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REPORT

Town of Bon Accord

Transportation Master Plan

OCTOBER 2019

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1 INTRODUCTION

Associated Engineering is pleased to have completed a Transportation Master Plan (TMP) for the Town of Bon Accord. The TMP is a strategic document that is intended to serve as a guide for how the Town should address its current and future transportation needs for the next few decades. Transportation not only includes the movement of private vehicles but also considers transit, cyclists, and pedestrians.

Bon Accord is a town of approximately 1600 people situated northeast of the City of Edmonton in Sturgeon County. The primary mode of transportation for the Town's residents is by vehicle, either to get around the Town or to access destinations outside of Bon Accord. Some residents also choose to walk or cycle within the Town. Due to its small size, there are currently no public transit options within the Town, though there are school bus routes that serve the two schools. Due to its south boundary being along Highway 28, there is a fair amount of regional traffic that passes by Bon Accord.

Based on these and other factors, the project team proceeded to develop the TMP in the following stages:

- Reference to and review of existing policies and data
- Consideration of proposed land use concepts, future development plans and the annexed area
- Consultation with the Town of Bon Accord and Alberta Transportation
- Establishment of a proposed future network to support efficient vehicle movements within the Town, with consideration given to accommodating cyclists and pedestrians

2 BACKGROUND

2.1 Municipal Development Plan

The Town of Bon Accord has a draft Municipal Development Plan (MDP) that was completed in 2016. AE has reviewed the MDP for any relevant information applicable to the development of this TMP.

In terms of demographics, the plan states that middle aged residents make up the largest portion of the population. Young people between the ages of 20 to 24 are leaving for work or education, but the age 25 to 34 group is returning, likely in association with employment opportunities at Canadian Forces Base Edmonton or nearby industrial sites. It estimates that only 11% of its residents work within the Town, while at least 64% work within Sturgeon County. Nearly 85% of residents travel to work by private vehicle either as a primary driver or as a passenger.

The Town's philosophical principles are described as follows:

Principle #1: Land uses and development activities must respect and maintain the integrity of the Town's land base.

Principle #2: Growth must be managed and directed in a compatible, equitable manner that recognizes the diverse needs and aspirations of all Town residents and businesses.

Principle #3: Smart growth principles will be applied in maintaining the integrity of the land base and to promote sustainable development such that the needs of the present generation are met without compromising the ability of future generations to meet their own needs.

AE has completed the TMP keeping these principles in mind, especially the consideration for future development and generations. The Town's MDP also contains several objectives relevant to future development and active transportation within the Town, which are described in **Figure 2-1** below.

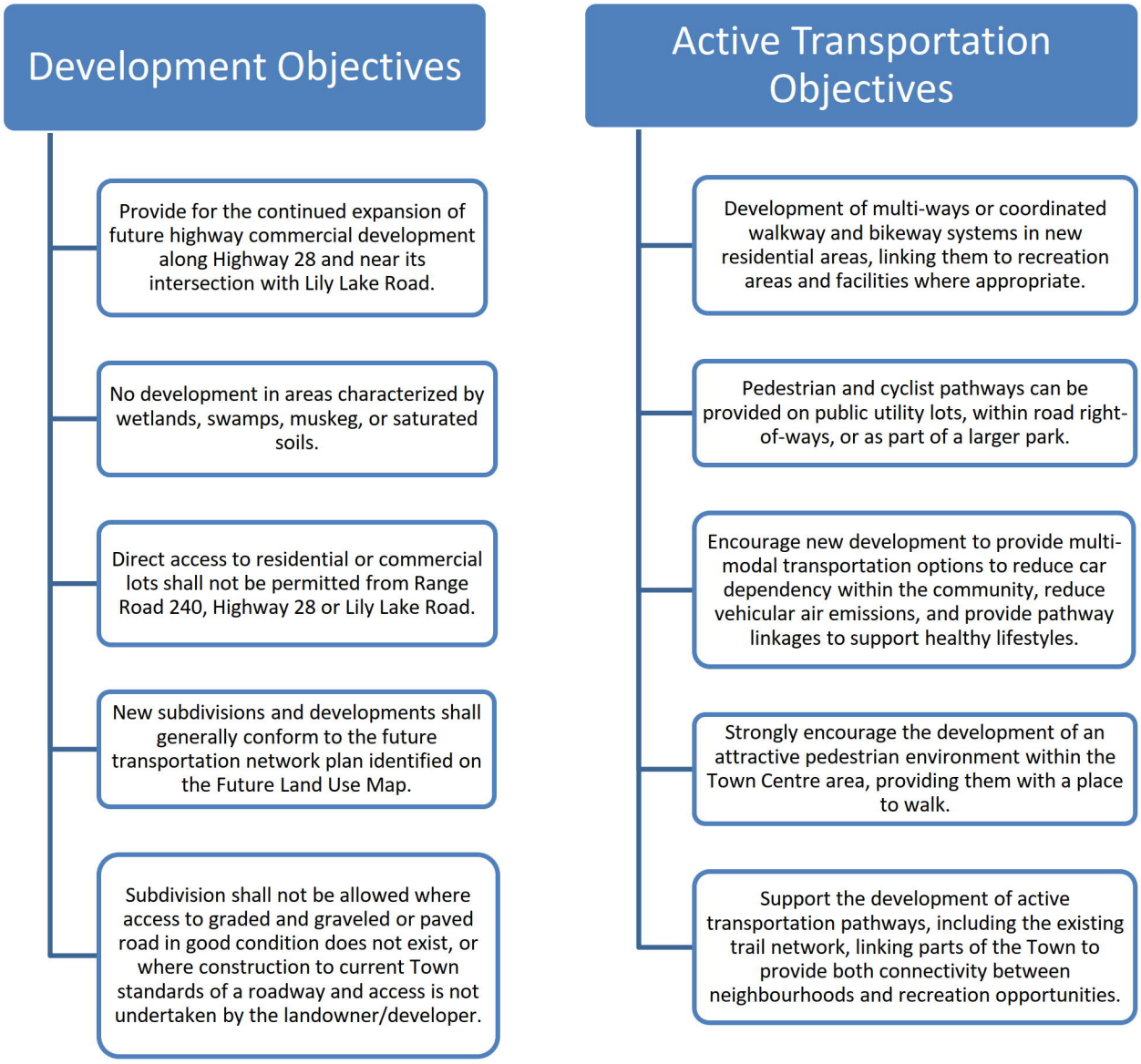


Figure 2-1 Development and Active Transportation Objectives

Based on the above objectives, two main conclusions are evident:

- Having a transportation network plan in place that supports further commercial development along Highway 28 is important to the Town, and;
- Providing pedestrian and cyclist pathways should be part of the Transportation Master Plan in support of the Town's desire to encourage active and healthy living.

2.2 Gateway Plan

The Town's Gateway Plan was completed in January 2012 with the intention of capturing the Town's ambitions for the future growth and development of Town lands within the Highway 28 corridor. It is considered a supplement to the Municipal Development Plan.

Along Highway 28 from the west, the Town's public works headquarters are adjacent to the highway, followed by the Bon Accord Community School and a major node of commercial development. East of 50 Street is a trucking and excavating business. The Gateway Plan calls for more commercial development along Highway 28 with a high level of architectural detail and landscaping. The protected wetland adjacent to Highway 28 would have a trail system, which would be connected to residential subdivisions. The design concept also incorporates a sidewalk along the northern boundary of 47 Avenue, wide enough to accommodate both pedestrian and bicycle traffic. The sidewalk should connect to existing trails east and west of the commercial area.

Within the design concept are two nodes of commercial development: the existing commercial strip between 51 and 50 Streets which is nearly fully developed, and the area in the northwest quadrant of the intersection of Highway 28 and Lily Lake Road.

2.3 Traffic Bylaw

The project team reviewed the Town's Traffic Bylaw. Items relevant to this study include:

- No vehicle over 4800 kg gross vehicle weight shall be operated on any highway except 47 Avenue between 50 Street and 51 Street, except when going to or returning from a residence or place of business when making a delivery or a pick-up.
- No person shall operate or permit a vehicle to be operated in the Municipality where that vehicle contains Dangerous Goods, unless that vehicle is being operated for the loading or unloading of Dangerous Goods within the Municipality or is being operated on the most direct and practicable route through the Municipality. The designated Dangerous Goods Parking area is on the south side of the service road 47 Avenue between 50 and 51 Street, for a maximum of 4 hours.
- Speed limits are as follows:
    - Shall be 40 km/h within the Town or as otherwise posted or listed below
    - School zones shall be 30 km/h in the school block only
    - Playground zones shall be 30 km/h between playground signs
    - Laneways shall be 20 km/h
    - Bon Acres Crescent shall be 20 km/h
    - 48 Avenue between 50 and 51 Streets shall be 20 km/h
    - Portions of 48 Avenue between the speed limit signs shall be 20 km/h

2.4 Observatory Park

Due to its designation as an International Dark Sky Community, an idea was brought forward to establish an Observatory Park within the Town. This project would renew facilities in the Town and would add entirely new program areas, creating a potential draw for tourism, private sector development and profile to the community. Based on our discussions with the Town it is understood that this project is put on hold indefinitely. A draft Business Plan completed in November 2014 did not identify a specific desired location for the park, stating that land acquisition of a preferred site should take place upon determining feasibility, funding, and developer and builder interest.

2.5 Streets Inventory and Pavement Condition

An assessment of the Town's existing road network was completed in 2011. The assessment included a road network inventory for the community, visual condition rating for each road section and recommendation for prioritized rehabilitation of the streets network. Estimates were provided to upgrade the gravel roads. They were based on an 8 m wide cross section for paved rural roads and a 9 m wide cross-section for the urban cross sections. The best first scenario for upgrading is shown in Table 2-1.

Table 2-1 Streets Upgrading Scenario

Year	Road	From	To	Width	Class
1	54 Avenue	51 Street	School	6.6	Arterial
2	55 Street	52 Avenue	South cul de sac	10.4	Local
3	48A Avenue / 52 Street	51 Street	51 Avenue	6	Local
4	51 Avenue	56 Street	52 Street	6.6	Arterial
5	51 Street	51 Avenue	54 Avenue	6.5	Arterial

2.6 Meadows of Bon Accord Servicing Study

In September 2007 a Servicing Study was completed to identify sanitary, storm and water servicing requirements for the proposed residential development in SE-18-56-23-4 as per Figure 2-2.

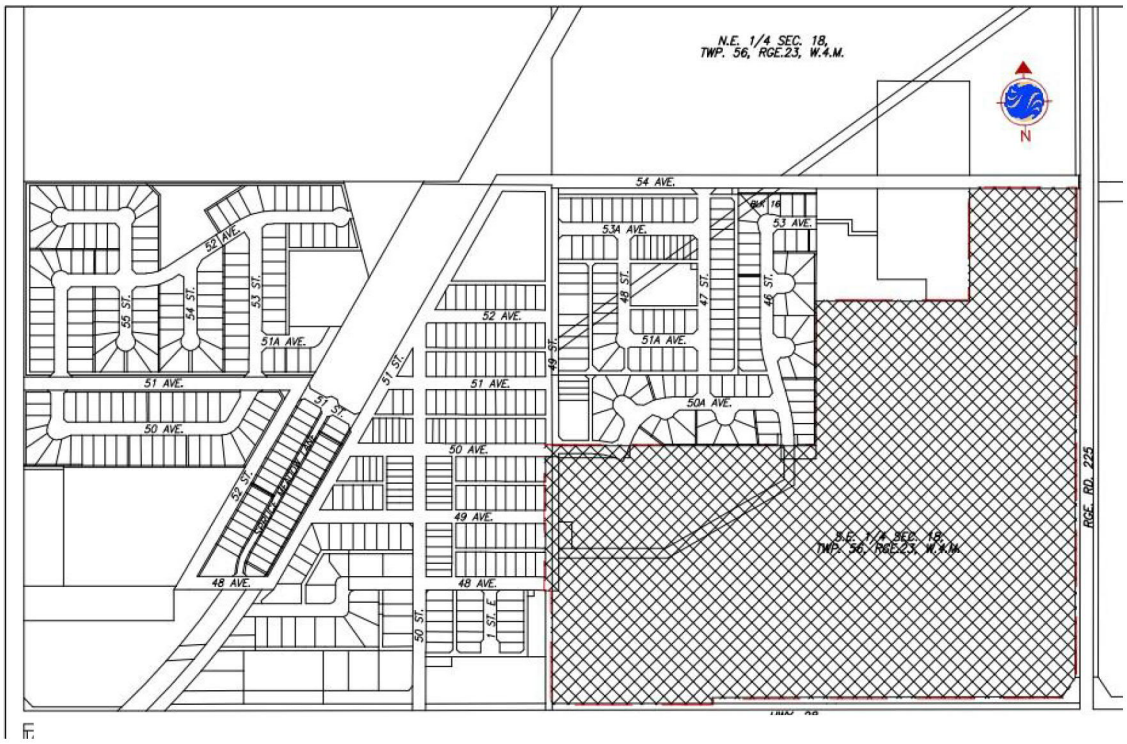


Figure 2-2 Proposed development in SE-18-56-23-4

This study mostly pertains to the servicing and stormwater aspects of the Master Plan; however, it is valuable to know about the topography and future land use when evaluating the future transportation network. In this area, most storm runoff drains to the protected wetland in the southwest corner. The remaining area on the east side of the school boundary drains to an existing wetland on the northeast corner of SE-18-56-23-4.

The proposed future land use is mainly residential, providing homes for an estimated population of 1420. The homes will mostly be single-family dwellings with multi-family sites in the southwest and northeast corners of the study area. The proposed land use does not show the commercial properties along Highway 28 proposed in the Gateway Plan or the 2016 Servicing Study. The latest land use plans will be referred to for purposes of this TMP development.

2.7 Land Use

There are not many major employment hubs within the Town, other than the two schools and a few small commercial/industrial businesses. As mentioned in the MDP, most residents commute to their place of work outside of the Town, likely in Edmonton or Fort Saskatchewan. It is understood that the Town is home to many military families, due to its proximity to the Canadian Forces Base (CFB) Edmonton.

The current land area for the Town is 2.11 km^2, made up of primarily residential development with some commercial/industrial areas near the highway and a few parks. The annexation would expand the Town's lands to 4.05 km^2. A breakdown of the proposed land use plan for the annexed lands is shown in **Table 2-2**.

Table 2-2 Composition of Annexed Lands

Land Use	Area (ha)	% of Gross Developable Area
Commercial	27.6	15.0%
Park/School	5.52	3.00%
Stormwater Management Facility	2.50	1.36%
Collector Roads	13.6	7.40%
Residential Area	116	63.0%

The municipal reserve is a requirement of the Municipal Development Plan, which ensures all gross developable areas in the Town maintain a minimum of 10% of the area as municipal reserve.

The Edmonton Metropolitan Region Board (EMRB) published "Re-imagine. Plan. Build. Edmonton Metropolitan Region Growth Plan" in 2017. In this document, the EMRB projects that the Town will have a population ranging from 2,700 to 3,300 by the year 2044. This results in an average annual growth rate of 2.1% - 2.8% per year.

Based on discussions with the Town on March 22, 2019, the Town proposed an annual growth rate of 0.5% to 1.0%; therefore, Associated Engineering's analyses used 1.0%. Using this growth rate and the 2016 population, a population of 1,575 is established for 2019, expected to grow to 2,020 by 2044. As the 2016 population was 1529, this is a significant increase.

According to the 2017 Alberta Municipal Affairs data, the Town of Bon Accord currently maintains 15.58 km of open road. Significantly more roadways would be required to accommodate such a population increase. To move all the additional traffic associated with the anticipated future development safely and efficiently, proper planning for the transportation network will be very important.

2.8 Highway 28 Future Expansion

According to the correspondence dated May 2, 2016, between Alberta Transportation (AT) and Ms. Vicki Zinyk (previous Chief Administrative Officer (CAO) of the Town), the Department is protecting Highway 28 to a future multi-lane highway. This will require the future twinning of Highway 28 with access limited to public road intersections with 1.6 km spacing. AT states that the majority of widening through the Town will likely be to the south of the existing alignment, except some minor widening to the north to ensure a rural cross-section is maintained west of Rge Rd 240. This will require a 30 m width north of the existing Highway 28 centreline to maintain a rural cross-section adjacent to the recently annexed area.

Any future development of the annexed lands which requires improvement to the existing fronting service road needs to ensure that proper separation is provided between the fronting service road and the existing highway centreline. The typical separation is 45 m between centrelines. However, this may increase at the connection to local roads, depending on the length of the design vehicle, to allow sufficient storage room for the design vehicle on the minor road without blocking the service road access.

The timelines and priority of the expansion of Highway 28 are unknown. It is understood that these concerns can be dealt with at each stage of the planning process (as directed by AT), so this information has been included within this TMP for information and knowledge capture only.

3 EXISTING TRANSPORTATION NETWORK

3.1 Roadways

The road network in and adjacent to Bon Accord is made of up the following road types: highways, arterials, collectors, and local roads. Highways generally serve traffic of an inter-regional and inter-municipal nature. The main consideration for arterials is traffic movement, providing a connection between highways and collector roads. Collector roads provide neighbourhood travel between local and arterial streets; traffic movement and land access are of equal importance. The main function of local roads is to provide direct access to adjacent lands, with traffic movement being of secondary importance. For purposes of the TMP, the main consideration will be given to arterial and collector roadways, as the layout of the future local roads will be established along with development plans.

Bon Accord is situated approximately 25 km northeast of Edmonton along Highway 28, a two-lane undivided Level 3 highway. Level 3 is a service classification designated by Alberta Transportation which is typically given to highways that carry traffic from major generators such as communities but with overall shorter travel distances. In this case the highway carries regional pass-by traffic and is the main commuting route for many residents of Bon Accord.

Via Highway 28, traffic can proceed to Gibbons, Redwater, or other counties to the north/east. Going west on Highway 28 past Bon Accord will lead to Edmonton, St. Albert, Morinville, or other communities. Sturgeon Valley Vista Estates, a nearby group of acreages, is accessible south of Bon Accord via Rge Rd 240; this road also continues directly to Highway 37. Rge Rd 240 appears to have been recently paved, leading us to conclude that it would be more favourable to traffic. There is not a lot of development north of Bon Accord, except the Town of Legal and individual farming properties.

During the development of the TMP, consideration has been given to the existing road network and current access points. There are four ways to access Bon Accord from Highway 28. 57 Street (Rge Rd 240) provides entrance from the west. 51 and 50 Streets lead into the heart of the Town. Lily Lake Road (Rge Rd 235) provides access to the Town from the east (though the bulk of the Town's development can be more directly accessed from 51 and 50 Streets). There is also a road going south off Highway 28 east of 50 Street that leads to the Town's sanitary lagoon.

The east/west collector immediately north of Highway 28 provides access to the highway for two residents via 57 Street. It is understood that access to these two properties must be maintained during the development of the future network.

3.2 Traffic Volumes

Regional traffic passing by Bon Accord may be going to/from the Town of Gibbons, about 6 km to the east, or to/from another community to the northeast like Redwater or Waskatenau. This regional traffic could be people in nearby municipalities working in Edmonton or Fort Saskatchewan. There is also a community 3 km south of Bon Accord, Sturgeon Valley Vista Estates; the residents of this community may send their children to school in Bon Accord. For the residents commuting to/from the Town daily, there is not much development north of Bon Accord other than farm residences and it would be expected that most traffic would head onto Highway 28 to either connect to 28A or Highway 803 depending on their destination.

No traffic volume information was available within the Town, so data from Alberta Transportation was relied upon for purposes of gaining an idea of traffic near the Town. This data is included in Appendix A. AT has historical traffic data along the segment of Highway 28 that runs adjacent to Bon Accord. This data covers the past 10 years, showing an

average annual daily traffic (AADT) count of 5745 in 2008 growing to 6305 in 2017. This is the average of the four segments where traffic volume data has been collected. The average historical growth rate amounts to 1.09% from 2008 to 2017. This is just over half the growth rate used in the annexation study for population growth.

Highway 28 saw a two-way AADT ranging from 5700 – 6940 adjacent to Bon Accord in 2018. Turning movement counts are available for the intersections of Highway 28 / 57 Street (Rge Rd 240) and Highway 28 / Lily Lake Road (Rge Rd 235), described in further detail in the subsequent sections.

3.2.1 Highway 28 / 57 Street (Rge Rd 240)

This intersection is immediately southwest of Bon Accord community school and southeast of the Town's Public Works Yard. It provides access to the west side of Bon Accord, though it is not the main access.

A comparison of historical traffic volume data from the past six years is shown in Table 3-1, in terms of average annual daily traffic for each turning movement. The traffic entering/exiting Bon Accord is highlighted in red.

Table 3-1 Highway 28 & 57 Street Historical Daily Volumes

	2013 AADT	2014 AADT	2015 AADT	2016 AADT	2017 AADT	2018 AADT	Peak (Year)
East to North	200	210	220	220	230	210	230 (2017)
East Through	2880	2950	3000	2950	2590	2590	3000 (2015)
East to South	40	40	40	40	50	50	50 (2018)
North to West	40	40	40	40	50	50	50 (2018)
North Through	110	110	110	110	150	150	150 (2018)
North to East	370	370	360	350	670	710	710 (2018)
West to South	370	370	360	350	670	710	710 (2018)
West Through	2880	2950	3000	2950	2590	2590	3000 (2015)
West to North	80	80	80	80	150	170	170 (2018)
South to East	80	80	80	80	150	170	170 (2018)
South Through	110	110	110	110	140	140	140 (2018)
South to West	200	210	220	220	230	210	230 (2017)

In general, eastbound and westbound through traffic has decreased by approximately 10% from 2013 to 2018. However, movements into and out of Bon Accord increased. The greatest increase was in the west to north right movement by 113%. There was a large jump in most values from 2016 to 2017, which likely corresponds with the year that Alberta Transportation completed another physical count at the location.

A comparison of historical traffic volume data for the AM and PM peaks of the past six years is shown in Table 3-2. AM peak refers to the busiest hour in the morning, most often when people are going to work in the morning. PM

peak refers to the busiest hour in the afternoon, most often when people are coming home from work in the evening. The traffic entering/exiting Bon Accord is highlighted in red.

Table 3-2 Highway 28 & 57 Street Historical Peak Volumes

	2013 AM (PM) Peak Volumes	2014 AM (PM) Peak Volumes	2015 AM (PM) Peak Volumes	2016 AM (PM) Peak Volumes	2017 AM (PM) Peak Volumes	2018 AM (PM) Peak Volumes
East to North	11 (47)	11 (48)	12 (50)	11 (50)	25 (25)	26 (25)
East Through	252 (371)	256 (378)	269 (397)	265 (390)	220 (256)	223 (261)
East to South	0 (5)	0 (5)	0 (5)	0 (5)	8 (2)	9 (0.7)
North to West	5 (6)	5 (6)	5 (7)	5 (6)	2 (2)	2 (2)
North Through	4 (21)	4 (22)	4 (23)	4 (22)	12 (21)	13 (21)
North to East	27 (66)	28 (67)	29 (70)	28 (69)	49 (91)	50 (93)
West to South	16 (26)	16 (26)	17 (28)	17 (27)	125 (64)	127 (65)
West Through	395 (244)	401 (248)	419 (260)	415 (256)	277 (321)	282 (327)
West to North	9 (3)	9 (3)	10 (3)	9 (3)	46 (10)	46 (10)
South to East	9 (0)	9 (0)	10 (0)	9 (0)	32 (7)	33 (7)
South Through	2 (3)	2 (3)	2 (3)	2 (3)	30 (10)	31 (10)
South to West	25 (15)	25 (16)	26 (16)	26 (16)	48 (19)	50 (19)

The eastbound AM through traffic has decreased by approximately 12% and westbound AM through traffic has decreased by approximately 29% from 2013 to 2018. However, AM movements into and out of Bon Accord have increased from 2013 to 2018. Most notably, the west to north right increased by 411%, the south to east left increased by 267%, and the south through volume increased by 1450%. This large increase could be associated with the time that Range Road 240 was paved, so drivers began choosing to go directly south instead of west on Highway 28 to get to the same destination. PM peak counts from 2013 – 2018 show an overall decrease in all movements coming from the west. However, all movements coming from the east have increased. West to south and west to north volumes show the greatest increases at 150% and 233%, respectively.

A comparison of the AADT, peak hour volumes, and corresponding percentage of total approach volumes at the intersection is shown in Table 3-3. The traffic entering/exiting Bon Accord is highlighted in red.

Table 3-3 Highway 28 & 57 Street Approach Volumes

	2018 AADT	% of Approach Volume	2018 AM Peak Volumes	% of Approach Volume	2018 PM Peak Volumes	% of Approach Volume
East to North	210	7.40	26	10.0	25	8.70
East Through	2590	90.9	223	86.5	261	90.6
East to South	50	17.5	9	3.50	0.7	2.00
North to West	50	5.50	2	3.00	2	2.00
North Through	150	16.5	13	20.0	21	18.0
North to East	710	78.0	50	77.0	93	80
West to South	710	20.5	127	28.0	65	16.2
West Through	2590	74.6	282	62.0	327	81.3
West to North	170	4.90	46	10.0	10	2.5
South to East	170	32.7	33	29.0	7	19
South Through	140	26.9	31	27.0	10	28
South to West	210	40.4	50	44.0	19	53

91% of the traffic coming from the west continues straight through, and 75% of the traffic coming from the east heads through the intersection. A large portion of traffic is exiting Bon Accord in the morning to go west. However, a fair amount (27%) are going straight south. This might be residents of Sturgeon Valley Vista Estates that have dropped their children off at school, or residents of Bon Accord heading to work in Edmonton or Fort Saskatchewan. Coming from the south in the morning, most traffic turns right, which could be residents of that same community going to Lilian Schick School, elsewhere in Bon Accord or Gibbons.

3.2.2 Highway 28 / Lily Lake Road (Range Road 235)

This intersection is at the east limits of the Town. The area immediately northwest of the intersection is undeveloped. A comparison of historical traffic volume data for the past six years is shown in Table 3-4, in terms of AADT for each turning movement. The traffic entering/exiting Bon Accord is highlighted in red.

Table 3-4 Highway 28 & Lily Lake Road Historical Daily Volumes

	2013 AADT	2014 AADT	2015 AADT	2016 AADT	2017 AADT	2018 AADT
East to North	320	330	330	430	430	440
East Through	2920	2980	3000	2750	2770	2820
East to South	20	20	20	20	20	20
North to West	20	20	20	20	20	20
North Through	10	10	10	10	10	10
North to East	30	30	30	30	30	30
West to South	30	30	30	30	30	30
West Through	2920	2980	3000	2750	2770	2820
West to North	350	350	340	310	310	340
South to East	350	350	340	310	310	340
South Through	10	10	10	10	10	10
South to West	320	330	330	430	430	440

There is minimal traffic using the south leg of this intersection. Westbound and eastbound through traffic have decreased slightly from 2013-2018. East to north left and south to west right movements have increased approximately 38%. This may be associated with population growth of the Town and students attending Lilian Schick School.

A comparison of historical traffic volume data for the AM and PM peaks of the past six years is shown in Table 3-5. The traffic entering/exiting Bon Accord is highlighted in red.

Table 3-5 Highway 28 & Lily Lake Road Historical Peak Volumes

	2013 AM (PM) Peak Volumes	2014 AM (PM) Peak Volumes	2015 AM (PM) Peak Volumes	2016 AM (PM) Peak Volumes	2017 AM (PM) Peak Volumes	2018 AM (PM) Peak Volumes
East to North	18 (57)	19 (58)	19 (61)	39 (45)	39 (45)	39 (46)
East Through	398 (341)	405 (347)	421 (359)	288 (268)	289 (269)	296 (274)
East to South	4 (6)	4 (6)	4 (7)	2 (2)	2 (2)	2 (2)
North to West	2 (3)	2 (3)	2 (3)	4 (0)	4 (0)	4 (0)
North Through	0 (0)	0 (0)	0 (0)	2 (1)	2 (1)	2 (1)
North to East	2 (3)	2 (3)	2 (3)	6 (2)	6 (2)	6 (2)
West to South	0 (8)	0 (8)	0 (9)	2 (2)	2 (2)	2 (2)
West Through	226 (261)	230 (265)	240 (275)	283 (367)	284 (368)	289 (374)
West to North	26 (43)	27 (43)	28 (45)	60 (47)	60 (47)	61 (48)
South to East	47 (47)	48 (48)	49 (49)	96 (22)	96 (22)	96 (22)
South Through	0 (2)	0 (2)	0 (2)	0 (1)	0 (1)	0 (1)
South to West	37 (21)	37 (21)	39 (22)	91 (23)	91 (23)	94 (24)

The east to north left and west to north right AM peak movements have increased from 2013 – 2018 by 117% and 135%, respectively. The west through movements have increased slightly by 28%, but the east through movements have decreased by approximately 26%. Most movements have decreased during the PM peak hour at this intersection. Increases were seen in the west through at 43%, the west to north right at 12%, and the south to west right at 14%. It should be noted that when Lilian Schick School finishes for the day, it is earlier than the typical peak time that someone would return from work for the day. This may result in a lower difference between the PM peak hour volume and regular weekday afternoon volume at this intersection compared to the other intersections.

A comparison of the AADT, peak hour volumes, and corresponding percentage of total approach volumes at the intersection is shown in Table 3-6. The traffic entering/exiting Bon Accord is highlighted in red.

Table 3-6 Highway 28 & Lily Lake Road Approach Volumes

	2018 AADT	% of Approach Volume	2018 AM Peak Volumes	% of Approach Volume	2018 PM Peak Volumes	% of Approach Volume
East to North	440	13.4	39	11.6	46	14.3
East Through	2820	86.0	296	87.8	274	85.1
East to South	20	0.60	2	0.60	2	0.62
North to West	20	33.3	4	33.3	0	0.00
North Through	10	16.7	2	16.7	1	33.0
North to East	30	50.0	6	50.0	2	67.0
West to South	30	0.94	2	0.57	2	0.47
West Through	282	88.4	289	82.1	374	88.2
West to North	340	10.7	61	17.3	48	11.3
South to East	340	43.0	98	51.0	22	46.8
South Through	140	1.30	0	0.00	1	2.10
South to West	440	55.7	94	49.0	24	51.1

Approximately 82 – 88% of the east/west approach traffic continues straight through the intersection. Very little traffic goes straight through on the north/south approaches (10 vehicles per day). The south leg of the intersection only sees an average of 120 vehicles per day.

Southbound traffic splits almost evenly to turn east or west in both peaks. Most of the northbound traffic turns right to go eastbound in both peaks. Traffic turning northbound from Highway 28 (11% of the total traffic approaching from the east and 13.4% of the total traffic approaching from the west) is most likely accessing residences or Lilian Schick School in the northeast section of Bon Accord.

3.2.3 Traffic Movement Comparison

A comparison of 2018 traffic counts at both intersections is presented in **Figure 3-1**.

Overall, there has been more traffic growth at the 57 Street (Rge Rd 240) intersection compared to at Lily Lake Road (Rge Rd 235). The growth is reflected in the turns onto and off the minor road rather than through traffic.

The 2018 Highway 28 AADT is comparable between the two intersections. More traffic is using the north leg of 57 Street (Rge Rd 240) than the north leg of Lily Lake Road (Rge Rd 235) on a daily basis. The number of vehicles travelling on the south leg of 57 Street (Rge Rd 240) is approximately 15 times greater than the amount using Lily Lake (Rge Rd 235) south, though both provide access to Sturgeon Valley Vista Estates. This is likely for the following reasons:

- Most of the development in Bon Accord is closer to 57 Street (Rge Rd 240).
- Rge Rd 240 provides a direct route further south to Highway 37, whereas Rge Rd 235 ends at Sturgeon Valley Vista Estates.
- Rge Rd 240 is the fastest route from Bon Accord to Fort Saskatchewan according to Google Maps.
- Rge Rd 235 is gravel whereas Rge Rd 240 is paved, providing a faster, more comfortable drive.

It is reasonable to conclude that with the location of 57 Street between the existing Town and the annexed lands, the intersection of Highway 28 / 57 Street (Rge Rd 240) will continue to see traffic volume growth as development progresses. Similarly, as the proposed future residential area develops in the northwest corner of the intersection of Highway 28 / Lily Lake Road (Rge Rd 235), in SE-18-56-23-W4M, volumes are expected to increase steadily with development on all legs except the south leg. There may be a slight increase in southbound traffic, but it is expected that 57 Street (Rge Rd 240) will continue to carry significantly more. Comparing the 2018 AADT on the south leg of Highway 28 / 57 Street (1810 vehicles per day) to the north leg of Highway 37 / Rge Rd 240 (1950 vehicles per day), it is evident that most traffic continues to Highway 37; this is the main reason for the relatively high amount of traffic on that leg.

It is noted that due to their proximity to the highway, Alberta Transportation will require, for proposed developments, a Traffic Impact Assessment that will offer recommendations on any necessary improvements to the intersections to accommodate estimated future demand.

