TRAFFIC IMPACT STUDY

for

30 MEGAWATT BIOMASS RENEWABLE POWER PLANT

PROPOSED FOR

ECHO LAKE ROAD EXTENSION

WATERTOWN, CONNECTICUT

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October 2007

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EXECUTIVE SUMMARY

Tamarack Energy, Inc. proposes to construct the Watertown Renewable Power Project, a biomass energy generating facility, along the north side of Echo Lake Road Extension immediately west of the State Forest in Watertown, Connecticut. Fuel for the Watertown Project will come principally from clean wood residue from sound forest management practices, timber stand improvements, tree trimmings produced by utility and municipal maintenance crews, stumps and unusable wood from land-conversion activities. The bulk of the material will come from forest management activities in Connecticut, eastern New York, and western Massachusetts. It is anticipated that some amount of primary mill by-products (clean sawdust or chipped slab wood) and recycled wood (pallets) may also be utilized by the facility. Wood chips, hauled to the site by tractor trailer trucks (40 to 65 truck loads per day), will be used to fuel the 30 megawatt facility. Access to the power plant will be provided by a single full access road located about 200 feet west of the eastern property boundary.

The ITE (Institute of Transportation Engineers) Trip Generation reference contains trip generation rates for various land uses, but does not include information about the number of trips expected to be generated by the Watertown Renewable Power Plant. The number of trips entering and leaving the facility was determined from discussions with representatives from Tamarack Energy, Inc. who indicated that there will be approximately 40 to 65 trucks per day hauling wood fuel to the site and one or two trucks per week hauling ash from the site. Additionally, there will be four people running the facility around the clock (working either 8 or 12 hour shifts) and an administrative staff of 4 to 6 people working from 8:00 AM to 5:00 PM. Morning and afternoon peak hour trips were determined from the work schedules and truck schedules provided by Tamarack Energy, Inc.

Level-of-service (LOS) capacity analyses, as more fully described on page 8 of this report, were completed for the 2007 Existing conditions, 2010 No-Build conditions, and 2010 Build conditions for the intersections listed below. Both 2010 conditions include trips associated with the Watertown Business Park proposed for Echo Lake Road west of the power plant site (See Map on the following page).

A. Route 262 at the Route 8 northbound off ramp

B. Route 262 at the Route 8 southbound on ramp

C. Echo Lake Road Extension at the Route 8 northbound on ramp

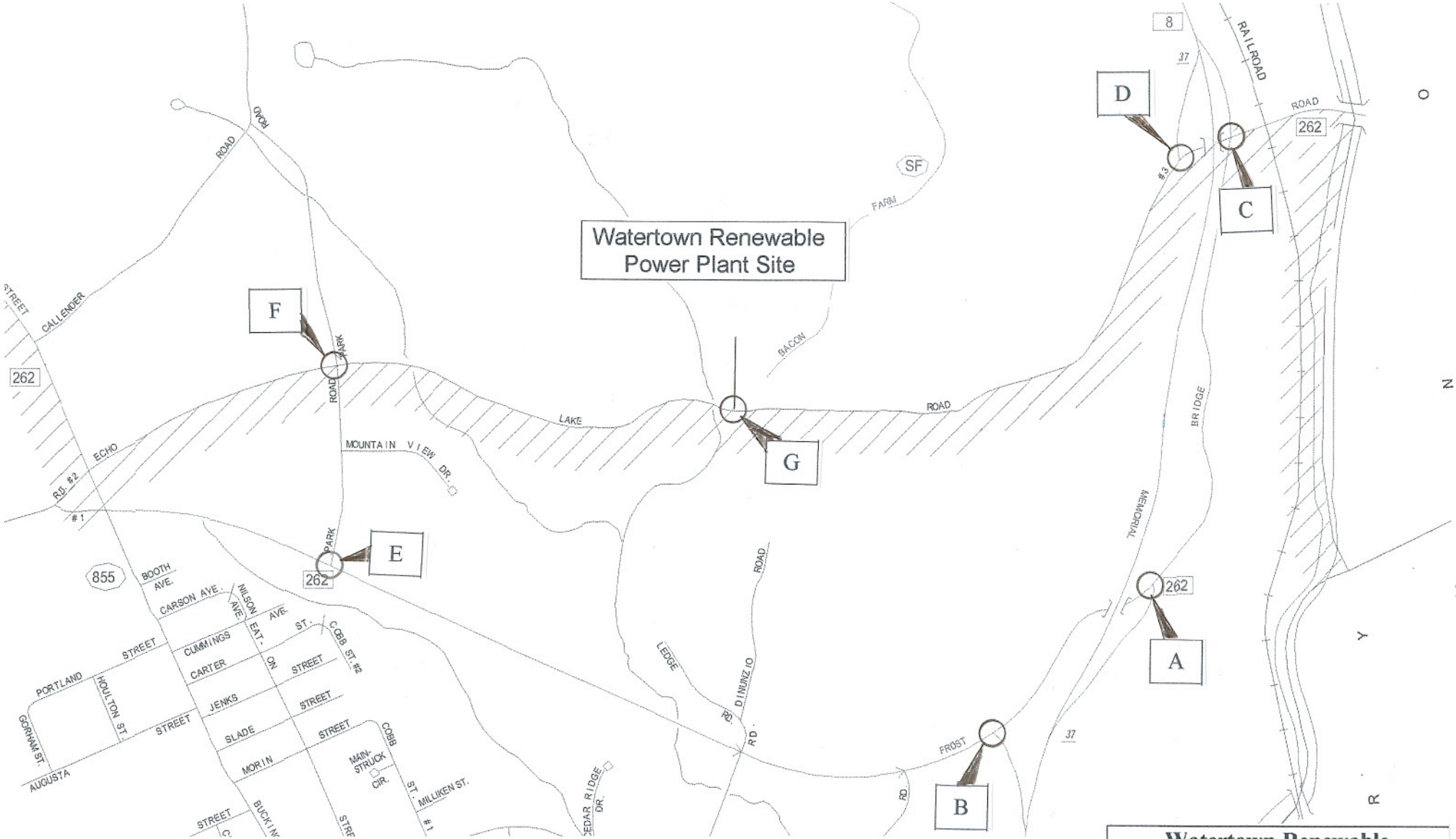
D. Echo Lake Road Extension at the Route 8 southbound off ramp

E. Route 262 at Park Road

F. Echo Lake Road Extension at Park Road.

G. Echo Lake Road Extension at site access road (2010 Build only)

The signalized intersection of Route 262 at Park Road presently operates at Level of Service (LOS) A during the morning peak hour and afternoon peak hours. This intersection will operate at LOS B during the morning peak and afternoon peak hours for the 2010 No-Build conditions, meaning the small number of trips (if any)


Watertown Renewable
Power Plant Site
A
B
C
D
E
F
G
262
855
8
37
ROAD
LAKE
BACON
FARM
SF
MOUNTAIN VIEW DR.
ECHO
CALLENDER
PARK
BOOTH AVE.
CARSON AVE.
WILSON AVE.
EATON STREET
CUMMINGS
CARTER
JENKS
SLADE
MORIN
COBB ST. #2
COBB
MAIN-STRUCK CIR.
MILLIKEN ST.
PORTLAND
HOULTON ST.
GORHAM ST.
AUGUSTA
LEDGE
DINUNZIO RD.
CEDAR RIDGE DR.
FROST
MEMORIAL
BRIDGE
RAILROAD
Watertown Renewable
Power Plant
Site Location Map
Traffic Engineering Solutions, P.C.

associated with the Renewable Power Plant (2010 Build conditions) will have no noticeable impact on the operating Level of Service at this intersection.

All movements at each of the unsignalized intersections included in this study operate at Level of Service (LOS) C or better during the morning and afternoon peak hours with the exception of vehicles turning left from the Route 8 northbound off ramp which presently operates at Level of Service E during the afternoon peak hour. Left turns from the Route 8 northbound off ramp will operate at LOS F and the northbound Frost Bridge Road approach to Echo Lake Road will operate at LOS D during the afternoon peak hour for the 2010 No-Build condition. All movements at both of these intersections will operate at LOS C or better during the morning peak hour and all movements at each of the other intersections will operate at LOS C or better during both peak hours for the 2010 No-Build conditions.

The addition of trips associated with the Watertown Renewable Power facility will have no impact on the operating level of service at any of the intersections included in this study. It is expected that trucks coming from the south on Route 8 (exiting the Route 8 northbound off ramp) will likely travel north on Route 262 to access the site, and therefore the left turn movement at this intersection will not be impacted.

The sight distance available to automobile drivers entering and leaving the Watertown Renewable Power Plant is greater than the distance presented in the Connecticut DOT 2003 Highway Design Manual when looking left from the site access road and just short of the distance presented in the Connecticut DOT 2003 Highway Design Manual when looking right from the site access road for the prevailing travel speeds on Echo Lake Road Extension (the distance looking to the right is just 13 feet short of the distance presented in the ConnDOT reference and could be increased with minor clearing along the south side of the road to the west of the access road). The sight distance for vehicles turning left from Echo Lake Road Extension onto the site is greater than the distance presented in the ConnDOT reference for the prevailing westbound travel speed which greatly exceeds the posted speed limit. Intersection Sight Distances available to truck drivers leaving the site access road do not meet the distances presented in the ConnDOT reference and cannot be easily increased to the desired distances. This study recommends that the intersection of Echo Lake Road Extension at the site access road be made a full-way STOP controlled intersection to promote safety as suggested by Section 11-2.05 of the ConnDOT Highway Design Manual.

INTRODUCTION

Tamarack Energy, Inc. proposes to construct the Watertown Renewable Power Plant along the north side of Echo Lake Road Extension immediately west of the State Forest in Watertown, Connecticut. Fuel for the Watertown Project will come principally from clean wood residue from sound forest management practices, timber stand improvements, tree trimmings produced by utility and municipal maintenance crews, stumps and unusable wood from land-conversion activities. The bulk of the material will come from forest management activities in Connecticut, eastern New York, and western Massachusetts. It is anticipated that some amount of primary mill by-products (clean sawdust or chipped slab wood)

and recycled wood (pallets) may also be utilized by the facility. It is expected that 40 to 65 tractor trailer truck loads will be required each day (Monday – Saturday) to generate 30MW of electricity. Access to the power plant will be provided by a single full access road located about 200 feet west of the eastern property boundary.

This report was prepared by Traffic Engineering Solutions to address the traffic impact on roadways and intersections surrounding the project. The following scope of work was included in this study:

- Turning movement counts during the morning (7:00 AM to 9:00 AM) and afternoon (4:00 PM to 6:00 PM) peak periods at the following locations:
  - ◊ Route 262 at the Route 8 northbound off ramp.
  - ◊ Route 262 at the Route 8 southbound on ramp.
  - ◊ Route 262 at Park Road.
  - ◊ Echo Lake Road Extension at the Route 8 northbound on ramp.
  - ◊ Echo Lake Road Extension at the Route 8 southbound off ramp.
  - ◊ Echo Lake Road Extension at Park Road.
- 24-hour directional machine count on Echo Lake Road Extension along the site frontage. The count included a directional speed study to determine the 85th percentile speed of travel in each direction on Echo Lake Road Extension. This is the speed that was used to determine the intersection and stopping sight distances for vehicles entering and leaving the site.
- Obtain from ConnDOT traffic accident data for the latest three year period for Route 262 from Park Road to the Route 8 northbound on ramp. Also, request from the Watertown Police Department traffic accident data for the latest three year period for Echo Lake Road Extension between Route 8 and Park Road.
- Visual observations of roadways and land use conditions along Route 262, Park Road and Echo Lake Road Extension along the sections of road that would be traveled between the site and Route 8. Also measure the intersection sight distance available to drivers entering and leaving the site at the site drive in accordance with the methods contained in the 2003 ConnDOT Highway Design Manual for sight distance measurements and comparing these distances with the reference distances for the 85^{th} percentile speed.
- Obtain from the Watertown Planning Department information relating to other developments proposed for the vicinity of the Watertown Renewable Power Plant.
- Determine the number of trips expected to be added to the roadway system by the proposed Watertown Renewable Power Plant.
- Based on the field observations made for this study, make recommendation of the route best suited for truck travel between Route 8 and the site.
- Morning and afternoon peak hour capacity analyses for the intersections included in the study to determine the existing operating Levels of Service (LOS) and anticipated LOS for the traffic volumes expected upon completion of the Watertown Renewable Power Plant. Also capacity

analyses for the intersection of Echo Lake Road Extension at the site drive for the traffic volumes expected upon completion of the power plant.

- Determine if off-site roadway improvements will be needed to address the trips associated with the proposed Renewable Power Plant.

EXISTING CONDITIONS

To establish a baseline for this traffic study visual observations were made and traffic counts were obtained for the roadways and intersections surrounding the proposed project site.

Roadways

Echo Lake Road Extension runs generally from east to west, beginning at the north half of the Route 8 interchange No. 37 near the Town Line with Thomaston at the east end and ending at a "T" intersection with Main Street (Route 63) at its west end. The total length of Echo Lake Road and Echo Lake Road Extension in Watertown is about 3-1/4 miles. The road is uphill nearly the entire section from Route 8 to Park Road (about 1-1/3 miles). The project site is located about 1 mile from the Route 8 interchange, and immediately west of the State Forest. Just east of the site Echo Lake Road Extension flattens and is nearly straight. The road rises gently along a portion of the site frontage before rising at a steeper grade and curving to the left when traveling toward the west. In the vicinity of the site, the road is 34 feet wide with a single lane of travel in each direction. A double yellow center line separates the two directions of travel. There are no other pavement markings such as solid white lines to delineate shoulders on either side of the road. The posted speed limit on Echo Lake Road Extension is 25 miles per hour. Most of the land near the site is undeveloped and wooded. Between the site and Route 8 there are several commercial/industrial uses including the Watertown solid waste transfer station. The land is more developed with commercial and industrial uses from a short distance west of the site to Park Road. There are two single family homes near the Park Road intersection. The intersection with Park Road is a four-way STOP controlled intersection.

Route 262 (Frost Bridge Road) runs southerly from the Town Line with Thomaston, near the north half of the Route 8 interchange No. 37, to the south half of the Route 8 interchange No. 37 where it curves to the west and continues nearly parallel with Echo Lake Road Extension to Buckingham Street (Route 262 continues north on Buckingham Street). The road continues west of Buckingham Street as Echo Lake Road. There is a single lane in the westbound direction from the Thomaston Town Line to just east of the Route 8 southbound on ramp, and two westbound lanes from this point to midway between Park Road and Buckingham Street. There is a single eastbound lane along the entire length of Route 262 between Buckingham Street and the Town Line with Thomaston. The posted speed limit on Route 262 is 30 miles per hour from the Town Line with Thomaston to just west of the Route 8 interchange and then 50 mph to Buckingham Street.

Park Road runs from south to north beginning at a signalized "T" intersection with Route 262 at its south end and terminating at a "T" intersection with Thomaston Road (Route 6) at its north end. The road passes through a four way intersection

with Echo Lake Road Extension about 1,500 feet north of Route 262. There is a single lane of travel in each direction on Park Road between Route 262 and Echo Lake Road Extension except at the very south end of the road where there are two lanes approaching the signalized intersection with Route 262. Development along Park Road in between Route 262 and Echo Lake Road Extension is commercial and light industrial, including the UPS and FedEX distribution centers.

Signalized Intersection

Route 262 at Park Road is a 3 legged signalized intersection with Route 262 running east to west and Park Road intersecting from the north. There is a single lane approaching the intersection from the west on Route 262 and two through lanes (right turns are made from the outside lane) approaching from the east on Route 262 and from the north on Park Road (exclusive left and right turn lanes). The traffic signal phasing at this location provides two phases for vehicular movements and no exclusive pedestrian phase. During the first phase vehicles traveling in the east and westbound directions on Route 262 are allowed to proceed through the intersection. During the second phase traffic on the Park Road approach is allowed to proceed through the intersection. Pedestrian movements are concurrent with the vehicular operation, meaning pedestrians cross with the green indications. This intersection operates as an isolated intersection and is not coordinated with other traffic signals in the area.

Existing Traffic Volumes

Twenty–four hour automatic traffic recorder (ATR) counts were obtained from the Connecticut DOT for Echo Lake Road Extension just east of Park Road. The ConnDOT count, made in August 1999, was supplemented by morning (7:00 AM to 9:00 AM) and afternoon (4:00 PM to 6:00 PM) turning movement counts and 24-hour automatic machine counts made between July 16 and July 19, 2007 for this study. According to the ConnDOT count, the average daily traffic volume (ADT) on Echo Lake Road Extension just east of Park Road during 1999 was 3,000 vehicles per day (vpd). The machine count made for this study during mid July indicates that 2,744 vehicles traveled Echo Lake Road Extension in the vicinity of the site. The morning peak hour of travel occurred from 8:00 AM to 9:00 AM when 214 vehicles traveled Echo Lake Road Extension (78 vehicles traveled eastbound and 136 vehicles traveled westbound), and the afternoon peak hour occurred from 3:00 PM to 4:00 PM when 260 vehicles traveled the road (132 vehicles traveled eastbound and 128 vehicles traveled westbound). The July 2007 machine and turning movement counts are included in the Appendix to this report.

Accidents

The Connecticut Department of Transportation (ConnDOT) Bureau of Planning and Research compiles records of accident data reported by investigating police authorities. Accidents which result in death, injury, or property damage in excess of $1,000 are required to be reported. Accident data was obtained for Route 262 from the Route 8 interchange to Park Road. The accident data covered the latest three-year period for which records are available, January 1, 2003 to December 31, 2005. During the three years covered by the ConnDOT accident data a total of 41 accidents were reported along this 1.32 mile section of Route 262. A third

(14) of the reported accidents involved a vehicle hitting a fixed object along the side of the road, eight involved vehicles turning to or from a side street or drive, seven of the accidents were rear-end accidents and five involved a vehicle striking a deer in the road. Three of the reported accidents occurred at the southbound Route 8 on ramp, 13 occurred at Dinunzio Road and 5 occurred at the signalized intersection with Park Road.

The ConnDOT Bureau of Planning and Research also assembles the reported accidents on State roadways and compiles the accidents in a report entitled Traffic Accident Surveillance Report (TASR). The TASR is used to prioritize accident sites statewide. A second list, the Suggested List of Surveillance Study Sites (SLOSSS), is a listing of locations which offer the greatest promise of accident reduction resulting from implementation of corrective action. While these lists are no longer available for public use, the last available TASR covered the period from 1998 to 2000. No section of Route 262 in Watertown was included in the TASR as having an accident rate greater than anticipated for this type of roadway. Hence, no section of Route 262 was included in the SLOSSS for further investigation.

The Watertown Police Department provided traffic accident information for the entire length of Echo Lake Road Extension and Echo Lake Road from its interchange with Route 8 to its intersection with Main Street. During the three year period of August 2004 to August 2007 there were a total of 53 accidents reported along the length of Echo Lake Road Extension and Echo Lake Road. Ten of these accidents occurred along the section of Echo Lake Road Extension between Route 262 (Frost Bridge Road) and Park Road. Review of the accident reports for these eleven accidents indicates a variety of accident types and locations. There were five accidents where the vehicle went off the road, one of these off road accidents bounced off a rock and subsequently struck a vehicle approaching from the opposite direction. Two of the accidents were rear end accidents (one striking a vehicle parked along the side of road), two accidents were angle accidents at the intersection of Frost Bridge Road and Echo Lake Road Extension and the last accident was a sideswipe accident involving vehicles traveling in the same direction. Three of the accidents occurred at the intersection of Frost Bridge Road at its intersection with Echo Lake Road Extension and the Route 8 northbound on-ramp.

PROJECT GENERATED TRAFFIC

The number of new trips added to the roadway system by a development is typically determined from the Institute of Transportation Engineers (ITE) reference, Trip Generation[1]. The ITE reference has established mathematical relationships based on studies of various land uses nationwide to determine their trip generation rates. These trip generation relationships have been standardized and published in the Trip Generation reference. However, the ITE reference contains no information for biomass power plants.

The number of trips associated with the 30 megawatt Watertown Renewable Power Plant was determined from discussions with representatives from Tamarack Energy, Inc. Site trips will include a combination of employee trips,

[1] Trip Generation 7th Edition published by the Institute of Transportation Engineers, 2003.

truck trips, service trips (i.e. postal, UPS and FedEx) and visitors. Four employees will staff the plant around the clock in two or three shifts, and there will be 40 to 65 truckloads of wood chips brought to the site each day. Additionally, there will be four to six administrative personnel working an 8:00 AM to 5:00 PM day. A conservative estimate of ten service and visitor trips per day has also been included here. The operations work shifts will be 6:00 AM to 6:00 PM and 6:00 PM to 6:00 AM if two shifts are used; or 8:00 AM to 4:00 PM, 4:00 PM to midnight and midnight to 8:00 AM if three shifts are used. Since the three shift schedule would overlap with the peak hours of road traffic in the area, this schedule was used in all analyses completed for this study to provide a worst case scenario. It was assumed that each employee represents a trip entering the site at the start of the shift and another trip leaving the site at the end of the shift. Trucks will be allowed to dump their loads between the hours of 7:00 AM and 7:00 PM, Monday through Saturday only. Between five and ten trucks are expected to arrive at the site prior to 7:00 AM and the remaining truck deliveries are expected to occur throughout the twelve hour period with three to four truck loads being delivered each hour. Each truck will take approximately twenty minutes to unload and there will be two dumping locations, meaning a maximum of six trucks can unload during any hour. Finally, the remnants of burning the wood (ash) will be stored in a roll-off container which will be removed from the site once or twice each week. Table 1 presents the number of trips expected to enter and leave the site on a daily basis and during the morning and the afternoon peak hours.

