

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD**

**IN RE: INVENERGY THERMAL DEVELOPMENT LLC's
APPLICATION TO CONSTRUCT THE
CLEAR RIVER ENERGY CENTER IN
BURRILLVILLE, RHODE ISLAND**

DOCKET No. SB-2015-06

**PRE-FILED DIRECT TESTIMONY OF
MAUREEN CHLEBEK**

(JUNE 30, 2017)

SUMMARY

Maureen Chlebek is a traffic engineer and General Manager at McMahon Associates and testifies regarding the traffic analysis conducted for Clear River Energy Center and CREC's traffic impacts. Specifically, she testifies in support of the Traffic Impact Analysis provided to the Board dated May 2016. She also testifies in support of the traffic analysis conducted for the Revised Water Supply Plan. Ms. Chlebek, relying on the application as supplemented, her analysis and traffic studies, relevant rules and regulations of RIDOT, including the updated traffic matters associated with the Revised Water Supply Plan, opines that CREC will not produce significant adverse effects on the quality of the state's roads and bridges and thereby not cause unacceptable harm to the traffic safety environment.

LIST OF EXHIBITS

- MC-1 Memorandum to Beth Noonan, From Maureen Chlebek, P.E., PTOE, dated July 29, 2016, titled “Clear River Energy Center Burrillville, RI – Traffic Comment Responses.”
- MC-2 Report, dated August 2016, titled “Invenergy Clear River Energy Center – Intersection Review – Church Street at Main Street, Pascoag, RI.”

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**INVENERGY THERMAL DEVELOPMENT LLC'S PRE-FILED DIRECT TESTIMONY
OF MAUREEN CHLEBEK, MCMAHON ASSOCIATES (TRAFFIC)**

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, BUSINESS TITLE AND BUSINESS ADDRESS.

A. My name is Maureen Chlebek. I am an Associate and General Manager at McMahon Associates, located at 14 Breakneck Hill Road, Lincoln, Rhode Island 02865.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING?

A. My testimony is on behalf of the applicant, Invenergy Thermal Development LLC ("Invenergy"), in support of its application (the "Application") for a license from the Rhode Island Energy Facility Siting Board ("EFSB" or "Board") to construct the Clear River Energy Center project in Burrillville, Rhode Island ("Clear River" or "CREC").

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. As I stated previously, I am employed by McMahon Associates, and I am an Associate and General Manager. I received my bachelor of science degree in civil engineering from the University of Rhode Island. I am a registered professional engineer in Rhode Island, Massachusetts and Connecticut. I am a certified professional traffic operations engineer. I have over thirty-two (32) years of transportation engineering experience and have managed numerous projects for state, municipal and private clients. A detailed description of my educational background and professional experience is included in my CV, filed with the EFSB on September 12, 2016.

1 **Q. PLEASE DESCRIBE YOUR EXPERIENCE PROVIDING TESTIMONY TO**
2 **REGULATORY COMMISSIONS, BOARDS, AGENCIES OR AS AN EXPERT**
3 **WITNESS.**

4
5 **A.** I have testified in front of numerous municipal boards and the RI Department of Health as
6 a traffic expert witness. In Rhode Island, I have appeared before boards in Middletown, East
7 Providence, East Greenwich, Richmond, Johnston, West Warwick, Warwick, Burrillville,
8 Charlestown, Westerly, Narragansett, Coventry, Cranston and Pawtucket.

9 **II. TRAFFIC ANALYSIS**
10

11 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**
12

13 **A.** In accordance with the Preliminary Order of the EFSB, the Burrillville Planning Board was
14 to advise whether CREC complied with the Town of Burrillville (“Town”) Comprehensive Plan
15 and the Zoning Board was to advise whether a Special Use Permit should be granted. One of the
16 areas at issue before the Planning Board and Zoning Board was CREC’s traffic impact. I was
17 retained to analyze what if any impact CREC would have on traffic in the Town, to conduct a
18 traffic impact study of the site and to conduct a roadway assessment of CREC’s truck routes in
19 Burrillville.

20 **Q. WHAT DID YOU REVIEW WHEN CONDUCTING YOUR ANALYSIS?**
21

22 **A.** I reviewed field conditions, including site access, travel routes and roadway conditions
23 along the travel routes to the site. Traffic count data was reviewed. The trip generating
24 characteristics of the site were reviewed for the full build condition and for the construction phases.
25 Accident data for a three-year period (2013-2016) was obtained from the Burrillville Police
26 Department and reviewed.

27 **Q. PLEASE EXPLAIN THE METHODOLOGY UTILIZED WHEN CONDUCTING**
28 **YOUR ANALYSIS.**
29

1 **A.** The traffic study was conducted in three steps. First, we took an inventory of the existing
2 traffic conditions, collecting traffic counts at key intersections where delivery and construction
3 vehicles would be traveling to CREC during peak weekday morning and afternoon times. We
4 reviewed accident data and evaluated conditions at the site access. Second, existing 2016 traffic
5 volumes were projected to 2021 without CREC (“no build”) and with CREC (“build”). This
6 second step included analyzing future roadway improvements and site-specific growth. We also
7 estimated the trip generation during the construction phases. Third, we analyzed the traffic
8 operations for the future “no-build” and “build” scenarios and for the construction phase which
9 generated the most traffic. We identified measures, if necessary, to improve existing and future
10 traffic operations and safety.

11 In addition to the traffic study, a roadway assessment was conducted along the anticipated
12 truck route to the site within Burrillville. Pre-construction damage was inventoried and baseline
13 conditions were documented.

