Southern Nevada Traffic Study

Appendix H.
DATA COLLECTION PLANS

October 2018

Prepared for

NEVADA DOT
SAFE AND CONNECTED

Prepared by HDR

DATA COLLECTION PLANS

- CC-215: Russell Road to I-15
- CC-215: Summerlin Parkway to Russell Road
- CC-215: US 95 to Summerlin Parkway
- I-15: Sahara to I-215
- I-15: I-215 to Sloan Road
- I-15/I-215 Interchange
- I-215: I-15 to I-515
- I-515: Charleston Boulevard to I-215
- I-515/I-215 Interchange
- Summerlin Parkway: CC 215 to US 95
- US 95/CC 215 Interchange
- US 95: CC 215 to I-15

Data Collection Plan
CC-215: Russell Rd to I-15

for

Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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CORRIDOR ANALYSIS DATA COLLECTION

This data collection plan provides details of existing data and sources, as well as additional data to be obtained, collection methods and assumptions. This data collection plan is tailored to the requirements for full corridor analysis and should only be used as reference for the above named corridor.

GEOMETRIC DATA

Required geometric data will be obtained from available construction drawings, field surveys, aerial photographs, geographical information system (GIS) files, and Google Earth / Streetview online tools. Data may include:

- Number and width of lanes
- Link length
- Vehicle storage length (turn bays)
- Lane add/drop/auxiliary location and length
- Ramp length
- Lane channelization
- Road Curvature

CONTROL DATA

The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
  - Speed Limits
  - Traffic Control
- Signal control data for intersections identified in Table 1 will be requested from the Nevada Freeway and Arterial System of Transportation (FAST) and local agencies, including but not limited to Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson.

DEMAND DATA

All traffic demand data and calibration data will be collected simultaneously. Demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data. Where additional data is required, 24-hour radar counts are to be obtained.
- AM and PM peak period turning movement counts at ramp terminals/intersections, and adjacent intersections on arterial cross-streets. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Peak period queue lengths at all CC-215 ramp terminal intersections in the study area.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figures 1a through 1c.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
NONE	NONE		

DATA COLLECTION EFFORT	
Intersection Description	**ID**
W Russell Rd / S Jerry Tarkanian Way / SB CC-215 Ramps	1.1
W Russell Rd / Brent Thurman Way / NB CC-215 Ramps	1.2
W Russell Rd / Fort Apache Rd	1.3
W Russell Rd / Durango Dr	1.4
W Sunset Rd / S Roy Horn Way / SB CC-215 Ramps	1.5
W Sunset Rd / Brent Thurman Way / NB CC-215 Ramps	1.6
W Sunset Rd / Fort Apache Rd	1.7
W Sunset Rd / Durango Dr	1.8
S Durango Dr / Rafael Rivera Way / WB CC-215 Ramps	1.9
S Durango Dr / Roy Horn Way / EB CC-215 Ramps	1.10
S Durango Dr / Badura Ave	1.11
S Buffalo Dr / Rafael Rivera Way / WB CC-215 Ramps	1.12
S Buffalo Dr / Roy Horn Way / EB CC-215 Ramps	1.13
S Buffalo Dr / Sunset Rd	1.14
S Buffalo Dr / Badura Ave	1.15
S Rainbow Blvd / Rafael Rivera Way / WB CC-215 Ramps	1.16
S Rainbow Blvd / Roy Horn Way / EB CC-215 Ramps	1.17
S Rainbow Blvd / Sunset Rd	1.18
S Rainbow Blvd / Badura Ave	1.19
S Jones Blvd / Rafael Rivera Way / WB CC-215 Ramps	1.20
S Jones Blvd / Roy Horn Way / EB CC-215 Ramps	1.21
S Jones Blvd / Sunset Rd	1.22
S Jones Blvd / Badura Ave	1.23
S Decatur Blvd / Rafael Rivera Way / WB CC-215 Ramps	1.24
S Decatur Blvd / Roy Horn Way / EB CC-215 Ramps	1.25
S Decatur Blvd / Sunset Rd	1.26
S Decatur Blvd / Badura Ave	1.27

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
CC-215 WB Off-Ramp to S Decatur Blvd	31444	2015
CC-215 WB On-Ramp from S Decatur Blvd	30140	2015
CC-215 EB Off-Ramp to S Decatur Blvd	30132	2015
CC-215 EB On-Ramp from S Decatur Blvd	31445	2015

DATA COLLECTION EFFORT	
Ramp Description	**ID**
CC-215 SB Off-Ramp to W Russell Rd	2.1
CC-215 SB On-Ramp from W Russell Rd	2.2
CC-215 NB Off-Ramp to W Russell Rd	2.3
CC-215 NB On-Ramp from W Russell Rd	2.4
CC-215 SB Off-Ramp to W Sunset Rd	2.5
CC-215 NB On-Ramp from W Sunset Rd	2.6
CC-215 WB Off-Ramp to S Durango Dr	2.7
CC-215 EB On-Ramp from S Durango Dr	2.8
CC-215 WB Off-Ramp to S Buffalo Dr	2.9
CC-215 WB On-Ramp from S Buffalo Dr	2.10
CC-215 EB Off-Ramp to S Buffalo Dr	2.11
CC-215 EB On-Ramp from S Buffalo Dr	2.12
CC-215 WB Off-Ramp to S Rainbow Blvd	2.13
CC-215 WB On-Ramp from S Rainbow Blvd	2.14
CC-215 EB Off-Ramp to S Rainbow Blvd	2.15
CC-215 EB On-Ramp from S Rainbow Blvd	2.16
CC-215 WB Off-Ramp to S Jones Blvd	2.17
CC-215 WB On-Ramp from S Jones Blvd	2.18
CC-215 EB Off-Ramp to S Jones Blvd	2.19
CC-215 EB On-Ramp from S Jones Blvd	2.20

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
CC-215 Count Station Description	**Station ID**
btwn the Decatur Intch 'Exit 13' and the I-15 Intch 'Exit 12'	30152

DATA COLLECTION EFFORT	
Mainline Location Description	**ID**
CC-215 at W Patrick Ln	3.1
CC-215 at S Cimarron Rd	3.2
CC-215 at S Tenaya Way	3.3
CC-215 at S Torrey Pines Dr	3.4

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments
- Ramps, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)
- Mainline, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Ramp tube count summaries (one per site).
- Mainline radar count summaries (one per site).
- Turning movement count summaries (one per intersection for each time period).

- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).
- Manual queue length study including raw data sheets and a data summary prepared in Excel.

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
- Weave zone observation (location and length). On an as-needed basis for calibration.
- Lane usage at intersections (Mainline lane utilization will be identified from FAST data.)
- Spillback

Queue Length

- Manual observation by field personnel, or video collection.
- Duration of AM and PM peak periods as noted above.
- Maximum queue length behind stop line, measured as number of vehicles and collected by lane, collected in 2-minute intervals
- Inclusion of stopped vehicles and slow moving vehicles (<5mph) in queue lengths at the end of the queue.

Table 4. Ramp Queue Length Collection Requirements

DATA COLLECTION EFFORT	
Ramp Description	**ID**
CC-215 EB Off-Ramp to S Buffalo Dr	4.1
CC-215 EB Off-Ramp to S Rainbow Blvd	4.2
CC-215 EB Off-Ramp to Decatur Blvd	4.3
CC-215 WB Off-Ramp to Decatur Blvd	4.4

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation. Spot speed data to be obtained for off-peak periods at the locations shown in Figures 1a through 1c.

Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation. Field measured travel time runs to be collected for validation of FAST and INRIX data.

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1a. Data Collection Site Map West to East

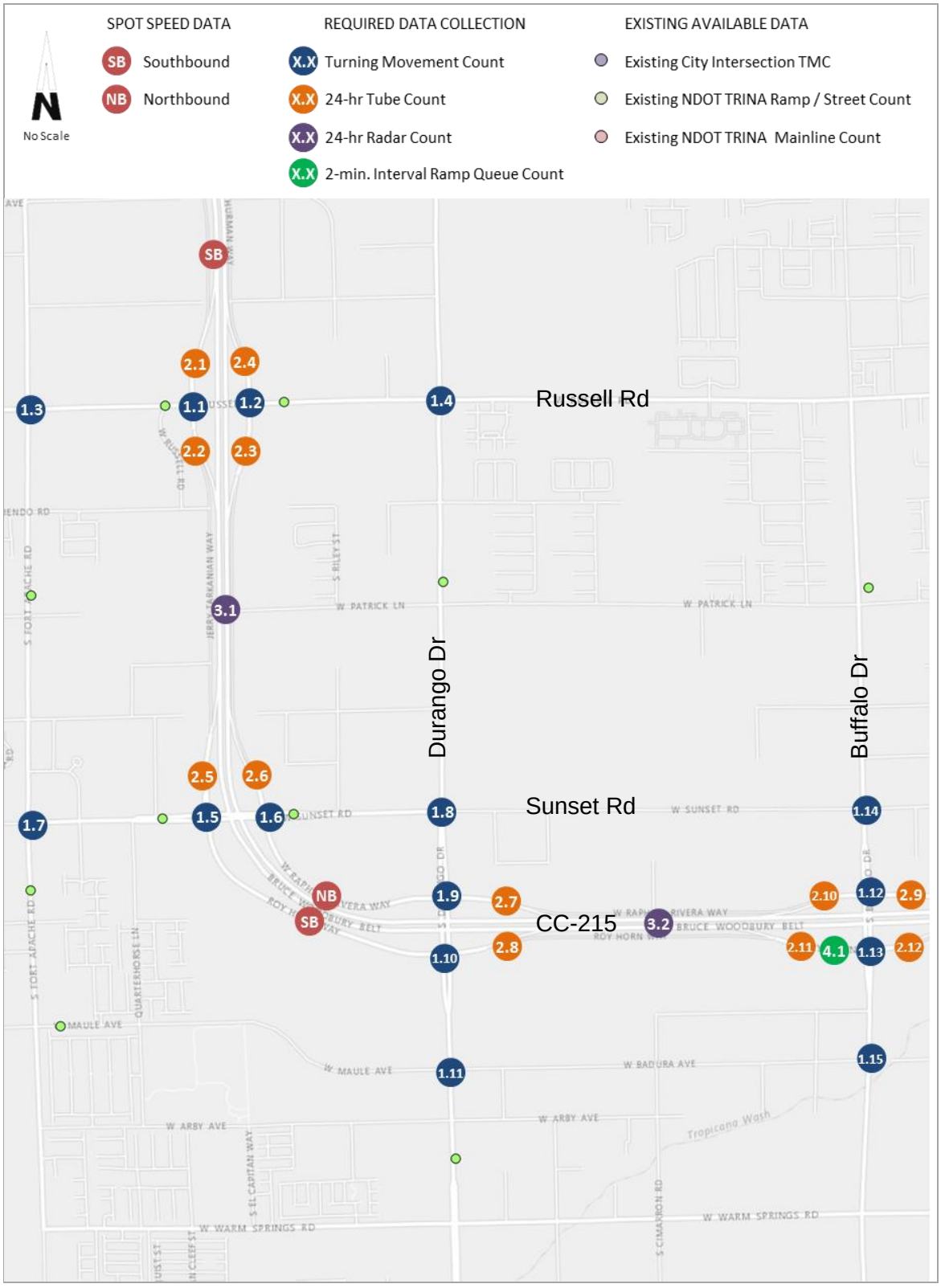


Figure 1b. Data Collection Site Map West to East

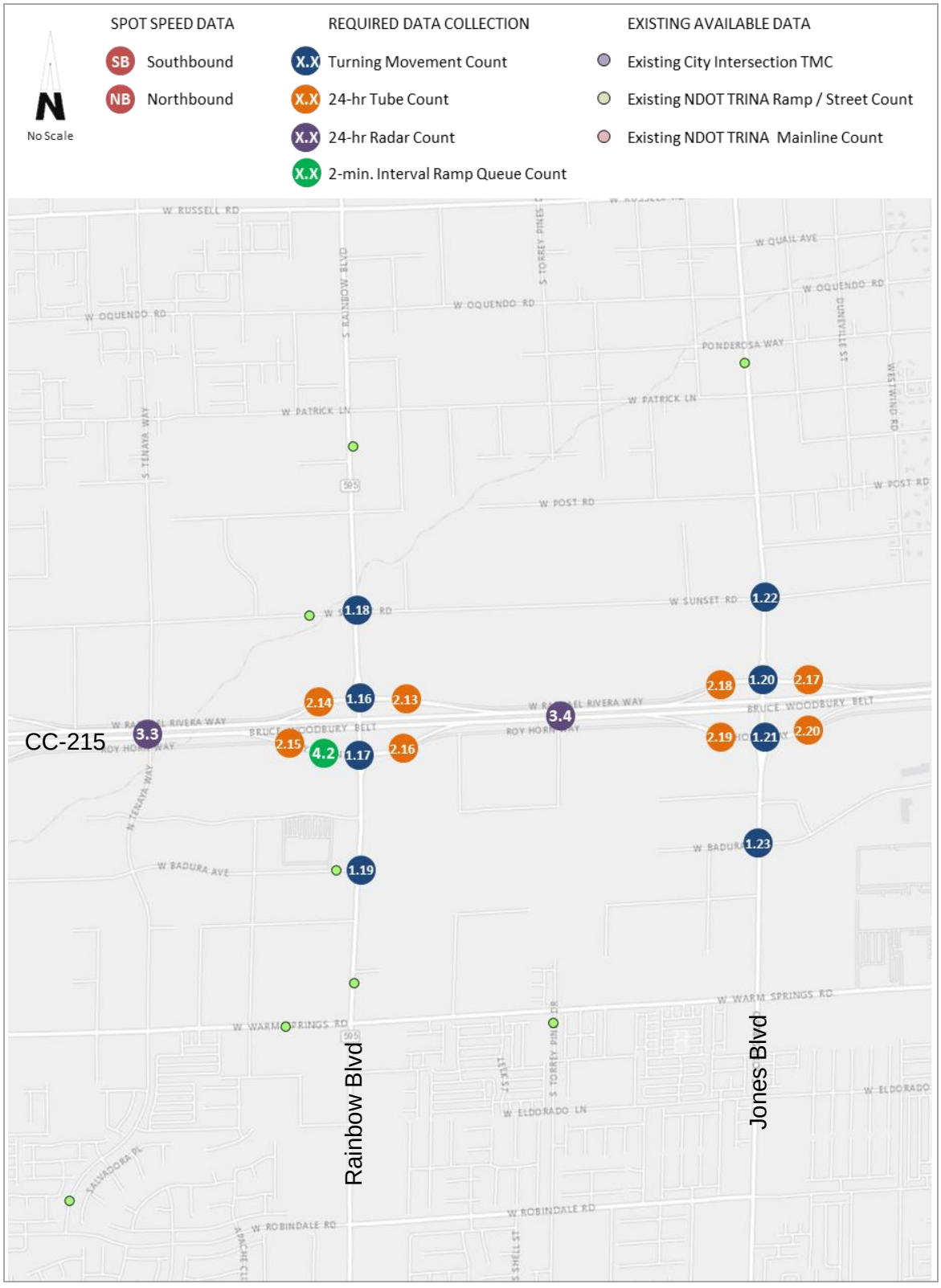
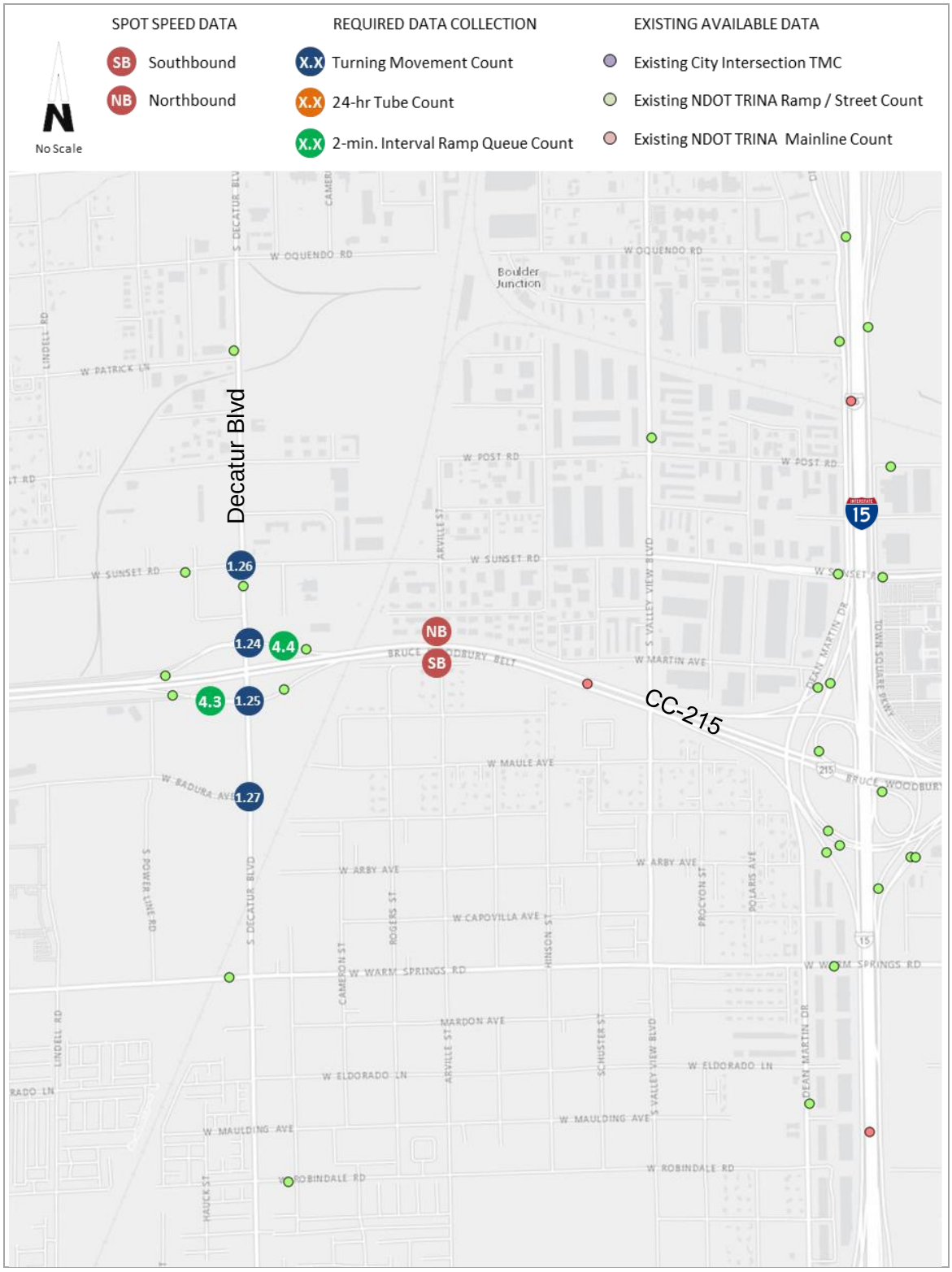


Figure 1c. Data Collection Site Map West to East



Data Collection Plan
CC-215: Summerlin Pkwy to Russell Rd

for

Southern Nevada Traffic Study

Prepared for:

Prepared by:

November 28, 2016

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GEOMETRIC DATA

Required geometric data will be obtained from available construction drawings, field surveys, aerial photographs, geographical information system (GIS) files, and Google Earth / Streetview online tools. Data may include:

- Number and width of lanes
- Link length
- Vehicle storage length (turn bays)
- Lane add/drop/auxiliary location and length
- Ramp length
- Lane channelization
- Road Curvature

CONTROL DATA

The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
  - Speed Limits
  - Traffic Control
- Signal control data for intersections identified in Table 1 will be requested from the Nevada Freeway and Arterial System of Transportation (FAST) and local agencies, including but not limited to Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson.

DEMAND DATA

All traffic demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Where additional data is required, 24-hour radar counts are to be obtained.
- AM and PM peak period turning movement counts at ramp terminals/intersections. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figures 1a through 1c.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
Far Hills Ave	CC-215 NB Ramps	27-Oct-15	City of Las Vegas
Far Hills Ave*	Carriage Hill Dr	18-Feb-16	City of Las Vegas
Charleston Blvd	CC-215 NB Ramps	16-Mar-16	City of Las Vegas
Charleston Blvd	CC-215 SB Ramps	17-Mar-16	City of Las Vegas

* Not required for HCS analysis, for information only

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Summerlin Pkwy / CC-215 NB Ramps	1.1
Summerlin Pkwy / CC-215 SB Ramps	1.2
Sahara Ave / CC-215 NB Ramps	1.3
Sahara Ave / CC-215 SB Ramps	1.4
Town Center Dr / CC-215 SPUI	1.5
Flamingo Rd / CC-215 NB Ramps	1.6
Flamingo Rd / CC-215 SB Ramps	1.7
Tropicana Ave / CC-215 NB Ramps	1.8
Tropicana Ave / CC-215 SB Ramps	1.9

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
NONE		

DATA COLLECTION EFFORT	
Ramp Description	**ID**
CC-215 SB Off-Ramp to Far Hills Ave	2.1
CC-215 SB On-Ramp from Far Hills Ave	2.2
CC-215 NB Off-Ramp to Far Hills Ave	2.3
CC-215 NB On-Ramp from Far Hills Ave	2.4
CC-215 SB Off-Ramp to Charleston Blvd	2.5
CC-215 SB On-Ramp from Charleston Blvd	2.6
CC-215 NB Off-Ramp to Charleston Blvd	2.7
CC-215 NB On-Ramp from Charleston Blvd	2.8
CC-215 SB Off-Ramp to Sahara Ave	2.9
CC-215 SB On-Ramp from Sahara Ave	2.10
CC-215 NB Off-Ramp to Sahara Ave	2.11
CC-215 NB On-Ramp from Sahara Ave	2.12
CC-215 SB Off-Ramp to Town Center Dr	2.13
CC-215 SB On-Ramp from Town Center Dr	2.14
CC-215 NB Off-Ramp to Town Center Dr	2.15
CC-215 NB On-Ramp from Town Center Dr	2.16
CC-215 SB Off-Ramp to Flamingo Rd	2.17
CC-215 SB On-Ramp from Flamingo Rd	2.18
CC-215 NB Off-Ramp to Flamingo Rd	2.19
CC-215 NB On-Ramp from Flamingo Rd	2.20
CC-215 SB Off-Ramp to Tropicana Ave	2.21
CC-215 SB On-Ramp from Tropicana Ave	2.22
CC-215 NB Off-Ramp to Tropicana Ave	2.23
CC-215 NB On-Ramp from Tropicana Ave	2.24

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
CC-215 Count Station Description	**Station ID**
NONE	

DATA COLLECTION EFFORT	
Mainline Location Description	**ID**
CC-215 at Alta Dr	3.1
CC-215 at W Hacienda Ave	3.2

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
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- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
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Deliverables

- Ramp tube count summaries (one per site).
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QUALITY ASSURANCE AND RECONCILIATION

