

APPENDIX E

**Traffic Impact Study and
Correspondence**

TRAFFIC IMPACT STUDY

By: SRF Associates

September 2011

Updated June 2014

Traffic Impact Study

for the proposed

Carroll Landfill Expansion

Town of Carroll
Chautauqua County, New York

Project No. 34031

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EXECUTIVE SUMMARY

OVERVIEW

The purpose of this report update is to identify the potential traffic impact associated with the proposed Carroll Landfill Expansion project located in the Town of Carroll, Chautauqua County, New York.

The proposed landfill expansion site is located along the south side of Dodge Road between Wiltsie Road and Anderson Road/Sandberg Road. The proposed landfill expansion construction is anticipated to begin during the summer of 2015, and the life of the facility is approximately 15 years. The expansion will correspond to a maximum average waste acceptance rate of 1,000 tons per day. Access to the proposed landfill is proposed via one existing full access driveway on Dodge Road located approximately 8,000 feet southeast of Wiltsie Road. The study area consists of four (4) existing intersections. A comprehensive inventory of the existing roadway network operations was developed and peak period traffic volume data were obtained by SRF & Associates (SRF).

Town of Carroll officials were contacted in an effort to include traffic generated from other developments in the area that are currently approved or under construction. No nearby developments were identified. A growth rate of 1.0% per year, used to project 2015 and 2030 background traffic conditions, was derived by considering historical traffic growth near the proposed landfill site.

Site generated traffic volumes for the proposed landfill expansion are projected and distributed to the network based on specified truck routes. Existing, background (2015 and 2030 future no-build) and full development (2015 and 2030 future build) traffic conditions were evaluated at each study area intersection for the proposed landfill expansion. The operating characteristics of the access drives and impacts to safety and the adjacent roadway network are identified and mitigating measures are provided to minimize any capacity or safety concerns.

CONCLUSIONS AND RECOMMENDATIONS

This study addresses the traffic impact that can be expected from the proposed Carroll Landfill Expansion project in the Town of Carroll, Chautauqua County as described in this Report. It indicates that the existing driveways can adequately accommodate the projected traffic volumes and resulting impacts to study area intersections. The following list summarizes conclusions and recommendations to be considered as a result of this proposed landfill expansion:

1. The proposed landfill expansion is expected to generate approximately 34 total trips with 30 trucks during the AM peak hour, and 27 trips with 25 trucks during the PM peak hour.
2. The proposed site driveway on Dodge Road should be constructed with one exiting and one entering lane and should be stop sign controlled.
3. An engineering assessment of the roadways, including Dodge Road, (performed by C&S Companies and Daigler Engineering) and bridges (performed by the NYSDOT) to be used by the facility has been undertaken and is included in the DEIS report.
4. Sight distance measurements indicate that minimum requirements are exceeded at all four study intersections and the proposed site driveway.

5. Based upon the accident analyses and projected traffic volumes for both trucks and passenger vehicles, the proposed Landfill expansion will not have a significant adverse impact on safety at any of the study area intersections and there are no existing apparent traffic safety deficiencies within the study area.

I. INTRODUCTION

The purpose of this report update is to identify the potential traffic impacts associated with the proposed Carroll Landfill Expansion project located in the Town of Carroll, Chautauqua County, New York. The operating characteristics of the proposed access points and impacts to the adjacent roadway network are identified.

In an effort to define traffic impact, this analysis determines the extent of existing traffic conditions, projects background traffic flow including area growth, and projects changes in traffic flow due to operation of the proposed landfill expansion.

II. LOCATION

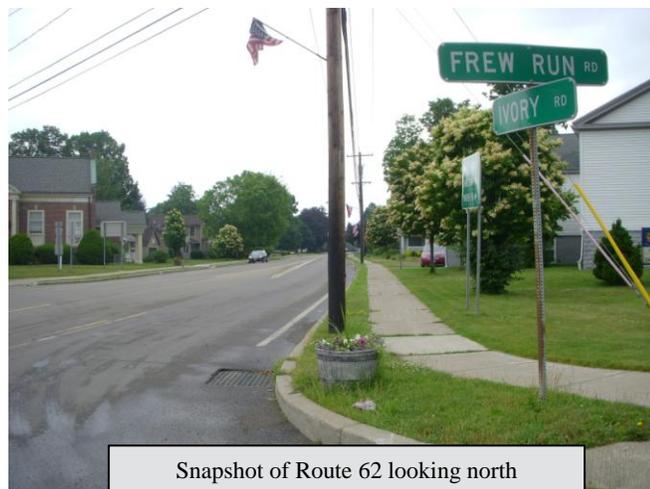
The proposed site is bounded by Dodge Road to the north and east, single family residential uses to the east and south, Sandberg Road to the south and vacant lands to the west and north in the Town of Carroll, Chautauqua County, New York. The site is currently mostly vacant. The site location and study area are illustrated in **Figure 1 – Site Location and Study Area** (all figures are included at the end of this report).

III. EXISTING HIGHWAY SYSTEM

The study area roadway system identified for investigation includes portions of Frew Run Road (County Road 34), NY Route 62, Wiltsie Road and Dodge Road. Four (4) existing intersections are studied in detail in this report as follows:

1. Route 62/CR 34/Institute Street
2. CR 317-Falconer Street/Route 62
3. CR 34/Wiltsie Road
4. Wiltsie Road/Dodge Road

NY Route 62 (Main Street/Ivory St.) is a north/south highway and is owned and maintained by the New York State Department of Transportation (NYSDOT). The highway is functionally classified as a rural arterial type highway with a posted speed limit of 35 mph in the Village of Frewsburg. The highway consists of one lane in each direction with a center turn lane in the vicinity of Frew Run Road between Institute and Falconer Streets. According to the most recent traffic volume data collected by the New York State Department of Transportation (NYSDOT) in 2012, the annual average daily traffic (AADT) along Route 62 approximately 50' north of Falconer St is 3,840 vehicles per day (vpd). The roadway section features 12 feet travel lanes, 10 feet on-street parking, 5 feet sidewalk, and a 10 feet two way left turn lane.



Snapshot of Route 62 looking north

Frew Run Road (CR 34) is owned and maintained by Chautauqua County with a posted speed limit of 35 mph closer to NY Route 62 and 55 mph to the south. Frew Run Road is generally an east-west highway that extends from US 62 & CR 55/CH 317, Frewsburg to the Cattaraugus Co. line. The highway consists of one travel lane in each direction. According to the most recent traffic volume data collected by SRF & Associates (SRF) in 2011, the AADT along Route 34 approximately 2 miles northwest of Wiltsie Road is 1,379 vpd.



Wiltsie Road is a north/south local roadway under the jurisdiction of the Town of Carroll with a posted speed limit of 45 mph. The highway consists of one travel lane in each direction. According to the most recent traffic volume data collected by SRF in 2011, the AADT along Wiltsie Road between Route 34 and Dodge Road is 496 vpd.



Dodge Road is generally an east-west local roadway under the jurisdiction of the Town of Carroll with a posted speed limit of 45 mph. The highway consists of one travel lane in each direction. According to the most recent traffic volume data collected by SRF in 2011, the AADT along Dodge Road, 1.6 miles east of Wiltsie Road is 134 vpd.

Existing Average Daily Traffic (ADT) information was recently collected by SRF and was also obtained from the New York State Department of Transportation (NYSDOT) *Traffic Volume Report 2012 and NYSDOT Traffic Data Viewer Website*. **Figure 2** illustrates the roadway geometry at each of the study intersections and the ADT volumes on the study roadways.

IV. EXISTING TRAFFIC CONDITIONS

A. Peak Intervals for Analysis

Given the functional characteristics of the corridor and the land use proposed for the site (Carroll Landfill Expansion), the peak hours selected for analysis are the weekday commuter AM and PM peaks. The combination of site traffic and adjacent through traffic produces the greatest demand during these time periods.

B. Existing Traffic Volume Data

Weekday AM (6:30am-9:00am) peak hour volumes were collected by Daigler Engineering and the Weekday PM (2:30pm-5:30pm) peak hour volumes were collected by SRF & Associates (SRF) at the study area intersections identified above on June 14, 2011. The 2011 existing counts were compared with the historical counts from NYSDOT in 2012 on Route 62 approximately 50' north of Falconer Street.

The peak hour traffic periods generally occurred between 7:00 to 8:00 AM and 4:15 to 5:15 PM on weekdays. All traffic volumes were reviewed to confirm the accuracy and relative balance of the collective traffic counts. Volumes on Route 62 and Wiltsie Road were balanced to account for the differences between the intersections. All traffic volumes were found to balance within the network within reasonable and expected variations.

Historical counts between 2011 and 2014 were reviewed. No growth in traffic has occurred since the 2011 data collection and in many cases traffic volumes have actually decreased in the study area. Therefore no adjustments were made to the 2011 traffic volumes. These volumes are now considered the 2014 existing base volumes for analysis purposes in this report. The 2014 existing base conditions are reflected in **Figure 3**.

C. Field Observations

All intersections included in the project area were observed during peak intervals to assess existing traffic operating conditions at each intersection. Windshield and travel surveys were performed on the identified truck routes to ascertain any apparent physical, safety, or operational deficiencies associated with these corridors. No deficiencies or areas of concern were noted. It is noted that the trucks will travel through intersections where school children cross. Truck traffic related to the proposed landfill will be infrequent during times when school children are crossing based upon the trip generation provided in Section VI.B. of this report.

D. Average Daily Traffic

SRF & Associates (SRF) collected 24-hour machine count data on County Road 34 (Frew Run Road), Wiltsie Road and Dodge Road on Thursday, June 23rd, 2011. Figures A, B and C graphically illustrate the Average Daily Traffic (ADT) at the three locations.

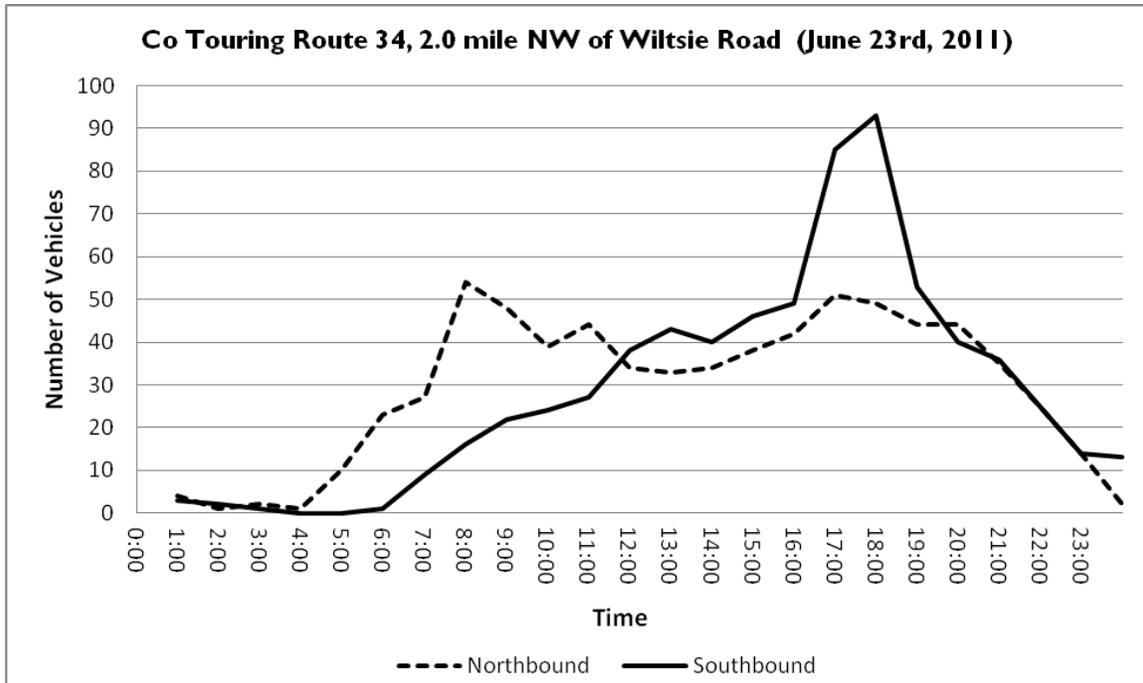


Figure A. Average Daily Traffic - County Touring Route 34

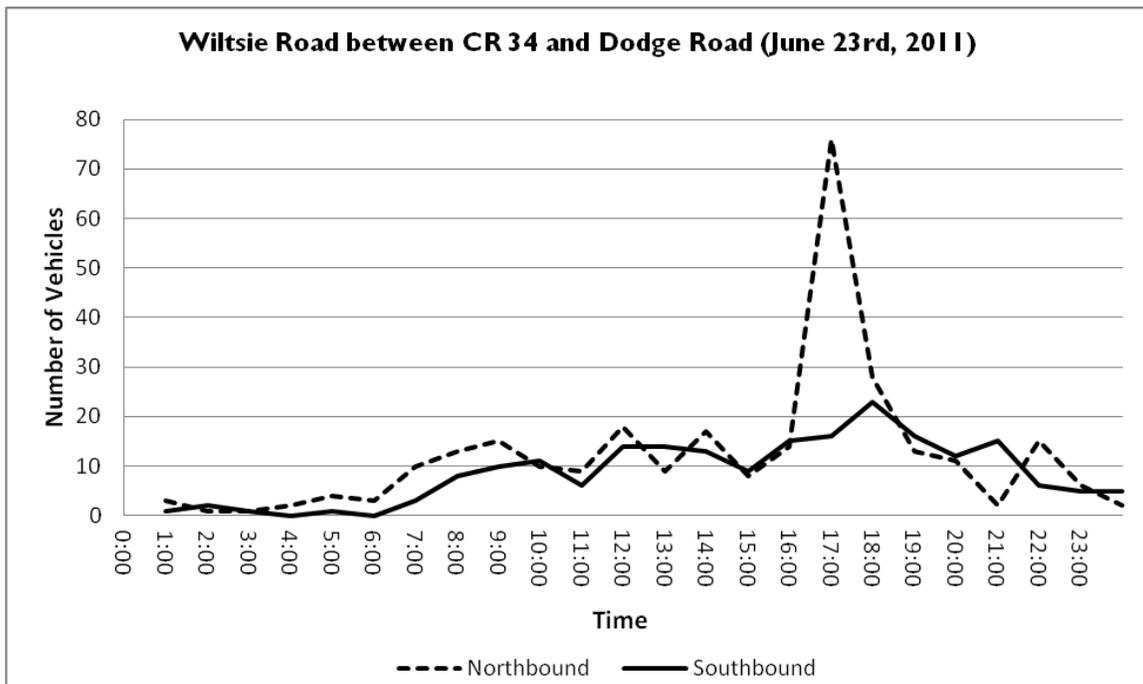


Figure B. Average Daily Traffic - Wiltzie Road

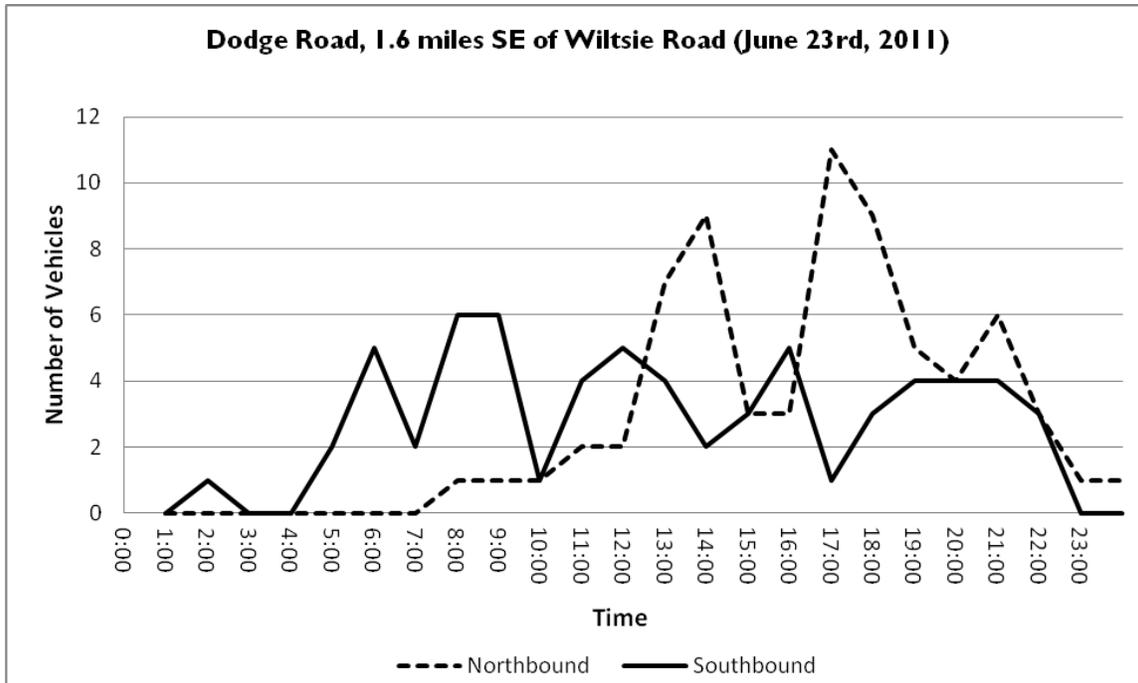


Figure C. Average Daily Traffic - Dodge Road

E. Existing Accident Investigation

Accident reports for the intersections along Route 62, CR 34 (Frew Run Street) and Wiltsie Road were investigated to assess the safety history. The accidents included in the current review occurred during a three-year time period from January 2008 through December 2010. This is the most recent accident data available, as provided by NYSDOT. During this period, six reportable accidents were documented at the intersections and segments along Route 62 and CR 34 (Frew Run Street) included in the study area.

Table I summarizes accidents occurring at each intersection and the segments within the study area. Based on the number of accidents at each intersection and the segments, accident rates were calculated and compared to the statewide average for similar facilities. The calculated rates and comparison to statewide averages are also summarized in Table I. Accident rate calculations are included in the Appendix. Intersection rates are listed as accidents per million entering vehicles (ACC/MEV).

TABLE I
SUMMARY OF ACCIDENTS AND COMPARISON OF RATES

Intersection	Number of Accidents	Actual Rate	Statewide Average Rate
Route 62/CR 34/Institute Street	1	0.11	0.19
CR 317-Falconer Street/Route 62	1	0.14	0.19
CR 34/Wiltsie Road	0	0	0.10
Wiltsie Road/Dodge Road	0	0	0.10
US Route 62 between Frew Run St and Mattison St.	1	0.38	2.14
US Route 62 between Frew Run St and Hazzard Road	1	2.10	2.14
Frew Run Street between Route 62 and Wiltsie Road	2	0.42	2.14
Wiltsie Road between Frew Run Street and Dodge Road	0	0	2.14

Calculated accident rates at all of the intersections included in the accident investigation are below the state wide average accident rates for similar facilities published by NYSDOT. Given that there were only six collisions in the entire study area for the last three years with no identifiable accident patterns, no further investigation is necessary. There are no apparent traffic safety deficiencies within the study area.

V. FUTURE AREA DEVELOPMENT AND LOCAL GROWTH

The proposed landfill expansion construction is anticipated to begin in the summer of 2015 with operations beginning at the end of 2015; it is estimated that the useable life of the expansion is approximately 15 years. As such, for purposes of this analysis, traffic projections within the study area have been generated to determine 2015 and 2030 conditions. Town of Carroll officials were contacted to discuss current projects within the project study area that are currently under construction and/or have been accepted for final approval. No nearby developments were identified.

Review of NYSDOT historical Average Daily Traffic (ADT) volumes along Route 62 indicates fluctuations in traffic volumes between 1999 and 2012. The segment of Route 62 approximately 50 feet north of Falconer Street has decreased 0.7% over the past 13 years. To account for normal increases in background traffic growth, including any unforeseen developments in the project study area, a conservative growth rate of 1% per year for one year (2015) and 15 years (2030) was used for purposes of this analysis. The 2015 and 2030 background traffic volumes are depicted in **Figure 4A** and **4B**. All supporting documentation is included in the appendix of this report.

VI. PROPOSED DEVELOPMENT

A. Description

The proposed landfill expansion site is located along the south side of Dodge Road between Wiltsie Road and Anderson Road/Sandberg Road in the Town of Carroll, Chautauqua County, New York. The proposed landfill expansion construction is anticipated to begin in the summer of 2015 with operations beginning at the end of 2015; it is estimated that the useable life of the expansion is approximately 15 years. The expansion will correspond to a maximum average waste acceptance rate of 1,000 tons per day. Access to the landfill gate will be on Dodge Road through an improved driveway located approximately 8,000 feet southeast of Wiltsie Road.

B. Site Traffic Generation

The next step in the evaluation is to determine the additional traffic attributable to the proposed landfill expansion. The expansion will correspond to a maximum average waste acceptance rate of 1,000 tons per day. This, combined with normal landfill operations, will generate various site traffic including waste haul trucks, leachate hauling trucks, operation employees, construction worker's vehicles, recycle trucks, oil and fuel delivery, soil material trucks and other operational and construction vehicles. Information provided by Daigler Engineering and Sealand Waste LLC, found in the DEIS, regarding the projected trip data from the Carroll landfill site, as well as historical trip data from other landfill sites in western New York obtained by SRF were used for estimating trips regarding the number of employees, landfill trucks, construction related vehicles, and delivery/sales trucks during the peak hours.

When a new section of the landfill is being constructed, materials are brought on site, such as processed stone and geosynthetics. Additional traffic associated with these construction activities is not a year round occurrence; only on an as-needed basis when a new cell is being constructed. Construction material is primarily transported to the landfill via dump trucks and flat bed trucks. Construction related trucks are assumed to take the same route as the landfill trucks provided by the developer - Interstate 86, US Route 62, Frew Run Road (CR 34), Wiltsie Road and Dodge Road. Trucks entering the landfill can arrive no earlier than 5:00 AM and the last load is generally accepted at the landfill no later than 6:00 PM. Based on our experience with other similar sites, it is assumed that there will be five (5) construction related trucks entering and five (5) trucks exiting the landfill site.

The trip rate for the peak hour of the generator may or may not coincide in time or volume with the trip rate for the peak hour of adjacent street traffic. Volumes generated during the peak hour of adjacent street traffic, in this case, the weekday AM and PM peaks, represent a more critical volume when analyzing the capacity of the system; those intervals will provide the basis of this analysis. The volume of traffic generated by a site is based on the land use and size of the development. However, the proposed landfill expansion is based on the average waste acceptance rate, which in this case is a maximum average of 1,000 tons per day. Trip generation is an estimate of the number of trips generated by a specific building or land use. These trips represent the volume of traffic entering and exiting the driveway. Trip generation estimates, based on the information obtained from the developer and SRF were used to derive trip generation estimates for the proposed landfill expansion. **Table II**

summarizes the volume of projected trips for the weekday AM and PM peak hour. All trip generation calculations are included in Appendix A2 of this report.

**TABLE II
SITE GENERATED TRIPS**

DESCRIPTION	AM PEAK		PM PEAK	
	ENTER	EXIT	ENTER	EXIT
Employee	4	0	0	2
Landfill Trucks	10	8	6	8
Delivery/Sales	1	1	0	1
Construction Related Trucks	5	5	5	5
Total	20	14	11	16

C. Site Traffic Distribution

The cumulative effect of site traffic on the transportation network is dependent on the origins and destinations of that traffic and the location of the access drive serving the site. The information regarding the proposed arrival/departure distribution of the employees, delivery truck and the landfill truck traffic to be generated at this site was obtained from the developer. All employees, delivery and truck traffic to be generated at the proposed landfill site arriving and departing from/to the east and west will use Interstate 86 (I-86), head south on US Route 62, east on Frew Run Road (CR 34), south on Wiltsie Road and east on Dodge Road to the landfill site. The traffic from the north and south will use US Route 62.