14 **Q. AFTER CONDUCTING YOUR ANALYSIS, DID YOU MAKE ANY FINDINGS**
15 **REGARDING THE TRAFFIC IMPACT OF CREC?**
16

17 **A.** Yes. Please see “Traffic Impact Study for the Clear River Energy Center – Wallum Lake
18 Road (Route 100) Burrillville, Rhode Island,” dated May 2016, filed with the Board on August 2,
19 2016 as a supplement to Invenergy’s Response to EFSB Data Request No. 1-1.

20 **Q. PLEASE SUMMARIZE YOUR FINDINGS FOR THE BOARD.**
21

22 **A.** The CREC will be a low traffic generator under full build conditions. The surrounding
23 street network is adequate to handle the additional traffic generated by the site, and the additional
24 traffic is not expected to adversely impact traffic operations. The proposed site access has adequate
25 stopping sight distance.

1 During the heaviest construction phase, additional delays will be incurred at the study area
2 intersections, particularly for left turn movements and minor street approaches. However, these
3 added delays are only anticipated during limited construction phases. Generally, the traffic
4 generated during construction is not expected to coincide with the peak periods of traffic at the
5 study area intersections.

6 The designated truck route to the proposed site was determined to be adequate. A
7 “baseline” condition summary was provided to document existing pavement conditions.

8 **Q. AFTER YOU PRESENTED THE TRAFFIC IMPACT STUDY TO THE**
9 **PLANNING AND ZONING BOARD, DID THAT END YOUR ANALYSIS?**

10
11 **A.** No. Invenergy addressed the Town’s Peer Review comments and confirmed that the
12 Traffic Impact Study conclusions remain valid. *See* Invenergy’s Responses to the Town’s 13th Set
13 of Data Requests, filed with the Board on June 20, 2016 and Memorandum to Beth Noonan, From
14 Maureen Chlebek, P.E., PTOE, dated July 29, 2016, titled “Clear River Energy Center Burrillville,
15 RI – Traffic Comment Responses,” attached as **Exhibit MC-1**.

16 The Burrillville Planning Board had additional questions on a number of traffic related
17 topics. Written responses were provided to a series of questions regarding projected accident rates,
18 potential cut-thru traffic routes, roadway repairs, and laydown areas. Specific questions regarding
19 CREC’s impact on an alternative traffic route and CREC’s impact on a specific intersection in
20 Burrillville were addressed. Accordingly, we conducted an additional review and submitted the
21 following two additional reports, attached to my testimony here as: **Exhibit MC-1** and **Exhibit**
22 **MC-2**, Report, dated August 2016, titled “Invenergy Clear River Energy Center – Intersection
23 Review – Church Street at Main Street, Pascoag, RI.”

24 **Q. DID YOUR FINDINGS CHANGE AFTER CONDUCTING FURTHER**
25 **ANALYSIS?**
26

1 A. No. After conducting the analysis regarding the alternative route, it was clear that this
2 alternative was not viable due to the added travel distance of 10+ miles and consideration of the
3 likely origins of the truck traffic. Additionally, after reviewing the intersection in question and
4 utilizing Autoturn templates to model the intersection, I am of the opinion that truck traffic can
5 maneuver the intersection adequately. Also, while the larger trucks require travel on the opposing
6 travel lane, this condition is typical throughout New England. Widening of the intersection corner
7 radius at Church Street at Main Street is feasible, but does require right of way acquisition.

8 **III. WATER SUPPLY PLAN**
9

10 **Q. DID YOU ANALYZE THE TRAFFIC IMPACTS OF INVENERGY'S REVISED**
11 **WATER SUPPLY PLAN, FILED WITH THE BOARD ON JANUARY 11, 2017?**
12

13 A. Yes. Please see the McMahon letter to John Niland of Invenergy LLC and dated January
14 10, 2017, filed with the Board as Appendix E of the Revised Water Supply Plan. The letter
15 summarizes the analysis relative to the revised water supply plan.

16 **Q. PLEASE DESCRIBE YOUR ANALYSIS.**

17 A. We considered two alternatives to transport water to the proposed facility. The first
18 alternative was to construct a pipeline from the site of the CREC to a pumping station in
19 Woonsocket. The route of the water main investigated was within RIDOT's right of way along
20 State Routes 146A, 102, 107, and 100, a distance of approximately 14 miles.

21 The second alternative was to evaluate reducing the water demand by CREC such that
22 water could be delivered to CREC by truck, either from Woonsocket or Johnston, RI. The trip
23 generation of the water delivery trucks was estimated and these trips were assigned to the
24 surrounding street system. In addition, revisions were made to the trip generation estimates for
25 ammonia trucks and trucks associated with oil fired events. The frequency of ammonia trucks
26 accessing the site were increased to once every other day. For the limited number of days involving

oil fired events, the duration of water and oil replenishment was extended, and resulted in 22 total trucks per day, which is less trucks on a daily basis than previously estimated. Traffic operations were assessed with the revised truck estimates. Furthermore, the appropriateness of the truck routes was evaluated.

Q. PLEASE DESCRIBE YOUR FINDINGS.

A. The first alternative, to construct a pipeline from the site of the CREC to a pumping station, was eliminated from further consideration due to the temporary construction impacts, including the disruption of traffic which could potentially last for more than one construction season.

