GAVIN/KYGER NETWORK DESIGN FOR OVEC/SHELL MONITORS: HILL, CHESHIRE SCHOOL AND LAKIN (WV) MONITORS

GAVIN/KYGER CREEK MODELING INFORMATION FOR USE IN AMBIENT SO_2 MONITOR SITING

Methodology

- AERMOD, using Consent Decree receptor grid
  - Determine locations of maximum 1-hour impacts
  - Determine locations of maximum design values

- Multiple meteorological approaches analyzed
  - LOWWIND2 (HTS)
  - LOWWIND3 (HTS)
  - Default Huntington (HTS) data
  - Default Charles Yeager (CRW) data

Methodology

- Short-term impacts identified areas of high impact

- Additional analysis to determine overall rank of receptors based on:
  - max impacts
  - frequency of maximum daily impacts

PEAK MODELED 1-HOUR VALUE PLOTS FOR VARIOUS SCENARIOS EXAMINED

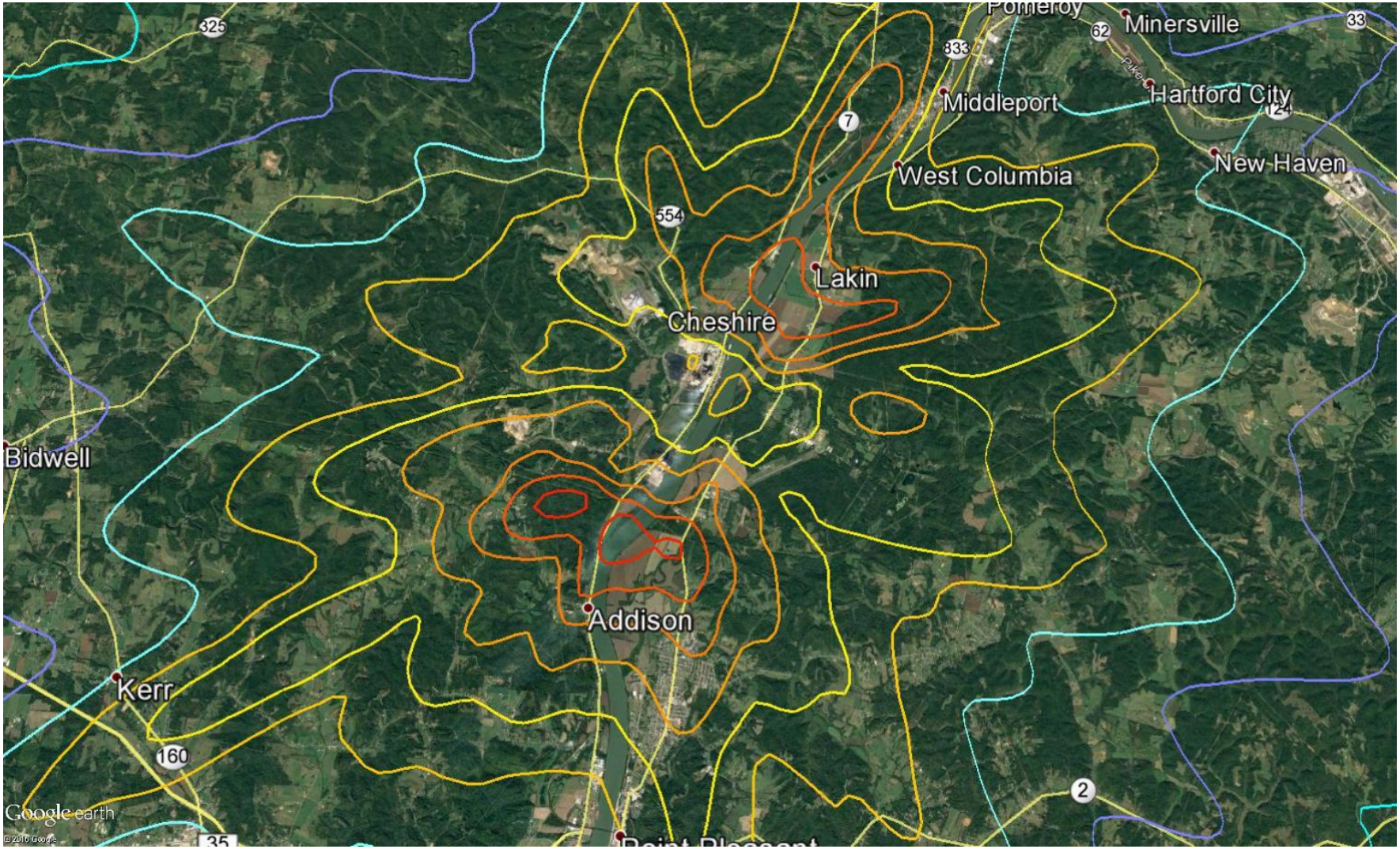


Figure 1: Contour plot of maximum 1-hour impacts using HTS meteorological data and default regulatory settings.

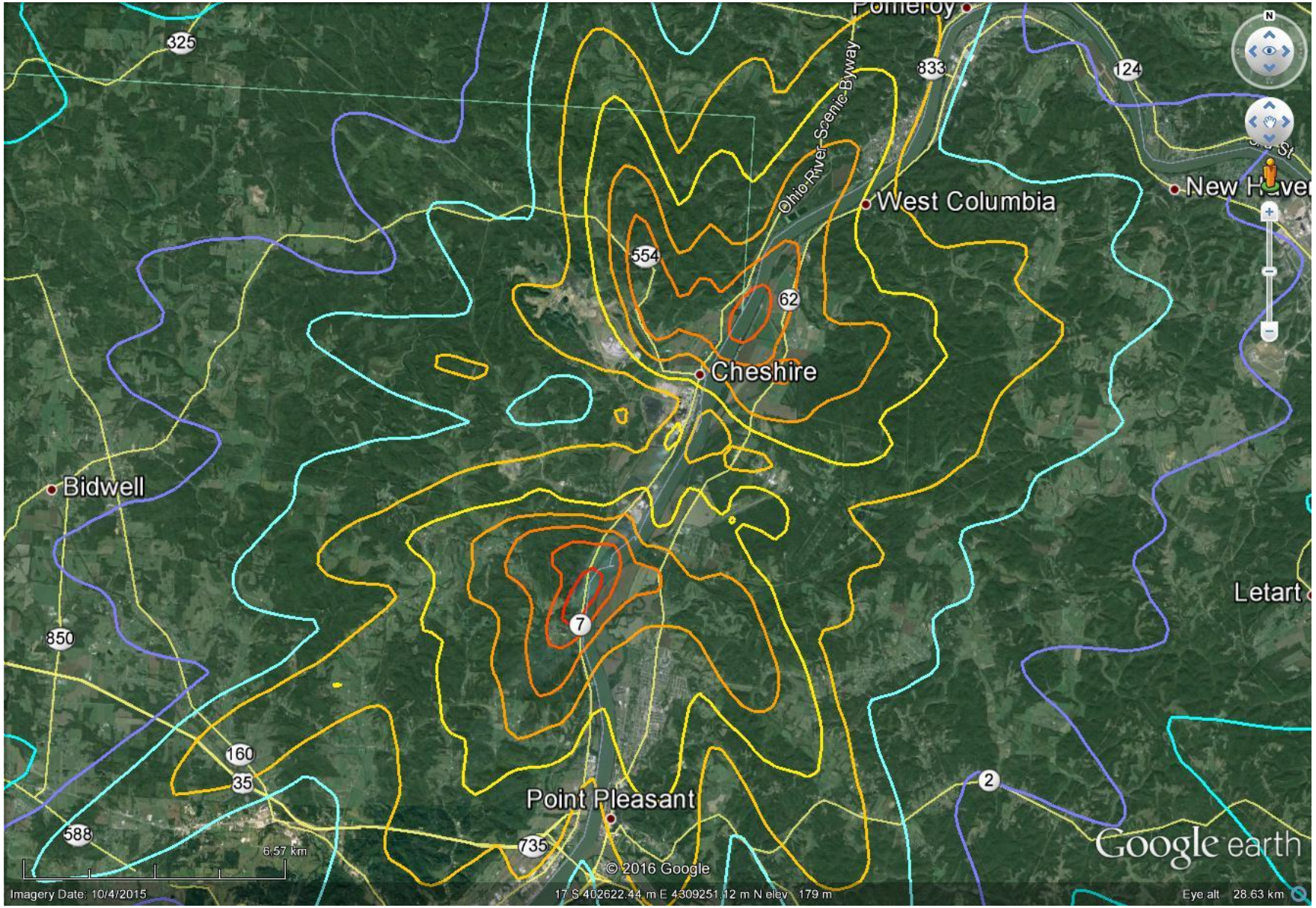


Figure 2: Contour plot of maximum 1-hour impacts using HTS meteorological data and non-default LOWWIND2 (LW2) option.