State and Interstate highways are designed to accommodate heavy vehicles (pavement thickness, bridges, and underpasses), whereas local roadways such as Frew Run Road, Wiltsie Road and Dodge Road may not be designed to accommodate higher percentages of heavy truck traffic. An engineering assessment of the roadways, including Dodge Road, (performed by C&S Companies and Dailger Engineering) and bridges (performed by the NYSDOT) to be used by the facility has been undertaken and is included in the DEIS.

Figure 5 shows the anticipated trip distribution pattern percentages for full build out of the proposed landfill expansion. **Figure 6** shows the resulting total site generated traffic as assigned to the site driveways and study area intersections for the weekday AM and PM peak hour periods under full build out conditions.

VII. FULL DEVELOPMENT VOLUMES

The projected design hour traffic volumes were developed for the weekday AM and PM peak hours by combining the future 2015 and 2030 background traffic conditions (Figure 4A and 4B), and projected site generated volumes for the landfill expansion site (Figure 6) to yield the total traffic conditions expected at full operation. **Figure 7A** and **7B** shows the total weekday AM and PM peak hour volumes anticipated for the proposed development under 2015 and 2030 full build out conditions.

VIII. CAPACITY ANALYSIS

Capacity analysis is a technique used for determining a measure of effectiveness for a section of roadway and/or intersection based on the number of vehicles during a specific time period. The measure of effectiveness used for the capacity analysis is referred to as a Level of Service (LOS). Levels of Service are calculated to provide an indication of the amount of delay that a motorist experiences while traveling along a roadway or through an intersection. Since the most amount of delay to motorists usually occurs at intersections, capacity analysis typically focuses on intersections, as opposed to highway segments.

Six Levels of Service are defined for analysis purposes. They are assigned letter designations, from "A" to "F", with LOS "A" representing the best conditions and LOS "F" the worst. Suggested ranges of service capacity and an explanation of Levels of Service are included in the Appendix. The standard procedure for capacity analysis of signalized and unsignalized intersections is outlined in the Highway Capacity Manual (HCM 2010) published by the Transportation Research Board. Traffic analysis software, Synchro 7, which is based on procedures and methodologies contained in the HCM 2000, was used to analyze operating conditions at study area intersections. The procedure yields a Level of Service (LOS) based on the HCM 2000 as an indicator of how well intersections operate.

Existing operating conditions during the peak study periods are evaluated to determine a basis for comparison with the projected future conditions. The future traffic conditions generated by the landfill expansion were analyzed to assess the operations of the intersections in the study area. Capacity results for existing, background, and full development conditions are listed in Table III. The discussion following the table summarizes capacity conditions. All capacity analysis calculations are included in the Appendix.

TABLE III: CAPACITY ANALYSIS RESULTS

INTERSECTION	EXISTING CONDITIONS		2015 CONDITIONS				2030 CONDITIONS				
			BACKGROUND CONDITIONS		FULL DEVELOPMENT CONDITIONS		BACKGROUND CONDITIONS		FULL DEVELOPMENT CONDITIONS		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
<i>Institute St. / Ivory Street (Rte 62) (U)</i>											
Eastbound - Institute Street	B(11.3)	C(16.9)	B(11.4)	C(17.6)	B(12.1)	C(19.0)	B(12.0)	C(20.5)	B(12.8)	C(22.5)	
Westbound - CR 34 (Frew Run Street)	B(11.4)	C(16.2)	B(11.5)	C(16.7)	B(12.1)	C(17.2)	B(12.2)	C(19.4)	B(12.9)	C(20.1)	
Northbound Left - Main Street (Rte 62)	A(0.3)	A(0.6)	A(0.3)	A(0.6)	A(0.3)	A(0.6)	A(0.3)	A(0.7)	A(0.3)	A(0.7)	
Southbound Left - Ivory Street (Rte 62)	A(1.3)	A(1.4)	A(1.4)	A(1.4)	A(2.4)	A(1.8)	A(1.4)	A(1.5)	A(2.4)	A(1.9)	
<i>Falconer St. / Ivory Street (Rte 62) (U)</i>											
Eastbound - Falconer Street	A(9.9)	B(11.5)	A(9.9)	B(11.7)	B(10.1)	B(11.9)	B(10.3)	B(12.6)	B(10.5)	B(12.8)	
Northbound Left - Ivory Street (Rte 62)	A(3.8)	A(2.2)	A(3.8)	A(2.3)	A(3.7)	A(2.2)	A(3.9)	A(2.4)	A(3.8)	A(2.3)	
<i>CR 34 (Frew Run) / Wiltsie Road (U)</i>											
Westbound Left - CR 34 (Frew Run St.)	A(0.9)	A(1.1)	A(0.9)	A(1.1)	A(0.9)	A(1.1)	A(0.9)	A(1.2)	A(0.9)	A(1.2)	
Northbound - Wiltsie Road	A(9.0)	A(9.1)	A(9.0)	A(9.1)	A(9.5)	A(10.0)	A(9.1)	A(9.2)	A(9.6)	B(10.1)	
<i>Dodge Road / Wiltsie Road (U)</i>											
Westbound - Dodge Road	A(8.4)	A(8.6)	A(8.4)	A(8.6)	A(8.9)	A(9.4)	A(8.4)	A(8.6)	A(8.8)	A(9.4)	
Southbound Left - Wiltsie Road	A(2.6)	A(4.5)	A(2.6)	A(4.6)	A(5.9)	A(5.6)	A(2.7)	A(4.5)	A(5.8)	A(5.4)	
<i>Dodge Road / Proposed Site Dr. (U)</i>											
Northbound - Proposed Site Dr.	NA	NA	NA	NA	A(9.7)	A(9.9)	NA	NA	A(9.8)	A(9.9)	

Notes:

(U) = Unsignalized intersection

B(11.3) = Level of Service (Delay in seconds per vehicle)

Institute St. / Ivory Street (Route 62)/ CR 34 (Frew Run Street)

All approaches at the Institute St. /Ivory Street/Frew Run Street intersection operate at an average LOS “C” or better under existing, 2015 background, 2015 future conditions, 2030 background, and 2030 future conditions. No change in level of service is expected as a result of the development. No improvements are warranted or recommended at this intersection.

Falconer St. / Ivory Street (Route 62)

All approaches at the Falconer St. /Ivory Street (Route 62) intersection operate at LOS “B” or better under existing, 2015 background, 2015 future conditions, 2030 background, and 2030 future conditions. The eastbound approach (Falconer Street) is projected to decline from LOS “A” to “B” during the AM peak hour between the 2015 background and 2015 full development conditions. The decrease in the LOS is related to borderline conditions (i.e. the delay was approaching thresholds that define differences in the letter designations for level of service) and the actual change in delay is 0.2 seconds per vehicle. No improvements are warranted or recommended at this intersection.

CR 34 (Frew Run) / Wiltsie Road

All approaches at the CR 34 (Frew Run)/Wiltsie Road intersection operate at an above average LOS “A” under existing, 2015 background, 2015 future conditions, 2030 background, and 2030 future conditions. The northbound approach decreases from LOS “A” to “B” between 2015 future conditions and 2030 future conditions during the PM peak hour. However, this condition is borderline, as the threshold between LOS “A” and “B” is 10.0 seconds; the actual increase in delay is 0.1 seconds. No improvements are warranted or recommended at this intersection.

Dodge Road /Wiltsie Road

All approaches at the Dodge Road/Wiltsie Road intersection operate at an above average LOS “A” under existing, 2015 background, 2015 future conditions, 2030 background, and 2030 future conditions. No changes in LOS are anticipated on any of the approaches between the background and full development conditions. No improvements are warranted or recommended at this intersection.

Dodge Road / Proposed Site Dr.

The proposed site driveway on Dodge Road is projected to operate at an above average LOS “A” on all approaches during both peaks under 2015 and 2030 full development condition. The driveway should be constructed to meet the requirements of the largest design vehicle expected to use the proposed site.

IX. SIGHT DISTANCE ANALYSIS

Sight distances were investigated at all four existing study intersections and the proposed driveway on Dodge Road. Sight distance is provided at intersections to allow drivers to perceive the presence of potentially conflicting vehicles. This should occur in sufficient time for a motorist to stop or adjust their speed, as appropriate, to avoid a collision at the intersection. Sight distance is also provided at intersections to allow the drivers of stopped vehicles a sufficient view of the intersecting highway to anticipate and avoid potential incidents. If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.

A *Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials (AASHTO), 2004, was used as a reference to establish the required stopping sight distance and desirable intersection sight distance for the proposed site driveway.

Required stopping distances and desirable intersection sight distances are based on the design speed for a given section of roadway; generally the design speed is the posted speed limit plus 5 mph. For example, the posted speed limit along US Route 62, Frew Run Road, Wiltsie Road and Dodge Road is 35 mph, 55 mph, 45 mph and 45 mph in the vicinity of the site. Hence design speeds of 40 mph, 60 mph, 50 mph and 50 mph were used. The required stopping distance and desirable intersection sight distance based on the design speed are shown in Table IV.

**TABLE IV
SIGHT DISTANCE REQUIREMENT AND MEASUREMENTS**

INTERSECTION	Posted Speed Limit (mph)	Design Speed (mph)	Desirable Intersection Sight Distance for Left Turn from Stop (ft)	Required Stopping Sight Distance (ft)	Available Sight Distance (ft) to the:	
					Left	Right
Falconer St. at US Route 62 Passenger Cars Combination Trucks	35	40	445' 680'	305' 305'	>1,000'	~650'
Frew Run Road at US Route 62 Passenger Cars Combination Trucks	35	40	445' 680'	305' 305'	~575'	>1,000'
Wiltsie Road at Frew Run Road Passenger Cars Combination Trucks	55	60	665' 1015'	570' 570'	>1,400'	>1,400'
Dodge Road at Wiltsie Road Passenger Cars Combination Trucks	45	50	555' 845'	425' 425'	>1,200'	~800'
Landfill Entrance at Dodge Road Passenger Cars Combination Trucks	45	50	555' 845'	425' 425'	~800'	~340' SSD~615'

The available sight distance exceeds the required stopping sight distance at all of the existing intersections and at the proposed site driveway location. At the Dodge Road & Landfill Entrance the available intersection sight distance is obstructed by the horizontal and vertical curvature of Dodge Road. However the available stopping sight distance, which is measured to an object in the travel lane as opposed to a vehicle exiting the driveway, exceeds the required stopping sight distance. Desirable intersection sight distances are exceeded at most locations as indicated in the table above.

X. SIMTRAFFIC TRAFFIC SIMULATION MODELING

A SimTraffic traffic simulation model was developed for the AM and PM peak hour condition under the existing, background and full development conditions. SimTraffic is a microscopic, multi-purpose traffic simulation program which has the ability to animate the conditions and

behavior of vehicles traversing the transportation network.

This visualization was created to be used as an educational tool to demonstrate to the public and review agency officials, the expected traffic conditions showing the impact of landfill trucks at the Route 62/CR 34/Institute Street and CR 317-Falconer Street/Route 62 intersections from the proposed landfill expansion. The simulation may be made available for review at public hearings.

XI. LINK EVALUATION

Roadway links connecting the study intersections were evaluated in terms of capacity conditions. The segments of US Route 62 between CR 34 /Institute St. and Falconer Street and Wiltsie Road between CR 34 (Frew Run St.) and Dodge Rd are major-street approaches to their respective intersections. Through vehicles on these approaches will experience zero delay and hence will operate at LOS "A" in both directions on both segments. Other roadway links in the study area are impeded only at the intersections, which are evaluated above.

XII. CONCLUSIONS & RECOMMENDATIONS

This study addresses the traffic impact that can be expected from the proposed Carroll Landfill Expansion project in the Town of Carroll, Chautauqua County as described in this Report. It indicates that the existing driveways can adequately accommodate the projected traffic volumes and resulting impacts to study area intersections. The following list summarizes conclusions and recommendations to be considered as a result of this proposed landfill expansion:

1. The proposed landfill expansion is expected to generate approximately 34 total trips with 30 trucks during the AM peak hour, and 27 trips with 25 trucks during the PM peak hour.
2. The proposed site driveway on Dodge Road should be constructed with one exiting and one entering lane and should be stop sign controlled.
3. An engineering assessment of the roadways, including Dodge Road, (performed by C&S Companies and Daigler Engineering) and bridges (performed by the NYSDOT) to be used by the facility has been undertaken and is included in the DEIS report.
4. Sight distance measurements indicate that minimum requirements are exceeded at all four study intersections and the proposed site driveway.
5. Based upon the accident analyses and projected traffic volumes for both trucks and passenger vehicles, the proposed Landfill expansion will not have a significant adverse impact on safety at any of the study area intersections and there are no existing apparent traffic safety deficiencies within the study area.

XIII. FIGURES

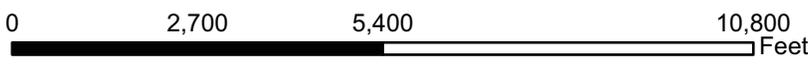
Figures I through 7B are included on the following pages.

FIGURE 1 - SITE LOCATION AND STUDY AREA



- Site Location
- Driveway
- Study Area
- Existing Intersection

**PROPOSED CARROLL LANDFILL EXPANSION
TOWN OF CARROLL, CHAUTAUQUA COUNTY, NEW YORK**



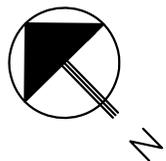
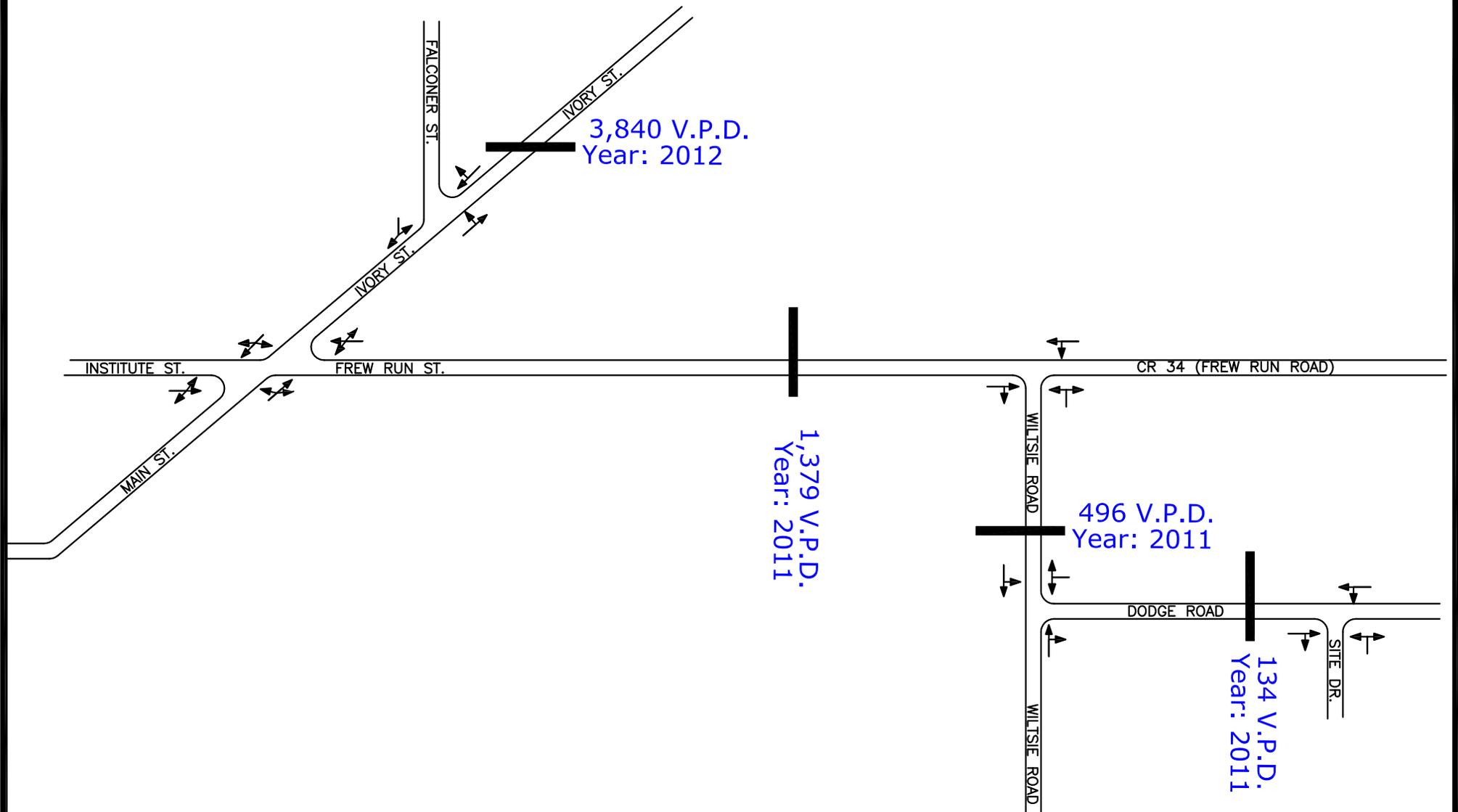


FIGURE 2

EXISTING LANE GEOMETRY &
AVERAGE DAILY TRAFFIC

PROPOSED CARROLL LANDFILL
TOWN OF CARROLL, NEW YORK

KEY

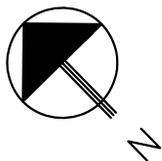
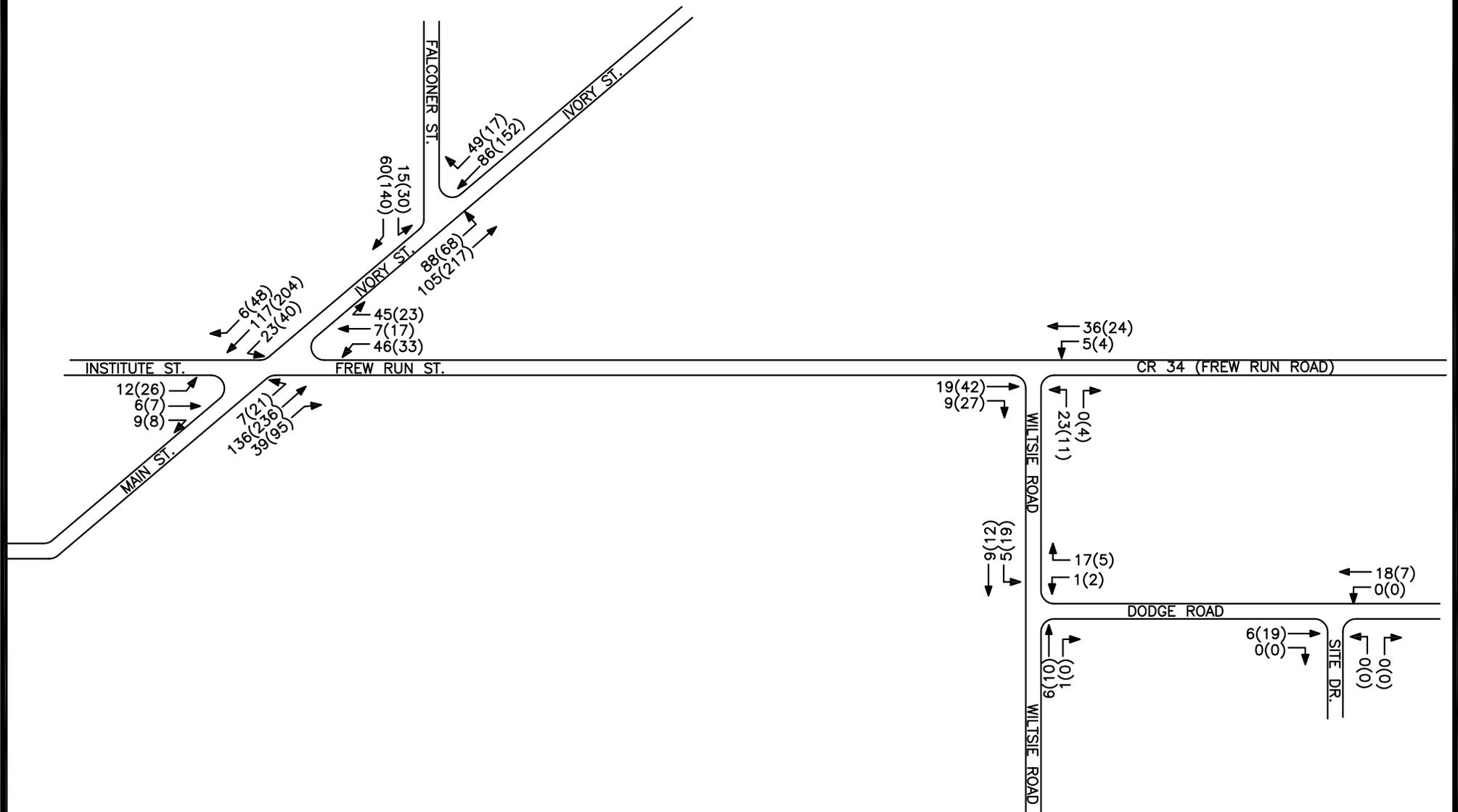


FIGURE 3

PEAK HOUR VOLUMES
2014 EXISTING BASE CONDITONS

PROPOSED CARROLL LANDFILL
TOWN OF CARROLL, NEW YORK

KEY

00(00) = AM(PM)

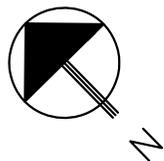
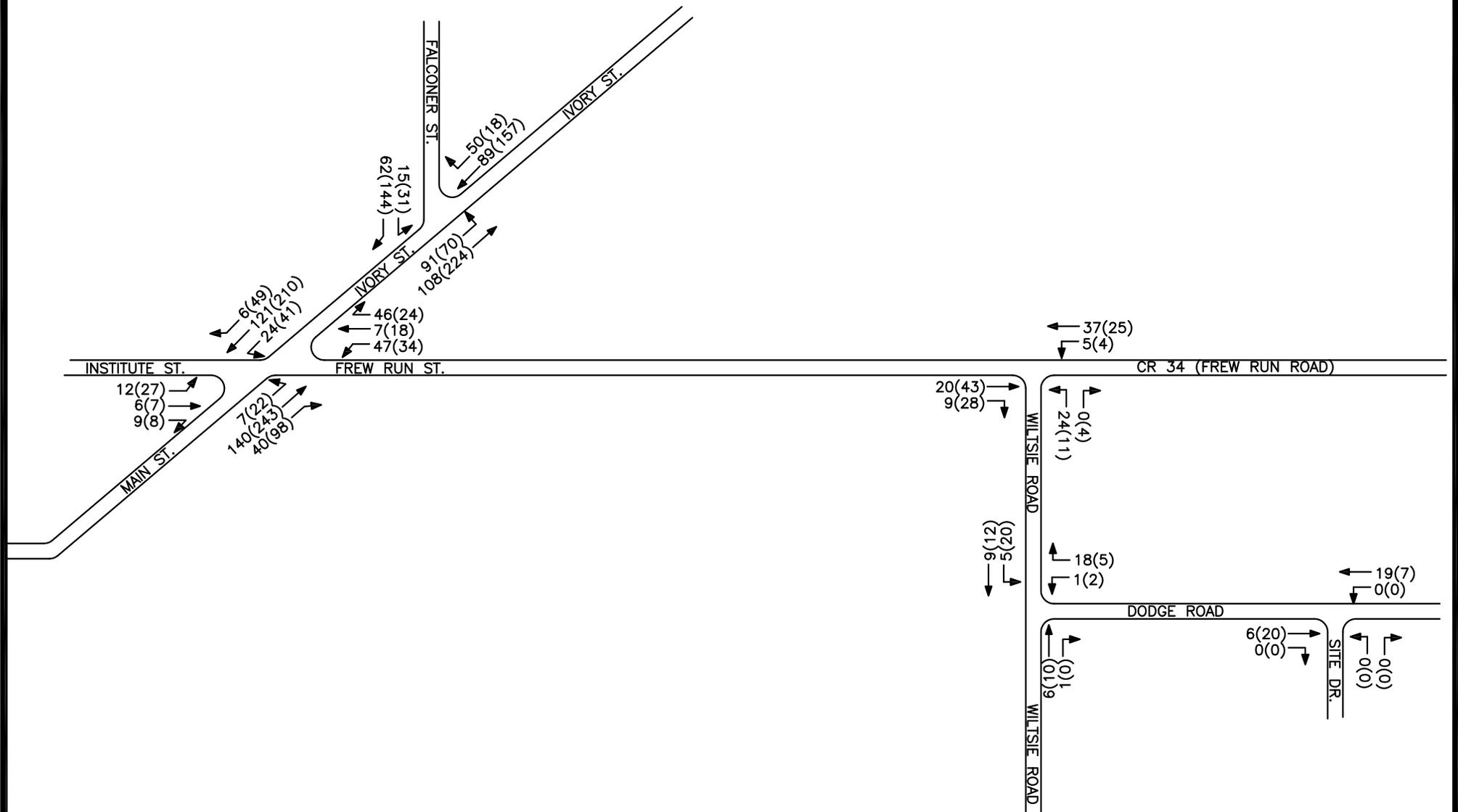