Table 1 - Trip Generation for Watertown Renewable Power Plant

	Trips Entering			Trips Leaving		
	Trucks	Cars	Total	Trucks	Cars	Total
Daily	65	28	93	65	28	93
Morning Peak Hour	6	10	16	6	4	10
Afternoon Peak Hour	6	4	10	6	10	16

Table 1 indicates that the proposed 30 megawatt Watertown Renewable Power Plant will generate 186 daily trips. During the morning peak hour there will be 16 trips entering the site and 10 leaving (including 6 trucks entering the site and 6 trucks leaving). During the afternoon peak hour the project is expected to generate 10 trips entering the site and 16 leaving the site (including 6 trucks entering and leaving the site). The trips presented in Table 1 were used in the analyses completed for this study.

CAPACITY ANALYSES

Capacity Analyses were done to determine the existing and anticipated quality of traffic operations at intersections and roadways surrounding the site. Letter designations from A to F are used to represent the Level of Service (LOS) for the traffic operation at each intersection or roadway with LOS A representing the best operating conditions with the least delay per vehicle and LOS F the worst with greater delay per vehicle.

The Level of Service is determined differently for signalized intersections, unsignalized intersections with multi-way STOP, and unsignalized intersections with STOP control on the minor street approaches. For signalized intersections and unsignalized intersections with multi-way STOP control, the analysis considers the operation of all traffic entering the intersection and the LOS is determined for the overall conditions at the intersection. For unsignalized intersections with STOP control on the minor street, the analysis assumes that through and right-turning traffic on the major street is not affected by traffic on the side streets. Hence, the LOS is determined for the movements on the side street and the left-turn movement from the major street onto the side street. Levels of Service are defined by the average delay per vehicle as indicated below.

Signalized Intersections

Level of Service	Avg. Delay/Vehicle (in Seconds)
LOS A	$\leq$ 10.0
LOS B	> 10.0 and $\leq$ 20.0
LOS C	> 20.0 and $\leq$ 35.0
LOS D	> 35.0 and $\leq$ 55.0
LOS E	> 55.0 and $\leq$ 80.0
LOS F	> 80.0

Unsignalized Intersections

Level of Service	Avg. Delay/Vehicle (in Seconds)
LOS A	$\leq$ 10.0
LOS B	> 10.0 and $\leq$ 15.0
LOS C	> 15.0 and $\leq$ 25.0
LOS D	> 25.0 and $\leq$ 35.0
LOS E	> 35.0 and $\leq$ 50.0
LOS F	> 50.0

Level-of-service capacity analyses were completed for the 2007 Existing conditions, 2010 No-Build conditions, and 2010 Build conditions for all intersections included in the study. The Watertown Renewable Power Project is expected to begin operation in 2010, and therefore this year was chosen for the study. The 2010 No-Build traffic volumes were determined by applying a two percent annual growth factor (106.12%) to the 2007 traffic volumes to account for growth that may occur in the area. Also included in the 2010 conditions are the expected trips associated with the proposed Watertown Business Park which will be located on Echo Lake Road west of the power plant site.

Currently there are no other developments under review or having been approved by the Town that are expected to add traffic to the area roadways prior to construction of the Watertown Renewable Power Project. Future developments will need to include trips associated with the Watertown Renewable Power facility in their traffic analyses.

The 2010 Build condition was determined by adding the trips generated by the Watertown Renewable Power Plant to the 2010 No-Build traffic volumes described above. All truck trips are expected to use Echo Lake Road Extension to travel to and from Route 8. A small portion of the employee trips (peak hour employee trips will total no more than 14 per hour during the morning and afternoon peak hour) may

follow Echo Lake Road Extension to the west. The results of the capacity analyses are presented in Tables 2 and 3.

Table 2: Signalized Intersection Capacity Analysis

		2007 Existing Conditions		2010 No-Build		2010 Build	
Location	Peak Hour	Delay	LOS	Delay	LOS	Delay	LOS
Route 262 at Park Road	AM Peak	9.5	A	10.3	B	10.3	B
	PM Peak	10.0	A	10.9	B	10.9	B

NOTES: Delay = Average stopped delay, in seconds, to all vehicles entering the intersection. LOS = Level of Service

Table 2 indicates that the signalized intersection of Route 262 at Park Road presently operates at Level of Service (LOS) A during the morning peak hour and afternoon peak hours. This intersection will operate at LOS B during the morning peak and afternoon peak hours for the 2010 No-Build conditions and the small number of trips (if any) associated with the Renewable Power Plant (2010 Build conditions) will not negatively impact the operating Level of Service at this intersection.

Table 3 shows that all movements at each of the unsignalized intersections included in this study currently operate at Level of Service (LOS) C or better during the morning and afternoon peak hours with the exception of vehicles turning left form the Route 8 northbound off ramp which presently operates at Level of Service E during the afternoon peak hour. Under the 2010 No-Build condition, the left turns from the Route 8 northbound off ramp will operate at LOS F and the northbound Frost Bridge Road approach to Echo Lake Road will operate at LOS D during the afternoon peak hour. All movements at both these intersections will operate at LOS C or better during the morning peak hour and all movements at each of the other intersections studied will operate at LOS C or better during both peak hours for the 2010 No-Build conditions.

Adding trips associated with the Watertown Renewable Power Plant will not impact the operating Level of Service at any of the intersections included in this study. It is expected that trucks coming from the south on Route 8 (exiting the Route 8 northbound off ramp) will likely travel north on Route 262 to access the site, and therefore the left turn movement at this intersection will not be impacted.

Table 3: Unsignalized Intersection Capacity Analysis

		2007 Existing Conditions		2010 No-Build		2010 Build	
Location	Peak Hour	Delay	LOS	Delay	LOS	Delay	LOS
Route 262 at Route 8 S-Bd On Ramp							
W-Bd Left Turns	AM Peak	10.3	B	10.7	B	10.8	B
	PM Peak	9.4	A	9.9	A	10.0	A
Route 262 at Route 8 N-Bd Off Ramp							
N-Bd Left Turns	AM	16.4	C	18.9	C	19.1	C
N-Bd Right Turns	Peak	9.1	A	9.4	A	9.5	A
N-Bd Left Turns	PM	49.4	E	76.2	F	76.7	F
N-Bd Right Turns	Peak	9.7	A	9.9	A	9.9	A
Route 262 at Echo Lake Rd. Extension and Route 8 N-Bd On Ramp							
E-Bd Left Turns	AM	7.5	A	7.5	A	7.6	A
W-Bd Left Turns		7.9	A	8.0	A	8.0	A
N-Bd Frost Bridge	Peak	13.9	B	18.6	C	20.1	C
E-Bd Left Turns	PM	7.7	A	7.8	A	7.8	A
W-Bd Left Turns		8.0	A	8.1	A	8.1	A
N-Bd Frost Bridge	Peak	18.5	C	26.8	D	30.1	D
Echo Lake Road Extension at Route 8 S-Bd Off Ramp							
S-Bd Ramp	AM Peak	11.1	B	12.4	B	12.8	B
	PM Peak	11.3	B	12.4	B	12.8	B

Table 3 Cont'd: Unsignalized Intersection Capacity Analysis

Location	Peak Hour	2007 Existing Conditions Delay	2007 Existing Conditions LOS	2010 No-Build Delay	2010 No-Build LOS	2010 Build Delay	2010 Build LOS
Echo Lake Road Extension at Park Road							
E-Bd Echo Lake	AM Peak	8.81	A	9.86	A	9.98	A
W-Bd Echo Lake		9.06	A	10.27	B	10.35	B
N-Bd Park Road		10.02	B	10.93	B	12.04	B
S-Bd Park Road		8.57	A	9.33	A	9.38	A
E-Bd Echo Lake	PM Peak	9.08	A	9.90	A	9.97	A
W-Bd Echo Lake		10.07	B	13.68	B	13.91	B
N-Bd Park Road		9.11	A	10.29	B	10.35	B
S-Bd Park Road		10.01	B	11.39	B	11.46	B
Echo Lake Rd. Ext. at Site Access Road							
E-Bd Echo Lake	AM Peak	n/a	n/a	n/a	n/a	8.24	A
W-Bd Echo Lake						9.66	A
S-Bd Site Access						9.03	A
E-Bd Echo Lake	PM Peak	n/a	n/a	n/a	n/a	9.26	A
W-Bd Echo Lake						8.98	A
S-Bd Site Access						8.58	A

Delay = Average stopped delay, in seconds, to all vehicles entering the intersection or to vehicles making the specified turn.

SITE ACCESS

Access to the Watertown Renewable Power Plant will be provided by a full access road that intersects Echo Lake Road Extension from the north about 200 feet west of the eastern site property boundary. Visual observations and sight distance measurements were made at the access drive to determine the Intersection Sight Distances. Intersection Sight Distances (the distance drivers leaving the access road will be able to see when looking left and right along Echo Lake Road Extension) were measured at a distance of 15 feet off the edge of road with a 3.5 foot height of eye and height of object in accordance with ConnDOT Standards for determining Intersection Sight Distances. The sight distance looking left (east) from the access road onto Echo Lake Road is 600 feet (limited by a rock outcrop that extends from 275 feet to 675 feet east of the access road) and the sight distance looking right (west) is 520 feet (limited by the curvature of Echo Lake Road Extension and vegetation along the far side of the road).

The Connecticut DOT presents intersection sight distances (ISD) in their December 2003 Highway Design Manual. Figure 11-2C of the ConnDOT

Guidelines presents ISD information for each 5 mph increment for speeds between 20 and 70 mph. The posted speed limit on Echo Lake Road Extension in the vicinity of the site is 25 miles per hour (mph), however, the speed study completed for Echo Lake Road Extension in the vicinity of the site indicates that the 85th percentile speeds of travel are 48 mph in the eastbound direction and 52 mph in the westbound direction. A summary of available intersection sight distances and distances required by ConnDOT in their Guidelines for Highway Design is presented in Table 4.

Table 4 – Comparison of Available and Required Intersection Sight Distances for the 85th percentile speeds

	Available Intersection Sight Distance	Required Intersection Sight Distance per ConnDOT 2003 Highway Design Manual
Looking Left from Site Access Road onto Echo Lake Rd. Ext.	> 600 Feet	577 Feet for Cars 882 Feet for Trucks
Looking Right from Site Access Road onto Echo Lake Rd. Ext.	520 Feet	533 Feet for Cars 816 Feet for Trucks

Table 4 shows that the Intersection Sight Distance (ISD) available to car drivers looking left from the site access road onto Echo Lake Road Extension is adequate and when looking to the right the ISD is just short of the required distance. Minimal clearing of vegetation along the south side of Echo Lake road Extension west of the site access road could sufficiently increase the ISD looking right. The ISD's available to truck drivers leaving the site, however, fall short of the distances presented in the ConnDOT reference for the 85th percentile speeds. Substantial clearing on property outside the existing road right of way and/or removal of a large area of rock outcrop would be required to provide the necessary Intersection Sight Distances for trucks leaving the site.

The Connecticut DOT Highway Design Manual addresses situations where Intersection Sight Distances cannot be achieved due to physical constraints. Under Section 11-2.05 of the Design Manual it states "Often intersections are converted to all-way stop control to address limited sight distance at the intersection." The intersection of Echo Lake Road Extension will have limited Intersection Sight Distances for truck drivers looking both ways from the proposed site access road, and these site distances cannot feasibly be increased due to the curvature of Echo Lake Road Extension west of the site and the rock outcrops along the State Forest frontage east of the site. Making the intersection an all-way STOP controlled intersection would provide an acceptable corrective action and eliminate the need to provide the full intersection sight distances from the site access road.

A second sight distance measured for this study is for Stopped Vehicle Turning Left Across Oncoming Traffic. According to Figure 11-2J of the ConnDOT Guidelines, vehicles turning left from Echo Lake Road Extension onto the site access road should be able to see 421 feet for cars and 577 feet for trucks. The 600+ feet available to drivers making the left turn is greater than the distance presented in the ConnDOT reference for vehicles approaching from the opposite direction at the 85th percentile speed of 52 mph.

Truck Routes

Wood fuel will be delivered to the site by 40 to 65 trucks per day, six days per week. Most, if not all, of the trucks are expected to travel Route 8 and exit at interchange No. 37. All trucks approaching from the north will travel Echo Lake Road Extension between Route 8 and the site and those approaching from the south will have the option of following Route 262 to Echo Lake Road Extension or following Route 262 to Park Road and subsequently to Echo Lake Road Extension.

Visual observations were made along both options that could be used by trucks traveling to and from the south on Route 8. Echo Lake Road Extension has two westbound lanes from its intersection with Frost Bridge Road to the entrance drive for the Solid Waste Transfer station and a single westbound lane west of the transfer station drive. There is a single eastbound lane for the entire length of Echo Lake Road Extension. Echo Lake Road Extension goes steadily uphill from Frost Bridge Road to the vicinity of the State Forest and becomes flat or nearly flat as it approaches the location of the site access road.

Trucks coming from the south on Route 8 (exiting the Route 8 northbound off ramp) will likely travel north on Route 262 (Frost Bridge Road) and then left onto Echo Lake Road Extension to the site, a distance of approximately 1.6 miles. Northbound traffic is STOP controlled at the intersection of Frost Bridge Road, Echo Lake Road Extension and the Route 8 northbound on ramp. Traffic Engineering Solutions, P.C. reviewed the accident reports for this intersection for the latest three year period and found that a total of three accidents occurred at this location, including a rear end accident, an accident involving a northbound vehicle on Frost Bridge Road striking or being struck by a westbound vehicle on Frost Bridge Road and an accident involving a northbound vehicle on Frost Bridge Road striking or being struck by an eastbound vehicle on Echo Lake Road Extension. The northbound vehicle in both angle accidents was continuing to the Route 8 on ramp and none of the three accidents involved a truck, despite many trucks using this intersection to gain access to the transfer station, industrial buildings along Echo Lake Road Extension, and to travel northbound on Route 8. The small amount of additional traffic generated by the Watertown Renewable Power Plant is not expected to cause a change in the accident rate at this intersection.

Travel from the Route 8 northbound exit to the site via Route 262 to Park Road and Echo Lake Road Extension is a lengthier route (approximately 2.25 miles). Route 262 from the exit ramp to Park Road has two lanes in the westbound direction and a single lane in the eastbound direction. The road goes uphill for a large portion of the length between Route 8 and Park Road, and the intersection with Park Road is signalized. Park Road goes steadily uphill between Route 262 and Echo Lake Road Extension and its intersection with Echo Lake Road Extension is STOP controlled on all approaches. Given the longer distance and the uphill on Park Road immediately following a signalized intersection, truck drivers would find this route less desirable than traveling Frost Bridge Road to Echo Lake Road Extension. Hence, this study concludes that most, if not all, site trips approaching from the south on Route 8 will travel north on Frost Bridge Road to Echo Lake Road to gain access to the site.

CONCLUSIONS

Tamarack Energy, Inc. proposes to construct the Watertown Renewable Power Plant along the north side of Echo Lake Road Extension immediately west of the Mattatuck State Forest in Watertown, Connecticut. Wood chips, hauled to the site by 40 to 65 tractor trailer trucks per day, six days per week, will be used to fuel the 30 megawatt facility. Access to the power plant will be provided by a single full access road located about 200 feet west of the eastern property boundary.

The ITE Trip Generation reference does not include information about the number of trips expected to be generated by the Watertown Renewable Power Plant. The number of trips entering and leaving the facility was determined from discussions with representatives from Tamarack Energy, Inc. who indicated that there will be approximately 40 to 65 trucks per day hauling wood chips to the site and one or two trucks per week hauling ash from the site. Additionally, there will be four people running the facility around the clock (working either 8 or 12 hour shifts) and an administrative staff of 4 to 6 people working from 8:00 AM to 5:00 PM. Morning and afternoon peak hour trips were determined from the work schedules and truck schedules provided by Tamarack Energy, Inc.

Level-of-service capacity analyses were completed for the 2007 Existing conditions, 2010 No-Build conditions (including trips associated with the Watertown Business Park proposed for Echo Lake Road west of the power plant site) and 2010 Build conditions for the six impacted intersections. Additionally, capacity analyses were completed for the intersection of Echo Lake road Extension at the site access road for the 2010 Build conditions. The addition of trips generated by the Watertown Renewable Power Plant did not reduce the level of service at any of the studied intersections.

Intersection site distances were measured for the site access road and compared the minimum distances presented in the Connecticut DOT 2003 Highway Design Manual for the prevailing 85th percentile travel speeds. While the distances are sufficient or nearly sufficient for cars, the Intersection Sight Distances available to truck drivers leaving the site access road are short of the distances presented in the ConnDOT reference and cannot be easily increased to the desired distances. This study recommends that the intersection of Echo Lake Road Extension at the site access road be made a full-way STOP controlled intersection as suggested by Section 11-2.05 of the ConnDOT Highway Design Manual.

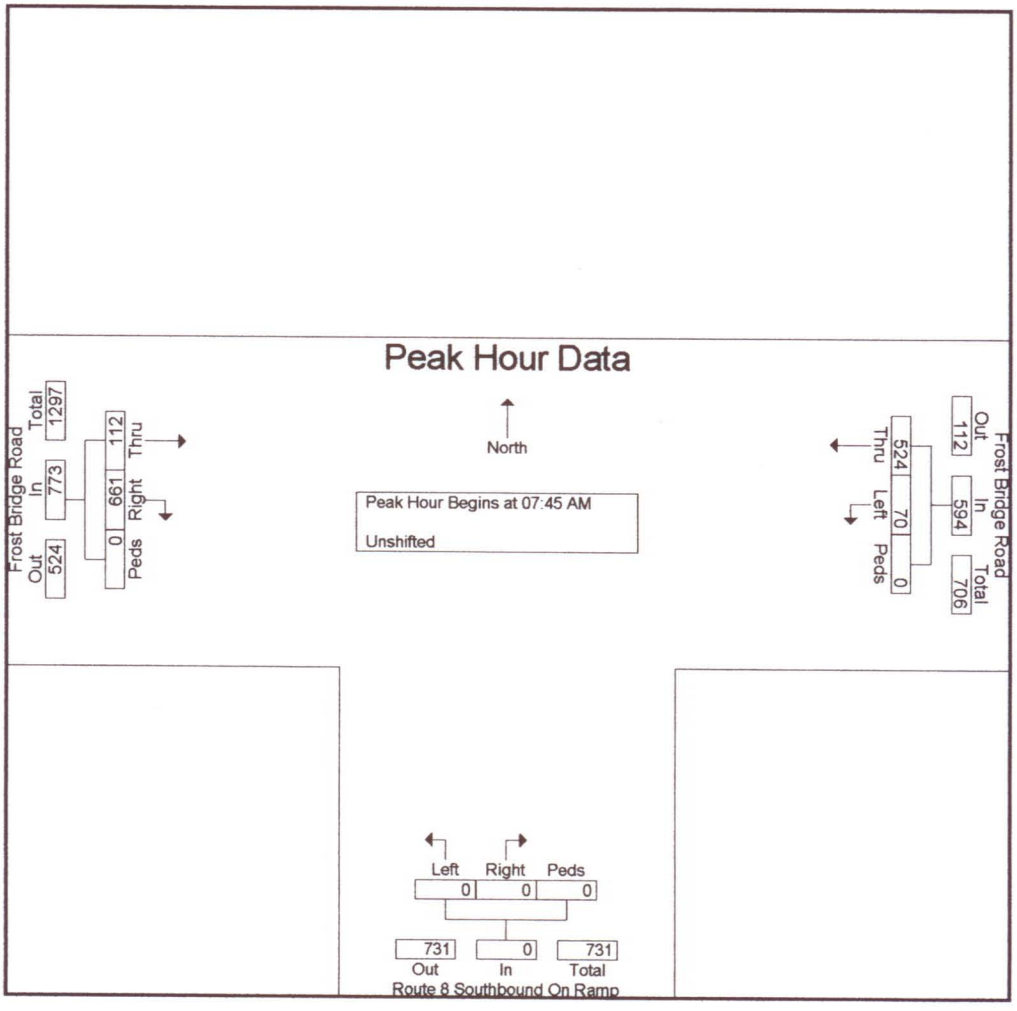
APPENDIX

EXISTING TRAFFIC VOLUMES

Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6874
Site Code : 6874
Start Date : 7/16/2007
Page No : 2