Figure 3-1
2018 Average Daily Traffic Volumes

3.3 Vehicle Types

Vehicle type breakdowns are provided on Alberta Transportation's turning movement diagrams. Their turning movement diagrams quantify five types: passenger vehicles, recreational vehicles, buses, single unit trucks, and tractor trailer trucks.

Highway 28 and 57 Street (Rge Rd 240):

- Passenger vehicles are predominant, averaging at 91.4% of the total traffic stream. The highest percentage was on the south approach at an average of 95.1%.
- As expected due to the school's proximity, the bus composition was the highest on the north leg, averaging at 6.6%.
- In all cases the recreational vehicle count was lowest, averaging at 0.7% of total traffic stream.
- The amount of tractor trailer trucks was highest heading west on Highway 28, averaging at 4.6%.

Highway 28 and Lily Lake Road (Rge Rd 235):

- Passenger vehicles are predominant, averaging at 87.2% of the total traffic stream. The highest percentage was on the south approach at an average of 93.3%.
- There is a higher amount of tractor trailer trucks using this intersection compared to 57 Street (Rge Rd 240), especially on the north leg. In the AM peak, 9.5% of the traffic on the north leg consisted of tractor trailer trucks. There is a Cajun Angus Beef Producer on the north side of town, which may explain some of the heavy traffic. The trucks would travel east/west along 54 Avenue to reach Rge Rd 235 instead of going through the Town to reach Highway 28, as they are not allowed in Town.

AE reviewed Alberta Transportation's current and proposed future high load corridors. Bon Accord does not fall on an existing or planned high load route, meaning that any future upgrades to Highway 28 along the Town would not have to accommodate oversized vehicles.

3.4 Collision History

3.4.1 Highway Collisions

No collision information was available within the Town. However, Alberta Transportation provides collision data for their highways, from which AE obtained the collision history for the segment of Highway 28 that passes along Bon Accord. From 2008-2017, there were 37 collisions along this segment. Most resulted in property damage only. However, three resulted in minor injuries, five resulted in major injuries, and one resulted in a fatality. The collision history on Highway 28 was compared to Alberta Transportation's latest provincial collision statistics.

Alberta Transportation included data from 2012-2016, so only the collision history on Highway 28 for those years was used to compare the results, as shown in Table 3-7.

Table 3-7 Collision Type Comparison

Collision Type	No. of Collisions on Hwy 28 near Bon Accord (2012-2016)	Percentage	Alberta Transportation Provincial Percentage (2012 - 2016)
Property Damage Only	15	78.9%	90.0%
Injury	3	15.8%	9.8%
Fatality	1	5.3%	0.2%

By percentage, Bon Accord has seen a higher rate of collisions resulting in injury or fatality compared to the provincial data.

Over the 2008-2017 period, the fatality and two of the major injury collisions occurred near the Lily Lake Road (Rge Rd 235) intersection. The major injury events were both a result of a left turn – across path collision. The fatality was a result of a right-angle collision and occurred at night. There is illumination at this intersection, though the Town may wish to investigate whether it is up to current standards. Though the Town has a Dark Sky program, the illumination would fall under the jurisdiction of Alberta Transportation (outside of the Town's limits).

A detailed summary of collision events along Highway 28 are shown in Appendix B.

3.5 Active Transportation Accommodation

The Town's MDP states several active transportation objectives. During our site visit we observed Bon Accord's Dark Sky Trail, as shown in Figure 3-2. There are numerous segments of this trail throughout the Town but based on observations and discussions with the Town there is no overarching trail network providing full connectivity. Most of the local roads that provide residential access have sidewalks either on one or both sides of the street, so there is a safe space for pedestrians in many areas. Local roads have low enough volumes that cyclists could use the roads, but there are currently no dedicated areas for cyclists (except for the Dark Sky Trail).

Figure 3-2 Bon Accord Dark Sky Trail

4 DESIGN STANDARDS

4.1 Town of Bon Accord Design Standards

Objective 24, Policy 89 in the MDP states that all infrastructure shall be constructed to meet or exceed the Town's minimum design standards. The Town provided 2003 design standards which include the following relevant requirements:

- Curb to curb widths for a minor arterial are 12 m as a minimum with a 24 minimum right of way. Major arterial minimum widths are on an as required basis.
- Design speed for streets classified as collectors shall be 50 km/h. Design speed for streets classified as arterial shall be 60 km/h or as required by the Town.
- Separate or monolithic sidewalks shall be constructed on both sides of all streets and in all areas designated as walkways.

4.2 Comparison of Other Design Standards

Although the Town confirmed they would accept use of the City of Edmonton's Design Standards, AE investigated the availability of standards from smaller municipalities more similar in size to Bon Accord.

The following three municipalities provided roadway design standards that could be applicable for Bon Accord's situation: Town of Calmar, City of Beaumont, and Town of Stony Plain. The design standards are summarized in **Table 4-1**, and details specific to each set of standards are described in the subsequent sections. We observed that many of the standards are similar to the Transportation Association of Canada (TAC) standards.

Table 4-1
Comparison of Design Standards for Small Municipalities

Classification	Source of Design Standards	Traffic Volumes (vpd)	Design Speed (km/h)	Right-of-Way Width (m)	Pavement Widths (m)	Travel Lanes	Minimum Intersection Spacing (m)	Sidewalks
Undivided Arterial	Town of Calmar	5,000 – 12,000	60 – 70	30.0	14.8	4 at 3.7m	150	Separate, 1 or 2 sides
	City of Beaumont	5,000 – 12,000	60	30.0	14.8	4 at 3.7m	400	Unspecified
	Town of Stony Plain	5,000 – 12,000	70	48.3	15.8	4 at 3.7m	N/A	Separate, 1 or 2 sides
Major Residential Collector	Town of Calmar	2,500 – 5,000	60	23.0	12.0	2 at 3.5m	60	Separate/Mono, both sides
	City of Beaumont	1,000 – 10,000	60	24	11.5	2 at 3.5m	60	1.5m, both sides
	Town of Stony Plain	2,500 – 5,000	60	24	12.5	2 at 3.6m	N/A	Separate/Mono, both sides
Minor Residential Collector	Town of Calmar	1,000 - 2,500	60	20	11.0	N/A	60	Separate/Mono, both sides
	City of Beaumont	5,000	50	20	10.5	2 at 3.5m	75	1.5m, both sides
	Town of Stony Plain	1,000 – 2,500	60	20	11.5	2 at 3.1m	N/A	Separate/Mono, both sides
Local Residential	Town of Calmar	Up to 1,000	60	18.5	9.0	N/A	60	Mono, both sides
	City of Beaumont	Up to 3,000	50	18	9.5	2 at 3.0m	75	1.5m, both sides
	Town of Stony Plain	Up to 1,000	50	18	9.5	N/A	N/A	Separate/Mono, both sides
Local Industrial	Town of Calmar	N/A	60	18.5	11.5	N/A	60	Optional
	City of Beaumont	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Town of Stony Plain	Up to 1,000	50	22	12	N/A	N/A	Separate/Mono, both sides

4.2.1 Town of Calmar

The Town of Calmar had a 2016 population of 2,230. This is slightly more than Bon Accord but still comparable in size. They have available design standards from 1999, which were reviewed in terms of roadways requirements and are included in Table 4-1. The additional relevant requirements were also noted:

- Posted speed shall be 10 km/h less than the design speed
- Additional travel lane width may be required to accommodate cyclists, e.g. on arterials the outside lanes are 4.2 m wide

4.2.2 City of Beaumont

The City of Beaumount had a 2016 population of 11,160. This is about 7 times larger than Bon Accord (population wise) but is still more relevant than a city the size of Edmonton. They have available design standards from 2001, last updated in 2011. These were reviewed in terms of roadways requirements and are included in Table 4-1. The additional relevant requirements were also noted:

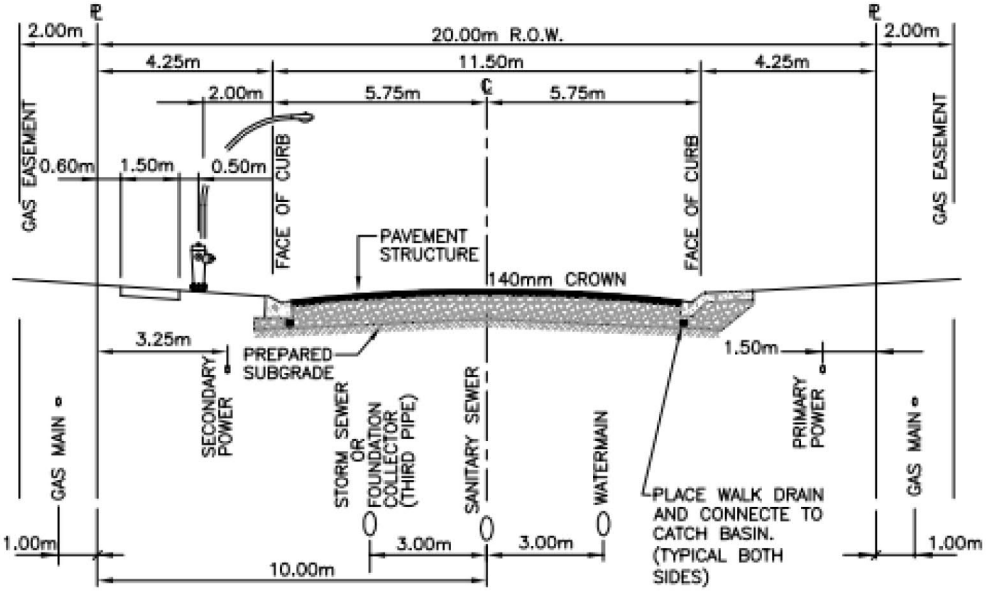
- Local residential straight or near straight roads shall have a maximum unimpeded length of 215 m. Traffic calming measures shall be implemented for roads in excess of 215 m.
- The traffic control proposed at the intersection of all collector to collector roads shall be reviewed to provide a traffic control method that will be self-enforcing and reduce traffic operational speeds to less than 40 km/h.

4.2.3 Town of Stony Plain

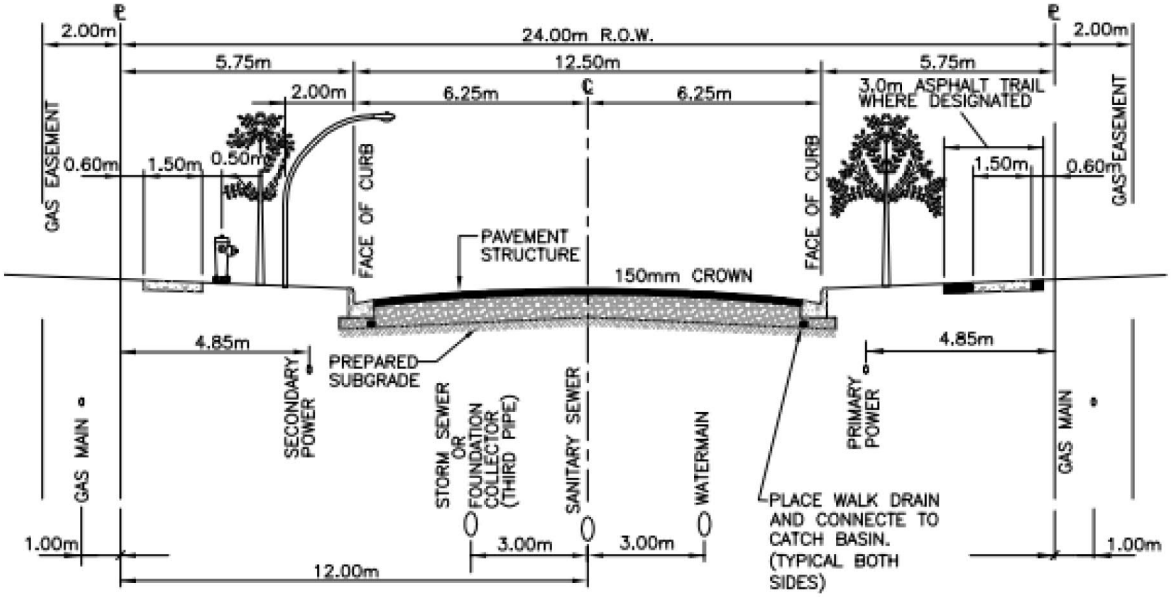
The Town of Stony Plain had a 2016 population of 17,190. This is about 11 times larger than Bon Accord (population wise) but is still more relevant than a city the size of Edmonton. They have available design standards from 2006, which were reviewed in terms of roadways requirements and are included in Table 4-1. The additional relevant requirements were also noted:

- Lanes shall be provided for residential lots fronting directly on to collector streets
- Concrete sidewalks measuring 1.5 m in width will be required in the following instances:
  - On both sides of arterial roads where there is no parallel service road with sidewalk
  - On one or both sides of collector rods
  - Where linkage is required to maintain continuity of pedestrian network
- Pedestrian trails shall be 3.0 m wide

The Town of Stony Plain provides cross-sections for various road types in their standards, which are examples of what Bon Accord may wish to implement (or a similar version). The examples of collector and arterial cross-sections are shown in Figures 4-1 to 4-3.



MINOR COLLECTOR RESIDENTIAL



MAJOR COLLECTOR RESIDENTIAL

Figure 4-1 Major & Minor Residential Collector Cross-Sections

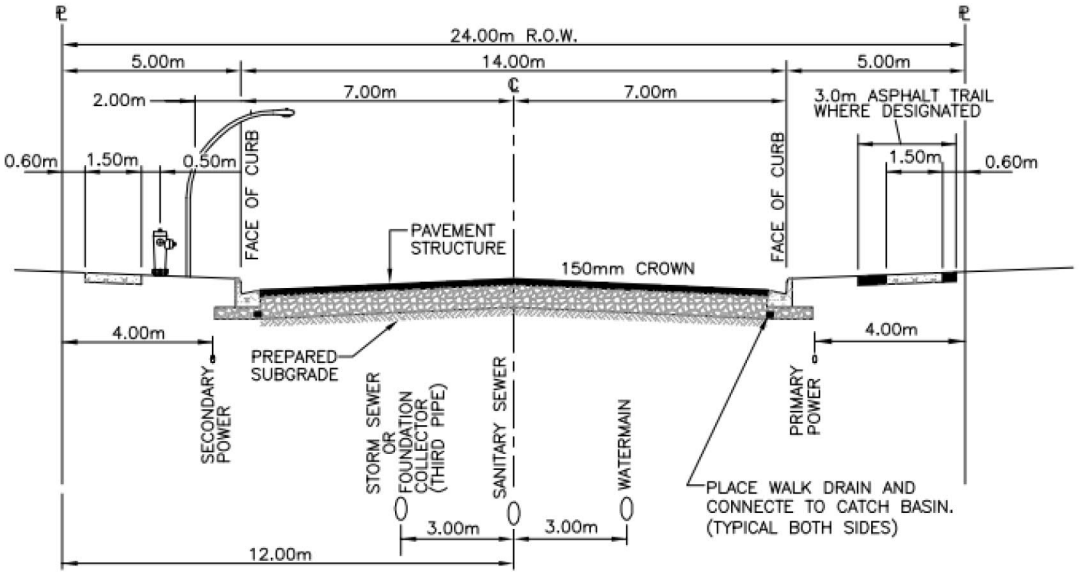


Figure 4-2 Industrial/Commercial Urban Collector Cross-Section

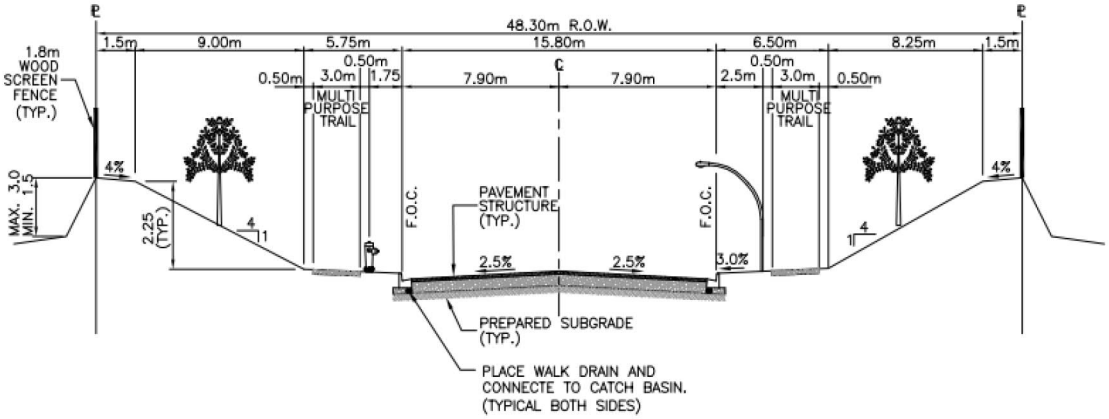


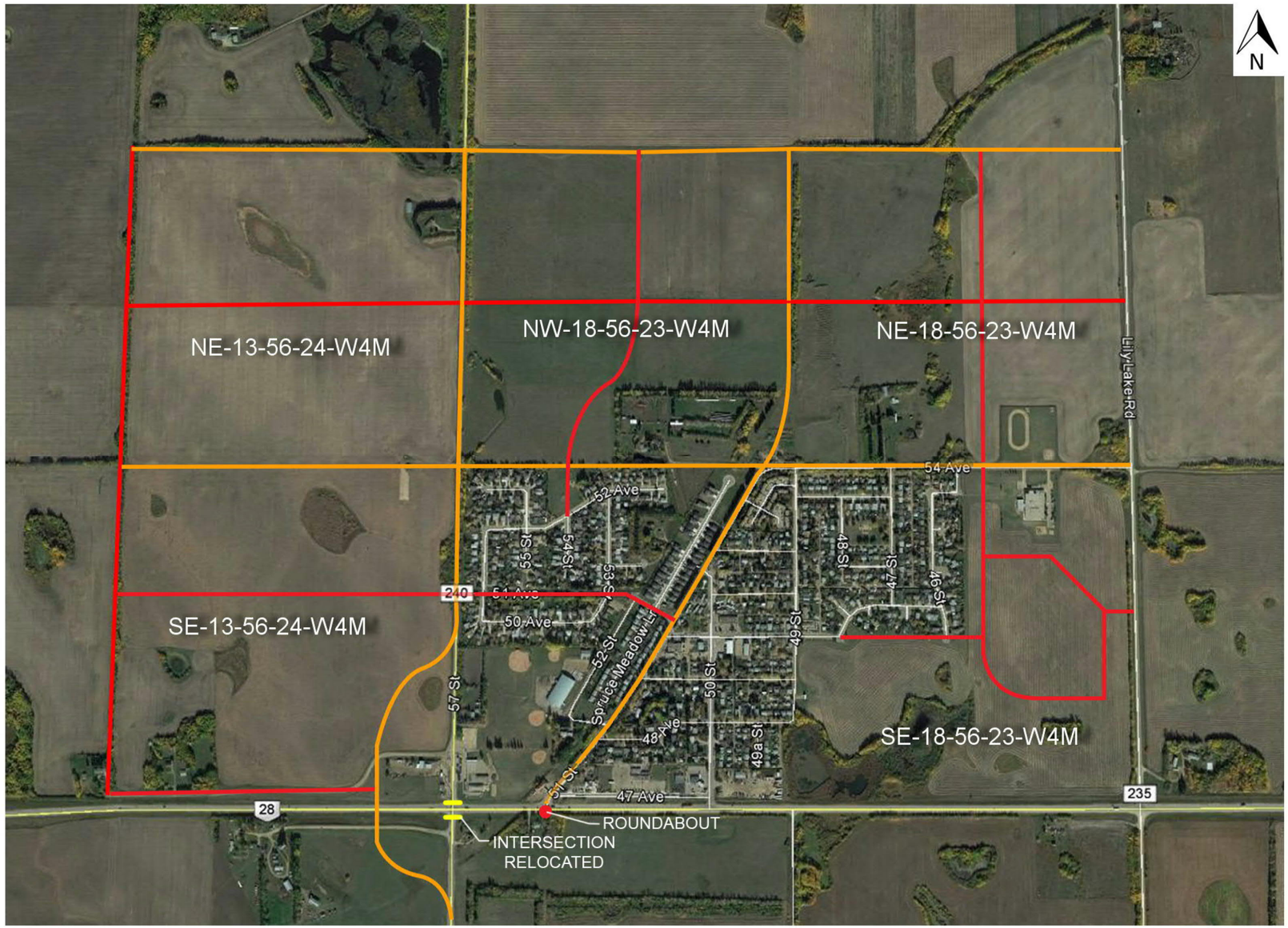
Figure 4-3 Undivided Urban Arterial Cross-Section

5 RECOMMENDATIONS

The proposed future road network of arterials and collectors is shown in **Figure 5-1** and has been confirmed with the Town of Bon Accord to be the preferred option. The reasoning behind the alignment and designation are explained in the subsequent sections.

BON ACCORD MASTER PLAN

PREFERRED OPTION



LEGEND

- COLLECTOR ROADS
- ARTERIAL ROADS

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5.1 Overall Considerations

The annexation requires consideration for a planned road network that will safely and efficiently move all modes of traffic (including vehicles, cyclists and pedestrians). In support of Objective 28, Policy 115 of the MDP, the network has been established with a hierarchical street system consisting of:

- Arterial roads that are quick and efficient, moving traffic from collector roads
- Collector roads that serve to connect residential / local roads to arterial streets

The upgrading of existing roadways and/or the development of new roadways should be performed in a staged approach. The Town's needs and requirements along with vehicle capacity of the roadway should be reviewed to determine the timing of each phase of the roadway. The roadway vehicle capacity should be based on Transportation Association of Canada's recommended capacity for each classification of roadway.

In Objective 28, Policy 115, the third level of roadways involves a system of local roads that will provide direct access to individual lots. They are not shown on the plan as they are typically designed in conjunction with development. They would be connected to the arterial and collector roads proposed in this TMP and/or otherwise established by the Town.

This TMP provides a recommended layout for arterial and collector roads that are intended to serve the Town for the next few decades or more. Objective 28, Policy 116 in the MDP states that the Town shall protect sufficient land for future arterial road rights-of-way from encroachment by other uses, and it is recommended that the same protection be provided for collector roads where possible. We further encourage providing future access points as the fourth leg to an existing T-intersection rather than creating a pair of offset T-intersections.

From discussions with the Town and past documentation, it was inferred that Alberta Transportation (AT) would not likely permit any additional intersections with Highway 28. Not only does the addition of an intersection create more potential conflict points, but the spacing between consecutive intersections is already below AT's standard in some cases. A new intersection would further decrease this spacing. As such, we maintained the same number of intersections in our network development.

Another consideration during the network development was the need to retain the service road in SE-13-56-24-W4M. This gravel road currently provides access to two residential properties, and a version of this access must be maintained. It is understood that the Town would like commercial frontage along the south boundary of this quarter section, so that it is visible from the highway and attracts more visitors. We have taken this into account and recommended that this road be upgraded to a paved collector road which serves the existing residential properties as well as new commercial development. However, this means all traffic accessing the highway commercial developments must access the collector from 57 Street, so we have considered the impacts of this as well.

5.2 Arterial Roadways

Arterial roads are high-capacity urban roads that deliver traffic from collector roads to freeways or expressways. Their primary consideration is efficient traffic movement, with restricted access control. Traffic flow is intended to be uninterrupted except at signals and crosswalks.

5.2.1 57 Street (Rge Rd 240)

It is recommended that 57 Street (Rge Rd 240) be the main north-south arterial road within the Town. It is currently non-street oriented and should remain as such to support the function of an arterial.

Though 57 Street provides the first access into Bon Accord from the west, there are a few reasons its current intersection with Highway 28 is not optimal:

- There is a school at the northeast corner of Highway 28 and 57 Street, resulting in a high amount of pedestrians (many of which are active children) and bus traffic immediately near the highway
- There is a truck fill in the northwest corner of Highway 28 and 57 Street, which increases the amount of truck traffic immediately near the intersection
- The spacing between 57 Street and 51 Street is only approximately 220 m, well below the spacing of 400 m recommended by Alberta Transportation.

AE recommends relocation of 57 Street to cross Highway 28 about 200 m to the west, on the west side of the truck fill. This would result in closure of the current 57 Street at Highway 28 with a bulb for a turnaround point on either side. Traffic would be diverted away from the school and spacing between 57 and 51 Street would be increased. Based on preliminary discussions with Alberta Transportation, they have indicated no immediate concerns with this alignment on a conceptual level.

As an arterial roadway that has a primary function of moving traffic, we recommend eliminating the three-way stop at 51 Avenue. 57 Street would have free-flow traffic through the intersection and the cross-traffic on the minor road would come to a stop. This may become a four-way intersection with future development. As volumes increase with development, the intersection's operations should be re-evaluated to determine whether signals are required.

It is also noted that 57 Street becomes a gravel road north of SE-13-56-24-W4M. When this road is upgraded to an arterial standard and as development occurs, it will require paving and possibly widening and other urban improvements.

It is understood that there are pedestrians and cyclists using this road to access the school at the southern end. We recommend this road be designed to an arterial standard with a separate multi-use trail on one side to accommodate pedestrians and cyclists.

5.2.2 51 Street and Old CN Right of Way

Due to its alignment crossing most of the Town, it is assumed that 51 Street is the primary road choice for many of Bon Accord's residents. We recommend that this alignment be maintained and 51 Street be extended further north to support future development.

The CN right of way passes through the Town at a skew angle. The train used to pass through the Town but the tracks were removed years ago. In the main hub of downtown, houses have been constructed in what was previously the old right of way. However, in the northern portion of the Town, the CN right of way remains. From a measurement of the right of way on Spin2 it is approximately 30 m wide.

One of the options evaluated during development of this TMP was to determine the feasibility of constructing a future roadway through the CN right of way north of 54 Avenue. However, based on discussions with the Town they prefer to maintain a straight road alignment over making use of the right of way. As such, 51 Street will extend northeast

slightly past 54 Avenue and then curve to continue directly north along the quarter section line. Ideally, eventually 51 Street would be extended to the northern boundary of the town to connect with a proposed future east-west arterial.

5.2.3 Lily Lake Road (Rge Rd 235)

It is recommended that Lily Lake Road continue to be a north-south arterial along the east limits of the Town. Depending on the area of Town someone wants to access, they could use this road to head to the northern half of the Town. It is currently non-street oriented and should remain as such to support the function of an arterial.

5.2.4 54 Avenue

The alignment of 54 Avenue is well positioned to become a main east-west throughfare, as it is essentially at the halfway north-south point of the Town's limits. It currently provides access to Lilian Schick School, residences, Cajun Beef Producer, and eventually connects to 51 Street. Its eastern connection to Lily Lake Road is made of gravel, and AE understands that this is an area of concern for the Town's residents. It is especially concerning as this is where Lilian Schick school is located.

It is desirable to provide a connection to 57 Street to provide an efficient means for residents to traverse the length of the Town without detouring to local roads (not designed for through traffic) and/or Highway 28. Connecting 54 Avenue to the west at 57 Street (Rge Rd 240) would require an extension of approximately 720 m that passes through the CN Railway right of way and one other land parcel. It is noted that if 54 Avenue were to become an arterial road, the access to Cajun Angus Beef Producers would have to be relocated. 54 Avenue could be further extended directly west of 57 Street (Rge Rd 240) to provide access to future developments, depending on what the development plans are for that area.

The Town has indicated they are in favour of straight road alignments. Extending 54 Avenue would accomplish this goal and would provide an optimal direct east-west route considering current and future development. As an arterial, an upgrade to the existing cross-section would be likely be necessary, and the gravel portions should be paved.

5.2.5 Future East-West Arterial along Northern Boundary

With the presence of Highway 28 along the Town's southern boundary and 54 Avenue halfway between the north and south boundaries, another east-west arterial is recommended along the Town's northern limits. We recommend that it extend along the entire boundary, from the eastern end at Lily Lake Road to the west end, where it would meet a proposed north-south collector road running along the new western limits (with the annexation).

5.3 Collector Roadways

Collector roadways connect traffic between arterials, other collectors, and local roads. Generally, traffic movement and land access are of equal importance. Several collectors have been proposed for the future network. Where possible, they have been proposed as the fourth leg at existing T intersections.

5.3.1 Service Road in SE-13-56-24-W4M

There is an existing gravel service road north of Highway 28 in the western quarter section recently annexed by the Town. It travels north of the Public Works yard and ends near the west quarter line. It currently provides access to two residential properties. This access, or some alternate form of access, needs to be provided for these two properties during future development.

It is understood that the Town would like this road to provide access to commercial properties such as fast food and gas stations which are visible from the highway. If this is the case, this road should be upgraded to an asphalt road with a thicker pavement structure (increased depth of asphalt and base course) to support truck traffic.

Its current access point with 57 Street (Rge Rd 240) should be maintained not only to provide the shortest safe distance for the two residences to access the highway, but also to encourage pass-by traffic to stop at Bon Accord. If a portion of 57 Street is relocated further west as described above, the service road's current access may no longer be feasible and may also have to be relocated further north.

One of the objectives in the Town's MDP is to provide for the development of small, neighbourhood-oriented commercial centres. It states that these commercial nodes should be accessed via a collector road and located along a collector road. Designing this service road to a collector standard will support this mandate.

5.3.2 Collector Road Loop in SE-18-56-23-W4M

There is an approved Area Structure Plan in place for SE-18-56-23-W4M with a proposed road network in the form of a loop. We propose to continue 50 Avenue to the east to connect to that area's road network, with a north-south connection to 54 Avenue on the west side of Lilian Schick School. An access should also be provided on the east side of the development to Lily Lake Road, though it is recommended that a spacing of at least 400 m is provided between that access point and Highway 28.

5.3.3 Other North-South Collectors

Keeping in mind the desire for straight road alignments, we recommend that a north-south collector be constructed along the quarter section line of the western Town limits. It will not be connected to Highway 28 at its south end but will connect to the east-west commercial frontage road just north of the highway.

A fourth leg is recommended at the 54 Street intersection that extends north of 54 Avenue to curve right and continue straight north at about the middle of the quarter section. It would eventually connect to the east-west arterial along the northern Town limits. Though it would be more ideal to connect 53 Street instead of 54 Street, there are residences already established in this area.

The collector loop for the proposed development in SE-18-56-23-W4M should also be extended north past 54 Avenue to connect to the east-west arterial along the northern Town limits. It is noted that there are some wetlands in this quarter section, which the road alignment should avoid wherever possible.

5.3.4 Other East-West Collectors

In addition to the service road in SE-13-56-24-W4M, we also recommend extending 51 Avenue to the west through the quarter section to connect to the north-south collector along the Town's western limits.

Another collector road is proposed to traverse the length of the town approximately halfway between the Town's northern annexed lands. It connects to Lily Lake Road on the east side and the north-south collector on the west side. It would also intersect with 57 Street, 51 Street, and a few other north-south collectors.

5.4 Intersections

At this time, no improvements have been recommended for the intersections of Highway 28 with 50 Street or Lily Lake Road (Rge Rd 235). As development progresses, traffic impact assessments may deem improvements are required at these intersections.

5.4.1 Highway 28 and 57 Street (Rge Rd 240)

As previously stated, the Town is in favour of relocating this intersection about 200 m to the west to minimize the traffic going by the school and to increase the access spacing from 51 Street. This would close the existing intersection on Highway 28 and open a new one. Because the highway is owned by Alberta Transportation, an analysis would be required to determine the new intersection layout. The current intersection of 57 Street and Highway 28 was likely designed to lower traffic volumes and an older standard that would no longer be applied for new construction. The 2018 AADT showed 5700 – 6940 vehicles on Highway 28 and 1050 – 1810 on Rge Rd 240.

Though dependent on the growth rate, we anticipate that a Type IV treatment would be warranted for current and 20-year design volumes for the east leg. A Type III would be warranted for current volumes and a Type IV treatment would be warranted for 20-year design volumes for the west leg. Examples of Type III and Type IV treatments are shown in Figures 5-2 and 5-3 below. The realigned north and south legs should meet Highway 28 at 90° angles.