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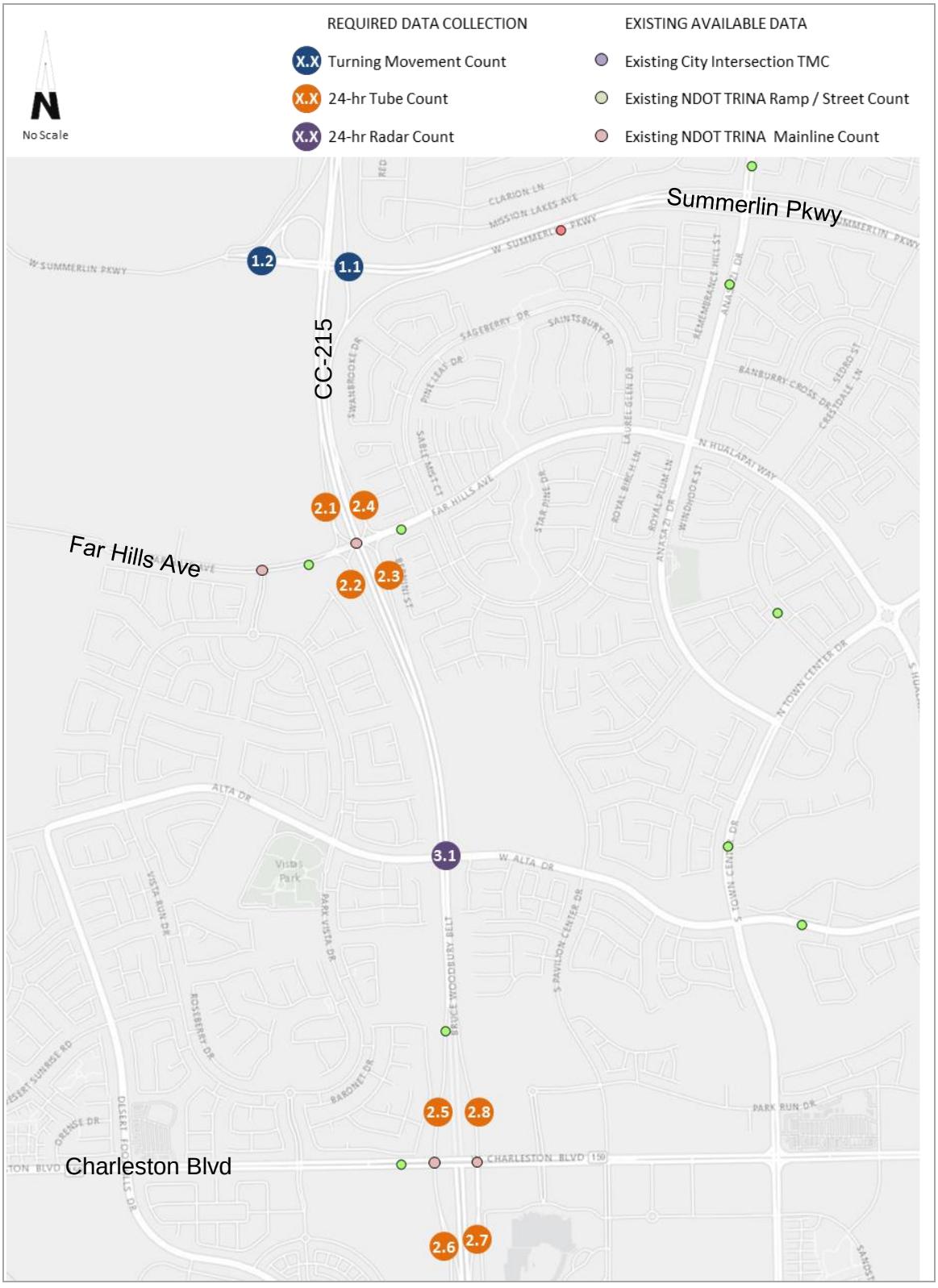

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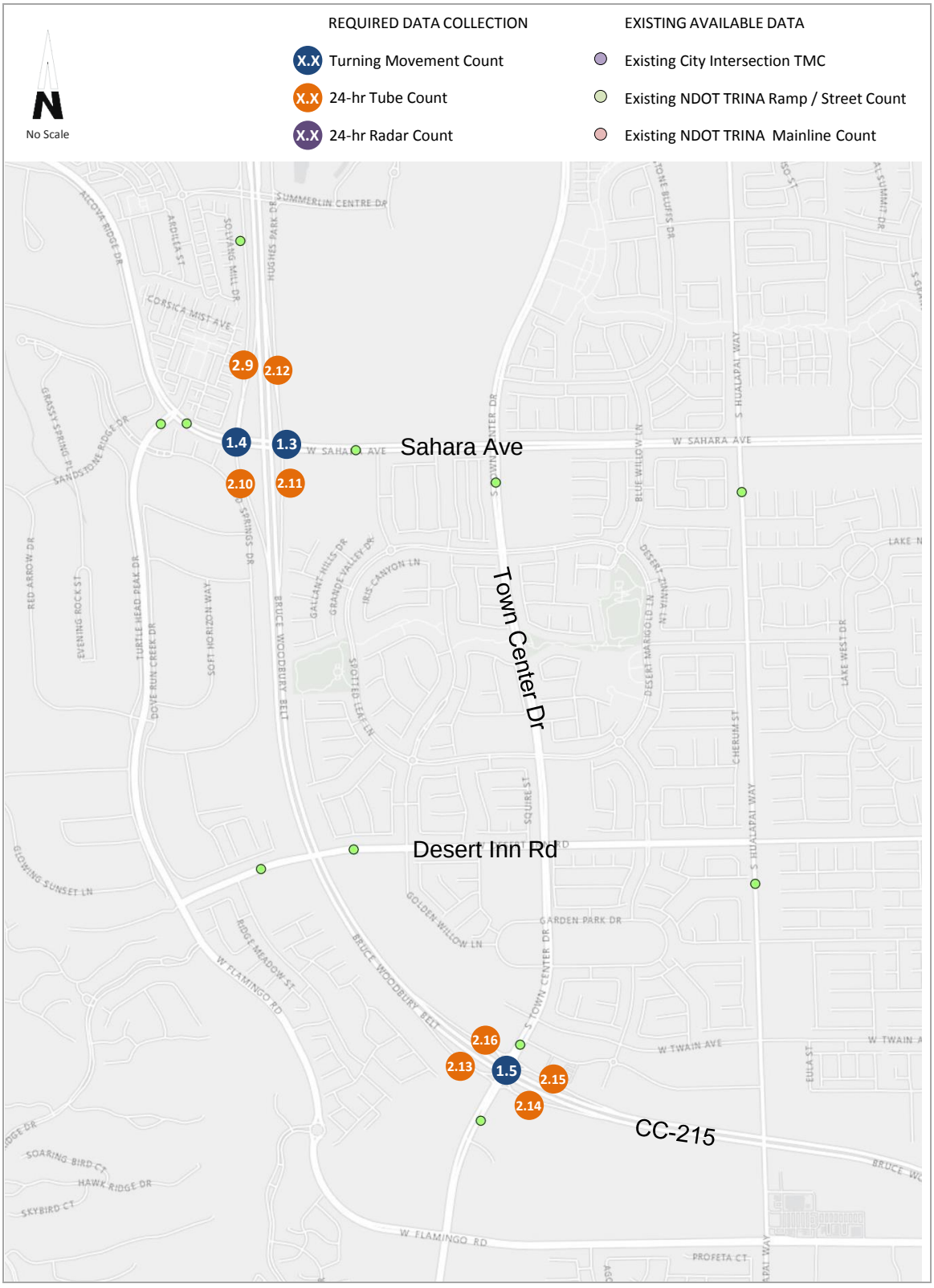
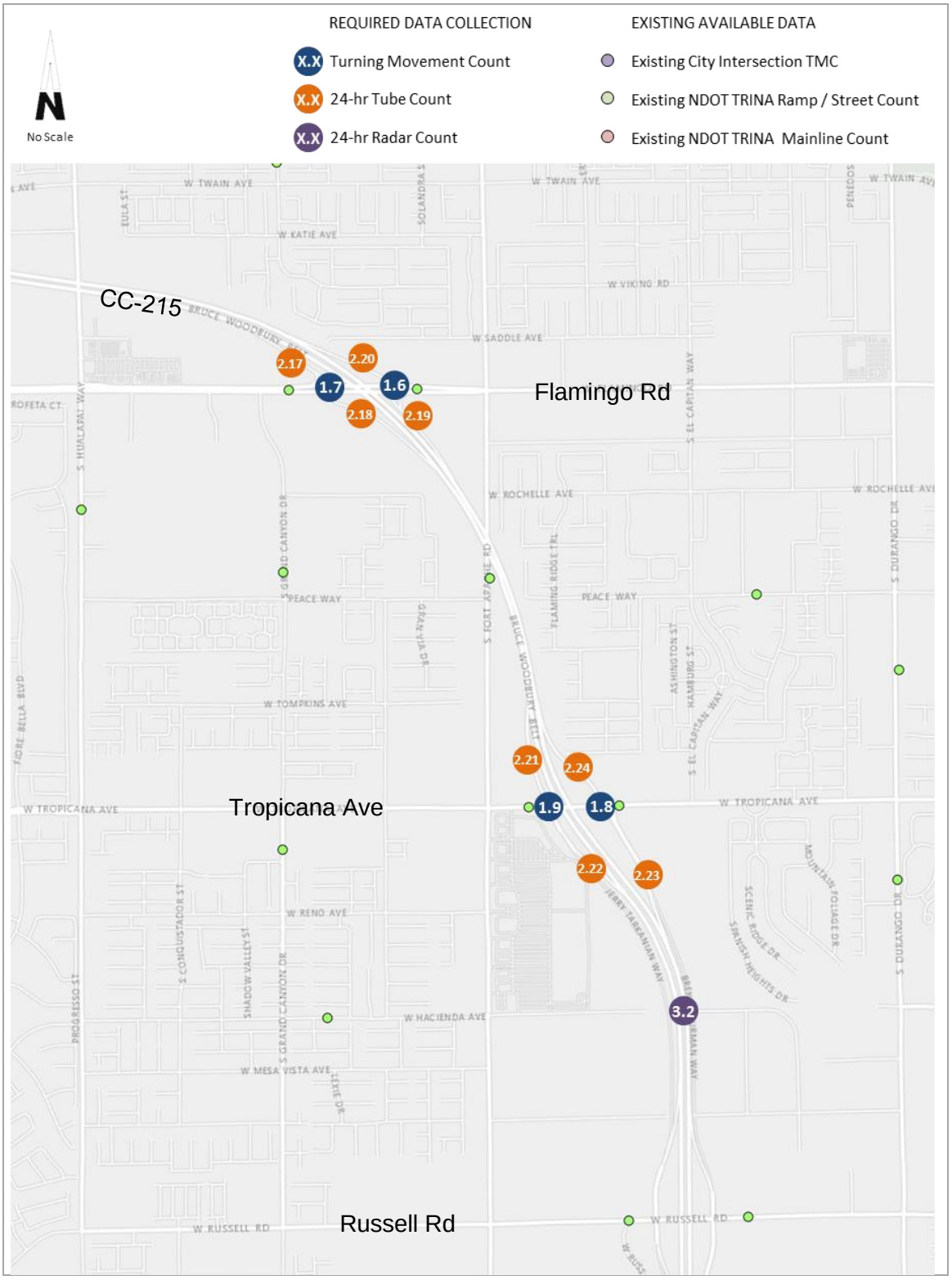


Figure 1c. Data Collection Site Map North to South



Data Collection Plan
CC-215: US95 to Summerlin Pkwy

for

Southern Nevada Traffic Study

Prepared for:

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Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
Durango Dr*	Deer Springs Way	18-Apr-13	City of Las Vegas
Durango Dr*	Centennial Pkwy	25-May-16	City of Las Vegas
Durango Dr	215 Beltway WB Ramps	31-May-16	City of Las Vegas
Durango Dr	215 Beltway EB Ramps	31-May-16	City of Las Vegas
Hualapai Way*	Deer Springs Way	13-Oct-15	City of Las Vegas
Hualapai Way	215 Beltway WB Ramps	29-Sep-15	City of Las Vegas
Hualapai Way	215 Beltway EB Ramps	29-Sep-15	City of Las Vegas
Cliff Shadows Pkwy*	Novat St	9-Feb-16	City of Las Vegas
Cheyenne Ave*	Shady Timber St	17-Feb-16	City of Las Vegas
Cheyenne Ave	CC-215 NB Ramps	19-Jun-15	City of Las Vegas
Lake Mead Blvd*	Thomas W Ryan Blvd	5-Feb-14	City of Las Vegas
Lake Mead Blvd	CC-215 SPUI	9-Dec-14	City of Las Vegas

* Not required for HCS analysis, for information only

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Oso Blanca / 215 Beltway	1.1
Ann Rd / 215 Beltway	1.2
Lone Mountain Rd / 215 Beltway	1.3
Cheyenne Ave / CC-215 SB Ramps	1.4

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
US95 NB Off-Ramp to WB CC-215	31400	2013

DATA COLLECTION EFFORT	
Ramp Description	**ID**
CC-215 EB On-Ramp from Durango Dr	2.1
CC-215 EB Off-Ramp to Durango Dr	2.2
CC-215 WB On-Ramp from Durango Dr	2.3
CC-215 WB Off-Ramp to Durango Dr	2.4
CC-215 EB On-Ramp from Hualapai Way	2.5
CC-215 EB Off-Ramp to Hualapai Way	2.6
CC-215 WB On-Ramp from Hualapai Way	2.7
CC-215 WB Off-Ramp to Hualapai Way	2.8
CC-215 NB On-Ramp from Cheyenne Ave	2.9
CC-215 NB Off-Ramp to Cheyenne Ave	2.10
CC-215 SB On-Ramp from Cheyenne Ave	2.11
CC-215 SB Off-Ramp to Cheyenne Ave	2.12
CC-215 NB On-Ramp from Lake Mead Blvd	2.13
CC-215 NB Off-Ramp to Lake Mead Blvd	2.14
CC-215 SB On-Ramp from Lake Mead Blvd	2.15
CC-215 SB Off-Ramp to Lake Mead Blvd	2.16

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
CC-215 Count Station Description	**Station ID**
NONE	

DATA COLLECTION EFFORT	
Mainline Location Description	**ID**
CC-215, 1000ft east of Sky Pointe Dr	3.1
CC-215 at W Tropical Pkwy	3.2
CC-215 at W Alexander Rd	3.3
CC-215 at Summers End Ave	3.4

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon or US95/CC-215 interchange construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMCs, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
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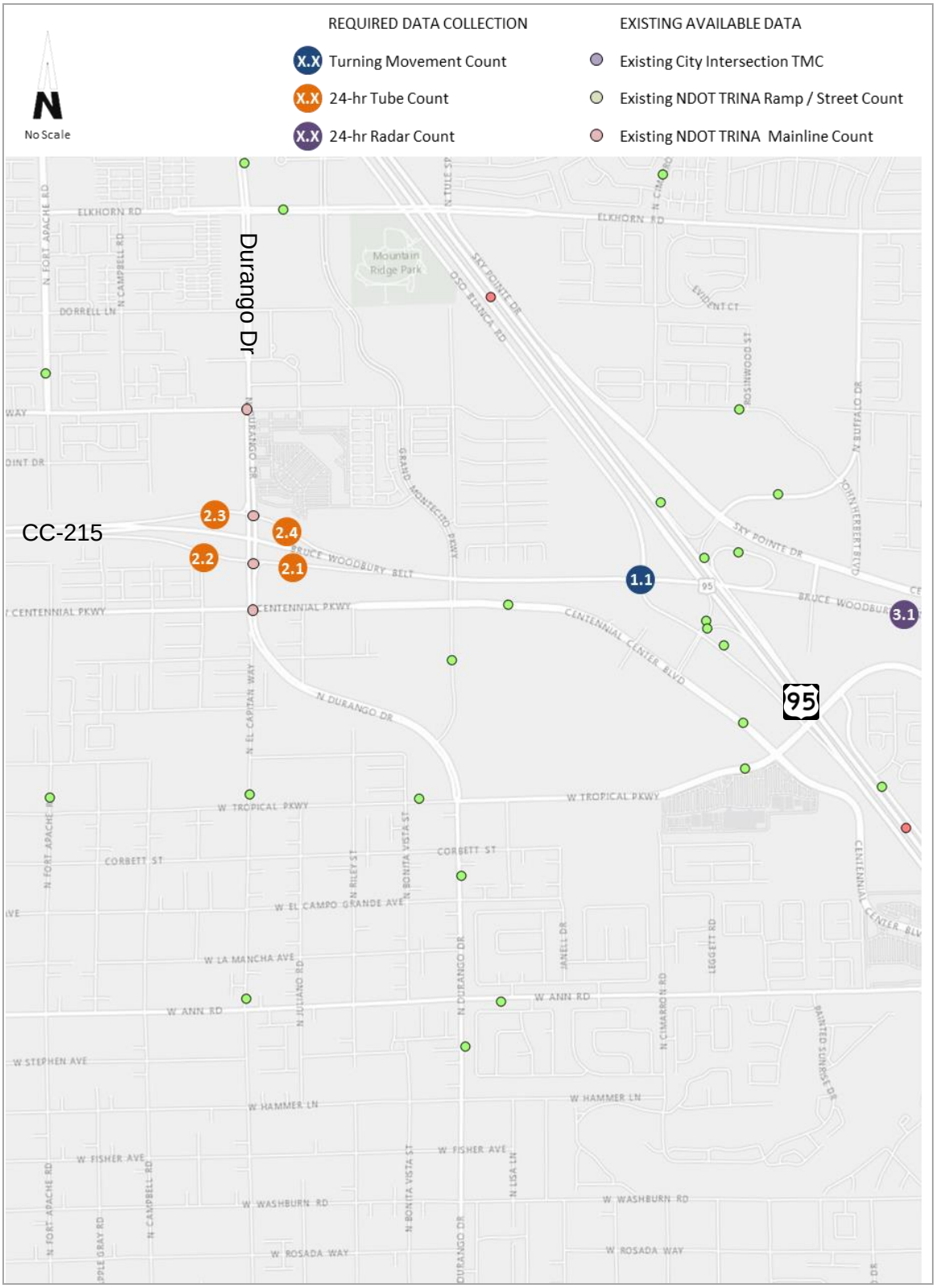


Figure 1b. Data Collection Site Map North to South

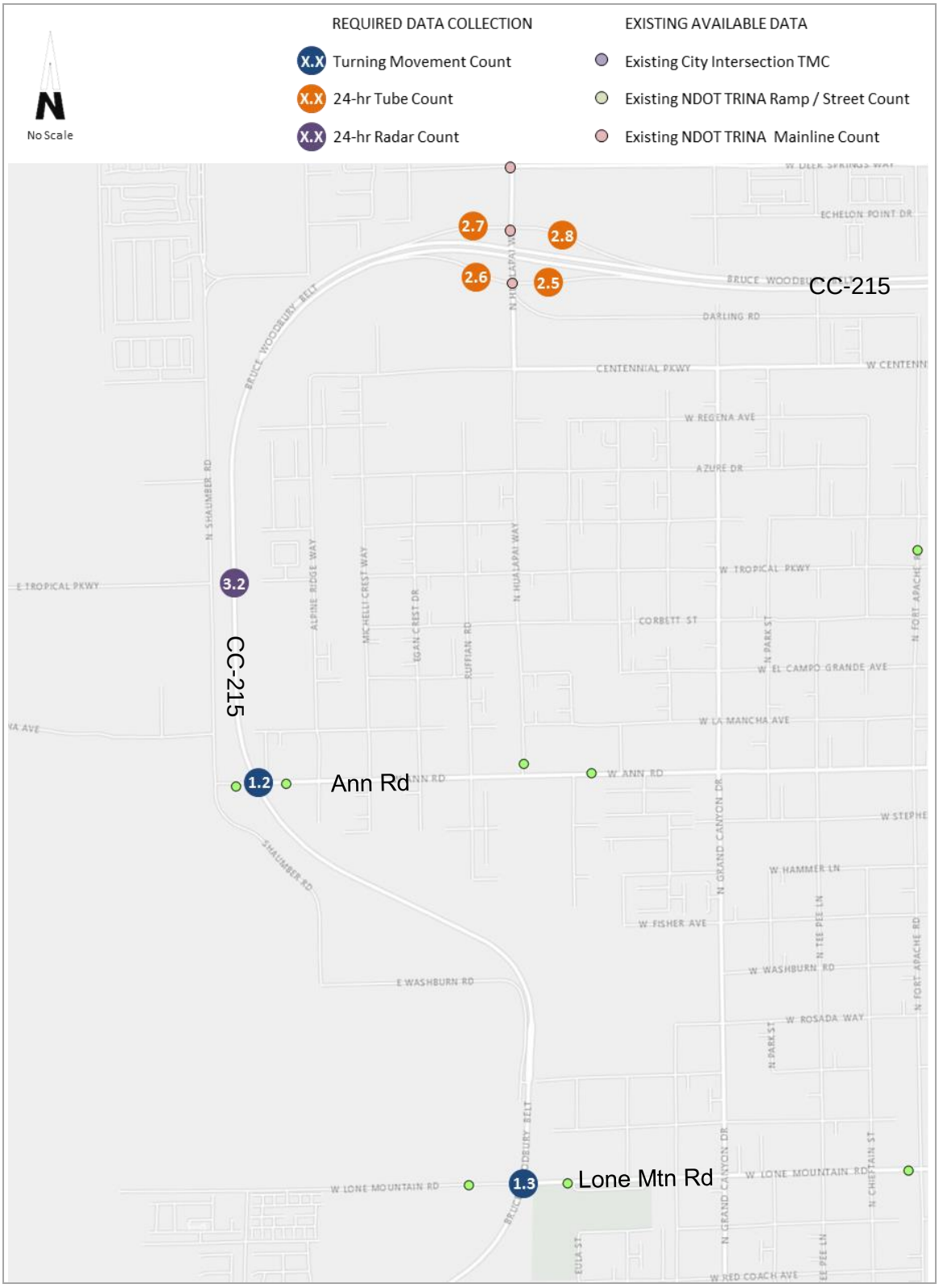
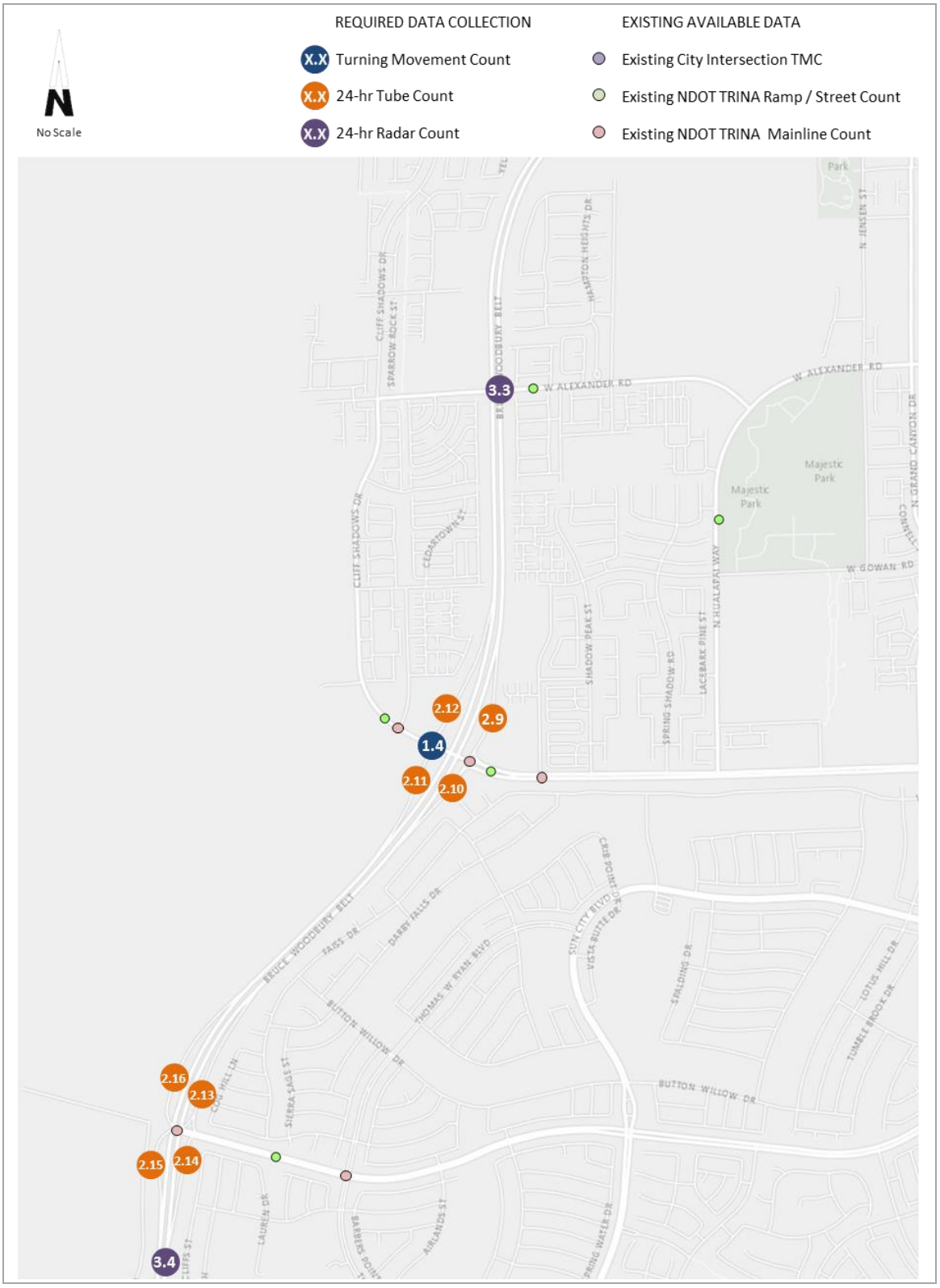


Figure 1c. Data Collection Site Map North to South



Data Collection Plan
I-15: Sahara to I-215

for

Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

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GEOMETRIC DATA

Required geometric data will be obtained from available construction drawings, field surveys, aerial photographs, geographical information system (GIS) files, and Google Earth / Streetview online tools. Data may include:

- Number and width of lanes
- Link length
- Vehicle storage length (turn bays)
- Lane add/drop/auxiliary location and length
- Ramp length
- Lane channelization
- Road Curvature

CONTROL DATA

The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
  - Speed Limits
  - Traffic Control
- Signal control data for intersections identified in Table 1 will be requested from the Nevada Freeway and Arterial System of Transportation (FAST) and local agencies, including but not limited to Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson.