The preferred alternative, to truck water to the site, was analyzed with adjustments to truck trip generation associated with the site as described above. The estimated peak hourly traffic during the peak time of the facility is approximately three trucks or six trips (three trucks entering, three trucks exiting) during both the weekday morning and afternoon peak hours, which is less than what was originally analyzed as part of the May 2016 Traffic Impact Study. The conclusions of the Traffic Impact Study in terms of peak hour operations remain valid. The routes were found to be adequate for truck traffic and the routes would not experience significant additional deterioration due to the transport of water to the site.

Q. DO YOU HAVE AN OPINION REGARDING THE TRUCK TRAFFIC INVOLVED IN THE REVISED WATER SUPPLY PLAN?

A. The truck traffic involved in the revised water supply plan will not adversely impact traffic operations of the surrounding street network. In my professional opinion, the routes will not experience significant additional deterioration due to the transport of water to the site.

IV. ADVISORY OPINIONS

PLANNING BOARD

Q. HAVE YOU REVIEWED THE PLANNING BOARD ADVISORY OPINION?

1
2 A. Yes.

3
4 Q. ON PAGE 20, THE PLANNING BOARD LISTS THE FOLLOWING CONDITION
5 IT WOULD LIKE TO SEE THE EFSB REQUIRE OF INVENERGY RELATING
6 TO TRAFFIC: “THERE NEEDS TO BE TRAFFIC MANAGEMENT AND
7 EMERGENCY RESPONSE ENHANCEMENT AND FINANCIAL SUPPORT FOR
8 THE STATE AND TOWN ROADS IMPACTED BY THIS PROJECT,
9 INCLUDING, BUT NOT LIMITED TO COMMITMENTS FROM INVENERGY
10 TO (1) REBUILD ALL ROADS DAMAGED BY INVENERGY, AND (2)
11 REDESIGN AND RECONSTRUCT THE INTERSECTION OF CHURCH STREET
12 AND HIGH STREET IN ORDER TO INCREASE THE SAFE TURNING RADIUS
13 FOR LARGE TRUCKS.” IN YOUR OPINION, IS THAT NECESSARY?
14

15 A. As discussed in **Exhibit MC-2**, if a requirement was imposed on Invenergy to rebuild all
16 roadways damaged by Invenergy, the condition should be limited to Route 100 within Burrillville
17 and Glocester, as this roadway represents the predominant travel route. As you move further from
18 the site, the truck traffic within the traffic stream consists of a mix of truck origins and destinations.
19 It would be difficult, if not impossible, to attribute damage to roadways such as Route 44 and the
20 interstate highways to the Invenergy-related truck traffic. Furthermore, roadways such as Route
21 44 and the interstate highways have pavement designed to handle high volumes of truck traffic.

22 I also note that Route 100 falls under the Rhode Island Department of Transportation
23 (“RIDOT”) jurisdiction and we have initiated coordination with RIDOT. As my colleague Bob
24 Smith points out in his testimony, Invenergy has proactively documented the roadway conditions
25 on the Route 100 travel route to the site. This helps establish a baseline condition that will aid in
26 assessing roadway damage that may be attributed to increased truck traffic associated with the
27 CREC Project. There will continue to be coordination with RIDOT as the project moves forward
28 through the permitting stage.

29 In regard to the intersection of Church Street and High Street, we have demonstrated that
30 large trucks can complete the necessary maneuvers at this intersection when traveling to and from

1 the site, acknowledging that the larger trucks will encroach into the opposing travel lane to
2 complete the maneuver, just as a school bus would at this intersection. However, the existing
3 deficiency is not attributable to the Invenergy site.

4 Furthermore, reconstruction of this intersection to accommodate the turn radius of large
5 sized trucks cannot be achieved within the roadway right-of-way and will require acquisition of
6 private property, which is beyond the realm of the proponent. In my opinion, it is unreasonable to
7 require that the intersection be reconstructed to accommodate the turn radius of large sized trucks
8 for several reasons. First, the intersection carries low volumes of traffic. Second, the southbound
9 Church Street approach is stop controlled and there is an upgrade on Pascoag Street approaching
10 the intersection, so the approach speeds are low. Third, there is not a history of high crash rates at
11 this intersection. Fourth, large trucks can maneuver this intersection with minimal delay to the
12 intersection traffic. Finally, the conditions at this intersection are common throughout New
13 England, and there are numerous examples of low volume, low speed intersections with a layout
14 that requires large sized trucks to cross into the opposing travel lane during turn maneuvers.

15 **Q. THE ADVISORY OPINION ALSO MENTIONED “EXCESSIVE TRAFFIC**
16 **IMPACTS” AS A REASON WHY CREC IS ALLEGEDLY NOT IN COMPLIANCE**
17 **WITH THE TOWN’S COMPREHENSIVE PLAN. WILL CREC HAVE**
18 **“EXCESSIVE TRAFFIC IMPACTS”?**

19
20 **A.** CREC will not have excessive traffic impacts, as documented in our traffic study. The
21 conclusion of the traffic study was based upon the analysis of the traffic operations, crash history,
22 and trip generation and distribution. CREC will generate a low volume of traffic in the Build
23 condition and this traffic will not have an appreciable impact on the study area roadways and
24 intersections. Traffic operations are often quantified in term of average vehicle delay with a “Level
25 of Service” rating scale applied, as such a decrease in level of service would occur if traffic impacts
26 were occurring due to changes to the traffic flow, and specifically as relates to the conflicting

vehicles as shown in the TIS, there are no expected decreases in levels-of-service between 2021 with CREC and 2021 without CREC.

