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Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

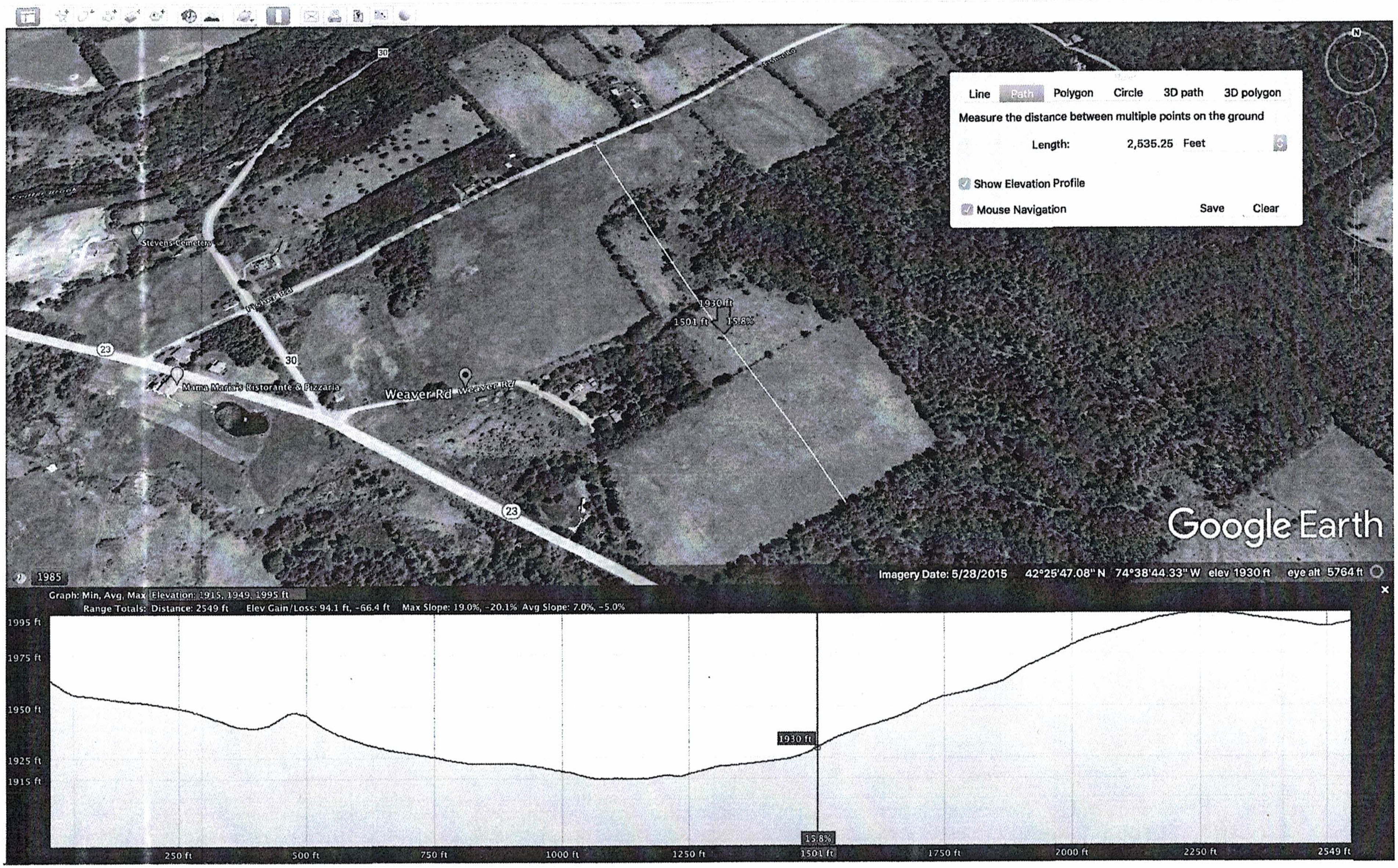
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