DEMAND DATA

All traffic demand data and calibration data will be collected simultaneously. Demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data.
- AM and PM peak period turning movement counts at ramp terminals/intersections, and adjacent intersections on arterial cross-streets. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Peak period queue lengths at all I-15 ramp terminal intersections in the study area.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figures 1a through 1c.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
Sahara Ave	Las Vegas Blvd	28-May-14	City of Las Vegas

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Sahara Ave / I-15 NB Ramps	1.1
Sahara Ave / Rancho Dr	1.2
Sahara Ave / Palace Station	1.3
Sahara Ave / Teddy Dr	1.4
Spring Mountain Rd / I-15 SB Ramps	1.5
Spring Mountain Rd / Polaris Ave	1.6
Spring Mountain Rd / Mel Torme Way	1.7
Spring Mountain Rd / Las Vegas Blvd	1.8
Flamingo Rd / I-15 SB Ramps	1.9
Flamingo Rd / I-15 NB Ramps	1.10
Flamingo Rd / Hotel Rio Dr	1.11
Flamingo Rd / Las Vegas Blvd	1.12
Tropicana Ave / I-15 SB Ramps	1.13
Tropicana Ave / I-15 NB Ramps	1.14
Tropicana Ave / Dean Martin Dr	1.15
Tropicana Ave / Las Vegas Blvd	1.16
Russell Rd / I-15 SB Ramps	1.17
Russell Rd / I-15 NB Ramps	1.18
Russell Rd / Polaris Ave	1.19
Russell Rd / Frank Sinatra Dr	1.20

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
I-15 SB Off-Ramp to Sahara Ave WB	30079	2016
I-15 SB Off-Ramp to Sahara Ave EB (Highland Dr)	31439	2016
I-15 SB Off-Ramp to Sahara Ave EB (Flyover)	31136	2016
I-15 SB On-Ramp from Sahara Ave	30081	2016
I-15 NB Off-Ramp to Sahara Ave	30075	2016
I-15 NB On-Ramp from Sahara Ave	30077	2016
I-15 SB Off-Ramp to Spring Mtn Rd WB	30072	2016
I-15 SB Off-Ramp to Spring Mtn Rd EB (Flyover)	30952	2016
I-15 SB On-Ramp from Spring Mtn Rd	30174	2016
I-15 NB Off-Ramp at Spring Mtn Rd	30229	2016
I-15 NB On-Ramp from Spring Mtn Rd EB	30984	2016
I-15 NB On-Ramp from Spring Mtn Rd WB	30070	2016
I-15 SB Off-Ramp to Flamingo Rd WB	30065	2016
I-15 SB Off-Ramp to Flamingo Rd EB	30792	2016
I-15 SB On-Ramp from Flamingo Rd	30066	2016
I-15 NB Off-Ramp to Flamingo Rd	30062	2016
I-15 NB On-Ramp from Flamingo Rd	30064	2016
I-15 SB Off-Ramp to Tropicana Ave	30057	2016
I-15 SB Off-Ramp to Tropicana Ave EB (Flyover)	30923	2014
I-15 SB On-Ramp from Tropicana Ave	30060	2016
I-15 NB Off-Ramp to Tropicana Ave	30053	2016
I-15 NB On-Ramp from Tropicana Ave	30055	2016
I-15 SB Off-Ramp to Russell Rd	31015	2016
I-15 SB On-Ramp from Russell Rd	31016	2016
I-15 NB Off-Ramp to Russell Rd	31017	2016
I-15 NB On-Ramp from Russell Rd	31018	2016

DATA COLLECTION EFFORT	
Ramp Description	**ID**
I-15 NB Off-Ramp to Spring Mtn Rd EB	2.1
I-15 NB Off-Ramp to Spring Mtn Rd WB	2.2
I-15 NB On-Ramp from Russell Rd connector	2.3
I-15 NB Off-Ramp to Tropicana Ave connector	2.4
I-15 NB Off-Ramp to Russell Rd @ I-215	2.5
I-15 NB Off-Ramp to Charleston Blvd	2.6
I-15 SB On-Ramp from Charleston Blvd	2.7

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
I-15 Count Station Description	**Station ID**
IR-15 1.5 mi S of Sloan Intch	35360
IR-15 1.0 mi S of SR 160 (Blue Diamond Rd Intch)	35340
0.9 mi S of the St Rose Intch 'Exit 27'	30842
0.5 mi N of the Spring Mountain Intch 'Exit 39'	30074
1.3 mi S of the IR-215 Intch 'Exit 34'	30453
btwn the St Rose Intch 'Exit 27' and the Blue Diamond Intch 'Exit 33'	30728
S of the Tropicana Intch 'Exit 37'	30052
0.3 mi S of the Spring Mountain Intch 'Exit 39'	30067
0.4 mi S of the Flamingo Intch 'Exit 38'	30061
0.2 mi S of mp 36 S of the Russell Intch 'Exit 36'	31021
IR-15 0.2 mi N of SR-589 (Sahara Ave Intch)	31210
0.1 mi N of the Cactus Intch 'Exit 30'	31535

DATA COLLECTION EFFORT
None

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments
- Ramps, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Ramp tube count summaries (one per site).

- Turning movement count summaries (one per intersection for each time period).
- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).
- Manual queue length study including raw data sheets and a data summary prepared in Excel.

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
- Weave zone observation (location and length). On an as-needed basis for calibration.
- Lane usage at intersections (Mainline lane utilization will be identified from FAST data.)
- Spillback

Queue Length

- Manual observation by field personnel, or video collection.
- Duration of AM and PM peak periods as noted above.
- Maximum queue length behind stop line, measured as number of vehicles and collected by lane, collected in 2-minute intervals
- Inclusion of stopped vehicles and slow moving vehicles (<5mph) in queue lengths at the end of the queue.

Table 4. Ramp Queue Length Collection Requirements

DATA COLLECTION EFFORT	
Ramp Description	**ID**
I-15 NB Off-Ramp to Sahara Ave	3.1
I-15 SB Off-Ramp to Spring Mtn Rd WB	3.2
I-15 NB Off-Ramp to Flamingo Rd	3.3
I-15 NB Off-Ramp to Tropicana Ave	3.4
I-15 NB Off-Ramp to Russell Rd	3.5

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation. Spot speed data to be obtained for off-peak periods at the locations shown in Figures 1a through 1c.

Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation. Field measured travel time runs to be collected for validation of FAST and INRIX data.

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1a. Data Collection Site Map North to South

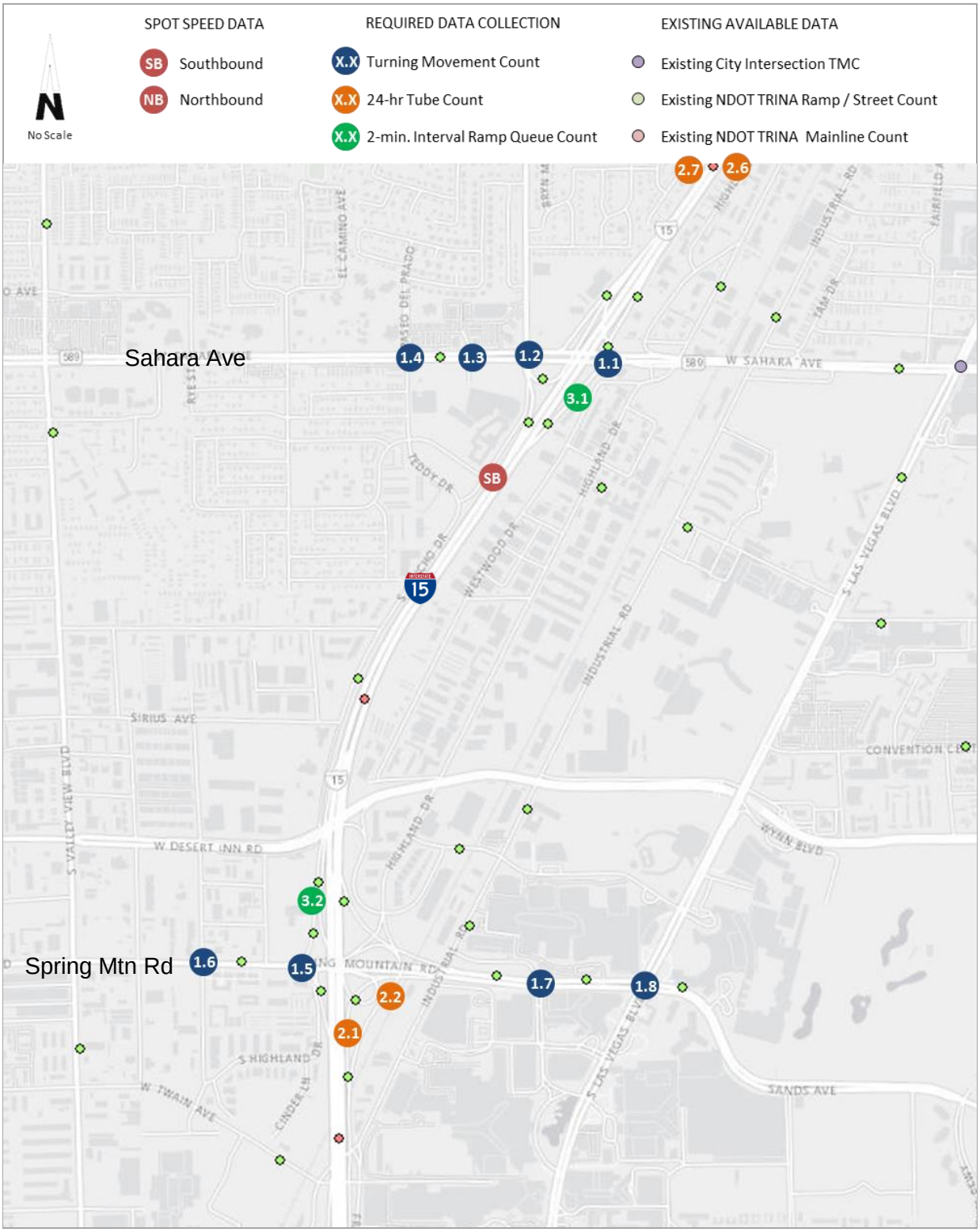


Figure 1b. Data Collection Site Map North to South

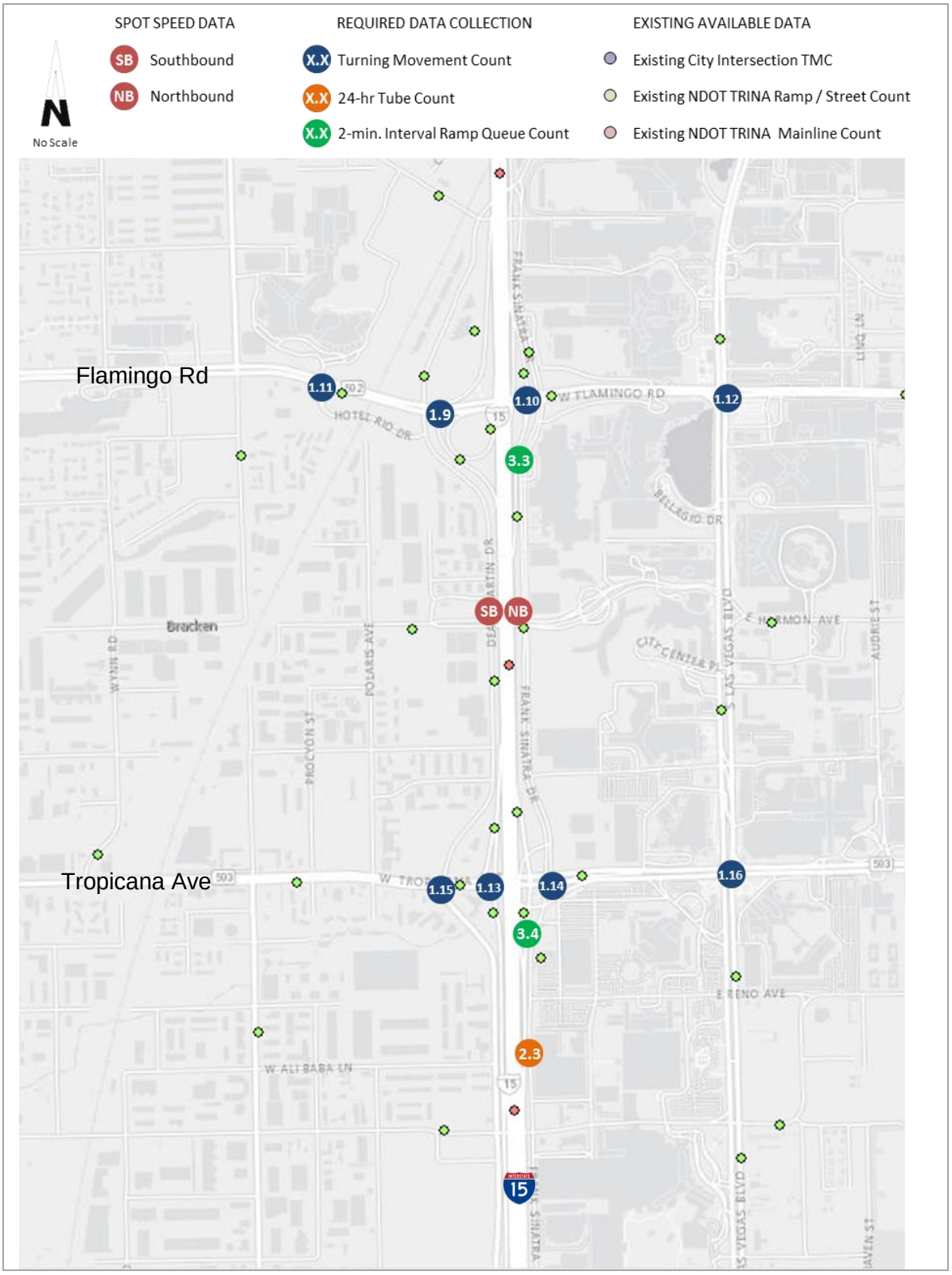
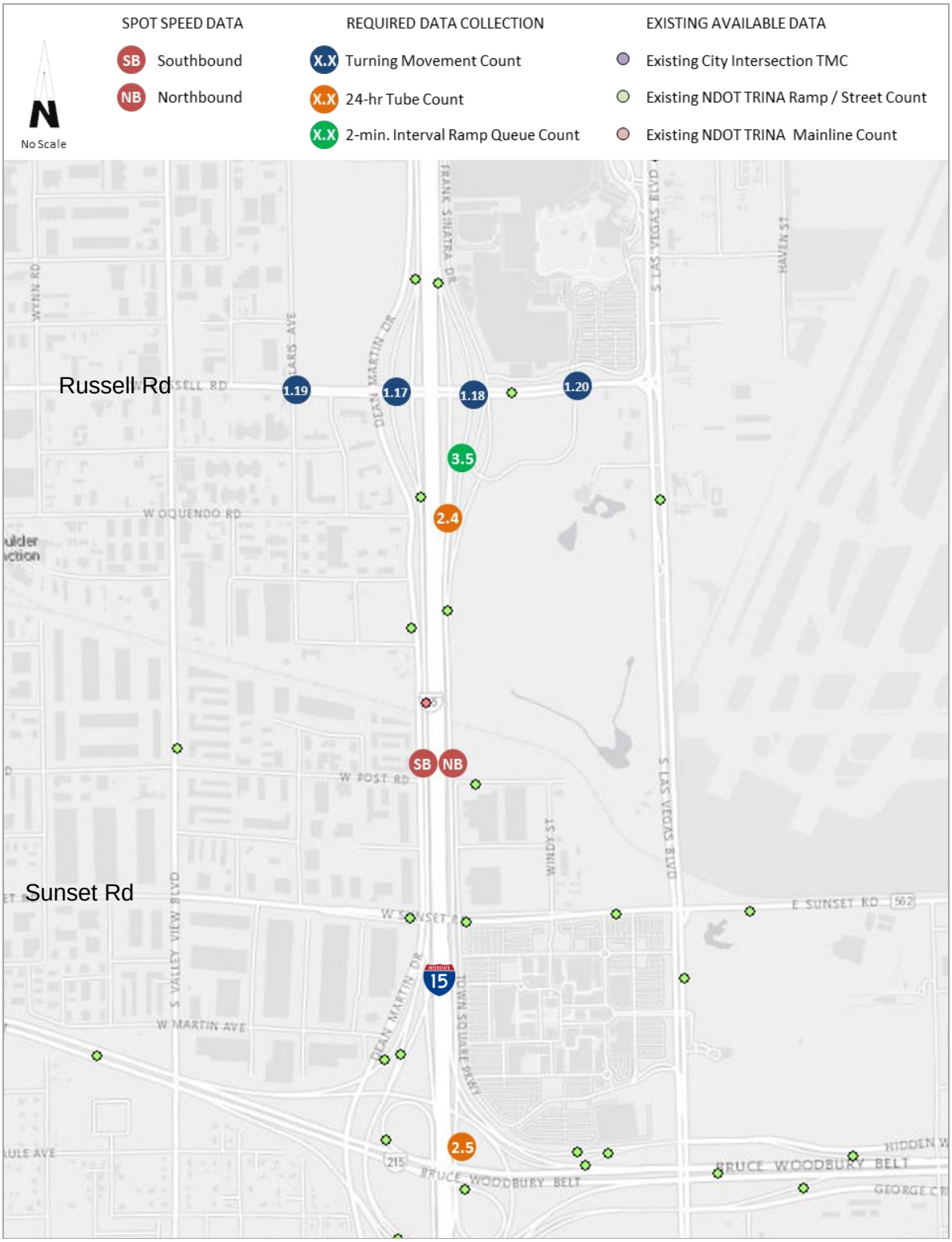


Figure 1c. Data Collection Site Map North to South



Data Collection Plan
I-15: I-215 to Sloan Rd

for

Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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CORRIDOR ANALYSIS DATA COLLECTION

This data collection plan provides details of existing data and sources, as well as additional data to be obtained, collection methods and assumptions. This data collection plan is tailored to the requirements for full corridor analysis and should only be used as reference for the above named corridor.

GEOMETRIC DATA

Required geometric data will be obtained from available construction drawings, field surveys, aerial photographs, geographical information system (GIS) files, and Google Earth / Streetview online tools. Data may include:

- Number and width of lanes
- Link length
- Vehicle storage length (turn bays)
- Lane add/drop/auxiliary location and length
- Ramp length
- Lane channelization
- Road Curvature

CONTROL DATA

The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
  - Speed Limits
  - Traffic Control
- Signal control data for intersections identified in Table 1 will be requested from the Nevada Freeway and Arterial System of Transportation (FAST) and local agencies, including but not limited to Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson.

DEMAND DATA

All traffic demand data and calibration data will be collected simultaneously. Demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data.
- AM and PM peak period turning movement counts at ramp terminals/intersections, and adjacent intersections on arterial cross-streets. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Peak period queue lengths at all I-15 ramp terminal intersections in the study area.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figures 1a through 1d.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
None Available	None Available		

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Blue Diamond Rd / SB I-15 Ramps	1.1
Blue Diamond Rd / NB I-15 Ramps	1.2
Blue Diamond Rd / Dean Martin Dr	1.3
Blue Diamond Rd / Las Vegas Blvd	1.4
Silverado Ranch Blvd / SB I-15 Ramps	1.5
Silverado Ranch Blvd / NB I-15 Ramps	1.6
Silverado Ranch Blvd / Dean Martin Dr	1.7
Silverado Ranch Blvd / South Point Dr	1.8
W Cactus Ave / SB I-15 Ramps	1.9
W Cactus Ave / NB I-15 Ramps	1.10
W Cactus Ave / Dean Martin Dr	1.11
W Cactus Ave / Las Vegas Blvd	1.12
St Rose Pkwy SPUI / NB and SB I-15 Ramps	1.13
St Rose Pkwy / Southern Highlands Pkwy	1.14
St Rose Pkwy / Las Vegas Blvd	1.15
Sloan Rd / SB I-15 Ramps	1.16
Sloan Rd / NB I-15 Ramps	1.17

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
I-15 SB Off-Ramp to Blue Diamond EB	30043	2016
I-15 SB Off-Ramp to Blue Diamond WB	31618	2016
I-15 SB On-Ramp from Blue Diamond	30045	2016
I-15 NB Off-Ramp at Blue Diamond	30037	2016
I-15 NB On-Ramp from Blue Diamond EB (Flyover)	31540	2016
I-15 (and I-215) NB On-Ramp from Blue Diamond	30040	2016
I-15 SB Off-Ramp to Silverado Ranch Blvd	31465	2016
I-15 SB On-Ramp from Silverado Ranch Blvd	31462	2016
I-15 NB Off-Ramp to Silverado Ranch Blvd	31463	2016
I-15 NB On-Ramp from Silverado Ranch Blvd	31464	2016
I-15 SB Off-Ramp to Cactus Ave	31532	2016
I-15 SB On-Ramp from Cactus Ave	31531	2016
I-15 NB Off-Ramp to Cactus Ave	31534	2016
I-15 NB On-Ramp from Cactus Ave	31533	2016
I-15 SB Off-Ramp to St Rose Pkwy	30035	2016
I-15 SB On-Ramp from St Rose Pkwy	30036	2016
I-15 NB Off-Ramp to St Rose Pkwy	30028	2016
I-15 NB On-Ramp from St Rose Pkwy	30032	2016
I-15 SB Off-Ramp to Sloan Rd	30025	2015
I-15 SB On-Ramp from Sloan Rd	30026	2015
I-15 NB Off-Ramp at Sloan Rd (to Las Vegas Blvd)	30020	2015
I-15 NB On-Ramp at Sloan Rd (from Las Vegas Blvd)	30027	2015

DATA COLLECTION EFFORT	
Ramp Description	**ID**
I-15 SB On-Ramp from I-215 at Blue Diamond	2.1
I-15 NB Off-Ramp to Blue Diamond	2.2
I-15 NB On-Ramp from Blue Diamond	2.3

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
I-15 Count Station Description	**Station ID**
IR-15 1.5 mi S of Sloan Intch	35360
IR-15 1.0 mi S of SR 160 (Blue Diamond Rd Intch)	35340
.9 mi S of the St Rose Intch 'Exit 27'	30842
1.3 mi S of the IR-215 Intch 'Exit 34'	30453
btwn the St Rose Intch 'Exit 27' and the Blue Diamond Intch 'Exit 33'	30728
.1 mi N of the Cactus Intch 'Exit 30'	31535

DATA COLLECTION EFFORT
None

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments
- Ramps, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Ramp tube count summaries (one per site).
- Turning movement count summaries (one per intersection for each time period).
- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).
- Manual queue length study including raw data sheets and a data summary prepared in Excel.