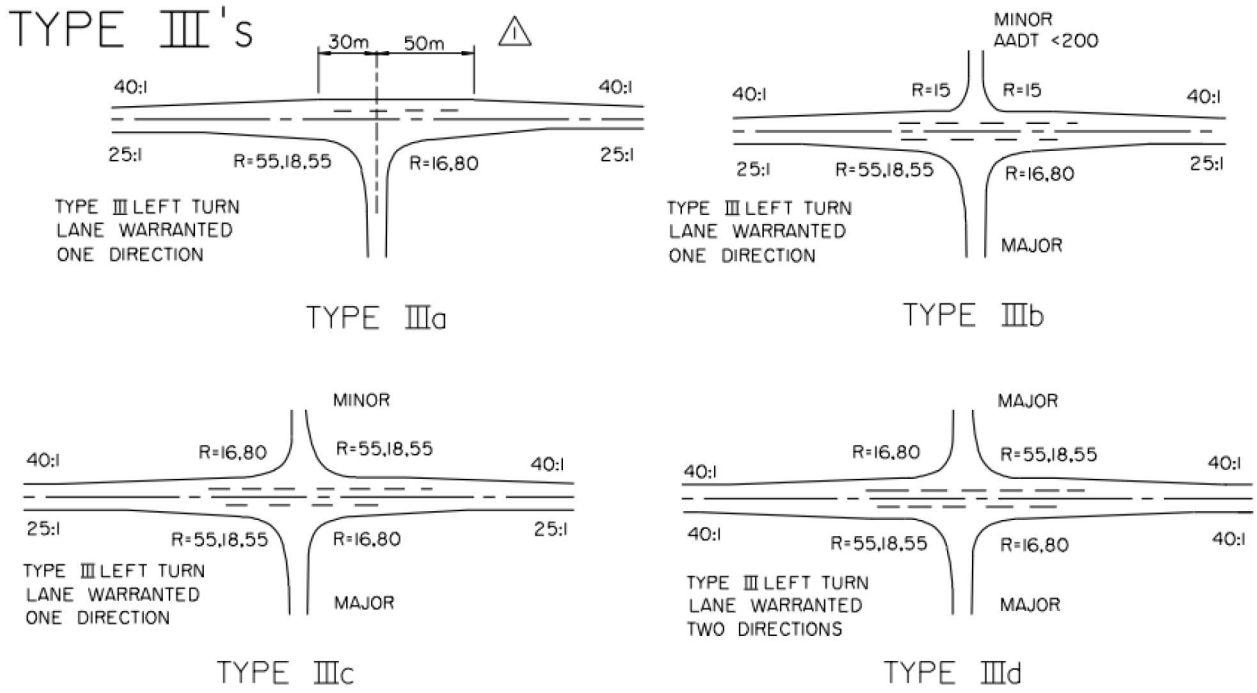

Figure 5-2
Type III Intersections per AT Guidelines

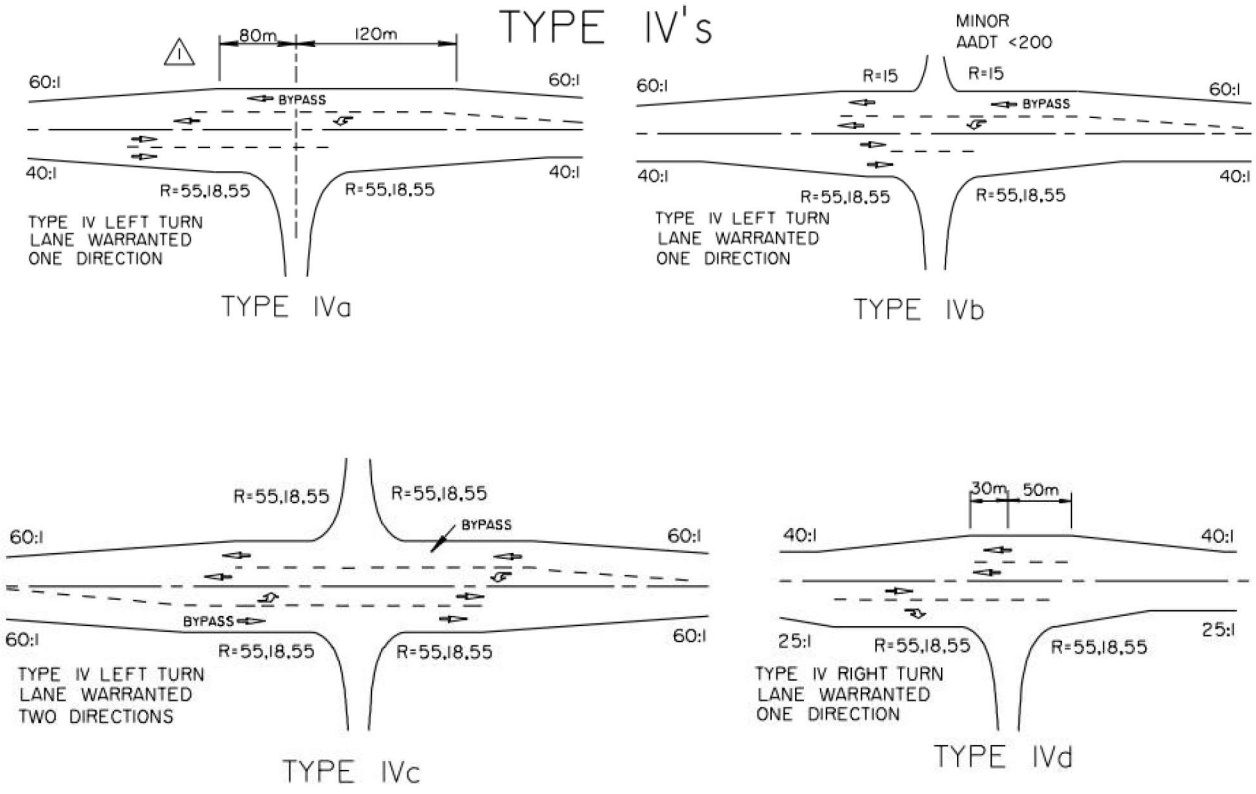

Figure 5-3
Type IV intersections per AT Guidelines

5.4.2 Highway 28 and 51 Street

Though traffic volumes are not available for this intersection, it is assumed that most vehicles accessing the Town will enter here. The existing geometry of the intersection is not ideal. It has a left-hand forward skew angle of around 50°, which is below the minimum of 70° recommended by Alberta Transportation's Highway Geometric Design Guide for highways intersecting with town access roads. The angle allows eastbound vehicles on Highway 28 to take the left turn onto 51 Street very quickly, posing a hazard. Exacerbating the problem is the proximity of 47 Avenue, which parallels the Highway 28 alignment only about 30 m to the north (from centreline to centreline). 47 Avenue also intersects 51 Street at a skew angle. Lastly, there is an existing liquor store in the northwest corner of the intersection. We present a couple options to address the geometric constraints at this intersection.

Option A: Realignment of North Leg

At any type of intersection, it is desirable for the intersecting roads to meet as close to right angles as possible to each other. We propose to realign the north leg of the Highway 28 / 51 Street intersection so that 51 Street is 90° at Highway 28. To do this, the liquor store would have to be relocated. The west end of 47 Avenue could be realigned so that it also intersects 51 Street at a right angle.

According to discussions with Alberta Transportation, they would be likely to approve the realignment as the next measure to improving safety at this intersection. Figure 5-4 shows an approximation of what this may look like on a conceptual level.

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INTERSECTION IMPROVEMENT OPTION A

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Option B: Roundabout

During the development of this TMP, implementation of a roundabout at the Highway 28 and 51 Street intersection was considered. Speeding is a concern on Highway 28, as through traffic is reluctant to slow down from highway speed when passing by the Town. The segment of Highway 28 through the Town is also in an urban setting, compared to long stretches of rural settings east and west of the Town.

There are several advantages to a roundabout, though there are disadvantages to consider as well. Both are identified in the Transportation Association of Canada (TAC) Roundabout Design Guide, and are summarized below.

Advantages

- Proven to reduce frequency and severity of collisions due to fewer conflict points, better speed control, and decreased impact angles
- A reduction in collisions lead to a reduction in societal cost
- Operate with lower delays and shorter queues
- Reduced fuel consumption and vehicle emissions
- Effective in conveying a change from rural to urban areas, encouraging traffic to slow down
- Facilitate safer, better turning movements
- Less maintenance than traffic signals

Disadvantages

- May require more space, resulting in potential property acquisition requirements
- Initial construction costs may be higher with a larger footprint, complexity in traffic management, contractor inexperience, ultimate footprint is required immediately
- Retrofitting may require a longer construction period with greater complexity
- More challenging for pedestrians with vision impairment and/or reduced mobility
- In communities where roundabouts are uncommon, roundabouts may require public education

Situations that are typically more suitable for roundabouts and apply to the intersection in question include:

- Where traffic calming is desired
- At intersections with unusual or complex geometry
- Where higher-order traffic controls (i.e. all-way stop, traffic signals) are not warranted and would result in greater overall delay
- On higher speed roadways
- Where a transition from a rural to an urban environment occurs
- Where intersections are closely spaced and require short queue lengths

According to Design Bulletin 68, once a greater degree of traffic control than a two-way stop is required at an intersection (or one-way at a T-intersection), Alberta Transportation requires designers to consider a roundabout as the first option. If a different treatment is recommended, the project documentation should include reasons why a roundabout was not selected for that location.

AE recommends that once signals are warranted at this location, consideration be given to a roundabout at the Highway 28 / 51 Street intersection. Alberta Transportation has suggested they may be open to a roundabout in the long-term, with the north leg realigned as an interim safety measure. A roundabout would provide traffic calming and encourage drivers to slow down through gentle curves on the approaches. It would create less conflict points and lower impact angles than a signalized intersection would, resulting in a safer environment. However, some property acquisition would likely be required. The residential access connected to the south side of Highway 28 approximately 40 m west of 51 Street would need to be closed or realigned. We would likely recommend that it be realigned to go east-west to connect to Rge Rd 240 to reduce an access point on a highway.

Figure 5-5 shows an approximation of what the roundabout may look like on a conceptual level.

BON ACCORD MASTER PLAN

INTERSECTION IMPROVEMENT OPTION B

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5.4.3 Signals

Currently there are no signalized intersections within the Town. A signal warrant analysis through the Transportation Association of Canada determines the traffic volumes at which signals would be required. The analysis will output a score based on lane configurations, peak hour traffic, and other inputs. If the score is 100 or greater, signals are warranted.

AE completed a signal warrant analysis at the two intersections where traffic counts were available from Alberta Transportation, both for 2019 and a 20-year horizon of 2039. As per the historical traffic growth rate seen on Highway 28, a rate of 1.1% was applied to the highway traffic to forecast growth, and volumes on the minor roads were grown at a rate of 1% (as per Alberta Transportation practice). Scores are shown in Table 5-1, and the full warrant analyses are included in Appendix C.

Table 5-1 Signal Warrant Scores

Intersection	2019 Score	Warranted?	2039 Score	Warranted?
Hwy 28 / Rge Rd 240 (57 St)	54	No	81	Yes
Hwy 28 / Rge Rd 235 (Lily Lake Rd)	43	No	64	No

These scores show that signals are not warranted at either intersection by 2039. However, depending on the timing of development and actual increases in traffic, they may in reality be required prior to 2039. A TIA will indicate what sort of upgrades, such as signals, would be required for any proposed development. Once development begins and 57 Street and Lily Lake Road begin to function as proper arterials, volumes and operations at intersections should be re-evaluated every few years. This includes pedestrian usage at the intersection.

5.5 Active Transportation

5.5.1 Pedestrians

Pedestrians are fairly well accommodated on the existing local roads in Bon Accord, as the neighbourhoods have sidewalks in most areas. The largest concerns in our mind are the accommodation of children that are attending school. 57 Street has no provision for pedestrians, forcing them to walk on the side of a busy road. 54 Avenue near Lilian Schick School is gravel without a sidewalk, though the grass beside the road is flat enough that pedestrians could walk on it. We recommend that once these roads are constructed to an arterial standard, a shared-use path be provided on one side for pedestrians and cyclists. With the higher speeds typically seen on arterial roads, this should be a separated path rather than a monowalk. In conjunction with this path, pedestrian crossings should be provided where necessary to provide complete connections. Not only does this make all transportation systems users much safer but it also may relieve some vehicle traffic near the school if students have a safe alternate means of getting there.

Consideration should also be given to providing pedestrian accommodation along collector roadways. These should provide a connection between the pedestrian paths along arterial roadways and the local neighbourhoods.

5.5.2 Cycling

There are various types of cycling facilities that can be designed in terms of the degree of separation between cyclists, motor vehicles, and pedestrians. The Town of Bon Accord does not have a large enough population to support installation of separate bike lanes. However, it is understood that the Town wishes to provide accommodation for these users to encourage active living and reduced vehicle emissions. It is recommended that this be achieved through "Shared Roadways" in the Town. This refers to a roadway designed to accommodate space for motor vehicles and cyclists such that both users feel they can travel safely without compromising each others' paths. However, these "Shared Roadways" would be limited to local roads.

Further, where new trails are planned, they should be designed wide enough to accommodate cyclists. This should be a key consideration for arterial and collector roads where the travel speed and volume are higher. Many cyclists are in the category of feeling too uncomfortable to share the road with vehicles, especially with fast-moving vehicles and/or large amounts of traffic and will only ride on multi-use trails.

6 STAKEHOLDERS

6.1 Emergency Access

It is understood that the County's Regional Fire Hall is located within the Town along 51 Street south of 50 Avenue. As such, its responders' primary route to access their destination is to head south on 51 Street and turn onto Highway 28. However, they could also use 50 Street to access Highway 28, though it is approximately 100 m longer of a distance from their doors. The intersection of 50 Street with Highway 28 is safer than the intersection with 51 Street, which is on a skew angle. Emergency services should be consulted on any planned improvements to access points with Highway 28.

6.2 Bus Routes

Currently, the only bus routes within Town are those that access the two schools: Bon Accord Community School at the northeast corner of 57 Street and Highway 28, and Lilian Schick School at 4509 54 Avenue. The proposed road network should not negatively affect the bus routes. If the intersection of 57 Street and Highway 28 is relocated, this may add on some time to a bus route, but would result in safety benefits associated with increased access spacing and increased distance from the school. Also, building up the current gravel road segments will make it easier for bus travel.

6.3 Truck Fill

There is a municipal truck yard at the northwest corner of 57 Street and Highway 28. Trucks frequent this yard, meaning there is a large amount of truck traffic using the intersection of 57 Street and Highway 28. Though the relocation of that intersection would not significantly increase their travel distance, they should be involved in the consultation process as development plans are being made in that area. The design vehicles accessing that facility may require special consideration in terms of access geometry, intersection storage lengths, pavement structure, etc.

7 CONCLUSION

The Town of Bon Accord now has a guide for an efficient future transportation system that considers the overall vision for the Town and can be shared with developers. The proposed layout of arterial and collector roads is in line with the Town's preference of straight road alignments and encompasses the entire Town limits. Highway 28 will be a safer travel route with the increased separation between 57 Street and 51 Street, as well as the initial realignment of the north leg of 51 Street and potential eventual roundabout. Provision of safe walking and cycling spaces may encourage more residents to choose walking or cycling instead of driving; if this is the case, this would result in the benefit of less fuel emissions from vehicles as well.

CLOSURE

This report was prepared for the Town of Bon Accord to provide a Transportation Master Plan that is intended to guide their planning process for the next few decades or more.

The services provided by Associated Engineering Alberta Ltd. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,
Associated Engineering Alberta Ltd.

2019-10-07
Diego Mejia, P.Eng.
Project Manager

2019-10-03
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ASSOCIATED ENGINEERING
QUALITY MANAGEMENT SIGN-OFF
Signature: _____
Date: 2019-10-17

APEGA Permit to Practice P 3979

APPENDIX A - TRAFFIC VOLUMES

Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:

28 & LILY LAKE RD 7-56-23-400000000

2013 AADT / ASDT ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1222	89.9
B: Recreational Vehicle	2	0.1
S: Bus	57	4.2
D: Single Unit Truck	45	3.3
E: Tractor Trailer Unit	34	2.5
ASDT 1550	**AADT** 1360	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5901	90.5
B: Recreational Vehicle	21	0.3
S: Bus	85	1.3
D: Single Unit Truck	269	4.1
E: Tractor Trailer Unit	244	3.7
ASDT 7410	**AADT** 6520	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5965	90.4
B: Recreational Vehicle	23	0.3
S: Bus	92	1.4
D: Single Unit Truck	264	4.0
E: Tractor Trailer Unit	256	3.9
ASDT 7510	**AADT** 6600	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	108	90.0
B: Recreational Vehicle	0	0.0
S: Bus	2	1.7
D: Single Unit Truck	10	8.3
E: Tractor Trailer Unit	0	0.0
ASDT 140	**AADT** 120	

TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

TURNING MOVEMENT ABBREVIATIONS

AADT: Average Annual Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of January 1 to December 31 (365 days)

ASDT: Average Summer Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

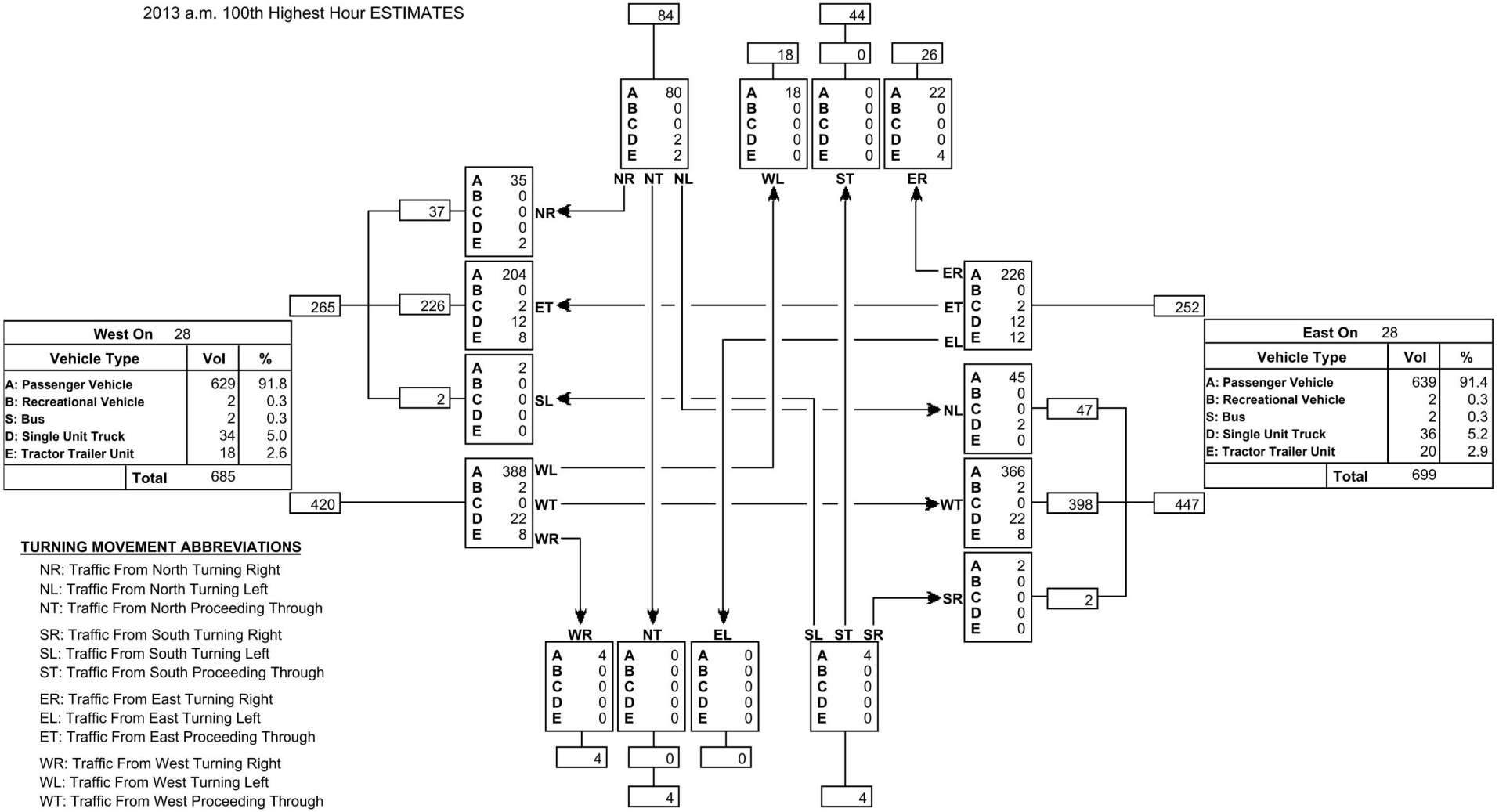
2013 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	120	93.8
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	2	1.6
E: Tractor Trailer Unit	6	4.7
Total	128	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	629	91.8
B: Recreational Vehicle	2	0.3
S: Bus	2	0.3
D: Single Unit Truck	34	5.0
E: Tractor Trailer Unit	18	2.6
Total	685	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	639	91.4
B: Recreational Vehicle	2	0.3
S: Bus	2	0.3
D: Single Unit Truck	36	5.2
E: Tractor Trailer Unit	20	2.9
Total	699	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	8	100.0
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	8	



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WT: Traffic From West Proceeding Through

Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

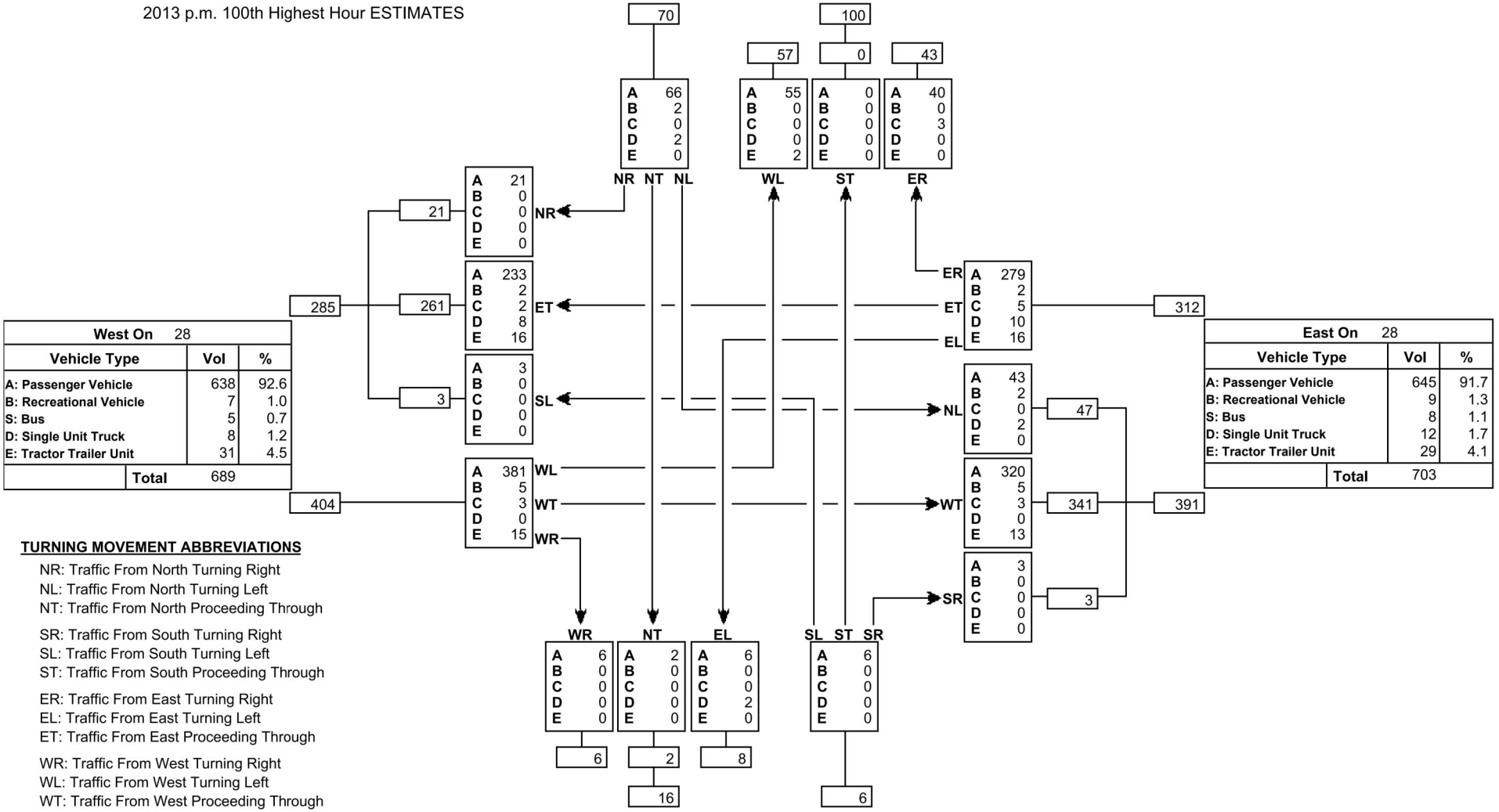
2013 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	161	94.7
B: Recreational Vehicle	2	1.2
S: Bus	3	1.8
D: Single Unit Truck	2	1.2
E: Tractor Trailer Unit	2	1.2
Total	170	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	638	92.6
B: Recreational Vehicle	7	1.0
S: Bus	5	0.7
D: Single Unit Truck	8	1.2
E: Tractor Trailer Unit	31	4.5
Total	689	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	645	91.7
B: Recreational Vehicle	9	1.3
S: Bus	8	1.1
D: Single Unit Truck	12	1.7
E: Tractor Trailer Unit	29	4.1
Total	703	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	20	90.9
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	2	9.1
E: Tractor Trailer Unit	0	0.0
Total	22	



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EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

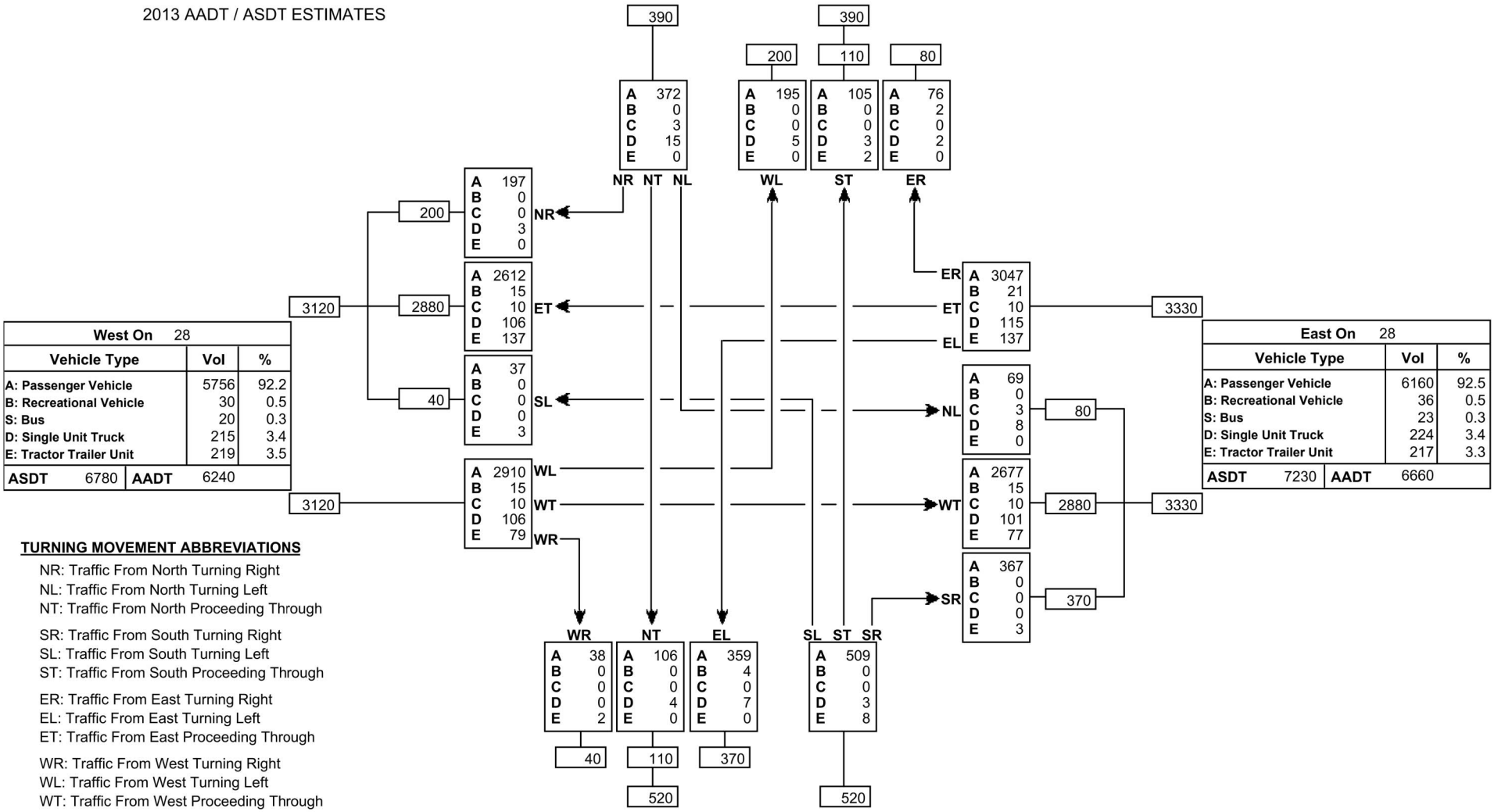
Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:

28 & BON ACCORD SCHOOL RD 12-56-24-400000000

2013 AADT / ASDT ESTIMATES



West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5756	92.2
B: Recreational Vehicle	30	0.5
S: Bus	20	0.3
D: Single Unit Truck	215	3.4
E: Tractor Trailer Unit	219	3.5
ASDT 6780	**AADT** 6240	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6160	92.5
B: Recreational Vehicle	36	0.5
S: Bus	23	0.3
D: Single Unit Truck	224	3.4
E: Tractor Trailer Unit	217	3.3
ASDT 7230	**AADT** 6660	

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	748	95.9
B: Recreational Vehicle	2	0.3
S: Bus	3	0.4
D: Single Unit Truck	25	3.2
E: Tractor Trailer Unit	2	0.3
ASDT 850	**AADT** 780	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1012	97.3
B: Recreational Vehicle	4	0.4
S: Bus	0	0.0
D: Single Unit Truck	14	1.3
E: Tractor Trailer Unit	10	1.0
ASDT 1130	**AADT** 1040	

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ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

TURNING MOVEMENT ABBREVIATIONS

AADT: Average Annual Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of January 1 to December 31 (365 days)

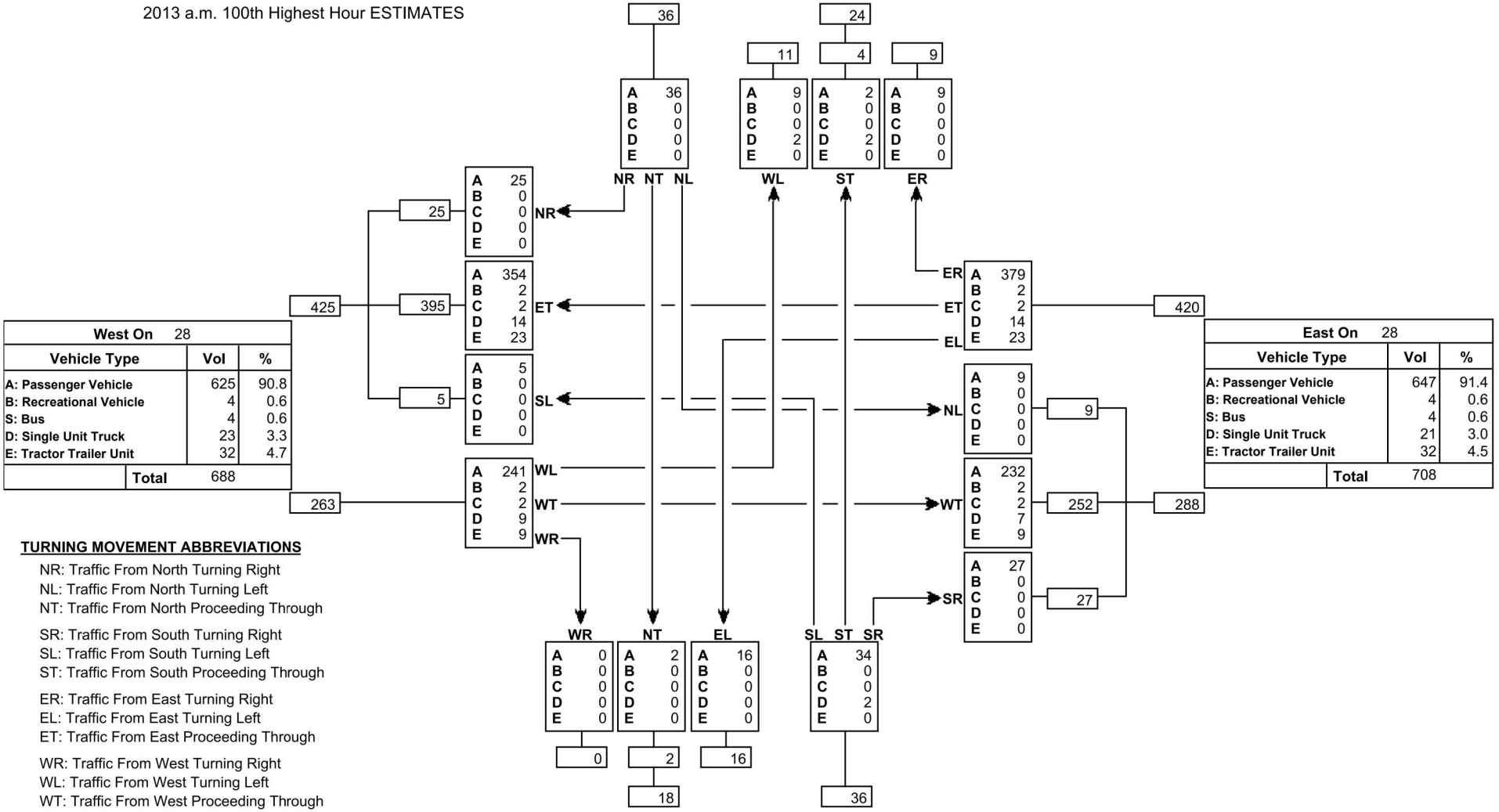
ASDT: Average Summer Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