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Range Totals: Distance: 2549 ft
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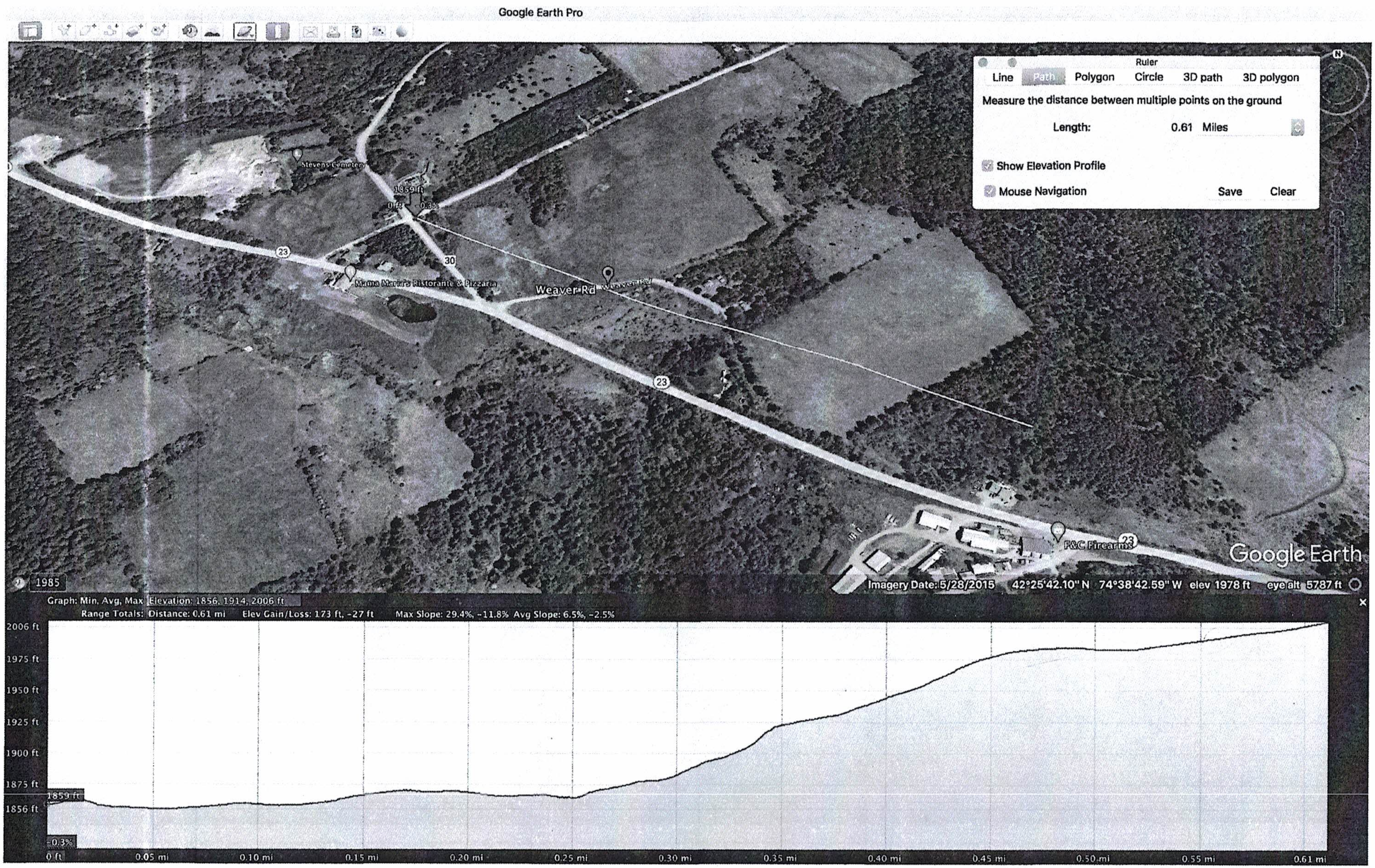
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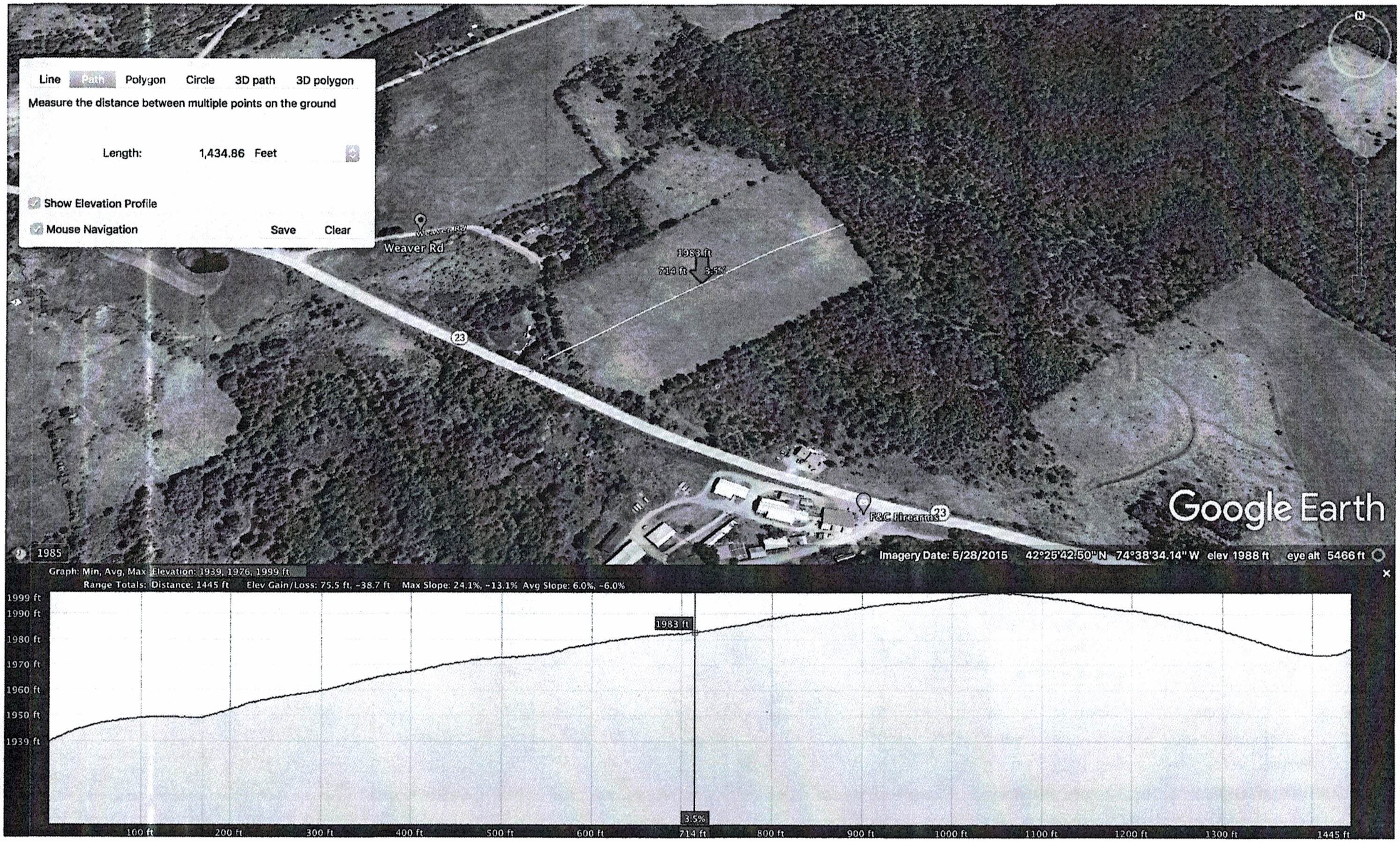

