Protect PT

3344 Route 130, PO Box 137
Harrison City, PA 15636
(724) 392-7023

August 26, 2021

Sent by Certified First-Class U.S. Mail & Email

Daniel Counahan
Environmental Program Manager, Oil & Gas
Department of Environmental Protection
400 Waterfront Drive
Pittsburgh, PA 15222

Re: Permit ESX 14-129-0008, 129-29114, 129-29115

Dear Mr. Counahan:

We are writing on behalf of the members of our organization, Protect PT (Penn-Trafford). Protect PT is a nonprofit citizens group dedicated to ensuring that the safety, security, and quality of life of community members are protected from the effects of unconventional natural gas development. Please consider this comment for permit numbers ESX 14-129-0008, 129-29114, 129-29115 for the Drakulic Well Pad proposed by Apex Energy (PA), LLC.

The Operator Failed to Notify the Property Owner

Pursuant to 58 Pa.C.S. 3211(b)(2), the operator must notify the property owner. The PA DEP's eFACTS Public Permit Review portal shows that the applicant submitted certification that "*all interested parties identified on the plat of this application for which written consent has not been uploaded, copies of the well plat have been sent via certified mail and I have either received a return receipt verifying delivery or I have an Affidavit of Non-Delivery of Certified Mail. Any false statement is subject to substantial civil and criminal penalties, including 18 P.S. section 4904 (relating to unsworn falsification to authorities).*" However, the records indicate that the applicant sent notice to the property owner where the well pad will be located, PT Property Management, LLC, to the incorrect address (Attachment A). A simple property search would have given the applicant the correct information, instead, they chose to notify the previous owner of the property, John Drakulic residing at 106 7th Street Trafford, PA 15085 who sold the property to PT Property Management, LLC in 2016. Interested Parties notifications, including the application package, were certified by Apex Energy (PA) LLC representative Brooke Molde on 7/13/2021 (Attachment B). Therefore, the proper enforcement of a false statement to authorities is essential. Wrongdoers should be held to the fullest extent of the law and the permitting materials should be resubmitted with a new date given to the current property owners to ensure they are able to comment on the development of their property.

The Emergency Response Plan (ERP) Is inadequate

The most dangerous type of accident resulting from fracking operations is an explosion. In the event of a well pad explosion, and as a part of the site-specific ERP, an emergency evacuation plan must be in place. Apex's emergency evacuation plan for the Drakulic well pad is gravely flawed. Numerous parks and schools are missing from the plan, creating an unacceptably dangerous situation in the event of an emergency. Furthermore, most well pad ERPs require a half-mile to a mile evacuation radius around the site depending upon location, topography, and weather patterns in the region. Some of the toxic materials discharged from a flared well could settle into valleys. The Drakulic Well Pad is located on the top of a hill with a large population surrounding it. Toxic materials settling into the surrounding valleys could jeopardize the health of residents living in these neighborhoods. According to the Environmental Protection Agency's Environmental Justice Mapping and Screening Tool, approximately 900 residents live within a half-mile radius of the well pad, 2,823 residents live within 1 mile of the well pad, and 12,733 people live within 2 miles of the well pad (Attachment C).

The location of the Drakulic Well Pad is exceptionally dangerous to surrounding residents. Given the topography, wind direction, and population in this area, a half-mile evacuation zone would not be appropriate. A minimum one-mile evacuation zone is more appropriate for this region and would include numerous densely populated housing plans in Level Green and Trafford (Attachment D). Furthermore, just outside of the one-mile radius includes two schools, Trafford Elementary/Middle School, and Level Green Elementary School. Considering the average wind direction, Level Green Elementary School is directly downwind and downhill from the well pad, which poses an unnecessary risk in the event of an explosion. If this occurs, it is possible that children attending this school, as well as those in the surrounding neighborhoods, will be subjected to various toxic chemicals in the air since they would not be included in the half-mile evacuation radius.

Health Impacts

The close proximity of this well pad to a densely populated, residential area unnecessarily jeopardizes the health of residents of every demographic. In particular, the close proximity increases the likelihood of childrens' exposure to harmful chemicals from Drakulic's fracking operations in the Level Green neighborhood. Many scientific studies have been published demonstrating that living in close proximity to fracking operations is harmful to public health. Several local families were involved in a study done by Environmental Health News published in March 2021 titled *Fractured: The body burden of living near fracking*. The study found that chemicals known to be used and found around fracking sites were present in the bodies of children and adults that live near fracking.

Additionally, Dr. Walter Tsou, the former Health Commissioner of Philadelphia, Adjunct Professor in the Department of Family Medicine & Community Health, University of Pennsylvania Perelman School of Medicine authored a resolution passed in 2016 by the Pennsylvania Medical Society calling for a moratorium on new gas drilling in Pennsylvania

based on the precautionary principle. The resolution also called for the Commonwealth of Pennsylvania to fund research on the health effects of fracking in order to advance our scientific knowledge. In 2020, after pressure from families living around unconventional natural gas development whose children have suffered from childhood cancers, Governor Tom Wolf committed $3.9 million in state funding for two studies examining the impact of fracking on childhood cancers and other medical conditions.

Additionally, in 2020, the PA Attorney General commissioned the 43rd Grand Jury Report finding that public health is detrimentally affected by oil and gas infrastructure by failing to protect residents during the fracking boom. So with all this evidence pointing to fracking being detrimental to public health, this well pad near my and thousands of other homes will not be able to operate without causing public harm. Knowing of these harms, the PA DEP has a duty to fulfill its mission "to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment" and not permit this well pad. Furthermore, the Pennsylvania Constitution, Article 1 Section 27 states "*the people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come.*" By permitting this pad, you are knowingly putting children and families at risk of health impacts and violating our constitutional rights.

Additionally, a recent NRDC Report, *A Hot Fracking Mess: How Weak Regulation Of Oil And Gas Production Leads To Radioactive Waste In Our Water, Air, And Communities* authors Mall and Alemayehu write, "Oil and gas extraction activities, including fracking, drilling, and production, can release radioactive materials that endanger workers, nearby communities, and the environment. The United States has known about these dangers for at least 30 years, ever since an EPA report revealed the health risks of unregulated radioactive oil and gas waste."

Inadequate Engineering of Site Design

In addition to the above impacts, our engineers have identified multiple engineering deficiencies in the proposed Erosion and Sedimentation plan. Their report is attached. The issues that they have identified mainly involve underestimation of anticipated stormwater runoff volumes and flow rates and numerous inconsistencies in the documentation and calculations. That, in turn, means that the proposed stormwater volume management is inadequate.

One of the largest issues is that the calculations were completed presuming that the areas will be returned to "Meadow" which has similar "Curve Number' (CN) value to the lands current state, "Woods", for estimating stormwater runoff volume and flow rates. However, unless specific requirements are included to require the increased cost to make the area a "Meadow" then it is far more likely to become poor condition "Pasture" as is common on oil and gas development lands. Pasture has far higher CN values, and therefore estimates of stormwater runoff would also be higher.

Due to those miscalculations, the plan in its current state does not accurately provide for the required 2-year net increase volume control and severely underestimates the required volume control. That, in turn, means that the stormwater runoff volumes and flow rates will likely overwhelm the designed stormwater controls and result in discharges that will lead to erosive conditions and water quality violations. These types of engineering flaws are not uncommon in the plans of this operator or their contracted engineer of record, Civil & Environmental Consultants, LLC (CEC). In fact, CEC has worked on a number of projects submitted to the Oil and Gas Division of PA DEP that have failed resulting in Health and Safety violations.

Request for a Public Hearing

Due to Apex's failure to notify the correct property owner, the well pad's close proximity to 12,733 people, the inadequate evacuation plan included in the ERP, the numerous documented health impacts from fracking operations, and the inadequate engineering of the site, we are requesting a properly noticed public hearing. Your department must take seriously the concerns of Pennsylvania residents that will be placed in serious jeopardy if the well pad is developed.

This comment will serve as Protect PT's interim comment on the Drakulic Well Pad because our Right-to-Know Law request to the PA DEP was granted on August 26, 2021. We have not been able to review the files granted in the RTKL and these files were not made available through the Public Review Portal.