Q. DURING THE PLANNING AND ZONING BOARD HEARINGS, QUESTIONS WERE RAISED REGARDING THE TYPES OF TRUCKS THAT WOULD BE TRAVELING ON THE ROADS EXAMINED. I BELIEVE YOU RESPONDED “REGULAR” TRUCKS. CAN YOU PLEASE EXPLAIN WHAT YOU MEANT BY THIS?

A. The majority of trucks generated by CREC during construction and under full operation will consist of single unit trucks, with 2, 3, or 4 axles. These trucks typically have lengths of 45 feet or less and are comparable in length to an average school bus. There will be some tractor-trailers generated during the construction of the CREC. However, the incidence of tractor-trailer trucks accessing the site is low and these trucks are most likely to arrive during off peak periods.

Q. ON SEPTEMBER 16, 2016, CDR MAGUIRE SUBMITTED A LETTER TO THE BURRILLVILLE TOWN COUNCIL STATING THAT “LARGER TRUCKS WILL HAVE DIFFICULTY NAVIGATING TURNS AT THE INTERSECTION OF PASCOAG MAIN STREET WITH CHURCH STREET AND WITH SOUTH MAIN STREET.” (ATTACHED HERETO AS EXHIBIT MC-2.) DO YOU HAVE A RESPONSE?

A. Yes. The single unit trucks generated by CREC during construction and under full operation will not have difficulty navigating turns at the intersections of Pascoag Main Street at Church Street and at South Main Street. There will be some tractor trailers generated during the construction of the CREC, and these trucks will access the site at a low incidence rate and typically during off peak hours. These tractor trailer trucks can maneuver the required turns at these two intersections along the route to and from CREC within the roadway width. However, these trucks will likely utilize a portion of the opposing travel lane when conducting turns at these intersections. The deficiency at these intersections is not attributable to CREC.

Reconstruction of the Main Street at Church Street intersection was discussed previously. Widening of the northeast corner at this intersection to accommodate the turn radius of large trucks

1 requires acquisition of private property and is considered to be unreasonable since the intersections
2 carries low volumes of traffic, does not have a history of high crash rates, and the low volume of
3 large trucks can maneuver the intersection with minimal delay.

4 A similar situation exists at the intersection of Main Street at South Main Street. The
5 majority of the trucks generated by CREC can maneuver the intersection. The low volume of
6 tractor trailer trucks that will be generated by the site can maneuver the required turns at this
7 intersection to travel to and from the site with encroachment into the opposing lane. To avoid the
8 encroachment into the opposing lane, the southwest radius of this intersection would need to be
9 widened. This improvement would require acquisition of private property. Due to the layout of
10 the Dunkin Donut site in the southwest corner of this intersection, it is likely that the corner radius
11 cannot be sufficiently increased without adversely affecting the on-site circulation, parking and
12 drive-thru lane of the Dunkin Donut site. Given the low volume of traffic at this intersection, the
13 low crash rate, the consequential property acquisition impacts and the fact that tractor-trailer trucks
14 can maneuver this intersection with minimal delay to traffic, the widening of the intersection radius
15 is, in my opinion, unreasonable and unjustified.

16 **V. RHODE ISLAND DEPARTMENT OF TRANSPORTATION**

17
18 **Q. HAVE YOU REVIEWED THE RIDOT ADVISORY OPINION?**

19
20 **A.** Yes.

21
22 **Q. DO YOU HAVE ANY COMMENTS OR RESPONSE?**

23
24 **A.** In its advisory opinion, RIDOT indicated which permits are required for the site, and I
25 agree. We met with RIDOT's Managing Engineer of Road Design and the Chief Civil Engineer
26 of Traffic Design in March of 2016 at the onset of the Project to discuss the traffic study and
27 pavement management plan. At this meeting, we discussed the travel routes to the site. At this

meeting RIDOT also informed us of relevant roadway projects, identified the types of RIDOT permits required, and we discussed sources and methods for assessing pavement conditions. Invenergy will continue to coordinate with RIDOT as the Project moves forward and throughout the expected permitting process.

VI. CONCLUSIONS

Q. DO YOU HAVE AN OPINION, TO A REASONABLE DEGREE OF SCIENTIFIC CERTAINTY, REGARDING CREC'S TRAFFIC IMPACT?

A. Yes. It is my opinion that CREC will have minimal impact on the overall operations of the roadways and intersections studied.

The final operation phase (after construction and once CREC is up-and-running) is expected to add approximately thirty-three (33) vehicle trips during the morning and evening weekday peak hours, which will have a very minimal impact on traffic conditions and road conditions.

The construction phase will impact the traffic conditions and roads. However, as detailed in Tables 4 and 5 in the traffic impact study, the roads will typically remain under capacity, meaning the roads have capacity for more traffic and more truck movement. The method used to estimate construction traffic was very conservative by adding both employee shift traffic and construction truck traffic to the peak hour volumes when realistically, these two trips do not occur in the same hour. We were asked by the Town's traffic expert to report the decline in level of service ("LOS") under a more realistic and less conservative trip generation estimate for the construction phase. The results for the intersection of Pascoag Main Street at South Main Street

1 indicated that the northbound left turn movement would decline to LOS E while all of the other
2 movements would operate at LOS C or better.¹

3 In regard to the revised water supply plan, the preferred alternative, to truck water to the
4 site, was analyzed. Adjustments were made to the trip generation estimates for ammonia trucks
5 and trucks associated with the oil-fired events at the plant. The resultant estimated peak hourly
6 traffic during the peak time of the facility was found to be less than the traffic projections originally
7 analyzed as part of the May 2016 Traffic Impact Study, and therefore, the conclusions of the
8 Traffic Impact Study in terms of peak hour operations remain valid. The travel routes for the water
9 supply trucks were found to be adequate for truck traffic and these routes will not experience
10 significant additional deterioration due to the transport of water to the site.