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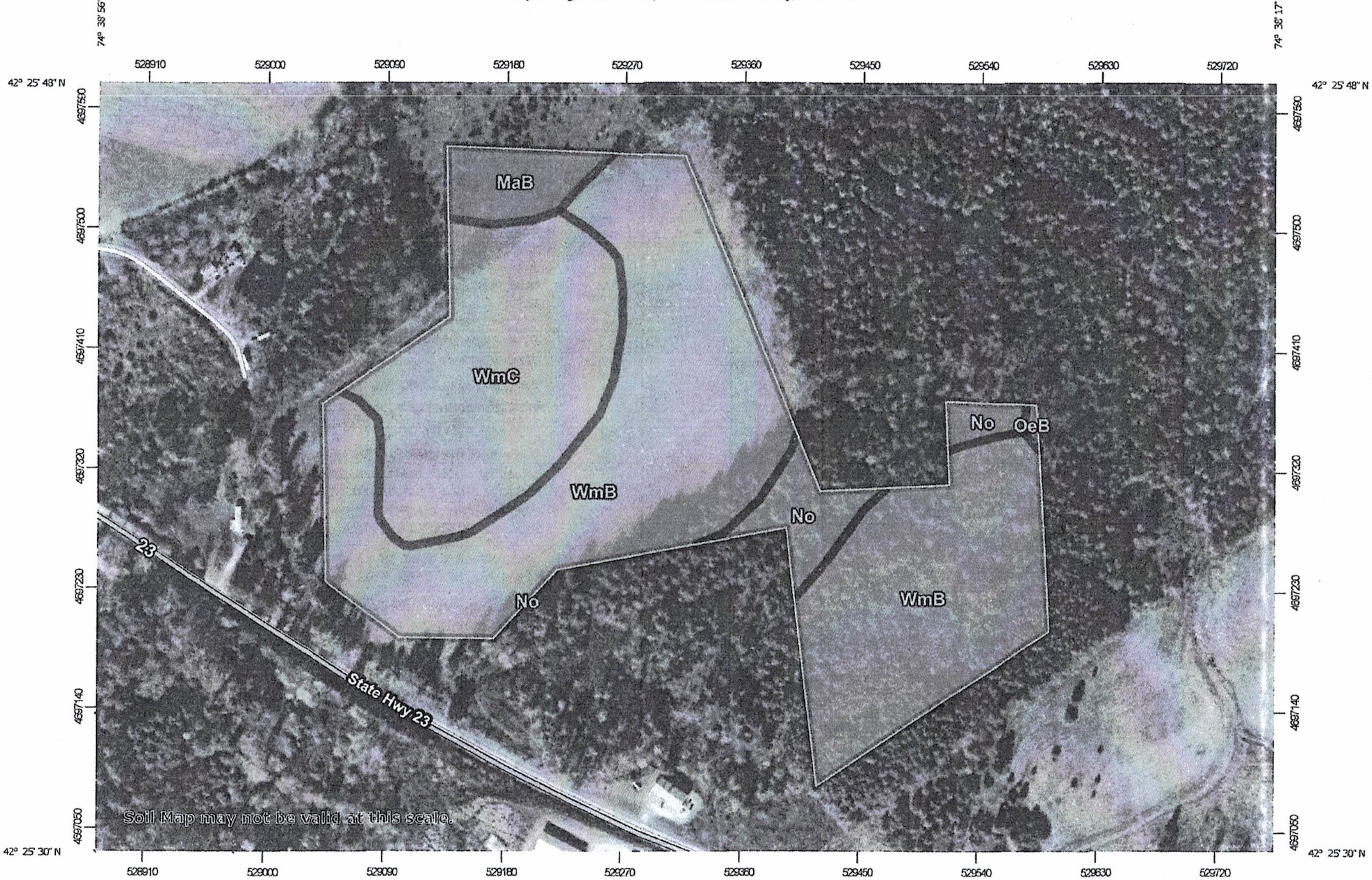