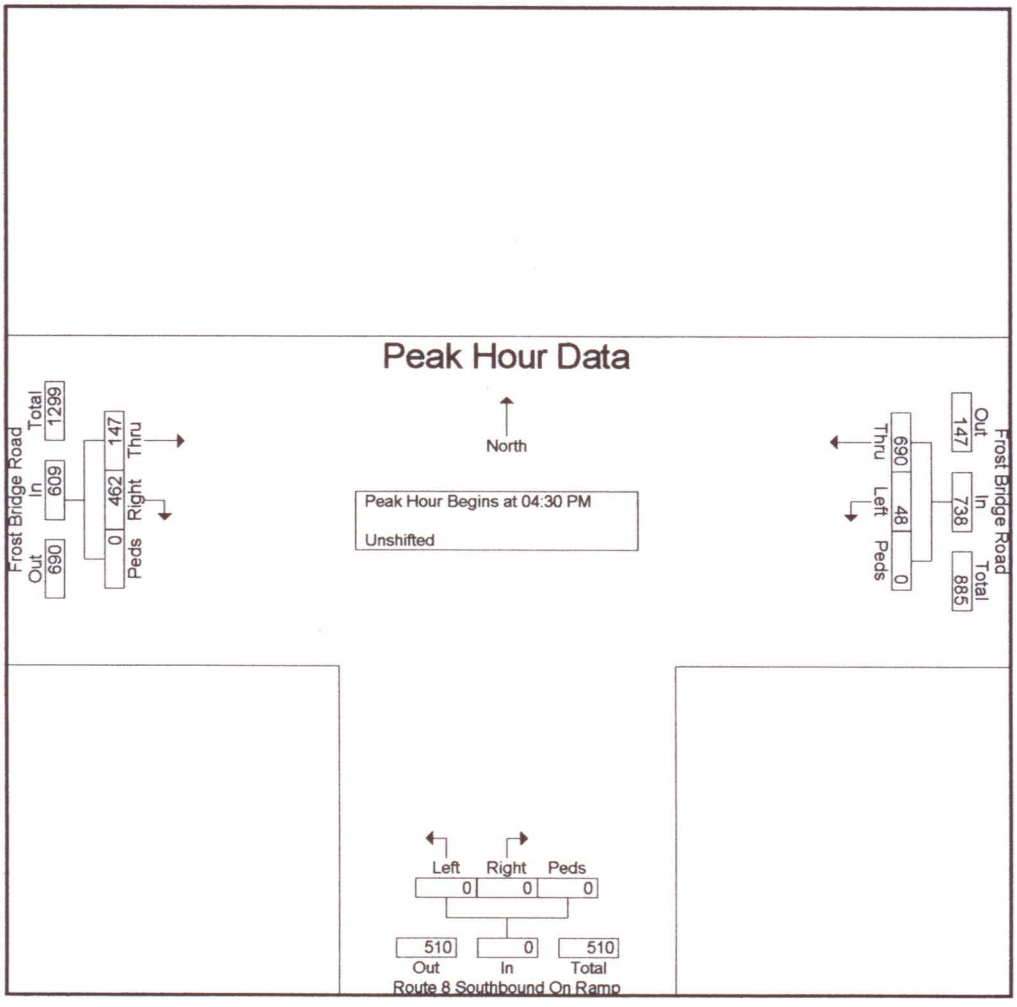
	Route 8 Southbound On Ramp From North					Frost Bridge Road From East					Route 8 Southbound On Ramp From South					Frost Bridge Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	0	117	12	0	129	0	0	0	0	0	**183**	30	0	0	**213**	342
08:00 AM	0	0	0	0	0	0	**161**	20	0	**181**	0	0	0	0	0	152	**38**	0	0	190	**371**
08:15 AM	0	0	0	0	0	0	118	**22**	0	140	0	0	0	0	0	156	25	0	0	181	321
08:30 AM	0	0	0	0	0	0	128	16	0	144	0	0	0	0	0	170	19	0	0	189	333
Total Volume	0	0	0	0	0	0	524	70	0	594	0	0	0	0	0	661	112	0	0	773	1367
% App. Total	0	0	0	0		0	88.2	11.8	0		0	0	0	0		85.5	14.5	0	0		
PHF	.000	.000	.000	.000	.000	.000	.814	.795	.000	.820	.000	.000	.000	.000	.000	.903	.737	.000	.000	.907	.921



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6875
Site Code : 6875
Start Date : 7/16/2007
Page No : 2

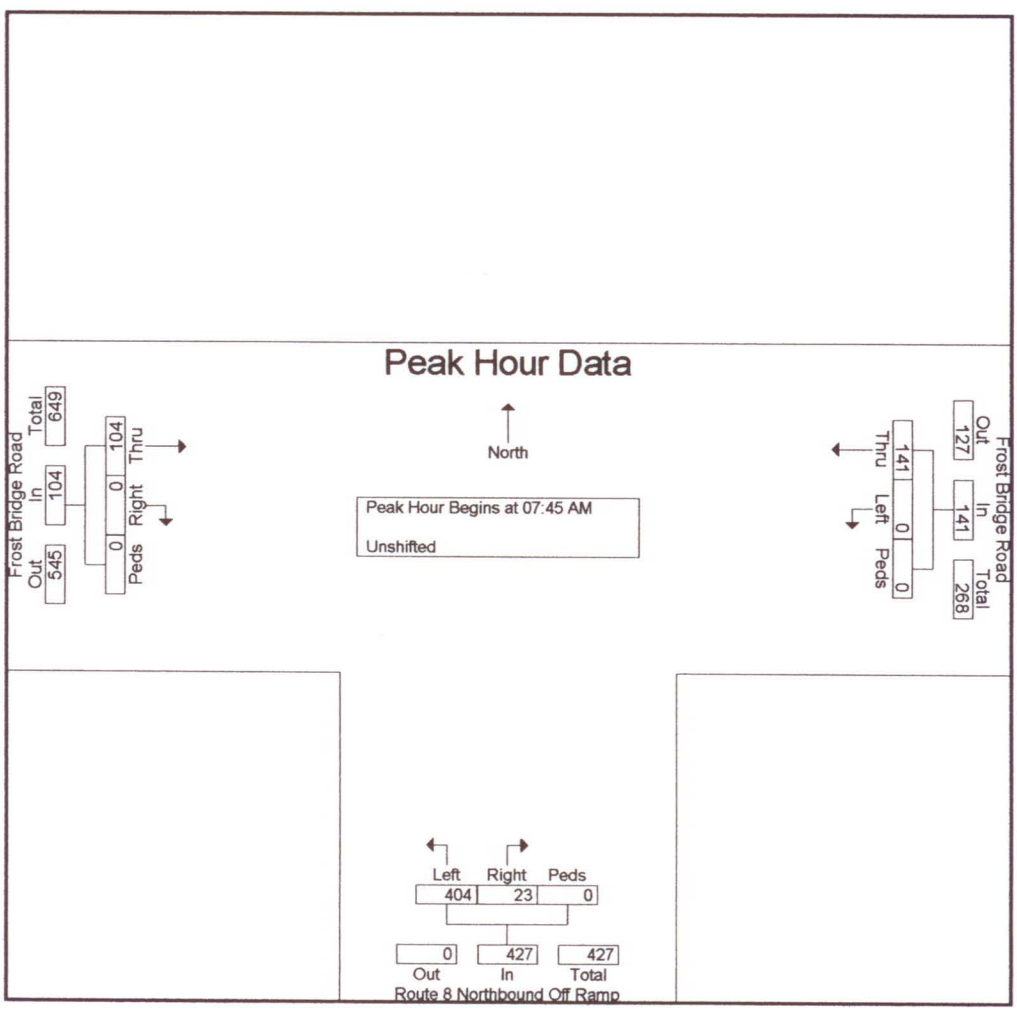
	Route 8 Southbound On Ramp From North					Frost Bridge Road From East					Route 8 Southbound On Ramp From South					Frost Bridge Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	0	0	0	0	0	162	**14**	0	176	0	0	0	0	0	124	29	0	0	153	329
04:45 PM	0	0	0	0	0	0	161	12	0	173	0	0	0	0	0	105	31	0	0	136	309
05:00 PM	0	0	0	0	0	**1**	182	12	0	**195**	0	0	0	0	0	**131**	**44**	0	0	**175**	**370**
05:15 PM	0	0	0	0	0	0	**185**	10	0	195	0	0	0	0	0	102	43	0	0	145	340
Total Volume	0	0	0	0	0	1	690	48	0	739	0	0	0	0	0	462	147	0	0	609	1348
% App. Total	0	0	0	0		0.1	93.4	6.5	0		0	0	0	0		75.9	24.1	0	0		
PHF	.000	.000	.000	.000	.000	.250	.932	.857	.000	.947	.000	.000	.000	.000	.000	.882	.835	.000	.000	.870	.911



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6870
Site Code : 6870
Start Date : 7/16/2007
Page No : 2

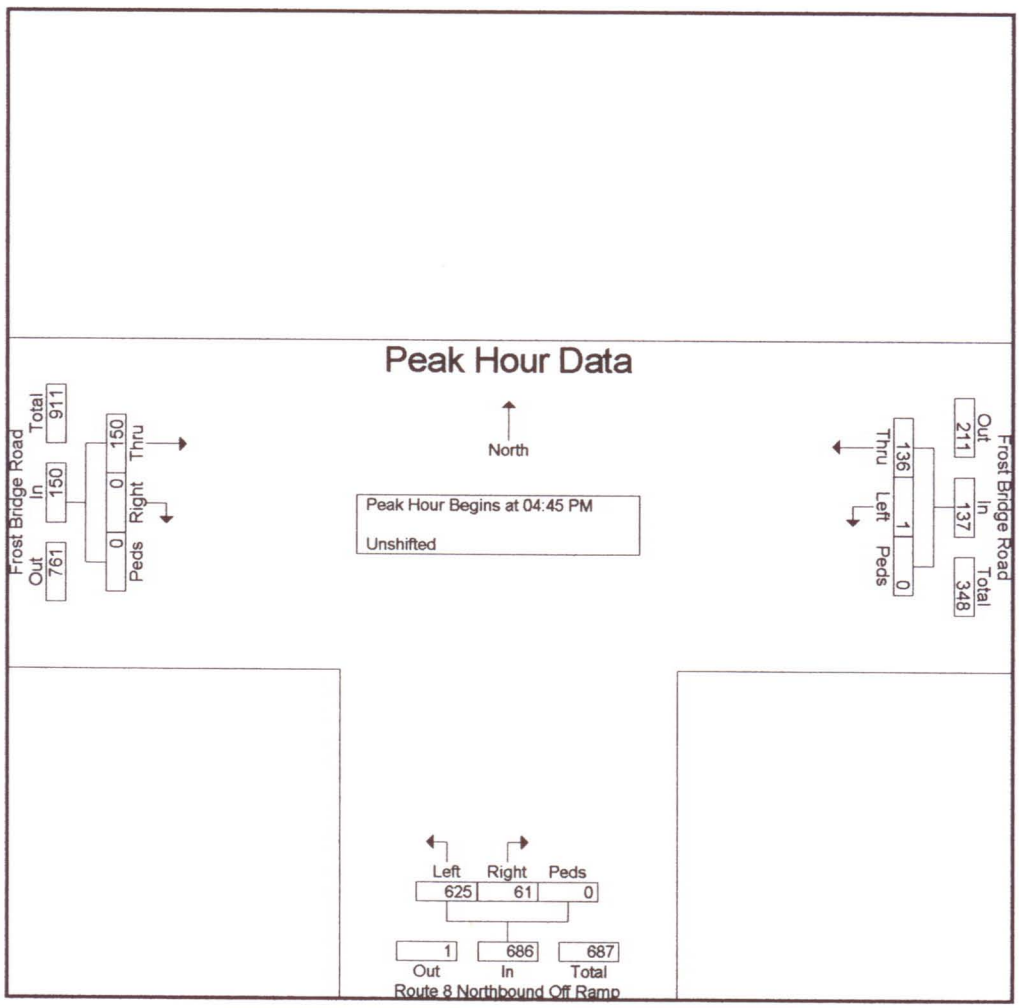
	Route 8 Northbound Off Ramp From North					Frost Bridge Road From East					Route 8 Northbound Off Ramp From South					Frost Bridge Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	0	33	0	0	33	5	0	86	0	91	0	**30**	0	0	**30**	154
08:00 AM	0	0	0	0	0	0	**43**	0	0	**43**	**7**	0	**112**	0	**119**	0	27	0	0	27	**189**
08:15 AM	0	0	0	0	0	0	37	0	0	37	5	0	96	0	101	0	27	0	0	27	165
08:30 AM	0	0	0	0	0	0	28	0	0	28	6	0	110	0	116	0	20	0	0	20	164
Total Volume	0	0	0	0	0	0	141	0	0	141	23	0	404	0	427	0	104	0	0	104	672
% App. Total	0	0	0	0		0	100	0	0		5.4	0	94.6	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.820	.000	.000	.820	.821	.000	.902	.000	.897	.000	.867	.000	.000	.867	.889



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6871
Site Code : 6871
Start Date : 7/16/2007
Page No : 2

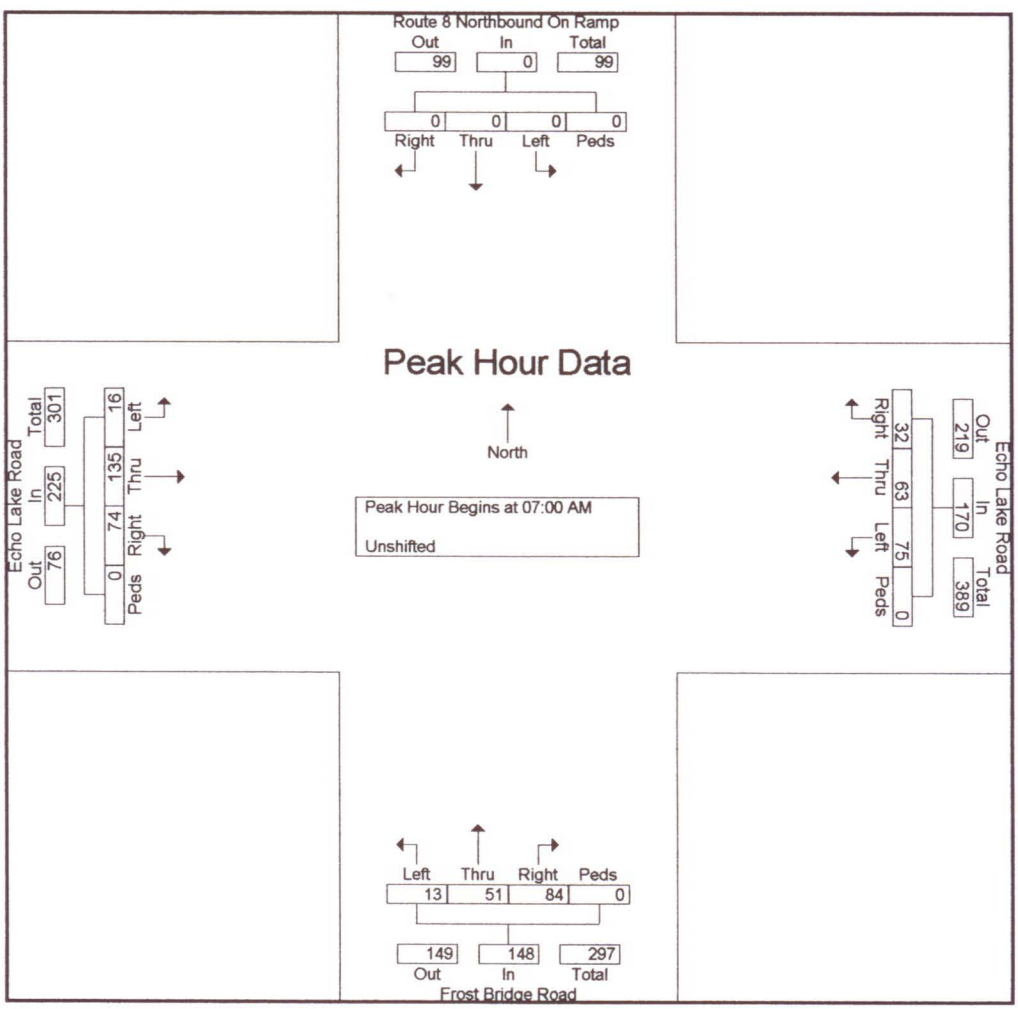
	Route 8 Northbound Off Ramp From North					Frost Bridge Road From East					Route 8 Northbound Off Ramp From South					Frost Bridge Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	0	**39**	**1**	0	**40**	15	0	141	0	156	0	29	0	0	29	225
05:00 PM	0	0	0	0	0	0	39	0	0	39	**17**	0	157	0	174	0	**44**	0	0	**44**	**257**
05:15 PM	0	0	0	0	0	0	26	0	0	26	16	0	**172**	0	**188**	0	37	0	0	37	251
05:30 PM	0	0	0	0	0	0	32	0	0	32	13	0	155	0	168	0	40	0	0	40	240
Total Volume	0	0	0	0	0	0	136	1	0	137	61	0	625	0	686	0	150	0	0	150	973
% App. Total	0	0	0	0		0	99.3	0.7	0		8.9	0	91.1	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.872	.250	.000	.856	.897	.000	.908	.000	.912	.000	.852	.000	.000	.852	.946



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6872
Site Code : 6872
Start Date : 7/17/2007
Page No : 2

	Route 8 Northbound On Ramp From North					Echo Lake Road From East					Frost Bridge Road From South					Echo Lake Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	8	12	**21**	0	41	11	11	3	0	25	22	35	**5**	0	**62**	128
07:15 AM	0	0	0	0	0	**9**	11	19	0	39	**31**	11	3	0	45	13	35	4	0	52	136
07:30 AM	0	0	0	0	0	9	**27**	16	0	**52**	25	**20**	**6**	0	**51**	13	**43**	5	0	61	**164**
07:45 AM	0	0	0	0	0	6	13	19	0	38	17	9	1	0	27	**26**	22	2	0	50	115
Total Volume	0	0	0	0	0	32	63	75	0	170	84	51	13	0	148	74	135	16	0	225	543
% App. Total	0	0	0	0		18.8	37.1	44.1	0		56.8	34.5	8.8	0		32.9	60	7.1	0		
PHF	.000	.000	.000	.000	.000	.889	.583	.893	.000	.817	.677	.638	.542	.000	.725	.712	.785	.800	.000	.907	.828

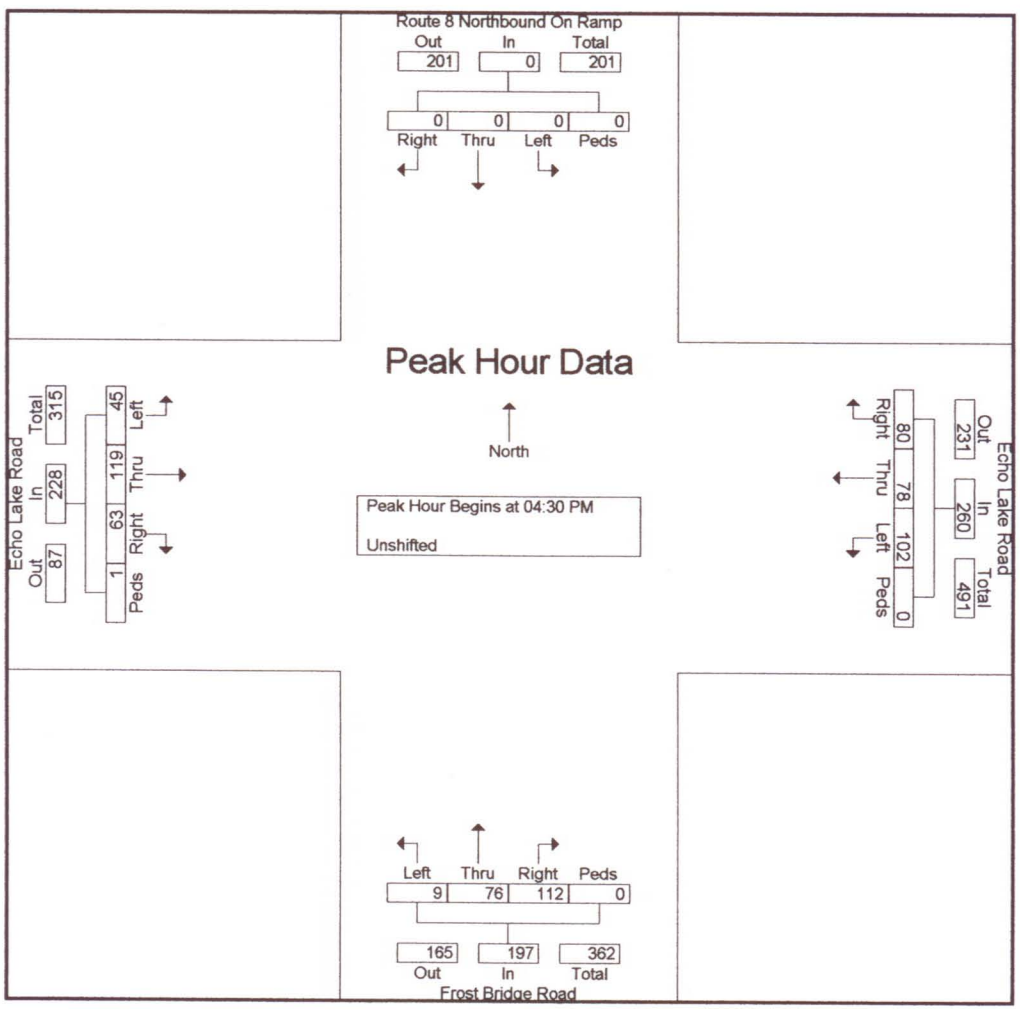


Connecticut Counts Inc.