FIGURE 4A

PEAK HOUR VOLUMES
2015 BACKGROUND CONDITONS

PROPOSED CARROLL LANDFILL
TOWN OF CARROLL, NEW YORK

KEY

00(00) = AM(PM)

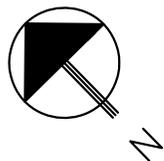
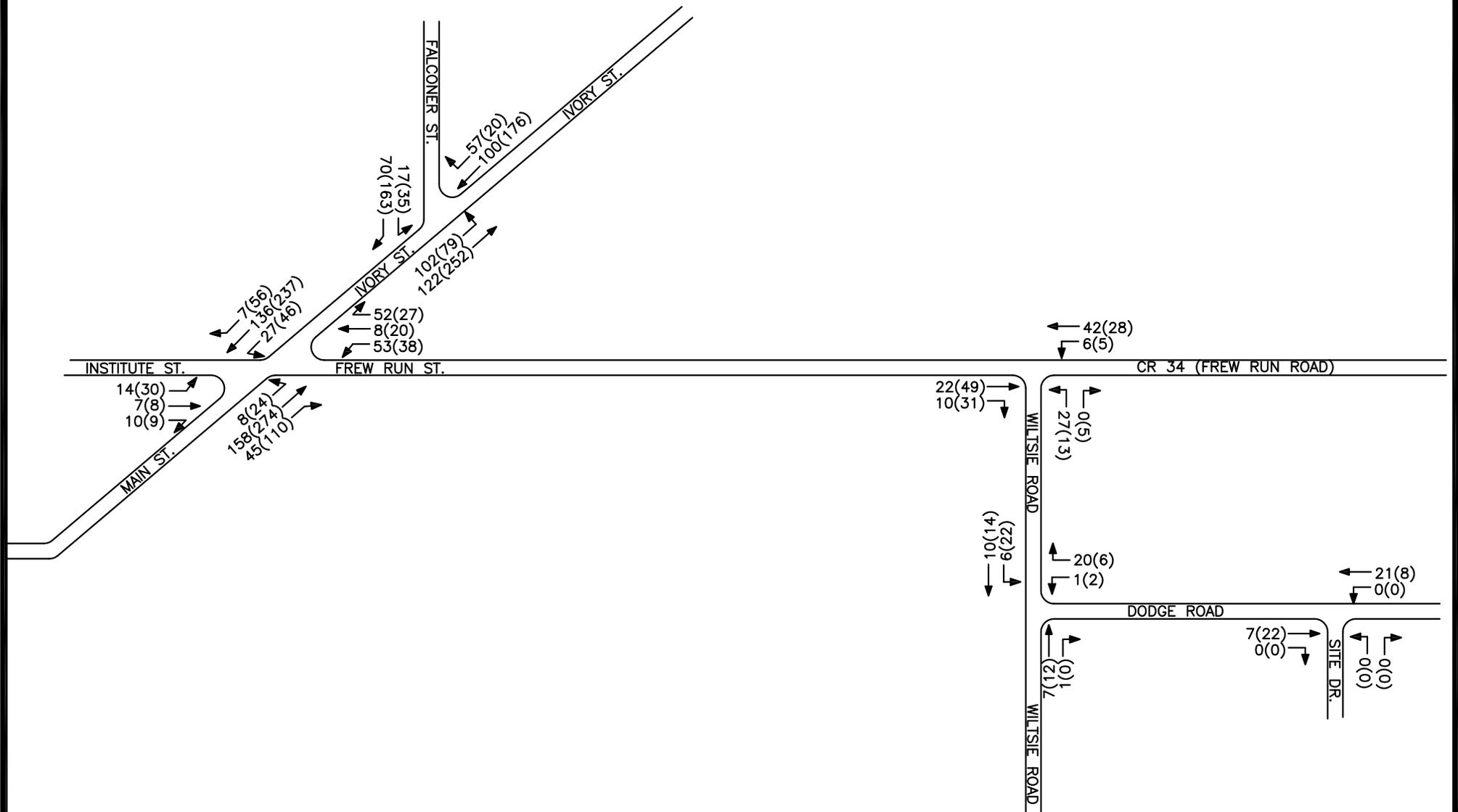


FIGURE 4B

PEAK HOUR VOLUMES
2030 BACKGROUND CONDITONS

PROPOSED CARROLL LANDFILL
TOWN OF CARROLL, NEW YORK

KEY

00(00) = AM(PM)

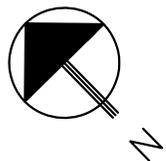
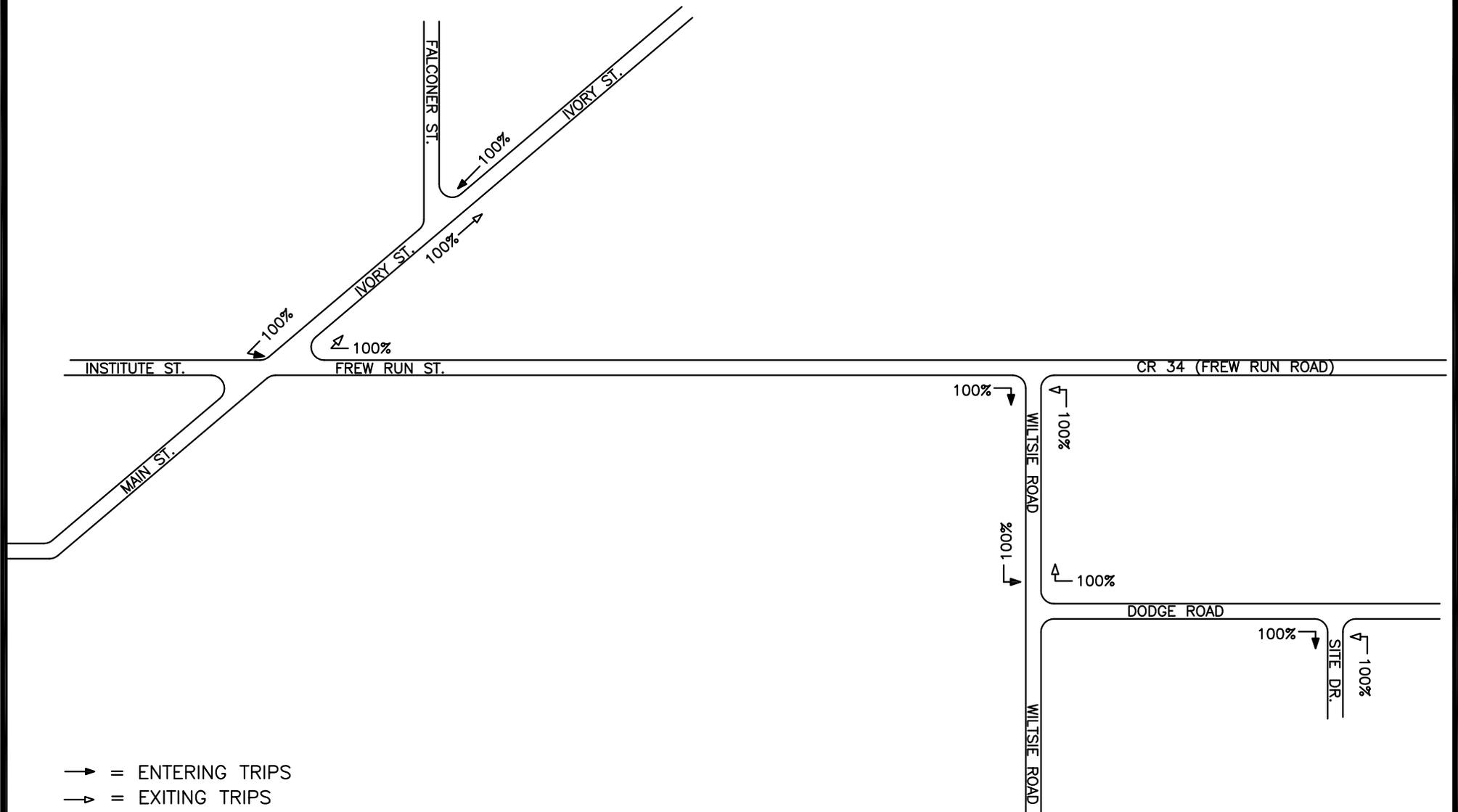


FIGURE 5

PEAK HOUR VOLUMES
TRIP DISTRIBUTION

PROPOSED CARROLL LANDFILL
TOWN OF CARROLL, NEW YORK

KEY

00(00) = AM(PM)

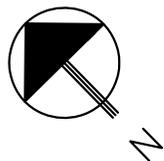
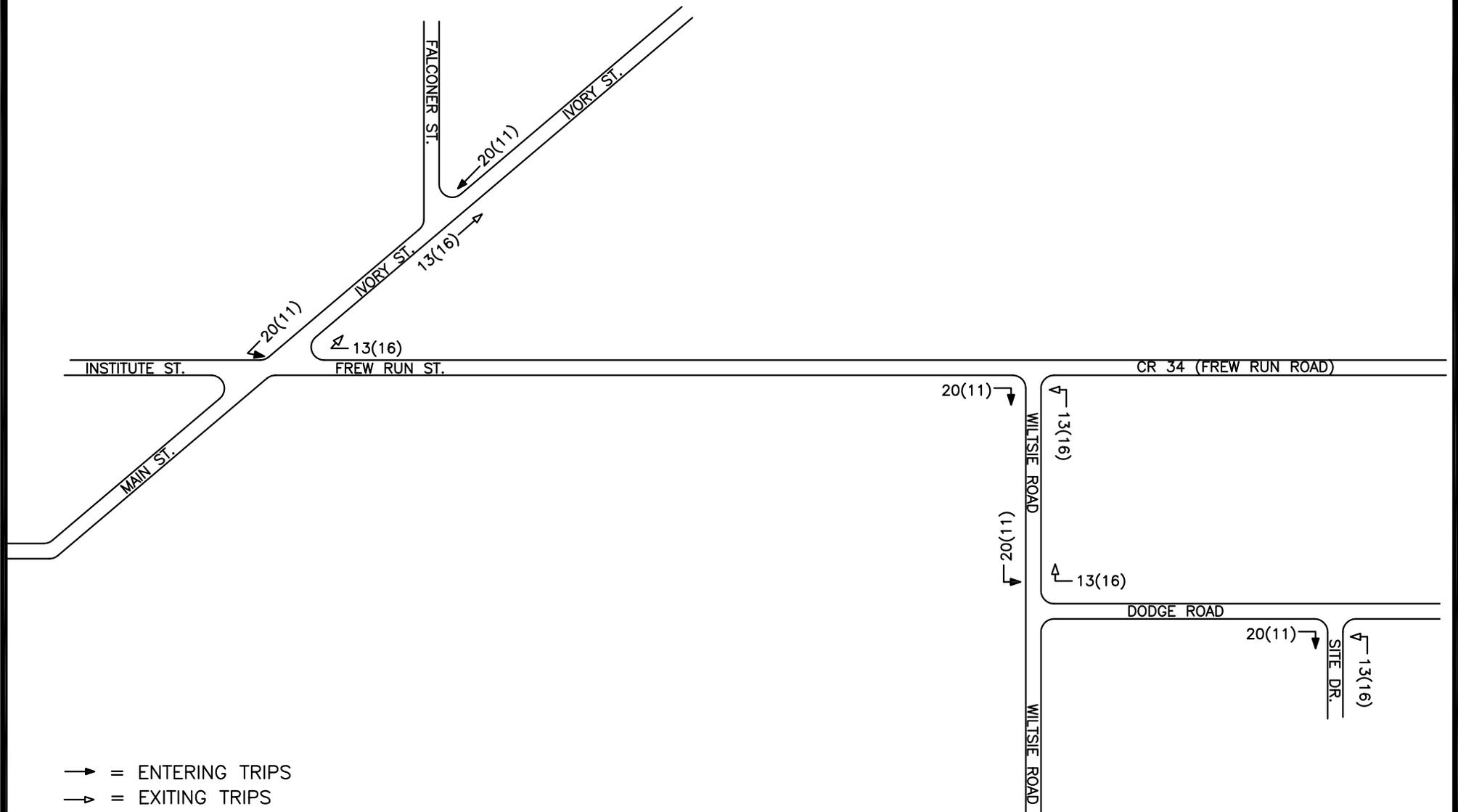


FIGURE 6

PEAK HOUR VOLUMES
PROPOSED TRIP GENERATION

PROPOSED CARROLL LANDFILL
TOWN OF CARROLL, NEW YORK

KEY

00(00) = AM(PM)

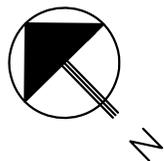
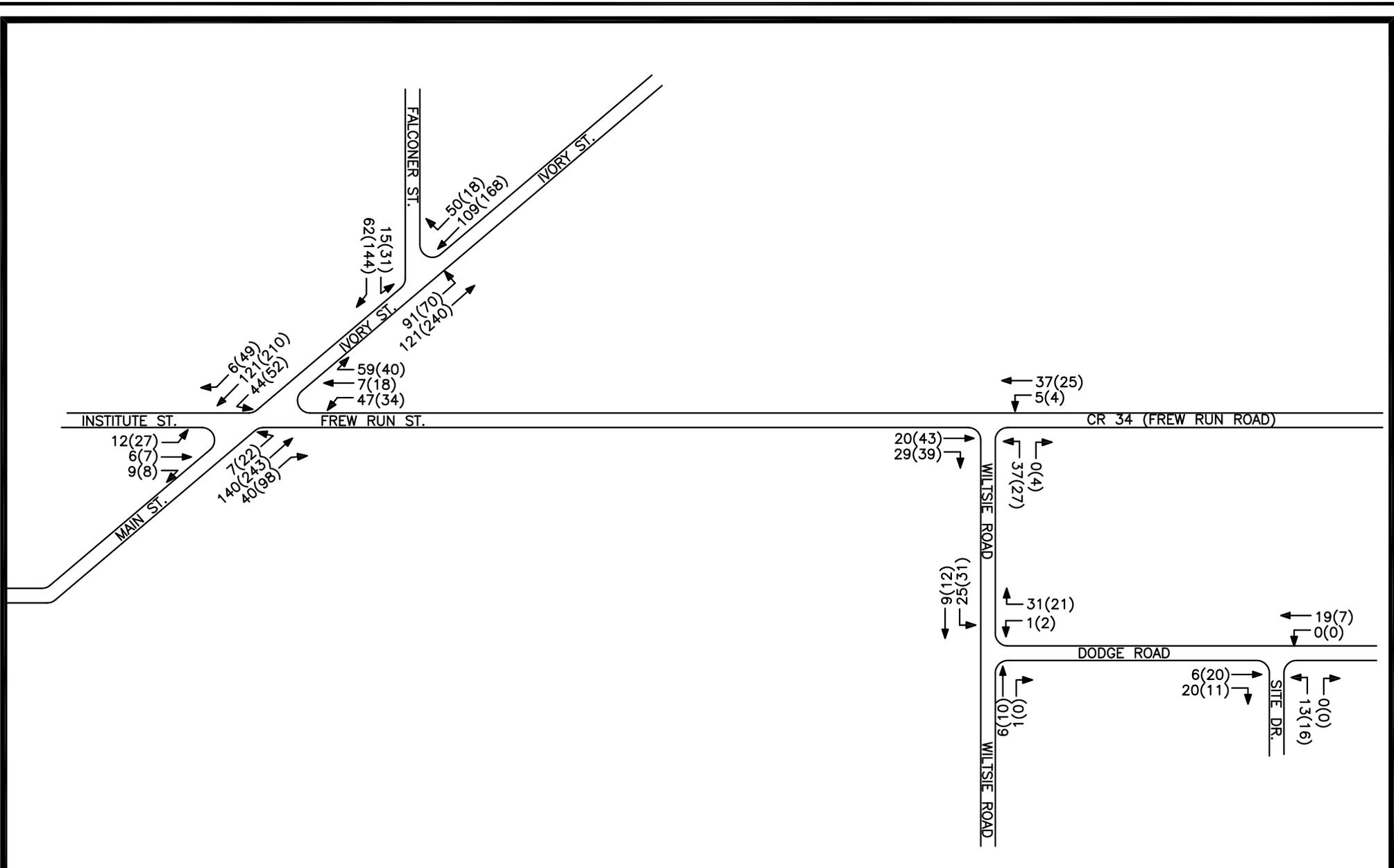


FIGURE 7A

PEAK HOUR VOLUMES
2015 FULL DEVELOPMENT CONDITIONS

PROPOSED CARROLL LANDFILL
TOWN OF CARROLL, NEW YORK

KEY

00(00) = AM(PM)

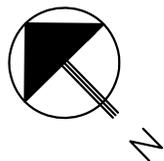
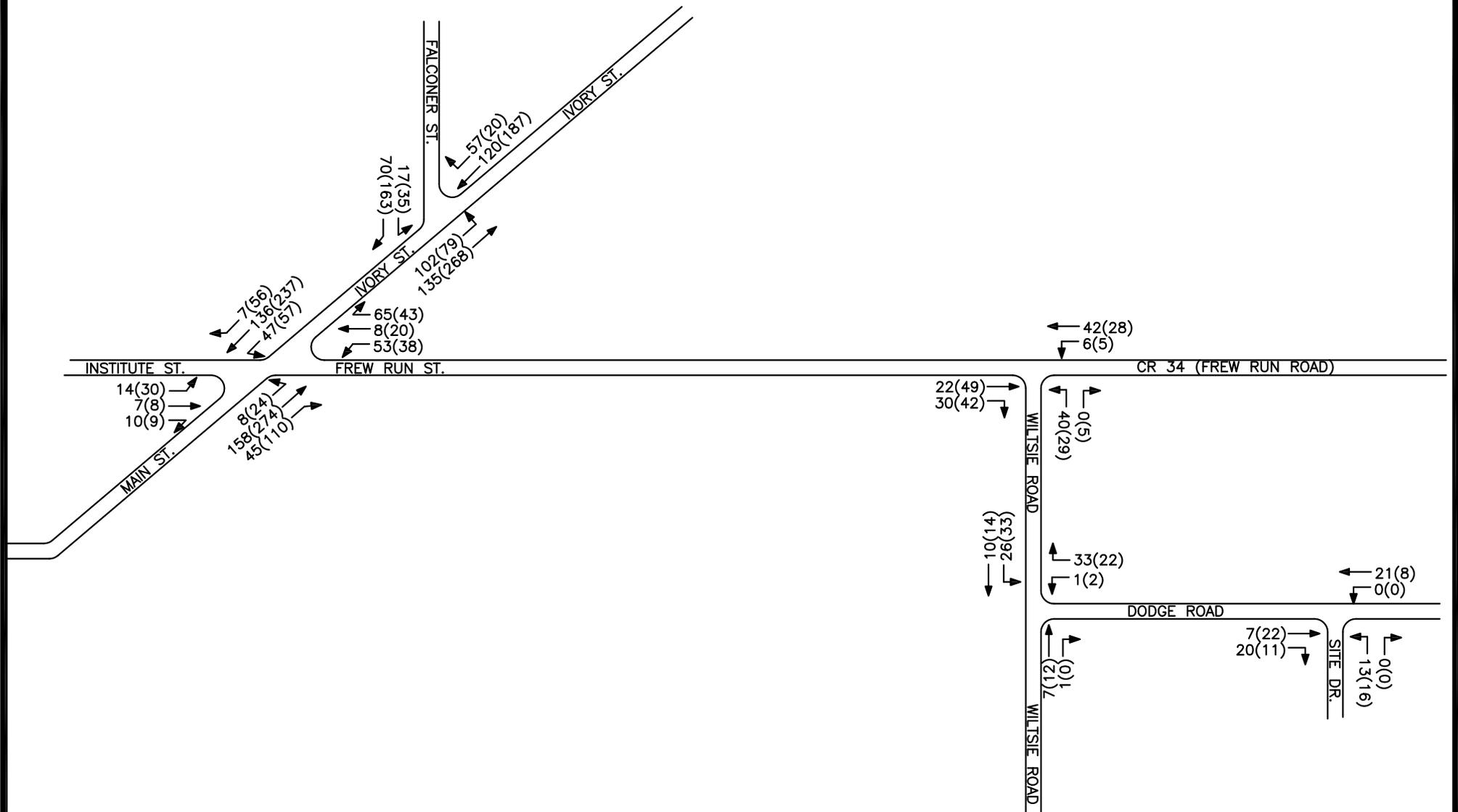


FIGURE 7B

PEAK HOUR VOLUMES
2030 FULL DEVELOPMENT CONDITIONS

PROPOSED CARROLL LANDFILL
TOWN OF CARROLL, NEW YORK

KEY

00(00) = AM(PM)