2013 a.m. 100th Highest Hour ESTIMATES



North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	56	93.3
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	4	6.7
E: Tractor Trailer Unit	0	0.0
Total	60	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	625	90.8
B: Recreational Vehicle	4	0.6
S: Bus	4	0.6
D: Single Unit Truck	23	3.3
E: Tractor Trailer Unit	32	4.7
Total	688	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	647	91.4
B: Recreational Vehicle	4	0.6
S: Bus	4	0.6
D: Single Unit Truck	21	3.0
E: Tractor Trailer Unit	32	4.5
Total	708	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	52	96.3
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	2	3.7
E: Tractor Trailer Unit	0	0.0
Total	54	

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Turning Movement Summary Diagram

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Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

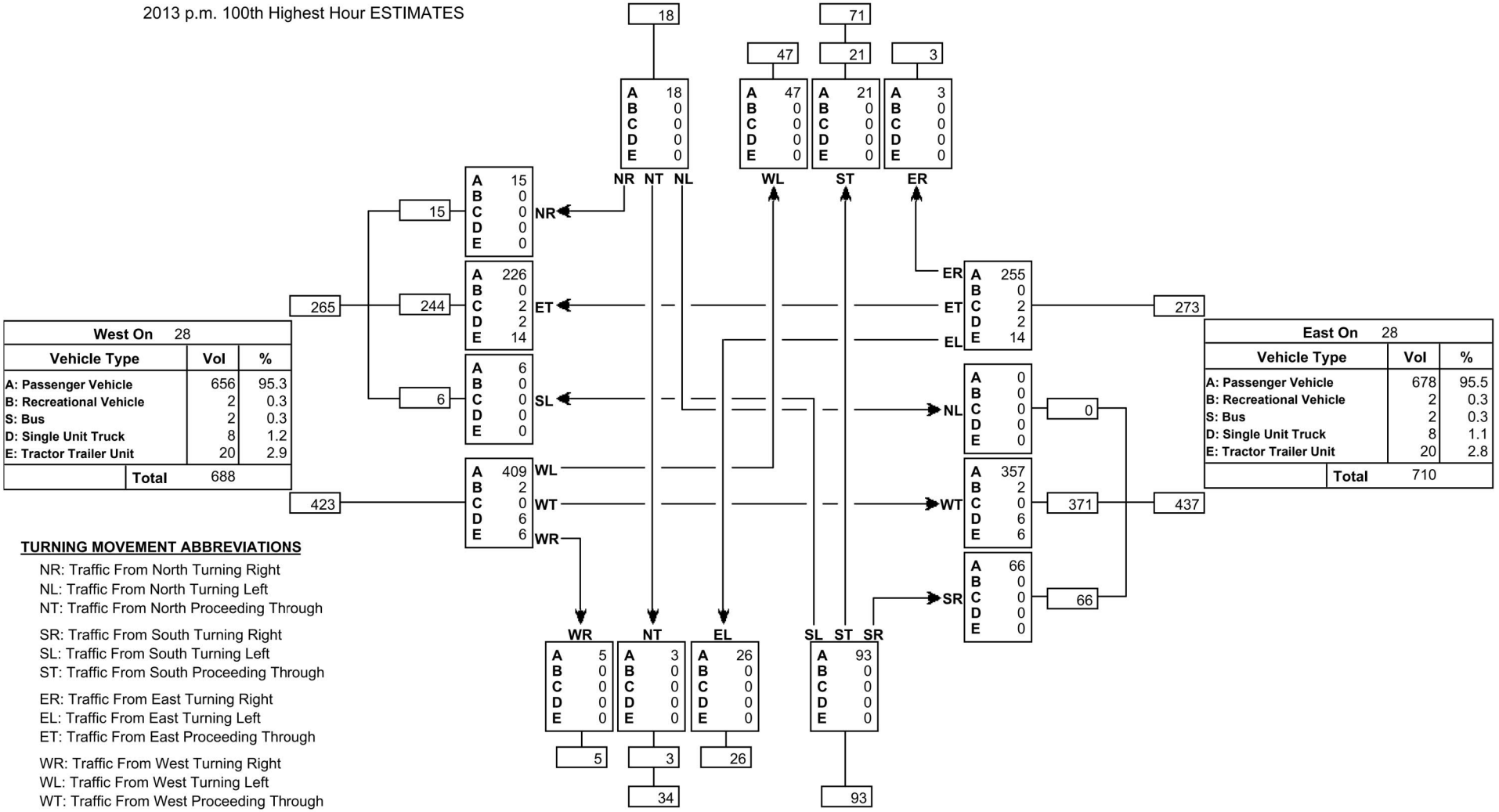
2013 p.m. 100th Highest Hour ESTIMATES

North On	Rge Rd 240	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	89	100.0
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	89	

West On	28	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	656	95.3
B: Recreational Vehicle	2	0.3
S: Bus	2	0.3
D: Single Unit Truck	8	1.2
E: Tractor Trailer Unit	20	2.9
Total	688	

East On	28	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	678	95.5
B: Recreational Vehicle	2	0.3
S: Bus	2	0.3
D: Single Unit Truck	8	1.2
E: Tractor Trailer Unit	20	2.8
Total	710	

South On	Rge Rd 240	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	127	100.0
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	127	



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Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

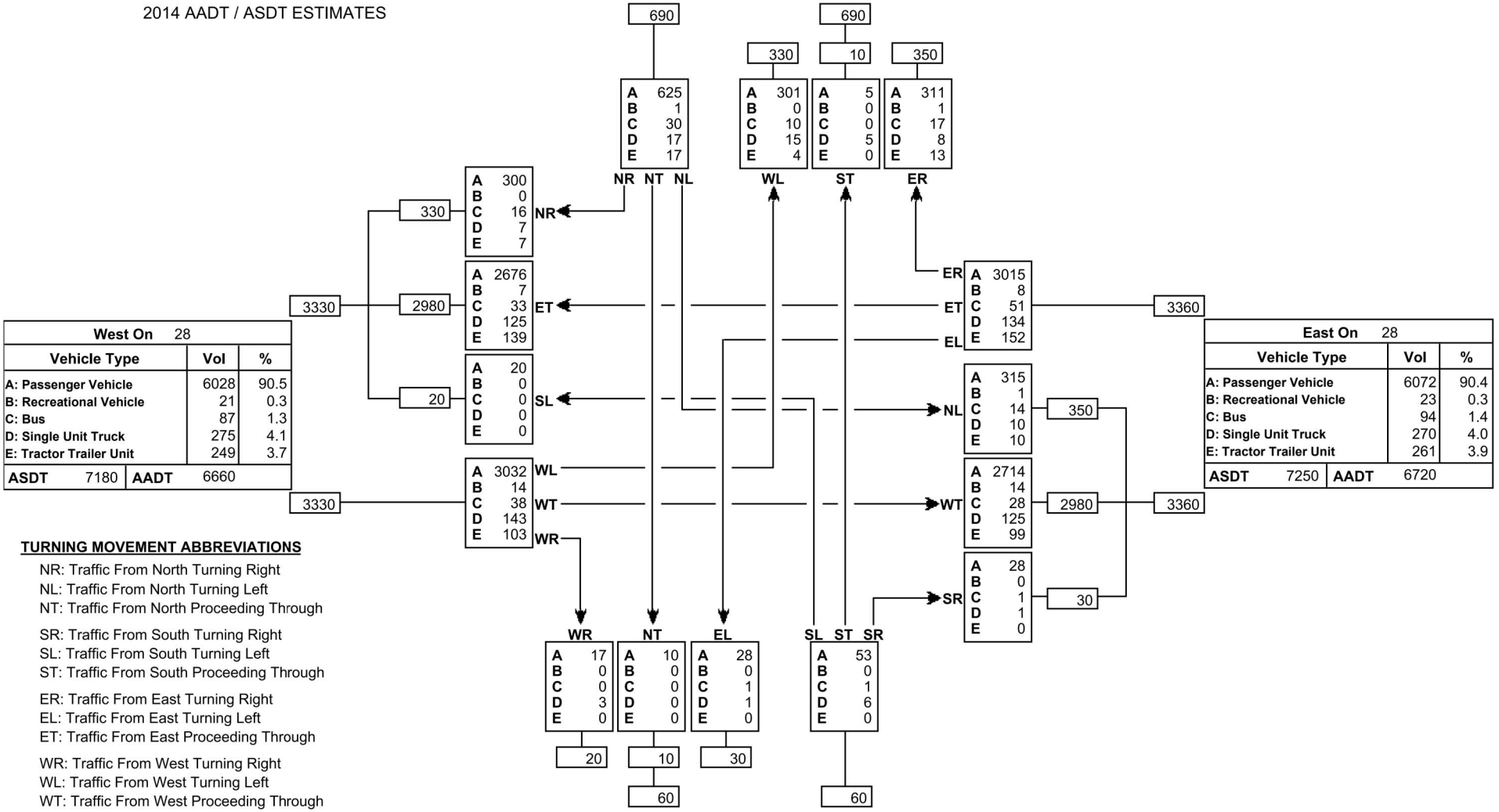
2014 AADT / ASDT ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1242	90.0
B: Recreational Vehicle	2	0.1
C: Bus	57	4.1
D: Single Unit Truck	45	3.3
E: Tractor Trailer Unit	34	2.5
ASDT 1490	**AADT** 1380	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6028	90.5
B: Recreational Vehicle	21	0.3
C: Bus	87	1.3
D: Single Unit Truck	275	4.1
E: Tractor Trailer Unit	249	3.7
ASDT 7180	**AADT** 6660	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6072	90.4
B: Recreational Vehicle	23	0.3
C: Bus	94	1.4
D: Single Unit Truck	270	4.0
E: Tractor Trailer Unit	261	3.9
ASDT 7250	**AADT** 6720	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	108	90.0
B: Recreational Vehicle	0	0.0
C: Bus	2	1.7
D: Single Unit Truck	10	8.3
E: Tractor Trailer Unit	0	0.0
ASDT 130	**AADT** 120	



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period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
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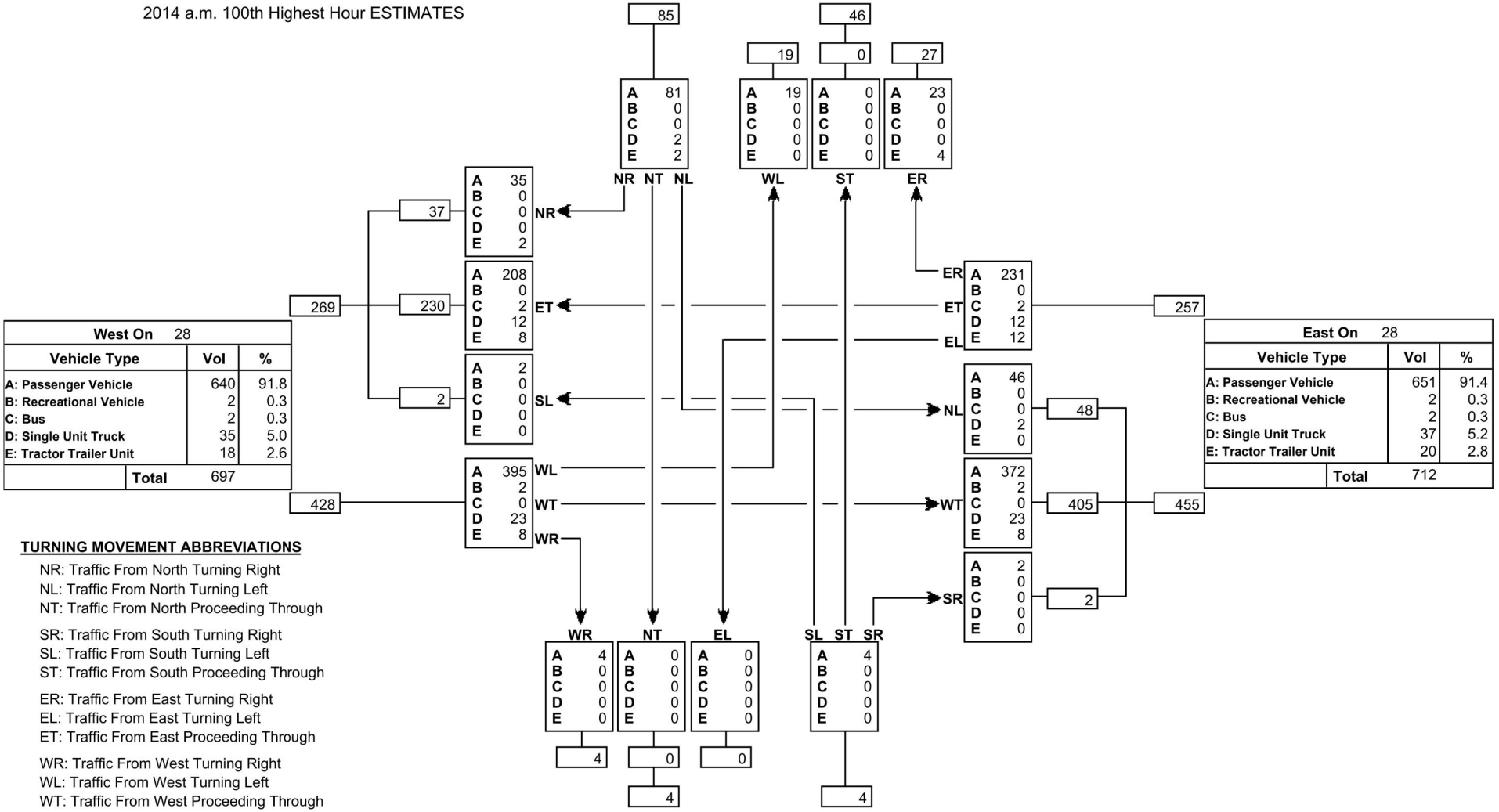
2014 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	123	93.9
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	2	1.5
E: Tractor Trailer Unit	6	4.6
Total	131	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	640	91.8
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	35	5.0
E: Tractor Trailer Unit	18	2.6
Total	697	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	651	91.4
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	37	5.2
E: Tractor Trailer Unit	20	2.8
Total	712	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	8	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	8	



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Turning Movement Summary Diagram

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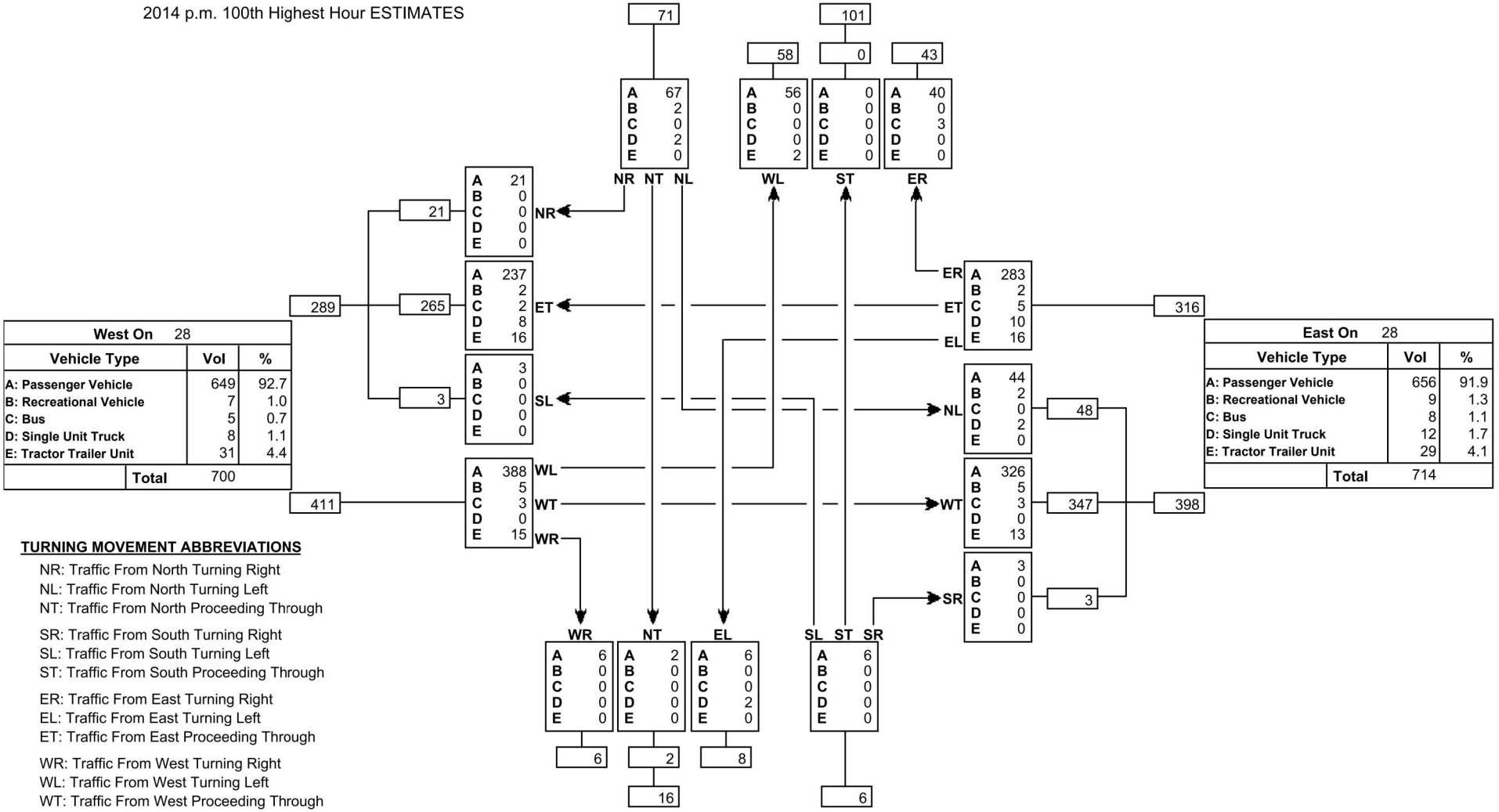
2014 p.m. 100th Highest Hour ESTIMATES

North On	Rge Rd 235	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	163	94.8
B: Recreational Vehicle	2	1.2
C: Bus	3	1.7
D: Single Unit Truck	2	1.2
E: Tractor Trailer Unit	2	1.2
Total	172	

West On	28	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	649	92.7
B: Recreational Vehicle	7	1.0
C: Bus	5	0.7
D: Single Unit Truck	8	1.1
E: Tractor Trailer Unit	31	4.4
Total	700	

East On	28	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	656	91.9
B: Recreational Vehicle	9	1.3
C: Bus	8	1.1
D: Single Unit Truck	12	1.7
E: Tractor Trailer Unit	29	4.1
Total	714	

South On	Rge Rd 235	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	20	90.9
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	2	9.1
E: Tractor Trailer Unit	0	0.0
Total	22	



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ET: Traffic From East Proceeding Through

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WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:

28 & BON ACCORD SCHOOL RD 12-56-24-400000000

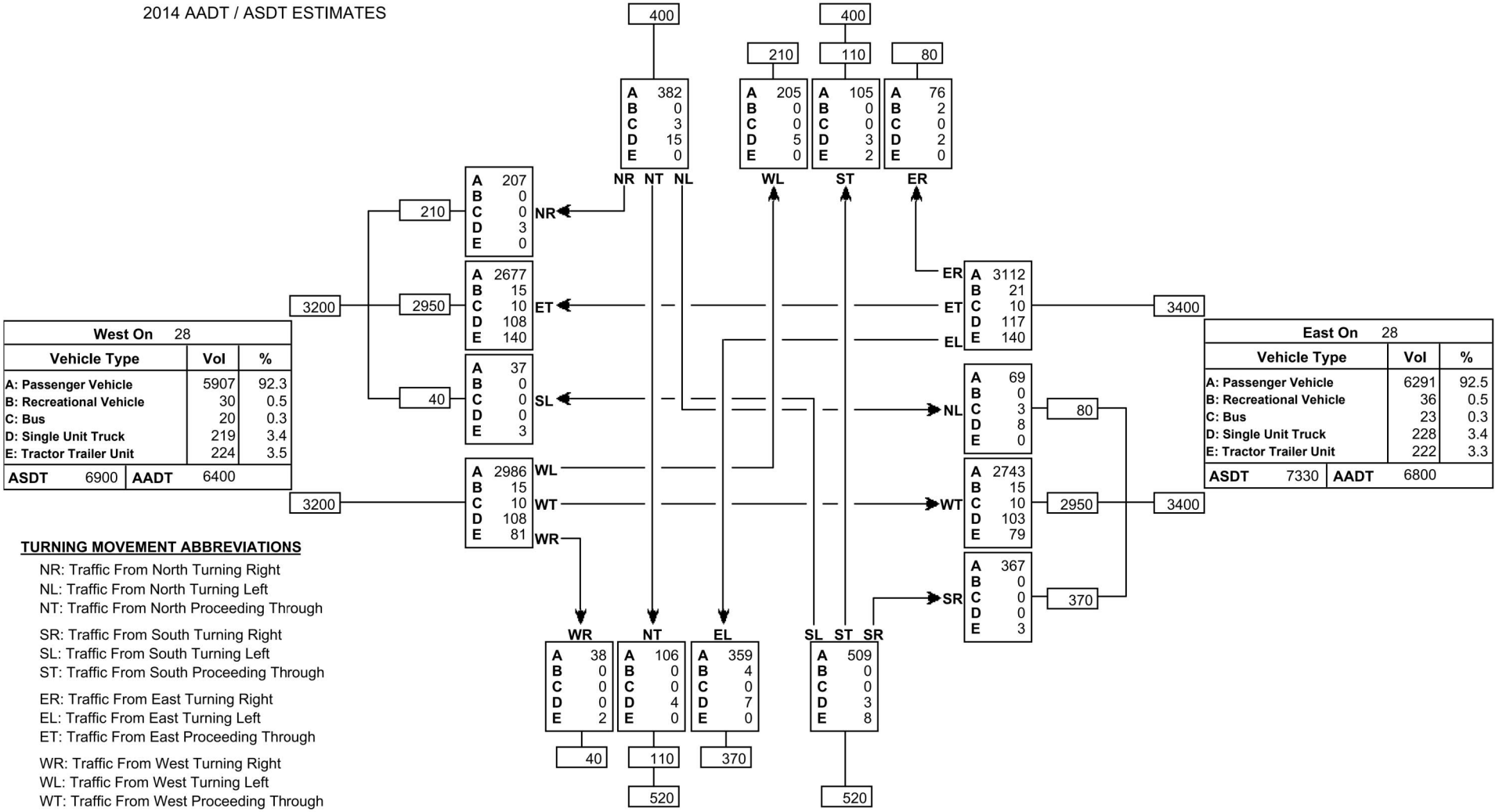
2014 AADT / ASDT ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	768	96.0
B: Recreational Vehicle	2	0.3
C: Bus	3	0.4
D: Single Unit Truck	25	3.1
E: Tractor Trailer Unit	2	0.3
ASDT 860	**AADT** 800	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5907	92.3
B: Recreational Vehicle	30	0.5
C: Bus	20	0.3
D: Single Unit Truck	219	3.4
E: Tractor Trailer Unit	224	3.5
ASDT 6900	**AADT** 6400	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6291	92.5
B: Recreational Vehicle	36	0.5
C: Bus	23	0.3
D: Single Unit Truck	228	3.4
E: Tractor Trailer Unit	222	3.3
ASDT 7330	**AADT** 6800	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1012	97.3
B: Recreational Vehicle	4	0.4
C: Bus	0	0.0
D: Single Unit Truck	14	1.3
E: Tractor Trailer Unit	10	1.0
ASDT 1120	**AADT** 1040	



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
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TURNING MOVEMENT ABBREVIATIONS

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Average daily traffic expressed as vehicles per day fo
period of January 1 to December 31 (365 days)

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Average daily traffic expressed as vehicles per day fo
period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

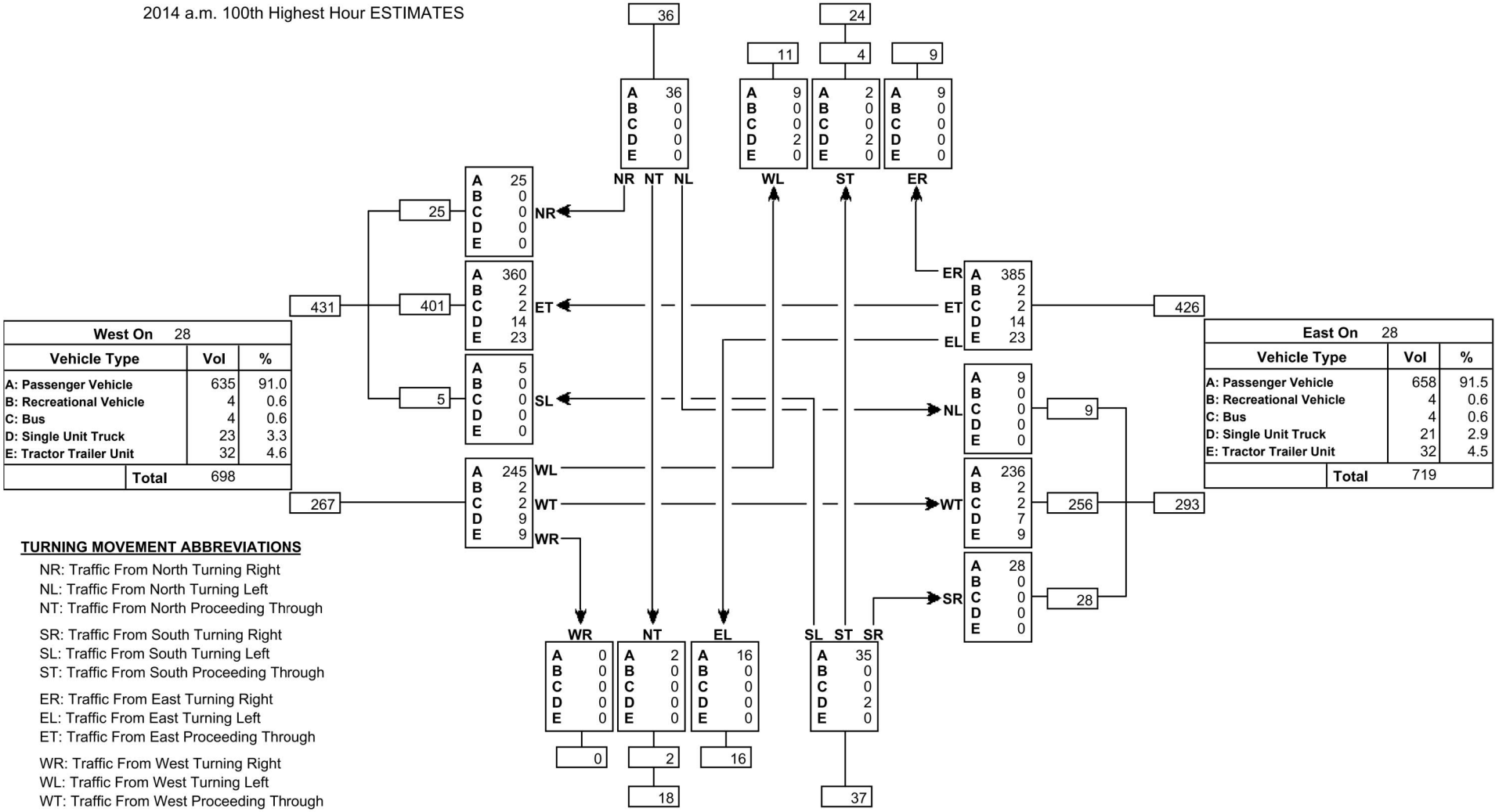
2014 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	56	93.3
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	4	6.7
E: Tractor Trailer Unit	0	0.0
Total	60	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	635	91.0
B: Recreational Vehicle	4	0.6
C: Bus	4	0.6
D: Single Unit Truck	23	3.3
E: Tractor Trailer Unit	32	4.6
Total	698	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	658	91.5
B: Recreational Vehicle	4	0.6
C: Bus	4	0.6
D: Single Unit Truck	21	2.9
E: Tractor Trailer Unit	32	4.5
Total	719	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	53	96.4
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	2	3.6
E: Tractor Trailer Unit	0	0.0
Total	55	



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Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

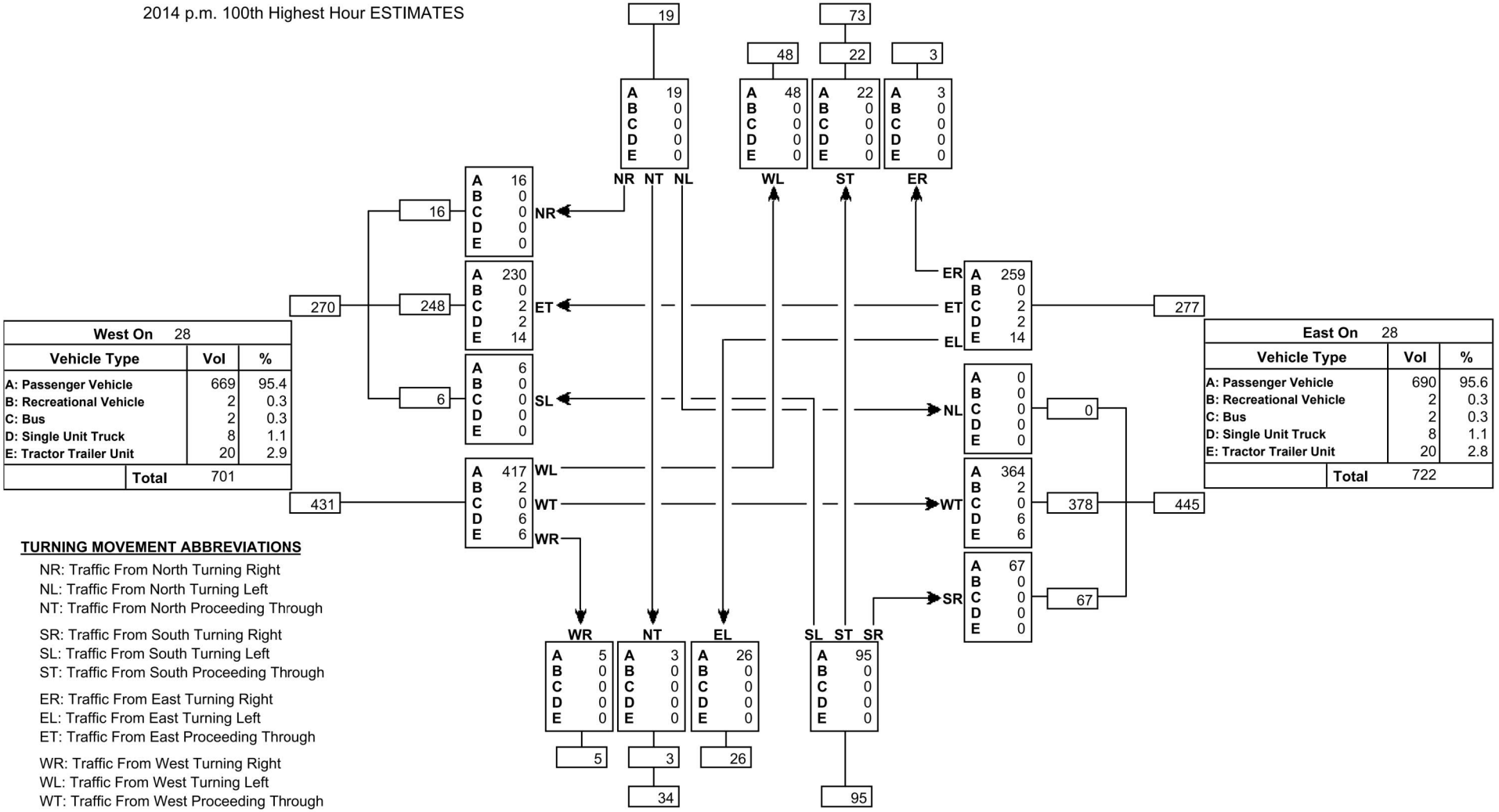
2014 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	92	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	92	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	669	95.4
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	8	1.1
E: Tractor Trailer Unit	20	2.9
Total	701	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	690	95.6
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	8	1.1
E: Tractor Trailer Unit	20	2.8
Total	722	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	129	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	129	