Thank you for your consideration of our comment and request for a properly noticed public hearing. If you have questions or comments, please contact me at gillian@protectpt.org or (724) 392-7023.

Sincerely,

Gillian Graber
Executive Director, Protect PT

ePermit Module Detail - DRAKULIC WELL PAD ESCGP-2 - 129-29114 - Submitted

UDOW Interested Party Details

Interested Party Name* PT Property Management LLC

Address* 106 7th Street Trafford PA 15085

Notification Type(s)

- **SL - Surface LandOwner** ☑
- **WS - Water supplies (Public or Private) less than 3000 ft.** ☑
- **GO - Active gas Storage Operator within the resevoir or within 3000 ft. of the resevoir** ☐
- **MU - Host Municipality** ☐
- **AMU - Adjacent Municipality or Municipality within 3000 ft.** ☐
- **CON - Coal Owner Non-Workable** ☐
- **COW - Coal Owner Workable** ☐
- **CL - Coal Lessee** ☐
- **CM - Operator of Operating Coal Mine** ☐

Distance Limitation(s)

- **WPWCU - Water Purveyor (public water supply) within 1000 ft.** ☐
- **WWU - Water Well (private water supply) within 500 ft.** ☐
- **BU - Building within 500 ft.** ☐

Cert Sent Mail 06/17/2021

Cert Mail Return Receipt 06/18/2021

Address Affidavit

Written Consent

Do you have a delivery date?* ◉ Yes ○ No

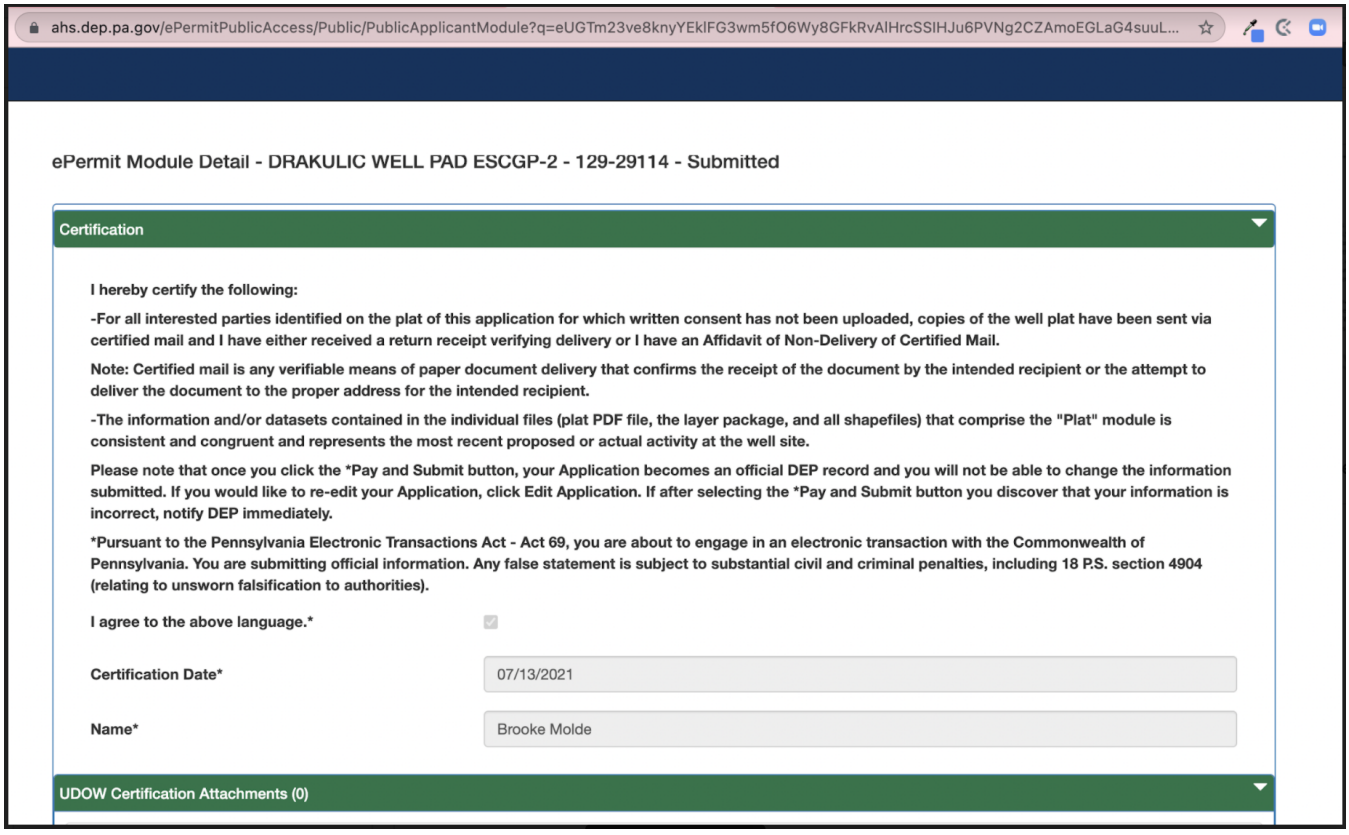
Is written consent required?* ○ Yes ◉ No

UDOW Interested Parties Details Attachments (0)

Date Added	Document Name	Document Type	Description	Download
There are no items to display				

Back

Attachment B



EJSCREEN Report (Version 2020)

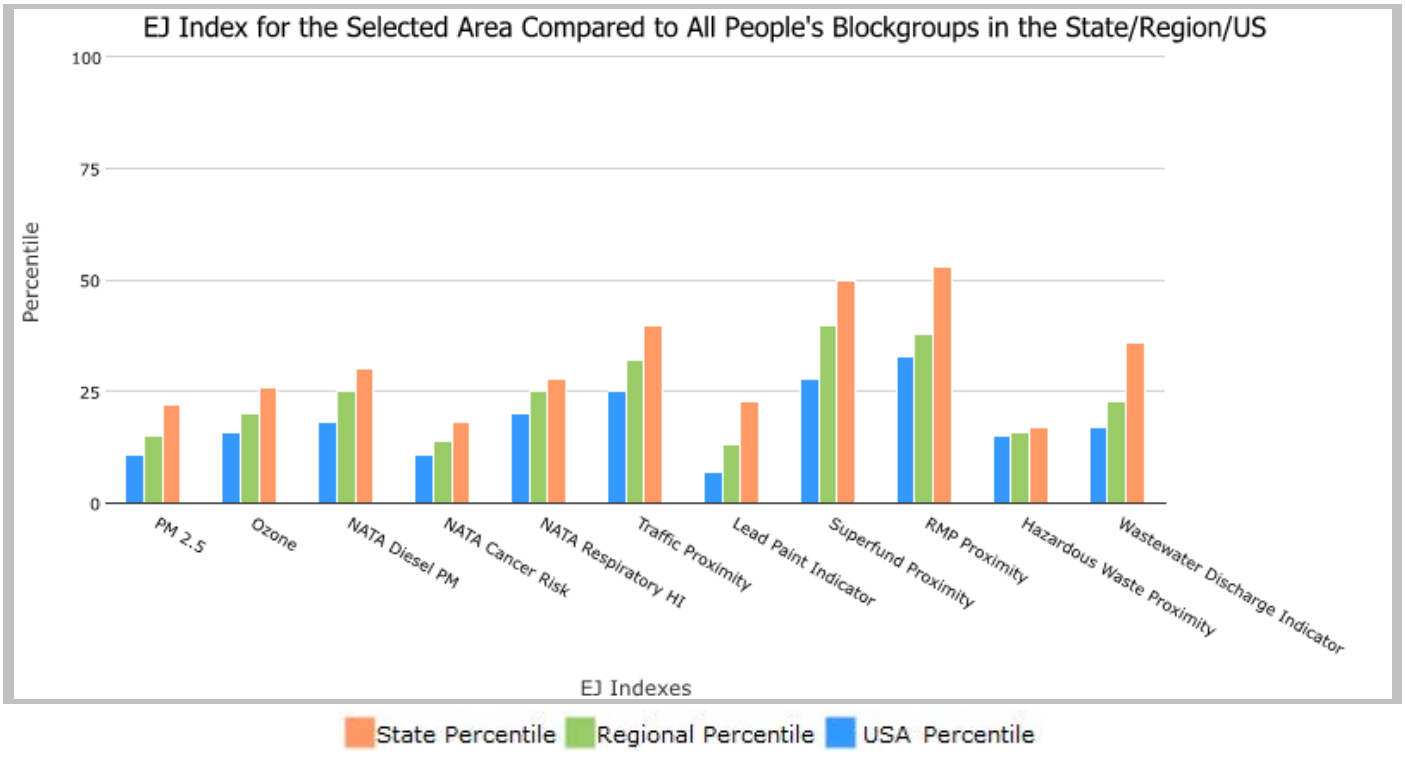
1 mile Ring Centered at 40.389950,-79.734870, PENNSYLVANIA, EPA Region 3

