

Figure D-3. Aerial photograph showing measured LA eq and LA peak sound levels produced by a 0.308 rifle measured at distances of approximately 1/4 mile, 1/2 mile, 1 mile and 2 miles from proposed range Site 2: Barry State Game Area Chief Noonday Site, with the shooter firing towards the south.

## APPENDIX E: SUMMARY OF WEAPONS DATA USED IN THE COMPUTER MODEL STUDIES

### Weapons used on proposed 25-yard, 50-yard, 100-yard and 150-yard Ranges

.223 Rifle  
 12-gauge Shotgun  
 .44 Handgun

#### Octave Band Sound Exposure Level Data for M-16 with .223 Rem. 55gr. power-locked hollow point rounds at a distance of 13 ft (4 meters)

| Receiver<br>Direction Relative to<br>Direction of Gunfire | Octave Band Sound Exposure Level in dB |        |        |         |         |         |
|---|--|--------|--------|---------|---------|---------|
|   | 125 Hz                                 | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz |
| Front   | 109                                    | 118    | 121    | 121     | 118     | 115     |
| Front/Side <sup>1</sup>                                   | 106                                    | 114    | 117    | 117     | 115     | 112     |
| Side  | 103                                    | 109    | 112    | 113     | 112     | 109     |
| Rear/Side <sup>2</sup>                                    | 100                                    | 106    | 109    | 110     | 110     | 107     |
| Rear <sup>4</sup>   | 96                                     | 102    | 105    | 107     | 108     | 104     |

#### Octave Band Sound Exposure Level Data for a 12-gauge shotgun at a distance of 13 ft (4 meters)

| Receiver<br>Direction Relative to<br>Direction of Gunfire | Octave Band Sound Exposure Level in dB |        |        |         |         |         |
|---|--|--------|--------|---------|---------|---------|
|   | 125 Hz                                 | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz |
| Front   | 111                                    | 118    | 119    | 119     | 116     | 112     |
| Front/Side <sup>2</sup>                                   | 106                                    | 113    | 114    | 114     | 112     | 110     |
| Side  | 101                                    | 108    | 109    | 109     | 109     | 107     |

#### Octave Band Sound Exposure Level Data for a .44 Remington Magnum with a 200 gr. hollow point hunting load ammunition at a distance of 13 ft (4 meters)

| Receiver<br>Direction Relative to<br>Direction of Gunfire | Octave Band Sound Exposure Level in dB |        |        |         |         |         |
|---|--|--------|--------|---------|---------|---------|
|   | 125 Hz                                 | 250 Hz | 500 Hz | 1000 Hz | 2000 Hz | 4000 Hz |
| Front   | 111                                    | 118    | 118    | 119     | 117     | 114     |
| Front/Side <sup>1</sup>                                   | 108                                    | 114    | 116    | 117     | 115     | 112     |
| Side  | 104                                    | 111    | 114    | 115     | 113     | 109     |
| Rear/Side <sup>2</sup>                                    | 104                                    | 109    | 112    | 113     | 112     | 109     |
| Rear <sup>4</sup>   | 104                                    | 107    | 110    | 111     | 111     | 108     |

**Notes:**

1. Sound levels were interpolated between the Front and Side conditions.
2. Sound levels were interpolated between the Rear and Side conditions.



**APPENDIX F: COMPUTER MODEL STUDY 1:**

**Base Range Design  
 Typical Day Scenario  
 8/20 Ft., 20 Ft., And 30 Ft. Tall Berms**

Computer model study 1 was conducted for each of the 2 proposed range sites, Site 1: Barry State Game Area Existing Range Site and Site 2: Barry State Game Area Chief Noontday Site.

1. The “typical day” had 5 shooters firing a .223 caliber rifle on the 100 yard range; 1 shooter firing a .223 caliber rifle on the 150 yard range; 2 shooters firing a 12 gauge Remington shotgun on the 50 yard range; and 3 shooters firing a 0.40 caliber handgun on the 25 yard range within a 1 second time period.
2. Weather conditions were modeled as downwind with 1 to 11 mph wind with a temperature of 50°F and 70% R.H.
3. The base range design was used in each model.
4. Three berm height configurations consisting of 8 ft. tall berms on two sides and 20 ft. berms downrange; 20 ft. tall berms on 3 sides of the range; and 30 ft. tall berms on 3 sides of the range; were modeled for the typical goal day scenario at the site.
5. The direction of fire was to the west for the rifle range and east-southeast for Site 1: Barry State Game Area Existing Range and to the south for Site 2: Barry State Game Area Chief Noontday.
6. The sound levels shown on the noise contour maps as LA eq in dBA.

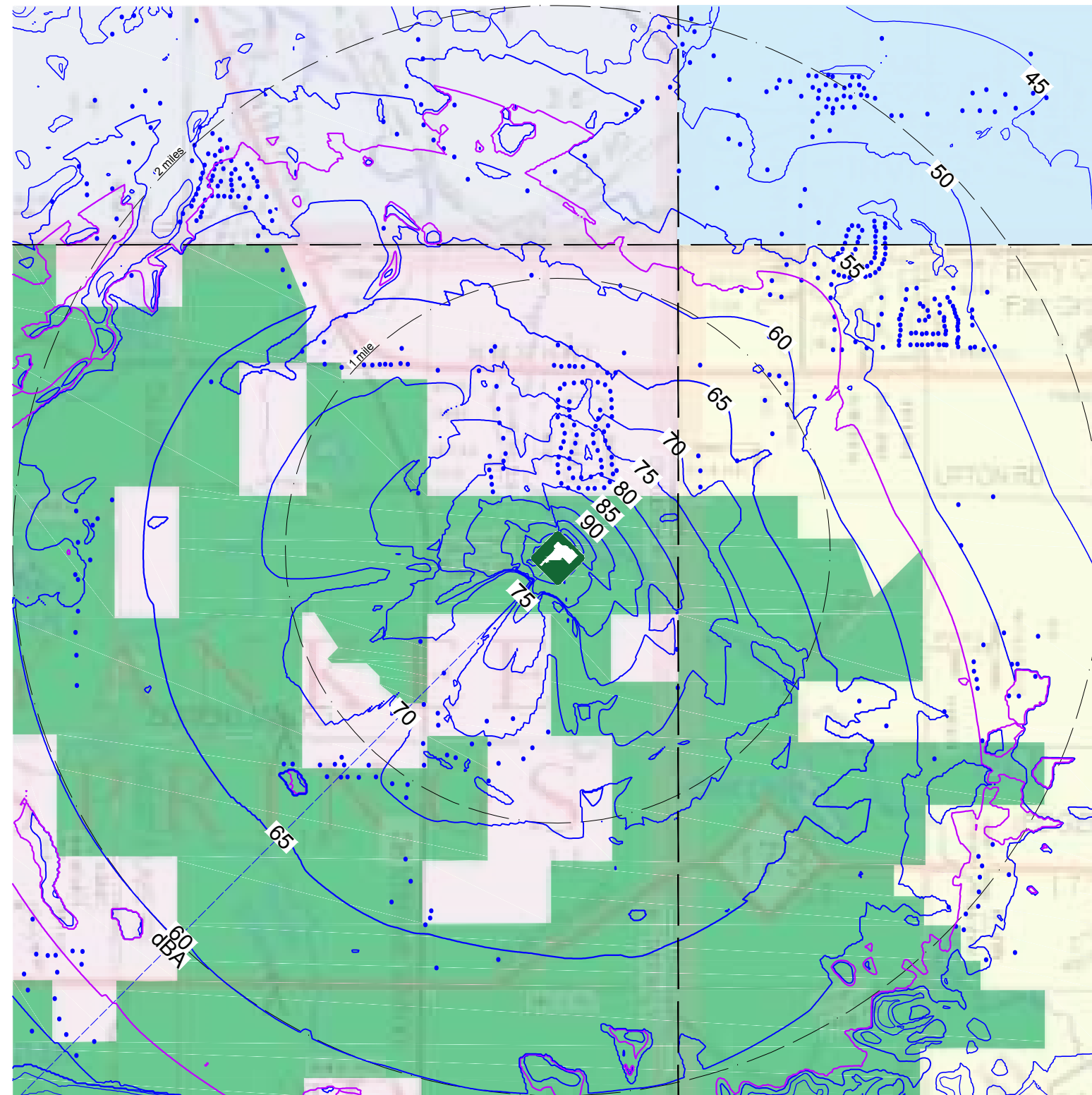
A summary of the points assigned for each range site and orientation with the base range design including 8 ft. tall berms on two sides and 20 ft. berms downrange and an open range structure are shown in Table F-1. Overall, Site 2 Chief Noontday oriented to the south had the least impacts when compared to Site 1 in the existing Barry State Game Area range rated with the greatest impacts. The noise mitigation options studied included raising the height of the down range berms to 20 ft. tall and 30 ft. tall at cost increases of approximately \$235,700 for the 20 ft. tall berm compared to the base design range consisting of 8 ft. tall side berms and 20 ft. tall downrange berm; and approximately \$676,200 for the 30 ft. tall berm compared to the base design range.

**Table F-1. Summary table of rating points for each scenario tested in this experiment.**

| <b>TYPICAL DAY 11 SHOOTERS   8 FT SIDE BERMS AND 20 FT DOWNRANGE BERM</b> |            |                 |           |            |
|---|------------|-----------------|-----------|------------|
| <b>Site</b>   | <b>DOF</b> | <b>LIN PRES</b> | <b>dB</b> | <b>PTS</b> |
| SITE 2: Chief Noontday  | S          | 9,626           | 90        | 1476       |
| SITE 1: Barry SGA   | SW/SE      | 71,150          | 99        | 1763       |

**Table F-2. Summary of rankings of each site and direction of fire for base berm heights, 20 ft. and 30 ft.**

| <b>TYPICAL DAY 11 SHOOTERS</b> |                |            |                 |           |            |
|--------------------------------|----------------|------------|-----------------|-----------|------------|
| <b>Description</b>             | <b>SITE</b>    | <b>DOF</b> | <b>LIN PRES</b> | <b>dB</b> | <b>PTS</b> |
| 30 FT. Tall Berm               | Chief Noontday | S          | 3,190           | 85        | 1343       |
| 20 FT. Tall Berm               | Chief Noontday | S          | 4,630           | 87        | 1785       |
| 8FT.Side /20FT. Downrange      | Chief Noontday | S          | 9,626           | 90        | 1476       |
| 30 FT. Tall Berm               | Barry          | SW/SE      | 47,150          | 97        | 1424       |
| 20 FT. Tall Berm               | Barry          | SW/SE      | 69,607          | 98        | 2060       |
| 8FT.Side /20FT. Downrange      | Barry          | SW/SE      | 71,150          | 99        | 1763       |



**BARRY SGA**  
 Different Height Berms

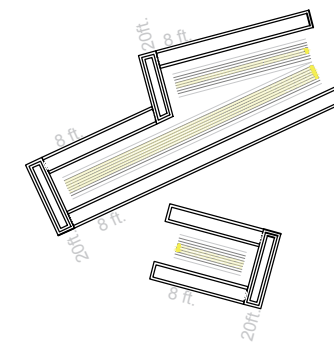
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. SW/SE