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Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:

28 & LILY LAKE RD 7-56-23-400000000

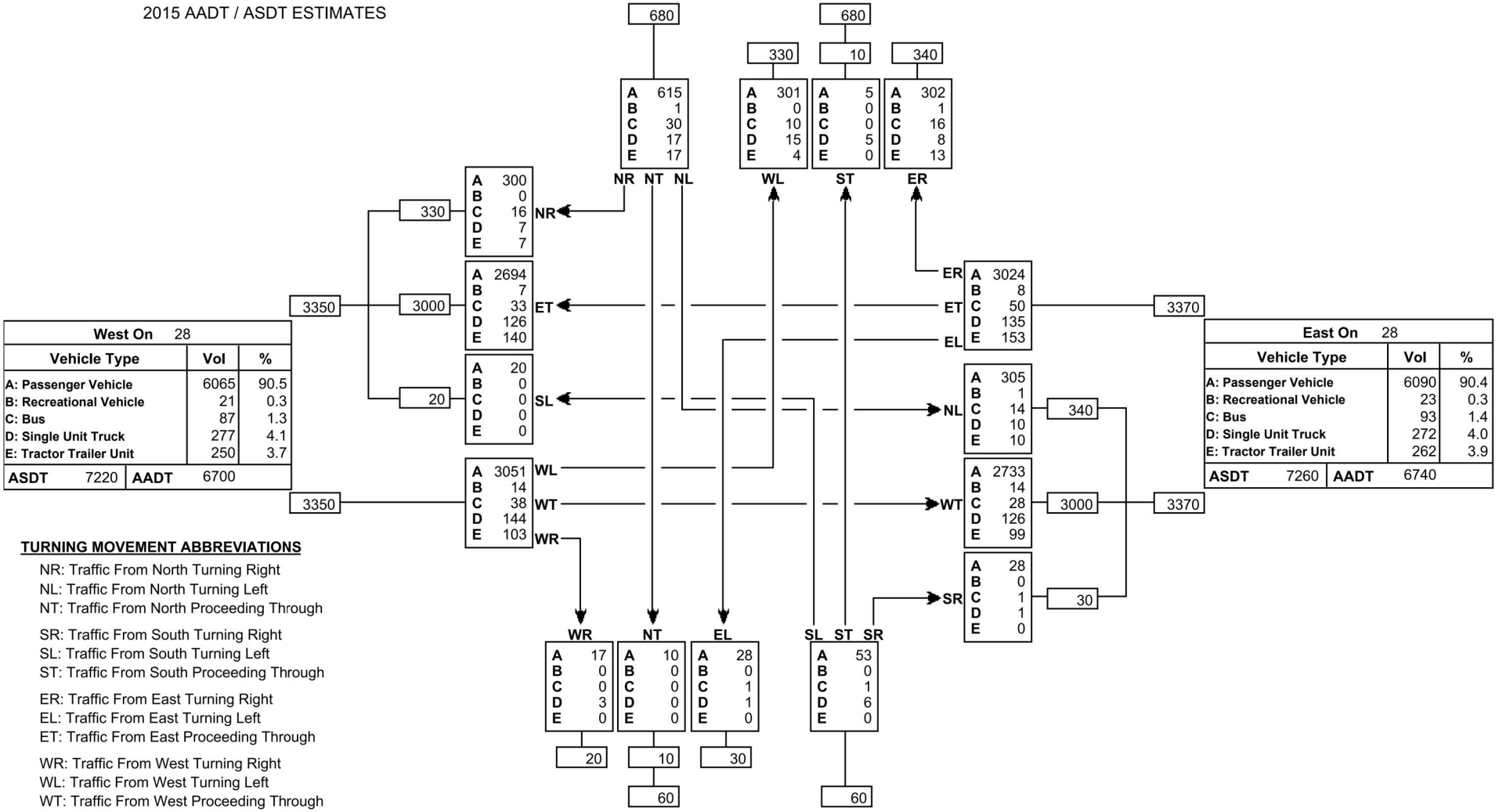
2015 AADT / ASDT ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1223	89.9
B: Recreational Vehicle	2	0.1
C: Bus	56	4.1
D: Single Unit Truck	45	3.3
E: Tractor Trailer Unit	34	2.5
ASDT 1470	**AADT** 1360	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6065	90.5
B: Recreational Vehicle	21	0.3
C: Bus	87	1.3
D: Single Unit Truck	277	4.1
E: Tractor Trailer Unit	250	3.7
ASDT 7220	**AADT** 6700	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6090	90.4
B: Recreational Vehicle	23	0.3
C: Bus	93	1.4
D: Single Unit Truck	272	4.0
E: Tractor Trailer Unit	262	3.9
ASDT 7260	**AADT** 6740	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	108	90.0
B: Recreational Vehicle	0	0.0
C: Bus	2	1.7
D: Single Unit Truck	10	8.3
E: Tractor Trailer Unit	0	0.0
ASDT 130	**AADT** 120	



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Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

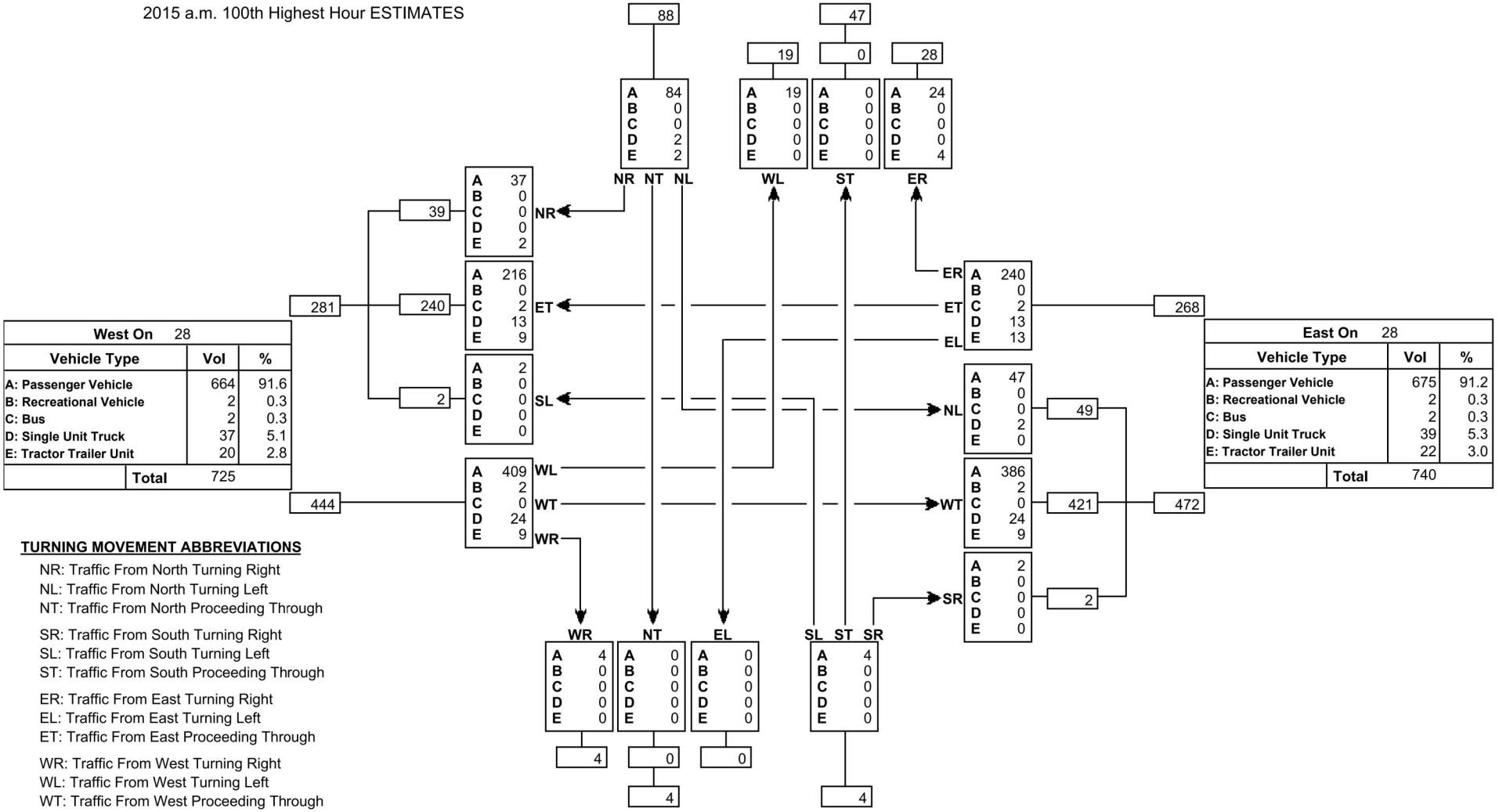
2015 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	127	94.1
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	2	1.5
E: Tractor Trailer Unit	6	4.4
Total	135	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	664	91.6
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	37	5.1
E: Tractor Trailer Unit	20	2.8
Total	725	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	675	91.2
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	39	5.3
E: Tractor Trailer Unit	22	3.0
Total	740	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	8	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	8	



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Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

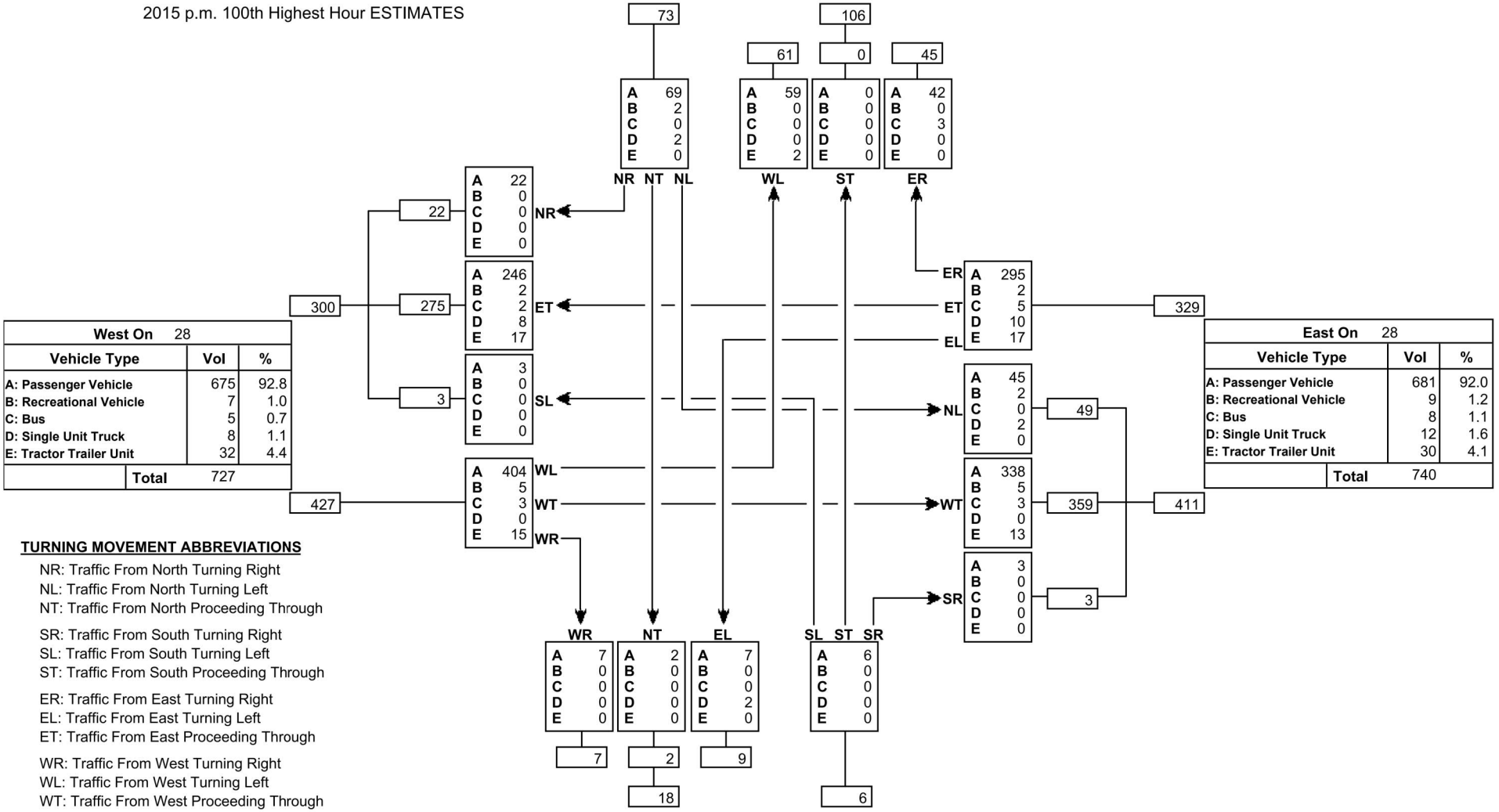
2015 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	170	95.0
B: Recreational Vehicle	2	1.1
C: Bus	3	1.7
D: Single Unit Truck	2	1.1
E: Tractor Trailer Unit	2	1.1
Total	179	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	675	92.8
B: Recreational Vehicle	7	1.0
C: Bus	5	0.7
D: Single Unit Truck	8	1.1
E: Tractor Trailer Unit	32	4.4
Total	727	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	681	92.0
B: Recreational Vehicle	9	1.2
C: Bus	8	1.1
D: Single Unit Truck	12	1.6
E: Tractor Trailer Unit	30	4.1
Total	740	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	22	91.7
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	2	8.3
E: Tractor Trailer Unit	0	0.0
Total	24	



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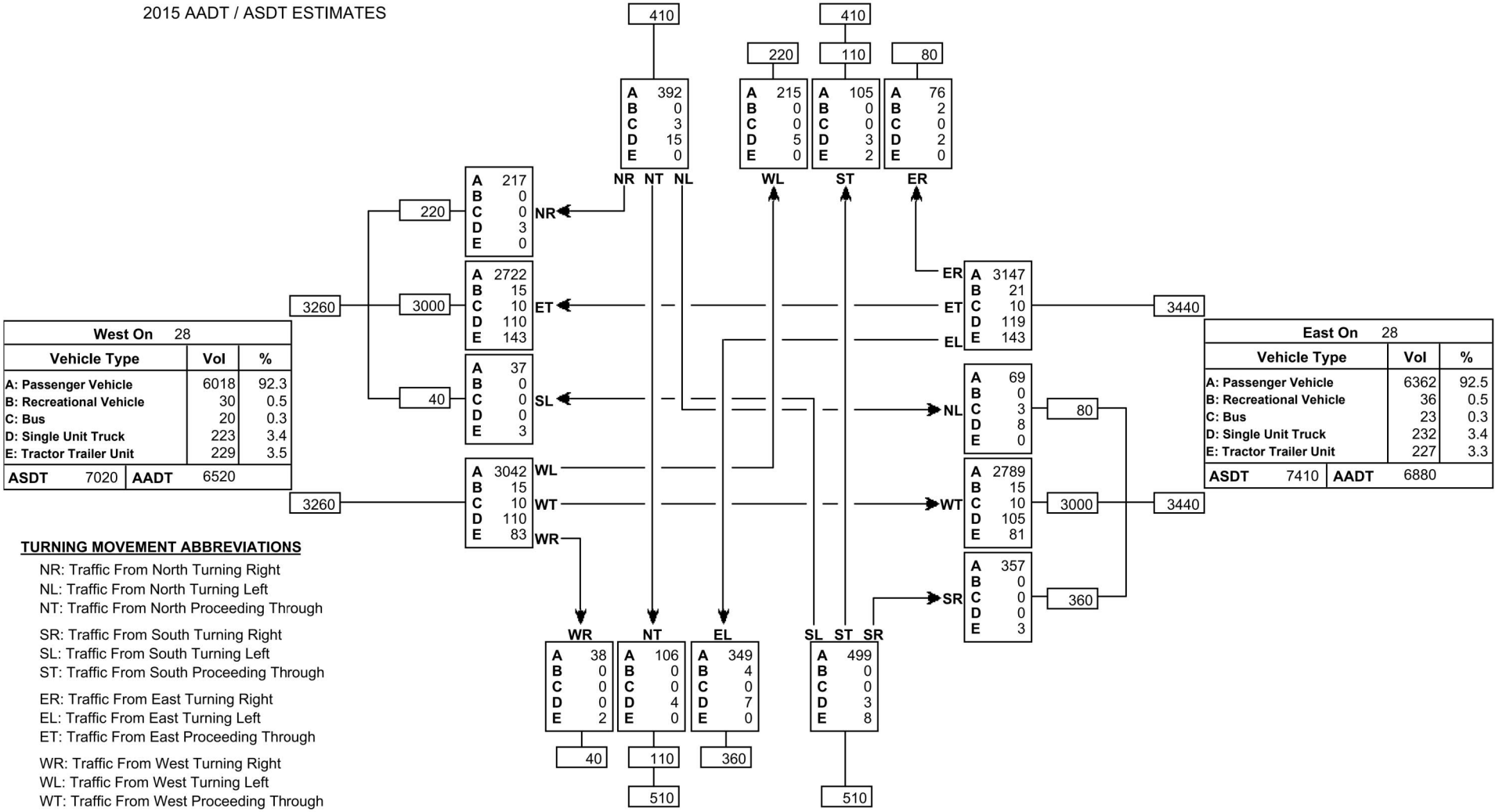
Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:

28 & BON ACCORD SCHOOL RD 12-56-24-400000000

2015 AADT / ASDT ESTIMATES



West On 28

Vehicle Type	Vol	%
A: Passenger Vehicle	6018	92.3
B: Recreational Vehicle	30	0.5
C: Bus	20	0.3
D: Single Unit Truck	223	3.4
E: Tractor Trailer Unit	229	3.5
ASDT 7020	**AADT** 6520	

East On 28

Vehicle Type	Vol	%
A: Passenger Vehicle	6362	92.5
B: Recreational Vehicle	36	0.5
C: Bus	23	0.3
D: Single Unit Truck	232	3.4
E: Tractor Trailer Unit	227	3.3
ASDT 7410	**AADT** 6880	

North On Rge Rd 240

Vehicle Type	Vol	%
A: Passenger Vehicle	788	96.1
B: Recreational Vehicle	2	0.2
C: Bus	3	0.4
D: Single Unit Truck	25	3.0
E: Tractor Trailer Unit	2	0.2
ASDT 880	**AADT** 820	

South On Rge Rd 240

Vehicle Type	Vol	%
A: Passenger Vehicle	992	97.3
B: Recreational Vehicle	4	0.4
C: Bus	0	0.0
D: Single Unit Truck	14	1.4
E: Tractor Trailer Unit	10	1.0
ASDT 1100	**AADT** 1020	

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Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

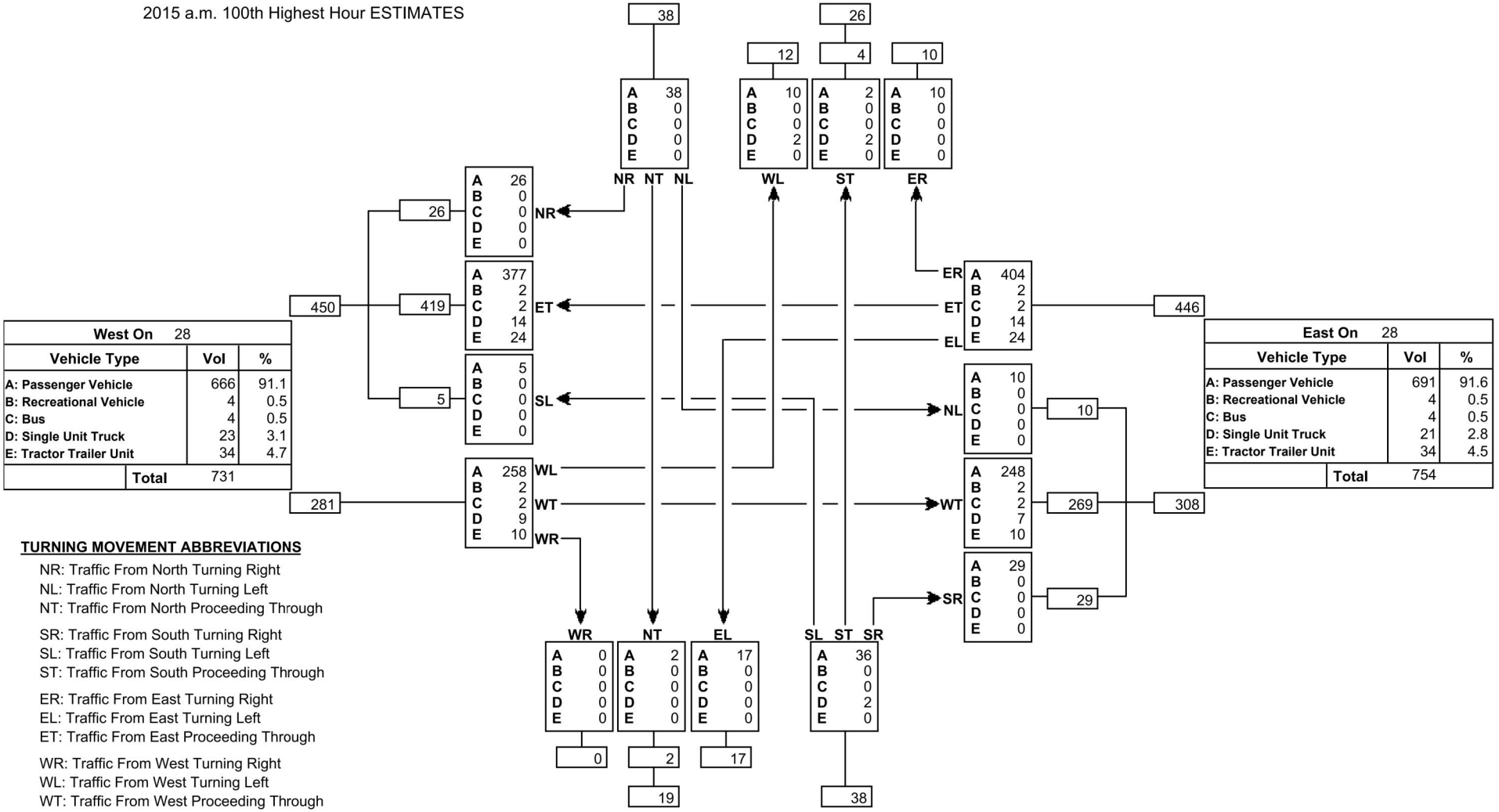
2015 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	60	93.8
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	4	6.3
E: Tractor Trailer Unit	0	0.0
Total	64	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	666	91.1
B: Recreational Vehicle	4	0.5
C: Bus	4	0.5
D: Single Unit Truck	23	3.1
E: Tractor Trailer Unit	34	4.7
Total	731	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	691	91.6
B: Recreational Vehicle	4	0.5
C: Bus	4	0.5
D: Single Unit Truck	21	2.8
E: Tractor Trailer Unit	34	4.5
Total	754	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	55	96.5
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	2	3.5
E: Tractor Trailer Unit	0	0.0
Total	57	



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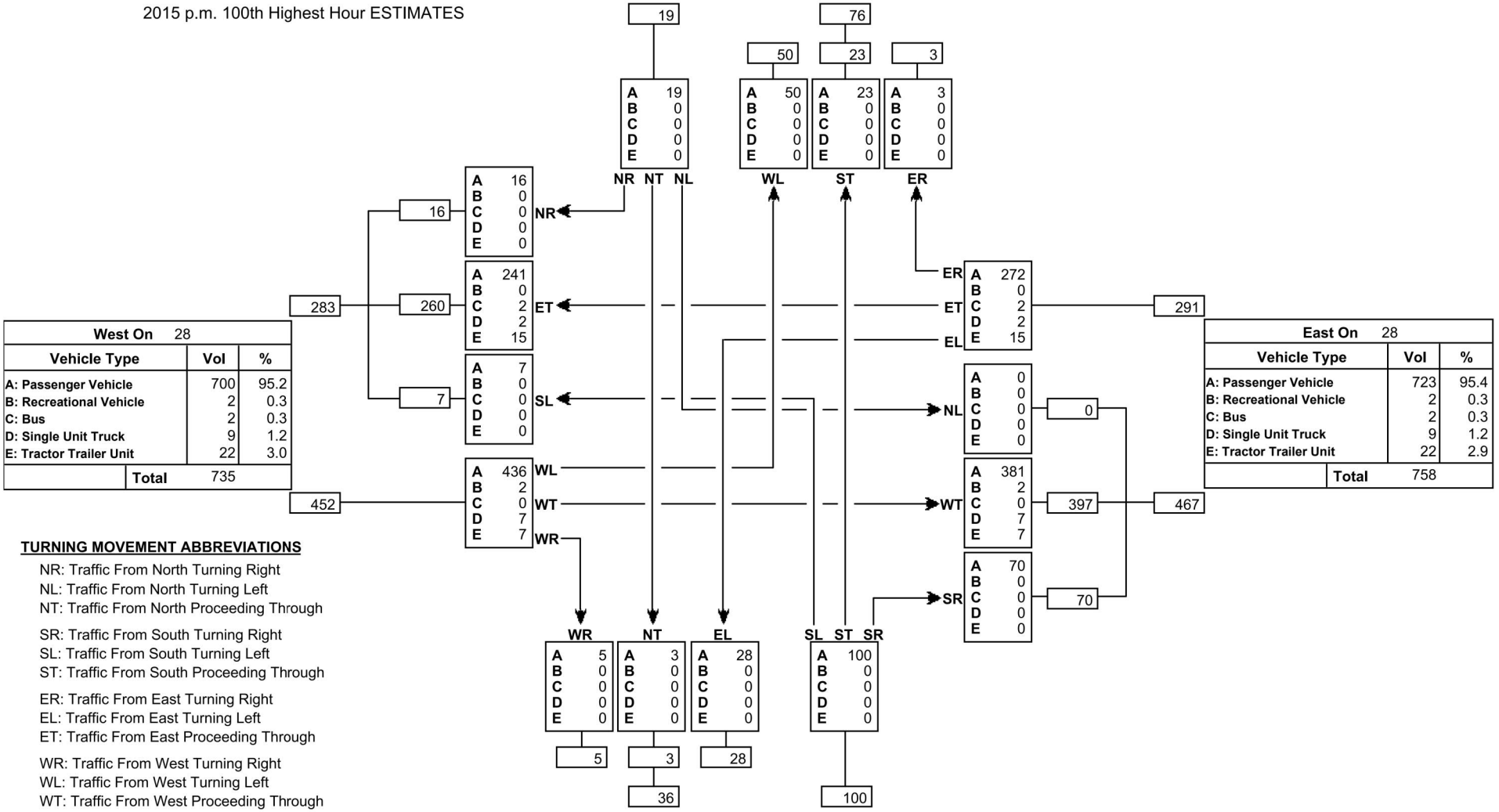
2015 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	95	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	95	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	700	95.2
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	9	1.2
E: Tractor Trailer Unit	22	3.0
Total	735	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	723	95.4
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	9	1.2
E: Tractor Trailer Unit	22	2.9
Total	758	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	136	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	136	



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Turning Movement Summary Diagram

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Intersection of:

28 & LILY LAKE RD 7-56-23-400000000

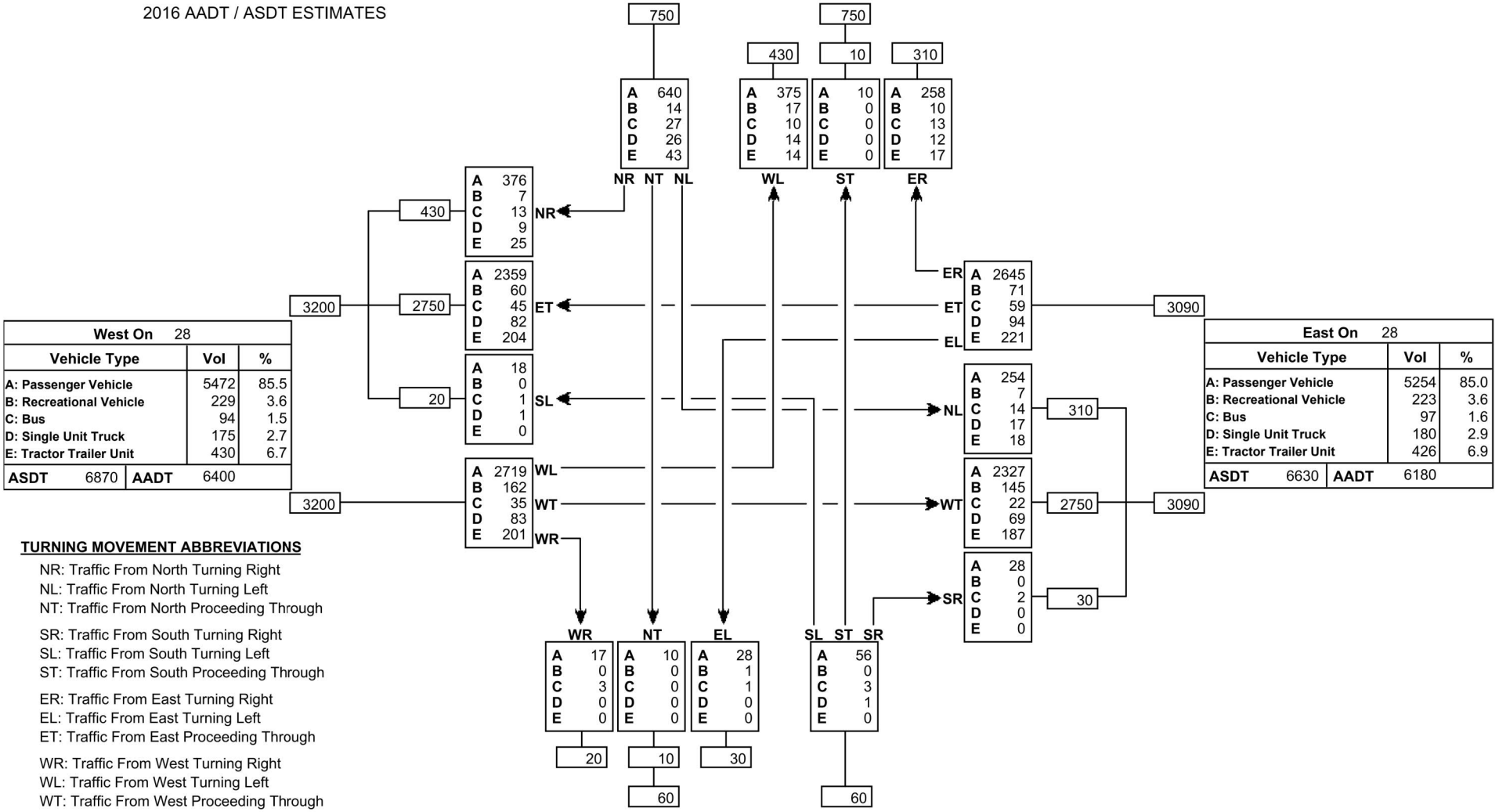
2016 AADT / ASDT ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1283	85.5
B: Recreational Vehicle	41	2.7
C: Bus	50	3.3
D: Single Unit Truck	52	3.5
E: Tractor Trailer Unit	74	4.9
ASDT 1610	**AADT** 1500	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5472	85.5
B: Recreational Vehicle	229	3.6
C: Bus	94	1.5
D: Single Unit Truck	175	2.7
E: Tractor Trailer Unit	430	6.7
ASDT 6870	**AADT** 6400	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5254	85.0
B: Recreational Vehicle	223	3.6
C: Bus	97	1.6
D: Single Unit Truck	180	2.9
E: Tractor Trailer Unit	426	6.9
ASDT 6630	**AADT** 6180	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	111	92.5
B: Recreational Vehicle	1	0.8
C: Bus	7	5.8
D: Single Unit Truck	1	0.8
E: Tractor Trailer Unit	0	0.0
ASDT 130	**AADT** 120	



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Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

