

CUY-90-19.50/21.30 SAFETY STUDY INTERSTATE ROUTE 90 ODOT DISTRICT 12 March 4, 2010



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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 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 East Blvd.
- Widen the WB I-90 exit ramp for dual left turn lanes to MLK Drive. Consider a traffic signal control at this intersection
- 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
- Revise the EB I-90 exit ramp approach to MLK Drive from a L-R to a LR-R configuration
- Revise MLK Drive northbound approach to EB I-90 exit/entrance ramp approach from a T-TR to a T-R configuration with channelizing island and a receiving lane on the

entrance ramp. The add lane can be 250-300 feet, and then right lane merges to form a single lane ramp prior to the gore.

- Restrict NB left turn movement at Broad Street intersection
- Estimated cost for short term countermeasures: \$1,575,000

> 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**.

		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
Poodway Section	EB	5 lanes	4 lanes	4 lanes	4 lanes
Roadway Section	WB	4 lanes	4 lanes	4 lanes	4 lanes
ADT		117,297	123,131	123,076	129,610

TABLE 1: EXISTING ROADWAY CONDITIONS - I-90

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.

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

TABLE 2: FREEWAY WEAVING ANALYSIS RESULTS

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. 55[™] 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





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



CRASH ANALYSIS

> Total crashes: 405 total crashes

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.

>	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.



Crashes Site is expected to have more crashes per year on average than its peers Expected → Potential for improvement! average crash frequency for the site Difference = Expected Excess **Crashes (Potential for Safety** Predicted Average Improvement) Crash Frequency for the site (how are its peers performing on average?) Expected average crash frequency for Site is expected to have fewer crashes per year on the site average than its peers Years

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.

	E 55 th 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

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

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.



	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

TABLE 4: HSM RESULTS FOR EXISTING CONDITIONS - MLK DRIVE

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
- > $E 72^{nd}$ 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 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. 72^{nd} 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. 55^{th} 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



OUNTERMEASURES

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. 72^{nd} 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. 72^{nd} Street interchange. Removal of the EB entrance ramp and WB exit ramp at E. 72^{nd} 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.
- > The removal of I-90 EB entrance ramp from E.72nd Street improves the safety of bicyclists in the northbound lanes with the removal of shared right turn lane. Without the ramp, the buffer for the bike lane can be extended across what is now the ramp area.







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. 72^{nd} Street was evaluated which included converting the EB ramps at E. 72^{nd} Street to a diamond ramp configuration and constructing an EB collector-distributor roadway between E. 72^{nd} Street and MLK Drive (**Figure 8**). This would eliminate the mainline weave segment by forcing all traffic destined to E. 72^{nd} Street and to MLK Drive to exit at the E. 72^{nd} Street interchange. Traffic destined to MLK Drive would continue through the at-grade intersection on E. 72^{nd} 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.
- > <u>MLK Drive at N. Marginal Road intersection</u>: LOS E on the eastbound approach of N. Marginal Road.
- > <u>MLK Drive at I-90 EB ramp intersection</u>: 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. 72^{nd} 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 be 325 feet. A signal warrant analysis must be conducted prior to recommending a traffic signal at this intersection.

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.







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. 72^{nd} Street and N. Marginal Road, and the WB entrance ramp to I-90 from E. 72^{nd} 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**.

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

TABLE 5: EXPECTED TRAFFIC DIVERSION TO N. MARGINAL ROAD

FIGURE 11C: ROUNDABOUT OPTION 3, 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'	

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

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

	EB	WB	NB	SB	
	APPROACH	APPROACH	APPROACH	APPROACH	
E. 55th Street at I-90	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. I	Marginal Roa	d (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	

TABLE 7: CAPACITY ANALYSIS – 55[™] STREET CORRIDOR

Numerical values represent delay in seconds per vehicle





> ODOT - DISTRICT 12
FIGURE 12 - E. 55th STREET CONCEPT PLAN



Innovative Facility and Infrastructure Design™

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. The second lane will be dropped as a left turn lane at East Blvd. opposite the existing pedestrian refuge island. 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. Consider signalizing this intersection to make it more conventional; further study is needed to evaluate the potential impacts of signalization on ramp queues.
 - > **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.
- > Revise the EB I-90 exit ramp approach to MLK Drive from a L-R configuration to LR-R configuration. This configuration will improve the throughput from the exit ramp and help allocate additional green time to the southbound MLK Drive approach.
- > Revise MLK Drive northbound approach to EB I-90 exit/entrance ramp approach from a T-TR configuration to T-R with a channelizing island and a receiving lane on the entrance ramp. This will allow the lefts and rights to move parallel for upto 300 feet, then the right lane on the ramp merges to form a single lane prior to the gore. This configuration will improve the throughput on MLK Drive during PM peak hour conditions, where the demand for the northbound right turn movement is heavy. Also, southbound left turn traffic at the intersection will have sufficient gaps to enter the entrance ramp.
- > **Restricted movement at Broad Street intersection**. Prohibit northbound left turn movement at the Broad Street intersection at all times as suggested the city of Cleveland. The traffic signal is to remain for pedestrian crossings and egress from Broad Street.

A southbound left turn to E. 88th Street is 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.
- 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, an estimated land of 1.75 acres size can be captured with realignment.

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**. Note that other roundabout configurations are possible without realignment of Lakeshore Boulevard such as two independent roundabouts at N. Marginal Road and WB I-90 ramps/Lakeshore Boulevard.

E.72nd Street/Gordon Park Driveway: Construct a dedicated southbound left turn lane at the Gordon Park Driveway. This improvement would require the removal of raised concrete median to accommodate the left turn lane.

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.

In the entire study area, emphasizing the existing shared use/recreational paths and on-street bicycle facilities in the area following recommendations should be considered in the final design:

- > Regulatory and directional signage for bicyclists and pedestrians as well as pavement markings denoting crossings should be part of the safety improvements.
- > Count down timers, push buttons should be installed at signalized intersections.
- > Any trail adjustments necessary to control the speeds of cyclists approaching crosswalks, notably at MLK Drive and N. Marginal Road intersection.





> ODOT - DISTRICT 12 FIGURE 13 - MLK DRIVE SHORT TERM CONCEPT PLAN







> ODOT - DISTRICT 12
FIGURE 14 MLK DRIVE LONG TERM PLAN



D 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. 55 th 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. 72 nd Street interchange	\$1,535,000	\$717,000	\$2,252,000
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.

Countermeasures with CMF values used in ECAT Tool	Provide defacto left turn lanesImprove signal visibilityRoad 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

TABLE 9: BENEFIT COST ANALYSIS: 55[™] STREET COUNTERMEASURES

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.
- > **Provide a right turn lane on one major road approach**: A CMF of 0.77 was applied to fatal and injury crashes, and a CMF of 0.86 for non-injury crashes.

Countermeasures with CMF values used in ECAT Tool	 Provide left and right turn lanes Install traffic signal Add through lane 	
Expected annual crash adjustment	-10.15	
Net present value of project	\$2,225,800	
Net present value of safety benefit	\$3,987,900	
Benefit / Cost Ratio	1.79	

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



LAKEFRONT GREENWAY and DOWNTOWN CONNECTOR STUDY







Public Meeting

March 5, 2015







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











Study Area



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 Metroparks 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

















Cleveland Metroparks Waterfront Plan



Cleveland Metroparks Waterfront Plan



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













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

The Rock and Roll Hall of Fame and Museum

FirstEnergy Stadium



North-South Connections Existing, Planned & Potential



W.3rd Street

Existing



- Potential to reconfigure roadway
- City is studying feasibility

0000

North Coast Harbor Ped Bridge



Planned Burke Lakefron Bicentennial Park p William d. Mathe The Rock and Roll Hall of Fame and Museum SIMER Great Lakes cience Center FirstEnergy Stadium 💿 Villard Pa Alfreditciden

Cleveland Public Auditorium

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



Pedestrian Bridge Project Area

E.9th Street



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

Existing

E. 16th/18th Street

Burke Lakefront Airport

750

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 akewood

- 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

Ohio Technical College

E. 49th Street



Potential



E. 55th Street

14



Existing



- Lots of pavement at intersections
 - South Marginal
 - I-90 EB ramps
 - North Marginal

E. 72nd Street



Existing

E Trancis

BRANGEL



Gordon Park Pedestrian Bridge



Clevel

Existing

Phoise

E TRade

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

MLK (Lake-to-Lakes Trail)





I-90 underpass

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









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



ODOT Safety Study

ODOT safety study

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













E.72nd - MLK Opportunities

- 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

Elizindist







Traffic: E.55th St – Peak Hours



stclair superior









E.55th St Opportunities



ODOT safety study



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













North Marginal by Burke

Burke Lakefront Airport

DOWNTOWN

The Rock and Roll Ha

FirstEnergy Stadium

Clauderdien

Payne Ave

(GET/ATENE

Astra

55

322

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









AREHOUSE





North Marginal as Two-Lane













North Marginal as One-Way









AREHOUSE





North Marginal as One-Way













North Marginal Bike/Ped Only (Trail)













North Marginal Bike/Ped Only (Trail)













Central Concept













Muni Lot Bridge



SMarginaliRo

Cleveland Men

Reconfigure WB off ramp to clarify end of ramp and facilitate bike/ped accommodations

2

- Provide connection to North Marginal for bikes/peds (and maybe vehicles)
- Consider grade issues

^{darginal}Rd

Oleveland Memorial Shoreway

Muni Lot Bridge















Central Concept Combinations

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

322

Burke Lakefront/Airport

A. Existing B. 2-lanes

DOWNTOWN

The Rock and Roll Have of Fame and Museum

FirstEnergy Stadium =

Charles Month

A. Existing

B.2-lanes

C.1-lane

D.Bike/ped only

Plan Development: Next Steps

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











Your Input Matters!

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)











BOARDS

THANK YOU!





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 longrange 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 **T**IP.

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.

NOAC	SFY 2014 - 2017 Ti	ansportation Improve	ment Program		Resolutio	n No. 2015-025
6	Highwa	y and Bikeway Elemer	nt			
		Amendments				3/6/15
PID	Project Description	Type of Work	Funding Data			AQ required?
82830	CUY D12 PPM FY2015 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) THE AMOUNT OF THE COST DECREASE EXCEEDS THE COST ESTIMATE THRESHOLD COST ESTIMATE THRESHOLD COST ESTIMATE THRESHOLD COST ESTIMATE THRESHOLD COST ESTIMATE THRESHOLD COST ESTIMATE THRESHOLD COST ESTIMATE THRESHOLD	Preventive Maintenance Repair, rehabilitate and resurface 1.40 miles	CE ODOT CE NHPP CE ODOT CE HSIP CO ODOT CO NHPP CO ODOT CO HSIP CO HSIP CO HSIP CO Cleve CE STP CO Cleve CE STP CO Cleve CC STP	\$9,600 \$38,400 \$404 \$3,636 \$33,000 \$297,000 \$997,000 \$97,700 \$87,300 \$87,300 \$87,300 \$87,300 \$87,300 \$87,5,000 \$175,000 \$175,000 \$175,000 \$175,000 \$175,000 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,200 \$343,000 \$343,000 \$343,000 \$343,000 \$343,000 \$343,000 \$343,000 \$343,000 \$343,000 \$343,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$340,000 \$300,000 \$340,000\$\$300 \$340,000\$\$300 \$340,000\$\$300 \$340,000\$\$300\$\$300 \$340,000\$\$300\$\$300\$\$300\$\$300\$\$300\$\$300\$\$	2015 2015 2015 2015 2015 2015 2015 2015	exempt
98548	CUY MLK BLVD Cleveland: MLK Blvd over Doan Brook Creek approximately 1/3 mile south of IR 90 and just south of East Blvd	Rehabilitate structure	PEDDCleve PEPDCleve CO STP CE STP CO Cleve CO Cleve CO MBR	\$333,900 \$333,900 \$172,000 \$267,200 \$668,000 \$668,000 \$2,500,000 \$2,500,000	2015 2015 Plan Plan Plan Plan	exempt

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

NOA	SFY 2014 - 2017 Tr	ansportation Improvem	ient Program		Resolutio	n No. 2015-025
T	Highwa	y and Bikeway Element				
I		Amendments				3/6/15
DID	Project Description	Type of Work	Funding Data			AQ required?
	CUY N MARGINAL	Rehabilitation	PEDDCleve	\$50,000	2015	exempt
	Cleveland:	1.20 miles	PEPDCleve	\$125,000	2015	
	E / ZIN 31 to Creverant ECL Involves three segments:		CE Cleve CE STP	\$45,618 \$182 474	Plan	
	E 72nd St to MLK Jr Dr; MLK Jr Dr - N Marginal Rd to Lakeshore Blvd:		CO Cleve	\$410,566	Plan	
	Lakeshore Blvd - MLK Jr Dr to Cleveland ECL		CO STP	\$1,642,262 \$2,455,920	Plan	
	CUY N MARGINAL RD / S MARGINAL RD	Rehabiltate	PEDDCleve	\$50,000	2015	exempt
	Cleveland:		PEPDCleve	\$75,000	2015	
	N Marginal Rd - IR-90 WB access ramp at West Blvd to Lorain		CE Cleve	\$84,084	Plan	
	Ave, and S marginiar to a vvesterit Ave to vv sout St N Marginal Rd from West Blod to W 98th St is functionally		CE STP	\$75,416	Plan	
	classified as a local road and will be funded with local funds		CO Cleve	\$756,760	Plan	
		0.06 mile	CO STP	\$678,740	Plan	
				\$1,720,000		
	CUY S MARGINAL RD	Rehabilitate	PEDDCleve	\$50,000	2015	exempt
	Cleveland:	o 76 milos	PEPDCleve	\$100,000	2015	
	E 9th St to E 55th St		CE Cleve	\$66,960	Plan	
			CE STP	\$267,840	Plan	
			CO Cleve	\$602,640	Plan	
			CO STP	\$2,410,560 \$3,498,000	Plan	
94367	CUY /LAK IR271-13.16/00.00 NOISE	Noise Wall Replacement &	CE ODOT	\$5,100	2015	exempt
	CUY IR 271-13.16 (US 322) to 16.65 (Mayfield/Highland Hts	Repair	CE NHPP	\$45,900	2015	
	Corporation Line): Mayfield Hts, Highland Hts	3.49 miles	CO ODOT	\$260,000	2015	
	LAK IK 2/1-00.00 (Cuyanoga/Lake County Line) to 1./5 (IK 90): Willourichev Hills		CO NHPP	\$2,340,000	2015	
	Replace deteriorated concrete panels and reuse existing steel posts			\$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 detailed design,

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

<u>WHEREAS</u>, 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

<u>WHEREAS</u>, 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

<u>WHEREAS</u>, 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

<u>WHEREAS</u>, 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

<u>WHEREAS</u>, 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.

<u>Section 3:</u> 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: Muchual Juramen



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SIGN-IN SHEET

Project name:	CUY-90-19.50/21.30 Safety Study	Date:	January 13, 2016
Project number:	PID 99086	Time:	9:30 am – 11:00 am
Client name:	ODOT District 12	Location:	ODOT District 12
DI TAOT NIO			

PLEASE SIGN IN						
Name:	Title:	Organization:	Address:	City, State, Zip:	Phone:	Email:
1. Brian Blayney	District Traffic Engineer	ODOT District 12	5500 Transportation Blvd.	Garfield Heights, Ohio 44125	(216) 584-2102	brian.blayney@dot.state.oh.us
2. Veena Madineni VM	Traffic Engineer	LJB	2500 Newmark Dr.	Miamisburg, Ohio 45342	(937) 259-5074	vmadineni@ljbinc.com
3. Andy Shahan	Principal	LJB	2500 Newmark Dr.	Miamisburg, Ohio 45342	(937) 259-5180	ashahan@ljbinc.com
4. Andy Cross APC	Traffic Engineer	City of Cleveland	601 Lakeside	Cleveland, Ohio 44114	(216) 664-3197	across@city.cleveland.oh.us
5. Sahar Tawfig Sahar Tach	Transportation Engineer	NOACA	1299 Superior Ave.	Cleveland, Ohio 44114	(216) 241-2414 x 280	stawfiq@mpo.noaca.org
6. Scott Knebel fratkrelef	Senior Project Manager	Crawford, Murphy, & Tilly	8101 North High Street, Suite 150	Columbus, Ohio 43235	(614) 468-1215	sknebel@cmtengr.com
7. James Amendola		St. Clair Superior	4205 St. Clair	Cleveland, Ohio 44114	(216) 881-0644 x 109	jamendola@stclairsuperior.org
8. Debbie Berry		University Circle Inc.	10831 Magnolia Drive	Cleveland, Ohio 44106		dberry@universitycircle.org
9. Kelly Coffman Gava. Maily	Senior Strategic Park Planner	Cleveland Metroparks	4101 Fulton Parkway	Cleveland, Ohio 44114	3289 (216) 635-3299	5bm@develoush_Mtryforgs.cn kbc@clevelandmetroparks.com
10. Brenton Bogard		ODOT ORES	1980 West Broad St.	Columbus, Ohio 43223		
11. Jim Shea Jam Ehr		Michael Baker Intl.	1228 Euclid Avenue, Suite 1050	Cleveland, Ohio 44114		
12. MICHELLE JOHNSON	DIRECTOR	EDG	806 LITERARY	CUE	513.461.2121 (c)	miohnson@envdesigngrap.co
13. Mike Cronebach	Transportation Engr.	ODOT ORES	1980 Wost Broad St.	Columbus OH 43223	(614) 757 - 9849	mike a cronebach@dot. state . oh. us
14. Elise yablonsky	Planning marage	ucl	10831 Magnetia	cleveland, DH 4400	216-207-46662	exaldonsty @ moensity aucle
15. Andrew Cross Abue	Engineer	Statehand	601-take			



MEETING MINUTES

CUY-90 19.50/21.30 Safety Study Stakeholder Meeting

Date: January 13, 2016 **Time:** 9:30 am - 11:30 am

Location: ODOT District 12 Training Conference Room

Attendees: See sign-in sheet

Purpose: Presentation of Study Recommendations to Stakeholders

Action items	Who by	Due by	Completed
Remove speed zone study from the list of recommendations for MLK Drive.	LJB	2/12/16	
LJB to confirm sight triangles on the I-90 EB exit ramp approach at MLK Drive.	LJB	2/12/16	
Revise capacity analysis of the NB MLK approach at the EB I- 90 ramps to have a T-R lane configuration. Assess operational impacts including queueing to make sure through lane does not block right turn traffic. Revise concept plan and cost estimate if a T-R lane configuration on the NB approach improves capacity of MLK Drive.	LJB	2/12/16	
Evaluate new traffic signal at the MLK/WB I-90 exit ramp intersection. A long cycle length in the AM peak would be acceptable to the stakeholders.	LJB	2/12/16	
Evaluate underpass lighting on MLK for the trail under I-90 and update the cost estimate.	LJB	2/12/16	
Co-ordinate preparation of TLCI and safety funding applications. ODOT will take lead on safety funding application.	All	TBD	
ODOT to co-ordinate with the city of Cleveland to confirm STP funds can be used for N. Marginal Road reconstruction.	BMB	TBD	
Revise E 55 th Street concept plan for bike lane continuity.	LJB	2/12/16	

1. E. 55th Street interchange countermeasures.

- a. The Greenway Study identified a connection for a bike trail between the N. Marginal Road and the S. Marginal Road (west side of E. 55th Street). The safety study repurposes the deck for sidewalk on the east side due to the alignment of lanes south of I-90. Recommendations to incorporate as part of a final study include the following:
 - i. Metroparks would like pedestrian treatments such as a 'ped count-down timer' at crossings to assist with the double crossing of E. 55th Street for the sidewalk on the east side
 - ii. The NB bike lane on E.55th Street conflicts with the right turn only lane at the EB I-90 on ramp. Relocate the bike lane between the through and right turn lane to be consistent the OMUTCD guidelines.
- b. ODOT proposes prioritizing the countermeasures at the MLK/72nd interchange ahead of those at the E. 55th Street interchange. The group agreed MLK improvements appeared to be generally higher priorities for both safety and connectivity.
- c. The city of Cleveland proposed an option where the SB through lane be oriented as the inside lane the curb lane is required to merge with the inside lane as it currently exists in the field. The safety study proposes the SB through lane be oriented as the curb lane thus requiring the inside lane drop as an exclusive left turn lane at Lake Avenue. The safety study configuration was proposed to minimize weaving by creating a defacto left turn lane throughout the study area. The final lane configuration to be determined by the City of Cleveland. No changes are proposed to the safety study concept plan at this point of time.
- d. Implementation of the lane configuration can be done as a short term countermeasure. Realignment of the EB I-90 exit ramp could be done as a separate project.

2. 72nd / MLK interchange countermeasures

a. Short term countermeasures

i. Removal of ramps on the east side of the 72nd Street interchange to eliminate weaving condition on I-90 that does not meet nominal criteria and appears to be a contributing factor to observed crash patterns.

The proposed improvement also removes the vehicle/bike conflict at the E. 72^{nd} sreet NB to I-90 EB on ramp. Traffic destined to the ramp is almost a free flow movement and conflicts with the buffered bike lane in the existing configuration – the countermeasure has a safety benefit to E. 72^{nd} Street users as well.

- ii. Stakeholders generally concur with adding a second SB lane under the railroad bridge as it fits inside existing curb lines and is expected to improve lane use.
 - The City and Metroparks want to reduce the length of the second SB through lane so as not to extend south of East Blvd where a pedestrian refuge island exists south of East Blvd. and is desirable to remain. This change would reduce the effective length of the second SB lane by 500 feet.
 - The group engaged in a lengthy discussion of where and how to drop the second lane (E. 88th vs St. Clair, Merge vs. inside lane drop). After discussion, the group reached consensus that the best approach is to drop the lane into a left turn only

lane at E.88th opposite the existing pedestrian refuge island with adequate advance signing to notify drivers of drop lane condition. This approach maximizes the effective length of the second through lane while keeping the pedestrian refuge island and dedicated left turn lane at E. 88th, a workable balance of competing interests.

- iii. Trail Crossings at N. Marginal Road and the EB I-90 exit ramp are important to stakeholders. The trail connection on the west side of MLK Drive under I-90 completes the last link in a 21 mile lake-to-lake trail.
- A double right turn lane (LR-R) on the EB I-90 exit ramp was suggested to improve throughput from the exit ramp and is to be incorporated into the final safety study. The lane configuration change will reallocate additional green time to the SB MLK Drive approach.
- v. Pedestrian/bicyclist safety a concern at the EB I-90 exit ramp crossing. No Turn On Red (NTOR) sign to improve pedestrian safety in the crosswalk. The city suggested a NTOR Except for Curb Lane signing. Keeping clear sight triangles for traffic exiting EB I-90 is important.
- vi. No changes are proposed to the existing traffic signal at Broad Avenue due to limited sight distance and pedestrian crossing facilities. Provide crosswalks on south and west legs.
- vii. The city suggested reconstructing the MLK Drive and E. 88th Street intersection as a standard T intersection by removing the raised island. This would provide a more conventional intersection and a shorter crosswalk on east leg.
- viii. A speed zone study is to be removed from the final safety study. The group agrees that a speed zone study was unnecessary and should be removed from the list of recommendations.

3. 72nd / MLK interchange long term countermeasures

- i. Greenway stakeholders want to maximize green space and asked for an estimate of land acreage that can be captured with the realignment of Lakeshore Drive.
- ii. Limited support was received for the long term countermeasure from all stakeholders due to the overall construction costs. The long term countermeasure is to remain in the final safety study for information purposes only and is not intended to identify the only feasible layout.
- iii. The MLK Drive/ I-90 WB exit ramp/Lakeshore Blvd intersection has an unconventional traffic control as a two-way stop controlled intersection. The City did not see advantage but did not object to ODOT considering it. ODOT agreed to consider Metroparks' request for a traffic signal as a conventional traffic control similar to the EB ramps intersection. ODOT may evaluate signalization of the WB I-90 exit ramp using a 300 second cycle, for example, to evaluate queue lengths on the WB approach.

4. Funding

- a. TLCI implementation funding may be available to enhance pedestrian and bike elements of the interchange improvements. Their focus is to help as many projects as possible and support projects with other funding sources. Funding applications due January 29, 2016.
 - i. Brian stated that someone other than ODOT should sponsor an application to TLCI for enhancement treatments (ie. pavers, lighting) for the trail connection on MLK under I-90.
 - ii. EDG agreed to contact NOACA to determine eligibility of the proposed ped/bike improvements on MLK Drive.
- b. ODOT wants to allow the city to continue to pursue STP funding for the N. Marginal Road reconstruction. A pavement replacement project is on the long range plan. The City suggests closure of the E. 72nd ramps should not occur before reconstruction of N. Marginal Road.
- c. ODOT expects to pursue safety funds for the balance of the short term countermeasures. Configuration on MLK Drive needs to be resolved with the City prior to March 15, 2016 to enable sufficient time to prepare a funding application for the project.

The above represents LJB's interpretations of the discussion held at the referenced meeting. These notes will be considered agreed to by all parties unless any errors, omissions or discrepancies are reported to the author.

















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> CUY-90-19.5/21.3 SAFETY STUDY Design Year (2034) ADT







>CUY-90-19.5/21.3 SAFETY STUDY Design Year (2034) AM 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) AM Peak Hour (2 of 2)





> 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)





>CUY-90-19.5/21.3 SAFETY STUDY Design Year (2034) PM Peak Hour (Build Condition)



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

ST/	ATION ID	576	576	40318	40318	40218	41018	63318	63418	63718	63918	64018	64118	64218	64318	64418	64518	64618	64718	64818	66018	66118	66218	66318
LO	CATION	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	0.010	0.016	0.057	0.057	0.007	0.007	0.000	0.000	0.000	0.007	0.027	0.027	0.027	0.002	0.002	0.020	0.010	0.027	0.027	0.010	0.010	0.007	0.007
	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
	0:00	529	350	35	24	10	9	90	113	29	82	89	84	/1	/8	60 25	47	120	15	18	38	27	26	47
	1:00	320	232	12	13	5	0	0/	57	10	44	20	00 22	41	33	30	38	/3	13	15	17	0 14	10	28
	2:00	240	191	15	10	12	5	33	20	0	20	59	33	41	25	25	12	42	14	0	25	14	13	10
≻	4.00	223	207	9 28	7 Q	12	15	40 70	29 67	5	28	44 57	43	30	55 85	23	25	32	14	4	58	15	36	26
DA	5:00	1031	1679	37	14	10	26	164	211	25	57	172	79	80	296	30	123	110	40	, 15	125	30	73	20
OF	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
UR	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
Н	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
ВΥ	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
IES,	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
/0F	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
í.	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
STE	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
חום	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
ΥAI	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
NLL	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
Ň	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
ASC	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
SE	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

ST/	ATION ID	40218	41018	64318	64418	64518	64618	64718	64818	66018	66118	66218	66318
LO	CATION	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 SSTH ST TO EB IR-90
DAT	E 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
GROW	/TH RATE (%)	0.126	0.126	0.41	0	0	0.41	0	0	0	1.177	1.177	0
GRO	WTH PERIOD	21	21	23	23	23	23	23	23	23	23	21	21
	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
DA	5:00	16	27	324	39	123	120	40	15	125	38	92	25
QF	6:00	38	90	948	96	409	193	84	48	412	71	302	104
UR	7:00	59	131	721	239	415	488	191	58	740	186	356	190 *
ЮН	8:00	54	94	962	252	428	399	135	70	548	180	271	231
BΥΙ	9:00	56	63	641	228	452	304	106	59	374	136	217	231
S, I	10:00	65	70	473	200	351	357	91	57	269	155	181	242
W	11:00	77	73	430	247	307	410	77	54	277	217	223	285
JLU	12:00	65	96	479	306	334	492	99	83	260	186	242	352
22	13:00	71	86	481	255	337	518	95	61	263	216	224	378
34	14:00	109	92	525	402	423	667	133	79	359	283	258	394
(20	15:00	142	112	518	440	428	975	142	93	763	247	260	481
AR	16:00	147	122	455	504	402	1127	124	102	447	303	195	614 *
I YE	17:00	155	90	448	392	450	1113	114	95	453	210	209	561
ND	18:00	96	109	410	316	334	693	95	98	184	141	153	297
ESI	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

LO	CATION	WEST OF E 55TH ST		BETWEEN E S5TH 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	RAMPS	EAST OF MARTIN	LUTHER KING JR DR
DIF	RECTION	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
GROW	TH 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
GRO	WTH PERIOD	20	20	20	20	20	20	20	20	20	20	20	20	20	20
	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
DA	5:00	1362	1685	12/4	1637	1299	1/63	1284	1/23	1308	1/60	1184	1/20	1311	2045
OF	6:00	2942	3969	2667	38/1	2//2	4286	2724	4201	2779	4316	2364	4219	25/5	5160
JR.	7:00	2605	5/81	3/81	55/3	3972	6317	3913	6125 F 429	3996	6293	33/3	505Z	4077	6803
ЮН	8.00	2060	2009	2437 2052	2057	2005	2222	2025	2430	2000	2210	2642	2070	2060	2710
BΥ	10·00	2575	2655	2052	2504	2646	2776	2588	268/	2668	2770	2042	2567	2900	3042
ES,	11:00	2683	2605	2402	2304	2040	2683	2300	2604	2000	2694	2313	2307	2905	2876
Ψ	12:00	2648	2700	2425	2524	2779	2786	2696	2686	2000	2798	2439	2488	2930	2968
OLL	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
034	15:00	4883	3618	4621	3383	5105	4151	5012	4008	5183	4144	4750	3699	5722	4230
3 (2	16:00	5564	4173	5348	3889	5966	4338	5863	4213	6046	4360	5639	3850	6765	4324 *
EAI	17:00	4722	3978	4503	3769	5067	4225	4972	4111	5157	4226	4702	3829	5803	4297
N X	18:00	4464	3073	4294	2929	4592	3114	4493	3018	4616	3144	4278	2824	4980	3242
SIG	19:00	2620	2074	2509	1945	2691	2059	2639	1992	2743	2076	2490	1842	3034	2125
DE	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	1192	291	112	515	123	894	120	862	124	627	113	430	1328	376

*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
<u>IR-90/MLK</u>	
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, M	lay 05	Tue, N	lay 06	Wed, N	lay 07	Thu, N	lay 08	Fri, M	ay 09	Sat, M	ay 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 0	62	16	1	1	1	0	Õ	2	0	Õ	0	Õ
40218	3	1	13	8	6	12	0 0	52	13	0	1	0	1	Õ	3	0	Õ	0	Õ
40218	3	1	13	8	6	13	0	57	14	2	1	0	0	Õ	2	0	0	0 0	Õ
40218	3	1	13	8	6	14	1	90	23	0	1	0	0	0	2	0	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
40210	3	1	13	8	6	17	1	132	33	0	1	0	0	0	0	0	0	0	0
40210	3	1	13	8	6	18	0	82	20	0	0	0	0	0	1	0	0	0	0
40210	3	1	13	8	6	10	3	74	18	0	0	0	0	0	0	0	0	0	0
40210	3	1	13	8	6	20	0	50	12	0	0	0	0	0	0	0	0	0	0
40210	3	1	12	0 0	6	20	0	50	12	0	0	0	0	0	0	0	0	0	0
40210	3	1	13	8	6	27	0	36	a	0	0	0	0	0	0	0	0	0	0
40210	3	1	13	8	6	23	0	30	7	0	0	0	0	0	0	0	0	0	0
40210	3	1	13	8	7	0	0	23	6	0	0	0	0	0	0	0	0	0	0
40210	3	1	13	8	7	1	0	10	3	0	0	0	0	0	0	0	0	0	0
40210	3	1	13	8	7	2	0	6	2	0	0	0	0	0	0	0	0	0	0
40210	3	1	13	8	7	2	0	11	2	0	0	0	0	0	0	0	0	0	0
40210	3	1	12	0 0	7	1	0	6	2	0	0	0	0	0	1	0	0	0	0
40210	3	1	13	0 0	7	5	0	11	2	0	0	0	0	0	0	0	0	0	0
40210	3	1	13	0 0	7	5	0	27	7	0	0	0	0	0	1	1	0	0	0
40210	2	1	10	0	7	7	0	27 50	10	0	0	0	0	0	0	0	0	0	0
40210	2	1	10	0	7	0	0	16	12	0	0	0	0	0	1	0	0	0	0
40210	3	1	10	0	7	0	0	40	10	0	1	0	0	0	1	0	0	0	0
40210	ა ი	1	10	0	7	9 10	0	50	1∠ 11	0	1	1	0	0	1 0	0	0	0	0
40210	ა ი	1	10	0	7	10	0	44	15	1	1	1	0	0	2	1	0	0	0
40218	3	1	13	ŏ	7	10	1	61	15	1	1	1	0	0	2	1	0	0	0
40218 40010	3	1	10	Ø	7	12	1	01	10	2	2	1	0	0	2	0	0	0	0
40218 40010	3	1	10	Ø	/	13	0	00	14	0	1	1	0	0	2	0	0	0	0
40218	3	1	13	8	1	14	U	/6	19	U	1	1	U	0	2	U	U	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	Õ	Õ	Õ	Õ	Õ	1	0	Õ	0	0
40318	1	1	13	8	8	19	0	64	16	Õ	1	Õ	Õ	Õ	0	0	Õ	0	0
40318	1	1	13	8	8	20	0 0	50	13	Õ	1	Õ	Õ	Õ	0 0	0 0	Õ	0 0	Õ
40318	1	1	13	8	8	21	0	39	10	0 0	0	Õ	0	Õ	0	0	Õ	0	0
40318	1	1	13	8	8	22	1	38	9	0	0	0	0	0	1	0	0 0	0	0
40318	1	1	13	8	8	22	0	30	10	0	0	0	0	0	0	0	0	0	0
40318	1	1	13	8	a	0	0	21	5	1	1	0	0	0	0	0	0	0	0
40310	1	1	13	0 Q	0	1	0	10	3	0	0	0	0	0	0	0	0	0	0
40310	1	1	13	0 9	9	2	0	10	2	0	0	0	0	0	0	0	0	0	0
40310	1	1	13	0 0	0	2	0	6	2	0	0	0	0	0	0	0	0	0	0
40010	1	1	10	0	0	1	0	0	2	0	1	0	0	0	0	0	0	0	0
40310	1	1	10	0	9	4	0	0 11	2	0	1	0	0	0	1	0	0	0	0
40310	5	1	10	0	9	5	0	24	0	0	0	0	0	0	1	0	0	0	0
40310	5	1	10	0	0	7	0	24	0	0	0	0	0	0	0	0	0	0	0
40310	5	1	10	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0
40310	5		10	0	0	0	0	32	0	0	1	0	0	0	0	0	0	0	0
40310	5	1	10	0	0	9	0	10	3	0	1	0	0	0	0	0	0	0	0
40310	5		13	0	0	10	0	10	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	1/	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 0	1	0 0	1	Õ	1	0	0 0	0	Ő
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	õ	Õ	0	õ	õ	õ	Õ	õ	Õ	õ
40918	5	1	13	7	26	0	0	11	3	0 0	0	0	Ő	0	0 0	0	0 0	0	0
40918	5	1	13	7	26	1	õ	10	3	õ	õ	õ	õ	õ	õ	õ	õ	õ	õ
40918	5	1	13	7	26	2	õ	6	1	õ	õ	õ	õ	õ	õ	õ	õ	õ	õ
40918	5	1	13	7	26	3	õ	7	2	õ	õ	õ	õ	õ	õ	õ	õ	õ	õ
40918	5	1	13	, 7	26	4	0 0	13	3	0 0	0 0	0	ñ	0 0	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 0
40918	5	1	13	7	26	6	1	62	16	0	0	0	0	0	1	0	0	0	0
10010	5	1	13	7	26	7	0	106	27	0	0	0	0	0	2	0	0	0	0
10018	5	1	13	7	26	8	0	79	20	2	1	1	0	0	2	0	0	0	0
10018	5	1	13	7	26	a	1	51	13	2	1	0	0	0	1	0	0	0	0
10018	1	1	13	7	25	a	1	17	12	2	1	1	0	0	2	0	0	0	0
40010	1	1	12	7	25	10	1	10	11	0	1	1	0	0	2	0	0	0	0
40910	1	1	10	7	25	10	1	42 54	11	0	1	1 0	1	0	2	0	0	0	0
40910	1	1	13	7	25	10	י 2	74	19	5	5	1	0	0	4	0	0	0	0
40910	1	1	10	7	25	12	1	74	10	2	0	1	0	0	4	0	0	0	0
40910	1	1	10	7	25	10	0	104	19	2	1	2	0	0	6	0	0	0	0
40910	1	1	10	7	25	14	0	01	20	0	1	0	0	0	4	0	0	0	0
40910	1	1	10	7	20	10	3 0	91 101	20	0	1	1	0	0	4	0	0	0	0
40310	1	1	10	7	20	10	4	120	30	2	1	1	0	0	1	0	0	0	0
40918	1	1	10	7	20	10	1	130	33 21	0	1	1	U	0	0	0	0	0	0
40910	1	1	10	7	20	10	∠ 1	106	21	1	1	0	0	0	2	0	0	0	0
40910	1	1	10	7	20	19	1 0	100	20	1	1	1	0	0	2	0	0	0	0
40918	1	1	13	7	20	20	∠ 1	101	20 10	0	0	1	0	0	1	0	0	0	0
40918	1	1	13	7	20	21	1	00	10	0	1	1	0	0	0	0	0	0	0
40918	1	1	13	/	25	22	0	80	1/	0	1	1	U	0	0	0	0	0	0
40918	1	1	13	/	25	23	1	30	1	0	U J	0	U	U	0	U	0	U	U
40918	1	1	13	/	26	U	0	15	4	U	1	U	0	U	U	U	U	U	U
40918	1	1	13	/	26	1	0	13	3	U	U	U	0	U	U	U	U	U	U
40918	1	1	13	/	26	2	0	6	1	U	U	U	0	U	U	U	U	U	U
40918	1	1	13	/	26	3	U	10	2	U	U	U	U	U	U	U	U	U	U
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	/	1	13	8	6	21	2	36	9	0	0	0	0	0	1	0	0	0	0
41018	/	1	13	8	6	22	0	32	8	0	0	0	0	0	0	0	0	0	0
41018	/	1	13	8	6	23	0	29	/	0	0	0	0	0	0	0	0	0	0
41018	/	1	13	8	/	0	0	1/	4	0	0	0	0	0	0	0	0	0	0
41018	/	1	13	8	/	1	0	6	2	0	0	0	0	0	0	0	0	0	0
41018	/	1	13	8	7	2	0	6	1	0	0	0	0	0	0	0	0	0	0
41018	/	1	13	8	/	3	0	10	2	0	0	0	0	0	1	0	0	0	0
41018	/	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	20	10	0	0	0	0	0	0	1	0	0	0
41018	7	1	13	8	7	ь 7	0	70	19	0	0	0	0	0	2	0	0	0	0
41018	7	1	13	8	7	/	0	70	29	0	1	1	0	0	4	0	0	0	0
41010	7	1	10	0	7	0	0	/0 EC	20	2	1	0	0	0	3	0	0	0	0
41010	7	1	10	0	7	9	1	50	14	2	3	1	0	0	2	1	0	0	0
41018	7	1	10	ð	7	10	1	54 50	14	2	1	1	0	U	∠ 1	1	0	U	U
41010	7	1	13 19	0 0	7	10	0	59 79	10	∠ 1	ა 1	1	0	0	1	0	0	0	0
41010	7	1	10	0	7	12	0	/ 3 60	10	1	1	1	0	0	1	0	0	0	0
41010	7	1	10	0	7	10	0	74	10	0	1	0	0	0	1	0	0	0	0
41018	1	I	١J	Ø	1	14	U	74	19	U	I	U	U	U	э	U	U	U	U
Date	Time	Туре	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			
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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		2	3	34	4	0	2	0			
10/05/11	16:00	Axle	1	0	541	62	Ő	.0	10	0	6	19	3	0	1	2			
10/05/11	17:00	Axle	1	2	536	52	Ő	4	.0	Ő	3	31	0	0	0	0			
10/05/11	18:00		1	2	356	35	1	1	5	0	3	8	0	1	0	1			
10/05/11	10:00		1	2	286	24	0	0	1	0	5	6	0	0	0	0			
10/05/11	20:00		1	1	200	27	0	2	2	0	3	5	0	0	0	0			
10/05/11	20.00	Axie	1	5	19/	12	0	2	2	0	2	1	0	0	0	0			
10/05/11	21.00	Axie	1	5	104	10	0	0	0	0		1	0	0	0	0			
10/05/11	22.00	Axie	1	0	107	19	0	0	0	0	1	ა ი	0	0	0	0			
10/05/11	23:00	Axie	1	1	107	0	0	0	0	0	1	3	0	0	0	0			
10/06/11	00:00	Axie	1	0	91	8	0	0	0	0	0	1	0	0	0	0			
10/06/11	01:00	Axie	1	0	67	/	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	/	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	Ő	59	6	Ő	2	0	Ő	0 0	Ő	Ő	0 0	Õ	Õ			
10/07/11	05:00	Axle	1	0 0	167	14	0 0	0	3	0 0	1	0 A	ñ	ů 0	ñ	ñ			
10/07/11	06:00	Axle	1	4	286	29	0	7	5	0	3	5	1	0	n	0			
10/07/11	07:00		1	1	460	41	2	10	4	1	2	14	١	0	n	1			
10/07/11	08:00		1	١	430	52	3	13	-∓ 8	0	2	26	1	0	0	1			
10/07/11	00.00			0	-00	52	5	10	0	0	2	20		0	0				

Date	Time	Туре	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	Δχίο	1	12	543	98	0	6	14	0	2	14	1	0	1	1
10/05/11	17:00		1	14	553	30 77	0	4	14	0	5	3	1	0	0	1
10/05/11	18:00	Axie	1	7	402	56	0		2	0	1	1	1	0	0	1
10/05/11	10.00	Axie	1	,	402	47	0	0	2 7	1	0	4	0	1	0	1
10/05/11	19.00	Axie	1	9	295	47	0	0	1	1	0	2	0	1	0	0
10/05/11	20:00	Axie		8	266	28	0		1	0	1	2	0	0	0	0
10/05/11	21:00	Axie	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		1	10	277	<u>an</u>	2	<u>م</u>	13	6	1	16	2	0	1	0
10/06/11	12:00	Axie	1	10	200	90	2	9 7	10	6	1	10	2	1	1	0
10/06/11	12.00	Axie		0	200	00	2		10	2	- + 0	16	1		0	0
10/00/11	13.00	Axie	1	0	200	92	0		9	3	3	10	1	1	1	0
10/06/11	14:00	Axie	1	15	382	102	5	8	10	1	4	10	4	1	1	0
10/06/11	15:00	Axie		13	450	94	2	9	10	2	3	15	3	0	0	0
10/06/11	16:00	Axie	1	12	486	/3	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 0	2	4	Ő	1	0	0	Ő	Ő	Õ
10/07/11	00:00	Δχίο	1	10	310	50	0	14	11	Ő	2	2	0	0	Ő	1
10/07/11	07:00		1	0	508	52	2	12	15	3	5	12	1	0	0	۰ م
10/07/11	07.00		1	9	/16	102	1	11	11	1	6	16	י כ	0	0	0
10/07/11	00.00		1	9 9	261	10Z 8/	1	0	0	ر د	1	0	5	0	0	1
10/07/11	10.00		1	0 7	201	100	1 0	9 0	9 10	5	4	9 1 /		1	1	4
10/07/11	11.00	AXIE	1	/	200	100	2	0	10	5	4	14	1		1	3
10/07/11	11.00	AXIE	1	9	201	/0	4	o	9	3	o	20	0	I	0	2

Date	Time	Туре	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		1	0	100	12	0 0	2	0 0	Ő	1	0	Ő	0	0	1
10/05/11	20.00		1	0	86	8	0	1	0	0	2	0	0	0	0	0
10/05/11	21.00		1	1	72	6	0	0	0	0	0	0	0	0	0	0
10/05/11	21.00		1	0	64	1	0	0	0	0	0	0	0	0	0	0
10/05/11	22.00		1	1	66	-+ 6	0	0	0	0	0	0	0	0	0	0
10/05/11	23.00	Axie	1	1	00	1	0	0	0	0	0	0	0	0	0	0
10/06/11	00.00	Axie	1	0	17	1	0	0	0	0	0	0	0	0	0	0
10/06/11	01:00	Axie	1	0	17	1	0	0	0	0	0	0	0	0	0	0
10/06/11	02:00	Axie	1	0	14	2	0	0	0	0	0	0	0	0	0	0
10/06/11	03:00	Axle	1	1	/	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	Ő	76	9	Ő	1	Ő	Ő	Ő	Ő	Õ	0 0	0 0	0
10/06/11	22.00	Axle	1	0 0	66	3	Ő	0	Ő	Ő	1	1	Ő	0	0	1
10/06/11	23.00	Axle	1	2	60	3	Ő	Ő	Ő	Õ	0	3	Õ	Ő	0 0	1
10/07/11	00.00		1	1	40	3	0 0	1	0 0	Ő	0	0	Ő	0	0	1
10/07/11	01.00		1	0	20	1	0	0	0	0	0	1	0	0	0	0
10/07/11	02.00		1	0	20	2	0	0	0	0	0	0	0	0	0	0
10/07/11	02:00		1	0	15	1	0	1	0	0	0	0	0	0	0	0
10/07/11	03.00	Axie	4	0	14	0	0	0	0	0	0	0	0	0	0	0
10/07/11	04.00	Axie	1	0	14	0	0	0	1	0	0	0	0	0	0	0
10/07/11	05.00	Axie	1	1	14	10	0	0	1	1	0	0	1	0	0	0
10/07/11	06:00	Axie	1	2	57	10	0	4	2	1	0	0	1	0	0	0
10/07/11	07:00	Axie		1	//	26	0	2	0	0		3	1	0	0	0
10/07/11	00:00	Axle		0	65	15	U	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	9/	16	0	3	2	1	U	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

Date	Time	Туре	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	Ő	2	8	0	1	3	0
10/11/11	18:00		1	0	269	41	0	2	0	0 0	1	4	0	0	0	0
10/11/11	19.00		1	1	284	29	0	1	0	0 0	1	4	0	ů 0	ů 0	0
10/11/11	20.00		1	1	207	20	0	0	0	0	0	3	0	0	1	0
10/11/11	21:00	Avlo	1	1	153	13	0	0	0	0	0	2	0	0	0	0
10/11/11	22:00		1	0	100	1/	0	0	0	0	0	1	0	0	0	0
10/11/11	22:00		1	0	122	7	0	0	0	0	0	1	0	0	0	0
10/12/11	20.00		1	2	0/	0	0	0	0	0	1	0	0	0	0	0
10/12/11	00.00	Axie	1	2	40	3	0	0	0	0	0	1	0	0	0	0
10/12/11	01.00	Axie	1	0	49	2	0	1	0	0	0	0	0	0	0	0
10/12/11	02.00	Axie		0	29	2	0	2	1	0	0	0	0	0	0	0
10/12/11	03.00	Axie		0	50	5	0	6	0	0	0	0	0	0	0	0
10/12/11	04.00	Axie	1	0	150	20	0	6	0	0	0	1	0	0	0	0
10/12/11	05.00	Axie	1	1	109	20	0	0	1	0	1	1	1	0	0	0
10/12/11	08.00	Axie	1	1	273	31	0	2	0	0	۱ م	4	1	0	0	0
10/12/11	07.00	Axie	1	0	409	44	0	3	2	0	5	10	0	0	0	0
10/12/11	00.00	Axie	1	0	411	40	0	4	2	0	5	14	0	0	3	1
10/12/11	09:00	Axie	1	0	317	43	0	07	2	0	3	0	0	1	1	1
10/12/11	10:00	Axie	1	0	283	52	0	1	Э 4	0	5	14	0	1	2	1
10/12/11	10:00	Axie	1	0	290	57	0	4	4	0	3	14	0	0	0	1
10/12/11	12:00	Axie	1	0	321	50	0	10	Э 4	0	3	15	0	0	0	1
10/12/11	13:00	Axie	1	0	200	54	1	13	4	0	3	15	1	0	2	0
10/12/11	14:00	Axie	1	1	350	60	1	23	0	0	5 F	22	1	0	1	1
10/12/11	15:00	Axie	1	0	418	69	0	0	0	0	5	11	0	0	0	1
10/12/11	16:00	Axie	1	0	301	62	0	8	3	0	3	10	1	0	1	0
10/12/11	17:00	Axie	1	0	380	44	0	5	1	0	4	5	0	0	2	0
10/12/11	18:00	Axie	1	0	330	33	1	0	0	0	1	6	0	0	0	0
10/12/11	19:00	Axie	1	0	234	22	0	1	0	0	2	2	0	0	1	0
10/12/11	20:00	Axie		0	213	18	0	0	0	0	0	3	0	0	1	0
10/12/11	21:00	Axie	1	0	1//	11	1	0	0	0	1	0	0	0	0	0
10/12/11	22:00	Axie	1	0	150	12	0	1	0	0	0	4	0	0	0	0
10/12/11	23:00	Axie	1	0	110	11	0	0	0	0	0	1	0	0	0	0
10/13/11	00:00	Axie	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	/	0	0	1	0	0	0	0	0
10/13/11	06:00	Axle	1	1	2/2	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

