Truck Traffic Volume Increases Projected to Result from Unconventional Gas Well Development (UGWD) in Maryland

The volume of truck traffic will increase in Garrett and Allegany Counties if UGWD moves forward. To give a rough perspective of the scale of that increase, this section compares UGWD truck trips estimates to current State Highway Administration (SHA) truck volume counts.

Data and Methodology

The SHA data available on truck volumes comes in the form of Annual Average Daily Traffic (AADT) and truck percentages along traffic count stations (SHA, AADT's of Stations for the Years 2003-2013). Each count station comes with details including AADTs, truck percentages, county, road name, mile marker, and other information, allowing us to choose stations aligning with potential UGWD areas in Western Maryland. Three count stations along Friendsville Road (MD 42, see Figures 1 and 3) in northwest Garrett County were the most relevant for this analysis, since a 2010 drilling permit application submitted to MDE listed Friendsville Road as a potential truck route. Table 1 summarizes the available information for these count stations.

Figure 1. Friendsville Road, in red, in Garrett County.

Table 1. Summary of three traffic count stations along Friendsville Road in Garrett County (SHA). AADT 2013 is Annual Average Daily Traffic for all vehicles. % of Trucks is the sum of given single-unit and combination truck percentages. AADT of Trucks is the product of traffic AADT 2013 and % of Trucks.

Station Code	Road Name	Road Section	Station Description	AADT 2013	% of Trucks	AADT of Trucks
1	Friendsville Rd	FEARER RD TO PENNSYLVANIA ST/L	MD42-.10 MI S OF PENNSYLVANIA ST/L	632	11.09	70.089
2	Friendsville Rd	IS 68 TO FEARER RD	MD42-.20 MI N OF IS68	2055	11.87	243.93
3	Friendsville Rd	HOYES RD TO IS 68	MD42-.50 MI S OF IS68	2765	10.65	294.47

UGWD truck trip estimates for one well, and for one pad with six wells were given in Appendix B: Roads and Traffic of Maryland's Marcellus Shale Risk Assessment, and are provided at the end of this document for reference (Tables 4 and 5). Using heavy and light truck trips from these tables, this analysis estimates the additional truck volume over each of these three Friendsville Rd. stations for three scenarios (Table 2). In addition to Well and Pad scenarios, a Peak Well scenario is included to illustrate the short-term impact of the step of UGWD that is associated with the most intensive truck traffic: hydraulic fracture water hauling and produced water disposal. Total trips are averaged per day in the listed time period to achieve standard AADT units. Since SHA's AADT values include both directions of traffic, UGWD truck trip estimates were doubled to also reflect both directions. See the Limitations and Clarifications section of this document for more details.

Table 2. List of three truck volume increase scenarios.

Scenario	Scope	Time Period	UGWD Truck Trips (x2)	UGWD AADT
Pad	One well pad with six wells	Two years	25,948	35.55
Well	One well	Four months	5,358	44.04
Peak Well	One well, water hauling only	One month	2,600	85.25

Results

Combining 2013 SHA truck AADTs for the three Friendsville Road SHA traffic count stations (Table 1) and UGWD truck AADT estimates (Table 2), resulting rates and percentage increases are listed in Table 3 and displayed in Figure 2. Increases vary from 12% to 122%, depending on the scenario and count station. The Peak Well scenario had the greatest impact at 85 more average heavy truck trips per day. The count station at Friendsville 1 may experience the greatest percent increases, since its current traffic volume is the lowest among the three. See the Limitations and Clarifications section below for details.

Table 3. Sum of current and estimated traffic volumes in AADT and %. The data is split by the three count stations from SHA in columns, and the three UGWD scenarios in rows.