APPENDICES

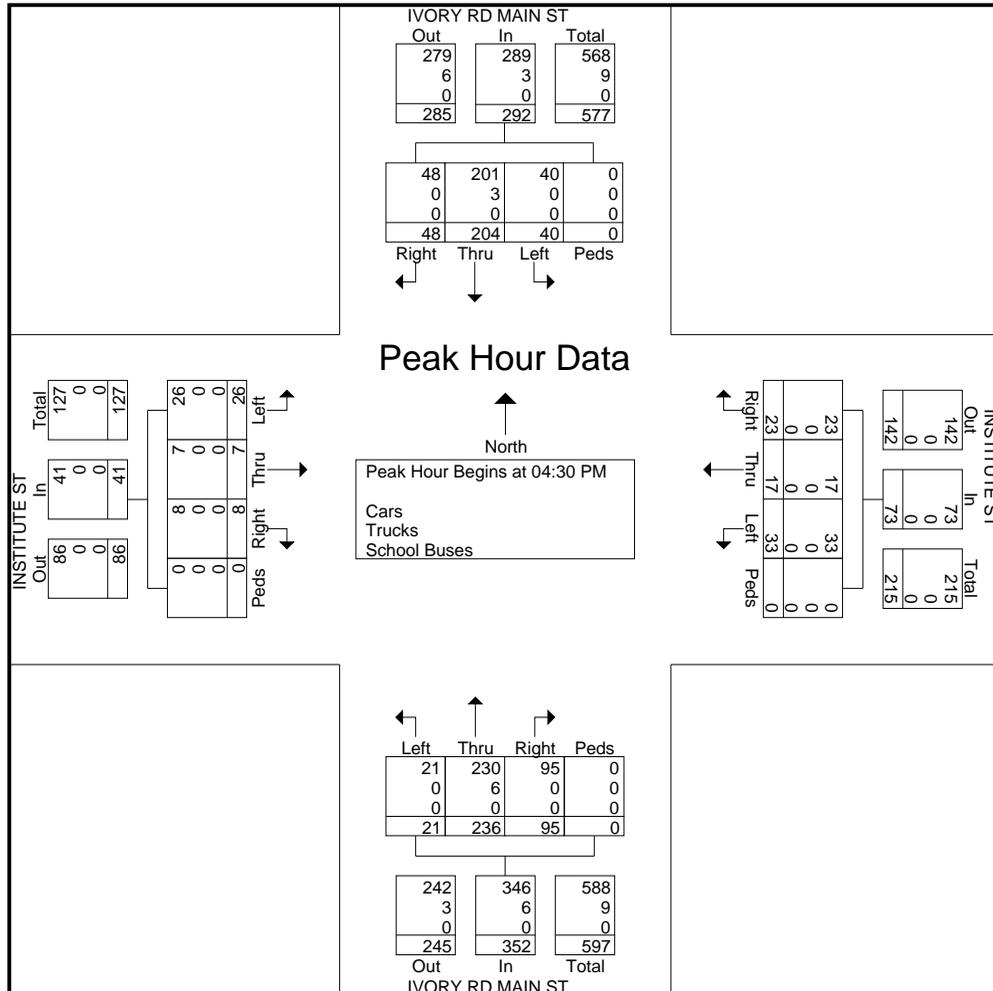
A1

Collected Traffic Volume Data

Groups Printed- Cars - Trucks - School Buses

Start Time	IVORY RD MAIN ST Southbound				INSTITUTE ST Westbound				IVORY RD MAIN ST Northbound				INSTITUTE ST Eastbound				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:30 PM	9	79	6	0	7	4	7	0	13	52	0	0	1	1	8	0	187
02:45 PM	7	50	3	0	2	1	7	0	20	69	5	0	1	4	11	0	180
Total	16	129	9	0	9	5	14	0	33	121	5	0	2	5	19	0	367
03:00 PM	2	39	8	0	2	4	9	0	15	65	3	0	3	2	10	0	162
03:15 PM	15	70	7	0	5	0	4	0	14	50	6	0	5	4	4	0	184
03:30 PM	8	55	9	0	6	2	8	0	19	49	8	0	1	4	5	0	174
03:45 PM	10	55	6	0	8	3	5	0	15	51	4	0	1	2	10	0	170
Total	35	219	30	0	21	9	26	0	63	215	21	0	10	12	29	0	690
04:00 PM	8	54	7	0	10	2	9	0	19	53	11	0	3	3	7	0	186
04:15 PM	6	55	11	0	5	2	2	0	15	57	5	0	4	2	6	0	170
04:30 PM	13	51	11	0	7	5	8	0	21	58	8	0	4	3	5	0	194
04:45 PM	12	51	8	0	7	2	9	0	25	66	5	0	0	2	8	0	195
Total	39	211	37	0	29	11	28	0	80	234	29	0	11	10	26	0	745
05:00 PM	13	54	10	0	4	4	6	0	27	63	3	0	3	1	9	0	197
05:15 PM	10	48	11	0	5	6	10	0	22	49	5	0	1	1	4	0	172
Grand Total	113	661	97	0	68	35	84	0	225	682	63	0	27	29	87	0	2171
Apprch %	13	75.9	11.1	0	36.4	18.7	44.9	0	23.2	70.3	6.5	0	18.9	20.3	60.8	0	
Total %	5.2	30.4	4.5	0	3.1	1.6	3.9	0	10.4	31.4	2.9	0	1.2	1.3	4	0	
Cars	111	639	95	0	64	35	82	0	222	650	62	0	27	29	87	0	2103
% Cars	98.2	96.7	97.9	0	94.1	100	97.6	0	98.7	95.3	98.4	0	100	100	100	0	96.9
Trucks	1	18	0	0	0	0	2	0	1	23	0	0	0	0	0	0	45
% Trucks	0.9	2.7	0	0	0	0	2.4	0	0.4	3.4	0	0	0	0	0	0	2.1
School Buses	1	4	2	0	4	0	0	0	2	9	1	0	0	0	0	0	23
% School Buses	0.9	0.6	2.1	0	5.9	0	0	0	0.9	1.3	1.6	0	0	0	0	0	1.1

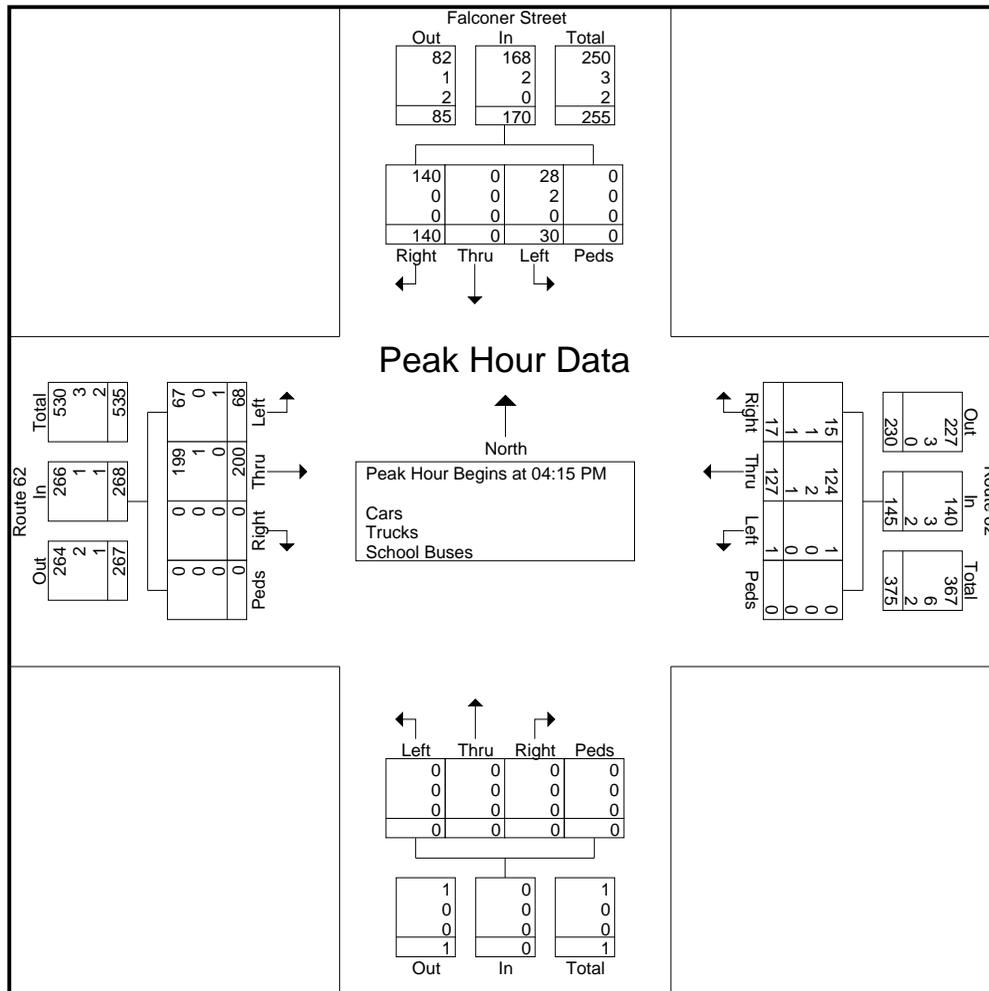
Start Time	IVORY RD MAIN ST Southbound					INSTITUTE ST Westbound					IVORY RD MAIN ST Northbound					INSTITUTE ST Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	13	51	11	0	75	7	5	8	0	20	21	58	8	0	87	4	3	5	0	12	194
04:45 PM	12	51	8	0	71	7	2	9	0	18	25	66	5	0	96	0	2	8	0	10	195
05:00 PM	13	54	10	0	77	4	4	6	0	14	27	63	3	0	93	3	1	9	0	13	197
05:15 PM	10	48	11	0	69	5	6	10	0	21	22	49	5	0	76	1	1	4	0	6	172
Total Volume	48	204	40	0	292	23	17	33	0	73	95	230	21	0	346	8	7	26	0	41	758
% App. Total	16.4	69.9	13.7	0		31.5	23.3	45.2	0		27	67	6	0		19.5	17.1	63.4	0		
PHF	.923	.944	.909	.000	.948	.821	.708	.825	.000	.869	.880	.894	.656	.000	.917	.500	.583	.722	.000	.788	.962
Cars	48	201	40	0	289	23	17	33	0	73	95	230	21	0	346	8	7	26	0	41	749
% Cars	100	98.5	100	0	99.0	100	100	100	0	100	100	97.5	100	0	98.3	100	100	100	0	100	98.8
Trucks	0	3	0	0	3	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	9
% Trucks	0	1.5	0	0	1.0	0	0	0	0	0	0	2.5	0	0	1.7	0	0	0	0	0	1.2
School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% School Buses																					



Groups Printed- Cars - Trucks - School Buses

Start Time	Falconer Street Southbound				Route 62 Westbound				Northbound				Route 62 Eastbound				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:30 PM	42	0	2	0	1	31	0	0	0	0	0	0	0	36	17	0	129
02:45 PM	30	0	9	0	4	26	0	0	0	0	0	0	0	53	24	0	146
Total	72	0	11	0	5	57	0	0	0	0	0	0	0	89	41	0	275
03:00 PM	29	0	7	0	0	16	1	0	0	0	0	0	0	57	15	0	125
03:15 PM	23	0	7	0	9	50	0	0	0	0	0	0	0	27	12	0	128
03:30 PM	29	0	14	0	4	35	0	0	0	0	0	0	0	37	19	0	138
03:45 PM	26	0	14	0	1	22	0	0	0	0	0	0	0	33	16	0	112
Total	107	0	42	0	14	123	1	0	0	0	0	0	0	154	62	0	503
04:00 PM	25	0	6	0	5	39	0	0	0	0	0	0	0	42	20	0	137
04:15 PM	41	0	3	0	5	32	0	0	0	0	0	0	0	51	19	0	151
04:30 PM	38	0	9	0	5	24	1	0	0	0	0	0	0	38	18	0	133
04:45 PM	31	0	10	0	4	34	0	0	0	0	0	0	0	61	17	0	157
Total	135	0	28	0	19	129	1	0	0	0	0	0	0	192	74	0	578
05:00 PM	30	0	8	0	3	37	0	0	0	0	0	0	0	50	14	0	142
Grand Total	344	0	89	0	41	346	2	0	0	0	0	0	0	485	191	0	1498
Apprch %	79.4	0	20.6	0	10.5	88.9	0.5	0	0	0	0	0	0	71.7	28.3	0	
Total %	23	0	5.9	0	2.7	23.1	0.1	0	0	0	0	0	0	32.4	12.8	0	
Cars	341	0	84	0	33	336	2	0	0	0	0	0	0	475	183	0	1454
% Cars	99.1	0	94.4	0	80.5	97.1	100	0	0	0	0	0	0	97.9	95.8	0	97.1
Trucks	0	0	2	0	2	8	0	0	0	0	0	0	0	5	0	0	17
% Trucks	0	0	2.2	0	4.9	2.3	0	0	0	0	0	0	0	1	0	0	1.1
School Buses	3	0	3	0	6	2	0	0	0	0	0	0	0	5	8	0	27
% School Buses	0.9	0	3.4	0	14.6	0.6	0	0	0	0	0	0	0	1	4.2	0	1.8

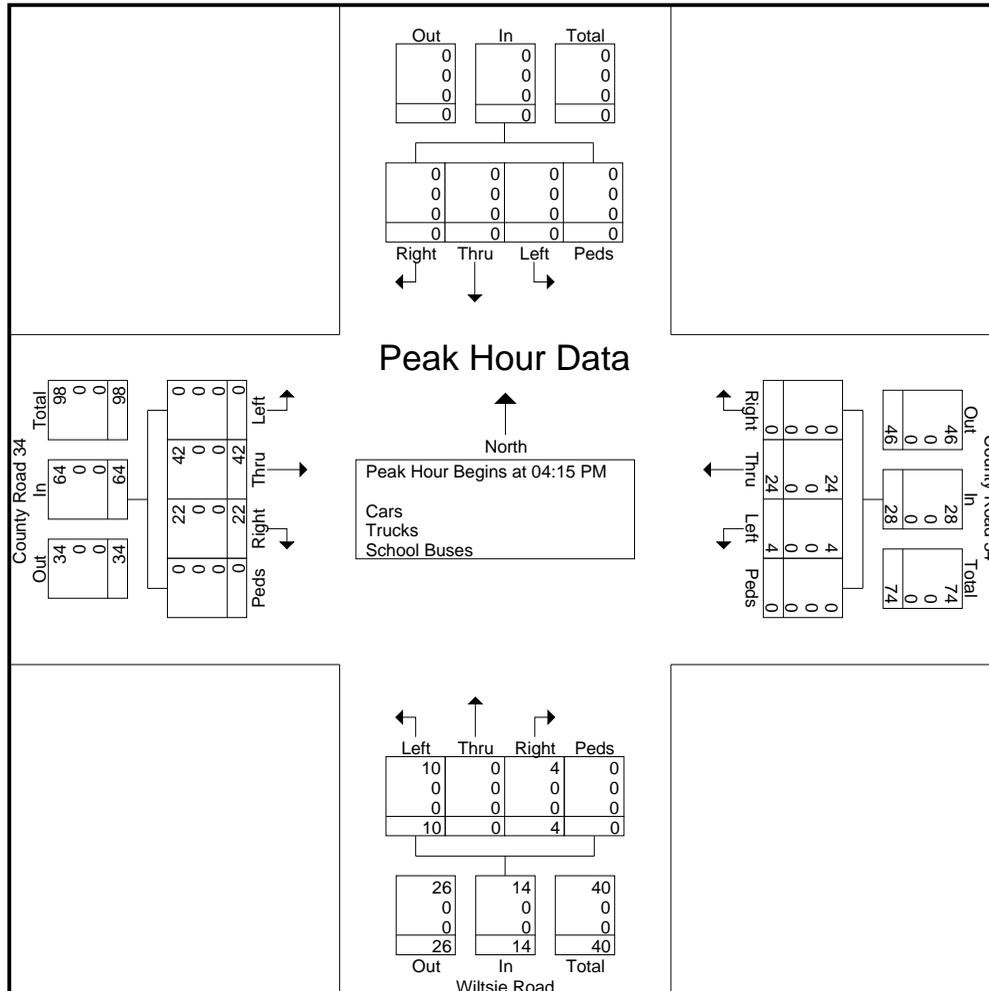
Start Time	Falconer Street Southbound					Route 62 Westbound					Northbound					Route 62 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:30 PM to 05:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	41	0	3	0	44	5	32	0	0	37	0	0	0	0	0	0	51	19	0	70	151
04:30 PM	38	0	9	0	47	5	24	1	0	30	0	0	0	0	0	0	38	18	0	56	133
04:45 PM	31	0	10	0	41	4	34	0	0	38	0	0	0	0	0	0	61	17	0	78	157
05:00 PM	30	0	8	0	38	3	37	0	0	40	0	0	0	0	0	0	50	14	0	64	142
Total Volume	140	0	30	0	170	17	127	1	0	145	0	0	0	0	0	0	200	68	0	268	583
% App. Total	82.4	0	17.6	0		11.7	87.6	0.7	0		0	0	0	0		0	74.6	25.4	0		
PHF	.854	.000	.750	.000	.904	.850	.858	.250	.000	.906	.000	.000	.000	.000	.000	.000	.820	.895	.000	.859	.928
Cars	140	0	28	0	168	15	124	1	0	140	0	0	0	0	0	0	199	67	0	266	574
% Cars	100	0	93.3	0	98.8	88.2	97.6	100	0	96.6	0	0	0	0	0	0	99.5	98.5	0	99.3	98.5
Trucks	0	0	2	0	2	1	2	0	0	3	0	0	0	0	0	0	1	0	0	1	6
% Trucks	0	0	6.7	0	1.2	5.9	1.6	0	0	2.1	0	0	0	0	0	0	0.5	0	0	0.4	1.0
School Buses	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	1	0	1	3
% School Buses																					



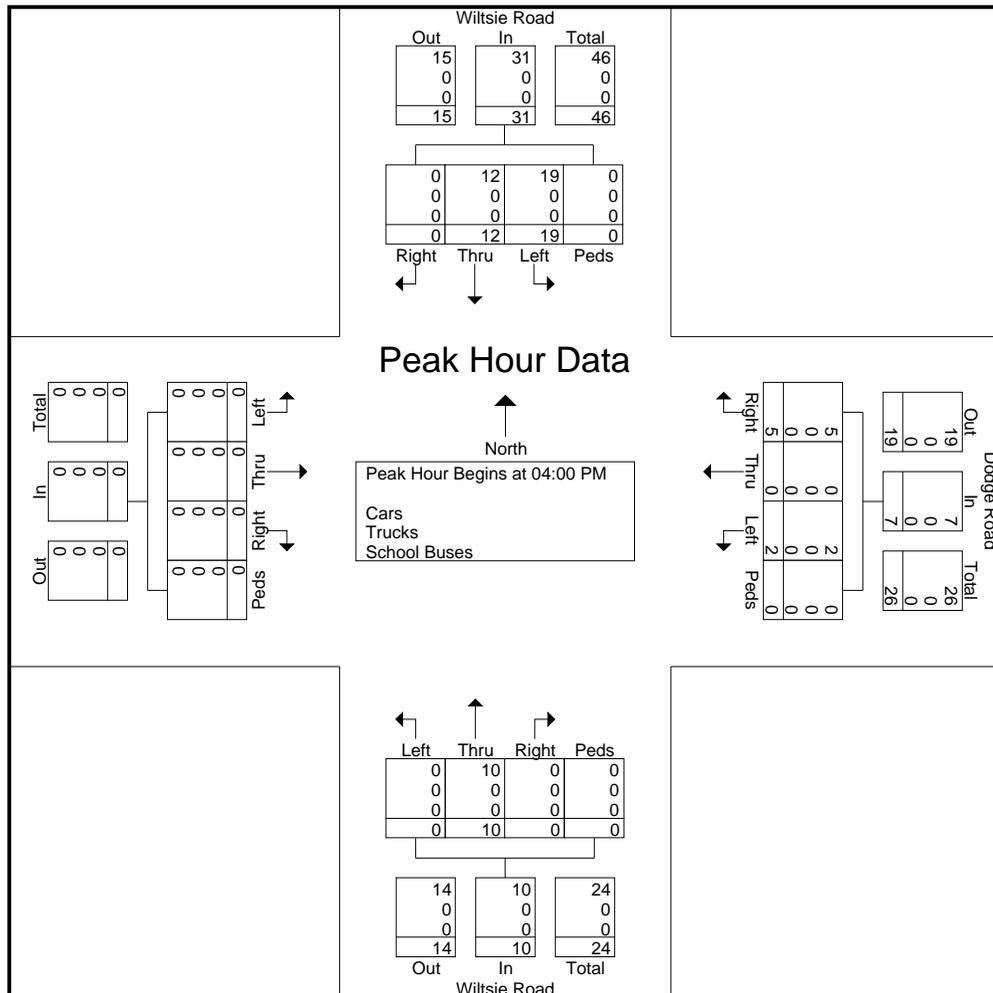
Groups Printed- Cars - Trucks - School Buses

Start Time	Southbound				County Road 34 Westbound				Wiltsie Road Northbound				County Road 34 Eastbound				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:45 PM	0	0	0	0	0	7	1	0	0	0	0	0	4	8	0	0	20
Total	0	0	0	0	0	7	1	0	0	0	0	0	4	8	0	0	20
03:00 PM	0	0	0	0	0	5	0	0	0	0	2	0	2	10	0	0	19
03:15 PM	0	0	0	0	0	4	1	0	0	0	1	0	2	15	0	0	23
03:30 PM	0	0	0	0	0	8	1	0	2	0	4	0	4	7	0	0	26
03:45 PM	0	0	0	0	0	2	0	0	1	0	2	0	3	7	0	0	15
Total	0	0	0	0	0	19	2	0	3	0	9	0	11	39	0	0	83
04:00 PM	0	0	0	0	0	4	1	0	2	0	3	0	7	8	0	0	25
04:15 PM	0	0	0	0	0	4	1	0	1	0	2	0	4	9	0	0	21
04:30 PM	0	0	0	0	0	10	1	0	0	0	4	0	11	11	0	0	37
04:45 PM	0	0	0	0	0	3	1	0	2	0	1	0	2	10	0	0	19
Total	0	0	0	0	0	21	4	0	5	0	10	0	24	38	0	0	102
05:00 PM	0	0	0	0	0	7	1	0	1	0	3	0	5	12	0	0	29
05:15 PM	0	0	0	0	0	4	1	0	1	0	1	0	2	7	0	0	16
05:30 PM	0	0	0	0	0	1	0	0	1	0	4	0	2	10	0	0	18
Grand Total	0	0	0	0	0	59	9	0	11	0	27	0	48	114	0	0	268
Apprch %	0	0	0	0	0	86.8	13.2	0	28.9	0	71.1	0	29.6	70.4	0	0	
Total %	0	0	0	0	0	22	3.4	0	4.1	0	10.1	0	17.9	42.5	0	0	
Cars	0	0	0	0	0	57	9	0	11	0	27	0	47	113	0	0	264
% Cars	0	0	0	0	0	96.6	100	0	100	0	100	0	97.9	99.1	0	0	98.5
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
School Buses	0	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	4
% School Buses	0	0	0	0	0	3.4	0	0	0	0	0	0	2.1	0.9	0	0	1.5

Start Time	Southbound					County Road 34 Westbound					Wiltsie Road Northbound					County Road 34 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	0	0	0	0	0	4	1	0	5	1	0	2	0	3	4	9	0	0	13	21
04:30 PM	0	0	0	0	0	0	10	1	0	11	0	0	4	0	4	11	11	0	0	22	37
04:45 PM	0	0	0	0	0	0	3	1	0	4	2	0	1	0	3	2	10	0	0	12	19
05:00 PM	0	0	0	0	0	0	7	1	0	8	1	0	3	0	4	5	12	0	0	17	29
Total Volume	0	0	0	0	0	0	24	4	0	28	4	0	10	0	14	22	42	0	0	64	106
% App. Total	0	0	0	0	0	0	85.7	14.3	0		28.6	0	71.4	0		34.4	65.6	0	0		
PHF	.000	.000	.000	.000	.000	.000	.600	1.000	.000	.636	.500	.000	.625	.000	.875	.500	.875	.000	.000	.727	.716
Cars	0	0	0	0	0	0	24	4	0	28	4	0	10	0	14	22	42	0	0	64	106
% Cars	0	0	0	0	0	0	100	100	0	100	100	0	100	0	100	100	100	0	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Start Time	Wiltsie Road Southbound					Dodge Road Westbound					Wiltsie Road Northbound					Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	3	7	0	10	3	0	0	0	3	0	1	0	0	1	0	0	0	0	0	14
04:15 PM	0	3	2	0	5	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	9
04:30 PM	0	4	8	0	12	2	0	2	0	4	0	2	0	0	2	0	0	0	0	0	18
04:45 PM	0	2	2	0	4	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	7
Total Volume	0	12	19	0	31	5	0	2	0	7	0	10	0	0	10	0	0	0	0	0	48
% App. Total	0	38.7	61.3	0		71.4	0	28.6	0		0	100	0	0		0	0	0	0		
PHF	.000	.750	.594	.000	.646	.417	.000	.250	.000	.438	.000	.625	.000	.000	.625	.000	.000	.000	.000	.000	.667
Cars	0	12	19	0	31	5	0	2	0	7	0	10	0	0	10	0	0	0	0	0	48
% Cars	0	100	100	0	100	100	0	100	0	100	0	100	0	0	100	0	0	0	0	0	100
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