20 ft. End Berms  
 8 ft. Side Berms

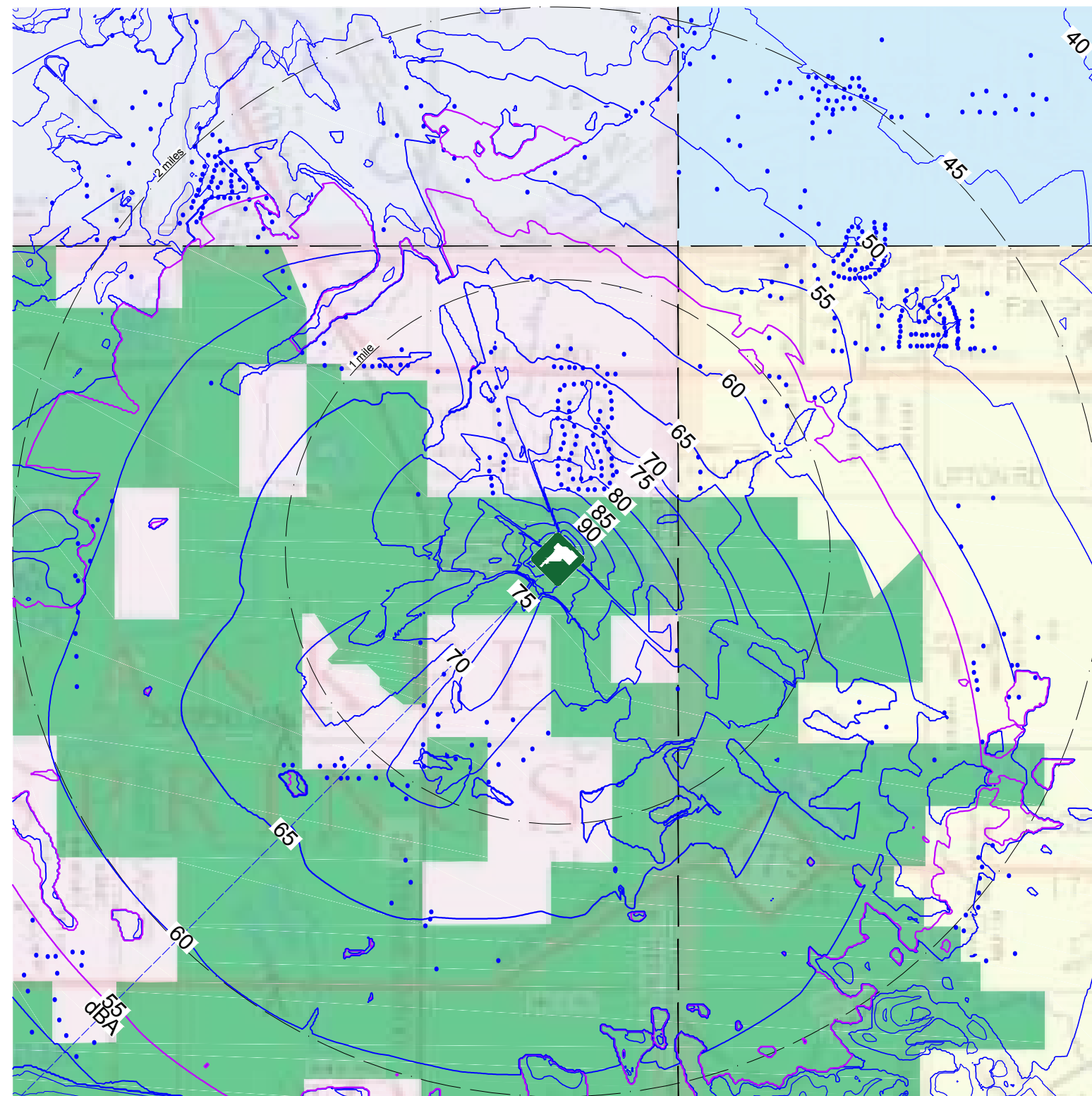
Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure F-1



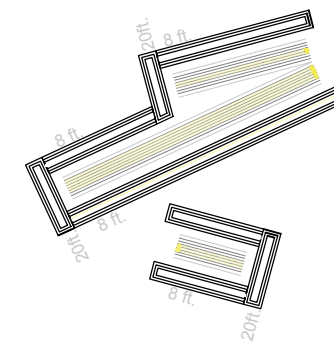
**BARRY SGA**  
 Different Height Berms

Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. SW/SE  
 20 ft. End Berms  
 20 ft. Side Berms

Wind: 1 to 11 mph downward

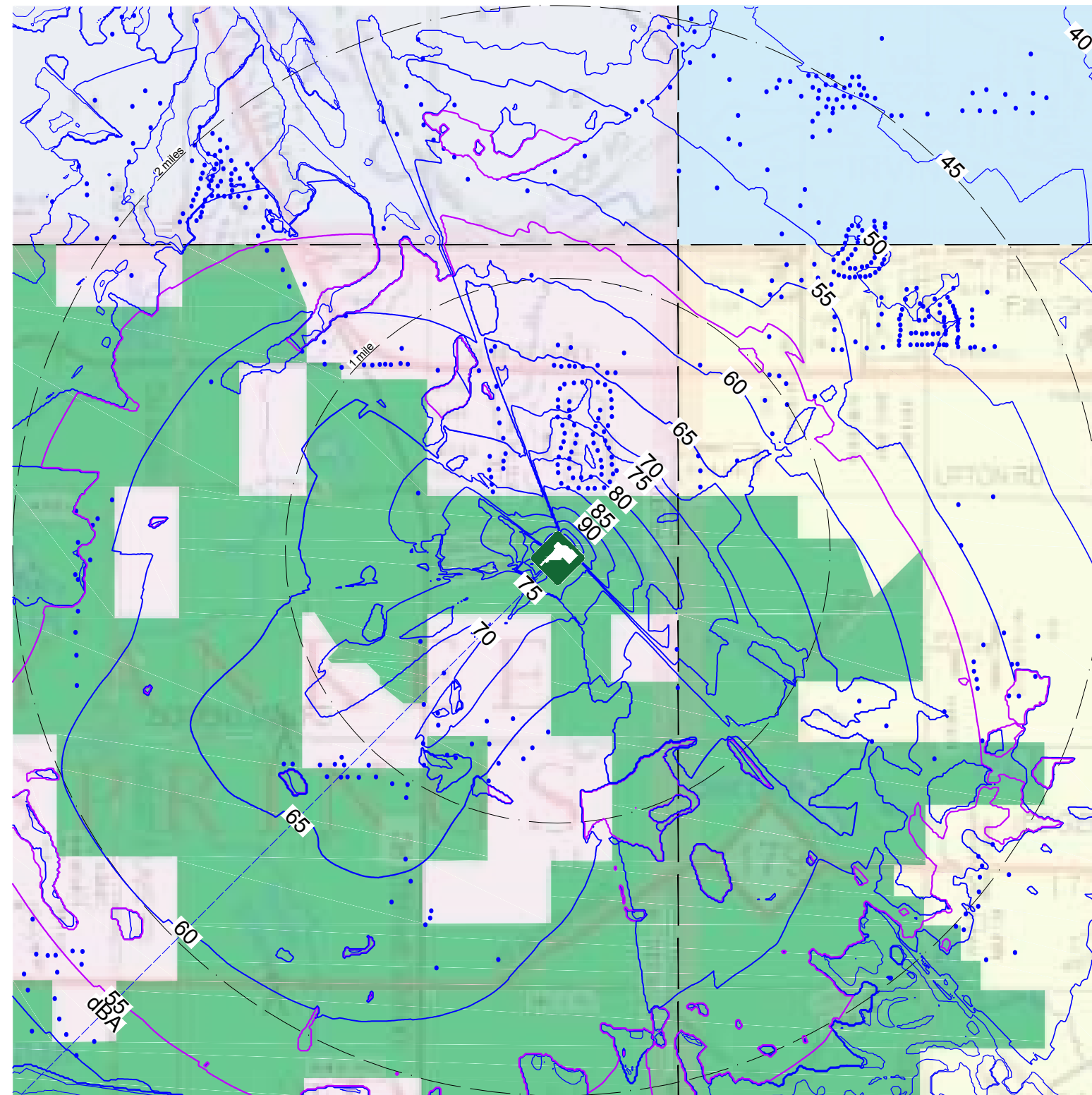
50°F and 70% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure F-2





**BARRY SGA**  
 Different Height Berms

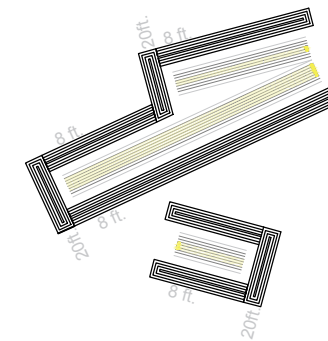
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. SW/SE

30 ft. End Berms  
 30 ft. Side Berms

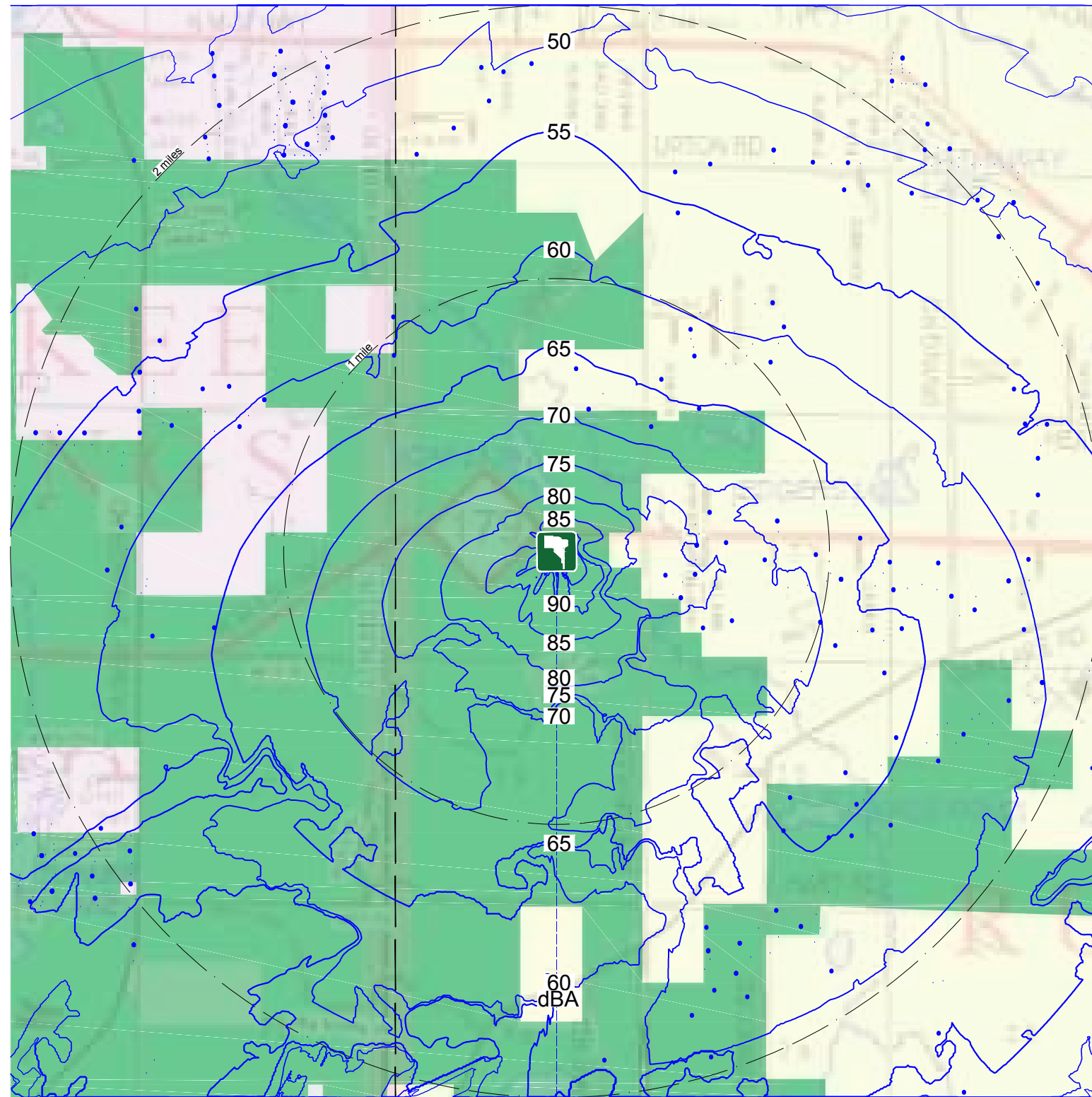
Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
- THORNAPPLE TOWNSHIP  
No sound level limitations established
- IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
- 57 dBA Residential Zones
- 60 dBA Commercial
- 65 dBA Industrial
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established
- BARRY COUNTY ZONING ORDINANCE  
Sound Level Limitations if site is zoned as Commercial