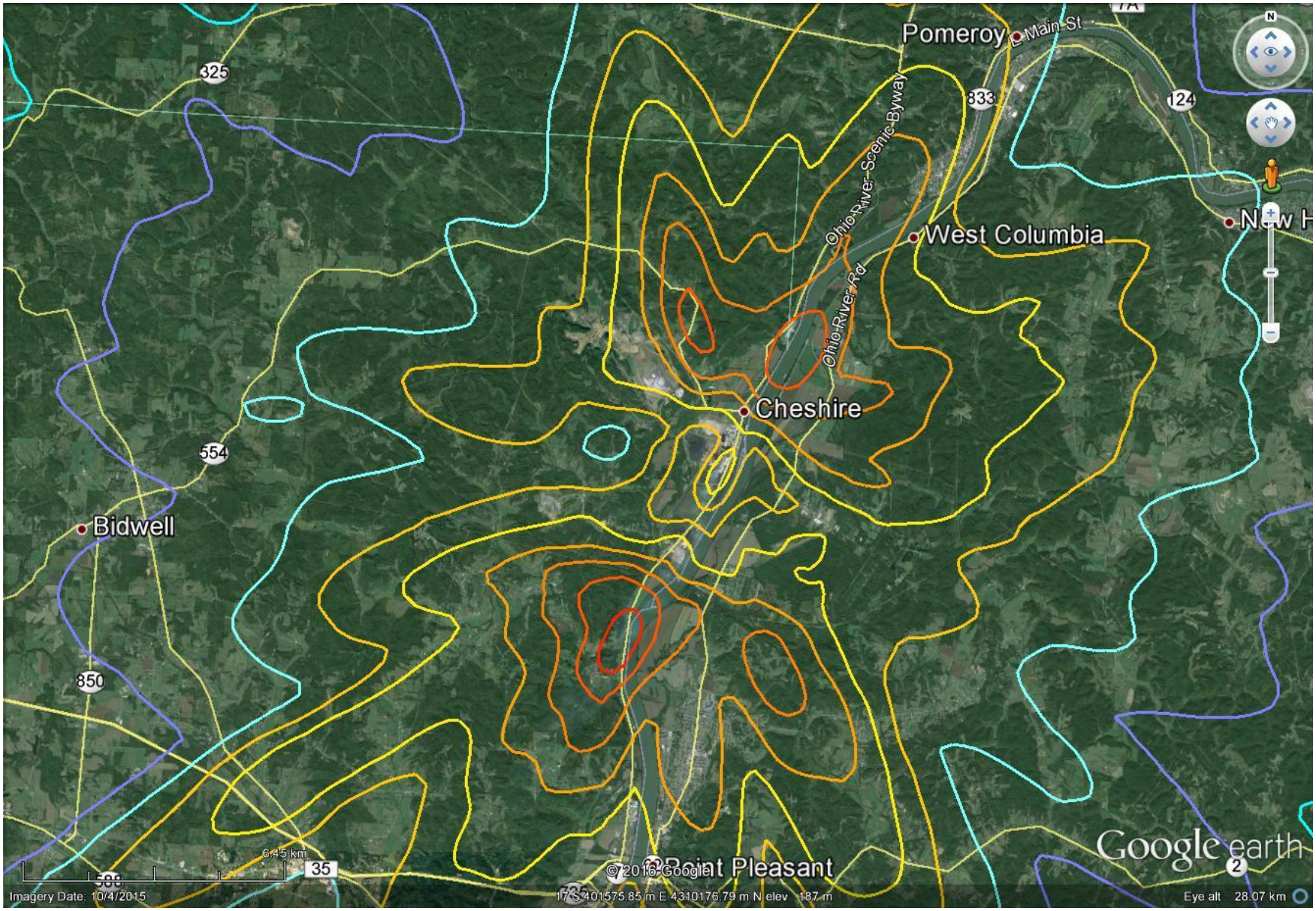


Figure 3: Contour plot of maximum 1-hour impacts using HTS meteorological data and non-default LOWWIND3 (LW3) option.

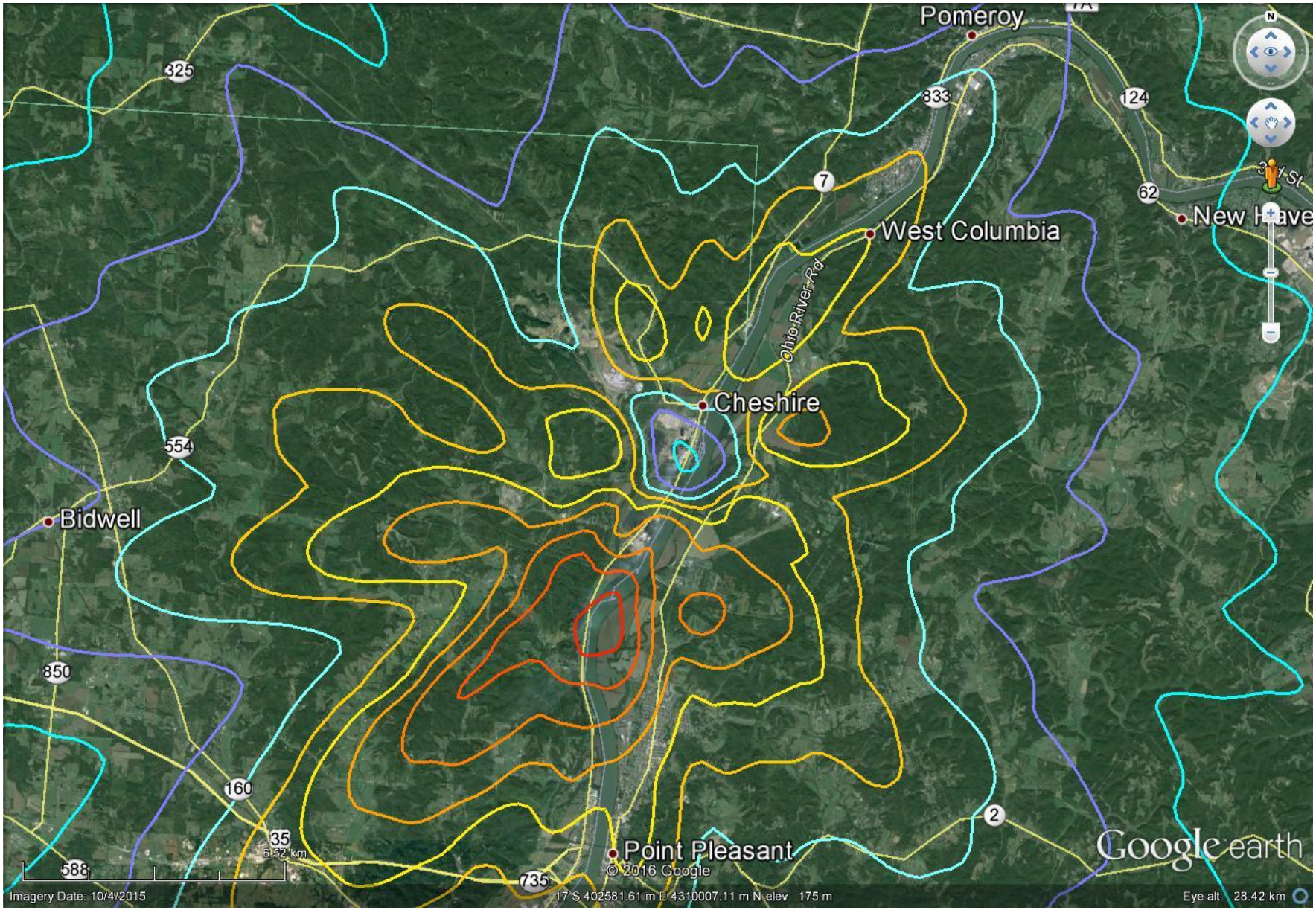


Figure 4: Contour plot of maximum 1-hour impacts using CRW meteorological data and default regulatory settings.

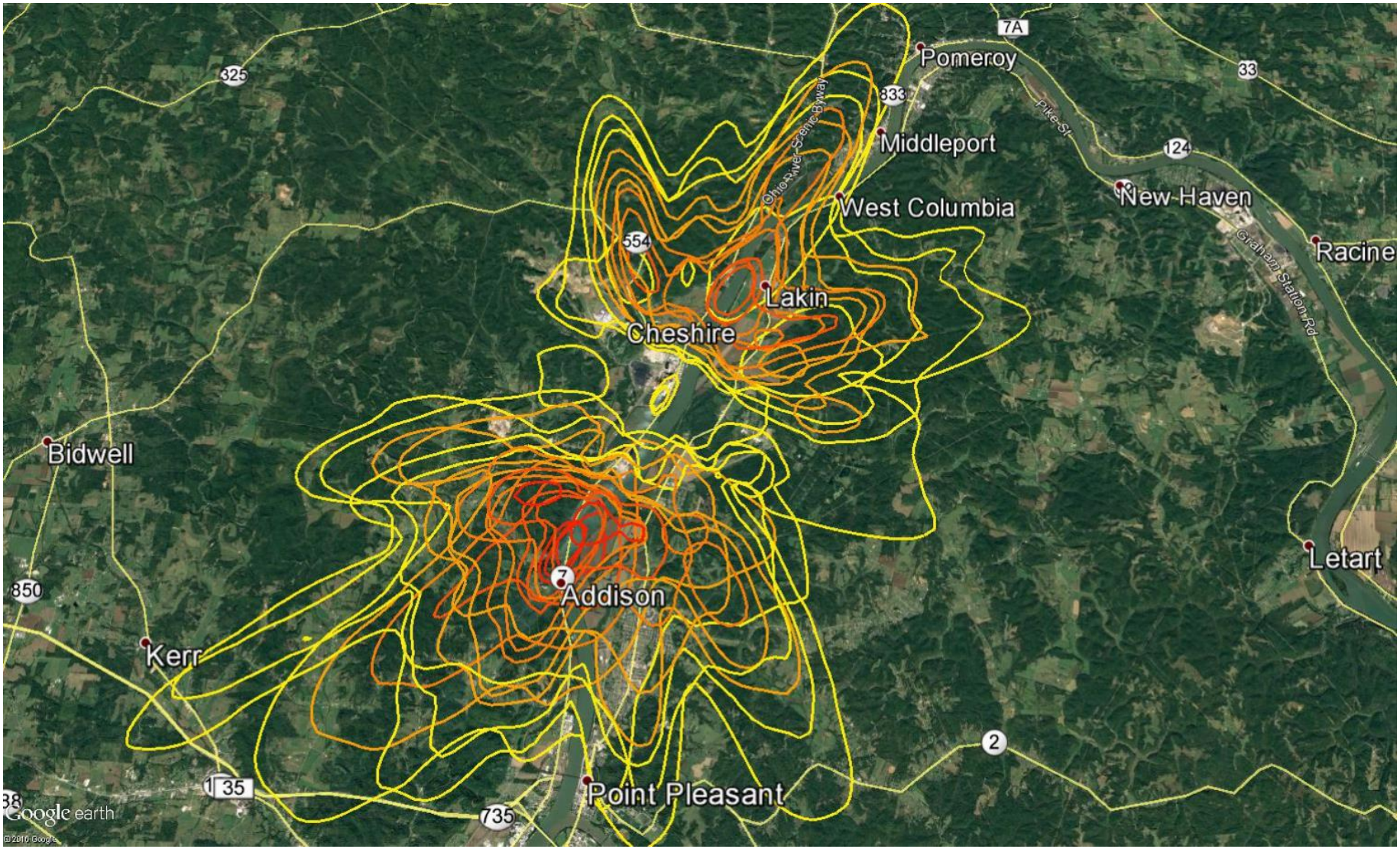


Figure 5: Composite contour plot of maximum 1-hour impacts for the 4 meteorological datasets and options included in the analysis.