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
- Weave zone observation (location and length). On an as-needed basis for calibration.
- Lane usage at intersections (Mainline lane utilization will be identified from FAST data.)
- Spillback

Queue Length

- Manual observation by field personnel, or video collection.
- Duration of AM and PM peak periods as noted above.
- Maximum queue length behind stop line, measured as number of vehicles and collected by lane, collected in 2-minute intervals
- Inclusion of stopped vehicles and slow moving vehicles (<5mph) in queue lengths at the end of the queue.

Table 4. Ramp Queue Length Collection Requirements

DATA COLLECTION EFFORT	
Ramp Description	**ID**
I-15 SB Off-Ramp to Blue Diamond Rd	3.1
I-15 NB Off-Ramp to Blue Diamond Rd	3.2
I-15 SB Off-Ramp to Silverado Ranch Blvd	3.3
I-15 NB Off-Ramp to Silverado Ranch Blvd	3.4

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation. Spot speed data to be obtained for off-peak periods at the locations shown in Figures 1a through 1d.

Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation. Field measured travel time runs to be collected for validation of FAST and INRIX data.

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1a. Data Collection Site Map North to South

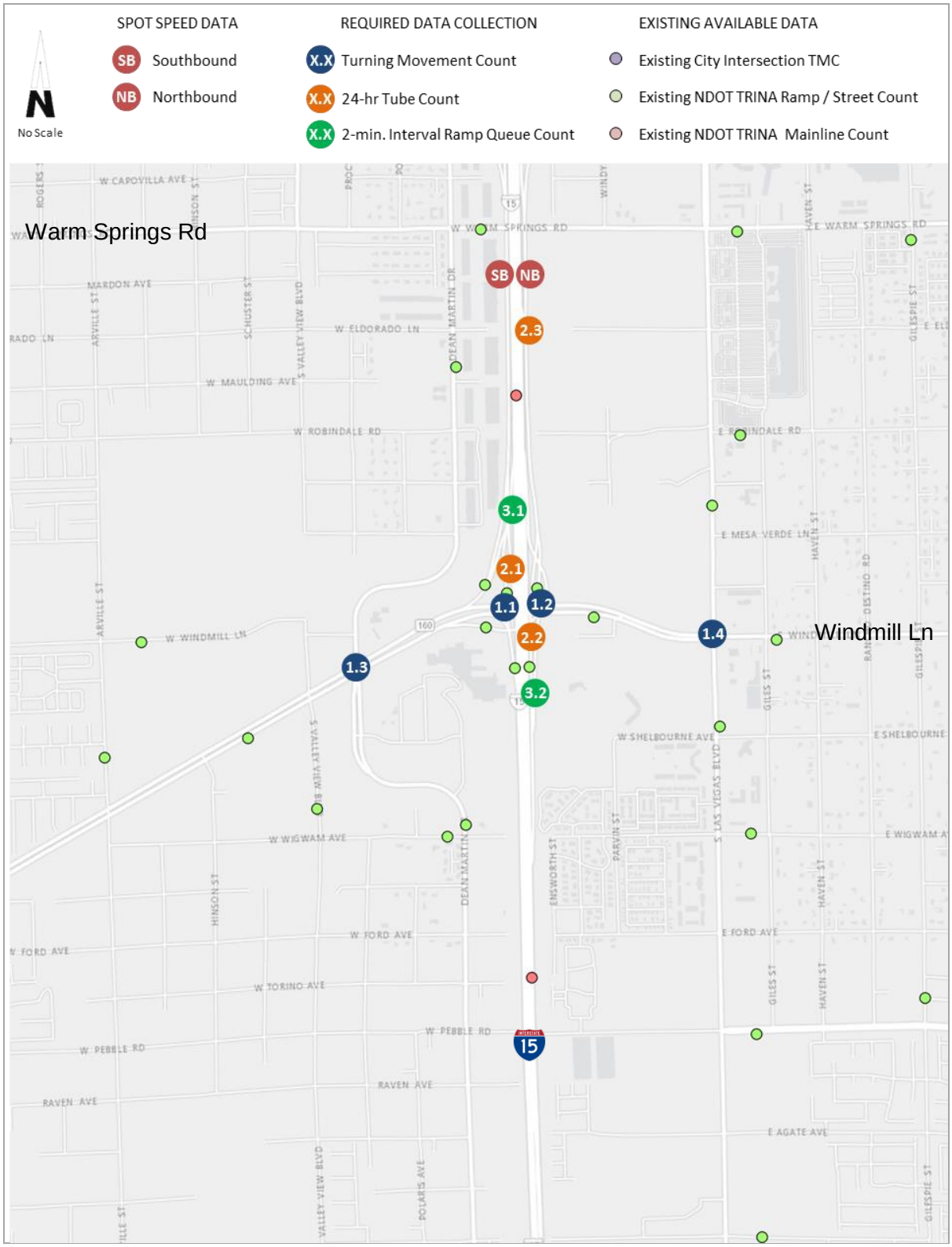


Figure 1b. Data Collection Site Map North to South

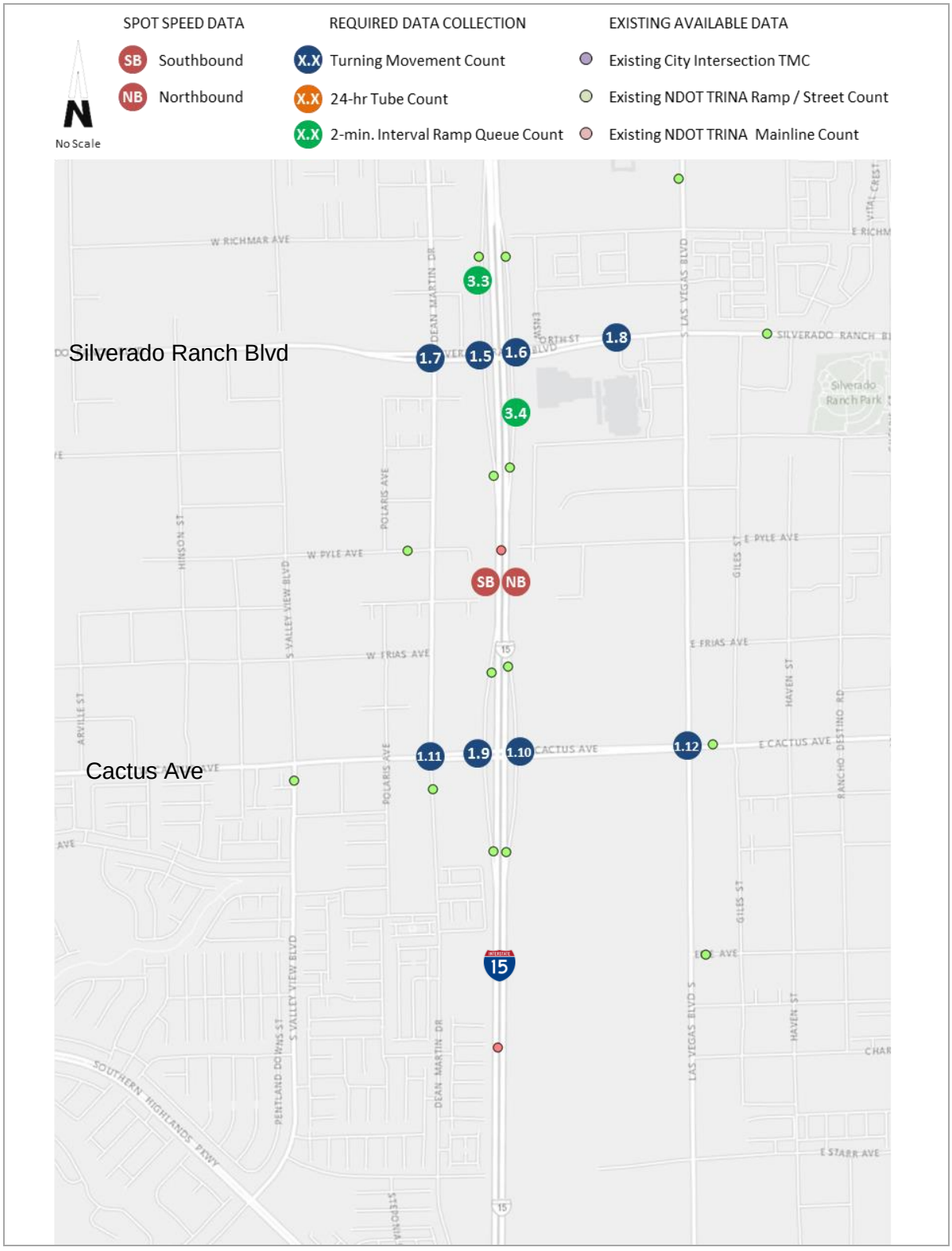


Figure 1c. Data Collection Site Map North to South

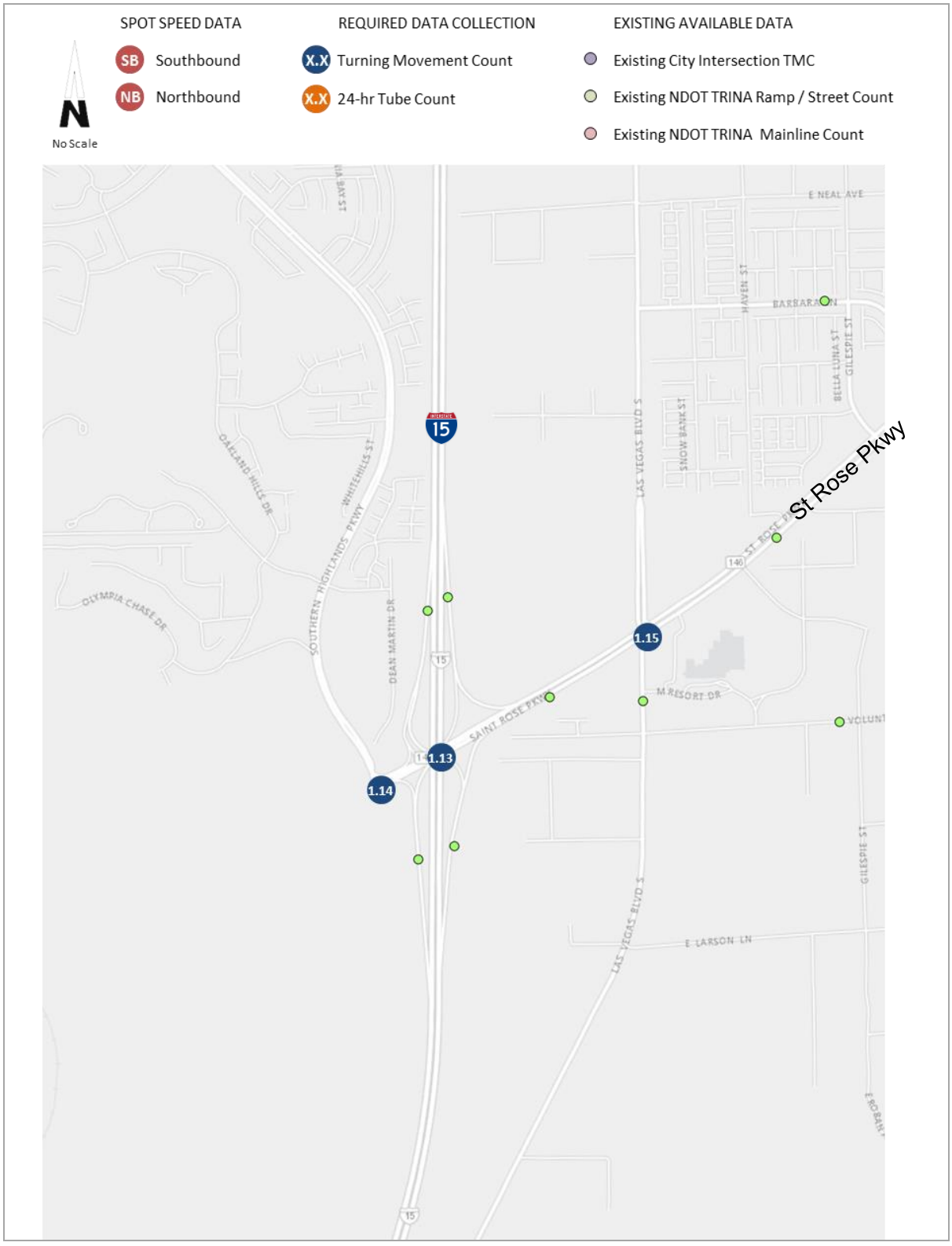
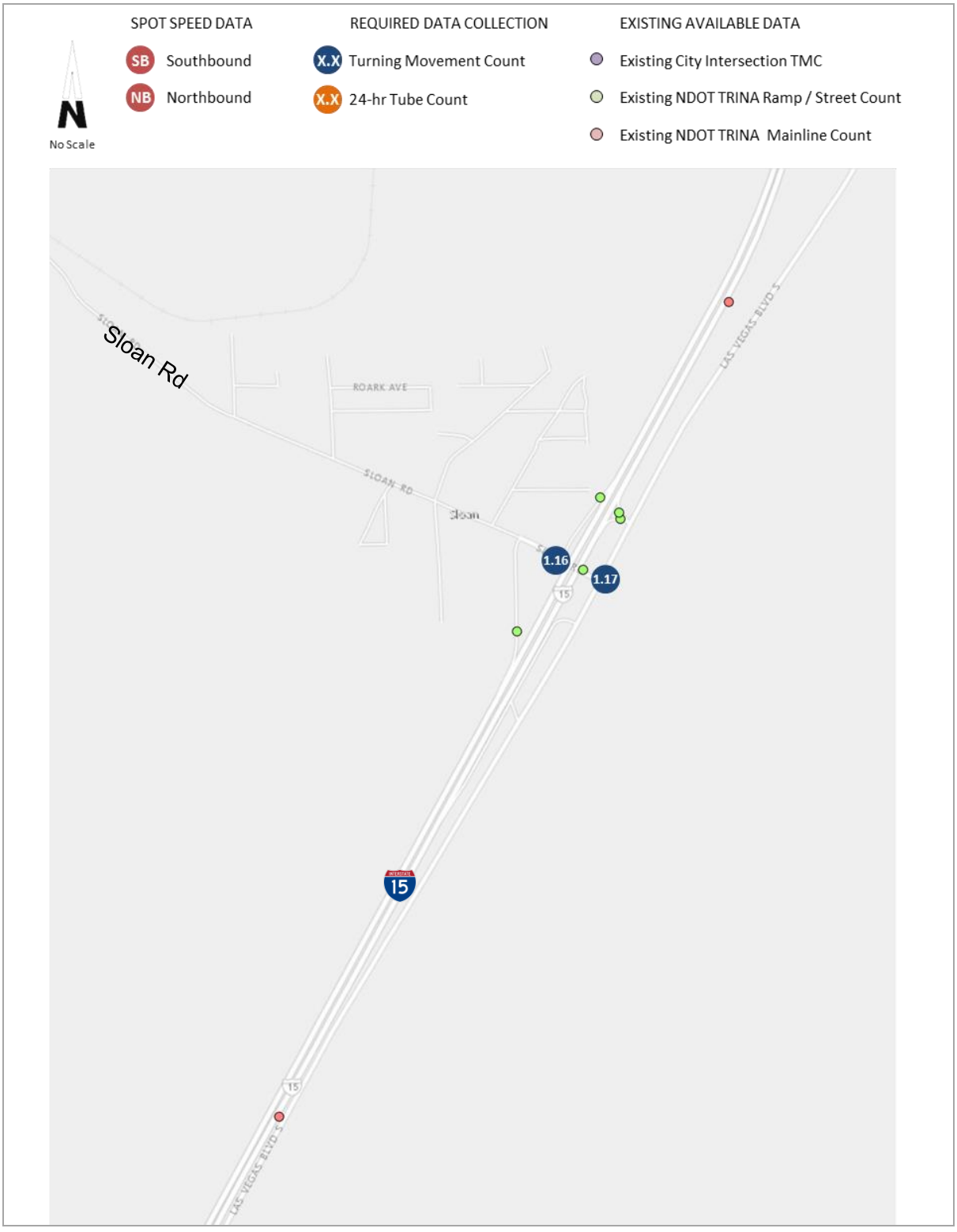


Figure 1d. Data Collection Site Map North to South



Data Collection Plan
I-15 / I-215 Interchange

for

Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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INTERCHANGE ANALYSIS DATA COLLECTION

This data collection plan provides details of existing data and sources, as well as additional data to be obtained, collection methods and assumptions. This data collection plan is tailored to the requirements for full interchange analysis and should only be used as reference for the above named interchange.

GEOMETRIC DATA

Required geometric data will be obtained from available construction drawings, field surveys, aerial photographs, geographical information system (GIS) files, and Google Earth / Streetview online tools. Data may include:

- Number and width of lanes
- Link length
- Lane add/drop/auxiliary location and length
- Ramp length
- Lane channelization
- Road Curvature

CONTROL DATA

The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
  - Speed Limits
  - Traffic Control

DEMAND DATA

All traffic demand data and calibration data will be collected simultaneously. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data.
- Tables 1 and 2 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figure 1.

Table 1. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
I-15 NB Off-Ramp to I-215 WB	31232	2015
I-15 NB Off-Ramp to I-215 EB	30056	2015
I-15 NB Off-Ramp to Las Vegas Blvd	30046	2015
I-15 SB Off-Ramp to Las Vegas Blvd	30003	2015
I-215 EB Of-Ramp to I-15 NB	31229	2015
I-215 WB Off-Ramp to I-15 NB	30118	2015
I-15 NB On-Ramp from Las Vegas Blvd	30879	2015
I-215 WB On-Ramp from Las Vegas Blvd	31420	2015
I-15 SB Off-Ramp to I-215 WB (from Russelll Rd)	31428	2015
I-15 SB Off-Ramp to I-215 EB and LVB (from Russell Rd)	30033	2015
I-215 WB Off-Ramp to I-15 SB	30155	2015
I-215 EB Off-Ramp to I-15 SB and Las Vegas Blvd	31234	2015
I-215 EB Off-Ramp to Las Vegas Blvd	31233	2015

DATA COLLECTION EFFORT	
Ramp Description	**ID**
I-15 SB Off-Ramp to I-215 EB and Las Vegas Blvd	2.1

Table 2. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
I-15 Count Station Description	**Station ID**
btwn the Decatur Intch 'Exit 13' and the I-15 Intch 'Exit 12'	30152
1.3 mi S of the IR-215 Intch 'Exit 34'	30453
E of SR-604 (Las Vegas Bl)	30162
.2 mi S of mp 36 S of the Russell Intch 'Exit 36'	31021

DATA COLLECTION EFFORT
NONE

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.

- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.

Time Periods

- Ramps, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Ramp tube count summaries (one per site).

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
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- Spillback

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation.

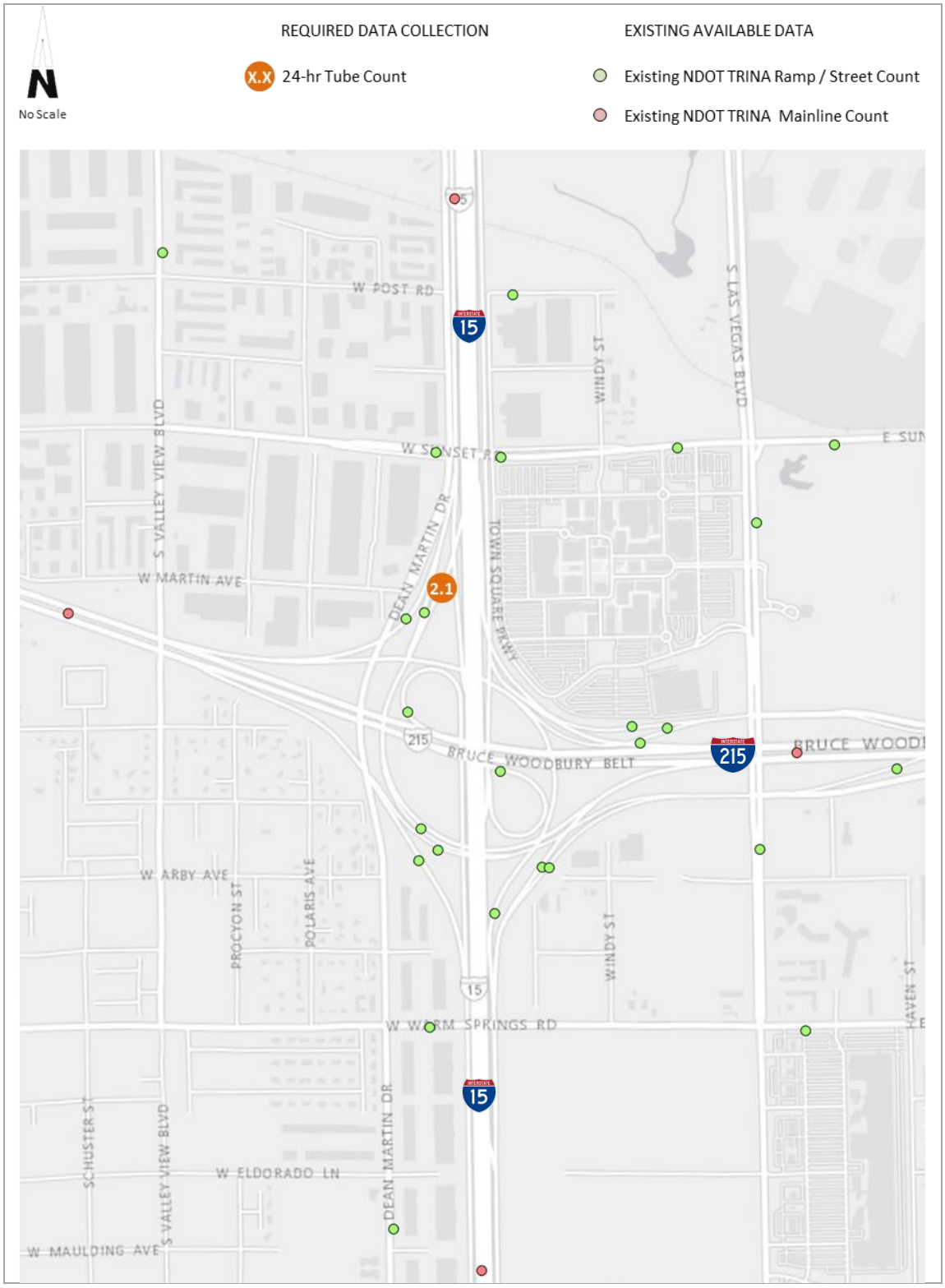
Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1. Data Collection Site Map



Data Collection Plan
I-215: I-15 to I-515
for
Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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- Link length
- Vehicle storage length (turn bays)
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- Ramp length
- Lane channelization
- Road Curvature

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The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
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- Signal control data for intersections identified in Table 1 will be requested from the Nevada Freeway and Arterial System of Transportation (FAST) and local agencies, including but not limited to Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson.