Date	Time	Туре	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

Date	Time	Туре	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	Õ	0 0
10/12/11	11:00	Axle	1	0	236	40	0	6	13	0	0	3	1	0	Õ	1
10/12/11	12.00	Axle	1	1	301	40	0	Ő	7	1	3	5	0	0	Õ	1
10/12/11	13:00	Axle	1	0	269	43	0	7	3	0	2	6	Ő	0	Ő	1
10/12/11	14:00	Axle	1	1	335	35	0	10	2	0	2	5	Ő	0	Ő	0
10/12/11	15:00	Axle	1	0	413	63	0	5	2	0	4	7	1	0	Ő	1
10/12/11	16:00	Axle	1	1	476	69	0	5	0	1	2	3	2	0	Ő	2
10/12/11	17:00		1	3	502	54	0	2	0	0	0	2	0	0	0	0
10/12/11	18:00		1	1	355	35	0	4	1	0	2	7	0	0	0	0
10/12/11	10:00		1	0	282	30	0	0	0	0	0	2	0	0	0	0
10/12/11	20.00	Avlo	1	1	244	21	0	0	0	0	0	0	0	0	0	0
10/12/11	21:00		1	0	170	20	0	0	0	0	1	1	0	0	0	0
10/12/11	22:00		1	2	185	11	0	1	0	0	2	0	0	0	0	0
10/12/11	22:00		4	2	110	6	0	0	0	0	2	0	0	0	0	0
10/12/11	23.00	Axie	1	0	70	4	0	0	0	0	0	0	0	0	0	0
10/13/11	01:00		1	0	10	6	0	0	0	0	1	0	0	0	0	0
10/13/11	01.00	Axie	1	0	42	5	0	0	0	0	1	1	0	0	0	0
10/13/11	02:00	Axie	1	0		1	0	1	0	0	0	0	0	0	0	0
10/13/11	03.00	Axie	1	0	20	2	0	0	0	0	0	0	0	0	0	0
10/13/11	04.00		1	0	29	0	0	0	1	0	0	0	0	0	0	0
10/13/11	05.00		1	0	150	9 10	0	2	0	0	0	0	0	0	0	0
10/13/11	00.00	Axie	1	0	109	19	0	2	0	0	1	0	0	0	0	0
10/13/11	07.00	AXIE	1	0	262	20	0	5	2	0	1	ა ი	0	0	0	0
10/13/11	00.00	AXIE	1	0	203	29	0	7	- 1	0	۱ م		0	0	0	0
10/13/11	10.00	Axie	1	0	240	30 40	0	/ E	1	0	0	1	0	0	0	0
10/13/11	11.00	AXIE	1	1	209	40 26	0	57	4	0	2	4	0	0	0	0
10/13/11	11.00				204		0	(0		9	0	0	0	0

Time	Туре	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
13:00	Axle	1	0	383	56	0	5	0	0	2	10	0	0	1	0
14:00	Axle	1	0	417	64	0	4	1	0	1	10	0	0	0	2
15:00	Axle	1	0	431	50	0	5	0	0	0	5	0	0	1	0
16:00	Axle	1	0	391	30	1	5	0	0	0	5	0	0	0	0
17:00	Axle	1	0	376	40	0	2	0	0	3	5	0	0	0	0
18:00	Axle	1	0	346	33	0	0	0	0	4	5	0	0	1	0
19:00	Axle	1	0	234	25	0	1	0	0	0	3	0	1	0	0
20:00	Axle	1	0	222	23	0	0	0	0	0	4	0	0	0	0
21:00	Axle	1	0	183	7	0	1	0	0	0	2	0	0	0	0
22:00	Axle	1	0	184	11	0	0	0	0	0	1	0	0	0	1
23:00	Axle	1	0	134	6	0	0	0	0	0	1	0	0	0	0
00:00	Axle	1	0	72	8	0	0	0	0	1	0	0	0	0	0
01:00	Axle	1	0	32	2	0	0	0	0	0	0	0	0	0	0
02:00	Axle	1	0	22	4	0	0	0	0	0	0	0	0	0	0
03:00	Axle	1	0	32	4	0	0	0	0	0	0	0	0	0	0
04:00	Axle	1	0	81	7	0	0	0	0	0	0	0	0	0	0
05:00	Axle	1	1	282	19	0	0	0	0	0	6	0	0	0	0
06:00	Axle	1	0	771	91	0	0	0	0	10	25	1	0	3	0
07:00	Axle	1	1	559	69	1	1	1	0	8	35	5	2	3	0
08:00	Axle	1	1	786	82	0	1	1	1	2	30	3	1	6	0
09:00	Axle	1	0	521	68	0	3	0	0	4	10	0	1	1	1
10:00	Axle	1	0	381	56	0	1	0	0	4	5	0	0	2	0
11:00	Axle	1	0	348	50	0	1	0	0	3	5	0	0	1	0
12:00	Axle	1	1	381	55	0	5	0	0	4	8	0	0	1	0
13:00	Axle	1	0	380	63	0	5	0	0	0	5	0	1	0	1
	Time 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 23:00 00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 11:00 12:00 13:00	TimeType13:00Axle14:00Axle15:00Axle15:00Axle16:00Axle17:00Axle17:00Axle19:00Axle20:00Axle21:00Axle23:00Axle01:00Axle02:00Axle01:00Axle03:00Axle05:00Axle07:00Axle08:00Axle09:00Axle11:00Axle11:00Axle11:00Axle13:00Axle	TimeTypeLane13:00Axle114:00Axle115:00Axle116:00Axle117:00Axle117:00Axle118:00Axle120:00Axle121:00Axle122:00Axle100:00Axle120:00Axle121:00Axle100:00Axle101:00Axle102:00Axle103:00Axle105:00Axle107:00Axle108:00Axle110:00Axle111:0	TimeTypeLaneBin 113:00Axle1014:00Axle1015:00Axle1015:00Axle1016:00Axle1017:00Axle1018:00Axle1019:00Axle1020:00Axle1021:00Axle1023:00Axle1000:00Axle1001:00Axle1002:00Axle1003:00Axle1005:00Axle1106:00Axle1107:00Axle1108:00Axle1007:00Axle1007:00Axle1011:00Axle1012:00Axle1013:00Axle11	TimeTypeLaneBin 1Bin 213:00Axle1038314:00Axle1041715:00Axle1043116:00Axle1039117:00Axle1037618:00Axle1034619:00Axle1023420:00Axle1022221:00Axle1018322:00Axle1018423:00Axle103201:00Axle103202:00Axle103202:00Axle103204:00Axle103204:00Axle1128206:00Axle1178609:00Axle1038111:00Axle1034812:00Axle1034812:00Axle10381	TimeTypeLaneBin 1Bin 2Bin 313:00Axle103835614:00Axle104176415:00Axle104315016:00Axle103913017:00Axle103764018:00Axle103463319:00Axle102342520:00Axle10183722:00Axle10183722:00Axle101841123:00Axle10134600:00Axle1032202:00Axle1032404:00Axle1032405:00Axle1081705:00Axle112821906:00Axle117868209:00Axle103815611:00Axle103485012:00Axle103485012:00Axle1038063	TimeTypeLaneBin 1Bin 2Bin 3Bin 413:00Axle1038356014:00Axle1041764015:00Axle1039130117:00Axle1039130117:00Axle1037640018:00Axle1023425020:00Axle1022223021:00Axle101837022:00Axle101346000:00Axle10322001:00Axle10324002:00Axle10324003:00Axle10324004:00Axle10324005:00Axle10324005:00Axle1128219006:00Axle1052168009:00Axle1038156011:00Axle1038156012:00Axle1038155013:00Axle10380630	TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 513:00Axle10383560514:00Axle10417640415:00Axle103913015516:00Axle103913015517:00Axle10376400218:00Axle10346330019:00Axle10234250120:00Axle1018370122:00Axle10184110023:00Axle1013460000:00Axle103220001:00Axle103240002:00Axle103240003:00Axle103240004:00Axle103240005:00Axle11282190006:00Axle10521680307:00Axle10348500108:00Axle10348500109:00Axle10 <td>TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 613:00Axle103835605014:00Axle104176404115:00Axle104315005016:00Axle103913015017:00Axle103764002018:00Axle102342501020:00Axle102222300021:00Axle10183701022:00Axle10134600023:00Axle1032200001:00Axle1032200002:00Axle1032200003:00Axle1032400002:00Axle1032400003:00Axle1032400004:00Axle112821900005:00Axle117868201106:00Axle10381</td> <td>TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 713:00Axle1038356050014:00Axle1041764041015:00Axle1039150050016:00Axle1039130150017:00Axle1034633000018:00Axle1022425010019:00Axle1022223000020:00Axle101837010022:00Axle1018411000023:00Axle103222000000:00Axle10324000001:00Axle10324000002:00Axle10324000001:00Axle10324000002:00Axle10324000001:00Axle103240000<t< td=""><td>TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 7Bin 813:00Axle10383560500214:00Axle104176404410115:00Axle10431500500016:00Axle10391301500318:00Axle10346330000419:00Axle10222230000020:00Axle10183701000021:00Axle1018411000000023:00Axle10134600<td< td=""><td>TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 7Bin 8Bin 913:00Axle1038356050021014:00Axle1041764041011015:00Axle1041764041051616:00Axle103913015000516:00Axle103764002003517:00Axle103764000004519:00Axle1034633000004519:00Axle1022223000002220:00Axle1018370100011021:00Axle10134600000100100100100000000000000000000000000000000000</td></td<></td></t<><td>Time Type Lane Bin 1 Bin 2 Bin 3 Bin 4 Bin 5 Bin 6 Bin 7 Bin 8 Bin 9 Bin 10 13:00 Axle 1 0 333 56 0 5 0 0 2 10 0 14:00 Axle 1 0 431 50 0 5 0 0 0 5 0 15:00 Axle 1 0 331 30 1 5 0 0 0 5 0 16:00 Axle 1 0 376 40 0 2 0 0 0 4 5 0 18:00 Axle 1 0 346 33 0 0 0 4 4 0 19:00 Axle 1 0 222 23 0 0 0 0 0 2 2 0 0 0 0</td><td>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 13:00 Axle 1 0 383 56 0 5 0 0 2 10 0 0 14:00 Axle 1 0 417 64 0 4 1 0 10 0 0 15:00 Axle 1 0 391 30 1 5 0 0 0 5 0 0 16:00 Axle 1 0 346 33 0 0 0 0 3 5 0 0 18:00 Axle 1 0 222 23 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <</td><td>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 13:00 Axle 1 0 383 56 0 5 0 0 2 10 0 0 1 14:00 Axle 1 0 417 64 0 4 1 0 1 10 0<!--</td--></td></td>	TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 613:00Axle103835605014:00Axle104176404115:00Axle104315005016:00Axle103913015017:00Axle103764002018:00Axle102342501020:00Axle102222300021:00Axle10183701022:00Axle10134600023:00Axle1032200001:00Axle1032200002:00Axle1032200003:00Axle1032400002:00Axle1032400003:00Axle1032400004:00Axle112821900005:00Axle117868201106:00Axle10381	TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 713:00Axle1038356050014:00Axle1041764041015:00Axle1039150050016:00Axle1039130150017:00Axle1034633000018:00Axle1022425010019:00Axle1022223000020:00Axle101837010022:00Axle1018411000023:00Axle103222000000:00Axle10324000001:00Axle10324000002:00Axle10324000001:00Axle10324000002:00Axle10324000001:00Axle103240000 <t< td=""><td>TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 7Bin 813:00Axle10383560500214:00Axle104176404410115:00Axle10431500500016:00Axle10391301500318:00Axle10346330000419:00Axle10222230000020:00Axle10183701000021:00Axle1018411000000023:00Axle10134600<td< td=""><td>TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 7Bin 8Bin 913:00Axle1038356050021014:00Axle1041764041011015:00Axle1041764041051616:00Axle103913015000516:00Axle103764002003517:00Axle103764000004519:00Axle1034633000004519:00Axle1022223000002220:00Axle1018370100011021:00Axle10134600000100100100100000000000000000000000000000000000</td></td<></td></t<> <td>Time Type Lane Bin 1 Bin 2 Bin 3 Bin 4 Bin 5 Bin 6 Bin 7 Bin 8 Bin 9 Bin 10 13:00 Axle 1 0 333 56 0 5 0 0 2 10 0 14:00 Axle 1 0 431 50 0 5 0 0 0 5 0 15:00 Axle 1 0 331 30 1 5 0 0 0 5 0 16:00 Axle 1 0 376 40 0 2 0 0 0 4 5 0 18:00 Axle 1 0 346 33 0 0 0 4 4 0 19:00 Axle 1 0 222 23 0 0 0 0 0 2 2 0 0 0 0</td> <td>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 13:00 Axle 1 0 383 56 0 5 0 0 2 10 0 0 14:00 Axle 1 0 417 64 0 4 1 0 10 0 0 15:00 Axle 1 0 391 30 1 5 0 0 0 5 0 0 16:00 Axle 1 0 346 33 0 0 0 0 3 5 0 0 18:00 Axle 1 0 222 23 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <</td> <td>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 13:00 Axle 1 0 383 56 0 5 0 0 2 10 0 0 1 14:00 Axle 1 0 417 64 0 4 1 0 1 10 0<!--</td--></td>	TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 7Bin 813:00Axle10383560500214:00Axle104176404410115:00Axle10431500500016:00Axle10391301500318:00Axle10346330000419:00Axle10222230000020:00Axle10183701000021:00Axle1018411000000023:00Axle10134600 <td< td=""><td>TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 7Bin 8Bin 913:00Axle1038356050021014:00Axle1041764041011015:00Axle1041764041051616:00Axle103913015000516:00Axle103764002003517:00Axle103764000004519:00Axle1034633000004519:00Axle1022223000002220:00Axle1018370100011021:00Axle10134600000100100100100000000000000000000000000000000000</td></td<>	TimeTypeLaneBin 1Bin 2Bin 3Bin 4Bin 5Bin 6Bin 7Bin 8Bin 913:00Axle1038356050021014:00Axle1041764041011015:00Axle1041764041051616:00Axle103913015000516:00Axle103764002003517:00Axle103764000004519:00Axle1034633000004519:00Axle1022223000002220:00Axle1018370100011021:00Axle10134600000100100100100000000000000000000000000000000000	Time Type Lane Bin 1 Bin 2 Bin 3 Bin 4 Bin 5 Bin 6 Bin 7 Bin 8 Bin 9 Bin 10 13:00 Axle 1 0 333 56 0 5 0 0 2 10 0 14:00 Axle 1 0 431 50 0 5 0 0 0 5 0 15:00 Axle 1 0 331 30 1 5 0 0 0 5 0 16:00 Axle 1 0 376 40 0 2 0 0 0 4 5 0 18:00 Axle 1 0 346 33 0 0 0 4 4 0 19:00 Axle 1 0 222 23 0 0 0 0 0 2 2 0 0 0 0	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 13:00 Axle 1 0 383 56 0 5 0 0 2 10 0 0 14:00 Axle 1 0 417 64 0 4 1 0 10 0 0 15:00 Axle 1 0 391 30 1 5 0 0 0 5 0 0 16:00 Axle 1 0 346 33 0 0 0 0 3 5 0 0 18:00 Axle 1 0 222 23 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <	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 13:00 Axle 1 0 383 56 0 5 0 0 2 10 0 0 1 14:00 Axle 1 0 417 64 0 4 1 0 1 10 </td

Date	Time	Туре	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

Date	Time	Туре	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	Ő	Ő	Ő	Õ	Ő	Ő	0	Ő
10/25/11	01:00	Axle	1	0	40	1	0 0	0 0	Ő	Ő	Ő	Õ	Ő	Ő	0	Ő
10/25/11	02.00	Axle	1	0	12	1	0	0 0	0	0	0	Õ	Ő	Õ	0	Ő
10/25/11	03:00	Axle	1	Ő	24	1	0	0	Ő	0	0	Ő	Ő	Ő	0	Ő
10/25/11	04.00		1	Ő	35	3	0	0	0	0	0	Ő	Ő	Ő	0	Ő
10/25/11	05:00		1	0	116	13	0	1	0	0	1	0	0	0	0	0
10/25/11	05.00		1	2	366	61	0	2	0	0	0	5	0	0	0	0
10/25/11	00.00		1	2	380	24	0	1	0	0	0	0	1	3	5	0
10/25/11	07.00	Axie	1	1	309	55	0	י ר	0	0	0	9	3	3	3	0
10/25/11	00.00	Axle	4	1	417	10	0	5	1	1	0	3	1	1	9	0
10/25/11	10:00	Axie		0	910	40	0	5	0	0	0	2	1	1	1	0
10/25/11	11.00	Axie	-	1	074	32	0	0	1	0	0	0	0	2		0
10/25/11	10.00	Axie	1	1	2/4	40	0	2	1	0	0	2	0	0	1	0
10/25/11	12.00	Axie	-	1	312	39	0	2	1	0	0	2	0	0	0	0
10/25/11	13:00	Axie	-	0	306	42	0	8	1	0	0	2	0	0	0	0
10/25/11	14:00	Axie		1	393	44	0	5	0	0	0	6	0	0	1	0
10/25/11	15:00	Axie		2	399	48	0	5	0	0	0	2	0	0	0	0
10/25/11	16:00	Axie	1	1	381	38	0	5	0	0	0	3	0	0	0	0
10/25/11	17:00	Axie	1	3	434	37	0	2	0	0	0	2	0	1	0	0
10/25/11	18:00	Axie	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

Date	Time	Туре	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

Date	Time	Туре	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

Date	Time	Туре	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

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

Date	Time	Туре	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	Õ	Õ	Õ	1	0 0	Õ	0	0
66318	3	1	13	8	6	1	0	23	6	0	Õ	Õ	Õ	Õ	2	0 0	Õ	0	0
66318	3	1	13	8	6	2	0	24	6	0	0	Õ	0	Õ	0	0	Õ	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	1	0	21	5	1	1	0	0	0	1	0	0	0	0
66318	3	1	13	8	6	5	0	21	5	0	0	1	0	0	0	0	0	0	0
66318	3	1	12	0 0	6	6	0	86	21	2	2	1	0	0	3	0	0	0	0
66318	3	1	13	0 0	6	7	0	152	20	2	2	1	1	0	0	0	0	0	0
66318	3	1	13	0 0	6	2 2	0	100	18	4	1	1	0	0	9	0	0	0	0
66210	2		10	0	6	0	1	100	40	4	-+ 2	1	0	0	0	0	0	0	0
66010	0	1	10	0	6	9	0	192	40	2	0	0	0	0	0	0	0	0	0
66010	ა ი	1	10	0	0	10	0	204	51	4	2	2	0	0	4	0	0	0	0
66010	ა ი	1	10	0	0	10	0	239	74	5	3	2	0	0	5 10	0	0	0	0
00310	3		10	0	0	12	3	295	74	3	3	1	0	0	10	0	0	0	0
00318	3	1	13	8	6	13	0	323	81	2	2		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	1/	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

Below is a summary of 2015 counts from the meters at E. 55th, E. 72nd, Gordon Park and

Meter Counts - 2015

Whiskey Island/Wendy Park as well as the persons-per-car multipliers that are used.

		January	February	March	April	May	June	July	August	September	October	November	December
Lakefront	E. 55 Fishing Pier Entr	5522	3619	7500	9920	21105	20763	22762	21757	17810	14793	11222	9670
Lakefront	E. 55 Marina	1411	1759	1793	2834	7778	9608	12484	12328	6882	7653	937	2050
Lakefront	E. 72 Gordon Boat Ramp Exit	5809	4859	1607	4190	8160	8715	9369	8539	7585	6527	6166	4149
Lakefront	E. 72 Pic Area Exit Fishing	5761	5599	9043	13757	26021	21685	25624	8375	18404	7763	6864	6428
Lakefront	Whiskey Island/Wendy Park*						31123	43349	42680	25431	11479	7033	4884

Meter malfunction, average used

*Counting began in June 2015

Persons Per Car Multiplier

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Lakefront (except Whiskey Is./Wendy Pk)	1.19	1.19	1.47	1.47	1.54	1.54	1.71	1.71	1.61	1.61	1.33	1.33
Whiskey Is./Wendy Pk*	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

*Conservative estimate used as no observations have been done to calculate a multiplier



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**.

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)

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

Monday, January 26, 2015 Cleveland, OH

Yes

IR 90 EB Ramps & MLK Jr Dr

Jurisdiction: Intersection: Number of APPROACH Lanes:

Date:

Major Street = 2 Minor Street = 2 Speed Limit = 35 (mph) Population above 10,000? 70% Warrant Apply? No



	War	rant 1 - Co	ondition	Α
	100%	80%	70%	56%
Major Approach:	600	480	420	336
Minor Approach:	200	160	140	112
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

warr	ant 1 -	Condit	ION B
100%	80%	70%	56%
900	720	630	504
100	80	70	56
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
+	+	+	+
10	12	10	10
12	12	12	12

Data:	Majo	or St:	TOTAL	Minc	or 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:

Wallant		
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 - C	ondition B:
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100%	Warrant Met?	Yes
70%	Warrant Met?	No



IR 90 EB Ramps & MLK Jr Dr



Warrant 3, Peak-Hour Vehicular Volume

IR 90 EB Ramps & MLK Jr Dr







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
	I-90	AM	B / 18.0
	West of E 55th	PM	C / 24.8
	I-90	AM	B / 16.5
	Btw E 55 th ramps	PM	C / 23.8
	I-90	AM	C / 18.2
ER	Btw E 55th and E 72nd	PM	D / 27.3
ED	I-90	AM	B / 17.9
	Btw E 72 nd ramps	PM	D / 26.8
	I-90	AM	B / 15.4
	Btw MLK ramps	PM	C / 25.1
	I-90	AM	C / 18.1
	East of MLK	PM	D / 31.5
	I-90	AM	D / 26.2
	West of E 55th	PM	C / 18.9
	I-90	AM	C / 25.4
	Btw E 55 th ramps	PM	B / 17.5
	I-90	AM	D / 28.8
W/B	Btw E 55th and E 72nd	PM	C / 20.9
VVD	I-90	AM	D / 27.9
	Btw E 72 nd ramps	PM	C / 20.3
	I-90	AM	D / 26.9
	Btw MLK ramps	PM	C / 18.6
	I-90	AM	D / 33.4
	East of MLK	PM	C / 20.9

TABLE E2: RAMP MERGE ANALYSIS

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

TABLE E3: RAMP DIVERGE ANALYSIS

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

	EB	WB	NB	SB
	APPROACH	APPROACH	APPROACH	APPROACH
MLK at I-90 WB Exit F	Ramp / Lakesł	nore Blvd (2-v	vay stop cont	rol)
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 F	load (1-way s	top 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 Ramp	s (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

TABLE E4: NO BUILD INTERSECTION ANALYSIS - MLK DRIVE

Numerical values represent delay in seconds per vehicle

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

	EB	WB	NB	SB
	APPROACH	APPROACH	APPROACH	APPROACH
E. 55th Street at S. I	Marginal Roa	d		
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	0 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. I	Marginal Roa	d		
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 V	VB Ramps			
2034 AM No Build	FREE	A/7.5	F / 62.4	-
2034 PM No Build	FREE	A/7.8	F / 241.2	-

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

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







3: E 55th St & North Marginal 2034 AM Peak No Build

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Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W.			. ↑ 1	41	
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	С	А				
Approach Delay (s)	15.8	1.0		0.0		
Approach LOS	С					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization	n		35.7%	IC	U Level o	f Service
Analysis Period (min)			15			

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

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Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	
Lane Configurations		Ý			At≱			-a†				
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			А			D				
Approach Delay (s)		118.0			0.0			42.3		0.0		
Approach LOS		F			А			D		А		
Intersection Summary												
HCM 2000 Control Delay			41.8	Н	CM 2000	Level of S	Service		D			
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)	-		90.0	S	um of lost	time (s)			34.0			
Intersection Capacity Utilization			58.5%	IC	CU Level c	of Service	•		В			
Analysis Period (min)			15									

c Critical Lane Group
1: E 55th St & South Marginal 2034 AM Peak No Build

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			ፋጉ			- † †	
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 1 4		
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		С			F			E			А	
Approach Delay (s)		32.7			158.1			75.8			2.2	
Approach LOS		С			F			E			А	
Intersection Summary												
HCM 2000 Control Delay			49.7	Н	CM 2000	Level of	Service		D			
HCM 2000 Volume to Capacit	y ratio		1.03									
Actuated Cycle Length (s)			90.0	S	um of lost	t time (s)			34.0			
Intersection Capacity Utilization	n		94.9%	IC	CU Level o	of Service			F			
Analysis Period (min)			15									

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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	W.			≜ î,	4 15		_
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	С	А					
Approach Delay (s)	16.5	2.4		0.0			
Approach LOS	С						
Intersection Summary							
Average Delay			1.4				
Intersection Capacity Utili	zation		45.7%	IC	CU Level c	f Service	
Analysis Period (min)			15				

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

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Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	
Lane Configurations		Y			¥î≽			41				
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			А			С				
Approach Delay (s)		52.4			2.0			31.5		0.0		
Approach LOS		D			А			С		А		
Intersection Summary												
HCM 2000 Control Delay			18.3	Н	CM 2000	Level of S	Service		В			
HCM 2000 Volume to Capacity	/ ratio		0.94									
Actuated Cycle Length (s)			90.0	S	um of lost	time (s)			34.0			
Intersection Capacity Utilization	n		62.9%	IC	CU Level c	f Service	:		В			
Analysis Period (min)			15									

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

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			đ ĥ			<u></u>	
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			А	
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	H	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capacit	y ratio		0.71									
Actuated Cycle Length (s)			90.0	Si	um of lost	t time (s)			34.0			
Intersection Capacity Utilization	n		71.6%	IC	CU Level o	of Service	è		С			
Analysis Period (min)			15									

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

	۶	-	\rightarrow	1	←	*	1	1	1	1	.↓	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		र्स	1		\$			≜ 15-			4ħ	
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			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		С	С		С			Α			С	
Approach Delay (s)		25.5			32.9			2.5			33.6	
Approach LOS		С			С			A			С	
Intersection Summary												
HCM 2000 Control Delay			21.8	Н	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capac	city ratio		0.68									
Actuated Cycle Length (s)			90.0	S	um of lost	time (s)			20.0			
Intersection Capacity Utilizat	ion		72.5%	IC	CU Level o	of Service			С			
Analysis Period (min)			15									
c Critical Lane Group												

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

	٦	\mathbf{r}	1	1	Ŧ	1		
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations	Y			41	tβ			
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	68			
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	С			С	А			
Approach Delay (s)	33.1			33.2	1.5			
Approach LOS	С			С	А			
Intersection Summary								
HCM 2000 Control Delay			14.7	H	CM 2000	Level of Service	В	
HCM 2000 Volume to Capac	city ratio		0.49					
Actuated Cycle Length (s)			90.0	Si	um of lost	time (s)	20.0	
Intersection Capacity Utilizat	tion		38.9%	IC	U Level c	of Service	Α	
Analysis Period (min)			15					

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

	۶	-	\rightarrow	1	←	*	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		ર્સ	1		\$			≜ 15-			- € †	
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		С	С		С			А			С	
Approach Delay (s)		28.9			28.0			2.0			29.1	
Approach LOS		С			С			А			С	
Intersection Summary												
HCM 2000 Control Delay			15.2	Н	CM 2000	Level of S	Service		В			
HCM 2000 Volume to Capacit	y ratio		0.54									
Actuated Cycle Length (s)			90.0	S	um of lost	time (s)			15.0			
Intersection Capacity Utilization	n		48.4%	IC	CU Level o	of Service			А			
Analysis Period (min)			15									
c Critical Lane Group												

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

	۶	\mathbf{r}	1	1	Ŧ	1		
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations	¥			4 †	A			
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	68			
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	С			С	А			
Approach Delay (s)	30.2			29.0	1.3			
Approach LOS	С			С	А			
Intersection Summary								
HCM 2000 Control Delay			16.4	H	CM 2000	Level of Service	В	
HCM 2000 Volume to Capaci	ity ratio		0.54					
Actuated Cycle Length (s)			90.0	Su	um of lost	time (s)	15.0	
Intersection Capacity Utilizati	on		52.3%	IC	U Level c	of Service	А	
Analysis Period (min)			15					

		TW	O-WAY STOP	CONTR	OL SU	MN	IARY				
General Information	า			Site Ir	nforma	atic	on				
Analyst		MLS		Interse	ction			IR-90 WB	Ram	nps &	N
Agency/Co.		LJB Inc.		luriodi	otion			Marginai	otriot	10	
Date Performed		3/2/2015						2024 Evic	sting (12 Condi	tion
Analysis Time Period		AM Peak	Hour		is real			2034 EXIS	sung (Jonun	
Project Description Cl	JY-90-	19.5/21.3									
East/West Street:				North/S	South St	reet	t: IR-90 W	/B Ramps			
Intersection Orientation:	Eas	t-West		Study F	Period (h	nrs):	: 0.25				
Vehicle Volumes ar	nd Ac	djustme	nts								
Major Street			Eastbound					Westbou	nd		
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
(veh/h)		0	114	0			54	103			0
Percent Heavy Vehicles		0					2				
Median Type				-	Undivi	ded					
RT Channelized				0							0
Lanes		0	2	0			0	2			0
Configuration			TR			LT	Т				
Upstream Signal			0					0			
Minor Street			Northbound					Southbou	Ind		
Movement		7	8	9			10	11			12
		L	Т	R			L	Т			R
Volume (veh/h)			550	190							
Peak-Hour Factor, PHF	_	1.00	0.92	0.92	0.92 1.00			1.00			1.00
lourly Flow Rate, HFR (veh/h)		0	597	206	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			Т	R							
Delay, Queue Length, a	nd Le	evel of Se	rvice								
Approach	Eas	tbound	Westbound	1	Vorthbou	und		S	outht	bound	
Movement		1	4	7	8		9	10	1	1	12
Lane Configuration			LT		Т		R				
v (veh/h)			54		597		206				
C (m) (veh/h)			1473		565		1002				
v/c			0.04		1.06		0.21				
95% queue lenath			0.11	·	17.10)	0.77				
Control Delay (s/veh)			7.5		80.6		9.5				
	7.5 A				F		<u>А</u>				
Approach Delay (s/yeh)				62 /							
Approach LOS					52. 4						
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	TW	O-WAY STOP	CONTR		MARY				
General Information	า		Site II	nformati	on				
Analyst	MLS	Interse	ection		IR-90 WE	8 Ramp	s & N	'	
Agency/Co.	LJB Inc.		Jurisdi	ction			strict 12	>	
Date Performed	3/2/2015		Analys	is Year		2034 Exis	stina Ca	nditio	n
Analysis Time Period	PM Peak	Hour				2004 220	ung oc	manne	
Project Description CL	JY-90-19.5/21.3								
East/West Street:			North/S	South Stree	et: IR-90 И	/B Ramps			
Intersection Orientation:	East-West		Study F	Period (hrs): 0.25				
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound				Westbou	nd		
Movement	1	2	3		4	5			6
	L	Т	R		L	<u> </u>			R
Volume (veh/h)	(00	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				Undivide	d				
RT Channelized			0					(0
Lanes	0	2	0	0 0				(0
Configuration		TR		LT	Т				
Upstream Signal					0				
Minor Street		Northbound				Southbou	ind		
Movement	7	8	9		10	11			12
	L	Т	R		L	Т			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	206 0		0		(0
Percent Heavy Vehicles	0	4	4		0	0		(2
Percent Grade (%)		0			-	0			
Flared Approach		N				N	1		
Storage		0				0			
DT Channelized	-		0						0
	-		1						<u>,</u>
Lanes	0	Z			0	0		(<u> </u>
		/	ĸ						
Delay, Queue Length, a	Level of Se	rvice		Jorthhour			outhha	und	
Approach	Eastbound	vestbound	7			10			12
	I	4	1	0 T	9	10			12
		LI		1	R				
v (ven/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	А				
Approach Delay (s/veh)				241.2					
Approach LOS				F					

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	TW	O-WAY STOP	CONTR	OLS	UMN	IARY					
General Information	า		Site I	nform	natio	on					
Analyst	MLS		Interse	ection			IR-90 WB	Off Ramp	& MLK		
Agency/Co.	LJB Inc.		Jurisdi	ction			ODOT Di	strict 12			
Date Performed	3/2/2015		Analys	is Yea	r		2034 Exis	ting Condi	tion		
Analysis Time Period	AM Peak	Hour									
Project Description CL	JY-90-19.5/21.3										
East/West Street: IR-90	WB Off Ramp		North/S	South S	Stree	t: Martin L	uther King	Jr Dr			
Intersection Orientation:	East-West		Study F	Period	(hrs)	: 0.25					
Vehicle Volumes ar	nd Adjustme	nts									
Major Street		Eastbound	_				Westbou	nd			
Movement	1	2	3			4	5		6		
	L	T	R			L	Т		R		
Volume (ven/h)	1.00	1.00	1.00			1100	0.02		100		
Hourly Flow Pate HEP	1.00	1.00	1.00			0.92	0.92		0.92		
(veh/h)	0	0	0			1195	0		108		
Percent Heavy Vehicles	0					4					
Median Type				Undi	videa	1					
RT Channelized			0						0		
Lanes	0	0	0			0	0		0		
Configuration						LTR	LR				
Upstream Signal		0					0				
Minor Street		Northbound					Southbou	nd			
Movement	7	8	9			10	11		12		
	L	Т	R			L	Т		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	<u>.</u>			
Flared Approach		N					N				
Storage		0					0				
RT Channelized			0						0		
Lanes	0	1	0			0	1		0		
Configuration		Т					Т				
Delay, Queue Length, a	nd Level of Se	rvice									
Approach	Eastbound	Westbound	I	Northb	ound		S	outhbound			
Movement	1	4	7	8		9	10	11	12		
Lane Configuration		LTR		Т				Т			
v (veh/h)		1195		130)			108			
C (m) (veh/h)		1610		7				8			
v/c		0.74		18.5	57			13.50			
95% queue length		7.54		18.0)7			15.17			
Control Delay (s/veh)		13.4		803	7			6530			
		R		- 555 F				F			
Approach Delay (a/yeh)					7			6520			
Approach Delay (s/ven)				093	1		6530				
Approach LOS				F				F			

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	TW	O-WAY STOP	CONTR		JMN	IARY			
General Information	า		Site I	nform	atio	on			
Analyst	MLS		Interse	ection			IR-90 WB	Off Ramp	& MLK
Agency/Co.	LJB Inc.		Jurisdi	ction			ODOT Di	strict 12	
Date Performed	3/2/2015		Analys	is Year	ſ		2034 Exis	sting Condit	tion
Analysis Time Period	PM Peak	Hour							
Project Description CL	JY-90-19.5/21.3								
East/West Street: IR-90	WB Off Ramp		North/S	South S	tree	t: Martin L	uther King	Jr Dr	
Intersection Orientation:	East-West		Study F	Period ((hrs)	: 0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
\	L	I	R			L	I		R 75
Volume (ven/n)	1.00	1.00	1.00			445	0.02		/5
Hourly Flow Pate HER	1.00	1.00	1.00			0.92	0.92).92
(veh/h)	0	0	0			483	0		81
Percent Heavy Vehicles	0					4			
Median Type		-		Undiv	videa	1			
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration						LTR	LR		
Upstream Signal		0					0		
Minor Street		Northbound					Southbou	Ind	
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)		75					130		
Peak-Hour Factor, PHF	1.00	0.92	1.00			1.00	0.92	1	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		Т					Т		
Delay, Queue Length, a	nd Level of Se	rvice							
Approach	Eastbound	Westbound	L	Northbo	ound		S	outhbound	
Movement	1	4	7	8		9	10	11	12
Lane Configuration		LTR		Т				Т	
v (veh/h)		483		81				141	
C (m) (veh/h)		1610		160)			169	
v/c		0.30		0.51	1			0.83	
95% aueue lenath		1.27		2.46	6			5.73	
Control Delav (s/veh)		8.2		48.6	3			85.9	
LOS		A		E	-			F	
Approach Delav (s/veh)	oach Delay (s/yeh)			E F 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

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Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations	¥			^	≜ 16			
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 #	ER 1	NR 1	NR 2	SB 1	SB 2			
Volume Total	12	102	2/1	0EE	440			
	43	192	341	800	449			
Volume Left	22	22	0	0	0			
	152	0 507	1700	1700	4700			
	153	527	1700	1700	1700			
Volume to Capacity	0.20	0.04	0.20	0.50	0.26			
Queue Lengin 95th (It)	20 27 7	J 1 O	0	0	0			
Long LOS	31.1	1.9	0.0	0.0	0.0			
Lane LOS	27 7	A		0.0				
Approach LOS	31.1 E	0.7		0.0				
	E							
Intersection Summary								
Average Delay			1.1					
Intersection Capacity Utilization			43.3%	IC	CU Level c	f Service	А	
Analysis Period (min)			15					

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

	≯	\rightarrow	1	1	Ŧ	-
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	¥			**	4 15	-
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	070	040	005			
vCu, unblocked vol	970	312	625			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	2 5	2.2	0.0			
	3.5	3.3	2.2			
pu queue free %	91	97	98			
civi capacity (ven/n)	245	663	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	С	Α				
Approach Delay (s)	16.3	0.4		0.0		
Approach LOS	С					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilizati	on		40.4%	IC	U Level c	f Service
Analysis Period (min)			15			

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

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲		1					A			- € †	
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			А							
Approach Delay (s)	267.7		0.0		0.3							
Approach LOS	F											
Intersection Summary												
Average Delay			58.2									
Intersection Capacity Utilizat	ion		76.3%	IC	CU Level o	of Service			D			
Analysis Period (min)			15									

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

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲		1					A			41	
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			А							
Approach Delay (s)	25.9		0.0		1.7							
Approach LOS	D											
Intersection Summary												
Average Delay			5.2									
Intersection Capacity Utilizatio	n		65.7%	IC	U Level o	of Service			С			
Analysis Period (min)			15									

SITE LAYOUT V Site: MLK @ N.Marginal/Lakeshore

Option 1 - (AM Peak) Roundabout



DELAY (CONTROL)

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

V 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	Α	F	D	С	E



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	Α	А	В	В	Α



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 F Total veh/h	lows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec_	Level of Service	95% Back of Veh	f Queue Dist ft_	Lane Config	Lane Length <u>ft</u>	Cap. Adj. %	Prob. Block. %
South: MLK D)r												
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	<mark>47.7</mark>
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: Lakesh	ore 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. Marg	ginal 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 (Akcelik 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

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LANE SUMMARY

₩ Site: MLK @ N.Marginal/Lakeshore - PM

Option 1 - (PM Peak) Roundabout

Lane Use ar	ane Use and Performance												
	Demand F Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Veh	[:] Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: MLK D)r												
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: Lakesh	nore 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. Marg	ginal 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 (Akcelik 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

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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 a	nd Perforr	nance)										
	Demand F Total	Flows HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Veh	f Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: MLK L)r												
Lane 1	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: Lakesho	ore												
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/W	/B 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. Marg	ginal 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

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LANE SUMMARY

₩ Site: MLK @ N.Marginal/Lakeshore -PM

Option 2 - (PM Peak) Roundabout

Lane Use ar	nd Perforr	nance)										
	Demand F Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back o Veh	f Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: MLK D)r	/0			,,,							,,,	
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: Lakesho	ore												
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/W	/B 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. Marg	ginal 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

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SITE LAYOUT

V Site: MLK @ N.Marginal/Lakeshore - PM

Option 3 - Greenway Study Option (PM Peak) Roundabout



LANE SUMMARY

V Site: MLK @ N.Marginal/Lakeshore

Option 3 - Greenway Study Option (AM Peak) Roundabout

Lane Use an	d Perforr	nance	;										
	Demand F Total	lows HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Veh	Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: MLK D	r												
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 ^ª	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: Lakesh	ore												
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. Marg	inal 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

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LANE SUMMARY

₩ Site: MLK @ N.Marginal/Lakeshore - PM

Option 3 - Greenway Study Option (PM Peak) Roundabout

Lane Use and	d Perforr	nance	;										
	Demand F Total	Flows HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Veh	Queue Dist	Lane Config	Lane Length	Cap. Adj. %	Prob. Block.
South: MLK Dr	ven/n	70	ven/n	v/C	70	560			11		п	70	70
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 I	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: Lakesho	ore												
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. Margi	nal 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

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	۲W		•			•
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	С	С	F	F		
Approach Delay (s)	16.3		Err	Err		
Approach LOS			F	F		
Intersection Summary						
Average Delay			1433.2			
Intersection Capacity Utili	zation		85.4%	IC	U Level o	of Service
Analysis Period (min)			15			
,						

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

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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	¥			^	≜ 16		
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	1000		4440				
vC, conflicting volume	1663	723	1446				
vC1, stage 1 conf vol							
VC2, stage 2 cont vol	4000	700	4440				
	1003	123	1440				
tC, single (s)	0.0	0.9	4.1				
(C, Z stage (S))	25	2.2	0.0				
r (S)	3.3 74	3.3 76	2.2				
p0 queue liee //	84	360	95 465				
	04	505	400				
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 Utilizat	tion		50.1%	IC	CU Level c	f Service	
Analysis Period (min)			15				

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

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4	1					•	1	ሻ	* *	
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	5.0	
Lane Util. Factor		0.95	0.95					1.00	1.00	1.00	0.95	
Frt		0.87	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1529	1504					1863	1583	1770	3539	
Flt Permitted		0.99	1.00					1.00	1.00	0.40	1.00	
Satd. Flow (perm)		1529	1504					1863	1583	744	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	0	322	0	0	0
Lane Group Flow (vph)	0	317	313	0	0	0	0	495	336	82	1283	0
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		15.1	15.1					26.2	26.2	26.2	26.2	
Effective Green, g (s)		15.1	15.1					26.2	26.2	26.2	26.2	
Actuated g/C Ratio		0.29	0.29					0.51	0.51	0.51	0.51	
Clearance Time (s)		5.0	5.0					5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		450	442					951	808	379	1807	
v/s Ratio Prot								0.27			c0.36	
v/s Ratio Perm		0.21	c0.21						0.21	0.11		
v/c Ratio		0.70	0.71					0.52	0.42	0.22	0.71	
Uniform Delay, d1		16.1	16.1					8.4	7.8	6.9	9.6	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.0	5.1					0.5	0.3	0.3	1.3	
Delay (s)		21.1	21.3					8.9	8.1	7.2	11.0	
Level of Service		С	С					А	А	А	В	
Approach Delay (s)		21.2			0.0			8.5			10.7	
Approach LOS		С			А			A			В	
Intersection Summary												
HCM 2000 Control Delay			12.2	Н	CM 2000	Level of S	Service		В			
HCM 2000 Volume to Capaci	ty ratio		0.71									
Actuated Cycle Length (s)			51.3	S	um of lost	t time (s)			10.0			
Intersection Capacity Utilizati	on		68.5%	IC	CU Level o	of Service			С			
Analysis Period (min)			15									
c Critical Lane Group												

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	N M		•			*
Volume (veh/h)	565	75	95	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	103	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	1321	1269
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0		1310	0	1321	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		0	100	0	0
cM capacity (veh/h)	1623		99	1085	0	105
Direction, Lane #	WB 1	WB 2	NB 1	SB 1		
Volume Total	409	286	103	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	1.04	1.35		
Queue Length 95th (ft)	45	45	163	248		
Control Delay (s)	8.6	7.1	182.6	283.2		
Lane LOS	А	А	F	F		
Approach Delay (s)	8.0		182.6	283.2		
Approach LOS			F	F		
Intersection Summary						
Average Delay			68.5			
Intersection Capacity Utiliz	ation		71.2%	IC	U Level o	of Service
Analysis Period (min)			15			

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

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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y		ľ	<u></u>	≜ †⊅		
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	NB 3	SB 1	SB 2	
Volume Total	217	22	312	312	402	353	
Volume Left	22	22	0	0	0	0	
Volume Right	196	0	0	0	0	152	
cSH	526	851	1700	1700	1700	1700	
Volume to Capacity	0.41	0.03	0.18	0.18	0.24	0.21	
Queue Length 95th (ft)	50	2	0	0	0	0	
Control Delay (s)	16.6	9.3	0.0	0.0	0.0	0.0	
Lane LOS	С	А					
Approach Delay (s)	16.6	0.3			0.0		
Approach LOS	С						
Intersection Summary							
Average Delay			2.4				
Intersection Capacity Utilization	ו		38.7%	IC	U Level o	f Service	А
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

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$	1					•	1	۲.	^	
Volume (vph)	45	0	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	5.0	
Lane Util. Factor		0.95	0.95					1.00	1.00	1.00	0.95	
Frt		0.87	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1535	1504					1863	1583	1770	3539	
Flt Permitted		0.99	1.00					1.00	1.00	0.40	1.00	
Satd. Flow (perm)		1535	1504					1863	1583	737	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	0	543	0	0	0	0	598	1364	207	592	0
RTOR Reduction (vph)	0	153	250	0	0	0	0	0	277	0	0	0
Lane Group Flow (vph)	0	146	43	0	0	0	0	598	1087	207	592	0
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		13.8	13.8					69.9	69.9	69.9	69.9	
Effective Green, g (s)		13.8	13.8					69.9	69.9	69.9	69.9	
Actuated g/C Ratio		0.15	0.15					0.75	0.75	0.75	0.75	
Clearance Time (s)		5.0	5.0					5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		226	221					1389	1180	549	2640	
v/s Ratio Prot								0.32			0.17	
v/s Ratio Perm		0.09	0.03						c0.69	0.28		
v/c Ratio		0.64	0.20					0.43	0.92	0.38	0.22	
Uniform Delay, d1		37.6	35.1					4.5	9.7	4.2	3.6	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		6.2	0.4					0.2	11.7	0.4	0.0	
Delay (s)		43.8	35.5					4.7	21.3	4.6	3.7	
Level of Service		D	D					А	С	Α	Α	
Approach Delay (s)		39.7			0.0			16.3			3.9	
Approach LOS		D			Α			В			Α	
Intersection Summary												
HCM 2000 Control Delay			17.5	Н	CM 2000	Level of S	Service		В			
HCM 2000 Volume to Capaci	ity ratio		0.87									
Actuated Cycle Length (s)			93.7	S	um of lost	time (s)			10.0			
Intersection Capacity Utilizati	on		113.5%	IC	CU Level o	of Service			Н			
Analysis Period (min)			15									
c Critical Lane Group												

	4	•	Ť	۲	1	Ļ		
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	<u>1</u>		•			•		
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 Grn Can (vnh)	1689		196			188		
v/s Ratio Prot	c0 53		c0 07			c0.06		
v/s Ratio Perm	00.00		00.01			00.00		
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	57		81			43		
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	В		D			D		
Intersection Summary								
HCM 2000 Control Delav			23.2	H	CM 2000	Level of Service	С	
HCM 2000 Volume to Capa	city ratio		0.79					
Actuated Cycle Length (s)	,		90.0	Si	um of lost	time (s)	15.0	
Intersection Capacity Utiliza	ation		63.1%	IC	U Level o	of Service	В	
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

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Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations	¥		5	**	41				
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		А	А	А				
Approach Delay (s)	37.2			2.1	4.5				
Approach LOS	D			А	А				
Intersection Summary									
HCM 2000 Control Delay			5.6	Н	CM 2000	Level of Service)	А	
HCM 2000 Volume to Capa	acity ratio		0.55						
Actuated Cycle Length (s)			90.0	S	um of lost	t time (s)		15.0	
Intersection Capacity Utiliza	ation		51.8%	IC	CU Level of	of Service		А	
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

