CES INC

TRAFFIC IMPACT STUDY ADDENDUM 1

Based on comments that we received via a phone conversation with Diane Morabito at Maine Traffic Resources, we would like to correct and add information to the Traffic Impact Study submitted on May 2 for the proposed Fiberight MSW processing facility off the Coldbrook Road in Hampden, Maine. The following information is corrected or added based on that conversation.

DELIVERY TRUCK HAUL ROUTES

Six distinct origins have been developed for MSW originating from the MRC communities. These routes, MSW generation, delivery methods, and daily trucks are provided on the MSW Generator sheets in the Appendix. The summary below shows the routes through the Town of Hampden and the adjusted peak daily deliveries that will use these routes.

US 1A/Western Ave./US Route 202/Coldbrook Road	8 trucks/day
US Route 202/Route 69/I-95 NB/Coldbrook Road	6 trucks/day
US Route 2/Coldbrook Road *	3 trucks/day
I-95 NB/Coldbrook Road	13 trucks/day
I-95 SB/Coldbrook Road	39 trucks/day
I-395 WB/US Route 202/Coldbrook Road	21 trucks/day

*As noted on the I-95 NB MSW Generator Sheet we have assigned the Town of Hermon's and the Town of Carmel's MSW deliveries to US Route 2 and the Coldbrook Road.

The total daily truck deliveries listed above sum to 90 deliveries/day. This is due to rounding error.

The intersection of US Route 1A and Coldbrook Road is not expected to see delivery traffic but it should be noted the City of Bangor collects and delivers MSW in packer trucks and depending on the neighborhood may send an occasional packer to this intersection. This is not expected as easy access to I-395 westbound is located very close to the Bangor/Hampden line. In addition, all of Bangor's MSW deliveries have been assigned to I-95 SB which is not likely to be the case. The estimated left turns at the Coldbrook Road I-95 off-ramp will be lower than predicted in this study but analysis will be conducted for the full number of left-turns during the peak hour.

The intersection of Route 1A and Coldbrook Road poses a concern based on limited sight distance. We do not believe that any trucks from across the Penobscot River delivering MSW to the facility will use this intersection due to the presence of the Route 202 connector off from I-395. Google Maps shows the preferred route being either I-395 to Route 202 to Coldbrook Road or I-395 to I-95 to Exit 180 and the Coldbrook Road. We believe that Route 202 will be used because the mileage is the same as the I-95 preferred route, the 202 exit is located before I-95, trucks will not have to use the I-95 cloverleaf onramp, and all turns to the facility will be right turns as opposed to left turns. Route 1A is not a preferred route because it exits onto a busy road, trucks will not want to deal with the traffic issues of Route 1A, and it is a longer route mileage wise. Again we do not project any truck traffic to voluntarily use 1A as a route to this facility with the other options available.

The enclosed drawing titled DAILY TRUCKS shows the daily expected turning movements along the proposed haul routes through the Town of Hampden.

PEAK HOUR TRAFFIC

The traffic volumes section of this the Traffic Impact Study explained the various shifts during operation of the Proposed MSW processing facility and the numbers of employees each shift contained. Employees will create two distinct peak hour traffic movements at the proposed facility. The AM Peak hour traffic movement will occur between 6:30 AM to 7:30 AM and will consist of 38 employees entering the facility and 4 employees leaving the facility. The second peak hour traffic movement will occur between 2:30 PM and 3:30 PM and will consist of 16 employees entering the facility and 34 employees leaving the facility.

Employee traffic was distributed to the roadway system using a basic distribution model based on the populations of the neighboring towns. This population model and the included towns are included in the Appendices. The peak hour employee traffic distributions are shown on the included sheets titled AM PEAK EMPLOYEES and PM PEAK EMPLOYEES.

An error was discovered in the PM PEAK EMPLOYEES drawing and a revised drawing has been included in this Addendum.

CAPACITY ANALYSIS

Capacity analyses were conducted for intersections where the peak lane movements were greater than 25 PCE for left turns or a combination of left turns and through movements. This criterion was met at the proposed access road to the facility and at the northbound and southbound ramps at the intersection with I-95. Future and full build analyses were conducted at the proposed access road. Existing conditions, future no build conditions, and full build conditions were analyzed for the SB ramps. All analyses were conducted using Trafficware's Synchro 6 traffic capacity software.

Capacity analyses for existing conditions were completed using traffic volumes factored to the 30th highest hour. Analyses for future no-build conditions were completed using the 30th highest traffic volumes increased by 2% per year for the 2 years until the beginning of operations in 2018. Full build conditions were analyzed by adding the expected facility traffic to the future traffic volumes. The Group Mean Factor used to compute the 30th highest hour was found to be in error due to using the wrong column in the MaineDOT Traffic Volume Counts 2014 Annual Report. Corrected Traffic volumes for the northbound and southbound ramps have been included as well as the original count sheets.

Level of service rankings are assigned to each intersection movement based on the control delay per vehicle. The letter rankings are similar to academic rankings where an 'A' is very good with little delay and an 'F' represents poor conditions with excessive delay. If an unsignalized intersection falls below a 'D' then traffic signal warrants should be evaluated to determine whether a traffic signal is needed.

Control delay is computed using the peak 15 minute period of the peak hour. This ensures that the absolute worst conditions are modeled for an intersection. When the peak hour is looked at as a whole the average control delay decreases to a delay much closer to the threshold levels of LOS "F".

The relationship between delay and the level of service is given in the table below for unsignalized intersections.

Level of Service Criteria (Unsignalized Intersections)

Level of Service	Control Delay/Vehicle (sec)
A	Less than 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	Over 50.0

The intersection created by the new access road was analyzed for future no-build and full build conditions. Existing conditions were not analyzed because there are no apparent issues with the HO Bouchard entrance which both the table below clearly shows. The capacity analysis for the new intersection is summarized in the table below:

Movement	AM Future No Build	AM Future Full Build	PM Future No Build	PM Future Full Build
NB Coldbrook	A (0.3)	A (0.0.3)	A (0.1)	A (0.1)
SB Coldbrook	A (0.0)	A (1.6)	A (0.0)	A (1.0)
HO Bouchard	B (11.8)	B (14.6)	B (13.5)	C (16.2)
Access Road	NA	B(13.1)	NA	C (16.3)

As the summary above shows there are no capacity concerns during the AM or PM peak hour at the proposed access road.

As part of the capacity analysis for the proposed access road, left-turn warrants were investigated for Coldbrook Road. These diagrams provided in the original Traffic Study show that a left-turn lane is not warranted for Coldbrook Road. In addition right-turn warrants were also investigated and show that a right-turn lane at the entrance is not warranted. These right-turn warrant diagrams are included in this Addendum.

The intersection of Coldbrook Road and the I-95 northbound and southbound ramps are the only other intersection which approaches the 25 PCE thresholds and was analyzed for the facilities peak hour of traffic movement. This intersection was analyzed for existing, future no-build, and full build-out conditions. The results are summarized below for the AM and PM peak hours.

The SB off-ramp was analyzed using a 300 foot dedicated right-turn lane. The ramp has sufficient width so that it operates as if the lane were there. We believe that the right-turn lane striping that is out there now as part of the MaineDOT Webster Bridge detour should be made permanent to provide off-ramp users with positive guidance that right-turners can pass any queued left-turn traffic. We have had conversations with Bruce Mattson, the Region Traffic Engineer with MaineDOT and he agrees with our assessment of the intersection and the future right-turn lane striping.

Intersection of Coldbrook and I-95 SB Ramps
AM Peak Hour

Movement	Existing	Future No Build	Full Build
NB Coldbrook	A (2.0)	A (2.1)	A (2.2)
SB Coldbrook	A (0.0)	A (0.0)	A (0.1)
I95 Off-ramp LT	D (29.8)	E (35.7)	E (47.7)

(Control Delay in seconds)

Intersection of Coldbrook and I-95 SB Ramps
PM Peak Hour

Movement	Existing	Future No Build	Full Build
NB Coldbrook	A (1.4)	A (1.4)	A (1.5)
SB Coldbrook	A (0.0)	A (0.0)	A (0.0)
I95 Off-ramp LT	E (45.8)	F (58.6)	F (73.5)

(Control Delay in seconds)

It needs to be noted that analyses of these types are heavily influenced by the peak 15 minute traffic volumes. In the situation of the PM peak hour the counted 15 minute volumes for the left out of the I-95 SB ramp were 51, 53, 38, and 83 vehicles. A large peak during any given 15 minute period (such as the 83 counted) will amplify the traffic volumes used during analysis and create a higher control delay. If the intersection movements have traffic volume spikes during different 15 minute periods during the count these movements also get amplified during the analysis. For example, if the identical traffic volumes are used for the full buildout PM peak and are relatively spread out over the hour long period of consideration, then the PM peak control delay for the left turn off from the I-95 SB ramp is computed to be 26.4 seconds for a LOS of D. This indicates that the intersection can and does move the traffic volumes through the intersection during any given hour.

The table below shows the 15 minute time periods for the PM 2:30-3:30 time period at the SB ramps. We have analyzed each 15-minute period as if all of the facility traffic occurred within that 15 minute period. This will not be the case but it will be a conservative view of what happens during each 15 minute time period.

Intersection of Coldbrook and I-95 SB Ramps
PM Peak Hour (15 minute intervals)
SB Ramp Left-Turn

Time	Full Build
2:30-2:45	C (19.0)
2:45-3:00	C (16.7)
3:00-3:15	C (15.1)
3:15-3:30	F (71.7)

(Control Delay in seconds)

The second reason to look closely at what is happening to this intersection is that capacity issues as seen in this analysis usually manifest themselves as safety issues and higher crash rates due to the overcapacity issues. The crash summary indicates that there are not a large number of crashes at this intersection and it is not considered a High Crash Location by the MaineDOT. Inquiries to Bruce Mattson the Region Traffic Engineer with MaineDOT also indicates that there are very few complaints about this intersection which would not be the case if the congestion issues lasted for long periods of time every weekday.

We believe that the high control delay numbers are a product of 15 minute peaks that do not coincide with the peak volumes expected at the facility. The one day count showed a peak movement (83 left-turns) during the 3:15 to 3:30 period which significantly skewed the total 1-hour count of left-movements out of the SB off-ramp used in the analysis.

The intersection of the NB Ramps were analyzed to determine if the newly added thru traffic from the SB off-ramp would affect the capacity of the NB ramps. The results of the analysis are summarized in the tables below.

Intersection of Coldbrook and I-95 NB Ramps
AM Peak Hour

Movement	Existing	Future No Build	Full Build
NB Coldbrook	A (0.0)	A (0.0)	A (0.0)
SB Coldbrook	A (5.9)	A (6.0)	A (5.9)
I95 NB Off-ramp	C (17.5)	C (18.2)	C (19.0)

(Control Delay in seconds)

Intersection of Coldbrook and I-95 NB Ramps
PM Peak Hour

Movement	Existing	Future No Build	Full Build
NB Coldbrook	A (0.0)	A (0.0)	A (0.0)
SB Coldbrook	A (4.1)	A (4.1)	A (4.1)
I95 NB Off-ramp	C (16.7)	C (17.5)	C (18.3)

(Control Delay in seconds)

The tables above show that the northbound I-95 ramps show very little change in control delay due to the increased traffic volumes from the facility. We believe that the northbound ramps provide more than adequate capacity to handle the traffic generated by the proposed facility.

SUMMARY

Based on the above information, the project has been designed to provide adequate provisions for safe and uncongested traffic movement into, out of, and within the proposed facility for the estimated peak day traffic volume of 348 vehicle trips/day.