Figure F-3



**CHIEF NOONDAY**

Different Height Berms

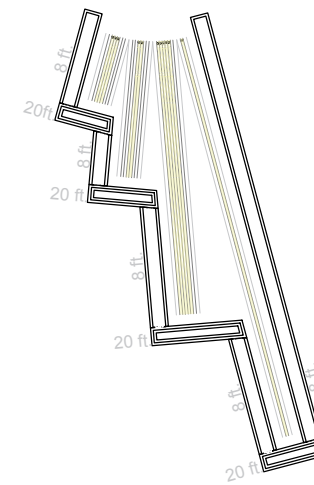
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. South

20 ft. End Berms  
 8 ft. Side Berms

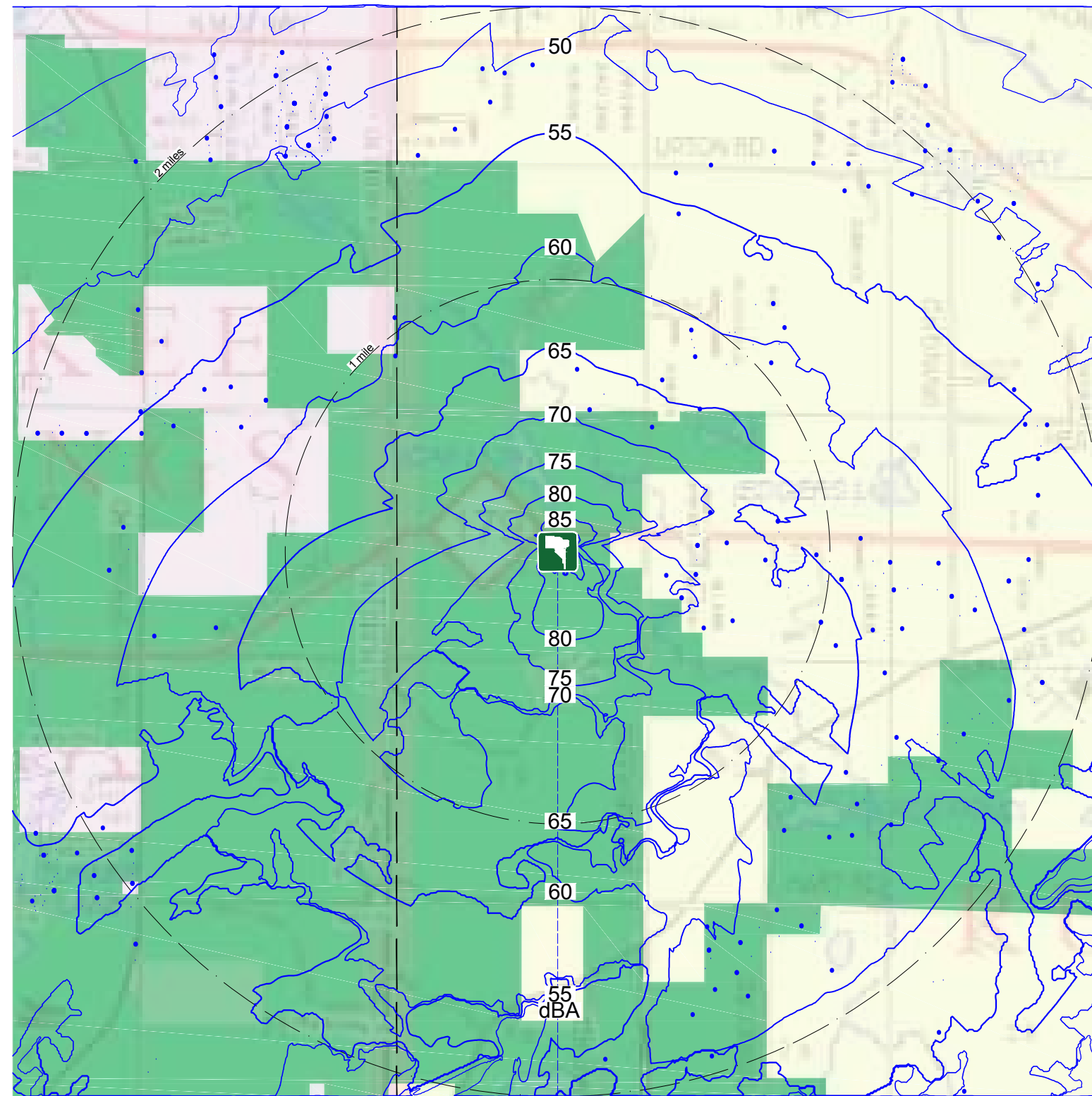
Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure F-4



**CHIEF NOONDAY**

Different Height Berms

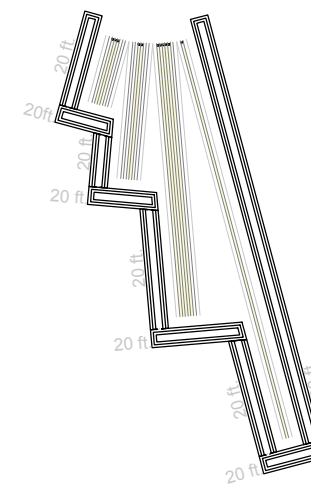
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. South

20 ft. End Berms  
 20 ft. Side Berms

Wind: 1 to 11 mph downward

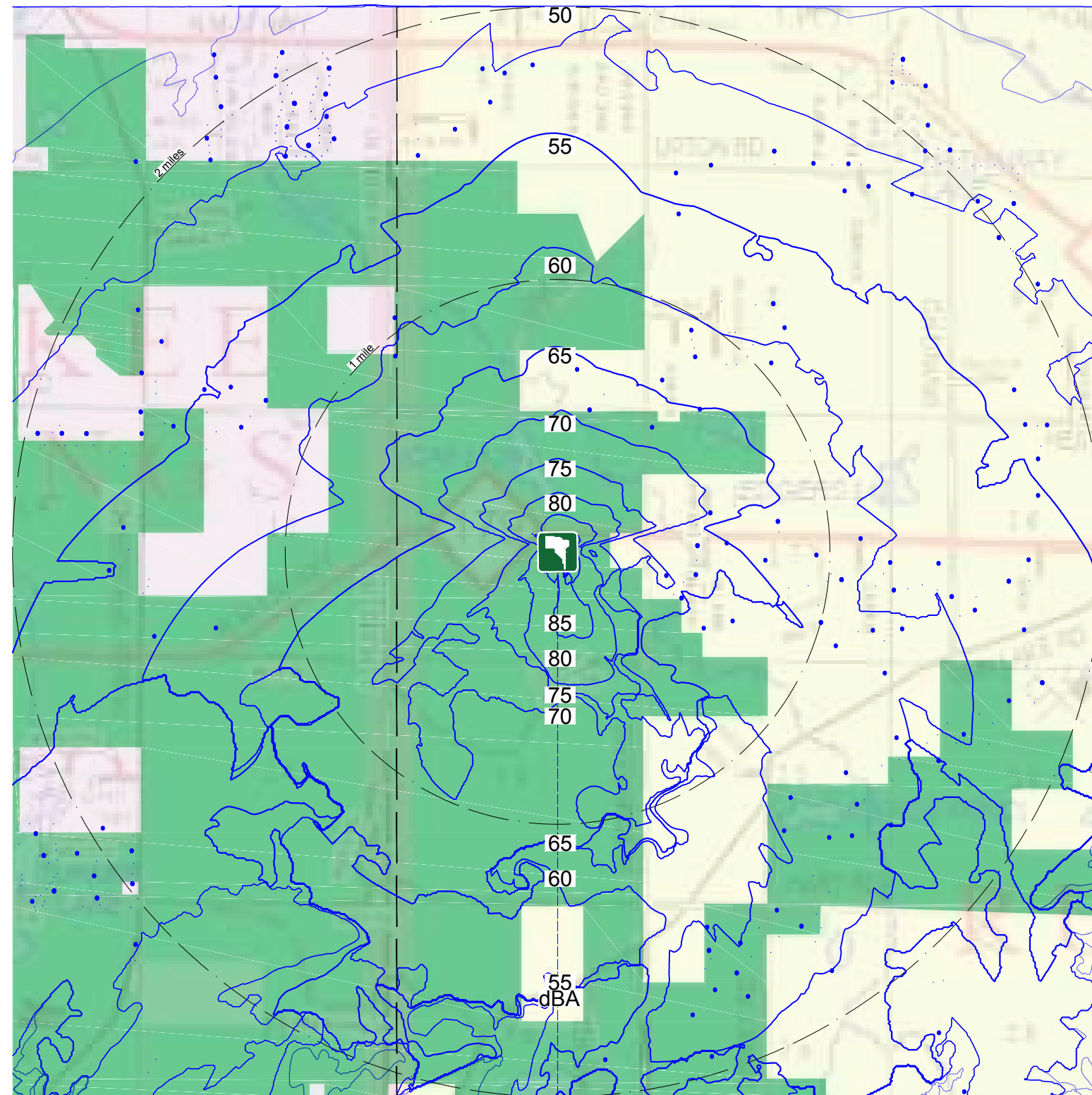
50°F and 70% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure F-5





**CHIEF NOONDAY**

Different Height Berms

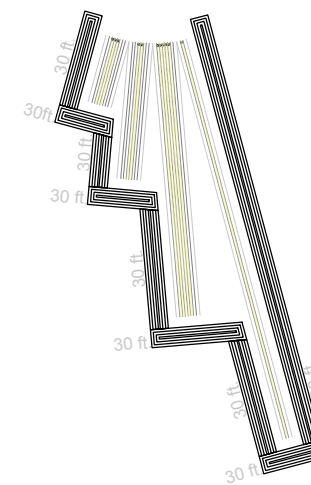
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. South

30 ft. End Berms  
 30 ft. Side Berms

Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure F-6

**APPENDIX G: COMPUTER MODEL STUDY 2:  
 Alternate Range Orientations  
 Typical Day Scenario  
 8/20 ft., 20 ft., and 30 ft. Tall Berms**

Computer model study 2 was conducted for alternate range orientations for each of the 2 proposed range sites, Site 1: Barry State Game Area Existing Range Site and Site 2: Barry State Game Area Chief Noonday Site.

1. The “typical day” had 5 shooters firing a .223 caliber rifle on the 100 yard range; 1 shooter firing a .223 caliber rifle on the 150 yard range; 2 shooters firing a 12 gauge Remington shotgun on the 50 yard range; and 3 shooters firing a 0.40 caliber handgun on the 25 yard range within a 1 second time period.
2. Weather conditions were modeled as downwind with 1 to 11 mph wind with a temperature of 50°F and 70% R.H.
3. The direction of fire in the base range design was changed for each of the 2 proposed sites.
4. Three berm height configurations consisting of 8 ft. tall berms on two sides and 20 ft. berms downrange; 20 ft. tall berms on 3 sides of the range; and 30 ft. tall berms on 3 sides of the range; were modeled for the typical goal day scenario at the site.
5. The alternate direction of fire was to the east for Site 1: Barry State Game Area Existing Range Site and to the southwest at Site 2: Barry State Game Area Chief Noonday Site.
6. The sound levels shown on the noise contour maps as LA eq in dBA.

