	5	0	0	1	0
11/16/11	16:00	Axle	1	0	203	37	0	2	0	0	6	12	2	0	0	0
11/16/11	17:00	Axle	1	0	156	19	0	0	0	0	0	7	0	0	0	0
11/16/11	18:00	Axle	1	1	108	11	0	0	0	0	1	1	0	0	0	0
11/16/11	19:00	Axle	1	0	100	13	0	1	0	0	0	3	0	0	0	0
11/16/11	20:00	Axle	1	0	90	16	0	0	0	0	0	2	0	0	0	0
11/16/11	21:00	Axle	1	0	50	12	0	0	0	0	0	0	0	0	0	0
11/16/11	22:00	Axle	1	0	32	9	0	0	0	0	2	0	0	0	0	0
11/16/11	23:00	Axle	1	0	40	7	0	0	0	0	0	0	0	0	0	0
11/17/11	00:00	Axle	1	0	27	5	0	1	0	0	0	0	0	0	0	1
11/17/11	01:00	Axle	1	0	15	2	0	0	1	0	0	0	0	0	0	0
11/17/11	02:00	Axle	1	0	11	1	0	0	0	0	0	0	0	0	0	0
11/17/11	03:00	Axle	1	0	7	1	0	0	0	0	0	0	0	0	0	0
11/17/11	04:00	Axle	1	0	9	1	0	0	0	0	0	0	0	0	0	0
11/17/11	05:00	Axle	1	0	29	3	0	1	0	0	0	0	0	0	0	1
11/17/11	06:00	Axle	1	0	46	9	0	3	0	0	0	2	0	0	0	0
11/17/11	07:00	Axle	1	0	155	17	0	1	1	0	7	2	0	1	1	0
11/17/11	08:00	Axle	1	1	124	14	0	2	2	1	6	3	0	0	0	0

11/17/11	09:00	Axle	1	0	76	23	0	3	0	0	0	1	1	1	0	0
11/17/11	10:00	Axle	1	1	79	29	0	2	1	0	4	6	0	0	0	0
11/17/11	11:00	Axle	1	0	108	26	0	4	0	0	3	5	1	0	0	1
11/17/11	12:00	Axle	1	2	116	24	1	4	3	0	2	3	0	0	1	2
11/17/11	13:00	Axle	1	0	131	25	0	1	2	0	0	8	0	0	0	1

STA	DIR	LANE	YEAR	MNTH	DATE	HOUR	CLS_1	CLS_2	CLS_3	CLS_4	CLS_5	CLS_6	CLS_7	CLS_8	CLS_9	CLS_10	CLS_11	CLS_12	CLS_13
66218	3	1	13	8	5	15	1	166	41	3	0	3	1	0	2	1	0	0	0
66218	3	1	13	8	5	16	1	131	33	1	0	1	3	0	5	2	0	0	0
66218	3	1	13	8	5	17	1	138	35	1	1	1	0	0	2	1	0	0	0
66218	3	1	13	8	5	18	0	84	21	1	0	1	0	0	1	0	0	0	0
66218	3	1	13	8	5	19	1	74	18	0	0	0	1	0	0	0	0	0	0
66218	3	1	13	8	5	20	1	74	19	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	5	21	3	59	15	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	5	22	0	55	14	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	5	23	0	48	12	0	0	0	0	0	1	0	0	0	0
66218	3	1	13	8	6	0	1	22	6	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	6	1	0	14	3	0	0	0	0	0	1	0	0	0	0
66218	3	1	13	8	6	2	0	12	3	1	0	1	0	0	0	0	0	0	0
66218	3	1	13	8	6	3	0	10	3	0	0	0	0	0	0	1	0	0	0
66218	3	1	13	8	6	4	0	30	8	0	0	0	0	0	2	0	0	0	0
66218	3	1	13	8	6	5	1	60	15	0	1	0	1	0	2	1	0	0	0
66218	3	1	13	8	6	6	0	202	51	2	1	2	0	0	6	3	0	0	0
66218	3	1	13	8	6	7	3	237	59	2	1	3	2	0	7	1	0	0	0
66218	3	1	13	8	6	8	0	183	46	2	0	2	2	0	4	1	0	0	0
66218	3	1	13	8	6	9	1	134	34	4	1	4	5	0	4	5	0	0	0
66218	3	1	13	8	6	10	0	114	29	4	0	3	3	0	2	5	0	0	0
66218	3	1	13	8	6	11	0	142	35	2	0	3	6	0	4	5	0	0	0
66218	3	1	13	8	6	12	1	150	38	4	1	1	2	0	9	8	0	0	0
66218	3	1	13	8	6	13	1	135	34	4	2	3	3	0	9	7	0	0	0
66218	3	1	13	8	6	14	1	167	42	4	1	4	4	0	3	2	0	0	0
66218	3	1	13	8	6	15	3	178	44	0	1	0	1	0	1	2	0	0	0
66218	3	1	13	8	6	16	6	122	30	3	1	2	3	0	5	0	0	0	0
66218	3	1	13	8	6	17	1	143	36	0	0	0	0	0	3	2	0	0	0
66218	3	1	13	8	6	18	0	104	26	1	0	1	1	0	2	0	0	0	0
66218	3	1	13	8	6	19	1	70	17	2	0	1	0	0	0	0	0	0	0
66218	3	1	13	8	6	20	0	70	18	0	0	1	1	0	0	0	0	0	0
66218	3	1	13	8	6	21	0	93	23	0	0	0	1	0	0	1	0	0	0
66218	3	1	13	8	6	22	0	55	14	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	6	23	0	39	10	0	0	1	1	0	0	0	0	0	0
66218	3	1	13	8	7	0	0	24	6	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	7	1	1	24	6	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	7	2	0	10	3	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	7	3	0	14	4	0	0	0	0	0	0	0	0	0	0
66218	3	1	13	8	7	4	1	37	9	1	0	1	0	0	0	0	0	0	0
66218	3	1	13	8	7	5	1	66	17	2	0	1	0	0	4	0	0	0	0
66218	3	1	13	8	7	6	3	182	46	2	0	3	4	0	2	4	0	0	0
66218	3	1	13	8	7	7	1	220	55	5	1	3	5	0	7	2	0	0	0
66218	3	1	13	8	7	8	1	179	45	2	1	1	5	0	7	2	0	0	0
66218	3	1	13	8	7	9	2	152	38	3	1	3	3	0	8	4	0	0	0
66218	3	1	13	8	7	10	1	121	30	6	3	4	2	0	10	5	0	0	0
66218	3	1	13	8	7	11	0	123	31	4	1	4	2	0	3	2	0	0	0
66218	3	1	13	8	7	12	1	148	37	1	0	1	3	0	6	2	0	0	0
66218	3	1	13	8	7	13	0	141	35	6	2	4	4	0	4	3	0	0	0
66218	3	1	13	8	7	14	1	154	39	8	1	5	2	0	4	1	0	0	0

STA	DIR	LANE	YEAR	MNTH	DATE	HOUR	CLS_1	CLS_2	CLS_3	CLS_4	CLS_5	CLS_6	CLS_7	CLS_8	CLS_9	CLS_10	CLS_11	CLS_12	CLS_13
66318	3	1	13	8	5	15	1	447	112	4	3	1	0	0	9	0	0	0	0
66318	3	1	13	8	5	16	1	602	151	1	1	0	0	0	5	0	0	0	0
66318	3	1	13	8	5	17	2	531	133	0	1	0	0	0	8	0	0	0	0
66318	3	1	13	8	5	18	2	252	63	0	0	0	0	0	2	0	0	0	0
66318	3	1	13	8	5	19	1	167	42	0	0	0	0	0	2	0	0	0	0
66318	3	1	13	8	5	20	2	153	38	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	5	21	0	118	29	0	1	0	0	0	0	0	0	0	0
66318	3	1	13	8	5	22	1	90	23	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	5	23	0	74	18	0	1	0	0	0	0	0	0	0	0
66318	3	1	13	8	6	0	0	41	10	0	0	0	0	0	1	0	0	0	0
66318	3	1	13	8	6	1	0	23	6	0	0	0	0	0	2	0	0	0	0
66318	3	1	13	8	6	2	0	24	6	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	6	3	0	17	4	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	6	4	0	21	5	1	1	0	0	0	1	0	0	0	0
66318	3	1	13	8	6	5	0	22	5	0	0	1	0	0	0	0	0	0	0
66318	3	1	13	8	6	6	0	86	21	2	2	1	0	0	3	0	0	0	0
66318	3	1	13	8	6	7	0	153	38	4	3	1	1	0	9	0	0	0	0
66318	3	1	13	8	6	8	0	190	48	4	4	1	0	0	8	0	0	0	0
66318	3	1	13	8	6	9	1	192	48	2	3	1	0	0	8	0	0	0	0
66318	3	1	13	8	6	10	0	204	51	4	2	2	0	0	4	0	0	0	0
66318	3	1	13	8	6	11	0	239	60	5	3	2	0	0	5	0	0	0	0
66318	3	1	13	8	6	12	3	295	74	3	3	0	0	0	10	0	0	0	0
66318	3	1	13	8	6	13	0	323	81	2	2	1	0	0	8	0	0	0	0
66318	3	1	13	8	6	14	1	334	83	4	3	1	0	0	8	0	0	0	0
66318	3	1	13	8	6	15	0	414	104	2	3	1	0	0	6	0	0	0	0
66318	3	1	13	8	6	16	1	533	133	2	1	1	0	0	6	0	0	0	0
66318	3	1	13	8	6	17	4	487	122	0	0	0	0	0	5	0	0	0	0
66318	3	1	13	8	6	18	5	257	64	0	0	0	0	0	1	0	0	0	0
66318	3	1	13	8	6	19	0	159	40	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	6	20	3	199	50	0	1	0	0	0	2	0	0	0	0
66318	3	1	13	8	6	21	0	144	36	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	6	22	0	96	24	0	0	0	0	0	1	0	0	0	0
66318	3	1	13	8	6	23	1	73	18	0	1	0	0	0	1	0	0	0	0
66318	3	1	13	8	7	0	0	44	11	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	7	1	0	30	8	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	7	2	0	24	6	0	0	0	0	0	0	0	0	0	0
66318	3	1	13	8	7	3	0	12	3	0	0	0	0	0	1	0	0	0	0
66318	3	1	13	8	7	4	0	18	4	0	1	0	0	0	0	0	0	0	0
66318	3	1	13	8	7	5	0	30	8	0	0	1	0	0	1	0	0	0	0
66318	3	1	13	8	7	6	0	89	22	4	3	0	0	0	3	0	0	0	0
66318	3	1	13	8	7	7	0	150	38	4	3	1	0	0	9	1	0	0	0
66318	3	1	13	8	7	8	0	176	44	6	3	1	0	0	13	0	0	0	0
66318	3	1	13	8	7	9	0	169	42	7	5	3	0	0	14	0	0	0	0
66318	3	1	13	8	7	10	1	206	51	8	5	2	0	0	5	0	0	0	0
66318	3	1	13	8	7	11	0	227	57	4	3	1	1	0	6	0	0	0	0
66318	3	1	13	8	7	12	1	240	60	4	5	1	0	0	5	0	0	0	0
66318	3	1	13	8	7	13	0	294	74	3	2	1	0	0	7	0	0	0	0
66318	3	1	13	8	7	14	0	306	77	7	5	2	0	0	7	0	0	0	0

APPENDIX D
SIGNAL WARRANTS

SUMMARY OF SUPPLEMENTAL TRAFFIC STUDIES

TRAFFIC SIGNAL WARRANT ANALYSIS

Traffic count data collected at the I-90 EB Ramp intersection with MLK Drive was used to evaluate eight-hour signal warrants as presented in the Ohio Manual of Uniform Traffic Control Devices (OMUTCD). Signal warrants results are summarized in **Table E1.**

TABLE E1: SIGNAL WARRANT RESULTS FOR MLK DRIVE @ EB RAMP INTERSECTION

Warrant	Warrant Criteria	Warrant Results
Warrant 1 Eight Hour Volume: Condition A	600 vph combined on major street approaches AND 200 vph on one minor street approach for any eight hours	**Warrant Met** (Meets 11 of the 8 hours needed)
Warrant 1 Eight Hour Volume: Condition B	925 vph combined on major street approaches AND 100 vph on one minor street approach for any eight hours	**Warrant Met** (Meets 11 of the 8 hours needed)

Date: Monday, January 26, 2015
Jurisdiction: Cleveland, OH
Intersection: IR 90 EB Ramps & MLK Jr Dr
Number of APPROACH Lanes:
Major Street = 2
Minor Street = 2
Speed Limit = 35 (mph)
Population above 10,000? Yes
70% Warrant Apply? No

Traffic Signal Warrant (OMUTCD - 2005)

	Warrant 1 - Condition A				Warrant 1 - Condition B			
	100%	80%	70%	56%	100%	80%	70%	56%
Major Approach:	600	480	420	336	900	720	630	504
Minor Approach:	200	160	140	112	100	80	70	56
Mid - 1AM								
1AM - 2AM								
2:00 AM								
3:00 AM								
4:00 AM								
5:00 AM								
6:00 AM	+	+	+	+	+	+	+	+
7:00 AM	+	+	+	+	+	+	+	+
8:00 AM	+	+	+	+	+	+	+	+
9:00 AM	+	+	+	+	+	+	+	+
10:00 AM	+	+	+	+	+	+	+	+
11:00 AM	+	+	+	+	+	+	+	+
Noon - 1PM	+	+	+	+	+	+	+	+
1PM - 2PM	+	+	+	+	+	+	+	+
2:00 PM	+	+	+	+	+	+	+	+
3:00 PM	+	+	+	+	+	+	+	+
4:00 PM	+	+	+	+	+	+	+	+
5:00 PM	+	+	+	+	+	+	+	+
6:00 PM								
7:00 PM								
8:00 PM								
9:00 PM								
10:00 PM								
11:00 PM								
Hours Met =	12	12	12	12	12	12	12	12

Data:	Major St:		TOTAL	Minor St:		> OF TWO
Mid - 1AM	*0*	*0*	**0**	*0*	*0*	**0**
1AM - 2AM	*0*	*0*	**0**	*0*	*0*	**0**
2:00 AM	*0*	*0*	**0**	*0*	*0*	**0**
3:00 AM	*0*	*0*	**0**	*0*	*0*	**0**
4:00 AM	*0*	*0*	**0**	*0*	*0*	**0**
5:00 AM	*0*	*0*	**0**	*0*	*0*	**0**
6:00 AM	*1284*	*586*	**1870**	*0*	*548*	**548**
7:00 AM	*1192*	*1013*	**2205**	*0*	*624*	**624**
8:00 AM	*808*	*722*	**1530**	*0*	*514*	**514**
9:00 AM	*630*	*658*	**1288**	*0*	*494*	**494**
10:00 AM	*511*	*926*	**1437**	*0*	*534*	**534**
11:00 AM	*526*	*861*	**1387**	*0*	*404*	**404**
Noon - 1PM	*534*	*859*	**1393**	*0*	*410*	**410**
1PM - 2PM	*511*	*1131*	**1642**	*0*	*454*	**454**
2:00 PM	*611*	*1413*	**2024**	*0*	*489*	**489**
3:00 PM	*557*	*1668*	**2225**	*0*	*514*	**514**
4:00 PM	*525*	*1643*	**2168**	*0*	*560*	**560**
5:00 PM	*559*	*1361*	**1920**	*0*	*522*	**522**
6:00 PM	*0*	*0*	**0**	*0*	*0*	**0**
7:00 PM	*0*	*0*	**0**	*0*	*0*	**0**
8:00 PM	*0*	*0*	**0**	*0*	*0*	**0**
9:00 PM	*0*	*0*	**0**	*0*	*0*	**0**
10:00 PM	*0*	*0*	**0**	*0*	*0*	**0**
11:00 PM	*0*	*0*	**0**	*0*	*0*	**0**

Warrant 1 - Condition A:

100%	Warrant Met?	Yes
70%	Warrant Met?	No

Combination of Warrant 1 - Conditions A & B:

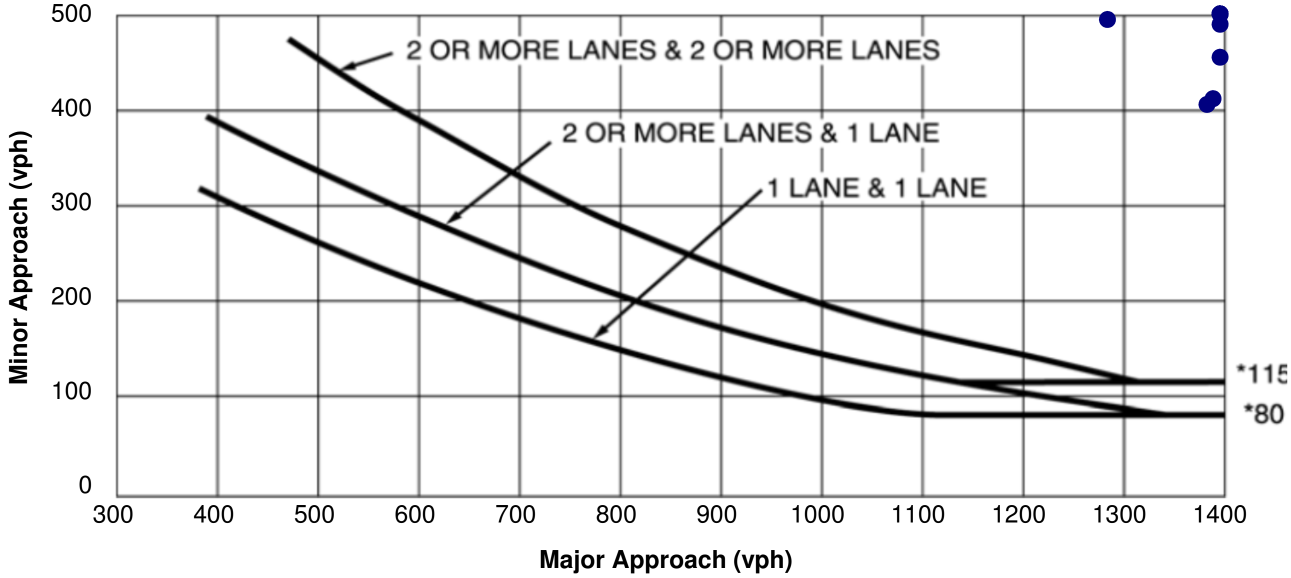
80%	Warrant Met?	Yes
56% (70%)	Warrant Met?	No

Warrant 1 - Condition B:

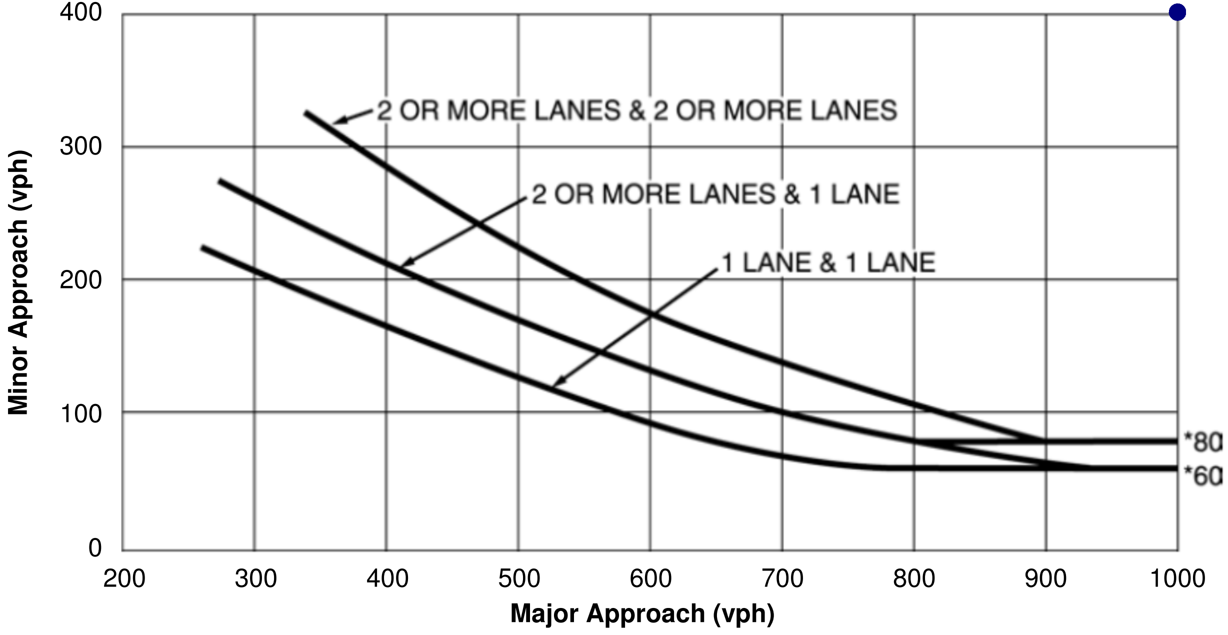
100%	Warrant Met?	Yes
70%	Warrant Met?	No

IR 90 EB Ramps & MLK Jr Dr

Warrant 2, Four-Hour Vehicular Volume



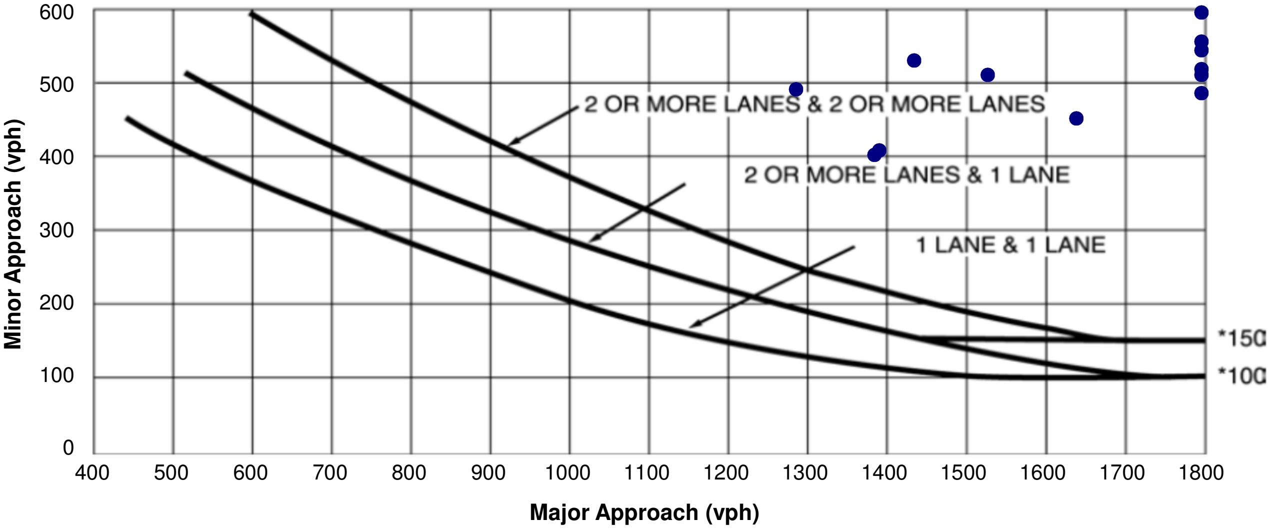
Warrant 2, Four-Hour Vehicular Volume (70% Factor)



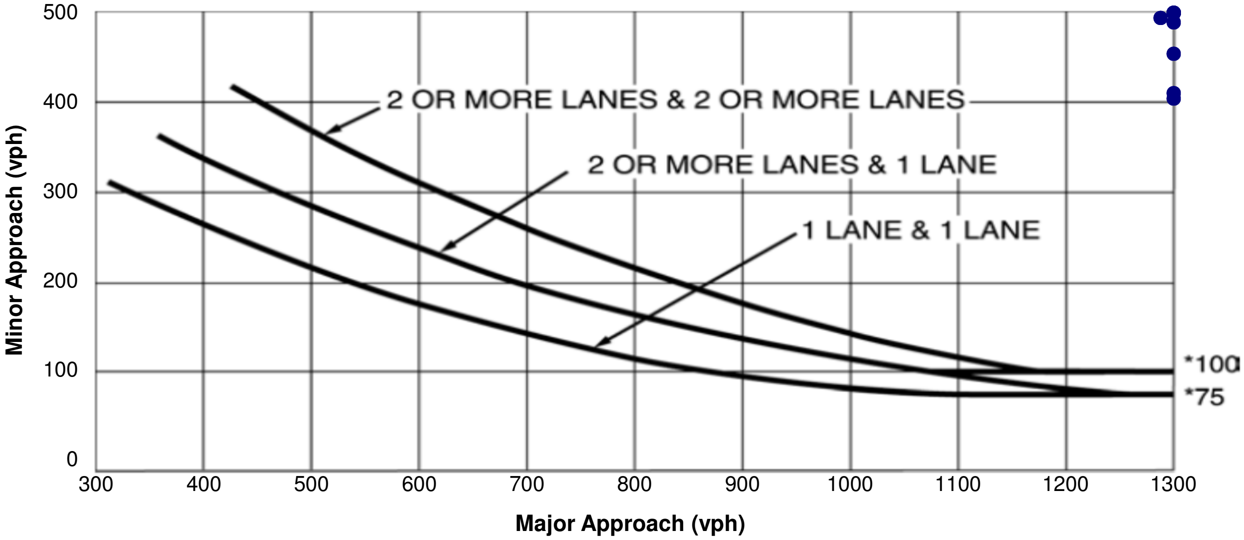
70% Warrant Apply? **No**

IR 90 EB Ramps & MLK Jr Dr

Warrant 3, Peak-Hour Vehicular Volume



Warrant 3, Peak-Hour Vehicular Volume (70% Factor)



70% Warrant Apply? **No**

APPENDIX E
CAPACITY ANALYSIS REPORTS

SUMMARY OF CAPACITY ANALYSIS

NO BUILD CAPACITY ANALYSIS

Capacity analyses were performed at key locations in the study area to assess existing operations and to identify critical deficiencies that may contribute to safety issues. Analyses were prepared for No Build conditions using 2034 AM and PM peak hour volumes for the analysis modules listed below. Analysis methodology and detailed output reports for all capacity analyses are included in **Appendix E.**

- Freeway section analysis (**Table E1**)

  I-90 Mainline
- Ramp merge analysis (**Table E2**)

  All I-90 ramps
- Ramp diverge analysis (**Table E3**)

  All I-90 ramps
- Intersection analyses (**Tables E4 and E5**)

  E. 55th Street and MLK Drive

TABLE E1: FREEWAY SECTION ANALYSIS

Direction	Section of I-90	Period	2034 No Build
EB	I-90 West of E 55th	AM	B / 18.0
		PM	C / 24.8
	I-90 Btw E 55th ramps	AM	B / 16.5
		PM	C / 23.8
	I-90 Btw E 55th and E 72nd	AM	C / 18.2
		PM	D / 27.3
	I-90 Btw E 72nd ramps	AM	B / 17.9
		PM	D / 26.8
	I-90 Btw MLK ramps	AM	B / 15.4
		PM	C / 25.1
	I-90 East of MLK	AM	C / 18.1
		PM	D / 31.5
WB	I-90 West of E 55th	AM	D / 26.2
		PM	C / 18.9
	I-90 Btw E 55th ramps	AM	C / 25.4
		PM	B / 17.5
	I-90 Btw E 55th and E 72nd	AM	D / 28.8
		PM	C / 20.9
	I-90 Btw E 72nd ramps	AM	D / 27.9
		PM	C / 20.3
	I-90 Btw MLK ramps	AM	D / 26.9
		PM	C / 18.6
	I-90 East of MLK	AM	D / 33.4
		PM	C / 20.9

TABLE E2: RAMP MERGE ANALYSIS

Merge	Period	2034 No Build
I-90 EB Entrance From E 55th	AM	B / 15.3
	PM	C / 23.7
I-90 EB Entrance From E 72nd	AM	weave segment
	PM	weave segment
I-90 EB Entrance From MLK Jr Dr	AM	B / 18.6
	PM	D / 31.1
I-90 WB Entrance From MLK Jr Dr	AM	weave segment
	PM	weave segment
I-90 WB Entrance From E 55th	AM	C / 22.5
	PM	B / 17.5
I-90 WB Entrance From E 72nd	AM	C / 23.2
	PM	B / 17.2

TABLE E3: RAMP DIVERGE ANALYSIS

Diverge	Period	2034 No Build
I-90 EB Exit To E 55th	AM	v/c = 0.19
	PM	v/c = 0.14
I-90 EB Exit To E 72nd	AM	B / 15.2
	PM	C / 23.5
I-90 EB Exit To MLK Jr Dr	AM	weave segment
	PM	weave segment
I-90 WB Exit To MLK Jr Dr	AM	D / 33.6
	PM	B / 19.8
I-90 WB Exit To E 72nd	AM	weave segment
	PM	weave segment
I-90 WB Exit To E 55th	AM	D / 28.8
	PM	C / 22.0

TABLE E4: NO BUILD INTERSECTION ANALYSIS – MLK DRIVE

	EB APPROACH	WB APPROACH	NB APPROACH	SB APPROACH
MLK at I-90 WB Exit Ramp / Lakeshore Blvd (2-way stop control)				
2034 AM No Build	-	B / 12.9[1]	**F / 8937**	**F / 6530**
2034 PM No Build	-	A / 7.3	**E / 49.0**	**F / 86.5**
MLK at N. Marginal Road (1-way stop control)				
2034 AM No Build	E / 37.7	-	A / 0.7	FREE
2034 PM No Build	C / 16.3	-	A / 0.4	FREE
MLK at I-90 EB Ramps (1 way stop control)				
2034 AM No Build	**F / 267.7**	-	FREE	A / 0.3
2034 PM No Build	D / 25.9	-	FREE	A / 1.7

Numerical values represent delay in seconds per vehicle

1. Westbound queues equal to 1,540 feet as simulated in SimTraffic model

TABLE E5: NO BUILD CAPACITY ANALYSIS - E. 55TH STREET

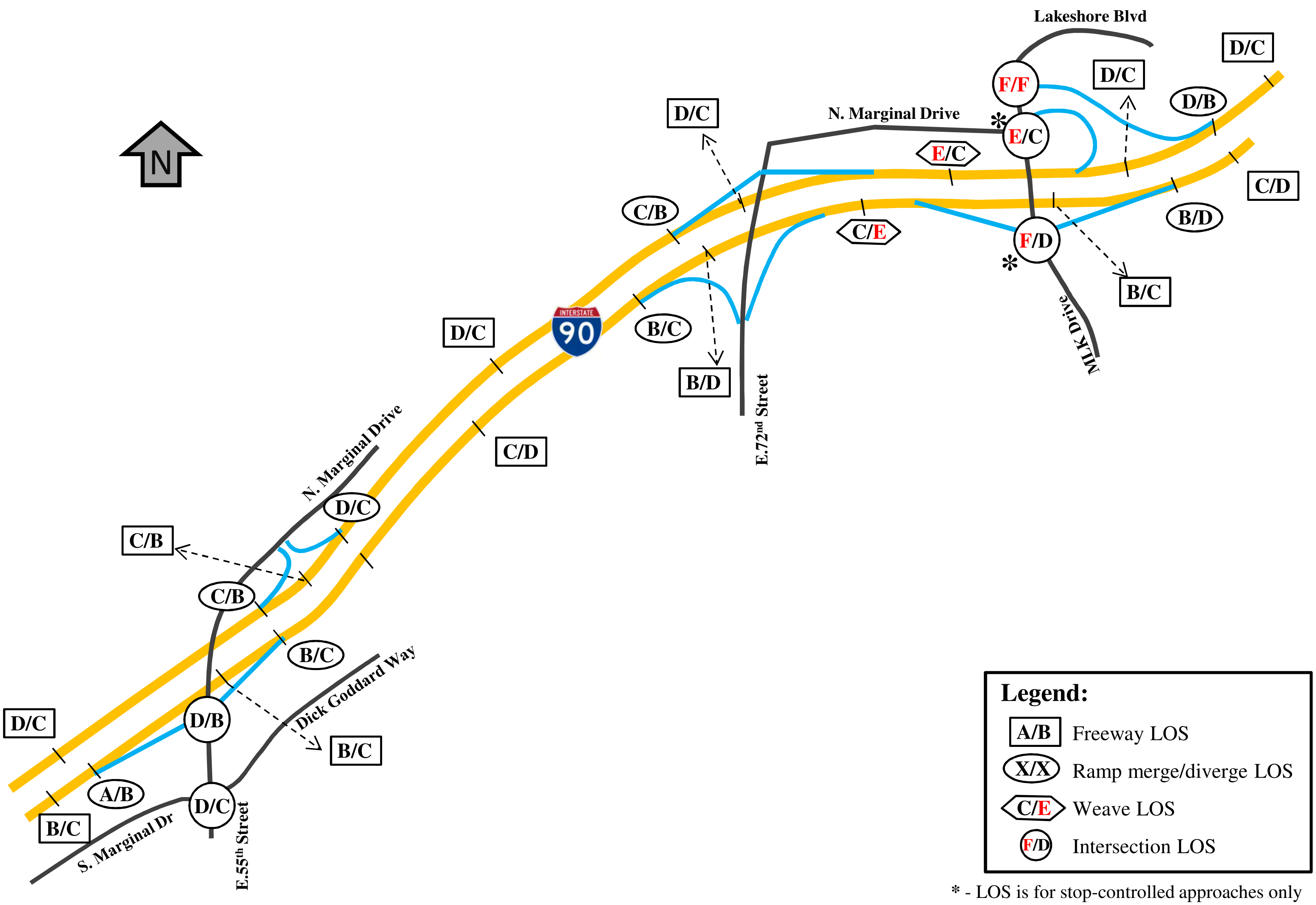
	EB APPROACH	WB APPROACH	NB APPROACH	SB APPROACH
E. 55th Street at S. Marginal Road				
2034 AM No Build	C / 32.7	**F / 160.6**	**E / 75.8**	A / 2.2
2034 PM No Build	D / 37.0	D / 39.2	D / 41.9	A / 0.5
E. 55th Street at I-90 EB Ramps				
2034 AM No Build	**F / 118.0**	-	A / 0.0	D / 42.3
2034 PM No Build	D / 52.4	-	A / 2.0	A / 0.0
E. 55th Street at N. Marginal Road				
2034 AM No Build	C / 15.8	-	A / 1.0	FREE
2034 PM No Build	C / 16.5	-	A / 2.4	FREE
N Marginal at I-90 WB Ramps				
2034 AM No Build	FREE	A / 7.5	**F / 62.4**	-
2034 PM No Build	FREE	A / 7.8	**F / 241.2**	-

Numerical values represent delay in seconds per vehicle

Capacity deficient locations are summarized below. Locations with LOS E or LOS F are considered capacity deficient for the purposes of this evaluation.

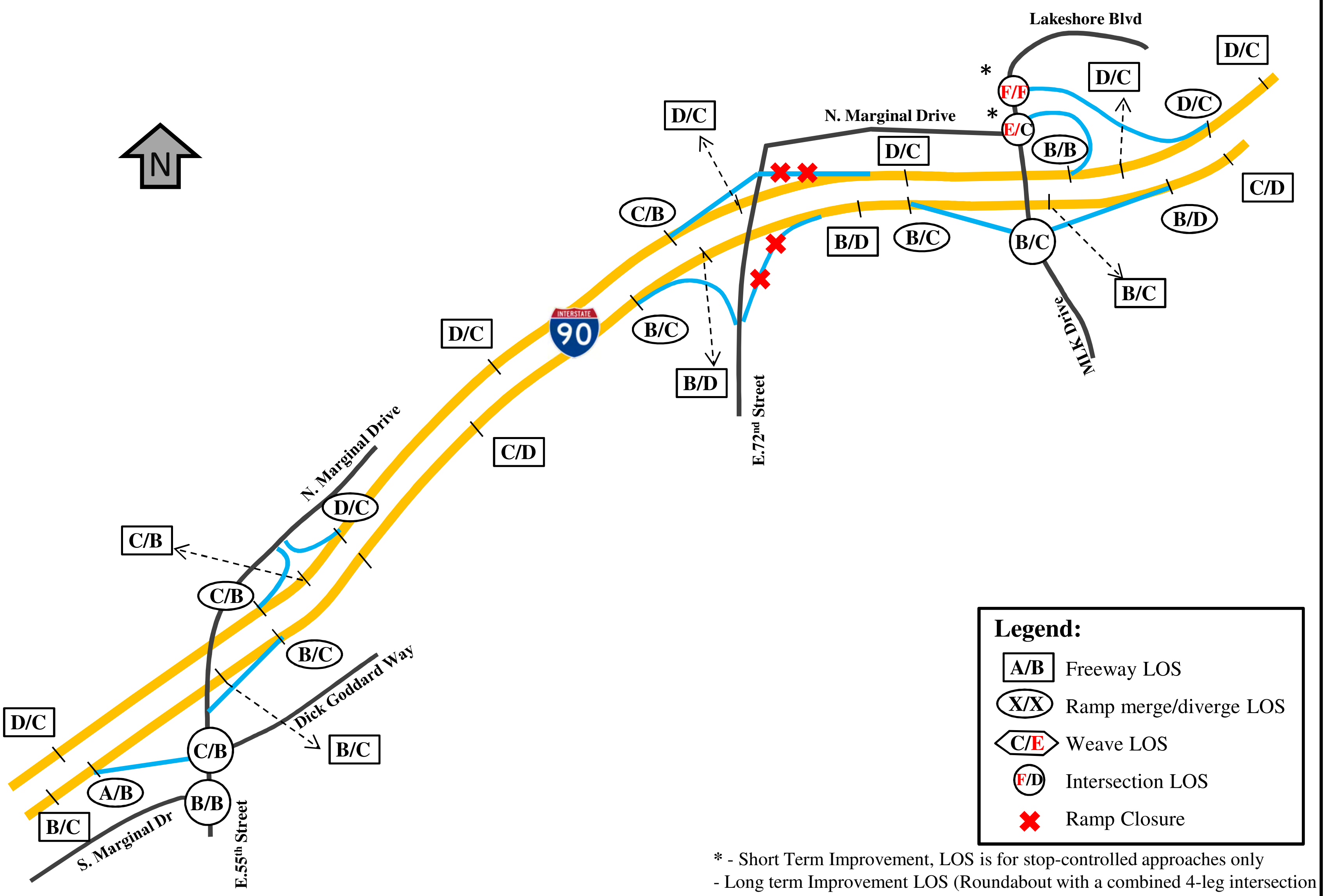
- Mainline I-90 weave segment between E. 72nd Street and MLK Drive (LOS E)
- MLK Drive at I-90 WB ramp intersection (LOS F on critical approach)
- MLK Drive at N. Marginal Road intersection (LOS E on critical approach)
- MLK Drive at I-90 EB ramp intersection (LOS F on EB approach)
- E. 55th Street at S. Marginal Road/Dick Goddard Way (LOS F on WB approach, LOS E on EB approach)
- E. 55th Street at I-90 EB ramp intersection (LOS F on EB approach)
- Mainline weave: I-90 EB and WB between E. 72nd Street and MLK Drive

Design Year (2034) No-Build Level of Service (LOS)



* - LOS is for stop-controlled approaches only

Design Year (2034) Build Level of Service (LOS)



* - Short Term Improvement, LOS is for stop-controlled approaches only

- Long term Improvement LOS (Roundabout with a combined 4-leg intersection of MLK Drive/N.Marginal Road/Lakeshore Blvd/WB Ramps) - A/A

E. 55TH STREET CAPACITY REPORTS

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰↑	↑↱	
Volume (veh/h)	20	20	25	225	660	35
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	22	27	245	717	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				415		
pX, platoon unblocked						
vC, conflicting volume	913	378	755			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	913	378	755			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	97	97			
cM capacity (veh/h)	268	626	864			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	109	163	478	277
Volume Left	22	27	0	0	0
Volume Right	22	0	0	0	38
cSH	375	864	1700	1700	1700
Volume to Capacity	0.12	0.03	0.10	0.28	0.16
Queue Length 95th (ft)	10	2	0	0	0
Control Delay (s)	15.8	2.6	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	15.8	1.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

2: E 55th St & I-90 East Exit & I-90 East Entrance
2034 AM Peak No Build

CUY-90-19.50/21.30 Safety Study

Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations		↖↗			↑↱			↰↑			
Volume (vph)	20	0	295	0	230	355	15	665	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			4.0			6.0			
Lane Util. Factor		1.00			0.95			0.95			
Frt		0.87			0.91			1.00			
Flt Protected		1.00			1.00			1.00			
Satd. Flow (prot)		1651			3229			3404			
Flt Permitted		1.00			1.00			0.68			
Satd. Flow (perm)		1651			3229			2310			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	0	321	0	250	386	16	723	0	0	0
RTOR Reduction (vph)	0	0	0	0	116	0	0	0	0	0	0
Lane Group Flow (vph)	0	343	0	0	520	0	0	739	0	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	1%	2%	3%	6%	0%	0%	0%
Turn Type	Prot	Prot			NA		Perm	NA			
Protected Phases	10	10			17 16			6			
Permitted Phases							6				
Actuated Green, G (s)		17.0			63.0			32.0			
Effective Green, g (s)		17.0			63.0			32.0			
Actuated g/C Ratio		0.19			0.70			0.36			
Clearance Time (s)		6.0						6.0			
Vehicle Extension (s)		3.0						3.0			
Lane Grp Cap (vph)		311			2260			821			
v/s Ratio Prot		c0.21			c0.16						
v/s Ratio Perm								c0.32			
v/c Ratio		1.10			0.23			0.90			
Uniform Delay, d1		36.5			4.8			27.5			
Progression Factor		1.00			0.00			1.00			
Incremental Delay, d2		81.5			0.0			14.9			
Delay (s)		118.0			0.0			42.3			
Level of Service		F			A			D			
Approach Delay (s)		118.0			0.0			42.3		0.0	
Approach LOS		F			A			D		A	

Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	34.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