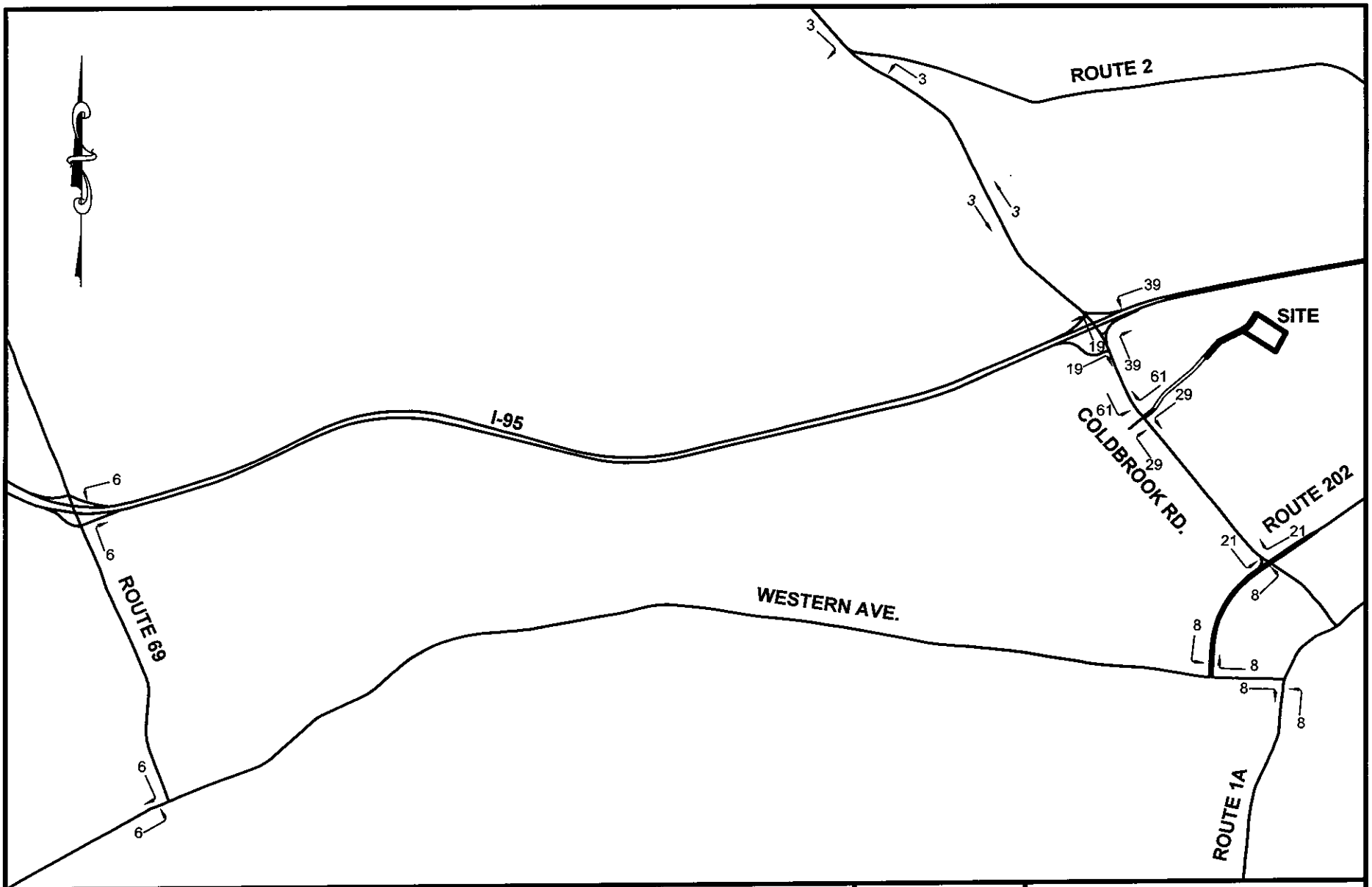
The estimated peak daily traffic volume will be spread out throughout the entire day and will not create a congestion issue during either of the typical AM or PM peak hours on Coldbrook Road or the closest intersections that does not already exist. The left turn out of the I-95 SB off-ramp presently operates at a computed LOS D for existing, and a LOS E for the future no-build, and future full-build AM conditions. The left turn out of the I-95 SB off-ramp presently operates at a computed LOS E for existing, and a LOS F for the future no-build, and future full-build PM conditions. We believe that these Levels of Service are skewed because of a peak 15 minute period and that while there are times where there will be a control delay of 1 minute or slightly more the situation clears itself relatively quickly.

The I-95 NB ramps show ample capacity to handle the increased traffic generated by the proposed facility. No changes will be required to these intersections.

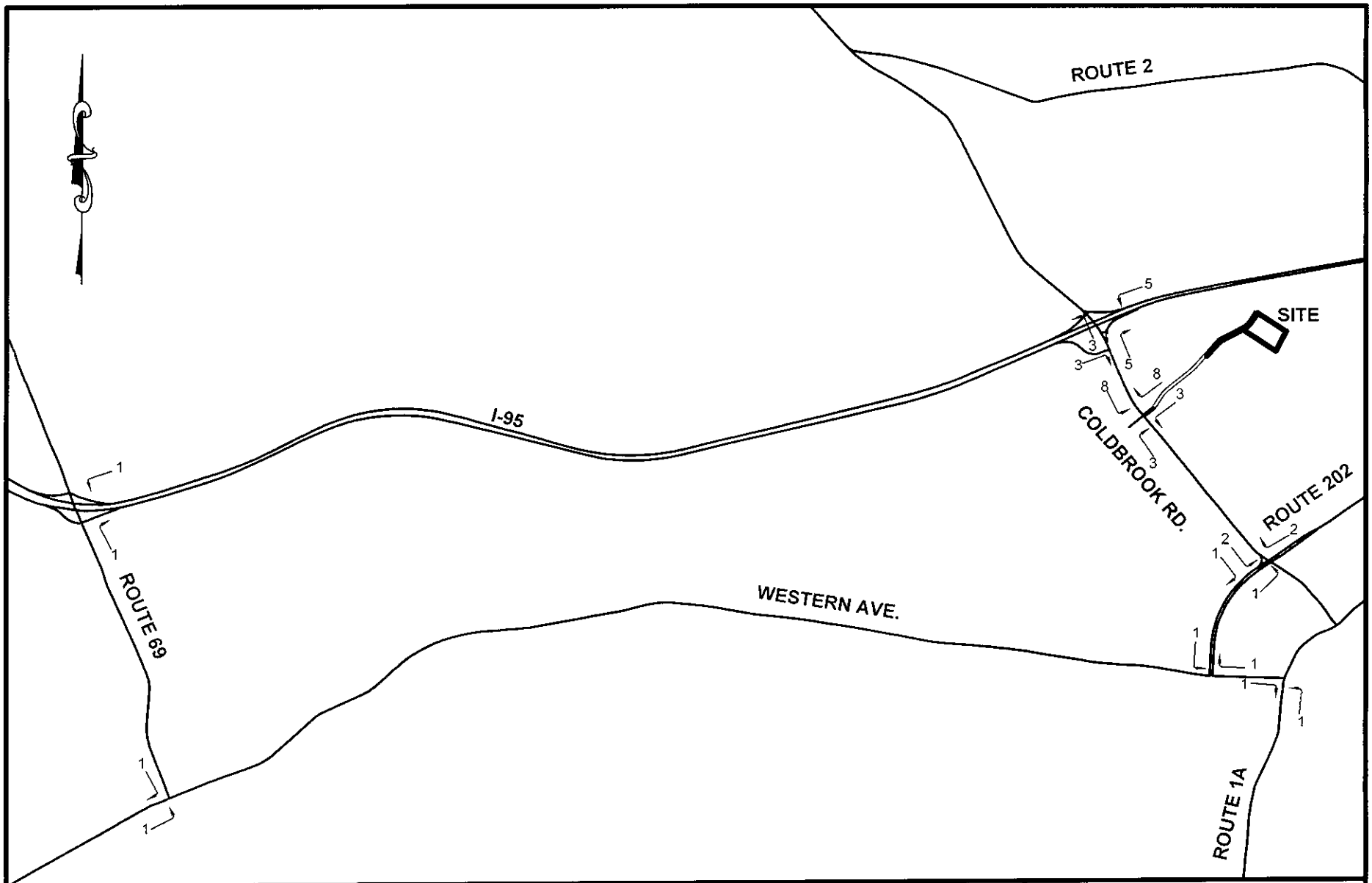
The Coldbrook Road and its intersections with US Route 202 and Interstate I-95 are designed for the largest trucks expected at the proposed facility and the crash data supports that there are no safety issues along this corridor.

There is no indication that any vehicles connected with this facility will use the intersection of US Route 1A and Coldbrook Road. All indications based on Google Earth and GPS data indicate that all of the traffic from the north of the facility will use I-395 to US Route 202 to access the facility.

The entrance onto Coldbrook Road and the interior road network have been designed with adequate sight distance and provide for safe traffic movements. The proposed entrance with Coldbrook Road will provide ample capacity to handle the traffic generated by the proposed facility.



PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK101**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **DAILY TRUCKS**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	



PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK103**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **PM PEAK TRUCKS**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	

Traffic Counts (morning) Date: 4-21-2016

Intersection of Coldbrook Road and HO Bouchard

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	HOB Right	HOB Left
6:00	17/2	0/1	12/3	0/0	0/1	0/0
6:15	15/6	3/0	31/2	2/0	0/3	0/1
6:30	17/4	4/0	35/4	2/0	0/1	0/0
6:45	44/4	5/0	60/5	0/0	1/0	1/0
7:00	48/11	2/0	48/3	5/0	0/0	1/1
7:15	49/7	3/0	50/9	2/0	1/0	0/0

	SB CB Thru	SB CB RT.	NB CB Thru	NB CB Left	HOB RT	HOB Left
7:30	44/10	1/0	68/9	2/0	1/0	0/0
7:45	52/11	1/0	76/9	1/0	0/0	0/0
8:00	46/9	0/0	52/8	0/0	0/0	0/0
8:15	30/9	1/0	40/2	0/0	0/0	1/0
8:30	28/5	0/0	46/7	1/0	0/0	0/0
8:45	34/6	1/0	42/4	1/0	0/0	1/0

NOTES:

Checkmark for a passenger vehicle-group by 5
T for truck
NB Coldbrook is traffic heading towards the interstate

Traffic Counts (afternoon) Date: 4-21-16

Intersection of Coldbrook Road and HO Bouchard

Start time	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	HOB Right	HOB Left
15:00	57/7	3/0	62/8	0/0	2/0	3/0
15:15	51/2	1/0	43/8	0/2	0/0	1/0
15:30	59/10	1/0	52/10	0/0	1/1	2/0
15:45	68/4	0/1	55/12	0/0	0/0	3/0
16:00	66/3	0/0	48/7	1/0	2/0	2/0
16:15	75/3	1/0	44/3	1/0	1/0	3/0

	SB	SB CB RT	NB	NB CB Ft	HoB(R)	HoB(L)	
16:30	72/3	2/1	55/7	0/0	0/0	5/0	
16:45	84/5	0/1	45/5	0/0	1/0	2/0	
17:00	92/4	2/0	90/7	0/0	2/0	16/0	
17:15	92/1	0/0	54/5	0/0	1/0	1/0	
17:30	60/4	0/0	45/1	0/0	0/0	1/0	
17:45	56/1	2/0	49/5	0/0	0/0	0/0	

NOTES:

Checkmark for a passenger vehicle-group by 5
T for truck
NB Coldbrook is traffic heading towards the interstate

Traffic Counts (morning)

Date: 4/27/2016

Intersection of Coldbrook Road and SouthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	Offramp Left	Offramp Right
6:00						
6:15	45/10	7/4	23/9	7	13/1	26/2
6:30	62/12	3/4	27/12	6/1	21/1	19/2
6:45	73/8	7/13	62/5	10/0	25/0	45/7

4/27/16

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	OFFRAMP ~~HOB~~ Right	OFFRAMP ~~HOB~~ Left
7:00	74/15	8/8	49/14	13/1	33/5	31/2
7:15	125/8	4/5	53/11	11/0	32/3	34/2
7:30	127/13	9/14	~~48~~/8	10/1	31/9	31/2
7:45	105/15	9/7	56/12	7/2	36/8	34/1

4/27/16

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	OFFRAMP ~~HOB~~ Right	OFFRAMP ~~HOB~~ Left
8:00	90/29	7/16	32/12	9/1	27/5	15/1
8:15	72/25	11/12	30/17	9/2	35/5	26/1
8:30	68/15	5/9	30/13	10/1	24/11	18/1
8:45	70/14	4/7	30/15	3/0	26/12	18/1

Traffic Counts (Afternoon)

Date: 4/27/2016

Intersection of Coldbrook Road and SouthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	Offramp Left	Offramp Right
14:30	70/9	7/8	28/11	6/0	51/0	38/8
14:45	57/8	8/11	27/9	3/0	51/2	25/11
15:00	63/11	6/14	30/9	5/1	36/2	34/15
15:15	57/6	9/13	41/17	8/1	80/3	34/7

4/27/16

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	OFFRAMP ~~HOB~~ Right	OFFRAMP ~~HOB~~ Left
15:30	84/15	11/7	30/13	4/1	46/7	45/6
15:45	48/7	16/8	24/9	6/2	47/14	67/2
16:00	66/3	16/7	37/14	12/1	48/13	55/0
16:15	63/4	12/12	31/8	10/0	58/15	75/1

Traffic Counts (morning)

Date: 5/5/2016

Intersection of Coldbrook Road and NorthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
6:30	28/4	35/2	22/7	41/2	26/2	10/0
6:45	36/5	43/10	20/2	27/1	27/4	6/0
7:00	46/3	62/8	20/8	38/1	19/5	13/0
7:15	58/7	80/5	36/2	56/1	22/4	11/1