The Site 2: Chief Noonday base range design with the 8 ft. tall berms on two sides and 20 ft. berms downrange had less impacts on surrounding properties with the alternate range orientation to the southwest and with the base range orientation to the south than the range at Site 1: Barry SGA.

When berm heights of 20 ft. and 30 ft. are added to the rankings of the 2 sites and the alternate directions of fire, Site 2: Chef Noonday is ranked as having the least impact on surrounding properties for a “typical” day scenario for both the base range orientation and the alternate range orientation. Site 1: Barry SGA oriented to the southwest with a 30 ft. tall berm is ranked fifth with a linear pressure score that is significantly greater than the base range design at Site 2: Chief Noonday.

For any given range site and direction of fire, the configurations with the 20 ft. and 30 ft. tall berms had lower impacts than the configurations with the 10 ft. tall berms at each site. The approximate cost increase to build the range with a 20 ft. tall berm compared to a 10 ft. tall berm was \$235,700. The approximate cost increase to build the range with a 30 ft. tall berm compared to a 10 ft. tall berm was \$676,100.

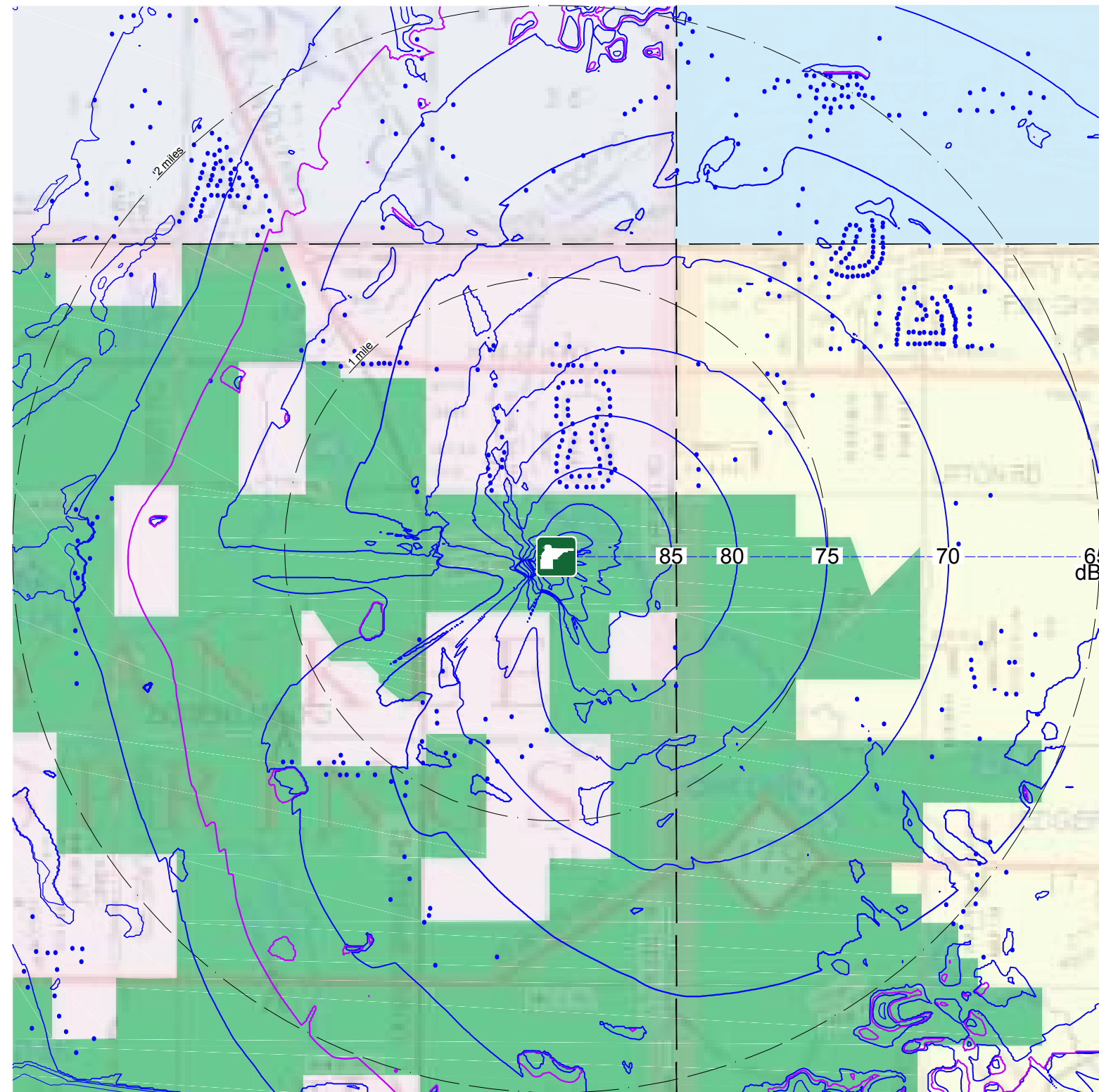
**Table G-1. Summary table of rating points for each scenario tested in Experiment 2.**

| <b>TYPICAL DAY 11 SHOOTERS   8 FT SIDE BERMS AND 20 FT DOWNRAGE BERM</b> |            |                 |           |            |
|--|------------|-----------------|-----------|------------|
| <b>Site</b>  | <b>DOF</b> | <b>LIN PRES</b> | <b>dB</b> | <b>PTS</b> |
| SITE 2: Chief Noonday  | SW         | 6,080           | 88        | 1612       |
| SITE 2: Chief Noonday  | S          | 9,626           | 90        | 1476       |
| SITE 1: Barry SGA  | SW/SE      | 71,150          | 99        | 1763       |
| SITE 1: Barry SGA  | E          | 182,395         | 103       | 2400       |

**Table G-2. List of points for each range site, berm height and orientation.**

| <b>TYPICAL DAY 11 SHOOTERS</b> |            |                          |                  |           |            |
|--------------------------------|------------|--------------------------|------------------|-----------|------------|
| <b>Site</b>                    | <b>DOF</b> | <b>Berm Height</b>       | <b>Lin Press</b> | <b>dB</b> | <b>PTS</b> |
| SITE 2: Chief Noonday          | SW         | 30 FT.                   | 3,917            | 86        | 1701       |
| SITE 2: Chief Noonday          | SW         | 20 FT.                   | 4,482            | 87        | 1613       |
| SITE 2: Chief Noonday          | SW         | 8FT.SIDES/20FT DOWNRANGE | 6,080            | 88        | 1612       |
| SITE 2: Chief Noonday          | S          | 8FT.SIDES/20FT DOWNRANGE | 9,626            | 90        | 1476       |
| SITE 1: Barry SGA              | SW         | 30 FT.                   | 30,195           | 95        | 1328       |
| SITE 1: Barry SGA              | SW         | 20 FT.                   | 34,757           | 95        | 1224       |
| SITE 1: Barry SGA              | E          | 30 FT.                   | 41,962           | 96        | 2122       |
| SITE 1: Barry SGA              | E          | 20 FT.                   | 59,135           | 98        | 2140       |
| SITE 1: Barry SGA              | SW/SE      | 8FT.SIDES/20FT DOWNRANGE | 71,150           | 99        | 1763       |
| SITE 1: Barry SGA              | E          | 8FT.SIDES/20FT DOWNRANGE | 182,395          | 103       | 2400       |





**BARRY SGA**  
 Different Height Berms

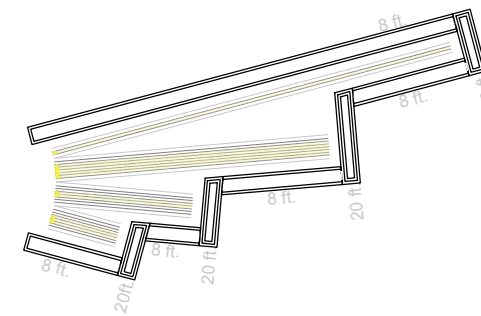
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. East

20 ft. End Berms  
 8 ft. Side Berms

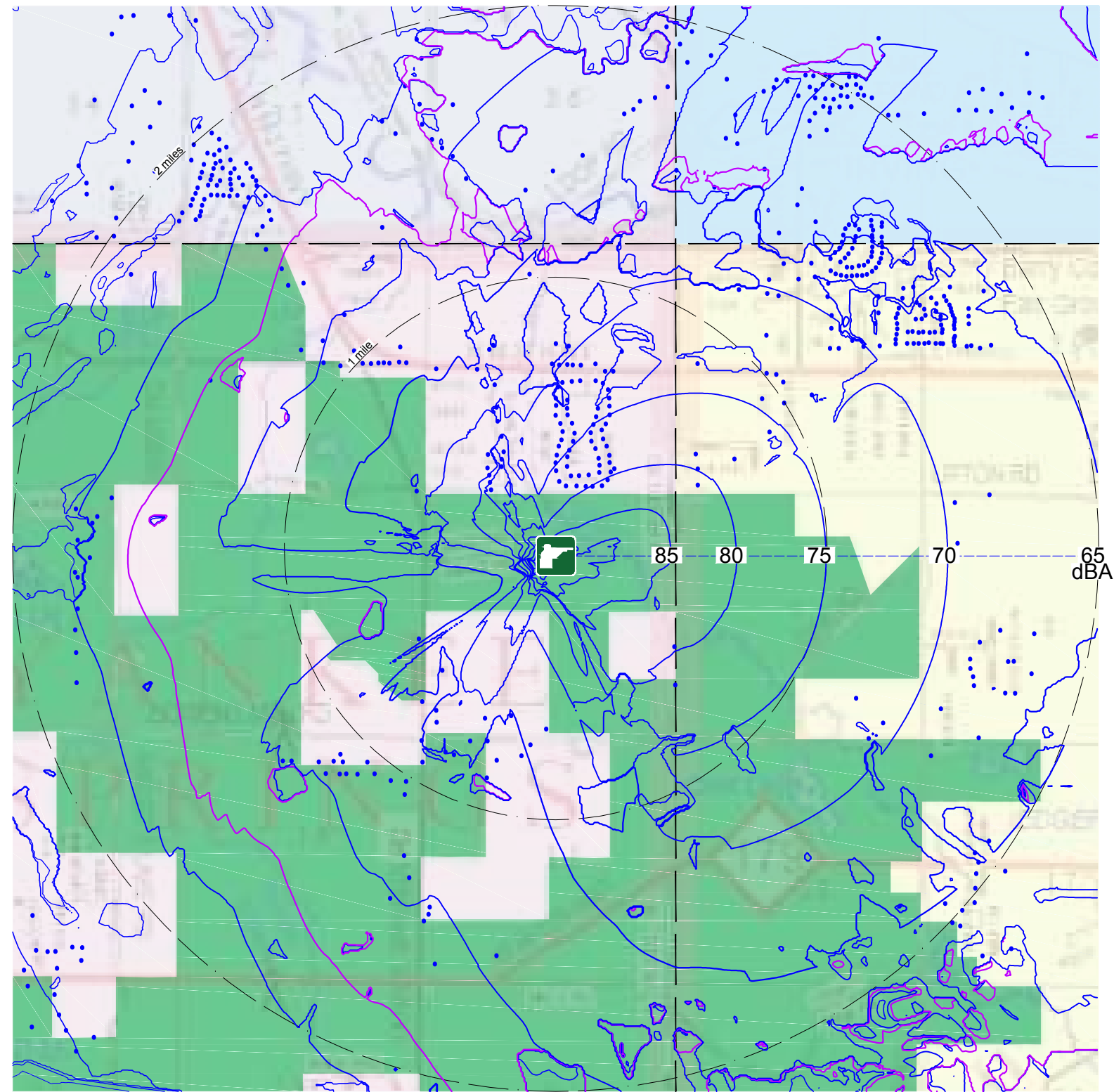
Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure G-1