11 This analysis presented in the traffic study depicts the highest level of volume and the
12 absolute worst-case-scenario.

13 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?**

14 **A.** Yes.

¹ LOS are ranked from A through F with LOS A representing free flow conditions, LOS C representing average delays and LOS F representing constrained conditions. LOS E indicates that the intersection is approaching capacity and that long delays are encountered. At unsignalized intersections, the minor street approaches often have lower LOS.

EXHIBIT MC-1

PRINCIPALS

Joseph W. McMahon, P.E.
Joseph J. DeSantis, P.E., PTOE
John S. DePalma
William T. Steffens
Casey A. Moore, P.E.
Gary R. McNaughton, P.E., PTOE

ASSOCIATES

John J. Mitchell, P.E.
Christopher J. Williams, P.E.
R. Trent Ebersole, P.E.
Matthew M. Kozsuch, P.E.
Maureen Chlebek, P.E., PTOE
Dean A. Carr, P.E.

MEMORANDUM

TO: Beth Noonan

FROM: Maureen Chlebek, P.E., PTOE

DATE: July 29, 2016

RE: Clean River Energy Center
Burrillville, RI
Traffic Comment Responses

McMahon Associates has prepared this memorandum to provide responses to traffic related comments made at the Burrillville meetings in June and July of 2016.

Comment 1. Crash Comment: "Has the non-intersection crash history along Route 100 been investigated?"

Response 1: Crash data was collected from the Burrillville town line on South Main Street to the proposed site on Wallum Lake Road for all study area roadways following the truck route. Additional analysis was performed to determine the number of crashes on the study area roadway segments. Intersections at the study area intersections are not included in this summation. A detailed summer of crashes along the truck route roadway segments is attached. When considering the number of crashes on the roadways, consider that the data covered a three-year period from 2013-2016 and that the roadway lengths vary.

Comment 2: ADT Comment: Please provide estimates of the daily trip generation.

Response 2: Under future build conditions when the power plant is fully occupied and operating, an expected 60 additional trips (30 vehicles in, 30 vehicles out) are expected daily, including trips for 25 power plant employees and various delivery vehicles during the day. The existing ADT and ADT with the addition of the proposed power plant is compared below.

	Existing ADT	Existing Build ADT	% Increase
South Main Street	4950	5000	1%
Pascoag Main Street	6500	6550	1%
Church Street	3650	3700	2%

As shown in the table, the project is expected to create a minor increase in traffic overall in comparison to the average daily traffic.

Comment 3. Alternative Truck Route Comment: "Have you explored alternative truck routes to the site?"

Response 1: Alternative truck routes have been explored and evaluated. See attached report on alternative truck routes. The results indicate that the alternative truck routes would not be viewed as advantageous for construction vehicles originating in the Providence metro area. This is mainly due to the additional distance of 10+ miles, and also that the roadways do not appear to present an overall upgrade in terms of their ability to handle larger vehicles when compared to the originally assumed route.

Crash Summary

	<u>Wallum Lake</u>	<u>Church Street</u>	<u>High Street</u>	<u>South Main Street</u>
	<u>Road</u>			
Segment Length (miles)	5	0.8	0.09	2.2
Years Reported	1/1/2013- 12/31/2015	5/10/2013- 5/10/2016	5/10/2013- 5/10/2016	5/10/2013- 5/10/2016
Type				
Angle	0	2	2	14
Head-on	1	0	0	0
Rear-end	1	1	0	9
Read to Side	0	1	0	0
Sideswipe	1	1	3	4
Animal	0	0	0	5
Rear to Rear	0	0	1	0
Single Vehicle	18	6	3	13
Unknown	<u>0</u>	<u>3</u>	<u>2</u>	<u>2</u>
Total	21	14	11	47
Severity				
Property Damage	16	11	10	37
Personal Injury	5	3	1	10
Fatality	0	0	0	0
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	21	14	11	47
Weather				
Clear	16	10	5	33
Cloudy	0	3	5	6
Rain	1	1	0	2
Snow	2	0	1	5
Blowing snow	1	0	0	0
Ice	0	0	0	0
Sleet	1	0	0	1
Fog	0	0	0	0
Unknown	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	21	14	11	47
Time				
7:00 AM to 9:00 AM	2	2	3	5
9:00 AM to 4:00 PM	9	7	8	19
4:00 PM to 6:00 PM	1	2	0	6
6:00 PM to 7:00 AM	<u>2</u>	<u>3</u>	<u>0</u>	<u>17</u>
Total	21	14	11	47

Source: Town of Burrillville Police

INVENERGY CLEAR RIVER ENERGY CENTER



ALTERNATE TRUCK ROUTES

Prepared by



McMahon Associates
55 Dorrance Street, Suite 403
Providence, RI 02903

Based on feedback received at the Burrillville Planning Board meetings of June 20 and July 11, 2016, we have investigated alternate truck routes that may potentially be utilized by construction vehicles accessing the site. Our initial traffic studies assumed that the majority of vehicles would originate in the Providence metro area, and therefore travel I-295 to US 44 to RI Route 100. The originally assumed truck route is shown as Route A in the attached diagram. Route 44 is a designated US route and is on the National Highway System, and Route 100 for most of its length has wide shoulders and good sight distance, suitable for larger vehicles. This is also the most direct route, measuring approximately 16 miles from I-295 to the site, passing through the village of Chepachet in Glocester (A-1). Only a small section of roughly one mile through the village of Pascoag has reduced roadway width, and a tight curve at the intersection of Pascoag Main Street and Church Street (A-2).