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4	1					≜ 15		5	* *	
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					Α		В	В	
Approach Delay (s)		42.3			0.0			9.1			10.2	
Approach LOS		D			А			А			В	
Intersection Summary												
HCM 2000 Control Delay			16.6	Н	CM 2000	Level of S	Service		В			
HCM 2000 Volume to Capaci	ity ratio		0.63									
Actuated Cycle Length (s)			90.0	S	um of lost	time (s)			10.0			
Intersection Capacity Utilizati	on		65.3%	IC	CU Level o	of Service			С			
Analysis Period (min)			15									
c Critical Lane Group												

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Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	ካዣ		•			•		
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		
FIt 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	00.20		00.01			00.00		
v/c Ratio	0.41		0.46			0.70		
Uniform Delay d1	83		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 Delav			17.7	H	CM 2000	Level of Service	В	
HCM 2000 Volume to Capa	acity ratio		0.45					
Actuated Cycle Length (s)			90.0	Si	um of lost	time (s)	15.0	
Intersection Capacity Utiliza	ation		38.6%	IC	U Level d	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

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Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations	¥		5	**	A 1.				
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			
Adi, 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	-	Ŭ				
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 q/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 Grn Can (vnh)	155		394	2807	2158				
v/s Ratio Prot	c0.03		001	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		А	А	А				
Approach Delay (s)	38.7			1.5	3.4				
Approach LOS	D			А	А				
Intersection Summary									
HCM 2000 Control Delay			7.4	Н	CM 2000	Level of Service)	Α	
HCM 2000 Volume to Capa	acity ratio		0.32						
Actuated Cycle Length (s)			90.0	S	um of lost	t time (s)		15.0	
Intersection Capacity Utiliza	ation		40.4%	IC	CU Level o	of Service		А	
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

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4	1					≜ 16		5	44	
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					С		E	А	
Approach Delay (s)		39.1			0.0			20.5			16.3	
Approach LOS		D			А			С			В	
Intersection Summary												
HCM 2000 Control Delay			22.8	Н	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capacit	y ratio		0.82									
Actuated Cycle Length (s)			90.0	S	um of lost	time (s)			15.0			
Intersection Capacity Utilization	on		91.8%	IC	CU Level o	of Service			F			
Analysis Period (min)			15									
dr Defacto Right Lane. Rec	ode with	1 though	lane as a	right lane	Э.							

c Critical Lane Group



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

Movement	WB	NB	SB
Directions Served	LR	Т	Т
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

Maxamant	ND	CD	CD
woverneni	ND	SB	SD
Directions Served	Т	Т	Т
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	Т	TR	LT	Т
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	Т	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	Т	TR	Т	
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

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

Movement	WB	WB	NB	SB	
Directions Served	L	LR	Т	Т	
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	Т	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

EB	EB	NB	NB	SB	SB
L	R	Т	TR	LT	Т
790	799	7	57	116	133
755	769	0	9	33	20
903	784	7	40	101	95
750	750	289	289	302	302
93	98				
0	0				
	EB L 790 755 903 750 93 0	EB EB L R 790 799 755 769 903 784 750 750 93 98 0 0	EBEBNBLRT7907997755769090378477507502899398000	EBEBNBLRTTR79079975775576909903784740750750289289939800	EBEBNBNBSBLRTTRLT79079975711675576909339037847401017507502892893029398000

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

EB	NB	SB	SB
LR	LT	Т	TR
39	598	109	108
14	113	23	28
39	426	76	85
269	2210	85	85
		0	0
		3	3
	EB LR 39 14 39 269	EB NB LR LT 39 598 14 113 39 426 269 2210	EB NB SB LR LT T 39 598 109 14 113 23 39 426 76 269 2210 85 0 3 3

Network Summary

Network wide Queuing Penalty: 12

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

Movement	WB	WB	NB	SB
Directions Served	L	LR	Т	Т
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	Т
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	Т	TR	Т	L	Т	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	

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Intersection: 8: MLK Jr Dr & N Marginal Rd

Movement	EB	NB	NB	SB
Directions Served	LR	L	Т	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	Т	TR	Т	Т
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

Arterial Level of Service: NB MLK Jr Dr

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	
IR-90 EB On Ramp	3	6.6	13.4	0.1	18	
N Marginal Rd	2	2.1	9.4	0.1	26	
IR-90 WB On Ramp	5	0.0	1.6	0.0	38	
IR-90 WB Off Ramp	1	16.2	21.9	0.0	8	
Total		24.9	46.4	0.2	16	

Arterial Level of Service: SB MLK Jr Dr

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	
IR-90 WB On Ramp	5	13.4	18.4	0.0	10	
N Marginal Rd	2	9.3	11.5	0.0	5	
IR-90 EB Off Ramp	3	28.3	35.4	0.1	7	
	12	9.1	16.1	0.1	15	
Total		60.2	81.4	0.2	9	

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

Movement	WB	NB	SB
Directions Served	LR	Т	Т
Maximum Queue (ft)	587	77	158
Average Queue (ft)	109	32	52
95th Queue (ft)	554	61	124
Link Distance (ft)	1208	177	582
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: MLK Jr Dr & N Marginal Rd

Movement	EB	NB	SB	SB
Directions Served	LR	L	Т	TR
Maximum Queue (ft)	209	84	108	63
Average Queue (ft)	53	22	32	17
95th Queue (ft)	173	73	120	81
Link Distance (ft)	786		18	18
Upstream Blk Time (%)			17	9
Queuing Penalty (veh)			51	28
Storage Bay Dist (ft)		100		
Storage Blk Time (%)		5		
Queuing Penalty (veh)		15		

Intersection: 3: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp

Movement	EB	EB	NB	NB	SB	SB	SB
Directions Served	L	R	Т	TR	L	Т	Т
Maximum Queue (ft)	710	704	49	94	120	378	353
Average Queue (ft)	365	213	7	39	74	129	111
95th Queue (ft)	<mark>792</mark>	669	<mark>33</mark>	<mark>91</mark>	142	413	380
Link Distance (ft)	750	750	289	289		302	302
Upstream Blk Time (%)	14	13				25	16
Queuing Penalty (veh)	0	0				73	48
Storage Bay Dist (ft)					100		
Storage Blk Time (%)					33	9	
Queuing Penalty (veh)					92	3	

Intersection: 5: MLK Jr Dr & IR-90 WB On Ramp

Movement	SB	SB
Directions Served	Т	Т
Maximum Queue (ft)	152	127
Average Queue (ft)	41	35
95th Queue (ft)	173	151
Link Distance (ft)	177	177
Upstream Blk Time (%)	10	6
Queuing Penalty (veh)	29	17
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: MLK Drive & Broad Ave

Movement	FB	NB	NB	SB	B12	B12
Directions Served			т		T	512
Directions Served	LR	L	I	IR	I	
Maximum Queue (ft)	61	50	632	153	268	126
Average Queue (ft)	18	6	182	43	58	19
95th Queue (ft)	49	31	<mark>504</mark>	140	272	141
Link Distance (ft)	276		2210	85	289	289
Upstream Blk Time (%)				2	9	1
Queuing Penalty (veh)				22	47	3
Storage Bay Dist (ft)		100				
Storage Blk Time (%)			6			
Queuing Penalty (veh)			1			

Network Summary

Network wide Queuing Penalty: 428

Arterial Level of Service: NB MLK Jr Dr

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	
IR-90 EB On Ramp	3	7.7	14.7	0.1	17	
N Marginal Rd	2	1.7	8.8	0.1	27	
IR-90 WB On Ramp	5	0.1	1.7	0.0	38	
IR-90 WB Off Ramp	1	11.8	17.3	0.0	10	
Total		21.3	42.4	0.2	17	

Arterial Level of Service: SB MLK Jr Dr

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	
IR-90 WB On Ramp	5	3.0	8.2	0.0	22	
N Marginal Rd	2	0.5	2.7	0.0	23	
IR-90 EB Off Ramp	3	7.8	15.1	0.1	16	
	12	2.0	9.0	0.1	27	
Total		13.4	35.0	0.2	21	

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

Movement	WB	WB	NB	SB
Directions Served	L	LR	Т	Т
Maximum Queue (ft)	4	25	70	80
Average Queue (ft)	0	2	31	45
95th Queue (ft)	0	15	60	72
Link Distance (ft)	1209	1209	171	576
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: MLK Jr Dr & N Marginal Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	121	48	18
Average Queue (ft)	52	8	1
95th Queue (ft)	87	33	10
Link Distance (ft)	780	307	18
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: MLK Jr Dr & IR-90 EB Off Ramp/IR-90 EB On Ramp

Movement	EB	EB	NB	SB	SB	SB
Directions Served	LTR	R	Т	L	Т	Т
Maximum Queue (ft)	183	160	154	149	132	139
Average Queue (ft)	88	39	79	70	54	72
95th Queue (ft)	<mark>153</mark>	<mark>101</mark>	<mark>130</mark>	125	103	119
Link Distance (ft)	752	752	300	307	307	307
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: MLK Jr Dr & IR-90 WB On Ramp

Movement	NB
Directions Served	R
Maximum Queue (ft)	3
Average Queue (ft)	0
95th Queue (ft)	2
Link Distance (ft)	18
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 13: MLK Drive & Broad Ave

Movement	FR	NR	SB	SB
Wovernerit	LD		50	00
Directions Served	LR	LT	Т	TR
Maximum Queue (ft)	56	1105	81	98
Average Queue (ft)	15	238	17	15
95th Queue (ft)	44	743	57	61
Link Distance (ft)	269	2210	85	85
Upstream Blk Time (%)		0	0	0
Queuing Penalty (veh)		0	1	2
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: Bend

Movement	EB
Directions Served	Т
Maximum Queue (ft)	169
Average Queue (ft)	6
95th Queue (ft)	89
Link Distance (ft)	368
Upstream Blk Time (%)	0
Queuing Penalty (veh)	1
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 3



	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	r	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / Ea West of E ODOT Di 2034 Exis	astbound 555th St strict 12 sting Condition
Project Description CUY-	90-19.5/21.3				
Oper.(LOS)		D	es.(N)	Plann	ing Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT. K	3975	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs_P	0.94 4 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f _ρ Ε _Τ	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1	1.2)] 0.980	
Speed Inputs			Calc Speed Adj and F	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f.w		mph
Number of Lanes, N	4		f ₁		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	e Measures		Design (N)		
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x f _{uv}		<u>Design (N)</u> Design LOS		
x f _p) S	60.0	pc/h/ln mph	v _p = (V or DDHV) / (PHF x x f _p) S	N x f _{HV}	pc/h/ln
$D = v_p / S$	18.0	pc/mi/ln	D = v / S		nc/mi/ln
LOS	В		Required Number of Lanes	, N	portini
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design l	nber of lanes S - Speed urly volume D - Density ow rate FFS - Free-flow speed Level of service BFFS - Base free-flow Directional design hour volume			11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	r	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / Ea West of E ODOT Di 2034 Exis	astbound 55th St strict 12 sting Condition
Project Description CUY-	90-19.5/21.3				
Oper.(LOS)		D	es.(N)	Planr	iing Data
Flow Inputs					
Volume, V AADT Deale Un Dean of AADT K	5480	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f _p E _T	1.00 1.5		E _R f _{ulv} = 1/[1+P _T (E _T - 1) + P _P (E _P - 1	1.2)10.980	
Speed Inputs			Calc Speed Adi and F	FS	
Lane Width		ft			
Rt-Side Lat Clearance		ft	f		moh
Number of Lanes, N	4		f		mph
Total Ramp Density, TRD		ramps/mi	LC TRD Adjustment		mph
FFS (measured)	60.0	mph	FES	60.0	mph
Base free-flow Speed, BFFS		mph		00.0	mpn
LOS and Performance	e Measures		Design (N)		
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	۷ x f _{нv}		<u>Design (N)</u> Design LOS		
x f _p) S	60.0	pc/h/ln mph	v _p = (V or DDHV) / (PHF x x f _p) S	N x f _{HV}	pc/h/ln
$D = v_p / S$	24.8	pc/mi/ln	$D = v_{\mu} / S$		pc/mi/ln
LOS	С		Required Number of Lanes	s, N	pointin
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design l	S - Speed D - Densit FFS - Free BFFS - Bas	d flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Г	
			1		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	r	Highway/Direction of Travel From/To Jurisdiction Analysis Year	IR-90 / Ea Between E ODOT Dis 2034 Exis	stbound E 55th Ramps strict 12 ting Condition
Project Description CUY-	90-19.5/21.3				
✓ Oper.(LOS)		D	es.(N)	🗌 Planni	ing Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D	3660	veh/h veh/day veh/h	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R General Terrain: Grade % Length	0.94 4 0 Level mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f _ρ Ε _τ	1.00 1.5		E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2]0.980	
Speed Inputs			Calc Speed Adj and F	FS	
Lane Width		ft	· · ·		
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	4		'LW f		mph
Total Ramp Density, TRD		ramps/mi	'LC TRD Adjustment		mph
FFS (measured)	60.0	mph		60.0	mph
Base free-flow Speed, BFFS		mph		00.0	трп
LOS and Performance	e Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x f x f _p) S D = v _p / S LOS	N x f _{HV} 993 60.0 16.5 B	pc/h/ln mph pc/mi/ln	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x N x f _p) S D = v _p / S Required Number of Lanes	N x f _{HV} , N	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design I	S - Speed D - Densit FFS - Free BFFS - Bas hour volume	l :y flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 7 11-3	f 11-13 f 1 11-2,	_{LW} - Exhibit 11-8 _{LC} - Exhibit 11-9 IRD - Page 11-11

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	BASIC FRE	EWAY SE	GMENTS WORKSHEE	<u>т </u>	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	ır	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / E Between ODOT D 2034 Ex	Eastbound DE 55th Ramps District 12 Isting Condition
Project Description CUY-	90-19.5/21.3				
✓ Oper.(LOS)			es.(N)	🗌 Plan	ning Data
Flow Inputs					
Volume, V AADT	5270	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f _p	1.00		E _R	1.2	
Ε _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 F	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{I W}		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 Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x I	N x f _{HV 1430}	nc/h/ln	Design (N) Design LOS v. = (V.or DDHV) / (PHF x.)	Nxf	
x f _p)	1100	po/1/11	$\mathbf{x} \mathbf{f}_{r}$)	HV HV	pc/h/ln
S	60.0	mph	S P'		mph
$D = v_p / S$	23.8	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LOS	С		Required Number of Lanes	, N	·
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Densit FFS - Free BFFS - Bas hour volume	d ty -flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst	MLS		Highway/Direction of Trave	l IR-90 / E	Eastbound
Agency or Company	LJB Inc.		From/To	72nd	TE SSIT and E
Date Performed	2/27/2015		Jurisdiction	ODOT E	District 12
Analysis Time Period	AM Peak Hou	ur	Analysis Year	2034 Ex	isting Condition
Project Description CUY-	90-19.5/21.3				
Oper.(LOS)			Des.(N)	Plan	ining Data
Flow Inputs					
Volume, V	4030	veh/h	Peak-Hour Factor, PHF	0.94	
		ven/uay	$\frac{1}{10000000000000000000000000000000000$	4	
Peak-Hr Prop. of AAD1, K			%RVS, P _R Conoral Torrain:	U	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f	1.00		Ep	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 _{I W}		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,		mph		••••	
I OS and Performanc	o Moasuros		Design (N)		
	c measures				
Operational (LOS)			Design (N)		
v _n = (V or DDHV) / (PHF x	N x f _{HV}				
x f _n)	1093	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N X I _{HV}	pc/h/ln
S	60.0	mph	x t _p)		
$D = v_p / S$	18.2	pc/mi/ln	S (C		mph
LOS	С		$D = v_p / S$		pc/mi/ln
			Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d	E _p - Exhibits 11-10, 11-12		f Exhibit 11-8
V - Hourly volume	D - Densi	ity	F ₋ - Exhibits 11-10 11-11	11-13	f Fxhibit 11-9
v _p - Flow rate	FFS - Free	e-flow speed	f - Page 11-18		TRD - Page 11-11
LOS - Level of service	BFFS - Ba	se free-flow	IOS S FFS v - Exhibits	11-2	The rage fi-fi
speed	hourvolume		11-3	· · ∠ ,	
ידוסט - virectional design					

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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	T	
General Information			Site Information		
Analyst	MLS		Highway/Direction of Trave	IR-90/E	astbound
Agency or Company	LJB Inc.		From/To	72nd	E SSUI AND E
Date Performed	2/27/2015		Jurisdiction	ODOT D	istrict 12
Analysis Time Period	PM Peak Hou	ır	Analysis Year	2034 Exi	sting Condition
	90-19.5/21.3				ning Data
			Jes.(N)	Plan	ning Data
	6030	veh/h	Peak-Hour Factor PHF	0.04	
AADT	0030	veh/dav	%Trucks and Buses. P_{τ}	0.94 4	
Peak-Hr Prop. of AADT. K			%RVs. P _P	0	
Peak-Hr Direction Prop, D			General Terrain:	Level	
DDHV = AADT x K x D		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f _p	1.00		E _R	1.2	
Ε _T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$)] <i>0.980</i>	
Speed Inputs			Calc Speed Adj and I	FS	
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,		mph			
BFF5	o Mogeuroe	•	Docian (N)		
Operational (LOS)			Design (N)		
v _n = (V or DDHV) / (PHF x I	N x f _{HV}				
x f _n)	1636	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N X I _{HV}	pc/h/ln
ร์	60.0	mph	хт _р)		
$D = v_p / S$	27.3	pc/mi/ln	S D = w / C		mpn
LOS	D		$D = v_p / S$		pc/mi/ln
			Required Number of Lanes	5, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d	E _R - Exhibits 11-10, 11-12		f _{r.w} - Exhibit 11-8
V - Hourly volume	D - Densi	ty	E _τ - Exhibits 11-10, 11-11,	11-13	f _{LC} - Exhibit 11-9
v _p - Flow rate	FFS - Free	-flow speed	f _n - Page 11-18		 TRD - Page 11-11
LOS - Level of service	BFFS - Ba	se tree-flow	LOS, S, FFS, v _n - Exhibits	11-2,	Ŭ
DDHV - Directional design	hour volume		11-3		
$v_p = (V \text{ or DDHV}) / (PHF x I x f_p)$ S D = v_p / S LOS Glossary N - Number of lanes V - Hourly volume v_p - Flow rate LOS - Level of service speed DDHV - Directional design	N x f _{HV} 1636 60.0 27.3 D S - Spee D - Densi FFS - Free BFFS - Bas	pc/h/ln mph pc/mi/ln d ty -flow speed se free-flow	$v_{p} = (V \text{ or DDHV}) / (PHF x$ $x f_{p})$ S $D = v_{p} / S$ Required Number of Lanes Factor Location $E_{R} - Exhibits 11-10, 11-12$ $E_{T} - Exhibits 11-10, 11-11,$ $f_{p} - Page 11-18$ LOS, S, FFS, v_{p} - Exhibits 11-3	N x f _{HV} 5, N 11-13 11-2,	pc/h/ln mph pc/mi/ln f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Т	
			Cite Information		
General Information					
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	r	Highway/Direction of Trave From/To Jurisdiction Analysis Year	Between ODOT Dis 2034 Exis	astbound E 72nd Ramps strict 12 sting Condition
Project Description CUY-	90-19.5/21.3		, ,		<u> </u>
Oper.(LOS)		D	es.(N)	Plann	ing Data
Flow Inputs					
Volume, V AADT	3960	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f _ρ Ε _Τ	1.00 1.5		E_{R} $f_{HV} = 1/[1+P_{T}(E_{T} - 1) + P_{R}(E_{R} - 1)]$	1.2)] 0.980	
Speed Inputs			Calc Speed Adj and F	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	4		fu o		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	e Measures		Design (N)		
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x f _{HV}		<u>Design (N)</u> Design LOS		
x f _p) S	¹¹ 1074 60.0	pc/h/ln mph	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/In
$D = v_p / S$	17.9	pc/mi/ln	S		mph
LOS	В	P	D = v _p / S Required Number of Lanes	, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design l	S - Speed D - Densit FFS - Free BFFS - Bas	flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Т	
			Cite Information		
General Information	<u> </u>		Site Information		a the a sup of
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	r	From/To Jurisdiction Analysis Year	Between ODOT Di 2034 Exis	astibound E 72nd Ramps strict 12 sting Condition
Project Description CUY-	90-19.5/21.3	-			
Oper.(LOS)		D	es.(N)	Plann	ing Data
Flow Inputs					
Volume, V AADT	5930	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f _ρ Ε _Τ	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)	1.2)] 0.980	
Speed Inputs			Calc Speed Adj and F	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	4		fuc		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			r
LOS and Performance	e Measures		Design (N)		
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x f _{нv}		<u>Design (N)</u> Design LOS		
x f _p) S	60.0	pc/h/ln mph	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln
$D = v_p / S$	26.8	pc/mi/ln	S		mph
LOS	D	·	D = v _p / S Required Number of Lanes	, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design l	S - Speed D - Densit FFS - Free BFFS - Bas	d flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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General Information			Site information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	r	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / Ea Between ODOT Di 2034 Exis	astbound MLK Ramps strict 12 sting Condition
Project Description CUY-	90-19.5/21.3		, ,		<u> </u>
Oper.(LOS)		D	es.(N)	Plann	ning Data
Flow Inputs					
Volume, V AADT Rock Hr Bron, of AADT, K	3395	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %P\/s_P	0.94 4	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f _p E _T	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)	1.2)] 0.980	
Speed Inputs			Calc Speed Adj and F	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f		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	e Measures		Design (N)		
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	۸ x f		<u>Design (N)</u> Design LOS		
x f _p)	° 921	pc/h/ln	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln
D = y / S	15 A	nc/mi/ln	S		mph
LOS	B	portini	D = v _p / S Required Number of Lanes	, N	pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design l	S - Speed D - Densit FFS - Free- BFFS - Bas	d ty -flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Т	
			Cite Information		
General Information	<u> </u>		Site Information		a the a sure of
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	ır	From/To Jurisdiction Analysis Year	Between ODOT Dis 2034 Exis	ASTOOUND MLK Ramps strict 12 string Condition
Project Description CUY-	90-19.5/21.3		,		<u> </u>
✓ Oper.(LOS)		D	es.(N)	🗌 Plann	ing Data
Flow Inputs					
Volume, V AADT	5545	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f _ρ Ε _τ	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1	1.2)] 0.980	
Speed Inputs			Calc Speed Adj and I	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f		mph
Number of Lanes, N	4		f. o		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		00.0	
LOS and Performance	e Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x I	N x f _{HV 4504}	n o /h //n	Design (N) Design LOS	Nyf	
x f _p) S D = v _p / S LOS	60.0 25.1 C	mph pc/mi/ln	$v_p = (v \text{ of DDTV}) / (r \text{ m x})$ x f _p) S D = v _p / S Required Number of Lanes	s, N	pc/h/ln mph pc/mi/ln
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design I	S - Speed D - Densit FFS - Free BFFS - Bas hour volume	d ty -flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 1 - 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

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	BASIC FRE	EWAY SEC	GMENTS WORKSHEE	Г	
0			0:4-4-6		
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	r	Highway/Direction of Travel From/To Jurisdiction Analysis Year	IR-90 / Ea East of M ODOT Dis 2034 Exis	astbound LK strict 12 sting Condition
Project Description CUY-	90-19.5/21.3		•		
Oper.(LOS)		D	es.(N)	Plann	ing Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	4015	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R	0.94 4 0	
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	mi	
Calculate Flow Adjus	tments				
f _p	1.00		E _R	1.2	
Ε _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 F	FS	
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	e Measures		Design (N)		
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x f _{HV} (acc		<u>Design (N)</u> Design LOS		
x f _p)	1089	pc/n/in	$v_p = (V \text{ or } DDHV) / (PHF X I x f_p)$	N X T _{HV}	pc/h/ln
5 D=v /S	00.0 19.1	npn nc/mi/ln	S		mph
LOS	С С	permini	D = v _p / S Required Number of Lanes	. N	pc/mi/ln
Glossary			Factor Location	-	
N - Number of lanes	S - Sneer	4			
V - Hourly volume	D - Densit	v	E _R - Exhibits 11-10, 11-12	11.10	f _{LW} - Exhibit 11-8
v - Flow rate	FFS - Free	-flow speed	E_{T} - Exhibits 11-10, 11-11,	11-13	r _{LC} - Exhibit 11-9
LOS - Level of service speed	BFFS - Bas	se free-flow	LOS, S, FFS, v _p - Exhibits ²	11-2,	тко - Page 11-11
DDHV - Directional design	nour volume		11-3		

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	BASIC FRE	EWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	ır	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / E East of N ODOT D 2034 Exi	astbound ILK istrict 12 sting Condition
Project Description CUY-	90-19.5/21.3				
Oper.(LOS)			es.(N)	Plan	ning Data
				0.01	
Volume, V AADT	6830	ven/h veh/day	%Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
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 I	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f ₁ C		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			Г
LOS and Performanc	e Measures		Design (N)		
Operational (LOS) v = (V or DDHV) / (PHF x)	N x f		<u>Design (N)</u> Design LOS		
$x f_p$	1853	pc/h/ln	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln
	58.8 21 E	mpn na/mi/ln	S		mph
LOS	51.5 D	pc/m/m	D = v _p / S Required Number of Lanes	. N	pc/mi/ln
Glossary			Factor Location	,	
N - Number of lanes		4			
	D - Densi	u tv	E _R - Exhibits 11-10, 11-12		f _{LW} - Exhibit 11-8
v Flow rate	FFS - Free	-flow speed	E _T - Exhibits 11-10, 11-11,	11-13	t _{LC} - Exhibit 11-9
LOS - Level of service	BFFS - Bas	se free-flow	t _p - Page 11-18 LOS, S, FFS, v _p - Exhibits	11-2,	TRD - Page 11-11
DDHV - Directional design	hour volume		11-3		

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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	Г	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	ur	Highway/Direction of Travel From/To Jurisdiction Analysis Year	IR-90 / Ea Between ODOT Dis 2034 Buil	astbound E.72nd and MLK strict 12 d
Project Description CUY-	90-19.5/21.3				
Oper.(LOS)			Des.(N)	🗌 Plann	ing Data
Flow Inputs					
Volume, V AADT	3960	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
f _p	1.00		E _R	1.2	
Ε _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 F	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{I W}		mph
Number of Lanes, N	4		f _{IC}		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 Performanc	e Measures	1	Design (N)		
Operational (LOS)	N v f		<u>Design (N)</u> Design LOS		
$x_p = (v of D b f v) / (i f f x f)$	1074 No. 1074	pc/h/ln	v _p = (V or DDHV) / (PHF x f x f _n)	N x f _{HV}	pc/h/ln
S D = w / C	60.0	mph	S		mph
$D = V_p / S$	17.9	pc/mi/ln	$D = v_p / S$		pc/mi/ln
105	В		Required Number of Lanes	, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design	S - Spee D - Densi FFS - Free BFFS - Ba hour volume	d ity ⊱flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 7 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11

	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / E Betweer ODOT E 2034 Bu	Eastbound n E.72nd and MLK District 12 nild
Project Description CUY-	90-19.5/21.3				
Oper.(LOS)			Des.(N)	Plan	ning Data
Flow Inputs					
Volume, V AADT	5930	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
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 I	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{IW}		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 Performanc	e Measures	5	Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x	N x f _{HV 1609}	nc/h/ln	Design (N) Design LOS v. = (V. or DDHV) / (PHE x	Nyf	
x f _p)	60.0	ponnin	$x_p = (v or b b f v) / (r r r x)$	HV	pc/h/ln
D = y / S	26.8	nc/mi/ln	S		mph
LOS	20.0 D	pe/mi/m	D = v _p / S Required Number of Lanes	3. N	pc/mi/ln
Glossarv			Factor Location		
N - Number of lanes	S - Spee	d			
V - Hourly volume	D - Dens	- itv	E_{R} - Exhibits 11-10, 11-12		f _{LW} - Exhibit 11-8
v - Flow rate	FFS - Free	-flow speed	E_{T} - EXNIDITS 11-10, 11-11,	11-13	T _{LC} - Exhibit 11-9
LOS - Level of service speed	BFFS - Ba	se free-flow	LOS, S, FFS, v _p - Exhibits	11-2,	IRD - Page 11-11
DDHV - Directional design	hour volume		11-3		

BASIC FREEWAY SEGMENTS WORKSHEET					
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	avel IR-90 / Westbound East of MLK ODOT District 12 2034 Existing Condition	
Project Description CUY-	90-19.5/21.3				
Oper.(LOS)			es.(N)	Plan	ning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT, K	7140	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R	0.94 4 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
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 F	FS	
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 Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v = (V or DDHV) / (PHF x l	N x f		<u>Design (N)</u> Design LOS		
$x f_p$	1937	pc/h/ln	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln
	57.9	mpn	S		mph
$D = v_p / S$	33.4 D	pc/mi/in	$D = v_p / S$		pc/mi/ln
203	D		Required Number of Lanes	, N	
Glossary			Factor Location		
N - Number of lanes	S - Speed	b	E ₂ - Exhibits 11-10 11-12		f Exhibit 11-8
V - Hourly volume	D - Density FFS - Free-flow speed		$E_{\rm T}$ - Exhibits 11-10, 11-11.	11-13	f_{LW} - Exhibit 11-9
v _p - Flow rate			f - Page 11-18		TRD - Page 11-11
LOS - Level of service speed	BFFS - Base free-flow		LOS, S, FFS, v _p - Exhibits	11-2,	
DDHV - Directional design	hour volume		11-3		

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BASIC FREEWAY SEGMENTS WORKSHEET					
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	ravel IR-90 / Westbound East of MLK ODOT District 12 2034 Existing Condition	
	90-19.5/21.5				aina Data
			es.(N)		ning Data
	4620	voh/h	Poak Hour Easter DHE	0.04	
AADT	4030	veh/day	%Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
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 I	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f, w		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> v _~ = (V or DDHV) / (PHF x I	N X fuy		<u>Design (N)</u> Design LOS		
x f _p)	^{¬¬} 1256	pc/h/ln	v _p = (V or DDHV) / (PHF x x f)	N x f _{HV}	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	С		Required Number of Lanes	s, N	
Glossary			Factor Location		
N - Number of lanes	S - Speed	d	E Evhibito 11 10 11 12		f Evhibit 11.9
V - Hourly volume	D - Density FFS - Free-flow speed		$E_{\rm R}^{-}$ Exhibits 11-10, 11-12	11_13	fExhibit 11-9
v _p - Flow rate			f - Page 11-18	11-13	LC = LAIIIDIL 11-9 TRD - Page 11-11
LOS - Level of service speed	BFFS - Base free-flow		LOS, S, FFS, v_p - Exhibits	11-2,	age 11-11
DDHV - Directional design	hour volume		11-3		

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BASIC FREEWAY SEGMENTS WORKSHEET						
General Information			Site Information			
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hour		Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / V Betweer ODOT D 2034 Ex	<i>IR-90 / Westbound Between MLK Ramps ODOT District 12 2034 Existing Condition</i>	
Project Description CUY-	90-19.5/21.3					
✓ Oper.(LOS)			es.(N)	Plan	ining Data	
Flow Inputs						
Volume, V AADT	5940	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4		
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi		
Calculate Flow Adjus	tments					
f _p	1.00		E _R	1.2		
Ε _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 F	FS		
Lane Width		ft				
Rt-Side Lat. Clearance		ft	f, w		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 Performanc	e Measures		Design (N)			
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x l x f _p) S	N x f _{HV} 1611 60.0	pc/h/ln mph	<u>Design (N)</u> Design LOS v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln	
D = v _p / S	26.9	pc/mi/ln	D = y / S		npn nc/mi/ln	
LOS	D		Required Number of Lanes	, N	pc/m/m	
Glossary			Factor Location			
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Densi FFS - Free BFFS - Bas hour volume	d ty -flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11	

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			-			
		Site information				
MLS LJB Inc. 2/27/2015 PM Peak Hour		Highway/Direction of Travel IR-90 / WestbFrom/ToBetween MLKJurisdictionODOT DistrictAnalysis Year2034 Existing		ound Ramps 12 Condition		
0-19.5/21.3						
	🗌 D	es.(N)	🗌 Planning 🛛	Data		
4110	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs_P	0.94 4			
	veh/h	General Terrain: Grade % Length Up/Down %	Level mi			
ments		-				
1.00 1.5		E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)$	1.2]0.980			
Speed Inputs			Calc Speed Adj and FFS			
	ft					
	ft	f _{LW}		mph		
4		f _{LC}		mph		
	ramps/mi	TRD Adjustment		mph		
60.0	mph	FFS	60.0	mph		
	mph					
Measures		Design (N)				
x fuv		<u>Design (N)</u> Design LOS				
^{nv} 1115	pc/h/ln	v _p = (V or DDHV) / (PHF x f x f _p)	N x f _{HV}	pc/h/ln		
18.6	nc/mi/ln	S		mph		
C	po/mi/m	D = v _p / S Required Number of Lanes	, N	pc/mi/ln		
		Factor Location				
S - Speed D - Densit FFS - Free- BFFS - Bas	y flow speed e free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 1 11-3	f _{LW} - 11-13 f _{LC} - TRD 11-2,	Exhibit 11-8 Exhibit 11-9 - Page 11-11		
	MLS LJB Inc. 2/27/2015 PM Peak Hour 0-19.5/21.3 4 110 10 1.5 1.00 1.5 4 60.0 18.6 C S - Speed D - Densit FFS - Free- BFFS - Bas our volume	MLS LJB Inc. 2/27/2015 PM Peak Hour 0-19.5/21.3 D 4110 veh/h veh/day veh/h ments 1.00 1.5 ft ft 4 60.0 mph mph mph Measures X f _{HV} 1115 pc/h/ln 60.0 mph 18.6 pc/mi/ln C S - Speed D - Density FFS - Free-flow speed BFFS - Base free-flow our volume	Site InformationMLSHighway/Direction of Travel From/ToLJB Inc.From/To2/27/2015JurisdictionPM Peak HourAnalysis Year0-19.5/21.3Des.(N)4110veh/hPeak-Hour Factor, PHF %Trucks and Buses, PT %RVs, PR General Terrain: veh/h4110veh/hPeak-Hour Factor, PHF %Trucks and Buses, PT %RVs, PR General Terrain: veh/h1.00ER HV1.00ER HV1.5ft 	Site InformationMLS LJB Inc. 2/27/2015Highway/Direction of Travel /R-90 / Westbuck Between MLK 2/27/2015PM Peak Hour 2/27/2015Jurisdiction JurisdictionODOT District Between MLK 2/27/2015PM Peak Hour 2/19.5/21.3Des.(N)Planning D4110veh/h veh/dayPeak-Hour Factor, PHF % Trucks and Buses, PT % Truc		

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	BASIC FREEWAY SEGMENTS WORKSHEET								
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	r	Highway/Direction of Trave From/To Jurisdiction Analysis Year	/estbound E 72nd Ramps strict 12 sting Condition					
Project Description CUY-	90-19.5/21.3								
Oper.(LOS)		D	es.(N)	Planr	ning Data				
Flow Inputs									
Volume, V AADT Peak-Hr Prop. of AADT, K	6160	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs. P _D	0.94 4 0					
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi					
Calculate Flow Adjus	tments								
f _p E _T	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1	1.2)] 0.980					
Speed Inputs			Calc Speed Adj and I	FS					
Lane Width		ft							
Rt-Side Lat. Clearance		ft	f _{I W}		mph				
Number of Lanes, N	4		f		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			ľ				
LOS and Performanc	e Measures		Design (N)						
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x f _{uv}		<u>Design (N)</u> Design LOS						
x f _p)	¹¹⁰ 1671	pc/h/ln	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln				
D = y / S	27.9	nc/mi/ln	S		mph				
LOS	D	pormin	D = v _p / S Required Number of Lanes	, N	pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed	S - Speed D - Densit FFS - Free BFFS - Bas	d ty -flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11				
וויע - טוופכווטראו design	nour volume								

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	BASIC FREEWAY SEGMENTS WORKSHEET								
			Cite Information						
	MIS		Site Information		laathaund				
Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	r	From/To Jurisdiction Analysis Year	Between ODOT Di 2034 Exis	E 72nd Ramps strict 12				
Project Description CUY-	90-19.5/21.3	1		200 T EXIC					
✓ Oper.(LOS)		D	es.(N)	Planr	ning Data				
Flow Inputs									
Volume, V AADT	4490	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4					
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi					
Calculate Flow Adjus	tments								
f _ρ Ε _Τ	1.00 1.5		E_{R} $f_{HV} = 1/[1+P_{T}(E_{T} - 1) + P_{R}(E_{R} - 1)]$	1.2)] 0.980					
Speed Inputs			Calc Speed Adj and F	FS					
Lane Width		ft							
Rt-Side Lat. Clearance		ft	f		mph				
Number of Lanes, N	4		fuc		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	e Measures		Design (N)						
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x f _{нv}		<u>Design (N)</u> Design LOS						
x f _p) S	60.0	pc/h/ln mph	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/In				
$D = v_p / S$	20.3	pc/mi/ln	S		mph				
LOS	С	·	D = v _p / S Required Number of Lanes	i, N	pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design l	S - Speed D - Densit FFS - Free BFFS - Bas	flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	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 Trave	el IR-90 / V	Vestbound					
Agency or Company	LJB Inc.		From/To	72nd	TE SSIT AND E					
Date Performed	2/27/2015		Jurisdiction	ODOT E	District 12					
Analysis Time Period	AM Peak Hou	ur	Analysis Year	2034 Ex	isting Condition					
Project Description CUY-	90-19.5/21.3									
Oper.(LOS)			Jes.(N)	Plar	ining Data					
Flow inputs	6250	veb/b	Deals Llaur Faster, DUF	0.04						
Volume, V	6350	ven/n	Marucks and Buses P	0.94 1						
Dook Ur Drop of AADT K		ven/uay	% PV/c P	4						
Peak-HI Plop. 01 AAD1, K Peak-Hr Direction Pron			General Terrain	U						
$DDHV = AADT \times K \times D$		veh/h	Grade % Length	mi						
			Up/Down %							
Calculate Flow Adjus	tments									
f	1.00		E _R	1.2						
Ε _Τ	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$)] 0.980						
Speed Inputs			Calc Speed Adj and I	FFS						
Lane Width		ft								
Rt-Side Lat. Clearance		ft	f _{I W}		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,		mph			ľ					
LOS and Performanc	e Measures		Design (N)							
Operational (LOS)			Design LOS							
v _p = (V or DDHV) / (PHF x l	N x f _{HV 1722}	no/h/ln		Nvf						
x f _p)	1725	pc/n/m	$v_p = (V O D D D V) / (P N X)$	HV	pc/h/ln					
S	59.7	mph	^ 'p)		ma m h					
D = v _p / S	28.8	pc/mi/ln	S D = 1/ / C		mpn					
LOS	D		$D = v_p / S$	5 NI	pc/mi/in					
			Required Number of Lanes	5, IN						
Glossary			Factor Location							
N - Number of lanes	S - Spee	d	E _R - Exhibits 11-10, 11-12		f _{I W} - Exhibit 11-8					
V - Hourly volume	D - Densi	ity	E_{τ} - Exhibits 11-10, 11-11,	11-13	f _{LC} - Exhibit 11-9					
v _p - Flow rate	FFS - Free	e-flow speed	f Page 11-18		TRD - Page 11-11					
LOS - Level of service	BFFS - Ba	se free-flow	LOS, S, FFS, v _n - Exhibits	11-2,						
DDHV - Directional design	hour volume		11-3							

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	BASIC FRE	EEWAY SE	GMENTS WORKSHEE	<u>T</u>	
			1		
General Information			Site Information		
Analyst	MLS		Highway/Direction of Trave	I IR-90 / W	/estbound E 55th and E
Agency or Company	LJB Inc.		From/To	72nd	E SSITI AND E
Date Performed	2/27/2015		Jurisdiction	ODOT D	istrict 12
Analysis Time Period	PM Peak Hou	ır	Analysis Year	2034 Exis	sting Condition
Project Description COY-	90-19.5/21.3				ine Dete
			ves.(N)		ling Data
	4620	voh/h	Dook Hour Easter DHE	0.04	
	4030	veh/dav	%Trucks and Buses P ₊	0.94 4	
Peak-Hr Prop. of AADT K		ven/day	%RVs P_	0	
Peak-Hr Direction Prop. D			General Terrain:	Level	
$DDHV = AADT \times K \times D$		veh/h	Grade % Length	mi	
			Up/Down %		
Calculate Flow Adjus	tments				
f _p	1.00		E _R	1.2	
Ε _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 I	FFS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f.w		mph
Number of Lanes, N	4		f _{LC}		mph
Total Ramp Density, TRD		ramps/mi	TRD Adjustment		mph
FFS (measured)	60.0	mph	FES	60.0	mnh
Base free-flow Speed,		mph		00.0	mpri
BFFS		mpri			
LOS and Performanc	e Measures		Design (N)		
Operational (LOS)			<u>Design (N)</u>		
$v_{x} = (V \text{ or } DDHV) / (PHF x)$	N x fu		Design LOS		
xf)	1256	pc/h/ln	$v_p = (V \text{ or DDHV}) / (PHF x)$	N x f _{HV}	pc/h/ln
s	60.0	mph	x f _p)		P
D = v / S	20.9	nc/mi/ln	S		mph
	20.0 C	permin	D = v _p / S		pc/mi/ln
200	Ū		Required Number of Lanes	3, N	
Glossary			Factor Location		
N - Number of lanes	S - Spee	d	E - Exhibits 11-10 11-12		f - Exhibit 11-8
V - Hourly volume	D - Densi	ity	$E_{R} = E_{X} + 10, 11 = 12$	11 13	f Exhibit 11.0
v _p - Flow rate	FFS - Free	-flow speed	$F_{T} = C_{T} + C_{T$	11-15	
LOS - Level of service	BFFS - Ba	se free-flow		11 0	1KD - Page 11-11
speed			$LUS, S, FFS, V_p - EXHIBITS$	i I-∠,	
DDHV - Directional design	hour volume		11-0		

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	BASIC FREEWAY SEGMENTS WORKSHEET								
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	r	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / W Between ODOT Di 2034 Exis	0 / Westbound /een E 55th Ramps)T District 12 4 Existing Condition				
Project Description CUY-	90-19.5/21.3								
Oper.(LOS)		D	es.(N)	Planr	ning Data				
Flow Inputs									
Volume, V AADT Peak-Hr Prop. of AADT. K	5610	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs_P	0.94 4 0					
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi					
Calculate Flow Adjus	tments								
f _p E _T	1.00 1.5		E_R $f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	1.2)] 0.980					
Speed Inputs			Calc Speed Adj and F	FS					
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 Performanc	e Measures		Design (N)						
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x fuv		<u>Design (N)</u> Design LOS						
x f _p)	¹¹⁰ 1522	pc/h/ln	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln				
D = y / S	25 1	nc/mi/ln	S		mph				
LOS	C	pormin	D = v _p / S Required Number of Lanes	, N	pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes	S - Speed	b	E _R - Exhibits 11-10, 11-12		f _{I W} - Exhibit 11-8				
V - Hourly volume	D - Densi	ty .	E _T - Exhibits 11-10, 11-11,	11-13	f _{LC} - Exhibit 11-9				
v _p - Flow rate LOS - Level of service speed	FFS - Free BFFS - Bas	-flow speed se free-flow	f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits	11-2,	TRD - Page 11-11				
DDHV - Directional design	hour volume		11-3						

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	BASIC FREEWAY SEGMENTS WORKSHEET								
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	r	Highway/Direction of Trave From/To Jurisdiction Analysis Year	/estbound E 55th Ramps istrict 12 sting Condition					
Project Description CUY-	90-19.5/21.3								
Oper.(LOS)		D	es.(N)	Planr	ning Data				
Flow Inputs									
Volume, V AADT Peak-Hr Prop. of AADT, K	3870	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P _R	0.94 4 0					
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi					
Calculate Flow Adjus	tments								
f _ρ Ε _Τ	1.00 1.5		E _R f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1	1.2)] 0.980					
Speed Inputs			Calc Speed Adj and I	FS					
Lane Width		ft							
Rt-Side Lat. Clearance		ft	f		mph				
Number of Lanes, N	4		f. o		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 Performanc	e Measures		Design (N)						
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x f _{HV}		<u>Design (N)</u> Design LOS						
x f _p)	60 0	pc/h/ln mph	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln				
$D = v_{\rm s} / S$	17.5	nc/mi/ln	S		mph				
LOS	В	portiunt	D = v _p / S Required Number of Lanes	, N	pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Densit FFS - Free BFFS - Bas hour volume	d fy flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	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 Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	r	Highway/Direction of Trave From/To Jurisdiction Analysis Year	West of E West of E ODOT Dis 2034 Exist	estbound 55th St trict 12 tina Condition				
Project Description CUY-	90-19.5/21.3		7						
Oper.(LOS)		D	es.(N)	🗌 Planni	ng Data				
Flow Inputs									
Volume, V AADT	5800	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4					
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi					
Calculate Flow Adjus	tments								
f _p E _T	1.00 1.5		E_{R} $f_{\mu_{V}} = 1/[1+P_{T}(E_{T}-1)+P_{P}(E_{P}-1)$	1.2)] 0.980					
Speed Inputs			Calc Speed Adi and I	FS					
Lane Width		ft							
Rt-Side Lat. Clearance		ft	f		mph				
Number of Lanes, N	4		LW f. a		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 Performanc	e Measures		Design (N)						
<u>Operational (LOS)</u> v _n = (V or DDHV) / (PHF x I	N x f _{HV}		<u>Design (N)</u> Design LOS						
x f _p)	¹¹ 1573 60.0	pc/h/ln mph	v _p = (V or DDHV) / (PHF x x f _p)	N x f _{HV}	pc/h/ln				
$D = v_n / S$	26.2	pc/mi/ln	S		mph				
LOS	D	F -	D = v _p / S Required Number of Lanes	5, N	pc/mi/ln				
Glossary			Factor Location						
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speed D - Densit FFS - Free BFFS - Bas hour volume	d ty -flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	f _I 11-13 f _I T 11-2,	_{LW} - Exhibit 11-8 _{LC} - Exhibit 11-9 RD - Page 11-11				

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	BASIC FREEWAY SEGMENTS WORKSHEET								
			•						
General Information			Site Information						
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	ır	Highway/Direction of Travel IR-90 / WestboundFrom/ToWest of E 55th StJurisdictionODOT District 12Analysis Year2034 Existing Condition						
Project Description CUY-	90-19.5/21.3								
Oper.(LOS)			es.(N)	Plan	ning Data				
	4170	vob/b	Dook Hour Foster, DHF	0.04					
AADT	4170	veh/day	%Trucks and Buses, P _T	0.94 4					
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi					
Calculate Flow Adjus	tments								
f _p	1.00 1.5		$E_{R} = 4/(4) P (E_{R} + 1) + P (E_{R} + 1)$	1.2					
L⊺ Speed Inpute	1.5		$I_{HV} = I_{II} I_{P_T(E_T} - I) + P_R(E_R - I)$)]0.900					
Speed inputs			Calc Speed Adj and i	гэ					
Lane Width		ft							
Rt-Side Lat. Clearance	1	π	f _{LW}		mph				
Total Pamp Donsity TPD	4	romno/mi			mph				
FES (measured)	60.0	mnh	TRD Adjustment		mph				
Base free-flow Speed, BFFS	00.0	mph	FFS	60.0	mph				
LOS and Performanc	e Measures		Design (N)						
<u>Operational (LOS)</u> v ₋ = (V or DDHV) / (PHF x I	N X fuy		<u>Design (N)</u> Design LOS						
x f _p)	[¬] 1131	pc/h/ln	v _p = (V or DDHV) / (PHF x x f _n)	N x f _{HV}	pc/h/ln				
S D u (O	60.0	mph	S		mph				
$D = v_p / S$	18.9	pc/mi/ln	$D = v_p / S$		pc/mi/ln				
LUS	C		Required Number of Lanes	s, N					
Glossary			Factor Location						
N - Number of lanes	S - Speed	b	E ₋ - Exhibits 11-10 11-12		f Exhibit 11-8				
V - Hourly volume	D - Densi	ty	E_{T} - Exhibits 11-10, 11-11.	11-13	f_{Lo} - Exhibit 11-9				
v _p - Flow rate	FFS - Free	-flow speed	f, - Page 11-18	-	TRD - Page 11-11				
LOS - Level of service speed	BFFS - Bas	se free-flow	LOS, S, FFS, v_p - Exhibits	11-2,					
DDHV - Directional design	hour volume		11-3						