Peak Value Summary

- Peak values modeled 3-5 km from sources
- Strong overlap under all met conditions (see Figure 5)
- Peak values:
  - Modeled to the north near Lakin and Cheshire
  - Modeled to the south in the hilly terrain north of Addison

DESIGN VALUE PLOTS FROM VARIOUS MODELED SCENARIOS

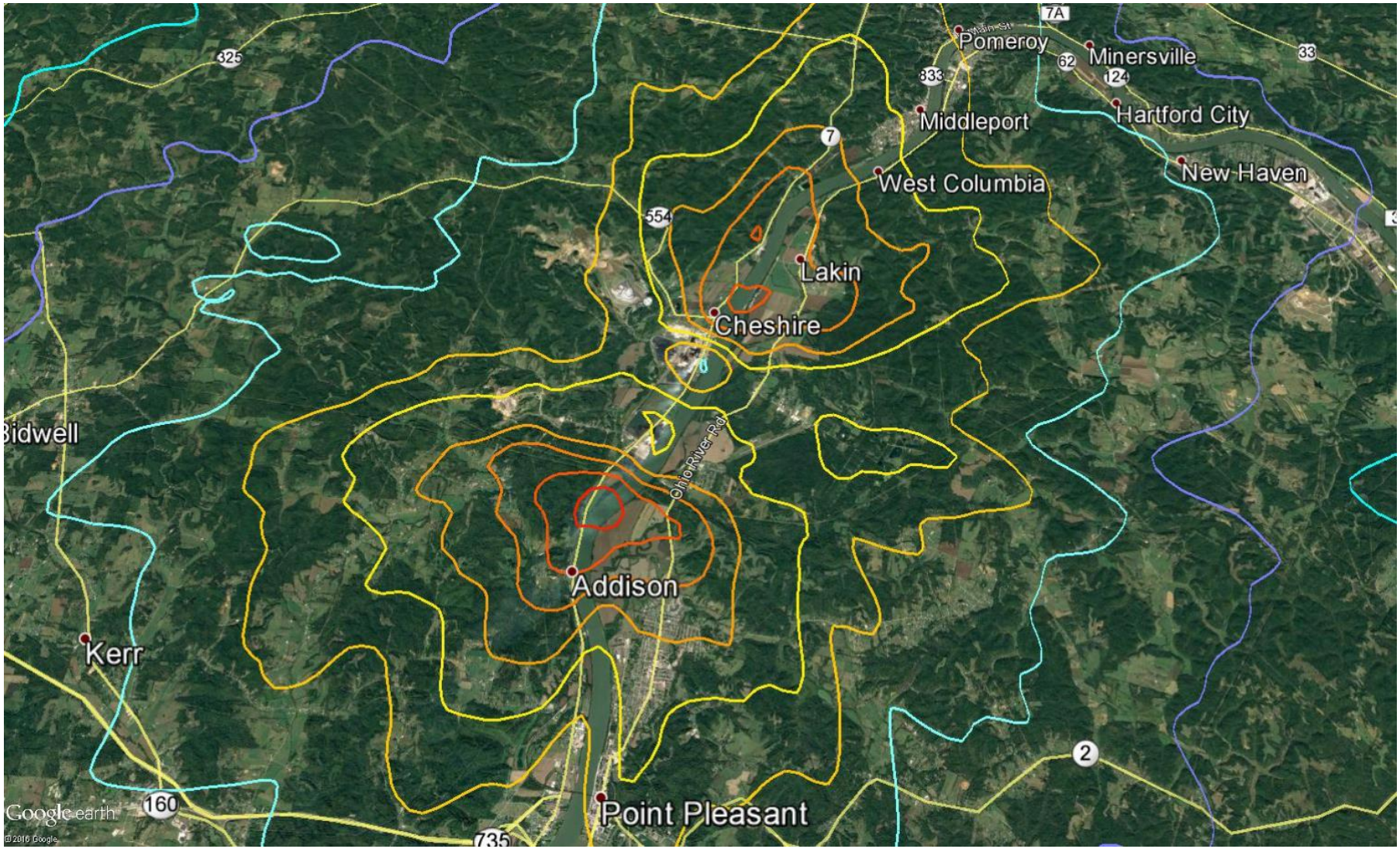


Figure 6: Contour plot of maximum 3-year design values using HTS meteorological data and default regulatory settings.

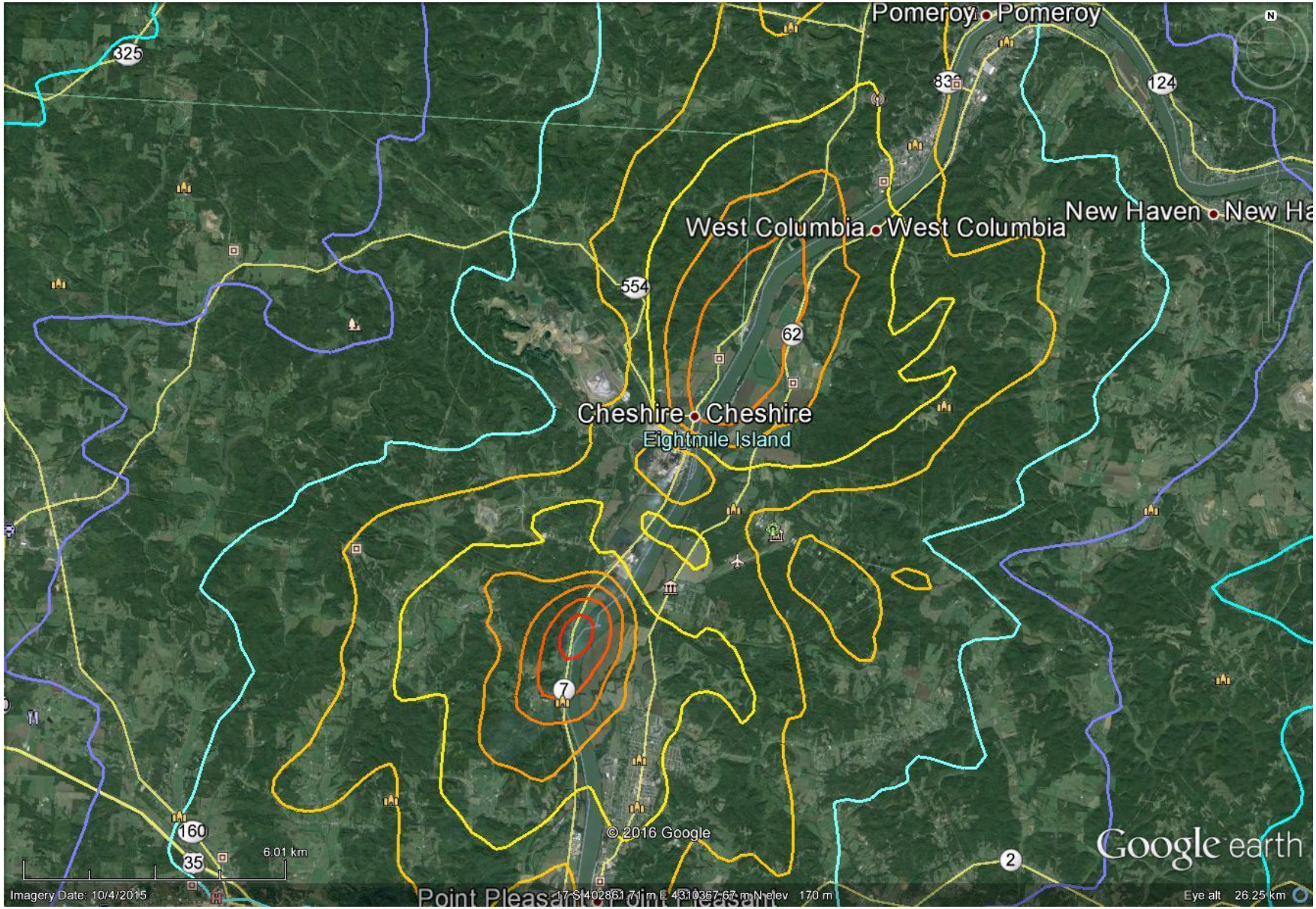


Figure 7: Contour plot of maximum 3-year design values using HTS meteorological data and non-default LOWWIND2 (LW2) option.

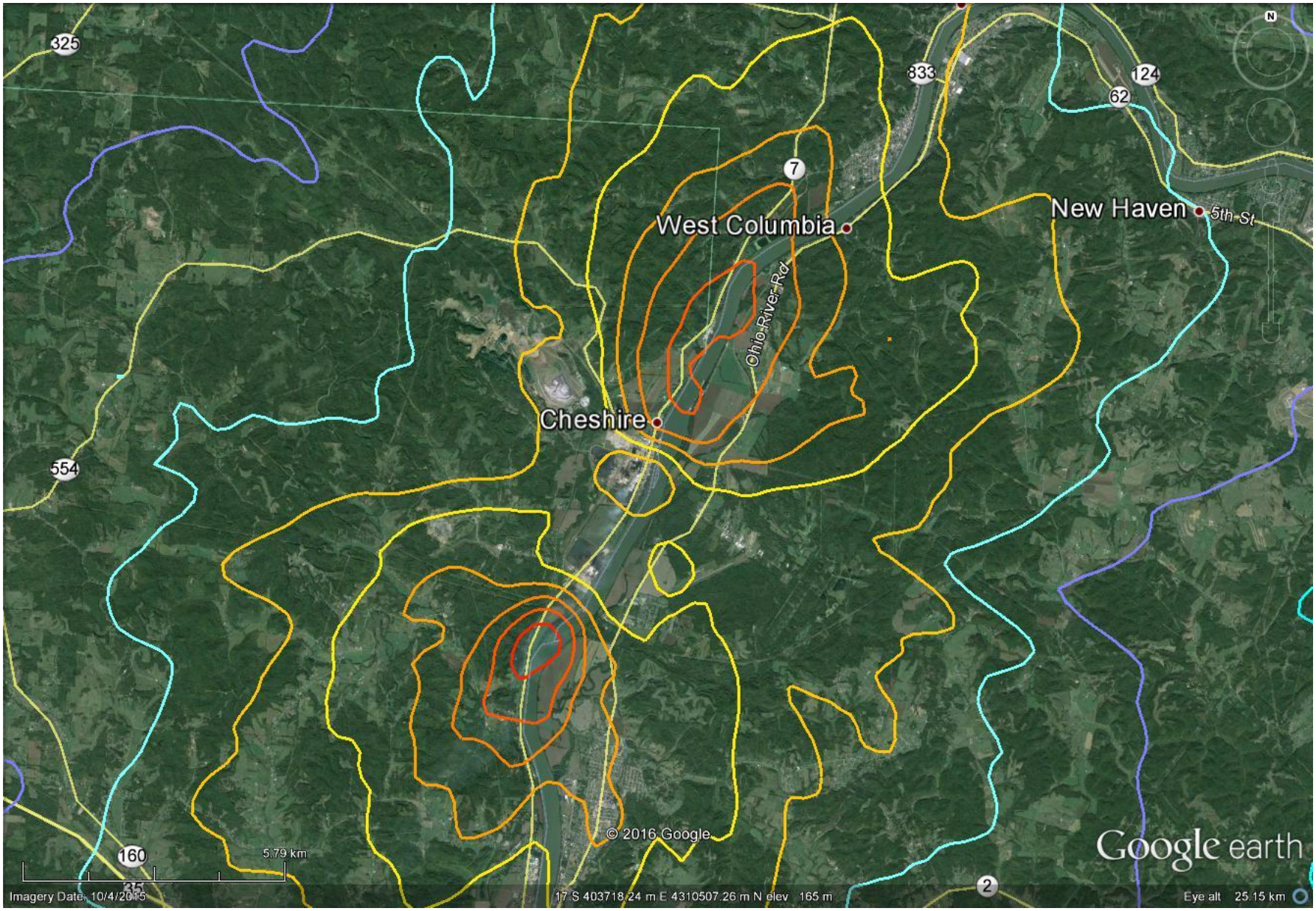


Figure 8: Contour plot of maximum 3-year design values using HTS meteorological data and non-default LOWWIND3 (LW3) option.