A-1: Putnam Pike (Main St.) at Money Hill Rd



A-2: Pascoag Main St at Church St

The Planning board questioned if there were alternate routes that construction vehicles might utilize and suggested investigation of RI/MA Route 146 to MA Route 16 and RI/MA Route 96 (Route B). We have investigated the feasibility of this suggested route and note the following. Also starting measurement from I-295, this route is significantly longer than the original assumed truck route, totaling 28.5 miles. Route 146 in Rhode Island and Massachusetts is primarily freeway, covering approximately 13 miles of the alternate route, and truck traffic can easily be accommodated on this roadway. Route 16 is of variable width, some areas having wide shoulders, others having little or no shoulder. It travels through the village of East Douglas and the Town Common of Douglas. East Douglas has a small commercial area with shops on each side of the road, and numerous crosswalks (similar to Route 107 in Harrisville). Douglas Town Common is more rural/historical. There are two noteworthy intersections along this piece of Route 16. First, is the intersection of Davis Street and NE Main Street (B-1). This intersection is under partial stop control with a flashing beacon. Route 16 (Davis Street) comes in at a sharp skew with to NE Main Street which has the right-of-way in the westbound direction. Sight distance is somewhat limited at this intersection. Second, is the intersection of SW Main Street and South Street (Route 96) (B-2).



B-1: Davis Street at NE Main Street

South Street intersects SW Main at a skewed angle, and sight distance is limited here as well, particularly looking west from the South Street northbound approach. From this intersection, Route 96 heads south back into Rhode Island, is somewhat narrow at first, but with wider shoulders toward the southern end. Unfortunately, there are no suitable east-west cross connections to the site on Route 100, so construction vehicles would need to proceed all the way to Hill Road (B-3), and then use Route 107 to Route 100 north. This would require vehicles to pass through the village of Pascoag, including the Church Street section.



B-2: South St at SW Main St



B-3: Round Top Rd at Hill Rd

As an alternate to this suggested route, we also investigated a slight variation (Route C). Instead of turning south onto Route 96 in Douglas, MA, continuing west on SW Main Street for just over one mile, it intersects with Wallum Lake Road (Route 100). This leads directly to the proposed site, and is about 3 miles shorter than the suggested alternate route (totaling 25.5 miles). Similar to Route 96, Route 100 is narrow at first in Massachusetts, but widens upon entering Rhode Island. There is a sharp, stop controlled portion at its intersection with East Wallum Lake Road (C-1). Immediately following that curve is a section of somewhat steep grade (C-2). Since this route comes in from the north, it does not travel the section of Route 100 through the village of Pascoag.



C-1: Wallum Lake Rd at E Wallum Lake Rd



C-2: Wallum Lake Rd

In summary, upon review of the two noted alternate truck routes, we do not feel that they would provide a route that would be viewed as advantageous for construction vehicles originating in the Providence metro area. This is mainly due to the additional distance of 10+ miles, and also that the roadways do not appear to present an overall upgrade in terms of their ability to handle larger vehicles when compared to the originally assumed route. For the majority of construction vehicles accessing the proposed site from the Providence metro area, we feel they would most likely utilize the originally assumed route noted above. However, for any construction vehicles for which trips may originate in the Worcester area, the suggested route (with the variation noted above) may present a considerably shorter trip. At this time it is difficult to project what percentage of construction vehicles may originate in the Worcester area. While this percentage is assumed to be small, any use of this alternate would potentially reduce the overall truck traffic currently projected to utilize Route 100 through Pascoag.