DEMAND DATA

All traffic demand data and calibration data will be collected simultaneously. Demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data.
- AM and PM peak period turning movement counts at ramp terminals/intersections, and adjacent intersections on arterial cross-streets. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Peak period queue lengths at all I-215 ramp terminal intersections in the study area.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figures 1a through 1d.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
Stephanie St	I-215 EB Ramps	2015	City of Henderson
Stephanie St	I-215 WB Ramps	2015	City of Henderson
Stephanie St	Wigwam Pkwy	2015	City of Henderson
Stephanie St	Paseo Verde Pkwy	2015	City of Henderson
Gibson Rd	I-215 EB Ramps	2015	City of Henderson
Gibson Rd	I-215 WB Ramps	2015	City of Henderson
Gibson Rd	Wigwam Pkwy	2015	City of Henderson

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Warm Springs Rd / I-215 SB Ramps	1.1
Warm Springs Rd / I-215 NB Ramps	1.2
Warm Springs Rd / Paradise Rd	1.3
Warm Springs Rd / Shadow Crest Dr	1.4
Warm Springs Rd / Amigo St	1.5
Windmill Lane / I-215 Ramps	1.6
Windmill Lane / Paradise Rd	1.7
Windmill Lane / S Spencer St	1.8
Eastern Ave / I-215 EB Ramps	1.9
Eastern Ave / I-215 WB Ramps	1.10
Eastern Ave / Pebble Rd	1.11
Eastern Ave / Serene Ave	1.12
Pecos Rd / I-215 EB Ramps	1.13
Pecos Rd / I-215 WB Ramps	1.14
Pecos Rd / Pebble Rd	1.15
Pecos Rd / Paseo Verde Pkwy	1.16
Green Valley Pkwy / I-215 Ramps	1.17
Green Valley Pkwy / Corporate Cir	1.18
Green Valley Pkwy / Village Walk Dr	1.19
Valle Verde Dr / I-215 Ramps	1.20
Valle Verde Dr / Valle Verde Plaza	1.21
Valle Verde Dr / Paseo Verde Pkwy	1.22
Gibson Rd / Las Palmas Entrada Ave	1.23

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
I-215 EB off-ramp to McCarran Connector	30126	2014
I-215 EB on-ramp from McCarran Connector	30727	2014
I-215 WB on-ramp from McCarran Connector	30308	2014
I-215 WB on-ramp from Warm Springs Rd WB	30704	2014
I-215 EB off-ramp to Warm Springs Rd	30400	2015
I-215 EB on-ramp from Warm Springs Rd	30438	2014
I-215 WB on-ramp from Warm Springs Rd EB	30535	2014
I-215 WB off-ramp to Warm Springs Rd	30445	2015
I-215 SB Off-Ramp to Windmill Ln	30048	2015
I-215 SB On-Ramp from Windmill Ln	30034	2015
I-215 NB Off-Ramp to Windmill Ln	30042	2015
I-215 NB On-Ramp from Windmill Ln	30071	2015
I-215 WB Off-Ramp to Eastern Ave	30086	2015
I-215 WB On-Ramp from Eastern Ave	30090	2015
I-215 EB Off-Ramp to Eastern Ave	30047	2015
I-215 EB On-Ramp from Eastern Ave	30082	2015
I-215 WB Off-Ramp to Pecos Rd	30216	2015
I-215 WB On-Ramp from Pecos Rd	30109	2015
I-215 EB Off-Ramp to Pecos Rd	30121	2015
I-215 EB On-Ramp from Pecos Rd	30869	2015
I-215 WB Off-Ramp to Green Valley Pkwy	30949	2015
I-215 WB On-Ramp from Green Valley Pkwy	30938	2015
I-215 EB Off-Ramp to Green Valley Pkwy	30948	2015
I-215 EB On-Ramp from Green Valley Pkwy	30950	2015
I-215 WB Off-Ramp to Valle Verde Dr	31427	2015
I-215 WB On-Ramp from Valle Verde Dr	31237	2015
I-215 EB Off-Ramp to Valle Verde Dr	30974	2015
I-215 EB On-Ramp from Valle Verde Dr	30965	2015
I-215 WB Off-Ramp to Stephanie St	30750	2015
I-215 WB On-Ramp from Stephanie St	30861	2015
I-215 EB Off-Ramp to Stephanie St	31236	2015
I-215 EB On-Ramp from Stephanie St	30108	2015
I-215 WB Off-Ramp to Gibson Rd	31260	2015
I-215 WB On-Ramp from Gibson Rd	31261	2015
I-215 EB Off-Ramp to Gibson Rd	31258	2015
I-215 EB On-Ramp from Gibson Rd	31259	2015

DATA COLLECTION EFFORT	
Ramp Description	**ID**
NONE	

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
I-215 Count Station Description	**Station ID**
btwn Windmill Intch 'Exit 8' and the Eastern Intch 'Exit 7'	30078
IR-215 0.5 mi W of Gibson Intch	35370
btwn Las Vegas Bl Intch 'Exit 11' and the Sunset/McCarran Intch 'Exit 10'	30129
btwn the Sunset/McCarran Intch 'Exit 10' and the Warm Springs Intch 'Exit 9'	30131
IR-215 0.2 mi E of Eastern Ave Intch	31250
btwn the Pecos Intch 'Exit 6' and the Green Valley Intch 'Exit 5'	30933
btwn the Valle Verde Intch 'Exit 3B' and the Stephanie Intch 'Exit 3A'	31239
btwn the Decatur Intch 'Exit 13' and the I-15 Intch 'Exit 12'	30152
btwn Warm Springs Intch 'Exit 9' and the Windmill Intch 'Exit 8'	30959
btwn the Green Valley Intch 'Exit 5' and the Valle Verde Intch 'Exit 3B'	31238
E of SR-604 (Las Vegas Bl)	30162
btwn the Gibson Intch Exit 2 and the US-95 Henderson Intch Exit 1	30246

DATA COLLECTION EFFORT
NONE

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments
- Ramps, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Ramp tube count summaries (one per site).

- Turning movement count summaries (one per intersection for each time period).
- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).
- Manual queue length study including raw data sheets and a data summary prepared in Excel.

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
- Weave zone observation (location and length). On an as-needed basis for calibration.
- Lane usage at intersections (Mainline lane utilization will be identified from FAST data.)
- Spillback

Queue Length

- Manual observation by field personnel, or video collection.
- Number of queued vehicles behind each stop line, collected by lane.
- Duration of AM and PM peak periods as noted above.
- Data collection at 2-minute intervals.
- Inclusion of stopped vehicles and slow moving vehicles (<5mph) in queue lengths at the end of the queue.

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation. Spot speed data to be obtained for off-peak periods at the locations shown in Figures 1a through 1d.

Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation.

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1a. Data Collection Site Map West ot East

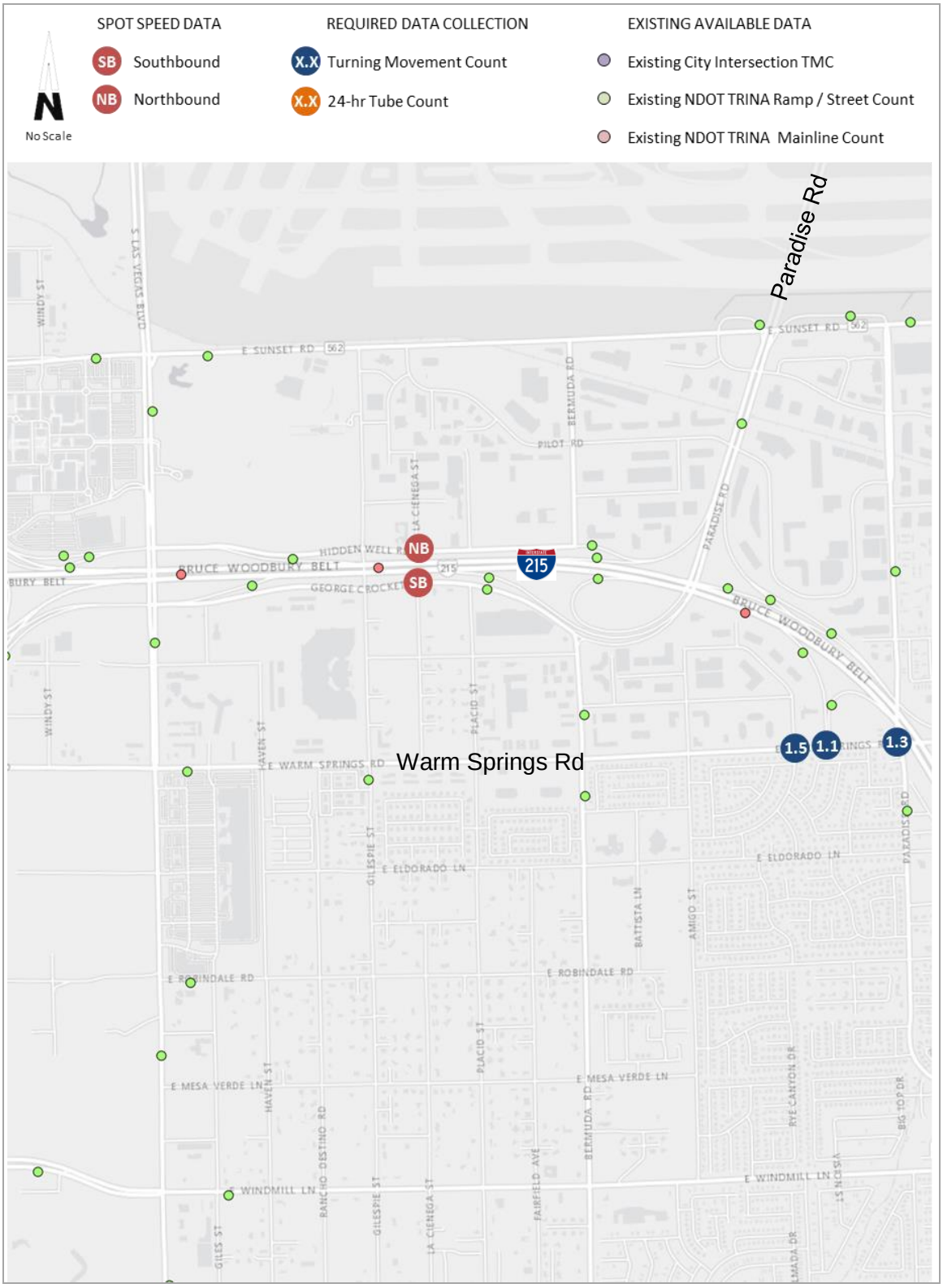


Figure 1b. Data Collection Site Map West ot East

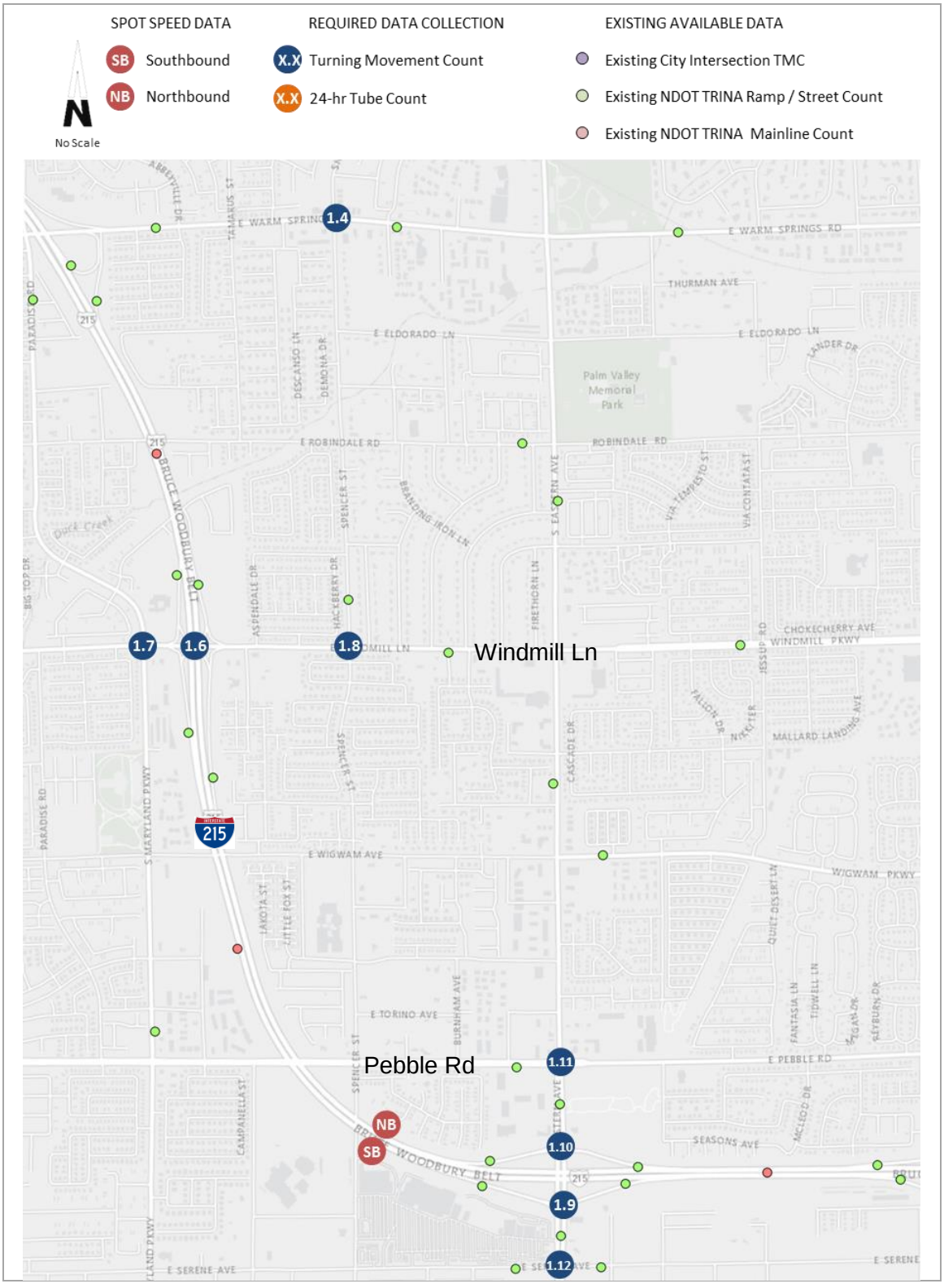


Figure 1c. Data Collection Site Map West ot East

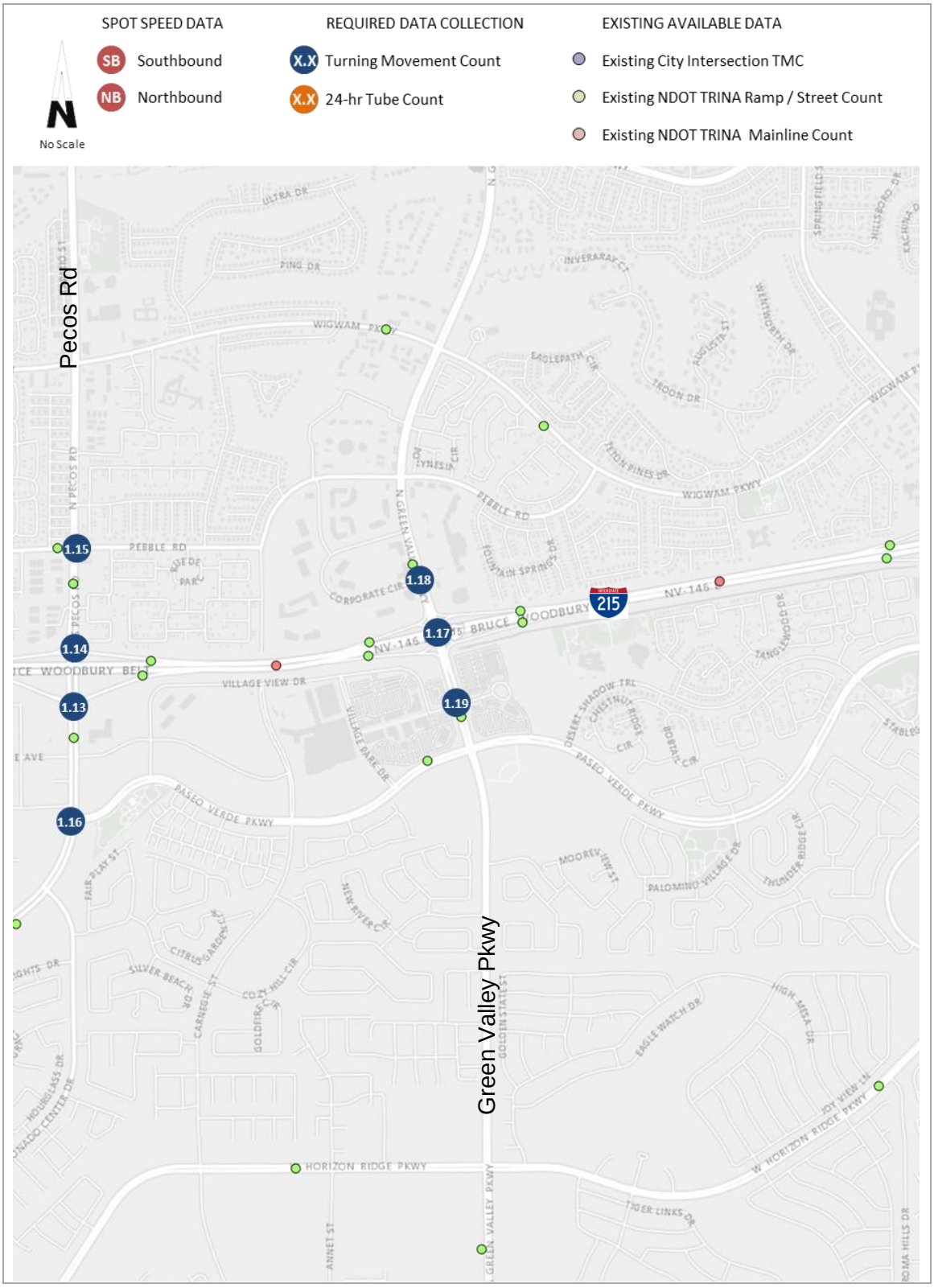
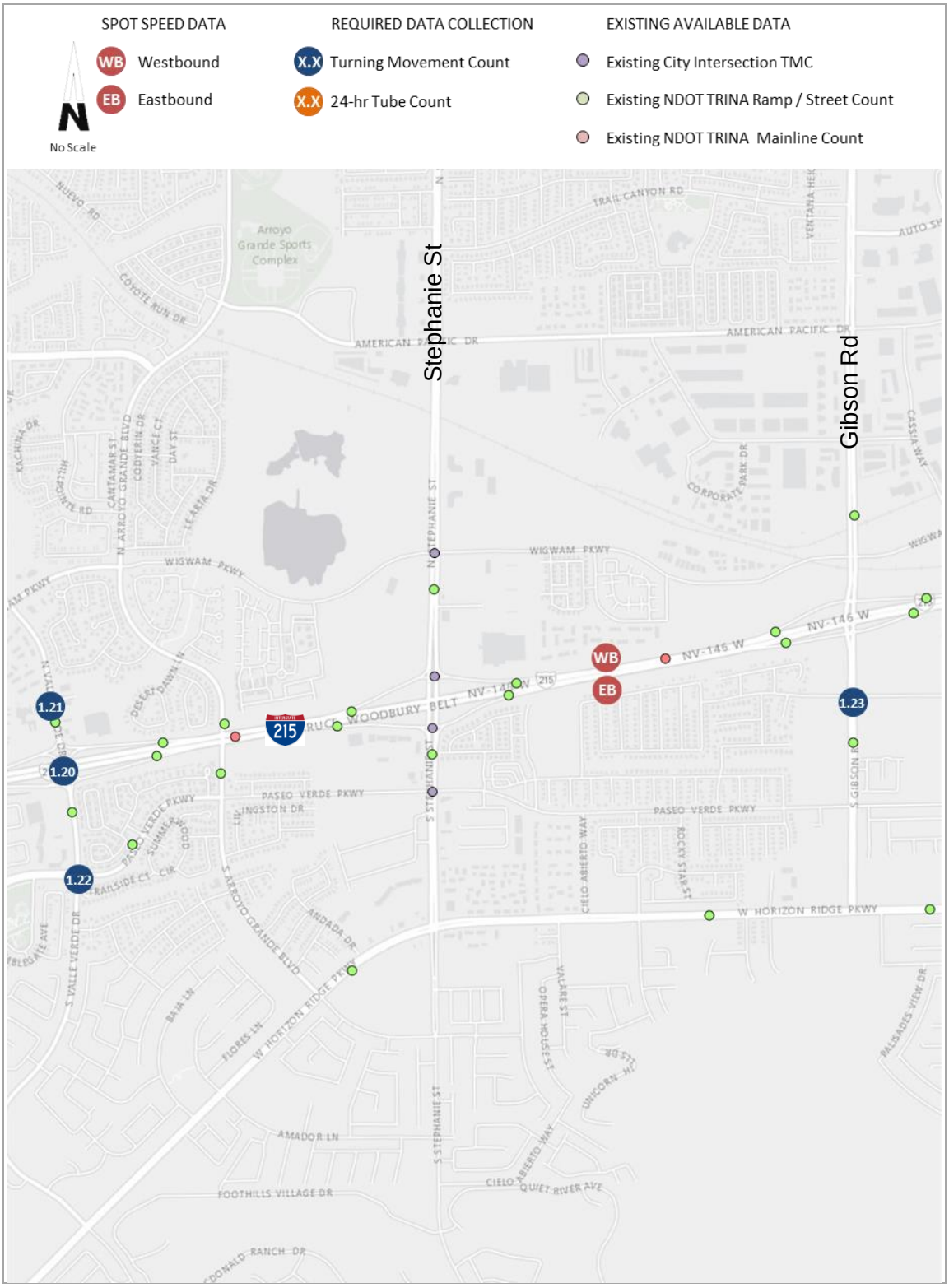


Figure 1d. Data Collection Site Map West ot East



Data Collection Plan
I-515: Charleston Blvd to I-215

for

Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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CORRIDOR ANALYSIS DATA COLLECTION

This data collection plan provides details of existing data and sources, as well as additional data to be obtained, collection methods and assumptions. This data collection plan is tailored to the requirements for full corridor analysis and should only be used as reference for the above named corridor.

GEOMETRIC DATA

Required geometric data will be obtained from available construction drawings, field surveys, aerial photographs, geographical information system (GIS) files, and Google Earth / Streetview online tools. Data may include:

- Number and width of lanes
- Link length
- Vehicle storage length (turn bays)
- Lane add/drop/auxiliary location and length
- Ramp length
- Lane channelization
- Road Curvature

CONTROL DATA

The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
  - Speed Limits
  - Traffic Control
- Signal control data for intersections identified in Table 1 will be requested from the Nevada Freeway and Arterial System of Transportation (FAST) and local agencies, including but not limited to Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson.