1: E 55th St & South Marginal
2034 AM Peak No Build

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↰↑↱			↑↑	
Volume (vph)	25	10	20	145	3	135	15	425	170	170	735	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		14.0			14.0			14.0			6.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.95			0.94			0.96			0.99	
Flt Protected		0.98			0.97			1.00			0.99	
Satd. Flow (prot)		1758			1658			3293			3373	
Flt Permitted		0.73			0.81			0.73			0.69	
Satd. Flow (perm)		1318			1373			2421			2342	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	11	22	158	3	147	16	462	185	185	799	60
RTOR Reduction (vph)	0	18	0	0	37	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	42	0	0	271	0	0	663	0	0	1039	0
Heavy Vehicles (%)	1%	0%	0%	6%	0%	3%	7%	2%	12%	7%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		12			12			1			6 14	
Permitted Phases	12			12			1			6 14		
Actuated Green, G (s)		15.0			15.0			24.0			57.0	
Effective Green, g (s)		15.0			15.0			24.0			57.0	
Actuated g/C Ratio		0.17			0.17			0.27			0.63	
Clearance Time (s)		14.0			14.0			14.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		219			228			645			1483	
v/s Ratio Prot												
v/s Ratio Perm		0.03			c0.20			0.27			c0.44	
v/c Ratio		0.19			1.19			1.03			0.70	
Uniform Delay, d1		32.3			37.5			33.0			10.9	
Progression Factor		1.00			1.00			1.00			0.16	
Incremental Delay, d2		0.4			120.6			42.8			0.5	
Delay (s)		32.7			158.1			75.8			2.2	
Level of Service		C			F			E			A	
Approach Delay (s)		32.7			158.1			75.8			2.2	
Approach LOS		C			F			E			A	

Intersection Summary			
HCM 2000 Control Delay	49.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	34.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

3: E. 55th Street & North Marginal
2034 PM - No Build

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰↑	↑↱	
Volume (veh/h)	15	40	65	250	650	175
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	43	71	272	707	190
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				415		
pX, platoon unblocked						
vC, conflicting volume	1079	448	897			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1079	448	897			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	92	91			
cM capacity (veh/h)	196	563	765			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	60	161	181	471	426
Volume Left	16	71	0	0	0
Volume Right	43	0	0	0	190
cSH	373	765	1700	1700	1700
Volume to Capacity	0.16	0.09	0.11	0.28	0.25
Queue Length 95th (ft)	14	8	0	0	0
Control Delay (s)	16.5	5.0	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.5	2.4		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

2: E. 55th Street & I-90 East Exit & I-90 East Entrance
2034 PM - No Build

Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations		↰↱			↑↱			↰↑			
Volume (vph)	55	0	155	0	260	730	30	660	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			4.0			6.0			
Lane Util. Factor		1.00			0.95			0.95			
Frt		0.90			0.89			1.00			
Flt Protected		0.99			1.00			1.00			
Satd. Flow (prot)		1676			3156			3402			
Flt Permitted		0.99			1.00			0.61			
Satd. Flow (perm)		1676			3156			2080			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	0	168	0	283	793	33	717	0	0	0
RTOR Reduction (vph)	0	0	0	0	229	0	0	0	0	0	0
Lane Group Flow (vph)	0	228	0	0	847	0	0	750	0	0	0
Heavy Vehicles (%)	3%	0%	0%	0%	1%	2%	3%	6%	0%	0%	0%
Turn Type	Prot	Prot			NA		Perm	NA			
Protected Phases	10	10			17 16			6			
Permitted Phases							6				
Actuated Green, G (s)		16.0			64.0			39.0			
Effective Green, g (s)		16.0			64.0			39.0			
Actuated g/C Ratio		0.18			0.71			0.43			
Clearance Time (s)		6.0						6.0			
Vehicle Extension (s)		3.0						3.0			
Lane Grp Cap (vph)		297			2244			901			
v/s Ratio Prot		c0.14			c0.27						
v/s Ratio Perm								c0.36			
v/c Ratio		0.77			0.38			0.83			
Uniform Delay, d1		35.2			5.1			22.6			
Progression Factor		1.00			0.37			1.00			
Incremental Delay, d2		17.2			0.1			8.9			
Delay (s)		52.4			2.0			31.5			
Level of Service		D			A			C			
Approach Delay (s)		52.4			2.0			31.5		0.0	
Approach LOS		D			A			C		A	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	34.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

1: E. 55th Street & South Marginal
2034 PM - No Build

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			↰↑↱			↑↑	
Volume (vph)	80	0	10	35	5	40	20	870	20	15	750	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		14.0			14.0			14.0			6.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		0.98			0.93			1.00			0.99	
Flt Protected		0.96			0.98			1.00			1.00	
Satd. Flow (prot)		1776			1664			3512			3408	
Flt Permitted		0.69			0.81			0.89			0.93	
Satd. Flow (perm)		1279			1380			3135			3171	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	0	11	38	5	43	22	946	22	16	815	54
RTOR Reduction (vph)	0	88	0	0	39	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	10	0	0	47	0	0	990	0	0	880	0
Heavy Vehicles (%)	1%	0%	0%	6%	0%	3%	7%	2%	12%	7%	5%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		12			12			1			6 14	
Permitted Phases	12			12			1			6 14		
Actuated Green, G (s)		9.0			9.0			31.0			63.0	
Effective Green, g (s)		9.0			9.0			31.0			63.0	
Actuated g/C Ratio		0.10			0.10			0.34			0.70	
Clearance Time (s)		14.0			14.0			14.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		127			138			1079			2219	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.03			c0.32			c0.28	
v/c Ratio		0.08			0.34			0.92			0.40	
Uniform Delay, d1		36.7			37.7			28.3			5.6	
Progression Factor		1.00			1.00			1.00			0.08	
Incremental Delay, d2		0.3			1.5			13.6			0.1	
Delay (s)		37.0			39.2			41.9			0.5	
Level of Service		D			D			D			A	
Approach Delay (s)		37.0			39.2			41.9			0.5	
Approach LOS		D			D			D			A	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	34.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

7: E 55th St & I-90 EB Off Ramp/Goddard Way
2034 AM Build (EB Ramp Reconfiguration)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		✣			↑↱			↰↑	
Volume (vph)	20	55	240	150	0	135	0	450	180	115	550	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0			5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frt		1.00	0.85		0.94			0.96			1.00	
Flt Protected		0.99	1.00		0.97			1.00			0.99	
Satd. Flow (prot)		1820	1568		1699			3387			3509	
Flt Permitted		0.89	1.00		0.79			1.00			0.59	
Satd. Flow (perm)		1641	1568		1380			3387			2087	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	60	261	163	0	147	0	489	196	125	598	0
RTOR Reduction (vph)	0	0	189	0	105	0	0	47	0	0	0	0
Lane Group Flow (vph)	0	82	73	0	205	0	0	638	0	0	723	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA			NA		pm+pt	NA	
Protected Phases		4			8			2 10		1	6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		25.0	25.0		25.0			41.0			35.0	
Effective Green, g (s)		25.0	25.0		25.0			41.0			35.0	
Actuated g/C Ratio		0.28	0.28		0.28			0.46			0.39	
Clearance Time (s)		5.0	5.0		5.0						5.0	
Lane Grp Cap (vph)		455	435		383			1542			874	
v/s Ratio Prot								c0.19			c0.04	
v/s Ratio Perm		0.05	0.05		c0.15						c0.28	
v/c Ratio		0.18	0.17		0.54			0.41			0.83	
Uniform Delay, d1		24.7	24.6		27.6			16.4			24.8	
Progression Factor		1.00	1.00		1.00			0.12			1.00	
Incremental Delay, d2		0.9	0.8		5.3			0.6			8.9	
Delay (s)		25.6	25.4		32.9			2.5			33.6	
Level of Service		C	C		C			A			C	
Approach Delay (s)		25.5			32.9			2.5			33.6	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

10: E 55th St & S Marginal Rd
2034 AM Build (EB Ramp Reconfiguration)

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰↑	↑↱	
Volume (vph)	35	20	15	595	880	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.95			1.00	0.99	
Flt Protected	0.97			1.00	1.00	
Satd. Flow (prot)	1716			3535	3505	
Flt Permitted	0.97			0.91	1.00	
Satd. Flow (perm)	1716			3236	3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	22	16	647	957	65
RTOR Reduction (vph)	18	0	0	0	6	0
Lane Group Flow (vph)	42	0	0	663	1016	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	13			2	6 8	
Permitted Phases			2			
Actuated Green, G (s)	15.0			26.0	65.0	
Effective Green, g (s)	15.0			26.0	65.0	
Actuated g/C Ratio	0.17			0.29	0.72	
Clearance Time (s)	5.0			5.0		
Lane Grp Cap (vph)	286			934	2531	
v/s Ratio Prot	c0.02				c0.29	
v/s Ratio Perm				c0.20		
v/c Ratio	0.15			0.71	0.40	
Uniform Delay, d1	32.0			28.6	4.9	
Progression Factor	1.00			1.00	0.25	
Incremental Delay, d2	1.1			4.6	0.3	
Delay (s)	33.1			33.2	1.5	
Level of Service	C			C	A	
Approach Delay (s)	33.1			33.2	1.5	
Approach LOS	C			C	A	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		✥			↑↱			↰↑	
Volume (vph)	55	5	150	40	0	40	0	970	20	15	650	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0			5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frt		1.00	0.85		0.93			1.00			1.00	
Flt Protected		0.96	1.00		0.98			1.00			1.00	
Satd. Flow (prot)		1763	1568		1695			3528			3535	
Flt Permitted		0.75	1.00		0.84			1.00			0.70	
Satd. Flow (perm)		1382	1568		1456			3528			2478	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	5	163	43	0	43	0	1054	22	16	707	0
RTOR Reduction (vph)	0	0	127	0	66	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	65	36	0	20	0	0	1074	0	0	723	0
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA			NA		Perm	NA	
Protected Phases		4			8			2 10			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		20.0	20.0		20.0			60.0			35.0	
Effective Green, g (s)		20.0	20.0		20.0			60.0			35.0	
Actuated g/C Ratio		0.22	0.22		0.22			0.67			0.39	
Clearance Time (s)		5.0	5.0		5.0						5.0	
Lane Grp Cap (vph)		307	348		323			2352			963	
v/s Ratio Prot								c0.30				
v/s Ratio Perm		c0.05	0.02		0.01						c0.29	
v/c Ratio		0.21	0.10		0.06			0.46			0.75	
Uniform Delay, d1		28.6	27.9		27.6			7.2			23.7	
Progression Factor		1.00	1.00		1.00			0.22			1.00	
Incremental Delay, d2		1.6	0.6		0.4			0.4			5.4	
Delay (s)		30.1	28.5		28.0			2.0			29.1	
Level of Service		C	C		C			A			C	
Approach Delay (s)		28.9			28.0			2.0			29.1	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

10: E 55th St & S Marginal Rd
2034 PM Build (EB Ramp Reconfiguration)

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰↑	↑↱	
Volume (vph)	80	10	20	890	785	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	1.00			0.95	0.95	
Frt	0.98			1.00	0.99	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1757			3535	3504	
Flt Permitted	0.96			0.92	1.00	
Satd. Flow (perm)	1757			3254	3504	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	11	22	967	853	60
RTOR Reduction (vph)	5	0	0	0	6	0
Lane Group Flow (vph)	93	0	0	989	907	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	13			2	6 8	
Permitted Phases			2			
Actuated Green, G (s)	20.0			35.0	60.0	
Effective Green, g (s)	20.0			35.0	60.0	
Actuated g/C Ratio	0.22			0.39	0.67	
Clearance Time (s)	5.0			5.0		
Lane Grp Cap (vph)	390			1265	2336	
v/s Ratio Prot	c0.05				c0.26	
v/s Ratio Perm				c0.30		
v/c Ratio	0.24			0.78	0.39	
Uniform Delay, d1	28.7			24.1	6.7	
Progression Factor	1.00			1.00	0.14	
Incremental Delay, d2	1.4			4.9	0.4	
Delay (s)	30.2			29.0	1.3	
Level of Service	C			C	A	
Approach Delay (s)	30.2			29.0	1.3	
Approach LOS	C			C	A	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	MLS
Agency/Co.	LJB Inc.
Date Performed	3/2/2015
Analysis Time Period	AM Peak Hour

Site Information

Intersection	IR-90 WB Ramps & N Marginal
Jurisdiction	ODOT District 12
Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3

East/West Street:	North/South Street: IR-90 WB Ramps
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		105	0	50	95	
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	114	0	54	103	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration		T	TR	LT	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)		550	190			
Peak-Hour Factor, PHF	1.00	0.92	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	597	206	0	0	0
Percent Heavy Vehicles	0	4	4	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	2	1	0	0	0
Configuration		T	R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		T	R			
v (veh/h)		54		597	206			
C (m) (veh/h)		1473		565	1002			
v/c		0.04		1.06	0.21			
95% queue length		0.11		17.10	0.77			
Control Delay (s/veh)		7.5		80.6	9.5			
LOS		A		F	A			
Approach Delay (s/veh)	--	--	62.4					
Approach LOS	--	--	F					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*MLS*
Agency/Co.	*LJB Inc.*
Date Performed	*3/2/2015*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*IR-90 WB Ramps & N Marginal*
Jurisdiction	*ODOT District 12*
Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

East/West Street:

North/South Street: *IR-90 WB Ramps*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*115*	*0*	*150*	*105*	
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*124*	*0*	*163*	*114*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)		*570*	*190*			
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*619*	*206*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*4*	*4*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*1*	*0*	*0*	*0*
Configuration		*T*	*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*T*	*R*			
v (veh/h)		*163*		*619*	*206*			
C (m) (veh/h)		*1461*		*381*	*995*			
v/c		*0.11*		*1.62*	*0.21*			
95% queue length		*0.38*		*36.17*	*0.78*			
Control Delay (s/veh)		*7.8*		*318.3*	*9.6*			
LOS		*A*		*F*	*A*			
Approach Delay (s/veh)	--	--	*241.2*					
Approach LOS	--	--	*F*					

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MARTIN LUTHER KING JR. DRIVE
CAPACITY REPORTS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*MLS*	Intersection	*IR-90 WB Off Ramp & MLK*
Agency/Co.	*LJB Inc.*	Jurisdiction	*ODOT District 12*
Date Performed	*3/2/2015*	Analysis Year	*2034 Existing Condition*
Analysis Time Period	*AM Peak Hour*		

Project Description *CUY-90-19.5/21.3*

East/West Street: *IR-90 WB Off Ramp*	North/South Street: *Martin Luther King Jr Dr*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)				*1100*		*100*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*1195*	*0*	*108*
Percent Heavy Vehicles	*0*	*--*	*--*	*4*	*--*	*--*
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration				*LTR*	*LR*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)		*120*			*100*	
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*130*	*0*	*0*	*108*	*0*
Percent Heavy Vehicles	*0*	*2*	*0*	*0*	*2*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*			*T*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LTR*		*T*			*T*	
v (veh/h)		*1195*		*130*			*108*	
C (m) (veh/h)		*1610*		*7*			*8*	
v/c		*0.74*		*18.57*			*13.50*	
95% queue length		*7.54*		*18.07*			*15.17*	
Control Delay (s/veh)		*13.4*		*8937*			*6530*	
LOS		*B*		*F*			*F*	
Approach Delay (s/veh)	--	--	*8937*			*6530*		
Approach LOS	--	--	*F*			*F*		

HCS+^{TM} Version 5.6

Generated: 6/22/2015 11:45 AM

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*MLS*	Intersection	*IR-90 WB Off Ramp & MLK*
Agency/Co.	*LJB Inc.*	Jurisdiction	*ODOT District 12*
Date Performed	*3/2/2015*	Analysis Year	*2034 Existing Condition*
Analysis Time Period	*PM Peak Hour*		

Project Description *CUY-90-19.5/21.3*

East/West Street: *IR-90 WB Off Ramp*

North/South Street: *Martin Luther King Jr Dr*

Intersection Orientation: *East-West*

Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)				445		75
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	483	0	81
Percent Heavy Vehicles	0	--	--	4	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration				LTR	LR	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)		75			130	
Peak-Hour Factor, PHF	1.00	0.92	1.00	1.00	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	81	0	0	141	0
Percent Heavy Vehicles	0	2	0	0	2	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		T			T	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LTR		T			T	
v (veh/h)		483		81			141	
C (m) (veh/h)		1610		160			169	
v/c		0.30		0.51			0.83	
95% queue length		1.27		2.46			5.73	
Control Delay (s/veh)		8.2		48.6			85.9	
LOS		A		E			F	
Approach Delay (s/veh)	--	--	48.6			85.9		
Approach LOS	--	--	E			F		

HCS+^{TM} Version 5.6 Generated: 6/22/2015 11:45 AM

2: MLK Jr Dr & N Marginal Rd
2034 AM No Build

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↱	
Volume (veh/h)	20	20	20	470	1180	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	22	22	511	1283	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				857		
pX, platoon unblocked						
vC, conflicting volume	1592	652	1304			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1592	652	1304			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	95	96			
cM capacity (veh/h)	94	410	527			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	192	341	855	449
Volume Left	22	22	0	0	0
Volume Right	22	0	0	0	22
cSH	153	527	1700	1700	1700
Volume to Capacity	0.28	0.04	0.20	0.50	0.26
Queue Length 95th (ft)	28	3	0	0	0
Control Delay (s)	37.7	1.9	0.0	0.0	0.0
Lane LOS	E	A			
Approach Delay (s)	37.7	0.7		0.0	
Approach LOS	E				

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↱	
Volume (veh/h)	20	20	20	575	555	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	22	22	625	603	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				857		
pX, platoon unblocked						
vC, conflicting volume	970	312	625			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	970	312	625			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	97	98			
cM capacity (veh/h)	245	683	952			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	230	417	402	223
Volume Left	22	22	0	0	0
Volume Right	22	0	0	0	22
cSH	361	952	1700	1700	1700
Volume to Capacity	0.12	0.02	0.25	0.24	0.13
Queue Length 95th (ft)	10	2	0	0	0
Control Delay (s)	16.3	1.0	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.3	0.4		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

3: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp
2034 AM No Build

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰		↱					↑↱			↰↑	
Volume (veh/h)	35	0	590	0	0	0	0	455	605	15	1180	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	0	641	0	0	0	0	495	658	16	1283	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								504				
pX, platoon unblocked												
vC, conflicting volume	1563	2467	641	2139	2139	576	1283			1152		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1563	2467	641	2139	2139	576	1283			1152		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	49	100	0	0	100	100	100			97		
cM capacity (veh/h)	74	29	417	0	47	460	537			602		

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	38	641	330	822	444	855
Volume Left	38	0	0	0	16	0
Volume Right	0	641	0	658	0	0
cSH	74	417	1700	1700	602	1700
Volume to Capacity	0.51	1.54	0.19	0.48	0.03	0.50
Queue Length 95th (ft)	54	873	0	0	2	0
Control Delay (s)	96.5	277.9	0.0	0.0	0.8	0.0
Lane LOS	F	F			A	
Approach Delay (s)	267.7		0.0		0.3	
Approach LOS	F					

Intersection Summary			
Average Delay	58.2		
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰		↱					↑↱			↰↑	
Volume (veh/h)	45	0	500	0	0	0	0	550	1255	30	545	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	0	543	0	0	0	0	598	1364	33	592	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								504				
pX, platoon unblocked												
vC, conflicting volume	957	2620	296	2185	1938	981	592			1962		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	957	2620	296	2185	1938	981	592			1962		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	75	100	22	100	100	100	100			89		
cM capacity (veh/h)	194	21	700	5	58	249	979			293		

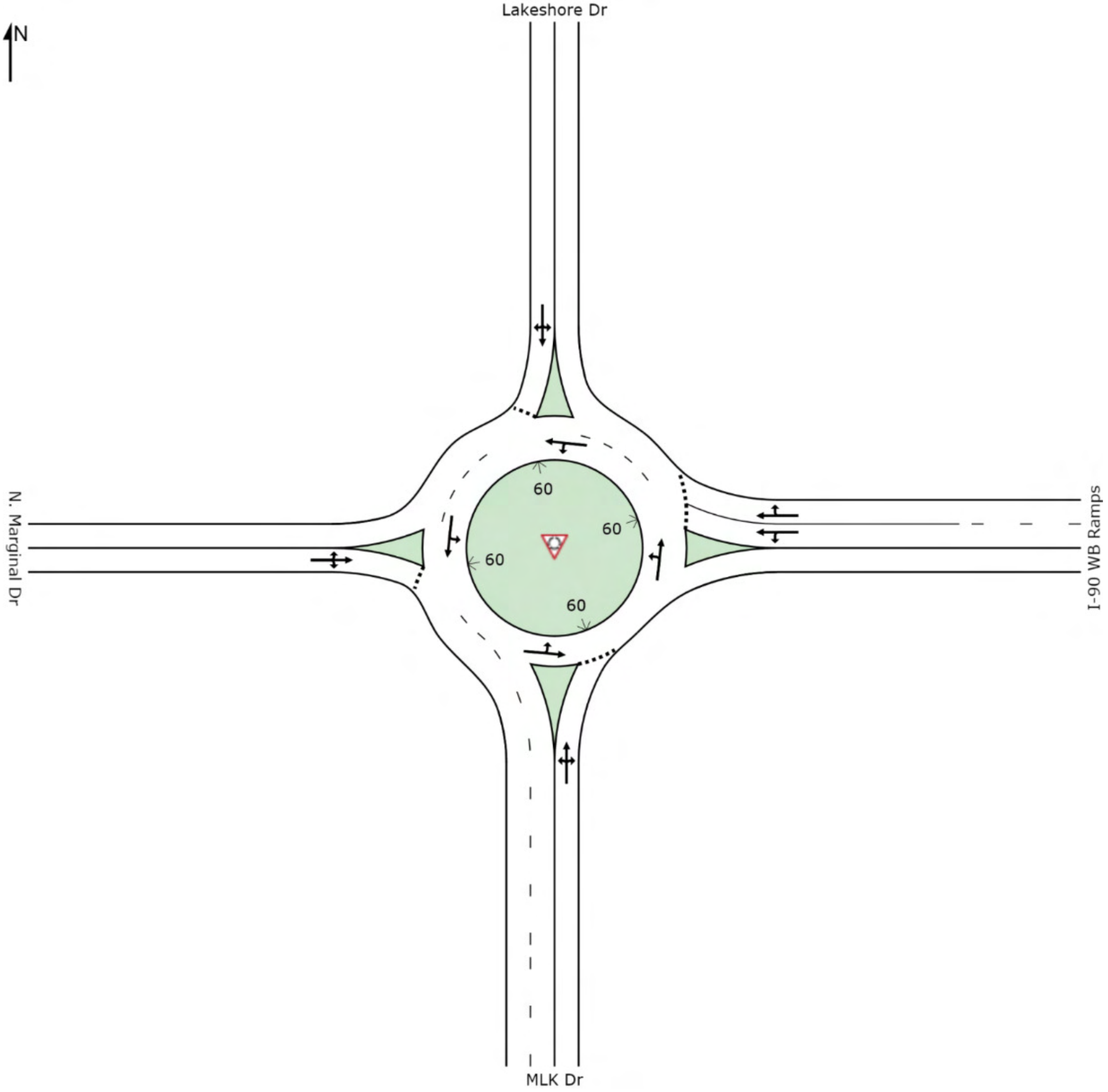
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	49	543	399	1563	230	395
Volume Left	49	0	0	0	33	0
Volume Right	0	543	0	1364	0	0
cSH	194	700	1700	1700	293	1700
Volume to Capacity	0.25	0.78	0.23	0.92	0.11	0.23
Queue Length 95th (ft)	24	188	0	0	9	0
Control Delay (s)	29.7	25.6	0.0	0.0	4.7	0.0
Lane LOS	D	D			A	
Approach Delay (s)	25.9		0.0		1.7	
Approach LOS	D					

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

SITE LAYOUT

Site: MLK @ N.Marginal/Lakeshore

Option 1 - (AM Peak)
Roundabout



DELAY (CONTROL)

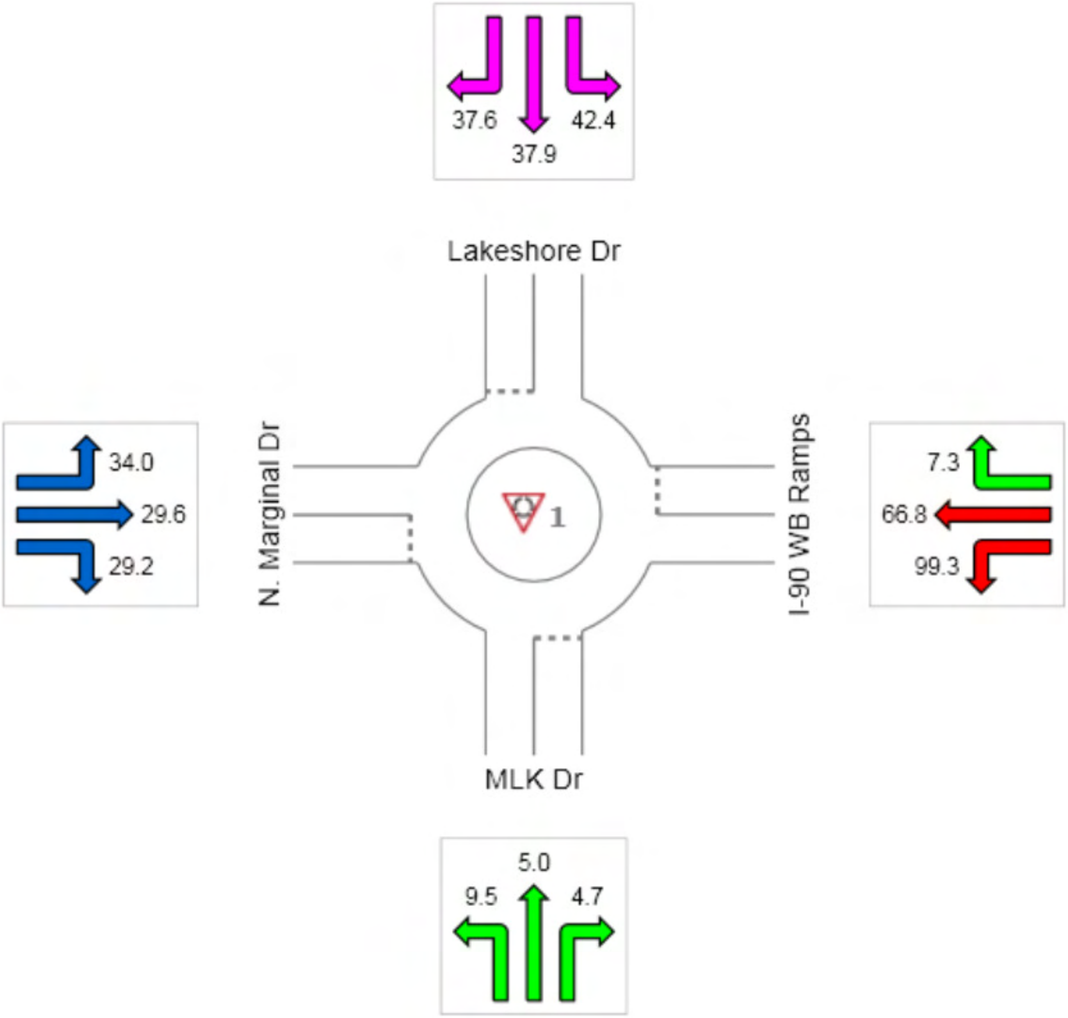
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: MLK @ N.Marginal/Lakeshore

Option 1 - (AM Peak)
Roundabout

All Movement Classes

	South	East	North	West	Intersection
	5.0	89.2	37.9	30.2	63.0
LOS	A	F	D	C	E



Colour code based on Level of Service

🟩	🟦	🟦	🟪	🟧	🟥	⬜
LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Roundabout Level of Service Method: SIDRA Roundabout LOS
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

DELAY (CONTROL)

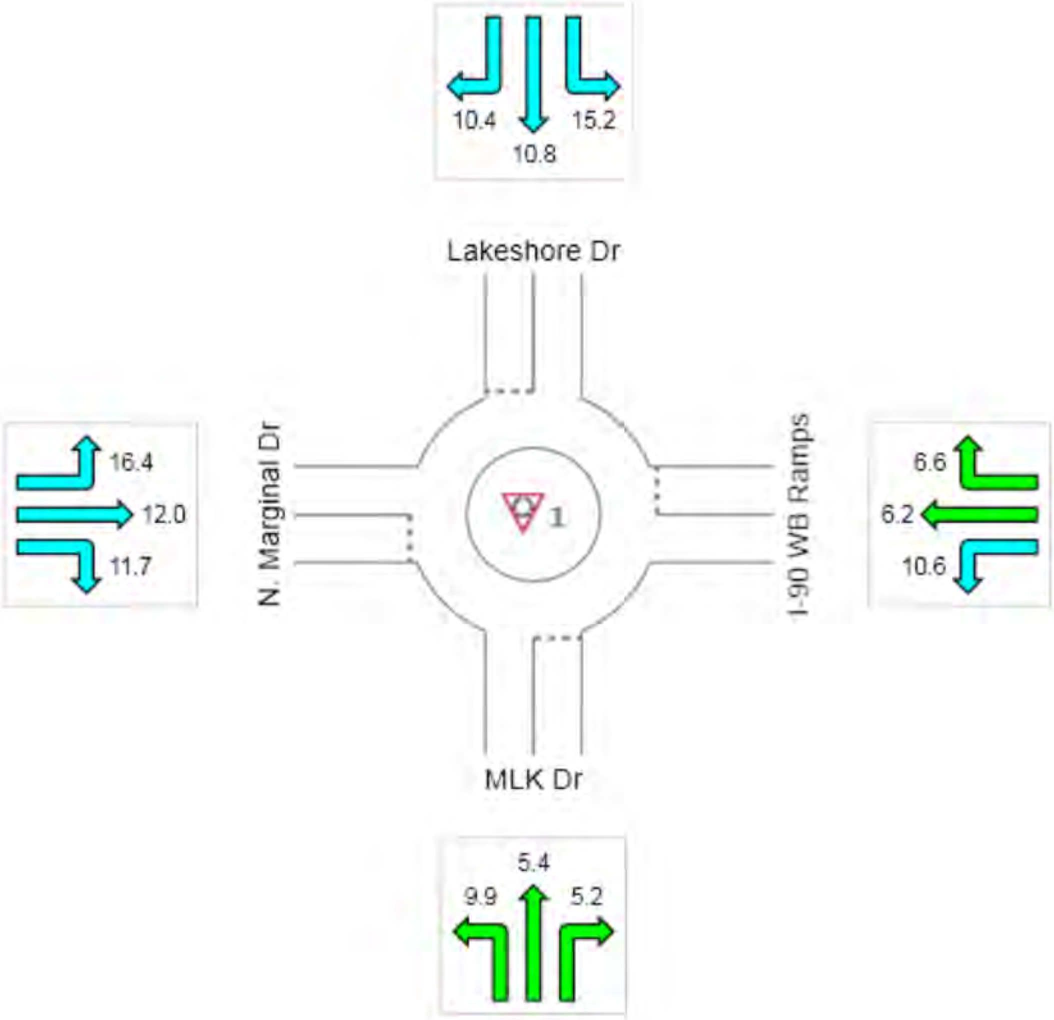
Average control delay per vehicle, or average pedestrian delay (seconds)

Site: MLK @ N.Marginal/Lakeshore - PM

Option 1 - (PM Peak)
Roundabout

All Movement Classes

	South	East	North	West	Intersection
	5.3	9.3	10.7	12.5	8.4
LOS	A	A	B	B	A



Colour code based on Level of Service

🟩	🟦	🟦	🟪	🟧	🟥	⬜
LOS A	LOS B	LOS C	LOS D	LOS E	LOS F	Continuous

Level of Service Method: Delay & v/c (HCM 2010)
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Roundabout Level of Service Method: SIDRA Roundabout LOS
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

LANE SUMMARY

Site: MLK @ N.Marginal/Lakeshore

Option 1 - (AM Peak)
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total veh/h	HV %	veh/h	Satn v/c	Util. %	Delay sec	Service	Veh	Dist ft	Config	Length ft	Adj. %	Block. %
South: MLK Dr													
Lane 1[d]	533	3.0	1077	0.495	100	5.0	LOS A	4.9	125.9	Full	350	0.0	0.0
Approach	533	3.0		0.495		5.0	LOS A	4.9	125.9				
East: I-90 WB Ramps													
Lane 1[d]	1292	3.0	1098	1.177	100	99.0	LOS F	95.2	2436.6	Full	1000	0.0	47.7
Lane 2	154	3.0	649	0.237	20[6]	7.3	LOS A	1.3	32.4	Full	1000	0.0	0.0
Approach	1446	3.0		1.177		89.2	LOS F	95.2	2436.6				
North: Lakeshore Dr													
Lane 1[d]	132	3.0	219	0.601	100	37.9	LOS D	4.9	124.3	Full	500	0.0	0.0
Approach	132	3.0		0.601		37.9	LOS D	4.9	124.3				
West: N. Marginal Dr													
Lane 1[d]	110	3.0	215	0.511	100	30.2	LOS C	3.8	97.6	Full	1000	0.0	0.0
Approach	110	3.0		0.511		30.2	LOS C	3.8	97.6				
Intersection	2220	3.0		1.177		63.0	LOS E	95.2	2436.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6 Lane under-utilisation due to downstream effects
d Dominant lane on roundabout approach

LANE SUMMARY

Site: MLK @ N.Marginal/Lakeshore - PM

Option 1 - (PM Peak)
Roundabout

Lane Use and Performance

	Demand Flows			Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total veh/h	HV %	Cap. veh/h	Satn v/c	Util. %	Delay sec	Service	Veh	Dist ft	Config	Length ft	Adj. %	Block. %
South: MLK Dr													
Lane 1[d]	647	3.0	1045	0.619	100	5.3	LOS A	7.1	182.7	Full	350	0.0	0.0
Approach	647	3.0		0.619		5.3	LOS A	7.1	182.7				
East: I-90 WB Ramps													
Lane 1[d]	614	3.0	1122	0.548	100	9.7	LOS A	4.6	116.6	Full	1000	0.0	0.0
Lane 2	82	3.0	671	0.122	22[5]	6.6	LOS A	0.6	15.4	Full	1000	0.0	0.0
Approach	696	3.0		0.548		9.3	LOS A	4.6	116.6				
North: Lakeshore Dr													
Lane 1[d]	164	3.0	545	0.301	100	10.7	LOS B	1.8	45.7	Full	500	0.0	0.0
Approach	164	3.0		0.301		10.7	LOS B	1.8	45.7				
West: N. Marginal Dr													
Lane 1[d]	240	3.0	564	0.426	100	12.5	LOS B	2.8	72.7	Full	1000	0.0	0.0
Approach	240	3.0		0.426		12.5	LOS B	2.8	72.7				
Intersection	1747	3.0		0.619		8.4	LOS A	7.1	182.7				

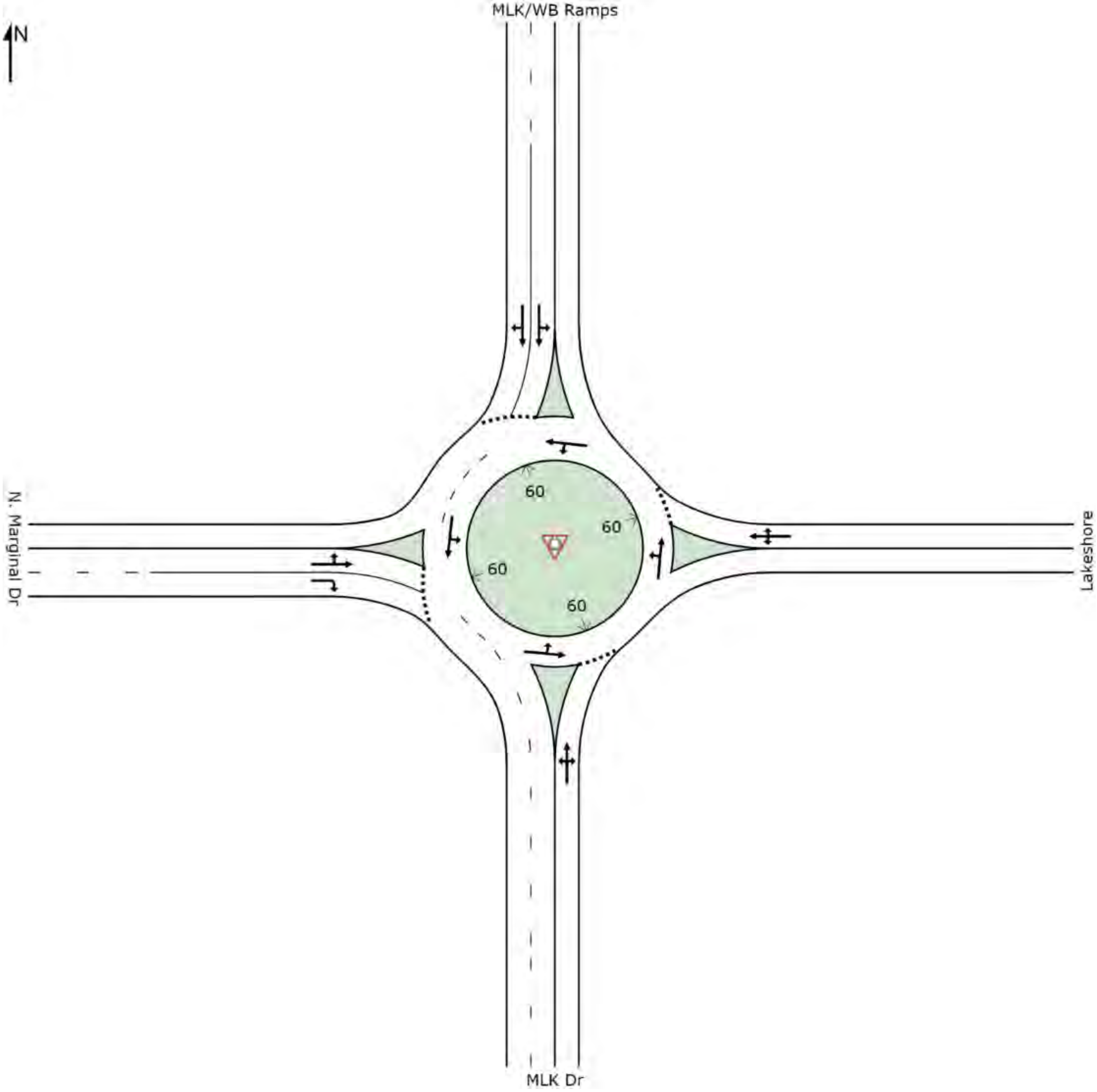
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

SITE LAYOUT

▽ Site: MLK @ N.Marginal/Lakeshore

Option 2 - (AM Peak)
Roundabout



LANE SUMMARY

Site: MLK @ N.Marginal/Lakeshore

Option 2 - (AM Peak)
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV		Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: MLK Dr													
Lane 1[d]	533	3.0	944	0.564	100	6.6	LOS A	4.9	124.9	Full	350	0.0	0.0
Approach	533	3.0		0.564		6.6	LOS A	4.9	124.9				
East: Lakeshore													
Lane 1[d]	109	3.0	685	0.159	100	11.7	LOS B	0.9	22.1	Full	1000	0.0	0.0
Approach	109	3.0		0.159		11.7	LOS B	0.9	22.1				
North: MLK/WB Ramps													
Lane 1	734	3.0	1142	0.642	100	6.8	LOS A	6.6	169.4	Full	500	0.0	0.0
Lane 2[d]	734	3.0	1142	0.642	100	6.2	LOS A	6.6	169.4	Full	500	0.0	0.0
Approach	1467	3.0		0.642		6.5	LOS A	6.6	169.4				
West: N. Marginal Dr													
Lane 1	23	3.0	129	0.177	100	46.5	LOS D	1.0	25.5	Full	300	0.0	0.0
Lane 2[d]	87	3.0	227	0.382	100	36.6	LOS D	3.0	75.6	Full	1000	0.0	0.0
Approach	110	3.0		0.382		38.7	LOS D	3.0	75.6				
Intersection	2218	3.0		0.642		8.4	LOS A	6.6	169.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[d] Dominant lane on roundabout approach

LANE SUMMARY

Site: MLK @ N.Marginal/Lakeshore -PM

Option 2 - (PM Peak)
Roundabout

Lane Use and Performance	Demand Flows		Cap.	Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV		Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: MLK Dr													
Lane 1[d]	647	3.0	958	0.675	100	6.9	LOS A	6.9	175.4	Full	350	0.0	0.0
Approach	647	3.0		0.675		6.9	LOS A	6.9	175.4				
East: Lakeshore													
Lane 1[d]	163	3.0	563	0.289	100	14.0	LOS B	1.7	44.3	Full	1000	0.0	0.0
Approach	163	3.0		0.289		14.0	LOS B	1.7	44.3				
North: MLK/WB Ramps													
Lane 1	358	3.0	1072	0.334	100	7.0	LOS A	2.3	58.6	Full	500	0.0	0.0
Lane 2[d]	359	3.0	1074	0.334	100	6.0	LOS A	2.3	58.6	Full	500	0.0	0.0
Approach	717	3.0		0.334		6.5	LOS A	2.3	58.6				
West: N. Marginal Dr													
Lane 1	43	3.0	365	0.119	100	16.1	LOS B	0.6	14.7	Full	300	0.0	0.0
Lane 2[d]	196	3.0	683	0.287	100	10.1	LOS B	1.8	45.6	Full	1000	0.0	0.0
Approach	239	3.0		0.287		11.2	LOS B	1.8	45.6				
Intersection	1766	3.0		0.675		8.0	LOS A	6.9	175.4				