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
7:30	48/2	81/16	43/9	66/0	28/4	14/1
7:45	50/8	80/9	33/7	81/0	30/7	11/1
8:00	30/7	42/11	30/12	43/1	19/6	10/2
8:15	39/10	56/21	23/9	39/1	18/7	6/3

Traffic Counts (Afternoon)

Date: 5/5/2016

Intersection of Coldbrook Road and NorthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
14:30	52/3	42/8	34/7	27/1	11/7	5/2
14:45	67/5	33/2	28/6	42/1	5/6	6/0
15:00	69/6	34/5	25/4	37/1	9/4	5/1
15:15	81/4	37/4	24/3	26/1	6/8	4/1

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	~~HOB~~ NB OFFRAMP Right	~~HOB~~ NB OFFRAMP Left
15:30	94/3	54/6	33/7	31/3	5/0	9/7
15:45	82/5	50/6	28/1	31/1	4/1	9/16
16:00	92/3	38/1	44/3	34/2	14/0	10/8
16:15	65/2	46/2	27/3	29	13/0	11/10

Traffic Counts (AM) Date: 4/21/16

Intersection of Coldbrook Road and HO Bouchard

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	HOB Right	HOB Left
6:00	19	1	15	0	1	0
6:15	21	3	33	2	3	1
6:30	21	4	39	2	1	0
6:45	48	5	65	0	1	1
7:00	59	2	51	5	0	2
7:15	56	3	59	2	1	0
7:30	54	1	97	2	1	0
7:45	63	1	85	1	0	0
8:00	55	0	60	0	0	0
8:15	39	1	42	0	0	1
8:30	33	0	53	1	0	0
8:45	40	1	46	1	0	1

NOTES:

NB Coldbrook is traffic heading towards the interstate

6:30 - 7:30 Peak Flows to the MSW Processing Facility

184	14	214	9	3	3

Traffic Counts (AM) Factored Date: 4/21/16

Intersection of Coldbrook Road and HO Bouchard

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	HOB Right	HOB Left
6:00	20	1	16	0	1	0
6:15	23	3	36	2	3	1
6:30	23	4	42	2	1	0
6:45	52	5	70	0	1	1
7:00	64	2	55	5	0	2
7:15	60	3	64	2	1	0
7:30	58	1	105	2	1	0
7:45	68	1	92	1	0	0
8:00	59	0	65	0	0	0
8:15	42	1	45	0	0	1
8:30	36	0	57	1	0	0
8:45	43	1	50	1	0	1

NOTES:

NB Coldbrook is traffic heading towards the interstate

30th Highest hour factor (Group 1) 0.96/ 0.89= 1.07865

6:30 - 7:30 Peak Flows to the MSW Processing Facility

198	15	231	10	3	3

Traffic Counts (AM) Future Date: 4/21/16

Intersection of Coldbrook Road and HO Bouchard

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	HOB Right	HOB Left
6:00	21	1	17	0	1	0
6:15	24	3	37	2	3	1
6:30	24	4	44	2	1	0
6:45	54	6	73	0	1	1
7:00	66	2	57	6	0	2
7:15	63	3	66	2	1	0
7:30	61	1	109	2	1	0
7:45	71	1	95	1	0	0
8:00	62	0	67	0	0	0
8:15	44	1	47	0	0	1
8:30	37	0	59	1	0	0
8:45	45	1	52	1	0	1

NOTES:

NB Coldbrook is traffic heading towards the interstate

Future Growth (2%/year) Factor 1.0404
Build out 2018

6:30 - 7:30 Peak Flows to the MSW Processing Facility

206	16	240	10	3	3

Traffic Counts (PM) Date: 4/21/16

Intersection of Coldbrook Road and HO Bouchard

Start time	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	HOB Right	HOB Left
15:00	64	3	70	0	2	3
15:15	53	1	51	2	0	1
15:30	69	1	62	0	2	2
15:45	72	1	67	0	0	3
16:00	69	0	55	1	2	2
16:15	78	1	47	1	1	3
16:30	75	3	62	0	0	5
16:45	89	1	50	0	1	2
17:00	96	2	97	0	2	16
17:15	93	0	59	0	1	1
17:30	64	0	46	0	0	1
17:45	57	2	54	0	0	0

NOTES:

NB Coldbrook is traffic heading towards the interstate

3:00-4:00 PM Peak (MSW Processing Facility Peak occurs between 2:30 - 3:30)

258	6	250	2	4	9

Traffic Counts (PM) Factored Date: 4/21/16

Intersection of Coldbrook Road and HO Bouchard

Start time	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	HOB Right	HOB Left
15:00	69	3	76	0	2	3
15:15	57	1	55	2	0	1
15:30	74	1	67	0	2	2
15:45	78	1	72	0	0	3
16:00	74	0	59	1	2	2
16:15	84	1	51	1	1	3
16:30	81	3	67	0	0	5
16:45	96	1	54	0	1	2
17:00	104	2	105	0	2	17
17:15	100	0	64	0	1	1
17:30	69	0	50	0	0	1
17:45	61	2	58	0	0	0

NOTES:

NB Coldbrook is traffic heading towards the interstate

30th Highest hour factor (Group 1) 0.96/ 0.89= 1.07865

3:00-4:00 PM Peak (MSW Processing Facility Peak occurs between 2:30 - 3:30)

278	6	270	2	4	10

Traffic Counts (PM) Future Date: 4/21/16

Intersection of Coldbrook Road and HO Bouchard

Start time	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	HOB Right	HOB Left
15:00	72	3	79	0	2	3
15:15	59	1	57	2	0	1
15:30	77	1	70	0	2	2
15:45	81	1	75	0	0	3
16:00	77	0	62	1	2	2
16:15	88	1	53	1	1	3
16:30	84	3	70	0	0	6
16:45	100	1	56	0	1	2
17:00	108	2	109	0	2	18
17:15	104	0	66	0	1	1
17:30	72	0	52	0	0	1
17:45	64	2	61	0	0	0

NOTES:

NB Coldbrook is traffic heading towards the interstate

Future Growth (2%/year) Factor 1.0404
Build out 2018

3:00-4:00 PM Peak (MSW Processing Facility Peak occurs between 2:30 - 3:30)

290	7	281	2	4	10

Traffic Counts (AM)

Date: 4/27/2016

Intersection of Coldbrook Road and SouthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	Offramp Left	Offramp Right
6:00						
6:15	55	11	32	7	14	28
6:30	74	7	39	7	22	21
6:45	81	20	67	10	25	47
7:00	89	16	63	14	33	38
7:15	133	9	64	11	36	35
7:30	140	23	56	11	33	40
7:45	120	16	68	9	35	44
8:00	119	23	44	10	16	32
8:15	97	23	47	11	27	40
8:30	83	14	43	11	19	35
8:45	84	11	45	3	19	38

NOTES:

NB Coldbrook is traffic heading towards the Dysart's

Peak for Processing Facility occurs between 6:30 to 7:30 AM

377	52	233	42	116	141

Traffic Counts (AM) Factored Date: 4/27/2016

Intersection of Coldbrook Road and SouthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	Offramp Left	Offramp Right
6:00						
6:15	57	11	33	7	14	29
6:30	76	7	40	7	23	22
6:45	84	21	69	10	26	49
7:00	92	17	65	14	34	39
7:15	137	9	66	11	37	36
7:30	145	24	58	11	34	41
7:45	124	17	70	9	36	45
8:00	123	24	45	10	17	33
8:15	100	24	49	11	28	41
8:30	86	14	44	11	20	36
8:45	87	11	47	3	20	39

NOTES:

NB Coldbrook is traffic heading towards the Dysart's

Peak for Processing Facility occurs between 6:30 to 7:30 AM

390	54	241	43	120	146

30th Highest hour factor= 0.92/0.89 1.033707865

Traffic Counts (AM) Future Date: 4/27/2016

Intersection of Coldbrook Road and SouthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	Offramp Left	Offramp Right
6:00						
6:15	59	12	34	8	15	30
6:30	80	8	42	8	24	23
6:45	87	22	72	11	27	51
7:00	96	17	68	15	35	41
7:15	143	10	69	12	39	38
7:30	151	25	60	12	35	43
7:45	129	17	73	10	38	47
8:00	128	25	47	11	17	34
8:15	104	25	51	12	29	43
8:30	89	15	46	12	20	38
8:45	90	12	48	3	20	41

NOTES:

NB Coldbrook is traffic heading towards the Dysart's

Peak for Processing Facility occurs between 6:30 to 7:30 AM

405	56	251	45	125	152

Assume 2% growth rate for 2 years to full build (2018)

Factor = 1.0404

Traffic Counts (PM) Date: 4/27/2016

Intersection of Coldbrook Road and SouthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	Offramp Left	Offramp Right
14:30	79	15	39	6	51	46
14:45	65	19	36	3	53	36
15:00	74	20	39	6	38	49
15:15	63	22	58	9	83	41
15:30	99	18	43	5	45	53
15:45	55	24	33	8	69	61
16:00	69	23	51	13	55	61
16:15	67	24	39	10	76	73

NB Coldbrook is traffic heading towards the Dysart's

Peak hour of Processing facility is 2:30 to 3:30 PM

Peak hour totals

281	76	172	24	225	172

Traffic Counts (PM) Factored Date: 4/27/2016

Intersection of Coldbrook Road and SouthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	Offramp Left	Offramp Right
14:30	82	16	40	6	53	48
14:45	67	20	37	3	55	37
15:00	76	21	40	6	39	51
15:15	65	23	60	9	86	42
15:30	102	19	44	5	47	55
15:45	57	25	34	8	71	63
16:00	71	24	53	13	57	63
16:15	69	25	40	10	79	75

NB Coldbrook is traffic heading towards the Dysart's

Peak hour of Processing facility is 2:30 to 3:30 PM

Peak hour totals

290	79	178	25	233	178

30th Highest hour factor = 0.92/0.89 1.033707865

Traffic Counts (PM) Future Date: 4/27/2016

Intersection of Coldbrook Road and SouthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Right	NB Coldbrook thru	NB CB Left	Offramp Left	Offramp Right
14:30	85	16	42	6	55	49
14:45	70	20	39	3	57	39
15:00	80	22	42	6	41	53
15:15	68	24	62	10	89	44
15:30	106	19	46	5	48	57
15:45	59	26	35	9	74	66
16:00	74	25	55	14	59	66
16:15	72	26	42	11	82	79

NB Coldbrook is traffic heading towards the Dysart's

Peak hour of Processing facility is 2:30 to 3:30 PM

Peak hour totals

302	82	185	26	242	185

Assume 2% growth rate for 2 years to full build (2018)

Factor = 1.0404

3:30-4:30

312	96	179	39	263	267

Traffic Counts (AM) Date: 5/5/2016

Intersection of Coldbrook Road and NorthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
6:30	32	37	29	43	28	10
6:45	41	53	22	28	31	6
7:00	49	70	28	39	24	13
7:15	65	85	38	57	26	12
7:30	50	97	52	66	32	15
7:45	58	89	40	81	37	12
8:00	37	53	42	44	25	12
8:15	49	77	32	40	25	9
	187	245	117	167	109	41

NOTES:
NB Coldbrook is traffic heading towards Dysart's Truck Stop and the traffic signal

Traffic Counts (AM factored) Date: 5/5/2016

Intersection of Coldbrook Road and NorthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
6:30	33	38	30	44	29	10
6:45	42	55	23	29	32	6
7:00	51	72	29	40	25	13
7:15	67	88	39	59	27	12
7:30	52	100	54	68	33	16
7:45	60	92	41	84	38	12
8:00	38	55	43	45	26	12
8:15	51	80	33	41	26	9

Factored to 30th highest hour

Factor= 0.92/0.89= 1.033707865

Facility Peak Hour occurs between 6:30 to 7:30

193	253	121	173	113	42

NOTES:
NB Coldbrook is traffic heading towards Dysart's Truck Stop and the traffic signal

Traffic Counts (AM future) Date: 5/5/2016

Intersection of Coldbrook Road and NorthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
6:30	34	40	31	46	30	11
6:45	44	57	24	30	33	6
7:00	53	75	30	42	26	14
7:15	70	91	41	61	28	13
7:30	54	104	56	71	34	16
7:45	62	96	43	87	40	13
8:00	40	57	45	47	27	13
8:15	53	83	34	43	27	10

Full buildout in 2018 (Assume 2% increase/year)

Growth= 1.02*1.02= 1.0404

Facility Peak Hour occurs between 6:30 to 7:30

201	263	126	180	117	44

NOTES:
NB Coldbrook is traffic heading towards Dysart's Truck Stop and the traffic signal