DEMAND DATA

All traffic demand data and calibration data will be collected simultaneously. Demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data.
- AM and PM peak period turning movement counts at ramp terminals/intersections, and adjacent intersections on arterial cross-streets. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Peak period queue lengths at all I-515 ramp terminal intersections in the study area.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figures 1a through 1d.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
Russell Rd	I-515 NB Ramps	2015	City of Henderson
Russell Rd	I-515 SB Ramps	2015	City of Henderson
Russell Rd	Stephanie St	2015	City of Henderson
Russell Rd	Whitney Ranch Dr	2015	City of Henderson

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Charleston Blvd / I-515 NB Ramps	1.1
Charleston Blvd / I-515 SB Ramps	1.2
Charleston Blvd / Honolulu St	1.3
Charleston Blvd / Sacramento Dr	1.4
Boulder Hwy / I-515 NB Ramps	1.5
Boulder Hwy / I-515 SB Ramps	1.6
Boulder Hwy / Sahara Ave	1.7
Boulder Hwy / Lamb Blvd	1.8
Flamingo Rd / I-515 NB Ramps	1.9
Flamingo Rd / I-515 SB Ramps	1.10
Flamingo Rd / Sandhill Rd	1.11
Flamingo Rd / Mountain Vista St	1.12
Tropicana Ave / I-515 NB Ramps	1.13
Tropicana Ave / I-515 SB Ramps	1.14
Tropicana Ave / Sandhill Rd	1.15
Tropicana Ave / Mountain Vista St	1.16
Galleria Dr / I-515 NB Ramps	1.17
Galleria Dr / I-515 SB Ramps	1.18
Galleria Dr / Stephanie St	1.19
Galleria Dr / Gibson Rd	1.20
Sunset Rd / I-515 NB Ramps	1.21
Sunset Rd / I-515 SB Ramps	1.22
Sunset Rd / Marks St	1.23
Sunset Rd / Gibson Rd	1.24
Auto Show Dr / I-515 NB Ramps	1.25
Auto Show Dr / I-515 SB Ramps	1.26
Auto Show Dr / Gibson Rd	1.27
Auto Show Dr / Eastgate Rd	1.28

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
I-515 SB Off-Ramp to Charleston Blvd	30791	2015
I-515 SB On-Ramp from Charleston Blvd	30801	2015
I-515 NB Off-Ramp to Charleston Blvd	30800	2015
I-515 NB On-Ramp from Charleston Blvd	30779	2015
I-515 SB Off-Ramp to Boulder Hwy	30806	2015
I-515 SB On-Ramp from Boulder Hwy	30805	2015
I-515 NB Off-Ramp to Boulder Hwy	30804	2015
I-515 NB On-Ramp from Boulder Hwy	30803	2015
I-515 SB Off-Ramp to Flamingo Rd	30809	2015
I-515 SB On-Ramp from Flamingo Rd EB	30812	2015
I-515 SB On-Ramp from Flamingo Rd WB	30810	2015
I-515 NB Off-Ramp to Flamingo Rd	30813	2015
I-515 NB On-Ramp from Flamingo Rd EB	30811	2015
I-515 NB On-Ramp from Flamingo Rd WB	30808	2015
I-515 SB Off-Ramp to Tropicana Ave	30815	2015
I-515 SB On-Ramp from Tropicana Ave	30818	2015
I-515 NB Off-Ramp to Tropicana Ave	30817	2015
I-515 NB On-Ramp from Tropicana Ave	30807	2015
I-515 SB Off-Ramp to Russell Rd	30823	2015
I-515 SB On-Ramp from Russell Rd	30822	2015
I-515 NB Off-Ramp to Russell Rd	30821	2015
I-515 NB On-Ramp from Russell Rd	30820	2015
I-515 SB Off-Ramp to Galleria Dr	31459	2015
I-515 SB On-Ramp from Galleria Dr	31458	2015
I-515 NB Off-Ramp to Galleria Dr	31457	2015
I-515 NB On-Ramp from Galleria Dr	31456	2015
I-515 SB Off-Ramp to Sunset Rd	30828	2015
I-515 SB On-Ramp from Sunset Rd	30829	2015
I-515 NB Off-Ramp to Sunset Rd	30827	2015
I-515 NB On-Ramp from Sunset Rd	30826	2015
I-515 SB Off-Ramp to Auto Show Dr	31424	2015
I-515 SB On-Ramp from Auto Show Dr	31411	2015
I-515 NB Off-Ramp to Auto Show Dr	31423	2015
I-515 NB On-Ramp from Auto Show Dr	31441	2015

DATA COLLECTION EFFORT	
Ramp Description	**ID**
NONE	

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
I-215 Count Station Description	**Station ID**
btwn the Tropicana Intch 'Exit 68' and the Russell Intch 'Exit 65'	30819
btwn the Boulder Highway Intch 'Exit 69' and the Charleston Intch 'Exit 71'	30799
South of the Auto Show Mall Intch 'Exit 62'	31422
US-95 0.3 mi S of Russel Rd	32230
btwn the Boulder Highway Intch 'Exit 69' and the Flamingo Intch 'Exit 68'	30798
btwn the Flamingo Intch 'Exit 38' and the Tropicana Intch 'Exit 37'	30814
500ft S of Mojave Rd btwn Eastern Av Intch Exit 73 and Charleston Bl Intch Exit 72	30789
btwn the Sunset Intch 'Exit 64A' and the Auto Show Mall Intch 'Exit 62'	30831

DATA COLLECTION EFFORT
NONE

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments
- Ramps, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Ramp tube count summaries (one per site).
- Turning movement count summaries (one per intersection for each time period).
- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).

- Manual queue length study including raw data sheets and a data summary prepared in Excel.

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
- Weave zone observation (location and length). On an as-needed basis for calibration.
- Lane usage at intersections (Mainline lane utilization will be identified from FAST data.)
- Spillback

Queue Length

- Manual observation by field personnel, or video collection.
- Duration of AM and PM peak periods as noted above.
- Maximum queue length behind stop line, measured as number of vehicles and collected by lane, collected in 2-minute intervals
- Inclusion of stopped vehicles and slow moving vehicles (<5mph) in queue lengths at the end of the queue.

Table 4. Ramp Queue Length Collection Requirements

DATA COLLECTION EFFORT	
Ramp Description	**ID**
I-515 NB Off-Ramp to Charleston Blvd	3.1
I-515 SB Off-Ramp to Boulder Hwy	3.2
I-515 SB Off-Ramp to Flamingo Rd	3.3
I-515 NB Off-Ramp to Russell Rd	3.4
I-515 SB Off-Ramp to Auto Show Dr	3.5

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation. Spot speed data to be obtained for off-peak periods at the locations shown in Figures 1a through 1d.

Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation. Field measured travel time runs to be collected for validation of FAST and INRIX data.

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1a. Data Collection Site Map North to South

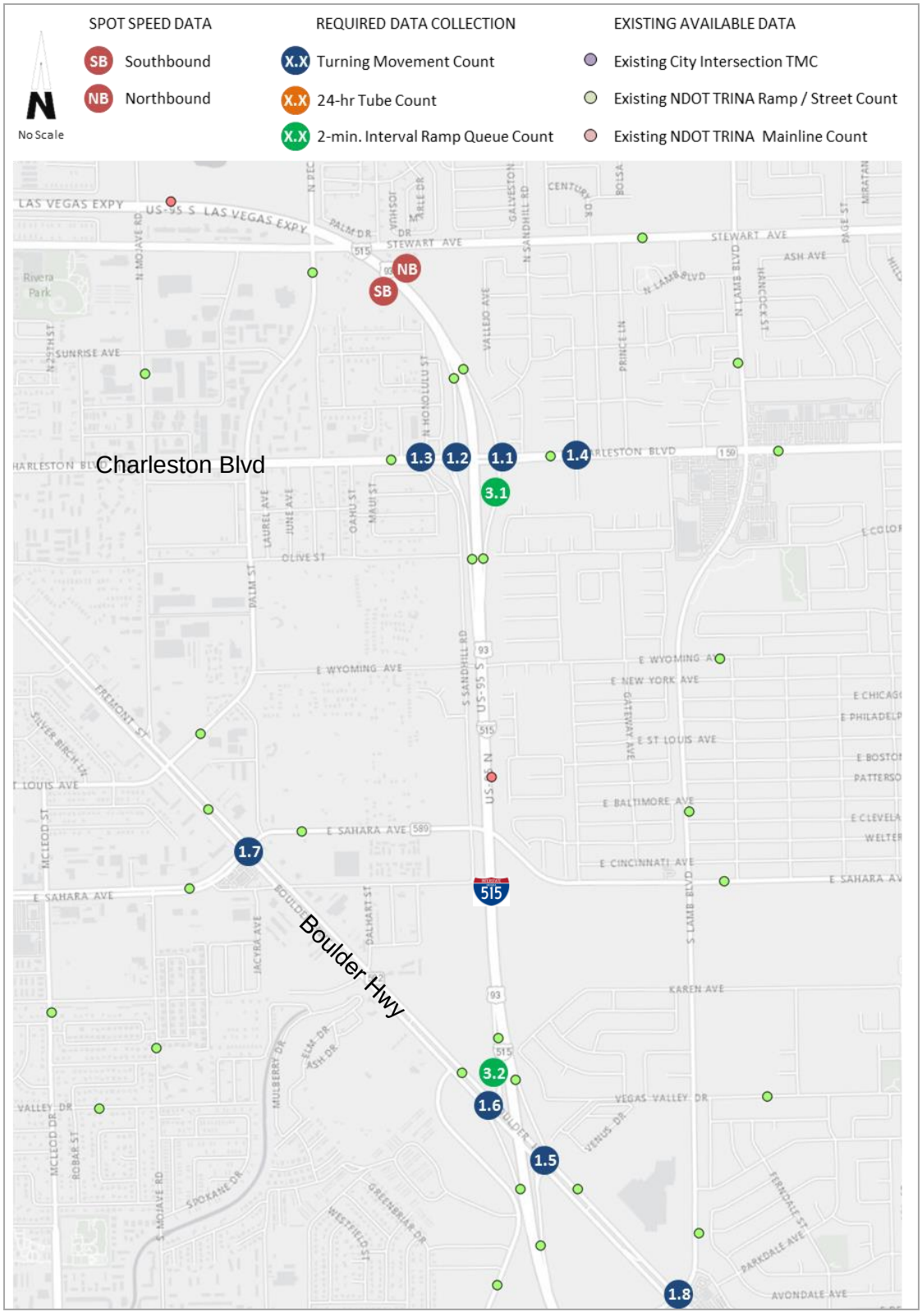


Figure 1b. Data Collection Site Map North to South

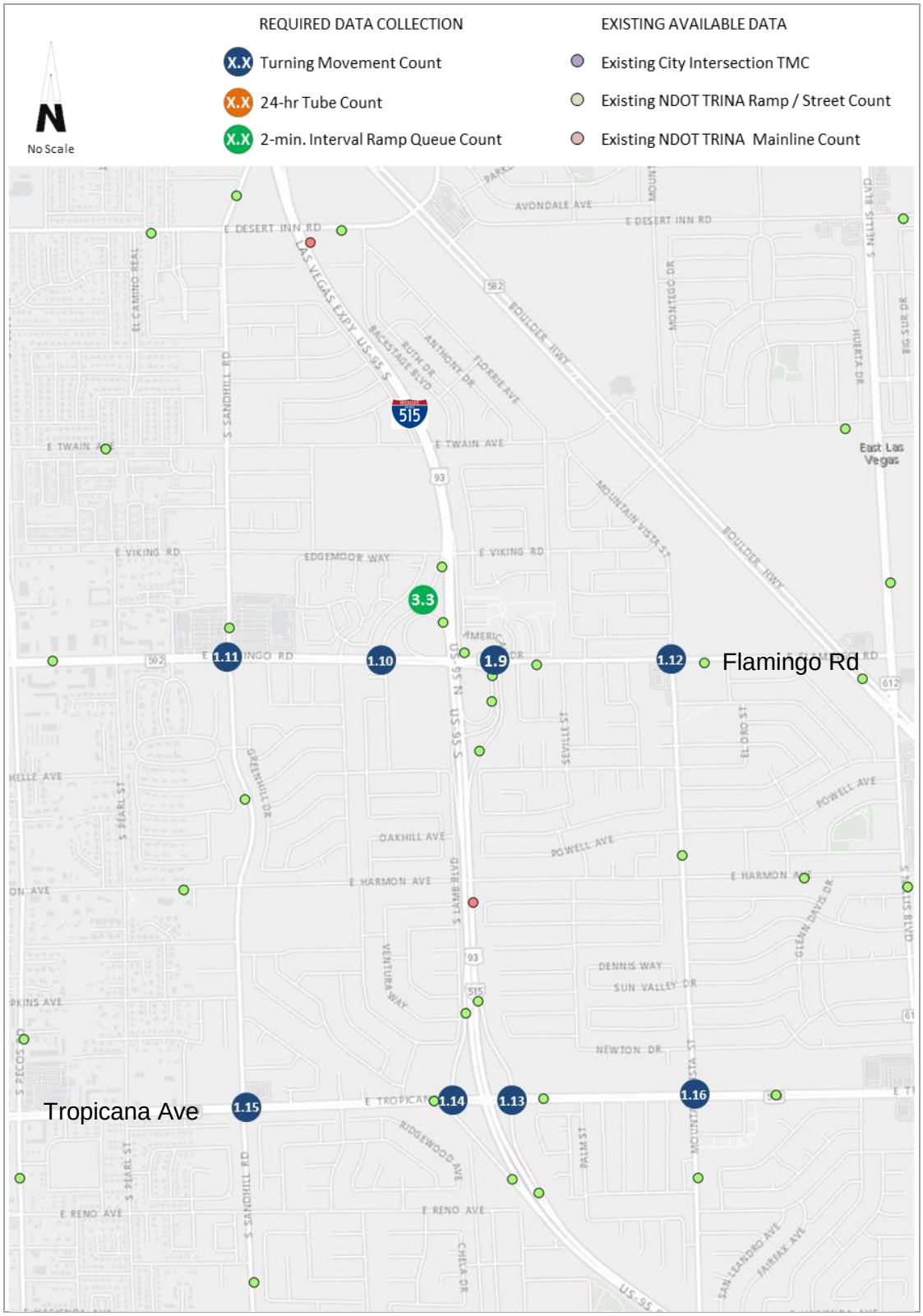


Figure 1c. Data Collection Site Map North to South

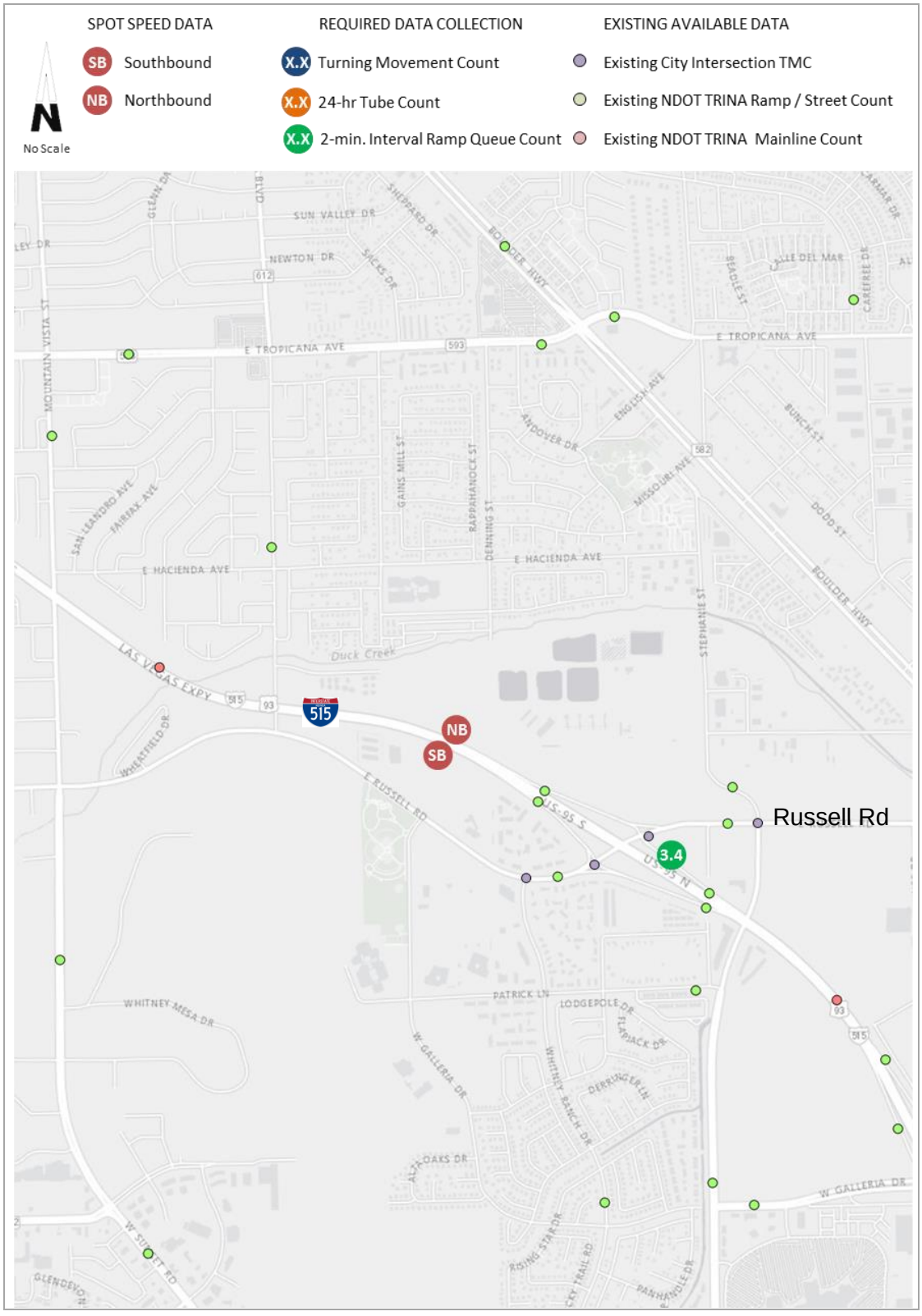
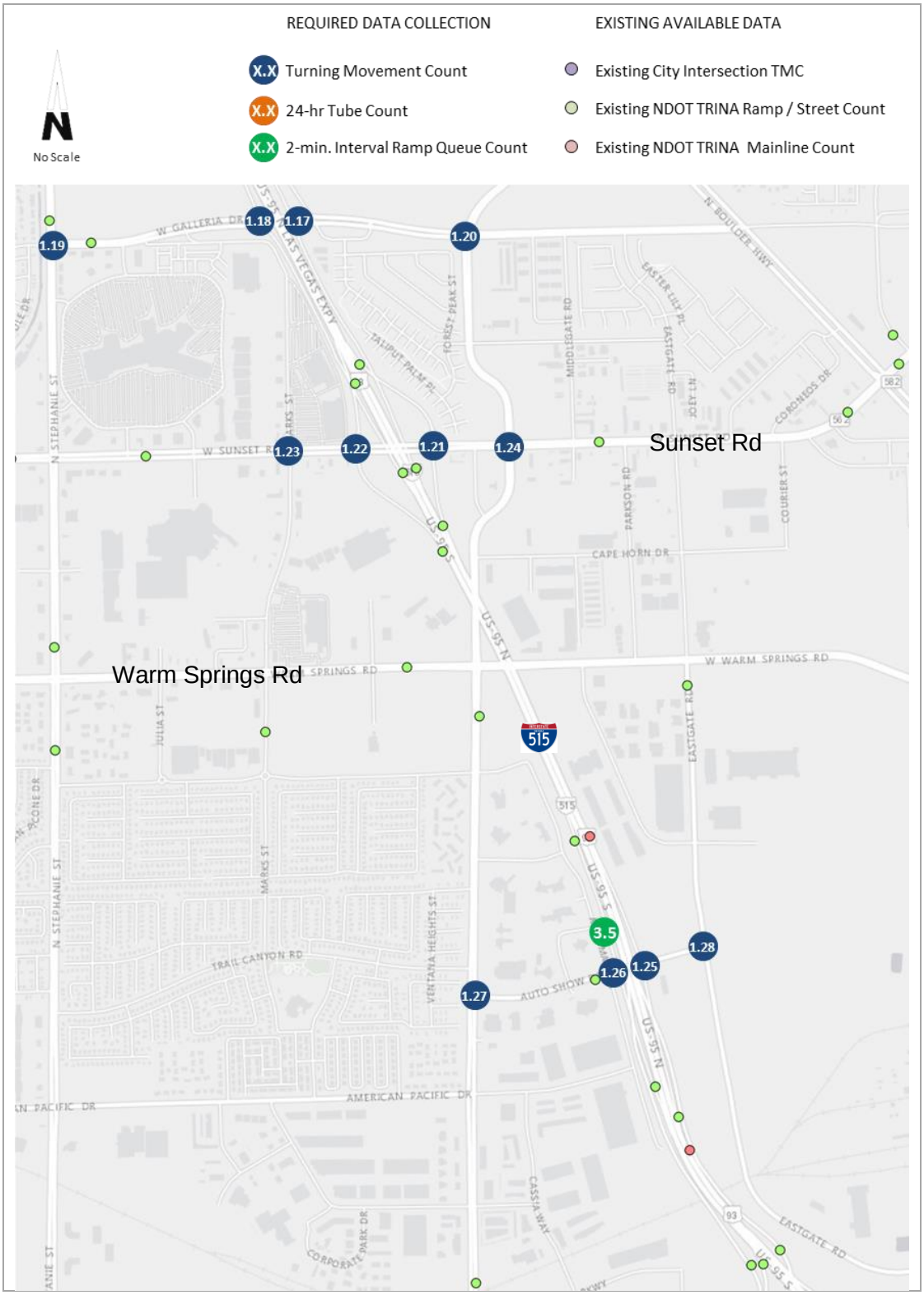


Figure 1d. Data Collection Site Map North to South



Data Collection Plan
I-515 / I-215 Interchange
for
Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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- Road Curvature

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- Entry volumes (ramp and mainline counts).
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TRAFFIC COUNTS

Assumptions and Data Needs

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- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data.
- AM and PM peak period turning movement counts at ramp terminals/intersections, and adjacent intersections on arterial cross-streets. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Peak period queue lengths at all ramp terminal intersections in the study area.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figure 1.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
NONE	NONE		

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Lake Mead Pkwy / Eastgate Rd	1.1

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
I-515 NB On-Ramp from Lake Mead Pkwy WB	30832	2015
I-515 NB Off-Ramp to Lake Mead Pkwy EB & I-215 WB	30895	2014
I-515 NB Off-Ramp to I-215 WB	31264	2014
I-515 NB On-Ramp from I-215 EB	31440	2015
I-515 SB Off-Ramp to Lake Mead Pkwy EB	31425	2015
I-515 SB Off-Ramp to I-215 WB	30833	2015
I-515 SB On-Ramp from I-215 EB	31417	2015
I-515 SB On-Ramp from Lake Mead Pkwy WB	30894	2015
I-515 SB On-Ramp from Lake Mead Pkwy WB	30894	2015

DATA COLLECTION EFFORT	
Ramp Description	**ID**
NONE	

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
I-515 / I-215 Count Station Description	**Station ID**
South of the Auto Show Mall Intch 'Exit 62'	31422
btwn the 215/Henderson Intch 'Exit 61' and the Horizon Intch 'Exit 59'	30896
btwn the Gibson Intch Exit 2 and the US-95 Henderson Intch Exit 1	30246
.2 mi E of the 215/Henderson Intch 'Exit 61'	30834

DATA COLLECTION EFFORT
NONE

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments
- Ramps, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Ramp tube count summaries (one per site).
- Turning movement count summaries (one per intersection for each time period).
- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).
- Manual queue length study including raw data sheets and a data summary prepared in Excel.

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
- Weave zone observation (location and length). On an as-needed basis for calibration.
- Lane usage at intersections (Mainline lane utilization will be identified from FAST data.)
- Spillback

Queue Length

- Manual observation by field personnel, or video collection.
- Number of queued vehicles behind each stop line, collected by lane.
- Duration of AM and PM peak periods as noted above.
- Data collection at 2-minute intervals.
- Inclusion of stopped vehicles and slow moving vehicles (<5mph) in queue lengths at the end of the queue.

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation. Spot speed data to be obtained for off-peak periods at the locations shown in Figure 1.

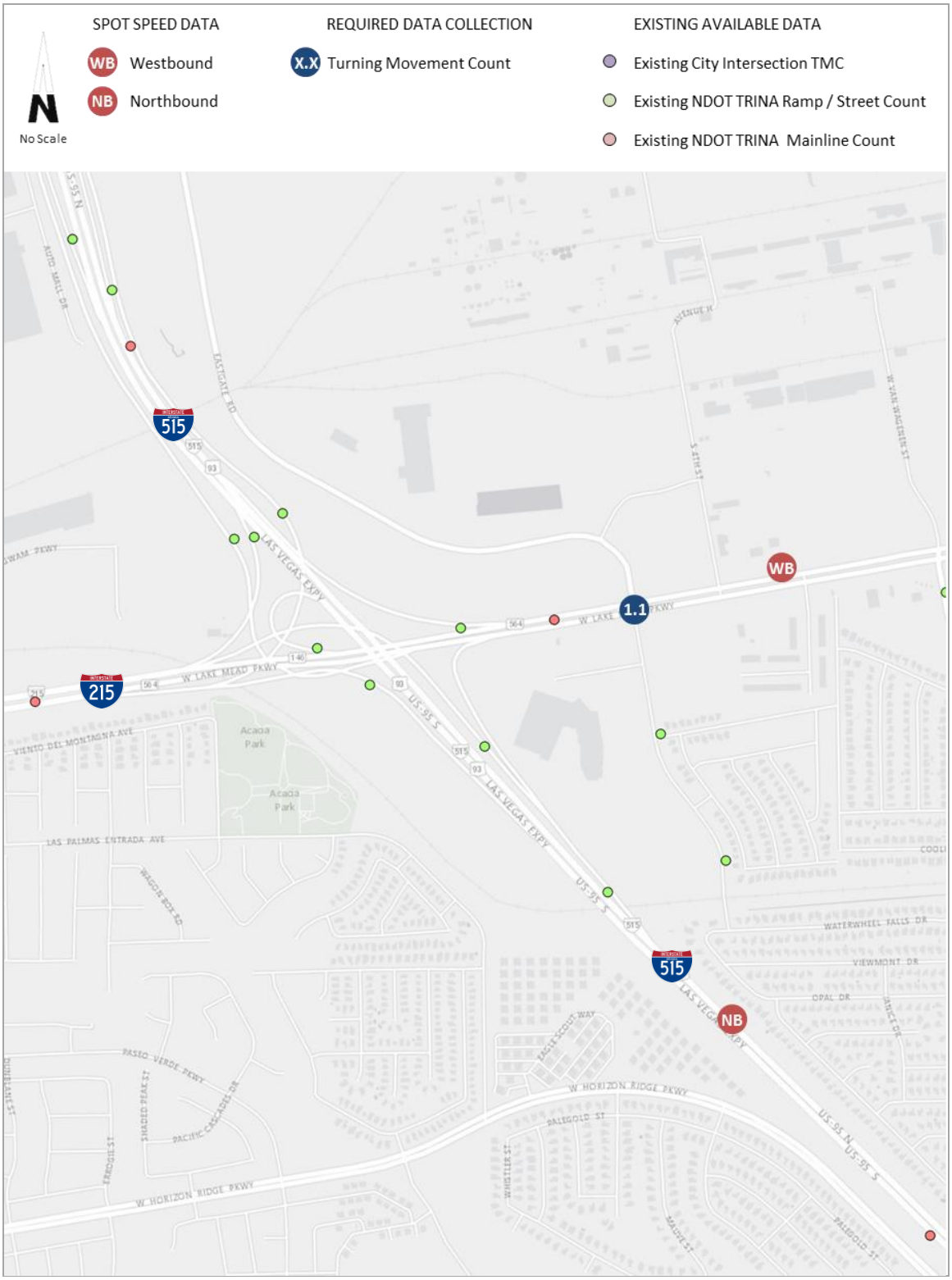
Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1. Data Collection Site Map



Data Collection Plan
Summerlin Pkwy: CC-215 to US95

for

Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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CORRIDOR ANALYSIS DATA COLLECTION

This data collection plan provides details of existing data and sources, as well as additional data to be obtained, collection methods and assumptions. This data collection plan is tailored to the requirements for full corridor analysis and should only be used as reference for the above named corridor.