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	BASIC FR	EEWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 AM Peak Hou	ur	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / Ε Betweer ODOT Γ 2034 Βι	Eastbound n MLK and E.72nd District 12 iild
Project Description CUY-	90-19.5/21.3				
✓ Oper.(LOS)			es.(N)	Plar	nning Data
Flow Inputs					
Volume, V AADT	6160	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T	0.94 4	
Peak-Hr Prop. of AADT, K Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	%RVs, P _R General Terrain: Grade % Length Up/Down %	0 Level mi	
Calculate Flow Adjus	tments				
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 I	FS	
Lane Width		ft			
Rt-Side Lat. Clearance		ft	f _{LW}		mph
Number of Lanes, N	4		f _{IC}		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 Performanc	e Measures	5	Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x	N x f _{HV 1671}	nc/h/ln	Design (N) Design LOS v. = (V or DDHV) / (PHE x	N x f	
x f _p)	50.0	moh	$x f_p$ (v or <i>DD</i> (<i>v</i>)) (1 in x)	HV	pc/h/ln
5 D=v /S	09.9 27.0	npn nc/mi/ln	S		mph
LOS	D	pe/m/m	D = v _p / S Required Number of Lanes	5. N	pc/mi/ln
Glossarv			Factor Location		
N - Number of lanes	S - Spee	h			
V - Hourly volume	D - Dens	itv	E_{R} - Exhibits 11-10, 11-12		f _{LW} - Exhibit 11-8
v - Flow rate	FFS - Free	-flow speed	E_{T} - EXNIDITS 11-10, 11-11,	11-13	T _{LC} - Exhibit 11-9
LOS - Level of service speed	BFFS - Ba	ise free-flow	LOS, S, FFS, v _p - Exhibits	11-2,	ואט - Page 11-11
DDHV - Directional design	hour volume		11-3		

	BASIC FRE	EWAY SE	GMENTS WORKSHEE	Т	
General Information			Site Information		
Analyst Agency or Company Date Performed Analysis Time Period	MLS LJB Inc. 2/27/2015 PM Peak Hou	ır	Highway/Direction of Trave From/To Jurisdiction Analysis Year	I IR-90 / E Between ODOT D 2034 Bu	Eastbound MLK and E.72nd District 12 ild
Project Description CUY-	90-19.5/21.3				
Oper.(LOS)			es.(N)	Plan	ning Data
Flow Inputs					
Volume, V AADT Peak-Hr Prop. of AADT_K	4490	veh/h veh/day	Peak-Hour Factor, PHF %Trucks and Buses, P _T %RVs, P ₂	0.94 4 0	
Peak-Hr Direction Prop, D DDHV = AADT x K x D		veh/h	General Terrain: Grade % Length Up/Down %	Level mi	
Calculate Flow Adjus	tments				
f _p	1.00		E _R	1.2	
E _T	1.5		$T_{HV} = 1/(1+P_T(E_T - 1) + P_R(E_R - 1))$)]0.980	
Speed Inputs			Calc Speed Adj and F	FS	
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 Performanc	e Measures		Design (N)		
<u>Operational (LOS)</u> v _p = (V or DDHV) / (PHF x I	N x f _{HV} 1218	pc/h/ln	<u>Design (N)</u> Design LOS v _n = (V or DDHV) / (PHF x l	N x f _{нv}	
x f _p)			x f _n)		pc/h/ln
S D = v / C	60.0	mph	S		mph
$D = V_p / S$	20.3	pc/mi/ln	$D = v_p / S$		pc/mi/ln
LUS	C		Required Number of Lanes	, N	
Glossary			Factor Location		
N - Number of lanes V - Hourly volume v _p - Flow rate LOS - Level of service speed DDHV - Directional design	S - Speer D - Densi FFS - Free BFFS - Bas hour volume	d ty -flow speed se free-flow	E _R - Exhibits 11-10, 11-12 E _T - Exhibits 11-10, 11-11, f _p - Page 11-18 LOS, S, FFS, v _p - Exhibits 11-3	11-13 11-2,	f _{LW} - Exhibit 11-8 f _{LC} - Exhibit 11-9 TRD - Page 11-11



		RA	MPS AND	RAMP JUNC	TIONS W	ORKSH	EET					
General I	nforma	tion			Site Infor	mation						
Analyst		MLS		Fre	eway/Dir of Tr	avel	IR-90	/ Eastbound	1			
Agency or Con	npany	LJB li	nc.	Jur	nction		E 55th	n St				
Date Performe	d	2/27/2	2015	Jur	isdiction		ODOT	District 12				
Analysis Time	Period	AM P	eak Hour	Ana	alysis Year		2034	Existing Cor	ndition			
Project Descrip	DIION CUY	-90-19.5/2	1.3 Salety Stu	dy								
mputs			Frooway Num	hor of Lanos N	1							
Upstream Adj I	Ramp		Down Numbo		4					Do	ownstrea	am Adj
Yes [On			r or Laries, N	1					R	amp	
	_ •		Acceleration L	ane Length, L _A	885						Yes	🗌 On
🗹 No 🛛	Off			ane Length L _D						~	🛛 No	Off
_	£		Freeway Volu	me, V _F	3660						=	ft
Lup –	IL		Ramp Volume	, V _R	370					-de	own	it.
V., = \	/eh/h		Freeway Free	-Flow Speed, S _{FF}	60.0						_D =	veh/h
u			Ramp Free-Fl	ow Speed, S _{FR}	45.0							
Conversi	on to p	<u>c/h Unc</u>	der Base (Conditions		1						
(pc/h)	0	V /eh/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		3	971
Ramp		370	0.94	Level	9	0	0).957	1.00		2	411
UpStream												
DownStream												
Estimatio	n of v		Merge Areas			Ectimot	ion	L	liverge Area	IS		
Estimatio	11 01 V ₁₂	2				Estimati		^{01 v} 12				
		$V_{12} = V_{F}$	(P _{FM})					V ₁₂ = '	V _R + (V _F -	V _R)P	FD	
L _{EQ} =		(Equa	ation 13-6 or	13-7)		L _{FO} =		(Equation	13-12	2 or 13-1	3)
P _{FM} =		0.166	using Equat	ion (Exhibit 13-6)		P _{FD} =		ı	using Equa	ation ((Exhibit 13	3-7)
V ₁₂ =		661 po	c/h			V ₁₂ =		,	oc/h			,
V ₃ or V _{av34}		1655 p	oc/h (Equatio	on 13-14 or 13-		V_3 or V_{av34}			pc/h (Equatio	on 13-1	14 or 13-1	7)
Is Van Van	> 2 700 pc/	17) h?□Vor				Is V ₃ or V _{av}	₃₄ > 2,	700 pc/h?	_ ∐Yes □I	٥V		,
Is V. or V	> 1 5 * V/	2 🔽 Vor				Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No						
av34	1.0 112	1588 r	oc/h (Equatio	on 13-16 13-		If Yes V = pc/h (Equation 13-16, 13-18, or						
If Yes,V _{12a} =		18, or	13-19)			12a		1:	3-19)			
Capacity	Checks	;				Capacit	y Ch	necks				
		Actual	C	apacity	LOS F?			Actual		Capac	city	LOS F?
						V _F			Exhibit	13-8		
V _{FO}		4382	Exhibit 13-8		No	$V_{FO} = V_{F}$	$-V_R$		Exhibit	13-8		
10						Vn			Exhibit	13-		
			<u> </u>						10			
FIOW Ente	ering w	Actual	fluence A	rea Desirable	Violation?	FIOW EN		Actual	rge Influ Mov F	ence		Violation?
V=		1999	Exhibit 13-8		No	V.	+	Actual	Exhibit 13		JIE	VIOIALIOIT
	Sorvico	Detern	nination (if not E)	NO		F Sor	vico Do	torminat	° tion	/if not	F)
D = 5	475 + 0 00 [°]	734 y + 0		06271				4 252 + 0	0086 V	- 0.00	<u>(11 1101</u> 19 1	.,
$B_R = 3.473 \pm 0.00734 v_R \pm 0.0076 v_{12} \pm 0.00027 L_A$				D = /m	R	4.202 · 0	.0000 12	0.00	0 -D			
$P_{R} = 10.0 \text{ (pointwitt)}$				$\nu_{\rm R} = (\rm pc/mi/ln)$								
speea De	elermina	αίιοΠ				Speea L			011			
M _S = 0.27	0 (Exibit 13	-11)				υ _s – (Ε ς –	tidinx:	13-12)				
S _R = 55.1	mph (Exhil	bit 13-11)				o _R − m∣	pn (Ex	nidit 13-12)				
S ₀ = 57.5	mph (Exhil	bit 13-11)				5 ₀ = m	ph (Ex	(nibit 13-12)				
S = 56.4 mph (Exhibit 13-13)						1S= mi	ph (Ex	hibit 13-13)				

RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Infor	General Information Site Information									
Analyst	MLS		Fre	eway/Dir of Tr	avel	IR-90	/ Eastbound			
Agency or Company	LJB	Inc.	Jur	nction		E 55th	n St			
Date Performed	2/27/	2015	Jur	isdiction		ODOT	District 12			
Analysis Time Period		Peak Hour	An	alysis Year		2034 1	Existing Con	dition		
Project Description	CUY-90-19.5/2	21.3 Safety Stu	dy							
mputs		Freeway Num	her of Lanes N	1						
Upstream Adj Ramp		Down Numbo		4					Downstrea	am Adj
Yes On	ı		r or Lanes, N	1					Ramp	
		Acceleration L	ane Length, L _A	885					Yes 🗌	On
I No □ Off	f	Deceleration L	Lane Length L _D	5270					🗹 No	Off
= ft		Pamp Volume	Ne, v _F	3270					L _{down} =	ft
-up			, v _R	760					down	
V _u = veh/h		Ramp Free-Fl	ow Speed S	60.0 45.0					V _D =	veh/h
Conversion to	o nc/h Un	dor Baso	Conditions	45.0						
	v v						(
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		t _{HV}	t _p	v = V/PHF	x f _{HV} x f _p
Freeway	5270	0.94	Level	4	0	0	.980	1.00	5	719
Ramp	760	0.94	Level	1	0	0	.995	1.00	8	313
UpStream		-				_				
DownStream		Merge Areas						iverge Areas	 :	
Estimation of	• V12	inorgo / nouo			Estimat	ion d	of v_{12}	iverge / il euc		
	12 V = V	(P)					12			
_	*12 *F	\'FM/ ation 13.6 or	- 13 7)				V ₁₂ = V	/ _R + (V _F - \	/ _R)P _{FD}	
EQ -	(Lqu	using Equat	10-7		L _{EQ} =		(Equation 1	3-12 or 13-1	3)
'FM -	0.110				P _{FD} =		L	ising Equat	ion (Exhibit 13	-7)
v ₁₂ -	004 p	C/N no/h (Equativ	on 12 14 or 12		V ₁₂ =		þ	oc/h		
V ₃ or V _{av34}	17)	pc/ii (Equalit	011 13-14 01 13-		$V_3^{}$ or $V_{av34}^{}$		F	oc/h (Equation	n 13-14 or 13-1	7)
Is V ₃ or V _{av34} > 2,70	0 pc/h? 🗌 Ye	s 🗹 No			Is V_3 or $V_{av34} > 2,700 \text{ pc/h}$? Yes No					
Is V_3 or $V_{av34} > 1.5 *$	[•] V ₁₂ /2	s 🗌 No			Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No					
If Yes,V _{12a} =	2287	pc/h (Equation	on 13-16, 13-		If Yes,V _{12a} =	=	ې 13	oc/h (Equat 3-19)	ion 13-16, 13	3-18, or
Canacity Che		13-19)			Canacit	v Ch	ecks	,		
	Actual		apacity	LOS F?					LOS F?	
		† 1			V _E		7.000	Exhibit 1	3-8	
V	0500	E-1-11-14 40 0		N.	$V_{ro} = V_r$	- V_		Exhibit 1	3-8	
V _{FO}	6532	EXNIDIT 13-8		INO	· FO · F	- R		Exhibit 1	3-	
					V _R			10	<u> </u>	
Flow Entering	g Merge In	fluence A	rea		Flow En	nterin	ng Diver	ge Influe	ence Area	
	Actual	Max	Desirable	Violation?			Actual	Max De	esirable	Violation?
V _{R12}	3100	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
Level of Serv	ice Deterr	nination (if not F)		Level of	f Ser	vice De	terminati	on (if not	F)
D _R = 5.475 +	0.00734 v _R + (0.0078 V ₁₂ - 0.0	00627 L _A			D _R =	4.252 + 0.	0086 V ₁₂ -	0.009 L _D	
D _R = 23.7 (pc/mi/ln)				D _R = (p	oc/mi/	ln)				
LOS = C (Exhibit 13-2)					LOS = (E	Exhibi	t 13-2)			
Speed Detern	nination				Speed L	Deter	rminatio	n		
M _S = 0.328 (Exil	bit 13-11)				D _s = (E	xhibit	13-12)			
$S_{p} = 54.1 \text{mph} t$	(Exhibit 13-11)				S _R = m	ph (Ex	hibit 13-12)			
$S_0 = 55.6 \text{ mph}$	(Exhibit 13-11)				S ₀ = m	ph (Ex	hibit 13-12)			
S = 54.9 mph	(Exhibit 13-13)				S = m	ph (Ex	, hibit 13-13)			
L					I					

	RA	MPS AND	RAMP JUNC	CTIONS W	ORKSH	EET				
General Infor	mation			Site Infor	mation					
Analyst	MLS		Fre	eway/Dir of Tr	avel	IR-90/	/ Eastbound			
Agency or Company	LJB I	Inc.	Jur	nction		Martin	Luther King	Jr Dr		
Date Performed	2/27/	2015	Jur	isdiction		ODOT	District 12			
Analysis Time Period		Peak Hour	Ana	alysis Year		2034 E	xisting Con	dition		
	CU1-90-19.5/2	21.3 Safety Stu	dy							
mputs		Freeway Num	her of Lanes N	1						
Upstream Adj Ramp		Down Numbo		4					Downstrea	am Adj
Yes On	1		r or Lanes, N	1					Ramp	
		Acceleration L	ane Length, L _A	520					Yes 🗌	On
I No □ Off	F	Deceleration L	Lane Length L _D	2205					🗹 No	Off
= ft			me, v _F	3395					L _{down} =	ft
Lup IC			, v _R	620					down	
V _u = veh/h		Freeway Free	-Flow Speed, S _{FF}	60.0					V _D =	veh/h
Conversion t	o no/h Un	dor Poco	ow Speed, S _{FR}	45.0						
Conversion a	v v				1		.			
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _p
Freeway	3395	0.94	Level	4	0	0	.980	1.00	3	684
Ramp	620	0.94	Level	2	0	0	.990	1.00	6	666
UpStream						_				
DownStream										
Merge Areas Estimation of v ₄₂					Fstimat	ion c	of v	iverge Areas		
	<u>• 12</u>	<u>(</u> , , , , , , , , , , , , , , , , , , ,					12			
	V ₁₂ = V _F	(P _{FM})					V ₁₂ = V	V _R + (V _F - V	/ _R)P _{FD}	
L _{EQ} =	(Equ	ation 13-6 or	13-7)		L _{EQ} =		(Equation 1	3-12 or 13-1	3)
P _{FM} =	0.135	using Equat	ion (Exhibit 13-6)		P _{FD} =		ι	using Equat	ion (Exhibit 13	-7)
V ₁₂ =	496 p	c/h			V ₁₂ =		p	oc/h		
V ₃ or V _{av34}	1594	pc/h (Equatio	on 13-14 or 13-		V_3 or V_{av34}		ŗ	oc/h (Equatior	n 13-14 or 13-1	7)
$ls V_{r}$ or $V_{r} > 2.70$	$0 \text{ nc/h}^2 \square V_{\text{c}}$				Is V ₃ or V _{av}	₃₄ > 2,7	700 pc/h? 🗌	Yes N	0	,
$V_{av34} > 15^{*}$					Is V ₂ or V ₂	۰۹ مر > 1.5	5 * V₁₂/2 □]Yes ∏N	0	
10 v ₃ of v _{av34} + 1.0	1473	s 🔄 NO pc/h (Equatio	on 13-16, 13-		If Yes V ₁₀ =	:	ے r	oc/h (Equat	ion 13-16, 13	8-18, or
if Yes, v _{12a} =	18, or	13-19)	,				13	3-19)		
Capacity Che	cks				Capacit	y Ch	ecks			
	Actual	C	apacity	LOS F?			Actual	C	apacity	LOS F?
					V _F			Exhibit 1	3-8	
V _{FO}	4350	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V _R		Exhibit 1	3-8	
					Vp			Exhibit 1	3-	
L	Norgo In	fluonco A	r02			torir			nco Aroa	
	Actual	Max	Desirable	Violation?			Actual	<u>ge mue</u> Max De	esirable	Violation?
V _{P42}	2139	Exhibit 13-8	4600:All	No	V12		/ lotudi	Exhibit 13-8		
	V _{R12} 2139 Exhibit 13-8 4600:All No				Level of	f Ser	vice Dei	terminati	on (if not	F)
$D_{p} = 5.475 + 0.00734 v_{p} + 0.0078 V_{40} - 0.00627 L.$						D _D = 4	4.252 + 0	.0086 V	0.009 L _~	- /
$D_{\rm p} = 18.6 ({\rm nc}/{\rm m})$	i/ln)	12	A		$D_{p} = r$	ہ ار/mi/l	n)	- 12	υ	
R = R (Exhibit	13-2)				-R (P	- - - - - - - - - - - - - - - - - - -	+ 13_2)			
Speed Determination					Speed [minatio	n		
					D = /F	xhihit 1	13-12)			
$M_{s}^{s} = 0.307$ (Exbit 13-11) $S_{s}^{s} = mph$ (Exbit 13-12)										
$S_{R}^{=}$ 54.5 mph (Exhibit 13-11)				~R III S =	에 (드세 nh (드년	hibit $12 \cdot 12$			
$S_0 = 57.8 \text{ mph} ($	Exhibit 13-11)				$S_0 = mph (Exhibit 13-12)$					
p = 56.1 mph (Exhidit 13-13)				5= m	pn (Exi	nidit 13-13)			

	RA	MPS AND	RAMP JUNC	CTIONS W	ORKSH	EET					
General Infor	mation			Site Infor	mation						
Analyst	MLS		Fre	eway/Dir of Tr	avel	IR-90	/ Eastbound				
Agency or Company	LJB	Inc.	Jur	nction		Martin	Luther King	Jr Dr			
Date Performed	2/27/	2015	Jur	isdiction		ODOT	District 12				
Analysis Time Period		Peak Hour	An	alysis Year		2034 E	Existing Con	dition			
Project Description	CUY-90-19.5/2	21.3 Safety Stu	ay								
mputs		Freeway Num	her of Lanes N	1							
Upstream Adj Ramp		Down Numbo		4					Downs	trear	m Adj
Yes On	1		r or Lanes, N	1					Ramp		
		Acceleration L	ane Length, L _A	520					Yes	5	On
I No □ Off	F	Deceleration L	Lane Length L _D	EEAE					🗹 No		Off
= ft		Pamp Volumo	Ne, v _F	1005					L _{down} =		ft
-up			^{, v} R	1265					down		
V _u = veh/h		Ramp Free-Fl	ow Speed S	60.0 45.0					V _D =		veh/h
Conversion to	nc/h Un	dor Baso	Conditions	43.0							
	v v		-	a/ - 1			4	4			. 6 6
(pc/n)	(Veh/hr)	PHF	Terrain	% I ruck	%Rv		ЧV	Р	v = v/F	'HF)	х I _{HV} х I _р
Freeway	5545	0.94	Level	4	0	0	.980	1.00	_	60	17
Ramp	1285	0.94	Level	2	0	0	.990	1.00	_	13	81
UpStream						_			_		
DownStream	Merge Areas						I	iverge Area	 s		
Estimation of v ₁₂					Estimat	ion d	of v_{12}	<u> </u>	-		
	$V_{10} = V_{r}$	(P ₅₄)									
=	(Equ	ation 13-6 or	13-7)				V ₁₂ = V	V _R + (V _F -	V _R)P _{FD}		
-EQ P =	0.045	using Equat	ion (Exhibit $13-6$)		L _{EQ} =		(Equation 1	13-12 or 1	3-13)
· FM V =	0.040 272 n	c/h			P _{FD} =		ι	ising Equa	ition (Exhib	it 13-1	7)
12	272 p 2872	oc/h (Equatio	on 13-14 or 13-		V ₁₂ =		þ	oc/h			
V ₃ or V _{av34}	17)				V ₃ or V _{av34}		1	oc/h (Equatio	n 13-14 or	13-17))
Is V_3 or $V_{av34} > 2,70$	0 pc/h? 🗹 Ye	s 🗌 No			Is V ₃ or V _{av}	₃₄ > 2,1	700 pc/h?	Yes	10		
Is V_3 or $V_{av34} > 1.5 *$	V ₁₂ /2 Ve	s 🗌 No			Is V ₃ or V _{av}	₃₄ > 1.5	5 * V ₁₂ /2]Yes □N	10 10		4.0
If Yes,V _{12a} =	2406	pc/h (Equatio	on 13-16, 13-		If Yes,V _{12a} =	•	۲ 13	oc/h (Equa 3-19)	tion 13-16	5, 13-	-18, or
Capacity Che	cks	13-19)			Capacit	v Ch	ecks	,			
	Actual	С	apacity	LOS F?		<u>, en</u>	Actual		Capacity		LOS F?
		1 i			V _E			Exhibit '	13-8		
V	7000	E-1-11-11-10-0		N.	$V_{=0} = V_{=}$	- V_		Exhibit '	13-8		
V _{FO}	7398	EXNIDIT 13-8		INO	· FO · F	- R		Exhibit	13-		
					V _R			10			
Flow Entering	g Merge In	fluence A	rea		Flow En	terir	ng Diver	ge Influ	ence Ar	ea	
	Actual	Max	Desirable	Violation?			Actual	Max D	esirable	-	Violation?
V _{R12}	3787	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-	8		
Level of Serv	Level of Service Determination (if not F)				Level of	^F Ser	vice De	terminat	ion (if n	ot F	-)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$						D _R = 4	4.252 + 0.	0086 V ₁₂ -	• 0.009 L _D		
D _R = 31.1 (pc/m	i/ln)				D _R = (p	oc/mi/l	ln)				
LOS = D (Exhibit	13-2)				LOS = (E	Exhibi	t 13-2)				
Speed Determination					Speed L	Deter	rminatio	n			
$M_s = 0.446$ (Exibit 13-11) $D_s = (Exhibit 13-12)$											
S_{R} = 52.0 mph (Exhibit 13-11) S_{R} = mph (Exhibit 13-12)											
$S_0 = 55.3 \text{ mph}$	Exhibit 13-11)				S ₀ = m	ph (Ex	hibit 13-12)				
S = 53.5 mph (Exhibit 13-13)				S = m	ph (Ex	, hibit 13-13)				
S = 53.5 mph (Exhibit 13-13) S = mph (Exhibit 13-13)											

	RA	MPS AND	RAMP JUNC	TIONS W	ORKSHE	ET				
General Info	ormation			Site Infor	mation					
Analyst	MLS		Fre	eway/Dir of Tr	avel I	IR-90 / W	/estbound			
Agency or Compar	iy LJB	Inc.	Jur	nction	E	E 72nd S	St			
Date Performed	2/27/	2015	Jur	isdiction	(ODOT Di	istrict 12			
Analysis Time Peri	od AM F	Peak Hour	An	alysis Year	4	2034 Exis	sting Cond	dition		
Project Description	CUY-90-19.5/2	21.3 Safety Stu	dy							
Inputs		r								
Upstream Adj Ram	ip	Freeway Num Ramp Numbe	ber of Lanes, N r of Lanes N	4 1					Downstrea Ramp	ım Adj
□Yes □C	Dn	Acceleration L	ane Length, L _A	735					Yes	On
🗹 No 🗌 C	Off	Deceleration I	Lane Length L _D	6160					🗹 No	Off
= ff			ine, v _F	0100					L _{down} =	ft
-up IC			, v _R	190					down	
V _u = veh	/h	Freeway Free Ramp Free-Fl	-Flow Speed, S _{FF} ow Speed, S _{FP}	60.0 45.0					V _D =	veh/h
Conversion	to pc/h Un	der Base	Conditions							
(10.1/h)	V		Torrein	0/ Truels	0/ Du	f		f		vf vf
(pc/n)	(Veh/hr)		Terrain	% I FUCK	%KV	'н 	HV	^I p		
Freeway	6160	0.94	Level	4	0	0.98	30	1.00	66	584
Ramp	190	0.94	Level	4	0	0.98	30	1.00	2	06
DownStream	-	<u>├</u> }								
DownStream	Merge Areas						I Di	verge Areas		
Estimation of		Estimati	on of	V ₁₂						
	$V_{10} = V_{-}$	(P)					12			
	IZ F	, ™/ ation 13-6 o	13-7)				V ₁₂ = V	_R + (v _F - v _R)P _{FD}	
EQ P =	0 102	using Equat	(on (Exhibit 13.6))		L _{EQ} =		(E	Equation 13-	12 or 13-13	3)
FM	1004	using Lyuai			P _{FD} =		u	sing Equatio	n (Exhibit 13	-7)
v ₁₂ -	1264	pc/n na/h (Eauati	an 10 11 ar 10		V ₁₂ =		р	c/h		
V ₃ or V _{av34}	2700	pc/n (Equail	on 13-14 or 13-		$V_3^{}$ or $V_{av34}^{}$		р	c/h (Equation 1	3-14 or 13-17	7)
Is V_3 or $V_{av34} > 2,7$	700 pc/h? 🗍 Ye	s 🔽 No			Is V ₃ or V _{av3}	₄ > 2,700) pc/h? 🗌	Yes 🗌 No		
$V_{2} = V_{2} = V_{2}$	5*V ₄ /2 Ve	s 🗌 No			Is V ₃ or V _{av3}	₄ > 1.5 * '	V ₁₂ /2	Yes No		
If Yes,V _{12a} =	2673	pc/h (Equation 13-19)	on 13-16, 13-		If Yes,V _{12a} =		р 13	c/h (Equatioi -19)	n 13-16, 13	8-18, or
Capacity Ch	ecks	10 10)			Capacity	/ Chec	cks			
	Actual	C	apacity	LOS F?			Actual	Cap	pacity	LOS F?
			1 2		Vr			Exhibit 13-8	3	
V	6800			Na	$V_{ro} = V_r$	- V_		Exhibit 13-8	3	
^v F0	6890	EXHIBIT 13-8		INO	1 FO 1 F	R		Exhibit 13	-	
					V _R			10		
Flow Enterin	ng Merge In	fluence A	rea		Flow En	tering	Diver	ge Influen	ce Area	
	Actual	Max	Desirable	Violation?		Ac	tual	Max Desi	rable	Violation?
V _{R12}	2879	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
Level of Ser	Level of Service Determination (if not F)				Level of	Servi	ice Det	erminatio	n (if not	F)
D _R = 5.475 + 0.00734 v _R + 0.0078 V ₁₂ - 0.00627 L _A					C	D _R = 4.2	252 + 0.0	0086 V ₁₂ - 0.	.009 L _D	
$D_{\rm R} = 23.2 ({\rm pc}/$	/mi/ln)				$D_{p} = (p)$	c/mi/ln))			
LOS = C (Exhib	it 13-2)				LOS = (E	xhibit 1	3-2)			
Speed Determination					Speed D	eterm	inatio	n		
$M_{-} = 0.324 (Evil) $						xhibit 13-	-12)			
$m_{\rm S}^{-} = 0.324 (E$	NUL 10-11)				S _p = mr	h (Exhibi	, oit 13-12)			
v_R = 54.2 mpl	D _R = 54.2 mph (Exhibit 13-11)						nit 13_12)			
$S_0 = 54.6 \text{ mpl}$	n (Exhibit 13-11)				~0 ⁻ inp	עריידיי אר (ביידיי	(10-1∠) (± 10-1∠)			
p - 54.4 mpi	ii (⊏xiiiuit 13-13)		S_0 = mph (Exhibit 13-12) S = mph (Exhibit 13-13) S_0 = mph (Exhibit 13-13)							

		RA	MPS AND	RAMP JUN	CTIONS W	/ORKSH	EET				
Genera	al Infor	mation			Site Infor	mation					
Analyst		MLS		Fr	eeway/Dir of Tr	avel	IR-90/	Westboun	ıd		
Agency or	Company	LJB	Inc.	Ju	inction		E 72no	l St			
Date Perfo	ormed	2/27/	2015	Ju	risdiction		ODOT	District 12			
Analysis Ti	ime Period	PM F	Peak Hour	Ar	nalysis Year		2034 E	Existing Co	ndition		
Project De	scription	CUY-90-19.5/2	21.3 Safety Stu	dy							
inputs				han af Lanaa Ni							
Upstream /	Adj Ramp		Freeway Nurr	iber of Lanes, N	4					Downstre	am Adj
Ves			Ramp Numbe	r of Lanes, N	1					Ramp	
			Acceleration I	ane Length, L _A	735					□Yes	On
🗹 No	Off		Deceleration	Lane Length L _D						No.	Off
			Freeway Volu	me, V _F	4490						
L _{up} =	ft		Ramp Volume	e, V _R	140					L _{down} =	ft
			Freeway Free	-Flow Speed, S _{FF}	60.0					V -	voh/h
v _u =	veh/h		Ramp Free-F	ow Speed, S _{EP}	45.0					v _D -	VEII/II
Conver	rsion to	p pc/h Un	der Base	Conditions							
(pc	:/h)	V	PHF	Terrain	%Truck	%Rv		funz	f	v = V/PHF	x fuy x f
(00	,,	(Veh/hr)	0.04			,	<u> </u>	HV			070
Freeway		4490	0.94	Level	4	0	0	.980	1.00	4	8/2
Ramp		140	0.94	Level	2	0	0	.990	1.00	_	150
DownStre	am									_	
Downourd	un		Merge Areas		1				L Diverge Areas	<u> </u>	
Estima	tion of	V12				Estimat	tion c	of v_{12}	_		
		V = V	(P)					12			
- =		· 12 · F	tion 13-6 o	r 13_7)				V ₁₂ =	V _R + (V _F - V	_R)P _{FD}	
EQ D –		(Ľqu		10-7)		L _{EQ} =			(Equation 13	3-12 or 13-1	3)
FM -		0.199	using Equa	LION (EXHIBIT 13-0)		P _{FD} =			using Equati	ion (Exhibit 13	3-7)
v ₁₂ –		970 p	ic/n			V ₁₂ =			pc/h		
V_3 or V_{av34}	ļ	1951	pc/n (Equali	01113-14 01 13-		V_3 or V_{av34}			pc/h (Equation	13-14 or 13-1	7)
Is V ₂ or V	> 2,70) pc/h? □Ye	s 🔽 No			Is V ₃ or V _{av}	_{/34} > 2,7	'00 pc/h? [Yes 🗌 No	D	
Is V ₂ or V	avo4 > 1.5 *		s 🗌 No			Is V ₃ or V _{av}	, ₃₄ > 1.5	5 * V ₁₂ /2 [Yes 🗌 No)	
	av34	1948	pc/h (Equati	on 13-16. 13-		If Yes V.	=		pc/h (Equati	on 13-16, 1	3-18, or
If Yes, V _{12a}	_ =	18, or	13-19)					1	3-19)		
Capaci	ity Che	cks				Capacit	ty Ch	ecks			
		Actual	(Capacity	LOS F?			Actual	C	apacity	LOS F?
						V _F			Exhibit 13	3-8	
V.	F.O.	5022	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V _R		Exhibit 13	3-8	
 '	0					V_			Exhibit 1	3-	
								<u> </u>	10		
FIOWE	ntering		Tiuence A	Nrea Desirable	Violation?	FIOWER	nterir	Actual		nce Area	Violation?
V		2008	Evhibit 12.9		No	V		Actual	Evhibit 12.9		VIUIduuII
V _{R12} 2098 Exhibit 13-8 4000:All No						v ₁₂		vice De		on /if not	<u>_</u>
						Levero					<u>r)</u>
	= 5.475 +	0.00734 V _R +1	0.0076 v ₁₂ - 0.	00627 L _A			$D_{R} = 4$	+.252 + 0	1.0086 V ₁₂ - 1	0.009 L _D	
$\nu_{R} = $	17.2 (pc/mi	/in)				$\nu_{\rm R} = (r$	oc/mi/l	n)			
LOS = I	B (Exhibit 1	13-2)				LOS = (E	Exhibit	: 13-2)			
Speed	Detern	nination				Speed L	Deter	minatio	on		
M _S = (0.287 (Exib	oit 13-11)									
S _R = s	54.8 mph (Exhibit 13-11)									
S ₀ = 5	56.5 mph										

	RA	MPS AND	RAMP JUNC	TIONS W	/ORKSHI	EET				
General Info	ormation			Site Infor	mation					
Analyst	MLS		Fre	eway/Dir of Tr	avel	IR-90 /	Westbound	d		
Agency or Compa	ny LJB I	Inc.	Jur	nction		E 55th	St			
Date Performed	2/27/	2015	Jur	isdiction		ODOT	District 12			
Analysis Time Per		Peak Hour	Ani	alysis Year		2034 E	xisting Cor	ndition		
	n CUY-90-19.5/2	21.3 Safety Stu	ldy							
mputs		Erooway Nur	bor of Lance N	1					1	
Upstream Adj Rar	np	Dema Number		4					Downstrea	am Adj
	On		er of Lanes, N	1					катр	
		Acceleration I	ane Length, L _A	565					🗌 Yes	On
🗹 No 🗌 🛛	Off	Deceleration	Lane Length L _D						✓ No	Off
		Freeway Volu	ime, V _F	5610					-	ft
L _{up} = π		Ramp Volume	e, V _R	190					└down [—]	п
V = vet	ı/h	Freeway Free	e-Flow Speed, S _{FF}	60.0					V _D =	veh/h
u vei		Ramp Free-F	low Speed, S _{FR}	45.0					, D	
Conversion	to pc/h Un	der Base	Conditions							
(pc/h)	V (\/eh/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	6	087
Ramp	190	0.94	Level	9	0	0.	.957	1.00	2	11
UpStream										
DownStream										
				0	iverge Areas					
Estimation		Estimat	ion o	of v ₁₂						
	V ₁₂ = V _F	(P _{FM})					V = V	V + (V V)P-5	
L _{EQ} =	(Equ	ation 13-6 o	r 13-7)		l=		- 12	Faulation 13.	(/' ⊦D .12 or 13_1'	3)
P _{FM} =	0.191	using Equat	tion (Exhibit 13-6)		-EQ P_= =		· · · ·	using Equation	n (Exhibit 13	-7)
V ₁₂ =	1165	pc/h			· FD V =		r	nc/h		')
Voor Voo	2461	pc/h (Equati	on 13-14 or 13-		V ₁₂		1	nc/h (Equation '	13-14 or 13-1	7)
1-3 av34	17)				Is V- or V	>27	ו 00 nc/h2		10-14-01-10-11	')
Is v_3 or $v_{av34} > 2$,700 pc/n? Ye	s 🗹 No			Is V or V	34 ⁻ 2, ' > 1 5	5*V /2 □			
Is V_3 or $V_{av34} > 1$.	.5 * V ₁₂ /2 Ve	s 🗌 No	10.10.10		13 V ₃ OI V _{av3}	34 - 1.5	v 12′2 ∟ r	oc/h (Fouatio	n 13-16, 13	8-18. or
If Yes,V _{12a} =	2434 18 or	pc/h (Equati 13-19)	on 13-16, 13-		If Yes,V _{12a} =	:	13	3-19)		, 10, 01
Capacity Cl	hecks	10 10)			Capacit	v Ch	ecks			
	Actual		Capacity	LOS F?	<u> </u>		Actual	Ca	pacity	LOS F?
					VF			Exhibit 13-	8	
V	6208	Evhibit 12.0		No	$V_{ro} = V_r$	- V.		Exhibit 13-	8	
[♥] FO	0290	EXHIBIT 13-0		INU		ĸ		Exhibit 13	-	
					V _R			10		
Flow Enteri	ng Merge In	fluence A	lrea		Flow En	terin	ng Diver	rge Influer	nce Area	
	Actual	Max	Desirable	Violation?			Actual	Max Des	irable	Violation?
V _{R12}	2645	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8		
Level of Se	rvice Detern	nination (if not F)		Level of	Ser	vice De	terminatio	n (if not	F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$						D _R = 4	4.252 + 0	.0086 V ₁₂ - 0	.009 L _D	
D _R = 22.5 (po	c/mi/ln)				D _R = (p	c/mi/l	n)			
LOS = C (Exhil	bit 13-2)				LOS = (E	xhibit	: 13-2)			
Speed Determination					Speed D)eter	minatio	on		
$M_{\rm s} = 0.325 (\text{Evihit 13-11})$ $D_{\rm s} = (\text{Exhibit 13-12})$										
$S_{2} = 51.1 \text{ mm}$	$S_{\rm B}^{-1} = 0.525$ (Exhibit 13-11) $S_{\rm B}^{-1} = mph$ (Exhibit 13-12)									
$S_{R} = 550 m^{-1}$	h (Exhibit 12 11)				S ₀ = m	ph (Exh	nibit 13-12)			
S = 54.8 mm	h (Exhibit 13-11)				S = m	nh (Evł	nihit 13-13)			
	<u>r</u>		101 10-10)							

	RA	MPS AND	RAMP JUNC	CTIONS W	ORKSH	EET					
General Info	ormation			Site Infor	mation						
Analyst	MLS		Fre	eway/Dir of Tr	avel	IR-90	/ Westbound	ł			
Agency or Compar	ny LJB	Inc.	Ju	nction		E 55th	l St				
Date Performed	2/27/	/2015	Ju	risdiction		ODOT	District 12				
Analysis Time Peri	od PM F	Peak Hour	An	alysis Year		2034 E	Existing Con	dition			
Project Description	CUY-90-19.5/2	21.3 Safety Stu	dy								
inputs		L									
Upstream Adj Ram	ıp	Freeway Num Ramp Number	ber of Lanes, N	4					Downstrea Ramp	am Adj	
Yes C	Dn	Acceleration L	ane Length, L _A	565					Yes	□ On	
⊠ No □ C	Off	Deceleration L	ane Length L _D						No No	☐ Off	
		Freeway Volu	me, V _F	3870							
L _{up} = ft		Ramp Volume	, V _R	300					-down -	Ц	
V - voh	/b	Freeway Free	-Flow Speed, S _{FF}	60.0					V_ =	veh/h	
v _u – ven	/11	Ramp Free-Fl	ow Speed, S _{FR}	45.0					- D	VCII/II	
Conversion	to pc/h Un	der 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	4	199	
Ramp	300	0.94	Level	8	0	0	.962	1.00		332	
UpStream											
DownStream											
				D	iverge Areas	6					
Estimation of v ₁₂					Estimation of v ₁₂						
	V ₁₂ = V _F	(P _{FM})					V = \	(+ 0) = 0	/)P		
L _{FO} =	(Equ	ation 13-6 or	[.] 13-7)		-		• 12 ⁻		'R/'FD 2 1 2 or 1 2 1	2)	
P _{EM} =	0.176	using Equat	ion (Exhibit 13-6)		EQ -		(3-12 OF 13-1	3)	
V ₁₀ =	740 n	nc/h	()		P _{FD} =		ι	ising Equa	tion (Exhibit 13	5-7)	
12	1729	nc/h (Equatio	on 13-14 or 13-		V ₁₂ =		þ	oc/h			
V ₃ or V _{av34}	17)				V ₃ or V _{av34}		F	oc/h (Equation	n 13-14 or 13-1	7)	
Is V_3 or $V_{av34} > 2$,	700 pc/h? 🗌 Ye	s 🗹 No			Is V ₃ or V _{av3}	₃₄ > 2,1	700 pc/h? [_	∐Yes ∐N	0		
Is V_3 or $V_{av34} > 1.5$	5 * V ₁₂ /2 🔽 Ye	s 🗌 No			Is V ₃ or V _{av3}	₃₄ > 1.5	5 * V ₁₂ /2	Yes 🗌 N	0		
lf Yes,V _{12a} =	1679 18 or	pc/h (Equatio	on 13-16, 13-		If Yes,V _{12a} =	:	ې 13	oc/h (Equat 3-19)	ion 13-16, 13	3-18, or	
Capacity Ch	ecks				Capacit	v Ch	ecks				
	Actual	С	apacity	LOS F?		<u> </u>	Actual		Capacity	LOS F?	
-					Vr			Exhibit 1	3-8		
	4504	E 1 11 11 40 0			$V_{} = V_{}$	- V_		Exhibit 1	3_8		
v _{FO}	4531	EXNIDIT 13-8		NO	*F0 *F	· R		Exhibit 1	3-		
					V _R			10	Ŭ		
Flow Enterin	ng Merge In	nfluence A	rea		Flow En	terir	ng Diver	ge Influe	ence Area		
	Actual	Max	Desirable	Violation?			Actual	Max D	esirable	Violation?	
V _{R12}	2011	Exhibit 13-8	4600:All	No	V ₁₂			Exhibit 13-8	3		
Level of Ser	Level of Service Determination (if not F)				Level of	^r Ser	vice De	terminat	ion (if not	F)	
$D_{R} = 5.475 + 0.00734 v_{R} + 0.0078 V_{12} - 0.00627 L_{A}$						D _R = 4	4.252 + 0.	0086 V ₁₂ -	0.009 L _D		
$D_{R} = 17.5 (pc/mi/ln)$ $D_{R} =$						oc/mi/	ln)		5		
I OS = B (Exhib	it 13-2)				IOS = (F	- xhibi	, t 13-2)				
Speed Determination					Sneed [rminatio	n			
					Speed Determination						
w _s = 0.299 (E	xidit 13-11)				⊂s = (⊏ S = ····		hibit 12 10				
$S_{R}^{=}$ 54.6 mph (Exhibit 13-11) $S_{R}^{=}$ mph (Exhibit 13-12)											
S ₀ = 57.3 mp	h (Exhibit 13-11)				S₀= m∣	ph (Ex	nibit 13-12)				
S = 56.1 mp	h (Exhibit 13-13)		S = mph (Exhibit 13-12) $S = mph (Exhibit 13-13)$ Constant 6/22/2015 1								

	RA	MPS AND	RAMP JUNC	TIONS W	ORKSHE	EET							
General Info	rmation			Site Infor	mation								
Analyst	MLS		Fre	eway/Dir of Tr	avel	IR-90 /	Eastbound						
Agency or Compan	y LJB	Inc.	Jur	nction		Martin	Luther King	g Jr Dr					
Date Performed	6/19/	2015	Jur	isdiction		ODOT	District 12						
Analysis Time Perio		Peak Hour	Ana	alysis Year		2034 E	Build Condit	ion					
Project Description	001-90-19.5/2		dy										
inputo		Freeway Num	ber of Lanes N	4									
Upstream Adj Ram	р	Ramp Numbe	r of Lanes N	1						Downstrea Ramp	am Adj		
□Yes □C	n	Acceleration L	ane Length, L _A	520						∏Yes	□ On		
🗹 No 🗆 C	off	Deceleration I	_ane Length L _D							No	Off		
		Freeway Volu	me, V _F	3335							н —		
L _{up} = ft		Ramp Volume	e, V _R	680						down -	п		
V = veh/	′h	Freeway Free	-Flow Speed, S _{FF}	60.0						V _D =	veh/h		
u ven		Ramp Free-Fl	ow Speed, S _{FR}	45.0						D			
Conversion	to pc/h Un	der Base	Conditions										
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p		v = V/PHF	^F x f _{HV} x f _p		
Freeway	3335	0.94	Level	4	0	0	.980	1.00		3	619		
Ramp	680	0.94	Level	2	0	0	.990	1.00			731		
UpStream						_							
DownStream	Merge Areas						Diverge Areas						
Estimation of		Estimation of v ₁₂											
	<u> </u>	(D)					12						
	v ₁₂ – v _F	(P _{FM})	40.7)				V ₁₂ = '	V _R + (V _F	- V _R)	P _{FD}			
L _{EQ} =	(Equ	ation 13-6 0	(13-7)		L _{EQ} =		(Equation	n 13-′	12 or 13-1	3)		
P _{FM} =	0.126	using Equat	ion (Exhibit 13-6)		P _{FD} =		ι	using Eq	uatio	n (Exhibit 13	3-7)		
v ₁₂ =	458 p	c/h	10.11.10		V ₁₂ =		F	oc/h					
V ₃ or V _{av34}	1580 17)	pc/n (Equati	on 13-14 or 13-		$V_3^{}$ or $V_{av34}^{}$			pc/h (Equa	ation 13	3-14 or 13-1	7)		
Is V_3 or $V_{2\sqrt{34}} > 2.7$	/00 pc/h? □ Ye	s 🔽 No			Is V_3 or V_{av3}	₃₄ > 2,7	700 pc/h? [Yes 🗌	No				
Is V_2 or $V_{av24} > 1.5$	5*V₁₀/2 √ Ye	s 🗌 No			Is V_3 or V_{av3}	₃₄ > 1.5	5 * V ₁₂ /2	Yes 🗌	No				
If Yes,V _{12a} =	1447 18 or	pc/h (Equation 13-19)	on 13-16, 13-		lf Yes,V _{12a} =		 1:	oc/h (Eq 3-19)	uatior	n 13-16, 1	3-18, or		
Capacity Ch	ecks	10 10)			Capacity	v Ch	ecks						
	Actual	C	apacity	LOS F?			Actual		Сар	acity	LOS F?		
					V _F			Exhib	oit 13-8				
V	4350	Evhihit 13-8		No	$V_{EO} = V_{E}$	- V _R		Exhib	oit 13-8				
* FO	4000			NO				Exhit	oit 13-				
					V _R			1	10				
Flow Enterin	ng Merge In	fluence A	rea		Flow En	terir	ng Diver	rge Infl	luen	ce Area			
	Actual	Max	Desirable	Violation?		-	Actual	Ma	x Desir	able	Violation?		
V _{R12}	21/8	Exhibit 13-8	4600:All	No	V ₁₂		<u> </u>	Exhibit 1	13-8				
Level of Service Determination (if not F)					Level of	Ser	vice De	termin	atio	<u>n (if not</u>	F)		
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$						$D_{R} = 4$	4.252 + 0	.0086 V ₁	12 - 0.1	009 L _D			
D _R = 18.9 (pc/	mi/ln)				D _R = (p	c/mi/l	n)						
LOS = B (Exhibit 13-2)					LOS = (E	xhibi	t 13-2)						
Speed Determination					Speed D	Deter	minatic	on					
$M_s = 0.309$ (Exibit 13-11) $D_s = (Exhibit 13-12)$													
S _R = 54.4 mph (Exhibit 13-11)						S _R = mph (Exhibit 13-12)							
S ₀ = 57.9 mpt	n (Exhibit 13-11)				S ₀ = m	ph (Exl	hibit 13-12)						
S = 56.1 mph	n (Exhibit 13-13)				S= mp	ph (Exl	hibit 13-13)						
		PULL F									440/0045 0 55		