Traffic Counts (PM) Date: 5/5/2016

Intersection of Coldbrook Road and NorthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
2:30	55	50	41	28	18	7
2:45	72	35	34	43	11	6
3:00	75	39	29	38	13	6
3:15	85	41	27	27	14	5
3:30	97	60	40	34	16	5
3:45	87	56	29	32	23	5
4:00	95	39	47	36	18	14
4:15	67	48	30	29	21	13
	287	165	131	136	56	24

NOTES:
NB Coldbrook is traffic heading towards Dysart's Truck Stop and the traffic signal

Traffic Counts (PM factored) Date: 5/5/2016

Intersection of Coldbrook Road and NorthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
6:30	57	52	42	29	19	7
6:45	74	36	35	44	11	6
7:00	78	40	30	39	13	6
7:15	88	42	28	28	14	5
7:30	100	62	41	35	17	5
7:45	90	58	30	33	24	5
8:00	98	40	49	37	19	14
8:15	69	50	31	30	22	13

Factored to 30th highest hour

Factor= 0.92/0.89= 1.033707865

Facility Peak Hour occurs between 2:30 to 3:30

297	171	135	141	58	25

NOTES:
NB Coldbrook is traffic heading towards Dysart's Truck Stop and the traffic signal

Traffic Counts (PM future) Date: 5/5/2016

Intersection of Coldbrook Road and NorthBound I95 Ramps

Start	SB Coldbrook thru	SB CB Left	NB Coldbrook thru	NB CB Right	NB Offramp Left	NB Offramp Right
6:30	59	54	44	30	19	8
6:45	77	38	37	46	12	6
7:00	81	42	31	41	14	6
7:15	91	44	29	29	15	5
7:30	104	65	43	37	17	5
7:45	94	60	31	34	25	5
8:00	102	42	51	39	19	15
8:15	72	52	32	31	23	14

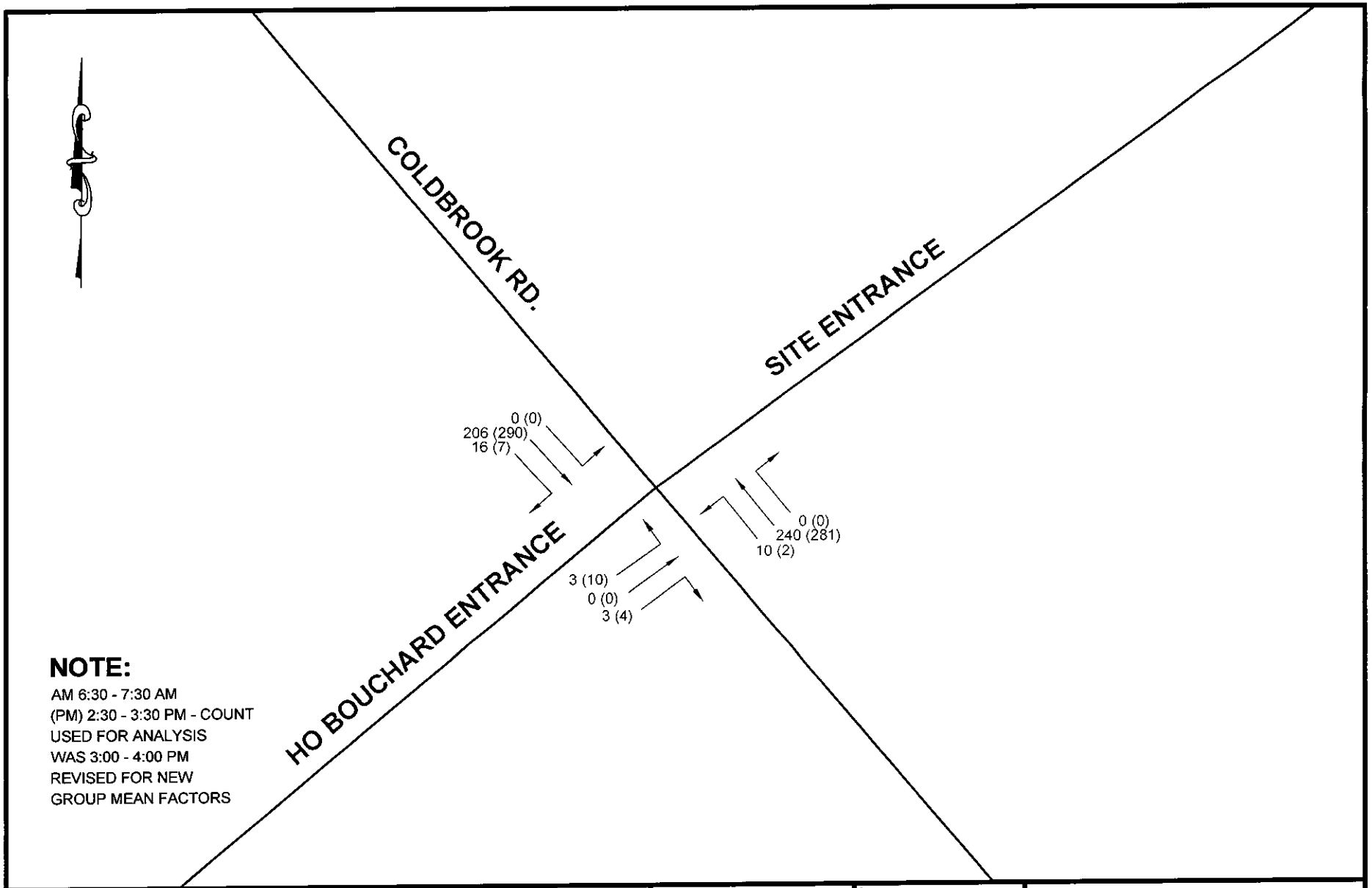
Full buildout in 2018 (Assume 2% increase/year)

Growth= 1.02*1.02= 1.0404

Facility Peak Hour occurs between 2:30 to 3:30

309	177	141	146	60	26

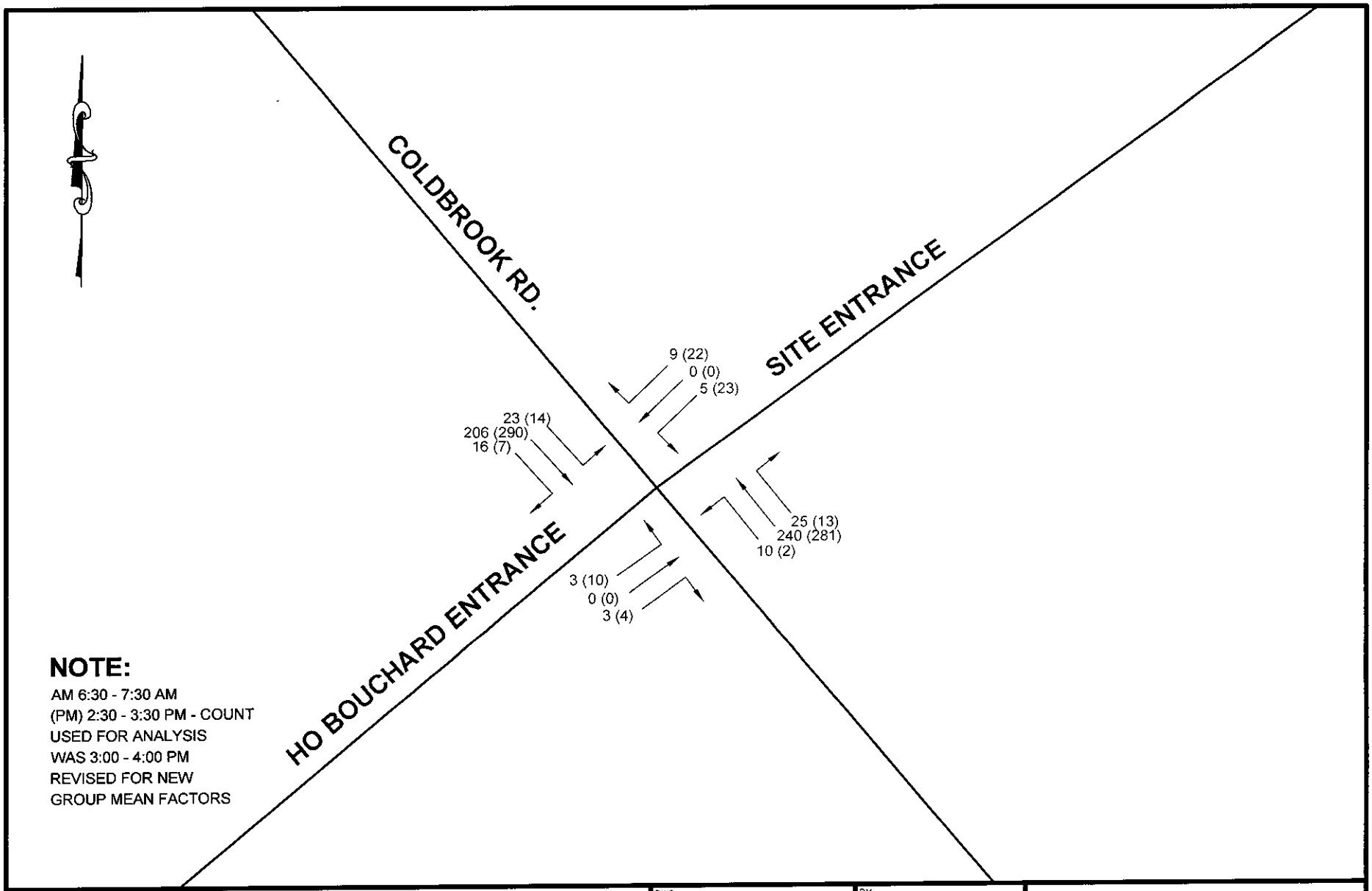
NOTES:
NB Coldbrook is traffic heading towards Dysart's Truck Stop and the traffic signal



NOTE:

AM 6:30 - 7:30 AM
(PM) 2:30 - 3:30 PM - COUNT
USED FOR ANALYSIS
WAS 3:00 - 4:00 PM
REVISED FOR NEW
GROUP MEAN FACTORS

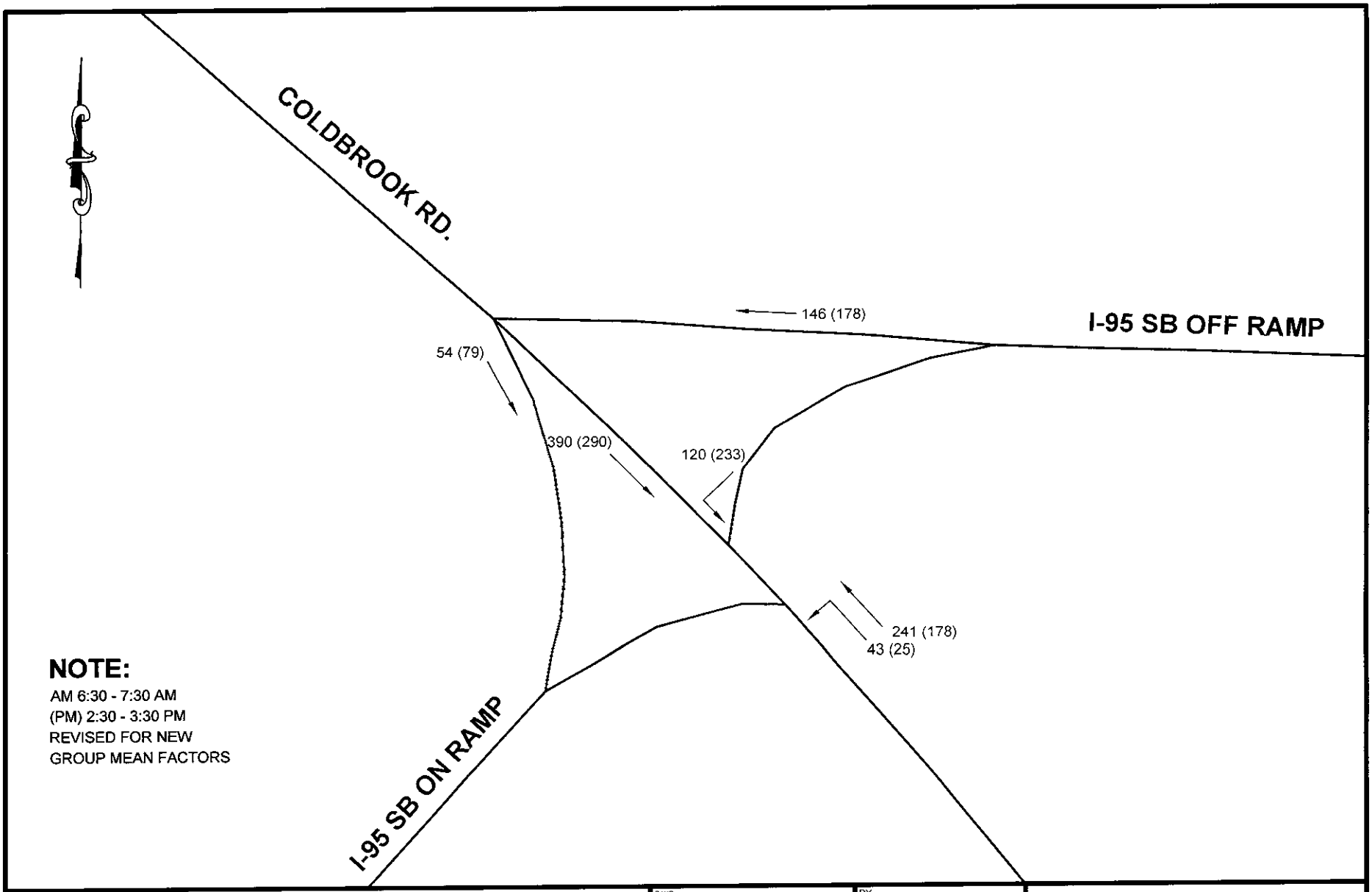
PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK111**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **FUTURE TRAFFIC (2018) NO BUILD**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	



