

IPRO 307 Intermodal Container Transport Solutions

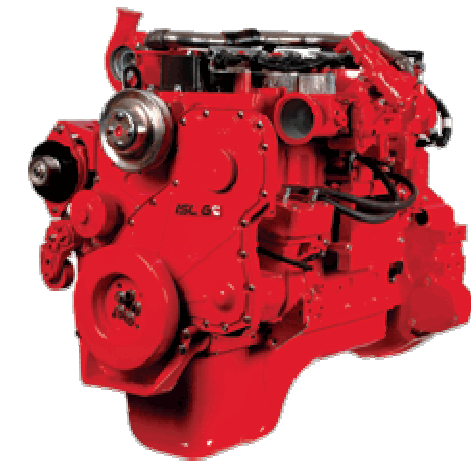


Possible implementation of alternative fuels at the Joliet Intermodal Facility

Means



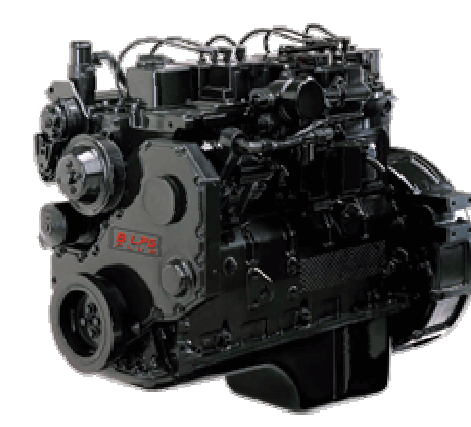
Engines:



- Cummins Westport ISL G
- 8.9 L, 250–320 hp
- 660–1,000 lb-ft torque
- US EPA & CARB 2010
- CNG, LNG, Biomethane



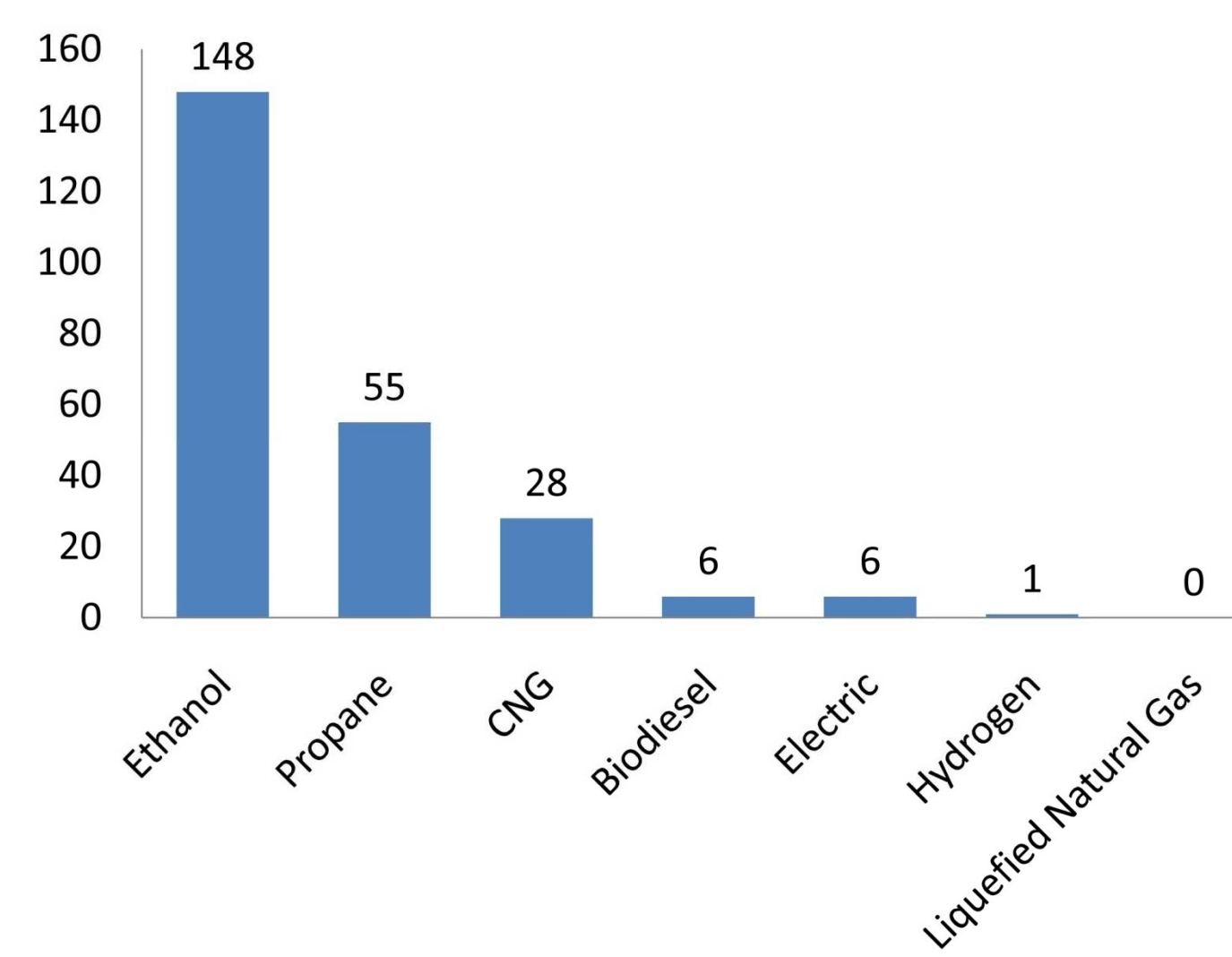
- Cummins Westport B Gas Plus
- 5.9 L, 195–230 hp
- 420–500 lb-ft torque
- US EPA & CARB 2007
- CNG, LNG, Biomethane