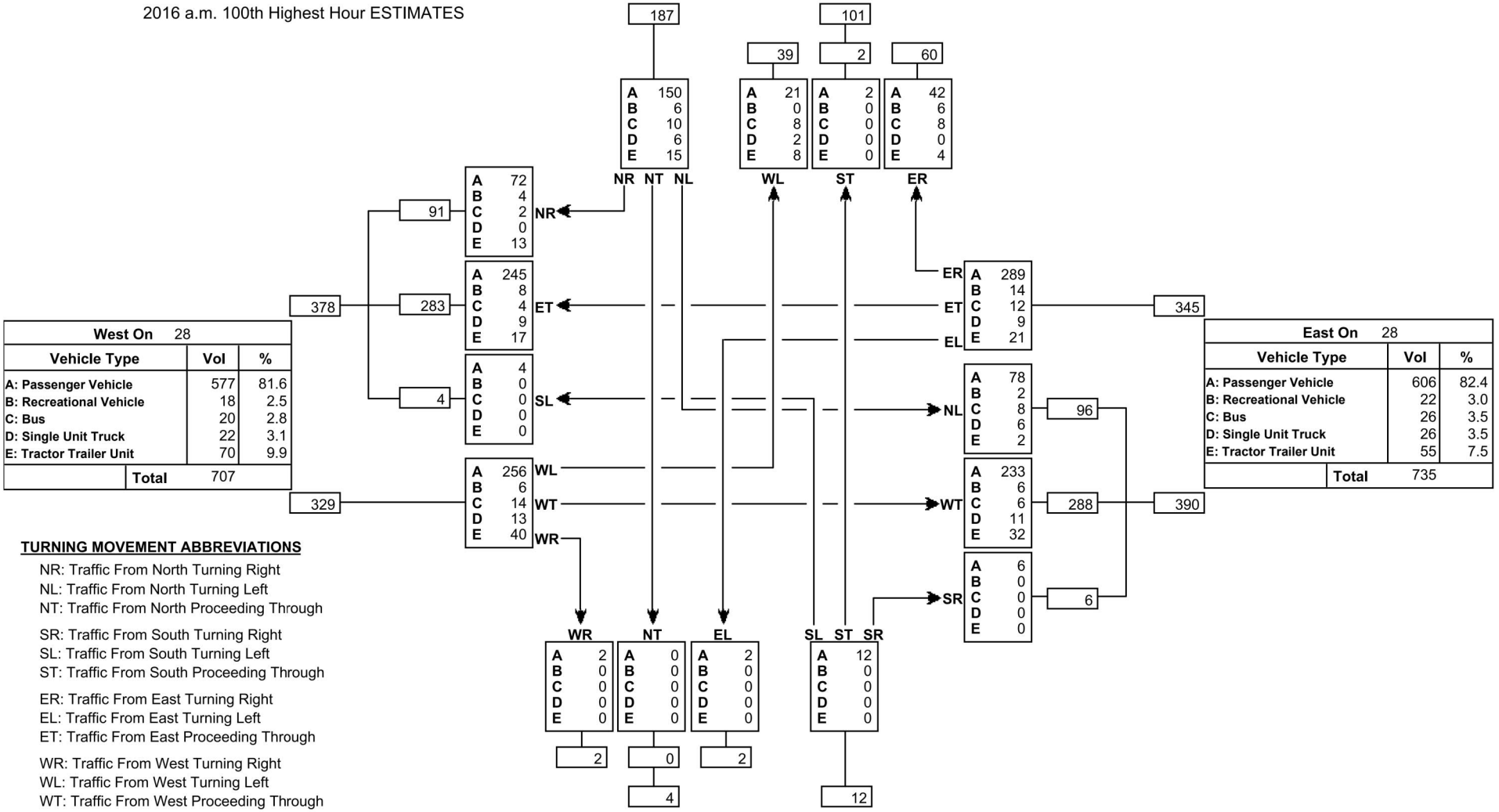
2016 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	215	74.7
B: Recreational Vehicle	12	4.2
C: Bus	26	9.0
D: Single Unit Truck	8	2.8
E: Tractor Trailer Unit	27	9.4
Total	288	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	577	81.6
B: Recreational Vehicle	18	2.5
C: Bus	20	2.8
D: Single Unit Truck	22	3.1
E: Tractor Trailer Unit	70	9.9
Total	707	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	606	82.4
B: Recreational Vehicle	22	3.0
C: Bus	26	3.5
D: Single Unit Truck	26	3.5
E: Tractor Trailer Unit	55	7.5
Total	735	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	16	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	16	



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Intersection of:
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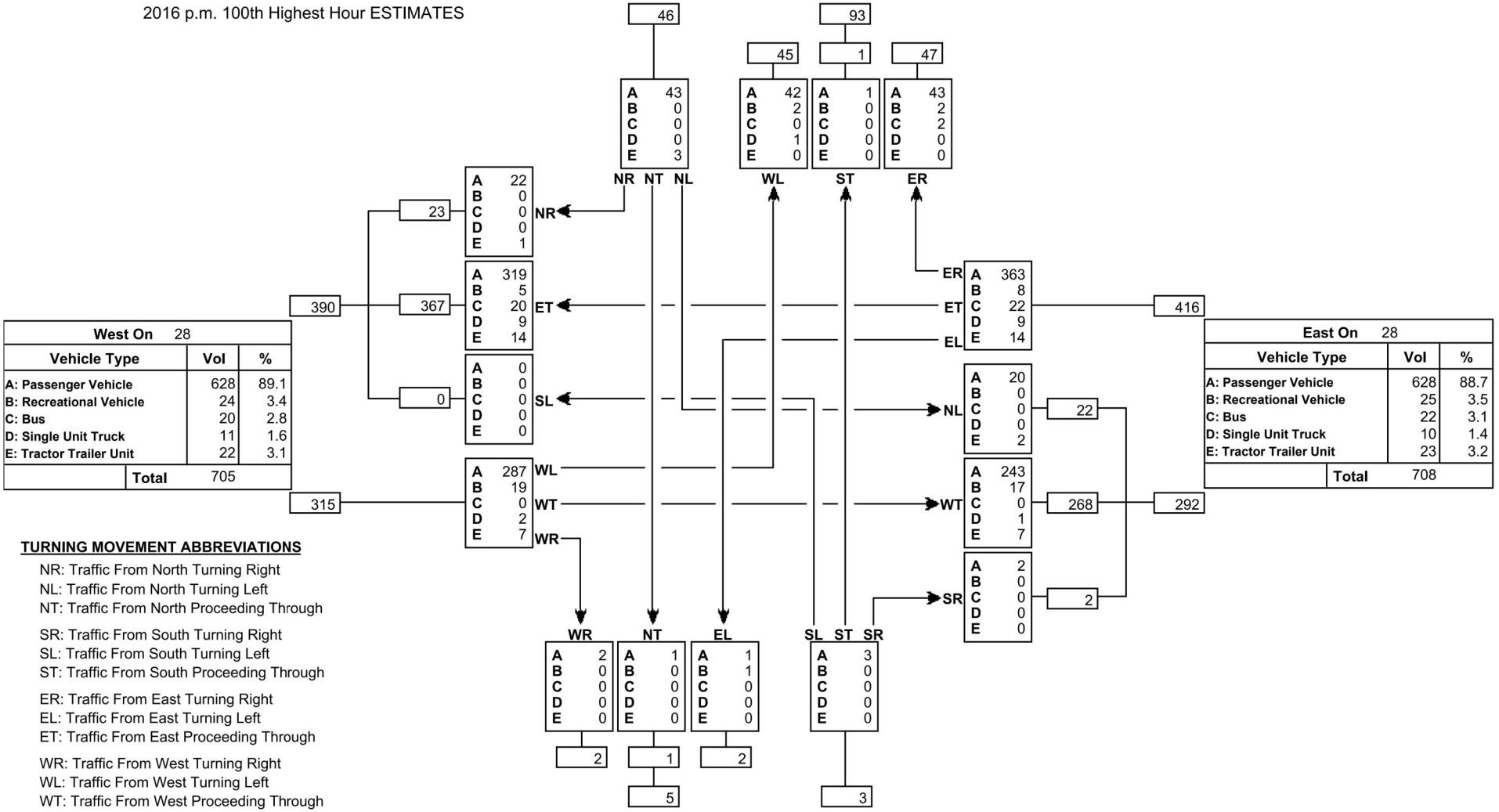
2016 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	129	92.8
B: Recreational Vehicle	4	2.9
C: Bus	2	1.4
D: Single Unit Truck	1	0.7
E: Tractor Trailer Unit	3	2.2
Total	139	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	628	89.1
B: Recreational Vehicle	24	3.4
C: Bus	20	2.8
D: Single Unit Truck	11	1.6
E: Tractor Trailer Unit	22	3.1
Total	705	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	628	88.7
B: Recreational Vehicle	25	3.5
C: Bus	22	3.1
D: Single Unit Truck	10	1.4
E: Tractor Trailer Unit	23	3.2
Total	708	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	7	87.5
B: Recreational Vehicle	1	12.5
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	8	



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Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

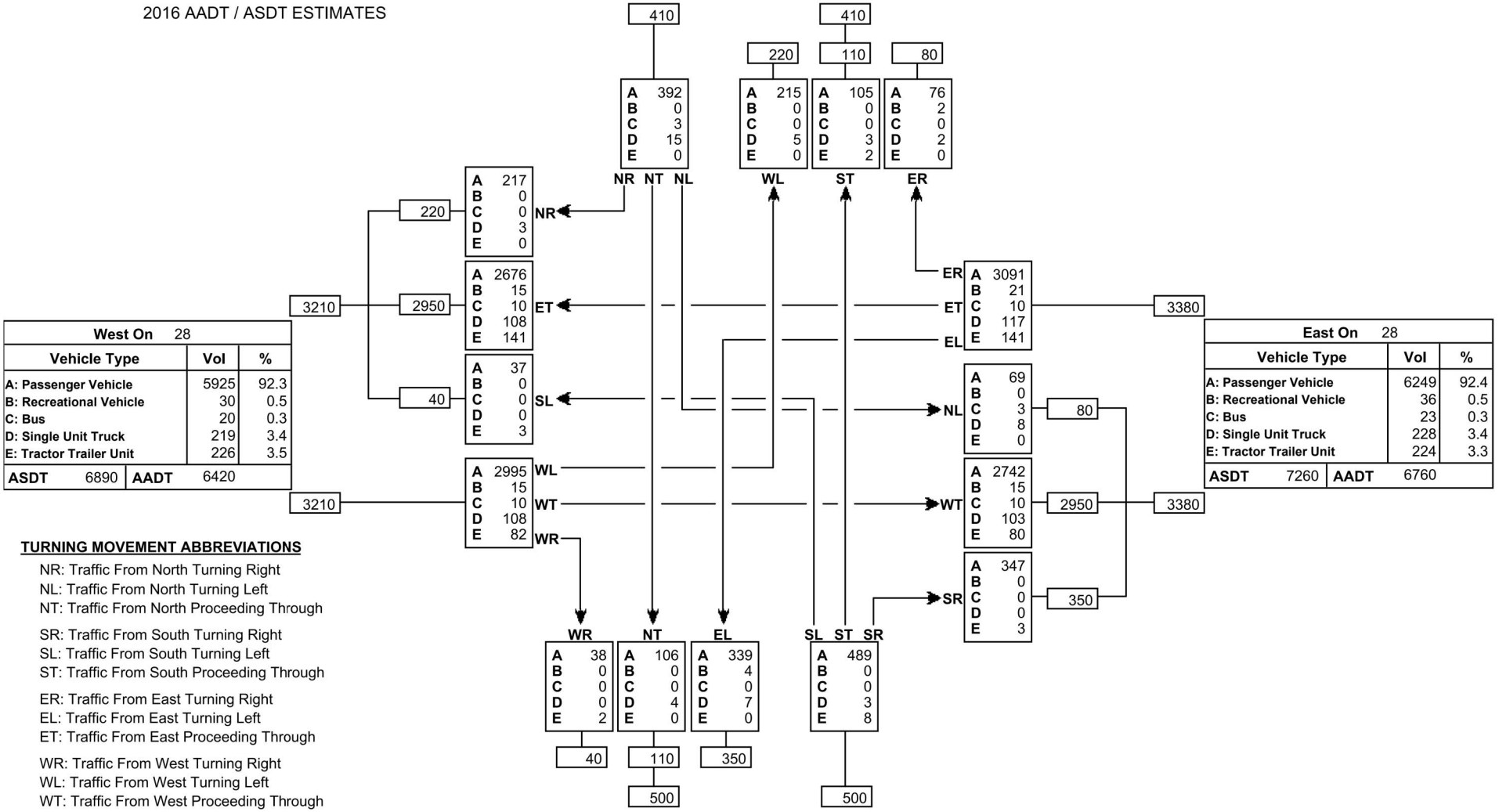
2016 AADT / ASDT ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	788	96.1
B: Recreational Vehicle	2	0.2
C: Bus	3	0.4
D: Single Unit Truck	25	3.0
E: Tractor Trailer Unit	2	0.2
ASDT 880	**AADT** 820	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5925	92.3
B: Recreational Vehicle	30	0.5
C: Bus	20	0.3
D: Single Unit Truck	219	3.4
E: Tractor Trailer Unit	226	3.5
ASDT 6890	**AADT** 6420	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6249	92.4
B: Recreational Vehicle	36	0.5
C: Bus	23	0.3
D: Single Unit Truck	228	3.4
E: Tractor Trailer Unit	224	3.3
ASDT 7260	**AADT** 6760	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	972	97.2
B: Recreational Vehicle	4	0.4
C: Bus	0	0.0
D: Single Unit Truck	14	1.4
E: Tractor Trailer Unit	10	1.0
ASDT 1070	**AADT** 1000	



TURNING MOVEMENT ABBREVIATIONS

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TURNING MOVEMENT ABBREVIATIONS

AADT: Average Annual Daily Traffic
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period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

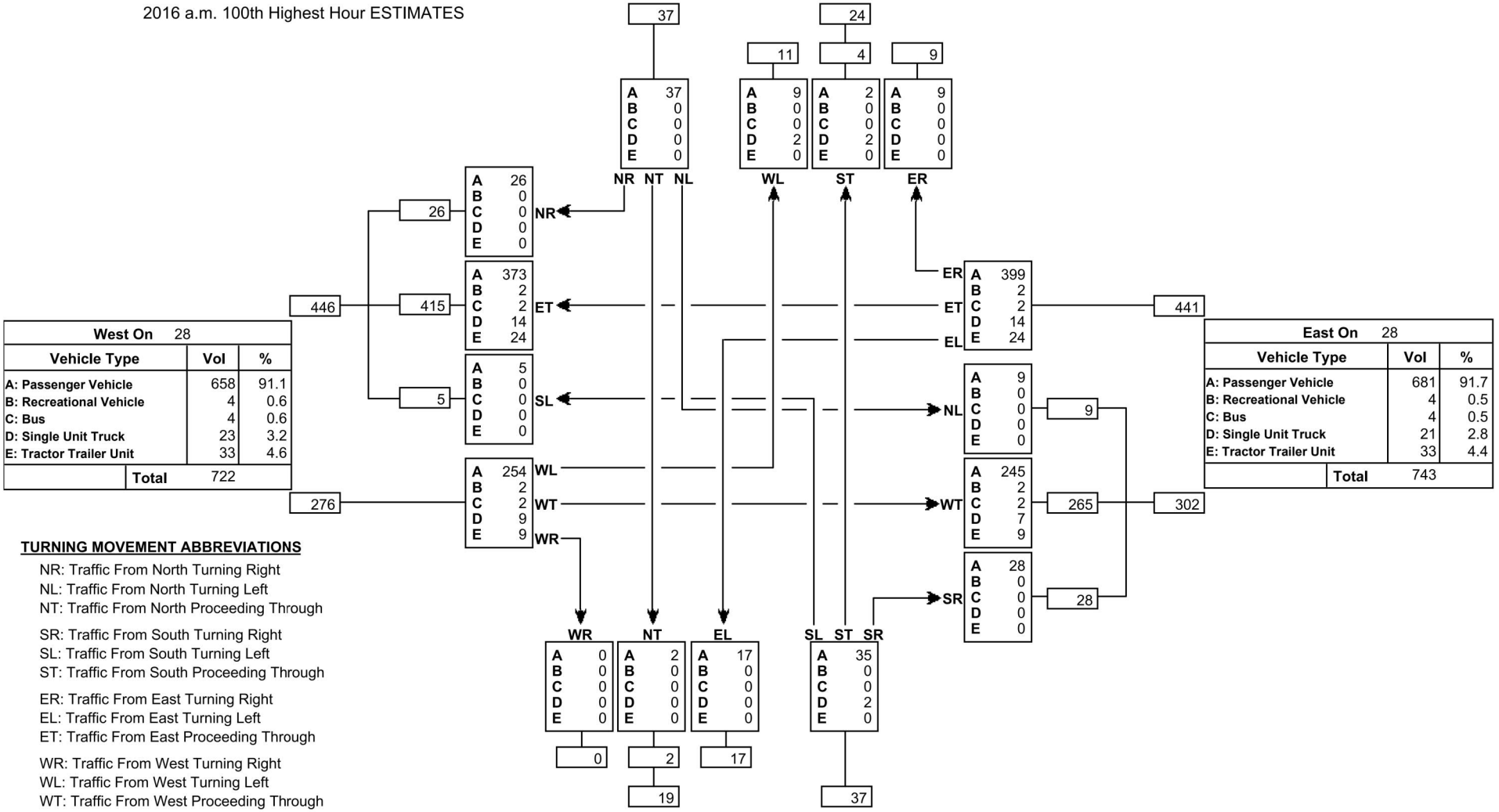
2016 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	57	93.4
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	4	6.6
E: Tractor Trailer Unit	0	0.0
Total	61	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	658	91.1
B: Recreational Vehicle	4	0.6
C: Bus	4	0.6
D: Single Unit Truck	23	3.2
E: Tractor Trailer Unit	33	4.6
Total	722	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	681	91.7
B: Recreational Vehicle	4	0.5
C: Bus	4	0.5
D: Single Unit Truck	21	2.8
E: Tractor Trailer Unit	33	4.4
Total	743	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	54	96.4
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	2	3.6
E: Tractor Trailer Unit	0	0.0
Total	56	



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Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

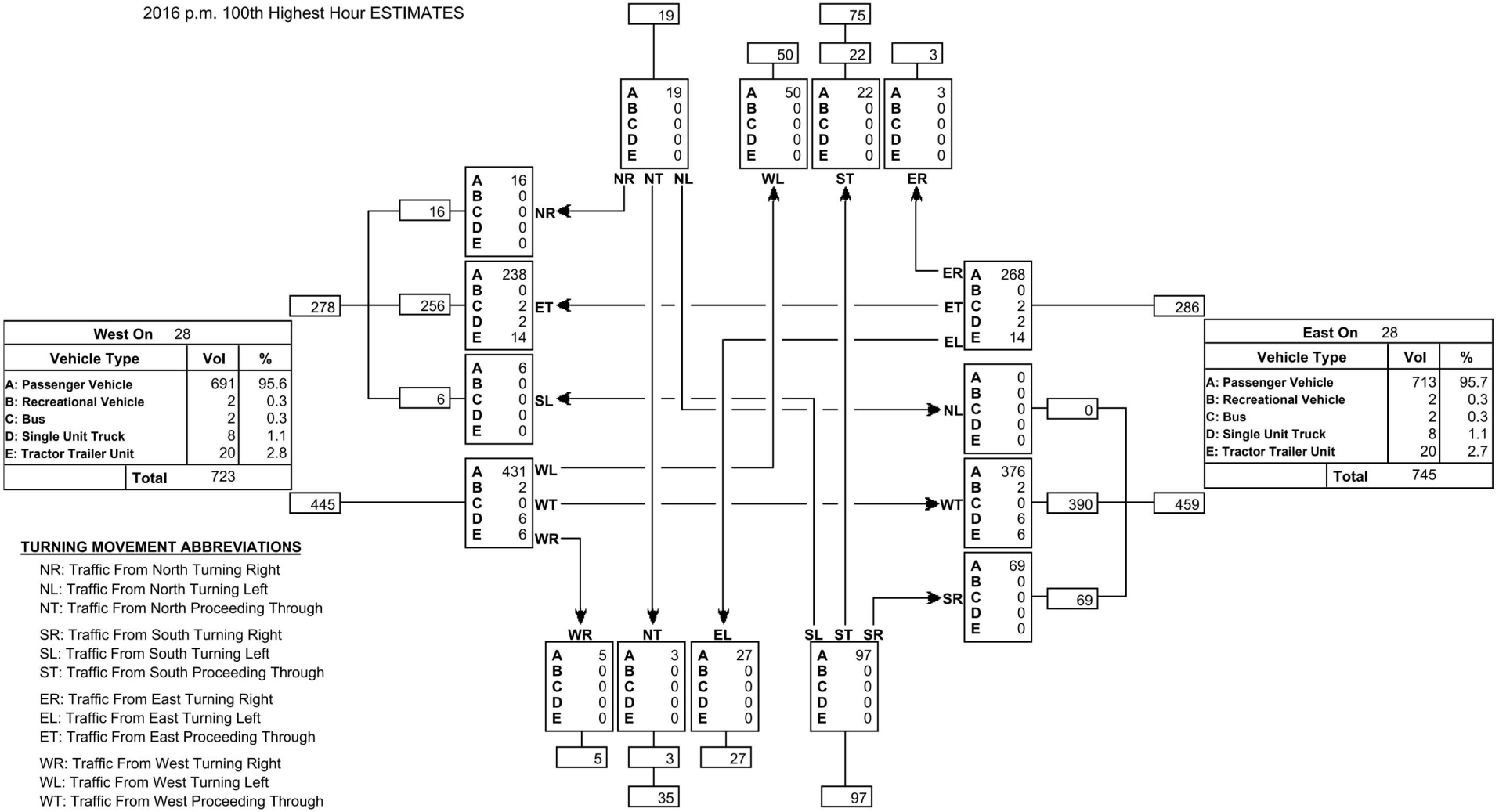
2016 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	94	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	94	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	691	95.6
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	8	1.1
E: Tractor Trailer Unit	20	2.8
Total	723	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	713	95.7
B: Recreational Vehicle	2	0.3
C: Bus	2	0.3
D: Single Unit Truck	8	1.1
E: Tractor Trailer Unit	20	2.7
Total	745	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	132	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	132	



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Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

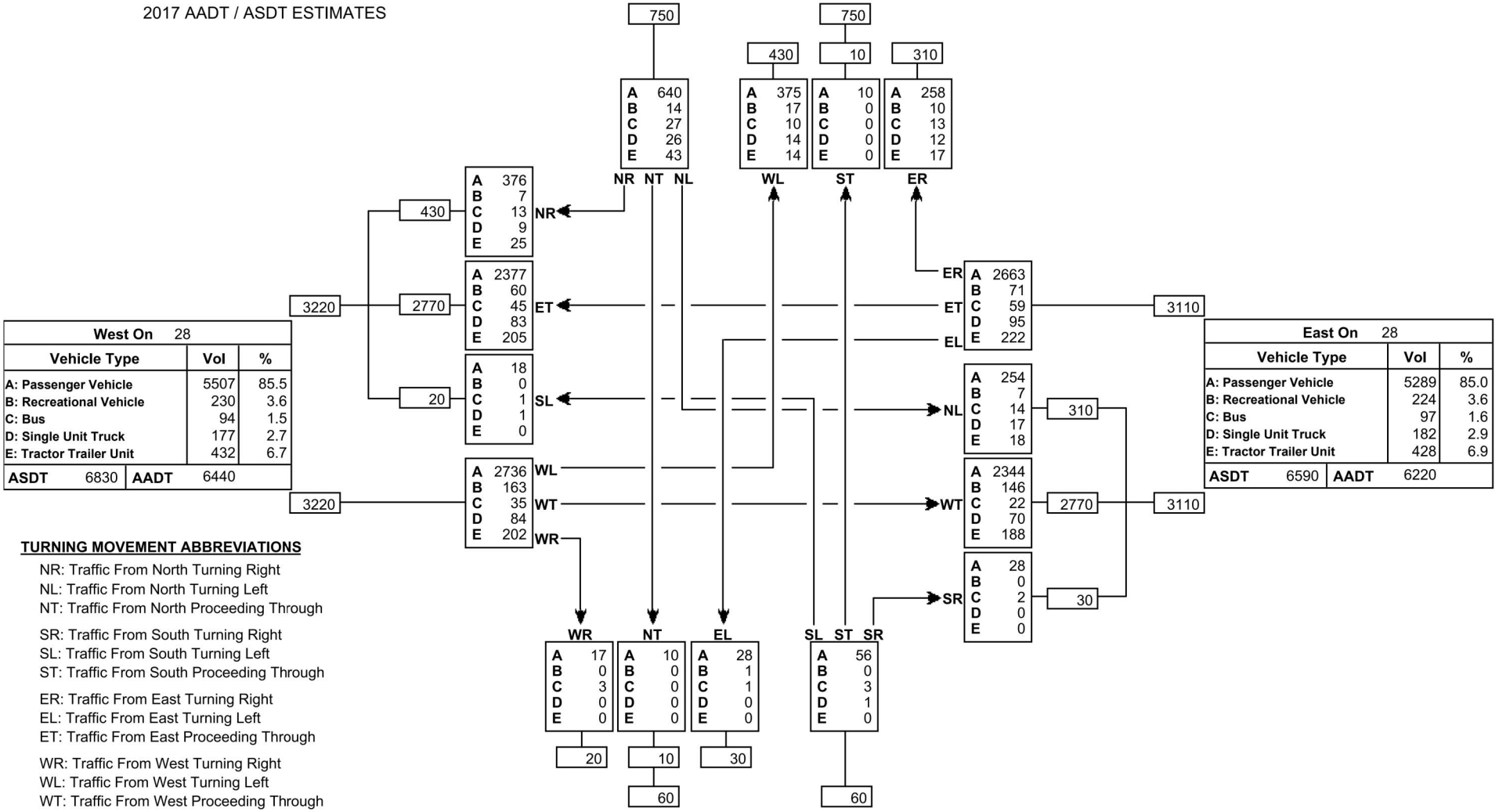
2017 AADT / ASDT ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1283	85.5
B: Recreational Vehicle	41	2.7
C: Bus	50	3.3
D: Single Unit Truck	52	3.5
E: Tractor Trailer Unit	74	4.9
ASDT 1590	**AADT** 1500	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5507	85.5
B: Recreational Vehicle	230	3.6
C: Bus	94	1.5
D: Single Unit Truck	177	2.7
E: Tractor Trailer Unit	432	6.7
ASDT 6830	**AADT** 6440	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5289	85.0
B: Recreational Vehicle	224	3.6
C: Bus	97	1.6
D: Single Unit Truck	182	2.9
E: Tractor Trailer Unit	428	6.9
ASDT 6590	**AADT** 6220	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	111	92.5
B: Recreational Vehicle	1	0.8
C: Bus	7	5.8
D: Single Unit Truck	1	0.8
E: Tractor Trailer Unit	0	0.0
ASDT 130	**AADT** 120	



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period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

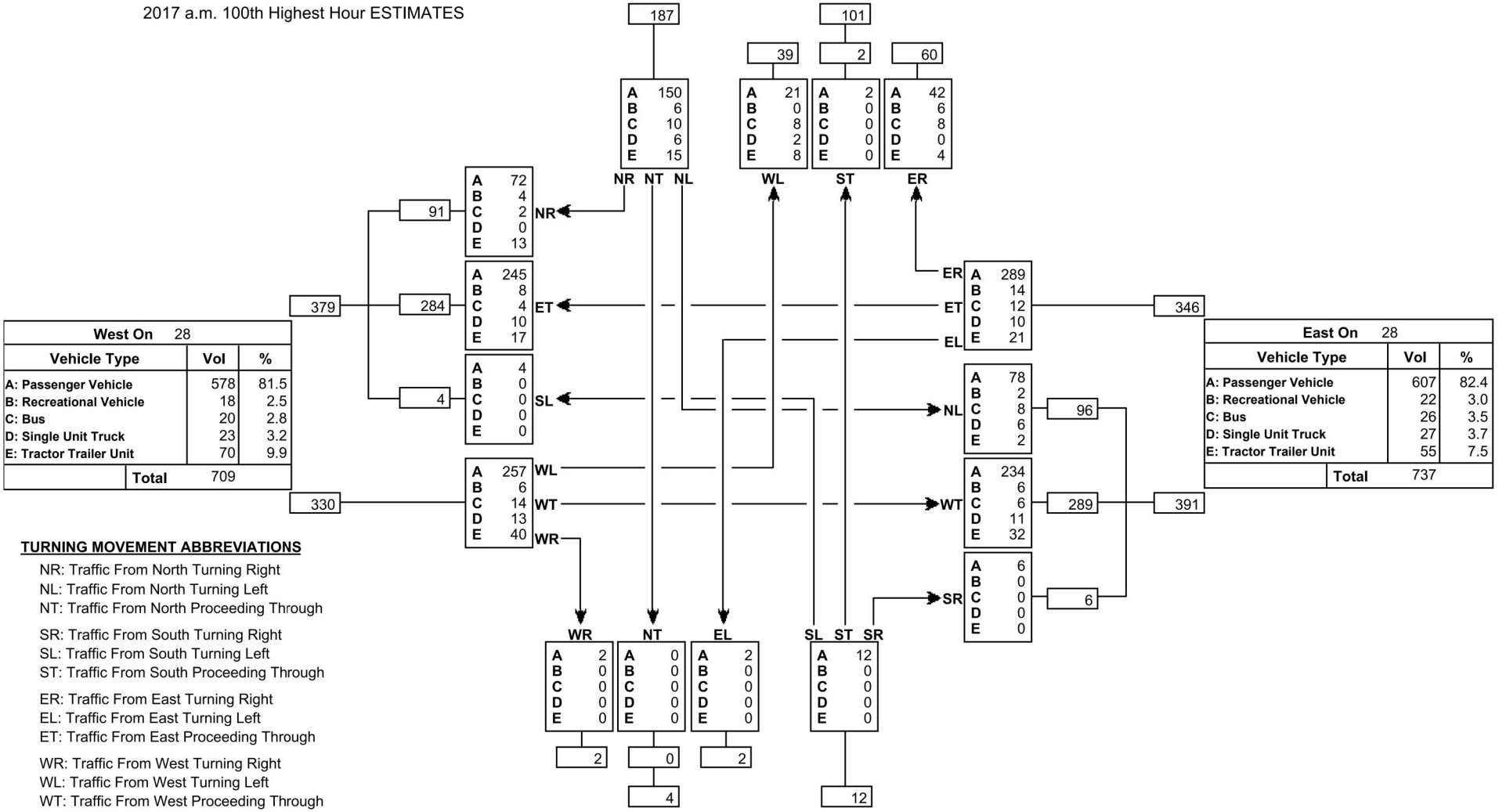
2017 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	215	74.7
B: Recreational Vehicle	12	4.2
C: Bus	26	9.0
D: Single Unit Truck	8	2.8
E: Tractor Trailer Unit	27	9.4
Total	288	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	578	81.5
B: Recreational Vehicle	18	2.5
C: Bus	20	2.8
D: Single Unit Truck	23	3.2
E: Tractor Trailer Unit	70	9.9
Total	709	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	607	82.4
B: Recreational Vehicle	22	3.0
C: Bus	26	3.5
D: Single Unit Truck	27	3.7
E: Tractor Trailer Unit	55	7.5
Total	737	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	16	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	16	



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Turning Movement Summary Diagram

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Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