NOTE:

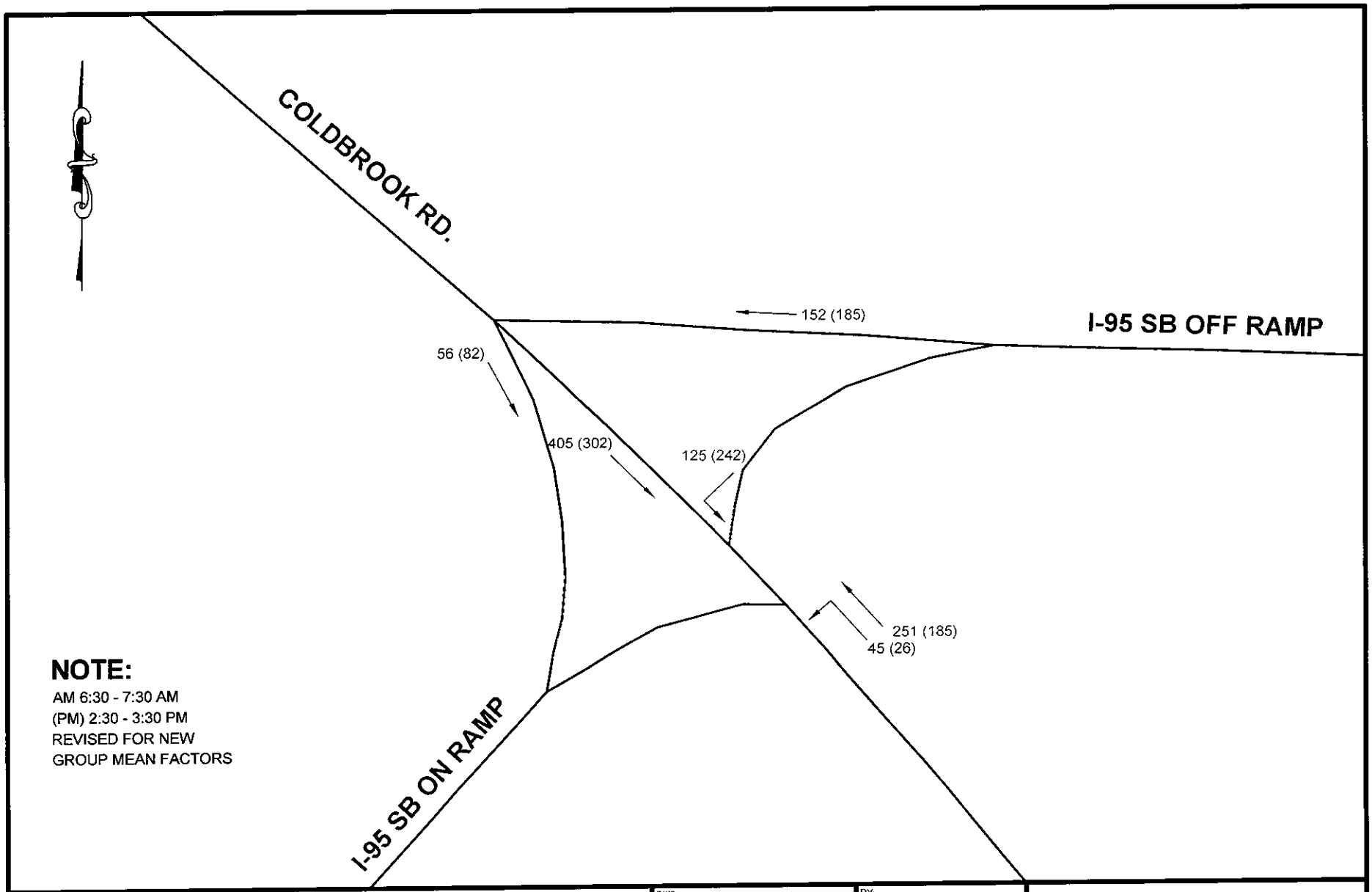
AM 6:30 - 7:30 AM
(PM) 2:30 - 3:30 PM - COUNT
USED FOR ANALYSIS
WAS 3:00 - 4:00 PM
REVISED FOR NEW
GROUP MEAN FACTORS

PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK110**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **FUTURE TRAFFIC (2018) FULL BUILDOUT**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	



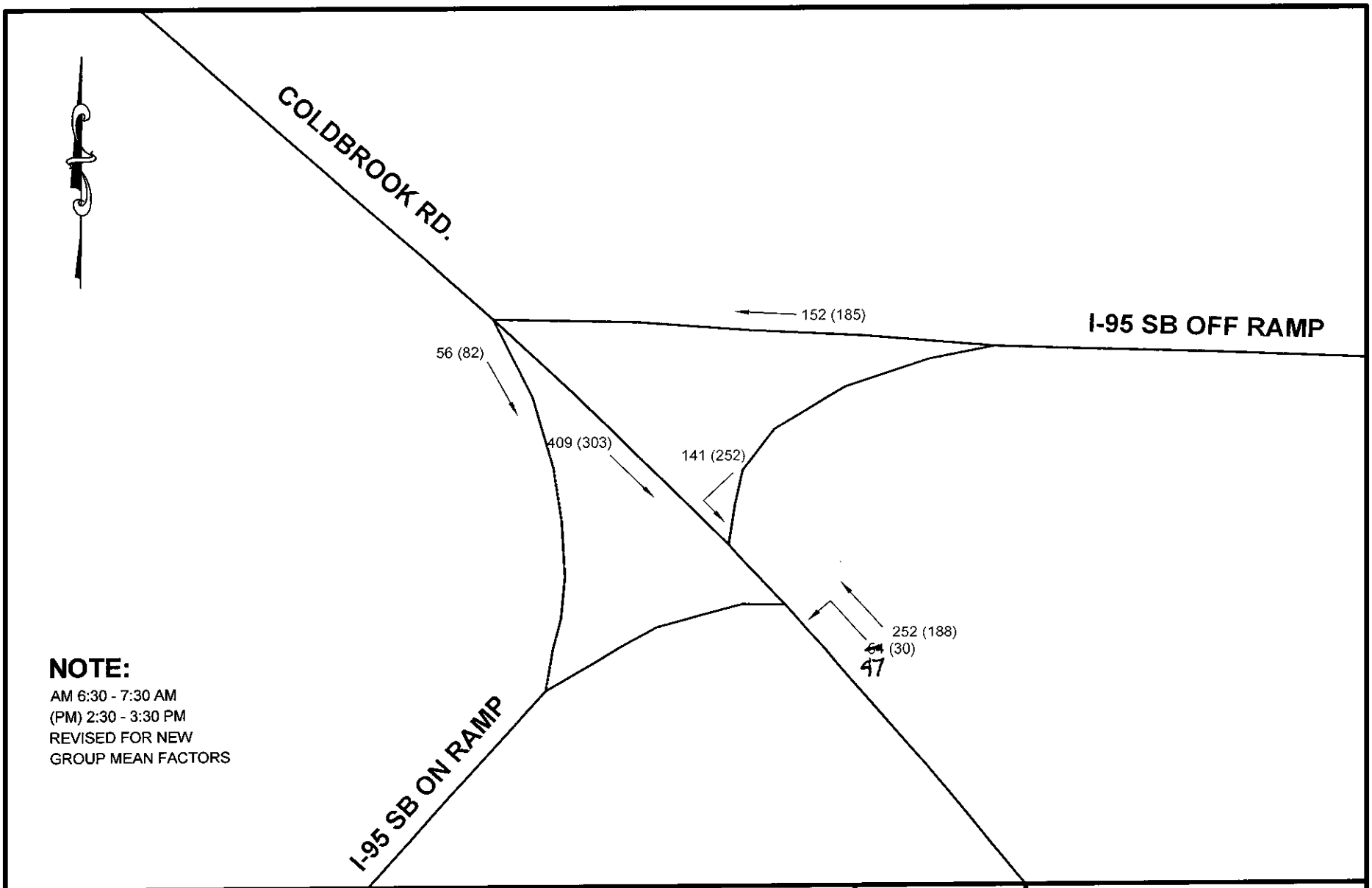
NOTE:
AM 6:30 - 7:30 AM
(PM) 2:30 - 3:30 PM
REVISED FOR NEW
GROUP MEAN FACTORS

PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK112**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **I-95 SB RAMPS EXISTING TRAFFIC**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	



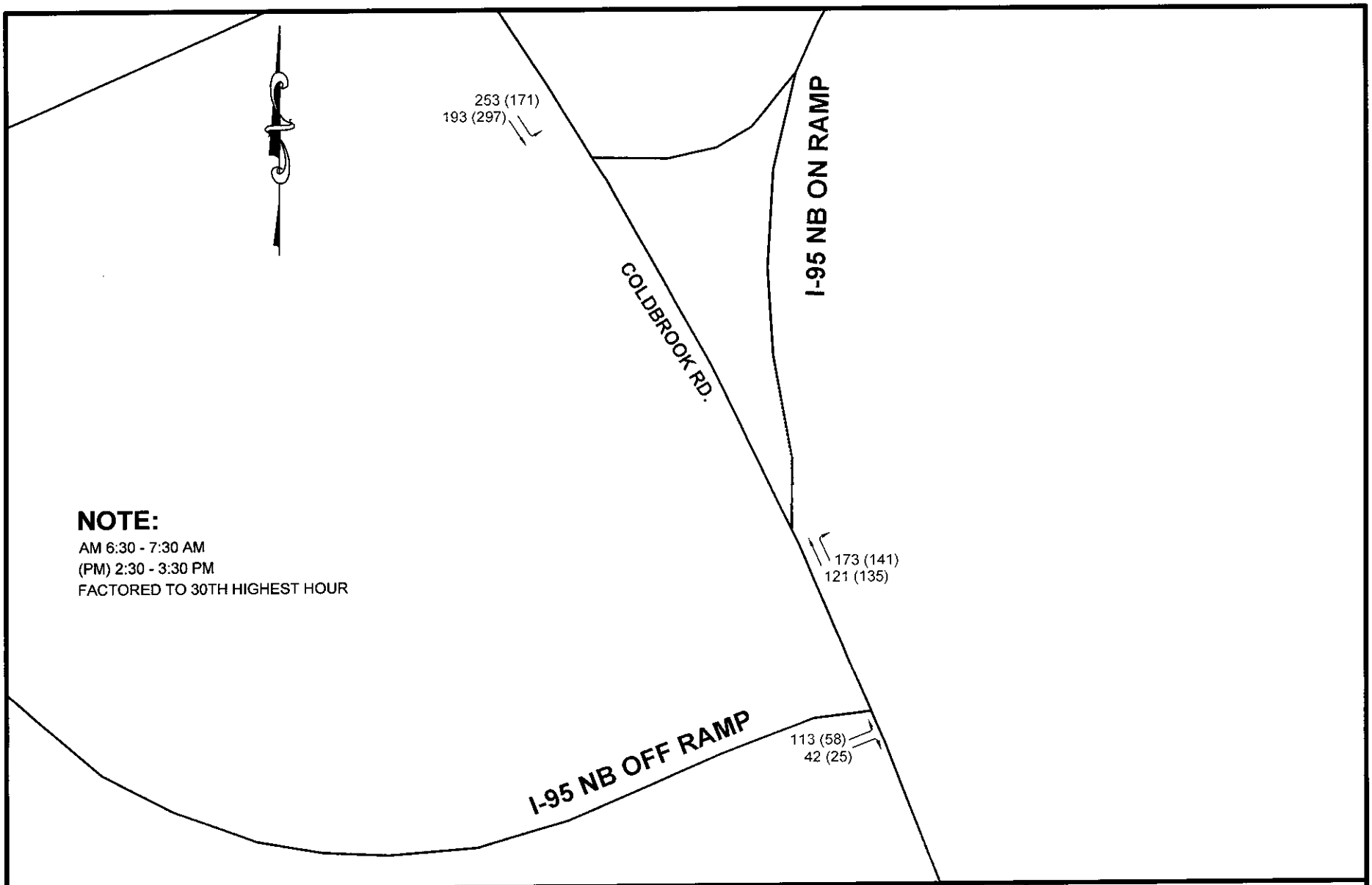
NOTE:
AM 6:30 - 7:30 AM
(PM) 2:30 - 3:30 PM
REVISED FOR NEW
GROUP MEAN FACTORS

PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK109**	BY: BTH	CESINC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **I-95 SB RAMPS FUTURE TRAFFIC (2018) NO BUILD**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	