ALTERNATE TRUCK ROUTES

BURRILLVILLE, RI

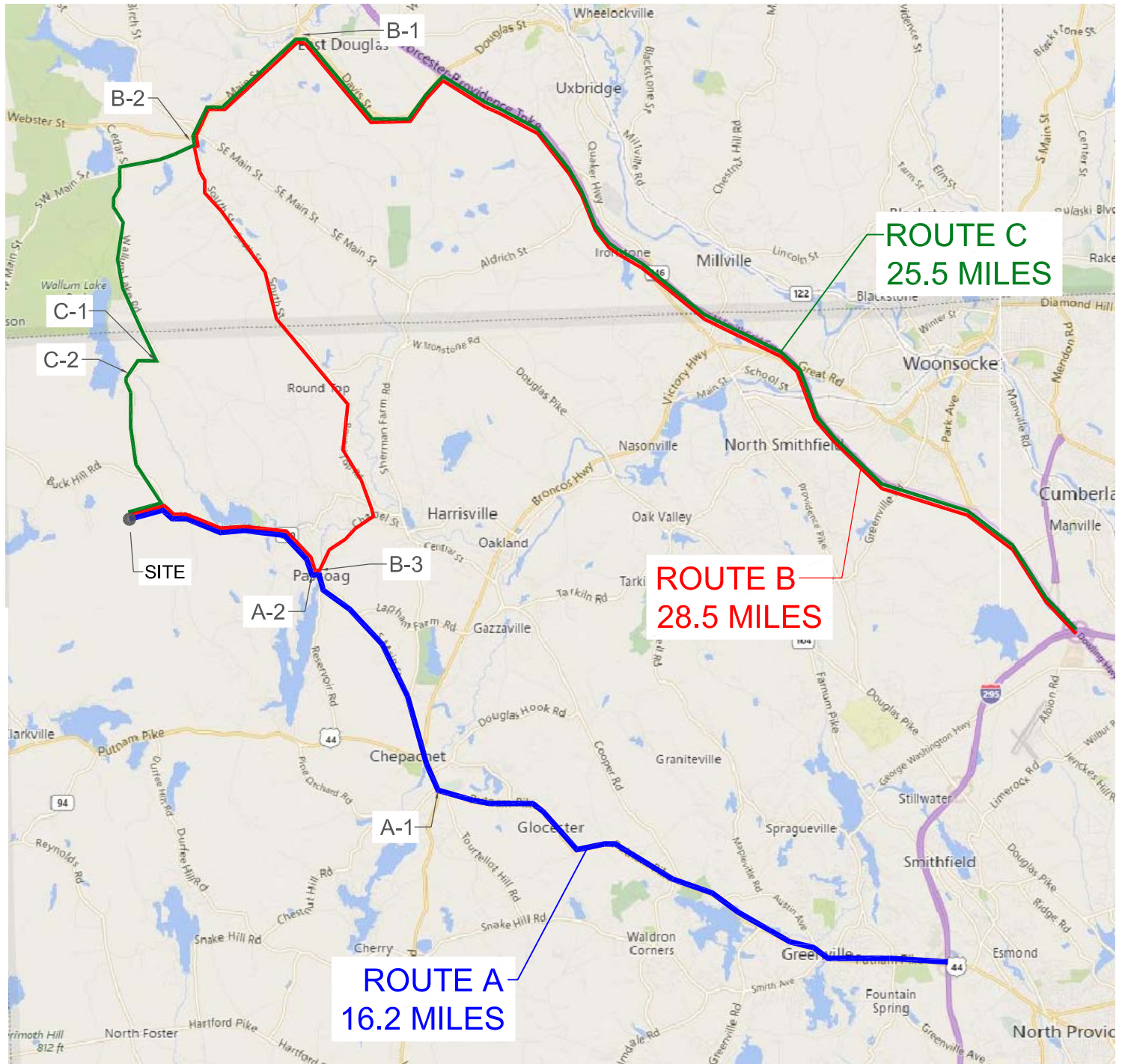


EXHIBIT MC-2

INVENERGY CLEAR RIVER ENERGY CENTER



INTERSECTION REVIEW

Church Street at Main Street, Pascoag, RI

Prepared by



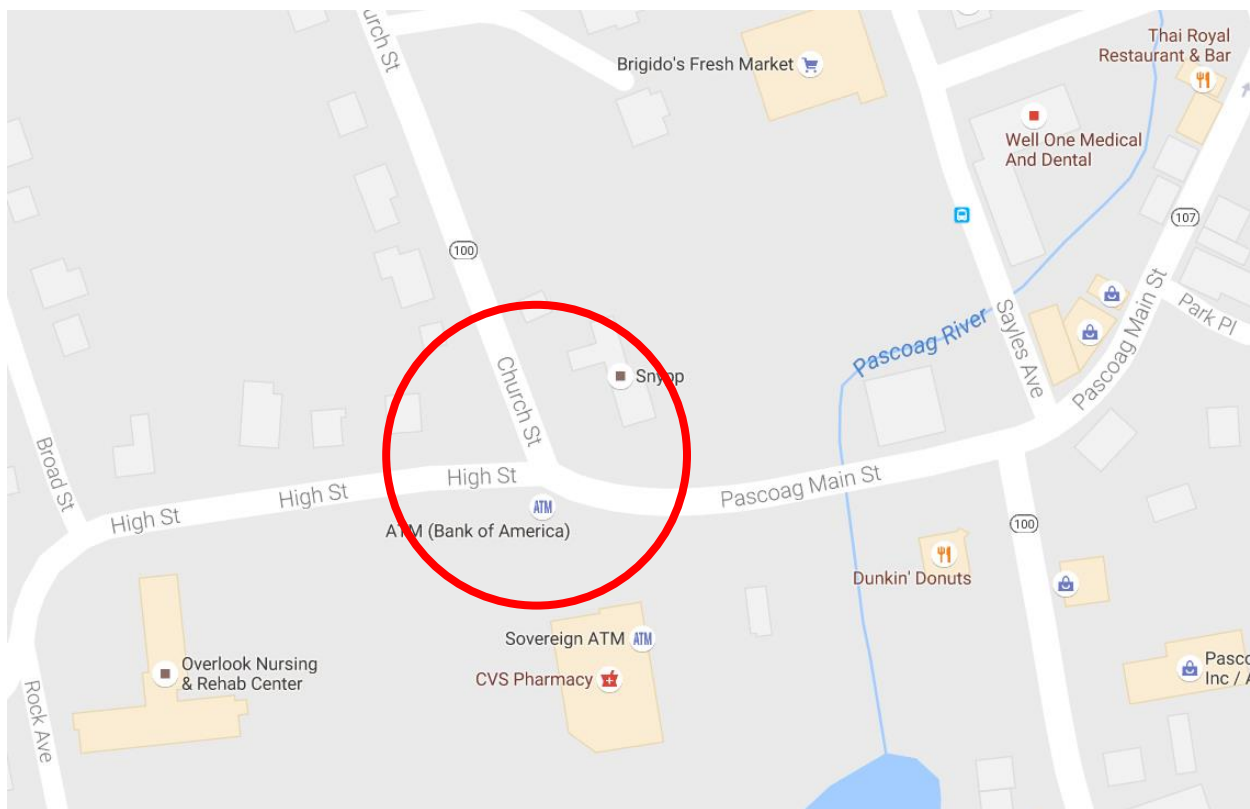
McMahon Associates
55 Dorrance Street, Suite 403
Providence, RI 02903