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Feet: 0 150 300 600 900

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Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MaB	Maplecrest gravelly silt loam, 3 to 8 percent slopes	B	1.4	4.3%
No	Norchip silt loam, 0 to 3 percent slopes	D	1.6	5.1%
OeB	Onteora channery silt loam, 3 to 8 percent slopes	D	0.1	0.2%
WmB	Willowemoc channery silt loam, 3 to 8 percent slopes	D	20.6	64.7%
WmC	Willowemoc channery silt loam, 8 to 15 percent slopes	D	8.2	25.8%
Totals for Area of Interest			**31.8**	**100.0%**

There are no science-based stormwater and water quality standards for solar farms.

Great Plains Institute, September 2021, Photovoltaic Stormwater Management Research and Testing (PV_SMaRT) Potential Stormwater Barriers and Opportunities

1. Most existing water quality standards and best practices were not designed or tested for solar installations. Permit standards and the portfolio of stormwater best management practices (BMPs) were developed for non-solar projects such as housing and commercial projects, and do not account for the unique three-dimensional nature of solar development.

2. Different post-construction and construction permit goals lead to suboptimal water quality results. The inability of developers to take regulatory credit for the full range of water quality benefits of green stormwater infrastructure, low-impact development, perennial and habitat/pollinator-friendly ground cover in the stormwater construction general permit (CGP) permit process creates a potentially significant barrier to market adoption of optimal water quality design standards and discourages designs that optimize co-benefits.

3. Solar projects face varying expectations and standards across jurisdictions, both state and local. Assessments of water quality and stormwater risks vary across jurisdictions. This has led to sometimes substantially different permitting standards and practices, requiring changes in solar design and consequently stormwater BMPs cost across jurisdictions, even for virtually identical circumstances.

4. Lack of consistent, data-driven best practices ab out array design, layout, and site standards that can minimize water quality risks and maximize benefits. PV system design affects stormwater runoff, and neither regulators nor developers have data on designing to minimize stormwater runoff or assess cost-effectiveness of design decisions. Modeling to identify mitigation requirements by authorities having jurisdiction ((AHJs) or development teams typically do not account for all design features that affect runoff.

Minimizing environmental impacts of solar farms: a review of current science on landscape hydrology and guidance on stormwater management
Rouhangiz Yavari et al 2022 Environ. Res.: Infrastruct. Sustain. 2032002

At the time of this review, we were unable to find any study that directly evaluated runoff generation on solar farms through field measurement. Thus, we are still lacking critical insight into whether solar farms change runoff generation, and whether existing site and stormwater management practices are adequate to prevent adverse impacts. As a result, existing hydrologic models of solar farms are largely uncalibrated. There is also a bias in the sort of sites being evaluated. In general, existing environmental research on solar farms has focused on more ideal sites, i.e. those on sites with lower slopes and well-draining soils. Thus, we are neglecting sites that could be more vulnerable to changes in hydrologic processes with solar farm development. In general, there is still also a need for simultaneous evaluation of multiple environmental co-benefits from solar farm land management, considering how certain vegetation or crop choices could help manage runoff, but also provide habitat or food.

CHRIS FERCA

Explore location

LOCAL OFFICE **NY ESFO** ▾

LOCATION
Delaware County, New York
CHANGE LOCATION

Resources

ENDANGERED SPECIES 1
MIGRATORY BIRDS 8
COASTAL BARRIERS
FACILITIES
WETLANDS ✔
PRINT RESOURCE LIST

What's next?

Define a project at this location to evaluate potential impacts, get an official species list, and make species determinations.

DEFINE PROJECT

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Birds of Conservation Concern

Measures for avoiding and minimizing impacts to birds

Nationwide conservation measures for birds

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern **(BCC) list or warrant special attention in your project location.** To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

THUMBNAILS LIST PROBABILITY OF PRESENCE SUMMARY

Bald Eagle
Haliaeetus leucocephalus

Black-billed Cuckoo
Coccyzus erythropthalmus

Black-capped Chickadee
Poecile atricapillus practicus

Bobolink
Dolichonyx oryzivorus

Canada Warbler
Cardellina canadensis

BCC Rangewide (CON)

No photo available

Chimney Swift
Chaetura pelagica

Prairie Warbler
Dendroica discolor

Wood Thrush
Hylocichla mustelina

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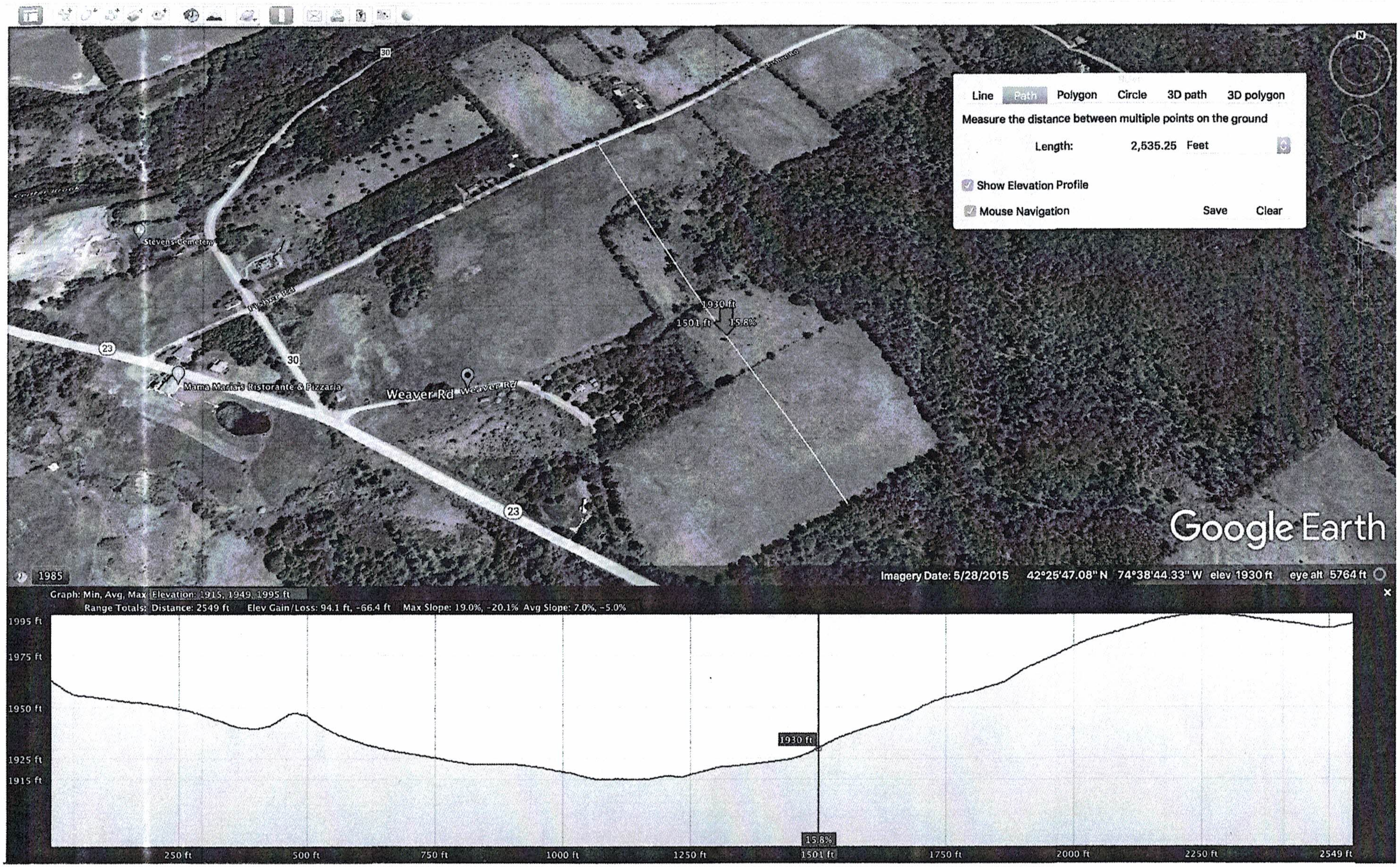

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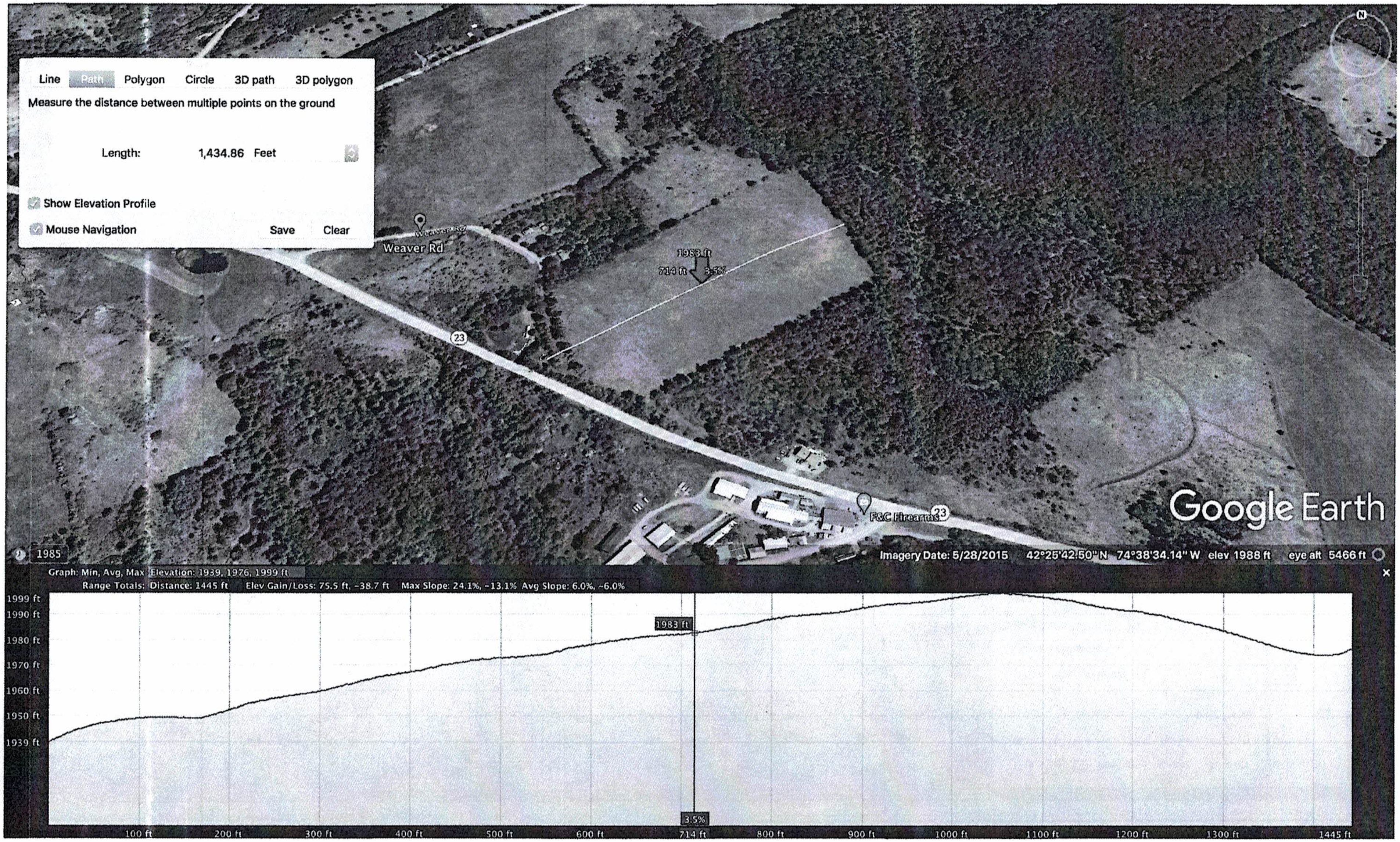

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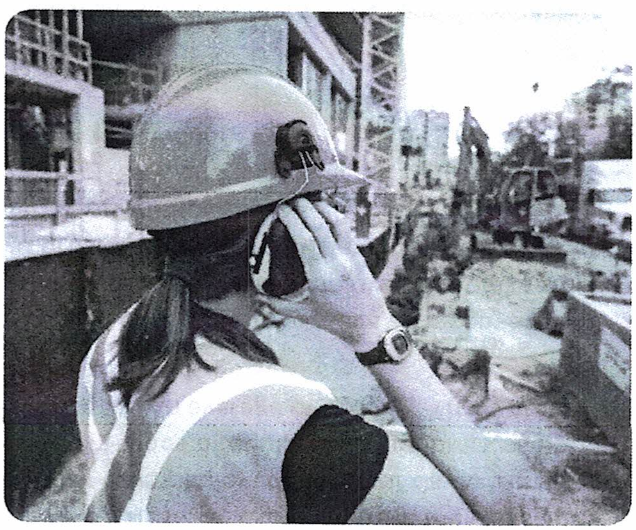
WorkSafe Bulletin

How loud is it? — Construction

As a worker in the construction industry, you're exposed to hazardous levels of noise on the job. Regular exposure to sounds louder than **85 decibels (dBA)** can cause permanent hearing loss. The risk of permanent hearing loss is still present even if you aren't exposed to noise continuously. Construction workers have higher rates of hearing loss than workers in other noisy industries. And many young construction workers aren't wearing hearing protection while on the jobsite.

The risk of hearing loss depends on the noise level and how long you're exposed to it. Working in higher noise levels for a short time can cause the same harm to your hearing as working in lower noise levels for a long time. The table to the right shows how long you can be exposed to certain noise levels without harm. It also lists examples of typical noise-level ranges for various equipment types.



Your hearing protection must be the right size for you and be comfortable, and you must wear it properly.

Maximum daily unprotected exposure time by noise level in dBA		Examples of noise-level ranges (in dBA) by equipment type*
8 hours	85	Dump truck (84–88)
4 hours	88	Crane (78–103)
2 hours	91	Backhoe (85–104)
1 hour	94	Dozer (89–103)
30 minutes	97	Belt sander (93–104)
15 minutes	100	Pneumatic nail gun (98–101)
7.5 minutes	103	Concrete saw (97–103)
3 min, 45 s	106	Compactor (90–112)
1 min, 50 s	109	Grinder (106–110)
1 minute	112	Jackhammer (100–115)
30 seconds	115	Riveter; sandblasting nozzle (111–117)
15 seconds	118	Pavement breaker (98–120)
7.5 seconds	121	Piledriver (119–125)

* Based on data collected by WorkSafeBC; may not reflect all types of equipment or operating conditions. Newer, well-maintained equipment is usually quieter than older equipment.

To understand the risk you face, it's important to know how loud your work environment is and how long you're working in it. For example, regardless of your trade, if you're exposed to a noise level of 91 dBA (like a backhoe), you can only work in this environment for 2 hours before *the noise becomes hazardous. If you do a variety* of work, the noise exposure from the tasks adds up. For example, over an 8-hour day while using different types of equipment, labourers can be exposed to an average of 93 dBA. That's six times the safe dose of noise.

Because construction workers are exposed to hazardous noise, your employer must take steps to protect your hearing. These steps include reducing workplace noise, arranging annual hearing tests, and supplying you with adequate hearing protection.

Hearing tests

All construction workers must have their hearing tested every year. You will get a wallet card with your hearing-test results to carry with you. Compare the test results each year to see if your hearing is being properly protected.

Hearing protection

Your hearing protection must provide enough protection from noise. To do this, it must be the right size for you and be comfortable, and you must wear it properly. (For example, if you can easily see a foam earplug from the front, it is not inserted correctly and may not protect you.) Make sure to wear your hearing protection before exposure to hazardous noise, and remove it only after leaving the hazardous-noise area. Your hearing protection must also allow you to communicate if you need to.

The Canadian Standards Association (CSA Group) recommends protection for 8 hours of exposure as follows:

Exposure (in dBA, averaged over 8 hours or equivalent)	Recommended CSA class
≤ 90	C
> 90 up to and including 95	B or BL
> 95 up to and including 105	A or AL
> 105	Dual*

* Dual hearing protection is required. Use a minimum of a Class B earmuff and a Class A earplug.

For more information

The following WorkSafeBC resources are available online:

- *Hear for Good: Preventing Noise Exposure at Work*
- Hearing protection
- Hearing loss prevention

Dealing with Vibration and Noise from Pile Driving

Addressing and alleviating negative public perceptions of pile driving

By W. Allen Marr, P.E., GEOCOMP Corporation

Pile driving produces vibrations and noise that may extend thousands of feet away from the driving activity. People have become increasingly intolerant of these effects. They complain to government agencies and oppose developments that use pile elements. Their opposition is beginning to seriously affect the pile driving industry in the developed countries. Governmental agencies and owners are choosing alternatives to pile driving to avoid the vibrations and noise. This is an unfortunate and uninformed reaction for three reasons:

1. The alternatives may be considerably more expensive than driving piles
2. The alternatives may produce comparable levels of noise and vibrations
3. The perceptions of people about the possible damage from vibrations and noise are generally wrong

This article discusses the third issue.

The pile driving hammer produces vibrations and noise with each blow delivered to the pile. The vibrations of consequence are caused by waves of energy traveling away from the pile. Each blow to the pile transfers energy from the pile to the surrounding soil. As much as 70 per cent of the energy transferred to the soil by pile driving travels away from the pile in the form of surface waves (Woods, 1997). The particle velocity of the ground surface caused by these traveling waves of energy decreases with distance from the source due to geometric effects, much like the height of a ripple created by dropping a stone into a pond decreases with distance away from the drop point.