Kensington, Connecticut 06037
(860) 828-1693

File Name : 6873
Site Code : 6873
Start Date : 7/17/2007
Page No : 2

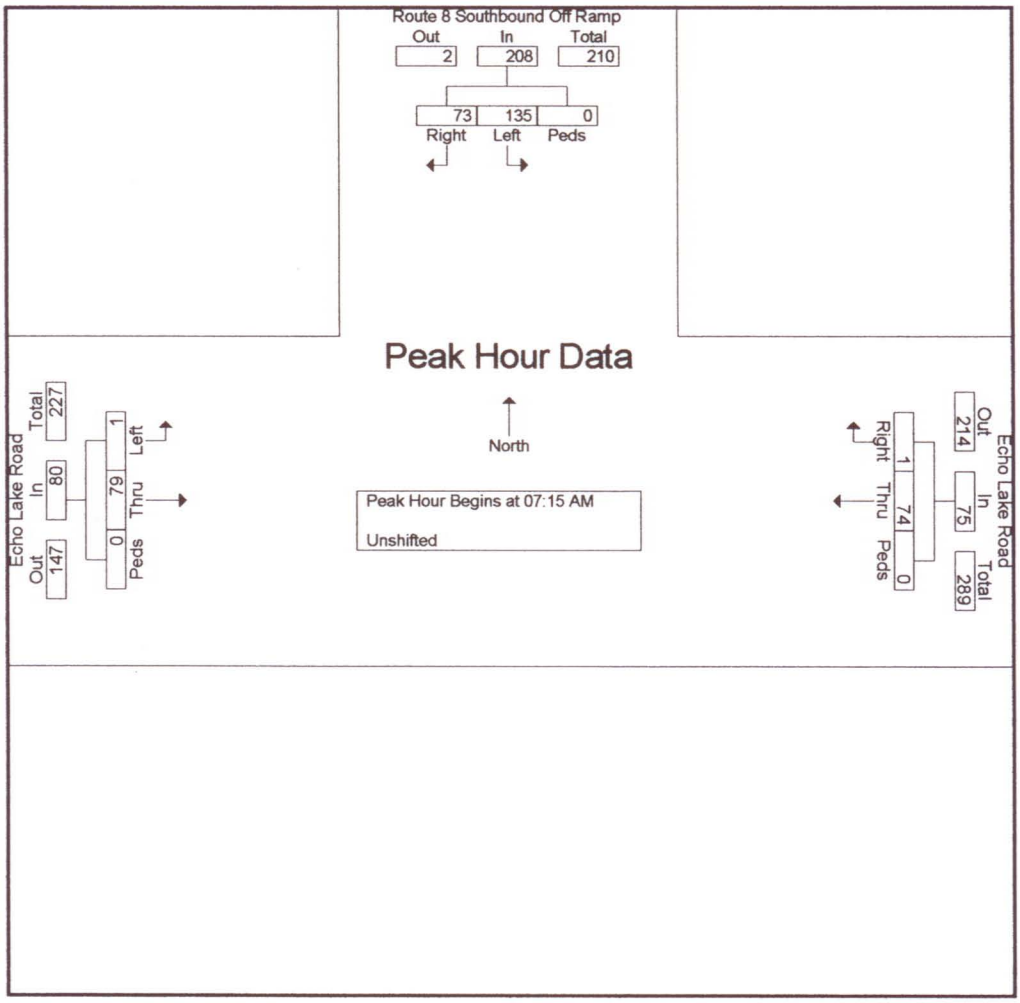
	Route 8 Northbound On Ramp From North					Echo Lake Road From East					Frost Bridge Road From South					Echo Lake Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	0	0	0	0	16	**25**	**34**	0	**75**	**32**	**20**	2	0	54	19	**38**	**16**	**1**	**74**	**203**
04:45 PM	0	0	0	0	0	**24**	20	24	0	68	24	20	**3**	0	47	12	29	8	0	49	164
05:00 PM	0	0	0	0	0	18	17	26	0	61	24	16	1	0	41	12	29	10	0	51	153
05:15 PM	0	0	0	0	0	22	16	18	0	56	32	20	3	0	**55**	**20**	23	11	0	54	165
Total Volume	0	0	0	0	0	80	78	102	0	260	112	76	9	0	197	63	119	45	1	228	685
% App. Total	0	0	0	0		30.8	30	39.2	0		56.9	38.6	4.6	0		27.6	52.2	19.7	0.4		
PHF	.000	.000	.000	.000	.000	.833	.780	.750	.000	.867	.875	.950	.750	.000	.895	.788	.783	.703	.250	.770	.844



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6868
Site Code : 6868
Start Date : 7/17/2007
Page No : 2

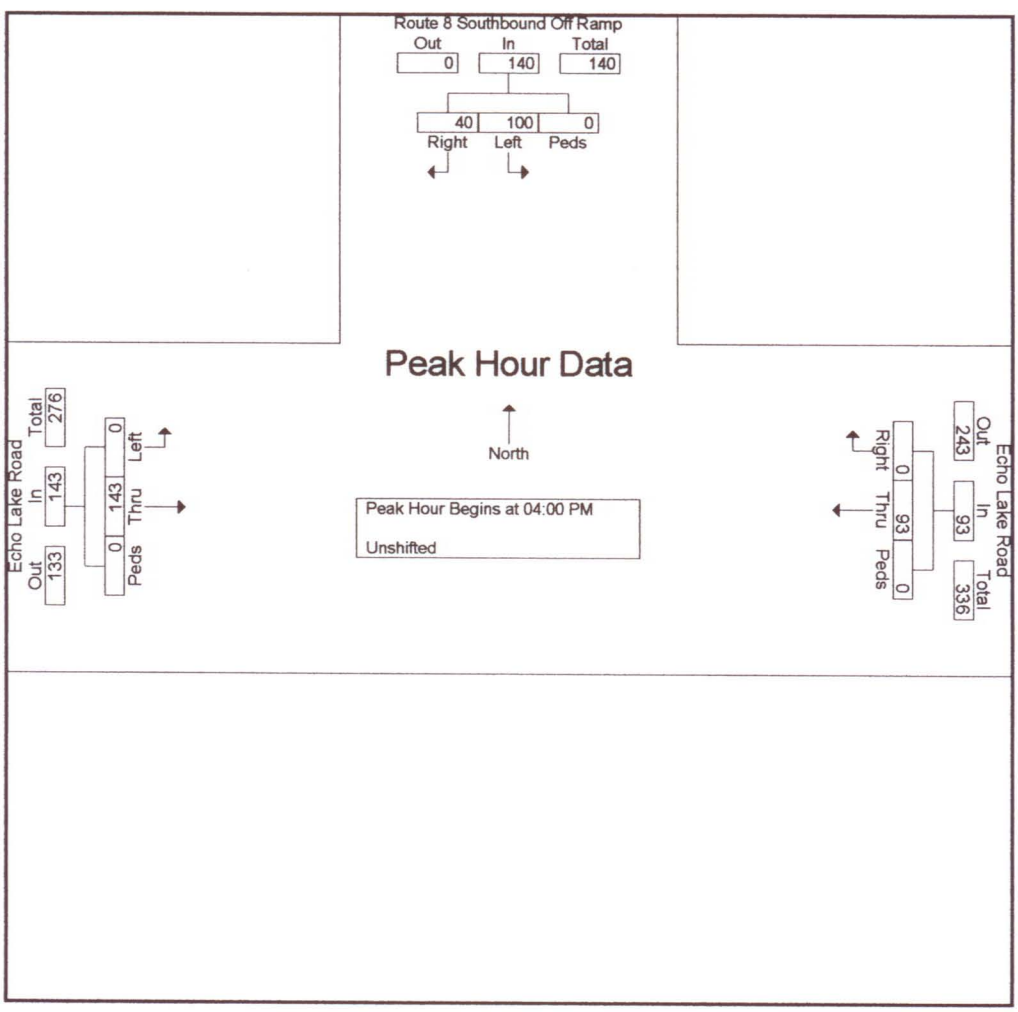
	Route 8 Southbound Off Ramp From North					Echo Lake Road From East					From South					Echo Lake Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	18	0	42	0	60	**1**	**20**	0	0	**21**	0	0	0	0	0	0	21	0	0	21	102
07:30 AM	**20**	0	**46**	0	**66**	0	20	0	0	20	0	0	0	0	0	0	**25**	**1**	0	**26**	**112**
07:45 AM	16	0	25	0	41	0	14	0	0	14	0	0	0	0	0	0	12	0	0	12	67
08:00 AM	19	0	22	0	41	0	20	0	0	20	0	0	0	0	0	0	21	0	0	21	82
Total Volume	73	0	135	0	208	1	74	0	0	75	0	0	0	0	0	0	79	1	0	80	363
% App. Total	35.1	0	64.9	0		1.3	98.7	0	0		0	0	0	0		0	98.8	1.2	0		
PHF	.913	.000	.734	.000	.788	.250	.925	.000	.000	.893	.000	.000	.000	.000	.000	.000	.790	.250	.000	.769	.810



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6869
Site Code : 6869
Start Date : 7/17/2007
Page No : 2

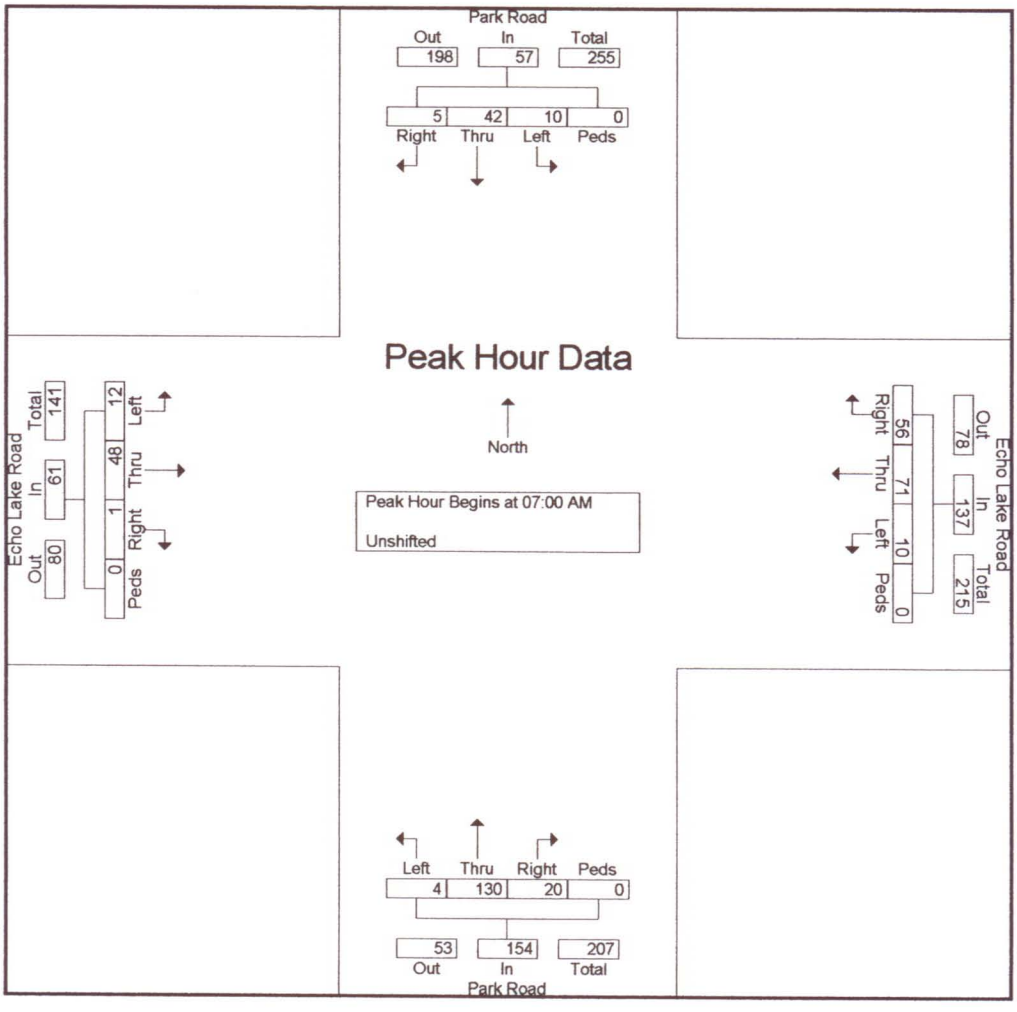
	Route 8 Southbound Off Ramp From North					Echo Lake Road From East					From South					Echo Lake Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	8	0	18	0	26	0	27	0	0	27	0	0	0	0	0	0	28	0	0	28	81
04:15 PM	8	**1**	**29**	0	38	0	**30**	0	0	**30**	0	0	0	0	0	0	**48**	0	0	**48**	**116**
04:30 PM	10	0	27	0	37	0	19	0	0	19	0	0	0	0	0	0	41	0	0	41	97
04:45 PM	**14**	0	26	0	**40**	0	17	0	0	17	0	0	0	0	0	0	26	0	0	26	83
Total Volume	40	1	100	0	141	0	93	0	0	93	0	0	0	0	0	0	143	0	0	143	377
% App. Total	28.4	0.7	70.9	0		0	100	0	0		0	0	0	0		0	100	0	0		
PHF	.714	.250	.862	.000	.881	.000	.775	.000	.000	.775	.000	.000	.000	.000	.000	.000	.745	.000	.000	.745	.813



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6878
Site Code : 6878
Start Date : 7/18/2007
Page No : 2

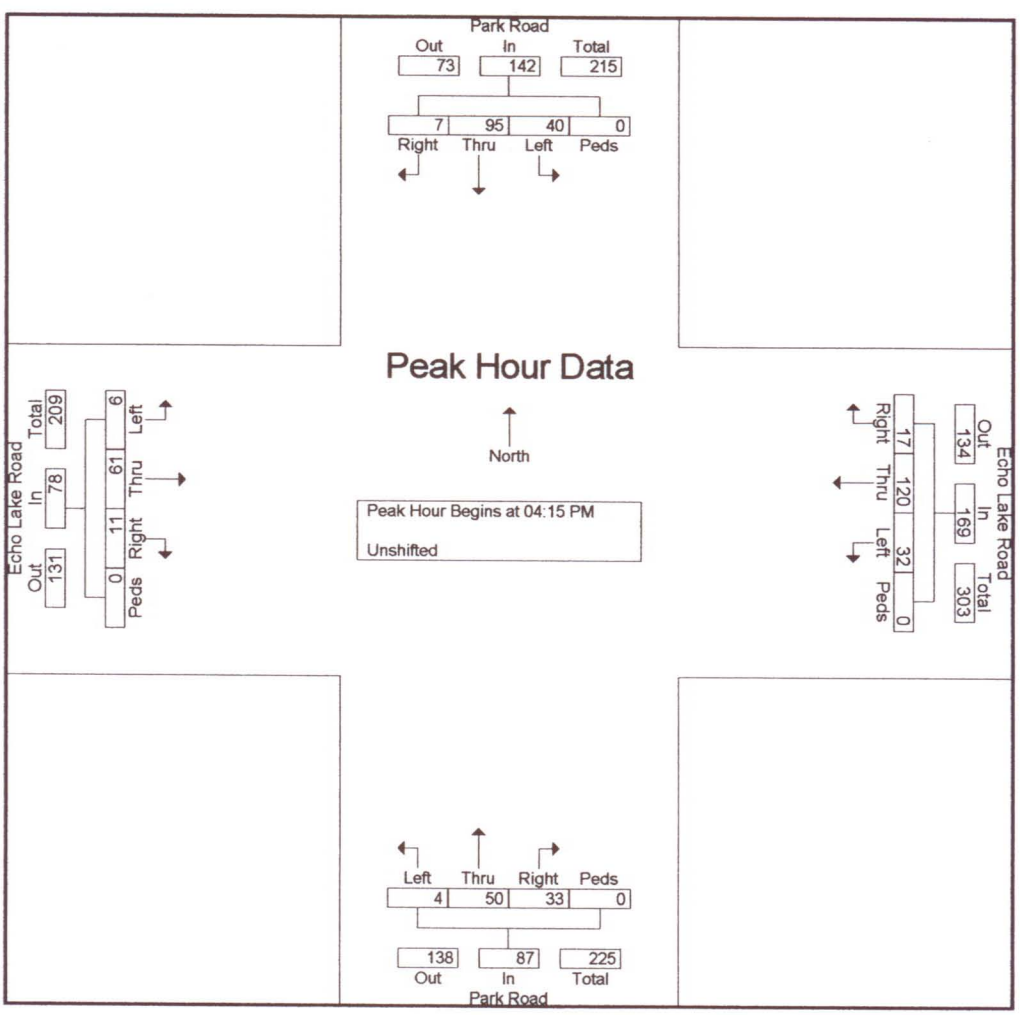
	Park Road From North					Echo Lake Road From East					Park Road From South					Echo Lake Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	1	**15**	**3**	0	19	**27**	14	2	0	**43**	**6**	**58**	1	0	**65**	0	**15**	**7**	0	**22**	**149**
07:15 AM	**3**	14	3	0	**20**	8	19	**4**	0	31	3	25	0	0	28	**1**	13	2	0	16	95
07:30 AM	1	7	3	0	11	15	**22**	0	0	37	5	28	**3**	0	36	0	9	2	0	11	95
07:45 AM	0	6	1	0	7	6	16	4	0	26	6	19	0	0	25	0	11	1	0	12	70
Total Volume	5	42	10	0	57	56	71	10	0	137	20	130	4	0	154	1	48	12	0	61	409
% App. Total	8.8	73.7	17.5	0		40.9	51.8	7.3	0		13	84.4	2.6	0		1.6	78.7	19.7	0		
PHF	.417	.700	.833	.000	.713	.519	.807	.625	.000	.797	.833	.560	.333	.000	.592	.250	.800	.429	.000	.693	.686



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6879
Site Code : 6879
Start Date : 7/18/2007
Page No : 2

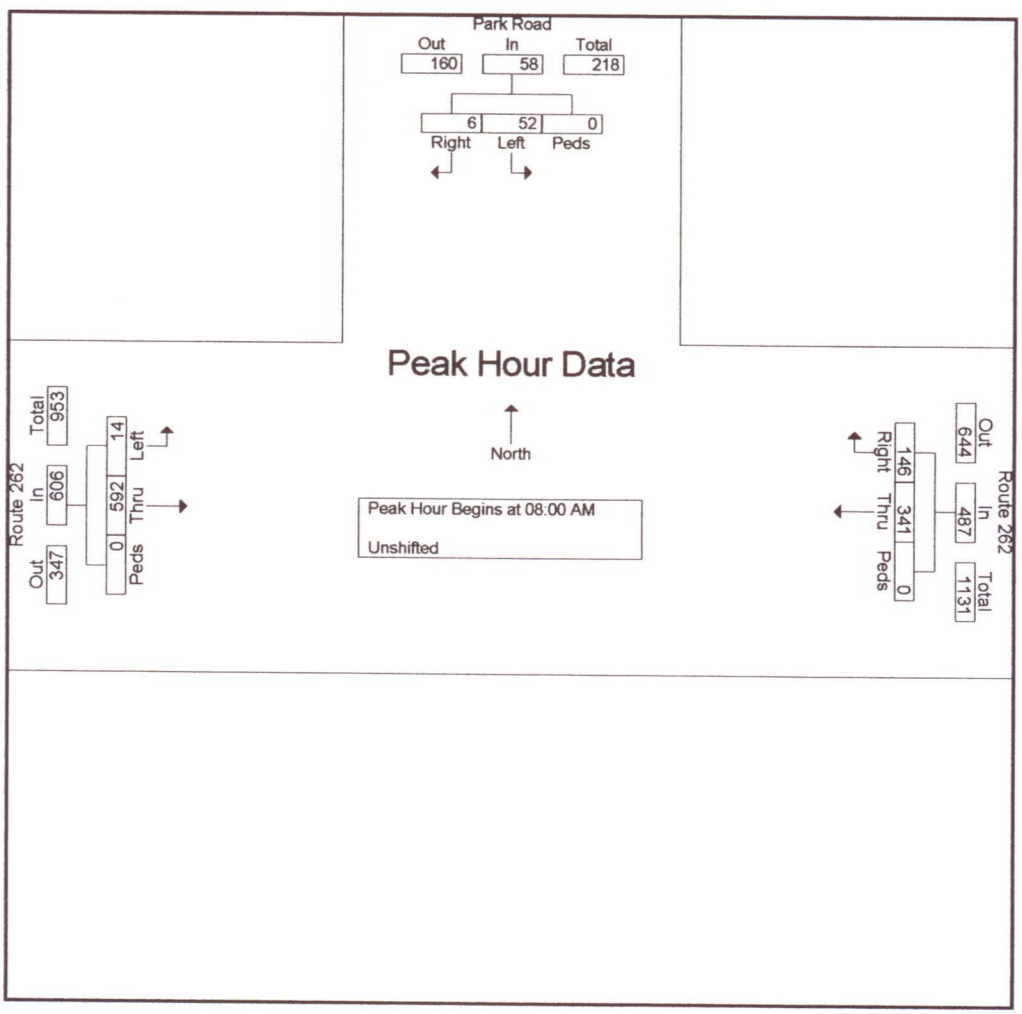
	Park Road From North					Echo Lake Road From East					Park Road From South					Echo Lake Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	**3**	**28**	**17**	0	**48**	**5**	**32**	**14**	0	**51**	8	10	1	0	19	3	12	**2**	0	17	**135**
04:30 PM	0	23	6	0	29	4	24	3	0	31	8	**17**	**2**	0	**27**	1	**19**	2	0	22	109
04:45 PM	3	24	11	0	38	4	32	10	0	46	**10**	16	1	0	27	2	12	0	0	14	125
05:00 PM	1	20	6	0	27	4	32	5	0	41	7	7	0	0	14	**5**	18	2	0	**25**	107
Total Volume	7	95	40	0	142	17	120	32	0	169	33	50	4	0	87	11	61	6	0	78	476
% App. Total	4.9	66.9	28.2	0		10.1	71	18.9	0		37.9	57.5	4.6	0		14.1	78.2	7.7	0		
PHF	.583	.848	.588	.000	.740	.850	.938	.571	.000	.828	.825	.735	.500	.000	.806	.550	.803	.750	.000	.780	.881



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6876
Site Code : 6876
Start Date : 7/17/2007
Page No : 2