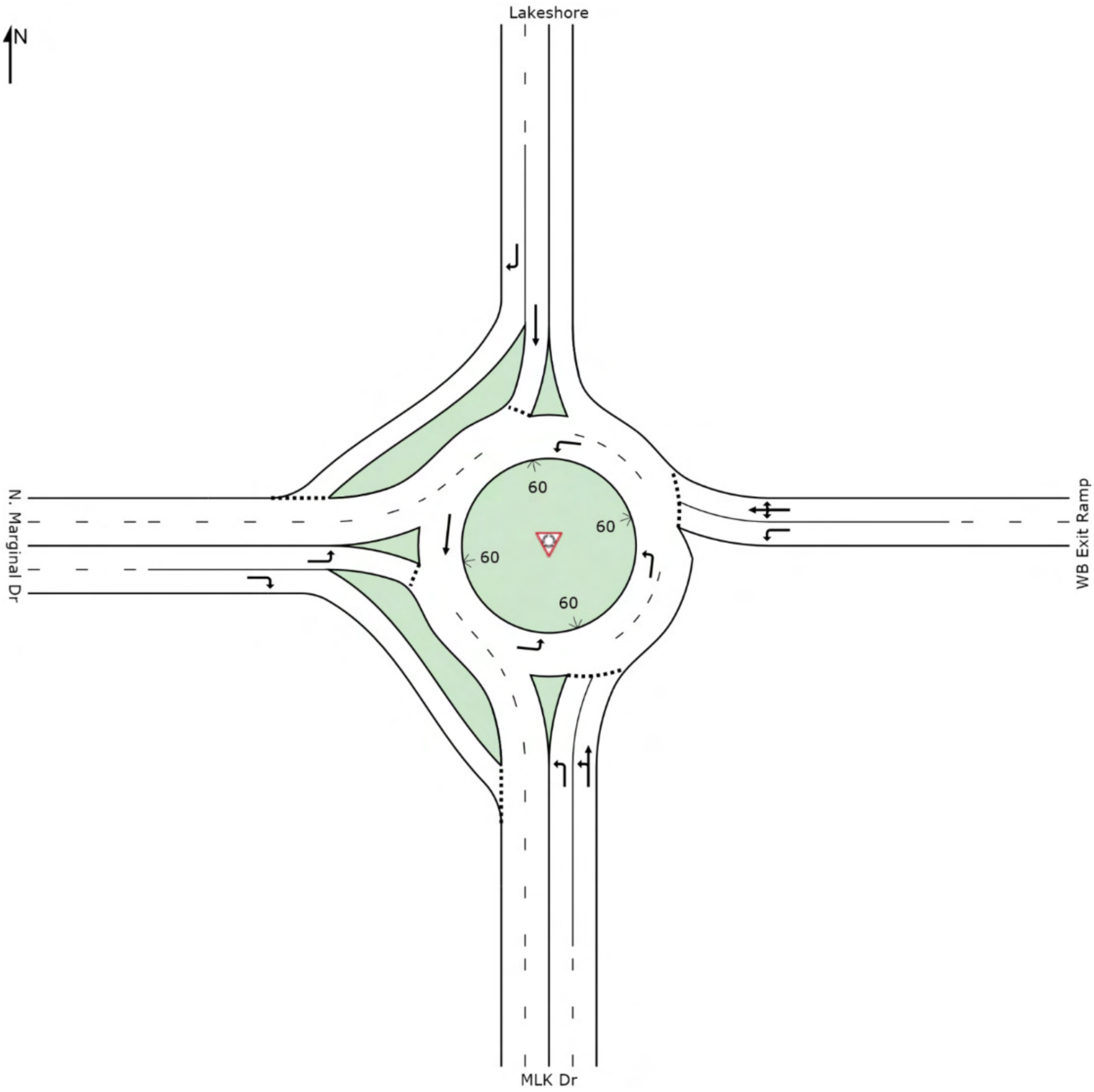
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[d] Dominant lane on roundabout approach

SITE LAYOUT

Site: MLK @ N.Marginal/Lakeshore - PM

Option 3 - Greenway Study Option
(PM Peak)
Roundabout



LANE SUMMARY

Site: MLK @ N.Marginal/Lakeshore

Option 3 - Greenway Study Option
(AM Peak)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: MLK Dr													
Lane 1	266	3.0	1229	0.217	100	9.4	LOS A	1.5	38.9	Full	350	0.0	0.0
Lane 2[d]	266	3.0	1229	0.217	100	7.2	LOS A	1.5	38.9	Full	350	0.0	0.0
Approach	533	3.0		0.217		8.3	LOS A	1.5	38.9				
East: WB Exit Ramp													
Lane 1	702	3.0	746	0.941	100	38.0	LOS D	22.1	564.7	Full	1000	0.0	0.0
Lane 2[d]	743	3.0	790	0.941	100	35.4	LOS D	22.7	582.1	Full	1000	0.0	0.0
Approach	1446	3.0		0.941		36.7	LOS D	22.7	582.1				
North: Lakeshore													
Lane 1[d]	98	3.0	98	1.000[4]	100	90.6	LOS F	3.8	96.9	Full	500	0.0	0.0
Lane 2	11	3.0	805	0.014	100	7.3	LOS A	0.1	1.8	Full	100	0.0	0.0
Approach	109	3.0		1.000		82.3	LOS F	3.8	96.9				
West: N. Marginal Dr													
Lane 1[d]	43	3.0	236	0.184	100	28.1	LOS C	1.3	33.9	Full	1000	0.0	0.0
Lane 2	87	3.0	236	0.368	100	26.4	LOS C	2.8	71.6	Full	1000	0.0	0.0
Approach	130	3.0		0.368		26.9	LOS C	2.8	71.6				
Intersection	2217	3.0		1.000		31.5	LOS C	22.7	582.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[4] x = 1.00 due to minimum capacity
[d] Dominant lane on roundabout approach

LANE SUMMARY

Site: MLK @ N.Marginal/Lakeshore - PM

Option 3 - Greenway Study Option
(PM Peak)
Roundabout

Lane Use and Performance

	Demand Flows			Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: MLK Dr													
Lane 1	323	3.0	1234	0.262	100	9.4	LOS A	1.8	46.4	Full	350	0.0	0.0
Lane 2[d]	323	3.0	1234	0.262	100	8.3	LOS A	1.8	46.4	Full	350	0.0	0.0
Approach	647	3.0		0.262		8.9	LOS A	1.8	46.4				
East: WB Exit Ramp													
Lane 1	374	3.0	666	0.562	100	18.7	LOS B	4.8	123.8	Full	1000	0.0	0.0
Lane 2[d]	403	3.0	717	0.562	100	15.7	LOS B	4.9	126.7	Full	1000	0.0	0.0
Approach	777	3.0		0.562		17.2	LOS B	4.9	126.7				
North: Lakeshore													
Lane 1[d]	141	3.0	321	0.440	100	29.0	LOS C	3.6	90.9	Full	500	0.0	0.0
Lane 2	22	3.0	716	0.030	100	8.7	LOS A	0.2	4.1	Full	500	0.0	0.0
Approach	163	3.0		0.440		26.3	LOS C	3.6	90.9				
West: N. Marginal Dr													
Lane 1[d]	43	3.0	642	0.068	100	13.8	LOS B	0.4	10.3	Full	1000	0.0	0.0
Lane 2	196	3.0	642	0.305	100	9.7	LOS A	2.0	51.1	Full	1000	0.0	0.0
Approach	239	3.0		0.305		10.5	LOS B	2.0	51.1				
Intersection	1826	3.0		0.562		14.2	LOS B	4.9	126.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[d] Dominant lane on roundabout approach

3: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp
2034 AM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB Signal

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥	↱					↑↱		↰	↑↑	
Volume (vph)	35	5	590	0	0	0	0	455	605	75	1180	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0		5.0	5.0	
Lane Util. Factor		0.95	0.95					0.95		1.00	0.95	
Frt		0.87	0.85					0.91		1.00	1.00	
Flt Protected		0.99	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1529	1504					3236		1770	3539	
Flt Permitted		0.99	1.00					1.00		0.17	1.00	
Satd. Flow (perm)		1529	1504					3236		322	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	5	641	0	0	0	0	495	658	82	1283	0
RTOR Reduction (vph)	0	27	27	0	0	0	0	322	0	0	0	0
Lane Group Flow (vph)	0	317	313	0	0	0	0	831	0	82	1283	0
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		15.1	15.1					26.2		26.2	26.2	
Effective Green, g (s)		15.1	15.1					26.2		26.2	26.2	
Actuated g/C Ratio		0.29	0.29					0.51		0.51	0.51	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		450	442					1652		164	1807	
v/s Ratio Prot								0.26			c0.36	
v/s Ratio Perm		0.21	c0.21							0.25		
v/c Ratio		0.70	0.71					0.50		0.50	0.71	
Uniform Delay, d1		16.1	16.1					8.3		8.2	9.6	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		5.0	5.1					0.2		2.4	1.3	
Delay (s)		21.1	21.3					8.5		10.6	11.0	
Level of Service		C	C					A		B	B	
Approach Delay (s)		21.2			0.0			8.5			11.0	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: MLK Jr Dr/Lakeshore Blvd & IR-90 WB Off Ramp
2034 AM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB Signal

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰ ↰↱		↑			↑
Volume (veh/h)	1230	100	120	0	0	100
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1337	109	130	0	0	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		2783	0	2793	2728
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		2783	0	2793	2728
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	18		0	100	0	0
cM capacity (veh/h)	1623		3	1085	0	4

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	891	554	130	109
Volume Left	891	446	0	0
Volume Right	0	109	0	0
cSH	1623	1623	3	4
Volume to Capacity	0.82	0.82	39.22	30.12
Queue Length 95th (ft)	269	269	Err	Err
Control Delay (s)	16.5	16.1	Err	Err
Lane LOS	C	C	F	F
Approach Delay (s)	16.3		Err	Err
Approach LOS			F	F

Intersection Summary			
Average Delay	1433.2		
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

2: MLK Jr Dr & N Marginal Rd
2034 AM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB Signal

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↱	
Volume (veh/h)	20	80	20	470	1180	150
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	87	22	511	1283	163
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				353		
pX, platoon unblocked						
vC, conflicting volume	1663	723	1446			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1663	723	1446			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	76	95			
cM capacity (veh/h)	84	369	465			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	109	192	341	855	591
Volume Left	22	22	0	0	0
Volume Right	87	0	0	0	163
cSH	219	465	1700	1700	1700
Volume to Capacity	0.50	0.05	0.20	0.50	0.35
Queue Length 95th (ft)	62	4	0	0	0
Control Delay (s)	36.5	2.1	0.0	0.0	0.0
Lane LOS	E	A			
Approach Delay (s)	36.5	0.8		0.0	
Approach LOS	E				

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

1: MLK Jr Dr/Lakeshore Blvd & IR-90 WB Off Ramp
2034 PM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB Signal

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰ ↰↱		↑			↑
Volume (veh/h)	565	75	75	0	0	130
Sign Control	Free		Stop			Stop
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	614	82	82	0	0	141
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	0		1310	0	1310	1269
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1310	0	1310	1269
tC, single (s)	4.1		6.5	6.2	7.1	6.5
tC, 2 stage (s)						
tF (s)	2.2		4.0	3.3	3.5	4.0
p0 queue free %	62		18	100	100	0
cM capacity (veh/h)	1623		99	1085	32	105

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	409	286	82	141
Volume Left	409	205	0	0
Volume Right	0	82	0	0
cSH	1623	1623	99	105
Volume to Capacity	0.38	0.38	0.82	1.35
Queue Length 95th (ft)	45	45	114	248
Control Delay (s)	8.6	7.1	124.7	283.2
Lane LOS	A	A	F	F
Approach Delay (s)	8.0		124.7	283.2
Approach LOS			F	F

Intersection Summary			
Average Delay	60.7		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

2: MLK Jr Dr & N Marginal Rd
2034 PM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB Signal

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑	↑↱	
Volume (veh/h)	20	180	20	575	555	140
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	196	22	625	603	152
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				353		
pX, platoon unblocked						
vC, conflicting volume	1035	378	755			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1035	378	755			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	68	97			
cM capacity (veh/h)	222	620	851			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	217	230	417	402	353
Volume Left	22	22	0	0	0
Volume Right	196	0	0	0	152
cSH	526	851	1700	1700	1700
Volume to Capacity	0.41	0.03	0.25	0.24	0.21
Queue Length 95th (ft)	50	2	0	0	0
Control Delay (s)	16.6	1.1	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.6	0.4		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

3: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp
2034 PM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB Signal

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥	↱					↑↱		↰	↑↑	
Volume (vph)	45	5	500	0	0	0	0	550	1255	190	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0		4.0	5.0	
Lane Util. Factor		0.95	0.95					0.95		1.00	0.95	
Frt		0.88	0.85					0.90		1.00	1.00	
Flt Protected		0.99	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1539	1504					3170		1770	3539	
Flt Permitted		0.99	1.00					1.00		0.08	1.00	
Satd. Flow (perm)		1539	1504					3170		143	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	5	543	0	0	0	0	598	1364	207	592	0
RTOR Reduction (vph)	0	194	255	0	0	0	0	290	0	0	0	0
Lane Group Flow (vph)	0	110	38	0	0	0	0	1672	0	207	592	0
Turn Type	Perm	NA	Perm					NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		10.5	10.5					48.0		61.4	61.4	
Effective Green, g (s)		10.5	10.5					48.0		61.4	61.4	
Actuated g/C Ratio		0.13	0.13					0.59		0.75	0.75	
Clearance Time (s)		5.0	5.0					5.0		4.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		197	192					1857		293	2653	
v/s Ratio Prot								c0.53		c0.08	0.17	
v/s Ratio Perm		0.07	0.02							0.45		
v/c Ratio		0.56	0.20					1.11dr		0.71	0.22	
Uniform Delay, d1		33.5	31.9					14.9		22.5	3.1	
Progression Factor		1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2		3.6	0.5					6.4		7.6	0.0	
Delay (s)		37.2	32.4					21.3		30.1	3.1	
Level of Service		D	C					C		C	A	
Approach Delay (s)		34.8			0.0			21.3			10.1	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	81.9	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

1: MLK Jr Dr/Lakeshore Blvd & IR-90 WB Off Ramp
2034 AM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB & WB Signal

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱↰↱		↑			↑
Volume (vph)	1230	100	120	0	0	100
Ideal Flow (vphpl)	1500	1500	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0			5.0
Lane Util. Factor	0.97		1.00			1.00
Frt	0.99		1.00			1.00
Flt Protected	0.96		1.00			1.00
Satd. Flow (prot)	2696		1863			1863
Flt Permitted	0.96		1.00			1.00
Satd. Flow (perm)	2696		1863			1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1337	109	130	0	0	109
RTOR Reduction (vph)	7	0	0	0	0	0
Lane Group Flow (vph)	1439	0	130	0	0	109
Turn Type	Prot		NA			NA
Protected Phases	8		4			6
Permitted Phases						
Actuated Green, G (s)	56.4		9.5			9.1
Effective Green, g (s)	56.4		9.5			9.1
Actuated g/C Ratio	0.63		0.11			0.10
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1689		196			188
v/s Ratio Prot	c0.53		c0.07			c0.06
v/s Ratio Perm						
v/c Ratio	0.85		0.66			0.58
Uniform Delay, d1	13.5		38.7			38.6
Progression Factor	1.00		1.12			1.00
Incremental Delay, d2	5.7		8.1			4.3
Delay (s)	19.1		51.6			42.9
Level of Service	B		D			D
Approach Delay (s)	19.1		51.6			42.9
Approach LOS	B		D			D

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2: MLK Jr Dr & N Marginal Rd
2034 AM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB & WB Signal

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Volume (vph)	20	80	20	470	1180	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.89		1.00	1.00	0.98	
Flt Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1645		1770	3539	3479	
Flt Permitted	0.99		0.10	1.00	1.00	
Satd. Flow (perm)	1645		178	3539	3479	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	87	22	511	1283	163
RTOR Reduction (vph)	78	0	0	0	10	0
Lane Group Flow (vph)	31	0	22	511	1436	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	8	
Permitted Phases			2			
Actuated Green, G (s)	9.5		70.5	70.5	56.4	
Effective Green, g (s)	9.5		70.5	70.5	56.4	
Actuated g/C Ratio	0.11		0.78	0.78	0.63	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	173		139	2772	2180	
v/s Ratio Prot	c0.02			c0.14	c0.41	
v/s Ratio Perm			0.12			
v/c Ratio	0.18		0.16	0.18	0.66	
Uniform Delay, d1	36.7		2.4	2.5	10.7	
Progression Factor	1.00		0.62	0.79	0.33	
Incremental Delay, d2	0.5		2.1	0.1	1.0	
Delay (s)	37.2		3.6	2.1	4.5	
Level of Service	D		A	A	A	
Approach Delay (s)	37.2			2.1	4.5	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

3: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp
2034 AM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB & WB Signal

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥	↱					↑↱		↰	↑↑	
Volume (vph)	35	5	590	0	0	0	0	455	605	75	1180	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0		5.0	5.0	
Lane Util. Factor		0.95	0.95					0.95		1.00	0.95	
Frt		0.87	0.85					0.91		1.00	1.00	
Flt Protected		0.99	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1529	1504					3236		1770	3539	
Flt Permitted		0.99	1.00					1.00		0.20	1.00	
Satd. Flow (perm)		1529	1504					3236		365	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	5	641	0	0	0	0	495	658	82	1283	0
RTOR Reduction (vph)	0	39	39	0	0	0	0	223	0	0	0	0
Lane Group Flow (vph)	0	305	301	0	0	0	0	930	0	82	1283	0
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		22.7	22.7					57.3		57.3	57.3	
Effective Green, g (s)		22.7	22.7					57.3		57.3	57.3	
Actuated g/C Ratio		0.25	0.25					0.64		0.64	0.64	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		385	379					2060		232	2253	
v/s Ratio Prot								0.29			c0.36	
v/s Ratio Perm		0.20	c0.20							0.22		
v/c Ratio		0.79	0.79					0.45		0.35	0.57	
Uniform Delay, d1		31.4	31.5					8.3		7.7	9.3	
Progression Factor		1.00	1.00					1.00		0.89	1.01	
Incremental Delay, d2		10.7	10.9					0.7		3.2	0.8	
Delay (s)		42.1	42.4					9.1		10.0	10.2	
Level of Service		D	D					A		B	B	
Approach Delay (s)		42.3			0.0			9.1			10.2	
Approach LOS		D			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: MLK Jr Dr/Lakeshore Blvd & IR-90 WB Off Ramp
2034 PM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB & WB Signal

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱↰↱		↑			↑
Volume (vph)	565	75	75	0	0	130
Ideal Flow (vphpl)	1500	1500	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0			5.0
Lane Util. Factor	0.97		1.00			1.00
Frt	0.98		1.00			1.00
Flt Protected	0.96		1.00			1.00
Satd. Flow (prot)	2684		1863			1863
Flt Permitted	0.96		1.00			1.00
Satd. Flow (perm)	2684		1863			1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	614	82	82	0	0	141
RTOR Reduction (vph)	11	0	0	0	0	0
Lane Group Flow (vph)	685	0	82	0	0	141
Turn Type	Prot		NA			NA
Protected Phases	8		4			6
Permitted Phases						
Actuated Green, G (s)	56.6		8.6			9.8
Effective Green, g (s)	56.6		8.6			9.8
Actuated g/C Ratio	0.63		0.10			0.11
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	1687		178			202
v/s Ratio Prot	c0.26		c0.04			c0.08
v/s Ratio Perm						
v/c Ratio	0.41		0.46			0.70
Uniform Delay, d1	8.3		38.5			38.7
Progression Factor	1.00		0.93			1.00
Incremental Delay, d2	0.7		1.9			10.0
Delay (s)	9.0		37.5			48.7
Level of Service	A		D			D
Approach Delay (s)	9.0		37.5			48.7
Approach LOS	A		D			D

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2: MLK Jr Dr & N Marginal Rd
2034 PM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB & WB Signal

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	⅄		↰	↑↑	↑↱	
Volume (vph)	20	180	20	575	555	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.88		1.00	1.00	0.97	
Flt Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1628		1770	3539	3432	
Flt Permitted	0.99		0.27	1.00	1.00	
Satd. Flow (perm)	1628		497	3539	3432	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	196	22	625	603	152
RTOR Reduction (vph)	177	0	0	0	24	0
Lane Group Flow (vph)	41	0	22	625	731	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	8	
Permitted Phases			2			
Actuated Green, G (s)	8.6		71.4	71.4	56.6	
Effective Green, g (s)	8.6		71.4	71.4	56.6	
Actuated g/C Ratio	0.10		0.79	0.79	0.63	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	155		394	2807	2158	
v/s Ratio Prot	c0.03			c0.18	c0.21	
v/s Ratio Perm			0.04			
v/c Ratio	0.26		0.06	0.22	0.34	
Uniform Delay, d1	37.8		2.0	2.3	7.9	
Progression Factor	1.00		0.69	0.61	0.38	
Incremental Delay, d2	0.9		0.1	0.1	0.4	
Delay (s)	38.7		1.5	1.5	3.4	
Level of Service	D		A	A	A	
Approach Delay (s)	38.7			1.5	3.4	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

3: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp
2034 PM Build - 2 SB Lanes, 2 WB Exit Lanes, +EB & WB Signal

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥	↱					↑↱		↰	↑↑	
Volume (vph)	45	5	500	0	0	0	0	550	1255	190	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0					5.0		5.0	5.0	
Lane Util. Factor		0.95	0.95					0.95		1.00	0.95	
Frt		0.88	0.85					0.90		1.00	1.00	
Flt Protected		0.99	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1539	1504					3170		1770	3539	
Flt Permitted		0.99	1.00					1.00		0.07	1.00	
Satd. Flow (perm)		1539	1504					3170		125	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	5	543	0	0	0	0	598	1364	207	592	0
RTOR Reduction (vph)	0	195	258	0	0	0	0	282	0	0	0	0
Lane Group Flow (vph)	0	109	35	0	0	0	0	1680	0	207	592	0
Turn Type	Perm	NA	Perm					NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		10.9	10.9					54.7		69.1	69.1	
Effective Green, g (s)		10.9	10.9					54.7		69.1	69.1	
Actuated g/C Ratio		0.12	0.12					0.61		0.77	0.77	
Clearance Time (s)		5.0	5.0					5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		186	182					1926		267	2717	
v/s Ratio Prot								c0.53		c0.08	0.17	
v/s Ratio Perm		0.07	0.02							0.51		
v/c Ratio		0.59	0.19					1.08dr		0.78	0.22	
Uniform Delay, d1		37.4	35.6					14.7		26.8	2.9	
Progression Factor		1.00	1.00					1.00		1.66	0.70	
Incremental Delay, d2		4.6	0.5					5.8		12.3	0.2	
Delay (s)		42.1	36.1					20.5		56.6	2.2	
Level of Service		D	D					C		E	A	
Approach Delay (s)		39.1			0.0			20.5			16.3	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.8%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

QUEUE REPORTS

Intersection: 1: MLK Jr Dr/Lakeshore Blvd & IR-90 WB Off Ramp

Movement	WB	NB	SB
Directions Served	LR	T	T
Maximum Queue (ft)	1264	162	126
Average Queue (ft)	1185	59	43
95th Queue (ft)	1535	125	85
Link Distance (ft)	1208	177	582
Upstream Blk Time (%)	85	4	
Queuing Penalty (veh)	0	5	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: MLK Jr Dr & IR-90 WB On Ramp

Movement	NB	SB	SB
Directions Served	T	T	T
Maximum Queue (ft)	18	218	208
Average Queue (ft)	1	192	175
95th Queue (ft)	9	237	233
Link Distance (ft)	18	177	177
Upstream Blk Time (%)	4	26	12
Queuing Penalty (veh)	9	160	70
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	LT	T
Maximum Queue (ft)	784	797	22	102	348	372
Average Queue (ft)	692	709	1	12	318	295
95th Queue (ft)	982	969	12	56	343	406
Link Distance (ft)	750	750	289	289	302	302
Upstream Blk Time (%)	78	84			45	14
Queuing Penalty (veh)	0	0			272	83
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: MLK Jr Dr & N Marginal Rd

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (ft)	106	126	65	55
Average Queue (ft)	31	19	35	14
95th Queue (ft)	82	84	52	42
Link Distance (ft)	787	302	18	18
Upstream Blk Time (%)		0	42	7
Queuing Penalty (veh)		0	252	42
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 13: MLK Drive & Broad Ave

Movement	EB	NB	NB	SB	B12	B12
Directions Served	LR	L	T	TR	T	
Maximum Queue (ft)	43	70	446	176	411	326
Average Queue (ft)	17	20	65	97	370	205
95th Queue (ft)	43	56	256	221	474	442
Link Distance (ft)	276	2210	2210	85	289	289
Upstream Blk Time (%)				8	69	6
Queuing Penalty (veh)				146	610	56
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 1706

Queuing and Blocking Report
2034 AM Build Alt 1 - 2 SB Lanes, 2 WB Exit Lanes

6/23/2015

Intersection: 1: MLK Jr Dr/Lakeshore Blvd & IR-90 WB Off Ramp

Movement	WB	WB	NB	SB
Directions Served	L	LR	T	T
Maximum Queue (ft)	25	33	151	116
Average Queue (ft)	2	3	73	48
95th Queue (ft)	12	18	136	88
Link Distance (ft)	1209	1209	171	576
Upstream Blk Time (%)			2	
Queuing Penalty (veh)			3	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: MLK Jr Dr & IR-90 WB On Ramp

Movement	NB	NB
Directions Served	T	R
Maximum Queue (ft)	12	9
Average Queue (ft)	2	0
95th Queue (ft)	13	6
Link Distance (ft)	18	18
Upstream Blk Time (%)	2	0
Queuing Penalty (veh)	4	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	LT	T
Maximum Queue (ft)	790	799	7	57	116	133
Average Queue (ft)	755	769	0	9	33	20
95th Queue (ft)	903	784	7	40	101	95
Link Distance (ft)	750	750	289	289	302	302
Upstream Blk Time (%)	93	98				
Queuing Penalty (veh)	0	0				
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 8: MLK Jr Dr & N Marginal Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	71	85	4
Average Queue (ft)	24	22	0
95th Queue (ft)	59	67	3
Link Distance (ft)	787	302	18
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 13: MLK Drive & Broad Ave

Movement	EB	NB	SB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (ft)	39	598	109	108
Average Queue (ft)	14	113	23	28
95th Queue (ft)	39	426	76	85
Link Distance (ft)	269	2210	85	85
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			3	3
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 12

Queuing and Blocking Report
2034 AM Build Alt 2 - 2 SB Lanes, 2 WB Exit Lanes, +EB Signal

6/23/2015

Intersection: 1: MLK Jr Dr/Lakeshore Blvd & IR-90 WB Off Ramp

Movement	WB	WB	NB	SB
Directions Served	L	LR	T	T
Maximum Queue (ft)	32	28	174	100
Average Queue (ft)	2	2	82	48
95th Queue (ft)	13	14	157	83
Link Distance (ft)	1209	1209	171	576
Upstream Blk Time (%)			5	
Queuing Penalty (veh)			6	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: MLK Jr Dr & IR-90 WB On Ramp

Movement	NB
Directions Served	T
Maximum Queue (ft)	27
Average Queue (ft)	3
95th Queue (ft)	18
Link Distance (ft)	18
Upstream Blk Time (%)	3
Queuing Penalty (veh)	8
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp

Movement	EB	EB	NB	NB	B12	SB	SB	SB
Directions Served	LTR	R	T	TR	T	L	T	T
Maximum Queue (ft)	269	234	187	299	37	66	158	158
Average Queue (ft)	162	112	38	155	2	14	77	104
95th Queue (ft)	242	212	118	270	29	43	130	151
Link Distance (ft)	752	752	295	295	85		308	308
Upstream Blk Time (%)			0	1	0			
Queuing Penalty (veh)			0	5	3			
Storage Bay Dist (ft)						100		
Storage Blk Time (%)							1	
Queuing Penalty (veh)							0	

Intersection: 8: MLK Jr Dr & N Marginal Rd

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	96	47	49	4
Average Queue (ft)	28	14	3	0
95th Queue (ft)	69	42	26	3
Link Distance (ft)	786		308	18
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		100		
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 13: MLK Drive & Broad Ave

Movement	EB	NB	SB	SB	B12	B12
Directions Served	LR	LT	T	TR	T	T
Maximum Queue (ft)	42	752	141	153	15	28
Average Queue (ft)	15	193	33	44	1	2
95th Queue (ft)	41	577	102	126	8	14
Link Distance (ft)	269	2210	85	85	295	295
Upstream Blk Time (%)			1	2		
Queuing Penalty (veh)			8	14		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 44

IR-90 MAINLINE
CAPACITY REPORTS

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		***Site Information***	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*West of E 55th St*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3975*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1078*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*18.0*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information / Site Information

Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*West of E 55th St*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5480*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs / Calc Speed Adj and FFS

Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures / Design (N)

Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1487*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*24.8*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 55th Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3660*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*993*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*16.5*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		***Site Information***	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 55th Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5270*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1430*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*23.8*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary

N - Number of lines
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 55th and E 72nd*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4030*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1093*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*18.2*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 55th and E 72nd*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6030*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1636*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*27.3*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*MLS*
Agency or Company	*LJB Inc.*
Date Performed	*2/27/2015*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*IR-90 / Eastbound*
From/To	*Between E 72nd Ramps*
Jurisdiction	*ODOT District 12*
Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3960*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1074*	pc/h/ln
S	*60.0*	mph
D = v_p / S	*17.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		***Site Information***	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 72nd Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5930*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1609*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*26.8*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between MLK Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

(Site Information)

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3395*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*921*	pc/h/ln
S	*60.0*	mph
D = v_p / S	*15.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		**Site Information**	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between MLK Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5545*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1504*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*25.1*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		**Site Information**	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*East of MLK*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4015*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1089*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*18.1*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		***Site Information***	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*East of MLK*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6830*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1853*	pc/h/ln
S	*58.8*	mph
D = v_p / S	*31.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		**Site Information**	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between E.72nd and MLK*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Build*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3960*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1074*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*17.9*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*MLS*
Agency or Company	*LJB Inc.*
Date Performed	*2/27/2015*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*IR-90 / Eastbound*
From/To	*Between E.72nd and MLK*
Jurisdiction	*ODOT District 12*
Analysis Year	*2034 Build*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5930*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1609*	pc/h/ln
S	*60.0*	mph
D = v_p / S	*26.8*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes

V - Hourly volume

v_p - Flow rate

LOS - Level of service

DDHV - Directional design hour volume

S - Speed

D - Density

FFS - Free-flow speed

BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12

E_T - Exhibits 11-10, 11-11, 11-13

f_p - Page 11-18

LOS, S, FFS, v_p - Exhibits 11-2, 11-3

f_{LW} - Exhibit 11-8

f_{LC} - Exhibit 11-9

TRD - Page 11-11

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*MLS*
Agency or Company	*LJB Inc.*
Date Performed	*2/27/2015*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*IR-90 / Westbound*
From/To	*East of MLK*
Jurisdiction	*ODOT District 12*
Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7140*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1937*	pc/h/ln
S	*57.9*	mph
D = v_p / S	*33.4*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*East of MLK*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4630*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1256*	pc/h/ln
S	*60.0*	mph
D = v_p / S	*20.9*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes
S - Speed
V - Hourly volume
D - Density
v_p - Flow rate
FFS - Free-flow speed
LOS - Level of service
BFFS - Base free-flow speed
DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 11-10, 11-12
f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13
f_{LC} - Exhibit 11-9
f_p - Page 11-18
TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*MLS*
Agency or Company	*LJB Inc.*
Date Performed	*2/27/2015*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*IR-90 / Westbound*
From/To	*Between MLK Ramps*
Jurisdiction	*ODOT District 12*
Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5940*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1611*	pc/h/ln
S	*60.0*	mph
D = v_p / S	*26.9*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes

V - Hourly volume

v_p - Flow rate

LOS - Level of service

DDHV - Directional design hour volume

S - Speed

D - Density

FFS - Free-flow speed

BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12

E_T - Exhibits 11-10, 11-11, 11-13

f_p - Page 11-18

LOS, S, FFS, v_p - Exhibits 11-2, 11-3

f_{LW} - Exhibit 11-8

f_{LC} - Exhibit 11-9

TRD - Page 11-11

BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*Between MLK Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4110*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
			Design (N)	
Operational (LOS)			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1115*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*18.6*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 72nd Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6160*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length	*mi*
			Up/Down %	

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]	*0.980*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
			Design (N)	
Operational (LOS)			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1671*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*59.9*	mph	S	mph
D = v_p / S	*27.9*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

## General Information		## Site Information	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 72nd Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4490*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

## Speed Inputs			## Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

## LOS and Performance Measures			## Design (N)	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1218*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*20.3*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

## Glossary		## Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information / Site Information

Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 55th and E 72nd*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6350*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1723*	pc/h/ln
S	*59.7*	mph
D = v_p / S	*28.8*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		***Site Information***	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 55th and E 72nd*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4630*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = $1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1256*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*20.9*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 55th Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5610*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1522*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*25.4*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		**Site Information**	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*Between E 55th Ramps*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3870*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**	
<u>Operational (LOS)</u>			<u>Design (N)</u>	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1050*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*17.5*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*B*		Required Number of Lanes, N	

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		***Site Information***	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*West of E 55th St*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5800*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**		
			Design (N)		
Operational (LOS)			Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1573*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S	*60.0*	mph	S		mph
D = v_p / S	*26.2*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*D*		Required Number of Lanes, N		

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
DDHV - Directional design hour volume
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		Site Information	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Westbound*
Agency or Company	*LJB Inc.*	From/To	*West of E 55th St*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2034 Existing Condition*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4170*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			Calc Speed Adj and FFS		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			Design (N)	
			Design (N)	
Operational (LOS)			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1131*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*60.0*	mph	S	mph
D = v_p / S	*18.9*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*C*		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information		**Site Information**	
Analyst	*MLS*	Highway/Direction of Travel	*IR-90 / Eastbound*
Agency or Company	*LJB Inc.*	From/To	*Between MLK and E.72nd*
Date Performed	*2/27/2015*	Jurisdiction	*ODOT District 12*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2034 Build*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6160*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f_{LW}		mph
Number of Lanes, N	*4*		f_{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	*60.0*	mph	FFS	*60.0*	mph
Base free-flow Speed, BFFS		mph			

LOS and Performance Measures			**Design (N)**	
Operational (LOS)			Design (N)	
			Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1671*	pc/h/ln	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	*59.9*	mph	S	mph
D = v_p / S	*27.9*	pc/mi/ln	D = v_p / S	pc/mi/ln
LOS	*D*		Required Number of Lanes, N	

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
V - Hourly volume	D - Density	E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 11-18	TRD - Page 11-11
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 11-2, 11-3	
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*MLS*
Agency or Company	*LJB Inc.*
Date Performed	*2/27/2015*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*IR-90 / Eastbound*
From/To	*Between MLK and E.72nd*
Jurisdiction	*ODOT District 12*
Analysis Year	*2034 Build*

Project Description *CUY-90-19.5/21.3*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4490*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*4*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]	*0.980*

Speed Inputs

Lane Width		ft
Rt-Side Lat. Clearance		ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD		ramps/mi
FFS (measured)	*60.0*	mph
Base free-flow Speed, BFFS		mph

Calc Speed Adj and FFS

f_{LW}		mph
f_{LC}		mph
TRD Adjustment		mph
FFS	*60.0*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1218*	pc/h/ln
S	*60.0*	mph
D = v_p / S	*20.3*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes

V - Hourly volume

v_p - Flow rate

LOS - Level of service

DDHV - Directional design hour volume

S - Speed

D - Density

FFS - Free-flow speed

BFFS - Base free-flow speed

Factor Location

E_R - Exhibits 11-10, 11-12

E_T - Exhibits 11-10, 11-11, 11-13

f_p - Page 11-18

LOS, S, FFS, v_p - Exhibits 11-2, 11-3

f_{LW} - Exhibit 11-8

f_{LC} - Exhibit 11-9

TRD - Page 11-11

IR-90 MERGE / DIVERGE CAPACITY REPORTS

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	E 55th St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	885
Deceleration Lane Length L_D	
Freeway Volume, V_F	3660
Ramp Volume, V_R	370
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3660	0.94	Level	4	0	0.980	1.00	3971
Ramp	370	0.94	Level	9	0	0.957	1.00	411
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\ (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.166 using Equation (Exhibit 13-6)

V_{12} = 661 pc/h

V_3 or V_{av34} 1655 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1588 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4382	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1999	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = 15.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.270 (Exibit 13-11)

S_R= 55.1 mph (Exhibit 13-11)

S_0= 57.5 mph (Exhibit 13-11)

S = 56.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	E 55th St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	885
Deceleration Lane Length L_D	
Freeway Volume, V_F	5270
Ramp Volume, V_R	760
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5270	0.94	Level	4	0	0.980	1.00	5719
Ramp	760	0.94	Level	1	0	0.995	1.00	813
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.116 using Equation (Exhibit 13-6)

V_{12} = 664 pc/h

V_3 or V_{av34} 2527 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2287 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6532	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3100	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 23.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.328 (Exibit 13-11)

S_R= 54.1 mph (Exhibit 13-11)

S_0= 55.6 mph (Exhibit 13-11)

S = 54.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	520
Deceleration Lane Length L_D	
Freeway Volume, V_F	3395
Ramp Volume, V_R	620
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3395	0.94	Level	4	0	0.980	1.00	3684
Ramp	620	0.94	Level	2	0	0.990	1.00	666
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.135 using Equation (Exhibit 13-6)

V_{12} = 496 pc/h

V_3 or V_{av34} 1594 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1473 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4350	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2139	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.6 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.307 (Exibit 13-11)

S_R= 54.5 mph (Exhibit 13-11)

S_0= 57.8 mph (Exhibit 13-11)

S = 56.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	520
Deceleration Lane Length L_D	
Freeway Volume, V_F	5545
Ramp Volume, V_R	1285
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5545	0.94	Level	4	0	0.980	1.00	6017
Ramp	1285	0.94	Level	2	0	0.990	1.00	1381
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.045 using Equation (Exhibit 13-6)

V_{12} = 272 pc/h

V_3 or V_{av34} 2872 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2406 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7398	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3787	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 31.1 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.446 (Exibit 13-11)

S_R= 52.0 mph (Exhibit 13-11)

S_0= 55.3 mph (Exhibit 13-11)

S = 53.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	E 72nd St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	735
Deceleration Lane Length L_D	
Freeway Volume, V_F	6160
Ramp Volume, V_R	190
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	6160	0.94	Level	4	0	0.980	1.00	6684
Ramp	190	0.94	Level	4	0	0.980	1.00	206
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.192 using Equation (Exhibit 13-6)

V_{12} = 1284 pc/h

V_3 or V_{av34} 2700 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2673 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6890	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2879	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 23.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.324 (Exibit 13-11)

S_R= 54.2 mph (Exhibit 13-11)

S_0= 54.6 mph (Exhibit 13-11)

S = 54.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	E 72nd St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	735
Deceleration Lane Length L_D	
Freeway Volume, V_F	4490
Ramp Volume, V_R	140
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4490	0.94	Level	4	0	0.980	1.00	4872
Ramp	140	0.94	Level	2	0	0.990	1.00	150
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F$ (P_{FM})

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.199 using Equation (Exhibit 13-6)

V_{12} = 970 pc/h

V_3 or V_{av34} 1951 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1948 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5022	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2098	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 17.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.287 (Exibit 13-11)

S_R= 54.8 mph (Exhibit 13-11)

S_0= 56.5 mph

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	E 55th St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	565
Deceleration Lane Length L_D	
Freeway Volume, V_F	5610
Ramp Volume, V_R	190
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5610	0.94	Level	4	0	0.980	1.00	6087
Ramp	190	0.94	Level	9	0	0.957	1.00	211
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.191 using Equation (Exhibit 13-6)

V_{12} = 1165 pc/h

V_3 or V_{av34} 2461 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2434 pc/h (Equation 13-16, 13-18, or 13-19)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6298	Exhibit 13-8		No

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2645	Exhibit 13-8	4600:All	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 22.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = 0.325 (Exibit 13-11)

S_R= 54.1 mph (Exhibit 13-11)

S_0= 55.2 mph (Exhibit 13-11)

S = 54.8 mph (Exhibit 13-13)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	E 55th St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	565
Deceleration Lane Length L_D	
Freeway Volume, V_F	3870
Ramp Volume, V_R	300
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3870	0.94	Level	4	0	0.980	1.00	4199
Ramp	300	0.94	Level	8	0	0.962	1.00	332
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.176 using Equation (Exhibit 13-6)

V_{12} = 740 pc/h

V_3 or V_{av34} 1729 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1679 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4531	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2011	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 17.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.299 (Exibit 13-11)

S_R= 54.6 mph (Exhibit 13-11)

S_0= 57.3 mph (Exhibit 13-11)

S = 56.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	6/19/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Build Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	520
Deceleration Lane Length L_D	
Freeway Volume, V_F	3335
Ramp Volume, V_R	680
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3335	0.94	Level	4	0	0.980	1.00	3619
Ramp	680	0.94	Level	2	0	0.990	1.00	731
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F\,(P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.126 using Equation (Exhibit 13-6)

V_{12} = 458 pc/h

V_3 or V_{av34} 1580 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1447 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4350	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2178	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\,v_R + 0.0078\,V_{12} - 0.00627\,L_A$

D_R = 18.9 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.309 (Exibit 13-11)

S_R= 54.4 mph (Exhibit 13-11)

S_0= 57.9 mph (Exhibit 13-11)

S = 56.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\,V_{12} - 0.009\,L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	6/19/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Build Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	520
Deceleration Lane Length L_D	
Freeway Volume, V_F	5385
Ramp Volume, V_R	1445
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5385	0.94	Level	4	0	0.980	1.00	5843
Ramp	1445	0.94	Level	2	0	0.990	1.00	1553
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.024 using Equation (Exhibit 13-6)

V_{12} = 138 pc/h

V_3 or V_{av34} 2852 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2337 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7396	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3890	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 31.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.465 (Exibit 13-11)

S_R= 51.6 mph (Exhibit 13-11)

S_0= 55.5 mph (Exhibit 13-11)

S = 53.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	6/19/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Build Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1350
Deceleration Lane Length L_D	
Freeway Volume, V_F	5810
Ramp Volume, V_R	350
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5810	0.94	Level	4	0	0.980	1.00	6304
Ramp	350	0.94	Level	2	0	0.990	1.00	376
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.171 using Equation (Exhibit 13-6)