Scenario	Units	More AADT from UGWD	SHA Count Stations		
			Friendsville 1	Friendsville 2	Friendsville 3
Current: 2013 SHA	AADT		70.09	243.93	294.47
Pad: 1 pad, 6 wells in 2 years	AADT	35.55	**105.63**	**279.47**	**330.02**
	% increase		**51%**	**15%**	**12%**
Well: 1 well in 4 months	AADT	44.04	**114.13**	**287.97**	**338.51**
	% increase		**63%**	**18%**	**15%**
Peak Well: 1 well, water only in 1 month	AADT	85.25	**155.33**	**329.17**	**379.72**
	% increase		**122%**	**35%**	**29%**

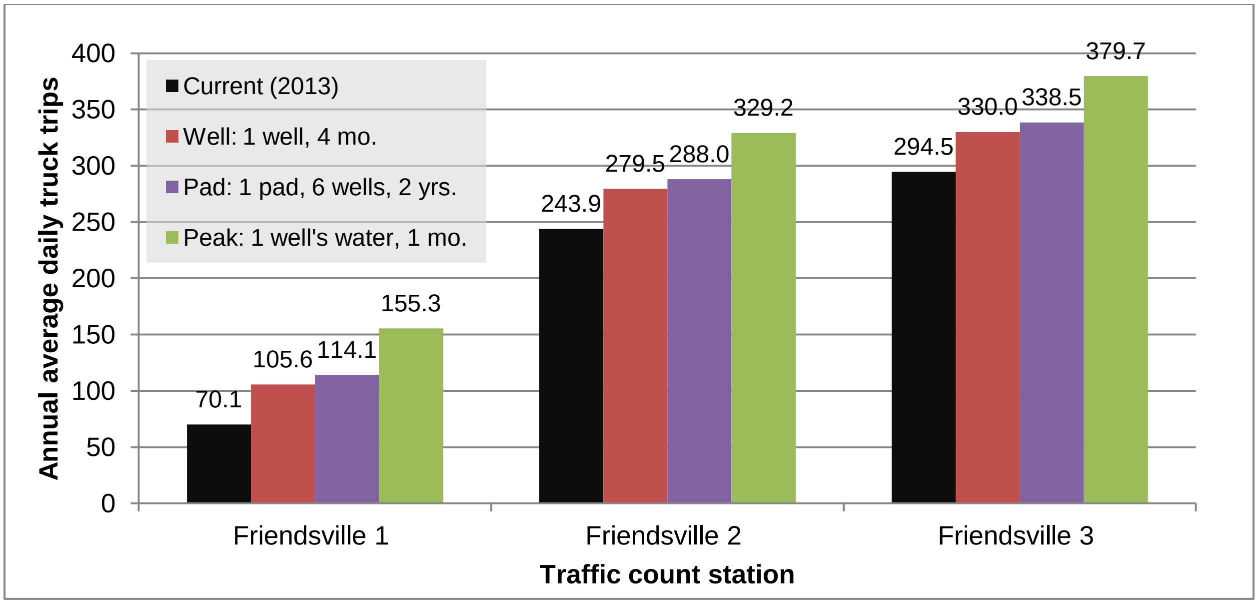

Figure 2. Current and estimated truck trips by SHA road stations and UGWD scenarios.

Limitations and Clarifications

Though Friendsville Road (MD 42) was chosen due to data availability from SHA and listing on an UGWD permit application, it is likely not representative of smaller local roads where traffic count data are unavailable. North of Interstate 68, Friendsville Road's functional class is Rural Major Collector (Figures 4 and 5); south of I-68, its class is Rural Minor Arterial (Figure 6; Google Maps; SHA, Truck Volume Maps). It connects to I-68, and is larger and more traveled by trucks than local rural roads. With likely lower current truck traffic volumes on local rural roads, increases in daily truck traffic rates from UGWD are expected to be proportionally larger in comparison. Well pad locations, geographic concentration, and the choice among alternative routes will dictate which roads would bear the most trucks. Those decisions would be addressed in the Comprehensive Gas Development Plan.

Additionally, not enough information is available to scale up these truck traffic volume increases. The economic impact analysis done by the Regional Economic Studies Institute at Towson University (RESI) includes well buildout estimates over 10 years, split by county, for low Scenario 1 and high Scenario 2. However, traffic volume analysis is very route-specific. Since traffic counts are only available along certain roads, but more information on well locations, pad density, and routes is not, scaling up cannot occur at this stage. For example, UGWD truck AADTs listed in Table 2 cannot simply be multiplied by the number of wells or pads listed in each scenario, because doing so would assume that all trucks for all wells would drive on the same road.