Approximate Population: 2,823

Input Area (sq. miles): 3.14

Drakulic Well

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	22	15	11
EJ Index for Ozone	26	20	16
EJ Index for NATA* Diesel PM	30	25	18
EJ Index for NATA* Air Toxics Cancer Risk	18	14	11
EJ Index for NATA* Respiratory Hazard Index	28	25	20
EJ Index for Traffic Proximity and Volume	40	32	25
EJ Index for Lead Paint Indicator	23	13	7
EJ Index for Superfund Proximity	50	40	28
EJ Index for RMP Proximity	53	38	33
EJ Index for Hazardous Waste Proximity	17	16	15
EJ Index for Wastewater Discharge Indicator	36	23	17



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

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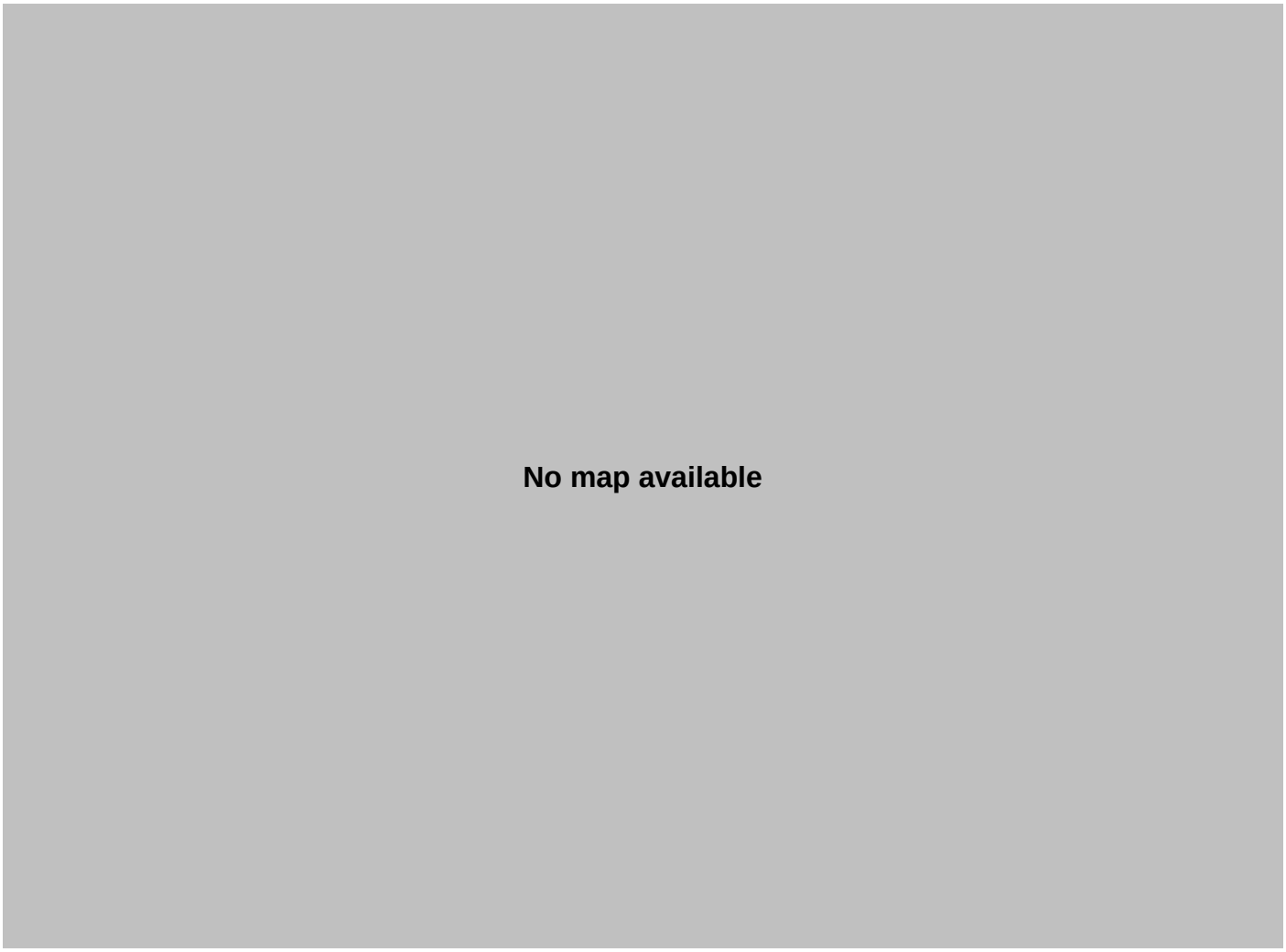

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	1

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 40.389950,-79.734870, PENNSYLVANIA, EPA Region 3

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Input Area (sq. miles): 3.14

Drakulic Well

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	10.9	9.32	97	8.63	99	8.55	93
Ozone (ppb)	45.5	43.2	88	43.2	92	42.9	74
NATA* Diesel PM (µg/m^3)	0.363	0.445	41	0.477	<50th	0.478	<50th
NATA* Cancer Risk (lifetime risk per million)	39	32	91	31	90-95th	32	80-90th
NATA* Respiratory Hazard Index	0.35	0.37	42	0.4	<50th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	120	570	34	650	36	750	38
Lead Paint Indicator (% Pre-1960 Housing)	0.35	0.48	40	0.36	58	0.28	67
Superfund Proximity (site count/km distance)	0.039	0.19	15	0.15	19	0.13	34
RMP Proximity (facility count/km distance)	0.12	0.8	15	0.62	24	0.74	21
Hazardous Waste Proximity (facility count/km distance)	1.2	1.6	60	2	55	5	54
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0.0014	77	49	34	65	9.4	68
Demographic Indicators							
Demographic Index	11%	26%	21	30%	14	36%	10
People of Color Population	9%	23%	44	33%	29	39%	20
Low Income Population	13%	29%	21	27%	26	33%	19
Linguistically Isolated Population	0%	2%	57	3%	55	4%	45
Population With Less Than High School Education	4%	10%	25	10%	26	13%	24
Population Under 5 years of age	5%	6%	48	6%	44	6%	41
Population over 64 years of age	20%	17%	68	16%	73	15%	77

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN Report (Version 2020)