V_{12} = 1077 pc/h

V_3 or V_{av34} 2613 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2521 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6680	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2897	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = 19.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.311 (Exibit 13-11)

S_R= 54.4 mph (Exhibit 13-11)

S_0= 55.0 mph (Exhibit 13-11)

S = 54.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	6/19/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Build Condition

Project Description CUY-90-19.5/21.3 Safety Study

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	1350
Deceleration Lane Length L_D	
Freeway Volume, V_F	3990
Ramp Volume, V_R	500
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3990	0.94	Level	4	0	0.980	1.00	4330
Ramp	500	0.94	Level	2	0	0.990	1.00	537
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.151 using Equation (Exhibit 13-6)

V_{12} = 652 pc/h

V_3 or V_{av34} 1839 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1732 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4867	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2269	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 14.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.278 (Exibit 13-11)

S_R= 55.0 mph (Exhibit 13-11)

S_0= 57.1 mph (Exhibit 13-11)

S = 56.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	E 55th St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	1460
Freeway Volume, V_F	3975
Ramp Volume, V_R	315
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3975	0.94	Level	9	0	0.957	1.00	4419
Ramp	315	0.94	Level	5	0	0.976	1.00	343
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F \, (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 2120 pc/h

V_3 or V_{av34} 1149 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4419	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	4076	Exhibit 13-8	9200	No
V_R	343	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2120	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = 9.3 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

D_s = 0.329 (Exhibit 13-12)

S_R= 54.1 mph (Exhibit 13-12)

S_0= 65.2 mph (Exhibit 13-12)

S = 59.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / *Site Information*

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	E 55th St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	1460
Freeway Volume, V_F	5480
Ramp Volume, V_R	210
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5480	0.94	Level	8	0	0.962	1.00	6063
Ramp	210	0.94	Level	5	0	0.976	1.00	229
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\,(P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 2773 pc/h

V_3 or V_{av34} 1645 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6063	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	5834	Exhibit 13-8	9200	No
V_R	229	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2773	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = 15.0 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.319 (Exhibit 13-12)

S_R= 54.3 mph (Exhibit 13-12)

S_0= 63.3 mph (Exhibit 13-12)

S = 58.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	E 72nd St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	645
Freeway Volume, V_F	4030
Ramp Volume, V_R	70
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4030	0.94	Level	4	0	0.980	1.00	4373
Ramp	70	0.94	Level	5	0	0.976	1.00	76
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\,(P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 1949 pc/h

V_3 or V_{av34} 1212 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4373	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	4297	Exhibit 13-8	9200	No
V_R	76	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1949	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = 15.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.500 (Exhibit 13-12)

S_R= 51.0 mph (Exhibit 13-12)

S_0= 65.0 mph (Exhibit 13-12)

S = 57.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	E 72nd St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	645
Freeway Volume, V_F	6030
Ramp Volume, V_R	100
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	30.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	6030	0.94	Level	4	0	0.980	1.00	6543
Ramp	100	0.94	Level	3	0	0.985	1.00	108
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\,(P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 2914 pc/h

V_3 or V_{av34} 1814 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6543	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	6435	Exhibit 13-8	9200	No
V_R	108	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2914	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = 23.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.503 (Exhibit 13-12)

S_R= 51.0 mph (Exhibit 13-12)

S_0= 62.6 mph (Exhibit 13-12)

S = 56.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	670
Freeway Volume, V_F	7140
Ramp Volume, V_R	1200
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	25.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7140	0.94	Level	4	0	0.980	1.00	7748
Ramp	1200	0.94	Level	3	0	0.985	1.00	1296
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 4109 pc/h

V_3 or V_{av34} 1819 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7748	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	6452	Exhibit 13-8	9200	No
V_R	1296	Exhibit 13-10	1900	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4109	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 33.6 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.675 (Exhibit 13-12)

S_R= 47.9 mph (Exhibit 13-12)

S_0= 62.6 mph (Exhibit 13-12)

S = 53.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Existing Condition

Site Information

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	670
Freeway Volume, V_F	4630
Ramp Volume, V_R	520
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	25.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4630	0.94	Level	4	0	0.980	1.00	5024
Ramp	520	0.94	Level	3	0	0.985	1.00	561
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 2507 pc/h

V_3 or V_{av34} 1258 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5024	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	4463	Exhibit 13-8	9200	No
V_R	561	Exhibit 13-10	1900	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2507	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.608 (Exhibit 13-12)

S_R= 49.0 mph (Exhibit 13-12)

S_0= 64.8 mph (Exhibit 13-12)

S = 55.9 mph (Exhibit 13-13)

HCS2010™ Version 6.60 Generated: 6/22/2015 11:44 AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	E 55th St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	575
Freeway Volume, V_F	6350
Ramp Volume, V_R	740
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	25.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6350	0.94	Level	4	0	0.980	1.00	6890
Ramp	740	0.94	Level	3	0	0.985	1.00	799
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exhibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 3455 pc/h

V_3 or V_{av34} 1717 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6890	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	6091	Exhibit 13-8	9200	No
V_R	799	Exhibit 13-10	1900	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3455	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 28.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.630 (Exhibit 13-12)

S_R= 48.7 mph (Exhibit 13-12)

S_0= 63.0 mph (Exhibit 13-12)

S = 54.9 mph (Exhibit 13-13)

HCS2010™ Version 6.60 Generated: 6/22/2015 11:43 AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	E 55th St
Date Performed	2/27/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Existing Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	575
Freeway Volume, V_F	4630
Ramp Volume, V_R	760
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	25.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4630	0.94	Level	4	0	0.980	1.00	5024
Ramp	760	0.94	Level	8	0	0.962	1.00	841
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\,(P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 2665 pc/h

V_3 or V_{av34} 1179 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5024	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	4183	Exhibit 13-8	9200	No
V_R	841	Exhibit 13-10	1900	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2665	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$$

D_R = 22.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.634 (Exhibit 13-12)

S_R= 48.6 mph (Exhibit 13-12)

S_0= 65.1 mph (Exhibit 13-12)

S = 55.2 mph (Exhibit 13-13)

HCS2010™ Version 6.60 Generated: 6/22/2015 11:43 AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		***Site Information***	
Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	6/19/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Build Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp			Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N	4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N	1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A		L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D	800	V_D = veh/h
	Freeway Volume, V_F	3960	
	Ramp Volume, V_R	625	
	Freeway Free-Flow Speed, S_{FF}	60.0	
	Ramp Free-Flow Speed, S_{FR}	45.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3960	0.94	Level	9	0	0.957	1.00	4402
Ramp	625	0.94	Level	5	0	0.976	1.00	682
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exhibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 2304 pc/h

V_3 or V_{av34} 1049 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4402	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	3720	Exhibit 13-8	9200	No
V_R	682	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2304	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 16.9 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.359 (Exhibit 13-12)

S_R= 53.5 mph (Exhibit 13-12)

S_0= 65.6 mph (Exhibit 13-12)

S = 58.7 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Eastbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	6/19/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Build Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	800
Freeway Volume, V_F	5930
Ramp Volume, V_R	545
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	45.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5930	0.94	Level	8	0	0.962	1.00	6561
Ramp	545	0.94	Level	5	0	0.976	1.00	594
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F\,(P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 3196 pc/h

V_3 or V_{av34} 1682 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6561	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	5967	Exhibit 13-8	9200	No
V_R	594	Exhibit 13-10	2100	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3196	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$$

D_R = 24.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.351 (Exhibit 13-12)

S_R= 53.7 mph (Exhibit 13-12)

S_0= 63.2 mph (Exhibit 13-12)

S = 58.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	6/19/2015	Jurisdiction	ODOT District 12
Analysis Time Period	AM Peak Hour	Analysis Year	2034 Build Condition

Site Information

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	670
Freeway Volume, V_F	7140
Ramp Volume, V_R	1330
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	25.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	7140	0.94	Level	4	0	0.980	1.00	7748
Ramp	1330	0.94	Level	3	0	0.985	1.00	1436
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$$V_{12} = V_F (P_{FM})$$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$$V_{12} = V_R + (V_F - V_R)P_{FD}$$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 4188 pc/h

V_3 or V_{av34} 1780 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7748	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	6312	Exhibit 13-8	9200	No
V_R	1436	Exhibit 13-10	1900	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4188	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$$

D_R = 34.2 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.687 (Exhibit 13-12)

S_R= 47.6 mph (Exhibit 13-12)

S_0= 62.8 mph (Exhibit 13-12)

S = 53.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	MLS	Freeway/Dir of Travel	IR-90 / Westbound
Agency or Company	LJB Inc.	Junction	Martin Luther King Jr Dr
Date Performed	6/19/2015	Jurisdiction	ODOT District 12
Analysis Time Period	PM Peak Hour	Analysis Year	2034 Build Condition

Project Description CUY-90-19.5/21.3

Inputs

Upstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	670
Freeway Volume, V_F	4630
Ramp Volume, V_R	650
Freeway Free-Flow Speed, S_{FF}	60.0
Ramp Free-Flow Speed, S_{FR}	25.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4630	0.94	Level	4	0	0.980	1.00	5024
Ramp	650	0.94	Level	3	0	0.985	1.00	702
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 2586 pc/h

V_3 or V_{av34} 1219 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5024	Exhibit 13-8	9200	No
$V_{FO} = V_F - V_R$	4322	Exhibit 13-8	9200	No
V_R	702	Exhibit 13-10	1900	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2586	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.621 (Exhibit 13-12)

S_R= 48.8 mph (Exhibit 13-12)

S_0= 65.0 mph (Exhibit 13-12)

S = 55.5 mph (Exhibit 13-13)

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IR-90 WEAVE
CAPACITY REPORTS

FREEWAY WEAVING WORKSHEET

General Information

Analyst	MLS
Agency/Company	LJB Inc.
Date Performed	2/27/2015
Analysis Time Period	AM Peak Hour

Site Information

Freeway/Dir of Travel	IR-90 / Eastbound
Weaving Segment Location	E 72nd St / MLK Jr Dr
Analysis Year	2034 Existing Condition

Project Description CUY-90-19.50/21.30

Inputs

Weaving configuration	One-Sided
Weaving number of lanes, N	4
Weaving segment length, L_S	515ft
Freeway free-flow speed, FFS	60 mph

Segment type	Freeway
Freeway minimum speed, S_{MIN}	40
Freeway maximum capacity, C_{IFL}	2300
Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3335	0.92	4	0	1.5	1.2	0.980	1.00	3698
V_{RF}	60	0.92	0	0	1.5	1.2	1.000	1.00	65
V_{FR}	625	0.92	4	0	1.5	1.2	0.980	1.00	693
V_{RR}	0	0.92	0	0	1.5	1.2	1.000	1.00	0
V_{NW}	3698							V =	4456
V_W	758								
VR	0.170								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc
Interchange density, ID	1.2 int/mi
Minimum RF lane changes, LC_{RF}	1 lc/pc
Minimum FR lane changes, LC_{FR}	1 lc/pc
Minimum RR lane changes, LC_{RR}	lc/pc

Minimum weaving lane changes, LC_{MIN}	758 lc/h
Weaving lane changes, LC_W	930 lc/h
Non-weaving lane changes, LC_{NW}	271 lc/h
Total lane changes, LC_{ALL}	1201 lc/h
Non-weaving vehicle index, I_{NW}	229

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	4370 veh/h
Weaving segment capacity, c_w	7906 veh/h
Weaving segment v/c ratio	0.553
Weaving segment density, D	22.3 pc/mi/ln
Level of Service, LOS	C

Weaving intensity factor, W	0.441
Weaving segment speed, S	49.9 mph
Average weaving speed, S_W	53.9 mph
Average non-weaving speed, S_{NW}	49.2 mph
Maximum weaving length, L_{MAX}	4233 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".

b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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FREEWAY WEAVING WORKSHEET

General Information

Analyst	MLS
Agency/Company	LJB Inc.
Date Performed	2/27/2015
Analysis Time Period	PM Peak Hour

Site Information

Freeway/Dir of Travel	IR-90 / Eastbound
Weaving Segment Location	E 72nd St / MLK Jr Dr
Analysis Year	2034 Existing Condition

Project Description CUY-90-19.50/21.30

Inputs

Weaving configuration	One-Sided
Weaving number of lanes, N	4
Weaving segment length, L_S	515ft
Freeway free-flow speed, FFS	60 mph

Segment type	Freeway
Freeway minimum speed, S_{MIN}	40
Freeway maximum capacity, C_{IFL}	2300
Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	fp	v (pc/h)
V_{FF}	5385	0.92	4	0	1.5	1.2	0.980	1.00	5970
V_{RF}	160	0.92	1	0	1.5	1.2	0.995	1.00	175
V_{FR}	545	0.92	1	0	1.5	1.2	0.995	1.00	595
V_{RR}	0	0.92	0	0	1.5	1.2	1.000	1.00	0
V_{NW}	5970							V =	6740
V_W	770								
VR	0.114								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc
Interchange density, ID	1.2 int/mi
Minimum RF lane changes, LC_{RF}	1 lc/pc
Minimum FR lane changes, LC_{FR}	1 lc/pc
Minimum RR lane changes, LC_{RR}	lc/pc

Minimum weaving lane changes, LC_{MIN}	770 lc/h
Weaving lane changes, LC_W	942 lc/h
Non-weaving lane changes, LC_{NW}	739 lc/h
Total lane changes, LC_{ALL}	1681 lc/h
Non-weaving vehicle index, I_{NW}	369

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	6620 veh/h
Weaving segment capacity, c_w	8071 veh/h
Weaving segment v/c ratio	0.820
Weaving segment density, D	35.8 pc/mi/ln
Level of Service, LOS	E

Weaving intensity factor, W	0.575
Weaving segment speed, S	47.0 mph
Average weaving speed, S_W	52.7 mph
Average non-weaving speed, S_{NW}	46.4 mph
Maximum weaving length, L_{MAX}	3678 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".

b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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FREEWAY WEAVING WORKSHEET

General Information

Analyst	MLS
Agency/Company	LJB Inc.
Date Performed	2/27/2015
Analysis Time Period	AM Peak Hour

Site Information

Freeway/Dir of Travel	IR-90 / Westbound
Weaving Segment Location	MLK Jr Dr / E 72nd St
Analysis Year	2034 Existing Condition

Project Description CUY-90-19.50/21.30

Inputs

Weaving configuration	One-Sided
Weaving number of lanes, N	4
Weaving segment length, L_S	475ft
Freeway free-flow speed, FFS	60 mph

Segment type	Freeway
Freeway minimum speed, S_{MIN}	40
Freeway maximum capacity, C_{IFL}	2300
Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	5810	0.92	4	0	1.5	1.2	0.980	1.00	6442
V_{RF}	350	0.92	7	0	1.5	1.2	0.966	1.00	394
V_{FR}	130	0.92	3	0	1.5	1.2	0.985	1.00	143
V_{RR}	0	0.92	0	0	1.5	1.2	1.000	1.00	0
V_{NW}	6442							V =	6979
V_W	537								
VR	0.077								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc
Interchange density, ID	1.2 int/mi
Minimum RF lane changes, LC_{RF}	1 lc/pc
Minimum FR lane changes, LC_{FR}	1 lc/pc
Minimum RR lane changes, LC_{RR}	lc/pc

Minimum weaving lane changes, LC_{MIN}	537 lc/h
Weaving lane changes, LC_W	692 lc/h
Non-weaving lane changes, LC_{NW}	814 lc/h
Total lane changes, LC_{ALL}	1506 lc/h
Non-weaving vehicle index, I_{NW}	367

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	6837 veh/h
Weaving segment capacity, c_w	8169 veh/h
Weaving segment v/c ratio	0.837
Weaving segment density, D	36.3 pc/mi/ln
Level of Service, LOS	E

Weaving intensity factor, W	0.562
Weaving segment speed, S	48.1 mph
Average weaving speed, S_W	52.8 mph
Average non-weaving speed, S_{NW}	47.8 mph
Maximum weaving length, L_{MAX}	3317 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".

b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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FREEWAY WEAVING WORKSHEET

General Information

Analyst	MLS
Agency/Company	LJB Inc.
Date Performed	2/27/2015
Analysis Time Period	PM Peak Hour

Site Information

Freeway/Dir of Travel	IR-90 / Westbound
Weaving Segment Location	MLK Jr Dr / E 72nd St
Analysis Year	2034 Existing Condition

Project Description CUY-90-19.50/21.30

Inputs

Weaving configuration	One-Sided
Weaving number of lanes, N	4
Weaving segment length, L_S	475ft
Freeway free-flow speed, FFS	60 mph

Segment type	Freeway
Freeway minimum speed, S_{MIN}	40
Freeway maximum capacity, C_{IFL}	2300
Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	fp	v (pc/h)
V_{FF}	3990	0.92	4	0	1.5	1.2	0.980	1.00	4424
V_{RF}	500	0.92	2	0	1.5	1.2	0.990	1.00	549
V_{FR}	120	0.92	5	0	1.5	1.2	0.976	1.00	134
V_{RR}	0	0.92	0	0	1.5	1.2	1.000	1.00	0
V_{NW}	4424							V =	5107
V_W	683								
VR	0.134								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	2 lc
Interchange density, ID	1.2 int/mi
Minimum RF lane changes, LC_{RF}	1 lc/pc
Minimum FR lane changes, LC_{FR}	1 lc/pc
Minimum RR lane changes, LC_{RR}	lc/pc

Minimum weaving lane changes, LC_{MIN}	683 lc/h
Weaving lane changes, LC_W	838 lc/h
Non-weaving lane changes, LC_{NW}	398 lc/h
Total lane changes, LC_{ALL}	1236 lc/h
Non-weaving vehicle index, I_{NW}	252

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5011 veh/h
Weaving segment capacity, c_w	8000 veh/h
Weaving segment v/c ratio	0.626
Weaving segment density, D	25.8 pc/mi/ln
Level of Service, LOS	C

Weaving intensity factor, W	0.481
Weaving segment speed, S	49.5 mph
Average weaving speed, S_W	53.5 mph
Average non-weaving speed, S_{NW}	49.0 mph
Maximum weaving length, L_{MAX}	3870 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".

b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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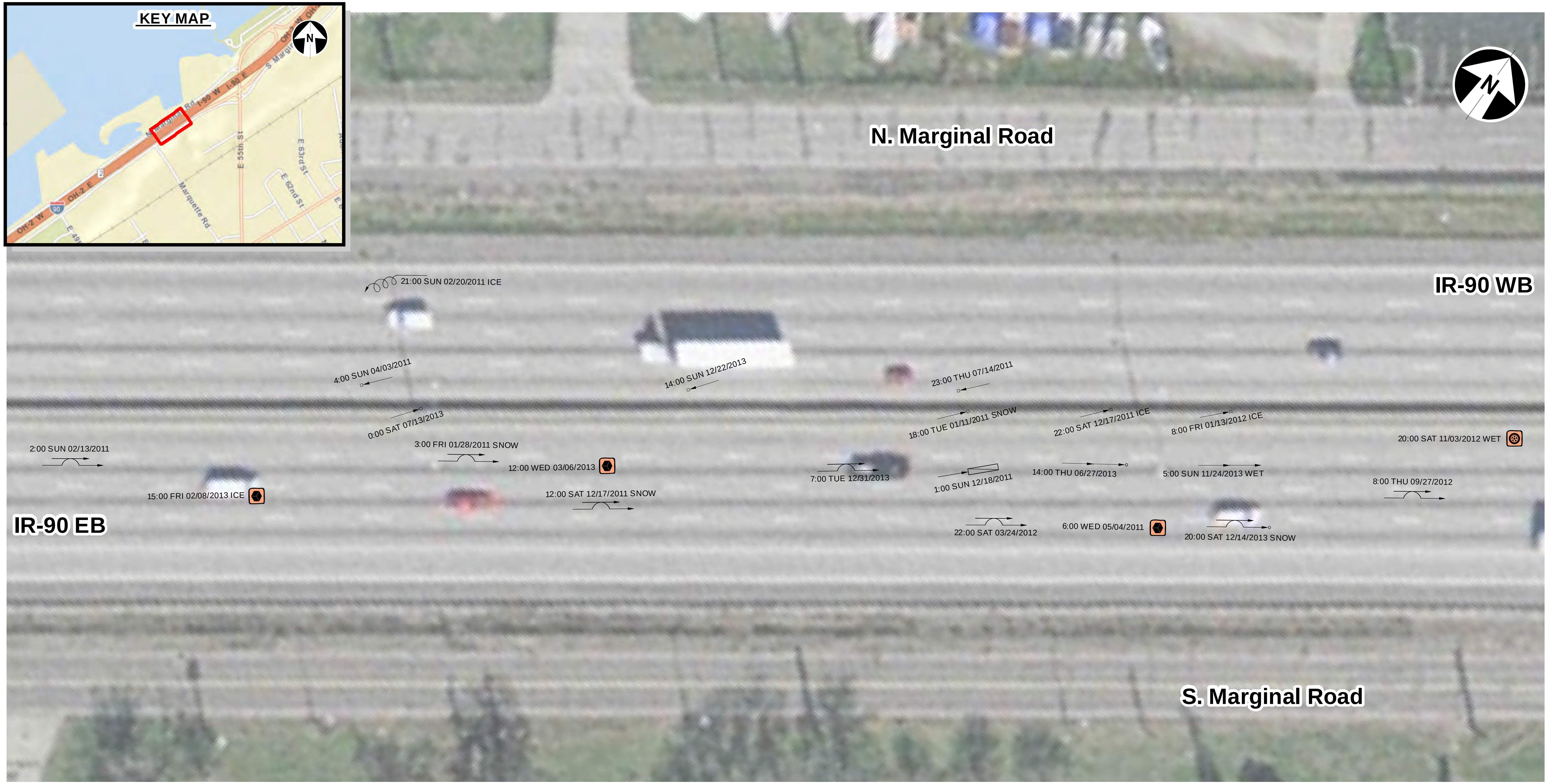
APPENDIX F
CRASH DIAGRAMS



NUMBER OF CRASHES

18	PROPERTY DAMAGE ONLY
4	INJURY OR FATAL
22	TOTAL ACCIDENTS

SYMBOLS

- ← MOVING VEHICLE
- ⇛ BACKING VEHICLE
- ←-·- NON-INVOLVED VEH.
- ←---- PEDESTRIAN
- ▱ PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 19.42 TO 19.54

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

PAGE: 1 of 26

NUMBER OF CRASHES

11	PROPERTY DAMAGE ONLY
5	INJURY OR FATAL
16	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 19.54 TO 19.65

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

PAGE: 2 of 26

NUMBER OF CRASHES

22	PROPERTY DAMAGE ONLY
10	INJURY OR FATAL
32	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 19.64 TO 19.75

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

NUMBER OF CRASHES

12	PROPERTY DAMAGE ONLY
5	INJURY OR FATAL
17	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 19.75 TO 19.86

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

PAGE: 4 of 26

NUMBER OF CRASHES

7	PROPERTY DAMAGE ONLY
3	INJURY OR FATAL
10	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- □ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 19.86 TO 19.98

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

PAGE: 5 of 26

NUMBER OF CRASHES

13	PROPERTY DAMAGE ONLY
4	INJURY OR FATAL
17	TOTAL ACCIDENTS

SYMBOLS

←──	MOVING VEHICLE
←─≫	BACKING VEHICLE
←-·-	NON-INVOLVED VEH.
←-----	PEDESTRIAN
▭	PARKED VEHICLE
□	FIXED OBJECT
●	FATAL ACCIDENT
○	INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

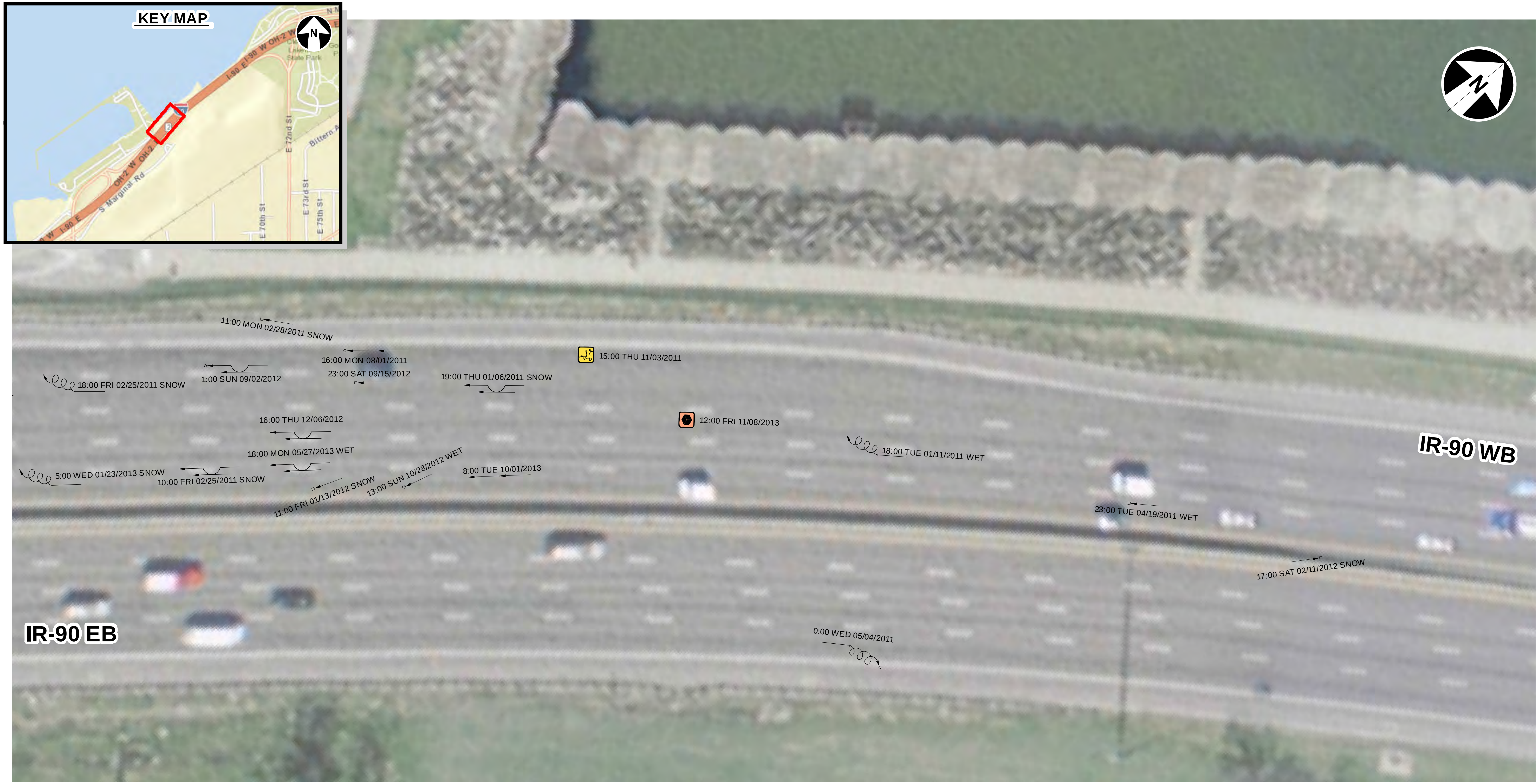
LOG POINT No. 19.98 TO 20.09

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

PAGE: 6 of 26



NUMBER OF CRASHES

10	PROPERTY DAMAGE ONLY
9	INJURY OR FATAL
19	TOTAL ACCIDENTS

SYMBOLS

←	MOVING VEHICLE
←≫	BACKING VEHICLE
←·-	NON-INVOLVED VEH.
←----	PEDESTRIAN
▭	PARKED VEHICLE
□	FIXED OBJECT
●	FATAL ACCIDENT
○	INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

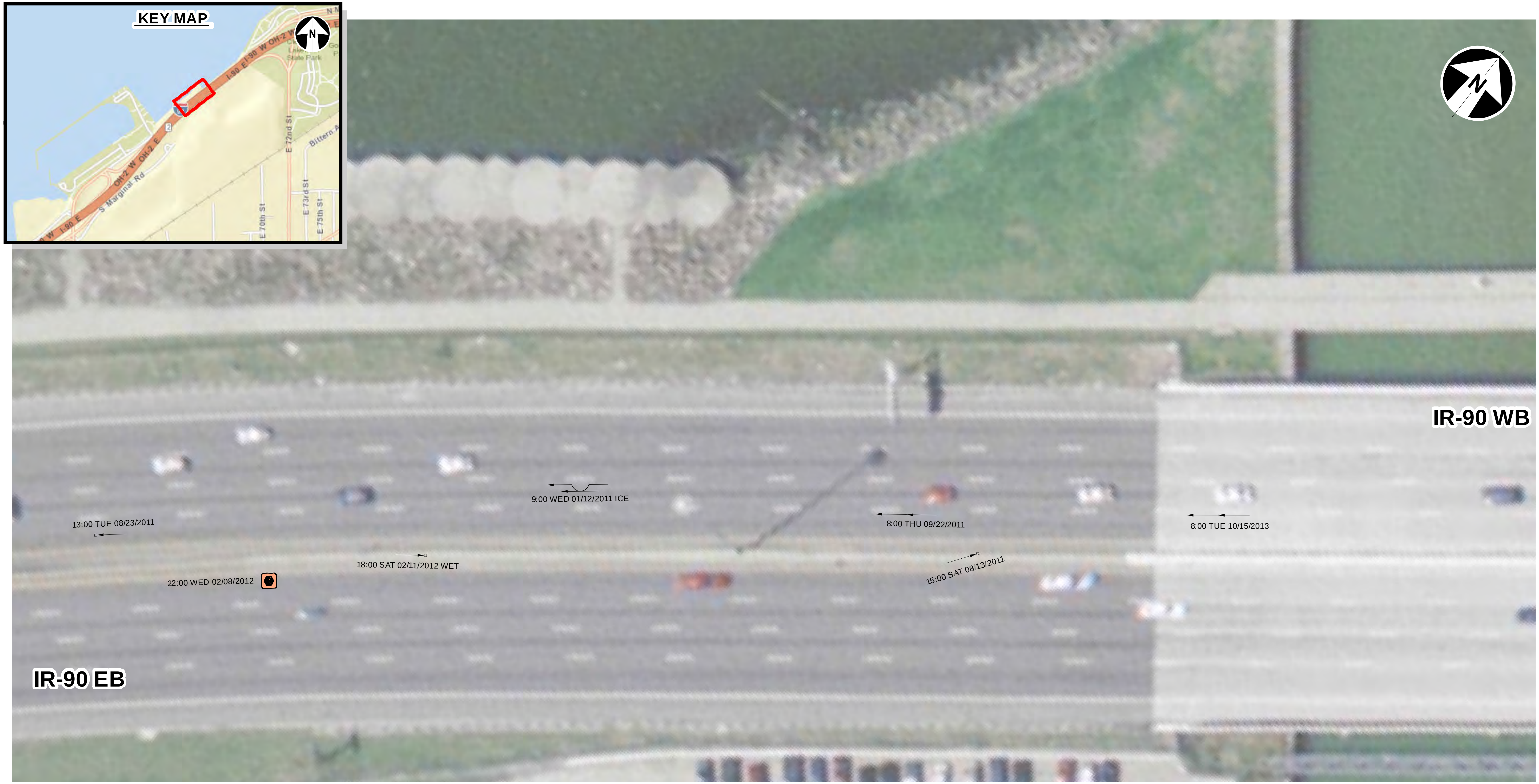
CRASH DIAGRAM

LOG POINT No. 20.09 TO 20.23

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015



NUMBER OF CRASHES

5 PROPERTY DAMAGE ONLY
2 INJURY OR FATAL
7 TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 20.23 TO 20.35
PERIOD 3 Years FROM 2011 TO 2013
CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

NUMBER OF CRASHES

4 PROPERTY DAMAGE ONLY

1 INJURY OR FATAL

5 TOTAL ACCIDENTS

SYMBOLS

←	MOVING VEHICLE
←⋙	BACKING VEHICLE
←·–	NON-INVOLVED VEH.
←----	PEDESTRIAN
▱	PARKED VEHICLE
□	FIXED OBJECT
●	FATAL ACCIDENT
○	INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

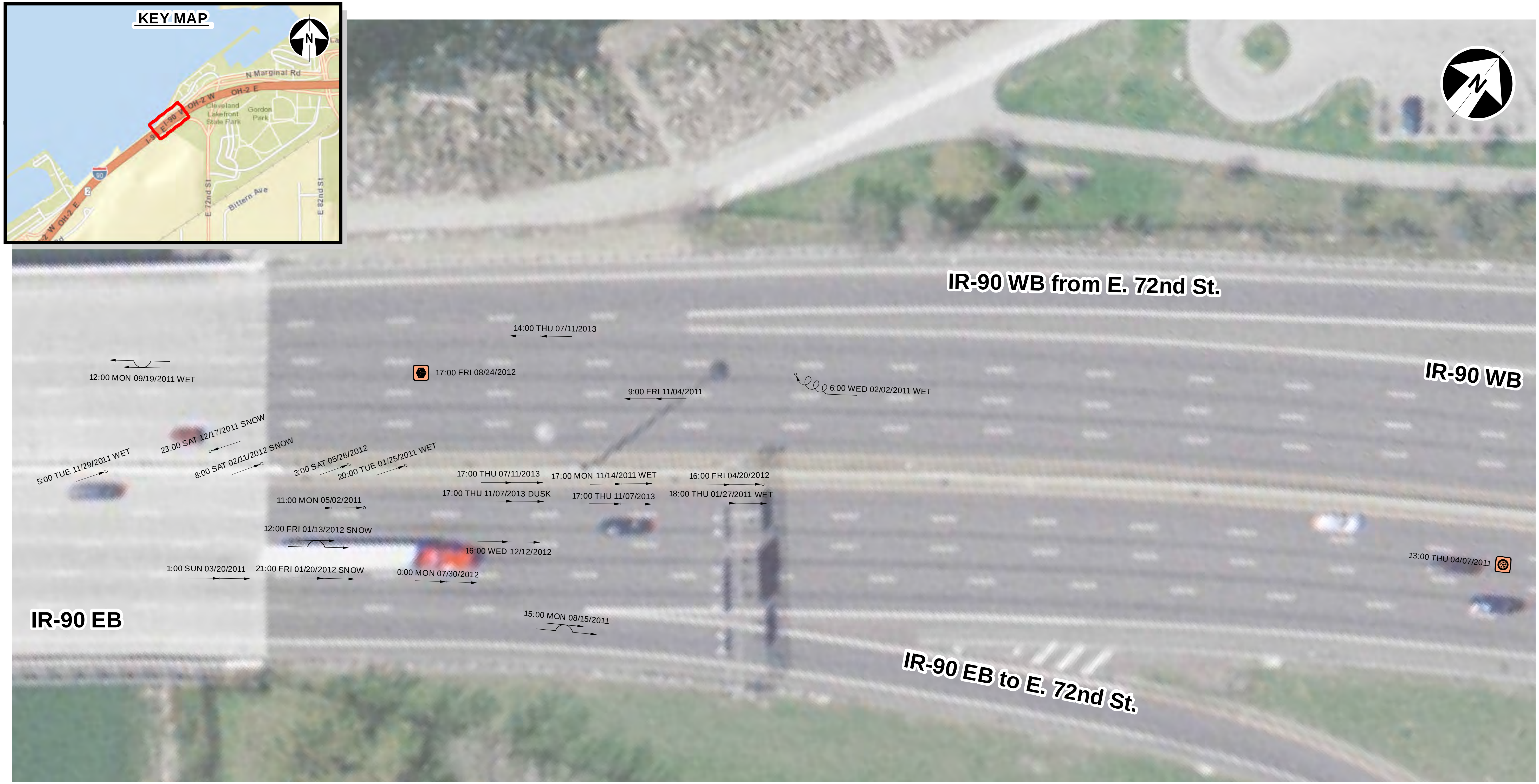
CRASH DIAGRAM

LOG POINT No. 20.35 TO 20.45

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015



NUMBER OF CRASHES

19	PROPERTY DAMAGE ONLY
5	INJURY OR FATAL
24	TOTAL ACCIDENTS

SYMBOLS

- ← MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- □ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 20.45 TO 20.57

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

NUMBER OF CRASHES

3	PROPERTY DAMAGE ONLY
3	INJURY OR FATAL
6	TOTAL ACCIDENTS

SYMBOLS

←	MOVING VEHICLE
←⋙	BACKING VEHICLE
←-·-	NON-INVOLVED VEH.
←-----	PEDESTRIAN
▱	PARKED VEHICLE
☐	FIXED OBJECT
●	FATAL ACCIDENT
○	INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 20.57 TO 20.68

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

NUMBER OF CRASHES

3	PROPERTY DAMAGE ONLY
2	INJURY OR FATAL
5	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 0.07 TO 0.18

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90 EB Off Ramp

DATE: 2/27/2015

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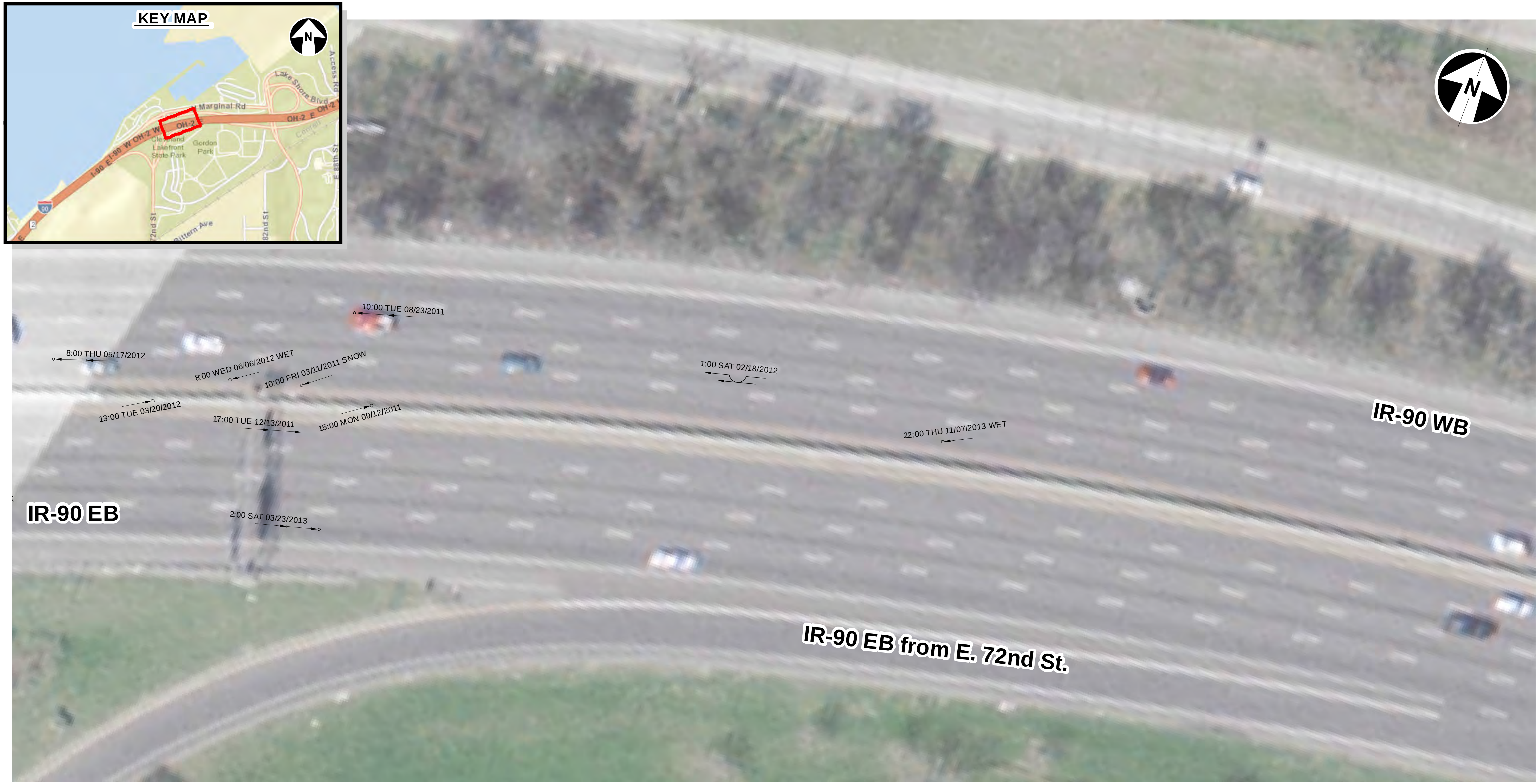


NUMBER OF CRASHES

6	PROPERTY DAMAGE ONLY
4	INJURY OR FATAL
10	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 20.68 TO 20.80

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

NUMBER OF CRASHES

21	PROPERTY DAMAGE ONLY
8	INJURY OR FATAL
29	TOTAL ACCIDENTS

SYMBOLS

- ← MOVING VEHICLE
- ⇚ BACKING VEHICLE
- ←·– NON-INVOLVED VEH.
- ←--- PEDESTRIAN
- ▭ PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 20.82 TO 20.93

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

PAGE: 14 of 26

NUMBER OF CRASHES

7	PROPERTY DAMAGE ONLY
10	INJURY OR FATAL
17	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 20.93 TO 21.05
PERIOD 3 Years FROM 2011 TO 2013
CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