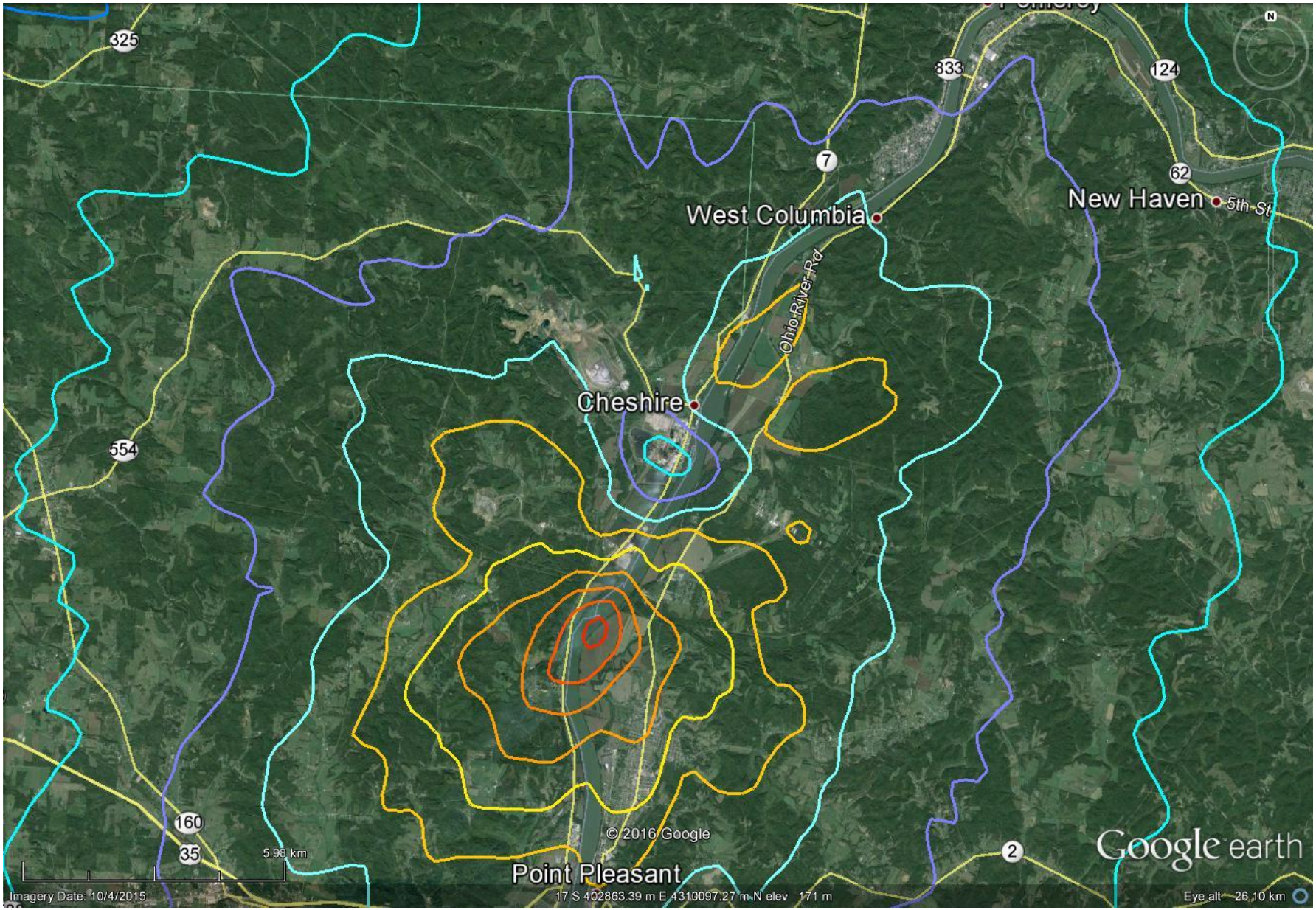


Figure 9: Contour plot of maximum 3-year design values using CRW meteorological data and default regulatory settings.

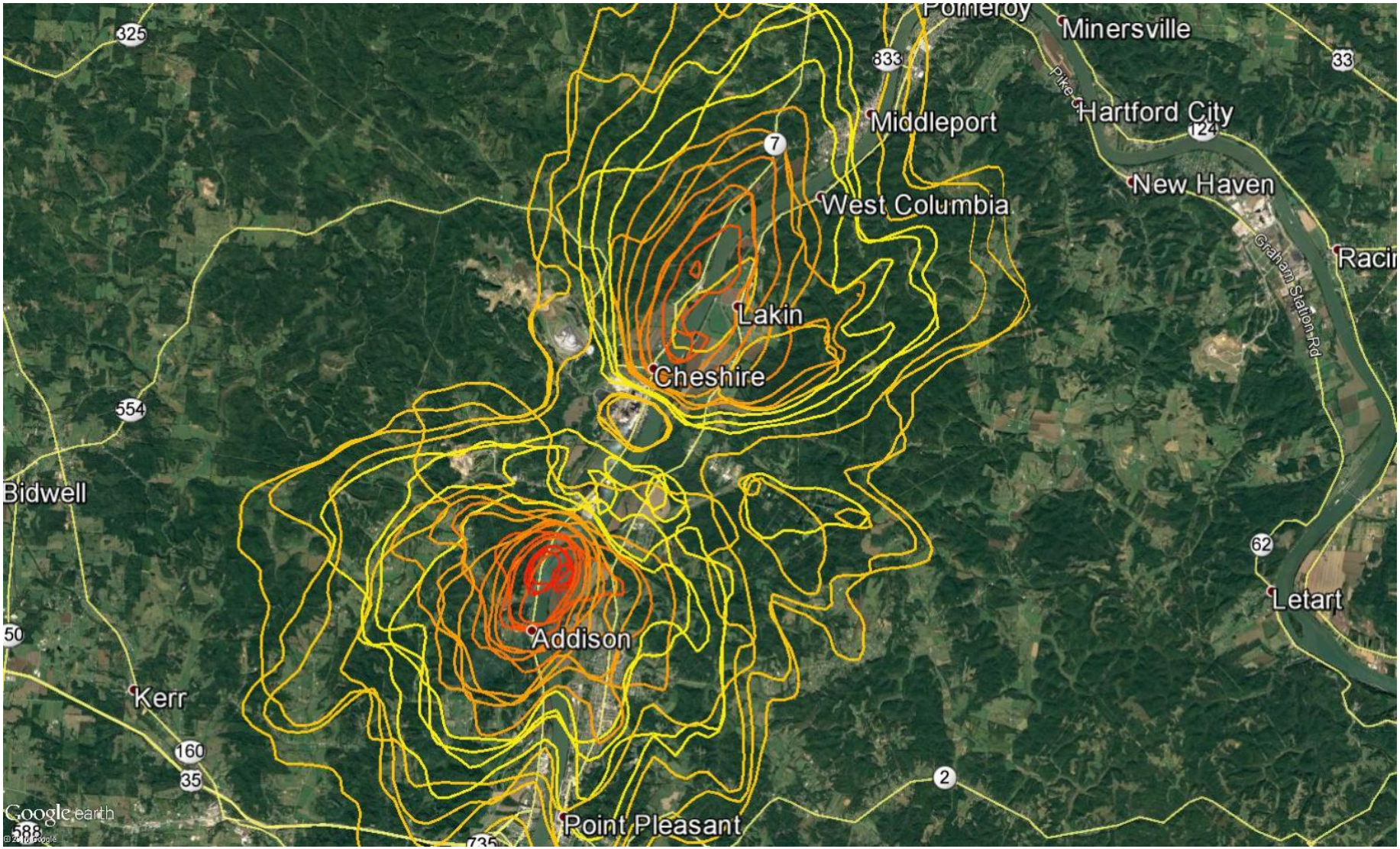


Figure 10: Composite contour plot of maximum 3-year design values for the 4 meteorological datasets and options included in the analysis.

Design Value Summary

- Maximum DVs modeled 3-5 km from sources
- Strong overlap under all met conditions (see Figure 10)
- Highest Design values:
  - Modeled to the north near Lakin and Cheshire
  - Modeled to the south in the hilly terrain north of Addison

Receptor Ranks: Default Met

- Default met data from Huntington (HTS)
- Modeled 2012-2014 normalized actual emissions
- Initial modeling run determined the 4th highest maximum daily values from 3090 receptors
- Subset of the highest 620 receptors were modeled with MAXDAILY output option
- Receptors ranked again based on the number of maximum daily values modeled at each receptor