GEOMETRIC DATA

Required geometric data will be obtained from available construction drawings, field surveys, aerial photographs, geographical information system (GIS) files, and Google Earth / Streetview online tools. Data may include:

- Number and width of lanes
- Link length
- Vehicle storage length (turn bays)
- Lane add/drop/auxiliary location and length
- Ramp length
- Lane channelization
- Road Curvature

CONTROL DATA

The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
  - Speed Limits
  - Traffic Control
- Signal control data for intersections identified in Table 1 will be requested from the Nevada Freeway and Arterial System of Transportation (FAST) and local agencies, including but not limited to Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson.

DEMAND DATA

All traffic demand data and calibration data will be collected simultaneously. Demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data.
- AM and PM peak period turning movement counts at ramp terminals/intersections, and adjacent intersections on arterial cross-streets. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Peak period queue lengths at all Summerlin Parkway ramp terminal intersections in the study area.
- Tables 1 through 4 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figures 1a through 1c.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
Anasazi Dr	Summerlin Pkwy EB Ramps	6-May-15	City of Las Vegas
Anasazi Dr	Summerlin Pkwy WB Ramps	6-May-15	City of Las Vegas
Anasazi Dr	Thomas W Ryan Blvd	12-May-15	City of Las Vegas
Anasazi Dr	Banburry Cross Dr	7-Oct-15	City of Las Vegas
Town Center Dr	Summerlin Pkwy EB Ramps	12-Mar-13	City of Las Vegas
Town Center Dr	Summerlin Pkwy WB Ramps	14-Mar-13	City of Las Vegas
Rampart Blvd	Summerlin Pkwy EB Ramps	1-Mar-16	City of Las Vegas
Rampart Blvd	Summerlin Pkwy WB Ramps	2-Mar-16	City of Las Vegas
Rampart Blvd	Tournament Hills	10-Dec-14	City of Las Vegas
Rampart Blvd	Canyon Run Dr	5-May-16	City of Las Vegas
Durango Dr	Summerlin Pkwy EB Ramps	18-Jun-14	City of Las Vegas
Durango Dr	Washington Ave	24-Jul-14	City of Las Vegas
Durango Dr	Westcliff Dr	12-Nov-14	City of Las Vegas
Buffalo Dr	Summerlin Pkwy EB Ramps	5-Mar-13	City of Las Vegas
Buffalo Dr	Summerlin Pkwy WB Ramps	28-Feb-13	City of Las Vegas
Buffalo Dr	Washington Ave	9-Jan-13	City of Las Vegas
Buffalo Dr	Westcliff Dr	10-Jan-13	City of Las Vegas

DATA COLLECTION EFFORT	
Intersection Description	**ID**
CC-215 NB Ramps / Summerlin Pkwy	1.1
Town Center Dr / Covington Cross Dr	1.2
Durango Dr / Summerlin Pkwy WB Ramps	1.3
Summerlin Pkwy / US95 / Rainbow Blvd (SPUI)	1.4

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
US95 SB Off-Ramp to Summerlin Pkwy WB	30855	2014
US95 SB Off-Ramp to Rainbow Blvd	30856	2015
US95 SB On-Ramp from Summerlin Pkwy	30857	2015
US95 NB On-Ramp from Rainbow Blvd	30722	2015
US95 SB On-Ramp from Rainbow Blvd	30864	2015
US95 NB Off-Ramp to Summerlin Pkwy	30865	2013
US95 NB Off-Ramp to Rainbow Blvd	30853	2015

DATA COLLECTION EFFORT	
Ramp Description	**ID**
CC-215 NB Off-Ramp to Summerlin Pkwy WB	2.1
CC-215 NB Off-Ramp to Summerlin Pkwy EB	2.2
CC-215 NB On-Ramp from Summerlin Pkwy	2.3
CC-215 SB Off-Ramp to Summerlin Pkwy	2.4
CC-215 SB On-Ramp from Summerlin Pkwy	2.5
Summerlin Pkwy WB Off-Ramp to Anasazi Dr	2.6
Summerlin Pkwy WB On-Ramp from Anasazi Dr	2.7
Summerlin Pkwy EB Off-Ramp to Anasazi Dr	2.8
Summerlin Pkwy EB On-Ramp from Anasazi Dr	2.9
Summerlin Pkwy WB Off-Ramp to Town Center Dr	2.10
Summerlin Pkwy WB On-Ramp from Town Center Dr	2.11
Summerlin Pkwy EB Off-Ramp to Town Center Dr	2.12
Summerlin Pkwy EB On-Ramp from Town Center Dr	2.13
Summerlin Pkwy WB Off-Ramp to Rampart Blvd	2.14
Summerlin Pkwy WB On-Ramp from Rampart Blvd	2.15
Summerlin Pkwy EB Off-Ramp to Rampart Blvd	2.16
Summerlin Pkwy EB On-Ramp from Rampart Blvd	2.17
Summerlin Pkwy WB Off-Ramp to Durango Dr	2.18
Summerlin Pkwy EB On-Ramp from Durango Dr	2.19
Summerlin Pkwy WB Off-Ramp to Buffalo Dr	2.20
Summerlin Pkwy WB On-Ramp from Buffalo Dr NB	2.21
Summerlin Pkwy WB On-Ramp from Buffalo Dr SB	2.22
Summerlin Pkwy EB Off-Ramp to Buffalo Dr	2.23
Summerlin Pkwy EB On-Ramp from Buffalo Dr	2.24
Summerlin Pkwy EB Off-Ramp to Rainbow Blvd SB	2.25
Summerlin Pkwy EB Off-Ramp to Rainbow Blvd NB	2.26
Summerlin Pkwy EB Off-Ramp to US95 NB	2.27

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
Summerlin Pkwy Count Station Description	**Station ID**
.6 mi W of Buffalo Dr	31122
.2 mi E of Buffalo Dr	31123
btwn N Anasazi Dr and Towncenter Dr.	31453
btwn I-215 and N Anasazi Dr	31294
.1 mi W of Rampart Bl	30866

DATA COLLECTION EFFORT
NONE

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments
- Ramps, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Ramp tube count summaries (one per site).
- Turning movement count summaries (one per intersection for each time period).
- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).
- Manual queue length study including raw data sheets and a data summary prepared in Excel.

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
- Weave zone observation (location and length). On an as-needed basis for calibration.
- Lane usage at intersections (Mainline lane utilization will be identified from FAST data.)
- Spillback

Queue Length

- Manual observation by field personnel, or video collection.
- Duration of AM and PM peak periods as noted above.
- Maximum queue length behind stop line, measured as number of vehicles and collected by lane, collected in 2-minute intervals
- Inclusion of stopped vehicles and slow moving vehicles (<5mph) in queue lengths at the end of the queue.

Table 4. Ramp Queue Length Collection Requirements

DATA COLLECTION EFFORT	
Ramp Description	**ID**
Summerlin Pkwy EB Off-Ramp to Town Center Dr	3.1
Summerlin Pkwy WB Off-Ramp to Town Center Dr	3.2
Summerlin Pkwy EB Off-Ramp to Rampart Blvd	3.3
Summerlin Pkwy WB Off-Ramp to Rampart Blvd	3.4
Summerlin Pkwy EB Off-Ramp to Buffalo Dr	3.5
Summerlin Pkwy EB Off-Ramp to Rainbow Blvd	3.6

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation. Spot speed data to be obtained for off-peak periods at the locations shown in Figures 1a through 1c.

Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation. Field measured travel time runs to be collected for validation of FAST and INRIX data.

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1a. Data Collection Site Map West to East

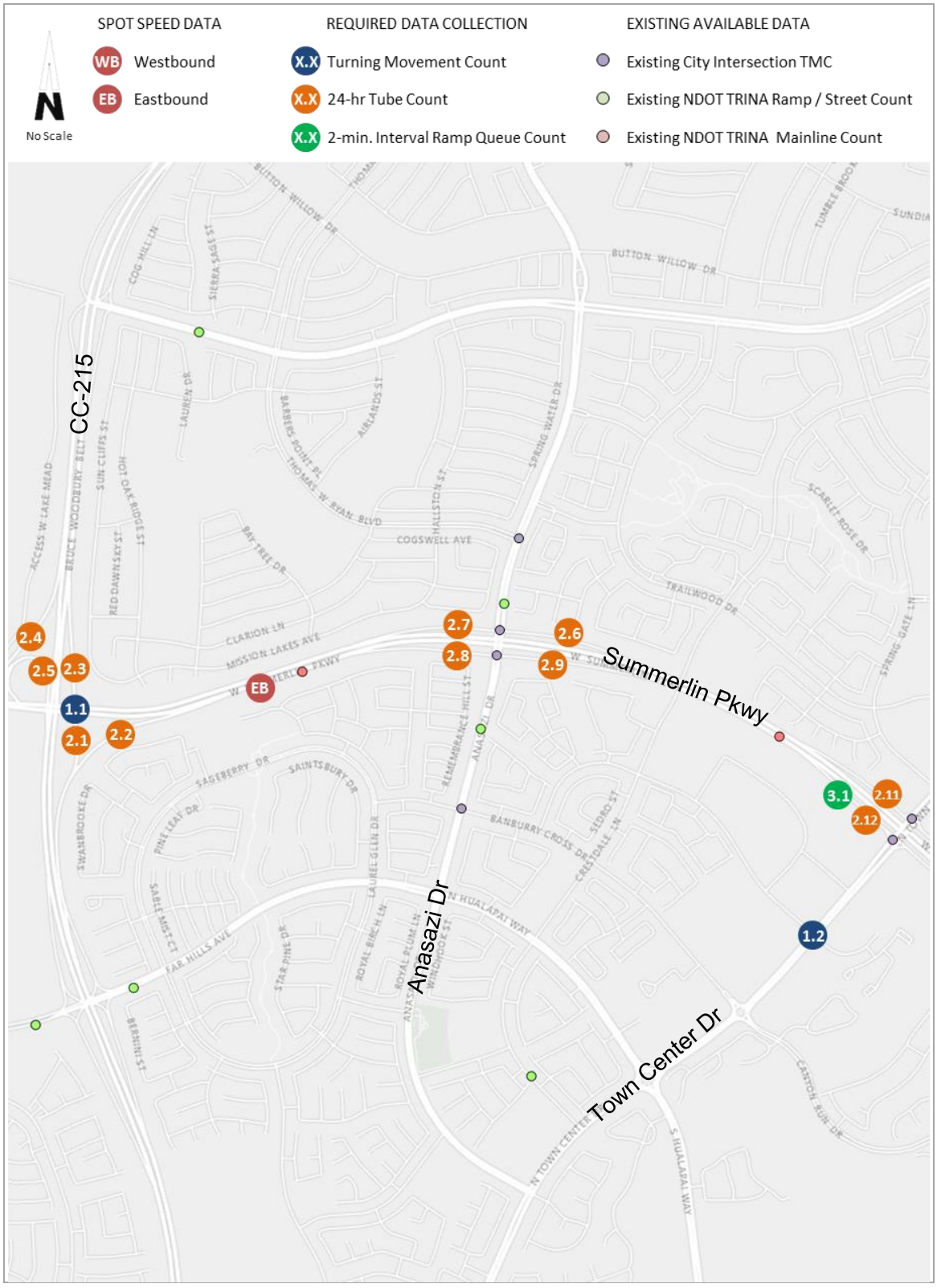


Figure 1b. Data Collection Site Map West to East

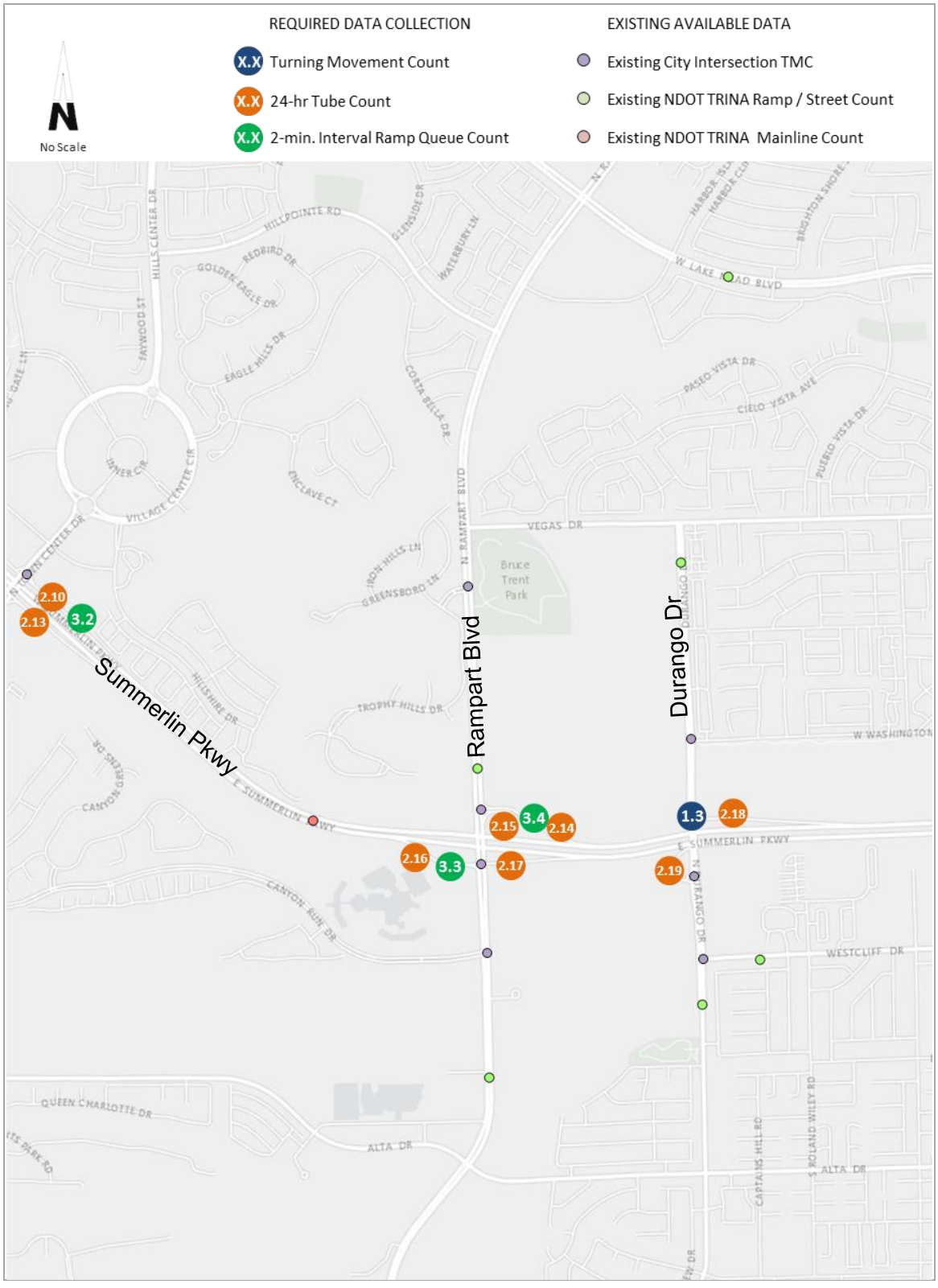
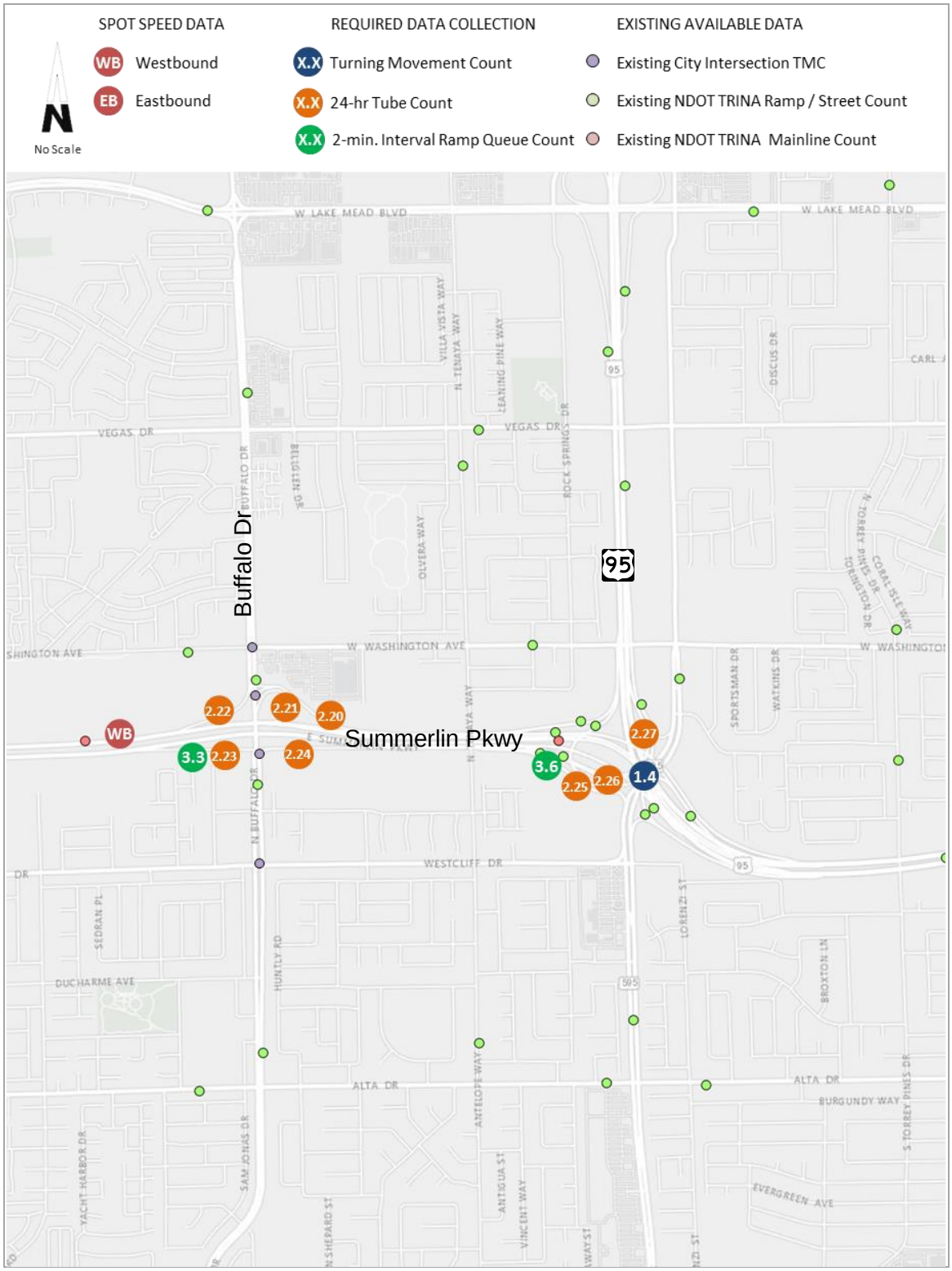


Figure 1c. Data Collection Site Map West to East



Data Collection Plan
US95 / CC-215 Interchange
for
Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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CORRIDOR ANALYSIS DATA COLLECTION

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GEOMETRIC DATA

Required geometric data will be obtained from available construction drawings, field surveys, aerial photographs, geographical information system (GIS) files, and Google Earth / Streetview online tools. Data may include:

- Number and width of lanes
- Link length
- Vehicle storage length (turn bays)
- Lane add/drop/auxiliary location and length
- Ramp length
- Lane channelization
- Road Curvature

CONTROL DATA

The following control data will be collected using Google Earth and Streetview online tools:

- Sign data (field review)
  - Speed Limits
  - Traffic Control
- Signal control data for intersections identified in Table 1 will be requested from the Nevada Freeway and Arterial System of Transportation (FAST) and local agencies, including but not limited to Clark County, City of Las Vegas, City of North Las Vegas, and City of Henderson.

DEMAND DATA

All traffic demand data and calibration data will be collected simultaneously. Demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST. Lane utilization factors will be developed from FAST data. Where additional data is required, 24-hour radar counts are to be obtained.
- AM and PM peak period turning movement counts at ramp terminals/intersections, and adjacent intersections on arterial cross-streets. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Peak period queue lengths at all ramp terminal intersections in the study area.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figure 1.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
None	None		

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Oso Blanca Rd / CC-215	1.1
Sky Pointe Dr / CC-215	1.2
Centennial Center Blvd / US95 SB Ramps	1.3
Sky Pointe Dr / US95 NB Ramps	1.4

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
US95 NB Off-Ramp to WB CC-215	31400	2013
US95 NB Off-Ramp to N Buffalo Dr	31401	2013
US95 NB On-Ramp from N Buffalo Dr	31402	2013
US95 SB Off-Ramp to Centennial Center Blvd	31403	2015
US95 SB On-Ramp from CC-215	30536	2013
US95 SB On-Ramp from Centennial Center Blvd	31404	2015

DATA COLLECTION EFFORT	
Ramp Description	**ID**
NONE	

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
US95 Count Station Description	**Station ID**
.4 mi N of the Rancho/Ann Intch 'Exit 86'	30720
US-95 0.8 mi S of the Durango Dr. Intch.	35320

DATA COLLECTION EFFORT	
CC-215, 1000ft east of Sky Pointe Dr	3.1
CC-215, 1500ft west of Oso Blanca Rd	3.2

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon or US95/C-215 interchange construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.
- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments
- Mainline, 24-hour counts: 12:00 AM to 12:00 AM (15-minute increments)

Deliverables

- Mainline radar count summaries (one per site).
- Turning movement count summaries (one per intersection for each time period).
- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).

CALIBRATION DATA

Field inspection

To be conducted in concurrence with the traffic counts data collection effort. Field inspections will include the following:

- Queue observation
- Weave zone observation (location and length). On an as-needed basis for calibration.
- Lane usage at intersections (Mainline lane utilization will be identified from FAST data.)
- Spillback

Queue Length

- Manual observation by field personnel, or video collection.
- Number of queued vehicles behind each stop line, collected by lane.

- Duration of AM and PM peak periods as noted above.
- Data collection at 2-minute intervals.
- Inclusion of stopped vehicles and slow moving vehicles (<5mph) in queue lengths at the end of the queue.

Speed Data

Mainline speed data is to be obtained from the FAST online database, where available. Further speed data may be obtained from INRIX on a case-by-case basis, dependent on validation. Spot speed data to be obtained for off-peak periods at the locations shown in Figure 1.