NUMBER OF CRASHES

16	PROPERTY DAMAGE ONLY
7	INJURY OR FATAL
23	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

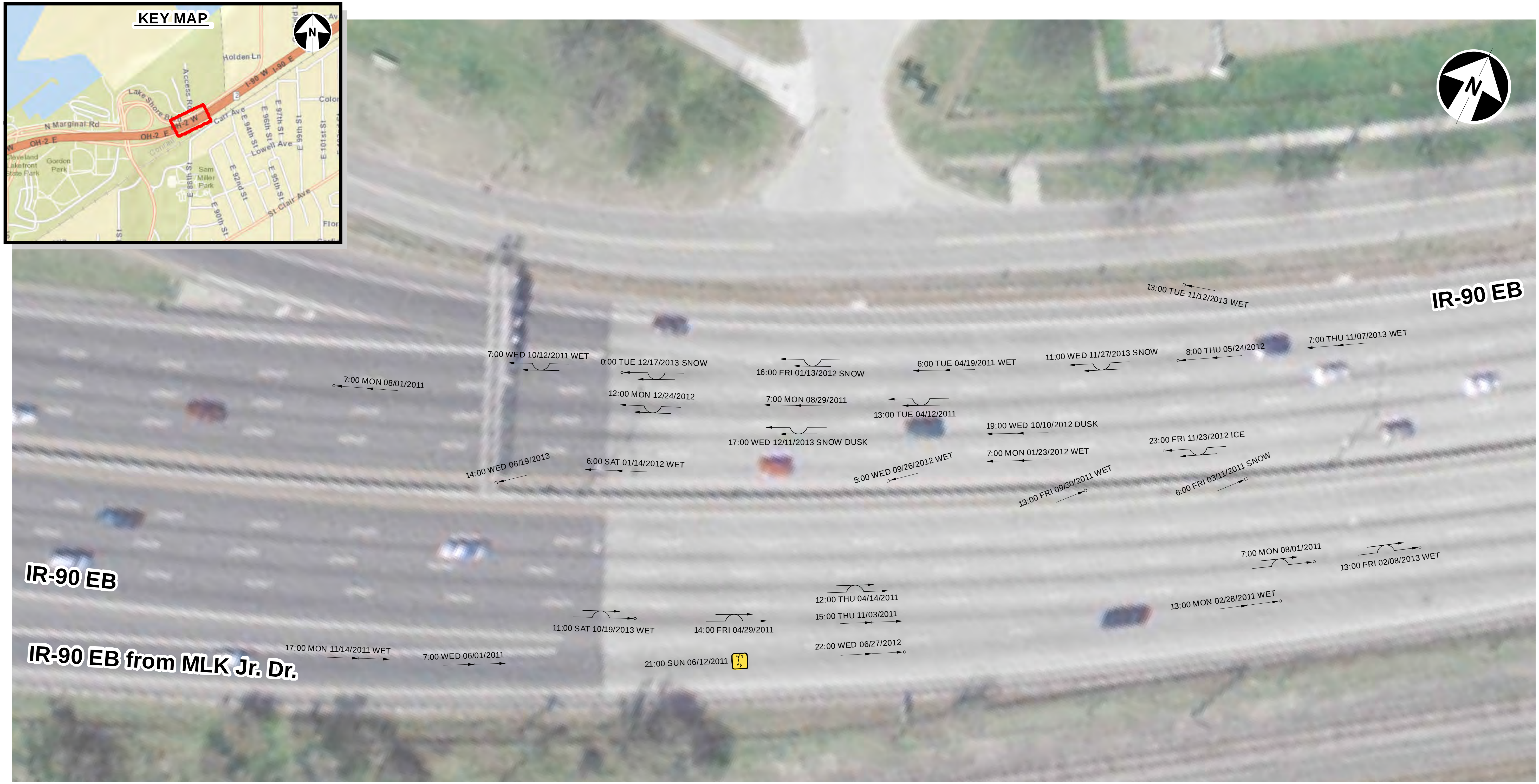
CRASH DIAGRAM

LOG POINT No. 21.05 TO 21.19

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015



NUMBER OF CRASHES

21	PROPERTY DAMAGE ONLY
11	INJURY OR FATAL
32	TOTAL ACCIDENTS

SYMBOLS

←	MOVING VEHICLE
←⋙	BACKING VEHICLE
←-·-	NON-INVOLVED VEH.
←----	PEDESTRIAN
▭	PARKED VEHICLE
□	FIXED OBJECT
●	FATAL ACCIDENT
○	INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 21.19 TO 21.30

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

PAGE: 17 of 26

NUMBER OF CRASHES

2	PROPERTY DAMAGE ONLY
0	INJURY OR FATAL
2	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 21.30 TO 21.42

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90

DATE: 2/27/2015

PAGE: 18 of 26

NUMBER OF CRASHES

12	PROPERTY DAMAGE ONLY
4	INJURY OR FATAL
16	TOTAL ACCIDENTS

SYMBOLS

←	MOVING VEHICLE
←⋙	BACKING VEHICLE
←·–	NON-INVOLVED VEH.
←----	PEDESTRIAN
▱	PARKED VEHICLE
□	FIXED OBJECT
●	FATAL ACCIDENT
○	INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 3.04 TO 3.38
PERIOD 3 Years FROM 2011 TO 2013
CITY Cleveland ROUTE NUMBER E 55th Street

DATE: 2/27/2015

NUMBER OF CRASHES

12	PROPERTY DAMAGE ONLY
5	INJURY OR FATAL
17	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 3.38 TO 3.49

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER E 55th Street

DATE: 2/27/2015

NUMBER OF CRASHES

3	PROPERTY DAMAGE ONLY
2	INJURY OR FATAL
5	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASHES

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

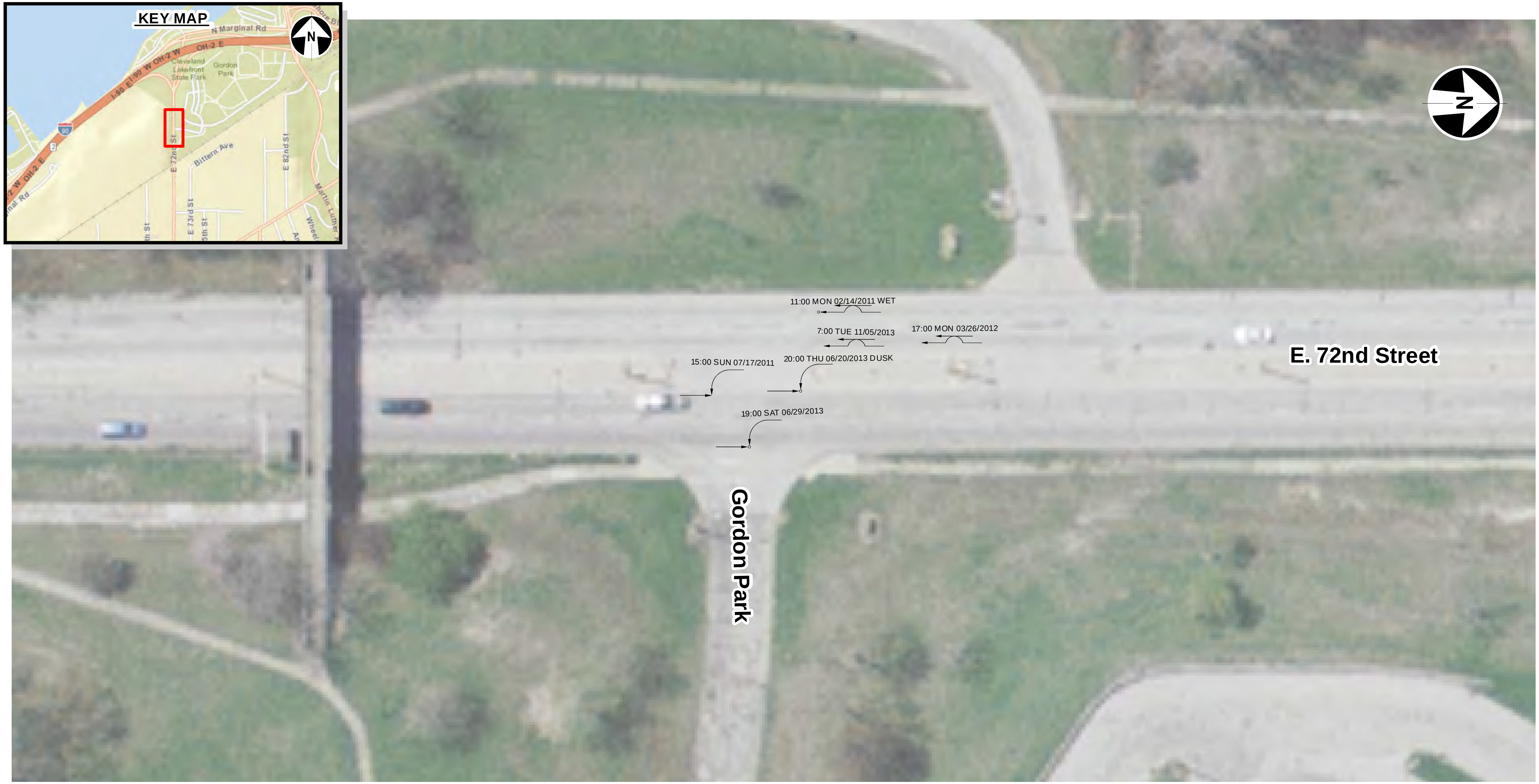
SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 0.12 TO 0.24
PERIOD 3 Years FROM 2011 TO 2013
CITY Cleveland ROUTE NUMBER N Marginal Rd

DATE: 2/27/2015



NUMBER OF CRASHES

3	PROPERTY DAMAGE ONLY
3	INJURY OR FATAL
6	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 1.37 TO 1.62

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER CUY-90 EB Off Ramp

DATE: 2/27/2015

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NUMBER OF CRASHES

2	PROPERTY DAMAGE ONLY
1	INJURY OR FATAL
3	TOTAL ACCIDENTS

SYMBOLS

- ←—— MOVING VEHICLE
- ←→>> BACKING VEHICLE
- ←·—·— NON-INVOLVED VEH.
- ←------ PEDESTRIAN
- ▭ PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 0.14 TO 0.19

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER E 72nd St

DATE: 2/27/2015

NUMBER OF CRASHES

8	PROPERTY DAMAGE ONLY
0	INJURY OR FATAL
8	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 2.63 TO 2.80

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER MLK Jr. Dr.

DATE: 2/27/2015

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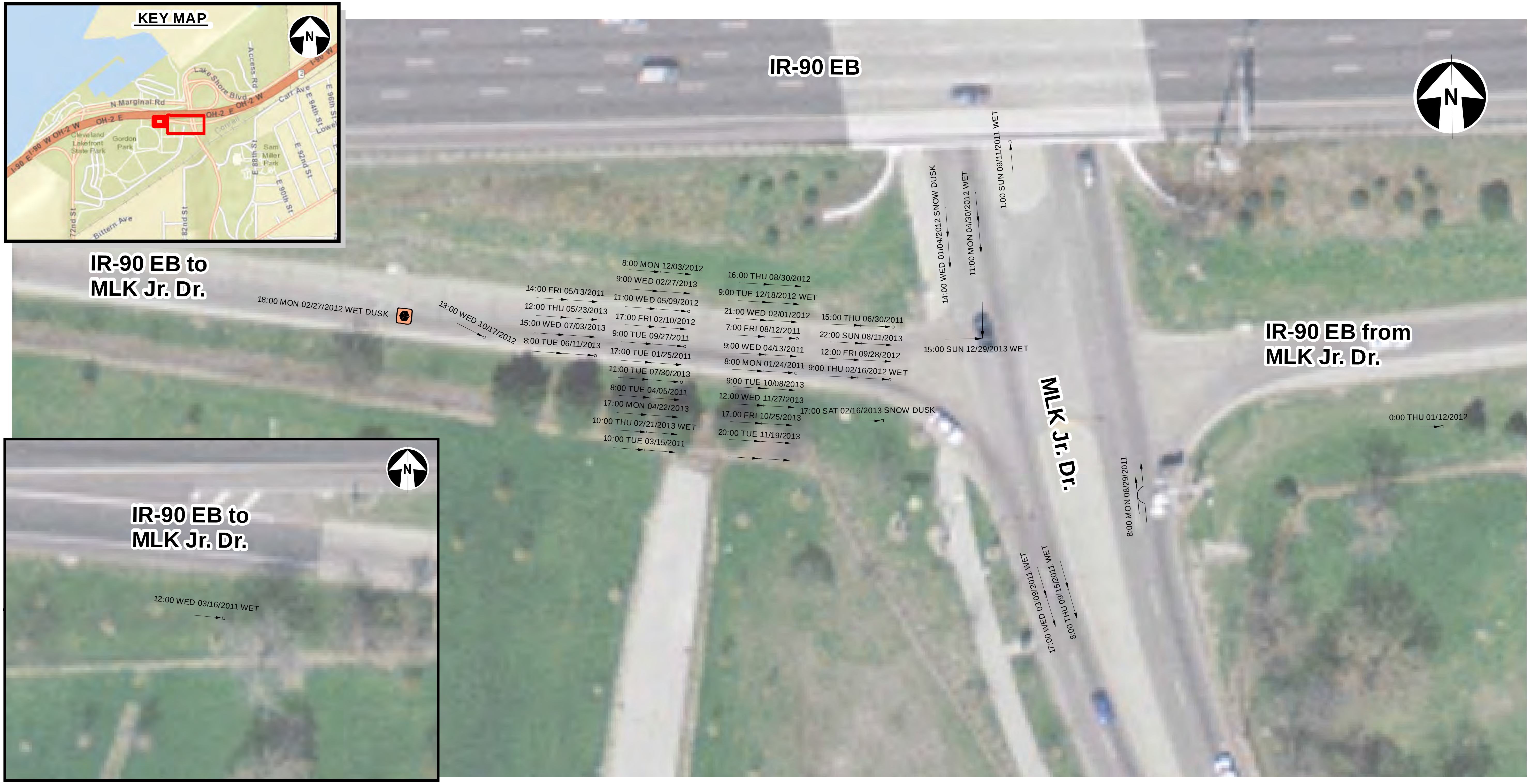


NUMBER OF CRASHES

33	PROPERTY DAMAGE ONLY
9	INJURY OR FATAL
42	TOTAL ACCIDENTS

SYMBOLS

- ← MOVING VEHICLE
- ←⋙ BACKING VEHICLE
- ←·– NON-INVOLVED VEH.
- ←---- PEDESTRIAN
- ▱ PARKED VEHICLE
- □ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

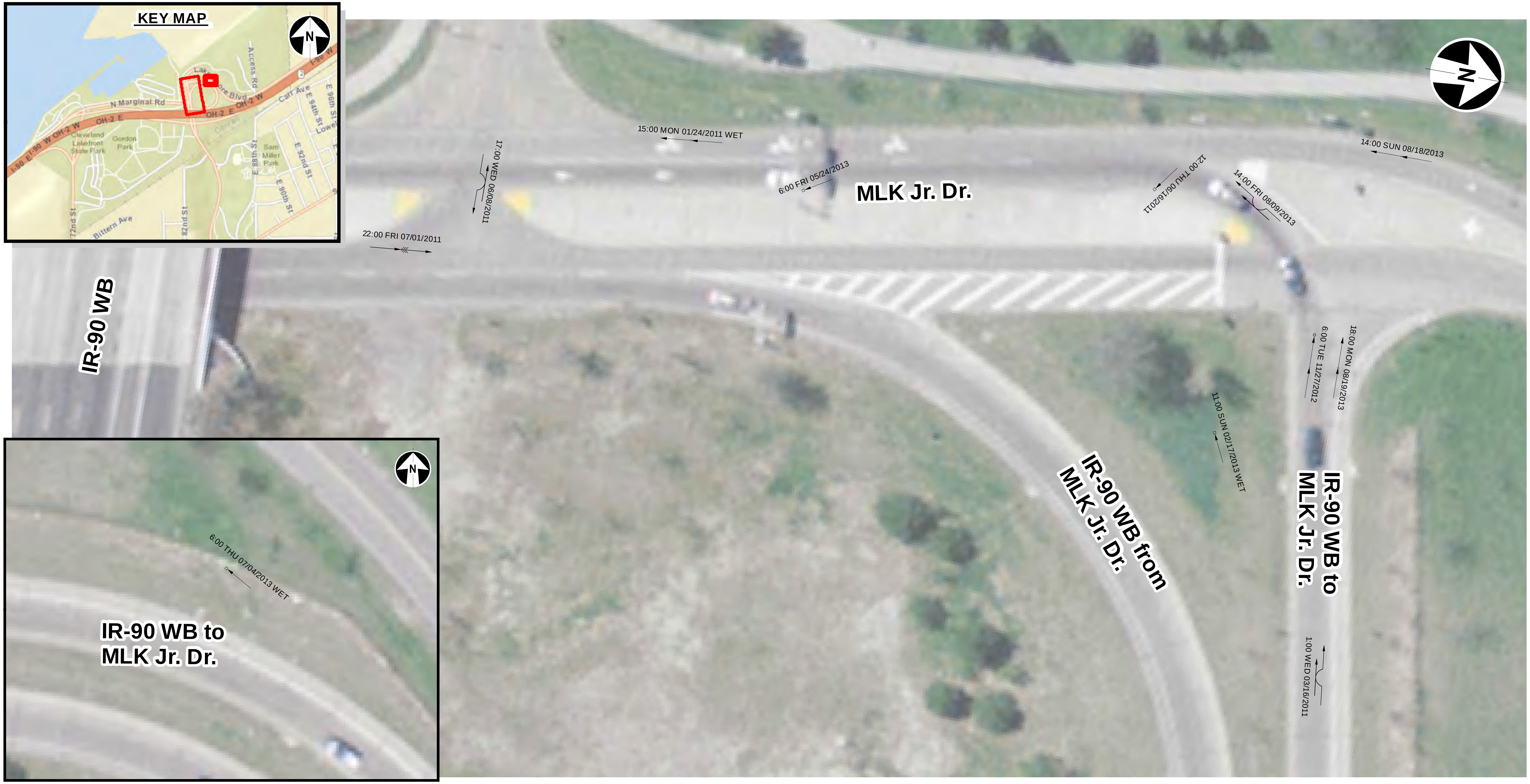
CRASH DIAGRAM

LOG POINT No. 2.63 TO 2.80

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER MLK Jr. Dr.

DATE: 2/27/2015



NUMBER OF CRASHES

9	PROPERTY DAMAGE ONLY
3	INJURY OR FATAL
12	TOTAL ACCIDENTS

SYMBOLS

- MOVING VEHICLE
- BACKING VEHICLE
- NON-INVOLVED VEH.
- PEDESTRIAN
- PARKED VEHICLE
- ☐ FIXED OBJECT
- ● FATAL ACCIDENT
- ○ INJURY ACCIDENT

TYPES OF CRASH

- REAR END
- RIGHT ANGLE
- SIDE SWIPE
- OUT OF CONTROL
- LEFT TURN
- HEAD ON

SHOW FOR EACH CRASH

1. TIME, DAY, DATE
2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED
3. NITE - IF BETWEEN DUSK AND DAWN

CRASH DIAGRAM

LOG POINT No. 2.95 TO 3.04

PERIOD 3 Years FROM 2011 TO 2013

CITY Cleveland ROUTE NUMBER MLK Jr. Dr.

DATE: 2/27/2015

Fatal

006667

OHIO Department of Public Safety — EDUCATION • SERVICE • PROTECTION

TRAFFIC CRASH REPORT

LOCAL INFORMATION: 13-159533, 13D-150

LOCAL REPORT NUMBER *: 006667

CRASH SEVERITY: 1 (1 - FATAL, 2 - INJURY, 3 - PDO)

HIT/SKIP: ☐ (1 - SOLVED, 2 - UNSOLVED)

☒ PHOTOS TAKEN ☒ OH-2 ☐ OH-1P ☐ OH-3 ☒ OTHER

☐ PDO UNDER STATE REPORTABLE DOLLAR AMOUNT

☐ PRIVATE PROPERTY

REPORTING AGENCY NCIC *: CLP00

REPORTING AGENCY NAME *: CLEVELAND DIVISION OF POLICE

NUMBER OF UNITS: 05

UNIT IN ERROR: 01 (98 - ANIMAL, 99 - UNKNOWN)

COUNTY *: 18

☒ CITY * ☐ VILLAGE * ☐ TOWNSHIP *

CITY, VILLAGE, TOWNSHIP *: CLEVELAND

CRASH DATE *: 05302013

TIME OF CRASH: 1044

DAY OF WEEK: Thu

DEGREES / MINUTES / SECONDS — LATITUDE: ° ' " — LONGITUDE: ° ' "

OR

DECIMAL DEGREES — LATITUDE: 41.534438 — LONGITUDE: 81.646058

ROADWAY DIVISION: ☒ DIVIDED ☐ UNDIVIDED

DIVIDED LANE DIRECTION OF TRAVEL: E (N - NORTHBOUND, S - SOUTHBOUND, E - EASTBOUND, W - WESTBOUND)

NUMBER OF THRU LANES: 04

ROAD TYPE OR MILEPOST [2]: AL - ALLEY, AV - AVENUE, BL - BOULEVARD, CR - CIRCLE, CT - COURT, DR - DRIVE, HE - HEIGHTS, HW - HIGHWAY, LA - LANE, MP - MILEPOST, PK - PARKWAY, PI - PIKE, PL - PLACE, RD - ROAD, SQ - SQUARE, ST - STREET, TE - TERRACE, TL - TRAIL, WA - WAY

LOCATION ROUTE TYPE [1]: IR

LOCATION ROUTE NUMBER: 90

LOC PREFIX (N, S, E, W):

LOCATION ROAD NAME:

LOCATION ROAD TYPE [2]: HW

ROUTE TYPES [1]: IR - INTERSTATE ROUTE (INC. TURNPIKE), US - US ROUTE, SR - STATE ROUTE, CR - NUMBERED COUNTY ROUTE, TR - NUMBER TOWNSHIP ROUTE

DISTANCE FROM REFERENCE: 328 ☐ MILES ☒ FEET ☐ YARDS

DIR FROM REF: W (N, S, E, W)

OF

REFERENCE ROUTE TYPE [1]:

REFERENCE ROUTE NUMBER:

REF PREFIX (N, S, E, W):

REFERENCE NAME (ROAD, MILEPOST, HOUSE #): 176.2

TYPE [2]:

REFERENCE POINT USED: 2 (1 - INTERSECTION, 2 - MILE POST, 3 - HOUSE NUMBER)

CRASH LOCATION: 01 (01 - NOT AN INTERSECTION, 02 - FOUR-WAY INTERSECTION, 03 - T-INTERSECTION, 04 - Y-INTERSECTION, 05 - TRAFFIC CIRCLE/ROUNDABOUT, 06 - FIVE-POINT, OR MORE, 07 - ON RAMP, 08 - OFF RAMP, 09 - CROSSOVER, 10 - DRIVEWAY/ALLEY/ACCESS, 11 - RAILWAY GRADE CROSSING, 12 - SHARED-USE PATHS OR TRAILS, 99 - UNKNOWN)

☐ INTERSECTION RELATED

LOCATION OF FIRST HARMFUL EVENT: 1 (1 - ON ROADWAY, 2 - ON SHOULDER, 3 - IN MEDIAN, 4 - ON ROADSIDE, 5 - ON GORE, 6 - OUTSIDE TRAFFICWAY, 9 - UNKNOWN)

ROAD CONTOUR: 4 (1 - STRAIGHT LEVEL, 2 - STRAIGHT GRADE, 3 - CURVE LEVEL, 4 - CURVE GRACE, 9 - UNKNOWN)

ROAD CONDITIONS — PRIMARY: 01 — SECONDARY: (01 - DRY, 02 - WET, 03 - SNOW, 04 - ICE, 05 - SAND, MUD, DIRT, OIL, GRAVEL, 06 - WATER (STANDING, MOVING), 07 - SLUSH, 08 - DEBRIS*, 09 - RUT, HOLES, BUMPS, UNEVEN PAVEMENT*, 10 - OTHER, 99 - UNKNOWN)

* SECONDARY CONDITION ONLY

MANNER OF CRASH COLLISION/IMPACT: 6 (1 - NOT COLLISION BETWEEN TWO MOTOR VEHICLES IN TRANSPORT, 2 - REAR END, 3 - HEAD-ON, 4 - REAR-TO-REAR, 5 - BACKING, 6 - ANGLE, 7 - SIDESWIPE, SAME DIRECTION, 8 - SIDESWIPE, OPPOSITE DIRECTION, 9 - UNKNOWN)

WEATHER: 1 (1 - CLEAR, 2 - CLOUDY, 3 - FOG, SMOG, SMOKE, 4 - RAIN, 5 - SLEET, HAIL, 6 - SNOW, 7 - SEVERE CROSSWINDS, 8 - BLOWING SAND, SOIL, DIRT, SNOW, 9 - OTHER/UNKNOWN)

ROAD SURFACE: 2 (1 - CONCRETE, 2 - BLACKTOP, BITUMINOUS, ASPHALT, 3 - BRICK/BLOCK, 4 - SLAG, GRAVEL STONE, 5 - DIRT, 6 - OTHER)

LIGHT CONDITIONS — PRIMARY: 1 — SECONDARY: (1 - DAYLIGHT, 2 - DAWN, 3 - DUSK, 4 - DARK - LIGHTED ROADWAY, 5 - DARK - ROADWAY NOT LIGHTED, 6 - DARK - UNKNOWN ROADWAY LIGHTING, 7 - GLARE*, 8 - OTHER, 9 - UNKNOWN)

* SECONDARY CONDITION ONLY

☐ SCHOOL ZONE RELATED

SCHOOL BUS RELATED: ☐ YES SCHOOL BUS DIRECTLY INVOLVED ☐ YES SCHOOL BUS INDIRECTLY INVOLVED

☐ WORK ZONE RELATED

☐ WORKERS PRESENT ☐ LAW ENFORCEMENT PRESENT (OFFICER/VEHICLE) ☐ LAW ENFORCEMENT PRESENT (VEHICLE ONLY)

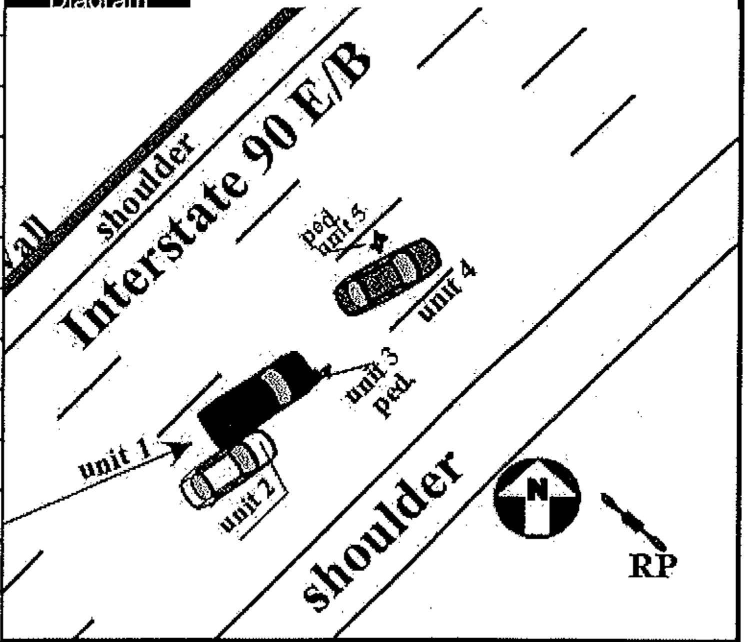
TYPE OF WORK ZONE: (1 - LANE CLOSURE, 2 - LANE SHIFT/CROSSOVER, 3 - WORK ON SHOULDER OR MEDIAN, 4 - INTERMITTENT OR MOVING WORK, 5 - OTHER)

LOCATION OF CRASH IN WORK ZONE: (1 - BEFORE THE FIRST WORK ZONE WARNING SIGN, 2 - ADVANCE WARNING AREA, 3 - TRANSITION AREA, 4 - ACTIVITY AREA, 5 - TERMINATION AREA)

NARRATIVE

Unit 1 is being operated east on Interstate 90 (eastbound) in lane 1. He comes upon Slowing/stopped traffic and swerves off to the right. It comes into contact with unit 2 (sideswipe) that was stopped in lane 3. Unit 1 is now traveling in a southeast direction and strikes unit 3 (pedestrian) who is standing/walking on roadway(with in lane 3). Unit 1 attempts to correct by steering to the left and collides with unit 4 that was also stopped in lane 3. The impact from this collision projects unit 4 forward, and causes it to come into contact with Unit 5 (pedestrian) before it veers off the right side of the roadway up a grassy embankment and collide with a chain link fence. Unit 1 now traveling in a northeasterly direction collides with the median wall breaking off two sections before it rolls back to final rest.

Diagram



REPORT TAKEN BY: ☐ POLICE AGENCY ☐ MOTORIST

☐ SUPPLEMENT (CORRECTION OR ADDITION TO AN EXISTING REPORT SENT TO ODPS)

DATE CRASH REPORTED	TIME CRASH REPORTED	DISPATCH TIME	ARRIVAL TIME	TIME CLEARED	OTHER INVESTIGATION TIME	TOTAL MINUTES
05302013	1045	1100	1108	1305	540	655

OFFICER'S NAME *: Green

OFFICER'S BADGE NUMBER: 662

CHECKED BY: 7400

PAGE 1 OF 9

HSY7001 OH1 (REV 01/12)

20134000572

OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION · SERVICE · PROTECTION

UNIT

LOCAL REPORT NUMBER: 06697

UNIT NUMBER: 01

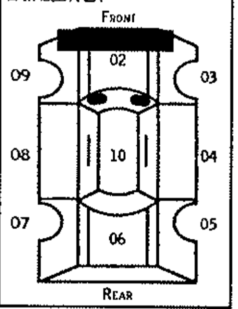
OWNER NAME: LAST, FIRST, MIDDLE (☐ SAME AS DRIVER): Najjar, Shereen

OWNER PHONE NUMBER - INC. AREA CODE (☐ SAME AS DRIVER): 2165010880

OWNER ADDRESS: CITY, STATE, ZIP (☒ SAME AS DRIVER): 1385 Fitzroy Street Westlake, Ohio 44145

DAMAGE SCALE: 4
1 - NONE
2 - MINOR
3 - FUNCTIONAL
4 - DISABLING
9 - UNKNOWN

DAMAGED AREA



LP STATE: OH

LICENSE PLATE NUMBER: X257738

VEHICLE IDENTIFICATION NUMBER: 1FMNU41S0YEC01151

OCCUPANTS: 01

VEHICLE YEAR: 2000

VEHICLE MAKE: Ford

VEHICLE MODEL: Excursion

VEHICLE COLOR: black

☐ PROOF OF INSURANCE SHOWN

INSURANCE COMPANY:

POLICY NUMBER:

TOWED BY: St Clair/L2/8774

CARRIER NAME, ADDRESS, CITY, STATE, ZIP:

CARRIER PHONE- INCLUDE AREA CODE:

US DOT:

HM PLACARD ID No.:

HM CLASS NUMBER:

VEHICLE WEIGHT GVWR/GCWR: 1
1 - LESS THAN OR EQUAL TO 10K LBS.
2 - 10,001 TO 26,000 LBS.
3 - MORE THAN 26,000 LBS.

☐ HAZARDOUS MATERIAL RELEASED

CARGO BODY TYPE: 01
01 - NO CARGO BODY TYPE/NOT APPLICABLE
02 - BUS/VAN (9-15 SEATS, INC DRIVER)
03 - BUS (16+ SEATS, INC DRIVER)
04 - VEHICLE TOWING ANOTHER VEHICLE
05 - LOGGING
06 - INTERMODAL CONTAINER CHASSIS
07 - CARGO VAN/ENCLOSED BOX
08 - GRAIN, CHIPS, GRAVEL
09 - POLE
10 - CARGO TANK
11 - FLAT BED
12 - DUMP
13 - CONCRETE MIXER
14 - AUTO TRANSPORTER
15 - GARBAGE/REFUSE
99 - OTHER/UNKNOWN

TRAFFICWAY DESCRIPTION: 4
1 - TWO-WAY, NOT DIVIDED
2 - TWO-WAY, NOT DIVIDED, CONTINUOUS LEFT TURN LANE
3 - TWO-WAY, DIVIDED, UNPROTECTED (PAINTED OR GRASS > 4 FT.) MEDIAN
4 - TWO-WAY, DIVIDED, POSITIVE MEDIAN BARRIER
5 - ONE-WAY TRAFFICWAY

☐ HIT / SKIP UNIT

NON-MOTORIST LOCATION PRIOR TO IMPACT:
01 - INTERSECTION - MARKED CROSSWALK
02 - INTERSECTION - NO CROSSWALK
03 - INTERSECTION - OTHER
04 - MIDBLOCK - MARKED CROSSWALK
05 - TRAVEL LANE - OTHER LOCATION
06 - BICYCLE LANE
07 - SHOULDER/ROADSIDE
08 - SIDEWALK
09 - MEDIAN/CROSSING ISLAND
10 - DRIVEWAY ACCESS
11 - SHARED-USE PATH OR TRAIL
12 - NON-TRAFFICWAY AREA
99 - OTHER/UNKNOWN

TYPE OF USE: 1
1 - PERSONAL
2 - COMMERCIAL
3 - GOVERNMENT

☐ IN EMERGENCY RESPONSE

UNIT TYPE: 06
99 - UNKNOWN OR HIT / SKIP

PASSENGER VEHICLES (LESS THAN 9 PASSENGERS)
01 - SUB-COMPACT
02 - COMPACT
03 - MID SIZE
04 - FULL SIZE
05 - MINIVAN
06 - SPORT UTILITY VEHICLE
07 - PICKUP
08 - VAN
09 - MOTORCYCLE
10 - MOTORIZED BICYCLE
11 - SNOWMOBILE / ATV
12 - OTHER PASSENGER VEHICLE

MED/HEAVY TRUCKS OR COMBO UNITS > 10K LBS
13 - SINGLE UNIT TRUCKS OR VAN 2 AXLE, 6 TIRES
14 - SINGLE UNIT TRUCK; 3+ AXLES
15 - SINGLE UNIT TRUCK / TRAILER
16 - TRUCK/TRACTOR (BOBTAIL)
17 - TRACTOR/SEMI-TRAILER
18 - TRACTOR/DOUBLE
19 - TRACTOR/TRIPLES
20 - OTHER MED/HEAVY VEHICLE

☐ HAS HM PLACARD

BUS/VAN/LIMO (9 OR MORE INCLUDING DRIVER)
21 - BUS/VAN (9-15 SEATS, INC DRIVER
22 - BUS (16+ SEATS, INC DRIVER

NON-MOTORIST
23 - ANIMAL WITH RIDER
24 - ANIMAL WITH BUGGY, WAGON, SURREY
25 - BICYCLE/PEDACYCLIST
26 - PEDESTRIAN/SKATER
27 - OTHER NON-MOTORIST

SPECIAL FUNCTION: 01
01 - NONE
02 - TAXI
03 - RENTAL TRUCK (OVER 10K LBS)
04 - BUS - SCHOOL (PUBLIC OR PRIVATE)
05 - BUS - TRANSIT
06 - BUS - CHARTER
07 - BUS - SHUTTLE
08 - BUS - OTHER
09 - AMBULANCE
10 - FIRE
11 - HIGHWAY/MAINTENANCE
12 - MILITARY
13 - POLICE
14 - PUBLIC UTILITY
15 - OTHER GOVERNMENT
16 - CONSTRUCTION EQUIP.
17 - FARM VEHICLE
18 - FARM EQUIPMENT
19 - MOTORHOME
20 - GOLF CART
21 - TRAIN
22 - OTHER (EXPLAIN IN NARRATIVE)

MOST DAMAGED AREA: 02

IMPACT AREA: 02

01 - NONE
02 - CENTER FRONT
03 - RIGHT FRONT
04 - RIGHT SIDE
05 - RIGHT REAR
06 - REAR CENTER
07 - LEFT REAR
08 - LEFT SIDE
09 - LEFT FRONT
10 - TOP AND WINDOWS
11 - UNDERCARRIAGE
12 - TOTAL (ALL AREAS)
14 - OTHER
99 - UNKNOWN

ACTION: 3
1 - NON- CONTACT
2 - NON-COLLISION
3 - STRIKING
4 - STRUCK
5 - STRIKING/STRUCK
0 - UNKNOWN

PRE-CRASH ACTIONS: 03
99 - UNKNOWN

MOTORIST
01 - STRAIGHT A HEAD
02 - BACKING
03 - CHANGING LANES
04 - OVERTAKING/PASSING
05 - MAKING RIGHT TURN
06 - MAKING LEFT TURN
07 - MAKING U-TURN
08 - ENTERING TRAFFIC LANE
09 - LEAVING TRAFFIC LANE
10 - PARKED
11 - SLOWING OR STOPPED IN TRAFFIC
12 - DRIVERLESS
13 - NEGOTIATING A CURVE
14 - OTHER MOTORIST ACTION

NON-MOTORIST
15 - ENTERING OR CROSSING SPECIFIED LOCATION
16 - WALKING, RUNNING, JOGGING, PLAYING, CYCLING
17 - WORKING
18 - PUSHING VEHICLE
19 - APPROACHING OR LEAVING VEHICLE
20 - STANDING
21 - OTHER NON -MOTORIST ACTION

CONTRIBUTING CIRCUMSTANCES

PRIMARY: 09

SECONDARY: 17

99 - UNKNOWN

MOTORIST
01 - NONE
02 - FAILURE TO YIELD
03 - RAN RED LIGHT
04 - RAN STOP SIGN
05 - EXCEEDED SPEED LIMIT
06 - UNSAFE SPEED
07 - IMPROPER TURN
08 - LEFT OF CENTER
09 - FOLLOWED TOO CLOSELY/ACDA
10 - IMPROPER LANE CHANGE /PASSING/OFF ROAD
11 - IMPROPER BACKING
12 - IMPROPER START FROM PARKED POSITION
13 - STOPPED OR PARKED ILLEGALLY
14 - OPERATING VEHICLE IN NEGLIGENT MANNER
15 - SWERVING TO AVOID (DUE TO EXTERNAL CONDITIONS)
16 - WRONG SIDE/WRONG WAY
17 - FAILURE TO CONTROL
18 - VISION OBSTRUCTION
19 - OPERATING DEFECTIVE EQUIPMENT
20 - LOAD SHIFTING/FALLING/SPILLING
21 - OTHER IMPROPER ACTION

NON-MOTORIST
22 - NONE
23 - IMPROPER CROSSING
24 - DARTING
25 - LYING AND/OR ILLEGALLY IN ROADWAY
26 - FAILURE TO YIELD RIGHT OF WAY
27 - NOT VISIBLE (DARK CLOTHING)
28 - INATTENTIVE
29 - FAILURE TO OBEY TRAFFIC SIGNS /SIGNALS/OFFICER
30 - WRONG SIDE OF THE ROAD
32 - OTHER NON-MOTORIST ACTION

VEHICLE DEFECTS:
01 - TURN SIGNALS
02 - HEAD LAMPS
03 - TAIL LAMPS
04 - BRAKES
05 - STEERING
06 - TIRE BLOWOUT
07 - WORN OR SLICK TIRES
08 - TRAILER EQUIPMENT DEFECTIVE
09 - MOTOR TROUBLE
10 - DISABLED FROM PRIOR ACCIDENT
11 - OTHER DEFECTS

SEQUENCE OF EVENTS
1: 21
2: 14
3: 21
4: 35
5:
6:

FIRST HARMFUL EVENT: 1

MOST HARMFUL EVENT: 2

99 - UNKNOWN

NON-COLLLSION EVENTS
01 - OVERTURN/ROLLOVER
02 - FIRE/EXPLOSION
03 - IMMERSION
04 - JACKKNIFE
05 - CARGO/EQUIPMENT LOSS OR SHIFT
06 - EQUIPMENT FAILURE (BLOWN TIRE, BRAKE FAILURE, ETC)
07 - SEPARATION OF UNITS
08 - RAN OFF ROAD RIGHT
09 - RAN OFF ROAD LEFT
10 - CROSS MEDIAN
11 - CROSS CENTER LINE OPPOSITE DIRECTION OF TRAVEL
12 - DOWNHILL RUNAWAY
13 - OTHER NON-COLLISION

COLLISIDN WITH PERSON, VEHICLE OR OBJECT NOT FIXED
14 - PEDESTRIAN
15 - PEDALCYCLE
16 - RAILWAY VEHICLE (TRAIN ENGINE)
17 - ANIMAL - FARM
18 - ANIMAL - DEER
19 - ANIMAL - OTHER
20 - MOTOR VEHICLE IN TRANSPORT
21 - PARKED MOTOR VEHICLE
22 - WORK ZONE MAINTENANCE EQUIPMENT
23 - STRUCK BY FALLING, SHIFTING CARGO OR ANYTHING SET IN MOTION BY A MOTOR VEHICLE
24 - OTHER MOVABLE OBJECT

COLLISION WITH FIXED OBJECT
25 - IMPACT ATTENUATOR/CRASH CUSHION
26 - BRIDGE OVERHEAD STRUCTURE
27 - BRIDGE PIER OR ABUTMENT
28 - BRIDGE PARAPET
29 - BRIDGE RAIL
30 - GUARDRAIL FACE
31 - GUARDRAIL END
32 - PORTABLE BARRIER
34 - MEDIAN GUARDRAIL BARRIER
35 - MEDIAN CONCRETE BARRIER
36 - MEDIAN OTHER BARRIER
37 - TRAFFIC SIGN POST
38 - OVERHEAD SIGN POST
39 - LIGHT/LUMINARIES SUPPORT
40 - UTILITY POLE
41 - OTHER POST, POLE OR SUPPORT
42 - CULVERT
43 - CURB
44 - DITCH
45 - EMBANKMENT
46 - FENCE
47 - MAILBOX
48 - TREE
49 - FIRE HYDRANT
50 - WORK ZONE MAINTENANCE EQUIPMENT
51 - WALL, BUILDING, TUNNEL
52 - OTHER FIXED OBJECT

UNIT SPEED: 60
☒ STATED
☐ ESTIMATED

POSTED SPEED: 60

TRAFFIC CONTROL: 01
01 - NO CONTROLS
02 - STOP SIGN
03 - YIELD SIGN
04 - TRAFFIC SIGNAL
05 - TRAFFIC FLASHERS
06 - SCHOOL ZONE
07 - RAILROAD CROSSBUCKS
08 - RAILROAD FLASHERS
09 - RAILROAD GATES
10 - CONSTRUCTION BARRICADE
11 - PERSON (FLAGGER, OFFICER)
12 - PAVEMENT MARKINGS
13 - CROSSWALK LINES
14 - WALK/DON'T WALK
15 - OTHER
16 - NOT REPORTED

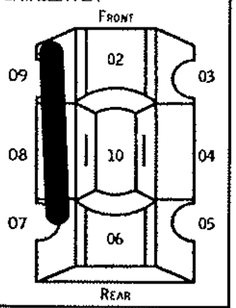
UNIT DIRECTION
FROM: 4
TO: 3
1 - NORTH
2 - SOUTH
3 - EAST
4 - WEST
5 - NORTHEAST
6 - NORTHWEST
7 - SOUTHEAST
8 - SOUTHWEST
9 - UNKNOWN

OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION · SERVICE · PROTECTION

UNIT

LOCAL REPORT NUMBER 06667

UNIT NUMBER 02	OWNER NAME: LAST, FIRST, MIDDLE (☐ SAME AS DRIVER) Loury, Earl, V.	OWNER PHONE NUMBER - INC. AREA CODE (☐ SAME AS DRIVER)	DAMAGE SCALE 4 1 - NONE 2 - MINOR 3 - FUNCTIONAL 4 - DISABLING 9 - UNKNOWN	DAMAGED AREA



OWNER ADDRESS: CITY, STATE, ZIP (☐ SAME AS DRIVER)
9503 Dickens Avenue Cleveland, Ohio 44103

LP STATE	LICENSE PLATE NUMBER	VEHICLE IDENTIFICATION NUMBER	# OCCUPANTS
OH	ETH 9404	1G8ZH5593RZ252378	00

VEHICLE YEAR	VEHICLE MAKE	VEHICLE MODEL	VEHICLE COLOR
1994	Saturn		white

☐ PROOF OF INSURANCE SHOWN	INSURANCE COMPANY	POLICY NUMBER	TOWED BY Quality/L2/8775

CARRIER NAME, ADDRESS, CITY, STATE, ZIP

CARRIER PHONE- INCLUDE AREA CODE

US DOT

HM PLACARD ID No.