Receptor Ranks: Default Met

- Overall rank determined from both the design value rank and frequency rank

- Confined analysis to the 250 highest overall receptors

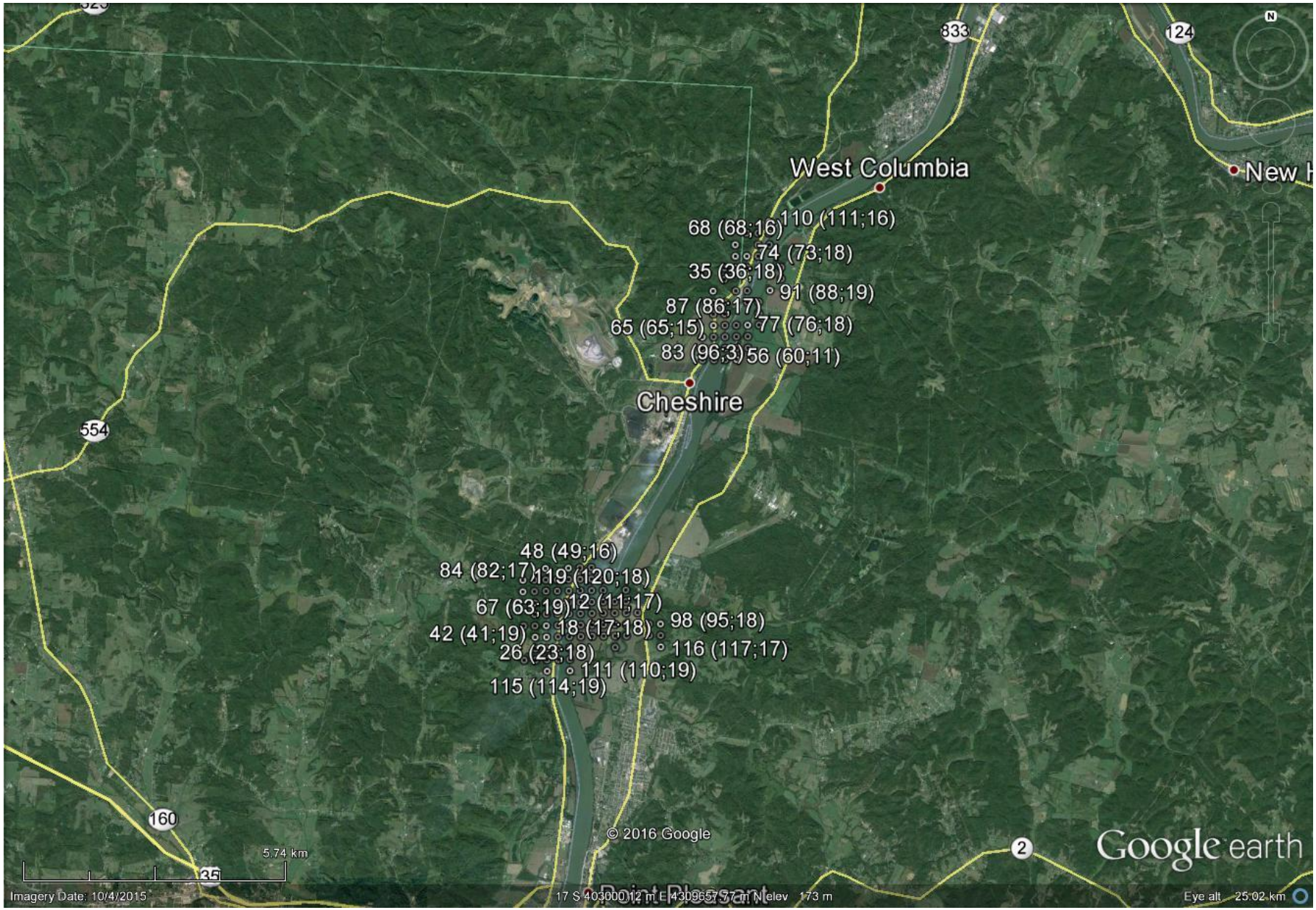


Figure 11: 1st – 125th receptors ranked according to maximum design value and frequency of maximum daily impacts.

Receptor Rank Results

- Highest ranked receptors located near Cheshire and Lakin and north of Addison

- Consistent with location of max impacts presented previously

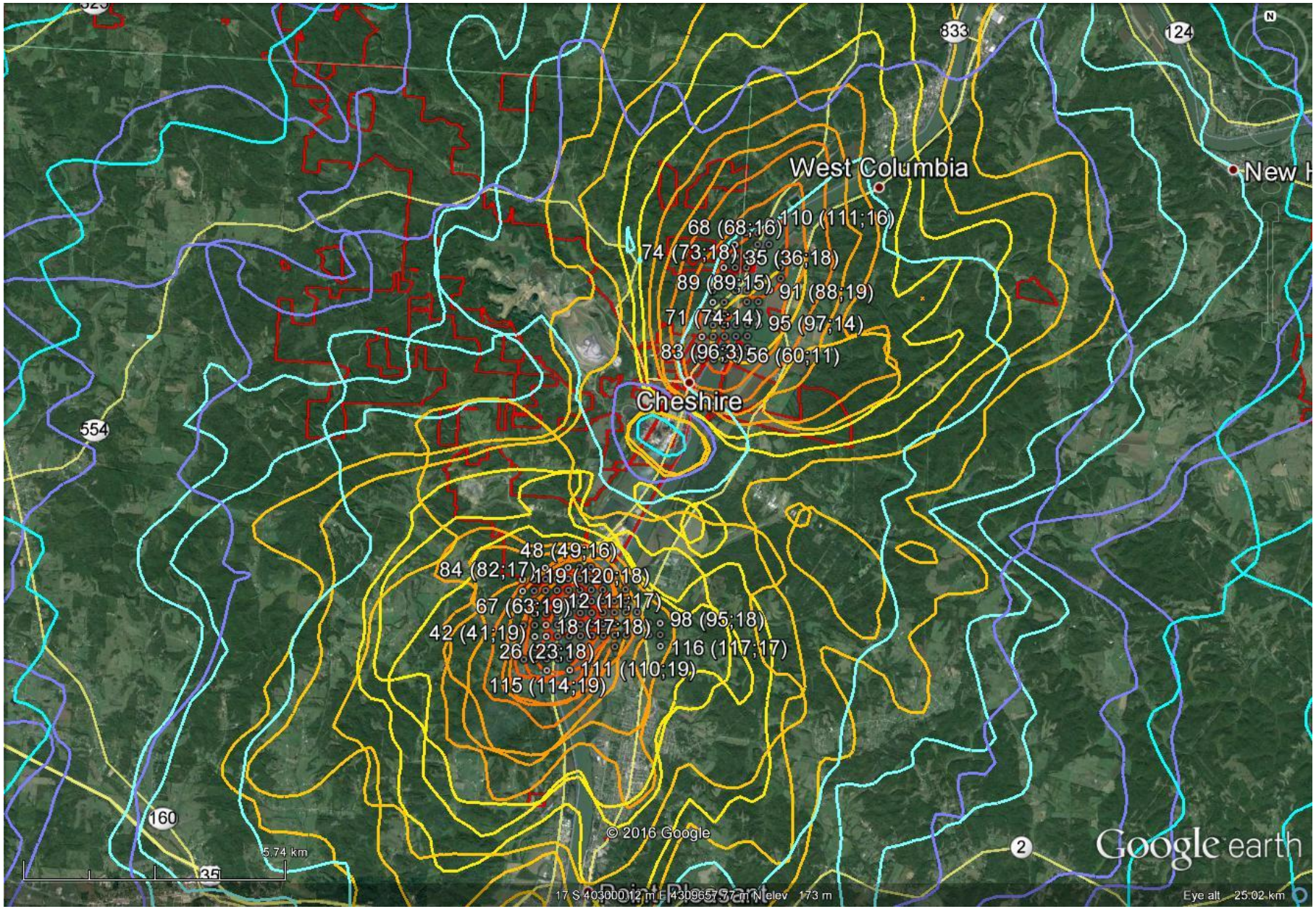


Figure 12: 1st – 125th receptors ranked according to maximum design value and frequency of maximum daily impacts, with design value contours from the 4 meteorological datasets.

PREFERRED PLACES TO LOOK FOR MONITOR SITES

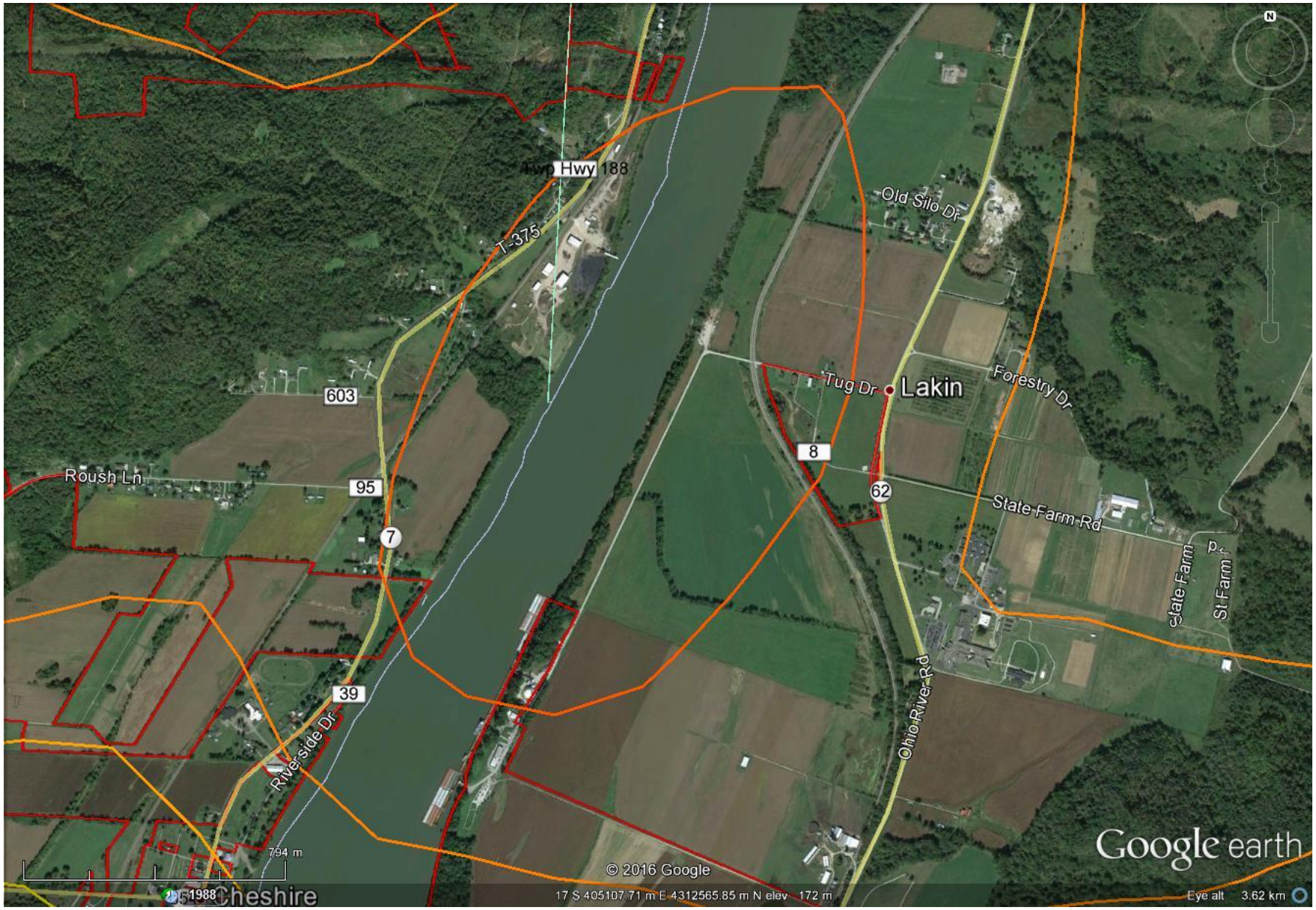


Figure 13: Lakin, West Virginia area, with AEP property lines shown (red).