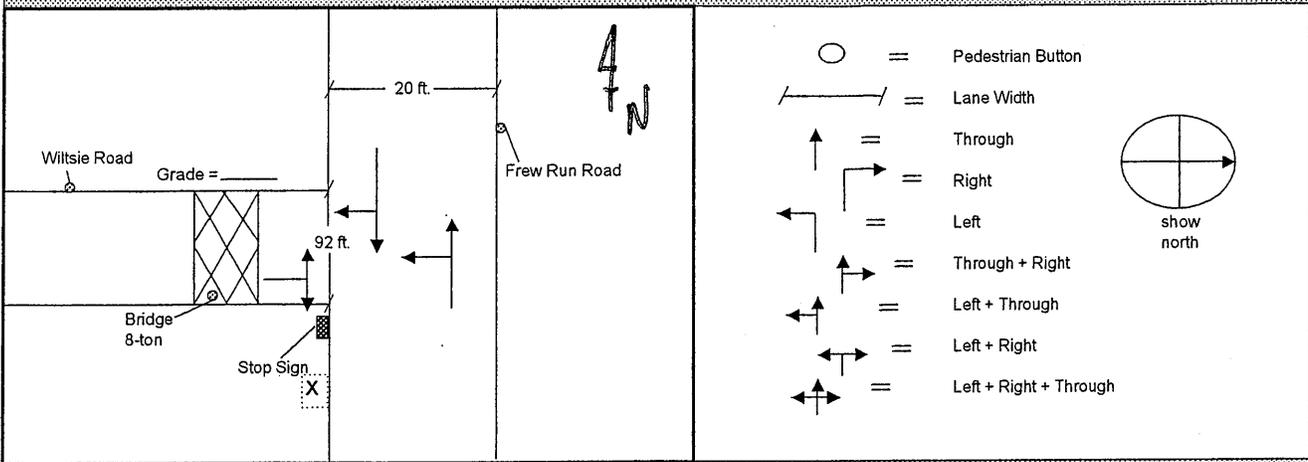


Input Worksheet

0

General Information		Site Information	
Analyst	SAM DAIGLER	Intersection	Wiltzie + Frew Way
Agency or Company	DE	Area Type	<input type="radio"/> Other <input type="radio"/> CBD
Date Performed	6-14-2011	Jurisdiction	
Analysis Time Period	6:05-9:00AM	Analysis Year	2011

Intersection Geometry



Volume

	WB		SB		NB		TH
	LT	RT	TH	RT	LT	TH	
Passenger Cars	9		4	3	4	22	
Heavy Vehicles							
Buses			1	1			
Pedestrians							
Bicycles							
TOTALS:	9		5	4	4	22	

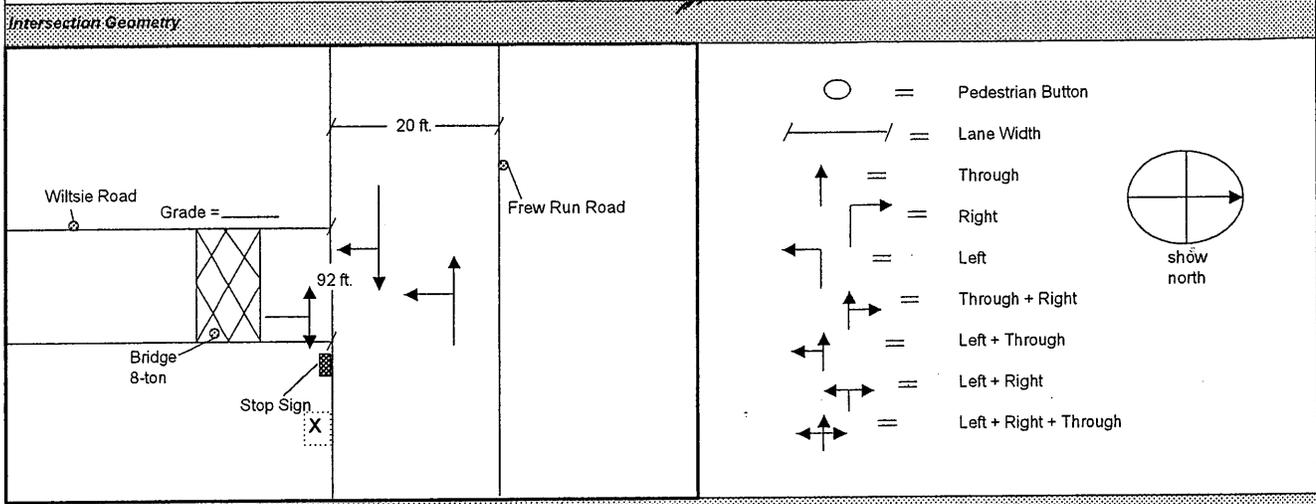
Notes

1. RT volumes, as shown, exclude RTOR.
2. Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
3. Refer to Equation 16-2.

6:00-7:00 AM

input worksheet

General Information		Site Information	
Analyst	_____	Intersection	_____
Agency or Company	_____	Area Type	<input type="radio"/> Other <input type="radio"/> CBD
Date Performed	_____	Jurisdiction	_____
Analysis Time Period	_____	Analysis Year	_____



Volume	WB		SB		NB		TH
	LT	RT	TH	RT	LT	TH	
Passenger Cars	18		18	7	5	35	
Heavy Vehicles							
Buses	1		1	1		1	
Pedestrians							
Bicycles							
motorcycles	1						
TOTALS:	20		19	8	5	36	

Notes

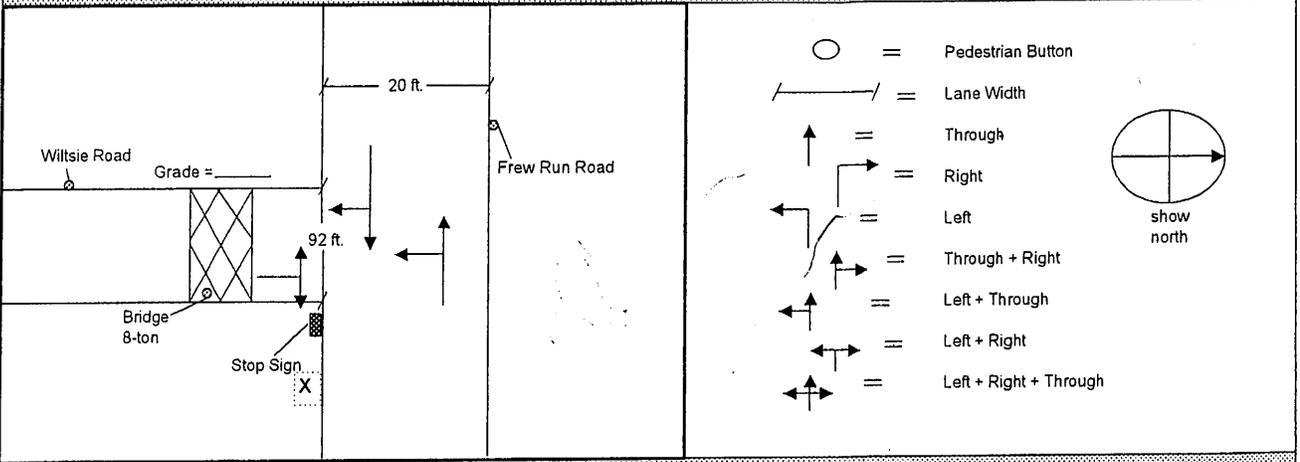
1. RT volumes, as shown, exclude RTOR.
2. Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
3. Refer to Equation 16-2.

7:00-8:00 AM

input worksheet

General Information		Site Information	
Analyst _____	Agency or Company _____	Intersection Area Type _____	<input type="radio"/> Other <input type="radio"/> CBD
Date Performed _____	Analysis Time Period _____	Jurisdiction _____	Analysis Year _____

Intersection Geometry



Volume

	WB		SB		NB		
	LT	RT	TH	RT	LT	TH	
Passenger Cars							
Heavy Vehicles							
Buses							
Pedestrians							
Bicycles							
TOTALS:	13	1	10	5	1	31	

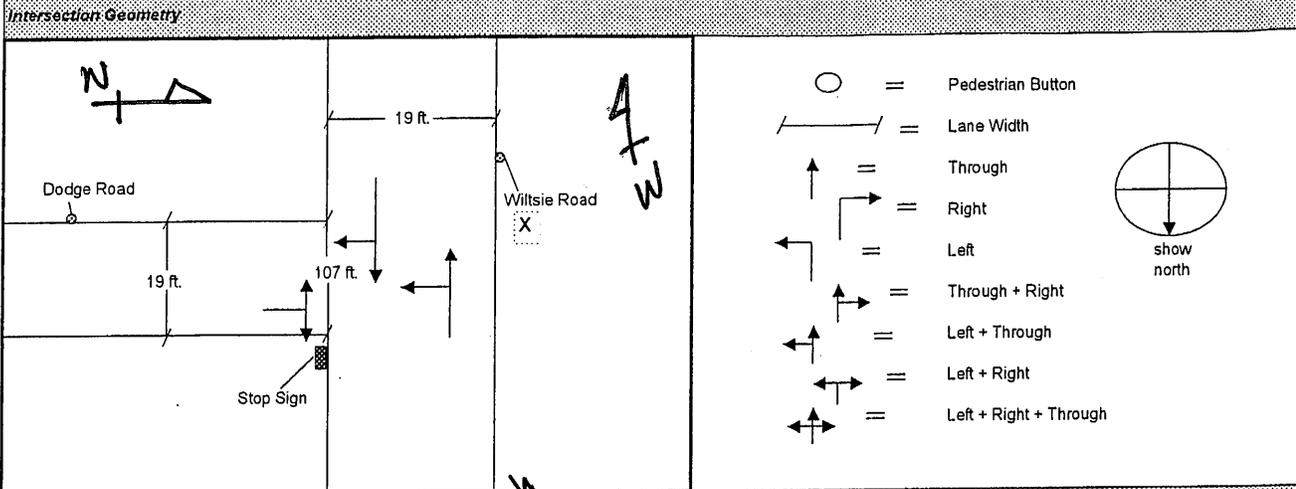
Notes

1. RT volumes, as shown, exclude RTOR.
2. Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
3. Refer to Equation 16-2.

8:00-9:00 AM

Input Worksheet

General Information		Site Information	
Analyst	JIM DAIGLER	Intersection	WILTSIE & DODGE
Agency or Company	DE	Area Type	<input type="radio"/> Other <input type="radio"/> CBD
Date Performed	6-14-11	Jurisdiction	
Analysis Time Period	6:05 am → 7:00	Analysis Year	2011



Volume

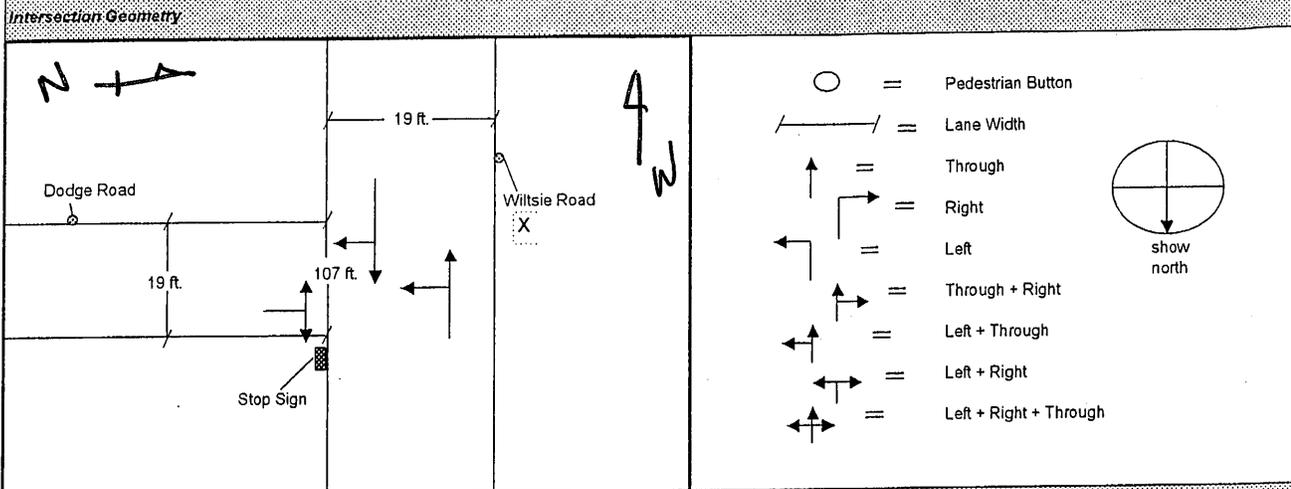
	NB			EB		WB				
	LT	RT	TH	RT	LT	TH				
Passenger Cars									1st 15min	2nd 15min
Heavy Vehicles									3rd 15min	4th 15min
Buses		school bus @ 6:45 am				WV @ 6:30 am			school bus parked in right shoulder of Dodge Rd to 6:35	
Pedestrians										
Bicycles										
TOTALS:										

Notes

1. RT volumes, as shown, exclude RTOR.
2. Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
3. Refer to Equation 16-2.

Input Worksheet

General Information		Site Information	
Analyst	JIM DAIGLER	Intersection	WILTSIE & DODGE
Agency or Company	DE	Area Type	<input type="radio"/> Other <input type="radio"/> CBD
Date Performed	6-14-11	Jurisdiction	
Analysis Time Period	7:00-8:00	Analysis Year	2011



Volume

	NB			EB			WB				
	LT	RT	TH	LT	RT	TH	LT	RT	TH		
Passenger Cars										1st 15min	2nd 15min
								⊗		3rd 15min	4th 15min
Heavy Vehicles											
Buses										School buses	
										7:36am NB/RT	
										7:53am WB/LT	
Pedestrians										7:59 NB/LT	
Bicycles											
Motorcycle											
TOTALS:											

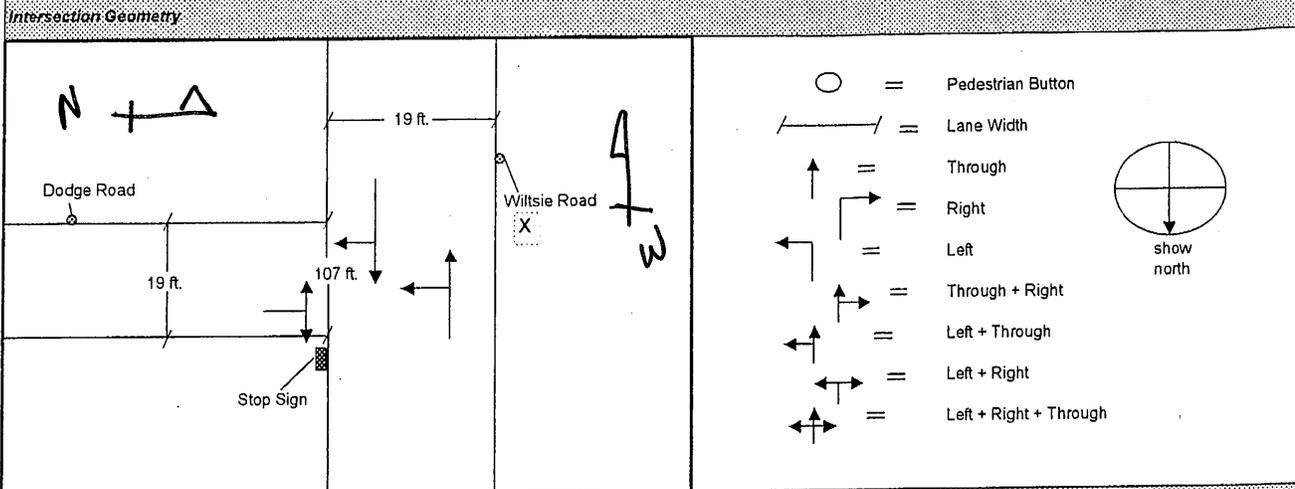
Notes

1. RT volumes, as shown, exclude RTOR.
2. Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
3. Refer to Equation 16-2.

women said this is small town (blue mini van)
 ① @ 7:42am asked what are you doing there - the response "county traffic"

Input Worksheet

General Information		Site Information	
Analyst	JIM DAIQUE	Intersection	WILTSIE & DODGE
Agency or Company	DE	Area Type	<input type="radio"/> Other <input type="radio"/> CBD
Date Performed	6-14-11	Jurisdiction	
Analysis Time Period	8:00-9:00	Analysis Year	2011



Volume

	NB			EB		WB			
	LT	RT	TH	RT	LT	TH			
Passenger Cars								1st 15min	2nd 15min
								3rd 15min	4th 15min
Heavy Vehicles									
Buses									
Pedestrians									
Bicycles									
FARM TRACTOR									
TOTALS:									

Notes

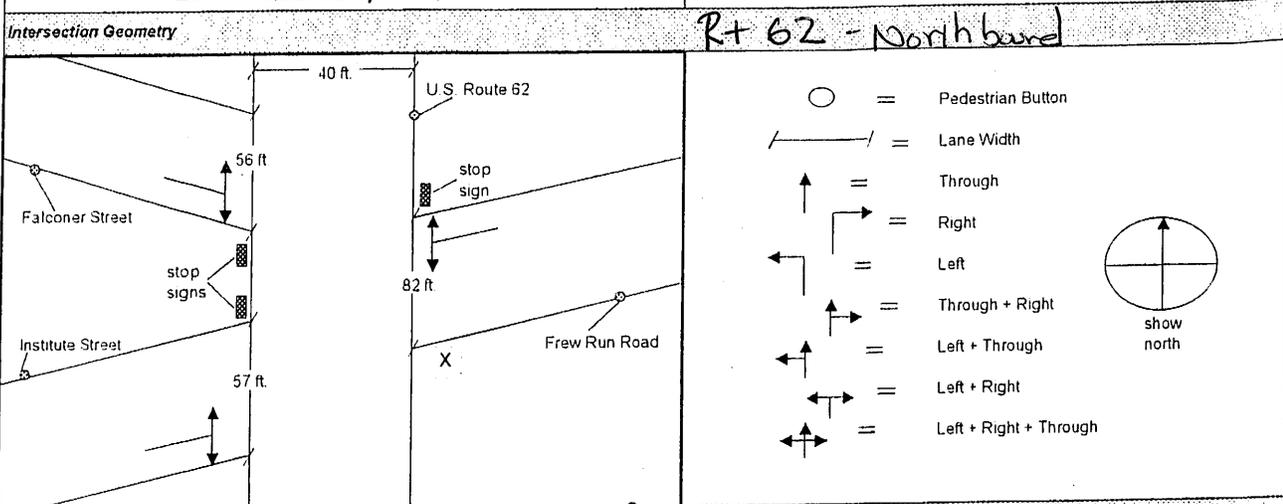
1. RT volumes, as shown, exclude RTOR.
2. Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
3. Refer to Equation 16-2.

8:42

8:38 am

Input Worksheet

General Information		Site Information	
Analyst	TRACY KANDLON	Intersection	Rt 62 / Institute / CR 34
Agency or Company	DE	Area Type	0 Other CBD
Date Performed	6/14/2011	Jurisdiction	
Analysis Time Period	6 AM - 9 AM	Analysis Year	2011



Volume	Rt 62 - NB	Rt 62 - To Institute	Rt 62 - Right to CR 34
Passenger Cars	THROUGH 	0	
Heavy Vehicles	0 0 0 0 	0	
Buses	630-7 845-9	0	
Pedestrians	0	0	
Bicycles	0	0	
TOTALS:	106	0	77

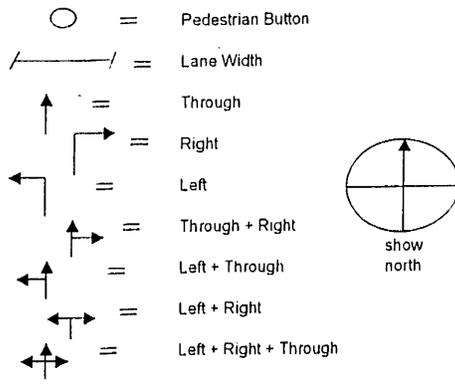
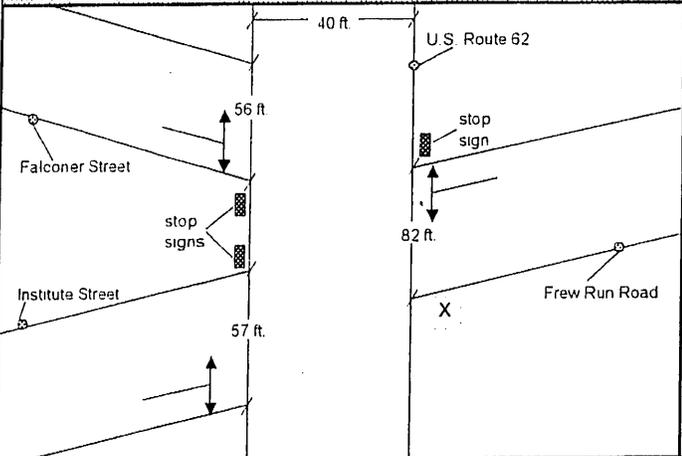
Notes

- 1 RT volumes, as shown, exclude RTOR
- 2 Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
- 3 Refer to Equation 16-2.