2 miles Ring Centered at 40.389950,-79.734870, PENNSYLVANIA, EPA Region 3

Approximate Population: 12,733

Input Area (sq. miles): 12.56

Drakulic Well (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	22	15	11
EJ Index for Ozone	26	20	16
EJ Index for NATA* Diesel PM	30	25	18
EJ Index for NATA* Air Toxics Cancer Risk	18	13	11
EJ Index for NATA* Respiratory Hazard Index	28	25	20
EJ Index for Traffic Proximity and Volume	38	30	23
EJ Index for Lead Paint Indicator	20	12	6
EJ Index for Superfund Proximity	51	40	28
EJ Index for RMP Proximity	52	38	32
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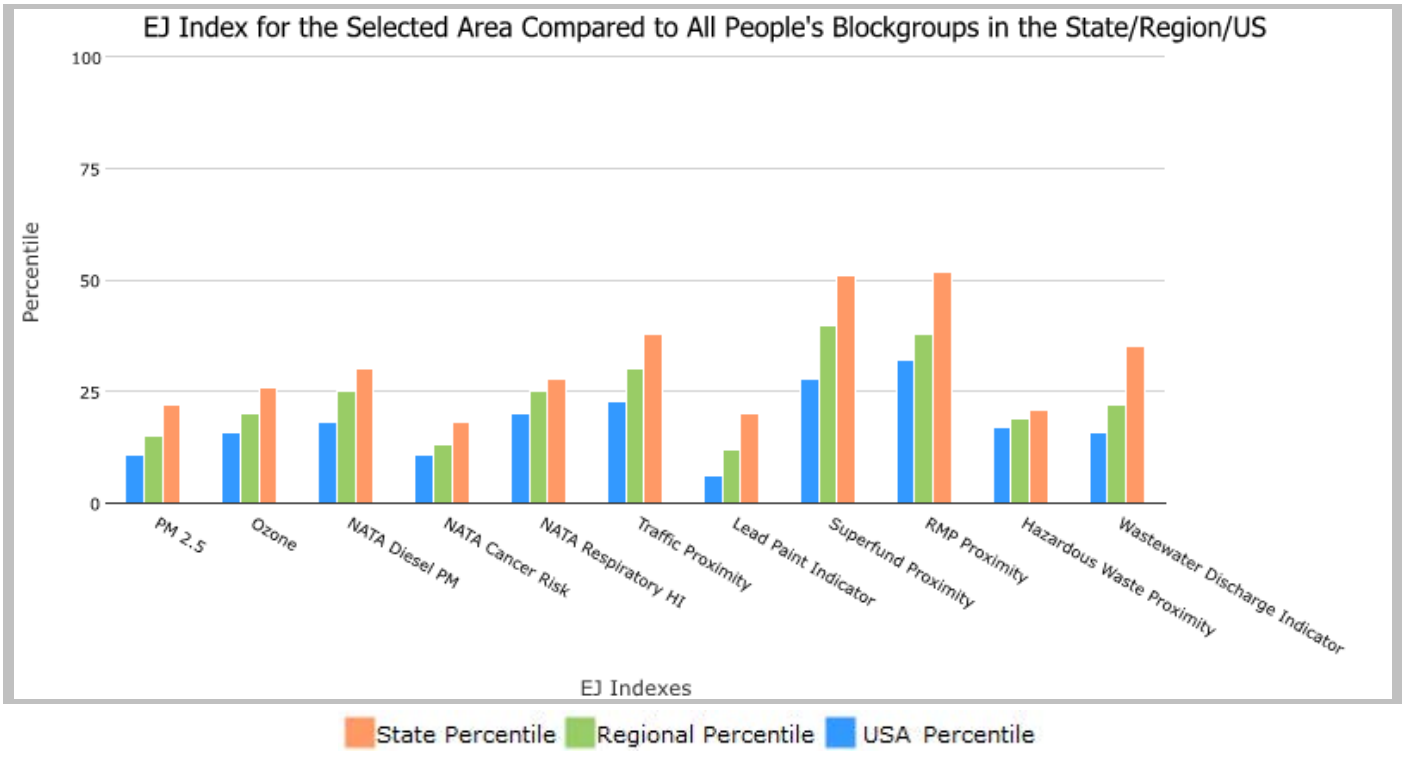

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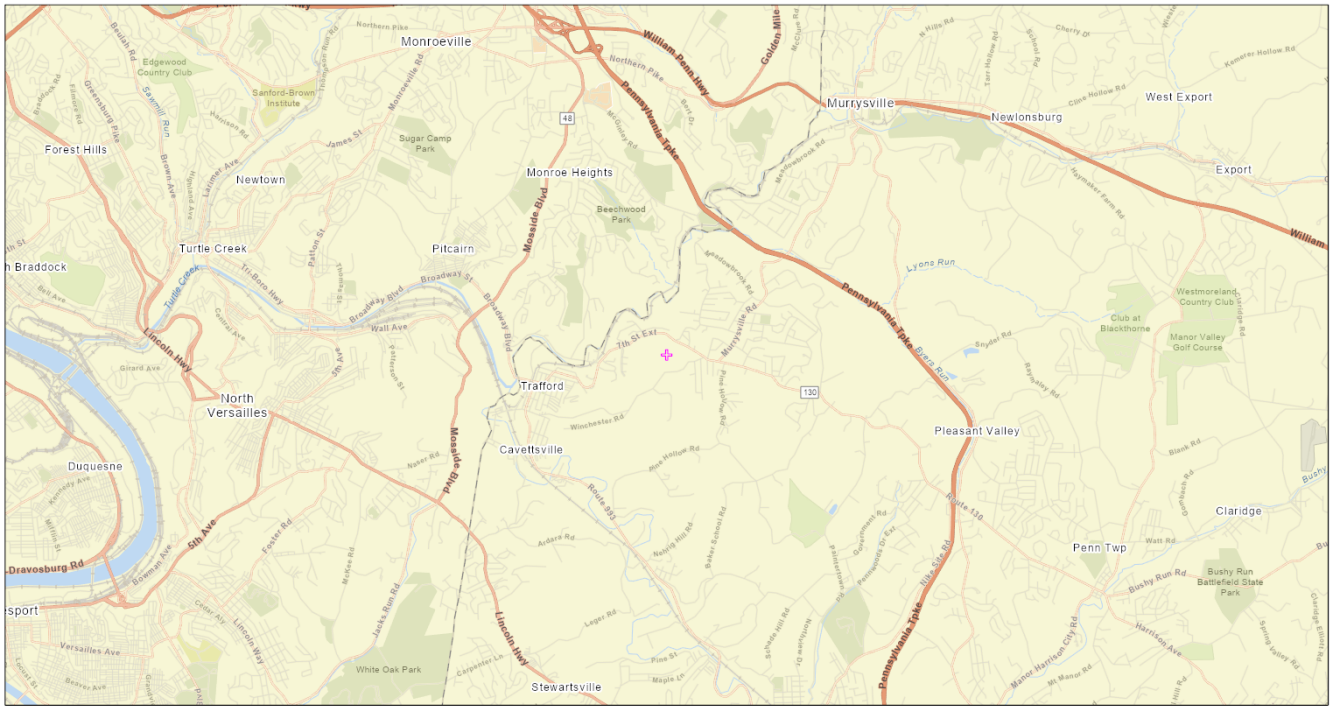

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NATA* Respiratory Hazard Index	0.35	0.37	43	0.4	<50th	0.44	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	130	570	36	650	38	750	39
Lead Paint Indicator (% Pre-1960 Housing)	0.41	0.48	47	0.36	64	0.28	71
Superfund Proximity (site count/km distance)	0.039	0.19	15	0.15	19	0.13	34
RMP Proximity (facility count/km distance)	0.12	0.8	15	0.62	24	0.74	21
Hazardous Waste Proximity (facility count/km distance)	0.99	1.6	54	2	50	5	50
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0.0017	77	50	34	66	9.4	69
Demographic Indicators							
Demographic Index	14%	26%	33	30%	23	36%	17
People of Color Population	11%	23%	48	33%	32	39%	22
Low Income Population	18%	29%	32	27%	37	33%	29
Linguistically Isolated Population	0%	2%	57	3%	55	4%	45
Population With Less Than High School Education	4%	10%	22	10%	22	13%	21
Population Under 5 years of age	4%	6%	39	6%	36	6%	33
Population over 64 years of age	22%	17%	73	16%	77	15%	81