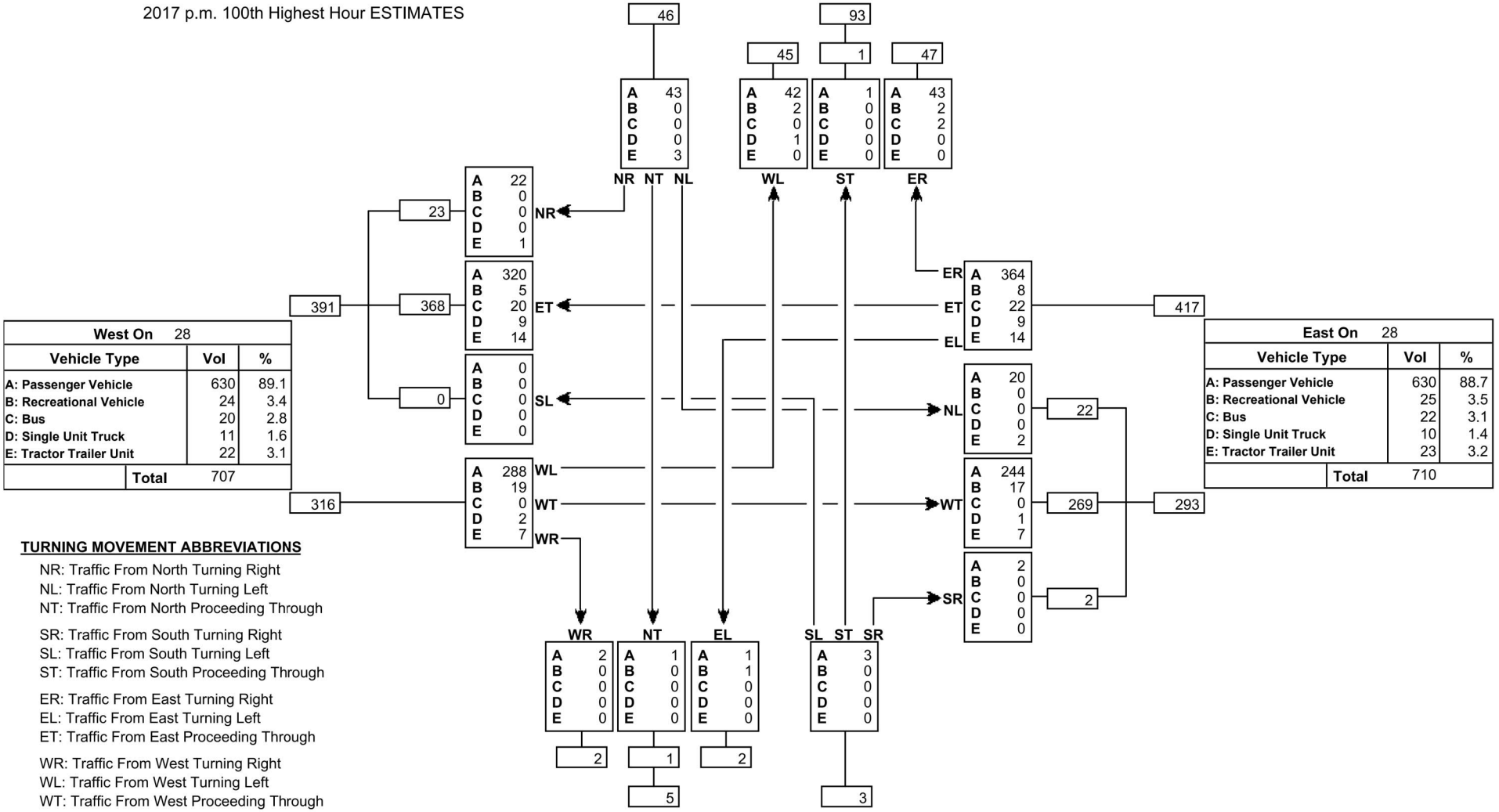
2017 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	129	92.8
B: Recreational Vehicle	4	2.9
C: Bus	2	1.4
D: Single Unit Truck	1	0.7
E: Tractor Trailer Unit	3	2.2
Total	139	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	630	89.1
B: Recreational Vehicle	24	3.4
C: Bus	20	2.8
D: Single Unit Truck	11	1.6
E: Tractor Trailer Unit	22	3.1
Total	707	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	630	88.7
B: Recreational Vehicle	25	3.5
C: Bus	22	3.1
D: Single Unit Truck	10	1.4
E: Tractor Trailer Unit	23	3.2
Total	710	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	7	87.5
B: Recreational Vehicle	1	12.5
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	8	



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Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

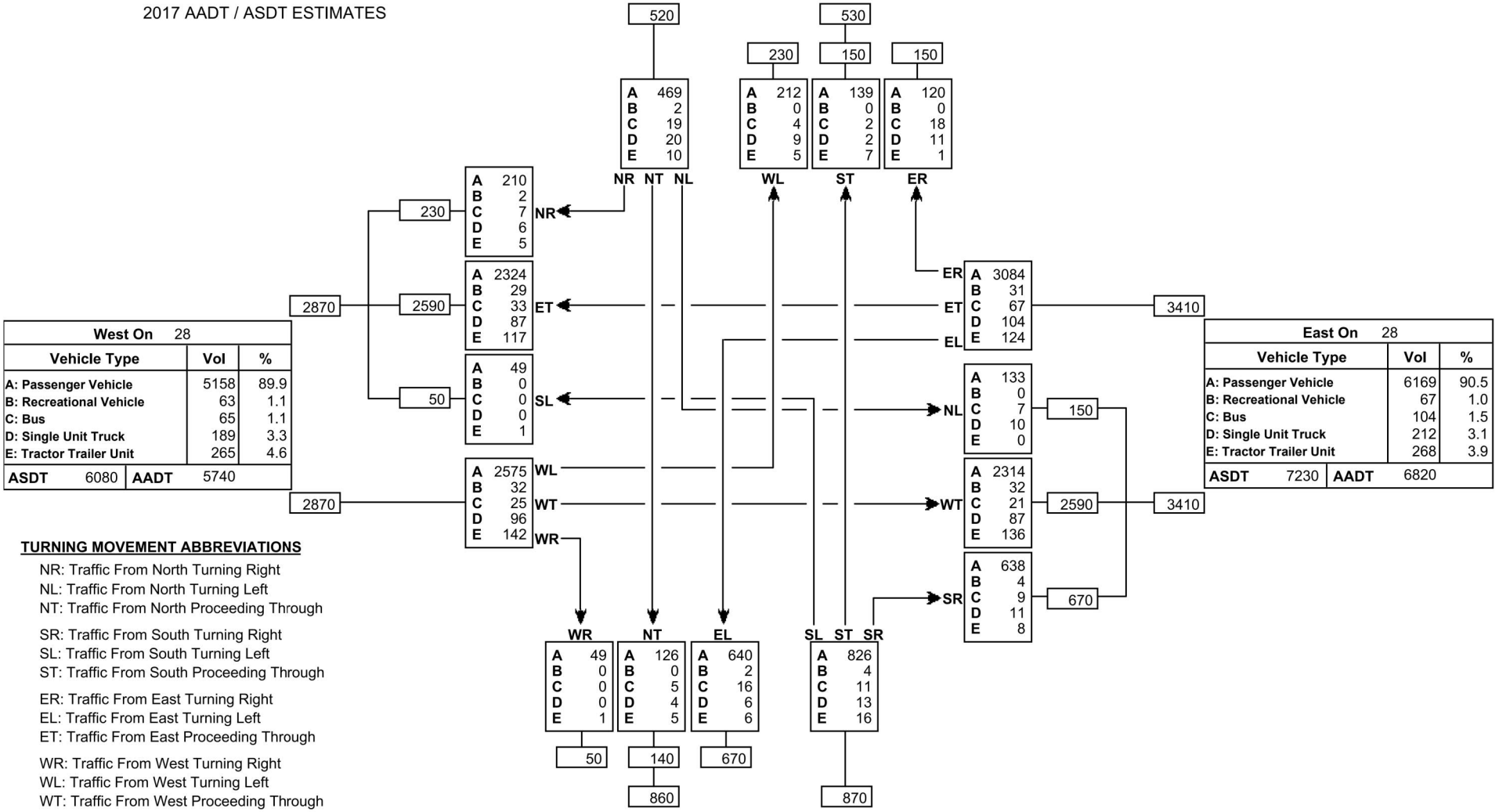
2017 AADT / ASDT ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	940	89.5
B: Recreational Vehicle	2	0.2
C: Bus	43	4.1
D: Single Unit Truck	42	4.0
E: Tractor Trailer Unit	23	2.2
ASDT 1110	**AADT** 1050	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5158	89.9
B: Recreational Vehicle	63	1.1
C: Bus	65	1.1
D: Single Unit Truck	189	3.3
E: Tractor Trailer Unit	265	4.6
ASDT 6080	**AADT** 5740	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6169	90.5
B: Recreational Vehicle	67	1.0
C: Bus	104	1.5
D: Single Unit Truck	212	3.1
E: Tractor Trailer Unit	268	3.9
ASDT 7230	**AADT** 6820	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1641	94.9
B: Recreational Vehicle	6	0.3
C: Bus	32	1.8
D: Single Unit Truck	23	1.3
E: Tractor Trailer Unit	28	1.6
ASDT 1830	**AADT** 1730	



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Turning Movement Summary Diagram

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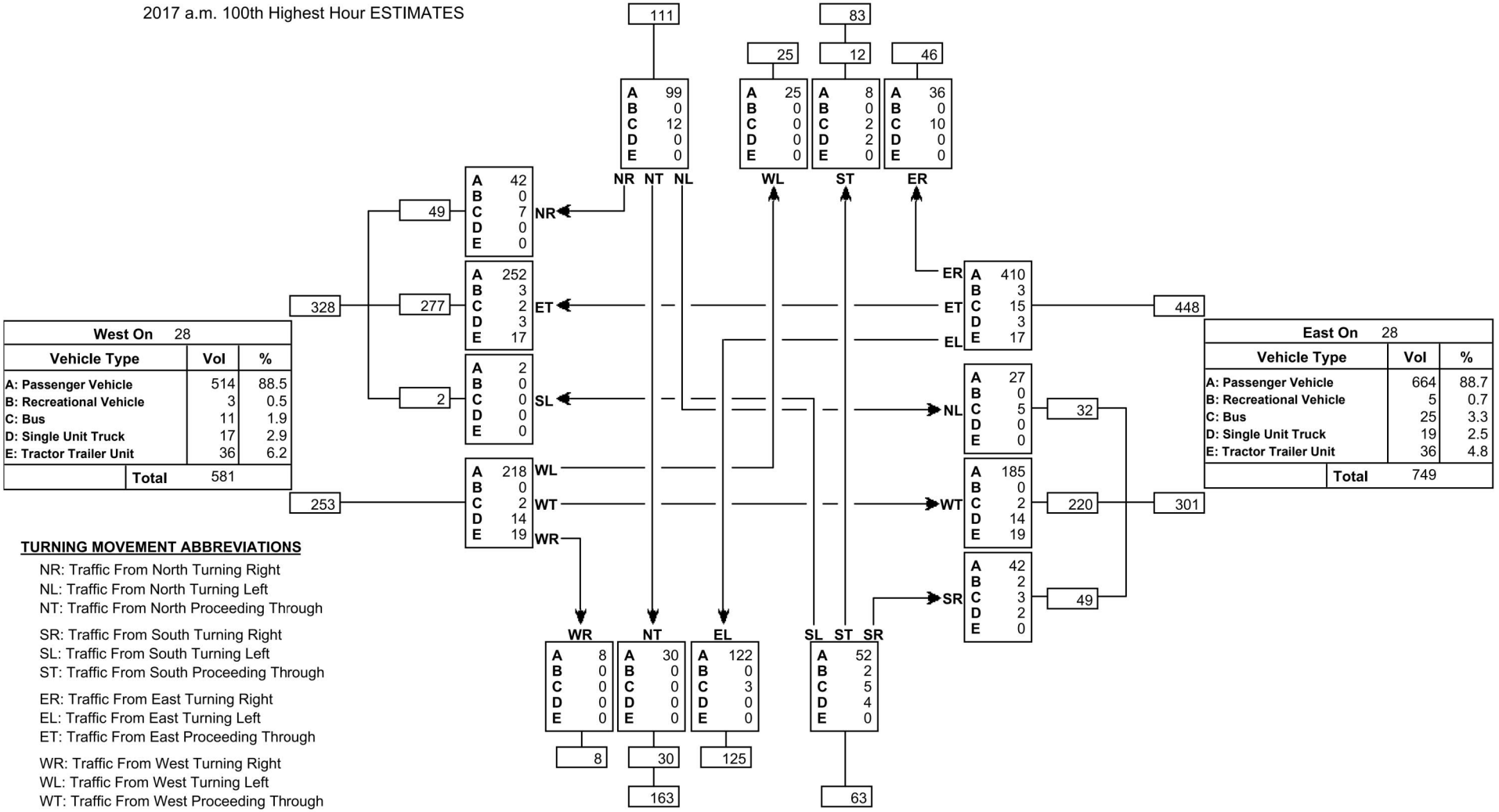
Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

2017 a.m. 100th Highest Hour ESTIMATES



West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	514	88.5
B: Recreational Vehicle	3	0.5
C: Bus	11	1.9
D: Single Unit Truck	17	2.9
E: Tractor Trailer Unit	36	6.2
Total	581	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	664	88.7
B: Recreational Vehicle	5	0.7
C: Bus	25	3.3
D: Single Unit Truck	19	2.5
E: Tractor Trailer Unit	36	4.8
Total	749	

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	168	86.6
B: Recreational Vehicle	0	0.0
C: Bus	24	12.4
D: Single Unit Truck	2	1.0
E: Tractor Trailer Unit	0	0.0
Total	194	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	212	93.8
B: Recreational Vehicle	2	0.9
C: Bus	8	3.5
D: Single Unit Truck	4	1.8
E: Tractor Trailer Unit	0	0.0
Total	226	

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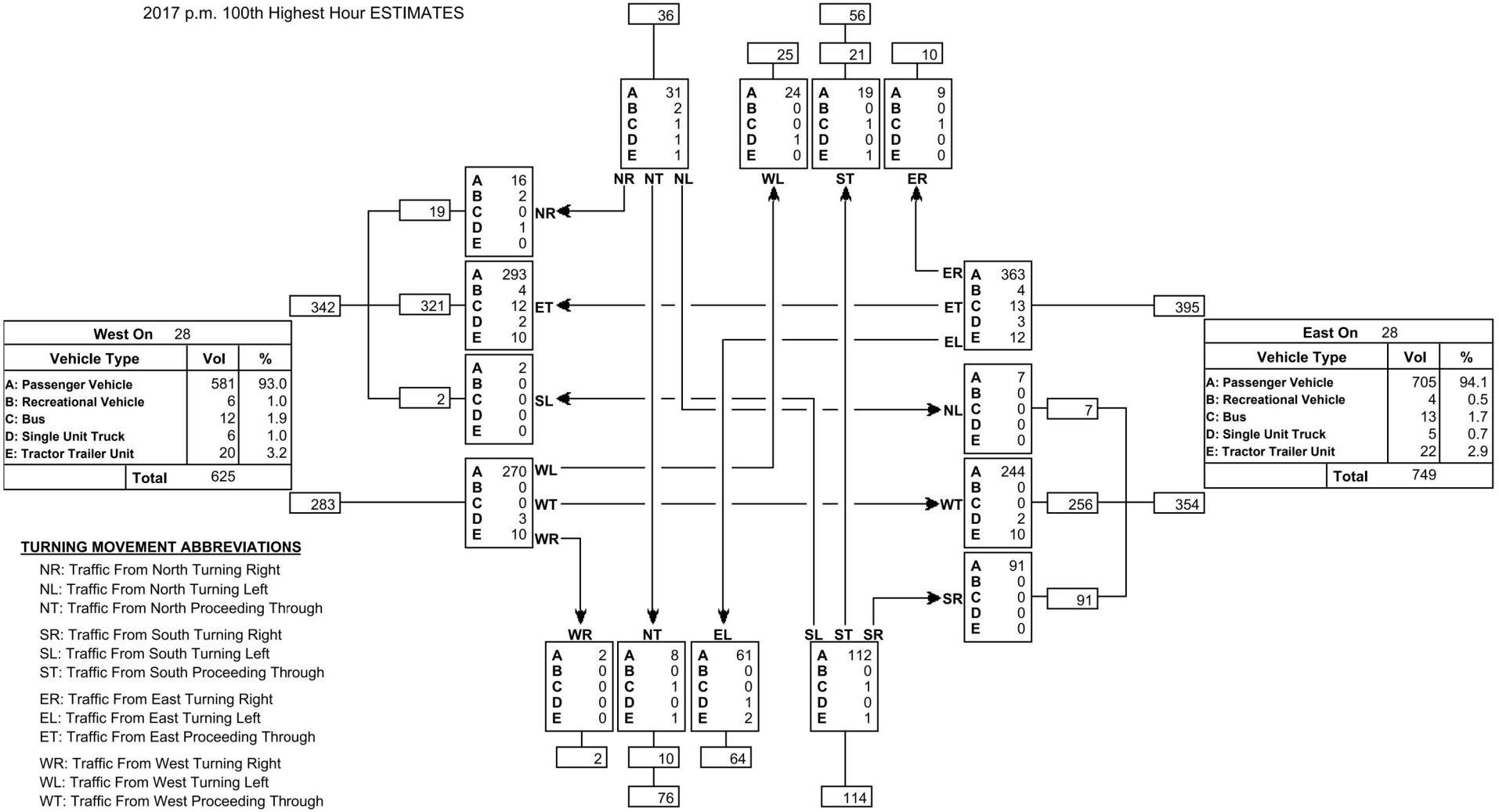
2017 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	83	90.2
B: Recreational Vehicle	2	2.2
C: Bus	3	3.3
D: Single Unit Truck	2	2.2
E: Tractor Trailer Unit	2	2.2
Total	92	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	581	93.0
B: Recreational Vehicle	6	1.0
C: Bus	12	1.9
D: Single Unit Truck	6	1.0
E: Tractor Trailer Unit	20	3.2
Total	625	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	705	94.1
B: Recreational Vehicle	4	0.5
C: Bus	13	1.7
D: Single Unit Truck	5	0.7
E: Tractor Trailer Unit	22	2.9
Total	749	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	183	96.3
B: Recreational Vehicle	0	0.0
C: Bus	2	1.1
D: Single Unit Truck	1	0.5
E: Tractor Trailer Unit	4	2.1
Total	190	



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Turning Movement Summary Diagram

Reference No.: 94580

Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

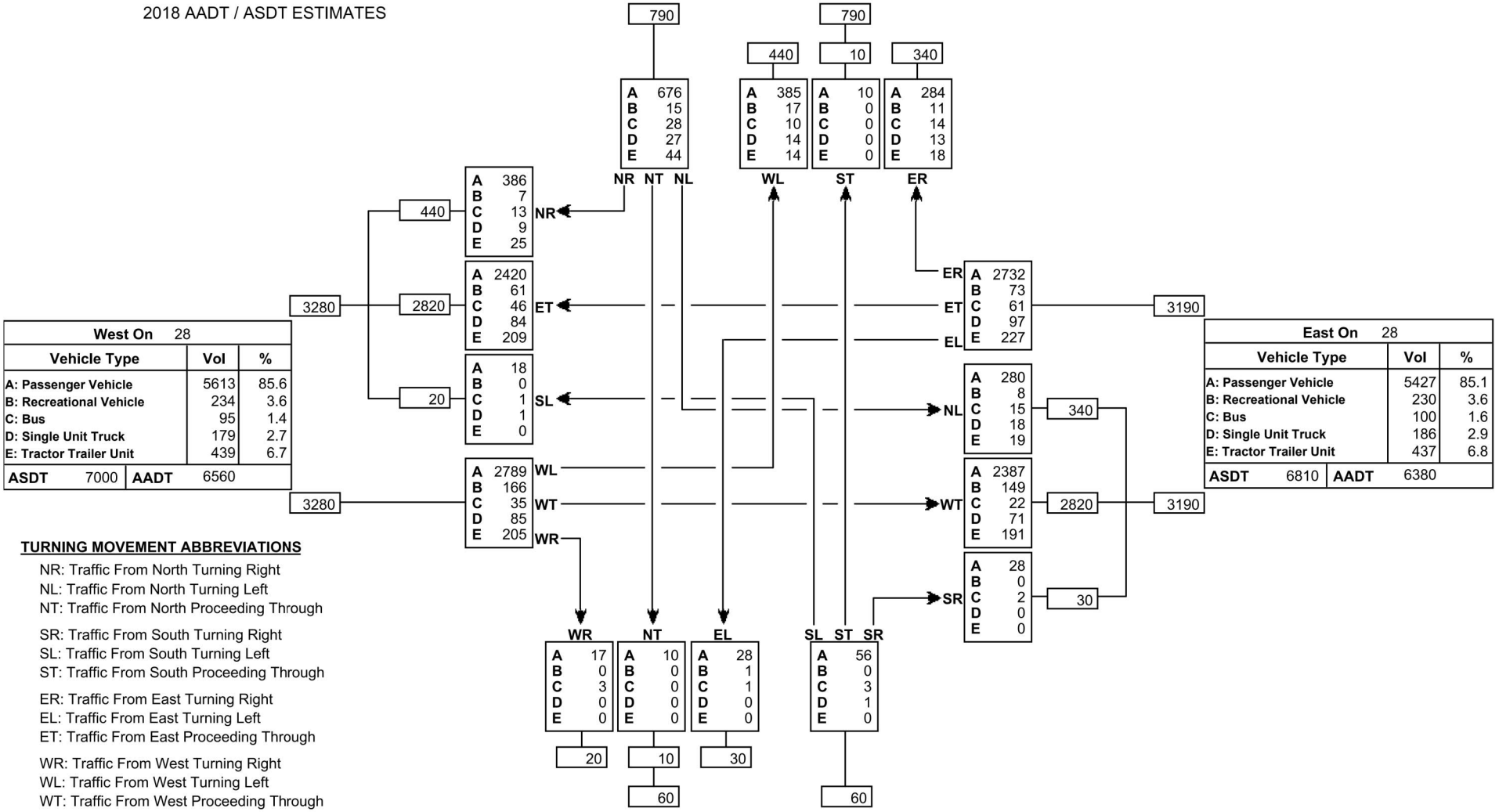
2018 AADT / ASDT ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1355	85.8
B: Recreational Vehicle	43	2.7
C: Bus	52	3.3
D: Single Unit Truck	54	3.4
E: Tractor Trailer Unit	76	4.8
ASDT 1690	**AADT** 1580	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5613	85.6
B: Recreational Vehicle	234	3.6
C: Bus	95	1.4
D: Single Unit Truck	179	2.7
E: Tractor Trailer Unit	439	6.7
ASDT 7000	**AADT** 6560	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5427	85.1
B: Recreational Vehicle	230	3.6
C: Bus	100	1.6
D: Single Unit Truck	186	2.9
E: Tractor Trailer Unit	437	6.8
ASDT 6810	**AADT** 6380	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	111	92.5
B: Recreational Vehicle	1	0.8
C: Bus	7	5.8
D: Single Unit Truck	1	0.8
E: Tractor Trailer Unit	0	0.0
ASDT 130	**AADT** 120	



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Intersection of:
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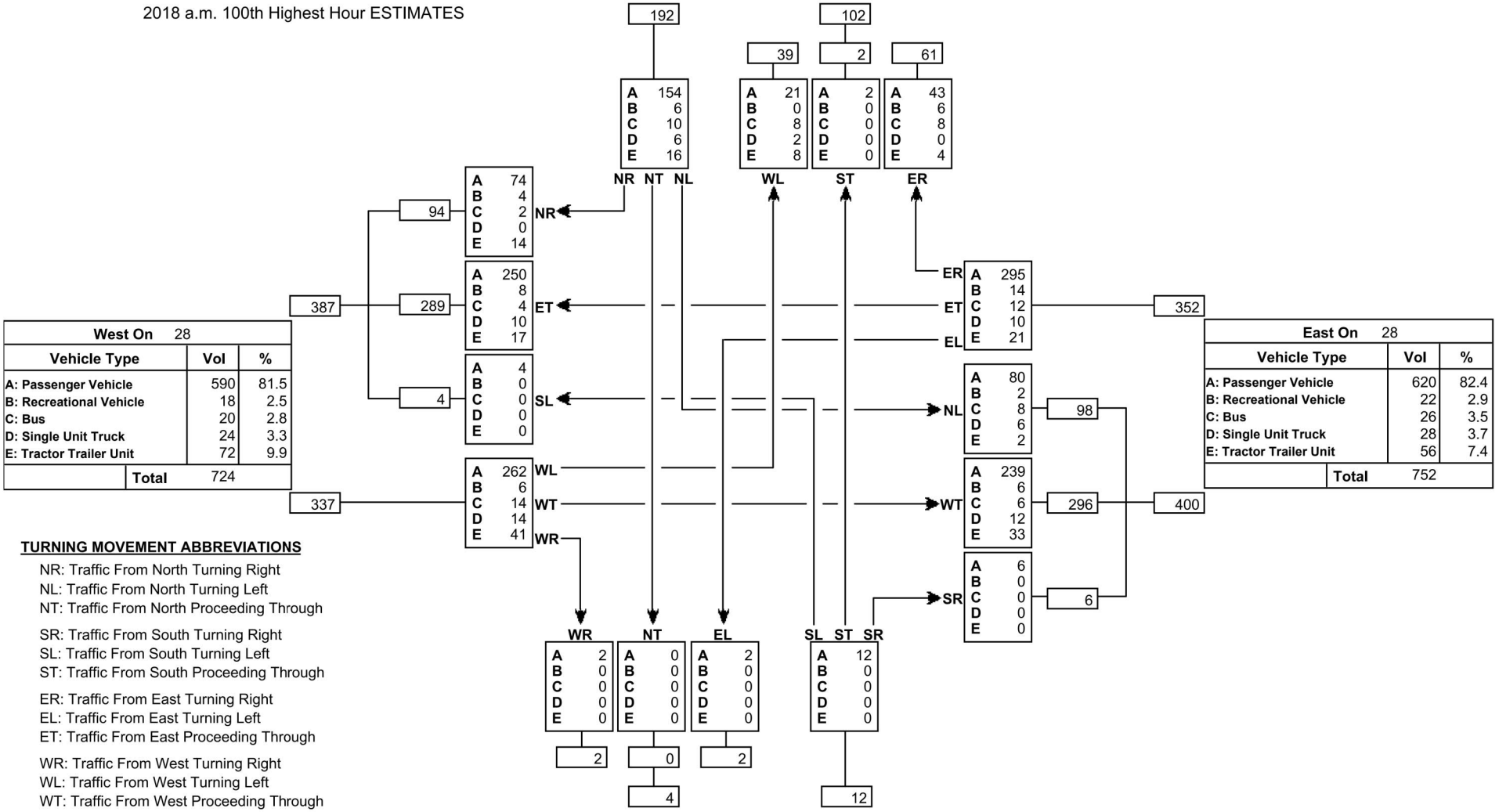
2018 a.m. 100th Highest Hour ESTIMATES



North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	220	74.8
B: Recreational Vehicle	12	4.1
C: Bus	26	8.8
D: Single Unit Truck	8	2.7
E: Tractor Trailer Unit	28	9.5
Total	294	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	590	81.5
B: Recreational Vehicle	18	2.5
C: Bus	20	2.8
D: Single Unit Truck	24	3.3
E: Tractor Trailer Unit	72	9.9
Total	724	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	620	82.4
B: Recreational Vehicle	22	2.9
C: Bus	26	3.5
D: Single Unit Truck	28	3.7
E: Tractor Trailer Unit	56	7.4
Total	752	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	16	100.0
B: Recreational Vehicle	0	0.0
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	16	

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Turning Movement Summary Diagram

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Intersection of:
28 & LILY LAKE RD 7-56-23-400000000

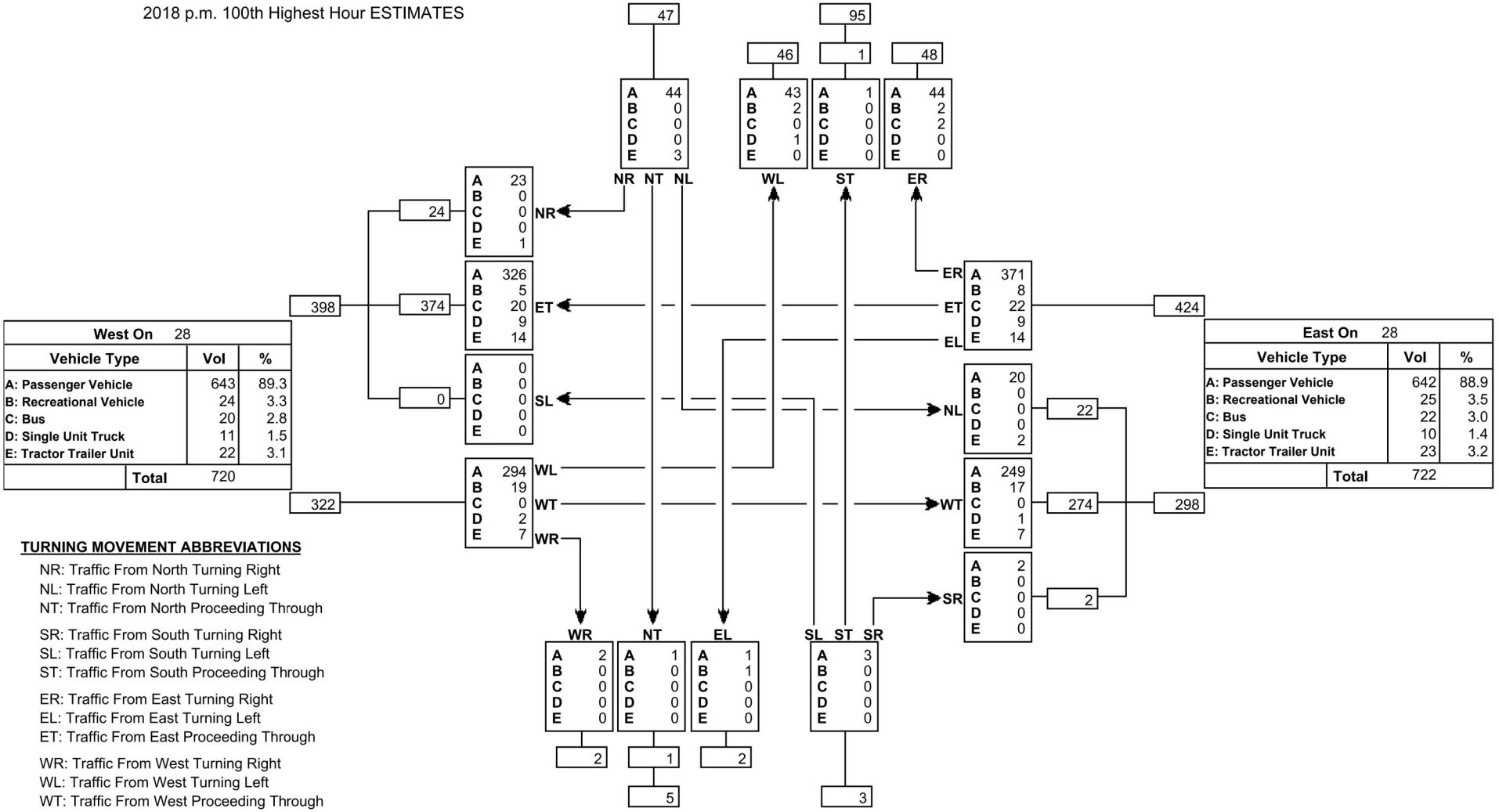
2018 p.m. 100th Highest Hour ESTIMATES

North On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	132	93.0
B: Recreational Vehicle	4	2.8
C: Bus	2	1.4
D: Single Unit Truck	1	0.7
E: Tractor Trailer Unit	3	2.1
Total	142	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	643	89.3
B: Recreational Vehicle	24	3.3
C: Bus	20	2.8
D: Single Unit Truck	11	1.5
E: Tractor Trailer Unit	22	3.1
Total	720	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	642	88.9
B: Recreational Vehicle	25	3.5
C: Bus	22	3.0
D: Single Unit Truck	10	1.4
E: Tractor Trailer Unit	23	3.2
Total	722	

South On Rge Rd 235		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	7	87.5
B: Recreational Vehicle	1	12.5
C: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
Total	8	



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:

28 & BON ACCORD SCHOOL RD 12-56-24-400000000

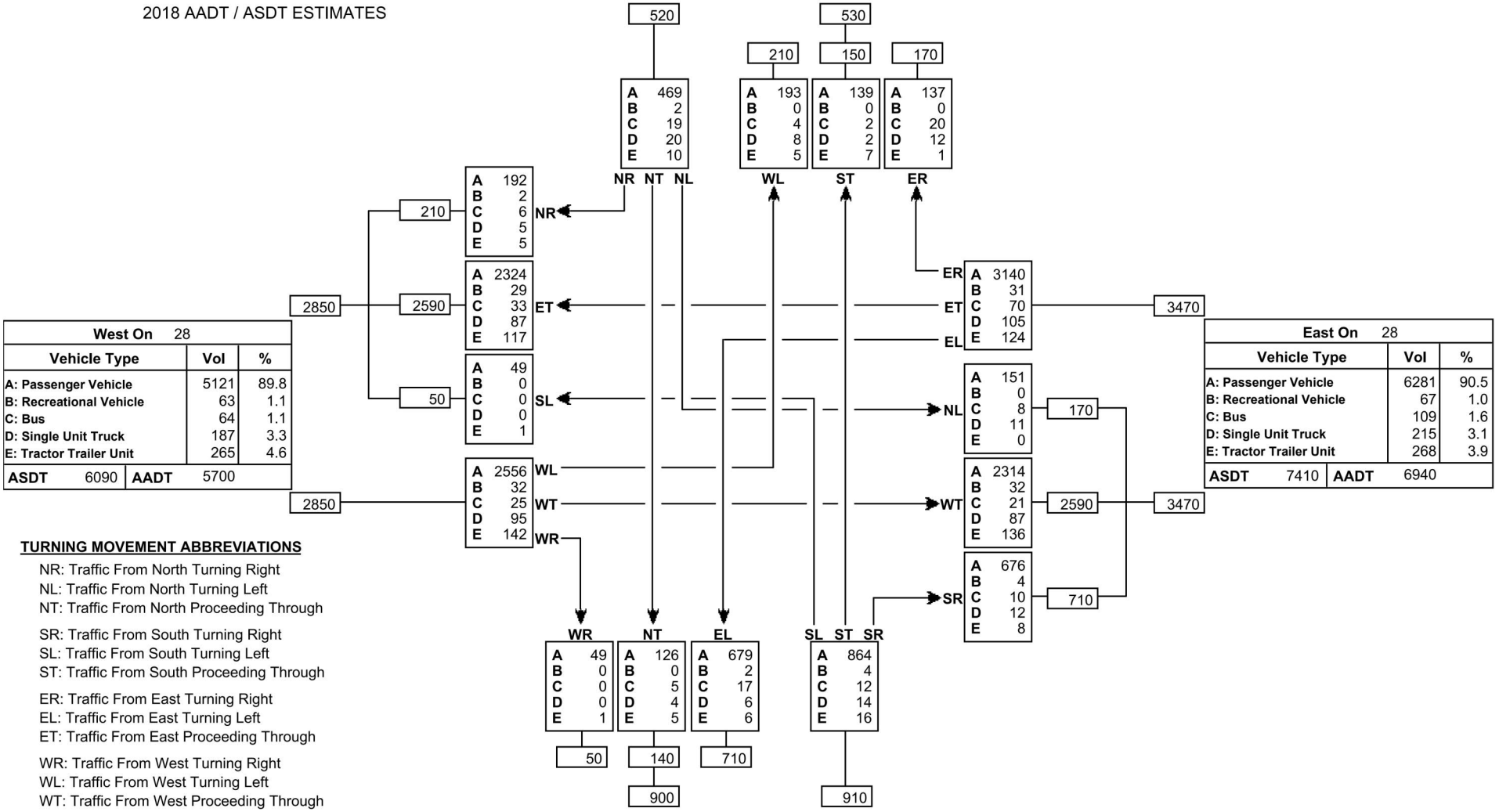
2018 AADT / ASDT ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	938	89.3
B: Recreational Vehicle	2	0.2
C: Bus	45	4.3
D: Single Unit Truck	42	4.0
E: Tractor Trailer Unit	23	2.2
ASDT 1120	**AADT** 1050	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	5121	89.8
B: Recreational Vehicle	63	1.1
C: Bus	64	1.1
D: Single Unit Truck	187	3.3
E: Tractor Trailer Unit	265	4.6
ASDT 6090	**AADT** 5700	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6281	90.5
B: Recreational Vehicle	67	1.0
C: Bus	109	1.6
D: Single Unit Truck	215	3.1
E: Tractor Trailer Unit	268	3.9
ASDT 7410	**AADT** 6940	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1718	94.9
B: Recreational Vehicle	6	0.3
C: Bus	34	1.9
D: Single Unit Truck	24	1.3
E: Tractor Trailer Unit	28	1.5
ASDT 1930	**AADT** 1810	