Input Worksheet

General Information		Site Information	
Analyst	TRACY KINDON	Intersection	CR-34
Agency or Company	DE	Area Type	<input type="radio"/> Other <input type="radio"/> CBD
Date Performed	6/14/2011	Jurisdiction	
Analysis Time Period	6:30 - 9 AM	Analysis Year	2011

Intersection Geometry



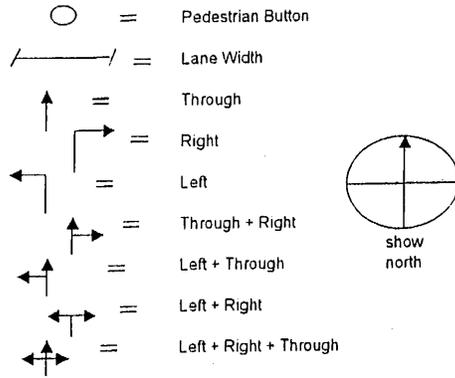
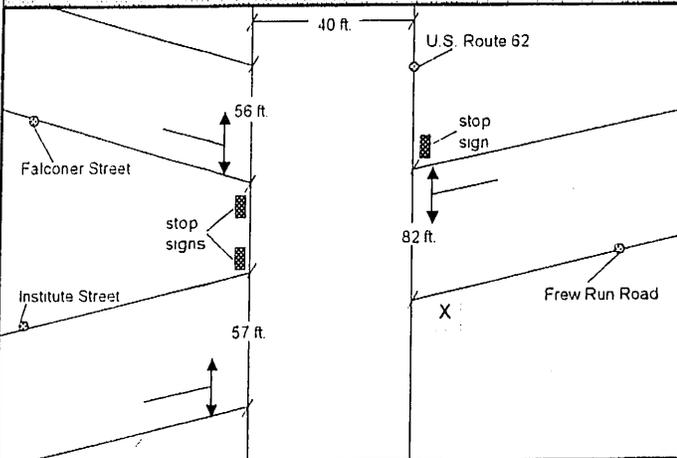
Volume	North on 62	South on 62	Through to INSTITUTE																																										
Passenger Cars	<table border="1"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>																	<table border="1"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>																	<table border="1"> <tr><td> </td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>		0	0	0	0	0				
	0	0																																											
0	0	0																																											
Heavy Vehicles	1 - 8:30 AM																																												
Buses	2 - 7:00-7:15 1 - 7:15-7:30 1 - 8:30-8:15																																												
Pedestrians																																													
Motorcycles Bicycles		1 - 8:15																																											
TOTALS:	81	85	13																																										

Notes
 1 RT volumes, as shown, exclude RTOR
 2 Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
 3. Refer to Equation 16-2

Input Worksheet

General Information		Site Information	
Analyst	TRACY KINDLOW	Intersection	Institute Street
Agency or Company	DE	Area Type	<input type="radio"/> Other <input type="radio"/> CBD
Date Performed	6/14/2011	Jurisdiction	
Analysis Time Period	6:30-9 AM	Analysis Year	

Intersection Geometry



Volume

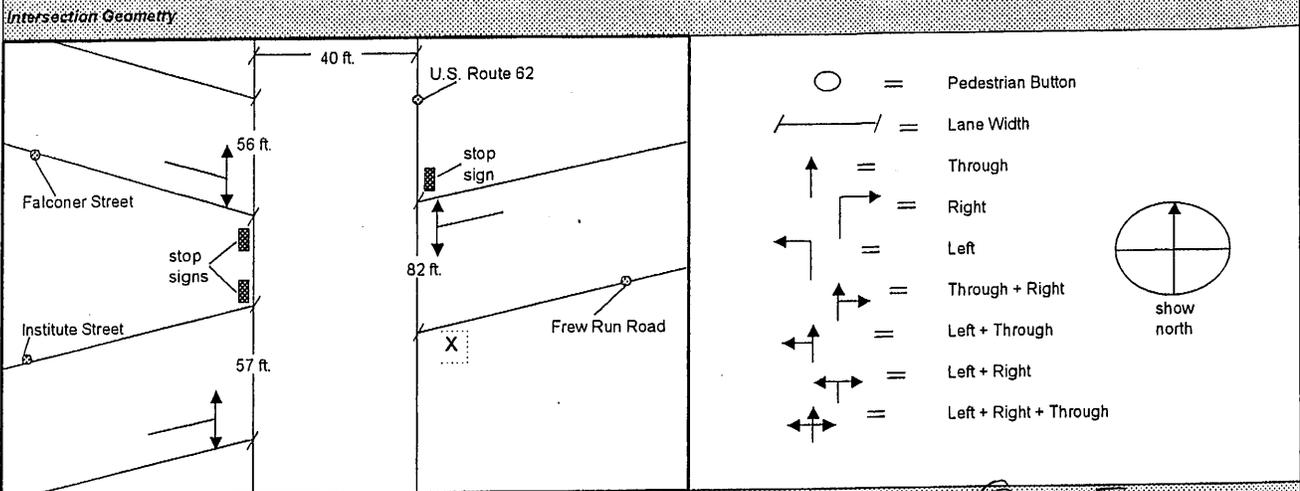
Institute - Left to 62 (South) Institute - Right to 62 (North) Through to CR-34

	Institute - Left to 62 (South)	Institute - Right to 62 (North)	Through to CR-34	
Passenger Cars				
Heavy Vehicles	1 - 8:00 - 8:15		1 - 8:00 - 8:15	
Buses				
Pedestrians				
Bicycles				
TOTALS:	23	11	12	

Notes
 1 RT volumes, as shown, exclude RTOR
 2 Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach
 3 Refer to Equation 16-2

Input Worksheet

General Information		Site Information	
Analyst	TRACY LINDON	Intersection	RT 62 / Falconer
Agency or Company	DE	Area Type	Other <input type="radio"/> CBD <input type="radio"/>
Date Performed	6/14/2021	Jurisdiction	
Analysis Time Period		Analysis Year	



Volume	Northbound (onto Falconer)		Southbound (on Falconer)	
	EB RT	WB LT	WB RT	WB RT
Passenger Cars	 		 	
Heavy Vehicles HEAVY VEHICLES	 2-700AM 4-730-745 2-8-815		1-630-7 11-800-815	
Buses	11-700-715 1-845-9		11-700AM-	
Pedestrians				
Bicycles				
TOTALS:	141		27	

Notes

- RT volumes, as shown, exclude RTOR.
- Approach pedestrian and bicycle volumes are those that conflict with right turns from the subject approach.
- Refer to Equation 16-2.

A2

Miscellaneous Traffic Data and Calculations



Proposed Carroll Landfill Expansion, Carroll, NY

Documentation of Ambient Traffic Volume Growth

Roadway	Segment	1999	2002	2005	2008	2011	2012	Annual Growth
US - 62	OLD RT 62 - CR 36 IVORY RD - 50' N of Falconer St	4,210	4,330	4,940	4,320	3,880	3,840	-0.7%

BY CHD DATE 7-5-13

DAIGLER ENGINEERING P.C.

JOB NO. _____

CHKD. BY BAA DATE 7-9-13

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SHEET NO. 2 OF 4

1711 Grand Island Blvd. - Grand Island, NY - 14072
Ph: (716) 773-6872 - Fax: (716) 773-6873

SUBJECT TRAFFIC GENERATION FOR CARROLL SWMF

3/4" GRAVEL HAULERS =

VOLUME REQUIRED

$$\left[(869,114 \text{ ft}^2 + 716,489 \text{ ft}^2) 2.2 \text{ ft} \right] / 27 \text{ ft}^3_{1/4}$$

$$= 129,197 \text{ cy use } 130,000 \text{ cy}$$

$$@ 1.5 \text{ T/cy} = 195,000 \text{ Tm}$$

$$@ 20 \text{ T/LOAD} = 9,750 \text{ loads}$$

ASSUME CONSTRUCTION OVER SEVEN YEAR PERIOD

$$7 \text{ yrs} \times \left[(52 \text{ wks}) (5 \text{ d/wk}) - 6 \text{ days holiday} \right] = 1778 \text{ days}$$

$$- 11 \text{ days/yr misc.} \approx 1700 \text{ days}$$

$$9750 / 1700 \text{ days} = 6 \text{ trucks/day}$$

RECYCLING OPERATION

(in) yard waste 400 tons/yr @ 375 lbs/cy
(2100 cy) 1875 T/cy

90% APRIL ⇒ NOVEMBER 9 months

25 days/month
or 225 days

$$(400 \text{ Tm/yr}) / 225 \text{ days} = 1.8 \text{ Tm/day @ } 1000 \text{ lbs/bd}$$

3-4 trucks/Trailers/day

cdpo

(in) 320 T/day (max) FROM TRUCKS
DESTINED FOR LANDFILL

$$160 \text{ T/day (typ.) } 7(20) + 3(6.75) = 160 \text{ T/day on}$$

140 + 20.25 10 trucks

BY DAD DATE 7-9-13

DAIGLER ENGINEERING P.C.

JOB NO. _____

CHKD. BY BPA DATE 7-9-13

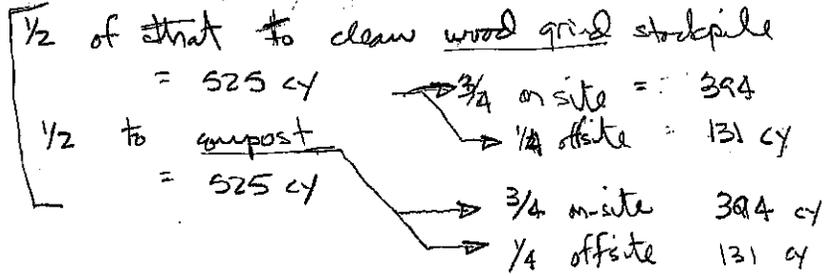
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SHEET NO. 3 OF 4

1711 Grand Island Blvd. - Grand Island, NY - 14072
Ph: (716) 773-6872 - Fax: (716) 773-6873

SUBJECT TRAFFIC GENERATION - CARROLL SUMF

(out) yard waste $(2100 \text{ cy/yr})(0.5) = 1050 \text{ cy/yr}$ of product



Total OFF SITE = 131 + 131 = 262 cy

$\div 15 \text{ cy/load} = 18 \text{ loads, say one month}$

$= 1 \text{ load/day}$

(out) cdpo (typ) 215 cy/day

- Salvage doors, lumber, aggregate
out materials are re-usable bldg materials
- primarily large dimensional lumber/doors (~5%)
 - metal salvage (3%)
 - clean wood grind boiler fuel (use 7%)

Total 15% $.15(215) = 32.25 \text{ cy}$

Say 33 cy

2 loads/day

GEOSYNTHETIC MATERIALS - BASED ON PAST PROJECTS, USE 4 loads/day

BY JAD DATE 7-9-13

CHKD. BY BAA DATE 7-9-13

DAIGLER ENGINEERING P.C.

.....engineering • science • design

1711 Grand Island Blvd. - Grand Island, NY - 14072
Ph: (716) 773-6872 - Fax: (716) 773-6873

JOB NO. _____

SHEET NO. 4 OF 4

SUBJECT TRAFFIC GENERATION FINE CARROLL SWMF

OIL & FUEL DELIVERY

① Diesel motor oil	500 gallon tank	/ 1220 gpy
② Hydraulic oil	500 " "	/ 2880 gpy
③ GASOLINE	300 " "	/ 7080 gpy
④ Diesel Fuel	8,000 " "	/ 167,200 gpy

① 1220 gpy / 307 days = 4 gpd	500/4 = 125 days
② 2880/307 = 10 gpd	500/10 = 50 days
③ 7080/307 = 23 gpd	300/23 = 13 days
④ 167,200/307 = 543 gpd	8000/543 = 14 days

BASED ON ABOVE: MOST FREQUENT TRUCK TRIP = $\frac{1}{13}$ days or
LESS THAN $\frac{1}{day}$

MISCELLANEOUS

1500 gallon domestic wastewater

other / delivery : $\frac{2}{day} \pm$

COMBINE OIL & FUEL DELIVERY w/ MISCELLANEOUS & OTHER
USE $\frac{3}{day}$

SUMMARY TRAFFIC: MAX THEORETICAL TRUCK / TRAFFIC CNT / DAY

	LF TRUCKS	DELIVERY ESPALS	CONST RELATED	EMPLOYEE
WASTE TRUCKS	60			
LEACHATE	5			
EMPLOYEES				15
CONST. MATERIALS			6+4	
RECYCLE IN	10	4		
RECYCLE OUT	2	1		
FUEL/MISC		3		
	77	8	10	15

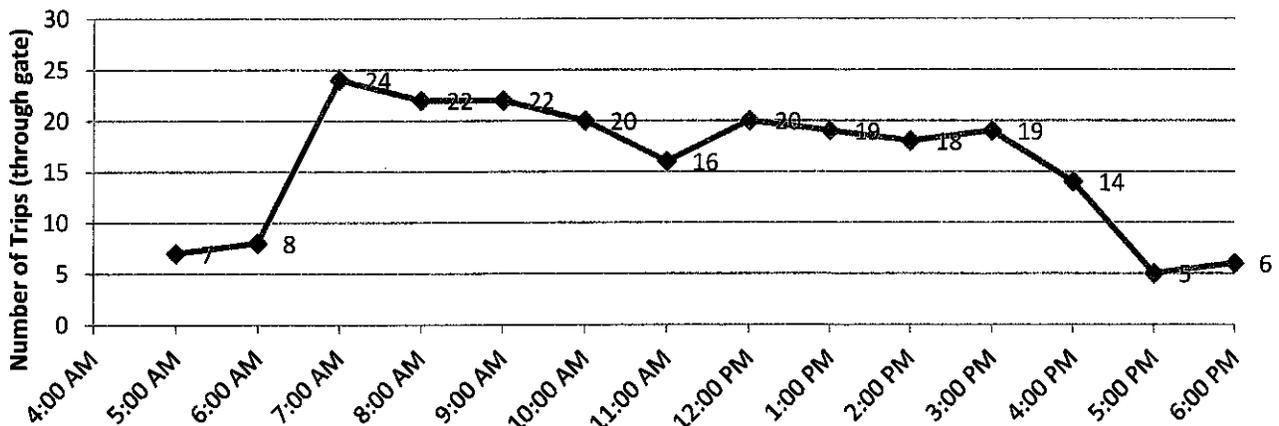
Revised Traffic Composition/Rates

hour of day	# trips (through gate)
5:00 AM	7
6:00 AM	8
7:00 AM	24
8:00 AM	22
9:00 AM	22
10:00 AM	20
11:00 AM	16
12:00 PM	20
1:00 PM	19
2:00 PM	18
3:00 PM	19
4:00 PM	14
5:00 PM	5
6:00 PM	6

Daily Vehicle Estimates

	Landfill trucks	Delivery & Sales	Construction Related	Employee	Total
Waste	60				
Leachate	5				
Employee				15	
Construction Materials			6+4		
Recycle In	10	4			
Recycle Out	2	1			
Fuel/Misc.		3			
Total	77	8	10	15	110
					x2
					220 trips

Carroll Landfill Expansion Projected Vehicle Trips





Proposed Carroll Landfill Carroll, NY

INTERSECTION ACCIDENT RATE CALCULATIONS

$$\text{Rate per MEV} = \frac{\# \text{ of Accidents} \times 1,000,000}{\text{Total No. of Entering Vehicles}} =$$

$$\text{Rate} = \frac{\# \text{ of Accidents} \times 1,000,000}{\text{Veh./Day} \times \text{Duration of Study}} =$$

Accidents per million entering vehicles (Acc / MEV)

* Accident data is from Jan 01, 2008 to Dec 31st, 2010

1 Route 62/CR 34/Institute Street

$$\text{ADT} = \frac{\text{Peak hour entering volume} / \text{k factor}}{\text{VPH} / 0.10} = 8010 \text{ VPD}$$

$$\text{Rate} = \frac{1 \text{ Acc.} \times 1,000,000}{8010 \text{ VPD} \times 365 \text{ Days} \times 3.00 \text{ Yrs.}^*} = 0.11 \text{ Acc / MEV}$$

2 US Route 62/Falconer Street

$$\text{ADT} = \frac{\text{Peak hour entering volume} / \text{k factor}}{\text{VPH} / 0.10} = 6640 \text{ VPD}$$

$$\text{Rate} = \frac{1 \text{ Acc.} \times 1,000,000}{6640 \text{ VPD} \times 365 \text{ Days} \times 3.00 \text{ Yrs.}^*} = 0.14 \text{ Acc / MEV}$$

ROADWAY SEGMENT (MID-BLOCK) ACCIDENT RATE CALCULATIONS

$$\text{Rate per MVM} = \frac{\# \text{ of Accidents} \times 1,000,000}{\text{Total Vehicle Miles of Travel}}$$

$$\text{Rate} = \frac{\# \text{ of Accidents} \times 1,000,000}{\text{Sectional Length} \times \text{AADT} \times \text{Duration of Study}}$$

Accidents per million vehicle miles (Acc / MVM)

3 Route 62 (Between Frew Run St and Mattison St.)

$$\begin{aligned} \text{Section length} &= 0.550 \text{ mi} \\ \text{2-way ADT} &= 4344 \end{aligned}$$

$$\text{Rate} = \frac{1 \text{ Acc.} \times 1,000,000}{0.550 \text{ mi} \times 4344 \text{ VPD} \times 365 \text{ Days} \times 3.00 \text{ Yrs.}} = 0.38 \text{ Acc / MVM}$$

4 Route 62 (Between Frew Run St and Hazzard Road)

$$\begin{aligned} \text{Section length} &= 0.100 \text{ mi} \\ \text{2-way ADT} &= 4344 \end{aligned}$$

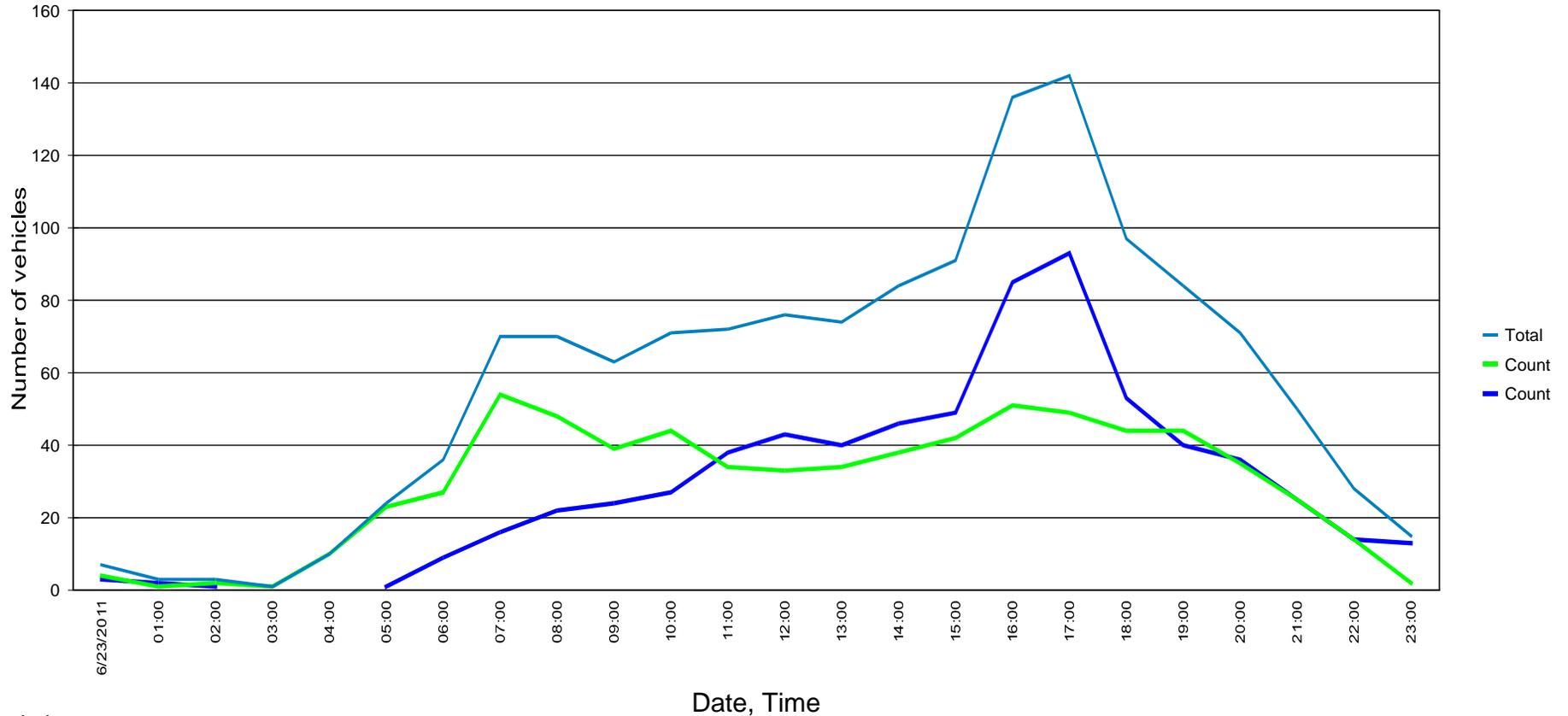
$$\text{Rate} = \frac{1 \text{ Acc.} \times 1,000,000}{0.100 \text{ mi} \times 4344 \text{ VPD} \times 365 \text{ Days} \times 3.00 \text{ Yrs.}} = 2.10 \text{ Acc / MVM}$$

5 Frew Run Street (Between Route 62 and Wiltsie Road)

$$\begin{aligned} \text{Section length} &= 3.160 \text{ mi} \\ \text{2-way ADT} &= 1379 \end{aligned}$$

$$\text{Rate} = \frac{2 \text{ Acc.} \times 1,000,000}{3.160 \text{ mi} \times 1379 \text{ VPD} \times 365 \text{ Days} \times 3.00 \text{ Yrs.}} = 0.42 \text{ Acc / MVM}$$

Co Touring Route 34, 2.0 mile NW of Wiltsie Road ((+) is NB, (-) is SB)

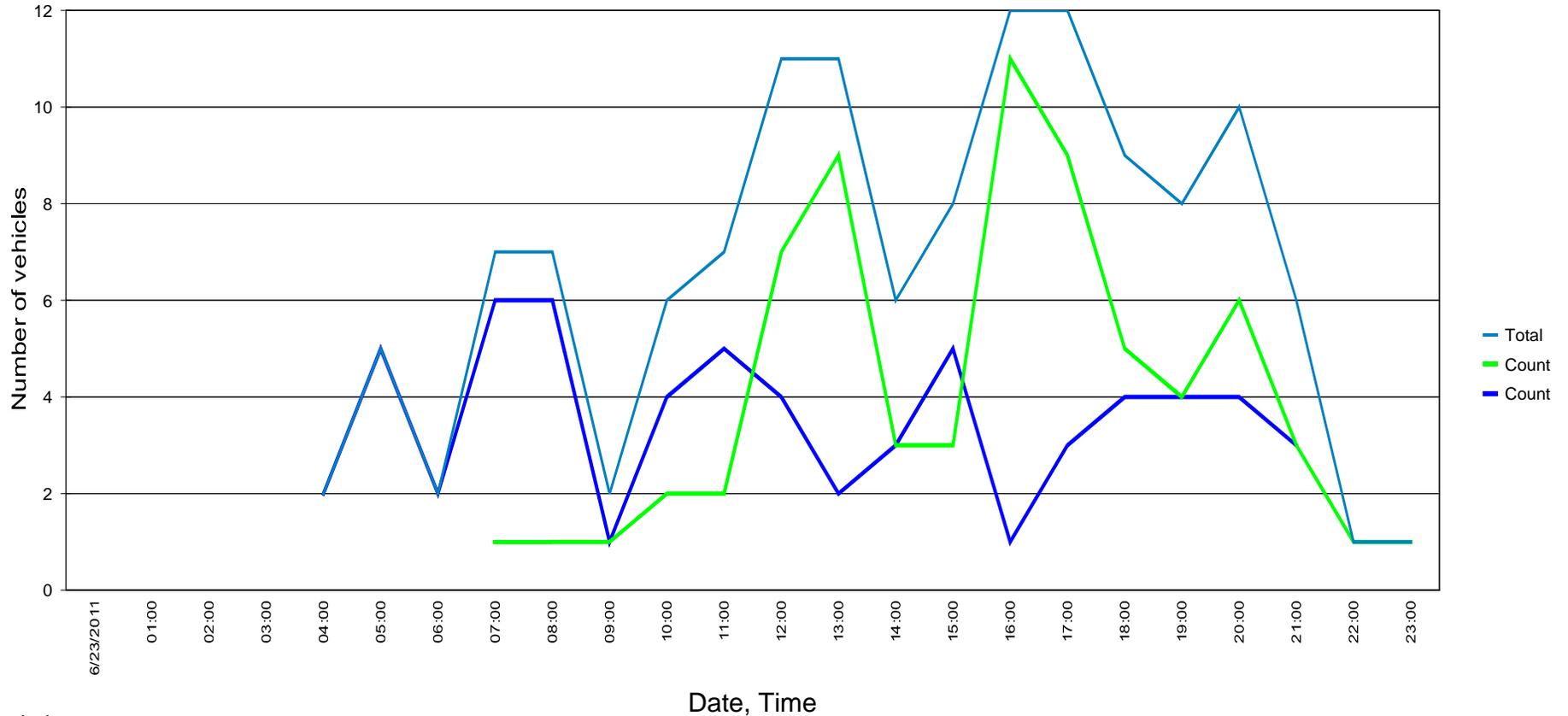


Statistics

Period: Thursday, June 23, 2011, 00:00 o'clock to Thursday, June 23, 2011, 23:59 o'clock