HM CLASS NUMBER

VEHICLE WEIGHT GVWR/GCWR: 1
1 - LESS THAN OR EQUAL TO 10K LBS.
2 - 10,001 TO 26,000 LBS.
3 - MORE THAN 26,000 LBS.

☐ HAZARDOUS MATERIAL RELEASED

CARGO BODY TYPE: 01
01 - NO CARGO BODY TYPE/NOT APPLICABLE
02 - BUS/VAN (9-15 SEATS, INC DRIVER)
03 - BUS (16+ SEATS, INC DRIVER)
04 - VEHICLE TOWING ANOTHER VEHICLE
05 - LOGGING
06 - INTERMODAL CONTAINER CHASSIS
07 - CARGO VAN/ENCLOSED BOX
08 - GRAIN, CHIPS, GRAVEL
09 - POLE
10 - CARGO TANK
11 - FLAT BED
12 - DUMP
13 - CONCRETE MIXER
14 - AUTO TRANSPORTER
15 - GARBAGE/REFUSE
99 - OTHER/UNKNOWN

TRAFFICWAY DESCRIPTION: 4
1 - TWO-WAY, NOT DIVIDED
2 - TWO-WAY, NOT DIVIDED, CONTINUOUS LEFT TURN LANE
3 - TWO-WAY, DIVIDED, UNPROTECTED (PAINTED OR GRASS > 4 FT.) MEDIAN
4 - TWO-WAY, DIVIDED, POSITIVE MEDIAN BARRIER
5 - ONE-WAY TRAFFICWAY

☐ HIT / SKIP UNIT

NON-MOTORIST LOCATION PRIOR TO IMPACT:
01 - INTERSECTION - MARKED CROSSWALK
02 - INTERSECTION - NO CROSSWALK
03 - INTERSECTION - OTHER
04 - MIDBLOCK - MARKED CROSSWALK
05 - TRAVEL LANE - OTHER LOCATION
06 - BICYCLE LANE
07 - SHOULDER/ROADSIDE
08 - SIDEWALK
09 - MEDIAN/CROSSING ISLAND
10 - DRIVEWAY ACCESS
11 - SHARED-USE PATH OR TRAIL
12 - NON-TRAFFICWAY AREA
99 - OTHER/UNKNOWN

TYPE OF USE: 1
1 - PERSONAL
2 - COMMERCIAL
3 - GOVERNMENT

☐ IN EMERGENCY RESPONSE

UNIT TYPE: 03
99 - UNKNOWN OR HIT / SKIP

PASSENGER VEHICLES (LESS THAN 9 PASSENGERS)
01 - SUB-COMPACT
02 - COMPACT
03 - MID SIZE
04 - FULL SIZE
05 - MINIVAN
06 - SPORT UTILITY VEHICLE
07 - PICKUP
08 - VAN
09 - MOTORCYCLE
10 - MOTORIZED BICYCLE
11 - SNOWMOBILE / ATV
12 - OTHER PASSENGER VEHICLE

MED/HEAVY TRUCKS OR COMBO UNITS > 10K LBS
13 - SINGLE UNIT TRUCKS OR VAN 2 AXLE, 6 TIRES
14 - SINGLE UNIT TRUCK; 3+ AXLES
15 - SINGLE UNIT TRUCK / TRAILER
16 - TRUCK/TRACTOR (BOBTAIL)
17 - TRACTOR/SEMI-TRAILER
18 - TRACTOR/DOUBLE
19 - TRACTOR/TRIPLES
20 - OTHER MED/HEAVY VEHICLE

☐ HAS HM PLACARD

BUS/VAN/LIMO (9 OR MORE INCLUDING DRIVER)
21 - BUS/VAN (9-15 SEATS, INC DRIVER
22 - BUS (16+ SEATS, INC DRIVER

NON-MOTORIST
23 - ANIMAL WITH RIDER
24 - ANIMAL WITH BUGGY, WAGON, SURREY
25 - BICYCLE/PEDACYCLIST
26 - PEDESTRIAN/SKATER
27 - OTHER NON-MOTORIST

SPECIAL FUNCTION: 01
01 - NONE
02 - TAXI
03 - RENTAL TRUCK (OVER 10K LBS)
04 - BUS - SCHOOL (PUBLIC OR PRIVATE)
05 - BUS - TRANSIT
06 - BUS - CHARTER
07 - BUS - SHUTTLE
08 - BUS - OTHER
09 - AMBULANCE
10 - FIRE
11 - HIGHWAY/MAINTENANCE
12 - MILITARY
13 - POLICE
14 - PUBLIC UTILITY
15 - OTHER GOVERNMENT
16 - CONSTRUCTION EQUIP.
17 - FARM VEHICLE
18 - FARM EQUIPMENT
19 - MOTORHOME
20 - GOLF CART
21 - TRAIN
22 - OTHER (EXPLAIN IN NARRATIVE)

MOST DAMAGED AREA: 08
IMPACT AREA:
01 - NONE
02 - CENTER FRONT
03 - RIGHT FRONT
04 - RIGHT SIDE
05 - RIGHT REAR
06 - REAR CENTER
07 - LEFT REAR
08 - LEFT SIDE
09 - LEFT FRONT
10 - TOP AND WINDOWS
11 - UNDERCARRIAGE
12 - TOTAL (ALL AREAS)
06 - REAR CENTER
14 - OTHER
99 - UNKNOWN

ACTION: 4
1 - NON- CONTACT
2 - NON-COLLISION
3 - STRIKING
4 - STRUCK
5 - STRIKING/STRUCK
9 - UNKNOWN

PRE-CRASH ACTIONS: 10
99 - UNKNOWN

MOTORIST
01 - STRAIGHT A HEAD
02 - BACKING
03 - CHANGING LANES
04 - OVERTAKING/PASSING
05 - MAKING RIGHT TURN
06 - MAKING LEFT TURN
07 - MAKING U-TURN
08 - ENTERING TRAFFIC LANE
09 - LEAVING TRAFFIC LANE
10 - PARKED
11 - SLOWING OR STOPPED IN TRAFFIC
12 - DRIVERLESS
13 - NEGOTIATING A CURVE
14 - OTHER MOTORIST ACTION

NON-MOTORIST
15 - ENTERING OR CROSSING SPECIFIED LOCATION
16 - WALKING, RUNNING, JOGGING, PLAYING, CYCLING
17 - WORKING
18 - PUSHING VEHICLE
19 - APPROACHING OR LEAVING VEHICLE
20 - STANDING
21 - OTHER NON -MOTORIST ACTION

CONTRIBUTING CIRCUMSTANCES
PRIMARY: 13
SECONDARY:
99 - UNKNOWN

MOTORIST
01 - NONE
02 - FAILURE TO YIELD
03 - RAN RED LIGHT
04 - RAN STOP SIGN
05 - EXCEEDED SPEED LIMIT
06 - UNSAFE SPEED
07 - IMPROPER TURN
08 - LEFT OF CENTER
09 - FOLLOWED TOO CLOSELY/ACDA
10 - IMPROPER LANE CHANGE /PASSING/OFF ROAD
11 - IMPROPER BACKING
12 - IMPROPER START FROM PARKED POSITION
13 - STOPPED OR PARKED ILLEGALLY
14 - OPERATING VEHICLE IN NEGLIGENT MANNER
15 - SWERVING TO AVOID (DUE TO EXTERNAL CONDITIONS)
16 - WRONG SIDE/WRONG WAY
17 - FAILURE TO CONTROL
18 - VISION OBSTRUCTION
19 - OPERATING DEFECTIVE EQUIPMENT
20 - LOAD SHIFTING/FALLING/SPILLING
21 - OTHER IMPROPER ACTION

NON-MOTORIST
22 - NONE
23 - IMPROPER CROSSING
24 - DARTING
25 - LYING AND/OR ILLEGALLY IN ROADWAY
26 - FAILURE TO YIELD RIGHT OF WAY
27 - NOT VISIBLE (DARK CLOTHING)
28 - INATTENTIVE
29 - FAILURE TO OBEY TRAFFIC SIGNS /SIGNALS/OFFICER
30 - WRONG SIDE OF THE ROAD
32 - OTHER NON-MOTORIST ACTION

VEHICLE DEFECTS
01 - TURN SIGNALS
02 - HEAD LAMPS
03 - TAIL LAMPS
04 - BRAKES
05 - STEERING
06 - TIRE BLOWOUT
07 - WORN OR SLICK TIRES
08 - TRAILER EQUIPMENT DEFECTIVE
09 - MOTOR TROUBLE
10 - DISABLED FROM PRIOR ACCIDENT
11 - OTHER DEFECTS

SEQUENCE OF EVENTS
1: 20
2:
3:
4:
5:
6:
FIRST HARMFUL EVENT ☐
MOST HARMFUL EVENT ☐
99 - UNKNOWN

NON-COLLISION EVENTS
01 - OVERTURN/ROLLOVER
02 - FIRE/EXPLOSION
03 - IMMERSION
04 - JACKKNIFE
05 - CARGO/EQUIPMENT LOSS OR SHIFT
06 - EQUIPMENT FAILURE (BLOWN TIRE, BRAKE FAILURE, ETC)
07 - SEPARATION OF UNITS
08 - RAN OFF ROAD RIGHT
09 - RAN OFF ROAD LEFT
10 - CROSS MEDIAN
11 - CROSS CENTER LINE OPPOSITE DIRECTION OF TRAVEL
12 - DOWNHILL RUNAWAY
13 - OTHER NON-COLLISION

COLLISION WITH PERSON, VEHICLE OR OBJECT NOT FIXED
14 - PEDESTRIAN
15 - PEDALCYCLE
16 - RAILWAY VEHICLE (TRAIN ENGINE)
17 - ANIMAL - FARM
18 - ANIMAL - DEER
19 - ANIMAL - OTHER
20 - MOTOR VEHICLE IN TRANSPORT
21 - PARKED MOTOR VEHICLE
22 - WORK ZONE MAINTENANCE EQUIPMENT
23 - STRUCK BY FALLING, SHIFTING CARGO OR ANYTHING SET IN MOTION BY A MOTOR VEHICLE
24 - OTHER MOVABLE OBJECT

COLLISION WITH FIXED OBJECT
25 - IMPACT ATTENUATOR/CRASH CUSHION
26 - BRIDGE OVERHEAD STRUCTURE
27 - BRIDGE PIER OR ABUTMENT
28 - BRIDGE PARAPET
29 - BRIDGE RAIL
30 - GUARDRAIL FACE
31 - GUARDRAIL END
32 - PORTABLE BARRIER
34 - MEDIAN GUARDRAIL BARRIER
35 - MEDIAN CONCRETE BARRIER
36 - MEDIAN OTHER BARRIER
37 - TRAFFIC SIGN POST
38 - OVERHEAD SIGN POST
39 - LIGHT/LUMINARIES SUPPORT
40 - UTILITY POLE
41 - OTHER POST, POLE OR SUPPORT
42 - CULVERT
43 - CURB
44 - DITCH
45 - EMBANKMENT
46 - FENCE
47 - MAILBOX
48 - TREE
49 - FIRE HYDRANT
50 - WORK ZONE MAINTENANCE EQUIPMENT
51 - WALL, BUILDING, TUNNEL
52 - OTHER FIXED OBJECT

UNIT SPEED: 00
☒ STATED
☐ ESTIMATED

POSTED SPEED: 60

TRAFFIC CONTROL: 01
01 - NO CONTROLS
02 - STOP SIGN
03 - YIELD SIGN
04 - TRAFFIC SIGNAL
05 - TRAFFIC FLASHERS
06 - SCHOOL ZONE
07 - RAILROAD CROSSBUCKS
08 - RAILROAD FLASHERS
09 - RAILROAD GATES
10 - CONSTRUCTION BARRICADE
11 - PERSON (FLAGGER, OFFICER)
12 - PAVEMENT MARKINGS
13 - CROSSWALK LINES
14 - WALK/DON'T WALK
15 - OTHER
16 - NOT REPORTED

UNIT DIRECTION
FROM 4 TO 3
1 - NORTH
2 - SOUTH
3 - EAST
4 - WEST
5 - NORTHEAST
6 - NORTHWEST
7 - SOUTHEAST
8 - SOUTHWEST
9 - UNKNOWN

OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION · SERVICE · PROTECTION

UNIT

LOCAL REPORT NUMBER: 06667

UNIT NUMBER: 03

OWNER NAME: LAST, FIRST, MIDDLE (☐ SAME AS DRIVER): Loury, Earl, V.

OWNER PHONE NUMBER - INC. AREA CODE (☐ SAME AS DRIVER):

OWNER ADDRESS: CITY, STATE, ZIP (☐ SAME AS DRIVER): 440 Ingleside Road Cleveland, Ohio 44128

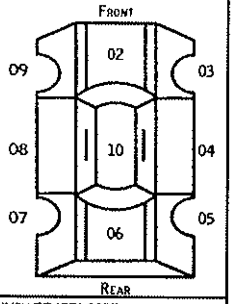
LP STATE:
LICENSE PLATE NUMBER:
VEHICLE IDENTIFICATION NUMBER:
OCCUPANTS:

VEHICLE YEAR:
VEHICLE MAKE:
VEHICLE MODEL:
VEHICLE COLOR:

☐ PROOF OF INSURANCE SHOWN
INSURANCE COMPANY:
POLICY NUMBER:
TOWED BY:

DAMAGE SCALE: 4
1 - NONE
2 - MINOR
3 - FUNCTIONAL
4 - DISABLING
9 - UNKNOWN

DAMAGED AREA



CARRIER NAME, ADDRESS, CITY, STATE, ZIP:
CARRIER PHONE- INCLUDE AREA CODE:

US DOT:
HM PLACARD ID No.:
HM CLASS NUMBER:

VEHICLE WEIGHT GVWR/GCWR:
1 - LESS THAN OR EQUAL TO 10K LBS.
2 - 10,001 TO 26,000 LBS.
3 - MORE THAN 26,000 LBS.

☐ HAZARDOUS MATERIAL RELEASED

CARGO BODY TYPE:
01 - NO CARGO BODY TYPE/NOT APPLICABLE
02 - BUS/VAN (9-15 SEATS, INC DRIVER)
03 - BUS (16+ SEATS, INC DRIVER)
04 - VEHICLE TOWING ANOTHER VEHICLE
05 - LOGGING
06 - INTERMODAL CONTAINER CHASSIS
07 - CARGO VAN/ENCLOSED BOX
08 - GRAIN, CHIPS, GRAVEL
09 - POLE
10 - CARGO TANK
11 - FLAT BED
12 - DUMP
13 - CONCRETE MIXER
14 - AUTO TRANSPORTER
15 - GARBAGE/REFUSE
99 - OTHER/UNKNOWN

TRAFFICWAY DESCRIPTION:
1 - TWO-WAY, NOT DIVIDED
2 - TWO-WAY, NOT DIVIDED, CONTINUOUS LEFT TURN LANE
3 - TWO-WAY, DIVIDED, UNPROTECTED (PAINTED OR GRASS > 4 FT.) MEDIAN
4 - TWO-WAY, DIVIDED, POSITIVE MEDIAN BARRIER
5 - ONE-WAY TRAFFICWAY

☐ HIT / SKIP UNIT

NON-MOTORIST LOCATION PRIOR TO IMPACT: 05
01 - INTERSECTION - MARKED CROSSWALK
02 - INTERSECTION - NO CROSSWALK
03 - INTERSECTION - OTHER
04 - MIDBLOCK - MARKED CROSSWALK
05 - TRAVEL LANE - OTHER LOCATION
06 - BICYCLE LANE
07 - SHOULDER/ROADSIDE
08 - SIDEWALK
09 - MEDIAN/CROSSING ISLAND
10 - DRIVEWAY ACCESS
11 - SHARED-USE PATH OR TRAIL
12 - NON-TRAFFICWAY AREA
99 - OTHER/UNKNOWN

TYPE OF USE:
1 - PERSONAL
2 - COMMERCIAL
3 - GOVERNMENT

☐ IN EMERGENCY RESPONSE

UNIT TYPE: 26
99 - UNKNOWN OR HIT / SKIP

PASSENGER VEHICLES (LESS THAN 9 PASSENGERS)
01 - SUB-COMPACT
02 - COMPACT
03 - MID SIZE
04 - FULL SIZE
05 - MINIVAN
06 - SPORT UTILITY VEHICLE
07 - PICKUP
08 - VAN
09 - MOTORCYCLE
10 - MOTORIZED BICYCLE
11 - SNOWMOBILE / ATV
12 - OTHER PASSENGER VEHICLE

MED/HEAVY TRUCKS OR COMBO UNITS > 10K LBS
13 - SINGLE UNIT TRUCKS OR VAN 2 AXLE, 6 TIRES
14 - SINGLE UNIT TRUCK; 3+ AXLES
15 - SINGLE UNIT TRUCK / TRAILER
16 - TRUCK/TRACTOR (BOBTAIL)
17 - TRACTOR/SEMI-TRAILER
18 - TRACTOR/DOUBLE
19 - TRACTOR/TRIPLES
20 - OTHER MED/HEAVY VEHICLE

☐ HAS HM PLACARD

BUS/VAN/LIMO (9 OR MORE INCLUDING DRIVER)
21 - BUS/VAN (9-15 SEATS, INC DRIVER
22 - BUS (16+ SEATS, INC DRIVER

NON-MOTORIST
23 - ANIMAL WITH RIDER
24 - ANIMAL WITH BUGGY, WAGON, SURREY
25 - BICYCLE/PEDACYCLIST
26 - PEDESTRIAN/SKATER
27 - OTHER NON-MOTORIST

SPECIAL FUNCTION:
01 - NONE
02 - TAXI
03 - RENTAL TRUCK (OVER 10K LBS)
04 - BUS - SCHOOL (PUBLIC OR PRIVATE)
05 - BUS - TRANSIT
06 - BUS - CHARTER
07 - BUS - SHUTTLE
08 - BUS - OTHER
09 - AMBULANCE
10 - FIRE
11 - HIGHWAY/MAINTENANCE
12 - MILITARY
13 - POLICE
14 - PUBLIC UTILITY
15 - OTHER GOVERNMENT
16 - CONSTRUCTION EQUIP.
17 - FARM VEHICLE
18 - FARM EQUIPMENT
19 - MOTORHOME
20 - GOLF CART
21 - TRAIN
22 - OTHER (EXPLAIN IN NARRATIVE)

MOST DAMAGED AREA: 08
IMPACT AREA: 08
01 - NONE
02 - CENTER FRONT
03 - RIGHT FRONT
04 - RIGHT SIDE
05 - RIGHT REAR
06 - REAR CENTER
07 - LEFT REAR
08 - LEFT SIDE
09 - LEFT FRONT
10 - TOP AND WINDOWS
11 - UNDERCARRIAGE
12 - TOTAL (ALL AREAS)
06 - REAR CENTER
14 - OTHER
99 - UNKNOWN

ACTION: 4
1 - NON- CONTACT
2 - NON-COLLISION
3 - STRIKING
4 - STRUCK
5 - STRIKING/STRUCK
9 - UNKNOWN

PRE-CRASH ACTIONS: 19
99 - UNKNOWN

MOTORIST
01 - STRAIGHT A HEAD
02 - BACKING
03 - CHANGING LANES
04 - OVERTAKING/PASSING
05 - MAKING RIGHT TURN
06 - MAKING LEFT TURN
07 - MAKING U-TURN
08 - ENTERING TRAFFIC LANE
09 - LEAVING TRAFFIC LANE
10 - PARKED
11 - SLOWING OR STOPPED IN TRAFFIC
12 - DRIVERLESS
13 - NEGOTIATING A CURVE
14 - OTHER MOTORIST ACTION

NON-MOTORIST
15 - ENTERING OR CROSSING SPECIFIED LOCATION
16 - WALKING, RUNNING, JOGGING, PLAYING, CYCLING
17 - WORKING
18 - PUSHING VEHICLE
19 - APPROACHING OR LEAVING VEHICLE
20 - STANDING
21 - OTHER NON -MOTORIST ACTION

CONTRIBUTING CIRCUMSTANCES
PRIMARY: 32
SECONDARY:
99 - UNKNOWN

MOTORIST
01 - NONE
02 - FAILURE TO YIELD
03 - RAN RED LIGHT
04 - RAN STOP SIGN
05 - EXCEEDED SPEED LIMIT
06 - UNSAFE SPEED
07 - IMPROPER TURN
08 - LEFT OF CENTER
09 - FOLLOWED TOO CLOSELY/ACDA
10 - IMPROPER LANE CHANGE /PASSING/OFF ROAD
11 - IMPROPER BACKING
12 - IMPROPER START FROM PARKED POSITION
13 - STOPPED OR PARKED ILLEGALLY
14 - OPERATING VEHICLE IN NEGLIGENT MANNER
15 - SWERVING TO AVOID (DUE TO EXTERNAL CONDITIONS)
16 - WRONG SIDE/WRONG WAY
17 - FAILURE TO CONTROL
18 - VISION OBSTRUCTION
19 - OPERATING DEFECTIVE EQUIPMENT
20 - LOAD SHIFTING/FALLING/SPILLING
21 - OTHER IMPROPER ACTION

NON-MOTORIST
22 - NONE
23 - IMPROPER CROSSING
24 - DARTING
25 - LYING AND/OR ILLEGALLY IN ROADWAY
26 - FAILURE TO YIELD RIGHT OF WAY
27 - NOT VISIBLE (DARK CLOTHING)
28 - INATTENTIVE
29 - FAILURE TO OBEY TRAFFIC SIGNS /SIGNALS/OFFICER
30 - WRONG SIDE OF THE ROAD
32 - OTHER NON-MOTORIST ACTION

VEHICLE DEFECTS:
01 - TURN SIGNALS
02 - HEAD LAMPS
03 - TAIL LAMPS
04 - BRAKES
05 - STEERING
06 - TIRE BLOWOUT
07 - WORN OR SLICK TIRES
08 - TRAILER EQUIPMENT DEFECTIVE
09 - MOTOR TROUBLE
10 - DISABLED FROM PRIOR ACCIDENT
11 - OTHER DEFECTS

SEQUENCE OF EVENTS
1: 20
2:
3:
4:
5:
6:
FIRST HARMFUL EVENT: 1
MOST HARMFUL EVENT: 1
99 - UNKNOWN

NON-COLLLSION EVENTS
01 - OVERTURN/ROLLOVER
02 - FIRE/EXPLOSION
03 - IMMERSION
04 - JACKKNIFE
05 - CARGO/EQUIPMENT LOSS OR SHIFT
06 - EQUIPMENT FAILURE (BLOWN TIRE, BRAKE FAILURE, ETC)
07 - SEPARATION OF UNITS
08 - RAN OFF ROAD RIGHT
09 - RAN OFF ROAD LEFT
10 - CROSS MEDIAN
11 - CROSS CENTER LINE OPPOSITE DIRECTION OF TRAVEL
12 - DOWNHILL RUNAWAY
13 - OTHER NON-COLLISION

COLLISION WITH PERSON, VEHICLE OR OBJECT NOT FIXED
14 - PEDESTRIAN
15 - PEDALCYCLE
16 - RAILWAY VEHICLE (TRAIN ENGINE)
17 - ANIMAL - FARM
18 - ANIMAL - DEER
19 - ANIMAL - OTHER
20 - MOTOR VEHICLE IN TRANSPORT
21 - PARKED MOTOR VEHICLE
22 - WORK ZONE MAINTENANCE EQUIPMENT
23 - STRUCK BY FALLING, SHIFTING CARGO OR ANYTHING SET IN MOTION BY A MOTOR VEHICLE
24 - OTHER MOVABLE OBJECT

COLLISION WITH FIXED OBJECT
25 - IMPACT ATTENUATOR/CRASH CUSHION
26 - BRIDGE OVERHEAD STRUCTURE
27 - BRIDGE PIER OR ABUTMENT
28 - BRIDGE PARAPET
29 - BRIDGE RAIL
30 - GUARDRAIL FACE
31 - GUARDRAIL END
32 - PORTABLE BARRIER
34 - MEDIAN GUARDRAIL BARRIER
35 - MEDIAN CONCRETE BARRIER
36 - MEDIAN OTHER BARRIER
37 - TRAFFIC SIGN POST
38 - OVERHEAD SIGN POST
39 - LIGHT/LUMINARIES SUPPORT
40 - UTILITY POLE
41 - OTHER POST, POLE OR SUPPORT
42 - CULVERT
43 - CURB
44 - DITCH
45 - EMBANKMENT
46 - FENCE
47 - MAILBOX
48 - TREE
49 - FIRE HYDRANT
50 - WORK ZONE MAINTENANCE EQUIPMENT
51 - WALL, BUILDING, TUNNEL
52 - OTHER FIXED OBJECT

UNIT SPEED: 01
☐ STATED
☒ ESTIMATED

POSTED SPEED: 60

TRAFFIC CONTROL:
01 - NO CONTROLS
02 - STOP SIGN
03 - YIELD SIGN
04 - TRAFFIC SIGNAL
05 - TRAFFIC FLASHERS
06 - SCHOOL ZONE
07 - RAILROAD CROSSBUCKS
08 - RAILROAD FLASHERS
09 - RAILROAD GATES
10 - CONSTRUCTION BARRICADE
11 - PERSON (FLAGGER, OFFICER)
12 - PAVEMENT MARKINGS
13 - CROSSWALK LINES
14 - WALK/DON'T WALK
15 - OTHER
16 - NOT REPORTED

UNIT DIRECTION
FROM 2 TO 1
1 - NORTH
2 - SOUTH
3 - EAST
4 - WEST
5 - NORTHEAST
6 - NORTHWEST
7 - SOUTHEAST
8 - SOUTHWEST
9 - UNKNOWN

OHIO DEPARTMENT OF PUBLIC SAFETY
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UNIT

LOCAL REPORT NUMBER 060617

UNIT NUMBER 04

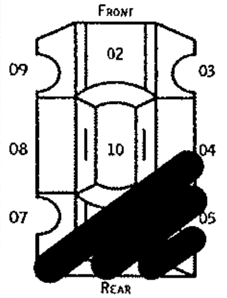
OWNER NAME: LAST, FIRST, MIDDLE (☐ SAME AS DRIVER) Germany, Derricka, T.

OWNER PHONE NUMBER - INC. AREA CODE (☐ SAME AS DRIVER) 2167320430

OWNER ADDRESS: CITY, STATE, ZIP (☐ SAME AS DRIVER) 877 Rudyard Road Cleveland, Ohio 44110

DAMAGE SCALE 4
1 - NONE
2 - MINOR
3 - FUNCTIONAL
4 - DISABLING
9 - UNKNOWN

DAMAGED AREA



LP STATE OH

LICENSE PLATE NUMBER X268230

VEHICLE IDENTIFICATION NUMBER 1G1ND52T9W6213279

OCCUPANTS 00

VEHICLE YEAR 1998

VEHICLE MAKE Chevrolet

VEHICLE MODEL Malibu

VEHICLE COLOR

☐ PROOF OF INSURANCE SHOWN

INSURANCE COMPANY General

POLICY NUMBER 25-0B1522737

TOWED BY Eckes/L2/8775

CARRIER NAME, ADDRESS, CITY, STATE, ZIP

CARRIER PHONE- INCLUDE AREA CODE

US DOT

HM PLACARD ID No.

HM CLASS NUMBER

VEHICLE WEIGHT GVWR/GCWR
1 - LESS THAN OR EQUAL TO 10K LBS
2 - 10,001 TO 26,000 LBS
3 - MORE THAN 26,000 LBS

☐ HAZARDOUS MATERIAL RELEASED

CARGO BODY TYPE 01
01 - NO CARGO BODY TYPE/NOT APPLICABLE
02 - BUS/VAN (9-15 SEATS, INC DRIVER)
03 - BUS (16+ SEATS, INC DRIVER)
04 - VEHICLE TOWING ANOTHER VEHICLE
05 - LOGGING
06 - INTERMODAL CONTAINER CHASSIS
07 - CARGO VAN/ENCLOSED BOX
08 - GRAIN, CHIPS, GRAVEL
09 - POLE
10 - CARGO TANK
11 - FLAT BED
12 - DUMP
13 - CONCRETE MIXER
14 - AUTO TRANSPORTER
15 - GARBAGE/REFUSE
99 - OTHER/UNKNOWN

TRAFFICWAY DESCRIPTION 4
1 - TWO-WAY, NOT DIVIDED
2 - TWO-WAY, NOT DIVIDED, CONTINUOUS LEFT TURN LANE
3 - TWO-WAY, DIVIDED, UNPROTECTED (PAINTED OR GRASS > 4 FT.) MEDIAN
4 - TWO-WAY, DIVIDED, POSITIVE MEDIAN BARRIER
5 - ONE-WAY TRAFFICWAY

☐ HIT / SKIP UNIT

NON-MOTORIST LOCATION PRIOR TO IMPACT 05
01 - INTERSECTION - MARKED CROSSWALK
02 - INTERSECTION - NO CROSSWALK
03 - INTERSECTION - OTHER
04 - MIDBLOCK - MARKED CROSSWALK
05 - TRAVEL LANE - OTHER LOCATION
06 - BICYCLE LANE
07 - SHOULDER/ROADSIDE
08 - SIDEWALK
09 - MEDIAN/CROSSING ISLAND
10 - DRIVEWAY ACCESS
11 - SHARED-USE PATH OR TRAIL
12 - NON-TRAFFICWAY AREA
99 - OTHER/UNKNOWN

TYPE OF USE 1
1 - PERSONAL
2 - COMMERCIAL
3 - GOVERNMENT

☐ IN EMERGENCY RESPONSE

UNIT TYPE 04
99 - UNKNOWN OR HIT / SKIP

PASSENGER VEHICLES (LESS THAN 9 PASSENGERS)
01 - SUB-COMPACT
02 - COMPACT
03 - MID SIZE
04 - FULL SIZE
05 - MINIVAN
06 - SPORT UTILITY VEHICLE
07 - PICKUP
08 - VAN
09 - MOTORCYCLE
10 - MOTORIZED BICYCLE
11 - SNOWMOBILE / ATV
12 - OTHER PASSENGER VEHICLE

MED/HEAVY TRUCKS OR COMBO UNITS > 10K LBS
13 - SINGLE UNIT TRUCKS OR VAN 2 AXLE, 6 TIRES
14 - SINGLE UNIT TRUCK; 3+ AXLES
15 - SINGLE UNIT TRUCK / TRAILER
16 - TRUCK/TRACTOR (BOBTAIL)
17 - TRACTOR/SEMI-TRAILER
18 - TRACTOR/DOUBLE
19 - TRACTOR/TRIPLES
20 - OTHER MED/HEAVY VEHICLE

☐ HAS HM PLACARD

BUS/VAN/LIMO (9 OR MORE INCLUDING DRIVER)
21 - BUS/VAN (9-15 SEATS, INC DRIVER
22 - BUS (16+ SEATS, INC DRIVER

NON-MOTORIST
23 - ANIMAL WITH RIDER
24 - ANIMAL WITH BUGGY, WAGON, SURREY
25 - BICYCLE/PEDACYCLIST
26 - PEDESTRIAN/SKATER
27 - OTHER NON-MOTORIST

SPECIAL FUNCTION 01
01 - NONE
02 - TAXI
03 - RENTAL TRUCK (OVER 10K LBS)
04 - BUS - SCHOOL (PUBLIC OR PRIVATE)
05 - BUS - TRANSIT
06 - BUS - CHARTER
07 - BUS - SHUTTLE
08 - BUS - OTHER
09 - AMBULANCE
10 - FIRE
11 - HIGHWAY/MAINTENANCE
12 - MILITARY
13 - POLICE
14 - PUBLIC UTILITY
15 - OTHER GOVERNMENT
16 - CONSTRUCTION EQUIP.
17 - FARM VEHICLE
18 - FARM EQUIPMENT
19 - MOTORHOME
20 - GOLF CART
21 - TRAIN
22 - OTHER (EXPLAIN IN NARRATIVE)

MOST DAMAGED AREA 05

IMPACT AREA 05

01 - NONE
02 - CENTER FRONT
03 - RIGHT FRONT
04 - RIGHT SIDE
05 - RIGHT REAR
06 - REAR CENTER
07 - LEFT REAR
08 - LEFT SIDE
09 - LEFT FRONT
10 - TOP AND WINDOWS
11 - UNDERCARRIAGE
12 - TOTAL (ALL AREAS)
14 - OTHER
99 - UNKNOWN

ACTION 4
1 - NON- CONTACT
2 - NON-COLLISION
3 - STRIKING
4 - STRUCK
5 - STRIKING/STRUCK
9 - UNKNOWN

PRE-CRASH ACTIONS 11
99 - UNKNOWN

MOTORIST
01 - STRAIGHT A HEAD
02 - BACKING
03 - CHANGING LANES
04 - OVERTAKING/PASSING
05 - MAKING RIGHT TURN
06 - MAKING LEFT TURN
07 - MAKING U-TURN
08 - ENTERING TRAFFIC LANE
09 - LEAVING TRAFFIC LANE
10 - PARKED
11 - SLOWING OR STOPPED IN TRAFFIC
12 - DRIVERLESS
13 - NEGOTIATING A CURVE
14 - OTHER MOTORIST ACTION

NON-MOTORIST
15 - ENTERING OR CROSSING SPECIFIED LOCATION
16 - WALKING, RUNNING, JOGGING, PLAYING, CYCLING
17 - WORKING
18 - PUSHING VEHICLE
19 - APPROACHING OR LEAVING VEHICLE
20 - STANDING
21 - OTHER NON -MOTORIST ACTION

CONTRIBUTING CIRCUMSTANCES

PRIMARY 13

SECONDARY

99 - UNKNOWN

MOTORIST
01 - NONE
02 - FAILURE TO YIELD
03 - RAN RED LIGHT
04 - RAN STOP SIGN
05 - EXCEEDED SPEED LIMIT
06 - UNSAFE SPEED
07 - IMPROPER TURN
08 - LEFT OF CENTER
09 - FOLLOWED TOO CLOSELY/ACDA
10 - IMPROPER LANE CHANGE /PASSING/OFF ROAD
11 - IMPROPER BACKING
12 - IMPROPER START FROM PARKED POSITION
13 - STOPPED OR PARKED ILLEGALLY
14 - OPERATING VEHICLE IN NEGLIGENT MANNER
15 - SWERVING TO AVOID (DUE TO EXTERNAL CONDITIONS)
16 - WRONG SIDE/WRONG WAY
17 - FAILURE TO CONTROL
18 - VISION OBSTRUCTION
19 - OPERATING DEFECTIVE EQUIPMENT
20 - LOAD SHIFTING/FALLING/SPILLING
21 - OTHER IMPROPER ACTION

NON-MOTORIST
22 - NONE
23 - IMPROPER CROSSING
24 - DARTING
25 - LYING AND/OR ILLEGALLY IN ROADWAY
26 - FAILURE TO YIELD RIGHT OF WAY
27 - NOT VISIBLE (DARK CLOTHING)
28 - INATTENTIVE
29 - FAILURE TO OBEY TRAFFIC SIGNS /SIGNALS/OFFICER
30 - WRONG SIDE OF THE ROAD
32 - OTHER NON-MOTORIST ACTION

VEHICLE DEFECTS 09
01 - TURN SIGNALS
02 - HEAD LAMPS
03 - TAIL LAMPS
04 - BRAKES
05 - STEERING
06 - TIRE BLOWOUT
07 - WORN OR SLICK TIRES
08 - TRAILER EQUIPMENT DEFECTIVE
09 - MOTOR TROUBLE
10 - DISABLED FROM PRIOR ACCIDENT
11 - OTHER DEFECTS

SEQUENCE OF EVENTS
1 20
2
3
4
5
6

FIRST HARMFUL EVENT 1

MOST HARMFUL EVENT 1

99 - UNKNOWN

NON-COLLLSION EVENTS
01 - OVERTURN/ROLLOVER
02 - FIRE/EXPLOSION
03 - IMMERSION
04 - JACKKNIFE
05 - CARGO/EQUIPMENT LOSS OR SHIFT
06 - EQUIPMENT FAILURE (BLOWN TIRE, BRAKE FAILURE, ETC)
07 - SEPARATION OF UNITS
08 - RAN OFF ROAD RIGHT
09 - RAN OFF ROAD LEFT
10 - CROSS MEDIAN
11 - CROSS CENTER LINE OPPOSITE DIRECTION OF TRAVEL
12 - DOWNHILL RUNAWAY
13 - OTHER NON-COLLISION

COLLISION WITH PERSON, VEHICLE OR OBJECT NOT FIXED
14 - PEDESTRIAN
15 - PEDALCYCLE
16 - RAILWAY VEHICLE (TRAIN ENGINE)
17 - ANIMAL - FARM
18 - ANIMAL - DEER
19 - ANIMAL - OTHER
20 - MOTOR VEHICLE IN TRANSPORT
21 - PARKED MOTOR VEHICLE
22 - WORK ZONE MAINTENANCE EQUIPMENT
23 - STRUCK BY FALLING, SHIFTING CARGO OR ANYTHING SET IN MOTION BY A MOTOR VEHICLE
24 - OTHER MOVABLE OBJECT

COLLISION WITH FIXED OBJECT
25 - IMPACT ATTENUATOR/CRASH CUSHION
26 - BRIDGE OVERHEAD STRUCTURE
27 - BRIDGE PIER OR ABUTMENT
28 - BRIDGE PARAPET
29 - BRIDGE RAIL
30 - GUARDRAIL FACE
31 - GUARDRAIL END
32 - PORTABLE BARRIER
34 - MEDIAN GUARDRAIL BARRIER
35 - MEDIAN CONCRETE BARRIER
36 - MEDIAN OTHER BARRIER
37 - TRAFFIC SIGN POST
38 - OVERHEAD SIGN POST
39 - LIGHT/LUMINARIES SUPPORT
40 - UTILITY POLE
41 - OTHER POST, POLE OR SUPPORT
42 - CULVERT
43 - CURB
44 - DITCH
45 - EMBANKMENT
46 - FENCE
47 - MAILBOX
42 - CULVERT
49 - FIRE HYDRANT
50 - WORK ZONE MAINTENANCE EQUIPMENT
51 - WALL, BUILDING, TUNNEL
52 - OTHER FIXED OBJECT

UNIT SPEED 00

☒ STATED
☐ ESTIMATED

POSTED SPEED 60

TRAFFIC CONTROL 01
01 - NO CONTROLS
02 - STOP SIGN
03 - YIELD SIGN
04 - TRAFFIC SIGNAL
05 - TRAFFIC FLASHERS
06 - SCHOOL ZONE
07 - RAILROAD CROSSBUCKS
08 - RAILROAD FLASHERS
09 - RAILROAD GATES
10 - CONSTRUCTION BARRICADE
11 - PERSON (FLAGGER, OFFICER)
12 - PAVEMENT MARKINGS
13 - CROSSWALK LINES
14 - WALK/DON'T WALK
15 - OTHER
16 - NOT REPORTED

UNIT DIRECTION

FROM 4 TO 7

1 - NORTH
2 - SOUTH
3 - EAST
4 - WEST
5 - NORTHEAST
6 - NORTHWEST
7 - SOUTHEAST
8 - SOUTHWEST
9 - UNKNOWN

OHIO DEPARTMENT OF PUBLIC SAFETY
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UNIT

LOCAL REPORT NUMBER 06667

UNIT NUMBER: 005

OWNER NAME: LAST, FIRST, MIDDLE (☐ SAME AS DRIVER): Bolden, Eric, C.