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

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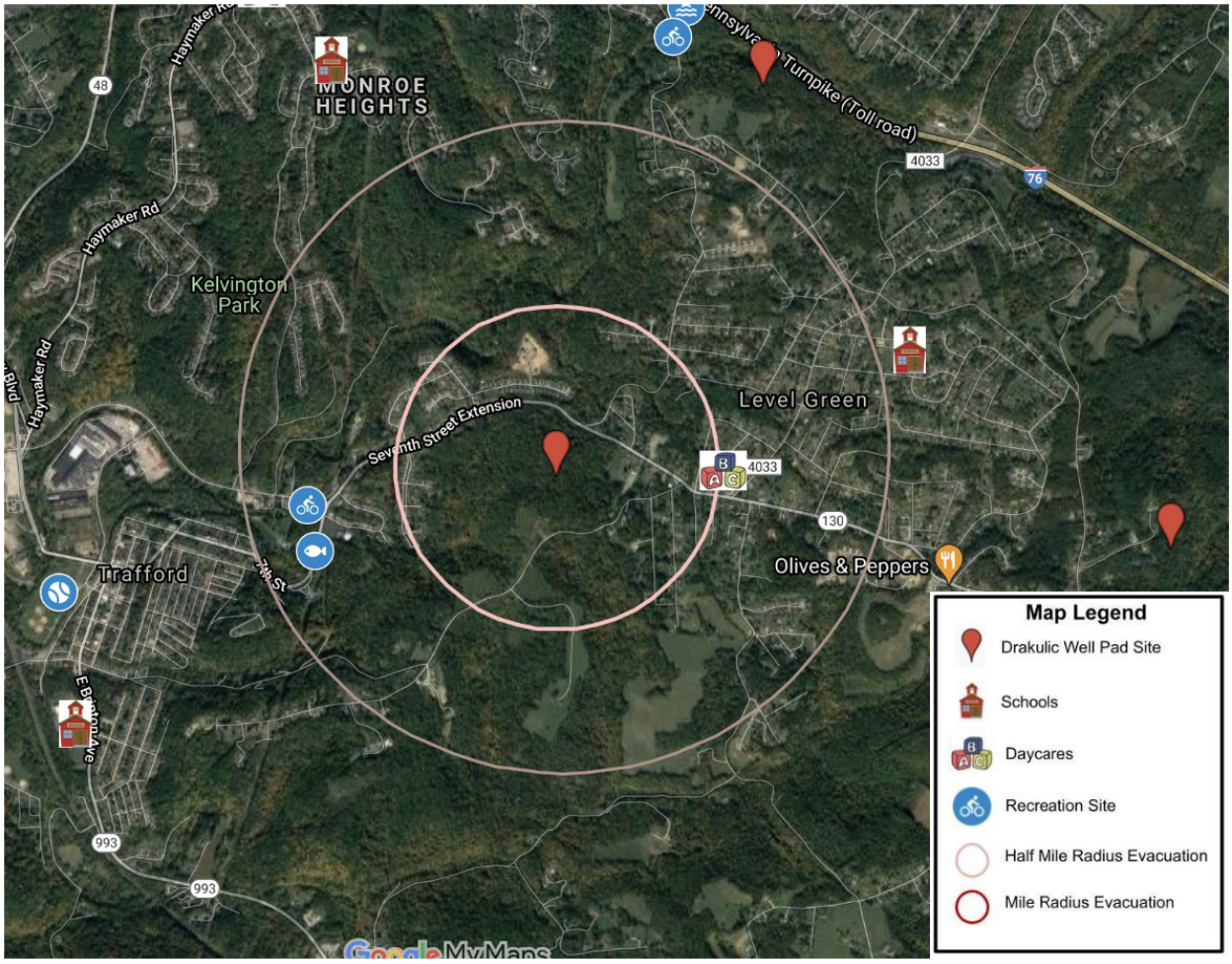
Attachment D



August 23, 2021

Tim Fitchett, Esq.
Staff Attorney
Fair Shake Environmental Legal Services
6425 Living Place Suite 200
Pittsburgh, PA 15206

RE: Apex Energy, LLC Drakulic Well Pad
Review of ESCGP2 2019 Renewal Application

Dear Mr. Fitchett:

At your request, I have reviewed the material related to the Apex Energy Drakulic Well Pad ESCGP2 2019 Renewal Application. All materials were provided to me by Fair Shake Environmental Legal Services.

It is my opinion, based on a reasonable degree of scientific certainty, that Apex Energy and its consultants at Civil & Environmental Consultants, Inc., are under-estimating the anticipated stormwater runoff volumes and flow rates at the Drakulic Well Pad, and are failing to provide stormwater volume management for the proposed well pad and entry road. Volume management is a requirement of the ESCGP-2 NPDES Permit. As a result of this underestimation of stormwater runoff and lack of volume management, increased stormwater flow rates and volumes can be anticipated downstream of the proposed well pad, including increased surface and streambank erosion and sediment discharges. The likelihood of sediment discharges is increased by the highly erodible nature of the soils at the site. The anticipated impacts will be greatest from the drainage area that includes the proposed well pad and entrance road (referred to by the applicant as POI B).

Background

The Drakulic well pad is proposed to be constructed in Penn Township, Westmoreland County and will disturb approximately 17.2 acres according to the NOI application dated as received by DEP SWDO Oil & Gas on October 1, 2019. The project site drains to unnamed tributaries of Turtle Creek to the north (POIs B and C) and Brush Creek to the south (POI A), both designated as TSF and neither of which are Special Protection Waters.

The Limit of Disturbance associated with the proposed work is not entirely clear as documented the Pre- and Post-Development Appendix D Stormwater BMP Worksheets (dated as received Nov 25, 2019), which indicate that the disturbed area ranges from 15.82 acres to 16.22 acres (it is not clear why there are inconsistencies), and additional information (dated as received Jan 28, 2020) has a slightly different area for Drainage Area A. The Pre- and Post-Development Hydrology Maps (dated as received Nov 25, 2019) indicate that the project drainage area is approximately 25.66 acres before development and 26.2 acres after development.

The project consists of a 465’ x 325’ well pad, an approximately 1,050 foot long access road originating of of 1st Street, and associated site disturbance. The site is primarily woods (24.75 acres) and an agricultural area designated as meadow (1.48 acres). Approximately 21. 6 acres of woods will be removed although the exact number is uncertain due to the inconsistencies in the application materials. The proposed well pad is situated close to a topographic high point and water drains in three directions: to the southwest (designated as Point of Interest or POI A), to the west (POI B) and to the southeast (POI C). The drainage area to POI B will be increased and the drainage area to POI C will be decreased by several acres. Runoff from much of the entrance road and well pad will be

directed to the proposed wet pond in POI B. There is an existing wetland and headwater stream near the POI B wet pond.

Existing Soils and Erodibility

In Section 2 of the Erosion & Sediment Control Report, information is provided on the existing soils at the site including the following information:

- Six of the six soil types are identified as "Easily Erodible".
- All six soil types are types that "Cut Banks Cave" meaning they are not structurally stable during construction.
- One soil type within the project area is noted as having High Water Table conditions.
- Six of the six soil types are Potentially Hydric (wetland).

The Apex E&S Report indicates that the project area includes Pittsburgh Red Beds that are prone to landslides but also indicates that "it is unlikely that red beds will be encountered during construction". The E & S Report indicates that the proposed development footprint is surrounded by historic landslides and zones of landslide susceptible soils, including old landslide features that extend into the well pad proposed fill slope. The E & S Report references (slope stabilization) mitigation measures which are detailed on the plan sheets. A former landslide area is indicated in the southeast portion of the well pad where fill will be placed (Plan Sheet GT01 marked as received by PaDEP Oct 1, 2019).

Based on the soil and slope stability conditions, the report and plans should also provide additional guidance to prevent water quality violations due to soils that are easily erodible and can generate high levels of sediment when disturbed. However, the E&S practices are all standard practices with no mention of practices or conditions to be aware of to address highly erodible soils. The E &S Report includes a table (unlabeled) in Section 2 that identifies limitations and resolutions. A copy of this table is provided below:

Soil Limitations and Resolutions

Limitation	Resolution
Erodible	All disturbed areas shall be seeded in accordance with the Site Restoration details shown on the Erosion and Sediment Control Plans. Slope stabilization, compost filter socks, and diversion channels will be used to minimize erosion.
Cut Banks Cave	Trenches and cut slopes shall be excavated with appropriate layback banks to prevent cave-ins. Stockpiles shall be located at a sufficient distance away from the trenches and cut slopes. Applicable OSHA standards and regulations should be implemented.
Corrosive to Concrete or Steel	Steel pipes are not specified in this plan. The use of concrete pipes has been limited to to extent possible.
High Water Table	Pumps and water filter bags shall be utilized if groundwater is encountered.
Low Strength	Proper construction techniques shall be employed during earthmoving activities in order to avoid slope failures. A geotechnical investigation will be completed prior to construction. Techniques noted in the report should be followed during construction.
Piping	Water shall be diverted away from open trenches. Anti-seep collars shall be utilized as shown on the plans.
Poor Topsoil	The soil amendments required with each vegetative stabilization mix specified by the Site Restoration detail on the Plans are designed to counteract this limitation.
Potentially Hydric	A wetland study was performed by HRG (October 2014).