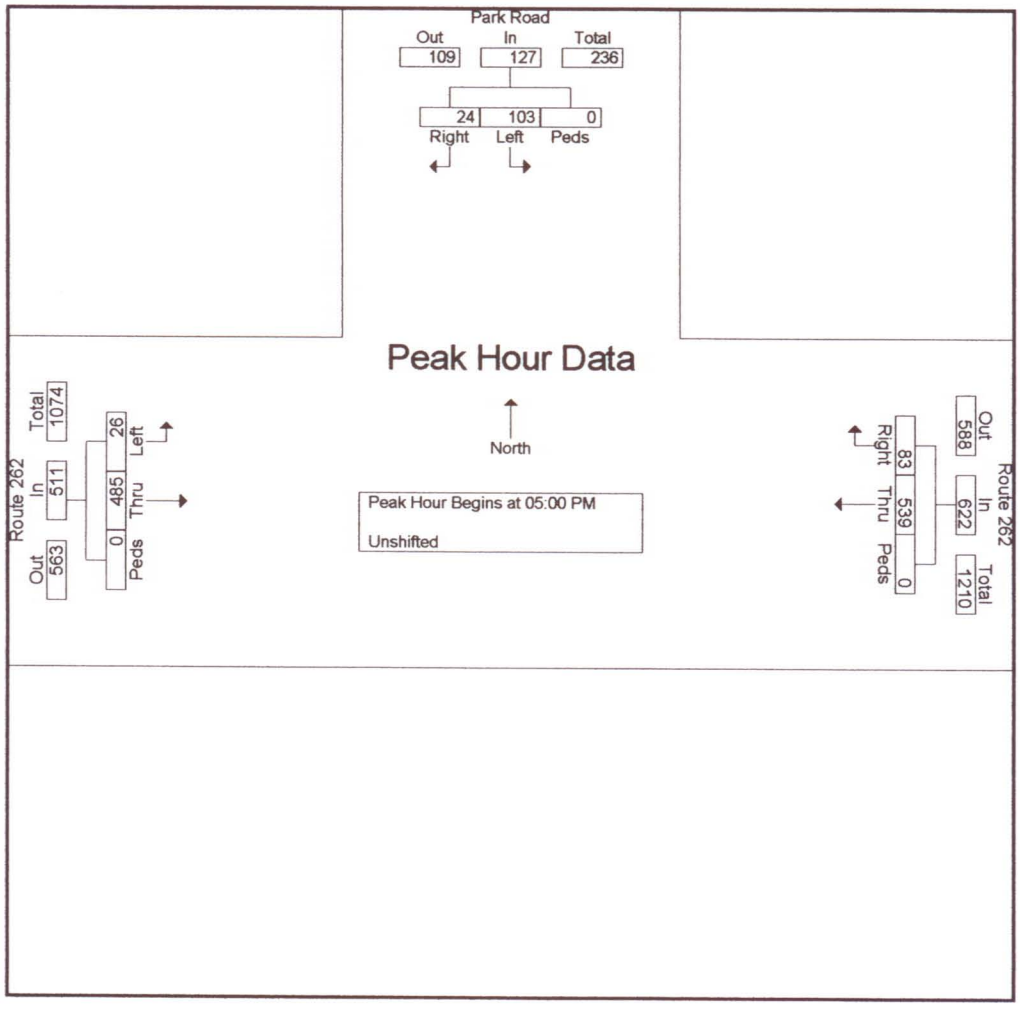
	Park Road From North					Route 262 From East					From South					Route 262 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	5	0	5	38	81	0	0	119	0	0	0	0	0	0	142	5	0	147	271
08:15 AM	1	0	15	0	16	26	78	**1**	0	105	0	0	0	0	0	0	144	**6**	0	150	271
08:30 AM	2	0	10	0	12	**42**	**91**	0	0	**133**	0	0	0	0	0	0	152	2	0	154	299
08:45 AM	**3**	0	**22**	0	**25**	40	91	0	0	131	0	0	0	0	0	0	**154**	1	0	**155**	**311**
Total Volume	6	0	52	0	58	146	341	1	0	488	0	0	0	0	0	0	592	14	0	606	1152
% App. Total	10.3	0	89.7	0		29.9	69.9	0.2	0		0	0	0	0		0	97.7	2.3	0		
PHF	.500	.000	.591	.000	.580	.869	.937	.250	.000	.917	.000	.000	.000	.000	.000	.000	.961	.583	.000	.977	.926



Connecticut Counts Inc.
Kensington, Connecticut 06037
(860) 828-1693

File Name : 6877
Site Code : 6877
Start Date : 7/17/2007
Page No : 2

	Park Road From North					Route 262 From East					From South					Route 262 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	5	0	23	0	28	16	120	0	0	136	0	0	0	0	0	0	116	4	0	120	284
05:15 PM	5	0	26	0	31	19	128	0	0	147	0	0	0	0	0	0	107	4	0	111	289
05:30 PM	5	0	24	0	29	23	**147**	0	0	**170**	0	0	0	0	0	0	120	8	0	128	327
05:45 PM	**9**	0	**30**	0	**39**	**25**	144	0	0	169	0	0	0	0	0	0	**142**	**10**	0	**152**	**360**
Total Volume	24	0	103	0	127	83	539	0	0	622	0	0	0	0	0	0	485	26	0	511	1260
% App. Total	18.9	0	81.1	0		13.3	86.7	0	0		0	0	0	0		0	94.9	5.1	0		
PHF	.667	.000	.858	.000	.814	.830	.917	.000	.000	.915	.000	.000	.000	.000	.000	.000	.854	.650	.000	.840	.875



Connecticut Counts Inc.
Kensington, Connecticut
(860) 828-1693

Echo Lake Road at Site Drive
Watertown, Connecticut

Site Code: 1220
Station ID: SN:019359

Eastbound

Latitude: 0' 0.000 Undefined

Start Time	0 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 9999	Total	85th Percent	95th Percent
07/17/07	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	0	0	**2**	2	9	14	11	12	2	0	0	0	0	0	52	47	50
14:00	0	0	0	**4**	8	23	24	8	4	0	0	0	0	0	71	46	50
15:00	**1**	0	0	2	**12**	30	**62**	**34**	5	0	**1**	0	0	0	**147**	48	50
16:00	0	0	1	0	7	**34**	52	22	**11**	**2**	0	0	0	0	129	49	53
17:00	0	**1**	0	1	4	23	29	8	4	1	1	0	0	0	72	47	52
18:00	0	0	0	0	3	8	9	12	6	1	0	0	0	0	39	51	54
19:00	0	0	0	1	1	10	23	16	7	1	0	0	0	0	59	50	53
20:00	0	0	0	0	0	7	9	6	1	0	1	0	0	0	24	48	51
21:00	0	1	0	1	1	7	4	0	0	1	0	0	0	0	15	43	44
22:00	0	0	0	0	1	4	7	3	1	0	0	0	0	0	16	47	48
23:00	0	0	0	2	2	7	10	8	4	0	0	0	0	0	33	49	52
Total	1	2	3	13	48	167	240	129	45	6	3	0	0	0	657		
Percent	0.2%	0.3%	0.5%	2.0%	7.3%	25.4%	36.5%	19.6%	6.8%	0.9%	0.5%	0.0%	0.0%	0.0%			
AM Peak Vol.																	
PM Peak	15:00	17:00	13:00	14:00	15:00	16:00	15:00	15:00	16:00	16:00	15:00				15:00		
Vol.	1	1	2	4	12	34	62	34	11	2	1				147		

Connecticut Counts Inc.
Kensington, Connecticut
(860) 828-1693

Echo Lake Road at Site Drive
Watertown, Connecticut

Site Code: 1220
Station ID: SN:019359

Eastbound

Latitude: 0' 0.000 Undefined

Start Time	0 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 9999	Total	85th Percent	95th Percent
07/18/07	0	0	0	0	0	3	3	0	1	0	0	0	0	0	7	43	51
01:00	0	0	0	0	1	7	4	1	0	0	0	0	0	0	13	43	44
02:00	0	0	**1**	1	0	2	2	1	0	0	0	0	0	0	7	42	46
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	41	41
05:00	0	0	0	0	2	2	2	0	0	0	0	0	0	0	6	41	42
06:00	0	0	0	1	2	10	12	8	2	0	0	0	0	0	35	48	50
07:00	0	0	0	2	11	20	18	3	2	0	0	0	0	0	56	44	47
08:00	0	0	0	5	12	24	**24**	**10**	2	0	0	**1**	0	0	78	46	50
09:00	0	0	0	**7**	**31**	**65**	24	7	1	0	0	0	0	0	**135**	43	46
10:00	0	0	0	2	4	9	19	4	2	0	0	0	0	0	40	45	49
11:00	0	**1**	0	3	6	15	17	5	**3**	**1**	0	0	0	0	51	46	51
12 PM	0	0	0	3	8	18	11	8	4	1	0	0	0	0	53	48	52
13:00	0	0	1	**4**	**14**	16	16	5	2	1	0	0	0	0	59	45	50
14:00	0	0	**3**	3	8	14	24	4	1	0	0	**1**	0	0	58	45	48
15:00	0	0	1	2	6	**25**	**55**	**30**	**8**	**4**	**1**	0	0	0	**132**	49	53
16:00	0	0	0	0	12	15	40	28	4	1	0	0	0	0	100	48	50
17:00	0	0	0	1	9	20	41	20	4	1	1	0	0	0	97	48	51
18:00	0	0	1	0	2	15	16	14	3	3	0	0	0	0	54	49	55
19:00	0	0	0	1	3	11	20	15	4	1	0	0	0	0	55	49	52
20:00	0	0	0	1	0	7	7	4	0	1	0	0	0	0	20	47	49
21:00	0	0	0	0	1	4	6	1	0	1	0	0	0	0	13	45	46
22:00	0	0	0	0	1	9	5	2	0	0	0	0	0	0	17	44	46
23:00	0	0	0	0	7	16	9	1	0	0	0	0	0	0	33	43	44
Total	0	1	7	36	140	328	376	171	43	15	2	2	0	0	1121		
Percent	0.0%	0.1%	0.6%	3.2%	12.5%	29.3%	33.5%	15.3%	3.8%	1.3%	0.2%	0.2%	0.0%	0.0%			
AM Peak		11:00	02:00	09:00	09:00	09:00	08:00	08:00	11:00	11:00		08:00			09:00		
Vol.		1	1	7	31	65	24	10	3	1		1			135		
PM Peak			14:00	13:00	13:00	15:00	15:00	15:00	15:00	15:00	15:00	14:00			15:00		
Vol.			3	4	14	25	55	30	8	4	1	1			132		

Connecticut Counts Inc.
Kensington, Connecticut
(860) 828-1693

Echo Lake Road at Site Drive
Watertown, Connecticut

Site Code: 1220
Station ID: SN:019359

Eastbound

Latitude: 0' 0.000 Undefined

Start Time	0 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 9999	Total	85th Percent	95th Percent
07/19/07	0	0	0	0	0	2	2	1	0	0	0	0	0	0	5	42	46
01:00	0	0	0	0	2	3	3	0	0	0	0	0	0	0	8	42	43
02:00	0	0	**1**	0	1	1	2	0	0	0	0	0	0	0	5	41	42
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	31	31
05:00	0	0	0	0	1	3	3	1	0	0	0	0	0	0	8	43	46
06:00	0	0	0	0	4	6	15	6	0	0	0	0	0	0	31	46	48
07:00	0	0	0	3	4	**26**	19	2	**2**	**1**	**1**	0	0	0	58	44	51
08:00	0	0	0	**5**	**13**	20	**28**	**18**	1	0	0	0	0	0	**85**	47	49
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	0	0	1	8	26	61	72	28	3	1	1	0	0	0	201		
Percent	0.0%	0.0%	0.5%	4.0%	12.9%	30.3%	35.8%	13.9%	1.5%	0.5%	0.5%	0.0%	0.0%	0.0%			
AM Peak			02:00	08:00	08:00	07:00	08:00	08:00	07:00	07:00	07:00				08:00		
Vol.			1	5	13	26	28	18	2	1	1				85		
PM Peak Vol.																	
Grand Total	1	3	11	57	214	556	688	328	91	22	6	2	0	0	1979		
Percent	0.1%	0.2%	0.6%	2.9%	10.8%	28.1%	34.8%	16.6%	4.6%	1.1%	0.3%	0.1%	0.0%	0.0%			

	15th Percentile :	36 MPH
	50th Percentile :	42 MPH
	85th Percentile :	48 MPH
	95th Percentile :	52 MPH
Statistics	10 MPH Pace Speed :	36-45 MPH
	Number in Pace :	1244
	Percent in Pace :	62.9%
	Number of Vehicles > 25 MPH :	1964
	Percent of Vehicles > 25 MPH :	99.2%
	Mean Speed(Average) :	41 MPH
Statistics	Mean Speed(Average) :	41 MPH
	10 MPH Pace Speed :	36-45 MPH
	Number in Pace :	1244
	Percent in Pace :	62.9%

Connecticut Counts Inc.
Kensington, Connecticut
(860) 828-1693

Echo Lake Road at Site Drive
Watertown, Connecticut

Site Code: 1220
Station ID: SN:019359

Westbound

Latitude: 0' 0.000 Undefined

Start Time	0 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 9999	Total	85th Percent	95th Percent
07/17/07	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	0	**1**	0	0	**5**	10	25	25	16	2	0	0	0	0	84	52	55
14:00	0	0	0	**3**	5	**18**	31	**53**	21	1	1	0	1	0	**134**	51	54
15:00	0	0	0	1	2	12	39	43	14	2	1	0	0	0	114	50	54
16:00	0	0	0	1	1	5	35	41	**27**	**11**	0	0	0	0	121	54	57
17:00	0	0	0	0	1	9	**42**	48	19	1	1	0	0	0	121	51	54
18:00	0	0	0	0	0	17	37	23	13	7	**2**	0	0	0	99	53	57
19:00	0	0	**1**	0	2	15	27	19	6	2	0	0	0	0	72	49	53
20:00	0	0	0	0	2	3	15	3	4	0	0	**1**	**2**	0	30	52	70
21:00	0	0	0	0	3	4	15	8	5	1	0	1	0	0	37	51	55
22:00	0	0	0	0	1	1	1	5	3	1	0	0	0	0	12	52	53
23:00	0	0	0	0	0	1	5	3	0	1	1	0	0	0	11	48	60
Total	0	1	1	5	22	95	272	271	128	29	6	2	3	0	835		
Percent	0.0%	0.1%	0.1%	0.6%	2.6%	11.4%	32.6%	32.5%	15.3%	3.5%	0.7%	0.2%	0.4%	0.0%			
AM Peak																	
Vol.																	
PM Peak		13:00	19:00	14:00	13:00	14:00	17:00	14:00	16:00	16:00	18:00	20:00	20:00		14:00		
Vol.		1	1	3	5	18	42	53	27	11	2	1	2		134		

Connecticut Counts Inc.
Kensington, Connecticut
(860) 828-1693

Echo Lake Road at Site Drive
Watertown, Connecticut

Site Code: 1220
Station ID: SN:019359

Westbound

Latitude: 0' 0.000 Undefined

Start Time	0 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 9999	Total	85th Percent	95th Percent
07/18/07	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	46	46
01:00	0	0	0	0	0	1	2	3	0	1	0	0	0	0	7	48	56
02:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	46	46
03:00	0	0	0	0	1	3	1	1	0	1	0	0	0	0	7	46	56
04:00	0	0	0	0	3	2	14	12	7	2	**1**	0	0	0	41	52	56
05:00	0	0	0	0	2	1	7	15	7	**4**	0	0	0	0	36	54	57
06:00	0	0	0	**2**	**7**	10	24	45	14	2	1	0	0	0	105	51	54
07:00	0	0	0	0	4	9	35	38	10	1	0	0	0	0	97	50	53
08:00	0	0	0	2	1	**18**	**43**	**51**	**18**	3	0	0	0	0	**136**	51	54
09:00	**1**	0	0	1	6	18	19	19	3	1	0	0	0	0	68	49	51
10:00	0	0	0	1	1	5	27	27	13	3	0	0	0	0	77	52	55
11:00	0	0	**1**	0	4	10	16	13	13	1	0	0	0	0	58	52	54
12 PM	0	0	0	0	2	10	33	19	14	6	**1**	0	0	0	85	53	57
13:00	0	0	0	0	**5**	16	26	13	6	2	0	0	0	0	68	49	54
14:00	0	0	0	1	4	**21**	**50**	32	17	5	1	0	0	0	131	51	55
15:00	0	0	0	1	4	15	37	45	23	3	0	0	0	0	128	52	55
16:00	0	0	0	0	1	20	48	**56**	15	1	1	0	0	0	142	50	54
17:00	0	0	0	0	1	19	46	49	**31**	**8**	0	0	0	0	**154**	53	55
18:00	0	0	0	0	3	16	33	25	14	3	1	**1**	0	0	96	52	55
19:00	0	0	0	**3**	1	9	24	18	7	3	1	0	0	**1**	67	51	57
20:00	0	0	0	0	1	15	15	14	4	0	0	0	0	0	49	49	52
21:00	0	0	0	0	2	4	13	8	6	0	1	0	0	0	34	51	54
22:00	0	0	0	0	0	8	5	5	2	2	0	0	0	0	22	54	56
23:00	0	0	0	0	1	6	4	2	0	0	0	0	0	0	13	44	46
Total	1	0	1	11	54	236	522	512	224	52	8	1	0	1	1623		
Percent	0.1%	0.0%	0.1%	0.7%	3.3%	14.5%	32.2%	31.5%	13.8%	3.2%	0.5%	0.1%	0.0%	0.1%			
AM Peak	09:00		11:00	06:00	06:00	08:00	08:00	08:00	08:00	05:00	04:00				08:00		
Vol.	1		1	2	7	18	43	51	18	4	1				136		
PM Peak				19:00	13:00	14:00	14:00	16:00	17:00	17:00	12:00	18:00		19:00	17:00		
Vol.				3	5	21	50	56	31	8	1	1		1	154		