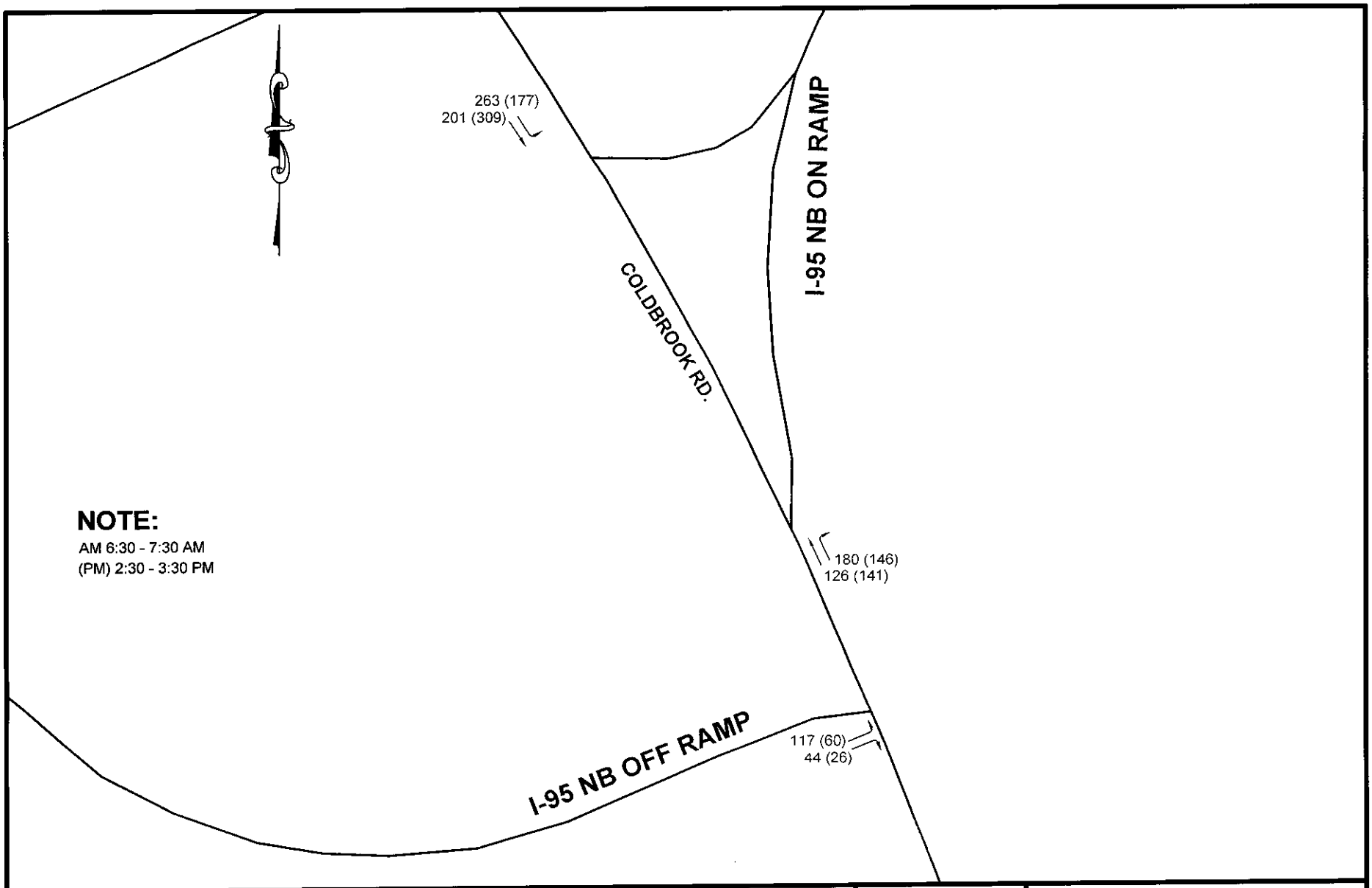
NOTE:
AM 6:30 - 7:30 AM
(PM) 2:30 - 3:30 PM
REVISED FOR NEW
GROUP MEAN FACTORS

PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK108**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **I-95 SB RAMPS FUTURE TRAFFIC (2018) FULL BUILDOUT**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	

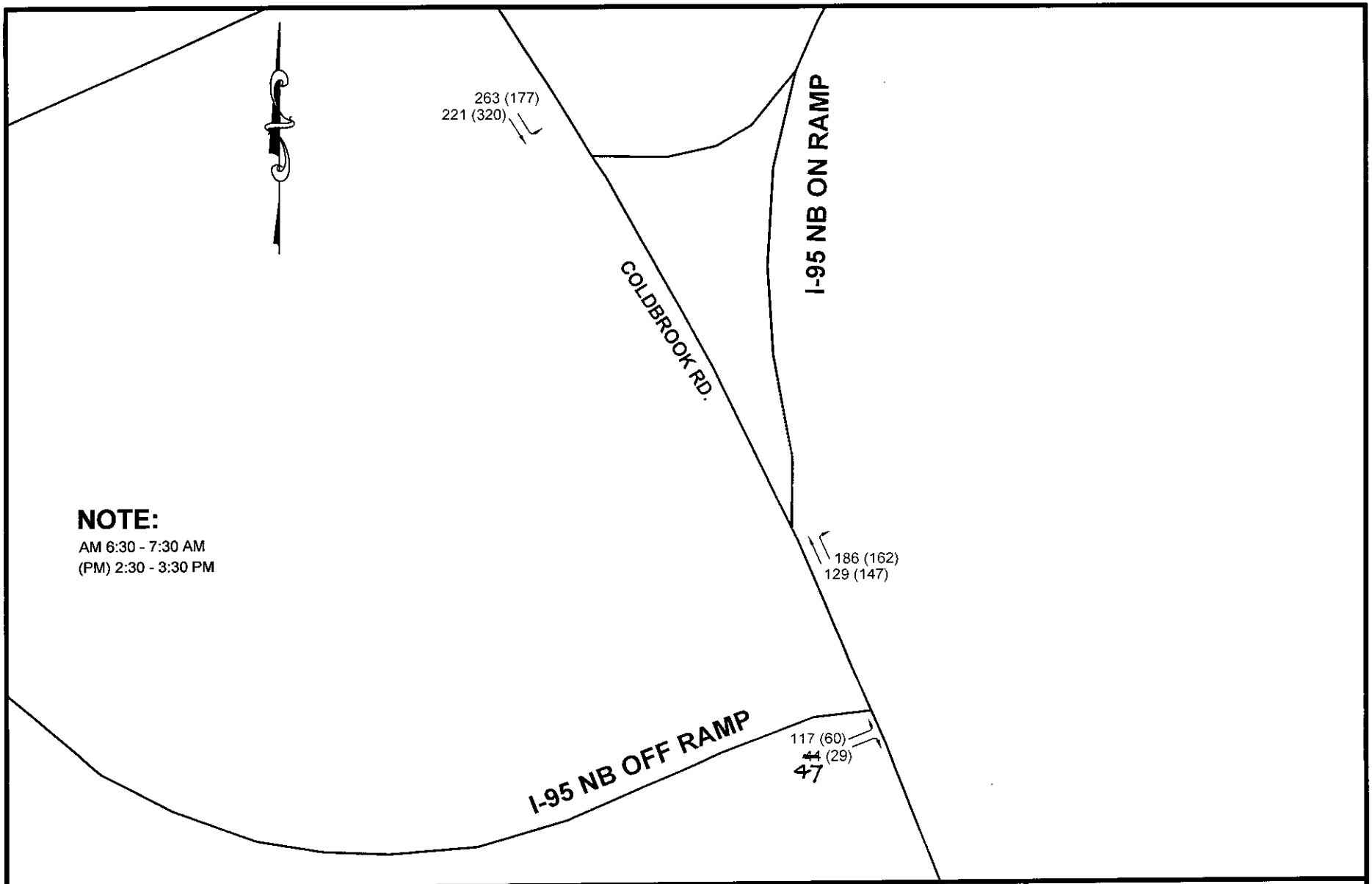


NOTE:
AM 6:30 - 7:30 AM
(PM) 2:30 - 3:30 PM
FACTORED TO 30TH HIGHEST HOUR

PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK113**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **I-95 NB RAMPS EXISTING TRAFFIC**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	



PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK114**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **I-95 NB RAMPS FUTURE TRAFFIC 2018**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	



PROJECT TITLE: **SOLID WASTE PROCESSING FACILITY HAMPDEN, MAINE**	DWG: **SK115**	BY: BTH	CES INC Engineers • Environmental Scientists • Surveyors
		DATE: 5/6/2016	
SHEET TITLE: **I-95 NB RAMPS FULL BUILDOUT 2018**	JN: 11293.001	REV:	
	SCALE: NTS	REV DATE:	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	240	0	0	206	16	0	0	0	3	0	3
Peak Hour Factor	0.95	0.82	0.95	0.95	0.77	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	293	0	0	268	17	0	0	0	3	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	284			293			593	598	293	590	590	276
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284			293			593	598	293	590	590	276
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	100
cM capacity (veh/h)	1278			1269			413	412	747	417	417	763

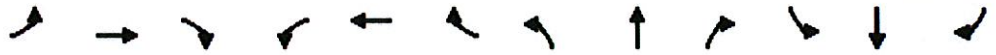
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	303	284	0	7
Volume Left	11	0	0	3
Volume Right	0	17	0	3
cSH	1278	1269	1700	539
Volume to Capacity	0.01	0.00	0.00	0.01
Queue Length 95th (ft)	1	0	0	1
Control Delay (s)	0.3	0.0	0.0	11.8
Lane LOS	A		A	B
Approach Delay (s)	0.3	0.0	0.0	11.8
Approach LOS			A	B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	240	25	23	206	16	5	0	9	3	0	3
Peak Hour Factor	0.95	0.82	0.50	0.50	0.77	0.95	0.50	0.92	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	11	293	50	46	268	17	10	0	18	3	0	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	284			343			685	690	293	700	732	276
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284			343			685	690	293	700	732	276
tC, single (s)	4.1			4.4			7.7	6.5	6.2	7.9	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.5			4.0	4.0	3.3	4.2	4.0	3.3
p0 queue free %	99			96			96	100	98	99	100	100
cM capacity (veh/h)	1278			1076			282	350	747	255	331	763

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	303	50	330	28	7
Volume Left	11	0	46	10	3
Volume Right	0	50	17	18	3
cSH	1278	1700	1076	470	382
Volume to Capacity	0.01	0.03	0.04	0.06	0.02
Queue Length 95th (ft)	1	0	3	5	1
Control Delay (s)	0.3	0.0	1.6	13.1	14.6
Lane LOS	A		A	B	B
Approach Delay (s)	0.3		1.6	13.1	14.6
Approach LOS				B	B

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	39.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	281	0	0	290	7	0	0	0	10	0	4
Peak Hour Factor	0.95	0.90	0.95	0.95	0.89	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	312	0	0	326	7	0	0	0	11	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	333			312			650	650	312	646	646	330
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	333			312			650	650	312	646	646	330
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	100	100	97	100	99
cM capacity (veh/h)	1226			1248			379	388	728	384	390	662