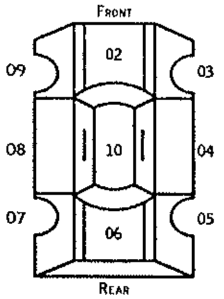
OWNER PHONE NUMBER - INC. AREA CODE (☐ SAME AS DRIVER): 2162885156

OWNER ADDRESS: CITY, STATE, ZIP (☐ SAME AS DRIVER): 10616 Everton Avenue Cleveland, Ohio 44106

DAMAGE SCALE: 3

1 - NONE
2 - MINOR
3 - FUNCTIONAL
4 - DISABLING
9 - UNKNOWN

DAMAGED AREA



LP STATE:

LICENSE PLATE NUMBER:

VEHICLE IDENTIFICATION NUMBER:

OCCUPANTS:

VEHICLE YEAR:

VEHICLE MAKE:

VEHICLE MODEL:

VEHICLE COLOR:

☐ PROOF OF INSURANCE SHOWN

INSURANCE COMPANY:

POLICY NUMBER:

TOWED BY:

CARRIER NAME, ADDRESS, CITY, STATE, ZIP:

CARRIER PHONE- INCLUDE AREA CODE:

US DOT:

HM PLACARD ID No.:

HM CLASS NUMBER:

VEHICLE WEIGHT GVWR/GCWR:
1 - LESS THAN OR EQUAL TO 10K LBS.
2 - 10,001 TO 26,000 LBS.
3 - MORE THAN 26,000 LBS

☐ HAZARDOUS MATERIAL RELEASED

CARGO BODY TYPE:
01 - NO CARGO BODY TYPE/NOT APPLICABLE
02 - BUS/VAN (9-15 SEATS, INC DRIVER)
03 - BUS (16+ SEATS, INC DRIVER)
04 - VEHICLE TOWING ANOTHER VEHICLE
05 - LOGGING
06 - INTERMODAL CONTAINER CHASSIS
07 - CARGO VAN/ENCLOSED BOX
08 - GRAIN, CHIPS, GRAVEL
09 - POLE
10 - CARGO TANK
11 - FLAT BED
12 - DUMP
13 - CONCRETE MIXER
14 - AUTO TRANSPORTER
15 - GARBAGE/REFUSE
99 - OTHER/UNKNOWN

TRAFFICWAY DESCRIPTION: 4
1 - TWO-WAY, NOT DIVIDED
2 - TWO-WAY, NOT DIVIDED, CONTINUOUS LEFT TURN LANE
3 - TWO-WAY, DIVIDED, UNPROTECTED (PAINTED OR GRASS > 4 FT.) MEDIAN
4 - TWO-WAY, DIVIDED, POSITIVE MEDIAN BARRIER
5 - ONE-WAY TRAFFICWAY

☐ HIT / SKIP UNIT

NON-MOTORIST LOCATION PRIOR TO IMPACT:
01 - INTERSECTION - MARKED CROSSWALK
02 - INTERSECTION - NO CROSSWALK
03 - INTERSECTION - OTHER
04 - MIDBLOCK - MARKED CROSSWALK
05 - TRAVEL LANE - OTHER LOCATION
06 - BICYCLE LANE
07 - SHOULDER/ROADSIDE
08 - SIDEWALK
09 - MEDIAN/CROSSING ISLAND
10 - DRIVEWAY ACCESS
11 - SHARED-USE PATH OR TRAIL
12 - NON-TRAFFICWAY AREA
99 - OTHER/UNKNOWN

TYPE OF USE:
1 - PERSONAL
2 - COMMERCIAL
3 - GOVERNMENT

☐ IN EMERGENCY RESPONSE

UNIT TYPE: 26

99 - UNKNOWN OR HIT / SKIP

PASSENGER VEHICLES (LESS THAN 9 PASSENGERS)
01 - SUB-COMPACT
02 - COMPACT
03 - MID SIZE
04 - FULL SIZE
05 - MINIVAN
06 - SPORT UTILITY VEHICLE
07 - PICKUP
08 - VAN
09 - MOTORCYCLE
10 - MOTORIZED BICYCLE
11 - SNOWMOBILE / ATV
12 - OTHER PASSENGER VEHICLE

MED/HEAVY TRUCKS OR COMBO UNITS > 10K LBS
13 - SINGLE UNIT TRUCKS OR VAN 2 AXLE, 6 TIRES
14 - SINGLE UNIT TRUCK; 3+ AXLES
15 - SINGLE UNIT TRUCK / TRAILER
16 - TRUCK/TRACTOR (BOBTAIL)
17 - TRACTOR/SEMI-TRAILER
18 - TRACTOR/DOUBLE
19 - TRACTOR/TRIPLES
20 - OTHER MED/HEAVY VEHICLE

☐ HAS HM PLACARD

BUS/VAN/LIMO (9 OR MORE INCLUDING DRIVER)
21 - BUS/VAN (9-15 SEATS, INC DRIVER
22 - BUS (16+ SEATS, INC DRIVER

NON-MOTORIST
23 - ANIMAL WITH RIDER
24 - ANIMAL WITH BUGGY, WAGON, SURREY
25 - BICYCLE/PEDACYCLIST
26 - PEDESTRIAN/SKATER
27 - OTHER NON-MOTORIST

SPECIAL FUNCTION:
01 - NONE
02 - TAXI
03 - RENTAL TRUCK (OVER 10K LBS)
04 - BUS - SCHOOL (PUBLIC OR PRIVATE)
05 - BUS - TRANSIT
06 - BUS - CHARTER
07 - BUS - SHUTTLE
08 - BUS - OTHER
09 - AMBULANCE
10 - FIRE
11 - HIGHWAY/MAINTENANCE
12 - MILITARY
13 - POLICE
14 - PUBLIC UTILITY
15 - OTHER GOVERNMENT
16 - CONSTRUCTION EQUIP.
17 - FARM VEHICLE
18 - FARM EQUIPMENT
19 - MOTORHOME
20 - GOLF CART
21 - TRAIN
22 - OTHER (EXPLAIN IN NARRATIVE)

MOST DAMAGED AREA: 04

IMPACT AREA: 04

01 - NONE
02 - CENTER FRONT
03 - RIGHT FRONT
04 - RIGHT SIDE
05 - RIGHT REAR
06 - REAR CENTER
07 - LEFT REAR
08 - LEFT SIDE
09 - LEFT FRONT
10 - TOP AND WINDOWS
11 - UNDERCARRIAGE
12 - TOTAL (ALL AREAS)
13 - OTHER
99 - UNKNOWN

ACTION: 4
1 - NON- CONTACT
2 - NON-COLLISION
3 - STRIKING
4 - STRUCK
5 - STRIKING/STRUCK
9 - UNKNOWN

PRE-CRASH ACTIONS: 18

99 - UNKNOWN

MOTORIST
01 - STRAIGHT A HEAD
02 - BACKING
03 - CHANGING LANES
04 - OVERTAKING/PASSING
05 - MAKING RIGHT TURN
06 - MAKING LEFT TURN
07 - MAKING U-TURN
08 - ENTERING TRAFFIC LANE
09 - LEAVING TRAFFIC LANE
10 - PARKED
11 - SLOWING OR STOPPED IN TRAFFIC
12 - DRIVERLESS
13 - NEGOTIATING A CURVE
14 - OTHER MOTORIST ACTION

NON-MOTORIST
15 - ENTERING OR CROSSING SPECIFIED LOCATION
16 - WALKING, RUNNING, JOGGING, PLAYING, CYCLING
17 - WORKING
18 - PUSHING VEHICLE
19 - APPROACHING OR LEAVING VEHICLE
20 - STANDING
21 - OTHER NON -MOTORIST ACTION

CONTRIBUTING CIRCUMSTANCES

PRIMARY: 32

SECONDARY:

99 - UNKNOWN

MOTORIST
01 - NONE
02 - FAILURE TO YIELD
03 - RAN RED LIGHT
04 - RAN STOP SIGN
05 - EXCEEDED SPEED LIMIT
06 - UNSAFE SPEED
07 - IMPROPER TURN
08 - LEFT OF CENTER
09 - FOLLOWED TOO CLOSELY/ACDA
10 - IMPROPER LANE CHANGE /PASSING/OFF ROAD
11 - IMPROPER BACKING
12 - IMPROPER START FROM PARKED POSITION
13 - STOPPED OR PARKED ILLEGALLY
14 - OPERATING VEHICLE IN NEGLIGENT MANNER
15 - SWERVING TO AVOID (DUE TO EXTERNAL CONDITIONS)
16 - WRONG SIDE/WRONG WAY
17 - FAILURE TO CONTROL
18 - VISION OBSTRUCTION
19 - OPERATING DEFECTIVE EQUIPMENT
20 - LOAD SHIFTING/FALLING/SPILLING
21 - OTHER IMPROPER ACTION

NON-MOTORIST
22 - NONE
23 - IMPROPER CROSSING
24 - DARTING
25 - LYING AND/OR ILLEGALLY IN ROADWAY
26 - FAILURE TO YIELD RIGHT OF WAY
27 - NOT VISIBLE (DARK CLOTHING)
28 - INATTENTIVE
29 - FAILURE TO OBEY TRAFFIC SIGNS /SIGNALS/OFFICER
30 - WRONG SIDE OF THE ROAD
32 - OTHER NON-MOTORIST ACTION

VEHICLE DEFECTS
01 - TURN SIGNALS
02 - HEAD LAMPS
03 - TAIL LAMPS
04 - BRAKES
05 - STEERING
06 - TIRE BLOWOUT
07 - WORN OR SLICK TIRES
08 - TRAILER EQUIPMENT DEFECTIVE
09 - MOTOR TROUBLE
10 - DISABLED FROM PRIOR ACCIDENT
11 - OTHER DEFECTS

SEQUENCE OF EVENTS
1: 21
2: 20
3:
4:
5:
6:

FIRST HARMFUL EVENT: 2

MOST HARMFUL EVENT: 1

99 - UNKNOWN

NON-COLLLSION EVENTS
01 - OVERTURN/ROLLOVER
02 - FIRE/EXPLOSION
03 - IMMERSION
04 - JACKKNIFE
05 - CARGO/EQUIPMENT LOSS OR SHIFT
06 - EQUIPMENT FAILURE (BLOWN TIRE, BRAKE FAILURE, ETC)
07 - SEPARATION OF UNITS
08 - RAN OFF ROAD RIGHT
09 - RAN OFF ROAD LEFT
10 - CROSS MEDIAN
11 - CROSS CENTER LINE OPPOSITE DIRECTION OF TRAVEL
12 - DOWNHILL RUNAWAY
13 - OTHER NON-COLLISION

COLLISION WITH PERSON, VEHICLE OR OBJECT NOT FIXED
14 - PEDESTRIAN
15 - PEDALCYCLE
16 - RAILWAY VEHICLE (TRAIN ENGINE)
17 - ANIMAL - FARM
18 - ANIMAL - DEER
19 - ANIMAL - OTHER
20 - MOTOR VEHICLE IN TRANSPORT
21 - PARKED MOTOR VEHICLE
22 - WORK ZONE MAINTENANCE EQUIPMENT
23 - STRUCK BY FALLING, SHIFTING CARGO OR ANYTHING SET IN MOTION BY A MOTOR VEHICLE
24 - OTHER MOVABLE OBJECT

COLLISION WITH FIXED OBJECT
25 - IMPACT ATTENUATOR/CRASH CUSHION
26 - BRIDGE OVERHEAD STRUCTURE
27 - BRIDGE PIER OR ABUTMENT
28 - BRIDGE PARAPET
29 - BRIDGE RAIL
30 - GUARDRAIL FACE
31 - GUARDRAIL END
32 - PORTABLE BARRIER
34 - MEDIAN GUARDRAIL BARRIER
35 - MEDIAN CONCRETE BARRIER
36 - MEDIAN OTHER BARRIER
37 - TRAFFIC SIGN POST
38 - OVERHEAD SIGN POST
39 - LIGHT/LUMINARIES SUPPORT
40 - UTILITY POLE
41 - OTHER POST, POLE OR SUPPORT
42 - CULVERT
43 - CURB
44 - DITCH
45 - EMBANKMENT
46 - FENCE
47 - MAILBOX
48 - TREE
49 - FIRE HYDRANT
50 - WORK ZONE MAINTENANCE EQUIPMENT
51 - WALL, BUILDING, TUNNEL
52 - OTHER FIXED OBJECT

UNIT SPEED: 0

☒ STATED
☐ ESTIMATED

POSTED SPEED: 60

TRAFFIC CONTROL:
01 - NO CONTROLS
02 - STOP SIGN
03 - YIELD SIGN
04 - TRAFFIC SIGNAL
05 - TRAFFIC FLASHERS
06 - SCHOOL ZONE
07 - RAILROAD CROSSBUCKS
08 - RAILROAD FLASHERS
09 - RAILROAD GATES
10 - CONSTRUCTION BARRICADE
11 - PERSON (FLAGGER, OFFICER)
12 - PAVEMENT MARKINGS
13 - CROSSWALK LINES
14 - WALK/DON'T WALK
15 - OTHER
16 - NOT REPORTED

UNIT DIRECTION
FROM 6 TO 7
1 - NORTH
2 - SOUTH
3 - EAST
4 - WEST
5 - NORTHEAST
6 - NORTHWEST
7 - SOUTHEAST
8 - SOUTHWEST
9 - UNKNOWN

OHIO DEPARTMENT OF PUBLIC SAFETY
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MOTORIST/ NON-MOTORIST / OCCUPANT

LOCAL REPORT NUMBER: 066617

MOTORIST/NON MOTORIST

UNIT NUMBER 01	NAME: LAST, FIRST, MIDDLE Najjar,Mohamed, Y.	DATE OF BIRTH 12071984	AGE 28	GENDER M F - FEMALE M - MALE

ADDRESS, CITY, STATE, ZIP 1385 Fitzroy Street Westlake, Ohio 44145	CONTACT PHONE- INCLUDE AREA CODE 2167495837

INJURIES 1	INJURED TAKEN BY 1	EMS AGENCY	MEDICAL FACILITY INJURED TAKEN TO Metro Health	SAFETY EQUIPMENT USED 01	☐ DOT COMPLIANT MOTORCYCLE HELMET	SEATING POSITION 03	AIR BAG USAGE 1	EJECTION 1	TRAPPED 1

OL STATE OH	OPERATOR LICENSE NUMBER SK678590	OL CLASS 4	☐ NO VALID OL	☐ M/C END.	CONDITION 1	ALCOHOL/DRUG SUSPECTED 1	ALCOHOL TEST STATUS 1	ALCOHOL TEST TYPE 1	ALCOHOL TEST VALUE	DRUG TEST STATUS 1	DRUG TEST TYPE 1		

OFFENSE CHARGED (☐ LOCAL CODE)	OFFENSE DESCRIPTION	CITATION NUMBER	HANDS-FREE ☐ DEVICE USED	DRIVER DISTRACTED BY 1

MOTORIST/NON MOTORIST

UNIT NUMBER	NAME: LAST, FIRST, MIDDLE	DATE OF BIRTH	AGE	GENDER F - FEMALE M - MALE

ADDRESS, CITY, STATE, ZIP	CONTACT PHONE- INCLUDE AREA CODE

INJURIES	INJURED TAKEN BY	EMS AGENCY	MEDICAL FACILITY INJURED TAKEN TO	SAFETY EQUIPMENT USED	☐ DOT COMPLIANT MOTORCYCLE HELMET	SEATING POSITION	AIR BAG USAGE	EJECTION	TRAPPED

OL STATE	OPERATOR LICENSE NUMBER	OL CLASS	☐ NO VALID OL	☐ M/C END.	CONDITION	ALCOHOL DRUG SUSPECTED	ALCOHOL TEST STATUS	ALCOHOL TEST TYPE	ALCOHOL TEST VALUE	DRUG TEST STATUS	DRUG TEST TYPE

OFFENSE CHARGED (☐ LOCAL CODE)	OFFENSE DESCRIPTION	CITATION NUMBER	HANDS-FREE ☐ DEVICE USED	DRIVER DISTRACTED BY

INJURIES
1 - NO INJURIES / NON REPORTED
2 - POSSIBLE
3 - NON-INCAPACITATING
4 - INCAPACITATING
5 - FATAL

INJURED TAKEN BY
1 - NOT TRANSPORTED / TREATED AT SCENE
2 - EMS
3 - POLICE
4 - OTHER
9 - UNKNOWN

SAFETY EQUIPMENT USED
99 - UNKNOWN SAFETY EQUIPMENT

MOTORIST
01 - NONE USED - VEHICLE OCCUPANT
02 - SHOULDER BELT ONLY USED
03 - LAP BELT ONLY USED
04 - SHOULDER AND LAP BELT USED
05 - CHILD RESTRAINT SYSTEM-FORWARD FACING
06 - CHILD RESTRAINT SYSTEM-REAR FACING
07 - BOOSTER SEAT
08 - HELMET USED

NON-MOTORIST
09 - NONE USED
10 - HELMET USED
11 - PROTECTIVE PADS USED (ELBOW, KNEES, ETC)
12 - REFLECTIVE CLOTHING
13 - LIGHTING
14 - OTHER

SEATING POSITION
01 - FRONT - LEFT SIDE (MOTORCYCLE DRIVER)
02 - FRONT - MIDDLE
03 - FRONT - RIGHT SIDE
04 - SECOND - LEFT SIDE (MOTORCYCLE PASSENGER)
05 - SECOND - MIDDLE
06 - SECOND - RIGHT SIDE
07 - THIRD - LEFT SIDE (MOTORCYCLE SIDE CAR)
08 - THIRD - MIDDLE
09 - THIRD - RIGHT SIDE
10 - SLEEPER SECTION OF CAB (TRUCK)
11 - PASSENGER IN OTHER ENCLOSED CARGO AREA (NON-TRAILING UNIT SUCH AS A BUS, PICK-UP WITH CAB)
12 - PASSENGER IN UNENCLOSED CARGO AREA
13 - TRAILING UNIT
14 - RIDING ON A VEHICLE EXTERIOR (NON-TRAILING UNIT)
15 - NON-MOTORIST
16 - OTHER
99 - UNKNOWN

AIR BAG USAGE
1 - NOT DEPLOYED
2 - DEPLOYED FRONT
3 - DEPLOYED SIDE
4 - DEPLOYED BOTH FRONT/SIDE
5 - NOT APPLICABLE
9 - DEPLOYMENT UNKNOWN

EJECTION
1 - NOT EJECTED
2 - TOTALLY EJECTED
3 - PARTIALLY EJECTED
4 - NOT APPLICABLE

TRAPPED
1 - NOT TRAPPED
2 - EXTRACT BY MECHANICAL MEANS
3 - EXTRACTED BY NON-MECHANICAL MEANS

OPERATOR LICENSE CLASS
1 - CLASS A
2 - CLASS B
3 - CLASS C
4 - REGULAR CLASS (OHIO IS "D")
5 - MC/MOPED ONLY

CONDITION
1 - APPARENTLY NORMAL
2 - PHYSICAL IMPAIRMENT
3 - EMOTIONAL (DEPRESSED, ANGRY, DISTURBED)
4 - ILLNESS
5 - FALL ASLEEP, FAINTED, FATIGUED
6 - UNDER THE INFLUENCE OF MEDICATION, DRUGS, ALCOHOL
7 - OTHER

ALCOHOL/DRUG SUSPECTED
1 - NONE
2 - YES - ALCOHOL SUSPECTED
3 - YES - HBD NOT IMPAIRED
4 - YES - DRUG SUSPECTED
5 - YES - ALCOHOL AND DRUG SUSPECT

ALCOHOL TEST STATUS
1 - NONE GIVEN
2 - TEST REFUSED
3 - TEST GIVEN, CONTAMINATED SAMPLE/UNUSABLE
4 - TEST GIVEN, RESULTS KNOWN
5 - TEST GIVEN, RESULTS UNKNOWN

ALCOHOL TEST TYPE
1 - NONE
2 - BLOOD
3 - URINE
4 - BREATH
5 - OTHER

DRUG TEST STATUES
1 - NONE GIVEN
2 - TEST REFUSED
3 - TEST GIVEN, CONTAMINATED SAMPLE/UNUSABLE
4 - TEST GIVEN, RESULTS KNOWN
5 - TEST GIVEN, RESULTS UNKNOWN

DRUG TEST TYPE
1 - NONE
2 - BLOOD
3 - URINE
4 - BREATH
5 - OTHER

DRIVER DISTRACTED BY
1 - NO DISTRACTED REPORTED
2 - PHONE
3 - TEXTING/EMAILING
4 - ELECTRONIC COMMUNICATION DEVICE
5 - OTHER ELECTRONIC DEVICE (NAVIGATION DEVICE, RADIO, DVD)
6 - OTHER INSIDE THE VEHICLE
7 - EXTERNAL DISTRACTION

OCCUPANT

UNIT	NAME: LAST, FIRST, MIDDLE	DATE OF BIRTH	AGE	GENDER F - FEMALE M - MALE

ADDRESS, CITY, STATE, ZIP	CONTACT PHONE- INCLUDE AREA CODE

INJURIES	INJURED TAKEN BY	EMS AGENCY	MEDICAL FACILITY INJURED TAKEN TO	SAFETY EQUIPMENT USED	☐ DOT COMPLIANT MOTORCYCLE HELMET	SEATING POSITION	AIR BAG USAGE	EJECTION	TRAPPED

OCCUPANT

UNIT NUMBER	NAME: LAST, FIRST, MIDDLE	DATE OF BIRTH	AGE	GENDER F - FEMALE M - MALE

ADDRESS, CITY, STATE, ZIP	CONTACT PHONE- INCLUDE AREA CODE

INJURIES	INJURED TAKEN BY	EMS AGENCY	MEDICAL FACILITY INJURED TAKEN TO	SAFETY EQUIPMENT USED	☐ DOT COMPLIANT MOTORCYCLE HELMET	SEATING POSITION	AIR BAG USAGE	EJECTION	TRAPPED

OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION • SERVICE • PROTECTION

MOTORIST/ NON-MOTORIST / OCCUPANT

LOCAL REPORT NUMBER: 06667

MOTORIST/NON-MOTORIST

UNIT NUMBER	NAME: LAST, FIRST, MIDDLE	DATE OF BIRTH	AGE	GENDER (F - FEMALE, M - MALE)
03	Loury, Earl, V.	09271962	50	M

ADDRESS, CITY, STATE, ZIP	CONTACT PHONE- INCLUDE AREA CODE
440 Ingleside Road Cleveland, Ohio 44128	

INJURIES	INJURED TAKEN BY	EMS AGENCY	MEDICAL FACILITY INJURED TAKEN TO	SAFETY EQUIPMENT USED	☐ DOT COMPLIANT MOTORCYCLE HELMET	SEATING POSITION	AIR BAG USAGE	EJECTION	TRAPPED
5	2	CEMS 11	Cleveland Clinic	01		15	5	4	1

OL STATE	OPERATOR LICENSE NUMBER	OL CLASS	☐ NO VALID OL	☐ M/C END.	CONDITION	ALCOHOL/DRUG SUSPECTED	ALCOHOL TEST STATUS	ALCOHOL TEST TYPE	ALCOHOL TEST VALUE	DRUG TEST STATUS	DRUG TEST TYPE
OH	RT708623	4			1	1	1	1		1	1

OFFENSE CHARGED (☐ LOCAL CODE)	OFFENSE DESCRIPTION	CITATION NUMBER	☐ HANDS-FREE DEVICE USED	DRIVER DISTRACTED BY
				1

MOTORIST/NON-MOTORIST

UNIT NUMBER	NAME: LAST, FIRST, MIDDLE	DATE OF BIRTH	AGE	GENDER (F - FEMALE, M - MALE)
05	Bolden, Eric, C.	12151971	41	M

ADDRESS, CITY, STATE, ZIP	CONTACT PHONE- INCLUDE AREA CODE
10616 Everton Avenue Cleveland, Ohio 44106	2162885156

INJURIES	INJURED TAKEN BY	EMS AGENCY	MEDICAL FACILITY INJURED TAKEN TO	SAFETY EQUIPMENT USED	☐ DOT COMPLIANT MOTORCYCLE HELMET	SEATING POSITION	AIR BAG USAGE	EJECTION	TRAPPED
3	2	CEMS 12	Metro Health	09		15	5	4	1

OL STATE	OPERATOR LICENSE NUMBER	OL CLASS	☐ NO VALID OL	☐ M/C END.	CONDITION	ALCOHOL DRUG SUSPECTED	ALCOHOL TEST STATUS	ALCOHOL TEST TYPE	ALCOHOL TEST VALUE	DRUG TEST STATUS	DRUG TEST TYPE
OH	OG102691	4			1	1	1	1		1	1

OFFENSE CHARGED (☐ LOCAL CODE)	OFFENSE DESCRIPTION	CITATION NUMBER	☐ HANDS-FREE DEVICE USED	DRIVER DISTRACTED BY
				1

INJURIES
- 1 - NO INJURIES / NON REPORTED
- 2 - POSSIBLE
- 3 - NON-INCAPACITATING
- 4 - INCAPACITATING
- 5 - FATAL

INJURED TAKEN BY
- 1 - NOT TRANSPORTED / TREATED AT SCENE
- 2 - EMS
- 3 - POLICE
- 4 - OTHER
- 9 - UNKNOWN

SAFETY EQUIPMENT USED

99 - UNKNOWN SAFETY EQUIPMENT

MOTORIST
- 01 - NONE USED - VEHICLE OCCUPANT
- 02 - SHOULDER BELT ONLY USED
- 03 - LAP BELT ONLY USED
- 04 - SHOULDER AND LAP BELT USED
- 05 - CHILD RESTRAINT SYSTEM-FORWARD FACING
- 06 - CHILD RESTRAINT SYSTEM-REAR FACING
- 07 - BOOSTER SEAT
- 08 - HELMET USED

NON-MOTORIST
- 09 - NONE USED
- 10 - HELMET USED
- 11 - PROTECTIVE PADS USED (ELBOW, KNEES, ETC)
- 12 - REFLECTIVE CLOTHING
- 13 - LIGHTING
- 14 - OTHER

SEATING POSITION
- 01 - FRONT - LEFT SIDE (MOTORCYCLE DRIVER)
- 02 - FRONT - MIDDLE
- 03 - FRONT - RIGHT SIDE
- 04 - SECOND - LEFT SIDE (MOTORCYCLE PASSENGER)
- 05 - SECOND - MIDDLE
- 06 - SECOND - RIGHT SIDE
- 07 - THIRD - LEFT SIDE (MOTORCYCLE SIDE CAR)
- 08 - THIRD - MIDDLE
- 09 - THIRD - RIGHT SIDE
- 10 - SLEEPER SECTION OF CAB (TRUCK)
- 11 - PASSENGER IN OTHER ENCLOSED CARGO AREA (NON-TRAILING UNIT SUCH AS A BUS, PICK-UP WITH CAB)
- 12 - PASSENGER IN UNENCLOSED CARGO AREA
- 13 - TRAILING UNIT
- 14 - RIDING ON A VEHICLE EXTERIOR (NON-TRAILING UNIT)
- 15 - NON-MOTORIST
- 16 - OTHER
- 99 - UNKNOWN

AIR BAG USAGE
- 1 - NOT DEPLOYED
- 2 - DEPLOYED FRONT
- 3 - DEPLOYED SIDE
- 4 - DEPLOYED BOTH FRONT/SIDE
- 5 - NOT APPLICABLE
- 9 - DEPLOYMENT UNKNOWN

EJECTION
- 1 - NOT EJECTED
- 2 - TOTALLY EJECTED
- 3 - PARTIALLY EJECTED
- 4 - NOT APPLICABLE

TRAPPED
- 1 - NOT TRAPPED
- 2 - EXTRACT BY MECHANICAL MEANS
- 3 - EXTRACTED BY NON-MECHANICAL MEANS

OPERATOR LICENSE CLASS
- 1 - CLASS A
- 2 - CLASS B
- 3 - CLASS C
- 4 - REGULAR CLASS (OHIO IS "D")
- 5 - M/C/MOPED ONLY

CONDITION
- 1 - APPARENTLY NORMAL
- 2 - PHYSICAL IMPAIRMENT
- 3 - EMOTIONAL (DEPRESSED, ANGRY, DISTURBED)
- 4 - ILLNESS
- 5 - FALL ASLEEP, FAINTED, FATIGUED
- 6 - UNDER THE INFLUENCE OF MEDICATION, DRUGS, ALCOHOL
- 7 - OTHER

ALCOHOL/DRUG SUSPECTED
- 1 - NONE
- 2 - YES - ALCOHOL SUSPECTED
- 3 - YES - HBD NOT IMPAIRED
- 4 - YES - DRUG SUSPECTED
- 5 - YES - ALCOHOL AND DRUG SUSPECT

ALCOHOL TEST STATUS
- 1 - NONE GIVEN
- 2 - TEST REFUSED
- 3 - TEST GIVEN, CONTAMINATED SAMPLE/UNUSABLE
- 4 - TEST GIVEN, RESULTS KNOWN
- 5 - TEST GIVEN, RESULTS UNKNOWN

ALCOHOL TEST TYPE
- 1 - NONE
- 2 - BLOOD
- 3 - URINE
- 4 - BREATH
- 5 - OTHER

DRUG TEST STATUS
- 1 - NONE GIVEN
- 2 - TEST REFUSED
- 3 - TEST GIVEN, CONTAMINATED SAMPLE/UNUSABLE
- 4 - TEST GIVEN, RESULTS KNOWN
- 5 - TEST GIVEN, RESULTS UNKNOWN

DRUG TEST TYPE
- 1 - NONE
- 2 - BLOOD
- 3 - URINE
- 4 - BREATH
- 5 - OTHER

DRIVER DISTRACTED BY
- 1 - NO DISTRACTED REPORTED
- 2 - PHONE
- 3 - TEXTING/EMAILING
- 4 - ELECTRONIC COMMUNICATION DEVICE
- 5 - OTHER ELECTRONIC DEVICE (NAVIGATION DEVICE, RADIO, DVD)
- 6 - OTHER INSIDE THE VEHICLE
- 7 - EXTERNAL DISTRACTION

OCCUPANT

UNIT	NAME: LAST, FIRST, MIDDLE	DATE OF BIRTH	AGE	GENDER (F - FEMALE, M - MALE)

ADDRESS, CITY, STATE, ZIP	CONTACT PHONE- INCLUDE AREA CODE

INJURIES	INJURED TAKEN BY	EMS AGENCY	MEDICAL FACILITY INJURED TAKEN TO	SAFETY EQUIPMENT USED	☐ DOT COMPLIANT MOTORCYCLE HELMET	SEATING POSITION	AIR BAG USAGE	EJECTION	TRAPPED

OCCUPANT

UNIT NUMBER	NAME: LAST, FIRST, MIDDLE	DATE OF BIRTH	AGE	GENDER (F - FEMALE, M - MALE)

ADDRESS, CITY, STATE, ZIP	CONTACT PHONE- INCLUDE AREA CODE

INJURIES	INJURED TAKEN BY	EMS AGENCY	MEDICAL FACILITY INJURED TAKEN TO	SAFETY EQUIPMENT USED	☐ DOT COMPLIANT MOTORCYCLE HELMET	SEATING POSITION	AIR BAG USAGE	EJECTION	TRAPPED

OCCUPANT/ WITNESS ADDENDUM

OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION - SERVICE - PROTECTION

LOCAL REPORT NUMBER 06667

OCCUPANT

UNIT NUMBER
NAME: LAST, FIRST, MIDDLE Johnson, Thomas
DATE OF BIRTH
AGE
GENDER M F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZIP 12005 Angelius Avenue Cleveland, Ohio 44105
CONTACT PHONE- INCLUDE AREA CODE 2163553766
INJURIES
INJURED TAKEN BY
EMS AGENCY
MEDICAL FACILITY INJURED TAKEN TO
SAFETY EQUIPMENT USED
☐ DOT COMPLIANT MOTORCYCLE HELMET
SEATING POSITION
AIR BAG USAGE
EJECTION
TRAPPED

OCCUPANT

UNIT NUMBER
NAME: LAST, FIRST, MIDDLE Guth, Chuck
DATE OF BIRTH
AGE
GENDER M F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZIP 27653 Capel Road Columbia Station, Ohio 44028
CONTACT PHONE- INCLUDE AREA CODE 2168577642
INJURIES
INJURED TAKEN BY
EMS AGENCY
MEDICAL FACILITY INJURED TAKEN TO
SAFETY EQUIPMENT USED
☐ DOT COMPLIANT MOTORCYCLE HELMET
SEATING POSITION
AIR BAG USAGE
EJECTION
TRAPPED

OCCUPANT

UNIT NUMBER
NAME: LAST, FIRST, MIDDLE Robinson, Edward
DATE OF BIRTH
AGE
GENDER M F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZIP 3759 Martin Luther King Drive Cleveland, Ohio 44108
CONTACT PHONE- INCLUDE AREA CODE 2168545382
INJURIES
INJURED TAKEN BY
EMS AGENCY
MEDICAL FACILITY INJURED TAKEN To
SAFETY EQUIPMENT USED
☐ DOT COMPLIANT MOTORCYCLE HELMET
SEATING POSITION
AIR BAG USAGE
EJECTION
TRAPPED

OCCUPANT

UNIT NUMBER
NAME: LAST, FIRST, MIDDLE Barnes, Austin, B.
DATE OF BIRTH
AGE
GENDER M F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZIP 3860 Ben Hur Avenue Willoughby, Ohio 44094
CONTACT PHONE- INCLUDE AREA CODE 3308074344
INJURIES
INJURED TAKEN BY
EMS AGENCY
MEDICAL FACILITY INJURED TAKEN TO
SAFETY EQUIPMENT USED
☐ DOT COMPLIANT MOTORCYCLE HELMET
SEATING POSITION
AIR BAG USAGE
EJECTION
TRAPPED

OCCUPANT

UNIT NUMBER
NAME: LAST, FIRST, MIDDLE Rivers, Domonique
DATE OF BIRTH 01111990
AGE 23
GENDER F F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZIP 4511 Granada Boulevard Warrensville Heights, Ohio 44121
CONTACT PHONE- INCLUDE AREA CODE 2167984440
INJURIES
INJURED TAKEN BY
EMS AGENCY
MEDICAL FACILITY INJURED TAKEN TO
SAFETY EQUIPMENT USED
☐ DOT COMPLIANT MOTORCYCLE HELMET
SEATING POSITION
AIR BAG USAGE
EJECTION
TRAPPED

OCCUPANT

UNIT NUMBER
NAME: LAST, FIRST, MIDDLE
DATE OF BIRTH
AGE
GENDER F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZIP
CONTACT PHONE- INCLUDE AREA CODE
INJURIES
INJURED TAKEN BY
EMS AGENCY
MEDICAL FACILITY INJURED TAKEN TO
SAFETY EQUIPMENT USED
☐ DOT COMPLIANT MOTORCYCLE HELMET
SEATING POSITION
AIR BAG USAGE
EJECTION
TRAPPED

INJURIES
1 - NO INJURIES / NON REPORTED
2 - POSSIBLE
3 - NON-INCAPACITATING
4 - INCAPACITATING
5 - FATAL

INJURED TAKEN BY
1 - NOT TRANSPORTED / TREATED AT SCENE
2 - EMS
3 - POLICE
4 - OTHER
9 - UNKNOWN

SAFETY EQUIPMENT USED
99 - UNKNOWN SAFETY EQUIPMENT

MOTORIST
01 - NONE USED - VEHICLE OCCUPANT
02 - SHOULDER BELT ONLY USED
03 - LAP BELT ONLY USED
04 - SHOULDER AND LAP BELT USED
05 - CHILD RESTRAINT SYSTEM-FORWARD FACING
06 - CHILD RESTRAINT SYSTEM-REAR FACING
07 - BOOSTER SEAT
08 - HELMET USED

NON-MOTORIST
09 - NONE USED
10 - HELMET USED
11 - PROTECTIVE PADS USED (ELBOW, KNEES, ETC)
12 - REFLECTIVE CLOTHING
13 - LIGHTING
14 - OTHER

SEATING POSITION
01 - FRONT - LEFT SIDE (MOTORCYCLE DRIVER)
02 - FRONT - MIDDLE
03 - FRONT - RIGHT SIDE
04 - SECOND - LEFT SIDE (MOTORCYCLE PASSENGER)
05 - SECOND - MIDDLE
06 - SECOND - RIGHT SIDE
07 - THIRD - LEFT SIDE (MOTORCYCLE SIDE CAR)
08 - THIRD - MIDDLE
09 - THIRD - RIGHT SIDE
10 - SLEEPER SECTION OF CAB (TRUCK)
11 - PASSENGER IN OTHER ENCLOSED CARGO AREA (NON-TRAILING UNIT SUCH AS A BUS, PICK-UP WITH CAB)
12 - PASSENGER IN UNENCLOSED CARGO AREA
13 - TRAILING UNIT
14 - RIDING ON A VEHICLE EXTERIOR (NON-TRAILING UNIT)
15 - NON-MOTORIST
16 - OTHER
99 - UNKNOWN

AIR BAG USAGE
1 - NOT DEPLOYED
2 - DEPLOYED FRONT
3 - DEPLOYED SIDE
4 - DEPLOYED BOTH FRONT/SIDE
5 - NOT APPLICABLE
9 - DEPLOYMENT UNKNOWN

EJECTION
1 - NOT EJECTED
2 - TOTALLY EJECTED
3 - PARTIALLY EJECTED
4 - NOT APPLICABLE

TRAPPED
1 - NOT TRAPPED
2 - EXTRACT BY MECHANICAL MEANS
3 - EXTRACTED BY NON-MECHANICAL MEANS

OHIO DEPARTMENT OF PUBLIC SAFETY
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OHIO TRAFFIC CRASH REPORT
DIAGRAM / NARRATIVE CONTINUATION

OH-2

006667

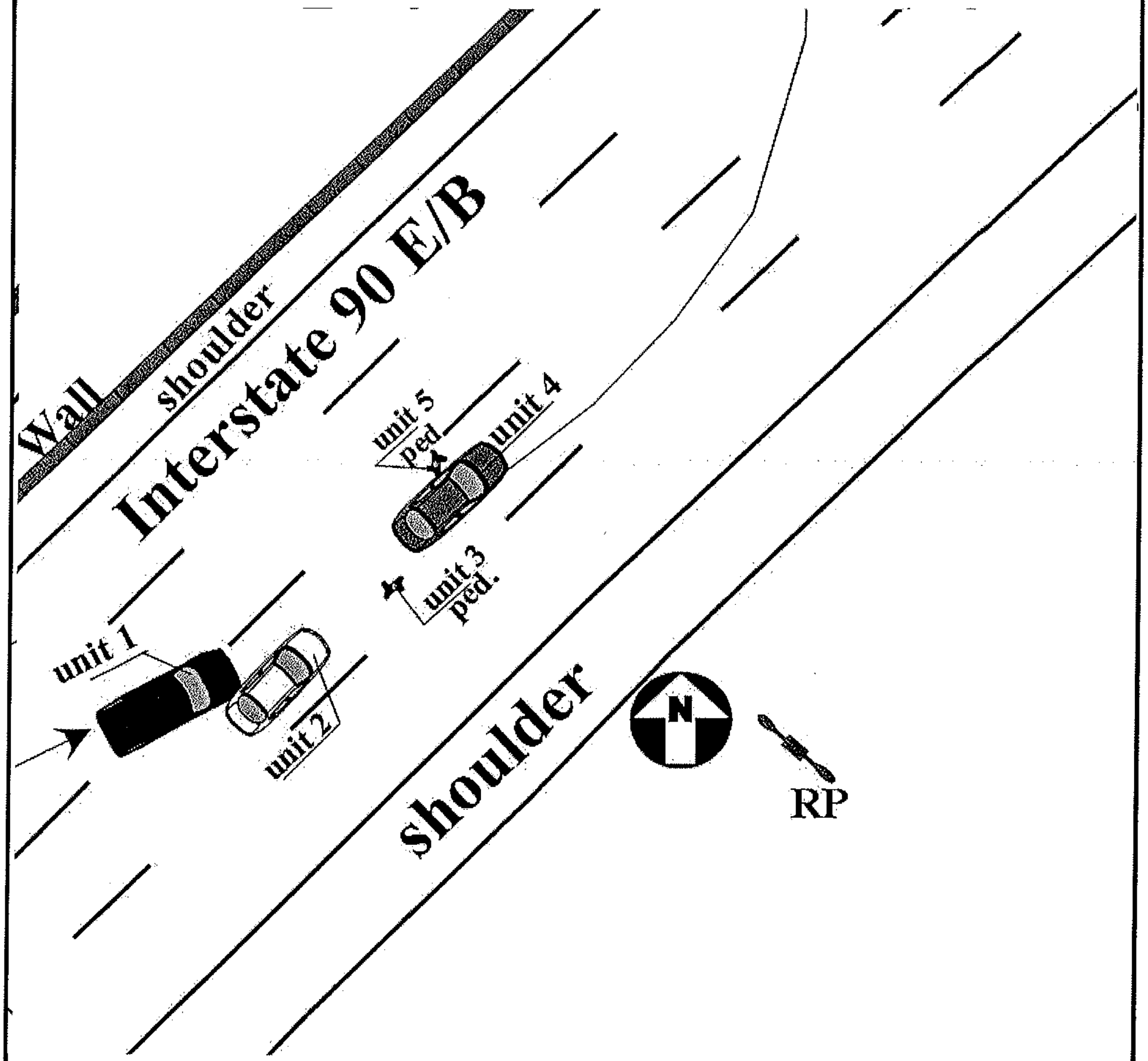
LOCAL REPORT NUMBER 13D-155

REPORTING AGENCY CLEVELAND DIVISION OF POLICE

DATE OF CRASH M 05 D 30 Y 2013

IN COUNTY OF Cuyahoga

CRASH LOCATION I 90 E/B 328 ft E of MP 176.2



OFFICER SIGNATURE X Green

BADGE NUMBER 662

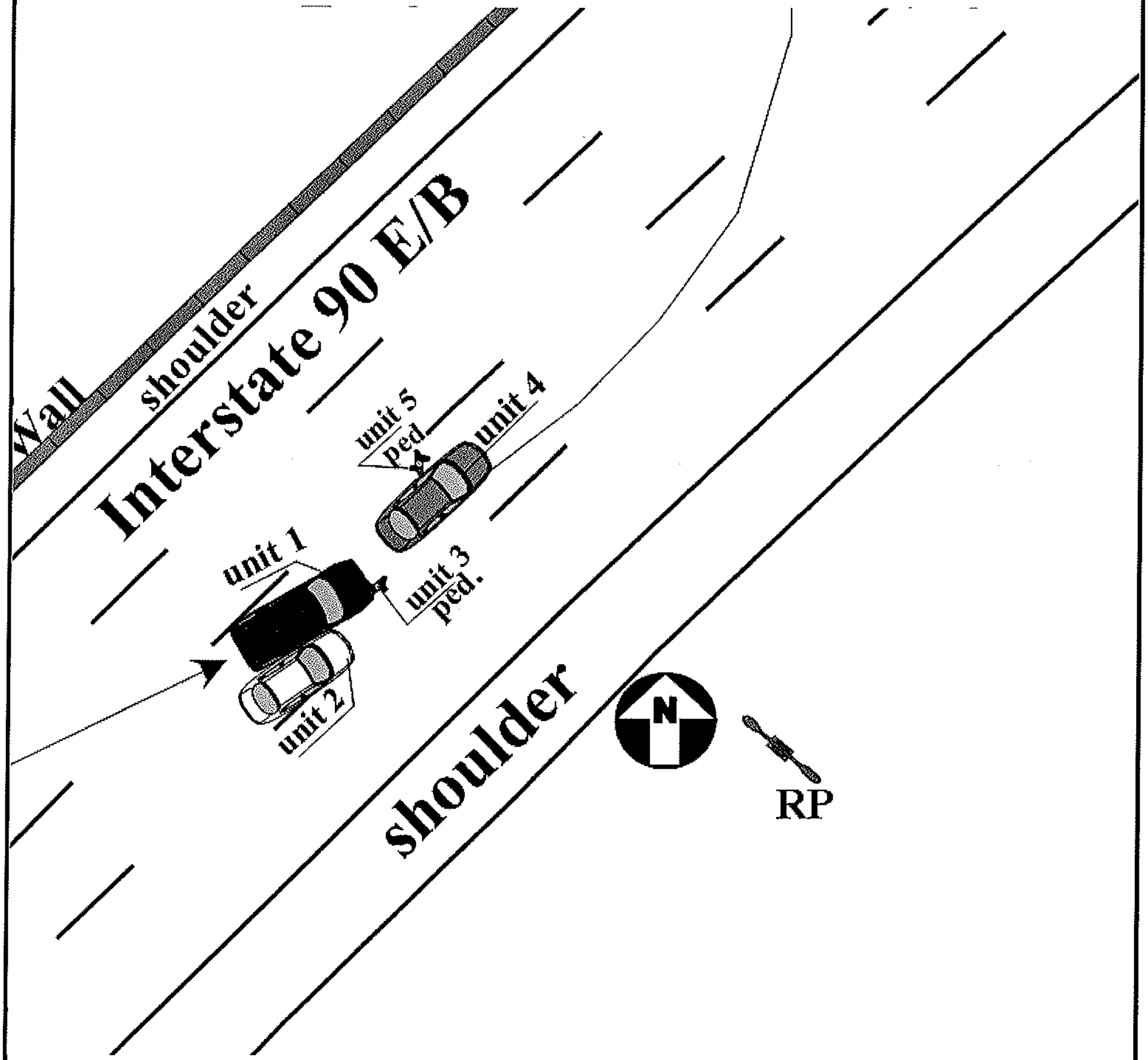
OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION · SERVICE · PROTECTION