		Count +	%	Count -	%	Total	%	V15 +	Va +	V85 +	Vmax+	V15 -	Va -	V85 -	Vmax -
Speed violations:	0 %	31	4.4	63	9.3	94	6.8	6	31	61	70	42	51	57	64
Average time interval:	1.1 sec	190	27.2	235	34.6	425	30.8	45	52	62	76	45	51	57	71
Traffic in column:	12 %	446	63.9	352	51.8	798	57.9	47	54	61	74	45	51	57	69
ADT:	1379	31	4.4	30	4.4	61	4.4	39	47	56	59	41	48	53	59
Truck Share:	62 %	698	50.7	680	49.3	1378	100	46	52	61	76	45	51	57	75

Dodge Road, 1.6 miles SE of Wiltsie Road (-) is SB, (+) is NB

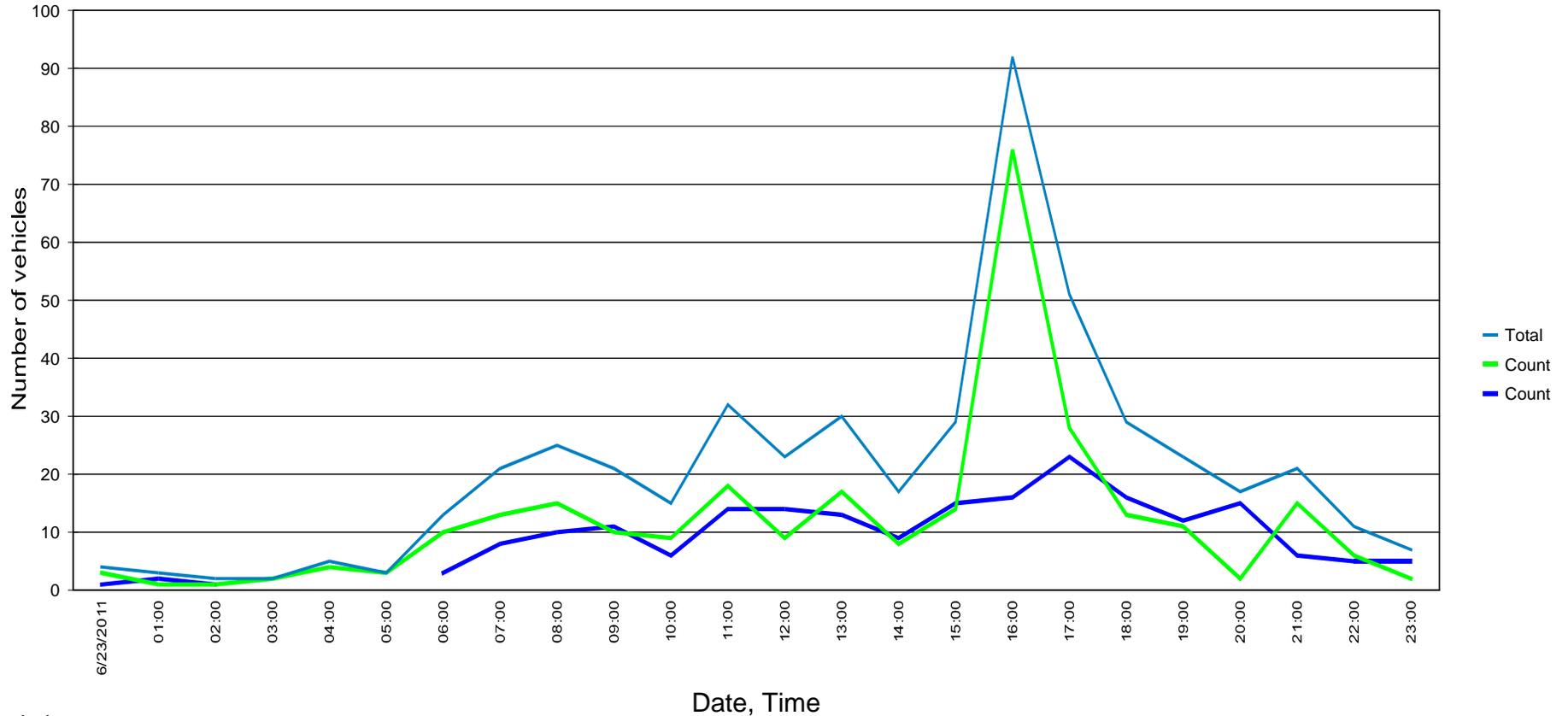


Statistics

Period: Thursday, June 23, 2011, 00:00 o'clock to Thursday, June 23, 2011, 23:59 o'clock

	Count +	%	Count -	%	Total	%	V15 +	Va +	V85 +	Vmax+	V15 -	Va -	V85 -	Vmax -
Speed violations:	0	0 %	21	32.3	39	29.1	22	29	35	40	25	31	33	49
Average time interval:	50	72.5	44	67.7	94	70.1	25	29	33	38	23	27	32	35
Traffic in column:	1	1.4	0	0	1	0.7	6	6	6	6				
ADT:	0	0	0	0	0	0								
Truck Share:	69	51.5	65	48.5	134	100	23	29	33	40	23	28	32	49

Wilsie Road between CR 34 and Dodge Road



Statistics

Period: Thursday, June 23, 2011, 00:00 o'clock to Thursday, June 23, 2011, 23:59 o'clock

	Count +	%	Count -	%	Total	%	V15 +	Va +	V85 +	Vmax+	V15 -	Va -	V85 -	Vmax -		
Speed violations:	0	0 %	186	64.1	188	91.3	374	75.4	18	24	29	36	22	25	29	35
Average time interval:	1.6	sec	94	32.4	18	8.7	112	22.6	9	19	27	32	13	21	25	28
Traffic in column:	7	%	4	1.4	0	0	4	0.8	9	11	12	13				
ADT:	496		6	2.1	0	0	6	1.2	11	13	14	15				
Truck Share:	2	%	290	58.5	206	41.5	496	100	11	22	29	36	21	25	29	35

A3

Level of Service:
Criteria and Definitions

Level of Service Criteria

Highway Capacity Manual 2010

SIGNALIZED INTERSECTIONS

Level of Service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. Level of Service for signalized intersections is defined in terms of delay specifically, average total delay per vehicle for a 15 minute analysis period. The ranges are as follows:

Level of Service	Control Delay per vehicle (seconds)
A	< 10
B	10 – 20
C	20 – 35
D	35 – 55
E	55 – 80
F	>80

UNSIGNALIZED INTERSECTIONS

Level of Service for unsignalized intersections is also defined in terms of delay. However, the delay criteria are different from a signalized intersection. The primary reason for this is driver expectation that a signalized intersection is designed to carry higher volumes than an unsignalized intersection. The total delay threshold for any given Level of Service is less for an unsignalized intersection than for a signalized intersection. The ranges are as follows:

Level of Service	Control Delay per vehicle (seconds)
A	< 10
B	10 – 15
C	15 – 25
D	25 – 35
E	35 - 50
F	>50

A4

Level of Service Calculations:
Existing Conditions

Proposed Carroll Landfill Expansion
1: Institute Street & Ivory Street

2014 Existing Conditions - AM Peak Hour
6/9/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	12	6	9	46	7	45	7	136	39	23	117	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	7	10	50	8	49	8	148	42	25	127	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	417	386	130	378	368	169	134			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	417	386	130	378	368	169	134			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	99	99	91	99	94	99			98		
cM capacity (veh/h)	501	535	919	558	548	875	1451			1384		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	29	107	198	159								
Volume Left	13	50	8	25								
Volume Right	10	49	42	7								
cSH	601	668	1451	1384								
Volume to Capacity	0.05	0.16	0.01	0.02								
Queue Length 95th (ft)	4	14	0	1								
Control Delay (s)	11.3	11.4	0.3	1.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.3	11.4	0.3	1.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				3.7								
Intersection Capacity Utilization				30.5%	ICU Level of Service	A						
Analysis Period (min)				15								

Proposed Carroll Landfill Expansion
2: Falconer Street & Ivory Street

2014 Existing Conditions - AM Peak Hour
6/9/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	15	60	88	105	86	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	65	96	114	93	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	426	120	147			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	120	147			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	93	93			
cM capacity (veh/h)	547	931	1435			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	82	210	147			
Volume Left	16	96	0			
Volume Right	65	0	53			
cSH	816	1435	1700			
Volume to Capacity	0.10	0.07	0.09			
Queue Length 95th (ft)	8	5	0			
Control Delay (s)	9.9	3.8	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.9	3.8	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			32.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
3: CR 34 (Frew Run) & Wiltsie Road

2014 Existing Conditions - AM Peak Hour
6/9/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	19	9	5	36	23	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	10	5	39	25	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			30	76	26	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			30	76	26	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	97	100	
cM capacity (veh/h)			1582	925	1050	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	30	45	25			
Volume Left	0	5	25			
Volume Right	10	0	0			
cSH	1700	1582	925			
Volume to Capacity	0.02	0.00	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.9	9.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.0			
Approach LOS		A	A			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization		16.1%		ICU Level of Service		A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
4: Dodge Road & Wiltsie Road

2014 Existing Conditions - AM Peak Hour
6/9/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Volume (veh/h)	1	17	6	1	5	9
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	18	7	1	5	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	28	7			8	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	28	7			8	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	984	1075			1613	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	8	15			
Volume Left	1	0	5			
Volume Right	18	1	0			
cSH	1070	1700	1613			
Volume to Capacity	0.02	0.00	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.4	0.0	2.6			
Lane LOS	A		A			
Approach Delay (s)	8.4	0.0	2.6			
Approach LOS	A		A			
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization		14.9%		ICU Level of Service		A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
5: Dodge Road & Proposed Site Drive

2014 Existing Conditions - AM Peak Hour
6/9/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Volume (veh/h)	6	0	0	18	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	0	20	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			7		26	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			7		26	7
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1614		989	1076
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	7	20	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1614	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0				
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
1: Institute Street & Ivory Street

2014 Existing Conditions - PM Peak Hour
6/9/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Volume (veh/h)	26	7	8	33	17	23	21	236	95	40	204	48	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.79	0.79	0.79	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	0.95	
Hourly flow rate (vph)	33	9	10	38	20	26	23	257	103	42	215	51	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	714	730	240	693	703	308	265						360
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	714	730	240	693	703	308	265						360
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	89	97	99	89	94	96	98						96
cM capacity (veh/h)	307	331	799	332	343	732	1299						1199
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	52	84	383	307									
Volume Left	33	38	23	42									
Volume Right	10	26	103	51									
cSH	354	405	1299	1199									
Volume to Capacity	0.15	0.21	0.02	0.04									
Queue Length 95th (ft)	13	19	1	3									
Control Delay (s)	16.9	16.2	0.6	1.4									
Lane LOS	C	C	A	A									
Approach Delay (s)	16.9	16.2	0.6	1.4									
Approach LOS	C	C											
Intersection Summary													
Average Delay				3.5									
Intersection Capacity Utilization				38.3%	ICU Level of Service							A	
Analysis Period (min)													

Proposed Carroll Landfill Expansion
2: Falconer Street & Ivory Street

2014 Existing Conditions - PM Peak Hour
6/9/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	↔			↔	↔		
Volume (veh/h)	30	140	68	217	152	17	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.90	0.90	0.86	0.86	0.91	0.91	
Hourly flow rate (vph)	33	156	79	252	167	19	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None	None		
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	587	176	186				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	587	176	186				
tC, single (s)	6.4	6.2	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	93	82	94				
cM capacity (veh/h)	445	867	1389				
Direction, Lane #	EB 1	NB 1	SB 1				
Volume Total	189	331	186				
Volume Left	33	79	0				
Volume Right	156	0	19				
cSH	743	1389	1700				
Volume to Capacity	0.25	0.06	0.11				
Queue Length 95th (ft)	25	5	0				
Control Delay (s)	11.5	2.2	0.0				
Lane LOS	B	A					
Approach Delay (s)	11.5	2.2	0.0				
Approach LOS	B						
Intersection Summary							
Average Delay			4.1				
Intersection Capacity Utilization			44.5%	ICU Level of Service			A
Analysis Period (min)							

Proposed Carroll Landfill Expansion
3: CR 34 (Frew Run) & Wiltsie Road

2014 Existing Conditions - PM Peak Hour
6/9/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	42	27	4	24	11	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.64	0.64	0.88	0.88
Hourly flow rate (vph)	58	37	6	38	12	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			95	126	76	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			95	126	76	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	99	100	
cM capacity (veh/h)			1499	865	985	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	95	44	17			
Volume Left	0	6	12			
Volume Right	37	0	5			
cSH	1700	1499	894			
Volume to Capacity	0.06	0.00	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	1.1	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.1	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			14.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
4: Dodge Road & Wiltsie Road

2014 Existing Conditions - PM Peak Hour
6/9/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	2	5	10	0	19	12
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.44	0.44	0.63	0.63	0.65	0.65
Hourly flow rate (vph)	5	11	16	0	29	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	93	16			16	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	93	16			16	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			98	
cM capacity (veh/h)	891	1063			1602	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	16	48			
Volume Left	5	0	29			
Volume Right	11	0	0			
cSH	1008	1700	1602			
Volume to Capacity	0.02	0.01	0.02			
Queue Length 95th (ft)	1	0	1			
Control Delay (s)	8.6	0.0	4.5			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	4.5			
Approach LOS	A					
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			18.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
5: Dodge Road & Proposed Site Drive

2014 Existing Conditions - PM Peak Hour
6/9/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Volume (veh/h)	19	0	0	7	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.59	0.59	0.44	0.44	0.92	0.92
Hourly flow rate (vph)	32	0	0	16	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			32		48	32
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			32		48	32
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1580		961	1042
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	32	16	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1580	1700			
Volume to Capacity	0.02	0.00	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Analysis Period (min)			15			

A5

**Level of Service Calculations:
2015 Background Conditions**

Proposed Carroll Landfill Expansion
1: Institute Street & Ivory Street

2015 Background Conditions - AM Peak Hour
6/9/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Volume (veh/h)	12	6	9	47	7	46	7	140	40	24	121	6	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	13	7	10	51	8	50	8	152	43	26	132	7	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	430	398	135	389	379	174	138						196
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	430	398	135	389	379	174	138						196
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2						2.2
p0 queue free %	97	99	99	91	99	94	99						98
cM capacity (veh/h)	490	527	914	548	540	870	1446						1377
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	29	109	203	164									
Volume Left	13	51	8	26									
Volume Right	10	50	43	7									
cSH	591	660	1446	1377									
Volume to Capacity	0.05	0.16	0.01	0.02									
Queue Length 95th (ft)	4	15	0	1									
Control Delay (s)	11.4	11.5	0.3	1.4									
Lane LOS	B	B	A	A									
Approach Delay (s)	11.4	11.5	0.3	1.4									
Approach LOS	B	B											
Intersection Summary													
Average Delay				3.7									
Intersection Capacity Utilization				31.4%		ICU Level of Service		A					
Analysis Period (min)	15												

Proposed Carroll Landfill Expansion
2: Falconer Street & Ivory Street

2015 Background Conditions - AM Peak Hour
6/9/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	↔			↔	↔		
Volume (veh/h)	15	62	91	108	89	50	
Sign Control	Stop		Free		Free		
Grade	0%		0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	16	67	99	117	97	54	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				None			
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	439	124	151				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	439	124	151				
tC, single (s)	6.4	6.2	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	97	93	93				
cM capacity (veh/h)	535	927	1430				
Direction, Lane #	EB 1	EB 1	NB 1	SB 1			
Volume Total	84	216	151				
Volume Left	16	99	0				
Volume Right	67	0	54				
cSH	811	1430	1700				
Volume to Capacity	0.10	0.07	0.09				
Queue Length 95th (ft)	9	6	0				
Control Delay (s)	9.9	3.8	0.0				
Lane LOS	A	A					
Approach Delay (s)	9.9	3.8	0.0				
Approach LOS	A						
Intersection Summary							
Average Delay				3.7			
Intersection Capacity Utilization				33.1%		ICU Level of Service	A
Analysis Period (min)	15						

Proposed Carroll Landfill Expansion
3: CR 34 (Frew Run) & Wiltsie Road

2015 Background Conditions - AM Peak Hour
6/9/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	20	9	5	37	24	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	10	5	40	26	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			32		78	27
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			32		78	27
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1581		922	1049
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	32	46	26			
Volume Left	0	5	26			
Volume Right	10	0	0			
cSH	1700	1581	922			
Volume to Capacity	0.02	0.00	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.9	9.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.0			
Approach LOS		A	A			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			16.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
4: Dodge Road & Wiltsie Road

2015 Background Conditions - AM Peak Hour
6/9/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Volume (veh/h)	1	18	6	1	5	9
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	20	7	1	5	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	28	7			8	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	28	7			8	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	984	1075			1613	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	21	8	15			
Volume Left	1	0	5			
Volume Right	20	1	0			
cSH	1070	1700	1613			
Volume to Capacity	0.02	0.00	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.4	0.0	2.6			
Lane LOS	A		A			
Approach Delay (s)	8.4	0.0	2.6			
Approach LOS	A		A			
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization			14.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
5: Dodge Road & Proposed Site Drive

2015 Background Conditions - AM Peak Hour
6/9/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Volume (veh/h)	6	0	0	19	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	0	21	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			7		27	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			7		27	7
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1614		988	1076
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	7	21	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1614	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
1: Institute Street & Ivory Street

2015 Background Conditions - PM Peak Hour
6/9/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	27	7	8	34	18	24	22	243	98	41	210	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	0.95
Hourly flow rate (vph)	34	9	10	39	21	28	24	264	107	43	221	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	736	752	247	713	724	317	273			371		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	736	752	247	713	724	317	273			371		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	97	99	88	94	96	98			96		
cM capacity (veh/h)	294	321	792	321	333	723	1291			1188		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	53	87	395	316								
Volume Left	34	39	24	43								
Volume Right	10	28	107	52								
cSH	339	394	1291	1188								
Volume to Capacity	0.16	0.22	0.02	0.04								
Queue Length 95th (ft)	14	21	1	3								
Control Delay (s)	17.6	16.7	0.6	1.4								
Lane LOS	C	C	A	A								
Approach Delay (s)	17.6	16.7	0.6	1.4								
Approach LOS	C	C										
Intersection Summary												
Average Delay				3.6								
Intersection Capacity Utilization				39.0%	ICU Level of Service	A						
Analysis Period (min)				15								

Proposed Carroll Landfill Expansion
2: Falconer Street & Ivory Street

2015 Background Conditions - PM Peak Hour
6/9/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	31	144	70	224	157	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.91	0.91
Hourly flow rate (vph)	34	160	81	260	173	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	606	182	192			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	606	182	192			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	81	94			
cM capacity (veh/h)	433	860	1381			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	194	342	192			
Volume Left	34	81	0			
Volume Right	160	0	20			
cSH	732	1381	1700			
Volume to Capacity	0.27	0.06	0.11			
Queue Length 95th (ft)	27	5	0			
Control Delay (s)	11.7	2.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.7	2.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			45.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
3: CR 34 (Frew Run) & Wiltsie Road

2015 Background Conditions - PM Peak Hour
6/9/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	43	28	4	25	11	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.64	0.64	0.88	0.88
Hourly flow rate (vph)	59	38	6	39	12	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			97	130	78	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			97	130	78	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	99	100	
cM capacity (veh/h)			1496	861	983	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	97	45	17			
Volume Left	0	6	12			
Volume Right	38	0	5			
cSH	1700	1496	890			
Volume to Capacity	0.06	0.00	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	1.1	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.1	9.1			
Approach LOS		A	A			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			14.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
4: Dodge Road & Wiltsie Road

2015 Background Conditions - PM Peak Hour
6/9/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	2	5	10	0	20	12
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.44	0.44	0.63	0.63	0.65	0.65
Hourly flow rate (vph)	5	11	16	0	31	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	96	16			16	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	96	16			16	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			98	
cM capacity (veh/h)	886	1063			1602	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	16	49			
Volume Left	5	0	31			
Volume Right	11	0	0			
cSH	1006	1700	1602			
Volume to Capacity	0.02	0.01	0.02			
Queue Length 95th (ft)	1	0	1			
Control Delay (s)	8.6	0.0	4.6			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	4.6			
Approach LOS	A		A			
Intersection Summary						
Average Delay			4.5			
Intersection Capacity Utilization			18.4%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
5: Dodge Road & Proposed Site Drive

2015 Background Conditions - PM Peak Hour
6/9/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Volume (veh/h)	20	0	0	7	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.59	0.59	0.44	0.44	0.92	0.92
Hourly flow rate (vph)	34	0	0	16	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			34		50	34
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			34		50	34
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1578		959	1039

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	34	16	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1578	1700
Volume to Capacity	0.02	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

A6

Level of Service Calculations: 2015 Full Development Conditions

Proposed Carroll Landfill Expansion
1: Institute Street & Ivory Street

2015 Full Development Conditions - AM Peak Hour
6/10/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Volume (veh/h)	12	6	9	47	7	59	7	140	40	44	121	6	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	13	7	10	51	8	64	8	152	43	48	132	7	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	488	441	135	433	423	174	138						196
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	488	441	135	433	423	174	138						196
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1						4.6
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2						2.6
p0 queue free %	97	99	99	90	98	92	99						96
cM capacity (veh/h)	431	487	914	504	498	820	1446						1157
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	29	123	203	186									
Volume Left	13	51	8	48									
Volume Right	10	64	43	7									
cSH	540	630	1446	1157									
Volume to Capacity	0.05	0.19	0.01	0.04									
Queue Length 95th (ft)	4	18	0	3									
Control Delay (s)	12.1	12.1	0.3	2.4									
Lane LOS	B	B	A	A									
Approach Delay (s)	12.1	12.1	0.3	2.4									
Approach LOS	B	B											
Intersection Summary													
Average Delay				4.3									
Intersection Capacity Utilization				37.6%		ICU Level of Service		A					
Analysis Period (min)	15												

Proposed Carroll Landfill Expansion
2: Falconer Street & Ivory Street

2015 Full Development Conditions - AM Peak Hour
6/10/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	15	62	91	121	109	50
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	67	99	132	118	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	475	146	173			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	475	146	173			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	93	93			
cM capacity (veh/h)	510	901	1404			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	84	230	173			
Volume Left	16	99	0			
Volume Right	67	0	54			
cSH	784	1404	1700			
Volume to Capacity	0.11	0.07	0.10			
Queue Length 95th (ft)	9	6	0			
Control Delay (s)	10.1	3.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.1	3.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			34.8%		ICU Level of Service	
Analysis Period (min)	15					

Proposed Carroll Landfill Expansion
3: CR 34 (Frew Run) & Wiltsie Road

2015 Full Development Conditions - AM Peak Hour
6/10/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	20	29	5	37	37	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	32	5	40	40	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			53	89	38	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			53	89	38	
tC, single (s)			4.1	6.7	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.8	3.3	
p0 queue free %			100	95	100	
cM capacity (veh/h)			1552	834	1035	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	53	46	40			
Volume Left	0	5	40			
Volume Right	32	0	0			
cSH	1700	1552	834			
Volume to Capacity	0.03	0.00	0.05			
Queue Length 95th (ft)	0	0	4			
Control Delay (s)	0.0	0.9	9.5			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		16.2%		ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
4: Dodge Road & Wiltsie Road

2015 Full Development Conditions - AM Peak Hour
6/10/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Volume (veh/h)	1	31	6	1	25	9
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	34	7	1	27	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	71	7			8	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	71	7			8	
tC, single (s)	6.4	6.6			4.9	
tC, 2 stage (s)						
tF (s)	3.5	3.7			2.9	
p0 queue free %	100	97			98	
cM capacity (veh/h)	912	970			1224	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	35	8	37			
Volume Left	1	0	27			
Volume Right	34	1	0			
cSH	968	1700	1224			
Volume to Capacity	0.04	0.00	0.02			
Queue Length 95th (ft)	3	0	2			
Control Delay (s)	8.9	0.0	5.9			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	5.9			
Approach LOS		A				
Intersection Summary						
Average Delay			6.6			
Intersection Capacity Utilization		18.5%		ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion 2015 Full Development Conditions - AM Peak Hour
 5: Dodge Road & Proposed Site Drive 6/10/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	6	20	0	19	13	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	22	0	21	14	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			28		38	17
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			28		38	17
tC, single (s)			4.1		7.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.4	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1585		774	1061