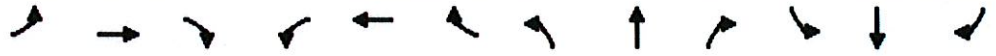
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	314	333	0	15
Volume Left	2	0	0	11
Volume Right	0	7	0	4
cSH	1226	1248	1700	436
Volume to Capacity	0.00	0.00	0.00	0.03
Queue Length 95th (ft)	0	0	0	3
Control Delay (s)	0.1	0.0	0.0	13.5
Lane LOS	A		A	B
Approach Delay (s)	0.1	0.0	0.0	13.5
Approach LOS			A	B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	281	13	14	290	7	23	0	22	10	0	4
Peak Hour Factor	0.95	0.80	0.50	0.50	0.89	0.95	0.50	0.92	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	2	351	26	28	326	7	46	0	44	11	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	333			377			745	745	351	785	767	330
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	333			377			745	745	351	785	767	330
tC, single (s)	4.1			4.7			7.2	6.5	6.5	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.7			3.6	4.0	3.6	3.5	4.0	3.5
p0 queue free %	100			97			85	100	93	96	100	99
cM capacity (veh/h)	1226			935			307	332	624	281	322	662

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	353	26	361	90	15
Volume Left	2	0	28	46	11
Volume Right	0	26	7	44	4
cSH	1226	1700	935	408	337
Volume to Capacity	0.00	0.02	0.03	0.22	0.05
Queue Length 95th (ft)	0	0	2	21	4
Control Delay (s)	0.1	0.0	1.0	16.3	16.2
Lane LOS	A		A	C	C
Approach Delay (s)	0.1		1.0	16.3	16.2
Approach LOS				C	C

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	43	241	0	0	390	54	120	0	146	0	0	0
Peak Hour Factor	0.75	0.87	0.50	0.50	0.70	0.71	0.81	0.92	0.73	0.92	0.92	0.92
Hourly flow rate (vph)	57	277	0	0	557	76	148	0	200	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	557			277			987	949	277	987	987	595
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	557			277			987	949	277	987	987	595
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	94			100			30	100	73	100	100	100
cM capacity (veh/h)	1004			1286			211	246	745	158	233	464

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	334	633	348
Volume Left	57	0	148
Volume Right	0	76	200
cSH	1004	1700	496
Volume to Capacity	0.06	0.37	0.70
Queue Length 95th (ft)	5	0	136
Control Delay (s)	2.0	0.0	29.8
Lane LOS	A		D
Approach Delay (s)	2.0	0.0	29.8
Approach LOS			D

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	45	251	0	0	405	56	125	0	152	0	0	0
Peak Hour Factor	0.75	0.87	0.50	0.50	0.70	0.71	0.81	0.92	0.73	0.92	0.92	0.92
Hourly flow rate (vph)	60	289	0	0	579	79	154	0	208	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	579			289			1027	987	289	1027	1027	618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	579			289			1027	987	289	1027	1027	618
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	94			100			22	100	72	100	100	100
cM capacity (veh/h)	985			1273			198	232	734	145	220	450

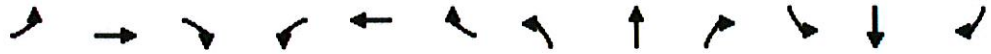
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	349	657	363
Volume Left	60	0	154
Volume Right	0	79	208
cSH	985	1700	465
Volume to Capacity	0.06	0.39	0.78
Queue Length 95th (ft)	5	0	173
Control Delay (s)	2.1	0.0	35.7
Lane LOS	A		E
Approach Delay (s)	2.1	0.0	35.7
Approach LOS			E

Intersection Summary			
Average Delay	10.0		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	47	252	0	0	409	56	141	0	152	0	0	0
Peak Hour Factor	0.75	0.87	0.50	0.50	0.70	0.71	0.81	0.92	0.73	0.92	0.92	0.92
Hourly flow rate (vph)	63	290	0	0	584	79	174	0	208	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	584			290			1039	999	290	1039	1039	624
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	584			290			1039	999	290	1039	1039	624
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	94			100			10	100	72	100	100	100
cM capacity (veh/h)	980			1272			193	228	733	142	216	446

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	352	663	382
Volume Left	63	0	174
Volume Right	0	79	208
cSH	980	1700	425
Volume to Capacity	0.06	0.39	0.90
Queue Length 95th (ft)	5	0	240
Control Delay (s)	2.2	0.0	47.7
Lane LOS	A		E
Approach Delay (s)	2.2	0.0	47.7
Approach LOS			E

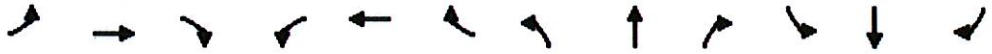
Intersection Summary			
Average Delay	13.6		
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	25	178	0	0	290	79	233	0	178	0	0	0
Peak Hour Factor	0.75	0.89	0.50	0.50	0.88	0.87	0.67	0.92	0.88	0.92	0.92	0.92
Hourly flow rate (vph)	33	200	0	0	330	91	348	0	202	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	330			200			642	596	200	642	642	375
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	330			200			642	596	200	642	642	375
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	97			100			6	100	75	100	100	100
cM capacity (veh/h)	1219			1372			371	405	823	286	382	623

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	233	420	550
Volume Left	33	0	348
Volume Right	0	91	202
cSH	1219	1700	587
Volume to Capacity	0.03	0.25	0.94
Queue Length 95th (ft)	2	0	306
Control Delay (s)	1.4	0.0	45.8
Lane LOS	A		E
Approach Delay (s)	1.4	0.0	45.8
Approach LOS			E

Intersection Summary			
Average Delay	21.2		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	26	185	0	0	302	82	242	0	185	0	0	0
Peak Hour Factor	0.75	0.89	0.50	0.50	0.88	0.87	0.67	0.92	0.88	0.92	0.92	0.92
Hourly flow rate (vph)	35	208	0	0	343	94	361	0	210	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	343			208			668	620	208	668	668	390
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	343			208			668	620	208	668	668	390
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	97			100			0	100	74	100	100	100
cM capacity (veh/h)	1205			1363			356	392	815	270	368	611

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	243	437	571
Volume Left	35	0	361
Volume Right	0	94	210
cSH	1205	1700	563
Volume to Capacity	0.03	0.26	1.01
Queue Length 95th (ft)	2	0	379
Control Delay (s)	1.4	0.0	58.6
Lane LOS	A		F
Approach Delay (s)	1.4	0.0	58.6
Approach LOS			F

Intersection Summary			
Average Delay	27.0		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	188	0	0	303	82	252	0	185	0	0	0
Peak Hour Factor	0.75	0.89	0.50	0.50	0.88	0.87	0.67	0.92	0.88	0.92	0.92	0.92
Hourly flow rate (vph)	40	211	0	0	344	94	376	0	210	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	344			211			683	636	211	683	683	391
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	344			211			683	636	211	683	683	391
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	97			100			0	100	74	100	100	100
cM capacity (veh/h)	1204			1359			347	383	812	262	359	610

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	251	439	586
Volume Left	40	0	376
Volume Right	0	94	210
cSH	1204	1700	540
Volume to Capacity	0.03	0.26	1.09
Queue Length 95th (ft)	3	0	450
Control Delay (s)	1.5	0.0	73.5
Lane LOS	A		F
Approach Delay (s)	1.5	0.0	73.5
Approach LOS			F

Intersection Summary			
Average Delay	34.1		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	188	0	0	303	82	252	0	185	0	0	0
Peak Hour Factor	0.92	0.92	0.50	0.50	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	204	0	0	329	89	274	0	201	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	329			204			643	599	204	643	643	374
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	329			204			643	599	204	643	643	374
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	97			100			26	100	75	100	100	100
cM capacity (veh/h)	1219			1367			370	404	819	285	381	624

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	237	418	475
Volume Left	33	0	274
Volume Right	0	89	201
cSH	1219	1700	642
Volume to Capacity	0.03	0.25	0.74
Queue Length 95th (ft)	2	0	163
Control Delay (s)	1.3	0.0	26.4
Lane LOS	A		D
Approach Delay (s)	1.3	0.0	26.4
Approach LOS			D

Intersection Summary			
Average Delay	11.4		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	168	0	0	380	64	220	0	196	0	0	0
Peak Hour Factor	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.92	1.00	0.92	0.92	0.92
Hourly flow rate (vph)	24	168	0	0	380	64	220	0	196	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	380			168			628	596	168	628	628	412
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	380			168			628	596	168	628	628	412
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	98			100			42	100	77	100	100	100
cM capacity (veh/h)	1168			1410			381	408	858	300	391	593

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	192	444	416
Volume Left	24	0	220
Volume Right	0	64	196
cSH	1168	1700	720
Volume to Capacity	0.02	0.26	0.58
Queue Length 95th (ft)	2	0	93
Control Delay (s)	1.2	0.0	19.0
Lane LOS	A		C
Approach Delay (s)	1.2	0.0	19.0
Approach LOS			C

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	16	159	0	0	281	80	238	0	156	0	0	0
Peak Hour Factor	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.92	1.00	0.92	0.92	0.92
Hourly flow rate (vph)	16	159	0	0	281	80	238	0	156	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	281			159			512	472	159	512	512	321
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	281			159			512	472	159	512	512	321
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	99			100			48	100	82	100	100	100
cM capacity (veh/h)	1270			1420			459	484	868	384	459	670

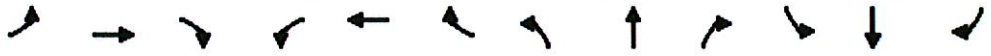
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	175	361	394
Volume Left	16	0	238
Volume Right	0	80	156
cSH	1270	1700	759
Volume to Capacity	0.01	0.21	0.52
Queue Length 95th (ft)	1	0	76
Control Delay (s)	0.8	0.0	16.7
Lane LOS	A		C
Approach Delay (s)	0.8	0.0	16.7
Approach LOS			C

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	28	171	0	0	321	88	174	0	212	0	0	0
Peak Hour Factor	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.92	1.00	0.92	0.92	0.92
Hourly flow rate (vph)	28	171	0	0	321	88	174	0	212	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	321			171			592	548	171	592	592	365
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	321			171			592	548	171	592	592	365
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	98			100			57	100	75	100	100	100
cM capacity (veh/h)	1228			1406			402	434	855	309	409	632

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	199	409	386
Volume Left	28	0	174
Volume Right	0	88	212
cSH	1228	1700	892
Volume to Capacity	0.02	0.24	0.43
Queue Length 95th (ft)	2	0	55
Control Delay (s)	1.3	0.0	15.1
Lane LOS	A		C
Approach Delay (s)	1.3	0.0	15.1
Approach LOS			C

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	44	251	0	0	273	96	366	0	96	0	0	0
Peak Hour Factor	1.00	1.00	0.50	0.50	1.00	1.00	1.00	0.92	1.00	0.92	0.92	0.92
Hourly flow rate (vph)	44	251	0	0	273	96	366	0	96	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									12			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	273			251			660	612	251	660	660	321
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	273			251			660	612	251	660	660	321
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.5
p0 queue free %	97			100			0	100	88	100	100	100
cM capacity (veh/h)	1279			1314			359	394	771	321	370	670

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	295	369	462
Volume Left	44	0	366
Volume Right	0	96	96
cSH	1279	1700	453
Volume to Capacity	0.03	0.22	1.02
Queue Length 95th (ft)	3	0	344
Control Delay (s)	1.5	0.0	71.7
Lane LOS	A		F
Approach Delay (s)	1.5	0.0	71.7
Approach LOS			F

Intersection Summary			
Average Delay	29.8		
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	201	0	0	294	113	42
Peak Hour Factor	0.72	0.92	0.92	0.75	0.88	0.77
Hourly flow rate (vph)	279	0	0	392	128	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			279		671	279
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			279		671	279
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		68	93
cM capacity (veh/h)			1284		404	760

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	279	392	183
Volume Left	0	0	128
Volume Right	0	0	55
cSH	1700	1700	469
Volume to Capacity	0.16	0.23	0.39
Queue Length 95th (ft)	0	0	46
Control Delay (s)	0.0	0.0	17.5
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.5
Approach LOS			C

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		31.0%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	253	193	121	173	0	0
Peak Hour Factor	0.73	0.71	0.75	0.74	0.92	0.92
Hourly flow rate (vph)	347	272	161	234	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	161				1243	278
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	161				1243	278
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	75				100	100
cM capacity (veh/h)	1370				144	761

Direction, Lane #	EB 1	WB 1
Volume Total	618	395
Volume Left	347	0
Volume Right	0	234
cSH	1370	1700
Volume to Capacity	0.25	0.23
Queue Length 95th (ft)	25	0
Control Delay (s)	5.9	0.0
Lane LOS	A	
Approach Delay (s)	5.9	0.0
Approach LOS		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	201	0	0	306	117	44
Peak Hour Factor	0.72	0.92	0.92	0.75	0.88	0.77
Hourly flow rate (vph)	279	0	0	408	133	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			279		687	279
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			279		687	279
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		66	92
cM capacity (veh/h)			1284		395	760