	RAI	MPS AND	RAMP JUNC	TIONS W	/ORKSHE	EET				
General Info	rmation	_		Site Infor	mation					
Analyst	MLS		Fre	eway/Dir of Tr	avel	IR-90 /	Eastbound			
Agency or Company	/ LJB I	nc.	Jur	nction		Martin	Luther King	g Jr Dr		
Date Performed	6/19/	2015	Jur	isdiction		ODOT	District 12			
Analysis Time Perio	d PM F	Peak Hour	Ana	alysis Year		2034 B	Build Condit	ion		
Project Description	CUY-90-19.5/2	21.3 Safety Stu	ldy							
inputs		Freewoy Num	har of Lanca N	4					1	
Upstream Adj Ramp)	Freeway Num	iber of Lanes, N	4					Downstrea	m Adj
	n	Ramp Numbe	er of Lanes, N	1					катр	
		Acceleration L	ane Length, L _A	520					🗌 Yes	🗌 On
🗹 No 🛛 🗆 O	ff	Deceleration I	Lane Length L _D						🗹 No	Off
		Freeway Volu	ime, V _F	5385					-	ft
L _{up} - π		Ramp Volume	e, V _R	1445					∸down [—]	ii.
V = veh/	h	Freeway Free	e-Flow Speed, S _{FF}	60.0					V _D =	veh/h
u		Ramp Free-F	low Speed, S _{FR}	45.0					5	
Conversion t	to pc/h Uno	der Base	Conditions		ī				Î.	
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _p
Freeway	5385	0.94	Level	4	0	0.	.980	1.00	58	343
Ramp	1445	0.94	Level	2	0	0.	.990	1.00	15	553
UpStream										
DownStream										
Estimation o		Ectimoti	ion o	<u> </u>	liverge Areas					
		Esumau		¹ 12						
	V ₁₂ = V _F	(P _{FM})					V ₁₂ = '	V _R + (V _F - V _R)P _{FD}	
L _{EQ} =	(Equa	ation 13-6 o	r 13-7)		L _{FO} =		(Equation 13-	12 or 13-13	3)
P _{FM} =	0.024	using Equat	tion (Exhibit 13-6)		P _{FD} =		ı	using Equation	n (Exhibit 13	-7)
V ₁₂ =	138 p	c/h			V ₁₂ =		r I	oc/h	,	
V ₃ or V _{av34}	2852	pc/h (Equati	on 13-14 or 13-		V_3 or V_{av34}			oc/h (Equation 1	3-14 or 13-17	<i>'</i>)
Is V or V $\rightarrow 27$	00 nc/h? 🔽 🗸				Is V ₃ or V _{av3}	₃₄ > 2,7	'00 pc/h?	Yes No		
$V_{av34} = 2,7$	* V/2 Vo				Is V ₃ or V _{av3}	34 > 1.5	5 * V ₁₂ /2 □	Yes No		
10 v 3 01 v av34 110	2337	nc/h (Equati	on 13-16 13-		If Yes V =	:	12 -	oc/h (Equatio	n 13-16, 13	-18, or
if Yes,V _{12a} =	18, or	13-19)					1:	3-19)		
Capacity Ch	ecks				Capacity	y Ch	ecks			
	Actual	0	Capacity	LOS F?			Actual	Ca	pacity	LOS F?
					V _F			Exhibit 13-	8	
V _{FO}	7396	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V _R		Exhibit 13-	8	
					V _R			Exhibit 13	-	
Elow Entorin	a Morao In	fluonco	Iroa			torin				
FIOW Enterni	Actual	Max	Desirable	Violation?	FIOWEII		Actual	Max Des	irable	Violation?
V _{P12}	3890	Exhibit 13-8	4600:All	No	V12	<u> </u>		Exhibit 13-8		
	V _{R12} 3890 Exhibit 13-8 4600:All No				Level of	- Ser	vice De	terminatio	n (if not	F)
$D_{r} = 5475 \pm 0.00734 v_{r} \pm 0.0078 V_{r} = 0.00627 I_{r}$						$D_{\rm p} = 4$	4.252 + 0	.0086 V., - 0	.009 Lp	/
$D_{\rm p} = 31.8 ({\rm pc/mi/ln})$					$D_n = (n)$	R nc/mi/li	n)	12	D	
IOS = D(Exhibit)	13-2)				IOS = (F	- xhihit	13-2)			
Speed Determination					Spood D		minatic	n		
					$D = \sqrt{r}$	vhihit 1	(3-12)	11		
$M_{\rm S}^{\rm S} = 0.465 (\text{Exbit 13-11})$ $S_{\rm S}^{\rm S} = \text{mph}(\text{Exbit 13-12})$										
S _R = 51.6 mph	(Exhibit 13-11)				S _R = mph (Exhibit 13-12) S = mph (Exhibit 13-12)					
$S_0 = 55.5 \text{ mph}$	(Exhibit 13-11)				C− m	pii(⊏xľ ≂⊨ (⊏∵'	1101(10-12)			
p = 53.4 mpn	(⊏xnibit 13-13)		p= mp	pn (Exr	110IT 13-13)					

	RA	MPS AND	RAMP JUNC	CTIONS W	ORKSHI	EET					
General Information Site Information Analyst MLS Freeway/Dir of Travel IR-90 / Westbound Acency or Company LJB Inc. Junction Martin Luther King Jr Dr											
Analyst	MLS		Fre	eway/Dir of Tra	avel	IR-90/	Westboun	d			
Agency or Company	LJB I	nc.	Ju	nction		Martin	Luther King	g Jr Dr			
Date Performed	6/19/	2015	Ju	risdiction		ODOT	District 12				
Analysis Time Period		Peak Hour	An	alysis Year		2034 E	Build Condit	ion			
Project Description	CUY-90-19.5/2	21.3 Safety Stu	ldy								
mputs		Freeway Num	ber of Lanes N	1					1		
Upstream Adj Ramp		Dome Numbe		4					Downstrea	m Adj	
Yes Or	n		er of Lanes, in	1					капр		
		Acceleration I	Lane Length, L _A	1350					🗌 Yes	On	
🗹 No 🗌 Of	f	Deceleration	Lane Length L _D	5040					🗹 No	Off	
l = ft		Freeway volu	ime, v _F	5810					L =	ft	
Lup II			e, v _R	350					-down		
$V_u = veh/h$	l	Freeway Free	P-Flow Speed, S _{FF}	60.0					V _D =	veh/h	
O a maria matia mat		Ramp Free-F	low Speed, S _{FR}	30.0							
Conversion to	o pc/n Und	der Base	Conditions		1				r		
(pc/h)	v (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	v = V/PHF	x f _{HV} x f _p	
Freeway	5810	0.94	Level	4	0	0.	.980	1.00	63	304	
Ramp	350	0.94	Level	2	0	0	.990	1.00	3	76	
UpStream											
DownStream	wnStream Merge Areas										
Estimation of		Entimat	iona	L	liverge Areas						
Estimation of	v ₁₂				Estimation of V ₁₂						
	V ₁₂ = V _F	(P _{FM})					V ₁₂ = '	V _P + (V _F - V _P)P _{ED}		
L _{EQ} =	(Equ	ation 13-6 o	r 13-7)		L _{F0} =		12	Equation 13-	12 or 13-13	3)	
P _{FM} =	0.171	using Equat	tion (Exhibit 13-6)		P _{FD} =			using Equatio	n (Exhibit 13	-7)	
V ₁₂ =	1077	pc/h			го V., =			nc/h	(.,	
V_2 or $V_{2/24}$	2613	pc/h (Equati	on 13-14 or 13-		V_2 or V_{-12}		ľ	oc/h (Equation 1	3-14 or 13-17	7)	
$1 \text{ s } \sqrt{\text{ or } \sqrt{\text{ s } 2.70}}$	17) 0 pc/b2 ⊡ Xa				Is V ₂ or V ₂₄	24 > 2.7	700 pc/h? [Yes No		/	
$V_{3} \text{ or } V_{av34} > 2.70$					Is V ₂ or V ₂	، مر > 1.5	5 * V₁₀/2 [Yes No			
13 v ₃ 01 v _{av34} > 1.5	v ₁₂ /∠ ⊻ re	sino nc/h (Equati	on 13 16 13		If Voc V -	- -	12 -	c/h (Equatio	n 13-16, 13	-18, or	
If Yes,V _{12a} =	18, or	13-19)	011 13-10, 13-		11 163, v _{12a} -	-	1:	3-19)			
Capacity Che	ecks				Capacit	y Ch	ecks				
	Actual	(Capacity	LOS F?			Actual	Ca	pacity	LOS F?	
					V _F			Exhibit 13-	8		
Vro	6680	Exhibit 13-8		No	$V_{FO} = V_{F}$	- V _R		Exhibit 13-	8		
FU					V_			Exhibit 13	-		
Elever Endening						4.0.1		10			
Flow Entering	g werge in	Tiuence A	Area Desirable	Violation?	Flow En	iterin		rge Influen	irable	\/ieletien?	
V	2007	Evhibit 12 9		VIOIAUOT ?	V		Actual	Evhibit 12.9		VIOIAUOTI?	
	ico Dotorr		4000.All	INU		E Com	vice De	EXHIDIL 13-0	n /if not	<u>_</u>)	
Level of Serv					Level of	Ser					
$D_{\rm R} = 5.475 +$	0.00734 V _R + 0	J.0078 V ₁₂ - 0.	00627 L _A			$D_{R} = 2$	4.252 + 0	.0086 v ₁₂ - 0	.009 L _D		
D _R = 19.4 (pc/m	ii/ln)				D _R = (p	oc/mi/l	n)				
LOS = B (Exhibit	13-2)				LOS = (E	Exhibit	t 13-2)				
Speed Detern	nination				Speed L	Deter	minatio	on			
M _S = 0.311 (Exi	$M_{\rm S} = 0.311 (\text{Exibit 13-11})$ $P_{\rm s} = (\text{Exhibit 13-12})$										
S _R = 54.4 mph ((Exhibit 13-11)				S _R = m	ph (Exł	hibit 13-12)				
S ₀ = 55.0 mph ((Exhibit 13-11)				S ₀ = m	ph (Exł	hibit 13-12)				
S = 54.7 mph ((Exhibit 13-13)				S = m	ph (Exł	hibit 13-13)				

	RAI	MPS AND	RAMP JUNC	CTIONS W	ORKSHE	EET							
General Infor	mation			Site Infor	mation								
Analyst	MLS		Fre	eway/Dir of Tra	avel	IR-90 / V	Vestbound	ł					
Agency or Company	LJB I	nc.	Jur	nction		Martin Lu	uther King	Jr Dr					
Date Performed	6/19/	2015	Jur	risdiction		ODOT D	District 12						
Analysis Time Period		Peak Hour	An	alysis Year		2034 Bu	ild Conditi	on					
	CU1-90-19.5/2	1.3 Salety Stu	dy										
inputs		Freeway Num	ber of Lanes N	4									
Upstream Adj Ramp		Domp Numbo	r of Lance N	1					Downstrea Bamp	m Adj			
Yes On	l	Acceleration L	ane Length, L	1350						□ On			
☑ No □ Off	F	Deceleration I	Lane Length L _D										
		Freeway Volu	me, V _F	3990									
L _{up} = ft		Ramp Volume	e, V _R	500					L _{down} =	ft			
		Freeway Free	-Flow Speed, S _{FF}	60.0					V_ =	veh/h			
v _u – ven/n		Ramp Free-Fl	ow Speed, S _{FR}	30.0					.0	Venin			
Conversion to	o pc/h Und	der Base	Conditions		_								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f	нv	f _p	v = V/PHF	x f _{HV} x f _p			
Freeway	3990	0.94	Level	4	0	0.98	80	1.00	43	30			
Ramp	500	0.94	Level	2	0	0.9	90	1.00	53	37			
UpStream													
DownStream	DownStream Merge Areas												
Merge Areas					Ectimati	ion of	D F M	iverge Areas					
Estimation of	v 12				Estimation of v ₁₂								
	V ₁₂ = V _F	(P _{FM})					V ₁₂ = \	V _R + (V _F - V _R)P _{FD}				
L _{EQ} =	(Equa	ation 13-6 o	r 13-7)		L _{FO} =		(Equation 13-	12 or 13-13)			
P _{FM} =	0.151	using Equat	tion (Exhibit 13-6)		P _{FD} =		Ĺ	ising Equatio	n (Exhibit 13-	7)			
V ₁₂ =	652 p	c/h			V ₁₂ =		p	oc/h	·				
$V_3^{}$ or $V_{av34}^{}$	1839 17)	pc/h (Equati	on 13-14 or 13-		V_3^{12} or V_{av34}^{12}		r.	oc/h (Equation 1	3-14 or 13-17)			
Is V ₃ or V _{av34} > 2,70	0 pc/h? 🗌 Ye	s 🗹 No			Is V_3 or V_{av3}	₃₄ > 2,70	0 pc/h? 🗌	Yes No					
Is V_3 or $V_{av34} > 1.5$ *	V ₁₂ /2 V Yes	s 🗌 No			Is V_3 or V_{av3}	₃₄ > 1.5 *	V ₁₂ /2	Yes 🗌 No					
If Yes,V _{12a} =	1732 j	pc/h (Equati 13-19)	on 13-16, 13-		If Yes,V _{12a} =	:	р 13	oc/h (Equation 3-19)	n 13-16, 13	-18, or			
Capacity Che	cks	10 10)			Capacit	v Che	cks						
	Actual		Capacity	LOS F?			Actual	Cap	acity	LOS F?			
			_ · _ ·		V _F			Exhibit 13-8	3				
V	1967	Evhibit 12.0		No	$V_{ro} = V_r$	- V _D		Exhibit 13-8	3				
* FO	4007			INU				Exhibit 13-	-				
					v _R			10					
Flow Entering	g Merge In	fluence A	lrea		Flow En	tering	g Diver	ge Influen	ce Area				
	Actual	Max	Desirable	Violation?		Ac	ctual	Max Desi	rable	Violation?			
V _{R12} 2269 Exhibit 13-8 4600:All No				No	V ₁₂		ل	Exhibit 13-8					
Level of Service Determination (if not F)					Level of	Servi	ice Dei	terminatio	n (if not i)			
$D_{R} = 5.475 +$	0.00734 v _R + (0.0078 V ₁₂ - 0.	00627 L _A			D _R = 4.3	252 + 0.	.0086 V ₁₂ - 0.	009 L _D				
D _R = 14.5 (pc/m	i/ln)				D _R = (p	c/mi/ln))						
LOS = B (Exhibit	13-2)				LOS = (E	Exhibit 1	13-2)						
Speed Determination Speed Determination													
M _S = 0.278 (Exil	$M_{s} = 0.278 \text{ (Exibit 13-11)}$ $D_{s} = (Exhibit 13-12)$												
S _R = 55.0 mph (Exhibit 13-11)				S _R = m	ph (Exhib	oit 13-12)						
S ₀ = 57.1 mph (Exhibit 13-11)				S ₀ = m	ph (Exhib	oit 13-12)						
S = 56.1 mph (Exhibit 13-13)				S = m	ph (Exhit	oit 13-13)						

		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET						
General Infor	rmation			Site Infor	mation								
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Eastbound						
Agency or Company	LJB	Inc.	Ju	Inction		E 55th	St						
Date Performed	2/27/ J AME	/2015 Dook Llour	JU	Irisdiction		ODOT	District 12	itian					
Project Description	CUY-90-19.5/2	21.3	AI	laiysis teal		2034 E	xisting Cond	luon					
Inputs	001 00 10.07	_ 1.0											
Linotroom Adi D	lomn	Freeway Nun	nber of Lanes, N	4					Downstroor	m Adi			
	amp	Ramp Numbe	er of Lanes, N	1				F	Ramp	II Auj			
Yes	On	Acceleration	Lane Length, L										
✓ No	Off	Deceleration	Lane Length L _D	1460									
		Freeway Volu	ıme, V _F	3975					INO №	UOπ			
L _{up} = f	ť	Ramp Volum	e, V _R	315				L	-down =	ft			
	a la /la	Freeway Free	e-Flow Speed, S _{FF}	60.0					/_ =	veh/h			
$v_u = v$	en/n	Ramp Free-F	low Speed, S _{FR}	45.0					• D -	Venin			
Conversion t	o pc/h Un	der Base	Conditions					I					
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	/ = V/PHF >	k f _{HV} x f _p			
Freeway	3975	0.94	Level	9	0	0.	957	1.00	441	9			
Ramp	315	0.94	Level	5	0	0.	976	1.00	343	3			
UpStream						—							
DownStream						I Di	verge Areas						
Estimation of	f V ₁₂			Estimat	ion o	f V ₄₂							
	12 V = V	(P)					$\frac{12}{12}$	(+))P				
 =	•12 - •F	('FM) ation 13-6 or	13-7)		=		• 12 - (F	R ' VF 'R	/' FD 2 or 13_13)				
-EQ P, =	usina	Fouation (Exhibit 13-6)		-EQ P-5 =		0.4	36 usina Fau	ation (Exhib	it 13_7)			
$V_{40} =$	nc/h				V ₄₀ =		212	0 nc/h		101)			
V ₂ or V ₂₂₂₄	pc/h (Fouation 13	3-14 or 13-17)		V _o or V _o		114	9 pc/h (Equa	ation 13-14	or 13-17)			
$1 \text{ s} V_2 \text{ or } V_{2224} > 2.70$)0 pc/h? □Ye	s 🗌 No			Is V ₂ or V ₂	., > 2.7	 00 pc/h? 🗔	Yes Vo					
Is V_2 or $V_{224} > 1.5$	*V₁₀/2 □ Ye	s 🗌 No			Is V ₂ or V ₂	₀₄ > 1.5	* V ₁₀ /2	Yes VNo					
If Yes,V _{12a} =	pc/h (Equation 13	3-16, 13-18, or		If Yes,V _{12a} =	:	12	/h (Equation	13-16, 13-1	8, or 13-			
Canacity Che	13-19)			Canacit	v Ch)					
	Actual	(Canacity	1.0S F2		<u>y 011</u>	Actual	Car	acity	LOS E2			
1	riotaai		Jupuony	20011	V _E		4419	Exhibit 13-8	9200	No			
Vro		Exhibit 13-8				- V.,	4076	Exhibit 13-8	9200	No			
FO						K	343	Exhibit 13-10	2100	No			
Elow Entoring	<u> </u> a Morao In	fluonco	l. Nroa			torin				110			
	Actual	Max	Desirable	Violation?			Actual	Max Desirabl	e	Violation?			
V _{P12}		Exhibit 13-8			V ₁₂		2120	Exhibit 13-8	4400:All	No			
Level of Service Determination (if not F)					Level of	⁻ Serv	/ice Det	ermination	í (if not F	;)			
$D_{\rm R} = 5.475 + 0.00734 v_{\rm R} + 0.0078 V_{12} - 0.00627 L_{\rm A}$						D _R = 4	.252 + 0.0	086 V ₁₂ - 0.0	09 L _D	/			
D _R = (pc/mi/lr		D _R = 9.1	3 (pc/r	ni/ln)		D							
LOS = (Exhibit	13-2)				LOS = A	(Exhit	, pit 13-2)						
Speed Determination					Speed L	Deter	minatio	า					
M _s = (Exibit 13-11)					$D_s = 0.329$ (Exhibit 13-12)								
$S_{p} = mph (Fxt)$		S _R = 54	1.1 mph	(Exhibit 1	3-12)								
$S_0 = mph (Ext)$	nibit 13-11)				S ₀ = 65	5.2 mph	(Exhibit 1	3-12)					
S = mph (Exh	nibit 13-13)				S = 59	9.4 mph	(Exhibit 1	3-13)					
	, , ,				0 0.976 1.00 343 Diverge Areas Estimation of v_{12} V12 = VR + (VF - VR)PFD LEQ = (Equation 13-12 or 13-13) PFD = 0.436 using Equation (Exhibit 13-7) V12 = 2120 pc/h V3 or Vav34 1149 pc/h (Equation 13-14 or 13-17) Is V3 or Vav34 > 2,700 pc/h? Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V3 or Vav34 > 1.5 * V12/2 Yes INO Is V4 or Nav34 > 1.5 * V12/2 Yes INO Is V4 or Nav34 > 1.5 * V12/2 Yes INO Is V4 or Nav34 > 1.5 * V12/2 Yes INO Is V5 ON Is V5 ON VF Actual								

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		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET			
General Infor	mation			Site Infor	mation					
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Eastbound			
Agency or Company	LJB	Inc.	Ju	nction		E 55th	St			
Date Performed	2/27/	/2015	Ju	risdiction		ODOT	District 12			
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 E	xisting Con	dition		
Innuts	001-90-19.3/2	21.3								
inputo		Freeway Nun	her of Lanes N	4						
Upstream Adj R	lamp	Ramp Numbe	er of Lanes N	1				l	Jownstrear Ramp	n Adj
Yes	On	Acceleration	Lane Length, L	I				ľ		
No	Off	Deceleration	Lane Length L _D	1460						
	-	Freeway Volu	ıme, V _F	5480						
L _{up} = f	t	Ramp Volum	e, V _R	210				l	-down =	ft
	ah/h	Freeway Free	e-Flow Speed, S _{FF}	60.0					/_ =	veh/h
v _u - v	en/n	Ramp Free-F	low Speed, S _{FR}	45.0					• D	VCIIIII
Conversion t	o pc/h Un	der Base	Conditions							
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	/ = V/PHF >	k f _{HV} x f _p
Freeway	5480	0.94	Level	8	0	0.	962	1.00	606	3
Ramp	210	0.94	Level	5	0	0.	976	1.00	229)
UpStream										
DownStream							warea Araaa			
Estimation of			Fstimat	ion o	fv	verge Aleas				
	<u>12</u>						· · 12			
_	$v_{12} = v_F$	(P _{FM})	40.7)				v ₁₂ =	$v_R + (v_F - v_R)$) ^P FD	
L _{EQ} -	(Equa		13-7)				(E		2 OF 13-13)	
	using	Equation (EXHIDIL 13-0)		F _{FD} -		0.4	36 USING EQU	ation (Exhib	it 13-7)
$v_{12} - v_{12} - v$	pc/n	Townships 10	(1 4 an 1 2 1 7)		$v_{12} - v_{12} - v$		21	/3 pc/n	1	
$v_3 \text{ or } v_{av34}$	pc/n (√		5-14 01 13-17)		v_3 or v_{av34}	× 0 7	۱۵۰ — ۲۵/۵۵ ۵۵	is pc/n (Equa	ation 13-14	or 13-17)
$15 V_3 OI V_{av34} > 2,70$	*\/ /2 □\				$15V_3 01V_{av}$	34 ~ 2,1 > 1 5	* \/ /2			
$15 v_3 01 v_{av34} > 1.5$	v ₁₂ /∠ ∐ Ye	S 🔲 NO Foulation 13	8-16 13-18 or		IS V ₃ OI V _{av3}	34 ~ 1.5	v ₁₂ /2	Yes MNO	13-16 13-1	8 or 13-
lf Yes,V _{12a} =	13-19)		, 10, 10, 10, 01		If Yes,V _{12a} =	:	19)	10 10, 10	0, 01 10
Capacity Che	ecks				Capacit	y Ch	ecks			
	Actual	(Capacity	LOS F?			Actual	Сар	acity	LOS F?
					V _F		6063	Exhibit 13-8	9200	No
V _{FO}		Exhibit 13-8			V _{FO} = V _F	- V _R	5834	Exhibit 13-8	9200	No
					V _R		229	Exhibit 13-10	2100	No
Flow Entering	g Merge In	fluence A	Area	-	Flow En	terin	g Diver	ge Influend	e Area	
	Actual	Max	Desirable	Violation?		/	Actual	Max Desirabl	е	Violation?
V _{R12}		Exhibit 13-8			V ₁₂	2	2773	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					Level of	Serv	/ice Det	ermination	i (if not F)
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$						D _R = 4	.252 + 0.	0086 V ₁₂ - 0.0	09 L _D	
D _R = (pc/mi/In	ı)				D _R = 15	5.0 (pc	/mi/ln)			
LOS = (Exhibit	13-2)				LOS = B	(Exhib	oit 13-2)			
Speed Determination					Speed L)eter	minatio	n		
M _s = (Exibit 13-11)					D _s = 0.	319 (E	xhibit 13-	12)		
S _R = mph (Exh		S _R = 54	1.3 mph	(Exhibit ?	13-12)					
S ₀ = mph (Exh	nibit 13-11)				S ₀ = 63	3.3 mph	(Exhibit ?	3-12)		
S = mph (Exh	nibit 13-13)				S = 58	3.8 mph	(Exhibit ²	3-13)		
								2		

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		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET					
General Infor	mation			Site Infor	mation							
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Eastbound	1				
Agency or Company	LJB	Inc.	Ju	Inction		E 72nd	St					
Date Performed	2/27/	/2015	Ju	irisdiction		ODOT	District 12					
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 E	xisting Cor	ndition				
	CU1-90-19.3/2	21.3										
mputs		Freeway Nun	her of Lanes N	1								
Upstream Adj R	lamp	Domp Numb	ar of Lance N						Downstrea	m Adj		
Yes	On		l or Laries, N	I					Ramp	_		
	_	Deceleration	Lane Length L	645					∐Yes	⊡On		
I I No □	_ Off	Freeway Volu	ime V_	4030					✓ No	Off		
L _{up} = f	ť	Ramp Volum	e. V _E	70					L _{down} =	ft		
up		Freeway Free	e-Flow Speed S	60.0								
V _u = v	$V_u = $ veh/h Ramp Free-Flow Speed, S_{r-1} 30 (V _D =	veh/h		
Conversion t	o nc/h Un	der Base		00.0								
			Tunin	0/ T , 1	0/ D		£	ſ				
(pc/n)	(Veh/hr)	PHF	Terrain	% I FUCK	%RV		Ч∨	р		х і _{НV} х і _р		
Freeway	4030	0.94	Level	4	0	0.	980	1.00	43	73		
Ramp	70	0.94	Level	5	0	0.	976	1.00	/6	5		
DownStream												
Merge Areas Diverge Areas												
Estimation of v ₁₂					Estimat	ion o	of v ₁₂		Downstream Adj Ramp Yes On Yes On No Off L _{down} = ft V _D = veh/h $V = V/PHF \times f_{HV} \times f_p$ 4373 76 4373 76 20 20 20 20 20 20 20 20 20 20			
$V_{42} = V_{E} (P_{EM})$							V ₁₂ =	· V _R + (V _F - V _F)P _{ED}	vnstream Adj np Yes On No Off n = ft = veh/h V/PHF x f _{HV} x f _p 4373 76 0 D 13-13) on (Exhibit 13-7) n 13-14 or 13-17) 16, 13-18, or 13- y LOS F? 9200 No 9200 No		
L _{FO} =	(Equa	ation 13-6 or	· 13-7)		L _{E0} =		12	Equation 13-1	2 or 13-13)	1		
P _{EM} =	using	Equation (Exhibit 13-6)				0.	436 usina Eau	, ation (Exhib	oit 13-7)		
$V_{12} =$	pc/h				$V_{12} =$		19)49 pc/h	,	,		
V_3 or V_{av34}	pc/h (Equation 13	3-14 or 13-17)		V_3 or $V_{3\sqrt{34}}$		12	212 pc/h (Equa	ation 13-14	or 13-17)		
Is V_3 or $V_{av34} > 2,70$)0 pc/h? 🗌 Ye	s 🗌 No	ŗ		Is V ₃ or V _{av}	₃₄ > 2,7	'00 pc/h? [Yes VNo		,		
Is V_3 or $V_{av34} > 1.5$	*V ₁₂ /2 □Ye	s 🗌 No			Is $V_3 \text{ or } V_{av34} > 1.5 * V_{12}/2 $ Yes V No							
If Yes V ₁₀ =	pc/h (Equation 13	3-16, 13-18, or		If v_{3} of $v_{av34} > 1.5$ $v_{12} = 12$ Pes M No If Yes V = pc/h (Equation 13-16, 13-18, or 13-							
	13-19))			••••••••••••••••••••••••••••••••••••••		1	9)				
	Actual		2 ana aitu		Capacity Checks							
P	Actual			LUGF?	V		ACIUAI	Evhibit 13.8		LUG F?		
V		Evhibit 12.8			V = V	- V	4007	Exhibit 12.9	0200	No		
¥ FO					V _{FO} – V _F	- V _R	4297	EXHIDIL 13-0	9200	NO NE		
		<u> </u>					76		2000	NO		
Flow Entering	g Merge In	Tiuence A	Area Desirable	Violation?	Flow En	iterin	atual	Max Desirab	ce Area	Violation?		
V	Actual	Evhibit 13-8	Desilable	VIOIALION	V		10/0	Evhibit 13-8		No		
	ico Dotorr	nination	(if not E)			f Son		torminatio	n (if not l	=)		
$\frac{1}{10000000000000000000000000000000000$							/					
$D_{\rm r} = (nc/mi/ln)$					$D_{-} = 14$	$R_{\rm R}$	/mi/ln)	.0000 12 0.	000 LD			
LOS = (Exhibit)	') 13_2)).2 (pc)						
Speed Determination					Speed [minatio	<u></u>				
w _s = (Exibit 1	3-11)				$S_{\rm s} = 51.0 \text{mph} (\text{Exhibit 13.12})$							
S _R = mph (Exh	101t 13-11)				$S_R = 65.0 \text{ mph} (Exhibit 13-12)$							
S_0 = mph (Exh	= mph (Exhibit 13-11)					$S_0 = 65.0 \text{ mph} (\text{Exhibit 13-12})$						
	= mph (Exhibit 13-13)						i (Exnibit	13-13)				

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RAMPS AND RAMP JUNCTIONS WORKSHEET													
General Infor	mation			Site Infor	mation								
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Eastbound						
Agency or Company	LJB I	Inc.	Ju	inction		E 72nd	St						
Date Performed	2/27/	2015	Ju	irisdiction		ODOT	District 12						
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 E	xisting Conc	lition					
	CUY-90-19.5/2	21.3											
mputs		Erooway Nun	abor of Lanos N	1									
Upstream Adj R	lamp	Domo Numbr		4					Downstrea	m Adj			
Yes	On	Acceleration	Lane Length, L	I									
✓ No	Off	Deceleration	Lane Length L _D	645									
		Freeway Volu	ıme, V _F	6030									
L _{up} = f	t	Ramp Volum	e, V _R	100					L _{down} =	ft			
	a la /la	Freeway Free	e-Flow Speed, S _{FF}	60.0					V_ =	veh/h			
V _u = veh/h Ramp Free-Flow Speed, S _{EP} 30									* D	VCII/II			
Conversion t	o pc/h Un	der 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	6030	0.94	Level	4	0	0.	980	1.00	654	.3			
Ramp	100	0.94	Level	3	0	0.	985	1.00	10	8			
UpStream													
DownStream													
Estimation of v													
		LStimat		12									
	$V_{12} = V_F (P_{FM})$						V ₁₂ = 1	V _R + (V _F - V _F	_R)P _{FD}				
L _{EQ} =	(Equa	ation 13-6 or	· 13-7)		L _{EQ} =		(E	quation 13-1	2 or 13-13)				
P _{FM} =	using	Equation (Exhibit 13-6)		P _{FD} =		0.4	36 using Equ	Equation (Exhibit 13-7)				
V ₁₂ =	pc/h				V ₁₂ =		291	4 pc/h	uation (Exhibit 13-7)				
V ₃ or V _{av34}	pc/h (Equation 13	8-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		181	4 pc/h (Equ	ation 13-14	or 13-17)			
Is V_3 or $V_{av34} > 2,70$)0 pc/h? 🗌 Ye	s 🗌 No			Is V_3 or $V_{av34} > 2,700$ pc/h? Yes V No Is V_2 or $V_{av34} > 1.5 * V_{42}/2$ Yes V No								
Is V_3 or $V_{av34} > 1.5$	*V ₁₂ /2 🗌 Ye	s 🗌 No			Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes V No								
If Yes,V _{12a} =	pc/h (13_10)	Equation 13	3-16, 13-18, or		If Yes,V _{12a} =	=	20 10	h (Equation	13-16, 13-	18, or 13-			
Capacity Che	ecks)			Capacit	v Ch	ecks)					
	Actual	(Capacity	LOS F?		<u> </u>	Actual	Ca	pacity	LOS F?			
					V _E		6543	Exhibit 13-8	9200	No			
Vro		Exhibit 13-8			$V_{ro} = V_{r}$	V _D	6435	Exhibit 13-8	3 9200	No			
FO					<u>- FO - F</u>	· ĸ	108	Exhibit 13-1	0 2000	No			
Elow Entoring	<u>a Morao In</u>	fluonco	l			torin			<u>co Aroa</u>	110			
	Actual	Max	Desirable	Violation?			Actual	Max Desirah		Violation?			
Vpta		Exhibit 13-8	200110210		V.0		2914	Exhibit 13-8	4400:All	No			
	I vice Detern	nination ((if not F)		l evel of	f Sen	vice Det	erminatio	n (if not F				
$D_{\rm p} = 5.475 \pm 0.12$.00734 v _p +	0.0078 V ₄₀	- 0.00627 L			$D_{\rm p} = 4$	1.252 + 0.0	086 V ₄₀ - 0.	009 L _P	/			
$D_{\rm r} = (\rm nc/mi/ln)$					$D_{\rm p} = 2^{\circ}$	- R 35 (nc	/mi/ln)	12					
LOS = (Exhibit 13-2)						(Evhil	hit 13 2)						
Speed Determination					Speed [minatio	n					
					$D_{r} = 0$	503 (F	xhibit 13-1	2)					
$ V _S = (EXIDIT)$	$\frac{3-11}{3}$				$S_{s} = 51.0 \text{ mph} (Exhibit 13.12)$								
o _R − mpn (Exh	$R_{\rm R}^{-}$ mpn (Exhibit 13-11)				$S_R = 62.6 \text{ mph} (Exhibit 13.12)$								
$S_0 = mph(Exh)$	= mph (Exhibit 13-11)					S_0 = 62.6 mph (Exhibit 13-12)							
	= mph (Exhibit 13-13)						(Exhidit 1	3-13)					

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		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET							
General Infor	mation			Site Infor	mation									
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Westboun	d						
Agency or Company	LJB I	nc.	Ju	Inction		Martin	Luther King	g Jr Dr						
Date Performed	2/27/	2015	Ju	risdiction		ODOT	District 12							
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 E	xisting Cor	ndition						
Innuts	001-90-19.3/2	21.3												
mputs		Freeway Nun	nher of Lanes N	1										
Upstream Adj R	lamp	Pamp Numbe	ar of Lance N	т 1					Downstrea Pamp	m Adj				
Yes	On	Acceleration	Lane Length, L	I										
No [Off	Deceleration	Lane Length L _D	670										
	-	Freeway Volu	ıme, V _F	7140										
L _{up} = f	t	Ramp Volum	e, V _R	1200					L _{down} =	ft				
N/ -		Freeway Free	e-Flow Speed, S _{FF}	60.0					V =	veh/h				
$v_u = v_i$	en/n	Ramp Free-F	low Speed, S _{FR}	25.0					v _D -	VEII/II				
Conversion t	o pc/h Un	der Base	Conditions											
(pc/h) V PHF Terrain %Truck				%Truck	%Rv		f _{HV}	f _p	v = V/PHF :	k f _{HV} x f _p				
Freeway	7140	0.94	Level	4	0	0.	980	1.00	774	8				
Ramp	1200	0.94	Level	3	0	0.	985	1.00	129	6				
UpStream														
DownStream														
Estimation of v														
		LStimat		12										
$V_{12} = V_F (P_{FM})$						V ₁₂ =	• V _R + (V _F - V _F	_R)P _{FD}						
L _{EQ} =	(Equa	ation 13-6 or	· 13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13)					
P _{FM} =	using	Equation (Exhibit 13-6)		P _{FD} =		0.	436 using Equ	uation (Exhib	3-13) (Exhibit 13-7) 13-14 or 13-17)				
V ₁₂ =	pc/h				V ₁₂ =		41	109 pc/h	quation 13-14 or 13-17)					
V ₃ or V _{av34}	pc/h (Equation 13	8-14 or 13-17)		$V_3^{}$ or $V_{av34}^{}$		18	319 pc/h (Equa	ation 13-14	or 13-17)				
Is V_3 or $V_{av34} > 2,70$	0 pc/h? 🗌 Ye	s 🗌 No			Is V ₃ or V _{av}	₃₄ > 2,7	'00 pc/h?	🛛 Yes 🗹 No						
Is V_3 or $V_{av34} > 1.5$	*V ₁₂ /2 Ye	s 🗌 No			Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No									
If Yes,V _{12a} =	pc/h (13_19)	Equation 13	3-16, 13-18, or		If Yes,V _{12a} =	=	p 1	c/h (Equation	13-16, 13-	18, or 13-				
Capacity Che	ecks				Capacit	v Ch	ecks	5)						
	Actual		Capacity	LOS F?		<u> </u>	Actual	Ca	pacity	LOS F?				
					VE		7748	Exhibit 13-8	9200	No				
Vro		Exhibit 13-8			$V_{ro} = V_{r}$	V _D	6452	Exhibit 13-8	9200	No				
FO					<u>- FO - F</u>	· ĸ	1296	Exhibit 13-1	1900	No				
Elow Entoring	<u> </u>	fluonoo	1.00			torin				110				
	Actual	Max	Desirable	Violation?			Actual	Max Desirab		Violation?				
Vpta		Exhibit 13-8	200110210		V ₄₀		4109	Exhibit 13-8	4400:All	No				
	ice Detern	nination ((if not F)		l evel of	f Ser	vice De	terminatio	n (if not F	;)				
$D_{\rm p} = 5.475 \pm 0.12$.00734 v _p +	0.0078 V ₄₀	- 0.00627 L			$D_{\rm p} = 4$	1.252 + 0	.0086 V ₄₀ - 0.0	009 L _D	/				
$D_{-} = (nc/mi/ln)$					D_ = 33	-R 36 (nc	/mi/ln)	12	D					
LOS = (Exhibit)	') 13_2)					.u (pc.) (Evbil	hit 12 2)							
Speed Determination					Speed [minatic	<u>n</u>						
	3-11) J-11				$P_{s}^{-} = 0.070 \text{ (EXTIIDIL 13-12)}$									
S _R = mph (Exh	ndit 13-11)				$\nabla_{\mathbf{R}}^{-}$ 4/.3 mpn (Exhibit 13-12) S = 62.6 mph (Exhibit 12-12)									
$S_0 = mph (Exh$	= mph (Exhibit 13-11)				$S_0^{=}$ 62.6 mph (Exhibit 13-12)									
p = mph (Exh	= mph (Exhibit 13-13)						i (Exhibit	13-13)						

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		RAMP	S AND RAM	P JUNCTI	ONS WC	RKS	HEET							
General Infor	mation			Site Infor	mation									
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90/	Westboun	d						
Agency or Company	LJB I	nc.	Ju	nction		Martin	Luther King	g Jr Dr						
Date Performed	. 2/27/	2015	Ju	risdiction		ODOT	District 12							
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 E	xisting Cor	ndition						
	CU1-90-19.5/2	21.3												
mputs		Erooway Nur	abor of Lanos N	1										
Upstream Adj R	amp	Domo Numb		4					Downstrea	m Adj				
Yes	On		er of Lanes, N	I					Ramp —					
	7	Deceleration	Lane Length, L _A	670					∐Yes	On				
I NO □	_Off	Freeway Volu	$_{\rm Lame} = 2 \cdot \cdot$	4630					✓ No	Off				
L _{up} = f	t	Ramp Volum	e, V _P	520					L _{down} =	ft				
		Freeway Free	e-Flow Speed, S	60.0										
$V_u = veh/h$ Ramp Free-Flow Speed, S _{rp} 25									V _D =	veh/h				
Conversion t	o pc/h Un	der Base	Conditions											
(pc/h) V PHF Terrain %Truck				%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	502	24				
Ramp	520	0.94	Level	3	0	0.	985	1.00	56	1				
UpStream														
DownStream														
Estimation of	Merge Areas						L I I I I I I I I I I I I I I I I I I I	liverge Areas						
Estimation of V ₁₂					LStimat		<u>12</u>							
	$V_{12} = V_{F}$	(P _{FM})					V ₁₂ =	V _R + (V _F - V _R)P _{FD}) bit 13-7) 4 or 13-17)				
L _{EQ} =	(Equa	ition 13-6 or	· 13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13)					
P _{FM} =	using	Equation (Exhibit 13-6)		P _{FD} =		0.	436 using Equ	ation (Exhib	13) xhibit 13-7) -14 or 13-17)				
V ₁₂ =	pc/h				V ₁₂ =		25	507 pc/h						
V ₃ or V _{av34}	pc/h (Equation 13	3-14 or 13-17)		V ₃ or V _{av34}		12	258 pc/h (Equa	ation 13-14	or 13-17)				
Is V_3 or $V_{av34} > 2,70$	0 pc/h? 🗌 Ye	s 🗌 No			Is V ₃ or V _{av}	₃₄ > 2,7	'00 pc/h?	🛛 Yes 🗹 No						
Is V_3 or $V_{av34} > 1.5$	'V ₁₂ /2 □Ye	s 🗌 No			Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No									
If Yes,V _{12a} =	pc/n (13-19)	Equation 13	3-16, 13-18, or		If Yes,V _{12a} =	=	p 19	oc/n (Equation 9)	13-16, 13-	18, or 13-				
Capacity Che	cks				Capacit	y Ch	ecks	- /						
	Actual	(Capacity	LOS F?		•	Actual	Cap	pacity	LOS F?				
					V _F		5024	Exhibit 13-8	9200	No				
V _{FO}		Exhibit 13-8			$V_{FO} = V_{F}$	- V _R	4463	Exhibit 13-8	9200	No				
					V _R		561	Exhibit 13-10) 1900	No				
Flow Entering	, Merge In	fluence A	Area	•	Flow Er	nterin	g Dive	rge Influend	ce Area					
	Actual	Max	Desirable	Violation?			Actual	Max Desirab	le	Violation?				
V _{R12}		Exhibit 13-8			V ₁₂	1	2507	Exhibit 13-8	4400:All	No				
Level of Serv	ice Detern	nination ((if not F)		Level of	f Ser	vice De	terminatior	n (if not F)				
D _R = 5.475 + 0.	00734 v _R +	0.0078 V ₁₂	- 0.00627 L _A			D _R = 4	1.252 + 0	.0086 V ₁₂ - 0.0	009 L _D					
D _R = (pc/mi/ln)					D _R = 19	9.8 (pc	/mi/ln)							
LOS = (Exhibit 13-2)					LOS = B	(Exhil	oit 13-2)							
Speed Determination					Speed L	Deter	minatic	on						
M _S = (Exibit 13-11)					D _s = 0.608 (Exhibit 13-12)									
S _R = mph (Exh	_R = mph (Exhibit 13-11)				S _R = 49.0 mph (Exhibit 13-12)									
S ₀ = mph (Exh	= mph (Exhibit 13-11)				S ₀ = 64.8 mph (Exhibit 13-12)									
S = mph (Exh	ibit 13-13)				S = 5	5.9 mph	(Exhibit	13-13)						
	and the set of the set of		e ve al		-			~						

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		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET						
General Infor	mation			Site Infor	mation								
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Westbound	d					
Agency or Company	LJB I	Inc.	Ju	Inction		E 55th	St						
Date Performed	. 2/27/	2015	Ju	irisdiction		ODOT	District 12						
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 E	xisting Cor	dition					
	CU1-90-19.5/2	21.3											
mputs		Erooway Nun	abor of Lanos N	1									
Upstream Adj R	amp	Domo Numbr		4					Downstrea	m Adj			
Yes	On		l ane Length	I					Ramp	_			
	7	Deceleration	Lane Length, L _A	575					∐Yes	On			
I No □	_Off	Freeway Volu	$1 \text{ ame. } V_{r}$	6350					✓ No	Off			
L _{up} = f	t	Ramp Volum	e, V _P	740					L _{down} =	ft			
		Freeway Free	e-Flow Speed, S _{FE}	60.0					V _	e le /le			
V _u = veh/h Ramp Free-Flow Speed, S _{rp} 25.									v _D =	ven/n			
Conversion t	o pc/h Un	der 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	689	90			
Ramp	740	0.94	Level	3	0	0.	985	1.00	79	9			
UpStream													
DownStream		Marga Araaa					l						
Estimation of		Estimat	ion o	fv	nverge Areas								
					Lotiniati		<u>12</u>		<u>, </u>				
$V_{12} = V_F (P_{FM})$							V ₁₂ =	V _R + (V _F - V _F	_R)P _{FD}				
L _{EQ} =	(Equa	ation 13-6 or	· 13-7)		L _{EQ} =		(1	Equation 13-1	2 or 13-13)				
P _{FM} =	using	Equation (Exhibit 13-6)		P _{FD} =		0.4	436 using Equ	uation (Exhib	oit 13-7)			
V ₁₂ =	pc/h				V ₁₂ =		34	55 pc/h	ation 13-14 or 13-17)				
V ₃ or V _{av34}	pc/h (Equation 13	3-14 or 13-17)		V ₃ or V _{av34}		17	′17 pc/h (Equa	ation 13-14	or 13-17)			
Is V_3 or $V_{av34} > 2,70$	10 pc/h? [] Ye	s 🗌 No			Is V_3 or $V_{av34} > 2.700$ pc/n? Yes V No Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes V No								
Is V_3 or $V_{av34} > 1.5$	^v ₁₂ /2 ∐Ye	s 🗌 No	0 16 12 10 or		Is V_{3} or $V_{av34} > 1.5 * V_{12}/2$ Yes No								
If Yes,V _{12a} =	13-19)	Equation 13	5-10, 13-18, 01		If Yes,V _{12a} =		μ 19	om (Equation 9)	13-10, 13-	18, 01 13-			
Capacity Che	ecks	·			Capacit	y Ch	ecks	,					
	Actual	(Capacity	LOS F?			Actual	Ca	pacity	LOS F?			
					V _F		6890	Exhibit 13-8	9200	No			
V _{FO}		Exhibit 13-8			V _{FO} = V _F	-V _R	6091	Exhibit 13-8	9200	No			
					V _R		799	Exhibit 13-10	0 1900	No			
Flow Enterine	, g Merge In	fluence A	Area		Flow En	terin	g Dive	rge Influen	ce Area	•			
	Actual	Max	Desirable	Violation?			Actual	Max Desirab	le	Violation?			
V _{R12}		Exhibit 13-8			V ₁₂	3	3455	Exhibit 13-8	4400:All	No			
Level of Serv	ice Detern	nination ((if not F)		Level of	f Serv	vice De	terminatior	n (if not F	7)			
D _R = 5.475 + 0.	00734 v _R +	0.0078 V ₁₂	- 0.00627 L _A			D _R = 4	1.252 + 0	.0086 V ₁₂ - 0.0	009 L _D				
D _R = (pc/mi/ln)					D _R = 28	3.8 (pc	/mi/ln)						
LOS = (Exhibit	13-2)				LOS = D	(Exhil	oit 13-2)						
Speed Determination					Speed L	Deter	minatic	on					
M _s = (Exibit 13-11)					D _s = 0.630 (Exhibit 13-12)								
S _R = mph (Exh	S _R = mph (Exhibit 13-11)				S _R = 48.7 mph (Exhibit 13-12)								
S ₀ = mph (Exh	₀= mph (Exhibit 13-11)				S ₀ = 63.0 mph (Exhibit 13-12)								
S = mph (Exh	ibit 13-13)				S = 54	1.9 mph	(Exhibit	13-13)					
								-					