**BARRY SGA**  
 Different Height Berms

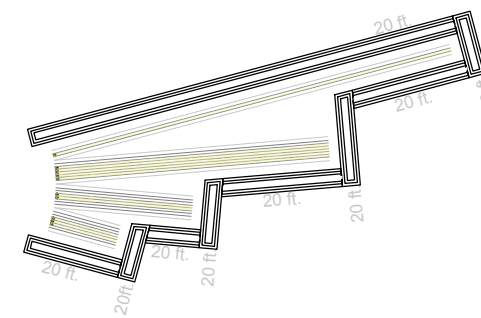
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. East

20 ft. End Berms  
 20 ft. Side Berms

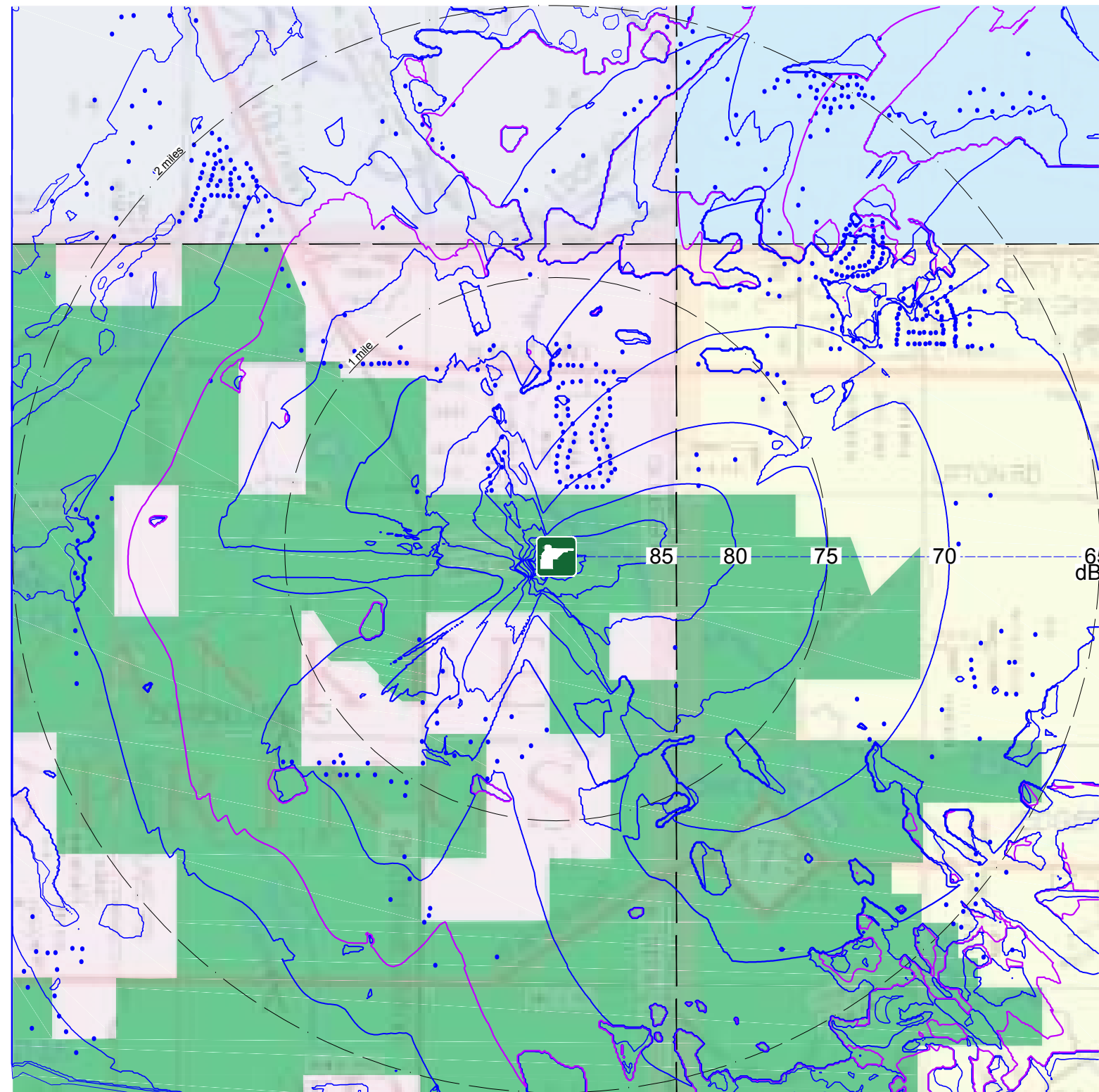
Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure G-2



**BARRY SGA**  
 Different Height Berms

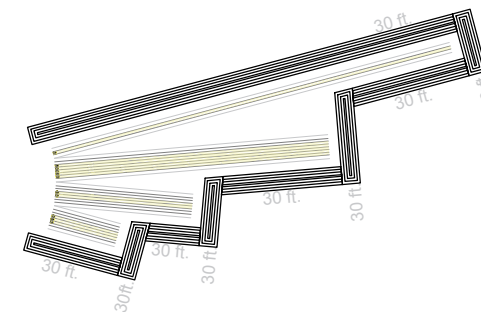
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. East

30 ft. End Berms  
 30 ft. Side Berms

Wind: 1 to 11 mph downward

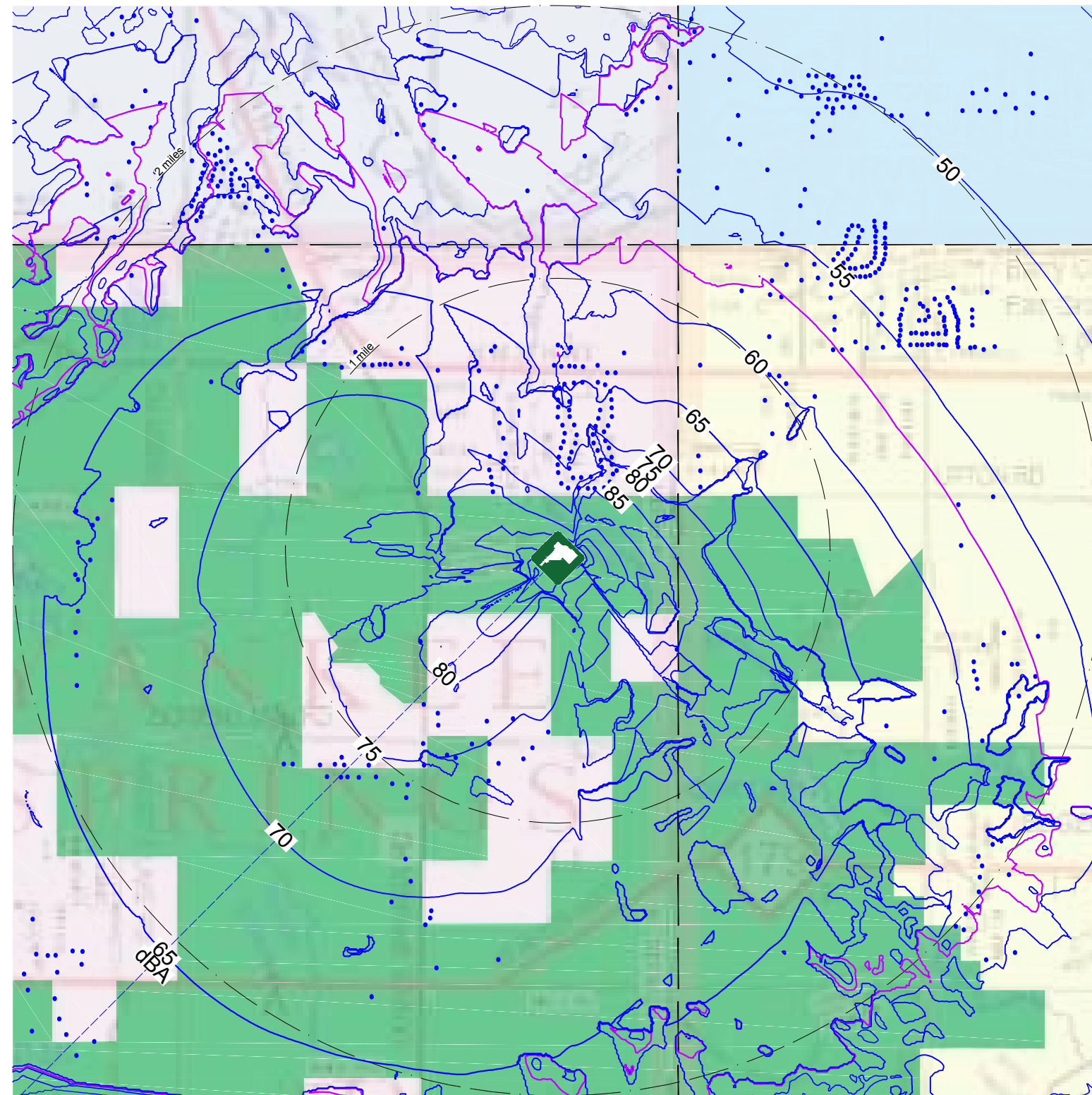
50°F and 70% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure G-3





**BARRY SGA**  
 Different Height Berms

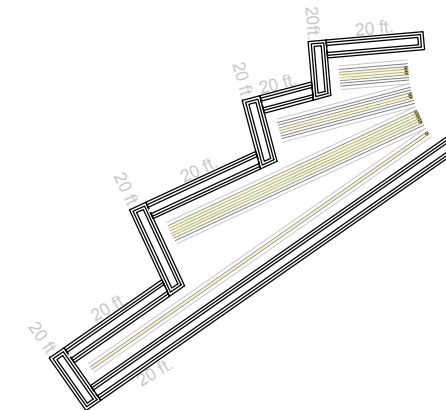
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. SW