Stormwater Management to POI A

The drainage area calculations for POI A are confusing. The Post-Development Hydrology Map (dated as received Nov 25, 2019) indicates a total drainage area to POI A of 2.46 acres "detained" by either the proposed infiltration berms (3) or the detention basin, and an additional 0.57 acres as "undetained" including the gravel entrance. The Worksheet 4 Volume calculations (dated as received Jan 28, 2020) indicate a drainage area of 1.94 acres to POI A before development and 1.99 acres to POI A after development and do not appear to include existing woods that are (presumably) to remain undisturbed (based on the calculations). The Department inquired about the POI A areas, and a letter dated January 27, 2020 from Lauren R. Parker, PE of CEC, Inc. to Dr. Tae-Uk Kim at PaDEP provides revised calculations, but information is still unclear as noted in Items 2 and 3 below.

1. Concerns Regarding Site Protection and Potential Impact on Sediment Discharge and Stormwater Discharge

Plan C300 indicates a "Limit of Disturbance" via a dashed red line (although the Legend indicates a black dashed line so I am assuming the red dashed line is the Limit of Disturbance). According to this line, much of the wooded area to POI A is to remain undisturbed, however there is nothing on the plans to clearly indicate that the Limit of Disturbance will be identified, protected, and maintained during construction. The "Site Restoration Post-Construction Stormwater Management Report" (dated received Nov 25, 2019) includes the Erosion and Sediment Control Report in Section 7. Under Section 7.0 BMP Installation Sequence the Report states:

1. Layout limits of the construction site and establish control points and benchmarks
2. Stake out the limit of disturbance as indicated on the plans
3. Install rock construction entrance, etc.

The Erosion and Sedimentation Control Notes on Plan Sheet C900 repeats the same language. There is no indication on the plans or in the report that the Limit of Disturbance will be clearly delineated by orange construction fence or other means such that these areas that are to remain undisturbed and be protected from construction activity. This is important because construction disturbance will increase both sediment discharge during construction and stormwater flow rates and volumes during and post-construction. Heavy equipment will be working in this area to install the gravel road, (including significant cuts of more than ten feet) as well as excavation for the three "infiltration berms" and detention basin.

If the wooded area outside the Limit of Disturbance is actually to be protected as represented in the stormwater calculations, **the Limit of Disturbance must be clearly delineated in the field via orange construction fence or other structural measures**. Without such measures, the contractor on the site will not have the necessary information to protect this area and the applicant cannot assume it wil remain undisturbed.

This comment is also relevant to POIs B and C, as significant project areas are indicated on Plan Sheet C300 (dated received Nov 25, 2019) as "NO CLEARING OR DISTURBANCE". **If the Erosion and Sediment Control calculations and Stormwater calculations represent these areas as undisturbed, then practices must be implemented during construction to assure that these areas are undisturbed. If the areas are disturbed during construction, the E&S and Stormwater calculations will be incorrect and unauthorized discharges of sediment and stormwater will occur.**

2. Peak Rate Stormwater Management Issues

As noted above, the Post-Development Hydrology Map indicates that 2.46 acres will be diverted to the detention basin. It is not clear the undisturbed woods to the east will drain to the detention basin, although Plan Sheet C302 indicates a "PROPOSED ROCK APRON" which possibly is intended to convey runoff from the wooded hillside into the basin. This "PROPOSED ROCK APRON" is also shown as intercepting an "EXISTING ROADSIDE CHANNEL". **No**

elevations or details are provided so it is unclear how this Rock Apron is to be constructed so as to intercept the undisturbed wooded hillside and/or roadsjide channel. Additionally, if the roadside channel collects road runoff, it appears that the road runoff would then be directed to the detention basin. **This is a concern because the drainage area from the roadside channel is not defined and the runoff from the road is not accounted for in the stormwater calculations**. It is unclear as to whether the detention basin was properly designed to receive this roadside runoff. The stormwater calculations do not appear to be designed to address road runoff from the existing roadside channel. If the stormwater detention basin receives more runoff than represented in the calculations, the calculations are incorrect and the basin will not manage stormwater as represented.

Additionally, by including the undisturbed wooded area in both the Pre- and Post-Development Stormwater calculations for peak flow rates, the applicant is "diluting" the impact of the disturbed area on stormwater volumes and flow rates. This practice is often applied incorrectly in stormwater calculations to falsely reduce the difference in pre- and post-development peak flow calculations, and falsely underestimate the post-development peak flow rates. **Additionally, there is no reason to direct undisturbed wooded areas to a detention basin, or to divert road runoff into the basin (if that is the intent). The lack of detail on the plans makes it difficult to determine the design intent.**

3. Inadequacies regarding Infiltration Berms

Volume management (and some peak flow rate control) is proposed to be provided in POI A via three "infiltration berms". There is inconsistency between the Stormwater Report and the Plan Sheets (C302 and Section G-G) , and a lack of information on the plans for proper construction of the infiltration berms.

- The top of Berm 3 is 1207.0 on the Plans but 1207.5 in the stormwater calculations.
- Berms 1 and 2 appear to be mixed up in the stormwater calculations.
- There is no infiltration testing to assure that infiltration will occur. The Geotechnical Borings did not address this area. Appendix E of the PCSMR includes infiltration testing for 2 test pits but their locations are not provided.
- There are berm dimensions (length and breadth) in the stormwater report but not on the plan sheet that the contractor will rely on for proper construction. No dimensions are provided and the contractor will be left to estimate construction dimensions, which may or may not be consistent with the stormwater calculation assumptions.
- The berms are different lengths in the stormwater report than would be assumed based on the plans (87' for berm 3, and 94' for berms 1 and 2 in the Stormwater Report, although on Plan Sheet C302 Berm 3 is clearly shown as the longest).
- Berm 3 would appear to have the largest drainage area per Plan Sheet C302 since it is at the top of the hill, but in the calculations Berm 2 is estimated to have a significantly larger drainage area than Berms 1 and 3.

Based on these inconsistencies in documentation and calculations, as well as lack of information for proper construction, the ability of the Infiltration Berms to successfully manage rate and volume cannot be confirmed.

4. Incorrect Curve Number Assumptions Leading to Incorrect Stormwater Calculations

The applicant is applying the NRCS Cover Complex Method to estimate stormwater runoff volumes and flow rates and is representing the post-development unpaved areas as "Meadow". Per this calculation methodology, the soil type and land use cover, represented by a "Curve Number" or CN value, is used to provide an estimate of the amount of stormwater runoff volume and correspondingly the stormwater flow rates. Low CN values represent less runoff and high CN Values represent more stormwater runoff.

In POI A, the applicant is assuming that the disturbed unpaved areas, such as the steep slopes along the gravel road will behave as "Meadow" which has a CN value nearly the same as "Woods" (71 versus 70) and nearly the equivalent amount of stormwater runoff. This means that the applicant is assuming that there will be virtually no stormwater impact as a result of disturbed and graded areas unless these areas are paved or gravel. Newly graded steep slopes along the road and surrounding the well pad are assumed to respond to rainfall essentially the same way the existing woods currently responds, with much less runoff generated than the gravel areas.