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		RAMP	S AND RAM	P JUNCTI	ONS WO	RKS	HEET						
General Infor	mation			Site Infor	mation								
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Westbound	ł					
Agency or Company	LJB I	nc.	Ju	Inction		E 55th	St						
Date Performed	. 2/27/	2015	Ju	irisdiction		ODOT	District 12						
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 E	xisting Con	dition					
	CU1-90-19.5/2	21.3											
mputs		Erooway Nun	abor of Lanos N	1									
Upstream Adj R	amp	Domo Numb		4				[Downstrear	n Adj			
Yes	On	Acceleration	l ane Length L.	I				ľ	kamp				
	Off	Deceleration	Lane Length L_{D}	575					∐ Yes	⊡ On			
		Freeway Volu	ıme, V _F	4630					✓ No	Off			
L _{up} = f	t	Ramp Volum	e, V _R	760				L	-down =	ft			
	a la /la	Freeway Free	e-Flow Speed, S _{FF}	60.0					/_ =	veh/h			
v _u - v	en/m	Ramp Free-F	low Speed, S _{FR}	25.0					·D	Venin			
Conversion to	o pc/h Un	der Base	Conditions										
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{HV}	f _p	/ = V/PHF x	: f _{HV} x f _p			
Freeway	4630	0.94	Level	4	0	0.	980	1.00	5024	4			
Ramp	760	0.94	Level	8	0	0.	962	1.00	841				
UpStream													
DownStream Diverge Areas													
Estimation of		Estimati	ion o	$\frac{1}{f v_{42}}$	itelge / itelae								
V = V (P)							12 V =	V + (V - V)	\P				
. =	v ₁₂ – v _F	$('_{FM})$	13 7)		=		• 12 ⁻	^{V}R $^{\prime}$ ^{V}F $^{-}$ ^{V}R	/'FD 2 or 13 13)				
EQ P =	(Lyuc	Equation ($F_{\text{vhibit}} 13_{-6}$		EQ P =		("	-qualion 10-12	ation (Evhibi	+ 12 7)			
'FM V =	nc/h		Exhibit 10-0)		'FD		0. - 26	foo using Equ		(13-7)			
V_{12}	pc/h	Equation 13	$2 14 \mathrm{or} 12 17$		V_{12}^{-}		20	70 pc/h	uation 13-14 or 13-17)				
$v_3 \circ v_{av34}$	pc/n (∩ nc/h2 ⊡ v-		5-14 01 13-17)		v_3 v_{av34}	> 2 7	⊡ 20/nc	79 pc/ii (Equa	1011 13-14	0113-17)			
$15 V_3 \text{ or } V_{av34} > 2.70$					Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No								
13 v ₃ 01 v _{av34} > 1.5	v ₁₂ /∠ □ re pc/h (S III NO Fouation 13	3-16, 13-18, or		$ _{SV_3} \text{ or } V_{av34} > 1.5 * V_{12}/2 \square \text{ Yes } \checkmark \text{ No}$ pc/b (Equation 13-16, 13-18, or 13-								
If Yes,V _{12a} =	13-19))	,,,		If Yes,V _{12a} =		19	9)		0,01.10			
Capacity Che	cks				Capacity	y Ch	ecks						
	Actual	(Capacity	LOS F?			Actual	Cap	acity	LOS F?			
					V _F		5024	Exhibit 13-8	9200	No			
V _{FO}		Exhibit 13-8			$V_{FO} = V_{F}$	- V _R	4183	Exhibit 13-8	9200	No			
					V _R		841	Exhibit 13-10	1900	No			
Flow Entering	g Merge In	fluence A	Area		Flow En	terin	g Diver	ge Influend	e Area				
	Actual	Max	Desirable	Violation?			Actual	Max Desirabl	е	Violation?			
V _{R12}		Exhibit 13-8			V ₁₂	2	2665	Exhibit 13-8	4400:All	No			
Level of Serv	ice Detern	nination ((if not F)		Level of	Ser	vice De	termination	i (if not F)			
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$					[D _R = 4	1.252 + 0.	.0086 V ₁₂ - 0.0	09 L _D				
D _R = (pc/mi/ln)				D _R = 22	2.0 (pc	/mi/ln)						
LOS = (Exhibit	13-2)				LOS = C	(Exhil	oit 13-2)						
Speed Determination					Speed D	Deter	minatio	n					
M _S = (Exibit 1	M _S = (Exibit 13-11)				D _s = 0.634 (Exhibit 13-12)								
S _R = mph (Exh	S _R = mph (Exhibit 13-11)				S _R = 48.6 mph (Exhibit 13-12)								
S ₀ = mph (Exh	mph (Exhibit 13-11)				S ₀ = 65.1 mph (Exhibit 13-12)								
S = mph (Exh	ibit 13-13)				S = 55	5.2 mph	(Exhibit	13-13)					
<u> </u>					714								

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		RAMP	S AND RAM	P JUNCTI	ONS WC	RKS	HEET							
General Infor	mation			Site Infor	mation									
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90/	Eastbound							
Agency or Company	LJB I	nc.	Ju	inction		Martin	Luther King	g Jr Dr						
Date Performed	6/19/	2015	Ju	risdiction		ODOT	District 12							
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 B	uild Condit	ion						
	001-90-19.3/2	21.3												
mputs		Freeway Nun	ber of Lanes N	4										
Upstream Adj R	amp	Ramp Numbe	ar of Lanes N	1					Downstrea Ramp	m Adj				
Yes	On	Acceleration	Lane Length, L _A	I						On				
✓ No	Off	Deceleration	Lane Length L _D	800										
	Freeway Volume, V _F 39													
$L_{up} = f$	t	Ramp Volum	e, V _R	625					L _{down} =	π				
	oh/h	Freeway Free	e-Flow Speed, S_{FF}	60.0				,	V _D =	veh/h				
v _u – v		Ramp Free-F	low Speed, S _{FR}	45.0					D					
Conversion to	o pc/h Un	der 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	3960	0.94	Level	9	0	0.	957	1.00	44()2				
Ramp	625	0.94	Level	5	0	0.	976	1.00	68	2				
UpStream						—			-					
DownStream		Merge Areas					r)iverge Areas						
Estimation of		Estimat	ion o	fv.	nverge Areas									
							<u> </u>							
	$V_{12} = V_F (P_{FM})$						v ₁₂ -		۶ ^{/۳} FD					
EQ -	(Equa	Equation (13-7)		EQ -		(2 01 13-13)					
'FM -	using	Equation (Exhibit 13-0)		FD -		0.	430 using Equ		-13) Exhibit 13-7) 3-14 or 13-17)				
v_{12}	pc/n	Equation 12	(14 or 12 17)		v_{12} –		23	004 pc/n 040 pc/h (Faux	otion 12 11	or 10 17)				
v_3 or v_{av34}	pc/n (∩ no/b2 ⊡ v-		-14 01 13-17)		v_3 v_{av34}	> 2 7	11 ⊐ 20/p2 00	N49 pc/n (Equa	auon 13-14	0[13-17]				
$15 V_3 \text{ or } V_{av34} > 2.70$					Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No									
If Yes. V_{40} =	v ₁₂ /2 □ re pc/h (Equation 13	8-16, 13-18, or		Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No If Yes V = pc/h (Equation 13-16, 13-18, or 13-									
	13-19)						19	9)						
	CKS) an a city		Capacity Checks									
	Actual	· · · · ·		LUGF?	V		4402	Evhihit 13.8		LUG F?				
V					V - V	V	2700		0000	No				
^V FO		EXHIBIT 12-0			V _{FO} - V _F	- • _R	3720		9200	INO				
					V _R		682		2100	NO				
Flow Entering	g Merge In	fluence A	Area Desirable	Violation2	Flow Er	<u>iterin</u>	g Dive	rge Influend	ce Area	Violation?				
	Actual	IVIAX	Desirable	violation?	V			Evhibit 12.9	4400-All	violation?				
	iaa Datarr		(if mot F)		V ₁₂	<u> </u>	2304		4400.All					
Level of Serv					Levero				<u>1 (IT NOT F</u>	7				
$D_{R} = 5.475 \pm 0.00734 V_{R} \pm 0.0078 V_{12} \pm 0.00627 L_{A}$						υ _R – 4	F.202 + U	.0000 v ₁₂ - 0.0	009 L _D					
$D_R = (pc/mi/in$)				$D_{\rm R} = 10$	6.9 (pc	/mi/in)							
LOS = (Exhibit 13-2)					LOS = B	(Exhil	oit 13-2)							
Speed Detern	nination				Speed L	Jeter	minatio							
M _S = (Exibit 1	M _S = (Exibit 13-11)				D _s = 0.359 (Exhibit 13-12)									
S _R = mph (Exh	S _R = mph (Exhibit 13-11)				S _R = 53.5 mph (Exhibit 13-12)									
S ₀ = mph (Exh	= mph (Exhibit 13-11)				S ₀ = 65.6 mph (Exhibit 13-12)									
S = mph (Exh	= mph (Exhibit 13-13)					8.7 mph	(Exhibit	13-13)						

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		RAMP	S AND RAM	P JUNCTI	ONS WC	RKS	HEET							
General Infor	mation			Site Infor	mation									
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Eastbound	ł						
Agency or Company	LJBI	nc.	Ju	Inction		Martin	Luther King	g Jr Dr						
Date Performed	6/19/	2015	Ju	risdiction		ODOT	District 12							
Analysis Time Period		Peak Hour	Ar	nalysis Year		2034 B	uild Condi	tion						
Innuts	001-90-19.3/2	21.3												
mputs		Freeway Nun	nher of Lanes N	1										
Upstream Adj R	lamp	Ramn Numbe	ar of Lanes N	т 1					Downstrea Ramp	m Adj				
Yes	On	Acceleration	Lane Length, L _A	I						On				
✓ No	Off	Deceleration	Lane Length L _D	800					No.					
		Freeway Volu	ume, V _F	5930										
L _{up} = f	L _{up} = ft Ramp Volume, V _R 545								L _{down} =	π				
V - v	oh/h	Freeway Free	e-Flow Speed, S _{FF}	60.0					V_ =	veh/h				
v _u - v	en/n	Ramp Free-F	low Speed, S _{FR}	45.0					•D	Veniin				
Conversion t	o pc/h Un	der 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	5930	0.94	Level	8	0	0.	962	1.00	656	61				
Ramp	545	0.94	Level	5	0	0.	976	1.00	59	4				
UpStream														
DownStream		Morgo Aroas					r)ivorgo Aroas						
Estimation of		Estimat	tion o	fv.	nverge Aleas									
					Diverge Areas Estimation of v_{12} $V_{12} = V_R + (V_F - V_R)P_{FD}$ $L_{EQ} = (Equation 13-12 or 13-13)$ $P_{-} = 0.436$ using Equation (Exhibit 13.7)									
	$V_{12} = V_{F} (P_{FM})$						v ₁₂ -	· v _R + (v _F - v _F	۶ ^{/۳} FD					
EQ -	(Equa	Equation (13-7)		EQ -		(2 01 13-13)					
'FM -	using	Equation (Exhibit 13-0)		FD -		0.	430 using Equ	Lation (Exhic	13-13) I (Exhibit 13-7) 13-14 or 13-17)				
$v_{12} = V_{12}$	pc/n	Equation 12	2 14 or 12 17		$v_{12} - v_{12} - v$		J	190 pc/n	otion 12 11	or 10 17)				
$v_3 \circ v_{av34}$	pc/n (0 pc/b2 ⊡ v-		5-14 01 13-17)		v_3 v_{av34}	> 2 7	זו המארה 00'	oz pc/n (Equ	alion 13-14	0113-17)				
$15 V_3 OI V_{av34} > 2,70$	*\/ /2 □\				Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes No									
If Yes, $V_{122} =$	pc/h (Equation 13	3-16, 13-18, or		Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Ves V No If Yes, $V_{120} =$ pc/h (Equation 13-16, 13-18, or 13-									
Canacity Cho	13-19)				Canacit	w Ch	ocks	9)						
	Actual		Canacity	LOS F2	Capacity Checks									
	/ totudi	<u> </u>		20011	V _E		6561	Exhibit 13-8	9200	No				
V		Evhibit 13-8			$V_{} = V_{}$	- V_	5067	Evhibit 13-8	8 0200	No				
• FO						- •R	504	Exhibit 12.1	0 2100	No				
Elever Enterin		fluonoo	<u> </u>				094		2100	NU				
Flow Entering	g werge m	Max	Area Desirable	Violation?	FIOW EI		Actual	May Desirah		Violation?				
V	Actual	Exhibit 13-8	Desilable	VIOIALION	V.		2106	Fyhihit 13-8	4400·All	No				
	ico Dotorr	nination	(if not E)			f Son		torminatio	n (if not l	=)				
$D_{-} = 5475 \pm 0$	00734 v - +	0 0078 V	- 0.00627 L			$D_{-} = 4$	1 252 + 0	0086 V 0	0091-	/				
$D_{\rm r} = (nc/mi/ln)$					D = 2	^D R 45 (no	/mi/ln)	.0000 12 0.	000 ED					
$U_R = (pc/m/m)$	13 2)				$P_{\rm R}^{-} = 2^{-1}$	4.5 (pc	/1111/111)							
Speed Determination					Speed I		minatio							
Speed Delerr														
M _S = (Exibit 1	$M_{\rm S}$ = (Exibit 13-11)				$\nu_{\rm s} = -0.351 (EXMIDIT 13-12)$									
p _R = mph (Exh	P_R = mph (Exhibit 13-11)				v_{R} = 53.7 mpn (Exhibit 13-12) S = 63.2 mph (Exhibit 13.42)									
$S_0 = mph (Exh$	= mph (Exhibit 13-11)					$S_0 = 63.2 \text{ mph} (\text{Exhibit } 13-12)$								
p = mpn (Exr)	= mph (Exhibit 13-13)						i (⊨xhibit	13-13)						

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		RAMP	S AND RAM	P JUNCTI	ONS WC	RKS	HEET				
General Infor	mation			Site Infor	mation						
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Westbound	d			
Agency or Company	LJB	Inc.	Ju	Inction		Martin	Luther King	g Jr Dr			
Date Performed	6/19/	/2015	Ju	irisdiction		ODOT	District 12				
Analysis Time Period		Peak Hour	Ai	halysis Year		2034 B	uild Condit	ion			
Innuts	001-90-19.0/2	21.3									
inputo		Freeway Nun	her of Lanes N	4							
Upstream Adj R	amp	Ramp Numbe	er of Lanes N	1					Downstrea Ramn	m Adj	
Yes	On	Acceleration	ane Length	I							
	7	Deceleration	Lane Length, L _A	670					∐ Yes	∟On	
I I No □	Ereeway Volume V 7140								🗹 No	Off	
L.,= f	.= ft Ramp Volume V_ 13								L _{down} =	ft	
up	Freeway Free-Flow Speed S 60 (
$V_u = veh/h$ Pamp Free Flow Speed, S _{FF} 00.0									V _D =	veh/h	
Comunation A	<u></u>			20.0							
Conversion to	opc/non	uer base	Conditions	1	1						
(pc/h)	(Veh/hr)	PHF	Terrain	%Truck	%Rv		f _{H∨}	f _p	v = V/PHF	x f _{HV} x f _p	
Freeway	7140	0.94	Level	4	0	0.	980	1.00	774	18	
Ramp	1330	0.94	Level	3	0	0.	985	1.00	143	36	
UpStream											
DownStream		Merge Areas					I)iverge Areas			
Estimation of V					Estimat	tion o	of V ₁₀	Nierge Areas			
						Inv p Inv p 0 0.980 1.00 7748 0 0.985 1.00 1436 Diverge Areas Estimation of v_{12} V12 = V _R + (V _F - V _R)P _{FD} Clequation 13-12 or 13-13) OFFD = 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? \Box Yes \bigtriangledown No					
	v ₁₂ – v _F	(F _{FM})	10 7)				v ₁₂ –	$\nabla_R = (\nabla_F - \nabla_F)$	R ^{JIF} FD		
EQ -	(⊏qua	Equation (13-7		EQ -		()	Equation 13-1	2 01 13-13)		
'FM -	using	Equation (Exhibit 13-0)		FD -		0.4	430 using ⊏qu	Jation (Exnit)1(13-7)	
$v_{12} - v_{12}$	pc/n	Equation 12	(14 or 12 17)		$v_{12} - v_{12} - v$		41	100 pc/n 200 pc/h (Fau	otion 12 11	or 10 17)	
$v_3 \circ v_{av34}$	pc/n (∩ nc/h2 ⊡ va		-14 01 13-17)		³ ^{or} ^v av34	> 2 7	// ⊐ 2d/pc/b2	ov pc/ii (⊑qu	allon 13-14	0113-17)	
$V_{3} \text{ or } V_{av34} > 2.70$	*V /2 □Ve				Is V or V	34 ⁻ 2,1 > 1 5	×V /2 □				
13 v ₃ 01 v _{av34} > 1.5	$v_{12'}^2 \square re$	S III NO Fouation 13	-16 13-18 or		Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes V No						
lf Yes,V _{12a} =	13-19))			If Yes,V _{12a} = pc/h (Equation 13-16, 13-18, or 13- 19)						
Capacity Che	ecks				Capacit	y Ch	ecks				
	Actual	(Capacity	LOS F?			Actual	Ca	pacity	LOS F?	
					V _F		7748	Exhibit 13-8	3 9200	No	
V _{FO}		Exhibit 13-8			$V_{FO} = V_{F}$	- V _R	6312	Exhibit 13-8	3 9200	No	
					V _R		1436	Exhibit 13-1	0 1900	No	
Flow Entering	g Merge In	fluence A	Area		Flow Er	nterin	g Dive	rge Influen	ce Area		
	Actual	Max	Desirable	Violation?			Actual	Max Desirab	ole	Violation?	
V _{R12}		Exhibit 13-8			V ₁₂	4	4188	Exhibit 13-8	4400:All	No	
Level of Serv	ice Deterr	nination (if not F)		Level of	f Serv	vice De	terminatio	n (if not l	-)	
D _R = 5.475 + 0.	00734 v _R +	0.0078 V ₁₂	- 0.00627 L _A			D _R = 4	1.252 + 0	.0086 V ₁₂ - 0.	009 L _D		
D _R = (pc/mi/In)				D _R = 34	4.2 (pc	/mi/ln)				
LOS = (Exhibit	13-2)				LOS = D	(Exhil	bit 13-2)				
Speed Determination					Speed L	Deter	minatic	on			
M _s = (Exibit 1	3-11)				D _s = 0.687 (Exhibit 13-12)						
S _R = mph (Exh	ibit 13-11)				S _R = 47.6 mph (Exhibit 13-12)						
S ₀ = mph (Exh	₀ = mph (Exhibit 13-11)					S ₀ = 62.8 mph (Exhibit 13-12)					
S = mph (Exh	ibit 13-13)				S = 53	3.6 mph	(Exhibit	13-13)			
								2			

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		RAMP	S AND RAM	P JUNCTI	ONS WC	RKS	HEET						
General Infor	mation			Site Infor	mation								
Analyst	MLS		Fr	eeway/Dir of Tr	avel	IR-90 /	Westboun	d					
Agency or Company	LJB	Inc.	Ju	Inction		Martin	Luther King	g Jr Dr					
Date Performed	6/19/	/2015	Ju	irisdiction		ODOT	District 12						
Analysis Time Period		Peak Hour	Ai	nalysis Year		2034 B	uild Condit	ion					
Innuts	001-90-19.3/2	21.3											
inputo		Freeway Nun	ber of Lanes N	4									
Upstream Adj R	lamp	Ramp Numbe	ar of Lanes N	1					Downstrea Ramp	m Adj			
Yes	On		ane Length	I						_			
	_	Deceleration	Lane Length, L _A	670					∐Yes	⊡On			
I No □	_Off	Ereeway Volu		4630					🗹 No	Off			
L = f	t	Pamp Volum	nne, v _F	4030					L _{down} =	ft			
up		France France	e, v _R	000					down				
V _u = v	$V_u = $ veh/h Pamp Free Flow Speed, S _{FF} 00.0								V _D =	veh/h			
		Ramp Free-F	low Speed, S _{FR}	25.0									
Conversion t	o pc/n Un	der Base	Conditions	<u> </u>	1								
(pc/h)	(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	502	24			
Ramp	650	0.94	Level	3	0	0.	985	1.00	70	2			
UpStream													
DownStream		 Marria Ariana											
Estimation of		Fstimat	tion o	L of v	liverge Areas	Downstream Adj Ramp Yes On No Off L _{down} = ft V _D = veh/h $V = V/PHF \times f_{HV} \times f_p$ 5024 702 R)P _{FD} 2 or 13-13) uation (Exhibit 13-7) ation 13-14 or 13-17) ation 13-14 or 13-17) ation 13-16, 13-18, or 13- apacity LOS F? 8 9200 No 8 9200 No 8 9200 No 9 1900 No ce Area Dle Violation? 4400:All No n (if not F) 009 L _D							
					Lotinat		<u>12</u>	<u> </u>	<u>, </u>				
	V ₁₂ = V _F	(P _{FM})					V ₁₂ =	• V _R + (V _F - V _F	_R)P _{FD}				
L _{EQ} =	(Equa	ation 13-6 or	13-7)		L _{EQ} =		(Equation 13-1	2 or 13-13)				
P _{FM} =	using	Equation (Exhibit 13-6)		P _{FD} =		0.	436 using Equ	uation (Exhibit 13-7)				
V ₁₂ =	pc/h				V ₁₂ =		25	586 pc/h					
V ₃ or V _{av34}	pc/h (Equation 13	3-14 or 13-17)		V ₃ or V _{av34}		12	219 pc/h (Equa	ation 13-14	or 13-17)			
Is V_3 or $V_{av34} > 2,70$	0 pc/h? ∐Ye	s 🗌 No			Is V_3 or $V_{av34} > 2,700$ pc/n? Yes V No Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ Yes V No								
Is V_3 or $V_{av34} > 1.5$	^v ₁₂ /2 ∐Ye	s 🗌 No	16 12 10 or		$ s V_3 \text{ or } V_{av34} > 1.5 * V_{12} ^2 \square \text{ Yes } \square \text{ No}$ pc/b (Equation 13-16, 13-18, or 13-								
lf Yes,V _{12a} =	pc/n (13-19)	Equation 13	-16, 13-18, Or		If Yes,V _{12a} =	=	р 19	9)	13-16, 13-	18, 01 13-			
Capacity Che	ecks	,			Capacit	y Ch	ecks	,					
	Actual	(Capacity	LOS F?			Actual	Ca	pacity	LOS F?			
					V _F		5024	Exhibit 13-8	9200	No			
V _{FO}		Exhibit 13-8			$V_{FO} = V_{F}$	- V _R	4322	Exhibit 13-8	9200	No			
					Vp		702	Exhibit 13-1	0 1900	No			
Flow Entering	n Merae In	fluence 4	lrea			nterin	a Dive	rae Influen	ce Area				
	Actual	Max	Desirable	Violation?			Actual	Max Desirab	le	Violation?			
V _{R12}		Exhibit 13-8			V ₁₂		2586	Exhibit 13-8	4400:All	No			
Level of Serv	ice Detern	nination (if not F)	<u> </u>	Level of	f Serv	vice De	termination	n (if not l	=)			
D _R = 5.475 + 0.	.00734 v _R +	0.0078 V ₁₂	- 0.00627 L ₄			D _R = 4	1.252 + 0	.0086 V ₁₂ - 0.0	009 L _D	/			
$D_{p} = (pc/mi/ln)$					$D_p = 20$	0.5 (pc	/mi/ln)	12	D				
LOS = (Exhibit	, 13-2)				LOS = C	(Fxhil	, bit 13-2)						
Speed Determination					Speed I	Deter	minatic	n					
M = (Evilit 13.11)					D = 0.621 (Exhibit 13-12)								
$W_S = (EXIDIC)$	J-11)				S_{p} = 48.8 mph (Exhibit 13-12)								
S - mak (Ext	$\frac{101113-11}{101112}$				S_{A} = 65.0 mph (Exhibit 13-12)								
$S_0 = mpn (EXP)$	= mph (Exhibit 13-11)					$p_0 = 65.0 \text{ mph} (Exhibit 13-12)$							
	= mph (Exhibit 13-13)							10-10)					

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		F	REEWAY	WEAV	ING WOF	RKSHEE	Т		
General Information					Site Information				
Analyst Agency/Con Date Perforr Analysis Tin	npany ned ne Period	MLS LJB Ind 2/27/20 AM Pe	c.)15 ak Hour		Freeway/Dir of TravelIR-90 / EastboundWeaving Segment LocationE 72nd St / MLK Jr DrAnalysis Year2034 Existing Condition				r Dr dition
Project Desc	cription CUY-90)-19.50/21.30							
Inputs					r				
Weaving col Weaving nu Weaving sea Freeway fre	nfiguration mber of lanes, N gment length, L _s e-flow speed, Fl	N S FS		One-Sided 4 515ft 60 mph	Segment typ Freeway min Freeway ma: Terrain type	e iimum speed ximum capao	, S _{MIN} Sity, C _{IFL}		Freeway 40 2300 Leve
Convers	sions to po	c/h Unde	r Base Co	ondition	<u>s</u>	1	1		
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _Τ	E _R	f _{HV}	fp	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								
Configu	ration Cha	aracteris	tics						
Minimum m	aneuver lanes, l	N _{WL}		2 lc	Minimum we	eaving lane c	hanges, LC _{MIN}	I	758 lc/h
Interchange	density, ID			1.2 int/mi	Weaving lan	ie changes, l	_C _w		930 lc/h
Minimum R	F lane changes,	LC _{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		271 lc/h
Minimum Fl	R lane changes,	LC_{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		1201 lc/h
Minimum R	R lane changes,	, LC _{RR}		lc/pc	Non-weaving	g vehicle ind	ex, I _{NW}		229
Weavin	g Segment	t Speed,	Density, I	_evel of	Service,	and Cap	oacity		
Weaving segment flow rate, v 4370 veh/h			4370 veh/h	Weaving intensity factor, W				0.441	
Weaving segment capacity, c _w 7906 veh/t			7906 veh/h	Weaving segment speed, S				49.9 mph	
Weaving segment v/c ratio 0.55			0.553	Average weaving speed, S _w			53.9 mph		
Weaving se	gment density, I	D	22	2.3 pc/mi/ln	Average non-weaving speed, S _{NW}			49.2 mph	
Level of Ser	VICE, LUS			С	Maximum w	eaving length	n, L _{MAX}		4233 ft
Notes									
a. vveaving s Chapter 13, " b. For volume	egments longer the Freeway Merge a	and Diverge Se	egments".	ength should l	De treated as is	solated merge	and diverge ar	eas using the	procedures of

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		F	REEWAY	WEAV	ING WOF	RKSHEE	Т		
General	Informati	on			Site Info	rmation			
Analyst Agency/Con Date Perforr Analysis Tin	npany ned ne Period	MLS LJB Inc 2/27/20 PM Pe	c.)15 ak Hour		Freeway/Dir of Travel IR-90 / Eastbound Weaving Segment Location E 72nd St / MLK Jr Dr Analysis Year 2034 Existing Condition				
Project Desc	cription CUY-90	0-19.50/21.30							
Inputs					1				
Weaving col Weaving nu Weaving seg Freeway fre	nfiguration mber of lanes, N gment length, L e-flow speed, F	N s FS		One-Sided 4 515ft 60 mph	Segment type Freew Freeway minimum speed, S _{MIN} 7 Freeway maximum capacity, C _{IFL} 23 Terrain type Le				
Convers	sions to p	<u>c/h Unde</u>	r Base Co	ondition	S				
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _Τ	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								
Configu	ration Cha	aracteris	tics						
Minimum m	aneuver lanes,	N _{WL}		2 lc	Minimum we	eaving lane c	hanges, LC _{MIN}	I	770 lc/h
Interchange	e density, ID			1.2 int/mi	Weaving lan	e changes, L	_C _w		942 lc/h
Minimum R	F lane changes	, LC _{rf}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		739 lc/h
Minimum Fl	R lane changes	, LC _{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		1681 lc/h
Minimum R	R lane changes	, LC _{RR}		lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		369
Weaving	g Segmen	t Speed,	Density, I	_evel of	Service,	and Cap	pacity		
Weaving segment flow rate, v6620 veh/hWeaving segment capacity, c8071 veh/h			6620 veh/h 8071 veh/h	Weaving intensity factor, W Weaving segment speed, S			0.575 47.0 mph		
Weaving segment v/c ratio 0.82			0.820	Average weaving speed, S _w				52.7 mph	
Weaving se	Weaving segment density, D 35.8 pc/mi/l			5.8 pc/mi/ln	n Average non-weaving speed, S _{NW}			46.4 mph	
Level of Ser	rvice, LOS			E	Maximum weaving length, L _{MAX} 367				3678 ft
Notes									
a. vveaving s Chapter 13, "	egments longer t Freeway Merge	and Diverge Se	egments".	ength should l	De treated as is	solated merge	and diverge ar	eas using the	procedures of

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		F	REEWAY	WEAV	ING WOF	RKSHEE	Т		
Genera	al Informati	on			Site Info	rmation			
Analyst Agency/Cc Date Perfo Analysis Ti	ompany rmed ime Period	MLS LJB Inc 2/27/20 AM Pe	c.)15 ak Hour		Freeway/Dir of TravelIR-90 / WestboundWeaving Segment LocationMLK Jr Dr / E 72nd StAnalysis Year2034 Existing Condition				
Project De	scription CUY-90)-19.50/21.30							
Inputs					r				
Weaving c Weaving n Weaving s Freeway fr	onfiguration umber of lanes, N egment length, L ree-flow speed, F	N s FS		One-Sided 4 475ft 60 mph	Segment type Freeway minimum speed, S _{MIN} Freeway maximum capacity, C _{IFL} Terrain type				Freeway 40 2300 Leve
Conve	rsions to po	<u>c/h Unde</u>	r Base Co	ondition	<u>s</u>				
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _Τ	E _R	f _{HV}	fp	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								
Config	uration Cha	aracteris	tics						
Minimum r	maneuver lanes,	N _{WL}		2 lc	Minimum we	eaving lane cl	hanges, LC _{MIN}	ı	537 lc/h
Interchang	je density, ID			1.2 int/mi	Weaving lan	ie changes, L	C _w		692 lc/h
Minimum I	RF lane changes	, LC _{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		814 lc/h
Minimum I	FR lane changes	, LC _{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		1506 lc/h
Minimum I	RR lane changes	, LC _{RR}		lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		367
Weavir	ng Segmen ⁻	t Speed,	Density, I	_evel of	Service,	and Cap	oacity		
Weaving segment flow rate, v 6837 veh/h			6837 veh/h	Weaving intensity factor, W				0.562	
Weaving segment capacity, c _w 8169 veh/ł			8169 veh/h	Weaving segment speed, S				48.1 mph	
Weaving segment v/c ratio 0.83			0.837	Average weaving speed, S _w				52.8 mph	
Weaving s	segment density,	D	36	5.3 pc/mi/ln	Average non-weaving speed, S _{NW}			47.8 mph	
Level of S	ervice, LOS			E	Maximum weaving length, L_{MAX}			3317 ft	
Notes	eesments laws "	han the sets '	ted mentioner 1	worth object 1			and diverse	1000 uni 46	are address of
a. weaving Chapter 13, b. For volun	, "Freeway Merge a nes that exceed the	and Diverge Se e weaving segi	egments". ment capacity, th	ne level of se	vice is "F".	solated merge	anu uiverge ar	eas using the	procedures of

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		F	REEWAY	' WEAV	ING WOF	RKSHEE	Т		
General Information					Site Information				
Analyst Agency/Con Date Perforr Analysis Tin	npany ned ne Period	MLS LJB Ind 2/27/20 PM Pe	c.)15 ak Hour		Freeway/Dir of TravelIR-90 / WestboundWeaving Segment LocationMLK Jr Dr / E 72nd StAnalysis Year2034 Existing Condition				
Project Deso	cription CUY-90	-19.50/21.30							
Inputs					.				
Weaving cou Weaving nu Weaving seu Freeway fre	nfiguration mber of lanes, N gment length, L _e e-flow speed, Ff	I ∋ ≂S		One-Sided 4 475ft 60 mph	Segment type Freeway minimum speed, S _{MIN} Freeway maximum capacity, C _{IFL} Terrain type				Freeway 40 2300 Level
Convers	sions to po	c/h Unde	r Base Co	ndition	<u>S</u>			•	
	V (veh/h)	PHF	Truck (%)	RV (%)	Ε _Τ	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								
Configu	ration Cha	aracteris	tics						
Minimum m	aneuver lanes, l	N _{WL}		2 lc	Minimum we	aving lane cl	hanges, LC _{MIN}	I	683 lc/h
Interchange	e density, ID			1.2 int/mi	Weaving lan	e changes, L	.C _w		838 lc/h
Minimum R	F lane changes,	LC_{RF}		1 lc/pc	Non-weaving	g lane chang	es, LC _{NW}		398 lc/h
Minimum Fl	R lane changes,	LC_{FR}		1 lc/pc	Total lane ch	nanges, LC _{AL}	L		1236 lc/h
Minimum R	R lane changes,	LC _{RR}		lc/pc	Non-weaving	g vehicle inde	ex, I _{NW}		252
Weaving	g Segment	t Speed,	Density, I	_evel of	Service,	and Cap	oacity		
Weaving segment flow rate, v 5011 veh/h			5011 veh/h	Weaving intensity factor, W				0.481	
Weaving segment capacity, c _w 8000 veh/h			8000 veh/h	Weaving segment speed, S				49.5 mph	
Weaving segment v/c ratio 0.62			0.626	Average weaving speed, S_{w}			53.5 mph		
Weaving se	gment density, I	D	25	5.8 pc/mi/ln	Average non-weaving speed, S_{NW}			49.0 mph	
Level of Se	rvice, LOS			C	Maximum w	eaving length	n, L _{max}		3870 ft
Notes									
a. Weaving s Chapter 13, " b. For volume	egments longer th Freeway Merge a es that exceed the	nan the calcula and Diverge Se e weaving segr	ated maximum le egments". ment capacity, th	ength should l	oe treated as is ∙vice is "F".	solated merge	and diverge ar	eas using the	procedures of

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AND MOVING VEHICLE REAR END BACKING VEHICLE REAR END 1. TIME, DAY, DATE	18 PROPERTY DAMAGE ONLY MOVING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. REAR END RIGHT ANGLE 1. TIME, DAY, DATE 4 INJURY OR FATAL PEDESTRIAN PARKED VEHICLE FIXED OBJECT PARKED VEHICLE FIXED OBJECT Image: Charge of the state of the stat	NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASHES	SHOW FOR				
18 PROPERTY DAMAGE ONLY Image only<	O INJURY ACCIDENT — HEAD ON DUSK AND DAWN CITY <u>Cleveland</u> ROUTE NU	18 PROPERTY DAMAGE ONLY 4 INJURY OR FATAL 22 TOTAL ACCIDENTS	MOVING VEHICLE BACKING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE FIXED OBJECT FATAL ACCIDENT O INJURY ACCIDENT	REAR END RIGHT ANGLE SIDE SWIPE OUT OF CONTROL LEFT TURN HEAD ON	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED 3. NITE - IF BETWEEN DUSK AND DAWN	LOG POINT №. PERIOD CITY	3 Years Cleveland	CRAS I 19.42 FROM	H DIAGR TC TC TC TC TC





22 PROPERTY DAMAGE ONLY 10 INJURY OR FATAL 32 TOTAL ACCIDENTS ACCIDENTS MOVING VEHICLE REAR END NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PARKED VEHICLE PROPERTY DAMAGE OND PROPERTY DAMAGE OND<	NUMBER OF CRASHES SYMBOLS TYPES OF CRASHES SHOW FOR	
	MOMBER OF CRASHES MOVING VEHICLE REAR END 22 PROPERTY DAMAGE ONLY MOVING VEHICLE RIGHT ANGLE 1. TIME, DAY, DATE 10 INJURY OR FATAL NON-INVOLVED VEH. SIDE SWIPE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED LOG POINT No. 32 TOTAL ACCIDENTS FIXED OBJECT FATAL ACCIDENT LEFT TURN 3. NITE - IF BETWEEN DUSK AND DAWN CITY Clears	CRASH DIAGI 19.64 T FROM 2011 Cleveland ROUTE NU



NUMBER OF CRASHE	s		SYMBOLS	TYPES OF CRASHES	SHOW FOR				
12 PROPERTY DAMAGE 5 INJURY OR FATAL 17 TOTAL ACCIDENTS	ONLY		MOVING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE FIXED OBJECT EATAL ACCIDENT	REAR END RIGHT ANGLE SIDE SWIPE OUT OF CONTROL LEFT TURN	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED 3. NITE - JE BETWEEN	LOG POINT No. PERIOD	3 Years	CRASH 19.75 FROM	I DIAGR TC
		0	INJURY ACCIDENT	HEAD ON	DUSK AND DAWN	CITY	Cleveland		ROUTE NUI



MOVING VEHICLE MOVING VEHICLE REAR END LOG POINT No. CRASH DIAGE 3 INJURY OR FATAL PARKED VEHICLE Image: Side Swipe Image: Side Swipe	NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASHES	SHOW FOR			
FATAL ACCIDENT FATAL ACCIDENT FATAL ACCIDENT LEFT TURN 3. NITE - IF BETWEEN DUSK AND DAWN CITY Cleveland ROUTE NU	7 PROPERTY DAMAGE ONLY 3 INJURY OR FATAL 10 TOTAL ACCIDENTS	MOVING VEHICLE BACKING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE FIXED OBJECT FATAL ACCIDENT NULRY ACCIDENT	REAR END RIGHT ANGLE SIDE SWIPE OUT OF CONTROL LEFT TURN	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED 3. NITE - IF BETWEEN DUSK AND DAWN	LOG POINT No PERIOD <u>3 Years</u> CITY <u>Clev</u>	19.86 FROM	H DIAGR TC TC ROUTE NUI



NUMBER	OF CRASHES		SYMBOLS	TYPES OF CRASH	SHOW FOR				
<u>13</u> PRO <u>4</u> INJU	DPERTY DAMAGE ONLY		MOVING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE FIXED OBJECT	REAR END RIGHT ANGLE SIDE SWIPE	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED	LOG POINT No. PERIOD	3 Years	CRASH 19.98 FROM	I DIAGR TC TC
	ALACCIDENTS	• •	FATAL ACCIDENT	LEFT TURN HEAD ON	3. NITE - IF BETWEEN DUSK AND DAWN	CITY	Cleveland		ROUTE NUI



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASHES	SHOW FOR				
		REAR END	EACH CRASH			CRASF	I DIAGR
10 PROPERTY DAMAGE ONLY		RIGHT ANGLE	1. TIME, DAY, DATE				
	← PEDESTRIAN	SIDE SWIPE	2. WEATHER AND ROAD	LOG POINT No.		20.09	тс
	PARKED VEHICLE		CONDITION EXISTED	PERIOD	3 Years	. FROM	2011
19 IOTAL ACCIDENTS	FATAL ACCIDENT		3. NITE - IF BETWEEN	CITY	Cleveland		
			BOOK AND DAWN				



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASHES	SHOW FOR		
	MOVING VEHICLE BACKING VEHICLE		1. TIME, DAY, DATE	CRAS	SH DIAGR
2 INJURY OR FATAL	NON-INVOLVED VEH	SIDE SWIPE	2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED	20.23	TO
7 TOTAL ACCIDENTS	 FIXED OBJECT FATAL ACCIDENT INJURY ACCIDENT 	LEFT TURN	3. NITE - IF BETWEEN DUSK AND DAWN	Cleveland	ROUTE NUM



NUMBER OF CRASHES SYMBOLS TYPES OF CRASH SHOW FOR	
MONING VEHICLE REAR END L TIME, DAY, DATE 1 INJURY OR FATAL NON-INVOLVED VEH. INJURY OR FATAL INJURY OR FATAL <td< th=""><th>I DIAGR TC TC </th></td<>	I DIAGR TC TC



NUMB	FR OF CRASHES	SYMBOLS		TYPES OF CRASH		SHOW FOR				
NOME		-	MOVING VEHICLE	REAR END)	EACHCRASH			CRAS	H DIAGR
19	PROPERTY DAMAGE ONLY	~ 》		RIGHT AN	GLE	1. TIME, DAY, DATE				
5			PEDESTRIAN		ΡE	2. WEATHER AND ROAD	LOG POINT No.		20.45	тс
			PARKED VEHICLE		NTROL	CONDITION EXISTED	PERIOD	3 Years	_ FROM	2011
	TOTAL ACCIDENTS	●	FATAL ACCIDENT		N	3. NITE - IF BETWEEN	CITY	Cleveland	1	
		0	INJURY ACCIDENT	HEAD ON		DUSK AND DAWN	0111 <u></u>			



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASH	SHOW FOR			
3 PROPERTY DAMAGE ONLY 3 INJURY OR FATAL 6 TOTAL ACCIDENTS	MOVING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE FIXED OBJECT FATAL ACCIDENT	REAR END RIGHT ANGLE SIDE SWIPE OUT OF CONTROL	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED 3. NITE - IF BETWEEN	LOG POINT No PERIOD <u>3 Years</u>	20.57 FROM	H DIAGR TC TC TC
	O INJURY ACCIDENT	HEAD ON	DUSK AND DAWN		Jana	



NUM	BER OF CRASHES	SYMBOLS		TYPES OF CRASH	SHOW FOR				
		-	MOVING VEHICLE		EACH CRASH	4		CRAS	
3	PROPERTY DAMAGE ONLY		BACKING VEHICLE		1. TIME, DAY, DATE			UNAU	
			NON-INVOLVED VEH.						
2		◄	PEDESTRIAN	SIDE SWIPE		LOG POINT No.		0.07	тс
	INJURT OR FATAL		PARKED VEHICLE	OUT OF CONTROL	CONDITION EXISTED		3 Vears	FROM	2011
5			FIXED OBJECT			PERIOD	0 10013		2011
	IOTAEAGOIDENTO	•	FATAL ACCIDENT		3. NITE - IF BETWEEN	CITY	Cleveland	l i i i i i i i i i i i i i i i i i i i	
		0	INJURY ACCIDENT	HEAD ON	DUSK AND DAWN		Sieveland	•	



MOMBER OF CRASHES MOVING VEHICLE REAR END 6 PROPERTY DAMAGE ONLY MOVING VEHICLE RIGHT ANGLE 1. TIME, DAY, DATE 4 INJURY OR FATAL PEDESTRIAN SIDE SWIPE 2. WEATHER AND ROAD LOG POINT No. 10 TOTAL ACCIDENTS FIXED OBJECT OUT OF CONTROL OUT OF CONTROL PERIOD PERIOD	20.68 3 Years FROM 2011 Cleveland ROUTE	
O INJURY ACCIDENT — HEAD ON DOSK AND DAWN		



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASH	SHOW FOR			
			1 TIME DAY DATE		CRAS	H DIAGR
21 PROPERTY DAMAGE ONLY	NON-INVOLVED VEH.		2 WEATHER AND ROAD		22.22	
8 INJURY OR FATAL	← PEDESTRIAN PARKED VEHICLE		SURFACE IF UNUSUAL	LOG POINT No.	20.82	тс
29 TOTAL ACCIDENTS	 FIXED OBJECT FATAL ACCIDENT INJURY ACCIDENT 	LEFT TURN	3. NITE - IF BETWEEN DUSK AND DAWN	PERIOD <u>3 Years</u> CITY <u>C</u>	FROM ;leveland	2011 ROUTE NUI



NUMBER OF CR	ASHES	SYMBOLS		TYPES OF CRASHES	SHOW FOR				
7 PROPERTY DA 10 INJURY OR FAT	MAGE ONLY		MOVING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN BARKED VEHICLE	REAR END RIGHT ANGLE SIDE SWIPE	1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL	LOG POINT No.		CRAS 20.93	Η DIAGR τς
TOTAL ACCIDE	INTS		FIXED OBJECT FATAL ACCIDENT INJURY ACCIDENT	LEFT TURN HEAD ON	3. NITE - IF BETWEEN DUSK AND DAWN	PERIOD CITY	3 Years Clevelanc	_ FROM	<u>2011</u> ROUTE NUM



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASHES	SHOW FOR				
16 PROPERTY DAMAGE ONLY 7 INJURY OR FATAL 23 TOTAL ACCIDENTS	MOVING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE FIXED OBJECT FATAL ACCIDENT	REAR END RIGHT ANGLE SIDE SWIPE OUT OF CONTROL LEFT TURN	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED 3. NITE - IF BETWEEN DUSK AND DAWN	LOG POINT №. PERIOD CITY	3 Years Cleveland	21.05 FROM	H DIAGR TC TC ROUTE NUM
		HEAD ON					



NUMBER OF CRASH	FS	SYMBOLS		TYPES OF CRASH	SHOW FOR				
21 PROPERTY DAMAGE 11 INJURY OR FATAL	ES EONLY		MOVING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE	REAR END RIGHT ANGLE SIDE SWIPE	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED	LOG POINT No.		21.19	
32 TOTAL ACCIDENTS			FIXED OBJECT FATAL ACCIDENT INJURY ACCIDENT	LEFT TURN HEAD ON	3. NITE - IF BETWEEN DUSK AND DAWN	PERIOD CITY	3 Years Cleveland	_ FROM	ROUTE NUN



NUM	IBER OF CRASHES		SYMBOLS	TYPE	S OF CRASHES	SHOW FOR				
Non					REAR END	1 TIME DAY DATE			CRASH	
2	PROPERTY DAMAGE ONLY		NON-INVOLVED VEH.			2 WEATHER AND ROAD			01.00	
0	INJURY OR FATAL	Ì	PEDESTRIAN PARKED VEHICLE	 	SIDE SWIPE	SURFACE IF UNUSUAL	LOG POINT No.		21.30	TC
2	TOTAL ACCIDENTS		FIXED OBJECT FATAL ACCIDENT INJURY ACCIDENT		LEFT TURN HEAD ON	3. NITE - IF BETWEEN DUSK AND DAWN	PERIOD CITY	Cleveland	_ FROM	ROUTE NUI

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NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASHES	SHOW FOR				
12 PROPERTY DAMAGE ONLY	MOVING VEHICLE MOVING VEHICLE MON-INVOLVED VEH. PEDESTRIAN	REAR END	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD			304	
<u>4</u> INJURY OR FATAL <u>16</u> TOTAL ACCIDENTS	PARKED VEHICLE FIXED OBJECT FATAL ACCIDENT NJURY ACCIDENT	OUT OF CONTROL	SURFACE IF UNUSUAL CONDITION EXISTED 3. NITE - IF BETWEEN DUSK AND DAWN	PERIOD CITY	3 Years Cleveland	FROM	10 2011 ROUTE NUM



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASHES	SHOW FOR				
Nomber of on on one		REAR END	EACH CRASH			CRASH	I DIAGR
12 PROPERTY DAMAGE ONLY		RIGHT ANGLE	1. TIME, DAY, DATE				
	PEDESTRIAN		2. WEATHER AND ROAD	LOG POINT No.		3.38	тс
			CONDITION EXISTED	PERIOD	3 Years	. FROM	2011
<u>17</u> TOTAL ACCIDENTS	 FATAL ACCIDENT INJURY ACCIDENT 	LEFT TURN	3. NITE - IF BETWEEN DUSK AND DAWN	CITY	Cleveland		ROUTE NUM



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASHES	SHOW FOR				
	HOVING VEHICLE		1. TIME, DAY, DATE			CRASH	
2 INJURY OR FATAL	← · · · NON-INVOLVED VEH. ← · · · PEDESTRIAN PARKED VEHICLE EIVED OB JECT	RIGHT ANGLE	2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED	LOG POINT No. PERIOD	3 Years	0.12	TC 2011
<u>5</u> TOTAL ACCIDENTS	 FATAL ACCIDENT INJURY ACCIDENT 	LEFT TURN HEAD ON	3. NITE - IF BETWEEN DUSK AND DAWN	CITY	Cleveland		



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASH	SHOW FOR				
	HOVING VEHICLE		1. TIME, DAY, DATE			CRAS	H DIAGR
3 PROPERTY DAMAGE ONLY 3 INJURY OR FATAL	NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE	SIDE SWIPE	2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED	LOG POINT No. PERIOD	3 Years	1.37 FROM	TO 2011
6 TOTAL ACCIDENTS	 FIXED OBJECT FATAL ACCIDENT INJURY ACCIDENT 	LEFT TURN	3. NITE - IF BETWEEN DUSK AND DAWN	CITY	Cleveland		ROUTE NUM



NUMBER OF CRASHES		SYMBOLS		TYPES OF CRASH	SHOW FOR				
2 	PROPERTY DAMAGE ONLY INJURY OR FATAL TOTAL ACCIDENTS		MOVING VEHICLE BACKING VEHICLE NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE FIXED OBJECT FATAL ACCIDENT	REAR END RIGHT ANGLE SIDE SWIPE OUT OF CONTROL	EACH CRASH 1. TIME, DAY, DATE 2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED 3. NITE - IF BETWEEN	LOG POINT №. PERIOD	<u>3 Years</u>	0.14 FROM	H DIAGR TC TC
		Õ	INJURY ACCIDENT	HEAD ON	DUSK AND DAWN		Cleveland	J	ROUTE NUI



NUMBER OF CRASHES		SYMBOLS		TYPES OF CRASH	SHOW FOR				
		+	MOVING VEHICLE BACKING VEHICLE	REAR END	1. TIME, DAY, DATE			CRASH	1 DIAGR
<u>8</u> 0	INJURY OR FATAL		NON-INVOLVED VEH. PEDESTRIAN		2. WEATHER AND ROAD SURFACE IF UNUSUAL	LOG POINT No.		2.63	тс
8	TOTAL ACCIDENTS		PARKED VEHICLE FIXED OBJECT FATAL ACCIDENT	OUT OF CONTROL	CONDITION EXISTED	PERIOD	3 Years	_ FROM	2011
		ŏ	INJURY ACCIDENT	HEAD ON	DUSK AND DAWN	CITY	Cleveland	1	ROUTE NU