Connecticut Counts Inc.
Kensington, Connecticut
(860) 828-1693

Echo Lake Road at Site Drive
Watertown, Connecticut

Site Code: 1220
Station ID: SN:019359

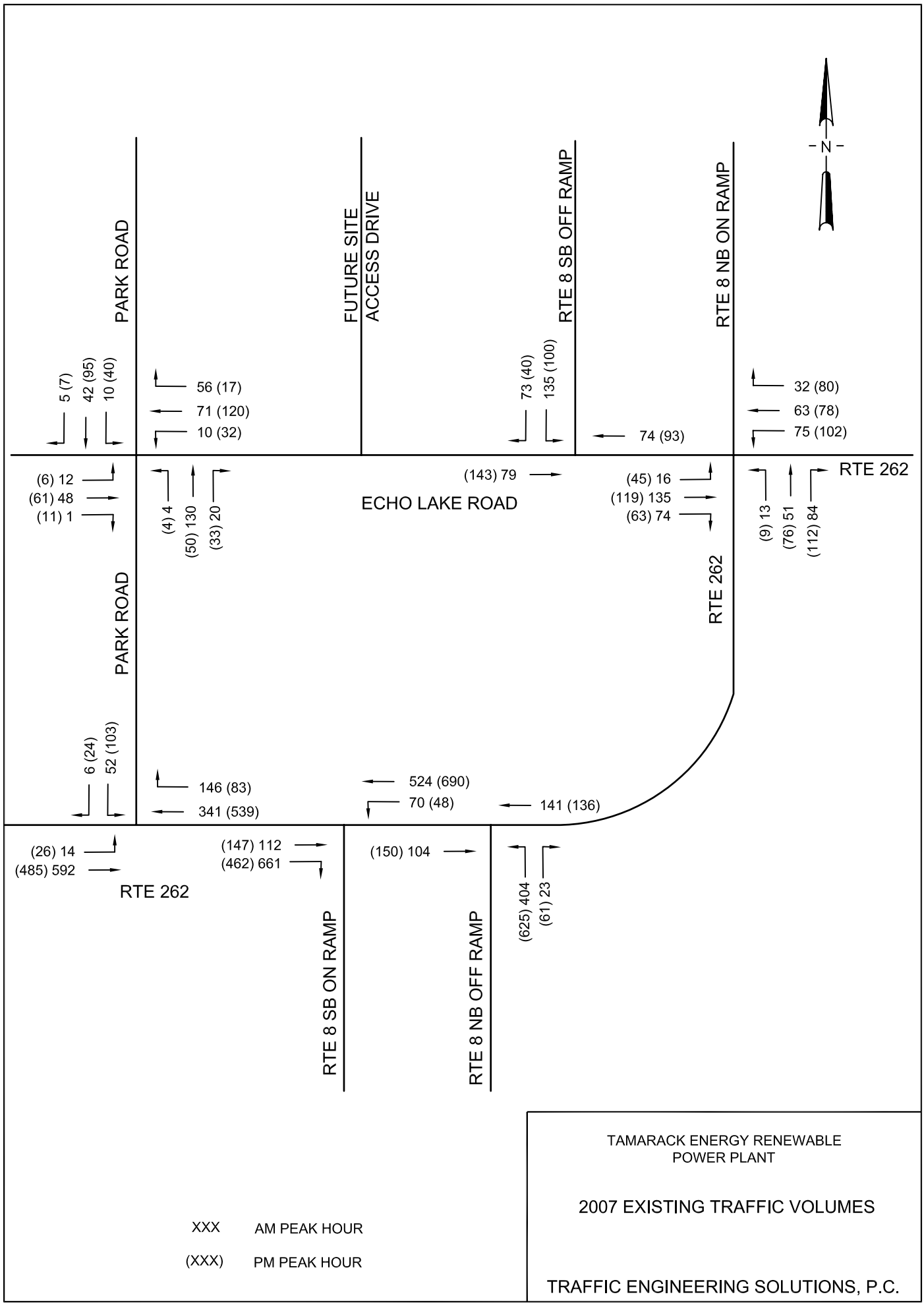
Westbound

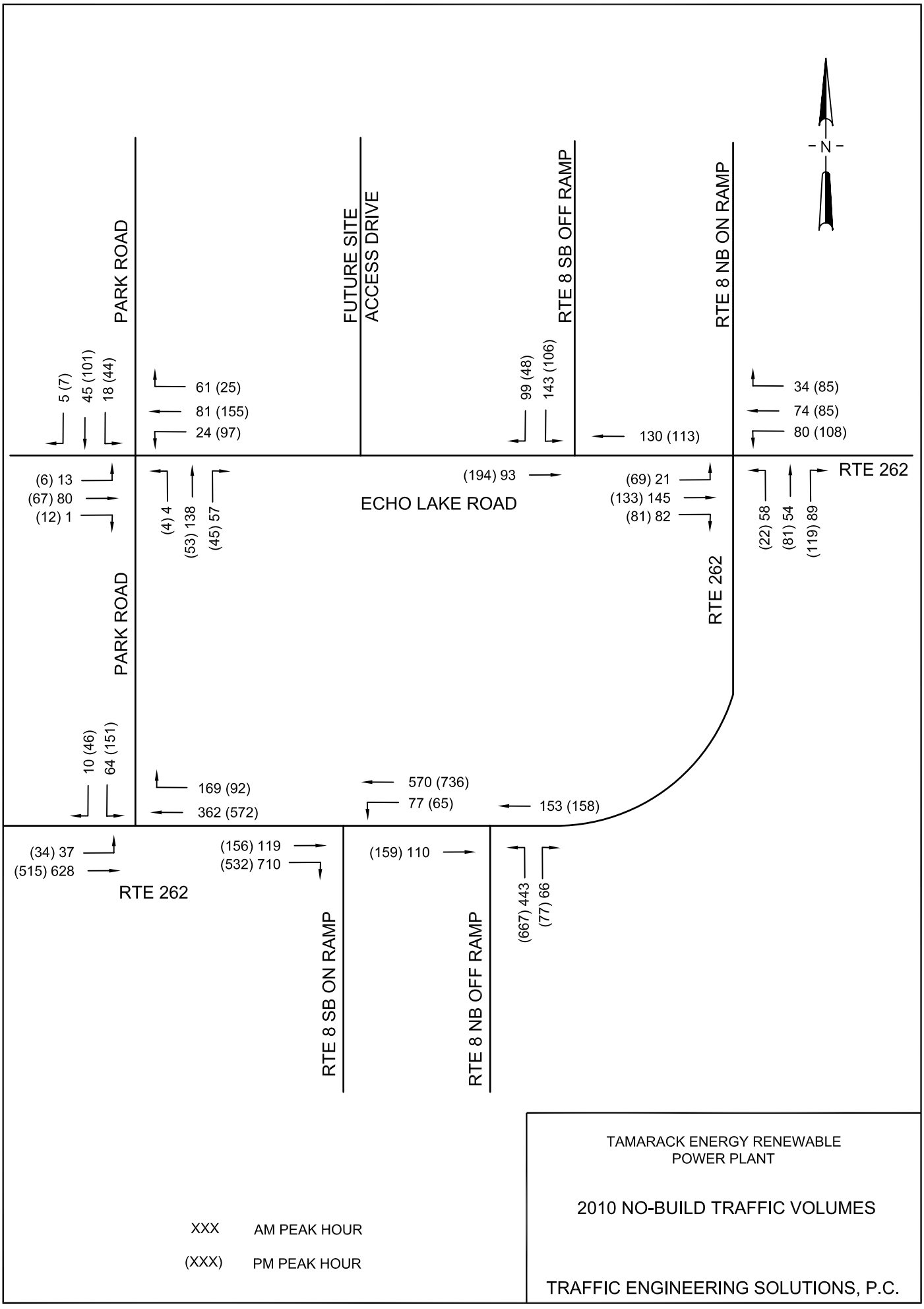
Latitude: 0' 0.000 Undefined

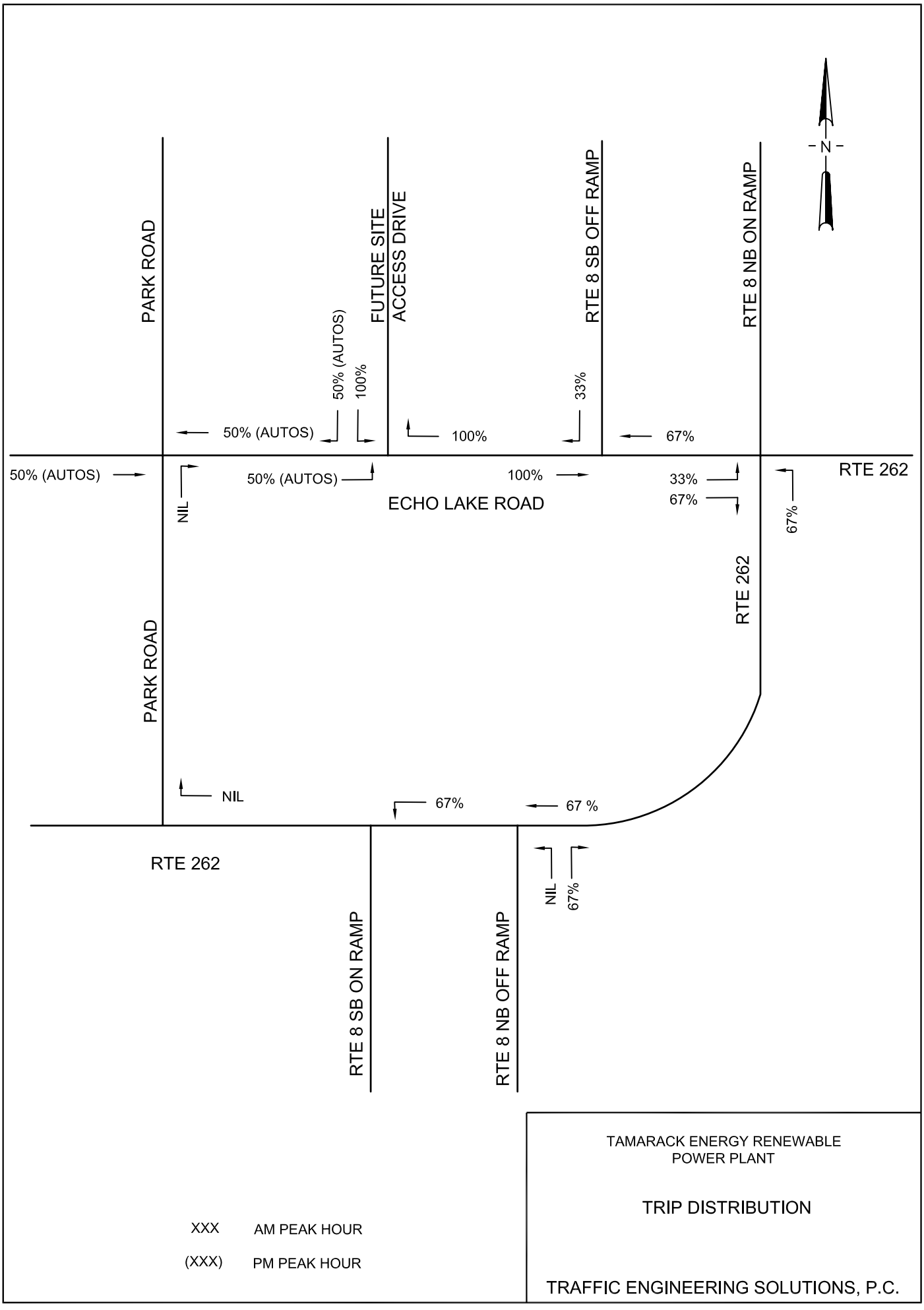
Start Time	0 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 9999	Total	85th Percent	95th Percent
07/19/07	0	0	0	0	0	1	7	0	1	0	0	0	0	0	9	45	51
01:00	0	0	0	0	0	1	0	0	1	1	0	0	0	**1**	4	56	76
02:00	0	0	0	0	0	1	0	0	0	2	0	0	0	0	3	57	57
03:00	0	0	0	0	0	1	3	0	1	0	0	0	0	0	5	43	51
04:00	0	0	1	0	2	5	15	10	7	1	0	0	0	0	41	51	54
05:00	0	0	0	0	0	1	10	11	14	3	1	0	0	0	40	54	57
06:00	0	0	0	0	5	7	26	**39**	22	5	0	0	0	0	104	53	55
07:00	0	0	**2**	1	**9**	20	30	34	16	5	**2**	**1**	0	0	120	52	57
08:00	0	0	0	**3**	5	**30**	**43**	38	**28**	**7**	1	0	0	0	**155**	53	55
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	0	0	3	4	21	67	134	132	90	24	4	1	0	1	481		
Percent	0.0%	0.0%	0.6%	0.8%	4.4%	13.9%	27.9%	27.4%	18.7%	5.0%	0.8%	0.2%	0.0%	0.2%			
AM Peak			07:00	08:00	07:00	08:00	08:00	06:00	08:00	08:00	07:00	07:00		01:00	08:00		
Vol.			2	3	9	30	43	39	28	7	2	1		1	155		
PM Peak Vol.																	
Grand Total	1	1	5	20	97	398	928	915	442	105	18	4	3	2	2939		
Percent	0.0%	0.0%	0.2%	0.7%	3.3%	13.5%	31.6%	31.1%	15.0%	3.6%	0.6%	0.1%	0.1%	0.1%			

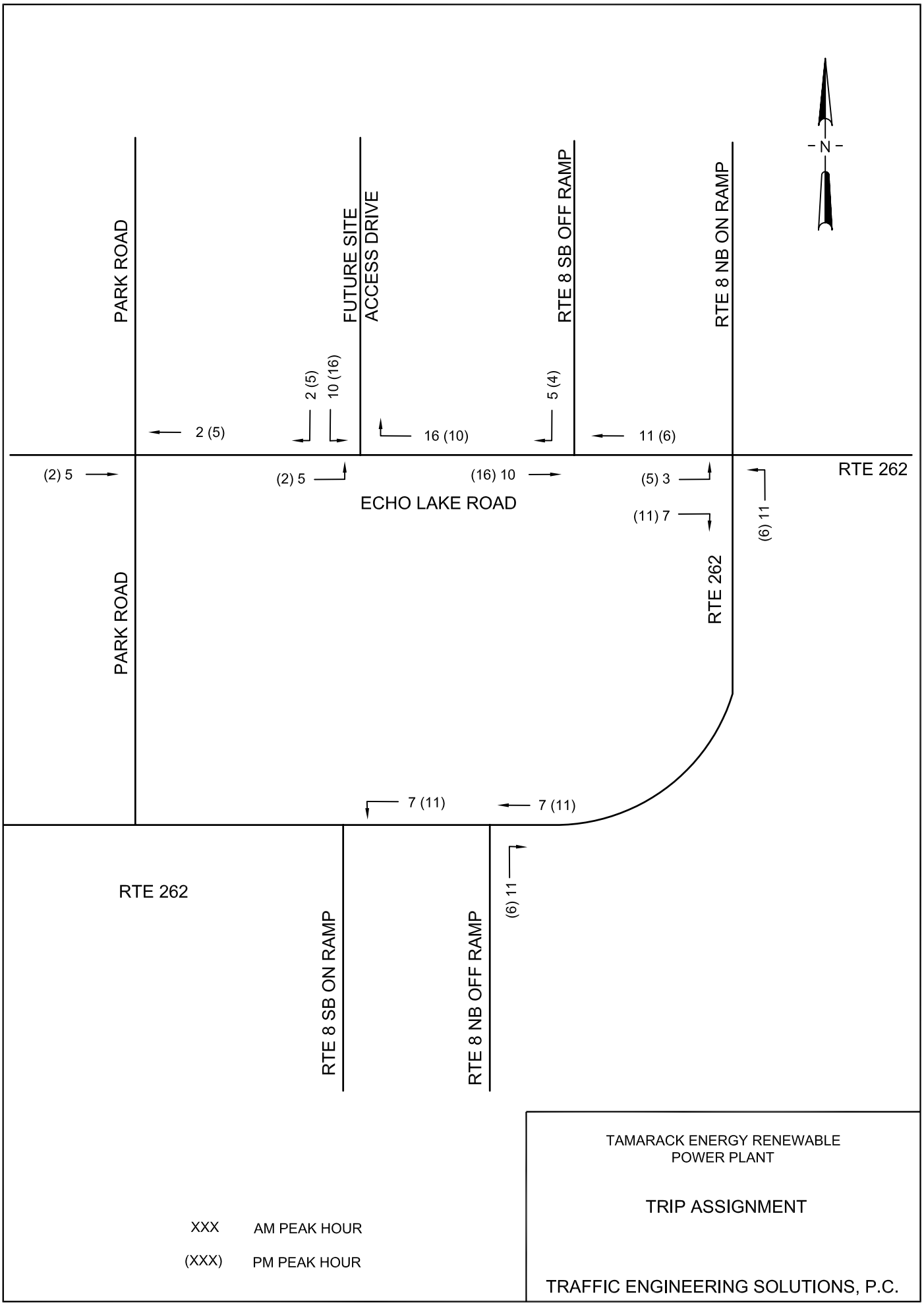
	15th Percentile :	39 MPH
	50th Percentile :	46 MPH
	85th Percentile :	52 MPH
	95th Percentile :	55 MPH
Statistics	10 MPH Pace Speed :	41-50 MPH
	Number in Pace :	1843
	Percent in Pace :	62.7%
	Number of Vehicles > 25 MPH :	2932
	Percent of Vehicles > 25 MPH :	99.8%
	Mean Speed(Average) :	46 MPH
Statistics	Mean Speed(Average) :	46 MPH
	10 MPH Pace Speed :	41-50 MPH
	Number in Pace :	1843
	Percent in Pace :	62.7%

TRAFFIC FLOW DIAGRAMS


N
PARK ROAD
FUTURE SITE
ACCESS DRIVE
RTE 8 SB OFF RAMP
RTE 8 NB ON RAMP
5 (7)
42 (95)
10 (40)
56 (17)
71 (120)
10 (32)
73 (40)
135 (100)
74 (93)
32 (80)
63 (78)
75 (102)
(6) 12
(61) 48
(11) 1
(4) 4
(50) 130
(33) 20
(143) 79
ECHO LAKE ROAD
(45) 16
(119) 135
(63) 74
(9) 13
(76) 51
(112) 84
RTE 262
PARK ROAD
RTE 262
6 (24)
52 (103)
146 (83)
341 (539)
524 (690)
70 (48)
141 (136)
(26) 14
(485) 592
RTE 262
(147) 112
(462) 661
(150) 104
(625) 404
(61) 23
RTE 8 SB ON RAMP
RTE 8 NB OFF RAMP
XXX AM PEAK HOUR
(XXX) PM PEAK HOUR
TAMARACK ENERGY RENEWABLE
POWER PLANT
2007 EXISTING TRAFFIC VOLUMES
TRAFFIC ENGINEERING SOLUTIONS, P.C.
F:\TEMP-CHERYL\TAMARACK-TV.DWG


N
PARK ROAD
FUTURE SITE ACCESS DRIVE
RTE 8 SB OFF RAMP
RTE 8 NB ON RAMP
5 (7)
45 (101)
18 (44)
61 (25)
81 (155)
24 (97)
99 (48)
143 (106)
130 (113)
34 (85)
74 (85)
80 (108)
RTE 262
(6) 13
(67) 80
(12) 1
(4) 4
(53) 138
(45) 57
(194) 93
ECHO LAKE ROAD
(69) 21
(133) 145
(81) 82
(22) 58
(81) 54
(119) 89
PARK ROAD
RTE 262
10 (46)
64 (151)
169 (92)
362 (572)
570 (736)
77 (65)
153 (158)
(34) 37
(515) 628
RTE 262
(156) 119
(532) 710
(159) 110
(667) 443
(77) 66
RTE 8 SB ON RAMP
RTE 8 NB OFF RAMP
XXX AM PEAK HOUR
(XXX) PM PEAK HOUR
TAMARACK ENERGY RENEWABLE POWER PLANT
2010 NO-BUILD TRAFFIC VOLUMES
TRAFFIC ENGINEERING SOLUTIONS, P.C.
F:\TEMP-CHERYL\TAMARACK-TV.DWG


PARK ROAD
FUTURE SITE ACCESS DRIVE
RTE 8 SB OFF RAMP
RTE 8 NB ON RAMP
N
50% (AUTOS)
100%
33%
67%
RTE 262
ECHO LAKE ROAD
NIL
RTE 262
PARK ROAD
NIL
67%
67 %
RTE 262
RTE 8 SB ON RAMP
RTE 8 NB OFF RAMP
NIL
67%
XXX AM PEAK HOUR
(XXX) PM PEAK HOUR
TAMARACK ENERGY RENEWABLE
POWER PLANT
TRIP DISTRIBUTION
TRAFFIC ENGINEERING SOLUTIONS, P.C.
F:\TEMP-CHERYL\TAMARACK-TV.DWG



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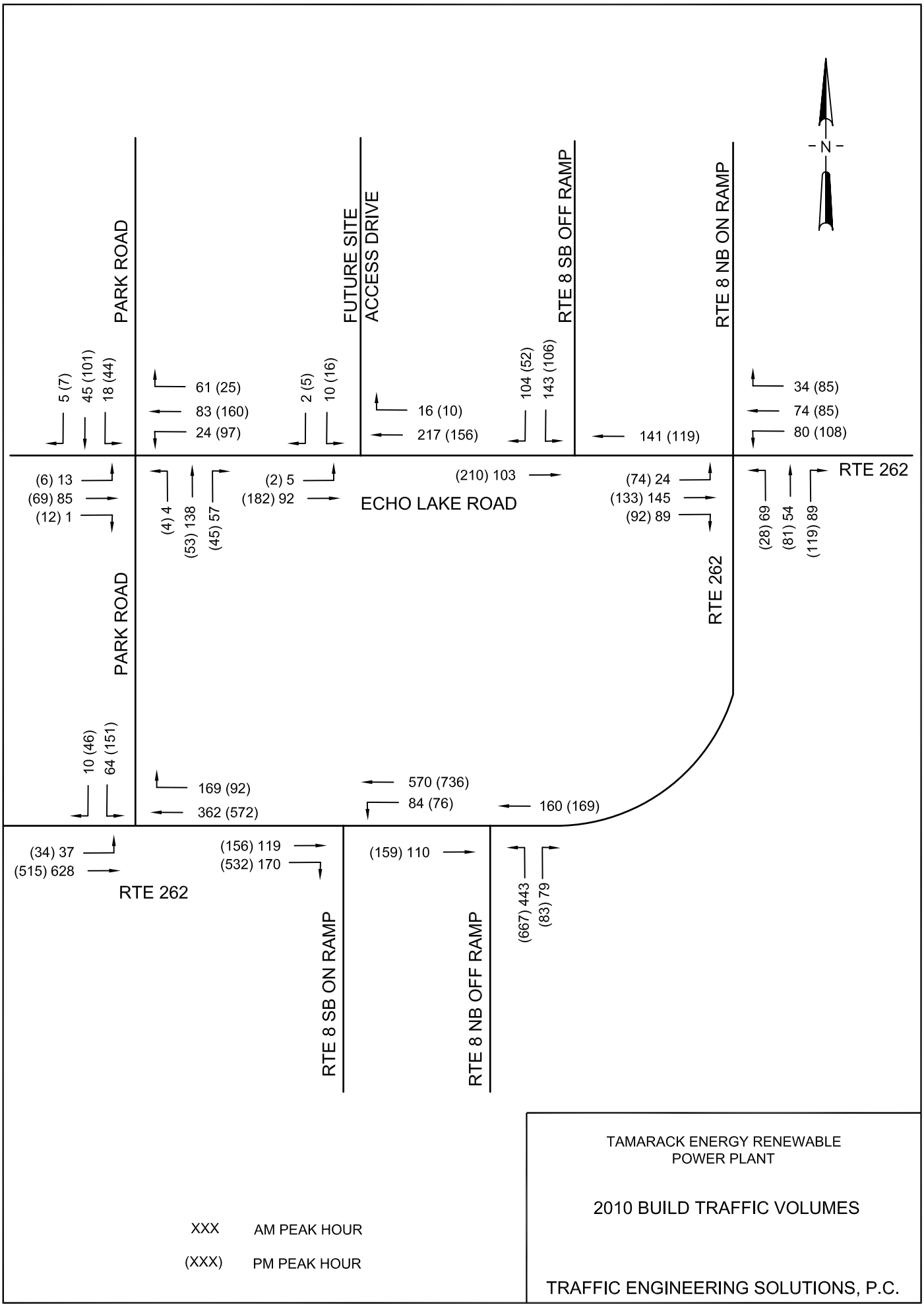

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SIGNALIZED INTERSECTION

CAPACITY ANALYSES

2007 EXISTING CONDITIONS

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	BAH	Intersection	Route 262 at Park Road
Agency or Co.	Traffic Engineering Solutions	Area Type	All other areas
Date Performed	8/15/2007	Jurisdiction	Watertown
Time Period	AM Peak	Analysis Year	2007 Existing Conditions
		Project ID	Tamarack Energy - Renewable Power Plant