Based on the soil disturbance and the lack of clear restoration or seeding and maintenance plans for "meadow", the disturbed areas are far more likely to represent pasture (livestock forage), likely in poor condition, which has a much higher CN value of 86 and correspondingly a much high amount of runoff. This is typically what is observed at oil and gas facilities post-construction and what can be anticipated at Drakulic based on the plans and proposed seeding mix. Plan Sheet C302 includes a "Seed Mixture Table", and with the exception of Mixture Number 4, the specified grasses are all non-native erosion control and/or pasture forage species. Several species (fine fescue, birdsfoot trefoil, redtop) are considered invasive in other states but not Pennsylvania. There is no associated seeding plan and the construction contractor will determined which seed mixes are applied based on interpretation of the provided "Seed Mixture Use" Table. Since native species seeds are more expensive, it can be anticipated that the site will be seeded in a mix appropriate for erosion control and potentially animal forage. **However, this does NOT represent meadow, and unless the area is restored as Meadow, there will be more stormwater runoff than represented by the calculations**. Penn State Extension Information Sheets on two of the species identified on the plans, "Birdsfoot Trefoil" and "Orchardgrass" are attached as examples of the type of pasture species identified on the applicant's plans. While Switchgrass and Big Bluestem (native species found in meadows) are also identified in one of the Seed Mixtures (4), these two species alone and without an establishment plan will not result in meadow establishment, and the "Seed Mixture Table" leaves too much room for interpretation by the contractor. Based on this and conditions observed at oil and gas facilities, the post-construction land use should be assumed to be pasture in fair or poor condition.

The impact is less at POI A than at POIs B and C, as most of the project disturbance will occur in an area that appears to be agricultural pasture or hay prior to construction. The impact will be more significant at POIs B and C where woods will be removed.

Stormwater Management to POI B

The drainage area to POI B contains the area associated with much of the entrance road as well as the well pad, approximately 3.63 acres of gravel. The drainage area will increase from 9.96 acres to 11.48 acres according to the BMP Worksheet 4 (dated received Nov 25 2019). Approximately 2.52 acres that currently discharges to POI C will be redirected to POI B. A wet pond is proposed for stormwater management (rate and volume). My primary concerns are as follows:

1. A Wet Pond Does Not Provide Volume Management

A wet pond is designed to have a constant pool of water and to provide stormwater detention and peak rate reduction. It does **not provide volume management**. The applicant represents the Wet Pond as providing 26,180 cubic feet of volume management on Worksheet 5 for Drainage Area B. PaDEP notes this in several emails and comments. Specifically, in an Administrative Completeness Deficiency Letter letter dated November 22, 2019 from Dr. Kim at PaDEP to the applicant, Item 5 states:

"*As noted many times before through other applications since 2013, Detention basin will not control the volume.*"

Additional concerns regarding area calculations and the use of a forebay for volume control are also noted in this comment. The ESCGP-2 application should not be approved until volume management is provided. Failure to provide volume management can be anticipated to result in increased volumes and rates of stormwater discharge, increased erosion, and associated water quality violations.

2. Incorrect Curve Number Assumptions Leading to Underestimate of Stormwater Runoff

As discussed in POI A, the applicant is assuming the land cover post-construction will be "Meadow" when "Pasture" is a more accurate representation based on the seeding mix, limited notes regarding restoration, and lack of a longterm meadow restoration plan. The stormwater response of pasture is quite different than the stormwater response of meadow. Pasture generates significantly more runoff, especially if in fair or poor condition.

The table below indicates the increase in runoff volume for POI B for the 2-year storm event as calculated by the applicant (assuming the pervious areas will be "meadow" after development), as compared to the 2-year storm event volume increase assuming pasture in fair and pasture in poor condition (as I calculated using PaDEP Worksheet 4). The corresponding worksheets are attached.

POI 2-Year Storm Event Net Volume Increase

P = 2.50 inches	Cubic Feet	Net Runoff Difference
Woods to Meadow	26,140	
Woods to Pasture in Fair Condition	36,028	9,888
Woods to Pasture in Poor Condition	46,916	20,776

As can be seen from this table, by applying a CN value that does not accurately represent the post-development land conditions, the applicant is significantly underestimating the volume of runoff and the 2-year net increase in runoff volume. **The applicant is both failing to provide the required 2-year net increase volume control and underestimating the required volume control.**

The CN value selection has serious implications beyond volume control. **The applicant's post-construction peak flow rate estimates for all storm events, not just the 2-year event, are also underestimated.** As a result, all pre-development to post-development peak flow rate comparisons are incorrect and underestimate the amount and rate of stormwater discharge. **Failure to adequately size and design stormwater controls will result in discharges at higher flow rates and volumes than calculated, leading to erosive conditions and water quality violations.**

Stormwater Management to POI C

The drainage area to POI C, which is in a different watershed, will be reduced as a result of well pad construction and a redirection of this area to POI B. Additionally, the same concerns regarding land use cover assumptions and underestimation of stormwater runoff volumes and flow rates also applies to POI C. No stormwater management is proposed in POI C. The applicant proposes to meet flow rate requirements by reducing the drainage area and hence the flow rates.

Summary

August 23, 2021

Apex Energy's failure to adequately design and implement stormwater control measures can be anticipated to adversely impact the stormwater discharges at the proposed Drakulic Well Pad. Until the deficiencies described in this letter are addressed the ESCGP-2 Permit application should not be approved by the Department.

These statements reflect my professional opinion based on the available information. If you have any questions or need additional information, I can be reached at 610-842-3547 (my cell), 610-933-0123 (office) or at michelea@melioradesign.com.

Sincerely yours,

Michele C. Adams, PE, LEED AP
President

Lawn and Turfgrass Weeds: Birdsfoot Trefoil - Lotus Corniculatus L.

Birdsfoot trefoil is a useful conservation plant but also an invasive weed in low maintenance turf areas maintained at high mowing heights.

Fig. 1. Patches of birdsfoot trefoil growing in under-fertilized turf in Pennsylvania. Photo: Peter Landschoot, Penn State

This species often appears as patches and clumps in under-fertilized lawns and institutional grounds, and in utility areas along roads and highways. It grows well in full sun and in poor-quality, droughty soils. Birdsfoot trefoil is most noticeable when producing yellow flowers during June and July. Used primarily as a forage crop and conservation planting along Pennsylvania highways, birdsfoot trefoil seed occasionally is transported to lawns and other grassy areas where it is not desired.

Fig. 2. Birdsfoot trefoil invading a low maintenance turf stand in a new development. Photo: Peter Landschoot, Penn State

Life cycle

Birdsfoot trefoil belongs to the legume family (Fabaceae), and is classified as a perennial. Plants form dense patches through branching stems that are semi erect or grow prostrate along the soil surface and root at nodes. Foliage typically dies back in winter and new leaves are produced from crown tissues in spring. Birdsfoot trefoil produces bright yellow flowers in summer, with a peak flowering period from late June to mid-July. Flowers eventually form seed pods containing small dark-brown seeds that germinate during cool, moist periods in spring and fall. Like other species in the legume family, birdsfoot trefoil forms a symbiotic relationship with nitrogen-fixing Rhizobia bacteria which produce nodules on roots and convert atmospheric nitrogen into a plant-available form.

Identification

Birdsfoot trefoil stems are smooth or slightly hairy. Leaves are arranged alternately on stems, and each leaf is composed of three leaflets at the upper portion of the leaf, and two leaflets (stipules) at the junction of the petiole and stem. Leaflets are oval or spatula-shaped and pointed at the tips. Leaflets have mostly smooth margins and are approximately ½ to ¾ inch in length and ¼ to ½ inch wide. Yellow flowers appear in clusters (umbels) of 2 to 8 and are situated on long stalks. Individual flowers contain five petals that look similar to pea flowers. Flowers are eventually replaced by green seed pods, about 1 inch in length, that radiate from the flower stalk and take on the appearance of a bird's foot.

Fig. 3. Leaves of birdsfoot trefoil showing three leaflets on the upper portion of the leaf and two leaflets (stipules) at the junction of the petiole and supporting stem. Photo: Peter Landschoot, Penn State

Fig. 4. Flowers of birdsfoot trefoil. A single flower is composed of five petals (a larger standard petal, two wing petals, and two fused petals that form the keel). Photo: Peter Landschoot, Penn State

Fig. 5. Seed pods (sometimes referred to as seed capsules or fruits) of birdsfoot trefoil. Seed pods are thought to resemble a bird's foot. Photo: Peter Landschoot, Penn State

Management and control

Birdsfoot trefoil forms large, dense patches in turf that is mowed at high cutting heights and not adequately fertilized with nitrogen. Infestations of birdsfoot trefoil can be reduced by improving turf density through good establishment procedures, fertilization, and use of turfgrasses well-adapted to site conditions.