NUMBER OF CRASHES	SYMBOLS	TYPES OF CRASH	SHOW FOR				
	MOVING VEHICLE BACKING VEHICLE		1. TIME, DAY, DATE			CRASH	1 DIAGR
9 INJURY OR FATAL	NON-INVOLVED VEH. PEDESTRIAN PARKED VEHICLE FIVED OD IFOT	SIDE SWIPE	2. WEATHER AND ROAD SURFACE IF UNUSUAL CONDITION EXISTED	LOG POINT №. PERIOD	3 Years	2.63 FROM	TO
42 TOTAL ACCIDENTS	 FIXED OBJECT FATAL ACCIDENT INJURY ACCIDENT 	LEFT TURN	3. NITE - IF BETWEEN DUSK AND DAWN	CITY	Cleveland		



NUMBER OF CRASHES		SYMBOLS		TYPES OF CRASH	SHOW FOR				
			MOVING VEHICLE	REAR END	EACH CRASH			CRASH	I DIAGR
9	PROPERTY DAMAGE ONLY	→ ≫	BACKING VEHICLE	RIGHT ANGLE	1. TIME, DAY, DATE				
			NON-INVOLVED VEH.		2. WEATHER AND ROAD			2.95	тс
	INJURY OR FATAL		PARKED VEHICLE		SURFACE IF UNUSUAL		2 Veere		10
12	TOTAL ACCIDENTS		FIXED OBJECT			PERIOD	3 rears	_ FROM	2011
		•	FATAL ACCIDENT INJURY ACCIDENT	HEAD ON	3. NITE - IF BETWEEN DUSK AND DAWN	CITY	Cleveland		ROUTE NUM

Fold	006667
I RAFFIC CRASH REPORT	CCAL REPORT NUMBER CRASH SEVERATY HIT/SKIP 1. FATAL 2. INJURY 2. UNSOLVED 2. UNSOLVED
	NUMBER OF UNTINESSOR
Image: State Reportable DOLLAR ANCINT PROPERTY Image: Onlar Ancint Image: Clipped ancint	
	10151310121011131 [1101414] [TIhju]
DEGREES / MINUTES / SECONDS LATITUDE LONGITUDE ///	DECIMAL DEGREES LATITUDE LONGITUDE
	411,5344438 811,646058 OR MILEPOST 2
Image: Divided in the second in the secon	CR - CIRCLE HE - HEIGHTS MP - MILEPOST PL - PLACE ST - STREET WA - WAY CT - COURT HW - HIGHWAY PK - PARKWAY RD - ROAD TE - TERRACE ARD DR - DRIVE LA - LANE PI - PIKE SQ - SQUARE TL - TRAIL
	LOCATION ROAD ROUTE TYPES 1 IF INTERSTATE ROUTE (INC. TURNPIKE) CR - NUMBERED COUNTY ROUTE SR - STATE ROUTE SR - STATE ROUTE TR - NUMBER TOWNSHIP ROUTE
	TERENCE NAME (ROAD, MILEPOST, HOUSE #
REFERENCE POINT USED CRASH LOCATION 01 - NOT AN INTERSECTION 06 - FIVE-POINT, OR MORE 11 - RAIL 1 - INTERSECTION 2 - MILE POST 01 - NOT AN INTERSECTION 06 - FIVE-POINT, OR MORE 11 - RAIL 2 - MILE POST 3 - HOUSE NUMBER 01 - NOT AN INTERSECTION 07 - ON RAMP 12 - SHAF 04 - Y-INTERSECTION 08 - OFF RAMP 09 - UNKI 04 - Y-INTERSECTION 09 - CROSSOVER 09 - CROSSOVER 05 - TRAFFIC CIRCLE/ROUNDABOUT 10 - DRIVEWAY/ALLEY/ACCESS 01 - DRIVEWAY/ALLEY/ACCESS	VAY GRACE CROSSING IED-USE PATHS OR TRAILS INTERSECTION RELATED INTERSECTION ICOCATION OF FIRST HARMFUL EVENT I- ON ROADWAY 5- ON GORE 1- ON ROADWAY 5- ON GORE 3- IN MEDIAN 0- UNKNOWN 4- ON ROADSIDE
ROAD CONTOUR I-STRAIGHT LEVEL 4 · CURVE GRACE PRIMARY SECONDARY 01 · DRY 1 · STRAIGHT GRADE 9 · UNKNOWN 01 · DRY 01 · DRY 02 · WET 3 · CURVE LEVEL 9 · UNKNOWN 01 · DRY 01 · DRY	05 - SAND, MUD, DIRT, OIL, GRAVEL 00 - RUT, HOLES, BUMPS, UNEVEN PAVEMENT* 06 - WATER (STANDING, MOVING) 10 - OTHER 07 - SLUSH 99 - UNKNOWN 08 - DEBRIS* * SECONDARY CONDITION ONLY
MANNER OF CRASH COLLISION/IMPACT 1 · NOT COLLISION BETWEEN 2 · REAR END 5 · BACKING 0 · SIDESWIPE, OPPOSITE TWO MOTOR VEHICLES 3 · HEAD-ON 4 · REAR-TO-REAR 7 · SIDESWIPE, SAME DIRECTION 9 · UNKNOWN	Teather 1 - CLEAR 4 - RAIN 7 - SEVERE CROSSWINDS 1 2 - CLOUDY 5 - SLEET, HAIL 8 - BLOWING SAND, SOL, DIRT, SNOW 3 - FOG, SMOG, SMOKE 8 - SNOW 9 - OTHER/UNKNOWN
ROAD SURFACE 1 - CONCRETE 4 - SLAG, GRAVEL LIGHT CONDITIONS 1 - CONCRETE 4 - SLAG, GRAVEL Image: Control of the state of the	5 - DARK - ROAGWAY NOT LIGHTED 9 - UNKNOWN 8 - DARK - UNKNOWN ROADWAY LIGHTING 7 - GLARE* 9 - UNKNOWN 8 - OTHER 9 - UNKNOWN 8 - OTHER 9 - UNKNOWN 9 - UNKNOWN 1 SCHOOL 2 ONE RELATED 1 SCHOOL 2 ONE RELATED 1 SCHOOL 2 ONE RELATED 1 YES SCHOOL BUS IMDIRECTLY INVOLVED 1 MORECTLY INVOLVED
WORK ZONE LAW ENFORCEMENT PRESENT (OFFICER/VEHICLE) TYPE OF WORK ZONE 1 - LANE CLOSURE 4 - INTERMITTENT LAW ENFORCEMENT PRESENT (OFFICER/VEHICLE) LAW ENFORCEMENT PRESENT (VEHICLE ONLY) TYPE OF WORK ZONE 1 - LANE CLOSURE 4 - INTERMITTENT 1 - LANE CLOSURE 1 - LANE CLOSURE 3 - WORK ON SHOULDER OR MEDIAN 5 - OTHER 3 - WORK ON SHOULDER OR MEDIAN	OR MOVING WORK LOCATION OF CRASH IN WORK ZONE 1 - BEFORE THE FIRST WORK ZONE WARNING SIGN 4 - ACTIVITY AREA 2 - ADVANCE WARNING AREA 5 - TERMINATION AREA 3 - TRANSITION AREA
NARRATIVE Unit 1 is being operated east on Interstate 90 (eastbound) in lane 1.	Diagram
He comes upon Slowing/stopped traffic and swerves off to the right. It comes	8
into contact with unit 2 (sideswipe) that was stopped in lane 3. Unit 1 is now	ant in the second se
traveling in a southeast direction and strikes unit 3 (pedestrian) who is	ille e
standing/waiking on roadway(with in lane 3). Only 1 attempts to correct by	
The impact from this collision projects unit 4 forward, and causes it to come	inter China
into contact with Unit 5 (pedestrian) before it veers off the right side of the	No and I have
roadway up a grassy embankment and collide with a chain link fence. Unit 1	THE BOD
now traveling in a northeasterly direction collides with the median wall	unit 1 to at a
breaking off two sections before it rolls back to final rest.	
	LINOL RP
REPORT TAKEN BY	
	10181 11310151 1514101 1615151
Green Chen not	S BADGE NUMBER CHECKED BY 662 662 PAGE 1 of 9
HSY7001 OH1 (Rev 01/12)	\mathcal{U}

OH SAF	<u>Unit</u>									at I			
UNIT NUMBER	OWNER NAME: LAST, FIR	RST, MIDDLE { 🔲 SAME AS D	IVER)		OWNER PHONE N	IMBER - INC.	AREA CODE		RIVER)	DAMAGE SCALE	DAMAGED A	REA	
		Najjar, She	een			2165	0108	80		4		Front	
OWNER ADDRESS	SE CITY, STATE, ZIP (🔀 S	1385 Fitzroy	Stree	t Westlake, (Dhio 441	45				I - NONE	 ~2		S [™]
	NSE PLATE NUMBER X25	57738	VBHC	LE IDENTIFICATION NUMBER	ISI0IYIE		1 1 5	5 <u>1</u> 0	UPANTS	2 - MINOR 3 - FUNCTIONAL	08	10	04
VEHICLE YEAR		Ford		VEHICLE MODEL Excu	ursion		VEHQLECC	black		4 - DISABLING	075		₹ ₀₅
PROOF OF INSURANCE SHOWN	INSURANCE COMPANY		PO	LICY NUMBER		TOMED BY	Clair	/L2/877	4	9 - UNKNOWN		REAR	<u> </u>
CARRIER NAME, AD	UNESS, UTT, STATE, ZIP									CANNERPHON	5- INCLUDE AR	EACODE	
US DOT HM PLACARD ID N	vehicle we 	IGHT GWWR/GCWR ESS THAN OR EQUAL TO 10x L 0,001 TO 26,000 LBS. IGRE THAN 26,000 LBS. ARDOUS MATERIAL EASTED	35. O	007 TYPE 01 - NO CARGO BODY T 02 - BUS/VAN (0-15 SE/ 03 - BUS (10+ SEATS, II 04 - VEHICLE TOWING A 05 - LOGGING 00 - INTERMODAL CONT 07 - CARGO VANENCLO	YPERVOT APPLICABL ATS, INC DRIVER) VC DRIVER) WOTHER VEHICLE AINER CHASSIS SED BOX	E 00 - POL 10 - CAR 11 - FLA 12 - DUM 13 - CON 14 - AUTO 15 - GAR	.E RGO TANK IT BED JP CRETE MIXE O TRANSPOR BAGE/REFU!	TRAFFICWA 1- 2- 3- 4- 5- SE	y descrip Two-way, Two-way, Two-way, Two-way, One-way	TION NOT DIVIDED NOT DIVIDED, CONT DIVIDED, UNPROTE DIVIDED, POSITIVE TRAFFICWAY	INUOUS LEFT 1 CTED (PAINTEL MEDIAN BARRI	TURN LANE) OR GRASS > ER	4 Ft.) MEDIAN
		Exact	LUNITS	08 - GRAIN, CHIPS, GR	AVEL	99 - OTH	ER/UNKNOW		KIP UNIT				
01- 02- 02- 03- 04- 06- 06- 06- 06- 06- 06- 06- 06	AILAT HACK ID MPACT INTERSECTION - NO CROSS INTERSECTION - ON-ER MIDBLOCK - MARKED CROS TRAVEL LANE - OTHER LOC BICYCLE LANE SHOULDER/ROADSIDE SHOULDER/ROADSIDE SHOULDER/ROADSIDE SHOULDER/ROADSIDE SHOULDER/ROADSIDE SHOULDER/ROADSIDE SHARED USE PATH OR TR NON-TRAFFICWAY AREA OTHER/UNKA/OWN	CROSSWALK SWALK SSWALK CATION D AIL I - PERSONAL 2 - COMMERCI 3 - GOVERNME I IN EMERGEN RESPONSE		WPE PASSENGER VEHICLI 01 SUB-COMP 02 COMPACT 03 MID SIZE 04 FULL SIZE 05 MINIVAN 06 SPORT UT 07 PICKUP 08 VAN 09 VAN 00 MOTORCY 11 SNOWMOE 12 OTHER PASS	ES (LESS THAN 9 PASSE PACT ILLITY VEHICLE CLE ED BICYCLE BILE / ATV SSENGER VEHICL	NGERS) MEC 13- 14- 15- 16- 17- 18- 20- 20- E	DIHEAVY TR - SINGLE UN - SINGLE UN - SINGLE UN - TRUCK/TR - TRACTOR/ - TRACTOR/ - TRACTOR/ - OTHER ME - OTHER ME		D UNITS ; AN 2 AXL LES LER) LE	▶ 10k LBs BUSY/k E, 6 TIRES 21 - 6 22 - 6 NON-M 23 - A 24 - A 25 - B 26 - P 27 - C	WUMO (9 OR M RUSAVAN (9-1) BUS (16+ SEA OTORIST NIMAL WITH NIMAL WITH BI CEVCLEYPER EDESTRIANSI THER NON-MC	NORE INCLUDI 3 SEATS, INC TS, INC DRIV RIDER UGGY, WAGC CYCLIST KATER DTORIST	NG DRIVER) DRIVER /ER NN, SURREY
SPECIAL FUNCTION	01 - NONE 02 - TAM 03 - RENTAL TRUCK (OVER 1 04 - BUS - SCHOOL (PUBLIC 06 - BUS - TRANSIT 06 - BUS - CHARTER 07 - BUS - SHUTTLE 08 - BUS - OTHER 	09 - AMBULANCE 10 - FIRE 10 - FIRE 20 - FIRE 20 - FRIVATA 13 - POLICE 14 - PUBLIC UTI 15 - OTHER GOV 16 - CONSTRUCT	untenance Ity Frament On Equip.	17 - FARM VEHICLE 19 - FARM EQUIPMENT 19 - MOTORHOME 20 - GOLF CART 21 - TRAIN 22 - OTHER (EXPLAIN IN NA		MAGED AREA 01 - 02 - 0 03 - AREA 04 - 05 - 08 07 -	NONE CENTER FR RIGHT FRO RIGHT SIDE RIGHT REAR REAR CENT LEFT REAR	08 - LEFT RONT 09 - LEFT NT 10 - TOP A E 11 - UNDE R 12 - TOTAI TER 08 - REAR 14 - OTHE	SIDE FRONT IND WINE RCARRIA L (ALL AR CENTER R	99 - UNKNO DOWS AGE REAS) R	WIN 3	N 1 - NON- CO 2 - NON-CC 3 - STRIKIN 4 - STRUCK 5 - STRIKIN 9 - UNKNOV	DNTACT LLISION G G/STRUCK WN
	S MOTORIST 01 - STRAIGHT A HE 02 - BACKING 03 - CHANGING LAN 04 - OVERTAKING? 05 - MAKING RIGHT 06 - MAKING LEFT T	EAD 07 - MAKING U-T 08 - ENTERING 1 VES 09 - LEAVING TR ASSING 10 - PARKED TURN 11 - SLOWING 0 TURN 12 - DRIVERLES:	URN RAFFIC LAN AFFIC LANE STOPPED	13 - NEGOTIA NE 14 - OTHER N E IN TRAFFIC	TING A CURVE	NON-MOT 15 - ENTI 16 - WAL 17 - WOF 18 - PUS 19 - APPI 20 - STAN	Torist Ering or (King, runi Rking Hing Vehic Roaching Nding	CROSSING SPEC NING, JOGGING, CLE OR LEAVING VE	CIFIED LO PLAYING HIGLE	DCATION 21 G, CYCLING	OTHER NON	I-MOTORIST	ACTION
CONTRIBUTING C PRIMARY 099 SECONDARY 17 99 - UNKNOWN	RCUMSTANCES MOTORIST 01 - NONE 02 - FAILURE TO YI 03 - RAN RED LIGH 04 - RAN STOP SIG 05 - EXCEEDED SP 06 - UNSAFE SPEE 07 - IMPROPER LU 09 - LEFT OF CENT 09 - FOLLOWED TC 10 - IMPROPER LU /PASSING/OFF	11 - IM 11 - IM 11 - IM 12 - IM 14 - OI 15 - SI 16 - W 16 - W 17 - FA 18 - VI 19 - OI 10 - CLOSELY/ACDA 18 - CHANGE 20 - LC 18 - CHANGE 21 - OI	PROPER B PROPER S OPPED OR ERATING I ERATING T RONG SIDE SION OBST ERATING D AD SHIFTIM HER IMPRO	ACKING TART FROM PARKED POSIT PARKED ILLEGALLY /EHICLE IN NEGLIGENT MA O AVOID (DUE TO EXTERN/ WRONG WAY 20NTROL RUCTION DEFECTIVE EQUIPMENT MO/FALLING/SPILLING DPER ACTION	fion Inner Al conditions)	NON-MOTO IST 22 - NONE 23 - IMPRO 24 - DARTII 25 - LYING 26 - FAILUF 27 - NOT VE 28 - INATTE 29 - FAILUF /SIGN/ 30 - WRON 32 - OTHER	R NG AND/OR ILL ISIBLE (DAF ENTIVE RE TO OBEN ALS/OFFICE G SIDE OF & NON-MOTO	SING D RIGHT OF WA' TRK CLOTHING) Y TRAFFIC SIGN :R THE ROAD ORIST ACTION	ADWAY Y S	VEHICLE DEFEC 01 02 03 04 06 06 07 07 08 08 00 10 11	TTS TURN SIGNA HEAD LAMPS TAIL LAMPS BRAKES STEERING TIRE BLOWC WORN OR SI TRAILER EQ MOTOR TRO DISABLED FF OTHER DEFE	LS S LICK TIRES JIPMENT D UBLE ROM PRIOR /	FECTIVE
SEQUENCE OF EVI 121 2 FIRST HARMFUL EVENT	ENTS 1 4 ³ 21 HARMFUL EVENT	435 5 00 - UNKN	6 DWN	NON-COLLLSION EVE 01 - OVERTURIVROLLO 02 - FIRE/EXPLOSION 03 - IMMERSION 04 - JACKKNIFE 05 - CARGO/EQJPMEN	<u>INTS</u> MER IT LOSS OR SHIFT	06 - EQUIP (BLOW 07 - SEPAF 08 - RAN C 09 - RAN C	MENT FAILU NTIRE, BRAKE RATION OF U DEF ROAD RI DEF ROAD LE	re Efailure, etc) Inits Ght Eft	10 - CROS 11 - CROS OPPC 12 - DOW 13 - OTHE	SS MEDIAN SS CENTER LINE XSITE DIRECTION OF NHILL RUNAWAY SR NON-COLLISION	TRAVEL		
COLLISION WITH 14 - PEDESTRIAI 15 - PEDALCYCL 16 - RAILWAY VE 17 - ANIMAL - FA 18 - ANIMAL - DE 19 - ANIMAL - OT 20 - MOTOR VEH	PERSON, VEHICLE OR C N E EHICLE (TRAIN ENGINE) RM ER HER HER ICLE IN TRANSPORT	28JECT NOT FIXED 21 - PARKED MOTOR VEHIC 22 - WORK ZONE MAINTENA 23 - STRUCK BY FALLING, SI OR ANYTHING SET IM MOTOR VEHICLE 24 - OTHER MOVABLE OBJEC OBJECT	le Ice Equipm Ifting Caro Ition by A I	COLLISION WITH FIXI 25 - IMPACT ATTENUAT 26 - BRIDGE OVER-EAU 27 - BRIDGE PIER OR A 30 28 - BRIDGE PARAPET 29 - BRIDGE RAIL 30 - GUARDRAIL FACE 31 - GUARDRAIL FACE 31 - GUARDRAIL END 32 - PORTABLE BARRI	ED OBJECT OR/CRASH CUSHION 3 STRUCTURE BUTIMENT ER	34 - MED 35 - MED 36 - MED 37 - TRAF 38 - OVEF 39 - LIGH 40 - UTIL	IAN GUARDF IAN CONCRE IAN OTHER I FFIC SIGN PC RHEAD SIGN IT/LUMINARIE JTY POLE	RAIL BARRIER ETE BARRIER BARRIER DST I POST ES SUPPORT	41 - OT OF 42 - CL 43 - CL 43 - CL 43 - CL 43 - CL 45 - EN 46 - FE 47 - M	HER POST, POLE SUPPORT ILVERT IRB TCH IBANKMENT INCE ILBOX	42 - CULVE 49 - FIRE H 50 - WORK EQUIP 51 - WALL, 52 - OTHER	rt Ydrant Zone Mainte Ment Building, Ti Fixed Objec	INANCE JNNEL IT
UNIT SPEED	POSTED SPEED	TRAFFIC CONTROL 01 - NO CONT 02 - STOP SIG 03 - TRAFFIC I 06 - SCHOOL J	ROLS N IGNAL LASHERS ONE	07 - RAILROAD CROSSBU 08 - RAILROAD FLASHERS 09 - RAILROAD GATES 10 - CONSTRUCTION BAR 11 - PERSON (FLAGGER, C 12 - PAVEMENT MARKING	CKS 13 - CR 14 - WA 15 - OTI IRICADE 16 - NO DFFICER) S	DSSWALK L LK/DON'T W HER I REPORTE	INES IALK		то З	1 - NORTH 2 - SOUTH 3 - EAST 4 - WEST	5 - NORTHE 6 - NORTHY 7 - SOUTHE 8 - SOUTHY	AST 0-U VEST AST VEST PAGE 2	of 9

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BOUCATION - MARYCE - PROTECTION								- Oble	67		
	NER NAME: LAST, FIRST, MIDDL	e (🔲 Same as Drive	ER)		OWNER PHONE N	IUMBER - INC	. AREA CODE	E (🔲 SAME AS DRIVER	DAMAGE SCALE	DAMAGED AREA	
	Lo	ury, Earl,	<u>V.</u>						4		ı
OWNER ADDRESS: CI	19, STATE, ZIP (L) SAME AS DR 9503 D	ickens Av	enue	e Cleveland	. Ohio 4	4103			I - NONE	09	03 7
LP STATE LICENSE	PLATE NUMBER		VEHICLE	IDENTIFICATION NUMBER				# OCCUPANT	2 - MINOR		
	ETH 940	4	11(]9 3 R 2	Z 2 5	2 3 7	<u>/ 8 0 0 </u>	3 - FUNCTIONAL		04
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	SURANCE COMPANY		POU	CYNUMBER		TOMED BY	, uality/	'L2/8775	9 - UNKNOWN	REAR	j
CARRIER NAME, ADDRE	SS, CITY, STATE, ZIP		L						CARRIERPHO	NE INCLUCE AREA CODE	
US DOT	VEHICLE WEIGHT GVW	VGCWR	CARGO BO	DY TYPE 1 01 - NO CARGO BODY T		F 09 - PO	LE	TRAFFICWAY DESC	RIPTION		
HM PLACARD ID No.	1 - LESS THAN C 2 - 10,001 TO 20 3 MODE THAN	DR EQUAL TO 10k LBS. 5,000 LBS.	01	02 - BUS/VAN (9-15 SEA 03 - BUS (16+ SEATS, IA	ATS, INC DRIVER) VC DRIVER)	10 - CAI 11 - FLA	RGO TANK	4 1-TNO-W 2-TNO-W	AY, NOT DIVIDED AY, NOT DIVIDED, COM	VTINUOUS LEFT TURN LANE	
	3- MORE THAN	20,000 LBS.		04 - VEHICLE TOWING A 05 - LOGGING	NOTHER VEHICLE	12 - DU 13 - CON	NP KORETE MIXE	R 4-TWO-W	AY, DIVIDED, UNPROT AY, DIVIDED, POSITIM	ECTED (PAINTED OR GRASS > 4 Pt.) ME E MEDIAN BARRIER	EDIAN
HM CLASS	HAZARDOUS MA	Terial		06 - INTERMODAL CONT 07 - CARGO VAVENCLO	AINER CHASSIS SED BOX	14 - AUT 15 - GAF	O TRANSPOR				
NON-MOTORIST LOCATIO	IN PRICE TO IMPACT	TYPE OF USE		D8 - GRAIN, CHIPS, GR	AVEL	99-01F	ERUNKNOW				
01 - INTE 02 - INTE	ERSECTION - MARKED CROSSWALK ERSECTION - NO CROSSWALK	1	0	3 PASSENGER VEHICLI	ES (LESS THAN 9 PASS Pact	ÉNGERS) ME 13	- SINGLE UN	UCKS OR COMBO UNIT IT TRUCKS OR VAN 2 A	S>10KLBS BUSA XLE,6TIRES 21 -	ANVLINO (9 OR MORE INCLUDING DR BUS/VAN (9-15 SEATS, INC DRIVI	ver) 'Er
04 - MID	ERSECTION - OTHER BLOCK - MARKED CROSSWALK	1 - PERSONAL	09 - UN	VKNOWN 03 - MID SIZE		14 15 16	- SINGLE UN - SINGLE UN - TRUCKAR	IT TRUCK; 3+ AXLES IT TRUCK / TRAILER	NON-	BUS (16+ SEATS, INC DRIVER MOTORIST	
06 - BIC 07 - SHC	YOLE LANE WLDER/ROADSIDE	2 - COMMERCIAL 3 - GOVERNMENT	Givini	05 - MINIVAN 06 - SPORT UT	ILITY VEHICLE	17	- TRACTOR/	SEMI-TRAILER	23 - 24 -	ANIMAL WITH RIDER ANIMAL WITH BUGGY, WAGON, SUF	RREY
08 - SID 09 - MED	EWALK DIAN/CROSSING ISLAND			07 - PICKUP 08 - VAN		19 20	- TRACTOR/ - OTHER ME	TRIPLES D/HEAVY VEHICLE	25- 26- 27-	BICYCLE/PEDACYCLIST PEDESTRIAN/SKATER OTHER NON-MOTORIST	
10 - DRIV 11 - SHA	VEWAY ACCESS IRED-USE PATH OR TRAIL	RESPONSE	ļ	09 - MOTORCY 10 - MOTORIZE	CLE ED BICYCLE	г			7	OTRIER NOTWING FORTST	
12 - NON 99 - OTH	I-TRAFFICWAY AREA IER/UNKNOWN			11 - SNOWMOE 12 - OTHER PA	BILE / ATV SSENGER VEHIC	LE		HM PLACARD	_		
SPECIAL FUNCTION 01-	NONE TAXI	09 - AMBULANCE 10 - FIRE		17 - FARM VEHICLE 18 - FARM EQUIPMENT	MOST DA		NONE	08 - LEFT SIDE	99 - UNKN	IOWN ACTION	т
	RENTAL TRUCK (OVER 10k LBS) BUS - SCHOOL (PUBLIC OR PRIVATI	11 - HIGHWAY/MAIN =) 12 - MILITARY	TENANCE	19 - MOTORHOME 20 - GOLF CART		AREA 04-	RIGHT FROM	NT 10 - TOP AND W 11 - UNDERCAR	INDOWS RIAGE	3 - STRIKING	M
06-	BUS - TRANSIT BUS - CHARTER BUS - SHI (TTLE	13 - POLICE 14 - PUBLIC UTILITY 16 OTHER COVERN	(21 - TRAIN 22 - Other (Explain in Nat	RRATIVE)	05-	RIGHT REAL	R 12 - TOTAL (ALL	AREAS) ER	5 - STRIKING/STR 9 - UNKNOWN	иск
08 - PRE-CRASH ACTIONS	BUS - OTHER	16 - CONSTRUCTION	EQUIP.			07-	LEFT REAR	14 - OTHER			
10	MOTORIST 01 - STRAIGHT A HEAD	07 - MAKING U-TUR	N	13 - NEGOTIA	TING A CURVE	NON-MO 15 - ENT	TORIST TERING OR (CROSSING SPECIFIED	LOCATION 21	- OTHER NON -MOTORIST ACTK	ION -
	02 - BACKING 03 - CHANGING LANES	08 - ENTERING TRA 09 - LEAVING TRAFI	FFIC LANE	E 14 - OTHER N	IOTORIST ACTIO	N 18 - WAI 17 - WO	lking, runi Rking	NING, JOGGING, PLAY	ING, CYCLING		
	04 - OVERTAKING/PASSING 05 - MAKING RIGHT TURN	10 - PARKED 11 - SLOWING OR S	TOPPED	N TRAFFIC		18 - PUS 19 - APF	ROACHING	XLE OR LEAVING VEHICLE			
	UNSTANCES	12 - DRIVERLESS				20.514	MUING			2016	
PRIMARY	MOTORIST	44 100		2////2		NON-MOTO	DR			- TURN SIGNALS - HEAD LAMPS	
13	02 - FAILURE TO YIELD 03 - RAN RED LIGHT	11 - MPR 12 - IMPR 13 - STOP	OPER BAC	ART FROM PARKED POSI ARKED ILLEGALLY	TION	22 - NONE 23 - IMPRO 24 - DARTI	: OPER CROS	SING	03 04	- TAIL LAMPS - BRAKES	
SECONDARY	04 - RAN STOP SIGN 05 - EXCEEDED SPEED LIMIT	14 - OPEF 15 - SWEI	RATING VE RVING TO	HICLE IN NEGLIGENT MA	NNER AL CONDITIONS)	25 - LYING 28 - FAILU	AND/OR ILL	EGALLY IN ROADWA'	/ 05 08	- STEERING - TIRE BLOWOUT	
	06 - UNSAFE SPEED 07 - IMPROPER TURN	16 - WRO 17 - FAILU	NG SIDE/V JRE TO CC	VRONG WAY		27 - NOT \ 28 - INATT	/ISIBLE (DAF ENTIVE	RK CLOTHING)	07	- WORN OR SLICK TIRES - TRAILER EQUIPMENT DEFECTION WORDS TROUGHT	IVE
99 - UNKNOWN	08 - LEFT OF CENTER 09 - FOLLOWED TOO CLOSEL 10 - IMPROPEO LANS CUANC	18 - VISIO Y/ACDA 19 - OPEF	N OBSTRU	UCTION FECTIVE EQUIPMENT		20 - FAILU /SIGN	RE TO OBEY	TRAFFIC SIGNS	10	OISABLED FROM PRIOR ACCIDI OTHER DEFECTS	ENT
	/PASSING/OFF ROAD	21 - OTHE	R IMPROF	PER ACTION		30 - WRON 32 - OTHEI	R NON-MOT	ORIST ACTION			
	s 3 3 4 7	5	6 []	NON-COLLISION EVE 01 - OVERTURN/ROLLO	ENTS MER	06 - EQUI	PMENT FAILU	RE 10-C	ROSS MEDIAN		Π
				02 - FIRE/EXPLOSION 03 - IMMERSION		(BLOM 07 - SEPA	IN TIRE, BRAKE RATION OF U	EFAILURE, ETC) 11 - CF NITS OF	ROSS CENTER LINE POSITE DIRECTION O	FTRAVEL	
HARMFUL	HARMFUL	99 - UNKNOV	/N	04 - JACKKNIFE 05 - CARGO/EQUIPMEN	IT LOSS OR SHIFT	09 - RAN (OFF ROAD LE	SFT 13-0	HER NON-COLLISIO	N	
COLLISION WITH PER	RSON, VEHICLE OR OBJECT NO	DT FIXED		COLLISION WITH FIXE 25 - IMPACT ATTENUAT	ED OBJECT OR/CRASH CUSHIO	N		41 -	OTHER POST, POLE	42 - CULVERT	
14 - PEDESTRIAN 15 - PEDALCYCLE 16 - PAILWAY VEHIC	21 - PAR 22 - WOF 21 E (TRAIN/ENIQIME) 22 - STR	KED MOTOR VEHICLE IK ZONE MAINTENANCE	EQUIPMEN	20 - BRIDGE OVERHEAU NT 27 - BRIDGE PIER OR A 28 - BBIDGE PARAPET	ID STRUCTURE IBUTMENT	34 - MEL 35 - MEC 36 - MEC	DIAN GUARDH DIAN CONCRE DIAN OTHER I	RAIL BARRIER 42 -	OR SUPPORT CULVERT	49 - FIRE HYDRANT 50 - WORK ZONE MAINTENANCE	ε
17 - ANIMAL - FARM 18 - ANIMAL - DEER	OR /	WYTHING SET IN MOTH	DN BY A	29 - BRIDGE RAIL 30 - GUARDRAIL FACE		37 - TRA 38 - OVE	FFIC SIGN PC	DATALLA 45- DST 44- IPOST 45-	DITCH EMBANKMENT	61 - WALL, BUILDING, TUNNEL 52 - OTHER FIXED OBJECT	
19 - ANIMAL - OTHER 20 - MOTOR VEHICL	R 24 - OTH E IN TRANSPORT OBJECT	ER MOVABLE OBJECT		31 - GUARDRAIL END 32 - PORTABLE BARRI	ER	39 - LIGH 40 - UTI	IT/LUMINARIE	ES SUPPORT 46 - 47 -	FENCE		
UNIT SPEED	POSTED SPEED TRAFFIC		LS C	07 - RAILROAD CROSSBU	CKS 13-CF	ROSSWALK				5 - NORTHEAST Q. UNKNOW	WN
	601	02 - STOP SIGN 03 - YIELD SIGN	c c	00 - RAILROAD FLASHERS 00 - RAILROAD GATES	6 14 - W 15 - O	ALK/DON'T V THER	VALK	4	3 2- SOUTH 3-EAST	6 - NORTHWEST 7 - SOUTHEAST	
STATED		04 - TRAFFIC SIG 05 - TRAFFIC FLA	NAL 1 SHERS 1	0 - CONSTRUCTION BAR 11 - PERSON (FLAGGER, C	RICADE 16 - NO OFFICER)	DT REPORTE	ED GE		4 - WEST	8 - SOUTHWEST	
	I	08 - SCHOOL ZON	₩. 1	IZ - PAVEMENT MARKING	5					PAGE 2 UF	9

OHIO MANUAL						LOCALYREPORT NU	WBER		
SAFETY EDUCATION - ALEXYCE - PROTECTION						-060	bit		
	IER NAME: LAST, FIRST, MIDDLE	(SAME AS DRIVE	R)	OWNER PHONE NUN	IBER - INC. AREA CO	de (🛄 Same as Driver)	DAMAGE SCALE	DAMAGED AREA	
		iry, Earl,	V				4		
OWNER ADDRESS: OIT	440 in	nleside R	oad Cleveland	Ohio 441	28		I - NONE	$ \sim \rangle ^{\circ}$	² C ³
LP STATE LICENSE	PLATE NUMBER		VEHICLE IDENTIFICATION NUMBER		L 0	# OCOLIPANTS	2 - MINOR		
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VEHICLE YEAR	VEHICLE MAKE		VEHICLE MODEL		VEHICLE	XOLOR			汁し
PROOF OF	URANCE COMPANY		POLICY NUMBER	1	TOWED BY		4 - DISABLING	″┌ <u> </u> ∘	• _"
							9 - UNKNOWN	RE	AR
CARRIER NAME, ADDRES	SS, CITY, STATE, ZIP						CARRIER PHON	E-INCLUDE AREA CODE	
US DOT	VEHICLE WEIGHT GVWR	GCWR	CARGO BODY TYPE		00 - POI F	TRAFFICWAY DESCRI	PTION		
HM PLACARD ID No.	1 - LESS THAN OF 2 - 10,001 TO 26,0	EQUAL TO 10K LBS. 200 LBS.	02 - BUS/VAN (9-15 S 03 - BUS (16+ SEATS	EATS, INC DRIVER)	10 - CARGO TANK	1 - TWO-WAY 2 - TWO-WAY	(, NOT DIVIDED (, NOT DIVIDED, CONT	INUOUS LEFT TURN LA	NE
	3 - MORE THAN 2	26,000 LBS.	04 - VEHICLE TOWING	ANOTHER VEHICLE	12 - DUMP 13 - CONCRETE MD	KER 4-TWO-WAY	, DIVIDED, UNPROTE , DIVIDED, POSITIVE	CTED (PAINTED OR GR MEDIAN BARRIER	ASS>4 Ft.) MEDIAN
HM CLASS	HAZARDOUS MATE RELEASED	FRAL	06 - INTERMODAL CO 07 - CARGO VAIVENCI	VTAINER CHASSIS OSED BOX	14 - AUTO TRANSPO 15 - GARBAGE/REP	ORTER 5-ONE-WAY	(TRAFFICWAY		
NON-MOTORIST LOCATIO	N PRIOR TO IMPACT	TYPE OF USE	08 - GRAIN, CHIPS, C	SRAVEL	99 - OTHER/UNKNC				
	RSECTION - MARKED CROSSWALK RSECTION - NO CROSSWALK		26 PASSENGER VEHI	CLES (LESS THAN 9 PASSEN) MPACT	SERS) MED/HEAVY 1 13 - SINGLE U	RUCKS OR COMBO UNITS JNIT TRUCKS OR VAN 2 AXL	>10 KL88 BUS/VA E,6 TIRES 21 - E	NULIMO (9 OR MORE IN IUS/VAN (9-15 SEAT	CLUDING DRIVER) S, INC DRIVER
03 - INTE 04 - MIDE	RSECTION - OTHER BLOCK - MARKED CROSSWALK	1 - PERSONAL	02 - COMPAC 99 - UNKNOWN 03 - MID SIZE		14 - SINGLE U 15 - SINGLE U	JNIT TRUCK: 3+ AXLES JNIT TRUCK / TRAILER	22 - 8 NON-M	ius (16+ seats, inc Otorist	DRIVER
05 - TRAV 06 - BIC	VEL LANE - OTHER LOCATION YOLE LANE	2 - COMMERCIAL 3 - GOVERNMENT	OR HIT / SKIP 04 - FULL SIZ		16 - TRACTO	RACTOR (BOBTAIL) R/SEMI-TRAILER	23 - A 24 - A	NIMAL WITH RIDER NIMAL WITH BUGGY, '	WAGON, SURREY
08 - SIDI 09 - MED	EWALK IAN/CROSSING ISLAND		07 - PICKUP 08 - VAN	THEAT T VEHICLE	19 - TRACTO 20 - OTHER M	R/TRIPLES	25 - B 26 - P	ICYCLE/PEDACYCLIST EDESTRIAN/SKATER	r _
10 - DRIV 11 - SHA	EWAY ACCESS RED-USE PATH OR TRAIL		09 - MOTORO 10 - MOTORI	ZED BICYCLE			27-0	THER NON-MOTORIS	T
12 - NON 99 - OTH	-TRAFFICWAY AREA ERJUNKNOWN		11 - SNOWM 12 - OTHER F	OBILE / ATV PASSENGER VEHICLE	🔲 н,	AS HM PLACARD			
SPECIAL FUNCTION 01-1	NONE	09 - AMBULANCE 10 - FIRE	17 - FARM VEHICLE 18 - FARM EQUIPMENT	MOSTDAW	GED AREA 01 - NONE	08 - LEFT SIDE	99 - UNKNO	ACTION DWN 1 - NC	ON- CONTACT
03-1	RENTAL TRUCK (OVER 10(LBS) BUS - SCHOOL (PUBLIC OR PRIVATE)	11 - HIGHWAY/MAIN 12 - MILITARY	ENANCE 19 - MOTORHOME 20 - GOLF CART	018	02 - CENTER I 03 - RIGHT FR	RONT 09 - LEFT FRONT	DOWS	4 2- NC 3- ST	DN-COLLISION RIKING
05 - 06 -	BUS - TRANSIT BUS - CHARTER	13 - POLICE 14 - PUBLIC UTILITY	21 - TRAIN 22 - Other (Explain in I		05 - RIGHT RE	AR 12 - TOTAL (ALL A	AGE REAS)	4 - ST 5 - ST	RUCK RIKING/STRUCK
07 - 08 - 1	BUS - SHUTTLE BUS - OTHER	15 - OTHER GOVERN 16 - CONSTRUCTION	iment Equip.		08 - REAR CEI 07 - LEFT REA	R 14 - OTHER	<	9 - UN	KNOWN
PRE-CRASH ACTIONS	MOTORIST				NON-MOTORIST		0.0477001 04		
1118	01 - STRAIGHT A HEAD 02 - BACKING	07 - MAKING U-TURI 08 - ENTERING TRA	N 13 - NEGOT FRC LANE 14 - OTHER 10 LANE	IATING A CURVE	15 - ENTERING OF 16 - WALKING, RU	R CROSSING SPECIFIED L NNING, JOGGING, PLAYIN	IG, CYCLING	OTHER NON -MOT	ORIST ACTION
99 - UNKNOWN	04 - OVERTAKING/PASSING 05 - MAKING RIGHT TURN	10 - PARKED 11 - SLOWING OR S			18 - PUSHING VEH	IICLE G OR LEAVING VEHICLE			
	06 - MAKING LEFT TURN	12 - DRIVERLESS			20 - STANDING				
CONTRIBUTING CIRCU PRIMARY	IMSTANCES MOTORIST			N	ION-MOTOR		VEHICLE DEFEC	CTS TURN SIGNALS	
32	01 - NONE 02 - FAILURE TO YIELD	11 - IMPR 12 - IMPR	OPER BACKING OPER START FROM PARKED PO:	SITION	ST 22 - NONE 23 - IMPROPER CRO	SSING	02 - 03 -	HEAD LAMPS TAIL LAMPS	
	03 - RAN RED LIGHT 04 - RAN STOP SIGN	13 - STOP 14 - OPER	PED OR PARKED ILLEGALLY ATING VEHICLE IN NEGLIGENT M	ANNER 2	24 - DARTING 25 - LYING AND/OR I	LLEGALLY IN ROADWAY	04 - 05 -	BRAKES STEERING	
SECONDARY	05 - EXCEEDED SPEED LIMIT 06 - UNSAFE SPEED	15 - SWEF 18 - WROI	RVING TO AVOID (DUE TO EXTER NG SIDE/WRONG WAY	NAL CONDITIONS)	26 - FAILURE TO YIE 27 - NOT VISIBLE (D.	LD RIGHT OF WAY ARK CLOTHING)	07 -	WORN OR SLICK TI	RES
	07 - IMPROPER TURN 08 - LEFT OF CENTER 09 - SOLLOWED TOO CLOSED	17 - FAILL 18 - VISIO 40 - OBER	RE TO CONTROL N OBSTRUCTION	2	28 - INATTENTIVE 29 - FAILURE TO OB	EY TRAFFIC SIGNS	09 - 10 -	MOTOR TROUBLE DISABLED FROM PR	RIOR ACCIDENT
99 - UNKNOWN	10 - IMPROPER LANE CHANGE /PASSING/OFF ROAD	20 - LOAD 21 - OTHE	SHIFTING/FALLING/SPILLING	2	30 - WRONG SIDE O	F THE ROAD	11 -	OTHER DEFECTS	
SEQUENCE OF EVENT	s	20416	NON-COLLESION E	VENTS			<u>I</u>		
¹ 20 ²	3 4	י רדן נ	01 - OVERTURNROL 02 - FIRE/EXPLOSIC	LOVER M	06 - EQUIPMENT FAIL (BLOWN TIRE, BRA	LURE 10 - CRC WEFAILURE, ETC) 11 - CRC	ISS MEDIAN ISS CENTER LINE		
		99 - UNKNOW	W 05 - CARCOVECT HDM		08 - RAN OFF ROAD	RIGHT 12-DOW	DSITE DIRECTION OF INHILL RUNAWAY	TRAVEL	
			COLLISION WITH F	XED OBJECT		10- 011			
14 - PEDESTRIAN	21 - PARK	ED MOTOR VEHICLE	25 - IMPACT ATTENU 26 - BRIDGE OVERHE	ATOR/CRASH CUSHION	34 - MEDIAN GUAR	41 - O DRAIL BARRIER O	THER POST, POLE R SUPPORT	42 - CULVERT 49 - FIRE HYDRAN	n
16 - RAILWAY VEHIC	LE (TRAIN ENGINE) 23 - STRU	CONCIMUNITERVING	ING CARGO 28 - BRIDGE PARAPE	Т	36 - MEDIAN OTHE 37 - TRAFFIC SIGN	R BARRIER 43-C POST 44-D	URB	EQUIPMENT	NG TUNNEL
18 - ANIMAL - DEER 19 - ANIMAL - OTHER	MOTO 24 - OTHER	R VEHICLE R MOVABLE OBJECT	30 - GUARDRAIL FAC 31 - GUARDRAIL EN	DE D	38 - OVERHEAD SIG 39 - LIGHT/LUMINAF	GN POST 45 - EI RIES SUPPORT 46 - FI	MBANKMENT	52 - OTHER FIXED	OBJECT
20 - MOTOR VEHICLE	EIN TRANSPORT OBJECT		32 - PORTABLE BAR	RIER	40 - UTILITY POLE	47 - M	AILBOX		
	POSTED SPEED	01 - NO CONTROL 02 - STOP SIGN	S 07 - RAILROAD CROSSE	UCKS 13 - CRO	SSWALK LINES		1 - NORTH	5 - NORTHEAST	9 - UNKNOWN
		03 - YIELD SIGN 04 - TRAFFIC SIGN	00 - RAILROAD GATES	15 - OTHE ARRICADE 18 - NOT	ER		3 - EAST 4 - WEST	7 - SOUTHEAST 8 - SOUTHWEST	
STATED ESTIMATED		05 - TRAFFIC FLA 06 - SCHOOL ZON	SHERS 11 - PERSON (FLAGGER E 12 - PAVEMENT MARKIN	, OFFICER)				PAGE	4 of 9
JE VODDA OHAH (Bev (1				L				لــــــــــــــــــــــــــــــــــــ