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	279	408	190
Volume Left	0	0	133
Volume Right	0	0	57
cSH	1700	1700	461
Volume to Capacity	0.16	0.24	0.41
Queue Length 95th (ft)	0	0	50
Control Delay (s)	0.0	0.0	18.2
Lane LOS			C
Approach Delay (s)	0.0	0.0	18.2
Approach LOS			C

Intersection Summary			
Average Delay		3.9	
Intersection Capacity Utilization		31.9%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	263	201	126	180	0	0
Peak Hour Factor	0.73	0.71	0.75	0.74	0.92	0.92
Hourly flow rate (vph)	360	283	168	243	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	168				1293	290
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	168				1293	290
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	74				100	100
cM capacity (veh/h)	1363				132	750

Direction, Lane #	EB 1	WB 1
Volume Total	643	411
Volume Left	360	0
Volume Right	0	243
cSH	1363	1700
Volume to Capacity	0.26	0.24
Queue Length 95th (ft)	27	0
Control Delay (s)	6.0	0.0
Lane LOS	A	
Approach Delay (s)	6.0	0.0
Approach LOS		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	221	0	0	305	117	44
Peak Hour Factor	0.72	0.92	0.92	0.75	0.88	0.77
Hourly flow rate (vph)	307	0	0	407	133	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			307		714	307
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			307		714	307
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		65	92
cM capacity (veh/h)			1254		381	733

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	307	407	190
Volume Left	0	0	133
Volume Right	0	0	57
cSH	1700	1700	445
Volume to Capacity	0.18	0.24	0.43
Queue Length 95th (ft)	0	0	52
Control Delay (s)	0.0	0.0	19.0
Lane LOS			C
Approach Delay (s)	0.0	0.0	19.0
Approach LOS			C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	263	221	129	186	0	0
Peak Hour Factor	0.73	0.71	0.75	0.74	0.92	0.92
Hourly flow rate (vph)	360	311	172	251	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	172				1329	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172				1329	298
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	73				100	100
cM capacity (veh/h)	1358				125	742

Direction, Lane #	EB 1	WB 1
Volume Total	672	423
Volume Left	360	0
Volume Right	0	251
cSH	1358	1700
Volume to Capacity	0.27	0.25
Queue Length 95th (ft)	27	0
Control Delay (s)	5.9	0.0
Lane LOS	A	
Approach Delay (s)	5.9	0.0
Approach LOS		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	297	0	0	276	58	25
Peak Hour Factor	0.84	0.92	0.92	0.87	0.74	0.86
Hourly flow rate (vph)	354	0	0	317	78	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			354		671	354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			354		671	354
tC, single (s)			4.1		6.8	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.9	3.5
p0 queue free %			100		78	96
cM capacity (veh/h)			1205		363	658

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	354	317	107
Volume Left	0	0	78
Volume Right	0	0	29
cSH	1700	1700	413
Volume to Capacity	0.21	0.19	0.26
Queue Length 95th (ft)	0	0	26
Control Delay (s)	0.0	0.0	16.7
Lane LOS			C
Approach Delay (s)	0.0	0.0	16.7
Approach LOS			C

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	171	297	135	141	0	0
Peak Hour Factor	0.81	0.85	0.80	0.83	0.92	0.92
Hourly flow rate (vph)	211	349	169	170	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	169				1025	254
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	169				1025	254
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	84				100	100
cM capacity (veh/h)	1350				220	785

Direction, Lane #	EB 1	WB 1
Volume Total	561	339
Volume Left	211	0
Volume Right	0	170
cSH	1350	1700
Volume to Capacity	0.16	0.20
Queue Length 95th (ft)	14	0
Control Delay (s)	4.1	0.0
Lane LOS	A	
Approach Delay (s)	4.1	0.0
Approach LOS		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	309	0	0	287	60	26
Peak Hour Factor	0.84	0.92	0.92	0.87	0.74	0.86
Hourly flow rate (vph)	368	0	0	330	81	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			368		698	368
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			368		698	368
tC, single (s)			4.1		6.8	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.9	3.5
p0 queue free %			100		77	95
cM capacity (veh/h)			1191		350	645

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	368	330	111
Volume Left	0	0	81
Volume Right	0	0	30
cSH	1700	1700	399
Volume to Capacity	0.22	0.19	0.28
Queue Length 95th (ft)	0	0	28
Control Delay (s)	0.0	0.0	17.5
Lane LOS			C
Approach Delay (s)	0.0	0.0	17.5
Approach LOS			C

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	177	309	141	146	0	0
Peak Hour Factor	0.81	0.85	0.80	0.83	0.92	0.92
Hourly flow rate (vph)	219	364	176	176	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	176				1065	264
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	176				1065	264
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	84				100	100
cM capacity (veh/h)	1342				206	774

Direction, Lane #	EB 1	WB 1
Volume Total	582	352
Volume Left	219	0
Volume Right	0	176
cSH	1342	1700
Volume to Capacity	0.16	0.21
Queue Length 95th (ft)	15	0
Control Delay (s)	4.1	0.0
Lane LOS	A	
Approach Delay (s)	4.1	0.0
Approach LOS		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	320	0	0	309	60	29
Peak Hour Factor	0.84	0.92	0.92	0.87	0.74	0.86
Hourly flow rate (vph)	381	0	0	355	81	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			381		736	381
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			381		736	381
tC, single (s)			4.1		6.8	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.9	3.5
p0 queue free %			100		76	95
cM capacity (veh/h)			1178		331	634

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	381	355	115
Volume Left	0	0	81
Volume Right	0	0	34
cSH	1700	1700	385
Volume to Capacity	0.22	0.21	0.30
Queue Length 95th (ft)	0	0	31
Control Delay (s)	0.0	0.0	18.3
Lane LOS			C
Approach Delay (s)	0.0	0.0	18.3
Approach LOS			C

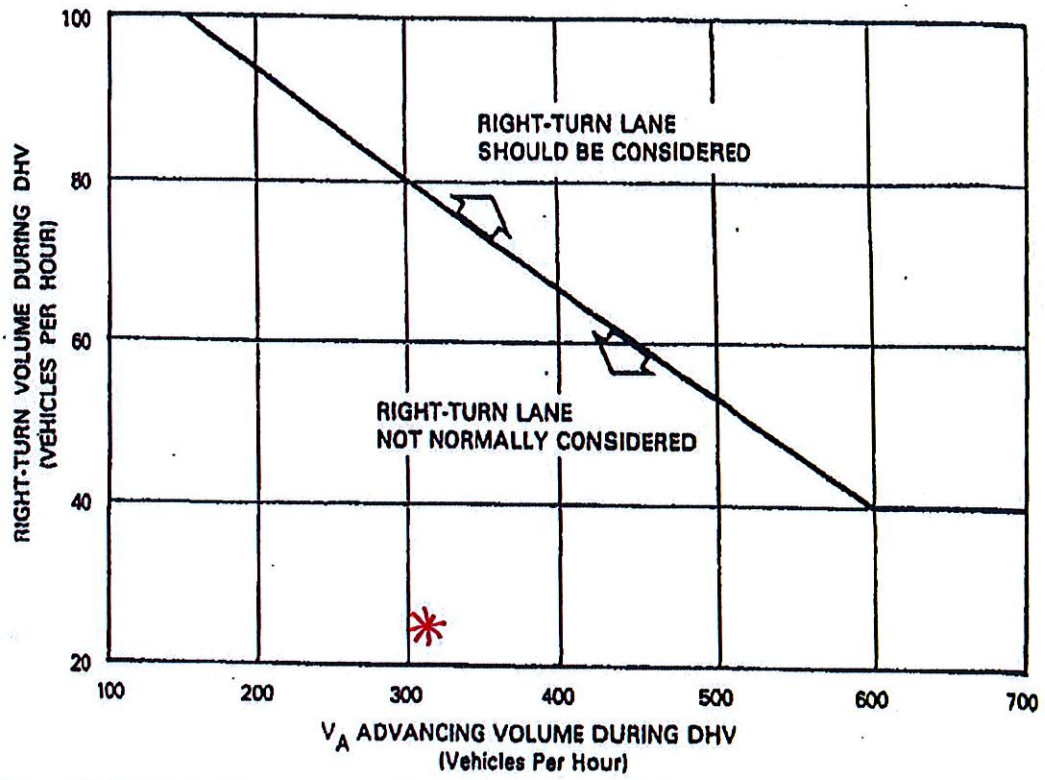
Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	177	320	147	162	0	0
Peak Hour Factor	0.81	0.85	0.80	0.83	0.92	0.92
Hourly flow rate (vph)	219	376	184	195	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	184				1095	281
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	184				1095	281
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	84				100	100
cM capacity (veh/h)	1333				198	758

Direction, Lane #	EB 1	WB 1
Volume Total	595	379
Volume Left	219	0
Volume Right	0	195
cSH	1333	1700
Volume to Capacity	0.16	0.22
Queue Length 95th (ft)	15	0
Control Delay (s)	4.1	0.0
Lane LOS	A	
Approach Delay (s)	4.1	0.0
Approach LOS		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

SITE ENTRANCE



Note: For highways with a design speed below 50 mph *and* DHV<300 *and* Right Turns>40, an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Example

AM PEAK HOUR

Given: Design Speed = 40 mph
V_A = 250 vph
Right Turns = 100 vph

$V_A = 303$

$V_{RT} = 25$

NO RT LANE REQUIRED

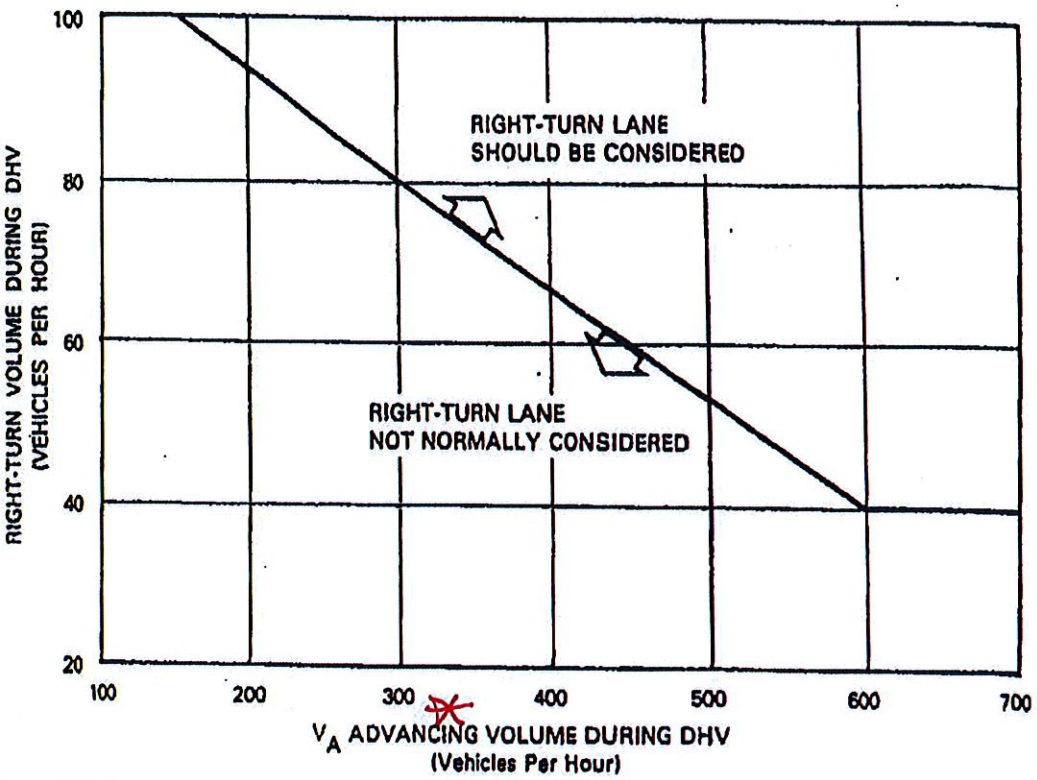
Problem: Determine if a right-turn lane should be considered.

Solution: To read the vertical axis, use 100-20 = 80 vph. The figure indicates that a right-turn lane should not normally be considered, unless other factors (e.g., high accident rate) indicate a lane is needed.

GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS

Figure 8-16

SITE ENTRANCE



Note: For highways with a design speed below 50 mph *and* DHV<300 *and* Right Turns>40, an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

PM PEAK

V_A = 327

V_{RT} = 13

Example

Given: Design Speed = 40 mph
V_A = 250 vph
Right Turns = 100 vph

NO RT LANE REQUIRED

Problem: Determine if a right-turn lane should be considered.

Solution: To read the vertical axis, use 100-20 = 80 vph. The figure indicates that a right-turn lane should not normally be considered, unless other factors (e.g., high accident rate) indicate a lane is needed.

GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS

Figure 8-16