- Cummins Westport B LPG Plus
- 5.9 L, 195 hp
- 420 lb-ft torque
- US EPA 2007
- LPG

Existing Stations:

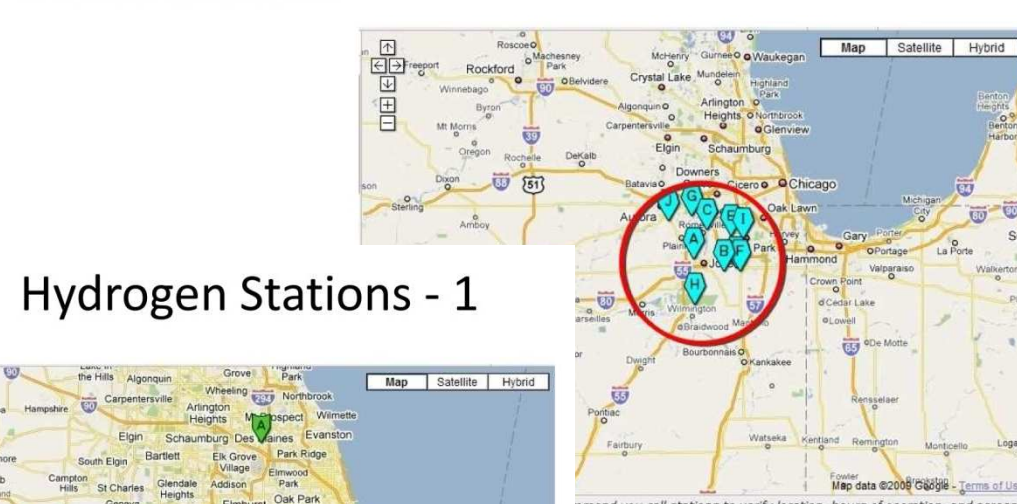
Number of Alternative Fueling Stations within 100 miles from Joliet, IL (by fuel type)