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ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

TURNING MOVEMENT ABBREVIATIONS

AADT: Annual Average Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of January 1 to December 31 (365 days)

ASDT: Average Summer Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

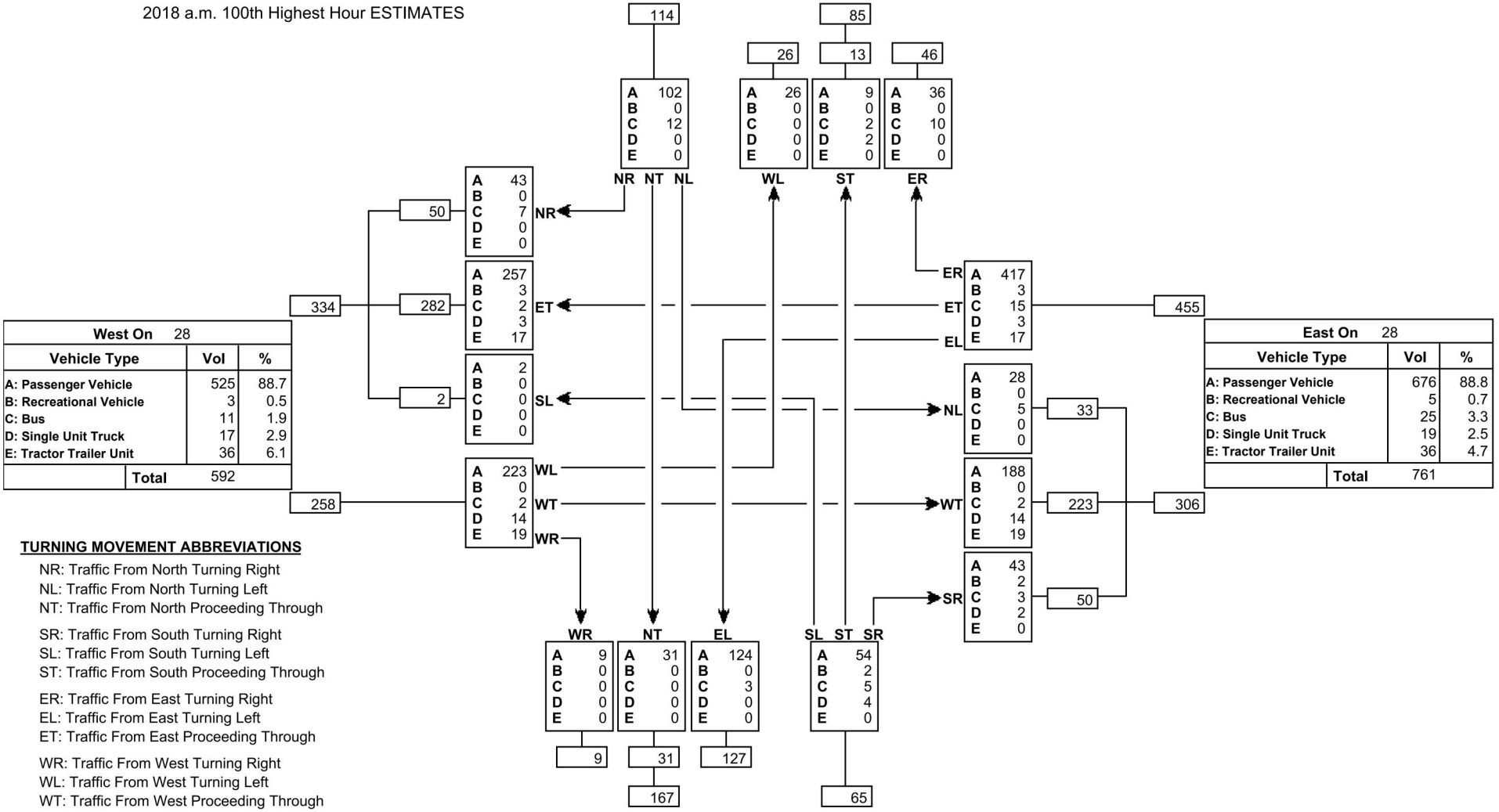
2018 a.m. 100th Highest Hour ESTIMATES

North On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	173	86.9
B: Recreational Vehicle	0	0.0
C: Bus	24	12.1
D: Single Unit Truck	2	1.0
E: Tractor Trailer Unit	0	0.0
Total	199	

West On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	525	88.7
B: Recreational Vehicle	3	0.5
C: Bus	11	1.9
D: Single Unit Truck	17	2.9
E: Tractor Trailer Unit	36	6.1
Total	592	

East On 28		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	676	88.8
B: Recreational Vehicle	5	0.7
C: Bus	25	3.3
D: Single Unit Truck	19	2.5
E: Tractor Trailer Unit	36	4.7
Total	761	

South On Rge Rd 240		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	218	94.0
B: Recreational Vehicle	2	0.9
C: Bus	8	3.4
D: Single Unit Truck	4	1.7
E: Tractor Trailer Unit	0	0.0
Total	232	



TURNING MOVEMENT ABBREVIATIONS

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WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

Turning Movement Summary Diagram

Reference No.: 92570

Intersection of:
28 & BON ACCORD SCHOOL RD 12-56-24-400000000

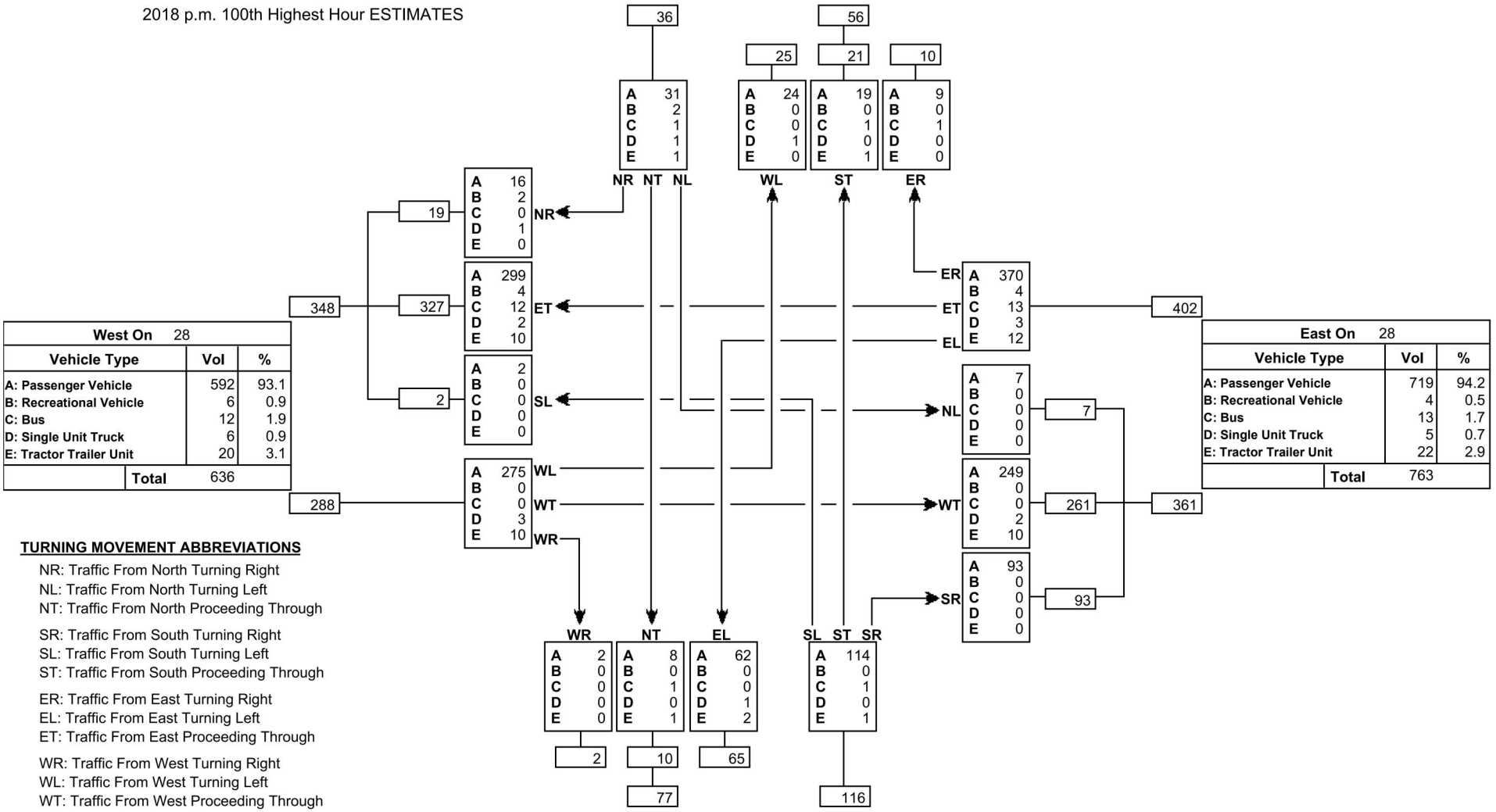
2018 p.m. 100th Highest Hour ESTIMATES

North On	Rge Rd 240	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	83	90.2
B: Recreational Vehicle	2	2.2
C: Bus	3	3.3
D: Single Unit Truck	2	2.2
E: Tractor Trailer Unit	2	2.2
Total	92	

West On	28	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	592	93.1
B: Recreational Vehicle	6	0.9
C: Bus	12	1.9
D: Single Unit Truck	6	0.9
E: Tractor Trailer Unit	20	3.1
Total	636	

East On	28	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	719	94.2
B: Recreational Vehicle	4	0.5
C: Bus	13	1.7
D: Single Unit Truck	5	0.7
E: Tractor Trailer Unit	22	2.9
Total	763	

South On	Rge Rd 240	
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	186	96.4
B: Recreational Vehicle	0	0.0
C: Bus	2	1.0
D: Single Unit Truck	1	0.5
E: Tractor Trailer Unit	4	2.1
Total	193	



TURNING MOVEMENT ABBREVIATIONS

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WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

APPENDIX B - COLLISION HISTORY

Past 10 Years Collisions adjacent to the Town Limits on Hwy 28

	km	Date	Time	Collision Type	Primary Event	Collision Severity	Environmental Conditions	Intersection
1	25.283	1-Nov-09	7:00 PM	Animal	Struck Object	Property Damage Only		
2	25.311	29-Jan-12	4:03 AM	Opposite Direction Sideswipe	Sideswipe Opposite Direction	Property Damage Only	Snow	
3	25.373	24-Sep-13	6:10 AM	Animal	Struck Object	Property Damage Only	Dry	
4	25.438	7-Mar-16	12:41 AM	Fixed Object Left / Median Ditch	Off Road Left	Property Damage Only	Fog/Smoke/Smog/Dust and Slush/Snow/Ice	
5	25.447	10-Nov-16	5:45 PM	Animal	Struck Object	Property Damage Only	Dry	
6	25.455	30-Nov-08	6:30 PM	Animal	Struck Object	Property Damage Only	Dry	
7	25.642	4-Apr-10	12:00 PM	Animal	Struck Object	Property Damage Only	Dry	
8	25.738	9-Jul-14	7:30 PM	Rear End All Others	Rear End	Property Damage Only	Dry	
9	25.739	23-Mar-16	6:15 AM	Animal	Struck Object	Property Damage Only	Snow/Slush/Ice	
10	25.855	7-Feb-11	9:15 AM	Overturn in Ditch Left / Median Side	Off Road Left	**Major**	Dry	
11	25.929	24-Jun-16	1:30 PM	Sideswipe All Others	Sideswipe Same Direction	Property Damage Only	Dry	
12	25.954	1-Mar-16	6:20 AM	Angle All Others	Right Angle	Property Damage Only	Snow/Slush/Ice	57 Street
13	25.953	4-Nov-15	7:25 AM	Same Direction Sideswipe	Sideswipe Same Direction	**Minor**	Clear, Dry	57 Street
14	26.170	19-Mar-11	12:15 PM	Rear End All Others	Rear End	Property Damage Only	Clear, Dry	51 Street
15	26.176	8-Jan-15	8:00 PM	Rear End All Others	Rear End	Property Damage Only	Snow/Slush/Ice	51 Street
16	26.176	9-Dec-15	5:30 PM	Rear End All Others	Rear End	Property Damage Only	Slush/Snow/Ice	51 Street
17	26.19	7-Jan-16	11:00 AM	Fixed Object Right Ditch	Off Road Right	Property Damage Only	Loose Material	
18	26.421	18-Aug-08	5:55 PM	Same Direction Sideswipe	Sideswipe Same Direction	Property Damage Only	Clear, Dry	
19	26.434	21-May-07	1:15 AM	Animal	Struck Object	Property Damage Only		
20	26.573	14-Jul-13	3:00 PM	Rear End All Others	Rear End	Property Damage Only	Clear, Dry	50 Street
21	26.574	29-Jul-09	6:00 PM	Angle All Others	Right Angle	**Minor**	Clear, Dry	50 Street
22	26.574	5-Jul-12	4:00 PM	Angle All Others	Right Angle	**Minor**	Clear, Dry	50 Street
23	26.574	30-Jan-09	7:00 PM	Rear End All Others	Rear End	Property Damage Only	Clear, Dry	50 Street
24	26.574	2-Jun-07	3:30 PM	Same Direction Sideswipe	Sideswipe Same Direction	Property Damage Only	Clear, Dry	50 Street
25	26.577	27-Nov-14	9:00 AM	Turning Manoeuvre	Left Turn Across Path	Property Damage Only	Snow/Slush/Ice	50 Street
26	26.661	7-Jan-11	2:45 PM	Rear End All Others	Rear End	**Major**	Snow/Slush/Ice	
27	27.074	5-Dec-08	8:30 PM	Fixed Object Left/Median Ditch	Off Road Left	Property Damage Only	Snow/Slush/Ice	
28	27.092	29-Dec-07	2:05 PM	Overturn in Ditch Right	Off Road Right	Property Damage Only		
29	27.232	6-Dec-11	5:03 PM	Opposite Direction Sideswipe Cross Centre Line	Sideswipe Opposite Direction	**Major**	Clear, Dry	
30	27.434	14-Jan-07	7:00 PM	Overturn in Ditch Right	Off Road Right	Property Damage Only	Snow/Slush/Ice	
31	27.492	8-Jan-09	1:56 PM	Overturn in Ditch Right	Off Road Right	Property Damage Only	Snow/Slush/Ice	
32	27.584	29-Mar-14	10:17 AM	Strike Non-Fixed Object on Roadway	Struck Object	Property Damage Only	Clear, Dry	Rge Rd 235
33	27.592	29-Sep-10	10:00 AM	Turning Manoeuvre	Left Turn Across Path	**Major**	Raining, Wet	Rge Rd 235
34	27.592	14-Aug-12	1:15 AM	Angle All Others	Right Angle	**Fatal**	Clear, Dry	Rge Rd 235
35	27.597	1-Jun-13	7:50 PM	Turning Manoeuvre	Left Turn Across Path	**Major**	Clear, Dry	Rge Rd 235
36	27.597	5-Feb-15	4:00 PM	Same Direction Sideswipe	Sideswipe Same Direction	Property Damage Only	Hail/Sleet Slush/Snow/Ice	Rge Rd 235
37	27.765	3-Mar-08	1:00 PM	Fixed Object Right Ditch	Off Road Right	Property Damage Only	Snow/Slush/Ice	

APPENDIX C - SIGNAL WARRANTS

Alberta Transportation - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Highway 28	Direction (EW or NS)	EW	Road Authority:	Alberta Transportation
Side Street (name)	57 Street	Direction (EW or NS)	NS	City:	Near the Town of Bon Accord
Quadrant / Int #	1898 AG	Comments	2019 Estimated Traffic Volumes for AM and PM Peaks	Analysis Date:	2019 May 10, Fri
	CHECK SHEET			Count Date:	2018 Jan 01, Mon
for Warrant Calculation Results, please hit 'Page Down'				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Highway 28	WB		1			1			2,000	2			
Highway 28	EB		1			1			2,000	2			
57 Street	NB				1				2,000	1			
57 Street	SB				1				2,000	1			

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 57 Street NB right turns significantly impeded by through movements? (y/n)	n
Are the 57 Street SB right turns significantly impeded by through movements? (y/n)	n
Are the Highway 28 WB right turns significantly impeded by through movements? (y/n)	n
Are the Highway 28 EB right turns significantly impeded by through movements? (y/n)	n

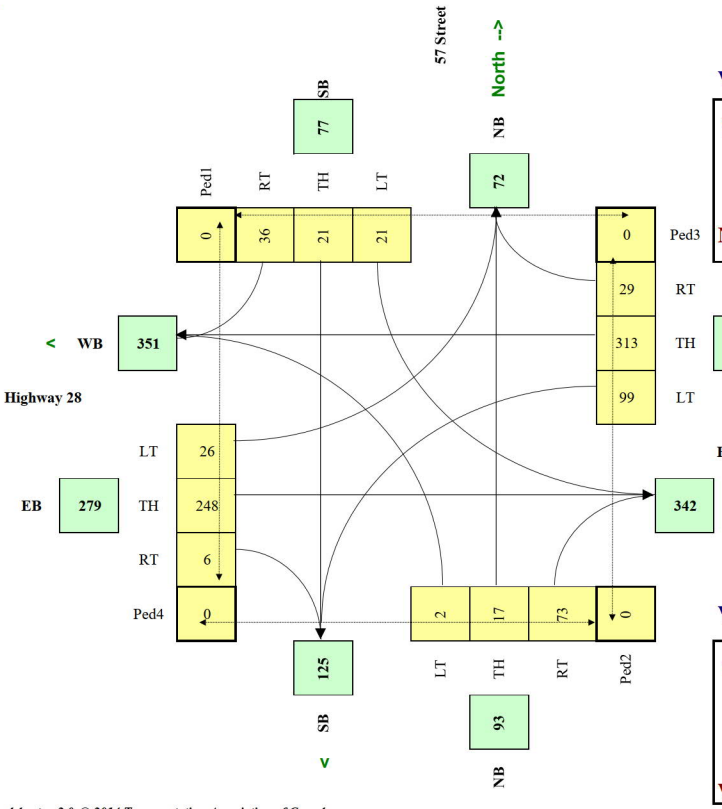
Demographics		
Elem. School/Mobility Challenged	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	y
Metro Area Population	(#)	1,600
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 28	EW	60	9.0%	n	
57 Street	NS		1.7%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1	Ped2	Ped3	Ped4
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	NS	NS	EW	EW
													W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	2	13	51	33	31	51	128	285	47	26	225	9				
	2	12	48	31	29	48	120	268	44	24	212	8				
	3	23	96	27	27	47	129	410	38	34	325	7				
	2	16	67	19	19	33	90	286	27	24	227	5				
	2	19	84	6	9	17	59	295	9	22	235	2				
	2	21	94	7	10	19	66	331	10	25	264	2				
Total (6-hour peak)	13	104	440	123	125	215	592	1,875	175	155	1,488	33	0	0	0	0
Average (6-hour peak)	2	17	73	21	21	36	99	313	29	26	248	6	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F (X_{v\text{-}p}) L) / K_2] \times C_i$

W =	54	54	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

Alberta Transportation - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Highway 28	Direction (EW or NS)	EW	Road Authority:	Alberta Transportation
Side Street (name)	57 Street	Direction (EW or NS)	NS	City:	Near the Town of Bon Accord
Quadrant / Int #	1898 AG	Comments	2039 Estimated Traffic Volumes for AM and PM Peaks	Analysis Date:	2019 Apr 26, Fri
CHECK SHEET				Count Date:	2018 Jan 01, Mon
for Warrant Calculation Results, please hit 'Page Down'				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Highway 28	WB		1			1			2,000	2			
Highway 28	EB		1			1			2,000	2			
57 Street	NB				1				2,000	1			
57 Street	SB				1				2,000	1			

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 57 Street NB right turns significantly impeded by through movements? (y/n)	n	
Are the 57 Street SB right turns significantly impeded by through movements? (y/n)	n	
Are the Highway 28 WB right turns significantly impeded by through movements? (y/n)	n	
Are the Highway 28 EB right turns significantly impeded by through movements? (y/n)	n	

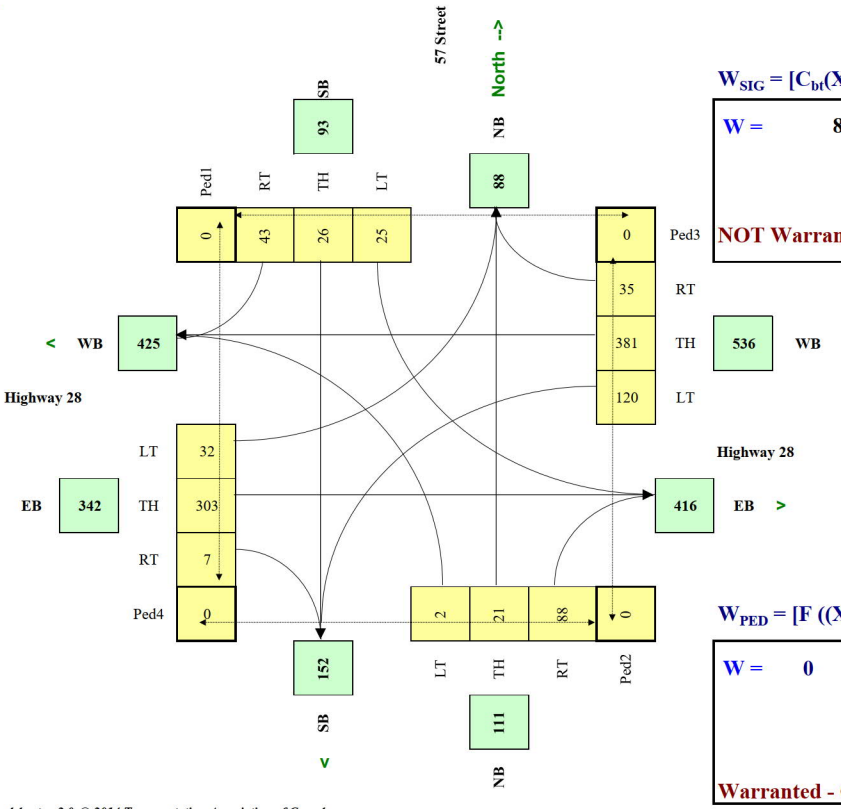
Demographics		
Elem. School/Mobility Challenged	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	y
Metro Area Population	(#)	2,240
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 28	EW	60	9.0%	n	
57 Street	NS		1.7%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1	Ped2	Ped3	Ped4
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	NS	NS	EW	EW
													W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	2	16	61	40	38	61	156	347	57	32	275	11				
	2	15	57	38	36	57	147	326	54	30	259	10				
	3	27	116	32	33	56	157	499	46	42	397	9				
	2	19	81	22	23	39	110	349	32	29	278	6				
	2	22	101	7	11	20	71	359	11	28	287	2				
	2	25	113	8	12	23	80	403	12	31	322	2				
Total (6-hour peak)	13	124	529	147	153	256	721	2,283	212	192	1,818	40	0	0	0	0
Average (6-hour peak)	2	21	88	25	26	43	120	381	35	32	303	7	0	0	0	0
													Actual Pedestrian Crossing Distance (m)			

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	81	81	0
		Veh	Ped

NOT Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

Alberta Transportation - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Highway 28	Direction (EW or NS)	EW	Road Authority:	Alberta Transportation
Side Street (name)	Lily Lake Rd	Direction (EW or NS)	NS	City:	Near the Town of Bon Accord
Quadrant / Int #	1898 AG	Comments	2019 Traffic Volumes for AM and PM Peaks	Analysis Date:	2019 May 10, Fri
CHECK SHEET				Count Date:	2018 Jan 01, Mon
for Warrant Calculation Results, please hit 'Page Down'				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Highway 28	WB		1			1			2,000	2			
Highway 28	EB		1			1			2,000	2			
Lily Lake Rd	NB				1				2,000	1			
Lily Lake Rd	SB				1				2,000	1			

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the Lily Lake Rd NB right turns significantly impeded by through movements? (y/n)	n	
Are the Lily Lake Rd SB right turns significantly impeded by through movements? (y/n)	n	
Are the Highway 28 WB right turns significantly impeded by through movements? (y/n)	n	
Are the Highway 28 EB right turns significantly impeded by through movements? (y/n)	n	

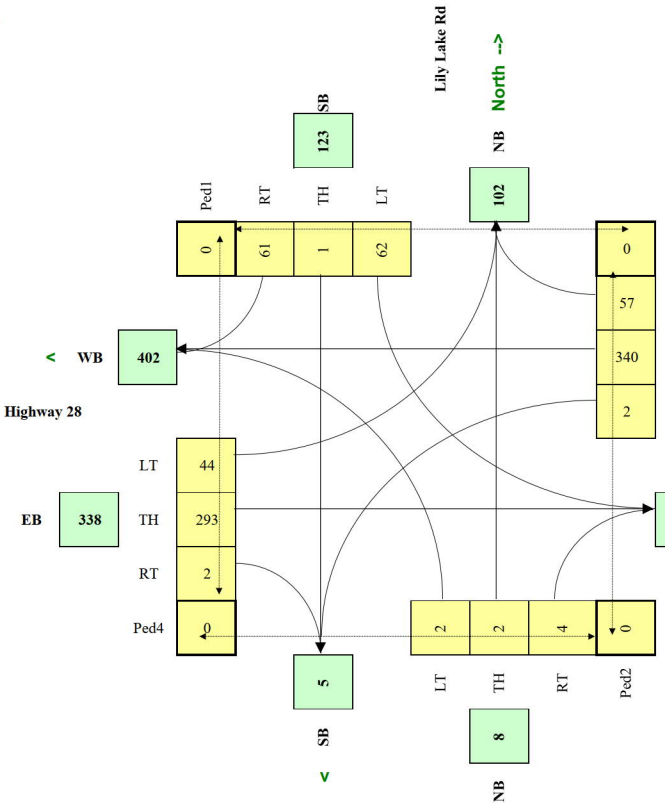
Demographics		
Elem. School/Mobility Challenged	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	y
Metro Area Population	(#)	1,600
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 28	EW	60	9.0%	n	
Lily Lake Rd	NS		1.7%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1	Ped2	Ped3	Ped4
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	NS	NS	EW	EW
													W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	4	2	6	99	0	95	2	292	62	39	299	2				
	4	2	6	93	0	89	2	274	58	37	281	2				
	3	2	5	80	1	79	3	446	74	57	383	3				
	2	1	4	56	0	55	2	312	52	40	268	2				
	0	1	2	20	1	21	2	336	44	42	247	2				
	0	1	2	22	1	24	2	378	49	47	277	2				
Total (6-hour peak)	13	9	25	370	3	363	13	2,038	339	262	1,755	13	0	0	0	0
Average (6-hour peak)	2	2	4	62	1	61	2	340	57	44	293	2	0	0	0	0
													Actual Pedestrian Crossing Distance (m)			

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	43	43	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

Alberta Transportation - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Highway 28	Direction (EW or NS)	EW	Road Authority:	Alberta Transportation
Side Street (name)	Lily Lake Rd	Direction (EW or NS)	NS	City:	Near the Town of Bon Accord
Quadrant / Int #	1898 AG	Comments	2039 Traffic Volumes for AM and PM Peaks	Analysis Date:	2019 May 10, Fri
	CHECK SHEET			Count Date:	2018 Jan 01, Mon
for Warrant Calculation Results, please hit 'Page Down'				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Highway 28	WB		1			1			2,000	2			
Highway 28	EB		1			1			2,000	2			
Lily Lake Rd	NB				1				2,000	1			
Lily Lake Rd	SB				1				2,000	1			

Are the Lily Lake Rd NB right turns significantly impeded by through movements? (y/n)	n	
Are the Lily Lake Rd SB right turns significantly impeded by through movements? (y/n)	n	
Are the Highway 28 WB right turns significantly impeded by through movements? (y/n)	n	
Are the Highway 28 EB right turns significantly impeded by through movements? (y/n)	n	

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

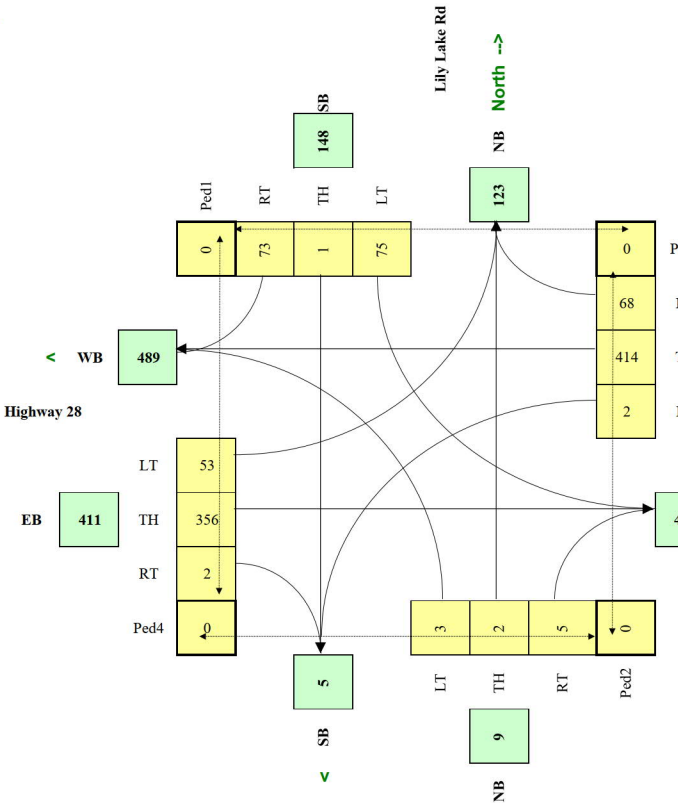
Demographics		
Elem. School/Mobility Challenged	(y/n)	y
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	y
Metro Area Population	(#)	2,240
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 28	EW	60	9.0%	n	
Lily Lake Rd	NS		1.7%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1	Ped2	Ped3	Ped4
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	NS	NS	EW	EW
													W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	5	2	7	119	0	114	2	356	75	48	364	2				
	5	2	7	112	0	107	2	335	71	45	342	2				
	3	2	6	97	1	95	3	543	89	70	466	3				
	2	1	4	68	0	66	2	379	62	49	326	2				
	0	1	2	24	1	26	2	409	53	51	300	2				
	0	1	2	27	1	29	2	460	59	57	337	2				
Total (6-hour peak)	15	9	28	447	3	437	13	2,482	409	320	2,135	13	0	0	0	0
Average (6-hour peak)	3	2	5	75	1	73	2	414	68	53	356	2	0	0	0	0
													Actual Pedestrian Crossing Distance (m)			

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	64	64	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection