

Expert Report

by

Professor Thomas L. Daniels

In the matter of:

Substantive Validity Challenge to Penn Township Zoning Ordinance, *Protect PT v. Penn Township Zoning Hearing Board v. Huntley & Huntley Energy Exploration, LLC and Apex Energy (PA), LLC*, Case No. 3499 of 2017, Westmoreland County Court of Common Pleas

Prepared for

Hamilton Law, LLC

PO Box 40257

Pittsburgh, PA 15201

October 20, 2017

Expert Credentials

Professor Thomas L. Daniels is a professor in the Department of City and Regional Planning at the University of Pennsylvania. He holds a Ph.D. in Agricultural and Resource Economics. He has taught land use planning and environmental planning for more than 15 years. He is the co-author of *The Small Towns Planning Handbook* (3rd ed. 2007, American Planning Association) and author of *The Environmental Planning Handbook* (2nd ed. 2014, American Planning Association). Professor Daniels served as the Director of the Lancaster County Agricultural Preserve Board from 1989-1997. Professor Daniels has performed consulting work and provided expert testimony on a number of cases involving unconventional natural gas development in Pennsylvania. (See CV in Appendix A).

Introduction

Penn Township is a first class township, so designated in 1958. This designation reflects a larger population, than a second class or rural township. In 2000, Penn Township had 19,591 residents, and 20,006 in 2010 of whom 23% or 4,600 were under the age of 18, according to the US Census Bureau (www.census.gov). There were 7,894 housing units in the township in 2010. Penn Township is located on the western edge of Westmoreland County and covers 30.5 square miles or slightly less than 20,000 acres. Interstate 76 splits the township into two parts, the western part makes up about one-third of the township, and the eastern part is about two-thirds of the township. Interstate 76 also runs along the northwestern border of the Township.

The Board of Commissioners of Penn Township, Westmoreland County, Pennsylvania adopted Ordinance No. 912-2016 Chapter 190 on September 19, 2016. (see Table 1). Ordinance No. 912-2016 created five zoning districts and four overlay districts. The Mineral Extraction Overlay District in Penn Township currently applies to the Rural Resource zoning district and the Industrial Commerce zoning district (see Map 1 and Map 2).

The Mineral Extraction Overlay District allows unconventional oil and natural gas wells as a special exception in the underlying zoning districts, but does not account for the different purposes, population densities, and other land uses allowed in these zoning districts. For instance, the Industrial Commerce zoning district allows light and heavy industrial uses by right and as conditional uses. This zone is appropriate for unconventional gas well development. The Rural Resource zone is essentially a rural residential zone that also allows agriculture. Gas well development in this zone has caused and is likely to continue to cause conflicts with nearby residential property owners. In fact, four unconventional gas well pads approved in the Rural Resource zoning district are currently under appeal.

Table 1. Ordinance 912-2016 Zoning Districts and Overlay Districts in Penn Township

Ordinance 912-2016 created the following zoning districts:

- a. Rural Resource District (RR);
- b. Mixed Density Residential District (MDR);
- c. Neighborhood Commercial District (NC);

- d. Commercial Corridor District (CC); and
- e. Industrial Commerce District (IC)

Ordinance 912-2016 also created the four overlay districts:

- a. Airport Overlay District (AO);
- b. Floodplain Overlay District (FO);
- c. Mineral Extraction Overlay District (MEO); and
- d. Development Infill Overlay District (DIO).

Act 13, enacted in February 2012, prohibited local governments from regulating the oil and gas industry, and required statewide uniformity among local zoning ordinances with respect to the development of oil and gas resources. This part of the law was declared unconstitutional by the Pennsylvania Supreme Court in December of 2013. As a result, the Supreme Court determined that townships have the authority to control the zoning for the development of oil and gas wells and related activities. Guidance for such zoning comes from the Municipalities Planning Code Section 603(i): “Zoning ordinances shall provide for the reasonable development of minerals in each municipality.”

It is my opinion that Ordinance 912-2016: 1) violates provisions of the Pennsylvania Municipalities Planning Code by promoting the unreasonable development of minerals in the Township, 2) is contrary to its own stated purpose and is contrary to the community development goals in the 2005 comprehensive plan, 3) violates several basic principles of zoning by introducing incompatible heavy industrial uses as a special exception into the Rural Resources zoning district, 4) treats the oil and gas industry differently than all other heavy industrial uses, and 5) fails to promote the interests of the entire public, adversely affecting residential land uses and property values.

Purposes of Zoning and Compatible Land Uses

The fundamental purpose of zoning is to separate incompatible land uses into different zoning districts, to promote orderly community development, and to protect the public health, safety, and welfare, including property values (Pennsylvania Municipalities Planning Code, Section 604). This means that municipalities zone by districts to separate conflicting land uses and the municipalities will allow only new developments or land uses that are compatible with the stated purposes and the existing land uses of each particular zoning district (not including pre-existing non-conforming uses). Incompatible land uses cause harm to neighbors in the form of threats to health, safety, and welfare, including reductions in property value.

In a zoning district, land uses may be allowed by right, by special exception, or by conditional use. A by-right use is permitted if the property owner meets the standards in the zoning ordinance for that use. A special exception is a land use listed for a specific zoning district and the special exception use has neighborhood impacts (Daniels et al. *The Small Town Planning Handbook*, 3rd ed. 2007, p. 203). A conditional use is a land use listed for a particular zoning district, and must meet specific standards. A conditional use has “the potential to affect

the entire community” (Daniels et al., *The Small Town Planning Handbook*, 3rd ed. 2007) p. 192), and a conditional use may be allowed or denied by a decision of the township supervisors.

Some land uses are not allowed at all in certain zoning districts because they would cause conflicts involving health, safety, and welfare, including the reduction in property values. For example, municipalities typically do not allow industrial uses in residential and commercial zones because of conflicts and incompatibility involving the health, safety, and welfare, including loss of property values, of the residential and commercial landowners.

A special exception is usually permitted so long as the proposed land use meets standards spelled out in the zoning ordinance. A special exception is granted or denied by the township Zoning Hearing Board. The Zoning Hearing Board “may attach such reasonable conditions and safeguards, in addition to those expressed in the ordinance” (Pennsylvania Municipalities Planning Code, 2015, Section 912.1).

The Zoning Hearing Board must find that a proposed special exception use is compatible with other permitted land uses in that particular zoning district. It is the job of the Zoning Hearing Board to ensure compliance with the criteria of the special exception standards, if the municipality has already decided that the special exception use is compatible with other uses in that district. If the applicant demonstrates compliance with the standards and receives the approval of the Zoning Hearing Board, the applicant receives a special exception permit. In sum, when a zoning ordinance allows a land use as a special exception in a particular zoning district, the ordinance represents the municipality’s decision that the special exception use is compatible with other land uses allowed in that zoning district.

The use of zoning as a form of the police power of government to protect the public health, safety, and welfare was upheld by the U.S. Supreme Court in *Euclid v. Ambler Realty* in 1926. But governments cannot exercise their zoning power in an arbitrary or unreasonable manner. A zoning ordinance must benefit the public as a whole. In other words, the public interest embodied in zoning is broader than the promotion of oil and gas development.

Zoning Overlay Districts

A zoning overlay is typically used to provide greater restrictions on development in areas with natural hazards or other development constraints. A zoning overlay district is placed on top of one or more base zones (e.g. residential or commercial) and a landowner or developer must meet both the regulations of the base zone and the overlay zoning district.

The Commonwealth Court has defined the purpose of an overlay district as follows: to “create specific and targeted provisions that conserve natural resources or realize development objectives without unduly disturbing the expectations created by the existing zoning ordinance. In other words, overlay districts supplement existing zoning districts; they do not supersede them either in fact or in practice.” *Main St. Dev. Grp., Inc. v. Tinicum Twp. Bd. of Supervisors*, 19 A.3d 21, 28 (Pa. Commw. 2011).

Mineral Extraction Overlay District

The Penn Township Mineral Extraction Overlay permits unconventional gas well pads to be constructed and operated throughout the Rural Resource zone and the Industrial Commerce zone as a special exception, subject to § 190-635 and § 190-641.

The Mineral Extraction Overlay is contradictory to the overall purposes of the Township zoning ordinance. The ordinance states the following purposes: “To maintain stability in each neighborhood and commercial area through an orderly general development pattern (§ 190-102. A. (2)(c)). A pattern of scattered unconventional wells throughout the Rural Resource zoning district does not promote stability in each neighborhood of the Rural Resource zoning district or an orderly development pattern (see Map 5).

The Penn Township zoning ordinance states an overall purpose of its zoning ordinance is: “To recognize the Township's image agricultural legacy and its evolution into a vibrant suburban community maintaining its small town and rural values” (§ 190-102. A. (3)(a)). Penn Township is a first class township, reflecting its population size of more than 20,000 residents and its suburbanizing trend. Townships of the second class are rural townships. Thus, it is not in the interest of the public health, safety, and welfare to promote the widespread development of unconventional oil or gas wells in a first class township that is anticipated to continue to become a more vibrant suburban community.

Another stated purpose of the Penn Township zoning ordinance is: “To preserve agricultural land within the Township” (§ 190-102 A. (4)(c)). Unconventional gas well development takes agricultural land out of production.

The Mineral Extraction Overlay allows “horizontal wellbores which extend into the DIO Development Infill Overlay District below the surface” §190-641(c)(2)(a). A Development Infill area is slated for residential and commercial development, not industrial development. Thus, this provision contradicts the stated purpose of the Mineral Extraction Overlay, which is to allow mineral extraction “where the population density is low and significant development is not projected for the near future” (§ 190-407 A).

The Mineral Overlay District allows for unconventional oil and gas well drilling and development as a special exception in the Rural Resource zoning district and the Industrial Commerce zoning district (§ 190-407 (E)). However, the Township performed no analysis of the amount of land available for oil and gas drilling in the Industrial Commerce or Rural Resource zoning districts. This lack of analysis raises doubt that the Township is adhering to the guidance of the Municipalities Planning Code Section 603(i) that “Zoning ordinances shall provide for the reasonable development of minerals in each municipality.”

According to § 190-635, there are Performance Standards that any oil and gas well development must meet, and § 190-635 sets out conditions that an applicant must meet to obtain approval for an unconventional oil or gas well development. There are additional standards in § 190-641.

The purpose of the Rural Resource zoning district is: “to provide land for continuing agricultural operations, resource management, timber harvesting, outdoor recreation, public and private conservation areas, low density single family residential, and compatible support uses” (§ 190-402(A)). Industrial oil and gas development activities, allowed as a special exception under the Mineral Extraction Overlay, are not compatible with the purposes listed in the Rural Resource zoning district.

Finally, the Mineral Extraction Overlay does not acknowledge the important differences between the Rural Resource zoning district and the Industrial Commerce zoning district. The Rural Resource zoning district is essentially a rural residential zone where agriculture is a permitted use, but single family residential development exists. The Industrial Commerce zoning district allows light and heavy industrial uses. Oil and gas development, especially unconventional wells, gas plants, and compressor stations are heavy industrial uses (See, Carolyn G. Loh & Anna C. Osland 2016. *Local Land Use Planning Responses to Hydraulic Fracturing*, p. 222, *Journal of the American Planning Association*, 82(3): 222-235). Thus, unconventional gas well development, compressor stations, and gas processing plants are appropriate uses in the Industrial Commerce zoning district which allows heavy industrial uses. The Mineral Extraction Overlay Ordinance does not allow compressor stations or gas processing plants; thus, compressor stations and gas processing plants are not allowed in the Rural Resource zoning district even with the Mineral Extraction Overlay. However, unconventional gas well pads are a heavy industrial use and should be limited to the Industrial Commerce zoning district.

Rural Resource District §190-402.

The Rural Resource zoning district covers about half of Penn Township (see Map 2). The Rural Resource zoning district is adjacent to large areas of the Mixed Development Residential zoning district and much of the Commercial Corridor zoning district.

The stated purpose of the Rural Resource zoning district is as follows:

“A. Purpose: The RR Rural Resource District is established in order to provide land for continuing agricultural operations, resource management, timber harvesting, outdoor recreation, public and private conservation areas, low density single family residential, and compatible support uses.”

The Rural Resource District requires a minimum lot size of 10 acres for a farm and a minimum lot size of one acre for a single family detached dwelling. Conventional drilling is allowed as a permitted use in the Rural Resource zoning district with a minimum one-acre lot size (B. 11)(see Map 4). Map 4 shows that more than 40 conventional gas wells had been drilled as of 2005, before the use of hydrofracturing. Several of these wells were drilled in the area now zoned Rural Resource. Gas Compressor Stations and Natural Gas Processing Plants are not listed as permitted or conditional uses. No special exceptions are listed.

It is important to note that Penn Township has an Agricultural Security Area of about 3,800 acres, which is virtually all within the Rural Resource zoning district (See Map 6). The Agricultural Security Area makes landowners eligible to apply to sell a conservation easement to

the county/state farmland preservation program. The Agricultural Security Area does not regulate or limit the development of farms, except that landowners have greater protection against eminent domain and township officials agree not to enact nuisance ordinances that would restrict normal farming practices. Westmoreland County has operated a farmland preservation program since 1992. During the past 25 years, only one farm of 34.4 acres has been preserved through the sale of a conservation easement to Westmoreland County and the Commonwealth of Pennsylvania (correspondence from Betty Reefer, Director of the Westmoreland County farmland preservation program, May 16, 2017). The Rural Resource zoning district is far from an exclusive or effective agricultural zoning district designed to protect farmland from development.

The Rural Resource District is essentially a rural residential zoning district where agriculture is also allowed. This means that single family dwellings can be scattered throughout the Rural Resource District, increasing the potential for conflicts between single family residences and nearby unconventional oil and gas wells, allowed as special exceptions through the Mineral Extraction Overlay zoning district (see Map 7).

Industrial Commerce District §190-406.

The stated purpose of the Industrial Commerce zoning district is as follows:

“A. Purpose: The IC Industrial Commerce District is established in order to provide land for heavy and light industrial, processing, planned light industrial and planned commerce uses, in addition to warehousing and distribution, supply yards, and compatible support uses.”

Conventional oil and gas operations are principal permitted uses in the IC zoning district (B. (24)). No special exceptions are listed.

Conditional Uses include: Natural Gas Compressor Stations and Natural Gas Processing Plant (D. (3) and (4)). A two-acre minimum lot area is required for permitted and conditional uses unless otherwise specified.

The Industrial Commerce zoning districts covers four separate areas of Penn Township (see Map 2). The largest Industrial Commerce area is in the north central part of the Township; the second largest Industrial Commerce area is in the northeast corner of the Township; and two smaller Industrial Commerce areas are in the south central and the southeast parts of the Township. Given that an unconventional gas well requires as little as five acres for development, the Industrial Commerce zone provides adequate space for the balanced extraction of minerals in the Township, called for by the Municipalities Planning Code.

§190-407. MEO Mineral Extraction Overlay District

The stated purpose of the Mineral Extraction Overlay zoning district is as follows: “A. Purpose. The purpose of the MEO Mineral Extraction Overlay District is to provide areas for the extraction of minerals as defined by the Commonwealth, where the population density is low and

significant development is not projected for the near future. Uses permitted in the MEO District shall comply with the provisions of §190-635, Performance Standards, and §190-641, where applicable, as well as with the “Surface Mining Conservation and Reclamation Act (P.L. 1198, No. 418), the “Noncoal Surface Mining Conservation and Reclamation Act (P.L. 1093, No. 219), the “Oil and Gas Act” (P.L. 1140, No. 223), and the Bituminous Mine Subsidence and Land Conservation Act” (P.L. 31, No. 1).”

Permitted principal uses in the Overlay District include:

- (1) All those uses listed as permitted or conditional in the underlying zoning district.
- (2) Deep mining and surface mining.
- (3) Sand and gravel and limestone excavation.
- (4) Oil and natural gas drilling (conventional).

Special Exception uses in the Overlay District include:

- (1) Oil and natural gas drilling (unconventional).

The minimum lot size is 10 acres for oil and gas operations, except as otherwise specified (F. (2)). There is no height limit on structures.

Development standards require that “All drilling and production operations, including but not limited to derricks, vacuum pumps, compressors, storage tanks, freshwater impoundment areas, vehicle parking areas, structures, machinery, ponds and pits, and ancillary equipment, shall be located and set back not less than 600 feet from any protected structure and not less than 200 feet from any adjoining property line. Wastewater impoundment areas shall be prohibited” (G. (6)).

“G. Development Standards: In addition to the applicable performance standards in §190-635, any permitted principal, conditional use, special exception or accessory use shall be subject to the following: (1) All permitted, conditional use, special exception and accessory uses in the In the MEO Mineral Extraction Overlay District shall comply with the provisions of 190-641 of this Ordinance where applicable. In no case shall wastewater be dumped or permitted to flow or seep into a stream or drainage way.

(2) All permitted, conditional use, special exception or accessory uses within the MEO Mineral Extraction Overlay District shall comply with the provisions of Chapter 156, Subdivision and Land Development Ordinance, Article III, 190-18 and 190-23 where such provisions have not been superseded by the provisions of 190-64.

(3) Wastewater -- Copies of all required Pennsylvania DEP permits or permits from the Municipal Authority with jurisdiction agreeing to accept any affluent produced shall be provided that cannot be treated on-site shall not be permitted to accumulate and shall be disposed of on a regular basis as required. (a) In no case shall wastewater be dumped or permitted as flow or seep into a stream or drainage way. “

The Penn Township zoning ordinance defines overlay zones as “Zoning districts that extend on top of one or more underlying base zoning districts and are intended to protect certain critical features and resources or to achieve a narrow planning objective.” The use of the MEO

overlay to allow unconventional gas well development in a large portion of the Township is hardly a narrow planning objective. Thus, the use of an overlay to allow widespread oil and natural gas drilling contradicts the definition of an overlay zone in the Penn Township zoning ordinance, 912-2016.

Any oil and gas well development and related compressor stations and gas processing facilities must meet the Performance Standards of §190-635, specifically . §190-635 A. Compliance: “No use, land or structure in any district shall involve any element or cause any condition that may be dangerous, injurious or noxious, or cause offensive odor, smoke, dust, dirt, noise, vibration, glare, excessive traffic, attract vermin or rodents or constitute a nuisance or be a detriment to the health, safety, moral or general welfare of the community or to any other person or property in the Township. All uses in all districts shall be subject to the following standards of operation.” Unconventional gas well development involves heavy truck traffic to bring out in hundreds of thousands of gallons of flow-back water, and, in cases where a piped source of water is unavailable, trucks must bring in millions of gallons of water for hydraulic fracturing.

An application for a special exception for an unconventional gas well must meet the standards set forth in § 190-641.

§190-641. Oil and Gas Operations (Unconventional Gas Wells)

“A. Oil and Gas Operations, which include the drilling of oil or natural gas wells in the MEO Mineral Extraction Overlay District, or the construction of compressor stations and gas processing plants in the IC Industrial Commerce District, shall be reviewed and approved by the Penn Township Zoning Hearing Board as a Special Exception prior to the issuance of any required Township permits. All proposals for Oil and Gas Operations, whether listed as permitted or conditional uses, shall include the following submittal information in addition to the requirements for land developments specified in Chapter 156, Article III, §156-18 and §156-23 of the Penn Township Subdivision and Land Development Ordinance where such operation involves the development and operation of a natural gas compressor station or processing plant:

(1) A Health and Safety Impact Report shall be prepared and submitted for review with the following information:

- a. Copies of all information submitted to the Pennsylvania Department of Environmental Protection required for issuance of an oil and gas operation permit.
- b. Copies of industry standard health and safety reports for development and operation of such facilities.
- c. Sealed and signed affidavit from applicant’s engineering consultant that the proposed facility(ies) meets all current industry standards and specific Commonwealth standards under the Pennsylvania Oil and Gas Act (1984, PL 1140, No. 223), as amended.
- d. Design and Construction methods proposed to mitigate any identified health and safety issues at the subject site, including but not limited to, installation of sound barriers, chemical storage and frack water disposal, site lighting, and stormwater management may be referred to professional consultants at the Township’s discretion, the cost for which shall be borne by the applicant.

- e. Copies of any previous enforcement notices, fines or penalties assessed against the applicant, applicant's contractors or consultants involved in the development of the proposed oil and gas operation.
- f. Other information deemed by the Zoning Hearing Board relevant to address public health and safety concerns regarding the proposed oil and gas operations.

(2) The applicant shall provide the Director of Community Development a routing plan for access to the site, identifying Commonwealth and Township roadways being utilized, including copies of any required road performance bonds, Commonwealth operation permits or other required local or Commonwealth permits.

(3) Applicant shall provide the Director of Community Development with a copy of the Erosion and Sediment Control General Permit (ESCGP) approved by the Pennsylvania Department of Environmental Protection.

(4) The applicant shall provide a copy of any access security measures approved by the Pennsylvania Department of Environmental Protection during the gas drilling operation phase on lands in zoning districts where such activity is permitted.

(5) Any approved landscaping plan shall be visually consistent with the provisions of §190-630.

(6) At the time an application for a Township Zoning Permit is submitted, unless otherwise specified, a copy of all Pennsylvania Department of Environmental Protection required information regarding the rehabilitation-reclamation of the site shall be attached.

(7) Notification requirements of the Pennsylvania Department of Environmental Protection shall be satisfied prior to commencement of those activities specified in this Section.

B. Any operator utilizing Penn Township owned and maintained weight restricted roads for Oil and Gas Operation activities shall be held to the minimum Township standards for purposes of bonding. It shall be the sole responsibility of the operator to keep the roadway segments being utilized passable and mud-free for all vehicular traffic at all times, in addition to the following:

1. Where a Penn Township owned and maintained road is to be used for an Oil and Gas Operation, a maintenance plan shall be provided to the Township showing all roadway segments being used and the reason Township roads need to be accessed. Such plan shall include a schedule to keep the roadway passable and mud-free.
2. When the operator's maintenance plan for accessing Township owned and maintained roads for an Oil and Gas Operation is considered deficient by the Township Engineer due to excessive use related to such oil and gas operation, an agreement shall be executed to rebuild the roadway surface, subbase and drainage prior to use. Such roadway rehabilitation work shall be performed at a time deemed appropriate by the Board of Commissioners with input from the Township Engineer.
3. There shall be no staging or queueing of trucks or equipment on Township owned and maintained roads.

C. Where such oil and gas operations are classified as a special exception in certain zoning districts, the following review procedure and submittal information shall be provided and development standards met:

(1) An application for a Special Exception approval for an Oil and Gas Operation which involves an oil or natural gas well, compressor station or processing plant shall be filed with the Director of Community Development along with the required administrative fee and such application shall include information as outlined and processed as follows:

- (a) Identify and describe the property, its location and the present use.
- (b) Reasonably describe present improvements and any intended additions and changes.
- (c) Disclose the Special Exception for which the application is being made, and show how the property, as it may be improved, meets the standards and criteria required for approval.
- (d) Upon receipt of such application for Special Exception, the Director of Community Development shall forthwith refer the same to the Zoning Hearing Board. The Application for Special Exception shall be processed as per the provisions of the Pennsylvania Municipalities Planning Code, Section 913.2 and §190-906 of this Chapter.
- (e) The Zoning Hearing Board shall hold a public hearing pursuant to public notice, on the Special Exception application, as per the provisions of the Pennsylvania Municipalities Planning Code.
- (f) The Zoning Hearing Board may authorize a Special Exception pursuant to express standards and criteria specified in this Ordinance for said uses and may attach such additional conditions and safeguards as it may deem necessary where such conditions and safeguards are not pre-empted by Commonwealth Act 13 of February 2012 as determined by Pennsylvania courts.
- (g) The Township Staff shall report the action of the Township Zoning Hearing Board as per the provisions of the Pennsylvania Municipalities Planning Code, Section 913.2.

(2) The following activities shall be permitted in the MEO Mineral Extraction Overlay District following receipt of an approved zoning permit or the granting of conditional use or special exception approval where applicable: (a) Oil and gas operations, including but not limited to oil and natural gas wells, gas and water pipelines above the surface and vertical and horizontal wellbores which extend into the DIO Development Infill Overlay District below the surface; (b) Well and pipe location assessment operations, including seismic operations.

D. The applicant shall demonstrate that the drill site operations will not violate the citizens of Penn Township's right to clean air and pure water as set forth in Art. 1 Sec. 27 of the Pennsylvania Constitution (The Environmental Rights Amendment). The applicant shall have the burden to demonstrate that its operations will not affect the health, safety or welfare of the citizens of Penn Township or any other potentially affected land owner. The application submitted shall include reports from qualified Environmental individuals attesting that the

proposed location will not negatively impact the Township residents' Environmental Rights; and, will include air modelling and hydrogeological studies as potential pathways that a spill or release of fluid may follow.”

Current Situation with Unconventional Gas Drilling in Penn Township

At present, one unconventional gas well has been drilled in Penn Township, known as the Quest well. In addition, eight other unconventional gas wells have been approved by the Township: Beattie, White, Draftina, Deutsch, Drakulic, Backus, Numis, and Poseidon. The approved Backus, Beattie, Deutsch, Draftina, Drakulis, Numis, and White well pads are in the Rural Resource zoning district. The drilled Quest well and approved Poseidon well are in the Industrial Commerce zoning district. Two new well pads, the Gaia and Metis sites have also recently been proposed in the Rural Resource zoning district.

The Beattie, Draftina, and White wells were originally denied by the Township prior to the adoption of Ordinance 912-2016, but were subsequently approved as part of a federal settlement in December 2016. The Backus, Deutsch, Drakulic, Numis, and Poseidon wells were approved as special exceptions in early 2017. The Backus, Deutsch, Drakulic, and Numis approvals are currently under appeal.

Natural Gas Development as a Long-Term Heavy Industrial Land Use

The Penn Township Zoning Ordinance defines Industrial Use as: “Any process, other than light industrial, involving the mechanical or chemical transformation of materials or substances into new products, including the assembling of component parts and the blending of raw materials” (§ 190-202) Hydrofracturing involves the use of water, sand, and chemicals (proppant) to extract natural gas from underground shale formations. This process is a heavy industrial use (See, Carolyn G. Loh & Anna C. Osland 2016. Local Land Use Planning Responses to Hydraulic Fracturing, p. 222, *Journal of the American Planning Association*, 82(3): 222-235).

Light Industrial uses are allowed by right in the Industrial Commerce zoning district. The Township zoning ordinance defines Light Industrial as “The processing and fabrication of certain materials and products where no process involved will produce noise, vibration, water pollution, fire hazard or noxious emissions which will disturb or endanger neighboring properties. Light industrial includes, but is not limited to, the production of the following goods: home appliances, electrical instruments, office machines, precision instruments, electronic devices, timepieces, jewelry, optical goods, musical instruments, novelties, wood products, printed material, lithographic plates, type composition, machine tools, dies and gauges, ceramics, apparel, lightweight nonferrous metal castings, film processing, light sheet metal products, plastic goods, pharmaceutical goods, food products, not including animal slaughtering, curing or rendering of fats, and similar activities” (§ 190-202). Note that oil and gas development are not listed as a light industrial use.

Oil and gas operations include the following:

A. Well location assessment, including seismic operations, well site preparation, construction drilling, hydraulic fracturing and site restoration associated with an oil or gas well of any depth;

B. Natural gas processing plants or facilities performing equivalent functions;

C. Water and other fluid storage or impoundment areas used exclusively for oil and gas operations;

D. Construction, installation, use, maintenance and repair of:

(1) Oil and gas pipelines;

(2) Natural gas compressor stations; and

(3) Natural gas processing plants or facilities performing equivalent functions;

E. Construction, installation, use, maintenance and repair of all equipment directly associated with activities specified in Subsection **A**, **B**, and C, to the extent that:

(1) The equipment is necessarily located at or immediately adjacent to a well site, impoundment area, oil and gas pipeline, natural gas compressor stations or natural gas processing plant; and

(2) The activities are authorized and permitted under the authority of a federal or commonwealth agency” (§ 190-202).

The processes involved in hydraulic fracturing and horizontal drilling that are used to extract shale gas in the United States and Pennsylvania have been widely reported and described in detail in a variety of government, industry, and academic publications. See for example U.S. Department of Energy. 2016. Office of Fossil Energy, Shale Gas 101. <http://energy.gov/fe/shale-gas-101>. Marcellus Shale Coalition. Hydraulic Fracturing. <http://marcelluscoalition.org/marcellus-shale/production-processes/fracture-stimulation/> <https://www.netl.doe.gov/File%20Library/Research/Oil-Gas/shale-gas-primer-update-2013.pdf>.

A typical well pad covers an area of about five acres in size. After construction of the well pad, a drilling rig is brought in, a process that can involve 50-65 tractor trailers. Non-conventional gas wells in the Marcellus Shale formation are drilled vertically and horizontally from the well pad. Marcellus Shale wells generally take between 15 and 30 days to drill. Multiple wells are drilled per pad. The total number of wells varies. The vertical and horizontal segments of the well are drilled using different rigs. Operations generally run day and night. The large rig is powered by large diesel engines. See well pad and drilling rig in photo below.



Marcellus Shale Well-Pad.

(Source: The Marcellus Shale Center for Outreach and Research, Penn State University, 2017.
<http://www.marcellus.psu.edu/>)

The large volume of hydraulic fracturing treatments that are employed in Marcellus Shale region wells involve a lot of equipment operated in a closely coordinated manner. The equipment includes pump trucks carrying in up to 3 million gallons of water-blending systems (though in Penn Township, piped municipal water is often available), storage tanks for water, sand and chemicals, tanks to capture produced liquids, piping systems to connect elements of the system, and specialized monitoring and control systems.



Marcellus well site during hydraulic fracturing operations.

(Source: National Energy Technology Laboratory, US Dept. of Energy, Modern Shale Gas Development in the United States: An Update, 2013, p. 49.

<https://www.netl.doe.gov/File%20Library/Research/Oil-Gas/shale-gas-primer-update-2013.pdf>.

Fracturing generally takes a few days per well as multiple zones along the horizontal laterals are sequentially perforated and fractured, beginning at the bottom (“toe”) of the wellbore and working back toward the “heel” where the horizontal portion of the well begins.

In the Marcellus Shale region, 10 to 20 percent of the water injected will come out of the well as flow-back water. Over the life of the well additional volumes of water will be produced. Flowback water and the produced water must be separated from the gas and hydrocarbon liquids at the site. Well pad production equipment may include separator units, dehydration facilities and condensate tanks to manage natural gas liquids produced by the well.

A natural gas processing plant cleans raw natural gas by separating impurities and various non-methane hydrocarbons and fluids to produce 'pipeline quality' dry natural gas. A gas processing plant is also used to recover natural gas liquids. See below. Source: US Dept. of Transportation. Fact Sheet: natural Gas Processing Plants.

<http://primis.phmsa.dot.gov/comm/factsheets/fsnaturalgasprocessingplants.htm>.



A compressor station helps to transport natural gas through a pipeline. The gas needs to be pressurized at intervals of 40 to 100 miles. Siting of a compressor station depends on the terrain and the number of gas wells in the vicinity. See below.



The construction of the well pad, the drilling and hydraulic fracturing, and the completion of the wells, and post-completion activities are machinery-intensive activities that cause disruption to the environment and spillovers onto neighboring properties in the form of noise, dust, odors, and light, and the risk of fire and explosions. (Silver, Jonathan. "Fire at Mercer County Gas Well Briefly Forces Evacuation in 1-Mile Radius," *Pittsburgh Post-Gazette*, Sept. 6, 2014).

Shale gas development also has the potential to contaminate nearby water wells (Muehlenbachs, Spiller and Timmins (2015). “The Housing Market Impacts of Shale Gas Development.” *American Economic Review*. 105(12):3633-3659). For all of these reasons, shale gas development constitutes a heavy industrial land use, and has been recognized as a heavy industrial use by a number of municipalities. For example, Robinson Township, Washington County, allows Natural Gas Compressor Stations and Natural Gas Processing Plants as conditional uses only in their Industrial District (Robinson Township, 2010, https://pennstatelaw.psu.edu/_file/aglaw/Ordinances/Robinson_Township_2-10.pdf). Lycoming County defines an Oil and Gas Water Storage Facility as “a heavy industrial activity” (Lycoming County Zoning Amendment Section 4, 3250D.1). https://pennstatelaw.psu.edu/_file/aglaw/Ordinances/Lycoming_County.pdf). The Lycoming County zoning ordinance applies to several townships within that county.

Unconventional gas wells, compressor stations, and gas processing plants are allowed in Penn Township’s Industrial Commerce zoning district. But compressor stations and gas plants are not allowed in the Rural Resource zoning district. Unconventional gas wells are allowed as a special exception in the Industrial Commerce and Rural Resource zoning districts through the Mineral Extraction Overlay and according to the standards of §190-641. Unconventional wells are listed as a special exception use, and special exception uses inherently cause neighborhood impacts, and this (along with the factual description of well pad development above) indicates that unconventional well pads are a heavy industrial use.

Pennsylvania Municipalities Planning Code and Comprehensive Plans

The Pennsylvania Municipalities Planning Code is the state planning and zoning enabling legislation which allows local governments to adopt comprehensive plans and implement those plans through zoning, subdivision and land development regulations, and capital improvements programs. The Municipalities Planning Code spells out the land use regulations that local governments can employ.

The general purpose of a zoning ordinance is to implement the Township Comprehensive Plan, according to Section 601 of the Municipalities Planning Code. The Municipalities Planning Code Section 603(a) states that: “Zoning ordinances should reflect the policy goals of the statement of community development objectives.”

As expressed by the Commonwealth Court in the *Main Street* ruling: “First, a municipality creates a comprehensive plan, which contains a statement of objectives concerning future development, a plan for land use, transit, etc. Section 301 of the MPC, 53 P.S. § 10301. The municipality then enacts a zoning ordinance, the purpose of which is to implement the comprehensive plan. Section 601 of the MPC, 53 P.S. § 10601. The zoning ordinance must be generally consistent with the comprehensive plan; if it is not, the municipality must amend its comprehensive plan (see Section 603(j) of the MPC, 53 P.S. § 10603(j)). Thus, the zoning ordinance takes the general goals laid out in the comprehensive plan and translates them into the regulation of specific uses in order to implement the comprehensive plan” (*Main Street Development Group, Inc. v. Tinicum Tp. Bd. of Supervisors*, 19 A.3d 21 PA Commonwealth Court (2011)).

Penn Township’s Comprehensive Plan

A comprehensive plan is a public declaration of the goals, objectives, policies, and actions to guide the decisions of the Township’s elected officials, property owners and other public and private sector partners and stakeholders as the community continues to grow and change.

A township zoning ordinance should implement the township’s comprehensive plan. Section 603(j) of the Municipalities Planning Code states: “Zoning ordinances adopted by municipalities shall be generally consistent with the municipal or multimunicipal comprehensive plan...If a municipality amends its zoning ordinance in a manner not generally consistent with its comprehensive plan, it shall concurrently amend its comprehensive plan in accordance with Article III.”

Section 606 of the Municipalities Planning Code states: “Zoning ordinances enacted after the effective date of this act should reflect the policy goals of the municipality as listed in a statement of community development objectives...This statement may be supplied by reference to the community comprehensive plan or such portions of the community comprehensive plan as may exist and be applicable.”

The current Penn Township Comprehensive Plan was adopted in 2005. A municipal comprehensive plan in the Commonwealth is supposed to be updated every 10 years. The current Penn Township Comprehensive Plan is thus out of date, and should have been updated before the adoption of Ordinance 912-2016. Ordinance 912-2016 is not generally consistent with the current Township comprehensive plan.

The Penn Township Comprehensive Plan expresses a “preference to remain a low-density bedroom community (Executive Summary 2005, p. 1). The plan states that there are “two (2) planning principles identified at the outset; preserving the rural character and encouraging quality neighborhood scale development.” (Executive Summary 2005, p. 1).

The Penn Township Comprehensive contains the following “thematic objectives”:

Promote the preservation of active farmland (p. 12);

Guide commercial and industrial development into areas with adequate infrastructure (p. 12);

Encourage development which maintains the rural character of Penn Township (p. 13); and

Maintain low density residential uses in predominantly rural areas (p. 14).

The Mineral Extraction Overlay district applied in the Rural Resource zoning district is inconsistent with these objectives. The development of gas wells on farmland converts farmland to a heavy industrial use that will not be available for farming for a matter of many years, if not permanently. The Industrial Commerce zoning district is the appropriate location for unconventional oil and gas well development. Gas well development in the Rural Resource zoning district does not maintain the rural character of Penn Township, but adds a heavy

industrial use. This heavy industrial use will tend to discourage low density residential uses in the Rural Resource zoning district because of conflicts between heavy industry and rural residences over noise, truck traffic, and the uncertainty of where new wells could be drilled (see Map 3).

The Penn Township Comprehensive Plan expresses the following community development goals (page 6):

1. Balance development with conservation to maintain the appeal and quality of the community's existing landscapes.
2. Uphold responsible development by aligning appropriate development opportunities with realistic infrastructure and services.
3. Maintain fiscal responsibility while delivering effective services.
4. Support a diversified, safe, efficient, and environmentally sound transportation network for moving motorized and non-motorized vehicles, as well as pedestrians.

Evaluation of Penn Township's Comprehensive Plan and Zoning Ordinance

1. It is my opinion that the Penn Township zoning ordinance does not further several of the objectives of the Township's comprehensive plan. Ordinance 912-2016 violates the community development objectives in the Township's comprehensive plan. By allowing oil and gas well development to occur in generally more than half of the Township, Ordinance 912-2016 sets the stage for development to occur in a haphazard arrangement across the Rural Resource zoning district (see Map 2 and Map 5). Ordinance 912-2016 is not consistent with the Township's 2005 comprehensive plan. A primary goal of the comprehensive plan is: "Balance development with conservation to maintain the appeal and quality of the community's existing landscapes" (page 6). Supporting objectives to attain this goal include: "1. Maintain the community's overall rural character; and 2. Protect the community's natural resources by strategically implementing land use development polices" (page 6).

The Mineral Extraction Overlay District by including the entire Rural Resource zoning district in effect turns much of the Rural Resource zoning district into a heavy industrial zone for unconventional oil and gas well development. The use of the Mineral Overlay District for all of the Rural Resource zoning district is inconsistent with the Township's comprehensive plan and makes the Rural Resource zoning district irrational (See, *Robinson Twp., Delaware Riverkeeper, et al., v. Com.*, 52 A. 3d at 484-485). The Mineral Overlay District applies to all of the Industrial Commerce zoning district which is an appropriate utilization of a special exception use to allow for heavy industrial oil and gas well and related development.

The Mineral Extraction Overlay zone has the potential to introduce incompatible land uses as close as 600 feet to existing dwellings and water wells in several parts of the Mixed Use Residential zoning district. The development of a gas well is a heavy industrial land use. These uses pose threats to the public health, safety, and welfare, and enjoyment of private property by

landowners. A heavy industrial use is not compatible in zoning districts that are designed to promote low- to medium-density residential and commercial development.

Ordinance 912-2016 does not stabilize property values in the Rural Resource zoning district because it allows oil and gas well development on nearby parcels at a minimum of 600 feet from a residence or water well. Such development on adjacent parcels will reduce residential property values (see, Section 4150.2.E.3 and D.1 and D.2 of the HUD Handbook, 1999). In addition, oil and gas well development does not protect woodlands, open space or agricultural or environmentally sensitive lands.

2. The purpose of zoning is to separate incompatible land uses, protect property values, and protect public health safety, and welfare. Unconventional gas wells are a heavy industrial use. Even as a special exception in a Rural Resource zoning district where single family development is permitted by right, unconventional gas wells are incompatible with residential land uses. It is, therefore, my opinion that unconventional drilling for natural gas is not reasonable in a rural residential area and should not be allowed by special exception in the Rural Resource zoning district. It is my opinion that unconventional gas well development should be concentrated in the Industrial Commerce zoning district where heavy industrial uses are desired and where approval of an unconventional gas well by special exception, subject to 190-635 and 190-641 is appropriate for promoting the public health, safety, and welfare.

3. The zoning ordinance is unreasonable in that it allows heavy industrial land uses across the RR zoning district and in up to 50 percent of the township. By allowing oil and gas well development potentially to occur in up to half of the Township, Ordinance 912-2016 sets the stage for development to occur in a haphazard arrangement across the Township (see Map 3). According to the Municipalities Planning Code: “Zoning ordinances shall provide for the reasonable development of minerals in each municipality” (Section 603(i)). Ordinance 912-2016 allows for the development of natural gas wells in potentially half of the Township. In my opinion this is unreasonable.

Map 3 and Table 1 indicate that through Ordinance 912-2016, the Township has simply zoned too much of the Township for potential heavy industrial development. The application of the Mineral Extraction overlay to the Rural Resource zoning district does not encourage balanced and orderly community growth and development because it allows for oil and gas well development in a large part of the Township. Unconventional drilling for natural gas as a special exception use is reasonable in the Industrial Commerce zoning district. This is an appropriate location for heavy industrial land uses such as unconventional oil and gas well development and related activities.

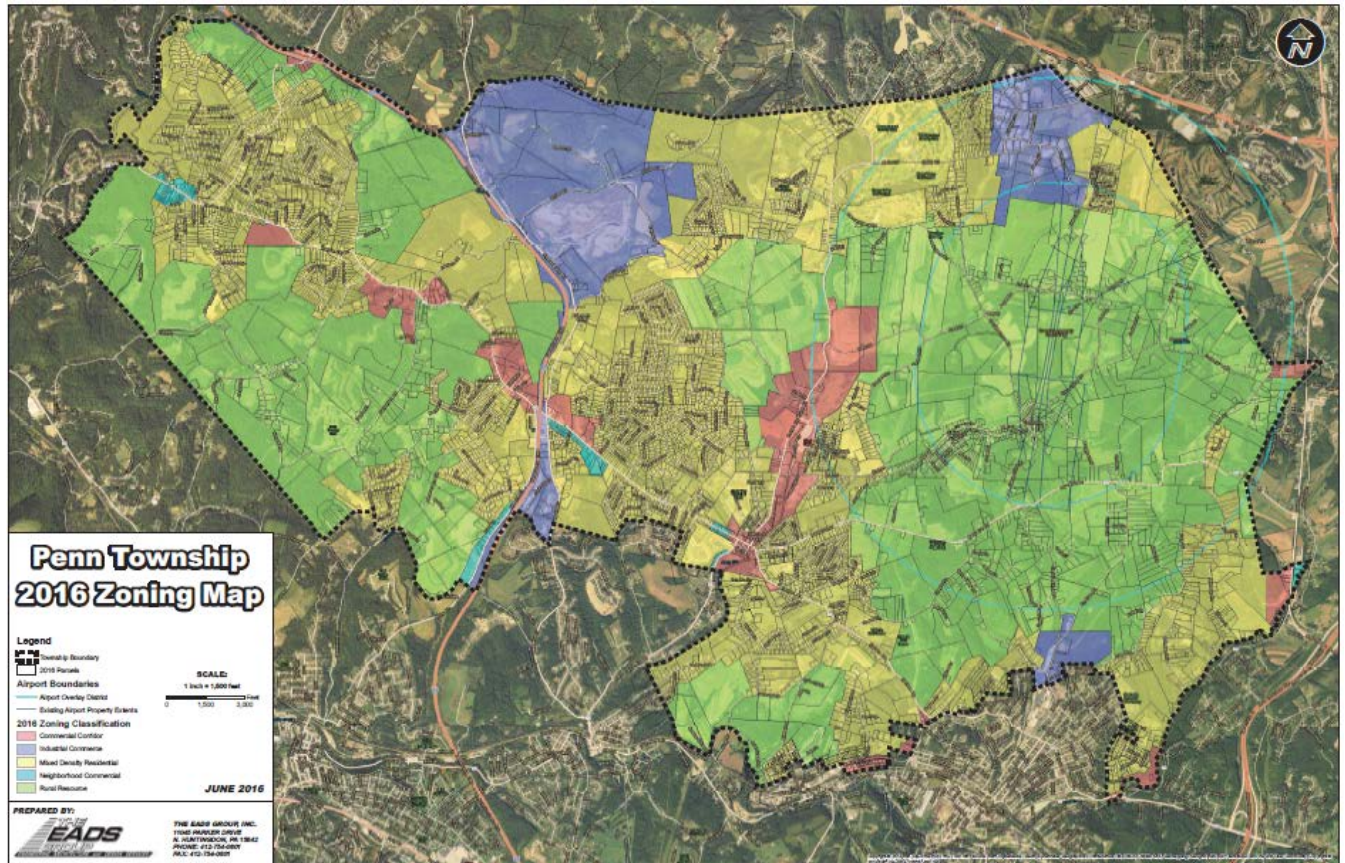
4. Allowing unconventional oil and gas well development in the Rural Resource zoning district will result in a haphazard pattern of heavy industrial development away from highway facilities which will not maintain the present rural atmosphere of the Township (see Map 3 and Map 5). Prior to September 26, 2016, Penn Township approved 2 unconventional well pads in the RR District and 1 in the IC District. Subsequent to September 26, 2017, Penn Township approved an additional 5 well pads in the RR District and 1 in the IC District. Penn Township has noticed hearings for two additional well pads in the RR District, not included here. Table 2

summarizes the number of well pads approved by the Township in the RR and IC zoning districts.

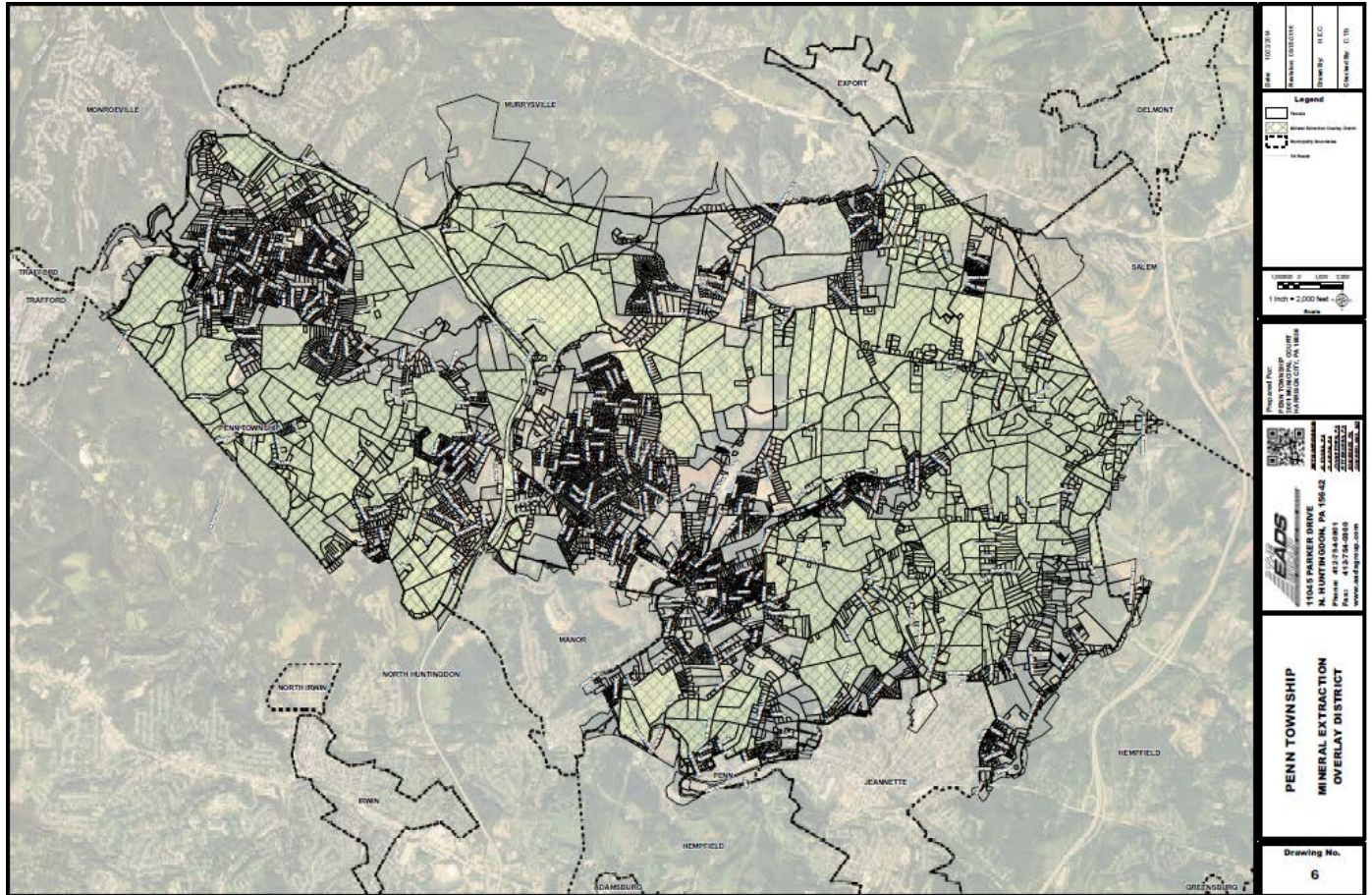
Table 2. The Number of Unconventional Gas Well Pads Approved by Penn Township per Zoning District, Before and Since September 26, 2016.

<u>Zoning District</u>	<u>Number of Well Pads Approved</u>
<i>Prior to September 26, 2016</i>	
Rural Resource District	0
Industrial Commerce District	1
<i>Since September 26, 2016</i>	
Rural Resource District	7
Industrial Commerce District	1
TOTAL	9

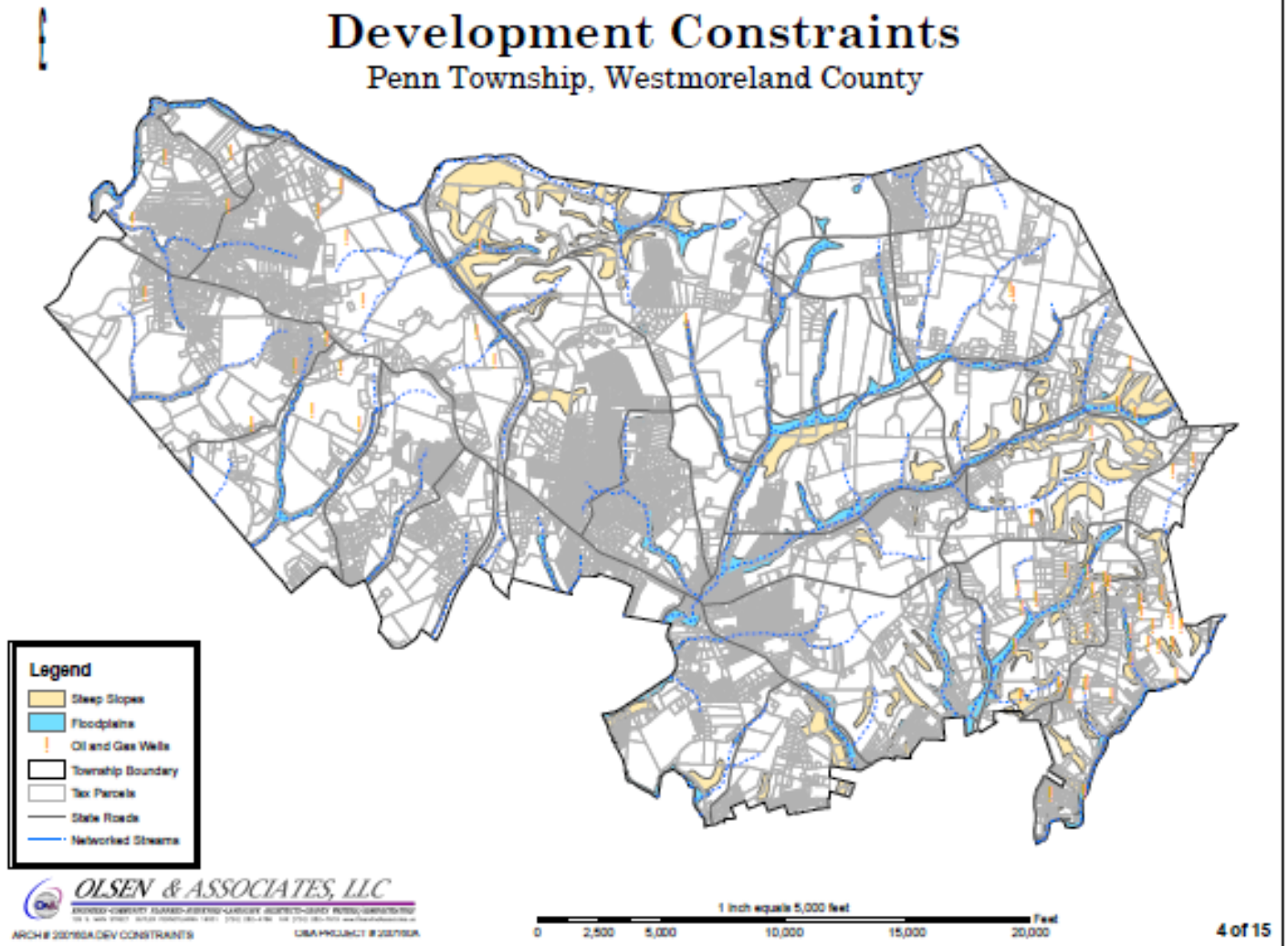
Map 2. Zoning Map of Penn Township.



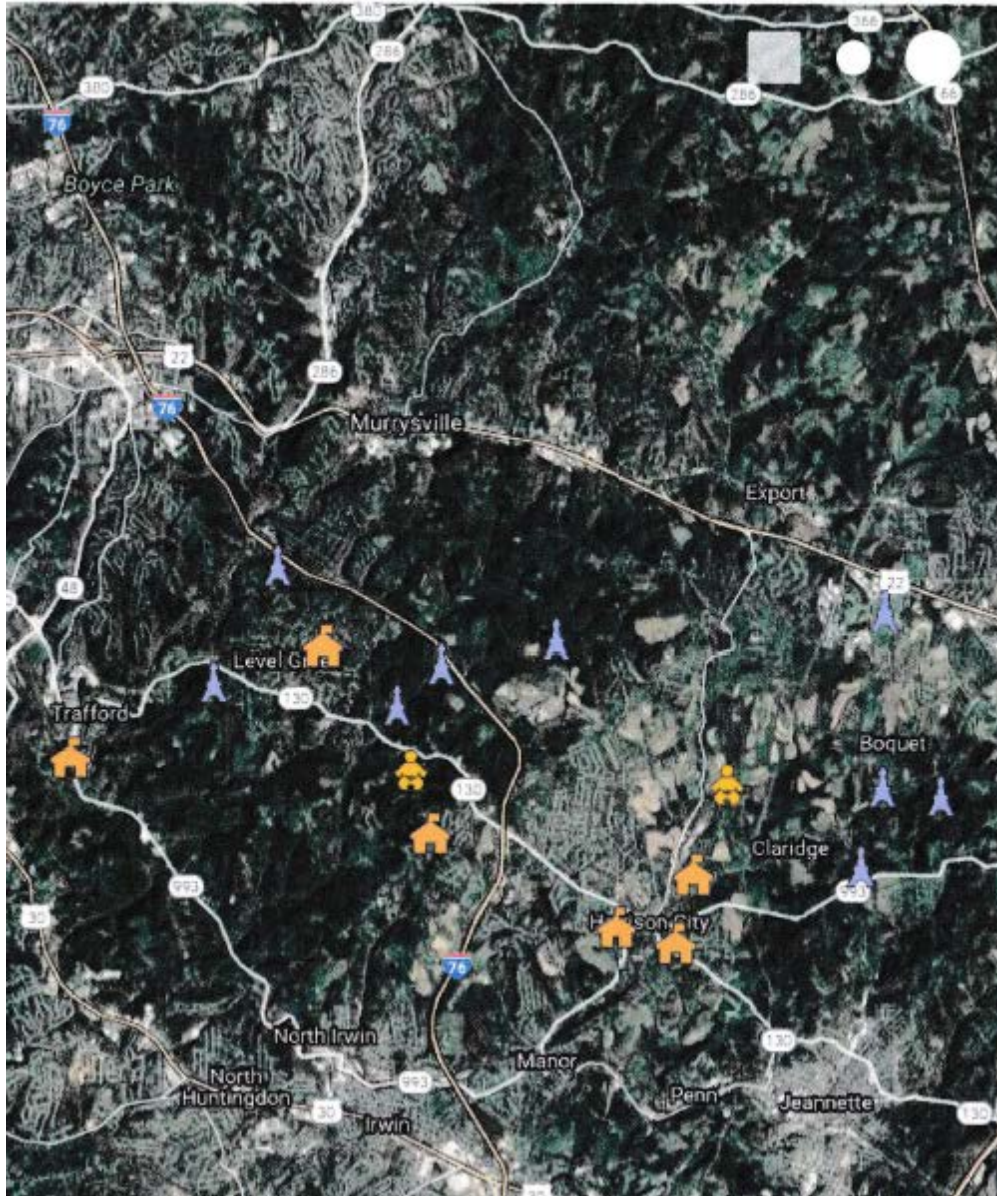
Map 3. Mineral Extraction Overlay District (in green) in Penn Township.



Map 4. Existing conventional wells in Penn Township, as of 2005. Source: Penn Township Comprehensive Plan.



Map 5. Drilled and Approved Unconventional Wells in Penn Township as of May, 2017.
Note: drilled and approved wells are shown in blue. School locations are shown in orange.



Impacts of Oil and Gas Development on Neighboring Properties

A fundamental purpose of zoning is to separate incompatible uses that threaten health and safety. By allowing for heavy industrial oil and gas uses in the Rural Resource zoning district, Ordinance 912-2016 unreasonably infringes upon the affected landowners' constitutionally protected rights to freely use and enjoy their property. An evacuation zone of up to two miles may be needed in the event of an accident—explosion and fire—at a gas well. The possibility of an evacuation is real (see, Silver, Jonathan. “Fire at Mercer County Gas Well Briefly Forces Evacuation in 1-Mile Radius,” *Pittsburgh Post-Gazette*, Sept. 6, 2014).

Another fundamental purpose of zoning is to protect the public health, safety, and welfare. Oil and gas development is a heavy industrial use that has the potential to create spillovers onto neighboring properties in terms of air and water pollution and concomitant threats to health and reductions in property values. Air pollution threats to neighbors from the generation of benzene and formaldehyde (both known carcinogens) from natural gas wells have been documented (Macey, et al, *Environmental Health* 13:82, 2014; Adgate, John L. et al. 2014. “Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development,” *Environmental Science and Technology*, No. 48 (August 5, 2014), pp. 8307 – 8320).

The Associated Press reported that “Pennsylvania has confirmed at least 106 water-well contamination cases since 2005, out of more than 5,000 new wells. There were five confirmed cases of water-well contamination in the first nine months of 2012, 18 in all of 2011 and 29 in 2010” (Begos, “4 states confirm water pollution from drilling,” *USA Today*, January 5, 2014). In August of 2014, Pennsylvania Department of Environmental Protection made public 243 cases in which oil and gas companies drilling for energy supplies contaminated private drinking water wells (Associated Press, August 28, 2014, “DEP releases details of cases of drinking well contamination from drilling.”). These cases included methane contamination and wastewater spills, and contamination occurred in 22 Pennsylvania counties. On October 2, 2017, the Pennsylvania Department of Environmental Protection updated its list of cases in which oil and gas companies drilling for energy supplies contaminated private drinking water wells. The DEP reported a total of 294 cases since 2008. Seven cases were reported in Westmoreland County (http://files.dep.state.pa.us/OilGas/BOGM/BOGMPortalFiles/OilGasReports/Determination_Letters/Regional_Determination_Letters.pdf).

The Federal Housing Administration takes into consideration “inharmonious land uses” when considering whether to insure the mortgage of a prospective homebuyer. For example:

“3. Inharmonious Land Uses

The appraiser must identify all inharmonious land uses in a neighborhood that affect value. Clearly define the current and long-term effect that inharmonious uses will have on the market value and the economic life of the subject property. If inharmonious land use represents a serious detriment to either the health or safety of the occupants or to the economic security of the property, clearly note safety of the occupants or to the economic security of the property, clearly note this on the VC and URAR. Recommend that the property be rejected by the Lender (Section 4150.2.E.3 of the HUD Handbook, 1999). “

Also,

“D. OPERATING AND ABANDONED OIL OR GAS WELLS

Operating and abandoned oil and gas wells pose potential hazards to housing, including potential fire, explosion, spray and other pollution.

1. Existing Construction

No existing dwelling may be located closer than 300 feet (federal standard, the State of Pennsylvania standard is 600 feet) from an active or planned drilling site. Note that this applies to the site boundary, not to the actual well site.

2. New or Proposed Construction

If an operating well is located in a single-family subdivision, no new or proposed construction may be built within 75 feet of the operating well unless mitigation measures are taken” (ibid.).

Given the health threats associated with oil and gas development, these uses could make it difficult for neighbors to acquire FHA-insured mortgages because of the associated threat to property values. If the US Department of Housing and Urban Development is saying that gas well development is hazardous to neighboring houses, then gas well development is inharmonious with residential development—such as the gas well development Ordinance 912-2016 introduces into the Rural Resource zoning district.

The negative effects of oil and gas well development on property values are demonstrated in the study “The Housing Market Impacts of Shale Gas Development,” by Lucia Muehlenbachs, Elisheba Spiller, and Christopher Timmins (American Economic Review, 2014, http://public.econ.duke.edu/~timmins/MST_AER_1_3_2014.pdf) in which the authors note: “results demonstrate that groundwater-dependent homes are, in fact, negatively affected by nearby shale gas development” (p. 4) because of the threat of groundwater contamination. In addition to the health threats, property values are negatively affected by the reduced enjoyment of property because of the noise of nearby well drilling activity and increased truck traffic. The overall negative effects on property values are also reflected in a standard Pennsylvania real estate seller’s disclosure agreement and oil, gas and mineral rights disclosure and addendum to agreement of sale. The seller’s disclosure agreement asks for “all known material defects about the Property being sold that are not readily observable.” A material defect is a Problem with the Property or any portion of it that would have a significant adverse impact on the value of the residential real property or THAT INVOLVES AN UNREASONABLE RISK TO PEOPLE ON THE LAND OR PROPERTY” (West Penn Multi-List, Inc.™ Seller Disclosure Statement, p. 1). The Seller Disclosure form asks: 20 (L) “Are you aware of a lease of the oil, gas, or mineral rights being agreed to for this particular property?” 20 (O) “Are you aware if any drilling has occurred or is planned to occur on nearby property?” (ibid., p. 8).

The oil, gas and mineral rights disclosure states: “[mineral] leases can be very complex and could drastically impact the surface rights of the landowner. Leases may also restrict the ability of the surface owner to use the property if it would conflict in any way with the subsurface rights” (Pennsylvania Association of Realtors, Oil, Gas and Mineral Rights Disclosure and Addendum to Agreement of Sale, p. 3).

Overall Conclusion

It is my opinion that Ordinance 912-2016 violates provisions of the Pennsylvania Municipalities Planning Code. It does not promote the reasonable development of minerals in the Township by allowing unconventional oil and gas wells as a special exception in the Rural Resource zoning district. The application of the Mineral Extraction Overlay to the Rural Resource zoning district allows for the development of unconventional oil and gas wells in a large part of the township. Moreover, the existing Industrial Commerce zoning district together with the application of the Mineral Extraction Overlay provide adequate and appropriate space for unconventional oil and gas well development and related heavy industrial activities. Ordinance 912-2016 is neither consistent nor in conformance with the comprehensive plan of Penn Township. Hence, Ordinance 912-2016 does not implement the Municipalities Planning Code or the Township Comprehensive Plan.

In addition, Ordinance 912-2016 is contrary to its own stated purpose and is contrary to the community development goals in the 2005 comprehensive plan. Introducing heavy industrial unconventional oil and gas well development as a special exception in the Rural Resource zoning district does not further the public health, safety, and welfare, but rather jeopardizes it.

Further, Ordinance 912-2016 violates several basic principles of zoning by introducing heavy industrial uses as a special exception into the Rural Resource zoning district: 1) residential and heavy industrial uses thwart the separation of conflicting land uses and do not result in the protection of public health and safety; 2) the protection of residential property values is jeopardized by allowing a heavy industrial oil and gas uses within the Rural Resource zoning district; 3) the heavy industrial oil and gas uses will not maintain the rural character of the Township; and 4) the introduction of the heavy industrial oil and gas uses as a special exception does not provide certainty for residential or agricultural property owners. Rather, Ordinance 912-2016 unreasonably infringes upon the rights of neighboring landowners to use and enjoy their property.

Finally, the township zoning ordinance, specifically the application of the Mineral Extraction Overlay in the Rural Resource zoning district, does not promote the interests of the entire public. The Mineral Overlay zoning district treats the oil and gas industry differently than all other heavy industrial uses by allowing unconventional wells in the Rural Resource zoning district which will adversely affect residential land uses and property values.

The opinions expressed in this report are to a reasonable degree of professional certainty.



Dated: October 20, 2017

Thomas L. Daniels, Professor

APPENDIX A



School of Design
Department of City and Regional Planning
127 Meyerson Hall
210 S 34th Street
Philadelphia, PA 19104-6311
Tel 215.898.8329 Fax 215.898.5731

Thomas L. Daniels

Dept. of City and Regional Planning
127 Meyerson Hall
School of Design
University of Pennsylvania
Philadelphia, PA 19104-6311
Phone: (215) 573-8965 (W)
Fax: (215) 898-5731

Nationality: American
Age: 64

(717) 368-0559 (cell)
e-mail: thomasld@design.upenn.edu

Education

1984 Ph.D. in Agricultural and Resource Economics, Oregon State University.

1977 M.S. in Agricultural and Resource Economics, University of Newcastle-upon-Tyne, England. Study on a Rotary Foundation Fellowship.

1976 B.A. cum laude in Economics, Harvard University.

Planning Experience

July 2003-

Present

Full Professor with Tenure, Department of City and Regional Planning,
University of Pennsylvania.

Teach: Land Use Planning, Environmental Planning, Metropolitan Growth
Management, and Land Preservation. Acting Chair, January-June 2006, July,
2015-June 2016.

Full Professor with Tenure, The University at Albany, State University of New
York. Director of the Planning Master's Program, Fall 1998-December 2001.

Fulbright Senior Fellowship, University of New South Wales, Australia,
February-June, 2002.

May 1989-

July 1998

Director, Agricultural Preserve Board of Lancaster County, Pennsylvania. Administered a nationally-recognized farmland preservation easement acquisition program with an annual budget of over \$4 million. Preserved over 16,000 acres in 188 easement projects. Assisted Planning Commission staff with growth management and agricultural zoning issues. The program received the 1993 Outstanding Program Award from the Small Town and Rural Planning Division of the American Planning Association. Received the 1996 National Achievement Award from the American Farmland Trust.

Aug. 1987-

May 1989

Associate Professor with Tenure, Department of Regional and Community Planning, Kansas State University.

Jan. 1985-

July 1987

Assistant Professor, Department of Community and Regional Planning, Iowa State University. Taught in Semester Abroad program in London, Fall 1986.

Publications

Books

- 2014 The Environmental Planning Handbook for Sustainable Communities and Regions (Second Edition). Chicago: American Planning Association.
- 2011 The Planners Guide to CommunityViz: The Essential Tool for a New Generation of Planning. Chicago: American Planning Association.
(Second author with Doug Walker).
- 2007 The Small Town Planning Handbook (3rd edition). Chicago: American Planning Association. (Senior author with John Keller, Mark Lapping, Katherine Daniels, and Jim Segedy.)
- 2003 The Environmental Planning Handbook for Sustainable Communities and Regions. Chicago: American Planning Association (Senior author with Katherine Daniels).
- 1999 When City and Country Collide: Managing Growth in the Metropolitan Fringe. Washington, D.C.: Island Press.
- 1997 Holding Our Ground: Protecting America's Farms and Farmland. Washington, D.C.: Island Press. (Senior author with Deborah Bowers).
- 1995 The Small Town Planning Handbook, 2nd edition. Chicago: Planners Press. (Senior author with John Keller and Mark Lapping).

- 1989 Rural Planning and Development in the United States, New York: Guilford Publications. (Second author with Mark Lapping and John Keller).
- 1988 The Small Town Planning Handbook. Chicago: Planners Press. (Senior author with John Keller and Mark Lapping).

Book Chapters

- 2017 Daniels, T., "Farmland Preservation Policies in the United States," in Caldwell, Hilts, and Wilton, eds. *Farmland Preservation: Land for Future Generations*, 2nd ed. Winnipeg, CA: University of Manitoba Press, pp. 184-199.
- 2011 Daniels, T., "Farmland Preservation as a Growth Management Strategy: Lessons for State and Local Governments," in Chapin and Coutts, eds., *Smart Growth through Public Land Acquisition: Realities and Prospects*. Aldershot, Kent, UK: Ashgate Publications.
- 2009 Daniels, T. "Water in the Urban Environment," in G. Hack *et al.*, *The Practice of Local Government Planning* (4th ed.) Washington, D.C.: International City Managers Association, pp. 392-400.
- Daniels, T. "Preserving Agricultural Land as a Growth Management Strategy," in G. Hack *et al.*, *The Practice of Local Government Planning* (4th ed.) Washington, D.C.: International City Managers Association, pp. 312-315.
- Daniels, T. "Energy and Community Greening" and "Food and Community Greening" in S. Piedmont-Palladino and T. Mennel, eds., *Green Community*. Chicago: American Planning Association, pp. 83, and 137-8.
- Daniels, Thomas L. and Katherine Daniels. 2009. "Environmental Planning," in E.L. Birch, ed., *The Urban and Regional Planning Reader*. New York: Routledge, pp. 297-306.
- 2008 Daniels, T. "Taking the Initiative: Why Cities Are Greening Now," in E.L. Birch and S. Wachter, eds. *Growing Greener Cities: Urban Sustainability in the 21st Century*. Philadelphia: University of Pennsylvania Press, pp. 11-27.
- 2007 Daniels, T., "Farmland Preservation Policies in the United States," in W. Caldwell, S. Hilts, and B. Wilton, eds., *Farmland Preservation: Land for Future Generations*. University of Guelph, Guelph, Ontario, Canada, 2007, pp. 307-328.
- 2006 "Land Preservation in New York, New Jersey, and Pennsylvania: Strategy, Funding, and Cooperation are Key," in K. Goldfeld, ed.

The Race For Space: The Politics and Economics of State Open Space Programs, Princeton, New Jersey: Princeton University, Woodrow Wilson School, pp. 9-24.

“Lessons from Sri Lanka,” with Harris Steinberg, in Birch and Wachter, eds. *Rebuilding Urban Places After Disaster: Lessons from Hurricane Katrina*. Philadelphia: University of Pennsylvania Press, pp. 244-255.

“Farms,” “Open Space Preservation Techniques”, “Farmland Preservation”, “Land Evaluation and Site Assessment”, in *Planning and Urban Design Standards*, New York: John Wiley & Sons.

2000 “Development Rights and the Environment,” in M. Kaplowitz, ed. *Property Rights, Economics, and the Environment*. Stamford, CT: JAI Press, pp. 123-141.

“Saving Agricultural Land with Conservation Easements in Lancaster County, PA,” in Gustanski and Squires, eds., *Protecting the Land: Conservation Easements...Past, Present, and Future*. Washington, D.C.: Island Press.

1994 "Using LESA in a Purchase of Development Rights Program: The Lancaster County, Pennsylvania Case," in Steiner, Pease, and Coughlin, eds., *A Decade with LESA: The Evolution of Land Evaluation and Site Assessment*, Ankeny, IA: Soil and Water Conservation Society.

Refereed Journal Articles

2017 “Preserving Large Farming Landscapes: The Case of Lancaster County Pennsylvania,” *Journal of Agriculture, Food Systems and Community Development*. (senior author with Lauren Payne-Riley).

“The Plan for the Valleys: Assessing the Vision of David Wallace and Ian McHarg.” *Journal of Planning History* (forthcoming) 2nd author with George Hundt, Jr.).

2010 “Integrating Forest Carbon Sequestration Into a Cap-and-Trade Program to Reduce Net CO2 Emissions *Journal of the American Planning Association*, 76 (4): 463-475.

“The Use of Green Belts to Control Sprawl in the United States,” *Journal of Planning Practice and Research*, 25: 2, 255 — 271.

2009 “A Trail Across Time: American Environmental Planning from City Beautiful to Sustainability. *Journal of the American Planning Association*. 75 (2): 178-192.

- "National Parks: Where the Timeless Landscape Meets the Tourist Time Clock," *Journal of Architectural and Planning Research* 26 (2):111-123.
- 2006 "The U.S. Freshwater Supply Shortage: Experiences with Desalination as a Part of the Solution." *Journal of Environmental Planning and Management*, 49 (4): 571-585. (second author with Emily Yuhas).
- 2005 "Land Preservation as a Key Element of Smart Growth," *Journal of Planning Literature*, 19:3, 316-329. (Senior author with Mark Lapping).
- 2001 "Smart Growth: A New American Approach to Regional Planning." *Planning Practice & Research*, Vols. 3 &4, pp. 271-281.
- "What Does 'Smart Growth' Mean for Community Development?" *Journal of the Community Development Society*, 32:1, pp. 20-34.
- "Coordinating Opposite Approaches to Managing Urban Growth and Curbing Sprawl: A Synthesis," *American Journal of Economics and Sociology*, 60:1, pp. 229-243.
- 2000 "Integrated Working Landscape Protection: The Case of Lancaster County, Pennsylvania," *Society & Natural Resources*, 13:3, pp. 261-271.
- 1997 "Where Does Cluster Zoning Fit in Farmland Protection?" *Journal of the American Planning Association*, Vol. 63, No. 1, pp. 129-137.
- 1996 "The Two Rural Americas Need More, Not Less Planning," *Journal of the American Planning Association*, Vol. 62, No. 3, pp. 285-288. (Senior author with Mark Lapping).
- 1991 "The Purchase of Development Rights: Preserving Agricultural Land and Open Space," *Journal of the American Planning Association*, Vol. 57, No. 4, pp. 421-431.
- "The Goals and Values of Local Economic Development Strategies in Rural America," *Agriculture and Human Values*, Vol. 8, No. 3, pp. 3-9.
- 1990 "Using the LESA System in a Purchase of Development Rights Program," *Journal of Soil and Water Conservation*, Vol. 45, No. 6, pp. 617-621.
- 1989 "Small Town Economic Development: Growth or Survival?" *Journal of Planning Literature*, Vol. 4, No. 4, pp. 413-429.

- "A Rationale for the Support of the Medium-Sized Family Farm," *Agriculture and Human Values*, Vol. 6, No. 4, pp. 47-53.
- 1988 "Agricultural Zoning in a Metropolitan County: An Evaluation of the Black Hawk County, Iowa Program," *Landscape and Urban Planning*, Vol. 16, No. 4, pp. 303-310. (Senior author with David Reed).
- "America's Conservation Reserve Program: Rural Planning or Just Another Subsidy?" *Journal of Rural Studies*, Vol. 4, No. 4, pp. 405-411.
- 1987 "Small Town Triage: A Rural Settlement Policy for the American Midwest," *Journal of Rural Studies*, Vol. 3, No. 3, pp. 273-280. (Senior author with Mark Lapping).
- 1986 "The Vermont Land Gains Tax: A Lesson in Land Policy Design," *American Journal of Economics and Sociology*, Vol. 45, No. 4, pp. 441-456. (Senior author with Robert H. Daniels and Mark Lapping).
- "Is Oregon's Farmland Preservation Program Working?" *Journal of the American Planning Association*, Vol. 52, No. 1, pp. 22-32. (Senior author with Chris Nelson).
- "Hobby Farming in America: Rural Development or Threat to Commercial Agriculture?" *Journal of Rural Studies*, Vol. 2, No. 1, pp. 31-40.
- 1984 "Has the Vermont State Land Use Program Failed?: An Analysis of Vermont's Act 250," *Journal of the American Planning Association*, Vol. 50, No. 4, pp. 502-508. (Senior author with Mark Lapping).
- 1982 "The Oregon Land Use Act: Implications for Farmland Protection," *Journal of the American Planning Association*, Vol. 48, No. 3, pp. 365-373. (Second author with Greg Gustafson and Rosalyn Shirack).

Other Articles

- 2017 "Montgomery County, Maryland's Ag Reserve," *Planning* (forthcoming).
- 2015 "Preserving Large Landscapes," with Jack Wright. *Planning*, pp. 33-39. November, 2015.
- "Rural Planning in the U.S.: Lessons for Ontario," *Ontario Planning Journal*, 30:3, pp.8-9. May/June, 2015.
- "Breathe Better Air, Breathe Easier," *Planning*, April 2015.

- 2012 "Drilling Down on Hydrofracking." *Planning*, 78 (8): p. 33.
- 2009 "Saving Farms and Farmland: Ag Land Preservation Has Reached Maturity." *Planning*, 75 (8): 38-43.
- 2008 "Works on Green Cities: From Potential to Imperative," Review Essay, Book review section, *Journal of the American Planning Association*, 74: 4, pp. 521-522.
- "Rural Zoning: Return to the Village," *Zoning Practice*. November, 2008.
- 2007 "Zoning for Successful Transferable Development Rights Programs," *Zoning Practice*, December, 2007.
- "Preserving Oregon's Heritage: Adding New Tools to the Mix," *Landmark*, Vol. 32, No. 2, Summer 2007, pp. 10-11.
- "Small Town Design: Getting It Right," *Planning*, June 2007, pp. 36-39. (second author with Jim Segedy)
- 2004 "The Next Big Things," *Planning*, August-September, 2004, pp. 28-33. (senior author with Katherine Daniels)
- 2000 "Farm Follows Function," *Planning*, January, 2000, pp. 15-17.

Conference Papers and Presentations

- 2017 "Using GIS to Measure Progress in Farmland Preservation," Pennsylvania Land Trust Association Conference, Lancaster, PA, May 4, 2017.
- 2016 Keynote Presentation, Missouri APA Conference, Springfield, MO, October 6, 2016.
- "Large Landscape Conservation: East," American Planning Association National Conference, Phoenix, AZ, April 2, 2016
- 2015 "Green Infrastructure for Urban Stormwater Management," Association of Collegiate Schools of Planning Conference, Houston, TX, October 22, 2015.
- "Land Preservation," Commerce and Conservation Conference, Washington, MO, July 29, 2016.
- "What's New in Environmental Planning?" American Planning Association Conference, Seattle, WA, April 18, 2015

- 2014 "A Comparison of Urban Containment: Oregon, Maryland, and Four Hybrid Counties." Association of Collegiate Schools of Planning, Philadelphia, PA, October 30, 2014.
- "Farmland Preservation in Lancaster County, PA: How We Preserved 100,000 Acres." National Workshop on Large Landscape Conservation, Washington, D.C., October 23, 2014.
- "Farmland Preservation: Where We've Been, Where We're Going," Keynote address, National Farmland Preservation Conference, Hershey, PA, May 12, 2014.
- "Return on Investment: How PDR is Strengthening Local Economies and Remaining Relevant Moving Forward." National Farmland Preservation Conference, Hershey, PA, May 12, 2014.
- 2013 "Planning for Climate Change: Mitigation and Adaptation," Planners Training Session, Seattle, June 11-12, 2013.
- "Philadelphia: Urban Water: Managing Stormwater, Rivers, and Watersheds," Urban Ecosystems Services and Decision Making: A Green Philadelphia Conference, Philadelphia, PA, May 23, 2013.
- "Partnering with NGOs on Land Conservation," American Planning Association Conference, Chicago, IL, April 16, 2013.
- "Climate Change Adaptation," American Planning Association Conference, Chicago, IL, April 16, 2013.
- "Protecting Peri-Urban Farmland and Farming in the United States," Feeding Cities Conference. Philadelphia, PA, March 15, 2013.
- 2012 "Planning for Green Infrastructure," Planners Training Session, Charlotte, NC, November 15-16, 2012.
- "Entering the Fray: Land Trusts and Land Use Planning," National Land Trust Rally, Salt Lake City, UT, October 1, 2012
- "Farmland Preservation and Smart Growth,: The Lancaster County, PA Case," New Partners for Smart Growth Conference, San Diego, Feb. 4, 2012.
- 2011 "Greenbelts to Control Sprawl in the United States," American Planning Association Conference, Boston, April 10, 2011.
- 2010 "Landscape Scale Farmland Preservation," American Society of

Landscape Architects Conference, Washington, DC, September 14, 2010.

Professional Reports

- 2017 Land Use Study, Solebury Township, PA, 25 pp.
- 2010 Cost of Community Services Study for Four Municipalities and the Hempfield School District, for East and West Hempfield Townships and the Hempfield School District in Lancaster County, PA, 51 pp.
- 2008 Ideas for Rural Smart Growth, Promoting the Economic Viability of Farmland and Forestland in the Northeastern United States, for the Office of Smart Growth, US Environmental Protection Agency, Washington, D.C., 40 pp.
- The Lancaster County TDR Practitioner's Handbook, for the Lancaster County, PA Planning Commission, 75 pp. (Third author with John Theilacker and John Snook).
- An Evaluation of the Peninsula Township, Michigan Farmland Preservation Program, for the Grand Traverse Regional Land Trust, Traverse Bay, MI, 60 pages.
- 2007 An Evaluation of the Consistency of the Plum Creek Timber Company Proposed Concept Plan in the Moosehead Lake Region with the Comprehensive Land Use Plan of the Maine Land Use Regulation Commission, 46 pp.
- 2006 Final Report to the National Fish and Wildlife Foundation: An Evaluation of the Foundation's Conservation Easement and Capacity-Building Grants Program. 221 pp.
- Transfer of Development Rights Report for Hillsborough County, FL Planning Commission, co-author with Jill Quigley, 45 pp.
- Transfer of Development Rights Ordinance for St. Lucie County, FL, co-authored with Nancy Stroud, 27pp.
- 2003 Dakota County, Minnesota, Farmland and Natural Area Preservation Program Guidelines, 54 pp., co-author with Jean Coleman, June, 2003.
- 2002 Policy and Program Approaches to the Growth, Development, and Water Quality Connection: A Comparison of Two Estuaries: The Hudson River and the Chesapeake Bay. For the Hudson River Foundation, 230 pp. (Senior author with Katherine Daniels and Robert Leslie), September, 2002.

Vermont's Current Use Program: An Evaluation of Policy Options and Their Land Use Implications, for the Joint Fiscal Office of the Vermont Legislature, January, 2002.

Purchase of Development Rights Feasibility Study for Tompkins County, New York (Third author with George Frantz and Teri Ptacek), January, 2002.

Grants

2013-17 U.S. EPA. Green Infrastructure for Urban Stormwater Management. \$1 million. Project associate.

2004-06 National Fish and Wildlife Foundation. Effectiveness of NFWF's Investments in Conservation Easements to Protect Wildlife Habitat. \$125,000. Principal Investigator.

2002 Open Space Institute, Study of Sprawl and Land Use Change in the Capital District of New York, \$40,000. Project associate.

2000 Hudson River Foundation, Study of Land Use Planning Techniques in the Chesapeake Bay Estuary and the Hudson River Estuary, \$61,396, Principal Investigator.

Professional Memberships

1983 - Member, American Planning Association
Present

2004- Present Member, Land Protection Committee, Lancaster County Conservancy (PA)

2005- Present Member, Board of Trustees, Orton Family Foundation

2011- Present National Advisory Board, Resources First Foundation, Yarmouth, Maine.

2012- Present National Advisory Board, Equine Land Conservation Resource, Lexington, KY

2015- Present Member AICP Exam Committee, American Planning Association