20 ft. End Berms  
 20 ft. Side Berms

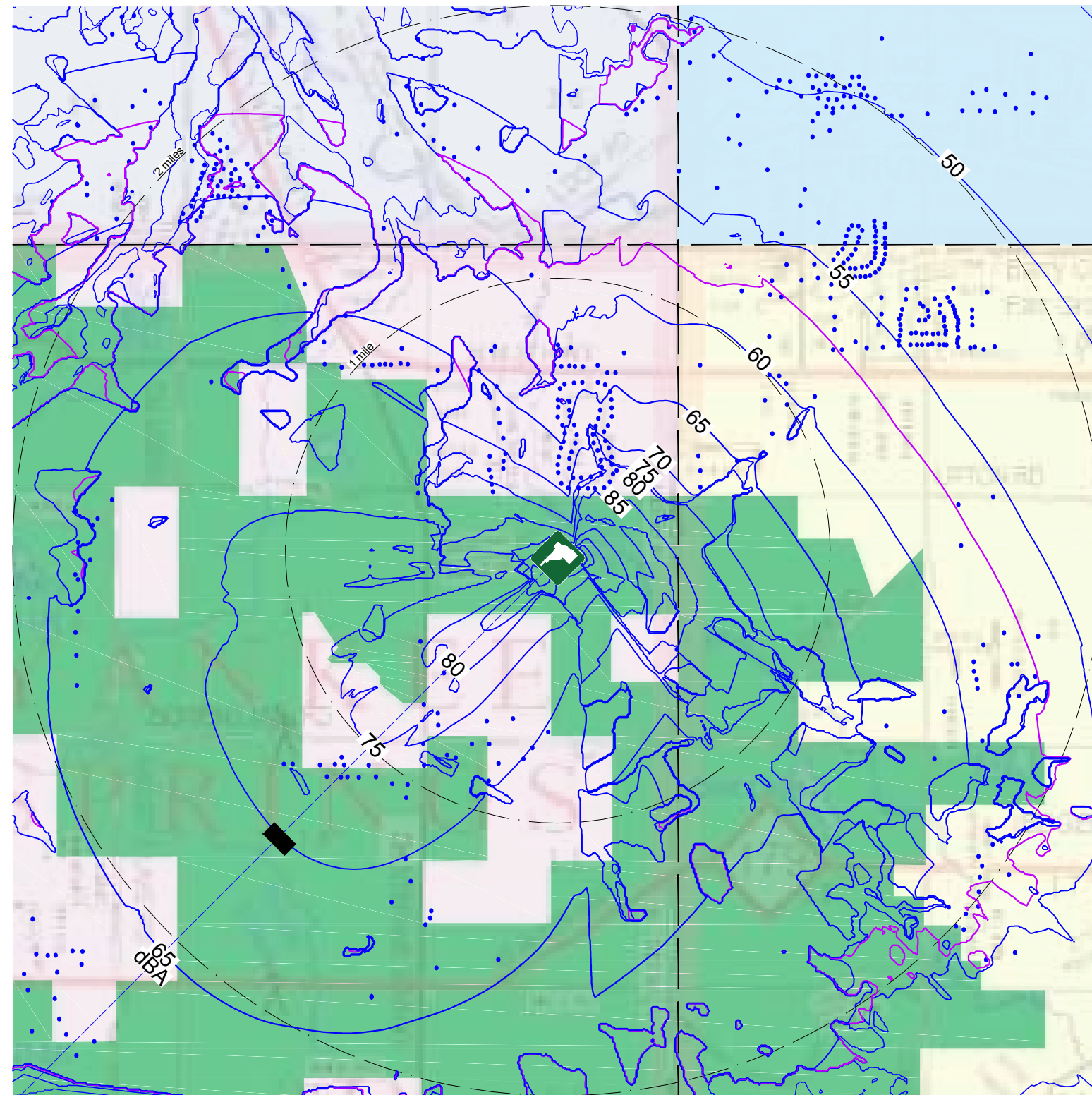
Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure G-4



**BARRY SGA**  
 Different Height Berms

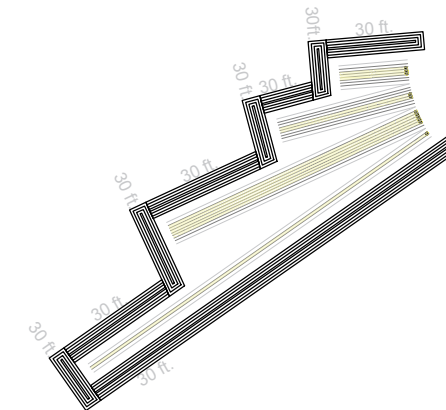
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. SW

30 ft. End Berms  
 30 ft. Side Berms

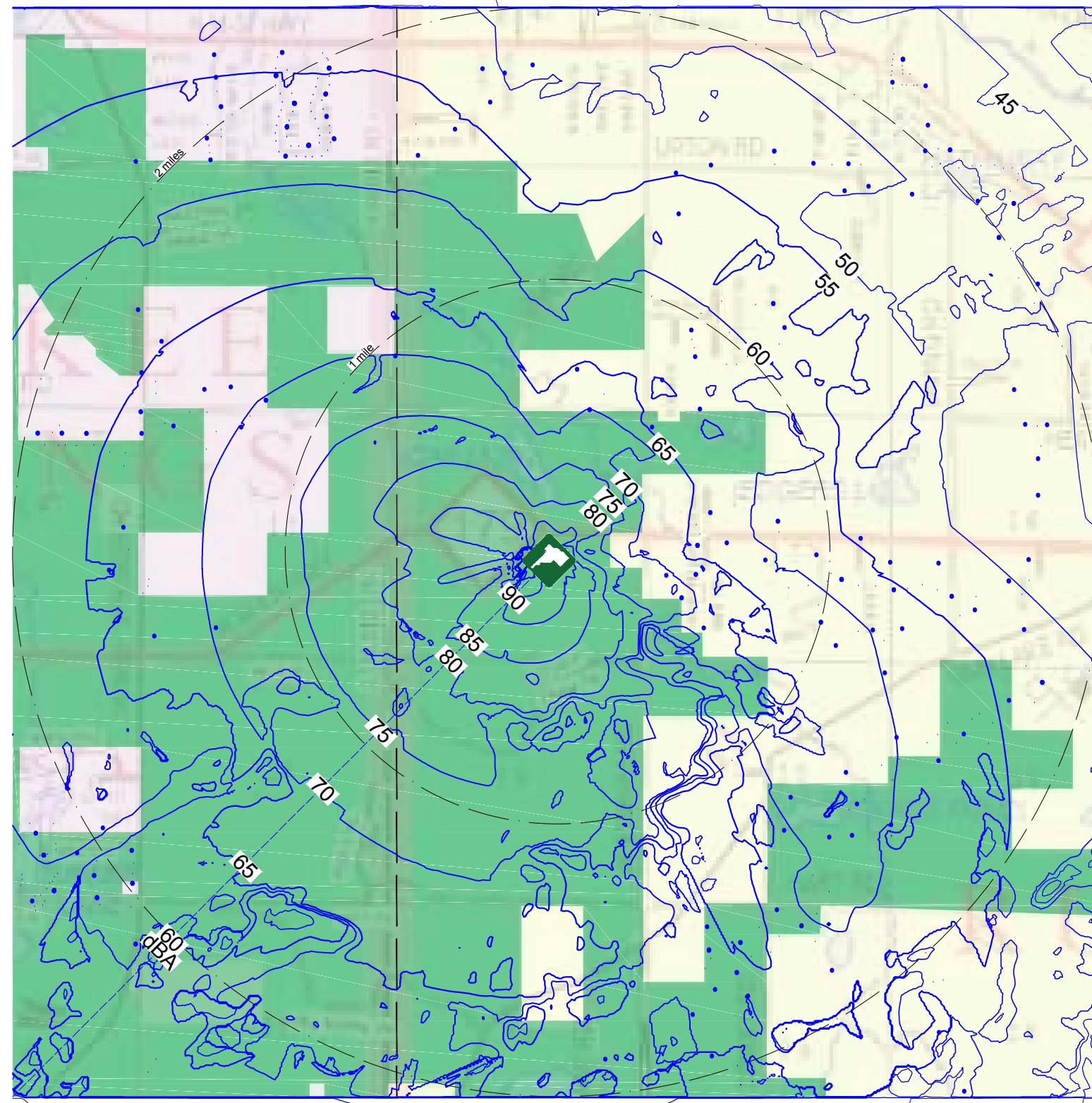
Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure G-5



**CHIEF NOONDAY**

Alternate Orientation

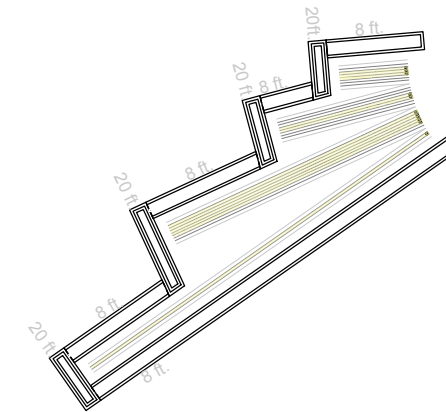
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. SW

20 ft. End Berms  
 8 ft. Side Berms

Wind: 1 to 11 mph downward

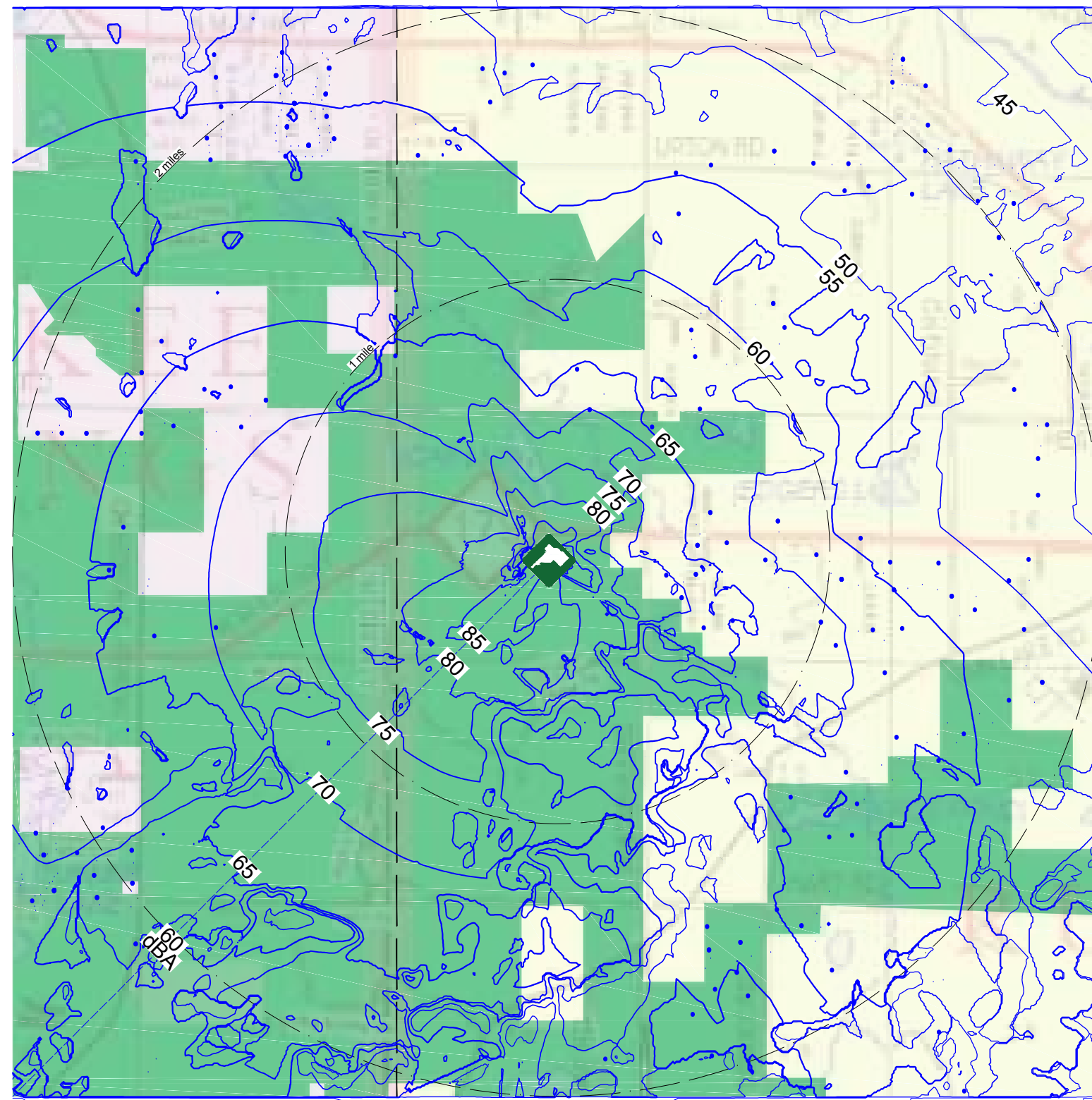
50°F and 70% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure G-6





**CHIEF NOONDAY**

Alternate Orientation

Shooters within 1 second:

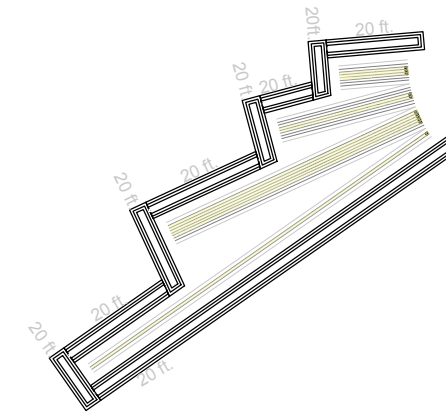
- 6 Rifles
- 2 Shotguns
- 3 Handguns

D.O.F. SW

20 ft. End Berms  
 20 ft. Side Berms

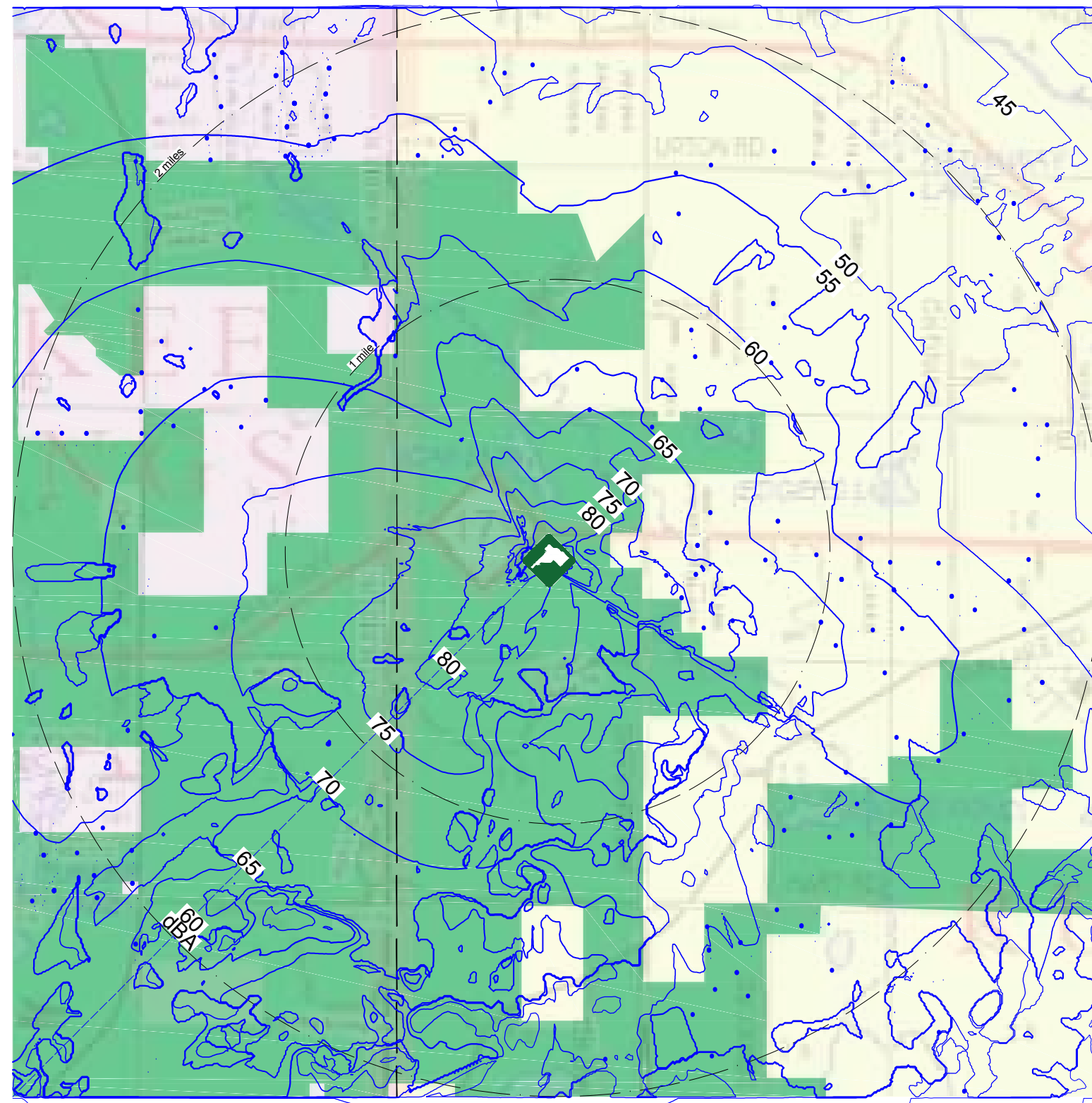
Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure G-7



**CHIEF NOONDAY**

Alternate Orientation

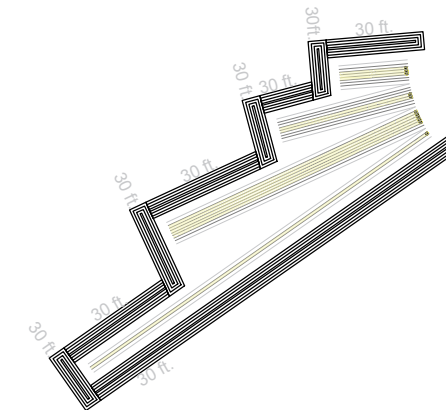
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. SW

30 ft. End Berms  
 30 ft. Side Berms

Wind: 1 to 11 mph downward

50°F and 70% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure G-8

**APPENDIX H: COMPUTER MODEL STUDY 3:  
Alternate Temperature and Relative Humidity Conditions  
Site 1 Alternate Range Orientation; Site 2 Base Range Orientation  
Typical Day Scenario  
20 ft. tall berms**

A series of experiments were conducted for the alternate range orientations on Sites 1 and 2 to study the effects of individual variables involved in the computer model studies under controlled conditions where only one of the variables was changed in each computer run. Computer model study 3 was conducted for alternate temperature and relative humidity conditions on Site 1: Barry State Game Area Existing Range Site with the direction of fire to the east with the typical day scenario and Site 2: Barry State Game Area Chief Noonday Site with the direction of fire to the south with the typical day scenario.

1. The “typical day” had 5 shooters firing a .223 caliber rifle on the 100 yard range; 1 shooter firing a .223 caliber rifle on the 150 yard range; 2 shooters firing a 12 gauge Remington shotgun on the 50 yard range; and 3 shooters firing a 0.40 caliber handgun on the 25 yard range within a 1 second time period.
2. Weather conditions were modeled as downwind with 1 to 11 mph wind as in computer model studies 1 and 2.
3. The 50°F and 70% relative humidity condition was used in the reference model.
4. Four other temperature and relative humidity combinations were run in this study:
  - A. 0°F and 50% R.H.
  - B. 32°F and 50% R.H.
  - C. 50°F and 50% R.H.
  - D. 70°F and 50% R.H.
5. The direction of fire was to the east for Site 1: Barry State Game Area Existing Range Site and to the south at Site 2: Barry State Game Area Chief Noonday Site.
6. The berm height of 20 ft. was used in each of the models.
7. The sound levels shown on the noise contour maps are LA eq in dBA.

The base air temperature in degrees Fahrenheit (F) and relative humidity (R.H.) in % for the iterations of the computer model experiments were selected as 50° F and 70% R.H. because experiment 3 demonstrated that other air temperatures and relative humidities representative of different seasons of the year resulted in lower linear pressure and dB points.

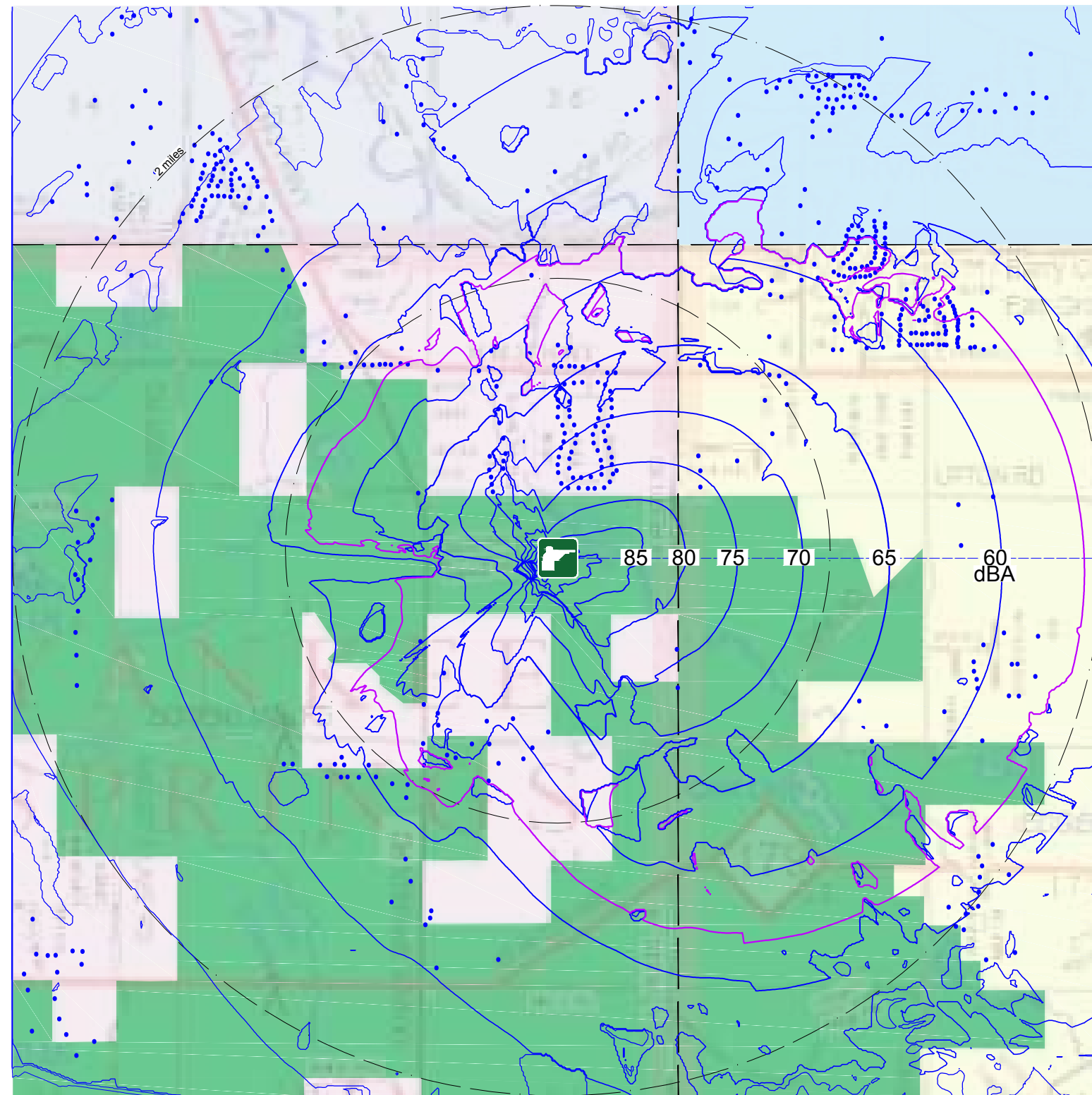
This means that the 50° F and 70% R.H. condition resulted in a worst case scenario for producing the greatest potential noise impacts at properties in the vicinity of the proposed range sites than the other conditions modeled.

The 0°F and 50% R.H. condition is representative of a winter day. The 32°F and 50% R.H. condition is representative of a late Fall or early spring day. The 50°F and 50% R.H. condition is representative of an early Fall or late Spring day. The 70°F and 50% R.H. condition is representative of a cool summer day.