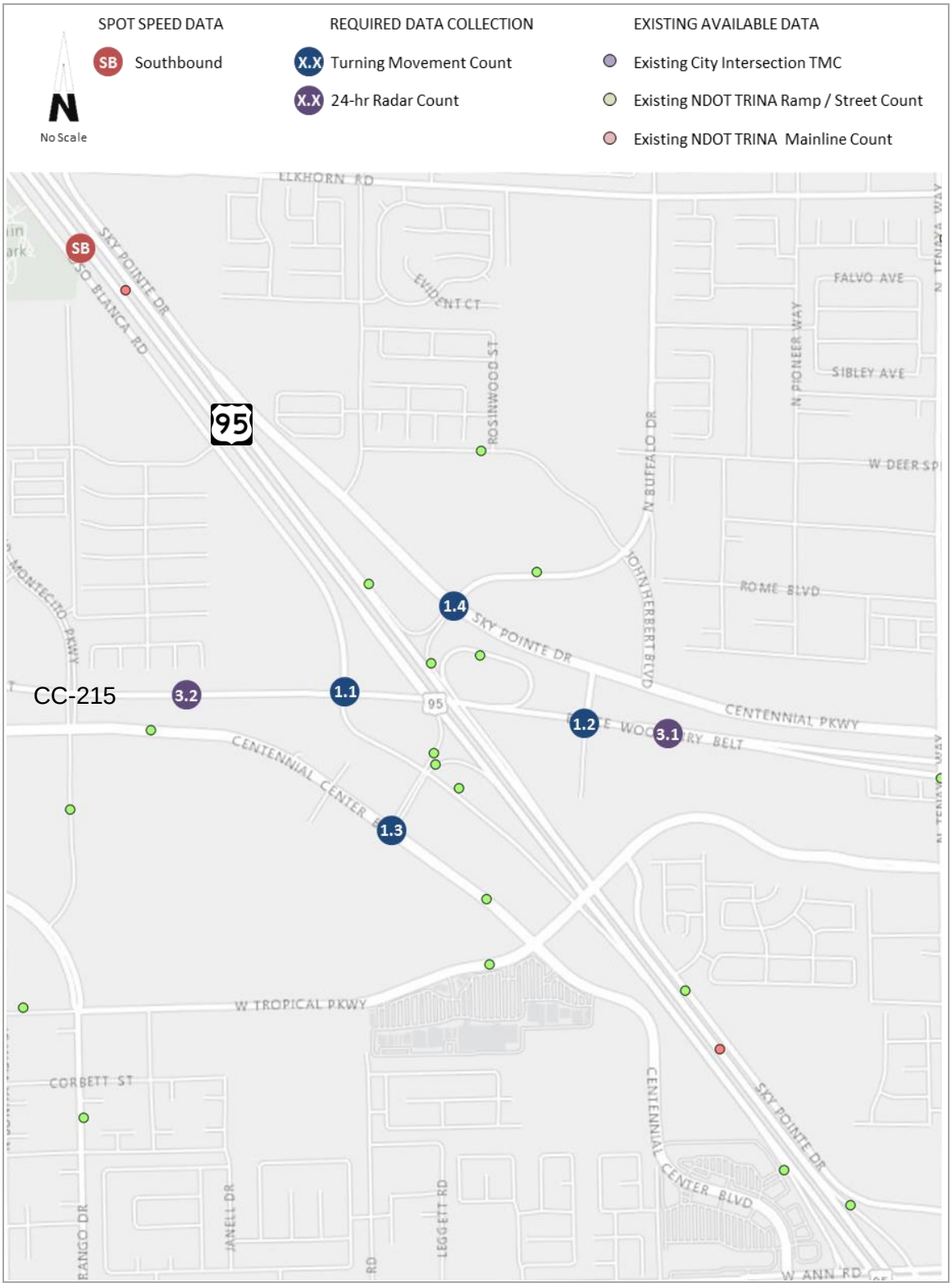
Travel Time Data

Travel time data is to be obtained from the FAST online database, where available. Further travel time data may be obtained from INRIX on a case-by-case basis, dependent on validation.

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors. Traffic count and calibration data will be reviewed for consistency and reasonableness.

Figure 1. Data Collection Site Map



Data Collection Plan
US95: CC-215 to I-15

for

Southern Nevada Traffic Study

Prepared for:

NEVADA DOT

Prepared by:

HDR

November 28, 2016

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DEMAND DATA

All traffic demand data at intersections will be collected in 15-minute increments during AM and PM peak periods. Peak periods will be determined from existing FAST data and approved by NDOT prior to data collection. Mainline and ramp demand data will be collected in 15-minute increments for 24-hour periods. The following demand data will be collected, at locations as identified within this collection plan:

- Turning Movements.
- Entry volumes (ramp and mainline counts).
- Mainline highway vehicle mix (light truck and heavy truck volume), available from NDOT.

TRAFFIC COUNTS

Assumptions and Data Needs

- Existing data to be used where identified as available. Only existing data newer than January 1st, 2013 to be used. 2013 has been identified as including significantly more data from existing sources than 2012, forming a natural cut-off for inclusion from existing sources.
- Ramp (or ramp connector) traffic volumes from NDOT TRINA. Where additional data is required, 24-hour tube counts are to be obtained.
- Mainline traffic volumes from NDOT TRINA and FAST.
- AM and PM peak period turning movement counts at ramp terminals/intersections. Limited data has been made available from the City of Las Vegas and the City of Henderson. When additional data is required, intersection turn movement counts are to be obtained.
- Tables 1 through 3 identify existing available data, and required data collection. Site maps of existing data availability and required data collection are provided in Figures 1a through 1d.

Table 1. Intersection TMC Data – Available Data / Collection Requirements

AVAILABLE DATA			
Cross-Street	**Ramps / Other**	**Date**	**Agency**
Ann Rd	US95 NB Ramps	3-Jun-15	City of Las Vegas
Ann Rd	US95 SB Ramps	4-Jun-15	City of Las Vegas
Ann Rd*	Tenaya Way	25-Mar-15	City of Las Vegas
Ann Rd*	Centennial Center Blvd	24-Sep-15	City of Las Vegas
Rainbow Blvd*	Rancho Dr	26-Jun-14	City of Las Vegas
Craig Rd	US95 NB Ramps	15-Jan-13	City of Las Vegas
Craig Rd	US95 SB Ramps	15-Jan-13	City of Las Vegas
Craig Rd*	Tenaya Way	22-Jan-14	City of Las Vegas
Cheyenne Ave	US95 NB Ramps	16-Jun-15	City of Las Vegas
Cheyenne Ave	US95 SB Ramps	17-Jun-15	City of Las Vegas
Cheyenne Ave*	Tenaya Way	10-Dec-13	City of Las Vegas
Rainbow Blvd*	Westcliff Dr	8-Sep-16	City of Las Vegas
Jones Blvd	US95 EB Ramps	25-Sep-13	City of Las Vegas
Jones Blvd	US95 WB Ramps	19-Sep-13	City of Las Vegas
Jones Blvd*	Washington Ave	5-Sep-13	City of Las Vegas
Jones Blvd*	Alta Dr	9-Jul-14	City of Las Vegas
Decatur Blvd	US95 EB Ramps	28-Oct-15	City of Las Vegas
Decatur Blvd	US95 WB Ramps	16-Apr-13	City of Las Vegas
Decatur Blvd*	Meadows Ln	29-May-14	City of Las Vegas
Valley View Blvd*	Meadows Mall Dr	6-Mar-13	City of Las Vegas
Valley View Blvd*	Bonanza Rd	17-Sep-13	City of Las Vegas
Rancho Dr	US95 Ramps (SPUI)	10-Sep-13	City of Las Vegas
Rancho Dr*	Bonanza Rd	18-Sep-13	City of Las Vegas

* Not required for HCS analysis, for information only

DATA COLLECTION EFFORT	
Intersection Description	**ID**
Lake Mead Blvd / Rock Springs Dr	1.1
Lake Mead Blvd / Rainbow Blvd	1.2
Valley View Blvd / US95 EB Ramps	1.3
Valley View Blvd / US95 WB Ramps	1.4

Table 2. 24-hour Ramp Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA		
Ramp Description	**Station ID**	**Year**
US95 SB Off-Ramp to Ann Rd	30196	2015
US95 SB On-Ramp from Ann Rd	30183	2015
US95 NB Off-Ramp to Ann Rd	30179	2015
US95 NB On-Ramp from Ann Rd	30184	2015
US95 SB Off-Ramp to Rancho Dr	30018	2015
US95 NB Off-Ramp to Rancho Dr	30177	2015
US95 NB On-Ramp from Rancho Dr	32285	2015
US95 SB Off-Ramp to Craig Rd	30877	2013
US95 SB On-Ramp from Craig Rd	30878	2015
US95 NB Off-Ramp to Craig Rd	30875	2015
US95 NB On-Ramp from Craig Rd	30876	2015
US95 SB Off-Ramp to Cheyenne Ave	30872	2015
US95 SB On-Ramp from Cheyenne Ave	30873	2015
US95 NB Off-Ramp to Cheyenne Ave	30874	2015
US95 NB On-Ramp from Cheyenne Ave	30871	2015
US95 NB On-Ramp from Rainbow Blvd (@ Lake Mead)	30921	2015
US95 NB Off-Ramp to Lake Mead Blvd EB	30917	2015
US95 NB Off-Ramp to Lake Mead Blvd WB	30920	2015
US95 SB Off-Ramp to Lake Mead Blvd	30922	2015
US95 SB On-Ramp from Lake Mead Blvd EB	30918	2015
US95 SB On-Ramp from Lake Mead Blvd WB	30919	2015
US95 WB Off-Ramp to Jones Blvd	30707	2015
US95 WB On-Ramp from Jones Blvd	30708	2015
US95 EB Off-Ramp to Jones Blvd	30709	2015
US95 EB On-Ramp from Jones Blvd	30710	2015
US95 WB Off-Ramp to Decatur Blvd	30451	2015
US95 WB On-Ramp from Decatur Blvd	30452	2015
US95 EB Off-Ramp to SB Decatur Blvd	31461	2015
US95 EB Off-Ramp to NB Decatur Blvd	30449	2015
US95 EB On-Ramp from Decatur Blvd	30450	2015
US95 WB Off-Ramp to Valley View Blvd	30700	2015

AVAILABLE TRINA DATA CONTINUED….		
Ramp Description	**Station ID**	**Year**
US95 WB On-Ramp from Valley View Blvd	30701	2015
US95 EB Off-Ramp to Valley View Blvd	30702	2015
US95 EB On-Ramp from Valley View Blvd	30703	2015
US95 WB Off-Ramp to Rancho Dr	30397	2015
US95 WB On-Ramp from Rancho Dr	30398	2015
US95 EB Off-Ramp to Rancho Dr	30399	2015
US95 EB and I-15 SB On-Ramp from Rancho Dr	31460	2015
US95 EB On-Ramp from Rancho Dr	30396	2015
US95 EB Off-Ramp to Martin Luther King Blvd	31048	2016
US95 WB On-Ramp from Martin Luther King Blvd	31001	2016

DATA COLLECTION EFFORT	
Ramp Description	**ID**
NONE	

Table 3. 24-hour Mainline Data – Available Data / Collection Requirements

AVAILABLE TRINA DATA	
US95 Count Station Description	**Station ID**
US-95 0.2 mi S of SR-596 (Jones Bl)	32220
.3 mi S of the Lake Mead Intch 'Exit 82A'	30718
500ft S of the Valley View Intch 'Exit 78'	30322
.4 mi N of the Rancho/Ann Intch 'Exit 86'	30720
100ft S of the Cheyenne Intch 'Exit 83'	30716
300ft S of Summerlin/Rainbow Intch 'Exit 81'	30719
.1 mi S of the Craig Intch 'Exit 85'	30715
.5 mi S of Lone Mountain Rd	30713
btwn the Decatur Intch 'Exit 79' and the Valley View Intch 'Exit 78'	30323

DATA COLLECTION EFFORT
NONE

General Requirements

- Traffic data will be collected when no construction activities, street, or lane closures are occurring at nearby locations. Where Project Neon construction activities render data collection unusable, NDOT will be consulted to determine an appropriate course of action.

- All data collection will be conducted on Tuesday, Wednesday, and Thursday and when school is in session, unless explicitly noted otherwise.
- All collected TMC data is to be classified by car / light vehicles, heavy vehicles, bicycles, and pedestrians

Time Periods

- Intersection TMC and queues, 3-hour AM Peak Period as approved by NDOT, 15-minute increments
- Intersection TMC and queues, 3-hour PM Peak Period as approved by NDOT, 15-minute increments

Deliverables

- Turning movement count summaries (one per intersection for each time period).
- Intersection configuration sheet per intersection (lane with numbers that match manual queue length observation sheets).

QUALITY ASSURANCE AND RECONCILIATION

Data collected will be reviewed and checked for errors.

Figure 1a. Data Collection Site Map North to South

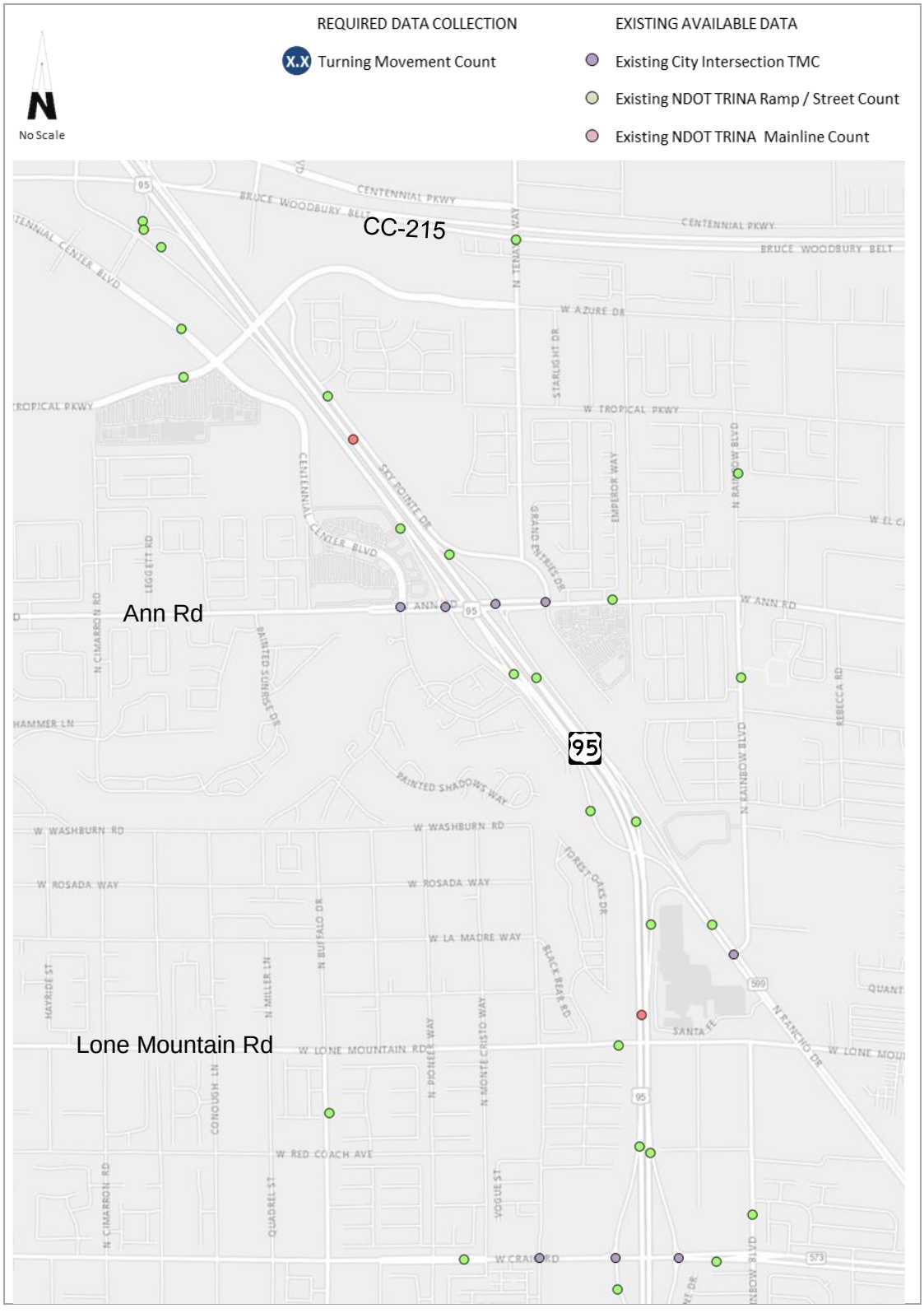

Figure 1b. Data Collection Site Map North to South

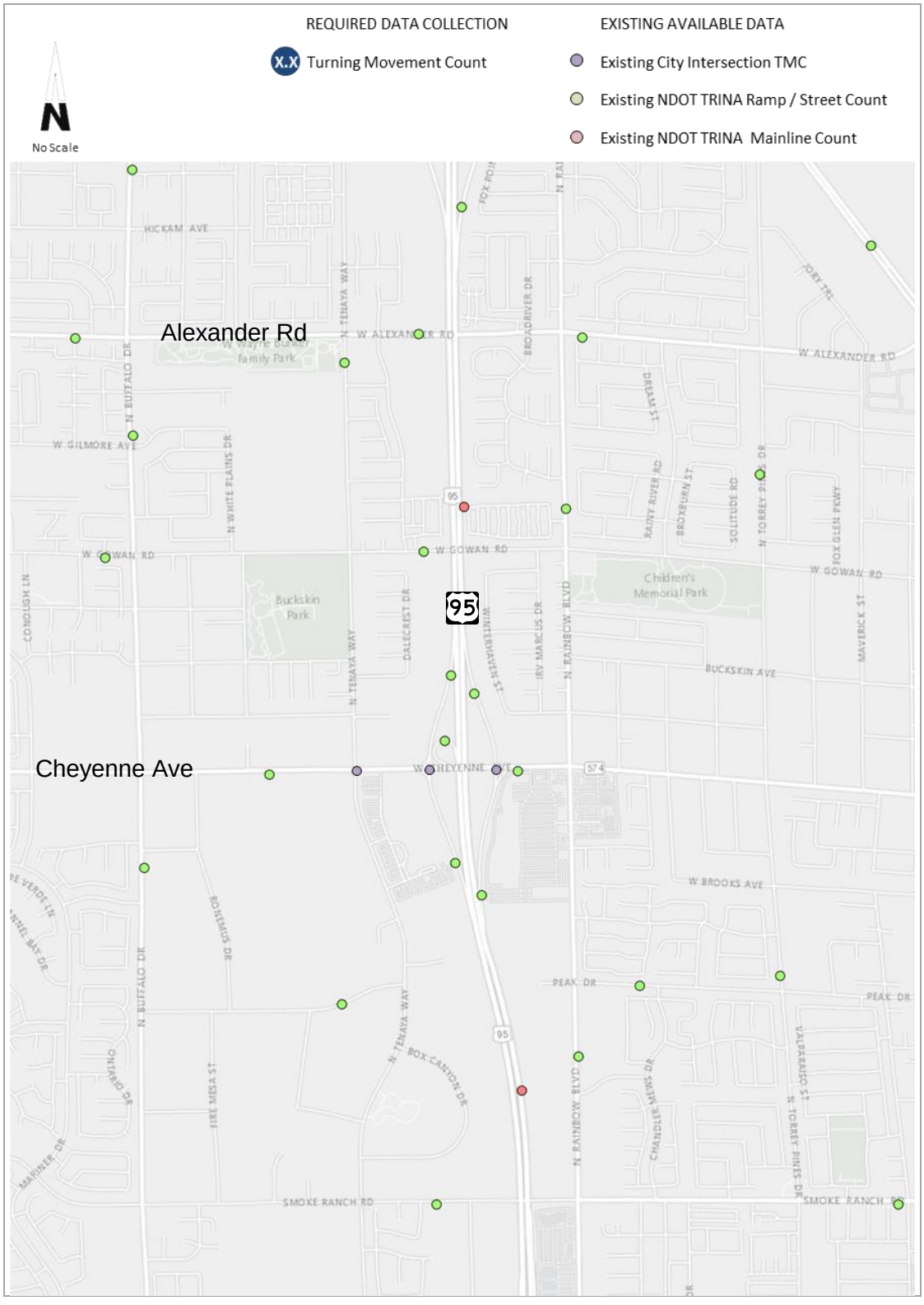

Figure 1c. Data Collection Site Map North to South

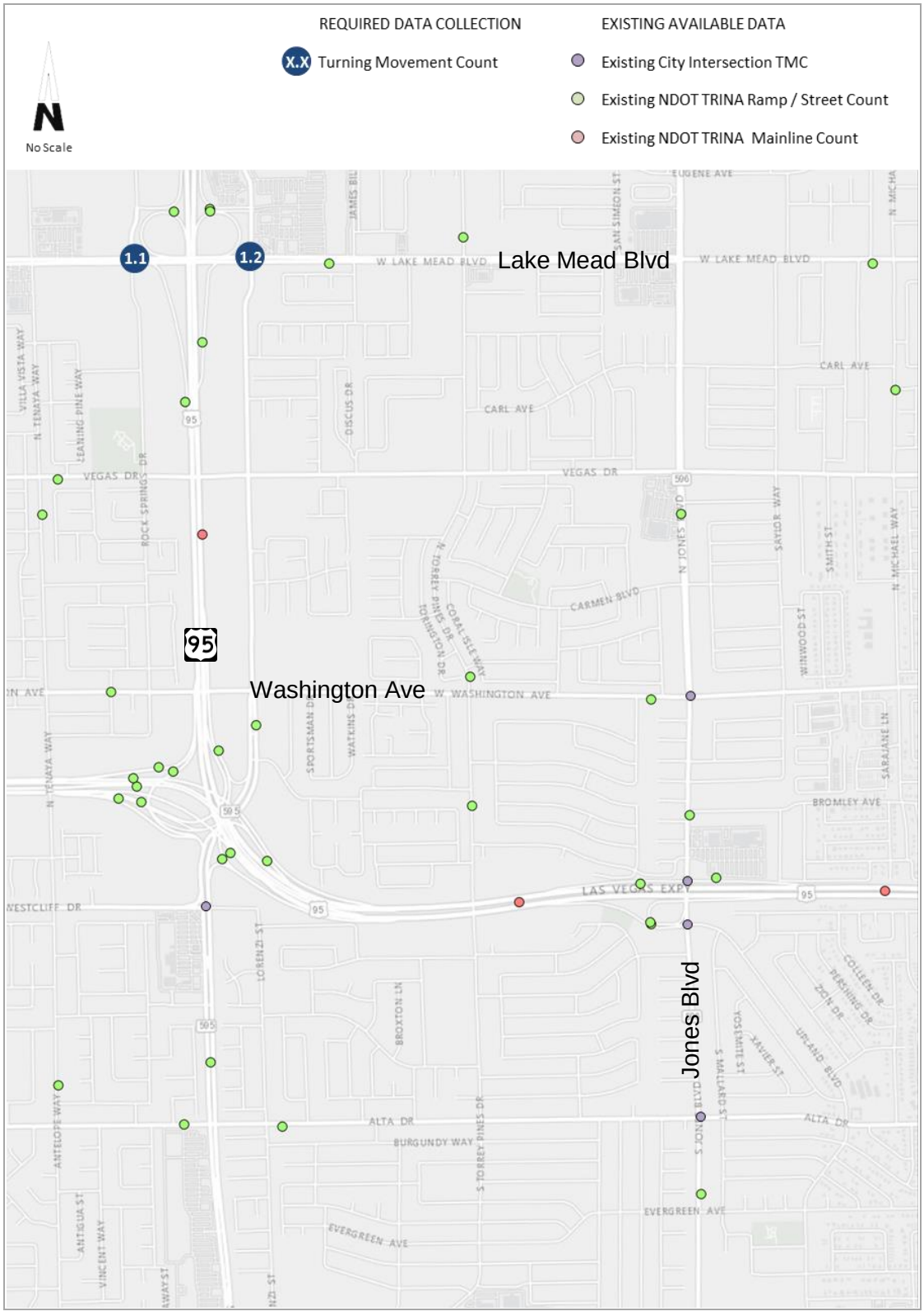

Figure 1d. Data Collection Site Map North to South