Biodiesel Stations - 6



Ethanol Stations - 148



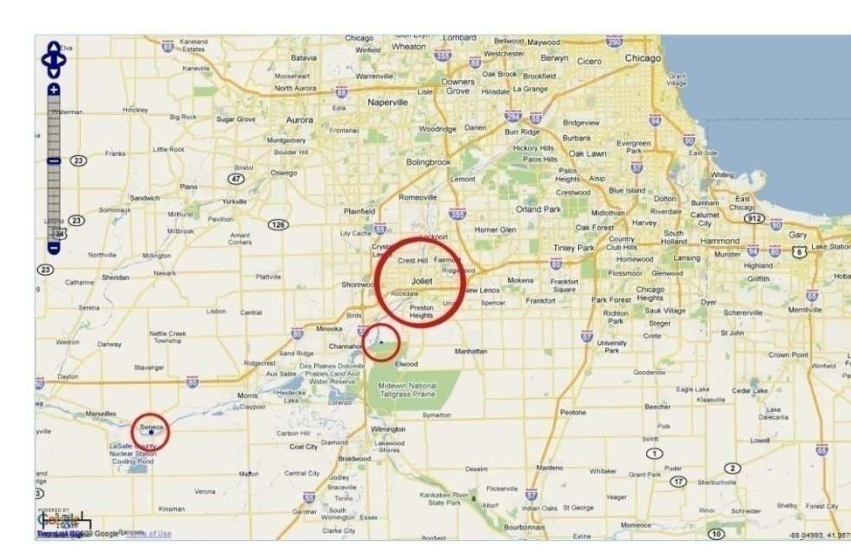
Hydrogen Stations - 1



Local Fuel Production:

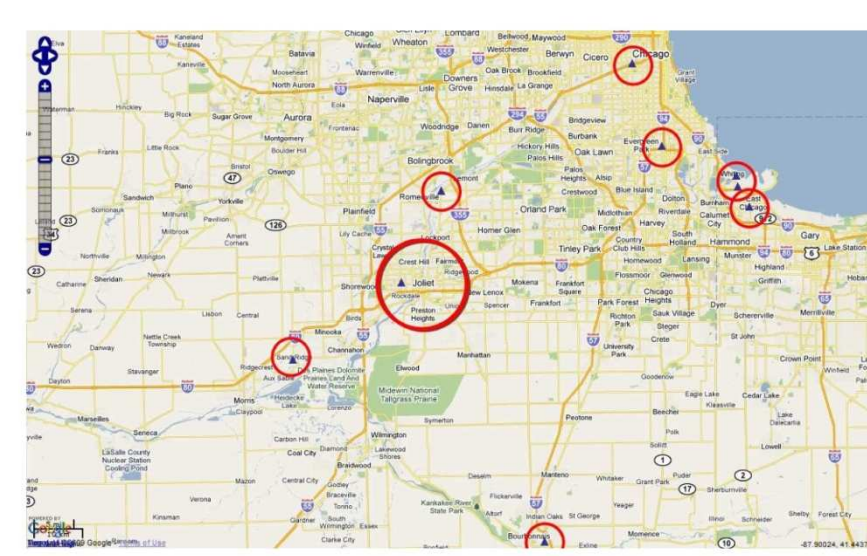
- Locally Produced Alternative Fuels

Biodiesel Production



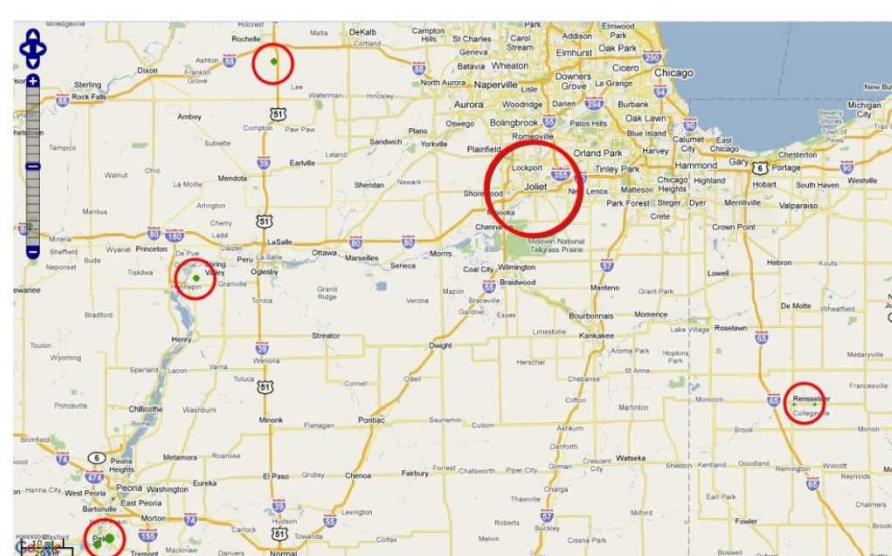
Data obtained from <http://www.afdc.energy.gov>