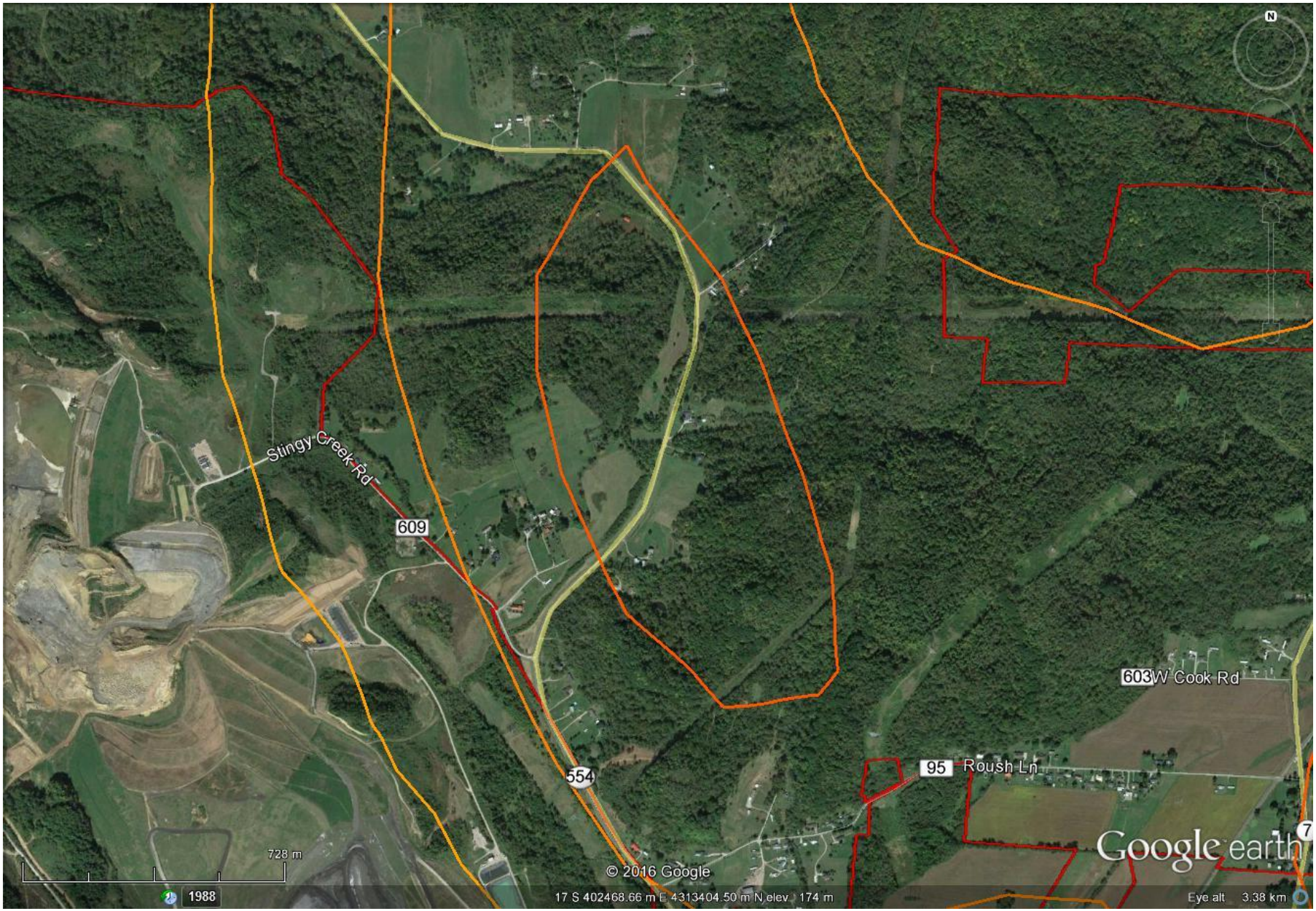


Figure 14: Northern impact area, with AEP property lines shown (red).

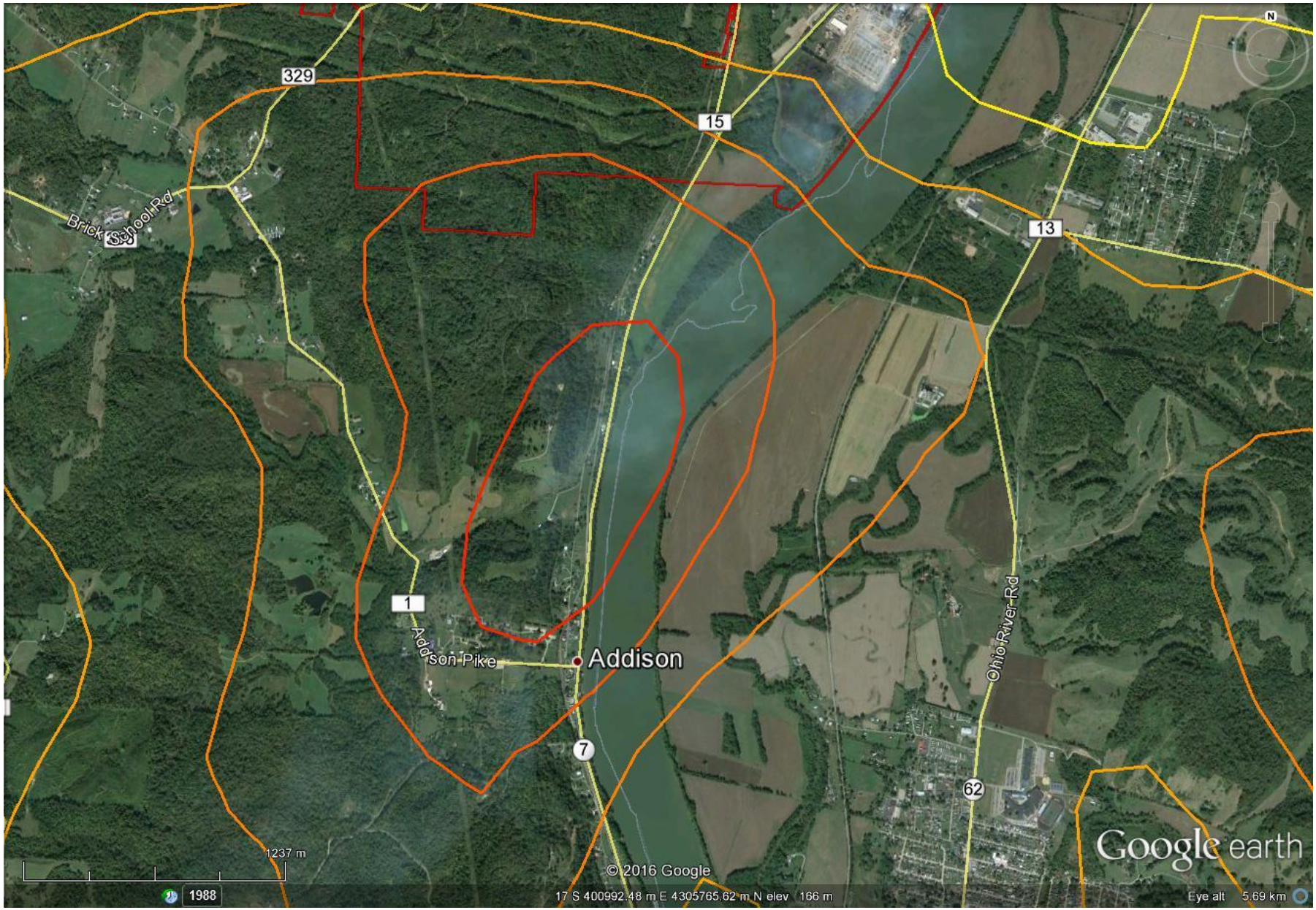


Figure 15: South/Southwest impact area, with AEP property lines shown (red).