The oscillating ground can induce stresses in a structure that cause damage. Plaster and weak mortar are among the first elements to experience damage. The repeated stressing from the hundreds of blows necessary to drive a single pile potentially exacerbates damage due to fatigue effects. Figure 1 (next page) shows a typical plot of the levels of particle velocity required to produce structural damage at a frequency of 10 Hz. Also shown are the measured peak vibration levels from various construction activities as a function of distance away from the vibration source. The measured data show how the particle velocity decreases rapidly with distance from the source. Figure 1 shows that if one is more than 15 feet away from the vibration source for typical pile driving, the vibration level is below that which may damage a structure. The available data and experience show that unless pile driving is occurring within a few feet of a structure, it doesn't cause damage to the structure from vibrations. (There may be other undesirable effects such as vibration induced ground settlement or disruptions to very sensitive equipment, but these are special cases.) The contents of Figure 1 are well known to the geotechnical engineering profession and many pile driving contractors.

So why do people complain about pile driving and resists its use? Figure 1 holds a significant part of the answer. Figure 1 also shows criteria on the sensitivity of people to vibrations. People can typically perceive

Figure 1: Typical Vibrations

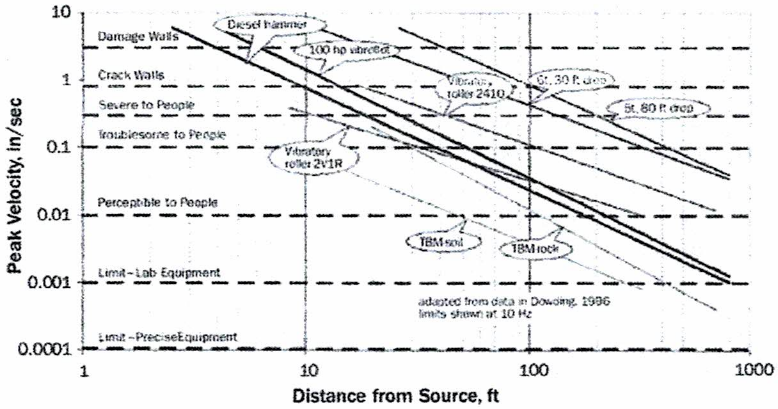
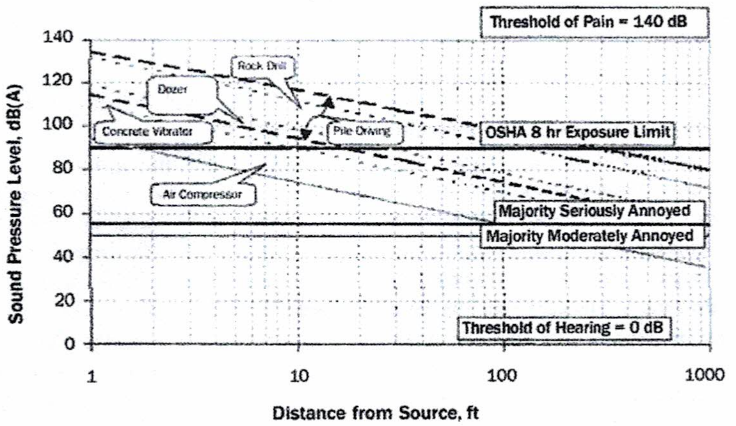


Figure 2: Sound levels



Figures courtesy of GEOCOMP Corporation

vibrations above 0.01 in/sec – one-hundredth the level at which structural damage might occur. This can become troublesome to some people. They can feel and become concerned about vibrations that are only a tiny fraction of those that might begin to cause damage to structures. People complain about pile driving effects because they are much more sensitive to vibrations than buildings are. They tend to extrapolate their personal sensitivity to vibrations to a concern about the safety of their building.

Noise from pile driving rarely, if ever, produces structural damage, but it causes annoyance that may reach a long distance. Figure 2 summarizes some typical data on noise levels for various construction activities. It also shows some of the criteria used to limit noise. The measurement of sound level used in Figure 2 is dB(A). Humans perceive a 10 dB increase in sound level as a doubling of loudness. Sound level decreases approximately six dB(A) for every doubling of the distance from the source. Noise below 80 dB(A) is considered to not cause hearing loss. OSHA set the eight-hour exposure limit to noise at 90 dB(A). Studies by the World Health Organization have shown that the majority of people become moderately annoyed by steady, continuous sound levels above 50 dB(A) and seriously annoyed at continuous sound levels above 55 dB(A).

Pile driving is one of the noisiest construction operations. Figure 2 shows a range of sound levels reported for pile driving for a variety of hammer types and sizes. For the noisiest hammer, one would have to go approximately 300 feet away from the hammer to get below the OSHA eight-hour exposure limit. One would have to get several miles away from the noisiest hammer for the sound level to drop below that, causing moderate annoyance to most people. Clearly, pile driving in suburban areas has the potential to annoy a lot of people. When people become annoyed, they also become concerned. They start looking for evidence of damage to their property from the construction work and complaining to their elected officials. Some engage lawyers to pursue compensation for their grief. When people look for evidence to confirm their suspicions, they will usually find something. Politicians don't like receiving complaints. Lawyers love opportunity. Noise may be the most serious threat to the pile driving industry today – not because it is causing damage, but because it creates a perceived problem to those impacted.