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	0	1			2	0				1		1
Lane Group		LT			TR					L		R
Volume, V (vph)	14	592			341	146				52		6
% Heavy Vehicles, %HV	2	2			2	2				2		2
Peak-Hour Factor, PHF	0.95	0.95			0.92	0.92				0.58		0.58
Pretimed (P) or Actuated (A)	A	A			A	A				A		A
Start-up Lost Time, l_1		2.0			2.0					2.0		2.0
Extension of Effective Green, e		2.0			2.0					2.0		2.0
Arrival Type, AT		3			3					3		3
Unit Extension, UE		3.0			3.0					3.0		3.0
Filtering/Metering, I		1.000			1.000					1.000		1.000
Initial Unmet Demand, Q_b		0.0			0.0					0.0		0.0
Ped / Bike / RTOR Volumes	0	0		0	0	0				0	0	0
Lane Width		16.0			12.0					11.0		15.0
Parking / Grade / Parking	N	0	N	N	0	N				N	-2	N
Parking Maneuvers, N_m												
Buses Stopping, N_B		0			0					0		0
Min. Time for Pedestrians, G_p	3.2			3.2						3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 45.0	G =	G =	G =	G = 22.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 4	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 76.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v		638			530					90		10
Lane Group Capacity, c		1232			2005					500		509
v/c Ratio, X		0.52			0.26					0.18		0.02
Total Green Ratio, g/C		0.59			0.59					0.29		0.29
Uniform Delay, d_1		9.1			7.5					20.2		19.3
Progression Factor, PF		1.000			1.000					1.000		1.000
Delay Calibration, k		0.12			0.11					0.11		0.11
Incremental Delay, d_2		0.4			0.1					0.2		0.0
Initial Queue Delay, d_3		0.0			0.0					0.0		0.0
Control Delay		9.5			7.6					20.4		19.3
Lane Group LOS		A			A					C		B
Approach Delay	9.5			7.6						20.3		
Approach LOS	A			A						C		
Intersection Delay	9.5			X_c = 0.41			Intersection LOS			A		

HCS+™ Version 5.21

Generated: 8/20/2007 10:34 AM

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	BAH	Intersection	Route 262 at Park Road
Agency or Co.	Traffic Engineering Solutions	Area Type	All other areas
Date Performed	8/15/2007	Jurisdiction	Watertown
Time Period	PM Peak	Analysis Year	2007 Existing Conditions
		Project ID	Tamarack Energy - Renewable Power Plant

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	0	1			2	0				1		1
Lane Group		LT			TR					L		R
Volume, V (vph)	26	485			539	83				103		24
% Heavy Vehicles, %HV	2	2			2	2				2		2
Peak-Hour Factor, PHF	0.84	0.84			0.92	0.92				0.81		0.81
Pretimed (P) or Actuated (A)	A	A			A	A				A		A
Start-up Lost Time, l_1		2.0			2.0					2.0		2.0
Extension of Effective Green, e		2.0			2.0					2.0		2.0
Arrival Type, AT		3			3					3		3
Unit Extension, UE		3.0			3.0					3.0		3.0
Filtering/Metering, I		1.000			1.000					1.000		1.000
Initial Unmet Demand, Q_b		0.0			0.0					0.0		0.0
Ped / Bike / RTOR Volumes	0	0		0	0	0				0	0	0
Lane Width		16.0			12.0					11.0		15.0
Parking / Grade / Parking	N	0	N	N	0	N				N	-2	N
Parking Maneuvers, N_m												
Buses Stopping, N_B		0			0					0		0
Min. Time for Pedestrians, G_p	3.2			3.2						3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 45.0	G =	G =	G =	G = 22.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 4	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 76.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v		608			676					127		30
Lane Group Capacity, c		1187			2058					500		509
v/c Ratio, X		0.51			0.33					0.25		0.06
Total Green Ratio, g/C		0.59			0.59					0.29		0.29
Uniform Delay, d_1		9.1			7.8					20.7		19.5
Progression Factor, PF		1.000			1.000					1.000		1.000
Delay Calibration, k		0.12			0.11					0.11		0.11
Incremental Delay, d_2		0.4			0.1					0.3		0.0
Initial Queue Delay, d_3		0.0			0.0					0.0		0.0
Control Delay		9.5			7.9					21.0		19.6
Lane Group LOS		A			A					C		B
Approach Delay	9.5			7.9						20.7		
Approach LOS	A			A						C		
Intersection Delay	10.0			X_c = 0.43			Intersection LOS			A		

HCS+™ Version 5.21 Generated: 8/20/2007 10:34 AM

SIGNALIZED INTERSECTION

CAPACITY ANALYSES

2010 NO-BUILD CONDITIONS

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	BAH	Intersection	Route 262 at Park Road
Agency or Co.	Traffic Engineering Solutions	Area Type	All other areas
Date Performed	8/29/2007	Jurisdiction	Watertown
Time Period	AM Peak	Analysis Year	2010 No-Build Conditions
		Project ID	Tamarack Energy - Renewable Power Plant

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	0	1			2	0				1		1
Lane Group		LT			TR					L		R
Volume, V (vph)	37	628			362	169				64		10
% Heavy Vehicles, %HV	2	2			2	2				2		2
Peak-Hour Factor, PHF	0.95	0.95			0.92	0.92				0.58		0.58
Pretimed (P) or Actuated (A)	A	A			A	A				A		A
Start-up Lost Time, l_1		2.0			2.0					2.0		2.0
Extension of Effective Green, e		2.0			2.0					2.0		2.0
Arrival Type, AT		3			3					3		3
Unit Extension, UE		3.0			3.0					3.0		3.0
Filtering/Metering, I		1.000			1.000					1.000		1.000
Initial Unmet Demand, Q_b		0.0			0.0					0.0		0.0
Ped / Bike / RTOR Volumes	0	0		0	0	0				0	0	0
Lane Width		16.0			12.0					11.0		15.0
Parking / Grade / Parking	N	0	N	N	0	N				N	-2	N
Parking Maneuvers, N_m												
Buses Stopping, N_B		0			0					0		0
Min. Time for Pedestrians, G_p	3.2			3.2						3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 45.0	G =	G =	G =	G = 22.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 4	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 76.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v		700			577					110		17
Lane Group Capacity, c		1185			2000					500		509
v/c Ratio, X		0.59			0.29					0.22		0.03
Total Green Ratio, g/C		0.59			0.59					0.29		0.29
Uniform Delay, d_1		9.7			7.6					20.5		19.4
Progression Factor, PF		1.000			1.000					1.000		1.000
Delay Calibration, k		0.18			0.11					0.11		0.11
Incremental Delay, d_2		0.8			0.1					0.2		0.0
Initial Queue Delay, d_3		0.0			0.0					0.0		0.0
Control Delay		10.5			7.7					20.7		19.4
Lane Group LOS		B			A					C		B
Approach Delay	10.5			7.7						20.5		
Approach LOS	B			A						C		
Intersection Delay	10.3			X_c = 0.47			Intersection LOS			B		

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	BAH	Intersection	Route 262 at Park Road
Agency or Co.	Traffic Engineering Solutions	Area Type	All other areas
Date Performed	8/29/2007	Jurisdiction	Watertown
Time Period	PM Peak	Analysis Year	2010 No-Build Conditions
		Project ID	Tamarack Energy - Renewable Power Plant

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	0	1			2	0				1		1
Lane Group		LT			TR					L		R
Volume, V (vph)	34	515			572	92				151		46
% Heavy Vehicles, %HV	2	2			2	2				2		2
Peak-Hour Factor, PHF	0.84	0.84			0.92	0.92				0.81		0.81
Pretimed (P) or Actuated (A)	A	A			A	A				A		A
Start-up Lost Time, l_1		2.0			2.0					2.0		2.0
Extension of Effective Green, e		2.0			2.0					2.0		2.0
Arrival Type, AT		3			3					3		3
Unit Extension, UE		3.0			3.0					3.0		3.0
Filtering/Metering, I		1.000			1.000					1.000		1.000
Initial Unmet Demand, Q_b		0.0			0.0					0.0		0.0
Ped / Bike / RTOR Volumes	0	0		0	0	0				0	0	0
Lane Width		16.0			12.0					11.0		15.0
Parking / Grade / Parking	N	0	N	N	0	N				N	-2	N
Parking Maneuvers, N_m												
Buses Stopping, N_B		0			0					0		0
Min. Time for Pedestrians, G_p	3.2			3.2						3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 45.0	G =	G =	G =	G = 22.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 4	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 76.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v		653			722					186		57
Lane Group Capacity, c		1162			2056					500		509
v/c Ratio, X		0.56			0.35					0.37		0.11
Total Green Ratio, g/C		0.59			0.59					0.29		0.29
Uniform Delay, d_1		9.5			8.0					21.5		19.8
Progression Factor, PF		1.000			1.000					1.000		1.000
Delay Calibration, k		0.16			0.11					0.11		0.11
Incremental Delay, d_2		0.6			0.1					0.5		0.1
Initial Queue Delay, d_3		0.0			0.0					0.0		0.0
Control Delay		10.1			8.1					22.0		19.9
Lane Group LOS		B			A					C		B
Approach Delay	10.1			8.1						21.5		
Approach LOS	B			A						C		
Intersection Delay	10.9			X_c = 0.50			Intersection LOS			B		

SIGNALIZED INTERSECTION

CAPACITY ANALYSES

2010 BUILD CONDITIONS

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	BAH	Intersection	Route 262 at Park Road
Agency or Co.	Traffic Engineering Solutions	Area Type	All other areas
Date Performed	8/29/2007	Jurisdiction	Watertown
Time Period	AM Peak	Analysis Year	2010 Build Conditions
		Project ID	Tamarack Energy - Renewable Power Plant

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	0	1			2	0				1		1
Lane Group		LT			TR					L		R
Volume, V (vph)	37	628			362	169				64		10
% Heavy Vehicles, %HV	2	2			2	2				2		2
Peak-Hour Factor, PHF	0.95	0.95			0.92	0.92				0.58		0.58
Pretimed (P) or Actuated (A)	A	A			A	A				A		A
Start-up Lost Time, l_1		2.0			2.0					2.0		2.0
Extension of Effective Green, e		2.0			2.0					2.0		2.0
Arrival Type, AT		3			3					3		3
Unit Extension, UE		3.0			3.0					3.0		3.0
Filtering/Metering, I		1.000			1.000					1.000		1.000
Initial Unmet Demand, Q_b		0.0			0.0					0.0		0.0
Ped / Bike / RTOR Volumes	0	0		0	0	0				0	0	0
Lane Width		16.0			12.0					11.0		15.0
Parking / Grade / Parking	N	0	N	N	0	N				N	-2	N
Parking Maneuvers, N_m												
Buses Stopping, N_B		0			0					0		0
Min. Time for Pedestrians, G_p	3.2			3.2						3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 45.0	G =	G =	G =	G = 22.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 4	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 76.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v		700			577					110		17
Lane Group Capacity, c		1185			2000					500		509
v/c Ratio, X		0.59			0.29					0.22		0.03
Total Green Ratio, g/C		0.59			0.59					0.29		0.29
Uniform Delay, d_1		9.7			7.6					20.5		19.4
Progression Factor, PF		1.000			1.000					1.000		1.000
Delay Calibration, k		0.18			0.11					0.11		0.11
Incremental Delay, d_2		0.8			0.1					0.2		0.0
Initial Queue Delay, d_3		0.0			0.0					0.0		0.0
Control Delay		10.5			7.7					20.7		19.4
Lane Group LOS		B			A					C		B
Approach Delay	10.5			7.7						20.5		
Approach LOS	B			A						C		
Intersection Delay	10.3			X_c = 0.47			Intersection LOS			B		

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	BAH	Intersection	Route 262 at Park Road
Agency or Co.	Traffic Engineering Solutions	Area Type	All other areas
Date Performed	8/29/2007	Jurisdiction	Watertown
Time Period	PM Peak	Analysis Year	2010 Build Conditions
		Project ID	Tamarack Energy - Renewable Power Plant

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	0	1			2	0				1		1
Lane Group		LT			TR					L		R
Volume, V (vph)	34	515			572	92				151		46
% Heavy Vehicles, %HV	2	2			2	2				2		2
Peak-Hour Factor, PHF	0.84	0.84			0.92	0.92				0.81		0.81
Pretimed (P) or Actuated (A)	A	A			A	A				A		A
Start-up Lost Time, l_1		2.0			2.0					2.0		2.0
Extension of Effective Green, e		2.0			2.0					2.0		2.0
Arrival Type, AT		3			3					3		3
Unit Extension, UE		3.0			3.0					3.0		3.0
Filtering/Metering, I		1.000			1.000					1.000		1.000
Initial Unmet Demand, Q_b		0.0			0.0					0.0		0.0
Ped / Bike / RTOR Volumes	0	0		0	0	0				0	0	0
Lane Width		16.0			12.0					11.0		15.0
Parking / Grade / Parking	N	0	N	N	0	N				N	-2	N
Parking Maneuvers, N_m												
Buses Stopping, N_B		0			0					0		0
Min. Time for Pedestrians, G_p	3.2			3.2						3.2		

Phasing	EW Perm	02	03	04	SB Only	06	07	08
Timing	G = 45.0	G =	G =	G =	G = 22.0	G =	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 4	Y =	Y =	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 76.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v		653			722					186		57
Lane Group Capacity, c		1162			2056					500		509
v/c Ratio, X		0.56			0.35					0.37		0.11
Total Green Ratio, g/C		0.59			0.59					0.29		0.29
Uniform Delay, d_1		9.5			8.0					21.5		19.8
Progression Factor, PF		1.000			1.000					1.000		1.000
Delay Calibration, k		0.16			0.11					0.11		0.11
Incremental Delay, d_2		0.6			0.1					0.5		0.1
Initial Queue Delay, d_3		0.0			0.0					0.0		0.0
Control Delay		10.1			8.1					22.0		19.9
Lane Group LOS		B			A					C		B
Approach Delay	10.1			8.1						21.5		
Approach LOS	B			A						C		
Intersection Delay	10.9			X_c = 0.50			Intersection LOS			B		

UNSIGNALIZED INTERSECTION

CAPACITY ANALYSES

2007 EXISTING CONDITIONS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 On Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/9/2007	Analysis Year	2007 Existing Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road (Route 262) | North/South Street: Route 8 S-Bd On Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		112	661	70	524	
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.82	0.82	1.00
Hourly Flow Rate, HFR (veh/h)	0	123	726	85	639	0
Percent Heavy Vehicles	0	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration			TR	LT	T	
Upstream Signal		0			0	

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

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT						
v (veh/h)		85						
C (m) (veh/h)		766						
v/c		0.11						
95% queue length		0.37						
Control Delay (s/veh)		10.3						
LOS		B						
Approach Delay (s/veh)	--	--						
Approach LOS	--	--						

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 On Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/9/2007	Analysis Year	2007 Existing Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road (Route 262) | North/South Street: Route 8 S-Bd On Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		147	462	48	690	
Peak-Hour Factor, PHF	1.00	0.87	0.87	0.95	0.95	1.00
Hourly Flow Rate, HFR (veh/h)	0	168	531	50	726	0
Percent Heavy Vehicles	0	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration			TR	LT	T	
Upstream Signal		0			0	

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

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT						
v (veh/h)		50						
C (m) (veh/h)		874						
v/c		0.06						
95% queue length		0.18						
Control Delay (s/veh)		9.4						
LOS		A						
Approach Delay (s/veh)	--	--						
Approach LOS	--	--						

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/9/2007	Analysis Year	2007 Existing Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road | North/South Street: Route 8 N-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		104			141	
Peak-Hour Factor, PHF	1.00	0.87	1.00	1.00	0.82	1.00
Hourly Flow Rate, HFR (veh/h)	0	119	0	0	171	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	404		23			
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	448	0	25	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			L		R			
v (veh/h)			448		25			
C (m) (veh/h)			757		901			
v/c			0.59		0.03			
95% queue length			3.95		0.09			
Control Delay (s/veh)			16.4		9.1			
LOS			C		A			
Approach Delay (s/veh)	--	--	16.0					
Approach LOS	--	--	C					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/9/2007	Analysis Year	2007 Existing Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road | North/South Street: Route 8 N-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		150			136	
Peak-Hour Factor, PHF	1.00	0.85	1.00	1.00	0.86	1.00
Hourly Flow Rate, HFR (veh/h)	0	176	0	0	158	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	625		61			
Peak-Hour Factor, PHF	0.91	1.00	0.91	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	686	0	67	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			L		R			
v (veh/h)			686		67			
C (m) (veh/h)			712		837			
v/c			0.96		0.08			
95% queue length			14.50		0.26			
Control Delay (s/veh)			49.4		9.7			
LOS			E		A			
Approach Delay (s/veh)	--	--	45.8					
Approach LOS	--	--	E					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BAH*	Intersection	*Echo Lake at Frost Bridge Rd.*
Agency/Co.	*Traffic Engineering Solutions*	Jurisdiction	*Watertown*
Date Performed	*8/9/2007*	Analysis Year	*2007 Existing Conditions*
Analysis Time Period	*AM Peak*		

Project Description *Tamarack Energy - Renewable Power Plant*

East/West Street: *Echo Lake Road* | North/South Street: *Frost Bridge Rd/Rte 8 On Ramp*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*16*	*135*	*74*	*75*	*63*	*32*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.82*	*0.82*	*0.82*
Hourly Flow Rate, HFR (veh/h)	*17*	*148*	*81*	*91*	*76*	*39*
Percent Heavy Vehicles	*5*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*13*	*51*	*84*			
Peak-Hour Factor, PHF	*0.73*	*0.73*	*0.73*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*17*	*69*	*115*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*2*	*2*	*0*	*0*	*0*
Percent Grade (%)		*2*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*				
v (veh/h)	*17*	*91*		*201*				
C (m) (veh/h)	*1455*	*1339*		*603*				
v/c	*0.01*	*0.07*		*0.33*				
95% queue length	*0.04*	*0.22*		*1.46*				
Control Delay (s/veh)	*7.5*	*7.9*		*13.9*				
LOS	*A*	*A*		*B*				
Approach Delay (s/veh)	--	--	*13.9*					
Approach LOS	--	--	*B*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Frost Bridge Rd.
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/9/2007	Analysis Year	2007 Existing Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road	North/South Street: Frost Bridge Rd/Rte 8 On Ramp
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	45	119	63	102	78	80
Peak-Hour Factor, PHF	0.77	0.77	0.77	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	58	154	81	117	89	91
Percent Heavy Vehicles	5	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9	76	112			
Peak-Hour Factor, PHF	0.90	0.90	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	10	84	124	0	0	0
Percent Heavy Vehicles	5	2	2	0	0	0
Percent Grade (%)		2			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR				
v (veh/h)	58	117		218				
C (m) (veh/h)	1378	1332		482				
v/c	0.04	0.09		0.45				
95% queue length	0.13	0.29		2.31				
Control Delay (s/veh)	7.7	8.0		18.5				
LOS	A	A		C				
Approach Delay (s/veh)	--	--	18.5					
Approach LOS	--	--	C					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Route 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/9/2007	Analysis Year	2007 Existing Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road | North/South Street: Route 8 S-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		79			74	
Peak-Hour Factor, PHF	1.00	0.77	1.00	1.00	0.89	1.00
Hourly Flow Rate, HFR (veh/h)	0	102	0	0	83	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				135		73
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.79	1.00	0.79
Hourly Flow Rate, HFR (veh/h)	0	0	0	170	0	92
Percent Heavy Vehicles	0	0	0	2	0	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration							LR	
v (veh/h)							262	
C (m) (veh/h)							853	
v/c							0.31	
95% queue length							1.31	
Control Delay (s/veh)							11.1	
LOS							B	
Approach Delay (s/veh)	--	--					11.1	
Approach LOS	--	--					B	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Route 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/9/2007	Analysis Year	2007 Existing Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road | North/South Street: Route 8 S-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		143			93	
Peak-Hour Factor, PHF	1.00	0.75	1.00	1.00	0.78	1.00
Hourly Flow Rate, HFR (veh/h)	0	190	0	0	119	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				100		40
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.88	1.00	0.88
Hourly Flow Rate, HFR (veh/h)	0	0	0	113	0	45
Percent Heavy Vehicles	0	0	0	2	0	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration							LR	
v (veh/h)							158	
C (m) (veh/h)							727	
v/c							0.22	
95% queue length							0.82	
Control Delay (s/veh)							11.3	
LOS							B	
Approach Delay (s/veh)	--	--					11.3	
Approach LOS	--	--					B	

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BAH
Agency/Co.	Traffic Engineering Solutions
Date Performed	8/9/2007
Analysis Time Period	AM Peak

Site Information

Intersection	Echo Lake Road at Park Road
Jurisdiction	Watertown
Analysis Year	2007 Existing Conditions

Project ID *Tamarack Energy - Renewable Power Plant*

East/West Street: *Echo Lake Road*

North/South Street: *Park Road*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	12	48	1	10	71	56
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	4	130	20	10	42	5
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.59		0.71	
Flow Rate (veh/h)	87		169		259		80	
% Heavy Vehicles	5		5		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	0.2		0.1		0.0		0.2	
Prop. Right-Turns	0.0		0.4		0.1		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		-0.1		0.0		0.1	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.08		0.15		0.23		0.07	
hd, final value (s)	5.09		4.72		4.67		4.96	
x, final value	0.12		0.22		0.34		0.11	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.1		2.7		2.7		3.0	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	337		419		509		330	
Delay (s/veh)	8.81		9.06		10.02		8.57	
LOS	A		A		B		A	
Approach: Delay (s/veh)	8.81		9.06		10.02		8.57	
LOS	A		A		B		A	
Intersection Delay (s/veh)	9.38							
Intersection LOS	A							

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BAH
Agency/Co.	Traffic Engineering Solutions
Date Performed	8/9/2007
Analysis Time Period	PM Peak

Site Information

Intersection	Echo Lake Road at Park Road
Jurisdiction	Watertown
Analysis Year	2007 Existing Conditions