ОНО	t t							
EDUCATION - STRING - MOTECTION	UNIT						6771	
UNIT NUMBER OWN	IER NAME: LAST, FIRST, MIDDLE	E (🔲 SAME AS DRIVE	R)	OWNER PHONE NUME	BER - INC. AREA CO	ODE (🛄 SAME AS DRIVER)	DAMAGE SCALE	DAMAGED AREA
OWNER ADDRESS: CIT		ny, Derric	ska, T.	2167320430			4	
	877 R	udyard Re	oad Cleveland,	Ohio 4411	0		2 MINOR	
	X268230			2 T 9 M 6 :	2 1 3 2		3 - FUNCTIONAL	08 10 04
VEHICLE YEAR		rolet		lalibu	VEHICLE	ECOLOR	4 - DISABLING	07
PROOF OF INSURANCE SHOWN	Generation Generation	al	POLICYNUMBER 25-0B152	22737	Eckes	s/L2/8775	9 - UNKNOWN	REAR
CARRIER NAME, ADDRES	SS, CITY, STATE, ZIP				<u> </u>		CARRIER PHONE	INCLUDE AREA CODE
US DOT	VEHICLE WEIGHT GVWR	/GCWR	CARGO BODY TYPE		09 - POLE	TRAFFICWAY DESCR	PTICN	
HM PLACARD ID No.	1 - LESS THAN O 2 - 10,001 TO 26,	r Equal to 10k lbs. ,000 lbs.	01 02 - BUSVAN (9-15-5 03 - BUS (18) SEATS	SEATS, INC DRIVER)	10 - CARGO TAN	IK 4 1-TWO-WA	Y, NOT DIVIDED Y, NOT DIVIDED, CONTI	NUCUS LEFT TURN LANE
	3 - MORE THAN	26,000 LBS.	04 - VEHICLE TOWIN	G ANOTHER VEHICLE	12 - DUMP 13 - CONCRETE N	41XER 4-TWO-WA	Y, DIVIDED, UNPROTEC Y, DIVIDED, POSITIVE N	TED (PAINTED OR GRASS > 4 FL) MEDIAN ÆDIAN BARRIER
HM CLASS	HAZARDOUS MAT	ERIAL	06 - INTERMODAL CO	NTAINER CHASSIS	14 AUTO TRANSI	PORTER 5 - ONE-WA	Y TRAFFICWAY	
NUMBER	RELEASED		07 - CARGO VANEAC 08 - GRAIN, CHIPS,	GRAVEL	99 - OTHER/UNKN		r	
NON-MOTORIST LOCATIO	IN PRIOR TO IMPACT	TYPE OF USE	UNIT TYPE	ICLES (LESS THAN 9 PASSENGE	Sest MED/HEAVY	TRUCKS OR COMBO UNITS	> 10k LBS BUSVAN	WLING (9 OR MORE INC) LIDING ORIVERI
	RSECTION - MARKED CROSSWALK RSECTION - NO CROSSWALK	1	04 01 - SUB-CC	MPACT	13 - SINGLE	UNIT TRUCKS OR VAN 2 AX	LE, 6 TIRES 21 - BI	US/VAN (9-15 SEATS, INC DRIVER
03 - INTE 04 - MIDE	BRSECTION - OTHER BLOCK - MARKED CROSSWALK	1 - PERSONAL	02 - COMPA 09 - UNKNOWN 03 - MID SIZ	CI E	14 - SINGLE 15 - SINGLE	UNIT TRUCK; 3+ AXLES	NON-MC	DIS (16+ SEATS, INC DRIVER DISKST
05 - TRA\ 06 - BIC'	VEL LANE - OTHER LOCATION YCLE LANE	2 - COMMERCIAL 3 - GOVERNMENT	OR HIT / SKIP 04 - FULL SI 05 - MINIVAI	ZE ¥	18 - TRUCK 17 - TRACT	/TRACTOR (BOBTAIL) OR/SEMI-TRAILER	23 - AN 24 - AN	NIMAL WITH RIDER JIMAL WITH BUGGY WAGON, SUBBEY
07 - SHO 08 - SIDI	ULDER/ROADSIDE EWALK		06 - SPORT 07 - PICKUP	UTILITY VEHICLE	18 - TRACT 19 - TRACT	OR/DOUBLE OR/TRIPLES	25 - BK	CYCLE/PEDACYCLIST
09 - MED	AN/CROSSING ISLAND		08 - VAN		20 - OTHER	MED/HEAVY VEHICLE	26 - PE 27 - OT	HER NON-MOTORIST
11 - SHA	RED-USE PATH OR TRAIL	RESPONSE	10 - MOTOR	IZED BICYCLE			1	
12 - NON 99 - OTH	ER/UNKNOWN		12 - OTHER	PASSENGER VEHICLE	Цн	AS HM PLACARD		
SPECIAL FUNCTION 01-1	NONE	09 - AMBULANCE	17 - FARM VEHICLE 18 - EARM FOURTMEN	MOST DAMAG	ED AREA 01 - NONE	08 - LEFT SIDE	99 - UNKNO	ACTION WN 1 - NON- CONTACT
01	RENTAL TRUCK (OVER 10K LBS)	11 - HIGHWAY/MAIN	TENANCE 19 - MOTORHOME		02 - CENTER 03 - RIGHT F	R FRONT 09 - LEFT FRONT RONT 10 - TOP AND WI	DOWS	2 - NON-COLLISION 3 - STRIKING
04-	BUS - SCHOOL (PUBLIC OR PRIVATE BUS - TRANSIT	12 - MILITARY 13 - POLICE	20 - GOLF CART 21 - TRAIN	IMPACT AR	EA 04 - RIGHT S	NDE 11 - UNDERCARE	AGE	4 - STRUCK
06 - 07 -	BUS - CHARTER BUS - SHUTTLE	14 - PUBLIC UTILITY 15 - OTHER GOVER!	Y 22 - OTHER (EXPLAIN IN WIENT	NARRATIVE 05	06 - REAR C	ENTER 08 - REAR CENTE	R	8 - UNKNOWN
PRE-CRASH ACTIONS	BUS - OTHER	16 - CONSTRUCTION	I EQUIP.		07 - LEFT RE	EAR 14-OTHER		
111	MOTORIST	07 - MAKING LLTUP	N 13 - NEGO		NON-MOTORIST	OR CROSSING SPECIFIED I	OCATION 21-	OTHER NON -MOTORIST ACTION
	02 - BACKING	08 - ENTERING TRA	FFIC LANE 14 - OTHE	R MOTORIST ACTION	18 - WALKING, R	UNNING, JOGGING, PLAYI	NG, CYCLING	
99 - UNKNOWN	03 - CHANGING LANES 04 - OVERTAKING/PASSING	09 - LEAVING TRAFI 10 - PARKED	FIC LANE		18 - PUSHING VE	EHICLE		
	05 - MAKING RIGHT TURN 06 - MAKING LEFT TURN	11 - SLOWING OR S 12 - DRIVERLESS	TOPPED IN TRAFFIC		19 - APPROACHI 20 - STANDING	ING OR LEAVING VEHICLE		
CONTRIBUTING CIRCI	UMSTANCES						VEHICLE DEFEC	TS
PRIMARY	MOTORIST			NC	N-MOTOR			TURN SIGNALS
13	01 - NONE 02 - FAILURE TO YIELD	11 - IMPR 12 - IMPR	OPER BACKING OPER START FROM PARKED PC	23 ISITION 23	2 - NONE 3 - IMPROPER CF	ROSSING		TAIL LAMPS
l	03 - RAN RED LIGHT 04 - RAN STOP SIGN	13 - STOF 14 - OPEF	PED OR PARKED ILLEGALLY RATING VEHICLE IN NEGLIGENT	MANNER 24	4 - DARTING 5 - LYING AND/OF	R ILLEGALLY IN ROADWAY	05 -	STEERING
SECONDARY	05 - EXCEEDED SPEED LIMIT 06 - UNSAFE SPEED	15 - SWEI 16 - WRO	RVING TO AVOID (DUE TO EXTÉ NG SIDE/WRONG WAY	RNAL CONDITIONS) 26 27	8 - FAILURE TO Y 7 - NOT VISIBLE (I	IELD RIGHT OF WAY DARK CLOTHING)	08 - 07 - 1	WORN OR SLICK TIRES
	07 - IMPROPER TURN 08 - LEET OF CENTER	17 - FAILU 18 - VISIO	JRE TO CONTROL	28	8 - INATTENTIVE 9 - FAILURE TO O	BEY TRAFFIC SIGNS	08 - 09 - I	TRAILER EQUIPMENT DEFECTIVE MOTOR TROUBLE
99 - UNKNOWN	09 - FOLLOWED TOO CLOSEL	Y/ACDA 10 - OPER	RATING DEFECTIVE EQUIPMENT	30	/SIGNALS/OFF		10 - I 11 - (DISABLED FROM PRIOR ACCIDENT OTHER DEFECTS
	/PASSING/OFF ROAD	21 - OTHE	ER IMPROPER ACTION	32	- OTHER NON-M	NOTORIST ACTION		
SEQUENCE OF EVENT	S		NON-COLLISION	EVENTS	06 - FOURPMENT F		DSS MEDIAN	
2 0 1		0	02 - FIRE/EXPLOSI	ON	(BLOWN TIRE, B	RAKEFAILURE, ETC) 11 - CR	OSS CENTER LINE	
FIRST	MOST	99 - UNKNOV	03 - IMMERSION 04 - JACKKNIFE		08 - RAN OFF ROA	DRIGHT 12-DO	OSHE DIRECTION OF	IRAVEL
			05 - CARGO/EQUIP!			– –→ · 33- 01	REA INVITUULLISION	
COLLISION WITH PER	RSON, VEHICLE OR OBJECT NO	T FIXED	25 - IMPACT ATTEN	JATORICRASH CUSHION	34 MEDIALOU		OTHER POST, POLE	42 - CULVERT
15 - PEDALCYCLE	21 - PARI 22 - WOR	K ZONE MAINTENANCE	20 - BRIDGE OVER E EQUIPMENT 27 - BRIDGE PIER C	R ABUTMENT	35 - MEDIAN CON	ICRETE BARRIER 42-	CULVERT	50 - WORK ZONE MAINTENANCE
16 - KAILWAY VERIC 17 - ANIMAL - FARM	ALE (TRAIN ENGINE) 23 - STRU OR A	NYTHING SET IN MOTI	ING GANGU 28 BRIDGE PARAP ON BY A 29 - 8RIDGE RAIL	c)	30 - MEUIAN OTH 37 - TRAFFIC SIG	NPOST 44-I	DITCH	EQUIPMENT 51 - WALL, BUILDING, TUNNEL
18 - ANIMAL - DEER 19 - ANIMAL - OTHER	MOT R 24-071-6	OR VEHICLE ER MOVABLE OBJECT	30 - GUARDRAIL FA 31 - GUARDRAIL EI	ICE ND	38 - OVERHEAD S 39 - LIGHTALUMIN	ARIES SUPPORT 45 - 1	ENCE	52 - OTHER FIXED OBJECT
20 - MOTOR VEHICLI	E IN TRANSPORT OBJECT	· · · · · · · · · · · · · · · · · · ·	32 - PORTABLE BAI	WER	40 - UTILITY POL	LE 47-1	MAILBOX	
UNIT SPEED	POSTED SPEED TRAFFIC	CONTROL 01 - NO CONTRO	LS 07 - RAILROAD CROSS	BUCKS 13 - CROS	SWALK LINES	FROM TO TO	1 - NORTH	5 - NORTHEAST 0 - UNKNOWN
001	60 01	02 - STOP SIGN 03 - YIELD SIGN	08 - RAILROAD FLASHI 09 - RAILROAD GATES	RS 14 - WALK 15 - OTHE	/DON'T WALK R	4	2 - SOUTH 3 - EAST	6 - NORTHWEST 7 - SOUTHEAST
STATED		04 - TRAFFIC SIG 05 - TRAFFIC FLA	NAL 10 - CONSTRUCTION E SHERS 11 - PERSON (FLAGGE	ARRICADE 16 - NOT F R, OFFICER)	REPORTED		4 - WEST	8 - SOUTHWEST
		08 - SCHOOL ZOI	NE 12 - PAVEMENT MARKI	NGS		I		PAGE 5 OF 9

HSY8304 OH1U (Rev 01/12)
[0]5] Bolden, Eric, C.	2162885156 3 J
OWNER ADDRESS: CITY, STATE, ZIP (SAME AS DRIVER)	
10616 Everton Avenue Clevelar	nd, Ohio 44106
LP STATE LICENSE PLATE NUMBER VEHICLE IDENTIFICATION NUMBER	
	VEHO F CO OR
SHOWN CARRIER NAME ADDRESS CITY STATE 7/P	
US DOT VEHICLE WEIGHT GVWR/GCWR CARGO BODY TYPE	Y TYPE/NOT APPLICABLE 00 · POLE TRAFFICWAY DESCRIPTION
HM PLACARD ID No. 2 - 10,001 TO 26,000 Lss. 02 - BUSI/AN (0-15 - 0.000 Lss. 3 - MORE THAN 26,000 Lbs. 03 - BUS (16 - SEAT)	SEATS, INC DRIVER) 10 - CARGO TANK 5, INC DRIVER) 11 - FLAT BED 13. TMOVWAY, NOT DIVIDED CONTINUOUS LEFT TURIVLANE 3. TMOVWAY, NOT DIVIDED CONTINUOUS LEFT TURIVLANE 3. TMOVWAY, NOT DIVIDED
04 - VEHICLE TOWN 05 - LOGGING	G ANOTHER VEHICLE 12: DOMP 13 - CONCETE MIXER 13 - CONCETE MIXER 5 - ONE-WAY TRAFFICWAY
HM CLASS HAZARDOUS MATERIAL 05 - INTERNOLAL UK NUMBER RELEASED 07 - CARGO VAVEN	ANJANER CRASSIS 14 - ADIO I RANSFORMER JLOSED BOX 15 - GARBAGE/REFUSE GRAVEI COLUMNIA I I I I I / SKIP UNIT
NON-MOTORIST LOCATION PRIOR TO IMPACT TYPE OF USE UNIT TYPE	
01 - INTERSECTION - MARKED CROSSWALK 02 - INTERSECTION - NO CROSSWALK 03 - INTERSECTION - NO CROSSWALK	INCLES [LESS IN AN 97ASSERGERS] MEDIALEAV 9 INCORS OR COMBO UNITS > TOKUS BOSYANUMO(9 CH MORE INCLUDING DRIVER) MAPACT 13- SINGLE UNIT TRUCKS OR VAN 2 AXLE, 6 TIRES 21 - BUSYANU (0-15 SEATS, INC DRIVER
03 - INTERSECTION - OTHER 04 - MIDBLOCK - MARKED CROSSWALK 1 - PERSONAL 00 - UNKNOWN 03 - MID SIZ	CT 14-SINGLE UNIT TRUCK 34 AALES 22-BUS (164 SEATS, INC DRIVER E 15-SINGLE UNIT TRUCK / TRAILER NON-MOTORIST 75 14-TELICK/TEACTOR (OPPTHE)
06 - IRAVEL DAVE - OTHER LOCATION 2 - CONVERCIAL OR HIT / SKIP 04 - POLL OF 06 - BICYCLE LANE 05 - MINUAL 07 - BICYCLE LANE 05 - MINUAL	KOUNTRACTOR/SEMI-TRAILER 23 - ANIMAL WITH RIDER 10 - TRACTOR/SEMI-TRAILER 24 - ANIMAL WITH BUGGY, WAGON, SURREY
08 - SIDEWALK 07 - PICKUP 08 - SIDEWALK 07 - PICKUP 08 - MEDIAN/CROSSING ISLAND 08 - VAN	19 - TRACTOR/TRIPLES 25 - BICYCLE/PEDACYCLIST 19 - TRACTOR/TRIPLES 26 - PEDESTRIANSKATER 20 - OTHER MED/HEAVY VEHICLE 26 - PEDESTRIANSKATER
10 - DRIVEWAY ACCESS IN MERGENCY 09 - MOTOR 11 - SHARED-USE PATH OR TRAIL RESPONSE 10 - MOTOR	
12 - NON-TRAFFICWAY AREA 11 - SNOWN 09 - OTHERUNKNOWN 12 - OTHER	IOBILE / ATV PASSENGER VEHICLE HAS HM PLACARD
SPECIAL FUNCTION 01 - NONE 09 - AMBULANCE 17 - FARM VEHICLE 00 - TAX 10 - FIRE 10 - FIRE 10 - FIRE	MOST DAMAGED AREA 01 - NONE 08 - LEFT SIDE 09 - UNKNOWN
03 - RENTAL TRUCK (OVER 10X Lbs) 11 - HIGHWAY/MAINTENANCE 19 - MOTORHOME 04 - BUS - SCHOOL (PUBLIC OR PRIVATE) 12 - MILITARY 20 - GOLF CART	02 - CENTER FRONT 09 - LEFT FRONT 03 - RIGHT FRONT 10 - TOP AND WINDOWS 03 - STRIKING
05 - BUS - TRANSIT 13 - POLICE 21 - TRAIN 08 - BUS - CHARTER 14 - PUBLIC UTILITY 22 - OTHER (EXPLAIN IN	MPACT AREA 04 - RIGHT SIDE 11 - UNDERCARRIAGE 4 - STRUCK NARRATIVEI 05 - RIGHT REAR 12 - TOTAL (ALL AREAS) 5 - STRIKING/STRUCK
07 - BUS - SHUTTLE 15 - OTHER GOVERNMENT 06 - BUS - OTHER 16 - CONSTRUCTION EQUIP.	0- UNKNOWN 07 - LEFT REAR 14 - OTHER
PRE-CRASH ACTIONS	NON-MOTORIST
13 - NEGC 02 - BACKING 08 - ENTERING TRAFFIC LANE 14 - OTHE	ITIATING A CURVE 15 - ENTERING OR CROSSING SPECIFIED LOCATION 21 - OTHER NON -MOTORIST ACTION R MOTORIST ACTION 18 - WALKING, RUNNING, JOGGING, PLAYING, CYCLING
99 - UNKNOWN 03 - CHANGING LANES 09 - LEAVING TRAFFIC LANE 04 - OVERTAKING/PASSING 10 - PARKED	17 - WORKING 18 - PUSHING VEHICLE 19 - ADDROAD WAR OF LEAKING VEHICLE
05 - MAKING KIGHTTURN 11 - SLOWING OK STOPPED IN TRAFFIC 08 - MAKING LEFTTURN 12 - DRIVERLESS	20 - STANDING
CONTRIBUTING CIRCUMSTANCES	VEHICLE DEFECTS
01 - NONE 11 - IMPROPER BACKING	IST 22 - NONE 03 - TAIL LAMPS 03 - TAIL LAMPS
02 - FAILURE TO YIELD 12 - IMPROPER START FROM PARKED PC 03 - RAN RED LIGHT 13 - STOPPED OR PARKED ILLEGALLY 04 - PAN STOP PCON 14 - OPERATING VIGUE	ISTRION 23 - IMPROPER CROSSING 04 - BRAKES 24 - DARTING 04 - BRAKES NANNED 25 - LYDE ANNOR ILL CONTY IN POADMAX 06 - STEERING
SECONDARY 05 - EXCEEDED SPEED LIMIT 15 - SWERVING TO AVOID QUE TO EXTEN	RNAL CONDITIONS) 26 - FAILURE TO YIELD RIGHT OF WAY 27 - NOT VISIBLE (DARK CLOTHING) 07 - WORN OR SLICK TIRES
07 - IMPROPER TURN 17 - FAILURE TO CONTROL 08 - LEFT OF CENTER 18 - VISION OBSTRUCTION	28 - INATTENTIVE 08 - TRAILER EQUIPMENT DEFECTIVE 29 - FAILURE TO OBEY TRAFFIC SIGNS 09 - MOTOR TROUBLE
99 - UNKNOWN 09 - FOLLOWED TOO CLOSELY/ACDA 19 - OPERATING DEFECTIVE EQUIPMENT 10 - IMPROPER LANE CHANGE 20 - LOAD SHIFTING/FALLING/SPILLING	/SIGNALS/OFFICER 10 - DISABLED FROM PRIOR ACCIDENT 30 - WRONG SIDE OF THE ROAD 11 - OTHER DEFECTS
/PASSING/OFF ROAD 21 - OTHER IMPROPER ACTION	32 - OTHER NON-MOTORIST ACTION
	LOVER 06 - EQUIPMENT FAILURE 10 - CROSS MEDIAN
	07 - SEPARATION OF UNITS OPPOSITE DIRECTION OF TRAVEL 08 - RAN OFF ROAD RIGHT 12 - DOWNHUL RUNAWAY
HARMFUL 2 HARMFUL 99 - UNKNOWN 05 - CARGO/EQUIP	VENT LOSS OR SHIFT 09 - RAN OFF ROAD LEFT 13 - OTHER NON-COLLISION
COLLISION WITH PERSON, VEHICLE OR OBJECT NOT FIXED 25 - IMPACT ATTEN	IXED DBJECT JATORIORASH CUSHION 41 - OTHER POST, POLE 42 - CULVERT STARTITISTIC 24 MEDIAN CHAPDEAN BARDIER OD CHIDDODT 40 - ENSE MATDAANT
15 - PEDALCYCLE 22 - WORK ZONE MAINTENANCE EQUIPMENT 27 - BRIDGE PIRA 16 - RAILWAY VEHICLE (TRAIN ENGINE) 23 - STRICK RY FAILING SHETING CARGO 28 - BRIDGE PARA	R ABUTINGING TO THE MEDIAN CONCRETE BARRIER 42 - CULVERT 50 - WORK ZONE MAINTENANCE ET 35 - MEDIAN OTHER BARRIER 43 - CUR8 FOUNDENT
17 - ANIMAL - FARM OR ANYTHING SET IN MOTION BY A 29 - BRIDGE RAIL 18 - ANIMAL - DEER MOTOR VEHICLE 30 - GUARDRAIL F/	37 - TRAFFIC SIGN POST 44 - DITCH 51 - WALL, BUILDING, TUNNEL ACE 38 - OVERHEAD SIGN POST 45 - EMBANKMENT 52 - OTHER FIXED OBJECT
10 - ANIMAL - OTHER 24 - OTHER MOVABLE OBJECT 31 - GUARDRAIL E 20 - MOTOR VEHICLE IN TRANSPORT OBJECT 32 - PORTABLE BA	ND 30 - LIGHT/LUMINARIES SUPPORT 40 - FENCE RRIER 40 - UTILITY POLE 47 - MAILBOX
UNIT SPEED POSTED SPEED TRAFFIC CONTROL	
0 610 08 - RAILROAD FLASH 03 - YIELD SIGN 09 - RAILROAD FLASH 03 - YIELD SIGN 09 - RAILROAD GATES	ERS 14-WALK/DONT WALK 6 10 7 2-SOUTH 6-NORTHWEST 15-OTHER 6 7 3-EAST 7-SOUTHEAST
STATED O5 - TRAFFIC SIGNAL 10 - CONSTRUCTION 0 STMATED O5 - TRAFFIC FLASHERS 11 - PERSON (FLAGGE	BARRICADE 16 - NOT REPORTED 1 - WEST 8 - SOUTHWEST R, OFFICER)
06 - SCHOOL ZONE 12 - PAVEMENT MARKI	NGS PAGE OF 9

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[NAME: LA	ST, FIRST,	MIDDLE										DATE OF BIRTH	<u></u>		AGE		GENDER	FEMALE
ŀ	ADDRESS, CITY	Y, STATE, ZIP				Najji	ar,M	ohan	ned	<u>, Y.</u>				120		1 9 8 ·	4 2 .DE AREA COC	8 ¢	<u>IVI</u> м	- MALE
DTORISY				1385 Fit	tzro	y Sti	reet	West	tlake	e, C	Dhio 441	45				2	16749	9583	37	
ST/NON M			18Y EMS	GENCY				MEDICA	Met	tra l	Health	SA [PLIANT Cle	SEATING POSI		G USAGE		
Moroe		OPERATORLIC	CENSE NUN	ABER	a.	CLASS	N₀ □VALID					ECTED	ALCOHOL TEST STATU	S ALCOHOL TEST	TYPE	ALCOHOL TEST		TEST STA		TEST TYPE
	OFFENSE CH/	ARGED (LOCAL CO	8590 ®			OL E DESORIP	TION				C	TATION NUMBER							DBY
		NAME	ST FIRST	MIDDE												USE	D	1		
		I C CITAL D B	, , , , , , ,	middle_															M R	FEMALE - MALE
RIST	ADDRESS, CITY,	, state, zip													CONTA	CTPHONE-INCL	LDE AREA COD	E		
Non Moro		JURED TAKEN	IBY EMS	AGENCY				MEDICA	L FACILIT	IY INJUR	ED TAKEN TO	SA [TETY EQUIPMENT USED		PLIANT	SEATING POSI		G USAGE	EJECTION	TRAPPED
MOTORIST/		OPERATOR LIC	XENSE NUM	BER			No	M/C	CONDITI	ion a	LCOHOL DRUG SUSP	CTED	ALCOHOL TEST STATU	HELMET	TYPE	LCOHOL TEST		TEST STA		TEST TYPE
	OFFENSE CHA	ARGED (LCCAL COL	XE)		OFFENS				1										
																	ICE D			
1	NJURIES 1 - NO INJURIE 2 - POSSIBI F	ES / NON RE	PORTED	INJURED TAKEN 1 - NOT TRANSP TREATED AT	BY ORTED	SAI M	FETY EQI	JIPMENT U	SED		99 - UNKNO	OWN S	VFETY EQUIPMENT		NON-N 09 - 1	NOTORIST		12 - REI	FLECTIVE	CLOTHING
100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100	3 - NON-INCAF 4 - INCAPACIT 5 - FATAL	PACITATING ATING		2 - EMS 3 - POLICE 4 - OTHER		000000000000000000000000000000000000000	1 - NONE 2 - SHOU 3 - LAP B	USED - VE	HICLE C		ANT 05 - CHILD 06 - CHILD 07 - BOOS1	RESTF RESTF IER SE	AINT SYSTEM-FOR AINT SYSTEM-REAL AT	WARD FACING R FACING	10-} 11-F (IELMET USED ROTECTIVE ELBOW, KNEI) PADS USED IS, ETC)	13 - LIG 14 - OTI	HTING HER	
		ITION		9 - UNKNOWN													AIR BAG U	BAGE		
	01 - FRONT - L 02 - FRONT - N 03 - FRONT - F	,EFT SIDE (N MIDDLE RIGHT SIDE	MOTORCY	CLE DRIVER)	07 - 08 - 09 -	THIRD - THIRD - THIRD -	LEFT SIL MIDDLE RIGHT S			SIDE C.	AR)	12 - P 13 - T 14 - R	ASSENGER IN UNEN RAILING UNIT IDING ON A VEHICLI	ICLOSED CARG	O AREA	LING UNIT)	1 - NOT DE 2 - DEPLO' 3 - DEPLO'	PLOYED (ED FRO) (ED SIDE	٩T	
	05 - SECOND 06 - SECOND -	- MIDDLE - RIGHT SIDE	(WOTORC	TOLE PASSENGE	11	PASSEI (NON-T	NGER IN RAILING	OTHER ENG	CLOSED	CARGI US, PIC	O AREA K-UP WITH CAB)	15 N 16 - O 99 - U	THER VKNOWN				5 - NOT AP 9 - DEPLO	PLICABLI MENT U	4 FRONT/S E NKNOWN	BIDE
E 211.200	EJECTION 1 - NOT EJECT 2 - TOTALLY E	IED JECTED	TRAPPE 1 - NOT 2 - EXTR	D TRAPPED RACT BY		OPERA 1 - CLA 2 - CLA	TOR LICE SS A SS B	NSE CLAS	S (CONDIN 1 - APP 2 - PHY	TION PARENTLY NORMA SICAL IMPAIRMEI	и VT	5-f 8-l	ALL ASLEEP, F		FATIGUED	ALCOHOL/E 1 - NONE 2 - YES - AI	COHOL :	SPECTED	D
10000	3 - PARTIALLY 4 - NOT APPLI	EJECTED CABLE	MEC 3 - EXT(NON	HANICAL MEANS RACTED BY MECHANICAL ME	ANS	3 • CLA 4 - REG 5 - MC/	SS C SULAR CL MOPED <u>ON</u>	ASS (OHIO II LY	\$ °D")	3 - EM(4 - ILLN	OTIONAL (DEPRESS VESS	ed, An	3RY, DISTURBED) 1 7 - 0	MEDICATION, D DTHER	RUGS, A	ALCOHOL	3 - YES - HI 4 - YES - DI 5 - YES - AI	SD NOT II RUG SUS COHOL /	MPAIRED PECTED AND DRUG	SUSPECT
٨	ALCOHOL TEST 1 - NONE GIVE	r Status N			ALCOH 1 - NO	IOL TEST	TYPE D	RUG TESY S - NONE GP	STATUES VEN				DRUG TEST TYPE 1 - NONE	DRIVER DISTR	ACTED	BY REPORTED	6 -	OTHER I	NSIDE THE	VEHICLE
14124124	2 - TEST REFO 3 - TEST GIVEN 4 - TEST GIVEN 5 - TEST GIVEN	N, CONTAMI N, RESULTS N, RESULTS	NATED SA KNOWN UNKNOW	AMPLE/UNUSABLE /N	2 - BLC 3 - URI 4 - BRI 5 - OTI	INE EATH HER	2 3 4 5	- TEST REI - TEST GIV - TEST GIV	/EN, COI /EN, RES /EN, RES	NTAMIN SULTS I	ATED SAMPLE/UNI KNOWN UNKNOWN	JSAÐLE	2 - BLOOD 3 - URINE 4 - BREATH 5 - OTHER	3 - TEXTING/E 4 - ELECTRON 5 - OTHER EL	MAILIN	G IMUNICATION NIC DEVICE	DEVICE	EXTERN	AL DISTRA	CTION
Ŭ	NIT	NAME: LAST	r, first, M	NDDLE	1.0.04									(NAVIGATI DATE OF BIRTH	ON DEV	ICE, RADIO, E	ND)	G	ENDER	FEMALE
ANT V	DORESS, CITY, 1	state, zip													CONTAC	T PHONE- INCLL	DE AREA CODI		м.	MALE
OccuP.			N GMC					LEDION.	FACILITY			In						110405	F 15071011	
			51 6/037	AGENC F				WELLOAC		T INDURC	SO TAKEN TO				aliant Le			USAGE		
Ui I	NIT NUMBER	NAME: LAST	, FIRST, M	IDDLE										DATE OF BIRTH		1 1 1	AGE	G	ENDER F	FEMALE MALE
	DORESS, CITY, S	state, zip												<u>II</u>	CONTAC	T PHONE- INCLU	DE AREA CODE		I	
000C	UURIES INJU	RED TAKEN B	BY EMS A	AGENCY				MEDICAL	FACILITY	/ INJURE	ED TAKEN TO	SAF	ETY EQUIPMENT USED	DOT COM	TIANT	SEATING POSIT	ON AIR BAG	USAGE		
	L													HELMET	LE				EJECTION	TRAPPED
L			<u> </u>					1									<u> </u>			^{of} 9

	OTORIST/	Non-N	OTOR	<u>IST / Oc</u>	CUPAN		oft I		
UNIT NUMBER NAME: LAST, F	IRST, MIDDLE	Lound	Earl V				1191612	AGE	GENDER F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZIP	ADDRESS, CITY, STATE, ZIP						TACT PHONE INCLUDE		
VINURIES INURED TAKEN BY	440 Inglesic	de Road C I	leveland	, Ohio 4412	SAFETY EQUIPMENT US		T SEATING POSITIO	N AIR BAG USAG	E EJECTION TRAPPED
	CEMS	11	Clevela	and Clinic	01		15	5	4 1
	708623		END.						
OFFENSE CHARGED (LCC	AL CODE)	OFFENSE DESCRIPTION	I		CITATION NUMBER	<u>, </u>	HANDS DEVICE USED		
	IRST, MIDDLE	<u> </u>	<u> </u>		1		1101711	AGE	GENDER
ADDRESS, CITY, STATE, ZIP		Bolden,	Eric, C.				TACT PHONE-INCLUDE	AREACODE	BVI M-MALE
NURIES INURED TAKEN BY	10616 Everton Avenue Cleveland, Ohio 44106						21	628851	56 E EJECTION TRAPPED
	CEMS	12	Metro	Health	09	HELMET	15	5	4 1
	102691		END.						
OFFENSE CHARGED (🔲 LCC	NL CODE)	OFFENSE DESCRIPTION			CITATION NUMBER				
3 - NON-INCAPACITATING 4 - INCAPACITATING 5 - FATAL SEATING POSITION 01 - FRONT - LEFT SIDE (MOT 02 - FRONT - MIDDLE 03 - FRONT - NIGHT SIDE 04 - SECOND - LEFT SIDE (MC 05 - SECOND - LEFT SIDE (MC 05 - SECOND - LEFT SIDE 06 - SECOND - RIGHT SIDE ELECTION TR	2 - EMS 3 - POLICE 4 - OTHER 9 - UNKNOWN DRCYCLE DRIVER) 0 0 0 0 0 0 0 0 0 0 0 0 0	2 - SHOULDE 03 - LAP BELT 04 - SHOULDE 7 - THIRD - LEFT SIDE (8 - THIRD - MIDDLE 9 - THIRD - RIGHT SIDE 9 - SLEEPER SECTION 1 - PASSENGER IN OTH (NON-TRAILING UN)	R BELT ONLY USE ONLY USED R AND LAP BELT I MOTORCYCLE SID OF CAB (TRUCK) IER/ENCLOSED CA T SUCH AS A BUS, F CLASS	00 09 - CHILD RE 07 - BOOSTEJ JSED 08 - HELMET I E CAR) 11 E CAR) 11 RGO AREA 11 PICK-UP WITH CAB) 05	STRAINT SYSTEM-RE I SEAT JSED - PASSENGER IN UNE - TRAILING UNIT - RIDING ON A VEHIC - NON-MOTORIST - OTHER - UNIKNEWN	NR FACING 11	- PROTECTIVE PAI (ELBOW, KNEES, LEA AI SAILING UNIT) 3 SAILING UNIT) 3 AI AI	DS USED 14 - O ETC) R BAG USAGE - NOT DEPLOYE - DEPLOYED FR - DEPLOYED SIC - NOT APPLICAB - DEPLOYED SIC - NOT APPLICAB - DEPLOYMENT - COHOL/DRUG S	D ONT ONT TH FRONT/SIDE WE UNKNOWN
1 - NOT EJEGTED 2 - TOTALLY EJECTED 3 - PARTIALLY EJECTED 4 - NOT APPLICABLE 3	NOT TRAPPED EXTRACT BY MECHANICAL MEANS EXTRACTED BY NON-MECHANICAL MEANS	1 - CLASS A 2 - CLASS B 3 - CLASS C 4 - REGULAR CLASS 5 - MC/MOPED ONLY	1 - / 2 - 1 3 - 1 3 - 1 4 - 1	APPARENTLY NORMAL PHYSICAL IMPAIRMENT EMOTIONAL (DEPRESED ILLINESS	5- 6- Амору, Disturibep) 7-	FALL ASLEEP, FAINTE UNDER THE INFLUEN MEDICATION, DRUGS OTHER	D, FATIGUED CE OF , ALCOHOL 3 4 5	- NONE - YES - ALCOHOI - YES - HBD NOT - YES - DRUG SU - YES - ALCOHOI	SUSPECTED IMPAIRED SPECTED AND DRUG SUSPECT
ALCORDE TEST STATUS 1 - NONE GIVEN 2 - TEST REFUSED 3 - TEST GIVEN, CONTAMINAT 4 - TEST GIVEN, RESULTS UNI 5 - TEST GIVEN, RESULTS UNI	4,4,4 1 - N 2 - Bi S - U 2 - Bi 3 - U 3 - U 3 - U 3 - V 3 - D 5 - O	ONE 1 NN LOOD 2 TH LOOD 3 TH REATH 4 TI THER 5 TH	DNE GIVEN EST REFUSED EST GIVEN, CONTA EST GIVEN, RESUL EST GIVEN, RESUL	MINATED SAMPLEAMUSA TS KNOWN TS UNKNOWN	DRUG TEST TYPE 1 • NONE 2 - BLOOD BLE 3 - URINE 4 - BREATH 5 - OTHER	1 - NO DISTRACTE 2 - PHONE 3 - TEXTING/EMAIL 4 - ELECTRONIC CO 5 - OTHER ELECTR (NAVIGATION)D	D BY D REPORTED ING DMMUNICATION DI ONIC DEVICE EVICE, RADIO, DVE	6 - OTHER 7 - Exter Evice))	INSIDE THE VEHICLE NAL DISTRACTION
ADORESS, CITY, STATE, ZIP	IST, MIDDLE						ACT PHONE- INCLUDE	AGE AREA CODE	GENDER F - FEMALE M - MALE
UNIT NUMBER NAME: LAST, FIR	EMS AGENCY	N	IEDICAL FACILITY INJ	URED TAKEN TO			SEATING POSITION		EJECTION TRAPPED
ADDRESS, CITY, STATE, ZIP						CONT	ACT PHONE- INCLUDE	AREA CODE	F - FEMALE M - MALE
	EMS AGENCY	M	EDICAL FACILITY INJ	ured taken to		DOT COMPLIANT NOTORCYCLE HELMET			PAGE 7 OF 9

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CCCUPANT/ WITN	iess Adde	INDUM				
UNIT NUMBER NAME: LAST, FIRST, MIDDLE					AGE	
ADDRESS, CITY, STATE, ZIP	Thomas			CONTACT PHONE- INCLUDE /	REA CODE	M - MALE
12005 Angelius Avenue C	Cleveland, Ohio 4	4105		216	35537	66
	Lacal Pagen To				AIR BAG USAGI	
	1 3		CATE OF BIRTH	·····	AGE.	GENDER
ADDRESS, CITY, STATE, ZIP	huck	·		CONTACT PHONE- INCLUDE A	REA CODE	IVI M - MALE
27653 Capel Road Columb	Dia Station, Ohio	44028 Isafety Equipment used		216	85776	42
	Edward		DATE OF BIRTH		AGE	GENDER
ADDRESS, CITY, STATE, ZIP				CONTACT PHONE INCLUDE A	REACCOE	LVI M-MALE
8 3759 Martin Luther King Driv	e Cleveland, Ohi	0 44108	DOT COM	216 PLIANT SEATING POSITION	85453	82
			HELMET			
	istin B				AGE	GENDER F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZIP		<u></u> f		CONTACT PHONE INCLUDE A	REA CODE	
	Iloughby, Ohio 44	4094 SAFETY EQUIPMENT USED		330	80743	44 EJECTION TRAPPED
			HELMET			
Rivers, Don	nonique			1 1 9 9 0	23	GENDER F - FEMALE M - MALE
ADDRESS, CITY, STATE, ZP	novillo Hoighta	Dhia 44404		CONTACT PHONE INCLUDE A		
NUTRIES INURIED TAKEN BY EMS AGENCY	CAL FACILITY INJURED TAKEN TO					EJECTION TRAPPED
			HELMET			
						F - FEMALE M - MALE
Z ADDRESS, CITY, STATE, ZIP				CONTACT PHONE- INCLUDE AR	EA CODE	
INJURIES INJURED TAKEN BY EMS AGENCY MEDIC	CAL FACILITY INJURED TAKEN TO			LIANT SEATING POSITION /	VR BAG USAGE	EJECTION TRAPPED
INJURIES INJURED TAKEN BY SAFETY EQUIPMENT	UŞED 89 - UNKNO		HEIMET			
1 - NO INJURIES / NON REPORTED 1 - NOT TRANSPORTED / MOTORIST 2 - POSSIBLE TREATED AT SCENE 3 - NON-INCAPACITATING 2 - EMS 01 - NONE USED - 1 2 - SMS 02		ESTRAINT SYSTEM-FORWA	ARD FACING	NON-MOTORIST 09 - NONE USED 10 - HELMET USED	12 - REJ 13 - LIG	LECTIVE CLOTHING
4 - INGAPACITATING 3 - POLICE 02 - SHOULDER DE 5 - FATAL 4 - OTHER 03 - LAP BELT ONL 0 - UNKNOWN 04 - SHOULDER AN	Y USED 07 - BOOSTE YD LAP BELT USED 08 - HELMET	ESTRAINT SYSTEM-HEAR F IR SEAT USED	-ACING	11 - PROTECTIVE PADS (ELBOW, KNEES, ET	USED 14-OTH C)	ER
SEATING POSITION 01 - FRONT - LEFT SIDE (MOTORCYCLE DRIVER) 02 - FRONT - MIDDLE 03 - FRONT - RIGHT SIDE 03 - FRONT - RIGHT SIDE 03 - PASSENCED IN LINESION	ENCLOSED CARGO AREA ICH AS A BUS, PICK-UP WITH CAB) OSED CARGO APEA	AIR BAG USAGE	臣) [1-	ECTION	TRAPPED	PED
04 - SECOND - LEFT SIDE (MOTORCYCLE PASSENGER) 13 - TRAILING UNIT 05 - SECOND - MIDDLE 14 - RIDING ON A VEHICLE E 06 - SECOND - RIGHT SIDE 15 - NON-MOTORIST 07 - THED LEFT SIDE (MOTORCYCLE SIDE ADD	XTERIOR (NON-TRAILING UNIT)	2 - DEFLOYED FRONT 3 - DEPLOYED SIDE 4 - DEPLOYED BOTH FROM 5 - NOT AFPLICABLE	2 - 3 - NT/SIDE 4 -	PARTIALLY EJECTED NOT APPLICABLE	2 - EXTRACT MECHANI 3 - EXTRACTI NON:MEC	BY CAL MEANS ED BY HANICAL MEANS
08 - THIRD - MIDDLE 09 - UNKNOWN 00 - THIRD - NIGHT SIDE 10 - SLEEPER SEGTION OF CAB (TRUCK)		9 - DEPLOYMENT UNKNOW	VAN			
					1	PAGE Q OF Q

HSY8355 OH1P (Rev 01/12)



OHIO TRAFFIC CRASH REPORT DIAGRAM / NARRATIVE CONTINUATION

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OHIO TRAFFIC CRASH REPORT DIAGRAM / NARRATIVE CONTINUATION

006667





OHIO TRAFFIC CRASH REPORT



006667

OH-2



OHIO TRAFFIC CRASH REPORT DIAGRAM / NARRATIVE CONTINUATION

LOCAL REPORT NUMBER			DATE OF CRASH
IN COUNTY OF	CRASH LOCATION	190 F/B 328 ft E of MP 176	
Cuyanoga).2
Walk months of the out out -			
		400 - 40 - 14	
		OFFICER SIGNATURE X Green	BADGE NUMBER 662





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) 16.0 Existing Conditions 13.9 14.0 Predicted Average Crash 12.8 Frequency 12.0 Existing Conditions 10.0 9.0 Expected Average Crash 8.1 8.0 Frequency 6.0 5.2 Existing Conditions 3.4 Potential for Safety 4.0 2.8 2.5 Improvement 1.8 1.6 2.0 0.9 1.1 0.6 0.4 0.4 0.4 0.2 0.0 Proposed Conditions 0.0 Expected Average Crash **B** -0.2 KA С 0 Total Frequency -2.0

Project Summary Results (Without Animal Crashes)										
	KA	В	C	0	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					





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								
Project Element ID		KA	В	С	0	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)										
Draiget Element ID	Common Namo	Crash Severity Level								
Project Element ID	Common Name	KA	В	С	0	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								
Project Element ID		KA	В	С	0	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				
Project Element ID		KA	В	С	0	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

and the second s	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						
		Existing		Proposed			
Crash Type	Predicted Crash Frequency 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		



Project Summary Results (Without Animal Crashes)						
	KA	В	C	0	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	0.2121	0.8903	1.5770	7.0231	9.7025	





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 Namo			Crash Severity Level		
Project Element ID	Common Name	KA	В	С	0	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	Crash Severity Level					
Project Element ID	Common Name	KA	В	С	0	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 Namo	Crash Severity Level					
Project Element ID	Common Name	KA	В	С	0	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 Namo		Crash Severity Level				
Project Element ID	Common Name	KA	В	С	0	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	0.0602	0.295	0.6192	4.4279	5.4023	
MR12252; 3.02	MLK @ WB ramps/N.Marginal	0.143	0.5649	0.908	2.1392	3.7551	





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						
		Existing		Proposed			
Crash Type	Predicted Crash Frequency	Expected Crash Frequency	PSI	Expected Crash Frequency			
Unknown	0.0125	0.0124	-0.0001	0.0059			
Head On	0.0970	0.0963	-0.0007	0.0460			
Rear End	6.4941	13.1865	6.6924	6.0252			
Backing	0.2983	0.2977	-0.0006	0.1442			
Sideswipe - Meeting	0.1994	0.2029	0.0035	0.0986			
Sideswipe - Passing	1.5035	1.8972	0.3937	0.9237			
Angle	2.4412	2.0674	-0.3738	0.9785			
Parked Vehicle	0.4303	0.3856	-0.0447	0.1849			
Pedestrian	0.2935	0.2762	-0.0173	0.1313			
Animal	0.0168	0.0166	-0.0002	0.0112			
Train	0.0008	0.0009	0.0001	0.0004			
Pedalcycles	0.1384	0.1343	-0.0041	0.0631			
Other Non-Vehicle	0.0000	0.0000	0.0000	0.0000			
Fixed Object	0.6940	0.8768	0.1828	0.4135			
Other Object	0.0252	0.0249	-0.0003	0.0120			
Overturning	0.0389	0.0388	-0.0001	0.0176			
Other Non-Collision	0.0903	0.0885	-0.0018	0.0416			
Left Turn	1.4848	1.3063	-0.1785	0.6159			
Right Turn	0.0000	0.0000	0.0000	0.0000			







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 markin

	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		
		De	sign Risk (35%)	\$363,000		
			Subtotal	\$1,399,000		
		Infla	tion Cost (15%)	\$210,000		
1			Total	\$1.609.000		

Notes:

R/W not anticipated
 New pavement is assumed to be concrete on ramp and asphalt on side road.
 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

Economic Crash Analysis Tool	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:

Comments: Improvements on E.55th - Improve I-90 EB ramps/Dick Goddard Rd alignment and upgrade signal system, SB defacto left turn lane.

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All	31	Le:	

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		
Site Characteristic Improvements (i.e. Lighting)		\$0.00			\$0.00	\$0.00	0.838	¢250 500
Site Characteristic Improvements (i.e. Signal Phasing)		\$0.00			\$0.00	\$0.00	-0.838	\$358,580
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







CUY-90-19.50/21.30 SAFETY STUDY ODOT DISTRICT 12 PRELIMINARY CONSTRUCTION ESTIMATE - REV FEB 2016

MLK Drive Short Term: RESURFACE AND STRIPE BETWEEN WB EXIT RAMP AND EAST BLVD, 2 NEW SIGNALS,

ADD RECEIVING LANE ON EB I-90 ENTRANCE RAMP AT MLK

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	942 SF	\$4	\$3,768
203	EMBANKMENT	1300 CY	\$10	\$13,000
254	PAVEMENT PLANING, ASPHALT CONCRETE	9600 SY	\$5	\$48,000
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"	431 CY	\$275	\$118,525
448	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, PG64-22, 1.75"	223 CY	\$250	\$55,750
451	9" REINFORCED CONCRETE PAVEMENT	500 SY	\$80	\$40,000
608	CONCRETE WALK	2500 SF	\$4	\$10,000
609	CURB	942 FT	\$20	\$18,840
609	6" CONCRETE TRAFFIC ISLAND	50 SY	\$60	\$3,000
630	SIGNAGE	1 LS	\$50,000	\$50,000
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	\$25,000	\$25,000
644	PAVEMENT MARKINGS	1 LS	\$30,000	\$30,000
832	SWPPP	1 LS	\$2,500	\$2,500
832	EROSION CONTROL	2500 EA	\$1	\$2,500
		-		
			Subtotal	\$ 859,000.00
614	MAINTAINING TRAFFIC	1 LS	\$150,000	\$150,000
619	FIELD OFFICE, TYPE B	6 MN	\$1,600	\$9,600
623	CONSTRUCTION LAYOUT STAKES	1 LS	\$15,000	\$15,000
624	MOBILIZATION	1 LS	\$40,000	\$40,000
			Subtotal	\$ 1,074,000.00
		De	sign Risk (35%)	\$376,000
			Subtotal	\$1,450,000
		-		
		Inflat	ion Cost (8.6%)	\$125,000
			Total	\$1,575,000

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

	1-90 Ramp improvements. REMOVE 2 RAMPS (WB Exit to 72nd, EB Entrance nom 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
atos	

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		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		
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)	\$461,000.00		\$46,100.00	\$161,350.00	\$668,450.00		
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	\$300,000.00		\$30,000.00	\$105,000.00	\$435,000.00		
CMF 5 - Provide a right turn lane on one major road approach	\$213,000.00		\$21,300.00	\$74,550.00	\$308,850.00		
			\$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	\$1,535,000.00	\$0.00	\$153,500.00	\$537,250.00	\$2,225,750.00	\$0.00	\$0.00

Inflation % 9%

\$2,417,164.50

Final Costruction Cost:

*Final construction cost should match the Project Cost Estimate

ECAT	Safety Benefit - Cost Analysis							
Economic Crash Analysis Tool	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					

Select Site Types to be used in Benefit-Cost Analysis:

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 East Blvd. Revise MLK NB approach from a T-TR to T-R config, add lane on the EB Entrance ramp

All Sites **Countermeasure Service Lives, Costs, and Safety Benefits** Service Annual Net Present Summary of Initial Cost of Total Cost of Net Present Value Countermeasures Life Maintenance & Salvage Value Cost of Annual Crash Countermeasures Countermeasure of Safety Benefits (Years) **Energy Costs** Countermeasure Modifications 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 0.000 (\$607) 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 0.000 \$0 \$0.00 CMF 2 - Add a through lane (SB direction) 20 \$668,450.00 \$668,450.00 \$668,450.00 -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 \$435,000.00 \$435,000.00 20 \$435,000.00 -2.083 \$749,397 CMF 5 - Provide a right turn lane on one major road approach 20 \$308,850.00 \$308,850.00 \$308,850.00 -1.012 \$347,686 \$0.00 0.000 \$0 \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 0.000 \$O \$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 \$2,225,750.00 \$0.00 \$0.00 \$2,225,750.00 \$2,225,750.00 -11.190 \$3,987,870



EGAT 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					Short Term Improvements		
Ben	efit - Cost Calculator		Expected Annual	Crash Adjustment		Comments:		
Net Present Net Present Value o Be	t Value of Project \$2,225,750.00 of Safety Benefits \$3,987,870.45 Net Benefit \$1,762,120.45 nefit / Cost Ratio 1.79		Number of Fatal & Incapacitating Injury Crashes Number of Injury Crashes Number of Total Crashes	-0.238 -3.143 -11.190				





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	CI FARING AND GRUBBING	115	\$15,000	\$15,000		
202	PAVEMENT REMOVED	9000 SY	\$8	\$72,000		
202	CUBB REMOVED	4500 L F	\$5	\$22,500		
202	CATCH BASIN OB INI ET BEMOVED	10 FA	\$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		
	ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-	(50.0)(AT0 750		
448	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		119	\$250,000	\$250,000		
610		18 MN	Ψ <u>2</u> 30,000 \$1 600	\$28 800		
623	CONSTRUCTION LAYOUT STAKES	115	\$25,000	\$25,000		
624	MOBILIZATION	115	\$100,000	\$100,000		
024		1 20	φ100,000	φ100,000		
			Subtotal	\$3.392.000		
				, _ , ,		
	Desian Risk (35%)					
	Subtotal					
Inflation Cost (8.6%)						
			Total	\$4,974,000		

Notes:

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- 1 Construction estimated in 2017
- 2 Utility relocation not included
- 3 Roundabout and 2 ramp culverts