Hydrogen Production



Data obtained from <http://www.afdc.energy.gov>

Ethanol Production



Data obtained from <http://www.afdc.energy.gov>

Analysis

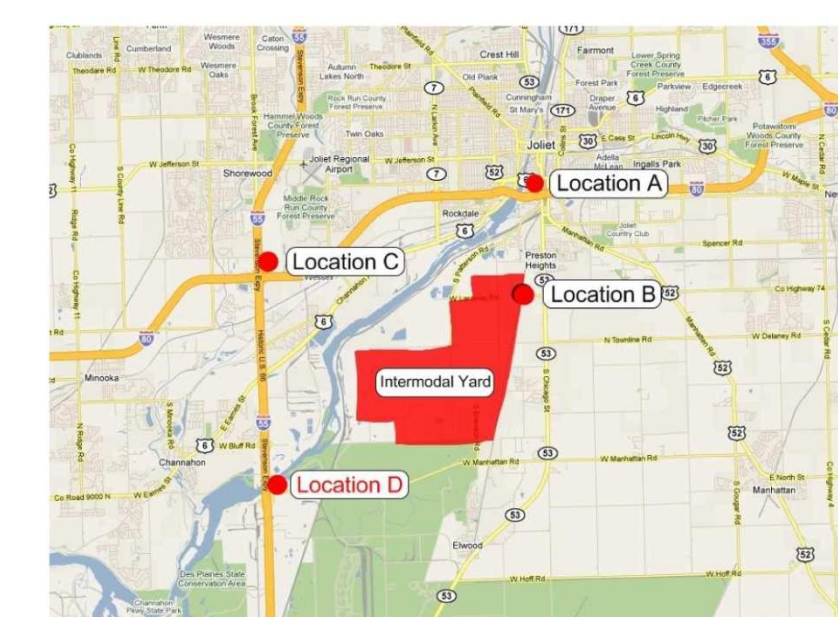


Location:

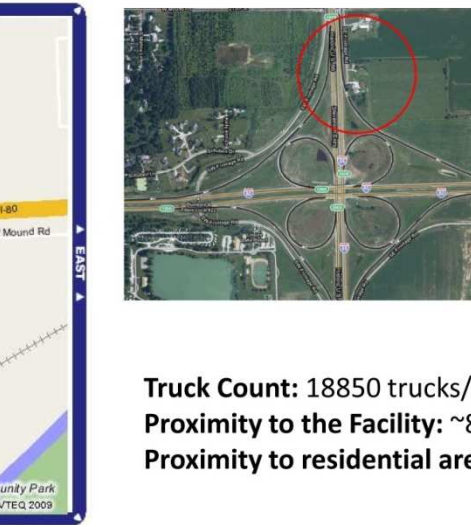
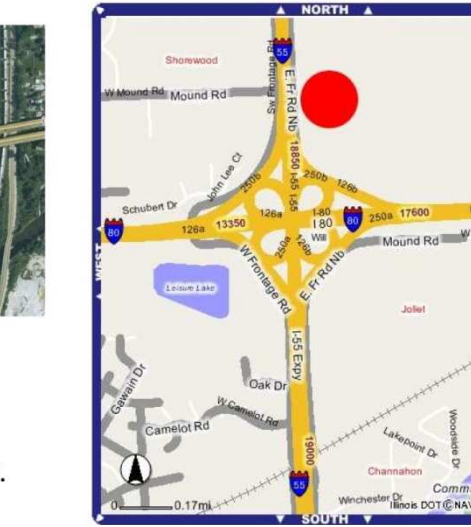
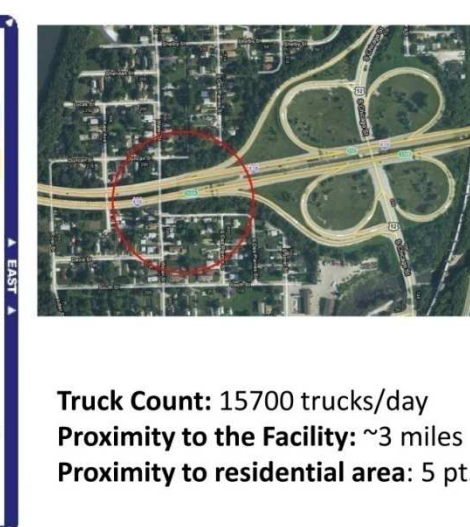
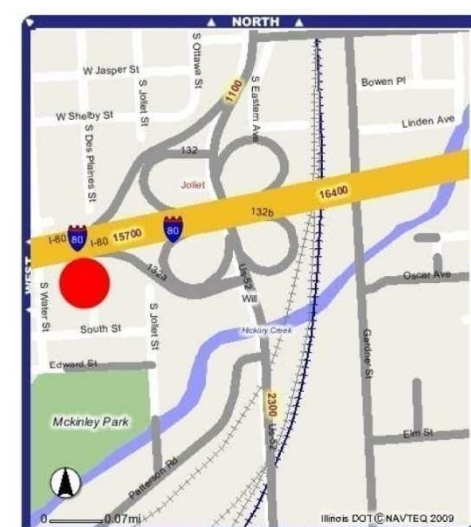
	1 (traffic)	2 (impact on population)	3 (proximity to facility)	Total Effectiveness (lower score = better effectiveness)
On Site	7.7 (2450 trucks/day)	2 pt.	1 (on site)	3.6
I-80/IL-53	1.2 (15700 trucks/day)	5 pt.	4 (~3 miles)	3.4
I-55/Bluff Rd.	1.3 (14250 trucks/day)	1 pt.	7 (~6 miles)	3.1
I-80/I-55	1 (18850 trucks/day)	3 pt.	9 (~7 miles)	4.3