Project ID *Tamarack Energy - Renewable Power Plant*

East/West Street: *Echo Lake Road* | North/South Street: *Park Road*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	61	11	32	120	17
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	4	50	33	40	95	7
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.59		0.71	
Flow Rate (veh/h)	111		209		145		198	
% Heavy Vehicles	5		5		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	0.1		0.2		0.0		0.3	
Prop. Right-Turns	0.1		0.1		0.4		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.1		-0.1		0.1	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.10		0.19		0.13		0.18	
hd, final value (s)	5.12		5.02		4.90		5.07	
x, final value	0.16		0.29		0.20		0.28	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.1		3.0		2.9		3.1	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	361		459		395		448	
Delay (s/veh)	9.08		10.07		9.11		10.01	
LOS	A		B		A		B	
Approach: Delay (s/veh)	9.08		10.07		9.11		10.01	
LOS	A		B		A		B	
Intersection Delay (s/veh)	9.68							
Intersection LOS	A							

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UNSIGNALIZED INTERSECTION

CAPACITY ANALYSES

2010 NO-BUILD CONDITIONS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 On Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 No-Build Conditions
Analysis Time Period	AM Peak		

Project Description	Tamarack Energy - Renewable Power Plant
East/West Street:	Frost Bridge Road (Route 262)
Intersection Orientation:	East-West
North/South Street:	Route 8 S-Bd On Ramp
Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		119	710	77	570	
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.82	0.82	1.00
Hourly Flow Rate, HFR (veh/h)	0	130	780	93	695	0
Percent Heavy Vehicles	0	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration			TR	LT	T	
Upstream Signal		0			0	

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

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT						
v (veh/h)		93						
C (m) (veh/h)		726						
v/c		0.13						
95% queue length		0.44						
Control Delay (s/veh)		10.7						
LOS		B						
Approach Delay (s/veh)	--	--						
Approach LOS	--	--						

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 On Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 No-Build Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road (Route 262) | North/South Street: Route 8 S-Bd On Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		156	532	65	736	
Peak-Hour Factor, PHF	1.00	0.87	0.87	0.95	0.95	1.00
Hourly Flow Rate, HFR (veh/h)	0	179	611	68	774	0
Percent Heavy Vehicles	0	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration			TR	LT	T	
Upstream Signal		0			0	

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

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT						
v (veh/h)		68						
C (m) (veh/h)		807						
v/c		0.08						
95% queue length		0.28						
Control Delay (s/veh)		9.9						
LOS		A						
Approach Delay (s/veh)	--	--						
Approach LOS	--	--						

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 No-Build Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road | North/South Street: Route 8 N-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		110			153	
Peak-Hour Factor, PHF	1.00	0.87	1.00	1.00	0.82	1.00
Hourly Flow Rate, HFR (veh/h)	0	126	0	0	186	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	443		66			
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	492	0	73	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			L		R			
v (veh/h)			492		73			
C (m) (veh/h)			741		891			
v/c			0.66		0.08			
95% queue length			5.09		0.27			
Control Delay (s/veh)			18.9		9.4			
LOS			C		A			
Approach Delay (s/veh)	--	--	17.7					
Approach LOS	--	--	C					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 No-Build Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road | North/South Street: Route 8 N-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		159			158	
Peak-Hour Factor, PHF	1.00	0.85	1.00	1.00	0.86	1.00
Hourly Flow Rate, HFR (veh/h)	0	187	0	0	183	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	667		77			
Peak-Hour Factor, PHF	0.91	1.00	0.91	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	732	0	84	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			L		R			
v (veh/h)			732		84			
C (m) (veh/h)			689		823			
v/c			1.06		0.10			
95% queue length			19.47		0.34			
Control Delay (s/veh)			76.2		9.9			
LOS			F		A			
Approach Delay (s/veh)	--	--	69.4					
Approach LOS	--	--	F					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Frost Bridge Rd.
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 No-Build Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road | North/South Street: Frost Bridge Rd/Rte 8 On Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	21	145	82	80	74	34
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	23	159	90	97	90	41
Percent Heavy Vehicles	5	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	58	54	89			
Peak-Hour Factor, PHF	0.73	0.73	0.73	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	79	73	121	0	0	0
Percent Heavy Vehicles	5	2	2	0	0	0
Percent Grade (%)		2			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR				
v (veh/h)	23	97		273				
C (m) (veh/h)	1436	1317		534				
v/c	0.02	0.07		0.51				
95% queue length	0.05	0.24		2.88				
Control Delay (s/veh)	7.5	8.0		18.6				
LOS	A	A		C				
Approach Delay (s/veh)	--	--	18.6					
Approach LOS	--	--	C					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Frost Bridge Rd.
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 No-Build Conditions
Analysis Time Period	PM Peak		

Project Description	Tamarack Energy - Renewable Power Plant
East/West Street:	Echo Lake Road
North/South Street:	Frost Bridge Rd/Rte 8 On Ramp
Intersection Orientation:	East-West
Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	69	133	81	108	85	85
Peak-Hour Factor, PHF	0.77	0.77	0.77	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	89	172	105	124	97	97
Percent Heavy Vehicles	5	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	22	81	119			
Peak-Hour Factor, PHF	0.90	0.90	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	24	90	132	0	0	0
Percent Heavy Vehicles	5	2	2	0	0	0
Percent Grade (%)		2			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR				
v (veh/h)	89	124		246				
C (m) (veh/h)	1361	1286		404				
v/c	0.07	0.10		0.61				
95% queue length	0.21	0.32		3.90				
Control Delay (s/veh)	7.8	8.1		26.8				
LOS	A	A		D				
Approach Delay (s/veh)	--	--	26.8					
Approach LOS	--	--	D					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Route 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 No-Build Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road | North/South Street: Route 8 S-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		93			130	
Peak-Hour Factor, PHF	1.00	0.77	1.00	1.00	0.89	1.00
Hourly Flow Rate, HFR (veh/h)	0	120	0	0	146	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				143		99
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.79	1.00	0.79
Hourly Flow Rate, HFR (veh/h)	0	0	0	181	0	125
Percent Heavy Vehicles	0	0	0	2	0	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration							LR	
v (veh/h)							306	
C (m) (veh/h)							789	
v/c							0.39	
95% queue length							1.84	
Control Delay (s/veh)							12.4	
LOS							B	
Approach Delay (s/veh)	--	--					12.4	
Approach LOS	--	--					B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Route 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 No-Build Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road | North/South Street: Route 8 S-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		194			113	
Peak-Hour Factor, PHF	1.00	0.75	1.00	1.00	0.78	1.00
Hourly Flow Rate, HFR (veh/h)	0	258	0	0	144	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				106		48
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.88	1.00	0.88
Hourly Flow Rate, HFR (veh/h)	0	0	0	120	0	54
Percent Heavy Vehicles	0	0	0	2	0	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration							LR	
v (veh/h)							174	
C (m) (veh/h)							659	
v/c							0.26	
95% queue length							1.06	
Control Delay (s/veh)							12.4	
LOS							B	
Approach Delay (s/veh)	--	--					12.4	
Approach LOS	--	--					B	

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BAH
Agency/Co.	Traffic Engineering Solutions
Date Performed	8/29/2007
Analysis Time Period	AM Peak

Site Information

Intersection	Echo Lake Road at Park Road
Jurisdiction	Watertown
Analysis Year	2010 No-Build Conditions

Project ID: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road

North/South Street: Park Road

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	13	80	1	24	81	61
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	4	138	57	18	45	5
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.59		0.71	
Flow Rate (veh/h)	134		206		335		95	
% Heavy Vehicles	5		5		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.1		0.0		0.3	
Prop. Right-Turns	0.0		0.4		0.3		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		-0.1		-0.1		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.12		0.18		0.30		0.08	
hd, final value (s)	5.47		5.14		4.90		5.42	
x, final value	0.20		0.29		0.46		0.14	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.5		3.1		2.9		3.4	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	384		456		585		345	
Delay (s/veh)	9.86		10.27		11.93		9.33	
LOS	A		B		B		A	
Approach: Delay (s/veh)	9.86		10.27		11.93		9.33	
LOS	A		B		B		A	
Intersection Delay (s/veh)	10.81							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BAH
Agency/Co.	Traffic Engineering Solutions
Date Performed	8/29/2007
Analysis Time Period	PM Peak

Site Information

Intersection	Echo Lake Road at Park Road
Jurisdiction	Watertown
Analysis Year	2010 No-Build Conditions

Project ID Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road

North/South Street: Park Road

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	67	12	97	155	25
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	4	53	45	44	101	7
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.59		0.71	
Flow Rate (veh/h)	122		345		171		212	
% Heavy Vehicles	5		5		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.4		0.0		0.3	
Prop. Right-Turns	0.1		0.1		0.4		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.1		-0.2		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.11		0.31		0.15		0.19	
hd, final value (s)	5.60		5.31		5.42		5.63	
x, final value	0.19		0.51		0.26		0.33	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.6		3.3		3.4		3.6	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	372		595		421		462	
Delay (s/veh)	9.90		13.68		10.29		11.39	
LOS	A		B		B		B	
Approach: Delay (s/veh)	9.90		13.68		10.29		11.39	
LOS	A		B		B		B	
Intersection Delay (s/veh)	11.88							
Intersection LOS	B							

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UNSIGNALIZED INTERSECTION

CAPACITY ANALYSES

2010 BUILD CONDITIONS

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 On Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 Build Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road (Route 262) | North/South Street: Route 8 S-Bd On Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		119	710	84	570	
Peak-Hour Factor, PHF	1.00	0.91	0.91	0.82	0.82	1.00
Hourly Flow Rate, HFR (veh/h)	0	130	780	102	695	0
Percent Heavy Vehicles	0	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration			TR	LT	T	
Upstream Signal		0			0	

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

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT						
v (veh/h)		102						
C (m) (veh/h)		726						
v/c		0.14						
95% queue length		0.49						
Control Delay (s/veh)		10.8						
LOS		B						
Approach Delay (s/veh)	--	--						
Approach LOS	--	--						

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 On Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 Build Conditions
Analysis Time Period	PM Peak		

Project Description	Tamarack Energy - Renewable Power Plant
East/West Street:	Frost Bridge Road (Route 262)
Intersection Orientation:	East-West
North/South Street:	Route 8 S-Bd On Ramp
Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		156	532	76	736	
Peak-Hour Factor, PHF	1.00	0.87	0.87	0.95	0.95	1.00
Hourly Flow Rate, HFR (veh/h)	0	179	611	80	774	0
Percent Heavy Vehicles	0	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration			TR	LT	T	
Upstream Signal		0			0	

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

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT						
v (veh/h)		80						
C (m) (veh/h)		807						
v/c		0.10						
95% queue length		0.33						
Control Delay (s/veh)		10.0						
LOS		A						
Approach Delay (s/veh)	--	--						
Approach LOS	--	--						

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 Build Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road | North/South Street: Route 8 N-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		110			160	
Peak-Hour Factor, PHF	1.00	0.87	1.00	1.00	0.82	1.00
Hourly Flow Rate, HFR (veh/h)	0	126	0	0	195	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	443		79			
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	492	0	87	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			L		R			
v (veh/h)			492		87			
C (m) (veh/h)			737		891			
v/c			0.67		0.10			
95% queue length			5.16		0.32			
Control Delay (s/veh)			19.1		9.5			
LOS			C		A			
Approach Delay (s/veh)	--	--	17.7					
Approach LOS	--	--	C					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Frost Bridge at Rte 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 Build Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Frost Bridge Road | North/South Street:

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		159			159	
Peak-Hour Factor, PHF	1.00	0.85	1.00	1.00	0.86	1.00
Hourly Flow Rate, HFR (veh/h)	0	187	0	0	184	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	667		83			
Peak-Hour Factor, PHF	0.91	1.00	0.91	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	732	0	91	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			L		R			
v (veh/h)			732		91			
C (m) (veh/h)			688		823			
v/c			1.06		0.11			
95% queue length			19.54		0.37			
Control Delay (s/veh)			76.7		9.9			
LOS			F		A			
Approach Delay (s/veh)	--	--	69.3					
Approach LOS	--	--	F					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*BAH*	Intersection	*Echo Lake at Frost Bridge Rd.*
Agency/Co.	*Traffic Engineering Solutions*	Jurisdiction	*Watertown*
Date Performed	*8/29/2007*	Analysis Year	*2010 Build Conditions*
Analysis Time Period	*AM Peak*		

Project Description *Tamarack Energy - Renewable Power Plant*

East/West Street: *Echo Lake Road* | North/South Street: *Frost Bridge Rd/Rte 8 On Ramp*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*24*	*145*	*89*	*80*	*74*	*34*
Peak-Hour Factor, PHF	*0.91*	*0.91*	*0.91*	*0.82*	*0.82*	*0.82*
Hourly Flow Rate, HFR (veh/h)	*26*	*159*	*97*	*97*	*90*	*41*
Percent Heavy Vehicles	*5*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*69*	*54*	*89*			
Peak-Hour Factor, PHF	*0.73*	*0.73*	*0.73*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*94*	*73*	*121*	*0*	*0*	*0*
Percent Heavy Vehicles	*5*	*2*	*2*	*0*	*0*	*0*
Percent Grade (%)		*2*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*LTR*				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*				
v (veh/h)	*26*	*97*		*288*				
C (m) (veh/h)	*1436*	*1309*		*522*				
v/c	*0.02*	*0.07*		*0.55*				
95% queue length	*0.06*	*0.24*		*3.32*				
Control Delay (s/veh)	*7.6*	*8.0*		*20.1*				
LOS	*A*	*A*		*C*				
Approach Delay (s/veh)	--	--	*20.1*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Frost Bridge Rd.
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 Build Conditions
Analysis Time Period	PM Peak		

Project Description	Tamarack Energy - Renewable Power Plant
East/West Street:	Echo Lake Road
North/South Street:	Frost Bridge Rd/Rte 8 On Ramp
Intersection Orientation:	East-West
Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	74	133	92	108	85	85
Peak-Hour Factor, PHF	0.77	0.77	0.77	0.87	0.87	0.87
Hourly Flow Rate, HFR (veh/h)	96	172	119	124	97	97
Percent Heavy Vehicles	5	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	28	81	119			
Peak-Hour Factor, PHF	0.90	0.90	0.90	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	31	90	132	0	0	0
Percent Heavy Vehicles	5	2	2	0	0	0
Percent Grade (%)		2			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	0	0
Configuration		LTR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR				
v (veh/h)	96	124		253				
C (m) (veh/h)	1361	1271		388				
v/c	0.07	0.10		0.65				
95% queue length	0.23	0.32		4.45				
Control Delay (s/veh)	7.8	8.1		30.1				
LOS	A	A		D				
Approach Delay (s/veh)	--	--	30.1					
Approach LOS	--	--	D					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Route 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 Build Conditions
Analysis Time Period	AM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road | North/South Street: Route 8 S-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		103			141	
Peak-Hour Factor, PHF	1.00	0.77	1.00	1.00	0.89	1.00
Hourly Flow Rate, HFR (veh/h)	0	133	0	0	158	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				143		104
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.79	1.00	0.79
Hourly Flow Rate, HFR (veh/h)	0	0	0	181	0	131
Percent Heavy Vehicles	0	0	0	2	0	5
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration							LR	
v (veh/h)							312	
C (m) (veh/h)							771	
v/c							0.40	
95% queue length							1.97	
Control Delay (s/veh)							12.8	
LOS							B	
Approach Delay (s/veh)	--	--				12.8		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BAH	Intersection	Echo Lake at Route 8 Off Ramp
Agency/Co.	Traffic Engineering Solutions	Jurisdiction	Watertown
Date Performed	8/29/2007	Analysis Year	2010 Build Conditions
Analysis Time Period	PM Peak		

Project Description: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road | North/South Street: Route 8 S-Bd Off Ramp

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		210			119	
Peak-Hour Factor, PHF	1.00	0.75	1.00	1.00	0.78	1.00
Hourly Flow Rate, HFR (veh/h)	0	280	0	0	152	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	2	0
Configuration		T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				106		52
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.88	1.00	0.88
Hourly Flow Rate, HFR (veh/h)	0	0	0	120	0	59
Percent Heavy Vehicles	0	0	0	2	0	5
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration							LR	
v (veh/h)							179	
C (m) (veh/h)							642	
v/c							0.28	
95% queue length							1.14	
Control Delay (s/veh)							12.8	
LOS							B	
Approach Delay (s/veh)	--	--					12.8	
Approach LOS	--	--					B	

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BAH
Agency/Co.	Traffic Engineering Solutions
Date Performed	8/29/2007
Analysis Time Period	AM Peak

Site Information

Intersection	Echo Lake Road at Park Road
Jurisdiction	Watertown
Analysis Year	2010 Build Conditions

Project ID: Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road

North/South Street: Park Road

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	13	85	1	24	83	61
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	4	138	57	18	45	5
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.59		0.71	
Flow Rate (veh/h)	142		208		335		95	
% Heavy Vehicles	5		5		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.1		0.0		0.3	
Prop. Right-Turns	0.0		0.4		0.3		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		-0.1		-0.1		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.13		0.18		0.30		0.08	
hd, final value (s)	5.48		5.17		4.93		5.46	
x, final value	0.22		0.30		0.46		0.14	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.5		3.2		2.9		3.5	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	392		458		585		345	
Delay (s/veh)	9.98		10.35		12.04		9.38	
LOS	A		B		B		A	
Approach: Delay (s/veh)	9.98		10.35		12.04		9.38	
LOS	A		B		B		A	
Intersection Delay (s/veh)	10.89							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BAH
Agency/Co.	Traffic Engineering Solutions
Date Performed	8/29/2007
Analysis Time Period	PM Peak

Site Information

Intersection	Echo Lake Road at Park Road
Jurisdiction	Watertown
Analysis Year	2010 Build Conditions

Project ID Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road

North/South Street: Park Road

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	69	12	97	160	25
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	4	53	45	44	101	7
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.69		0.80		0.59		0.71	
Flow Rate (veh/h)	125		351		171		212	
% Heavy Vehicles	5		5		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.3		0.0		0.3	
Prop. Right-Turns	0.1		0.1		0.4		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.1		-0.2		0.1	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.11		0.31		0.15		0.19	
hd, final value (s)	5.62		5.32		5.45		5.66	
x, final value	0.20		0.52		0.26		0.33	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.6		3.3		3.5		3.7	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	375		601		421		462	
Delay (s/veh)	9.97		13.91		10.35		11.46	
LOS	A		B		B		B	
Approach: Delay (s/veh)	9.97		13.91		10.35		11.46	
LOS	A		B		B		B	
Intersection Delay (s/veh)	12.02							
Intersection LOS	B							

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BAH
Agency/Co.	Traffic Engineering Solutions
Date Performed	8/29/2007
Analysis Time Period	AM Peak

Site Information

Intersection	Echo Lake Rd at Site Access
Jurisdiction	Watertown
Analysis Year	2010 Build Conditions

Project ID *Tamarack Energy - Renewable Power Plant*

East/West Street: *Echo Lake Road Ext.*

North/South Street: *Site Access Road*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	5	92	0	0	217	16
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	0	0	10	0	2
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		TR				LR	
PHF	0.70		0.70				0.70	
Flow Rate (veh/h)	138		332				16	
% Heavy Vehicles	5		5				50	
No. Lanes	1		1		0		1	
Geometry Group	1		1				1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.0				0.9	
Prop. Right-Turns	0.0		0.1				0.1	
Prop. Heavy Vehicle	0.0		0.0				0.5	
hLT-adj	0.2	0.2	0.2	0.2			0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6			-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7			1.7	1.7
hadj, computed	0.1		0.0				1.0	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20				3.20	
x, initial	0.12		0.30				0.01	
hd, final value (s)	4.37		4.14				5.87	
x, final value	0.17		0.38				0.03	
Move-up time, m (s)	2.0		2.0				2.0	
Service Time, t_s (s)	2.4		2.1				3.9	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	388		582				266	
Delay (s/veh)	8.24		9.66				9.03	
LOS	A		A				A	
Approach: Delay (s/veh)	8.24		9.66				9.03	
LOS	A		A				A	
Intersection Delay (s/veh)	9.24							
Intersection LOS	A							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	BAH
Agency/Co.	Traffic Engineering Solutions
Date Performed	8/29/2007
Analysis Time Period	PM Peak

Site Information

Intersection	Echo Lake Rd at Site Access
Jurisdiction	Watertown
Analysis Year	2010 Build Conditions

Project ID Tamarack Energy - Renewable Power Plant

East/West Street: Echo Lake Road Ext.

North/South Street: Site Access Road

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	2	182	0	0	156	10
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	0	0	16	0	5
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		TR				LR	
PHF	0.70		0.70				0.70	
Flow Rate (veh/h)	262		236				29	
% Heavy Vehicles	5		5				20	
No. Lanes	1		1		0		1	
Geometry Group	1		1				1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.0				0.8	
Prop. Right-Turns	0.0		0.1				0.2	
Prop. Heavy Vehicle	0.0		0.0				0.2	
hLT-adj	0.2	0.2	0.2	0.2			0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6			-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7			1.7	1.7
hadj, computed	0.1		0.0				0.3	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20				3.20	
x, initial	0.23		0.21				0.03	
hd, final value (s)	4.31		4.30				5.34	
x, final value	0.31		0.28				0.04	
Move-up time, m (s)	2.0		2.0				2.0	
Service Time, t_s (s)	2.3		2.3				3.3	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	512		486				279	
Delay (s/veh)	9.26		8.98				8.58	
LOS	A		A				A	
Approach: Delay (s/veh)	9.26		8.98				8.58	
LOS	A		A				A	
Intersection Delay (s/veh)	9.10							
Intersection LOS	A							

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