Invenergy Clear River Energy Center Intersection Review - Church Street at Main Street, Pascoag, RI

Based on feedback received at the Burrillville Planning Board meeting of August 15, 2016, we have investigated the intersection of Church Street and Main Street in Pascoag. This intersection is located along the truck route that will likely be utilized by construction vehicles accessing the Invenergy site proposed off of Wallum Lake Road.

It was mentioned by both the Planning Board and the general public that a tight curve at the intersection of Church Street and Main Street may inhibit passage of large truck traffic. McMahon Associates has performed an investigation of conditions at this intersection and our findings are detailed below.

Church Street, Pascoag Main Street, and High Street form an intersection opposite the CVS Pharmacy in the Pascoag section of Burrillville. Pascoag Main and High run east to west and are uncontrolled through movements in the intersection. Pascoag Main and Church, however form Rhode Island Route 100, with Church Street running south to north. Church Street is stop controlled on its southbound approach to Pascoag Main/High. The CVS entrance forms a fourth leg of the intersection, opposite Church.



It is anticipated that trucks heading to the site will travel west on Pascoag Main Street, and turn right onto Church, following Route 100 north. Upon return, they will follow Route 100 south by heading south on Church, then take the stop controlled left onto Pascoag Main. These are the two movements we have evaluated.

It should be noted we were unable to obtain detailed plans of this intersection from RIDOT within the study timeframe. Findings were obtained from field observations, and utilizing Google Maps aerial information. A site visit was conducted on the morning of August 18, 2016 under ideal weather conditions. At that time no tractor trailer type vehicles were observed in the intersection. However, several large 10 wheel dump trucks and vehicles pulling trailers were observed traversing the intersection. All did so with no difficulty, including the movements noted above.

In order to represent the wheel patterns of a tractor trailer we have utilized Autoturn templates over a google image of the intersection. The tractor trailer (WB-50 design vehicle) can maneuver the turns at this intersection, however, there is encroachment into the opposing lanes. For the stop controlled southbound Church to Pascoag Main Street move this encroachment is minor, with the projected wheelpath just over the centerline for a short distance. For the northbound Route 100 movement (Pascoag Main to Church), a more significant encroachment is shown (reference attached Autoturn diagrams 1 – 3)

It should be noted, that when using the turning templates it is not uncommon to see encroachment outside of travel lanes, particularly along older roadways in the northeast. In addition, the templates are somewhat conservative, and the majority of professional truck drivers can easily maneuver within the wheelpaths shown in the templates. For this northbound Route 100 movement, 2 scenarios were depicted, varying the location where the driver would start to swing around the corner. Both showed encroachment to within the majority of the oncoming lane. For comparison purposes, an Autoturn simulation was also performed for a standard full sized school bus (S-BUS-36) and it also showed encroachment into the opposing lane at this intersection. Fortunately, Church Street southbound is stop controlled, and there is an upgrade on Pascoag Main Street approaching the intersection, so speeds are low on those approaches. In addition, traffic volumes are quite low, reducing the opportunity for conflict.

If the Town desires to improve conditions at this intersection, the radius in the northeast corner of the intersection could be increased to eliminate the need for the northbound tractor trailer to travel in the opposing lane when making this turn. However, this would require right-of-way acquisition in order to rebuild the curb and sidewalk further back from its existing location. Physically there is room to accomplish this widening within a small landscaped area in front of the Echo Plaza, without impacting plaza parking spaces. Utility impacts could be limited to relocation of one fire hydrant. It should be noted that there is also ledge visible on the opposite side of the intersection, so some ledge excavation could also be required.



With just this minor widening, tractor trailers (WB-50 design vehicles) appear to have enough room to negotiate this corner without any significant encroachment into the oncoming lane (reference Autoturn diagram 4).

It should be noted that increasing the curb radius could potentially result in increased travel speeds for smaller vehicles at this intersection, since motorists would be able to more smoothly complete the westbound to northbound movement. To reduce the potential for speed increases, a truck apron could be added in the northeast corner within the widened area. In other words, the corner radius of the curb and sidewalk would be increased, but the added pavement would be of a different look and feel (similar to what is typically provided at a roundabout). This would accommodate a truck wheel base but is less inviting to smaller vehicles. These minor improvements could benefit all larger wheelbase vehicles utilizing the existing intersection configuration, including school buses.





AUTOTURN 2
WB-50 WESTBOUND RIGHT
CHURCH ST AT PASCOAG MAIN ST
BURRIVILLE, RHODE ISLAND



AUTOTURN 3
WB-50 WESTBOUND RIGHT
CHURCH ST AT PASCOAG MAIN ST
BURRIVILLE, RHODE ISLAND



AUTOTURN 4
WB-50 WESTBOUND RIGHT WITH IMPROVEMENTS
CHURCH ST AT PASCOAG MAIN ST
BURRIVILLE, RHODE ISLAND