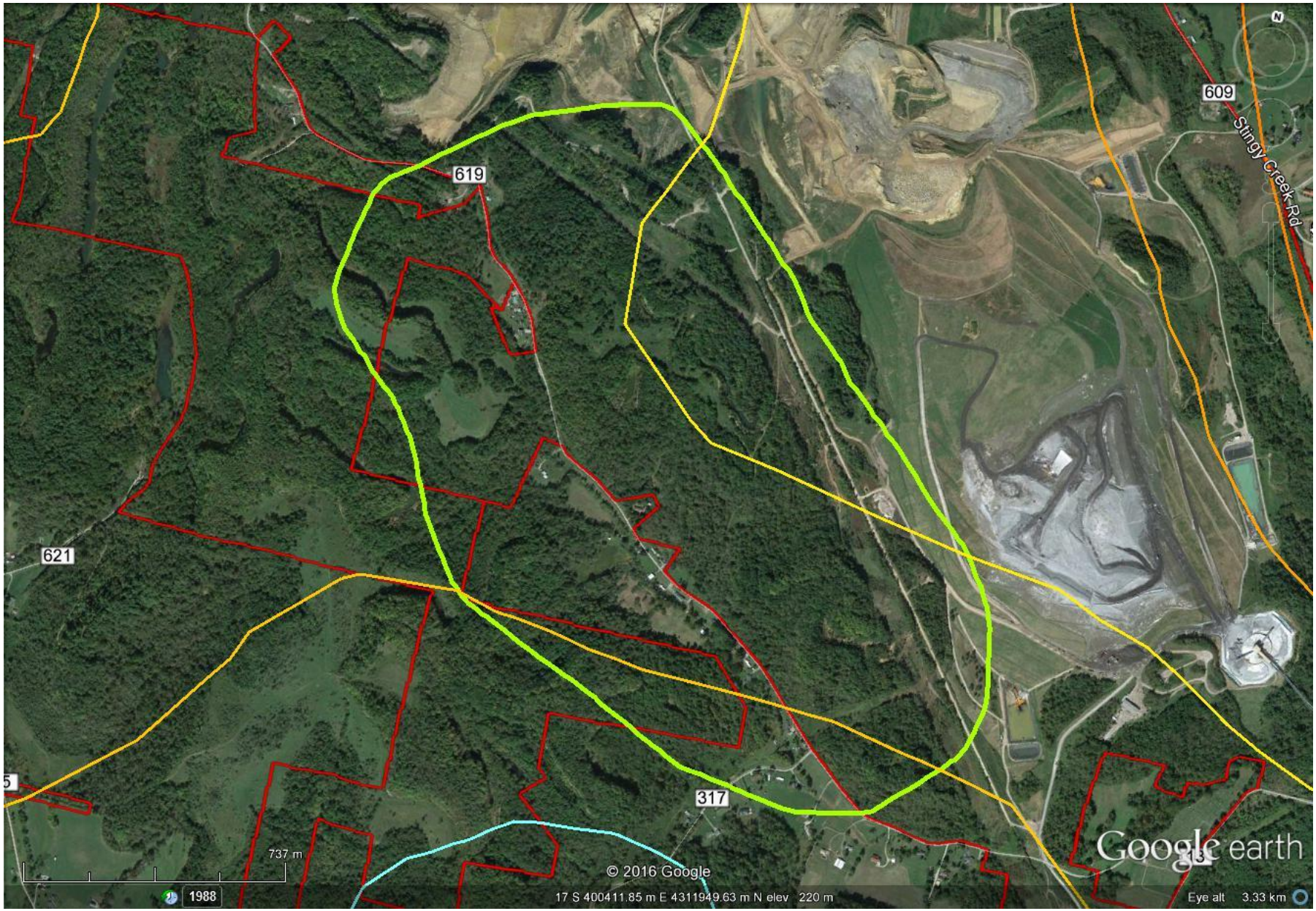


Figure 16: Elevated terrain, West-Northwest of Gavin Plant, with AEP property lines shown (red).

NETWORK LAYOUT

Green circles mark proposed monitor sites

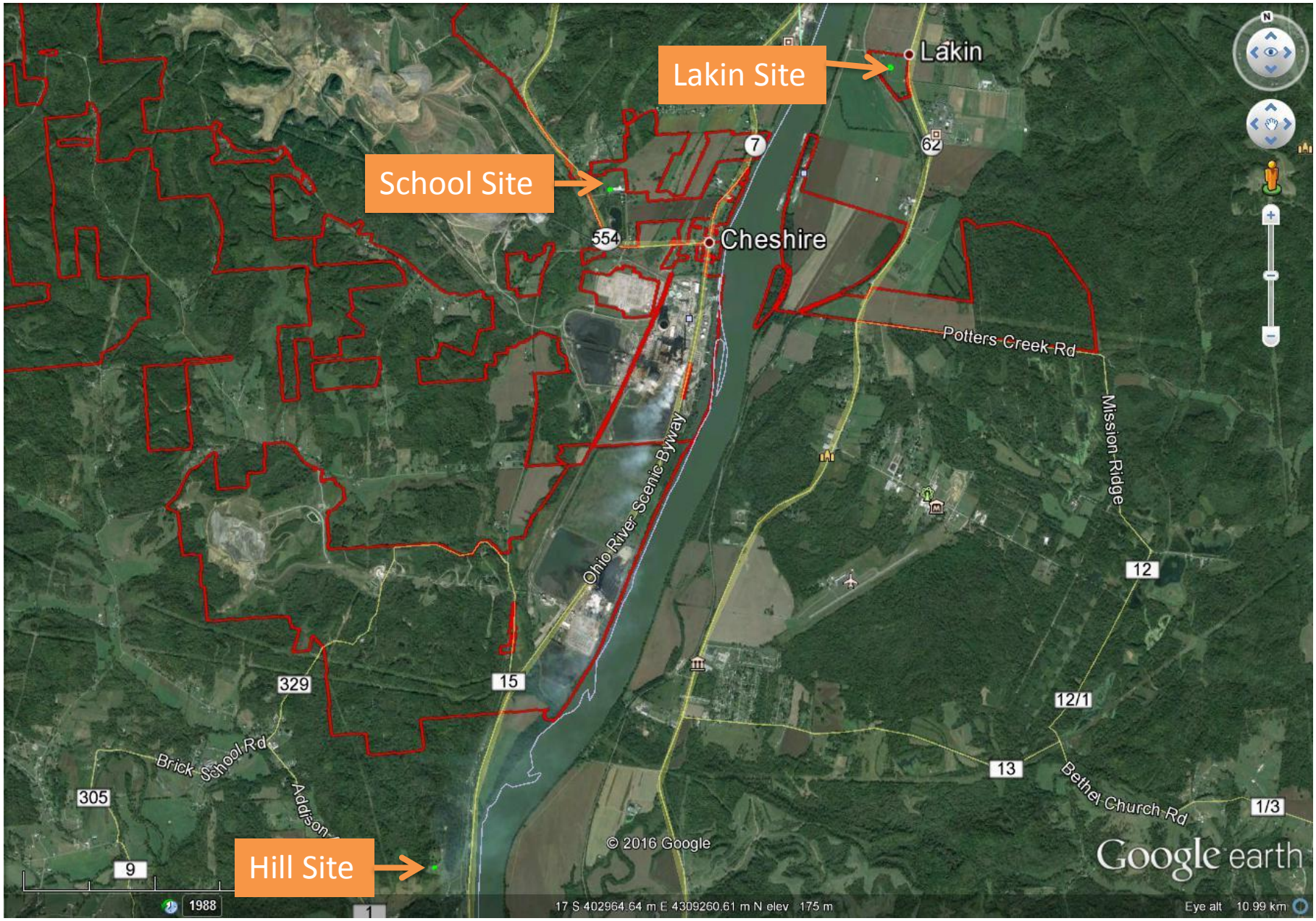


Figure 17: Proposed monitor locations.

HILL SITE

Planned Equipment

SO2 Monitor

Wind Speed and Direction

2 Meter and 10 Meter Temperature

Solar Radiation

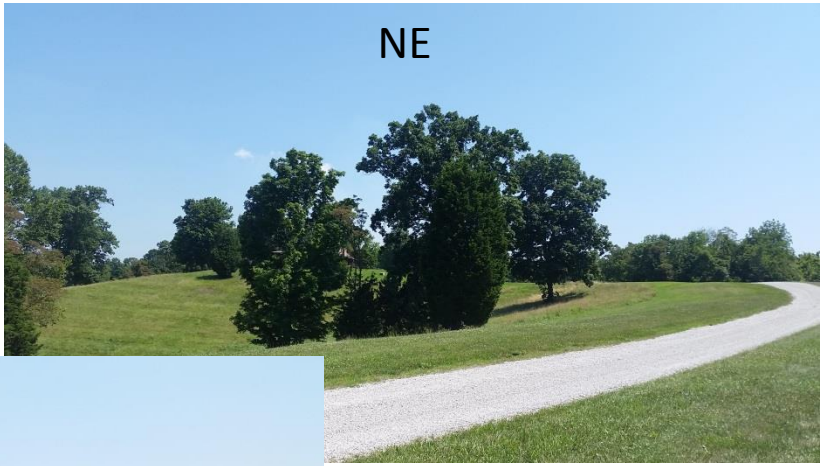
Vertical Velocity

Figure 18: Proposed Hill Site location.

Hill Site - Directionals

N

NE



E

S

W

CHESHIRE SCHOOL SITE

Planned Equipment

SO2 Monitor

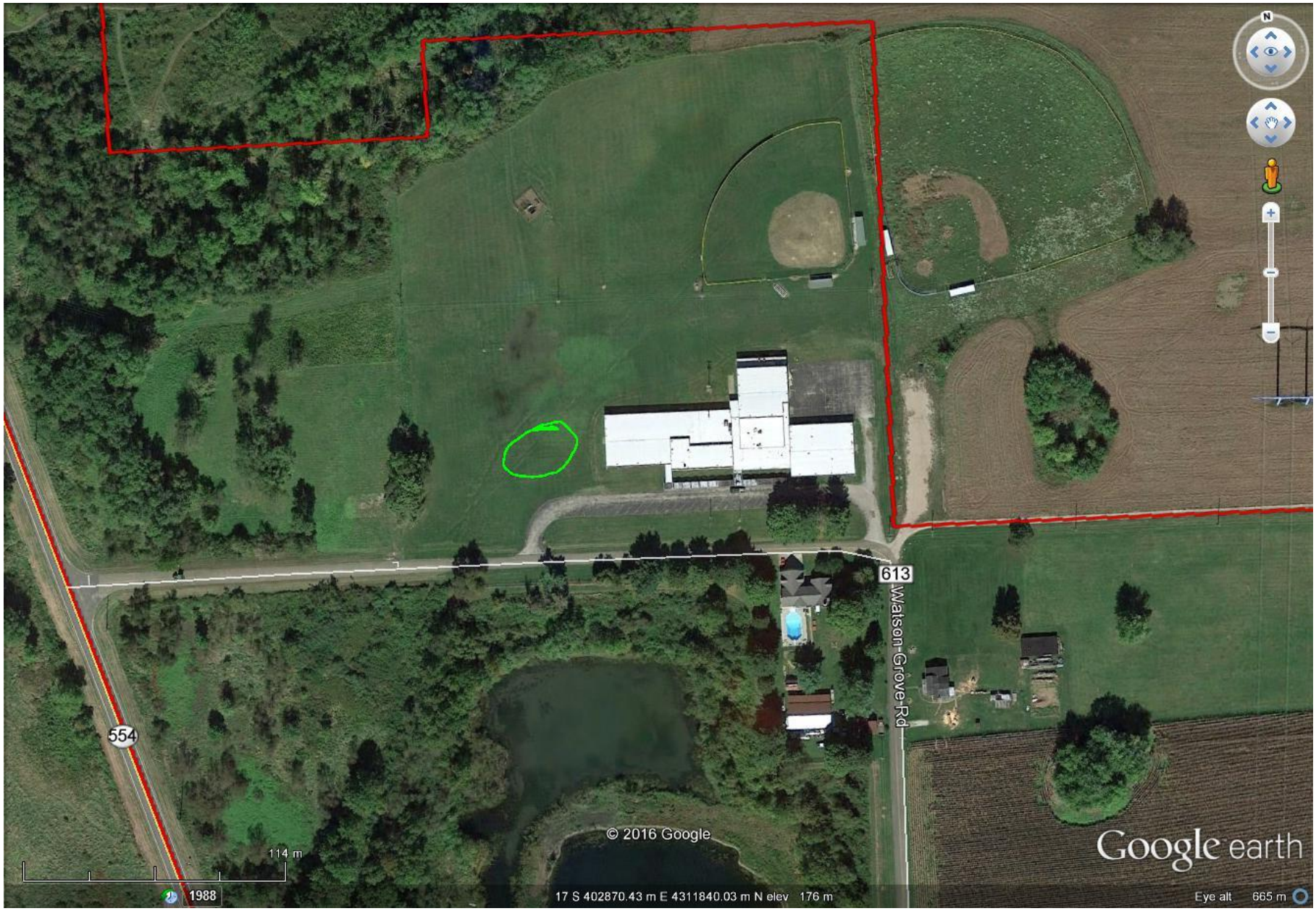
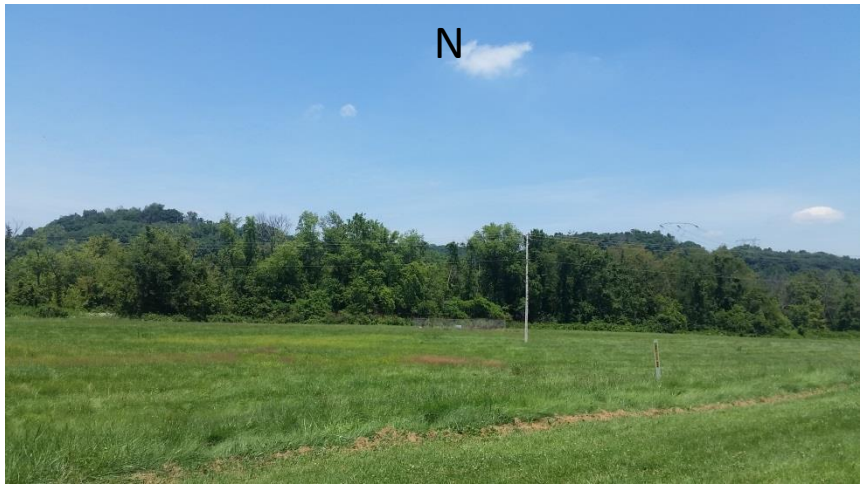