- Location chosen based on the following criteria:
- Ave daily traffic trucks/cars
- Proximity to the facility
- Proximity to the residential area

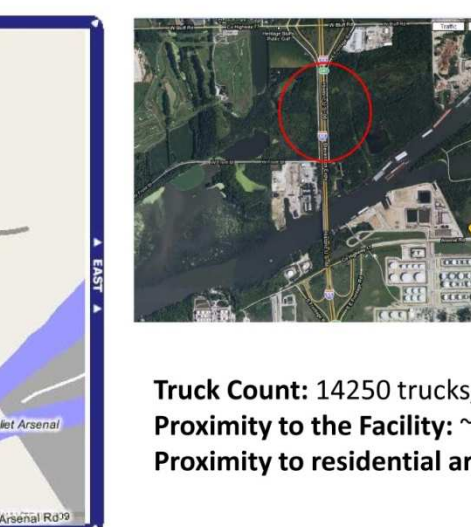
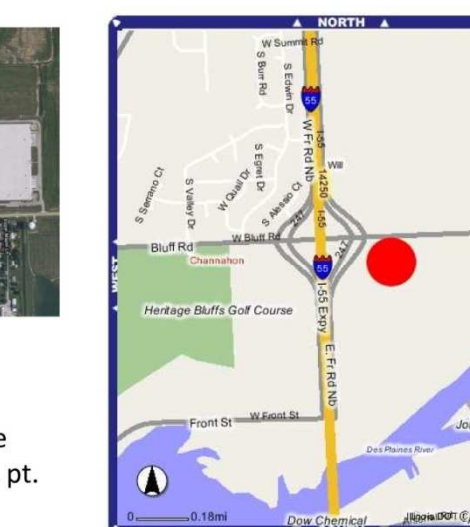
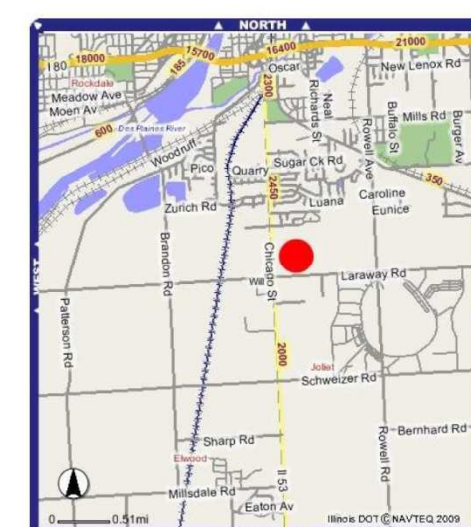
Area Overview