OHIO TRAFFIC CRASH REPORT
DIAGRAM / NARRATIVE CONTINUATION

OH-2

006667

LOCAL REPORT NUMBER 13D-155	REPORTING AGENCY CLEVELAND DIVISION OF POLICE	DATE OF CRASH M 05 D 30 Y 2013
IN COUNTY OF Cuyahoga	CRASH LOCATION I 90 E/B 328 ft E of MP 176.2	



OFFICER SIGNATURE X Green	BADGE NUMBER 662

HSY 7002 4/07

OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION · SERVICE · PROTECTION

006667

OH-2

OHIO TRAFFIC CRASH REPORT
DIAGRAM / NARRATIVE CONTINUATION

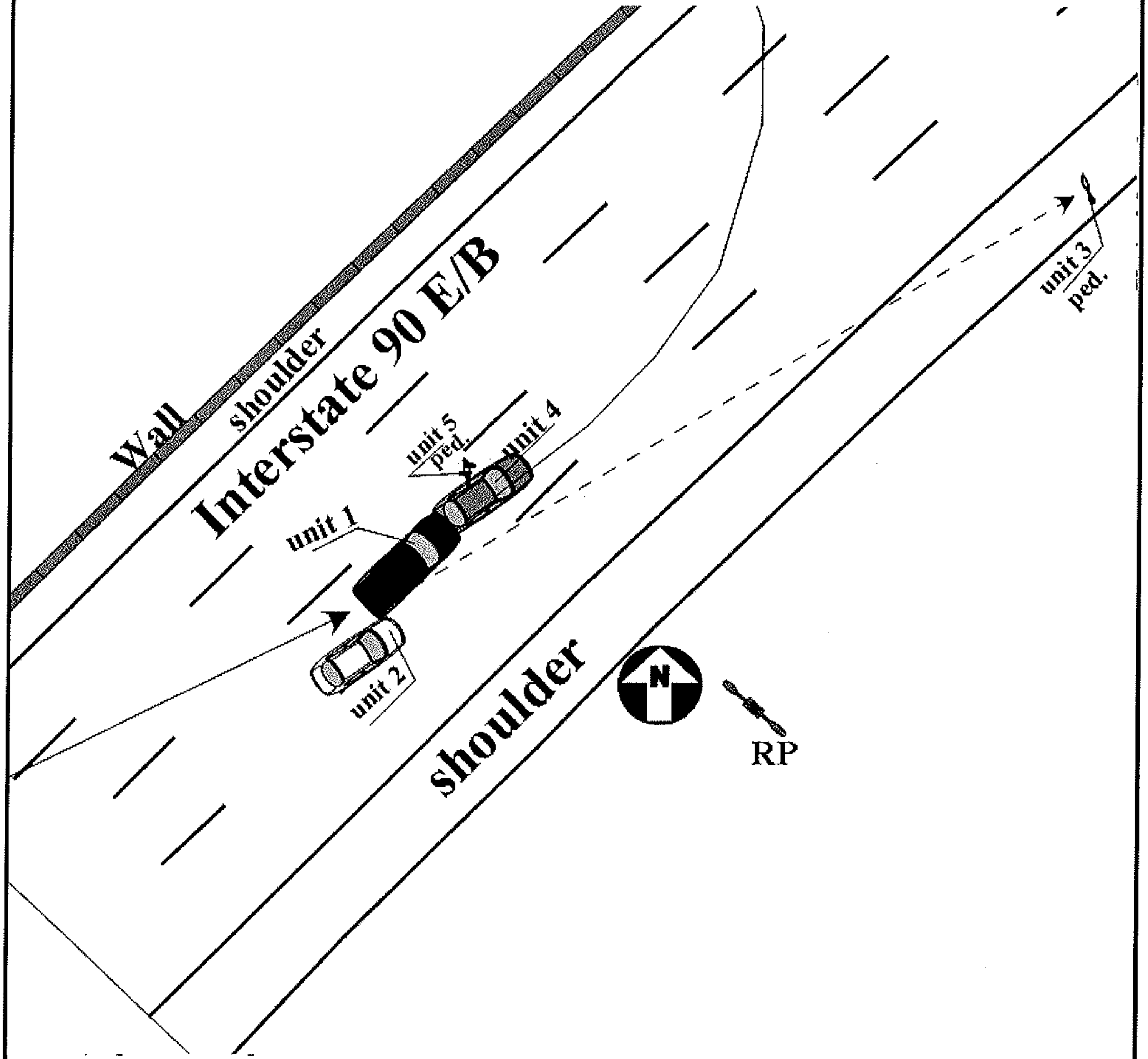
LOCAL REPORT NUMBER: 13D-155

REPORTING AGENCY: CLEVELAND DIVISION OF POLICE

DATE OF CRASH: M 05 D 30 Y 2013

IN COUNTY OF: Cuyahoga

CRASH LOCATION: I 90 E/B 328 ft E of MP 176.2



OFFICER SIGNATURE: X Green

BADGE NUMBER: 662

HSY 7002 4/07

OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION · SERVICE · PROTECTION

OHIO TRAFFIC CRASH REPORT
DIAGRAM / NARRATIVE CONTINUATION

OH-2

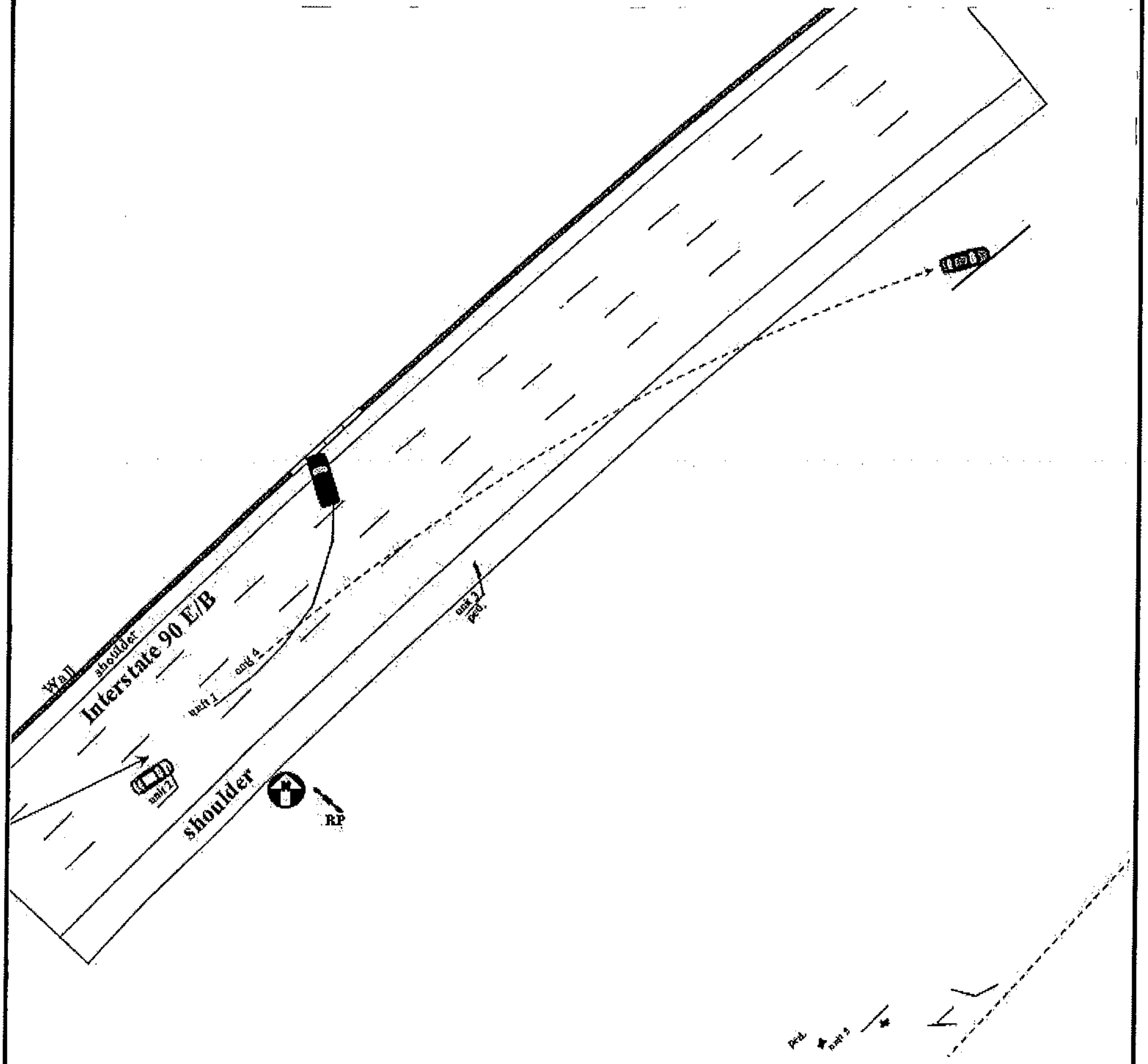
LOCAL REPORT NUMBER: 13D-155

REPORTING AGENCY: CLEVELAND DIVISION OF POLICE

DATE OF CRASH: M 05 D 30 Y 2013

IN COUNTY OF: Cuyahoga

CRASH LOCATION: I 90 E/B 328 ft E of MP 176.2



OFFICER SIGNATURE: X Green

BADGE NUMBER: 662

APPENDIX G
HSM REPORTS

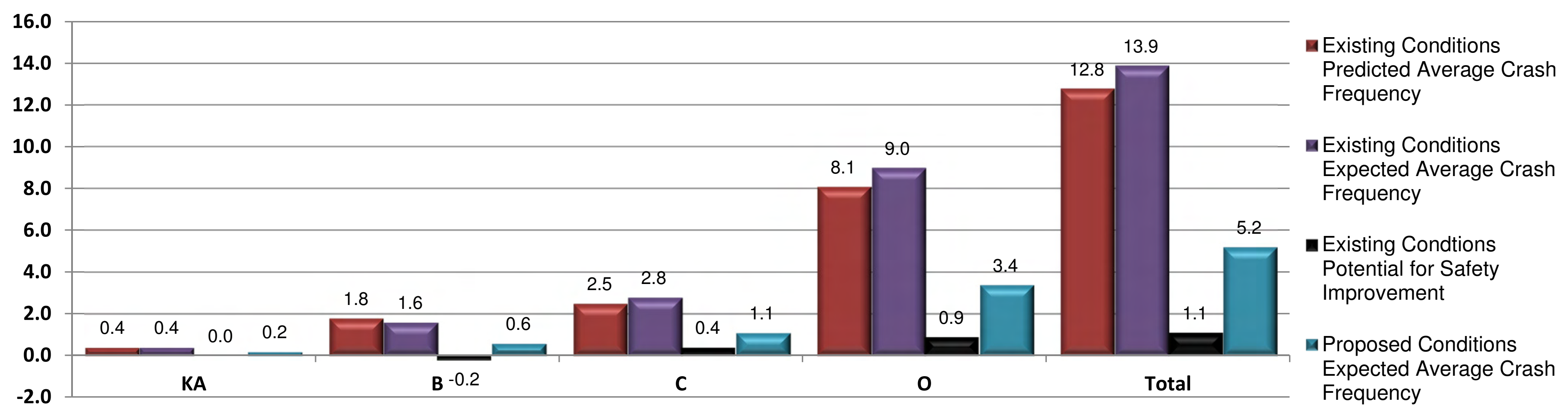
ECAT
Economic Crash Analysis Tool

Project Safety Performance Report

General Information

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		MLK Drive - Short Term Improvements

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
$N_{predicted}$ - Existing Conditions	0.4371	1.7888	2.4512	8.1335	12.8106
$N_{expected}$ - Existing Conditions	0.4274	1.5820	2.8137	9.0469	13.8700
$N_{potential\ for\ improvement}$ - Existing Conditions	-0.0097	-0.2068	**0.3625**	**0.9134**	**1.0594**
$N_{expected}$ - Proposed Conditions	0.1622	0.5973	1.0642	3.4253	5.2490

Created by the Office of Systems Planning and Program Management

Ohio Department of Transportation

Project Safety Performance Report

General Information

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		MLK Drive - Short Term Improvements

Existing Conditions Project Element Predicted Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
CR382; 3.4	E.55th/S.Marginal/Dick Goddard/I-90 EB ramp	0.4371	1.7888	2.4512	8.1335	12.8106

Existing Conditions Project Element Expected Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
CR382; 3.4	E.55th/S.Marginal/Dick Goddard/I-90 EB ramp	0.4274	1.582	2.8137	9.0469	13.87

Existing Conditions Project Element Potential for Safety Improvement Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
CR382; 3.4	E.55th/S.Marginal/Dick Goddard/I-90 EB ramp	-0.0097	-0.2068	**0.3625**	**0.9134**	**1.0594**

Proposed Conditions Project Element Expected Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
CR382; 3.4	E.55th/S.Marginal/Dick Goddard/I-90 EB ramp	0.1622	0.5973	1.0642	3.4253	5.249

Project Safety Performance R

General Information

Project Name	CUY-90 Safety Study	Contact Email	
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	
Reference Number		Date Performed	
Analyst	VM	Analysis Year	
Agency/Company	LJB Inc		

Summary by Crash Type

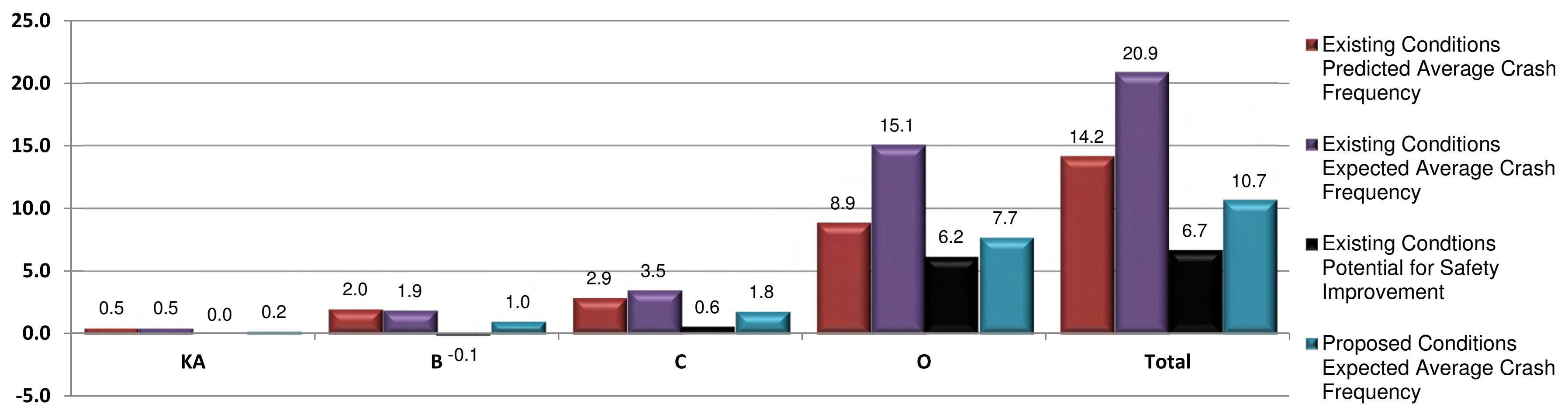
Crash Type	Existing			Proposed
	Predicted Crash Frequency	Expected Crash Frequency	PSI	Expected Crash Frequency
Unknown	0.0071	0.0071	0.0000	0.0034
Head On	0.0827	0.0819	-0.0008	0.0393
Rear End	5.8618	7.8887	2.0269	3.7861
Backing	0.2772	0.2502	-0.0270	0.1201
Sideswipe - Meeting	0.1710	0.1687	-0.0023	0.0810
Sideswipe - Passing	1.3537	1.2020	-0.1517	0.5769
Angle	2.2058	1.6654	-0.5404	0.7993
Parked Vehicle	0.2498	0.2325	-0.0173	0.1116
Pedestrian	0.4294	0.3725	-0.0569	0.1902
Animal	0.0000	0.0000	0.0000	0.0000
Train	0.0004	0.0004	0.0000	0.0002
Pedalcycles	0.3396	0.2992	-0.0404	0.1292
Other Non-Vehicle	0.0000	0.0000	0.0000	0.0000
Fixed Object	0.4026	0.4079	0.0053	0.1958
Other Object	0.0143	0.0142	-0.0001	0.0068
Overturning	0.0225	0.0223	-0.0002	0.0107
Other Non-Collision	0.0536	0.0528	-0.0008	0.0253
Left Turn	1.3390	1.2042	-0.1348	0.5779
Right Turn	0.0000	0.0000	0.0000	0.0000

Project Safety Performance Report

General Information

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		Short Term Improvements

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
$N_{predicted}$ - Existing Conditions	0.4610	1.9869	2.8754	8.9188	14.2421
$N_{expected}$ - Existing Conditions	0.4500	1.9173	3.4555	15.0699	20.8927
$N_{potential\ for\ improvement}$ - Existing Conditions	-0.0110	-0.0696	**0.5801**	**6.1511**	**6.6506**
$N_{expected}$ - Proposed Conditions	0.2301	0.9784	1.7620	7.7439	10.7144

Created by the Office of Systems Planning and Program Management

Project Safety Performance Report

General Information

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		Short Term Improvements

Existing Conditions Project Element Predicted Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
MR12252; 2.65-2.84	MLK-E.88th to EB ramps	0.0132	0.0457	0.0758	0.3156	0.4503
MR12252; 2.88	MLK @ I-90 EB ramps intersection	0.1574	0.6831	0.9783	4.035	5.8538
MR12252; 3.02	MLK @ WB ramps/N.Marginal	0.2904	1.2581	1.8213	4.5682	7.938

Existing Conditions Project Element Expected Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
MR12252; 2.65-2.84	MLK-E.88th to EB ramps	0.013	0.045	0.0736	0.6756	0.8072
MR12252; 2.88	MLK @ I-90 EB ramps intersection	0.1545	0.7565	1.5884	10.1692	12.6686
MR12252; 3.02	MLK @ WB ramps/N.Marginal	0.2825	1.1158	1.7935	4.2251	7.4169

Existing Conditions Project Element Potential for Safety Improvement Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
MR12252; 2.65-2.84	MLK-E.88th to EB ramps	-0.0002	-0.0007	-0.0022	**0.36**	**0.3569**
MR12252; 2.88	MLK @ I-90 EB ramps intersection	-0.0029	**0.0734**	**0.6101**	**6.1342**	**6.8148**
MR12252; 3.02	MLK @ WB ramps/N.Marginal	-0.0079	-0.1423	-0.0278	-0.3431	-0.5211

Proposed Conditions Project Element Expected Crash Summary (Without Animal Crashes)

Project Element ID	Common Name	Crash Severity Level				
		KA	B	C	O	Total
MR12252; 2.65-2.84	MLK-E.88th to EB ramps	0.0089	0.0304	0.0498	0.456	0.5451
MR12252; 2.88	MLK @ I-90 EB ramps intersection	0.0782	0.3831	0.8042	5.1487	6.4142
MR12252; 3.02	MLK @ WB ramps/N.Marginal	0.143	0.5649	0.908	2.1392	3.7551

Created by the Office of Systems Planning and Program Management

Ohio Department of Transportation

Project Safety Performance R

General Information

Project Name	CUY-90 Safety Study	Contact Email
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone
Reference Number		Date Performed
Analyst	VM	Analysis Year
Agency/Company	LJB Inc	

Summary by Crash Type

Crash Type	Existing			Proposed
	Predicted Crash Frequency	Expected Crash Frequency	PSI	Expected Crash Frequency
Unknown	0.0125	0.0124	-0.0001	0.0064
Head On	0.0970	0.0963	-0.0007	0.0495
Rear End	6.4941	13.1865	**6.6924**	6.7735
Backing	0.2983	0.2977	-0.0006	0.1530
Sideswipe - Meeting	0.1994	0.2029	**0.0035**	0.1051
Sideswipe - Passing	1.5035	1.8972	**0.3937**	0.9745
Angle	2.4412	2.0674	-0.3738	1.0541
Parked Vehicle	0.4303	0.3856	-0.0447	0.1992
Pedestrian	0.2935	0.2762	-0.0173	0.1402
Animal	0.0168	0.0166	-0.0002	0.0112
Train	0.0008	0.0009	**0.0001**	0.0005
Pedalcycles	0.1384	0.1343	-0.0041	0.0681
Other Non-Vehicle	0.0000	0.0000	0.0000	0.0000
Fixed Object	0.6940	0.8768	**0.1828**	0.4493
Other Object	0.0252	0.0249	-0.0003	0.0129
Overturning	0.0389	0.0388	-0.0001	0.0198
Other Non-Collision	0.0903	0.0885	-0.0018	0.0452
Left Turn	1.4848	1.3063	-0.1785	0.6631
Right Turn	0.0000	0.0000	0.0000	0.0000

Created by the Office of Systems Planning and Program Management

Ohio Department of Transportation

APPENDIX H
COST ESTIMATE AND BENEFIT-COST REPORTS

CUY-90-19.50/21.30 - SAFETY STUDY
ODOT DISTRICT 12
PRELIMINARY CONSTRUCTION ESTIMATE - AUGUST 2015

E. 55th Street Improvements: New signal, mill & overlay, new pavement markings

ITEM	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
201	CLEARING AND GRUBBING	1 LS	$5,000	$5,000
202	PAVEMENT REMOVED	4000 SY	$8	$32,000
202	GR REMOVED	1200 LF	$3	$3,600
202	WALK REMOVED	500 SF	$2	$750
202	MEDIAN REMOVED	150 SY	$5	$750
202	CURB REMOVED	1800 LF	$3	$5,400
202	CATCH BASIN OR INLET REMOVED	4 EA	$350	$1,400
203	EXCAVATION	500 CY	$15	$7,500
203	EMBANKMENT	100 CY	$12	$1,200
204	SUBGRADE COMPACTION	3500 SY	$2	$7,000
206	CEMENT STABILIZED SUBGRADE, 16" DEEP	3000 SY	$6	$16,500
252	PAVEMENT SAWING	200 LF	$2	$400
254	PAVEMENT PLANING, ASPHALT CONCRETE	6500 SY	$3	$16,250
301	ASPHALT CONCRETE BASE, PG64-22	100 CY	$125	$12,500
304	AGGREGATE BASE, 6"	630 CY	$40	$25,200
407	TACK COAT	1000 GAL	$3	$3,000
448	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, PG64-22	25 CY	$175	$4,375
448	ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-22	250 CY	$225	$56,250
451	CONCRETE PAVEMENT	3000 SY	$75	$225,000
603	15" CONDUIT, TYPE B	500 LF	$50	$25,000
604	CATCH BASIN, NO. 3	4 EA	$2,500	$10,000
604	MANHOLE, NO. 3	2 EA	$3,000	$6,000
605	6" BASE PIPE UNDERDRAIN	1200 LF	$8	$9,600
608	4" CONCRETE WALK	1000 SF	$5	$5,000
608	CURB RAMPS	2 EA	$450	$900
609	CURB, TYPE 6	2000 LF	$15	$30,000
609	6" CONCRETE TRAFFIC ISLAND	50 SY	$50	$2,500
630	SIGNAGE	1 LS	$15,000	$15,000
630	OH SIGN	2 LS	$20,000	$40,000
632	TRAFFIC SIGNAL REMOVED	2 LS	$25,000	$50,000
632	TRAFFIC SIGNAL INSTALLATION	2 EA	$150,000	$300,000
644	PAVEMENT MARKINGS	1 LS	$25,000	$25,000
659	TOPSOIL	25 CY	$25	$625
659	SEEDING AND MULCHING	500 SY	$2	$1,000
832	SWPPP	1 LS	$3,000	$3,000
832	EROSION CONTROL	2500 EA	$1	$2,500
			Subtotal	$ 951,000.00
614	MAINTAINING TRAFFIC	1 LS	$25,000	$25,000
619	FIELD OFFICE, TYPE B	6 MN	$1,600	$9,600
623	CONSTRUCTION LAYOUT STAKES	1 LS	$10,000	$10,000
624	MOBILIZATION	1 LS	$40,000	$40,000
			Subtotal	$1,036,000
			Design Risk (35%)	$363,000
			Subtotal	$1,399,000
			Inflation Cost (15%)	$210,000
			Total	$1,609,000

Notes:

1 R/W not anticipated
2 New pavement is assumed to be concrete on ramp and asphalt on side road.
3 Utility relocation not included

Project Cost Estimate

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		MLK Drive - Short Term Improvements

Engineering Design %	10%
Contingency %	35%

Countermeasures	Construction Costs	Right of Way Costs	Engineering Design Costs	Contingency Amount	Total Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value
Site Characteristic Improvements (i.e. Lane widening)			$0.00	$0.00	**$0.00**		
Site Characteristic Improvements (i.e. Lighting)			$0.00	$0.00	**$0.00**		
Site Characteristic Improvements (i.e. Signal Phasing)			$0.00	$0.00	**$0.00**		
Site Characteristic Improvements (i.e. Added Right Turn Lane)			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
CMF 2 - Road Diet (Convert 4-lane undivided to 2-lane plus turn lanes-ID:199)	$550,000.00		$55,000.00	$192,500.00	**$797,500.00**		
CMF 3 - Provide a left turn lane on one major road approach	$136,000.00		$13,600.00	$47,600.00	**$197,200.00**		
			$0.00	$0.00	**$0.00**		
CMF 5 - Improve signal visibility	$350,000.00		$35,000.00	$122,500.00	**$507,500.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
Totals	**$1,036,000.00**	**$0.00**	**$103,600.00**	**$362,600.00**	**$1,502,200.00**	**$0.00**	**$0.00**

Inflation %	15%

Final Costruction Cost:	**$1,727,530.00**

*Final construction cost should match the Project Cost Estimate

Safety Benefit - Cost Analysis

General Information

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		

Comments: Improvements on E.55th - Improve I-90 EB ramps/Dick Goddard Rd alignment and upgrade signal system, SB defacto left turn lane.

Select Site Types to be used in Benefit-Cost Analysis:

All Sites

Countermeasure Service Lives, Costs, and Safety Benefits

Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
Site Characteristic Improvements (i.e. Lane widening)		$0.00			$0.00	$0.00	-0.838	$358,580
Site Characteristic Improvements (i.e. Lighting)		$0.00			$0.00	$0.00		
Site Characteristic Improvements (i.e. Signal Phasing)		$0.00			$0.00	$0.00		
Site Characteristic Improvements (i.e. Added Right Turn Lane)		$0.00			$0.00	$0.00		
		$0.00			$0.00	$0.00	0.000	$0
CMF 2 - Road Diet (Convert 4-lane undivided to 2-lane plus turn lanes-ID:199)	20	$797,500.00			$797,500.00	$797,500.00	-3.779	$1,627,421
CMF 3 - Provide a left turn lane on one major road approach	20	$197,200.00			$197,200.00	$197,200.00	-3.609	$1,553,823
	20	$0.00			$0.00	$0.00	0.000	$0
CMF 5 - Improve signal visibility	20	$507,500.00			$507,500.00	$507,500.00	-0.395	$170,114
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
Totals		**$1,502,200.00**	**$0.00**	**$0.00**	**$1,502,200.00**	**$1,502,200.00**	**-8.621**	**$3,709,939**

Safety Benefit - Cost Analysis

General Information

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		

Benefit - Cost Calculator

Net Present Value of Project	**$1,502,200.00**
Net Present Value of Safety Benefits	**$3,709,938.89**
Net Benefit	**$2,207,738.89**
Benefit / Cost Ratio	**2.47**

Expected Annual Crash Adjustment

Number of Fatal & Incapacitating Injury Crashes	**-0.265**
Number of Injury Crashes	**-2.999**
Number of Total Crashes	**-8.621**

Comments:

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Ohio Department of Transportation

CUY-90-19.50/21.30 SAFETY STUDY
ODOT DISTRICT 12
PRELIMINARY CONSTRUCTION ESTIMATE - AUGUST 2015
MLK Drive Short Term: RESURFACE AND STRIPE BETWEEN WB EXIT RAMP AND 88TH ST, 2 NEW SIGNALS

ITEM	DESCRIPTION	JANTITY	UNIT COST	TOTAL COST
201	CLEARING AND GRUBBING	1 LS	$5,000	$5,000
202	REMOVE CONCRETE ISLANDS	1540 SY	$25	$38,500
202	PAVEMENT REMOVED	260 SY	$15	$3,900
202	SIDEWALK REMOVED	2500 SF	$2	$5,000
202	CURB REMOVED	280 SF	$4	$1,120
254	PAVEMENT PLANING, ASPHALT CONCRETE	6500 SY	$5	$32,500
301	ASPHALT CONCRETE BASE, 6"	200 CY	$200	$40,000
304	AGGREGATE BASE, 10"	300 CY	$50	$15,000
407	TACK COAT	1000 GAL	$5	$5,000
448	ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-22, 1.25"	325 CY	$275	$89,375
448	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, PG64-22, 1.75"	75 CY	$250	$18,750
608	CONCRETE WALK	2500 SF	$4	$10,000
609	CURB	280 FT	$20	$5,600
630	SIGNAGE	1 LS	$5,000	$5,000
632	TRAFFIC SIGNAL INSTALLATION	2 EA	$150,000	$300,000
632	TRAFFIC SIGNAL ADJUSTMENTS	1 EA	$25,000	$25,000
644	PAVEMENT MARKINGS REMOVAL AND REPLACEMENT	1 LS	$20,000	$20,000
644	PAVEMENT MARKINGS	1 LS	$25,000	$25,000
832	SWPPP	1 LS	$2,500	$2,500
832	EROSION CONTROL	2500 EA	$1	$2,500
			Subtotal	$ 650,000.00
614	MAINTAINING TRAFFIC	1 LS	$25,000	$25,000
619	FIELD OFFICE, TYPE B	3 MN	$1,600	$4,800
623	CONSTRUCTION LAYOUT STAKES	1 LS	$2,500	$2,500
624	MOBILIZATION	1 LS	$10,000	$10,000
			Subtotal	$693,000
			Design Risk (35%)	$243,000
			Subtotal	$936,000
			Inflation Cost (8.6%)	$81,000
			Total	$1,017,000

Notes:

1 Construction estimated in 2017

2 Utility relocation not included

CUY-90-19.50/21.30 SAFETY STUDY
ODOT DISTRICT 12
PRELIMINARY CONSTRUCTION ESTIMATE - AUGUST 2015
I-90 Ramp Improvements: REMOVE 2 RAMPS (WB Exit to 72nd, EB Entrance from 72nd)

ITEM	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
201	CLEARING AND GRUBBING	1 LS	$5,000	$5,000
202	PAVEMENT REMOVED	10000 SY	$8	$80,000
202	CURB REMOVED	3800 LF	$5	$19,000
202	CATCH BASIN OR INLET REMOVED	5 EA	$500	$2,500
202	GUARD RAIL REMOVED	300 LF	$8	$2,400
203	EXCAVATION	8000 CY	$8	$64,000
203	EMBANKMENT	500 CY	$12	$6,000
252	PAVEMENT SAWING	1200 LF	$2	$2,400
304	AGGREGATE BASE	100 CY	$60	$6,000
452	CONCRETE PAVEMENT	500 SY	$100	$50,000
605	6" BASE PIPE UNDERDRAIN	1200 LF	$8	$9,600
609	CURB, TYPE 6	500 LF	$18	$9,000
630	SIGNAGE	1 LS	$30,000	$30,000
644	PAVEMENT MARKINGS	1 LS	$50,000	$50,000
659	SEEDING AND MULCHING	15000 SY	$2	$30,000
832	SWPPP	1 LS	$10,000	$10,000
832	EROSION CONTROL	5000 EA	$1	$5,000
			Subtotal	$ 381,000.00
614	MAINTAINING TRAFFIC	1 LS	$50,000	$50,000
619	FIELD OFFICE, TYPE B	6 MN	$1,600	$9,600
623	CONSTRUCTION LAYOUT STAKES	1 LS	$10,000	$10,000
624	MOBILIZATION	1 LS	$10,000	$10,000
			Subtotal	$461,000
			Design Risk (35%)	$162,000
			Subtotal	$623,000
			Inflation Cost (8.6%)	$54,000
			Total	$677,000

Notes:

1 Construction estimated in]2017

2 Utility relocation not included

Project Cost Estimate

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		

Engineering Design %	10%
Contingency %	35%

Countermeasures	Construction Costs	Right of Way Costs	Engineering Design Costs	Contingency Amount	Total Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value
Site Characteristic Improvements (i.e. Lane widening)			$0.00	$0.00	**$0.00**		
Site Characteristic Improvements (i.e. Lighting)			$0.00	$0.00	**$0.00**		
Site Characteristic Improvements (i.e. Signal Phasing)			$0.00	$0.00	**$0.00**		
Remove I-90 ramps at 72nd St(EB entrance & WB exit)	$461,000.00		$46,100.00	$161,350.00	**$668,450.00**		
			$0.00	$0.00	**$0.00**		
CMF 2 - Add a through lane (SB direction)	$193,000.00		$19,300.00	$67,550.00	**$279,850.00**		
CMF 3 - Provide a left turn lane on one major road approach	$100,000.00		$10,000.00	$35,000.00	**$145,000.00**		
CMF 4 - Install Traffic Signal (CMF ID:1459), AADT upto 125,500	$400,000.00		$40,000.00	$140,000.00	**$580,000.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
			$0.00	$0.00	**$0.00**		
Totals	**$1,154,000.00**	**$0.00**	**$115,400.00**	**$403,900.00**	**$1,673,300.00**	**$0.00**	**$0.00**

Inflation %	9%

Final Costruction Cost:	**$1,817,203.80**

*Final construction cost should match the Project Cost Estimate

Safety Benefit - Cost Analysis

General Information

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		

Select Site Types to be used in Benefit-Cost Analysis:

All Sites

Comments: Install traffic signal at EB ramps intersection, Add a LT lane at the WB exit ramp approach and on MLK to EB entrance ramp, remove median and add a SB through lane on MLK from WB ramps to south of E.88th st.

Countermeasure Service Lives, Costs, and Safety Benefits

Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
Site Characteristic Improvements (i.e. Lane widening)		$0.00			$0.00	$0.00	0.000	($607)
Site Characteristic Improvements (i.e. Lighting)		$0.00			$0.00	$0.00		
Site Characteristic Improvements (i.e. Signal Phasing)		$0.00			$0.00	$0.00		
Remove I-90 ramps at 72nd St(EB entrance & WB exit)	20	$668,450.00			$668,450.00	$668,450.00		
CMF 1 - Conversion of stop-controlled intersection into multi-lane roundabout	20	$0.00			$0.00	$0.00	0.000	$0
CMF 2 - Add a through lane (SB direction)	20	$279,850.00			$279,850.00	$279,850.00	-0.262	$72,137
CMF 3 - Provide a left turn lane on one major road approach	20	$145,000.00			$145,000.00	$145,000.00	-7.834	$2,819,257
CMF 4 - Install Traffic Signal (CMF ID:1459), AADT upto 125,500	20	$580,000.00			$580,000.00	$580,000.00	-2.083	$749,397
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
		$0.00			$0.00	$0.00	0.000	$0
Totals		**$1,673,300.00**	**$0.00**	**$0.00**	**$1,673,300.00**	**$1,673,300.00**	**-10.178**	**$3,640,184**

Created by the Office of Systems Planning and Program Management

Ohio Department of Transportation

Safety Benefit - Cost Analysis

General Information

Project Name	CUY-90 Safety Study	Contact Email	vmadineni@ljbinc.com
Project Description	I-90/E.55th and I-90/MLK Interchange, MLK Improvements	Contact Phone	937-259-5074
Reference Number		Date Performed	6/25/2015
Analyst	VM	Analysis Year	2013
Agency/Company	LJB Inc		

Benefit - Cost Calculator

Net Present Value of Project	**$1,673,300.00**
Net Present Value of Safety Benefits	**$3,640,184.33**
Net Benefit	**$1,966,884.33**
Benefit / Cost Ratio	**2.18**

Expected Annual Crash Adjustment

Number of Fatal & Incapacitating Injury Crashes	**-0.220**
Number of Injury Crashes	**-2.852**
Number of Total Crashes	**-10.178**

Comments:

CUY-90-19.50/21.30 SAFETY STUDY - MLK
ODOT DISTRICT 12
PRELIMINARY CONSTRUCTION ESTIMATE - AUGUST 2015
MLK MEDIUM TERM

ITEM	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
201	CLEARING AND GRUBBING	1 LS	$15,000	$15,000
202	PAVEMENT REMOVED	9000 SY	$8	$72,000
202	CURB REMOVED	4500 LF	$5	$22,500
202	CATCH BASIN OR INLET REMOVED	10 EA	$500	$5,000
203	EXCAVATION	8000 CY	$25	$200,000
203	EMBANKMENT	10000 CY	$25	$250,000
204	SUBGRADE COMPACTION	10000 SY	$3	$30,000
252	PAVEMENT SAWING	500 LF	$2	$1,000
254	PAVEMENT PLANING, ASPHALT CONCRETE	10500 SY	$4	$42,000
304	AGGREGATE BASE, 6"	1700 CY	$40	$68,000
407	TACK COAT	1500 GAL	$5	$7,500
448	ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-22, 1.5"	450 CY	$175	$78,750
451	CONCRETE PAVEMENT	10000 SY	$75	$750,000
501	STRUCTURES	2 LS	$500,000	$1,000,000
603	15" CONDUIT, TYPE B	2500 LF	$40	$100,000
604	CATCH BASIN	10 EA	$2,500	$25,000
604	MANHOLE, NO. 3	5 EA	$3,000	$15,000
605	6" BASE PIPE UNDERDRAIN	2500 LF	$8	$20,000
608	4" CONCRETE WALK, 5' wide	5500 SF	$5	$27,500
608	CURB RAMPS	4 EA	$450	$1,800
609	CURB, TYPE 6	2800 LF	$18	$50,400
609	6" CONCRETE TRAFFIC ISLAND	500 SY	$50	$25,000
610	RETAINING WALLS	500 SF	$50	$25,000
630	SIGNAGE	1 LS	$50,000	$50,000
644	PAVEMENT MARKINGS	1 LS	$75,000	$75,000
659	SEEDING AND MULCHING	8000 SY	$2	$16,000
832	SWPPP	1 LS	$10,000	$10,000
832	EROSION CONTROL	5000 EA	$1	$5,000
			Subtotal	$ 2,988,000.00
614	MAINTAINING TRAFFIC	1 LS	$250,000	$250,000
619	FIELD OFFICE, TYPE B	18 MN	$1,600	$28,800
623	CONSTRUCTION LAYOUT STAKES	1 LS	$25,000	$25,000
624	MOBILIZATION	1 LS	$100,000	$100,000
			Subtotal	$3,392,000
			Design Risk (35%)	$1,188,000
			Subtotal	$4,580,000
			Inflation Cost (8.6%)	$394,000
			Total	$4,974,000

Notes:

1 Construction estimated in 2017
2 Utility relocation not included
3 Roundabout and 2 ramp culverts