Time periods chosen for each UGWD scenario can vary considerably. Time required to develop a well in the first year will be greater than the time required to develop a well in a later year based on considerations such as whether a pad or roadway infrastructure has already been built, seasonal restrictions, and more. For purposes of making annual emission estimates, New York based the calculations on a maximum of four wells per site per year (NYSDEC 2011). Well buildout scenarios from RESI's economic impact analysis projected no more than three wells built per pad in one year. Based on these sources and best professional judgment, 4 months was chosen for the One Well scenario. Second, time required to develop a well pad is more complicated, since RESI's well buildout scenarios suggest that one well pad will not be maximized to six wells/pad until the tenth year. Based on this, New York's EIS, and best professional judgment, 2 years was chosen for the One Pad scenario. Finally, permit applications estimated 2-3 weeks to haul water to the site, and New York's EIS listed 2-8 weeks to haul produced water away. To give a conservative estimate in this analysis, the minimum sum of 1 month was chosen as the time period for the Peak Well scenario of one well's water hauling.

Current (2013) traffic volumes will not necessarily remain constant. Truck traffic volume is expected to grow in Western Maryland regardless of Marcellus Shale UGWD due to increased commerce in the area. However, the current 2013 comparison points in this document are used as reference levels and do not include estimates of that growth. Instead, we use SHA's 2013 truck counts to represent the status quo, or point of comparison. Therefore, actual points of comparison will be larger than those used here, so proportions of UGWD trucks are somewhat over-estimated in this document to an unknown degree.

SHA truck trips include both single-unit and combination truck classes. Though large trucks with 1-2 trailers are included as intended, buses, camping and recreational vehicles, smaller trucks with six tires (dual rear wheels), etc. are included in SHA truck counts as well (SHA, Truck Volume Maps). Therefore, actual current truck counts are smaller than those used here, which means the proportions of UGWD trucks in this document are under-estimated to an unknown degree.

The stations used in this document along Friendsville Road are from Maryland's portable count program. "The portable count program only collects volume and/or classification data, which is manually validated and loaded. The data for these stations is collected on a three or six year cycle depending on the roadway. Growth Factors are applied to counts which were not taken during the current year" (SHA, AADT's of Stations for the Years 2003-2013).

Finally, truck percentages of total counted traffic were taken during 2011-2013 (SHA Truck Volume Maps). These truck percentages were applied to 2013 counts.