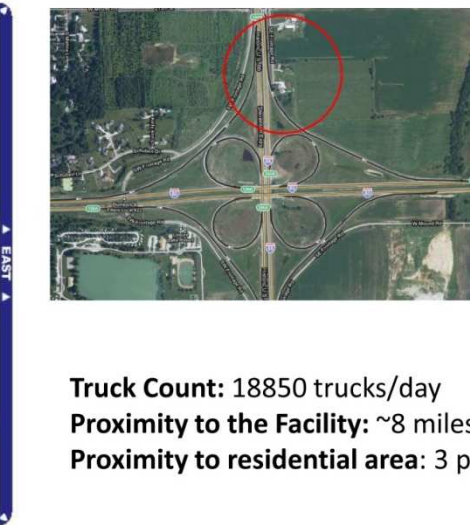
Traffic I-80/IL-53 (Location A)



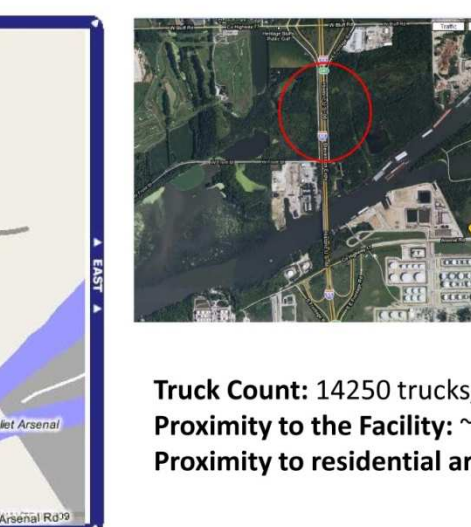
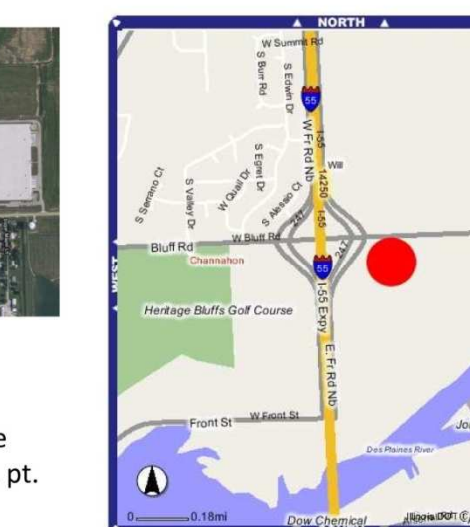
Traffic On Site (Location B)



Traffic I-80/I-55 (Location C)



Traffic I-55/Bluff Rd. (Location D)



Dimensions/Pump Number:

- Two existing stations analyzed

- Average daily traffic compared

- Number of pumps and parking lot sizes for Gas-Ciity determined

	Gas Ciity	O'Hare	Russel Rd
Traffic Overall	14250	10900	11500
Traffic to Station (4% of overall)	570	436	460
Parking area (ft ²)	133803.4	72000	140000
Parking area/traffic (ft ² /truck)	165.1	304.3	304.3
Pumps	6	4	6
Pumps/truck	0.009124	0.013043	0.0111
Traffic Overall	55300	161000	89000
Traffic (4% of overall)	2212	6500	3560
Parking area	16342.61	50400	25000
Parking area/traffic (ft ² /car)	7.8	7.0	7.0
Pumps	6	12	12
Pumps/car	0.001846	0.003371	0.0029
Building area	3500	8100	

Gas-Ciity Alt Fuel Station Site



Trucks	Daily Traffic (trucks/day)	14250
	Traffic to Station (trucks/day)	436
	Parking area (ft ²)	133803.4
	Pumps	6
	Pumps/truck	0.009124
	Daily Traffic (cars/day)	30000
	Traffic to Station (cars/day)	1200
	Parking area (ft ²)	16342.61
	Pumps	6
	Pumps/car	0.003671
	Building area	3500

O'Hare Oasis Gas Station



Trucks	Daily Traffic (trucks/day)	10900
	Traffic to Station (trucks/day)	436
	Parking area (ft ²)	72000
	Pumps	4
	Pumps/truck	0.013043
	Daily Traffic (cars/day)	22000
	Traffic to Station (cars/day)	880
	Parking area (ft ²)	50400
	Pumps	12
	Pumps/car	0.003371
	Building area	8100