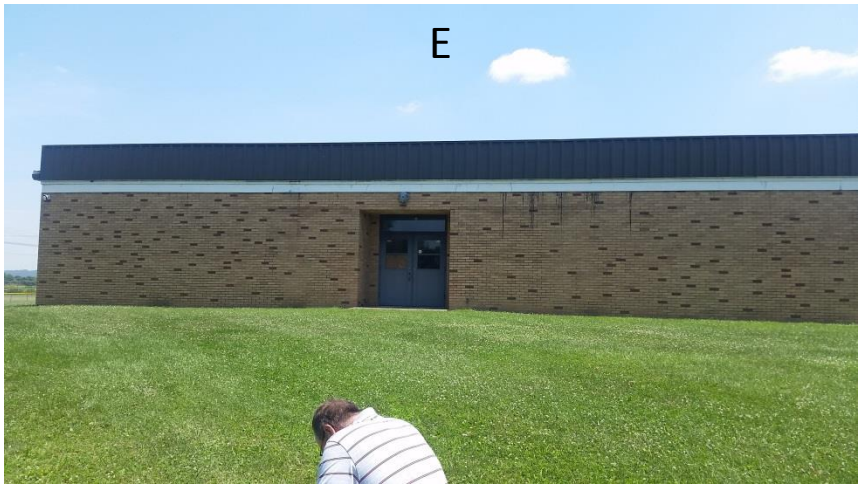
Figure 19: Proposed Cheshire School location.

Cheshire School Site - Directionals

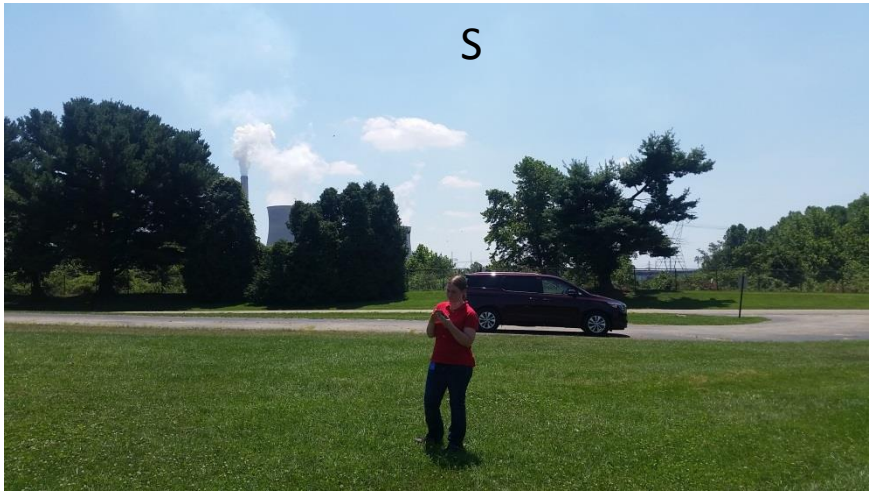
N



E



S



W

LAKIN, WV SITE

Planned Equipment

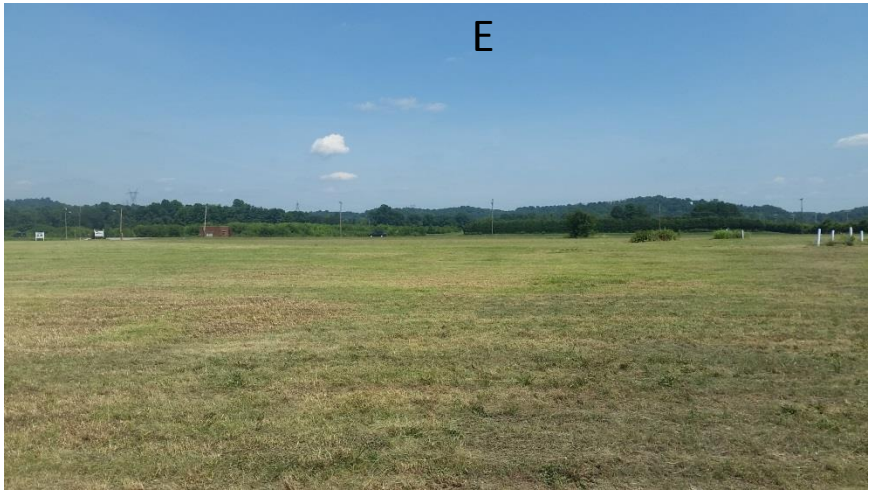
SO2 Monitor

Wind Speed and Direction

Temperature

Figure 20: Proposed Lakin, West Virginia location.

Lakin, WV Site - Details



OEPA Pomeroy Monitor Relocation

- OEPA Monitor 39-105-0003 originally located 13 km north of Gavin Power Plant
- Monitor is being moved to Guiding Hands School as part of Gavin/Kyger network
- Monitor sited north of Cheshire in area of both high impacts and high frequency

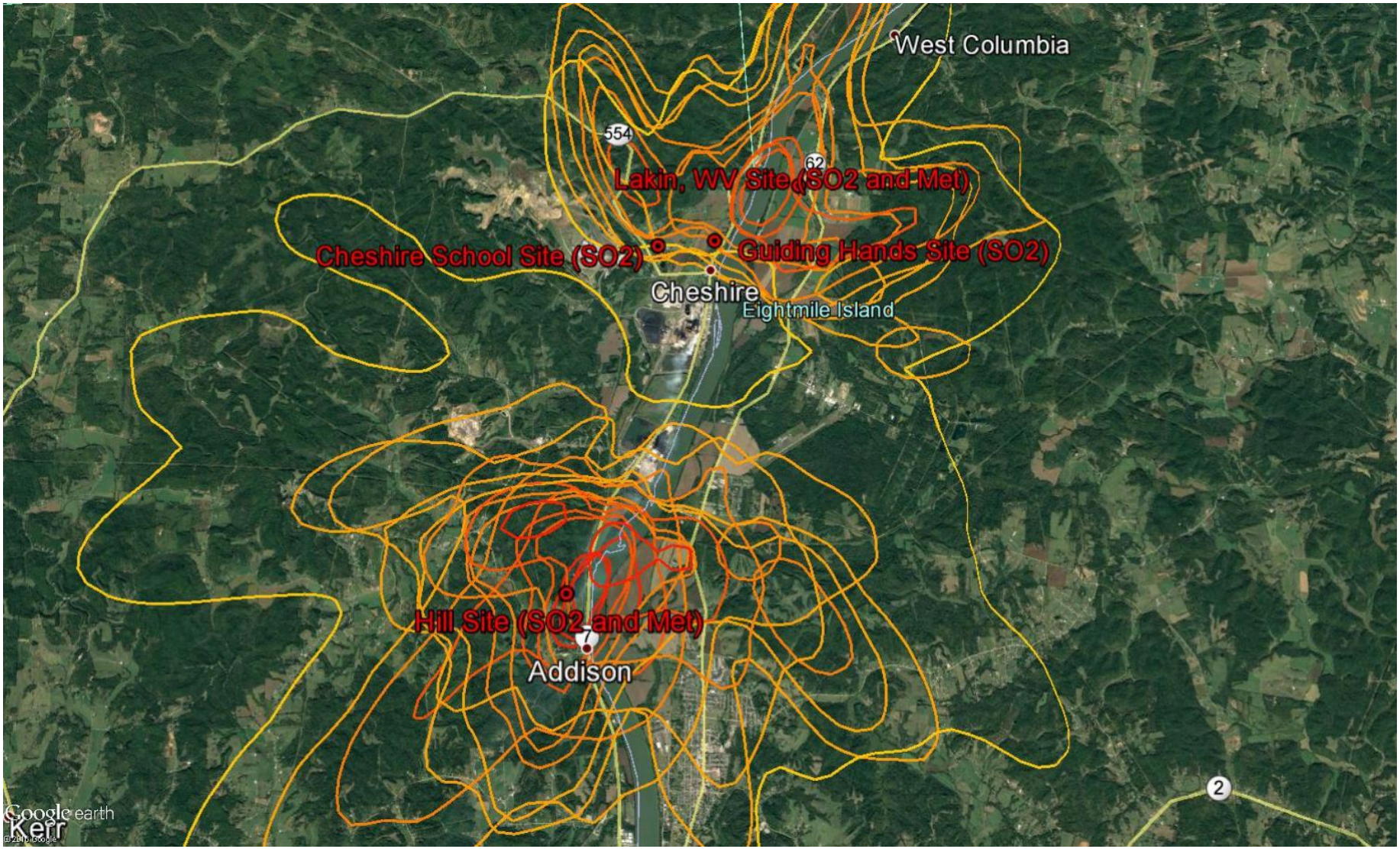


Figure 21: Proposed monitor locations with composite contour plot of maximum 1-hour impacts from the 4 meteorological datasets analyzed.