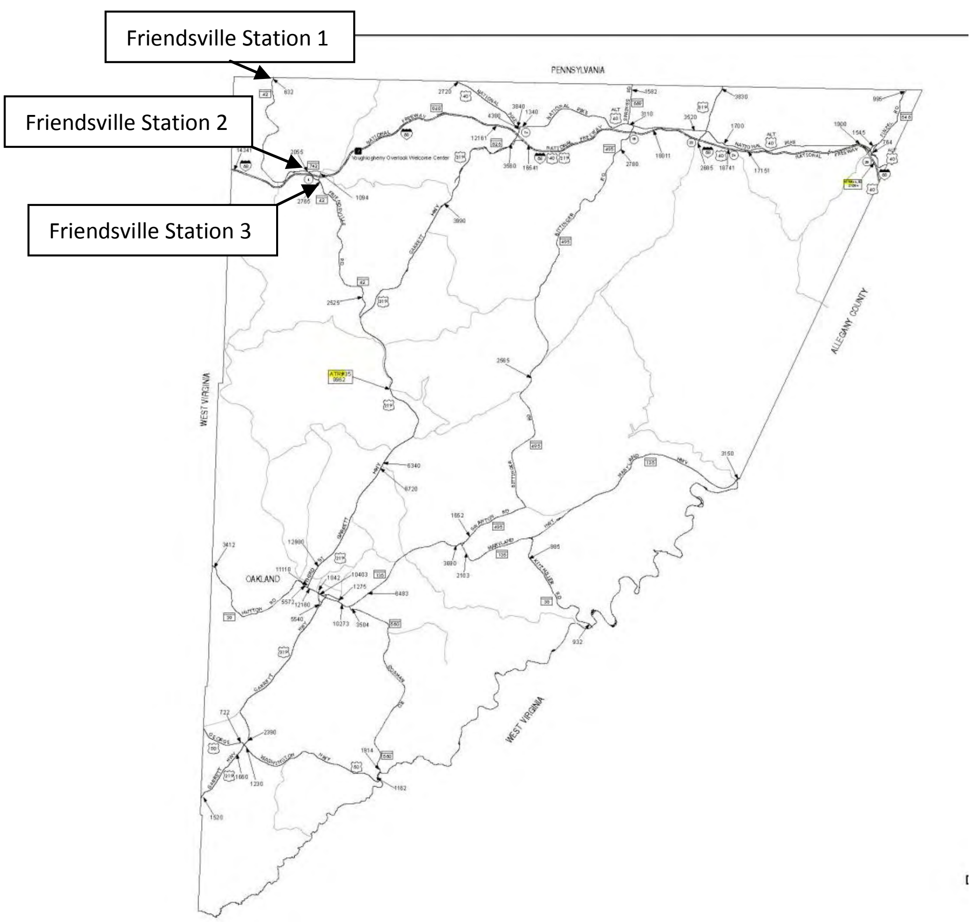

Figure 3. Locations of Stations 1, 2 and 3 (SHA, Garrett County Traffic Volume Map).

Figure 4. Friendsville 1, near the location of the traffic counter south of the Pennsylvania border (Google Maps).

Figure 5. Friendsville 2, near the location of the traffic counter north of I-68 (Google Maps).

Figure 6. Friendsville 3, near the location of the traffic counter south of I-68 (Google Maps).

Well pad activity	Early well pad scenario (All water transport by truck)	
	Heavy trucks	Light trucks
Drill pad construction	45	90
Rig mobilization	95	140
Drilling fluids	45	0
Non-rig drilling equipment	45	0
Drilling (rig crew, etc.)	50	140
Completion chemicals	20	326
Completion equipment	5	0
Hydraulic fracturing equipment (trucks & tanks)	175	0
Hydraulic fracturing water hauling	1000*	0
Hydraulic fracturing sand	23	0
Produced water disposal	300**	0
Final pad prep	45	50
Miscellaneous	0	85
TOTAL truck trips per well pad (1 well)	**1848**	**831**

Table 4. Estimated number of loaded, one-way truck trips for one well pad with one well.
*** Modified from ALL Consulting 2010 to account for 5,000,000 gallons/well and 5,000 gallons/truck.**
**** Modified from ALL Consulting 2010 to account for 30% flowback volume.**
Sources: ALL Consulting 2010, NTC Consultants 2011, NYSDEC 2011.

Well pad activity	Scaling Coefficient, 6 wells/pad	Early well pad scenario (All water transport by truck)	
		Heavy trucks	Light trucks
Drill pad construction	1	45	90
Rig mobilization	2	190	280
Drilling fluids	6	270	0
Non-rig drilling equipment	2	90	0
Drilling (rig crew, etc.)	6	300	840
Completion chemicals	6	120	1956
Completion equipment	2	10	0
Hydraulic fracturing equipment (trucks & tanks)	2	350	0
Hydraulic fracturing water hauling	6	6000*	0
Hydraulic fracturing sand	6	138	0
Produced water disposal	6	1800**	0
Final pad prep	1	45	50
Miscellaneous	-	0	400
TOTAL truck trips per well pad (6 wells)		**9358**	**3616**

Table 5. Estimated number of loaded, one-way trips per well pad with six horizontal wells.
*** Modified from ALL Consulting 2010 to account for 5,000,000 gallons/well and 5,000 gallons/truck.**
**** Modified from ALL Consulting 2010 to account for 30% flowback volume.**
Sources: ALL Consulting 2010, NTC Consultants 2011, NYSDEC 2011.

References

Google Maps, copyright 2014.

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