Russell Rd. Truck Stop

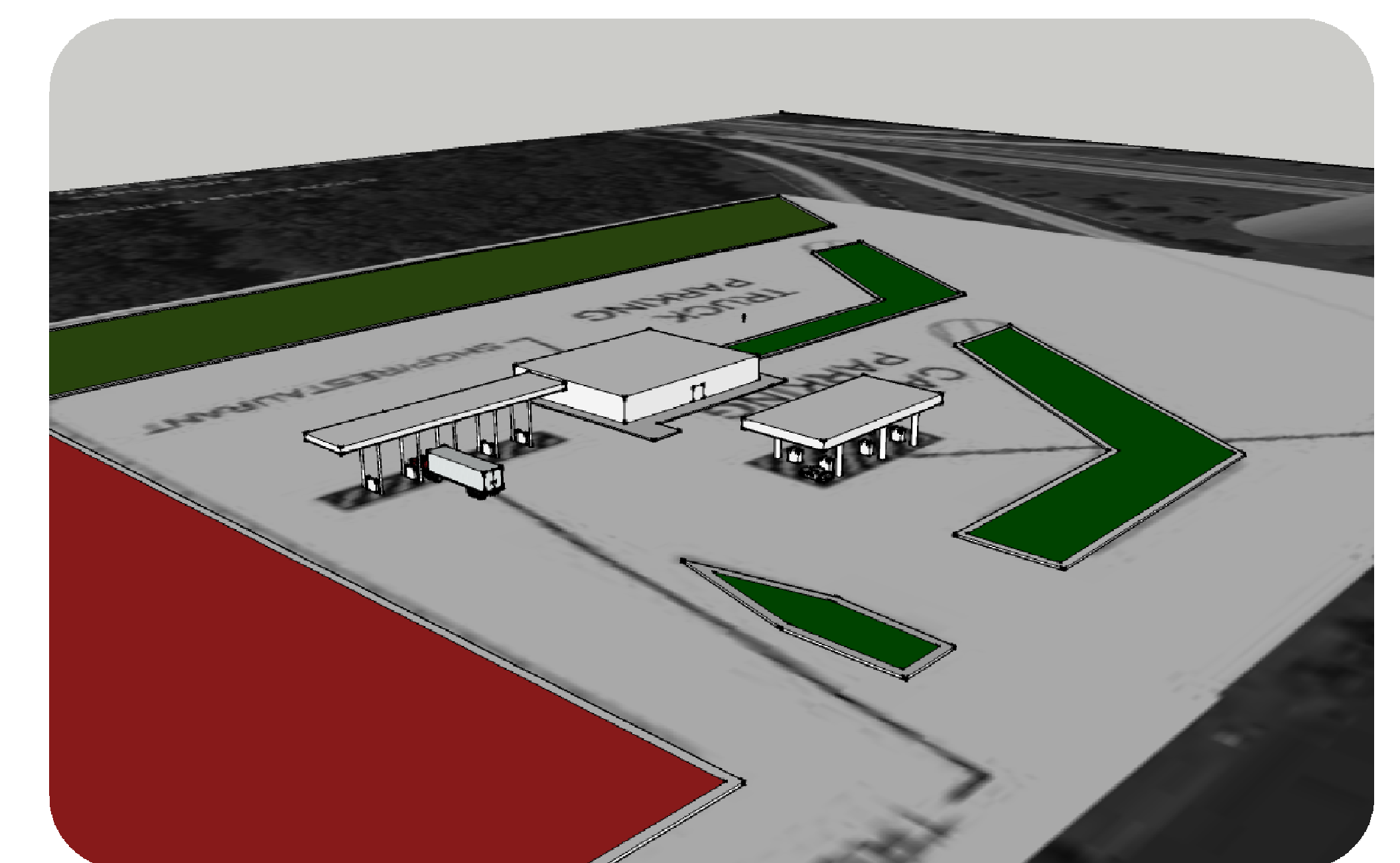


Trucks	Daily Traffic (trucks/day)	11500
	Traffic to Station (trucks/day)	460
	Parking area (ft ²)	140000
	Pumps	6
	Pumps/truck	0.0111
	Daily Traffic (cars/day)	23000
	Traffic to Station (cars/day)	920
	Parking area (ft ²)	25000
	Pumps	12
	Pumps/car	0.0029
	Building area	8100