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	28	21	14
Volume Left	0	0	14
Volume Right	22	0	0
cSH	1700	1585	774
Volume to Capacity	0.02	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	9.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.7
Approach LOS			A

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Proposed Carroll Landfill
1: Institute Street & Ivory Street

2015 Full Development Conditions - PM Peak Hour
6/10/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	27	7	8	34	18	40	22	243	98	52	210	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	0.95
Hourly flow rate (vph)	34	9	10	39	21	46	24	264	107	55	221	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	778	775	247	736	747	317	273			371		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	778	775	247	736	747	317	273			371		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.6	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.7	2.2			2.4		
p0 queue free %	87	97	99	87	93	93	98			95		
cM capacity (veh/h)	263	307	792	306	318	643	1291			1091		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	53	106	395	327								
Volume Left	34	39	24	55								
Volume Right	10	46	107	52								
cSH	309	400	1291	1091								
Volume to Capacity	0.17	0.26	0.02	0.05								
Queue Length 95th (ft)	15	26	1	4								
Control Delay (s)	19.0	17.2	0.6	1.8								
Lane LOS	C	C	A	A								
Approach Delay (s)	19.0	17.2	0.6	1.8								
Approach LOS	C	C										
Intersection Summary												
Average Delay				4.2								
Intersection Capacity Utilization				44.0%	ICU Level of Service	A						
Analysis Period (min)				15								

Proposed Carroll Landfill
2: Falconer Street & Ivory Street

2015 Full Development Conditions - PM Peak Hour
6/10/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	31	144	70	240	168	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.91	0.91
Hourly flow rate (vph)	34	160	81	279	185	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	636	195	204			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	636	195	204			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	81	94			
cM capacity (veh/h)	415	847	1367			
Direction, Lane #	EB 1	EB 1	NB 1	SB 1		
Volume Total	194	360	204			
Volume Left	34	81	0			
Volume Right	160	0	20			
cSH	715	1367	1700			
Volume to Capacity	0.27	0.06	0.12			
Queue Length 95th (ft)	28	5	0			
Control Delay (s)	11.9	2.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.9	2.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay				4.1		
Intersection Capacity Utilization				47.0%	ICU Level of Service	A
Analysis Period (min)				15		

Proposed Carroll Landfill
3: CR 34 (Frew Run) & Wiltsie Road

2015 Full Development Conditions - PM Peak Hour
6/10/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	43	39	4	25	27	4
Sign Control	Free		Free		Stop	
Grade	0%					
Peak Hour Factor	0.73	0.73	0.64	0.64	0.88	0.88
Hourly flow rate (vph)	59	53	6	39	31	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			112		137	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			112		137	86
tC, single (s)			4.1		7.0	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1477		735	973
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	112	45	35			
Volume Left	0	6	31			
Volume Right	53	0	5			
cSH	1700	1477	759			
Volume to Capacity	0.07	0.00	0.05			
Queue Length 95th (ft)	0	0	4			
Control Delay (s)	0.0	1.1	10.0			
Lane LOS	A		A			
Approach Delay (s)	0.0	1.1	10.0			
Approach LOS	A					
Intersection Summary						
Average Delay	2.1					
Intersection Capacity Utilization	14.7%		ICU Level of Service		A	
Analysis Period (min)	15					

Proposed Carroll Landfill
4: Dodge Road & Wiltsie Road

2015 Full Development Conditions - PM Peak Hour
6/10/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	2	21	10	0	31	12
Sign Control	Stop		Free		Free	
Grade	0%					
Peak Hour Factor	0.44	0.44	0.63	0.63	0.65	0.65
Hourly flow rate (vph)	5	48	16	0	48	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	130	16			16	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	130	16			16	
tC, single (s)	6.4	7.0			4.4	
tC, 2 stage (s)						
tF (s)	3.5	4.0			2.5	
p0 queue free %	99	95			97	
cM capacity (veh/h)	835	884			1411	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	52	16	66			
Volume Left	5	0	48			
Volume Right	48	0	0			
cSH	880	1700	1411			
Volume to Capacity	0.06	0.01	0.03			
Queue Length 95th (ft)	5	0	3			
Control Delay (s)	9.4	0.0	5.6			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	5.6			
Approach LOS	A					
Intersection Summary						
Average Delay	6.4					
Intersection Capacity Utilization	19.0%		ICU Level of Service		A	
Analysis Period (min)	15					

Proposed Carroll Landfill
5: Dodge Road & Proposed Site Drive

2015 Full Development Conditions - PM Peak Hour
6/10/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	20	11	0	7	16	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.59	0.59	0.44	0.44	0.92	0.92
Hourly flow rate (vph)	34	19	0	16	17	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			53		59	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			53		59	43
tC, single (s)			4.1		7.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.4	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1553		751	1027
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	53	16	17			
Volume Left	0	0	17			
Volume Right	19	0	0			
cSH	1700	1553	751			
Volume to Capacity	0.03	0.00	0.02			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.0	9.9			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			13.3%		ICU Level of Service	A
Analysis Period (min)			15			

A7

**Level of Service Calculations:
2030 Background Conditions**

Proposed Carroll Landfill Expansion 2030 Background Development Conditions - AM Peak Hour
1: Institute Street & Ivory Street 6/19/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	14	7	10	53	8	52	8	158	45	27	136	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	8	11	58	9	57	9	172	49	29	148	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	485	448	152	439	428	196	155			221		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	485	448	152	439	428	196	155			221		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	98	99	89	98	93	99			98		
cM capacity (veh/h)	444	492	895	505	505	845	1425			1349		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	34	123	229	185
Volume Left	15	58	9	29
Volume Right	11	57	49	8
cSH	544	620	1425	1349
Volume to Capacity	0.06	0.20	0.01	0.02
Queue Length 95th (ft)	5	18	0	2
Control Delay (s)	12.0	12.2	0.3	1.4
Lane LOS	B	B	A	A
Approach Delay (s)	12.0	12.2	0.3	1.4
Approach LOS	B	B		

Intersection Summary			
Average Delay		3.9	
Intersection Capacity Utilization	34.4%		ICU Level of Service A
Analysis Period (min)	15		

Proposed Carroll Landfill Expansion 2030 Background Development Conditions - AM Peak Hour
2: Falconer Street & Ivory Street 6/19/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	17	70	102	122	100	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	76	111	133	109	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	494	140	171			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	494	140	171			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	92	92			
cM capacity (veh/h)	492	908	1407			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	95	243	171
Volume Left	18	111	0
Volume Right	76	0	62
cSH	780	1407	1700
Volume to Capacity	0.12	0.08	0.10
Queue Length 95th (ft)	10	6	0
Control Delay (s)	10.3	3.9	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	3.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization	36.1%		ICU Level of Service A
Analysis Period (min)	15		

Proposed Carroll Landfill Expansion 2030 Background Development Conditions - AM Peak Hour
3: CR 34 (Frew Run) & Wiltsie Road 6/19/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	22	10	6	42	27	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	11	7	46	29	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			35		88	29
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			35		88	29
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1577		909	1045
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	35	52	29			
Volume Left	0	7	29			
Volume Right	11	0	0			
cSH	1700	1577	909			
Volume to Capacity	0.02	0.00	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.9	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			17.3%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion 2030 Background Development Conditions - AM Peak Hour
4: Dodge Road & Wiltsie Road 6/19/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Volume (veh/h)	1	20	7	1	6	10
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	22	8	1	7	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	32	8			9	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	32	8			9	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	978	1074			1611	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	23	9	17			
Volume Left	1	0	7			
Volume Right	22	1	0			
cSH	1069	1700	1611			
Volume to Capacity	0.02	0.01	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	8.4	0.0	2.7			
Lane LOS	A		A			
Approach Delay (s)	8.4	0.0	2.7			
Approach LOS			A			
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization			15.9%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion 2030 Background Development Conditions - AM Peak Hour
 5: Dodge Road & Proposed Site Drive 6/19/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Volume (veh/h)	7	0	0	21	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	0	23	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			8		30	8
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol					30	8
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1613		984	1075

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	8	23	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1613	1700
Volume to Capacity	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

Proposed Carroll Landfill Expansion
1: Institute Street & Ivory Street

2030 Background Conditions - PM Peak Hour
6/19/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	30	8	9	38	20	27	24	274	110	46	237	56
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	0.95
Hourly flow rate (vph)	38	10	11	44	23	31	26	298	120	48	249	59
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	828	845	279	802	815	358	308			417		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	828	845	279	802	815	358	308			417		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	96	99	84	92	95	98			96		
cM capacity (veh/h)	248	281	760	276	292	687	1252			1142		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	59	98	443	357								
Volume Left	38	44	26	48								
Volume Right	11	31	120	59								
cSH	291	346	1252	1142								
Volume to Capacity	0.20	0.28	0.02	0.04								
Queue Length 95th (ft)	19	28	2	3								
Control Delay (s)	20.5	19.4	0.7	1.5								
Lane LOS	C	C	A	A								
Approach Delay (s)	20.5	19.4	0.7	1.5								
Approach LOS	C	C										
Intersection Summary												
Average Delay				4.1								
Intersection Capacity Utilization				43.3%	ICU Level of Service	A						
Analysis Period (min)				15								

Proposed Carroll Landfill Expansion
2: Falconer Street & Ivory Street

2030 Background Conditions - PM Peak Hour
6/19/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	35	163	79	252	176	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.91	0.91
Hourly flow rate (vph)	39	181	92	293	193	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	681	204	215			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	681	204	215			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	78	93			
cM capacity (veh/h)	388	836	1355			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	220	385	215			
Volume Left	39	92	0			
Volume Right	181	0	22			
cSH	694	1355	1700			
Volume to Capacity	0.32	0.07	0.13			
Queue Length 95th (ft)	34	5	0			
Control Delay (s)	12.6	2.4	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.6	2.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			4.5			
Intersection Capacity Utilization			50.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
3: CR 34 (Frew Run) & Wiltsie Road

2030 Background Conditions - PM Peak Hour
6/19/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	49	31	5	28	13	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.64	0.64	0.88	0.88
Hourly flow rate (vph)	67	42	8	44	15	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			110		148	88
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			110		148	88
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	99
cM capacity (veh/h)			1481		840	970
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	110	52	20			
Volume Left	0	8	15			
Volume Right	42	0	6			
cSH	1700	1481	872			
Volume to Capacity	0.06	0.01	0.02			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	1.2	9.2			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.2	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			15.7%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
4: Dodge Road & Wiltsie Road

2030 Background Conditions - PM Peak Hour
6/19/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	2	6	12	0	22	14
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.44	0.44	0.63	0.63	0.65	0.65
Hourly flow rate (vph)	5	14	19	0	34	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	108	19			19	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	108	19			19	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			98	
cM capacity (veh/h)	870	1059			1597	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	18	19	55			
Volume Left	5	0	34			
Volume Right	14	0	0			
cSH	1005	1700	1597			
Volume to Capacity	0.02	0.01	0.02			
Queue Length 95th (ft)	1	0	2			
Control Delay (s)	8.6	0.0	4.5			
Lane LOS	A		A			
Approach Delay (s)	8.6	0.0	4.5			
Approach LOS			A			
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			18.6%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
5: Dodge Road & Proposed Site Drive

2030 Background Conditions - PM Peak Hour
6/19/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	22	0	0	8	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.59	0.59	0.44	0.44	0.92	0.92
Hourly flow rate (vph)	37	0	0	18	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			37		55	37
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			37		55	37
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1573		952	1035

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	37	18	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1573	1700
Volume to Capacity	0.02	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization	6.7%	ICU Level of Service	A
Analysis Period (min)	15		

A8

Level of Service Calculations: 2030 Full Development Conditions

Proposed Carroll Landfill Expansion
1: Institute Street & Ivory Street

2030 Full Development Conditions - AM Peak Hour
6/23/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	14	7	10	53	8	65	8	158	45	47	136	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	8	11	58	9	71	9	172	49	51	148	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	542	492	152	482	471	196	155			221		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	542	492	152	482	471	196	155			221		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			4.5		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			2.6		
p0 queue free %	96	98	99	88	98	91	99			96		
cM capacity (veh/h)	390	454	895	464	466	801	1425			1144		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	34	137	229	207								
Volume Left	15	58	9	51								
Volume Right	11	71	49	8								
cSH	496	593	1425	1144								
Volume to Capacity	0.07	0.23	0.01	0.04								
Queue Length 95th (ft)	5	22	0	4								
Control Delay (s)	12.8	12.9	0.3	2.4								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.8	12.9	0.3	2.4								
Approach LOS	B	B										
Intersection Summary												
Average Delay				4.6								
Intersection Capacity Utilization				40.8%	ICU Level of Service	A						
Analysis Period (min)				15								

Proposed Carroll Landfill Expansion
2: Falconer Street & Ivory Street

2030 Full Development Conditions - AM Peak Hour
6/23/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	17	70	102	135	120	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	76	111	147	130	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	530	161	192			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530	161	192			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	91	92			
cM capacity (veh/h)	469	884	1381			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	95	258	192			
Volume Left	18	111	0			
Volume Right	76	0	62			
cSH	753	1381	1700			
Volume to Capacity	0.13	0.08	0.11			
Queue Length 95th (ft)	11	7	0			
Control Delay (s)	10.5	3.8	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.5	3.8	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			37.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
3: CR 34 (Frew Run) & Wiltsie Road

2030 Full Development Conditions - AM Peak Hour
6/23/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	22	30	6	42	40	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	33	7	46	43	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			57		99	40
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			57		99	40
tC, single (s)			4.1		6.7	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.8	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			1548		826	1031
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	57	52	43			
Volume Left	0	7	43			
Volume Right	33	0	0			
cSH	1700	1548	826			
Volume to Capacity	0.03	0.00	0.05			
Queue Length 95th (ft)	0	0	4			
Control Delay (s)	0.0	0.9	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.6			
Approach LOS		A	A			
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			17.3%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
4: Dodge Road & Wiltsie Road

2030 Full Development Conditions - AM Peak Hour
6/23/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Volume (veh/h)	1	33	7	1	26	10
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	36	8	1	28	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	76	8			9	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	76	8			9	
tC, single (s)	6.4	6.6			4.9	
tC, 2 stage (s)						
tF (s)	3.5	3.7			2.9	
p0 queue free %	100	96			98	
cM capacity (veh/h)	907	975			1234	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	37	9	39			
Volume Left	1	0	28			
Volume Right	36	1	0			
cSH	973	1700	1234			
Volume to Capacity	0.04	0.01	0.02			
Queue Length 95th (ft)	3	0	2			
Control Delay (s)	8.8	0.0	5.8			
Lane LOS	A		A			
Approach Delay (s)	8.8	0.0	5.8			
Approach LOS	A		A			
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			18.6%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion 2030 Full Development Conditions - AM Peak Hour
 5: Dodge Road & Proposed Site Drive 6/23/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↘	↙	↔	↙	↘
Volume (veh/h)	7	20	0	21	13	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	22	0	23	14	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			29		41	18
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			29		41	18
tC, single (s)			4.1		7.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.4	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1584		771	1060
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	29	23	14			
Volume Left	0	0	14			
Volume Right	22	0	0			
cSH	1700	1584	771			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.0	9.8			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization		13.3%		ICU Level of Service		A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
1: Institute Street & Ivory Street

2030 Full Development Conditions - PM Peak Hour
6/23/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	30	8	9	38	20	43	24	274	110	57	237	56
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.87	0.87	0.87	0.92	0.92	0.92	0.95	0.95	0.95
Hourly flow rate (vph)	38	10	11	44	23	49	26	298	120	60	249	59
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	870	869	279	825	838	358	308			417		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	870	869	279	825	838	358	308			417		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.6	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.6	2.2			2.4		
p0 queue free %	83	96	99	83	92	92	98			94		
cM capacity (veh/h)	221	268	760	263	279	615	1252			1056		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	59	116	443	368
Volume Left	38	44	26	60
Volume Right	11	49	120	59
cSH	265	353	1252	1056
Volume to Capacity	0.22	0.33	0.02	0.06
Queue Length 95th (ft)	21	35	2	5
Control Delay (s)	22.5	20.1	0.7	1.9
Lane LOS	C	C	A	A
Approach Delay (s)	22.5	20.1	0.7	1.9
Approach LOS	C	C		

Intersection Summary			
Average Delay		4.7	
Intersection Capacity Utilization	48.4%		ICU Level of Service A
Analysis Period (min)	15		

Proposed Carroll Landfill Expansion
2: Falconer Street & Ivory Street

2030 Full Development Conditions - PM Peak Hour
6/23/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	35	163	79	268	187	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.91	0.91
Hourly flow rate (vph)	39	181	92	312	205	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	712	216	227			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	712	216	227			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	78	93			
cM capacity (veh/h)	372	823	1341			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	220	403	227
Volume Left	39	92	0
Volume Right	181	0	22
cSH	678	1341	1700
Volume to Capacity	0.32	0.07	0.13
Queue Length 95th (ft)	35	6	0
Control Delay (s)	12.8	2.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.8	2.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		4.4	
Intersection Capacity Utilization	51.5%		ICU Level of Service A
Analysis Period (min)	15		

Proposed Carroll Landfill Expansion
3: CR 34 (Frew Run) & Wiltsie Road

2030 Full Development Conditions - PM Peak Hour
6/23/2014

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	49	42	5	28	29	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.64	0.64	0.88	0.88
Hourly flow rate (vph)	67	58	8	44	33	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			125		155	96
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			125		155	96
tC, single (s)			4.1		7.0	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.0	3.3
p0 queue free %			99		95	99
cM capacity (veh/h)			1462		723	961
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	125	52	39			
Volume Left	0	8	33			
Volume Right	58	0	6			
cSH	1700	1462	750			
Volume to Capacity	0.07	0.01	0.05			
Queue Length 95th (ft)	0	0	4			
Control Delay (s)	0.0	1.2	10.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.2	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			15.7%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion
4: Dodge Road & Wiltsie Road

2030 Full Development Conditions - PM Peak Hour
6/23/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	2	22	12	0	33	14
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.44	0.44	0.63	0.63	0.65	0.65
Hourly flow rate (vph)	5	50	19	0	51	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	142	19			19	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	142	19			19	
tC, single (s)	6.4	6.9			4.4	
tC, 2 stage (s)						
tF (s)	3.5	4.0			2.5	
p0 queue free %	99	94			96	
cM capacity (veh/h)	820	886			1418	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	55	19	72			
Volume Left	5	0	51			
Volume Right	50	0	0			
cSH	880	1700	1418			
Volume to Capacity	0.06	0.01	0.04			
Queue Length 95th (ft)	5	0	3			
Control Delay (s)	9.4	0.0	5.4			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	5.4			
Approach LOS	A					
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization			19.2%		ICU Level of Service	A
Analysis Period (min)			15			

Proposed Carroll Landfill Expansion 2030 Full Development Conditions - PM Peak Hour
 5: Dodge Road & Proposed Site Drive 6/23/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	22	11	0	8	16	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.59	0.59	0.44	0.44	0.92	0.92
Hourly flow rate (vph)	37	19	0	18	17	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			56		65	47
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			56		65	47
tC, single (s)			4.1		7.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		4.4	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1549		745	1023

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	56	18	17
Volume Left	0	0	17
Volume Right	19	0	0
cSH	1700	1549	745
Volume to Capacity	0.03	0.00	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	9.9
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Letter from: Thomas A. Messana, State of New York

Department of Transportation

To: Brian Boddecker, Daigler Engineering, P.C.

**NYSDOT Review - Proposed Traffic Safety
Improvements**

April 21, 2014



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
REGION FIVE
100 SENECA STREET
BUFFALO, NEW YORK 14203
www.dot.ny.gov

DARRELL F. KAMINSKI, P.E.
REGIONAL DIRECTOR

JOAN McDONALD
COMMISSIONER

April 21, 2014

Mr. Brian Boddecker, Staff Engineer
DAIGLER ENGINEERING, P.C.
2620 Grand Island Boulevard
Grand Island, NY 14072

Subject: **REVIEW OF PROPOSED TRAFFIC SAFETY IMPROVEMENTS
TOWN OF CARROLL (HAMLET OF FREWSBURG)**

Dear Mr. Boddecker:

We have completed our review of the report submitted by your firm on March 19, 2014 proposing safety enhancements to mitigate the effects of increased truck traffic through the Village of Frewsburg, caused by an expansion of the Carroll Landfill south of the Village.

Based on our review, we have the following comments:

- A review of our records indicates that Frewsburg is an unincorporated hamlet, not a village; therefore they do not have any legal standing. All municipal references in this letter will be related to the Town of Carroll.
- The New York State Department of Transportation (NYSDOT) agrees with the proposal to add painted crosswalks at the intersections of Route 62 with Institute St, Frew Run Rd, and Falconer St; however, crosswalks can only be placed where there are *Americans with Disabilities Act (ADA)* compliant curb ramps.

Based on this requirement, we have determined that a crosswalk can be placed across Route 62, on the north side of the intersection with Institute St/Frew Run Rd. It would be preferable for the curb ramp on the northwest quadrant of this intersection to face directly the curb ramp on the east side of the road; we have also determined that crosswalks can be placed across Falconer St, Institute St, and Frew Run Rd.

Since the crossing of Route 62 is not stop controlled, the crosswalk should be of the high visibility type. There should also be a *Pedestrian* warning sign and a diagonal downward *Arrow* at the crossing location, as well as a *Pedestrian* warning sign with sub-panel reading *300 Feet*, in advance of the crosswalk, for both the northbound and southbound directions.

Mr. Brian Boddecker

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April 21, 2014

In street *Pedestrian Crossing* signs, they are placed within a crosswalk; therefore, one could be placed within the crosswalk proposed for Route 62. The Town of Carroll would need to obtain a permit from our Department to place and remove the sign on a daily basis, and the sign would only be allowed between April and October.

- NYSDOT also agrees with the proposal to add stop lines to the intersections of Institute St, Frew Run Rd, and Falconer St with Route 62.
- The school speed limit on Route 62, at the Robert H. Jackson Elementary School is currently 1000 feet. *New York State Vehicle and Traffic Law* allows for a school speed limit to be a maximum of 1320 feet. Therefore, NYSDOT will extend this school speed limit to the legal maximum, and adjust the location of the school speed limit signs.
- School speed limits can be established for roads which have direct access to/from a school. Therefore, a school speed limit can be established for Institute St, but not Route 62. Should it be so desired, a school speed limit can also be established on Falconer St. This request must come from the Town of Carroll directly to NYSDOT, and once approved, then the signs could be installed.

In summary, the NYSDOT agrees with your proposal to install crosswalks, stop lines, and pedestrian signs on Route 62 and recommends that the curb ramp on the northwest quadrant of the intersection be modified as well. We have enclosed an aerial photograph indicating these modifications for your use. Prior to completing any of this work, permits and approvals must first be obtained from the NYSDOT. A separate permit must be obtained by the municipality to place the in-street pedestrian sign. NYSDOT will make the proposed change to the existing school speed limit on Route 62; however, the Town of Carroll must officially request any additional school speed limits.

If you have any questions or need additional information, please contact me at (716) 847-3268 or Angelo Borgese, of my staff, at (716) 847-3262.

Sincerely,
Original Signed by
Thomas S. Messana, P.E.

Thomas S. Messana, P.E.
Regional Traffic Engineer

TSM/AB/paf

Enclosure

cc: Major Michael J. Cerretto, Troop "A" Commander, NYS Police
Angelo Borgese, P.E., Regional Traffic Operations Engineer