Very few turfgrass herbicides are labeled for the control of birdsfoot trefoil, perhaps because it is used as a conservation plant or because it is not often found in high-maintenance turf. Two herbicides labeled for control of birdsfoot trefoil are Trimec Classic and Speedzone. Both these herbicides contain 2,4-D, MCPP, and dicamba as active ingredients.

References

Hilty, J. 2017. Birdsfoot trefoil. Illinois Wildflowers.

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Authors

Peter Landschoot, Ph.D.
Professor of Turfgrass Science
pjl1@psu.edu
814-863-1017

Tim Abbey
Extension Educator, Horticulture - Green Industry
tma13@psu.edu
717-840-7408

Tanner Delvalle
Extension Educator
tcd125@psu.edu
570-391-0982

extension.psu.edu

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Orchardgrass

Orchardgrass (Dactylis glomerata L.) is a perennial, cool-season, tall-growing, grass which does not have rhizomes or stolons (bunch-type grass).

ARTICLES | **UPDATED: JANUARY 1, 2000**

Table 1. Characteristics of perennial cool-season grasses in the Northeast.

Grass	Seedling vigor	Tolerance to soil limitations			Winter survival	Tolerance to frequent harvest	Relative maturity[b]
		Drought	Wet	Low pH[a]			
Kentucky bluegrass	M[c]	L	M	M	H	H	Early
Orchardgrass	H	M	M	M	M	H	Early-medium
Perennial ryegrass	H	L	M	M	L	H	Early-medium
Reed canarygrass	L	H	H	H	H	H	Medium-late
Smooth bromegrass	H	H	M	M	H	L	Medium-late

[a] pH below 6.0.
[b] Maturity characteristic refers to relative time of seed head appearance in the spring. This will depend not only on species but also variety.
[c] L = low, M = moderate, H = high

Grass	Seedling vigor	Tolerance to soil limitations			Winter survival	Tolerance to frequent harvest	Relative maturity[b]
		Drought	Wet	Low pH[a]			
Tall fescue	H	M	M	H	M	H	Medium-late
Timothy	M	L	L	M	H	L	Late

[a] pH below 6.0.
[b] Maturity characteristic refers to relative time of seed head appearance in the spring. This will depend not only on species but also variety.
[c] L = low, M = moderate, H = high

Orchardgrass is adapted to the better well-drained soils and is especially well adapted for mixtures with legumes such as alfalfa or red clover (Table 1). It will generally persist longer than the other cool-season grasses in frequently cut, properly managed, alfalfa mixtures.

Orchardgrass is a versatile grass and can be used for pasture, hay, green chop, or silage. A high-quality grass, it will provide excellent feed for most classes of livestock.

Adapted Varieties

Several varieties of orchardgrass have been tested and were high-yielding in Pennsylvania variety trials. Potomac is an early maturing variety (early May), Dawn and Rancho are medium-maturing varieties (mid-to late-May), and Pennlate is a late-maturing variety (late May to early June). When seeding an orchardgrass-legume mixture, the two should mature at about the same time. This will enable harvesting of both species at proper developmental stages and improve the potential of harvesting top quality forage.

Establishment

Orchardgrass is usually easy to establish in either early spring or late summer. Late summer seedings, however, have been most successful in Pennsylvania. There is increased risk of winter injury with summer seedings made after mid-August.

United States Department of Agriculture

Natural Resources Conservation Service

Conservation Engineering Division

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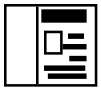
To show bookmarks which navigate through the document. Click the show/hide navigation pane button  , and then click the bookmarks tab. It will navigate you to the contents, chapters, rainfall maps, and printable forms.

Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Prepared by: CLK 11/13/19
Checked by: CFB 11/20/19

WORKSHEET 4. CHANGE IN RUNOFF VOLUME FOR 2-YR STORM EVENT BETWEEN PRE & POST DEVELOPMENT

Project: Apex Drakulic Well pad
Drainage Area: POI B
2-Year Rainfall: 2.50 in

Existing Conditions:

Cover Type	Soil Type	Area (sf)	Area (ac)	CN	S	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Woods	C	198,634	4.56	70	4.3	0.5	7,536
Woods	D	246,985	5.67	77	3.0	0.7	15,237
Total		**445,619**	**10.23**				**22,773**

Developed Conditions:

Cover Type	Soil Type	Area (sf)	Area (ac)	CN	S	Q Runoff[1] (in)	Runoff Volume[2] (ft^3)
Meadow	C	167,706	3.85	71	4.1	0.5	6,864
Meadow	D	184,694	4.24	78	2.8	0.8	12,127
Gravel	-	158,123	3.63	98	0.2	2.3	29,921
Total		**510,523**	**11.72**				**48,913**

2-Year Storm Runoff Volume Increase (ft^3)=	**26,140**
2-Year Storm Runoff Volume Increase (Ac-Ft) =	**0.60**

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$, where:

   P = 2-Year Rainfall (in)

   S = (1000/CN) - 10

2. Runoff Volume (CF) = Q X Area X 1/12 x 43560 ft^2/acre, where:

   Q = Runoff (in)

   Area = Stormwater Management Area (ac) from Worksheet 3

Note: Runoff Volume must be calculated for EACH land use type and soil.
The use of a weighted CN value for volume calculations is not acceptable.

CHANGE IN RUNOFF VOLUME FOR2-YEAR STORM EVENT - 2 year Post Assume Pasture Fair Condition

PROJECT	Drakulic Well Pad - 2 year
DRAINAGE AREA	84,613 SF
	1.94 AC
2-YEAR RAINFALL	2.5 IN

PRE-DEVELOPMENT CONDITION

Cover Type	Soil Type	Area (SF)	Area (AC)	CN	S	Q Runoff (in)	Runoff Volume (cf)
Woods	C	198,634	4.56	70	4.29	0.46	7,536
Woods	D	246,985	5.67	77	2.99	0.74	15,237
Total		445,619					22,773

DEVELOPMENT CONDITION

Cover Type	Soil Type	Area (SF)	Area (AC)	CN	S	Q Runoff (in)	Runoff Volume (cf)
Pasture Fair	C	167,706	3.85	79	2.66	0.84	11,703
Pasture Fair	D	184,694	4.24	84	1.90	1.12	17,176
Gravel	NA	158,123	3.63	98	0.20	2.27	29,921
Total		510,523					58,801

100-year Volume Increase:	36,028 CF

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-year rainfall (in)
   S = 1000/CN -10

2. Runoff Volume (CF) = Q x Area x 1/12 x 43560 ft^2/acre
   Q = Runoff (in)
   Area = Stormwater mangement area

CHANGE IN RUNOFF VOLUME FOR2-YEAR STORM EVENT - 2 year Post Assume Pasture Poor Condition

PROJECT	Drakulic Well Pad - 2 year
DRAINAGE AREA	84,613 SF
	1.94 AC
2-YEAR RAINFALL	2.5 IN

PRE-DEVELOPMENT CONDITION

Cover Type	Soil Type	Area (SF)	Area (AC)	CN	S	Q Runoff (in)	Runoff Volume (cf)
Woods	C	198,634	4.56	70	4.29	0.46	7,536
Woods	D	246,985	5.67	77	2.99	0.74	15,237
Total		445,619					22,773

DEVELOPMENT CONDITION

Cover Type	Soil Type	Area (SF)	Area (AC)	CN	S	Q Runoff (in)	Runoff Volume (cf)
Pasture Poor	C	167,706	3.85	86	1.63	1.24	17,378
Pasture Poor	D	184,694	4.24	89	1.24	1.45	22,390
Gravel	NA	158,123	3.63	98	0.20	2.27	29,921
Total		510,523					69,689

100-year Volume Increase:	46,916 CF

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
   P = 2-year rainfall (in)
   S = 1000/CN -10

2. Runoff Volume (CF) = Q x Area x 1/12 x 43560 ft^2/acre
   Q = Runoff (in)
   Area = Stormwater mangement area