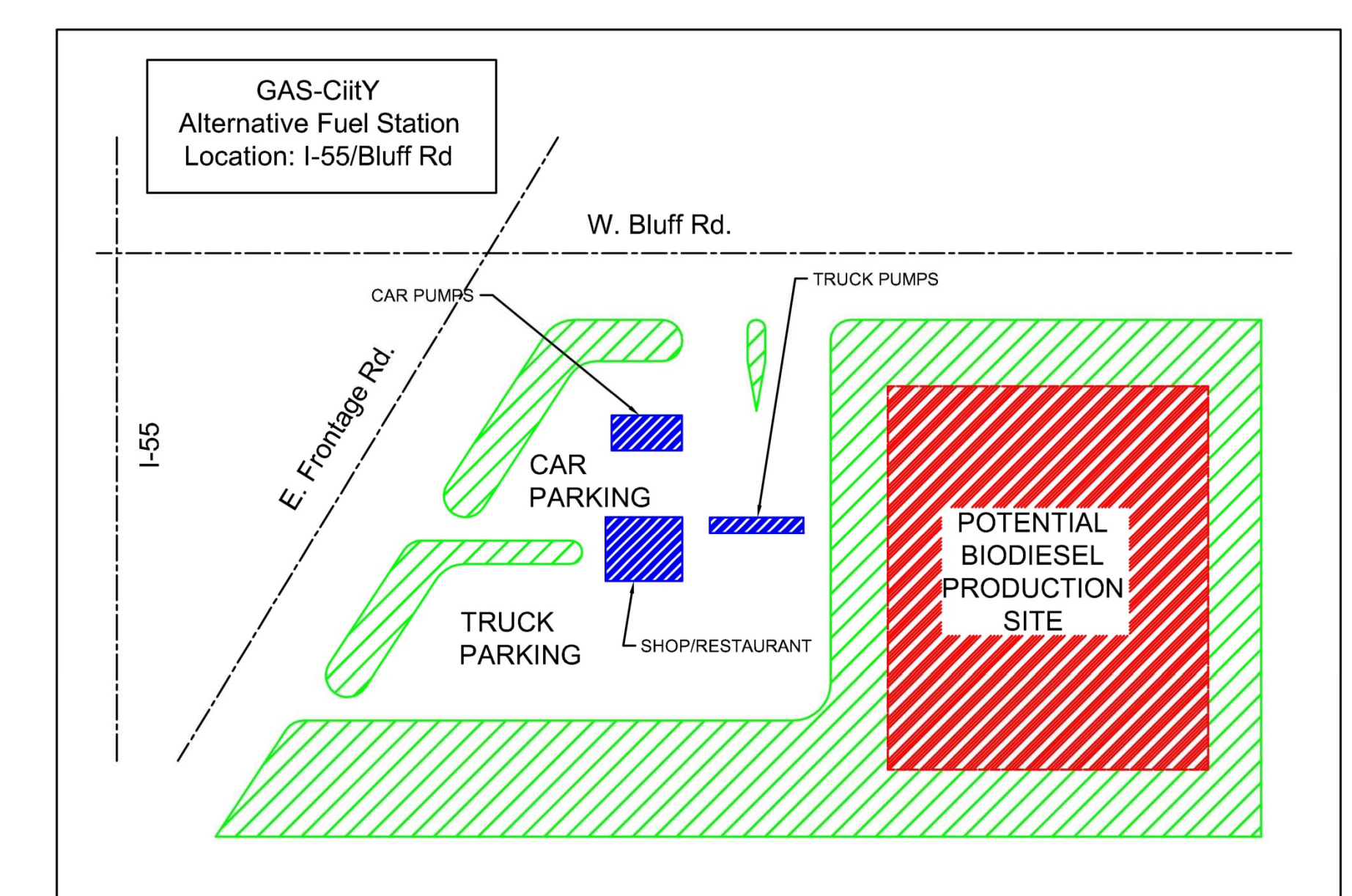
Result



Gas-Ciity Alternative Multi-Fuel Station:



Gas-Ciity Floor Plan:



Conclusions:

- It is theoretically possible to implement an alternative multi-fuel station in the Joliet area to accommodate increasing traffic flow to intermodal facility
- More analysis should be conducted to determine feasibility of such station