**Table H-1. Summary table of rating points for each scenario tested in Experiment 3.**

| <b>TYPICAL DAY 11 SHOOTERS   20 FT BERM   TEMPERATURE AND RELATIVE HUMIDITY</b> |            |  |              |                  |           |            |
|---|------------|--|--------------|------------------|-----------|------------|
| <b>Site</b>   | <b>DOF</b> | <b>Temperature and Relative Humidity</b> |              | <b>Lin Press</b> | <b>dB</b> | <b>PTS</b> |
| SITE 2: Chief Noonday   | S          | 00F 50% RH                               | 20 FT. BERMS | 494              | 77        | 1472       |
| SITE 2: Chief Noonday   | S          | 70F 50% RH                               | 20 FT. BERMS | 606              | 78        | 1363       |
| SITE 2: Chief Noonday   | S          | 30F 50% RH                               | 20 FT. BERMS | 616              | 78        | 1360       |
| SITE 2: Chief Noonday   | S          | 50F 50% RH                               | 20 FT. BERMS | 3,057            | 85        | 1680       |
| SITE 2: Chief Noonday   Reference   | S          | 50F 70% RH                               | 20 FT. BERMS | 4,630            | 87        | 1785       |
| SITE 1: Barry SGA   | E          | 00F 50% RH                               | 20 FT. BERMS | 20,598           | 93        | 2355       |
| SITE 1: Barry SGA   | E          | 30F 50% RH                               | 20 FT. BERMS | 35,198           | 95        | 1912       |
| SITE 1: Barry SGA   | E          | 50F 50% RH                               | 20 FT. BERMS | 46,966           | 97        | 2236       |
| SITE 1: Barry SGA   | E          | 70F 50% RH                               | 20 FT. BERMS | 46,995           | 97        | 1996       |
| SITE 1: Barry SGA   Reference   | E          | 50F 70% RH                               | 20 FT. BERMS | 59,135           | 98        | 2140       |



**BARRY SGA**  
 Alternate Weather Conditions

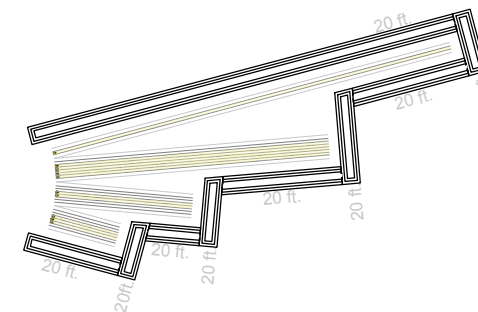
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. East

20 ft. End Berms  
 20 ft. Side Berms

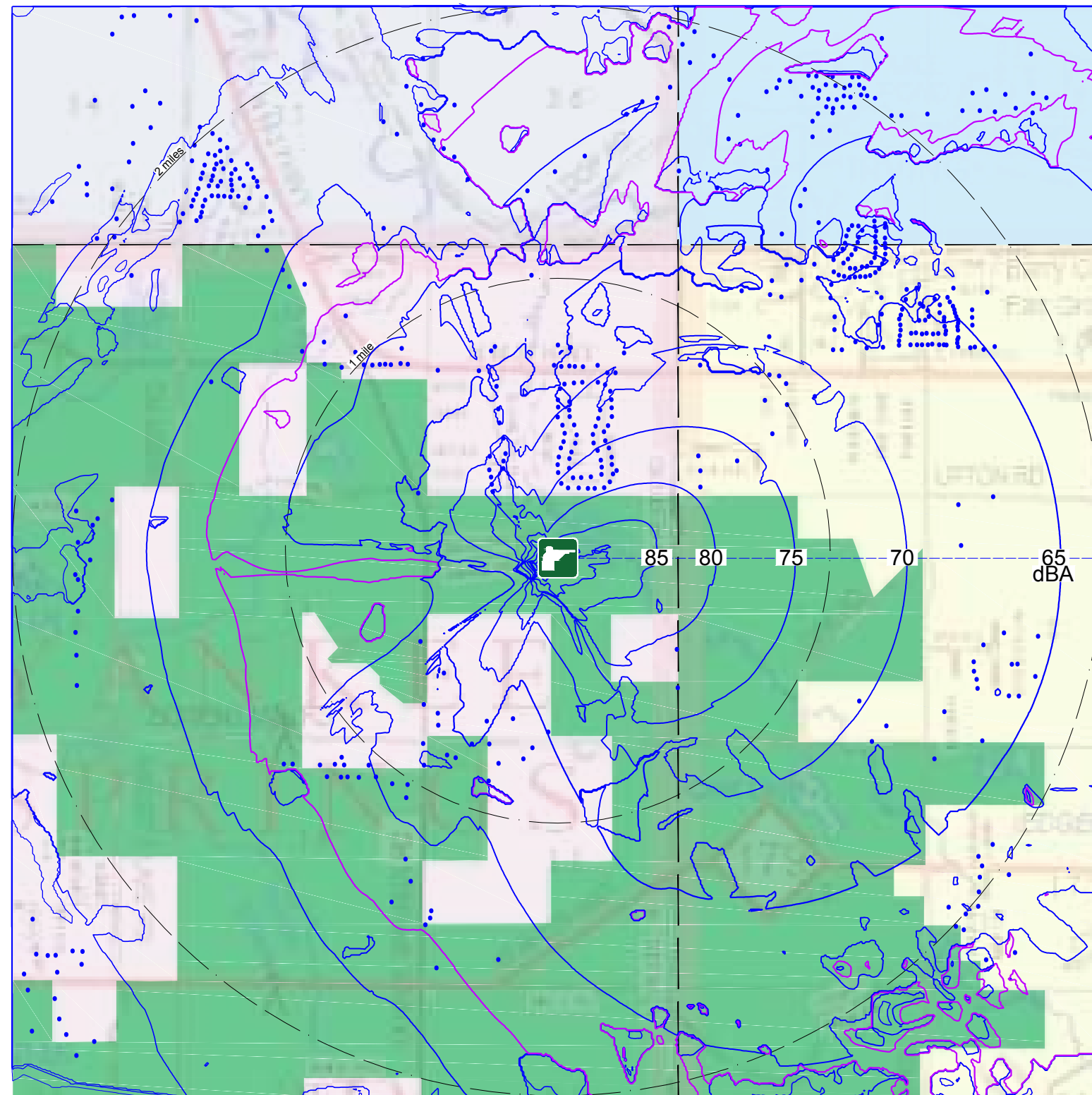
Wind: 1 to 11 mph downward

00°F and 50% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure H-1



**BARRY SGA**  
 Alternate Weather Conditions

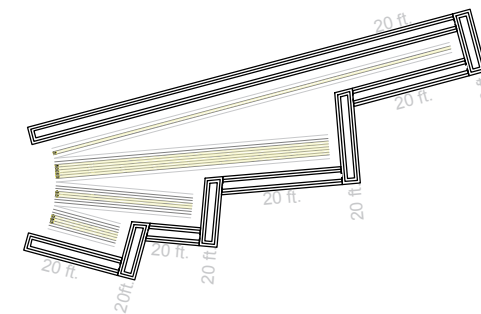
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. East

20 ft. End Berms  
 20 ft. Side Berms

Wind: 1 to 11 mph downward

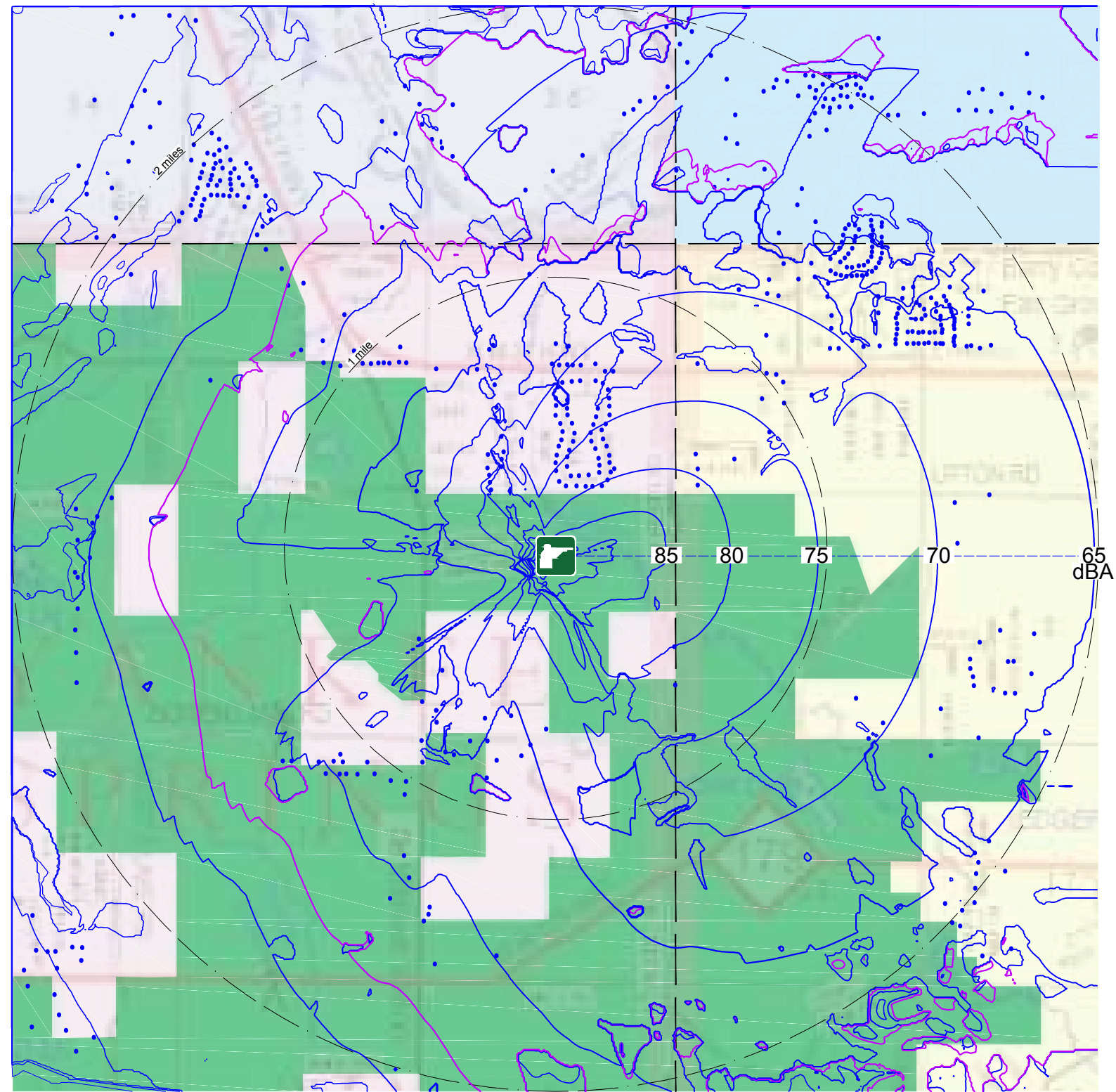
30°F and 50% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure H-2





**BARRY SGA**  
 Alternate Weather Conditions

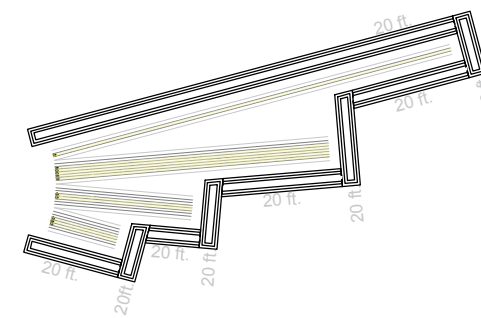
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. East

20 ft. End Berms  
 20 ft. Side Berms

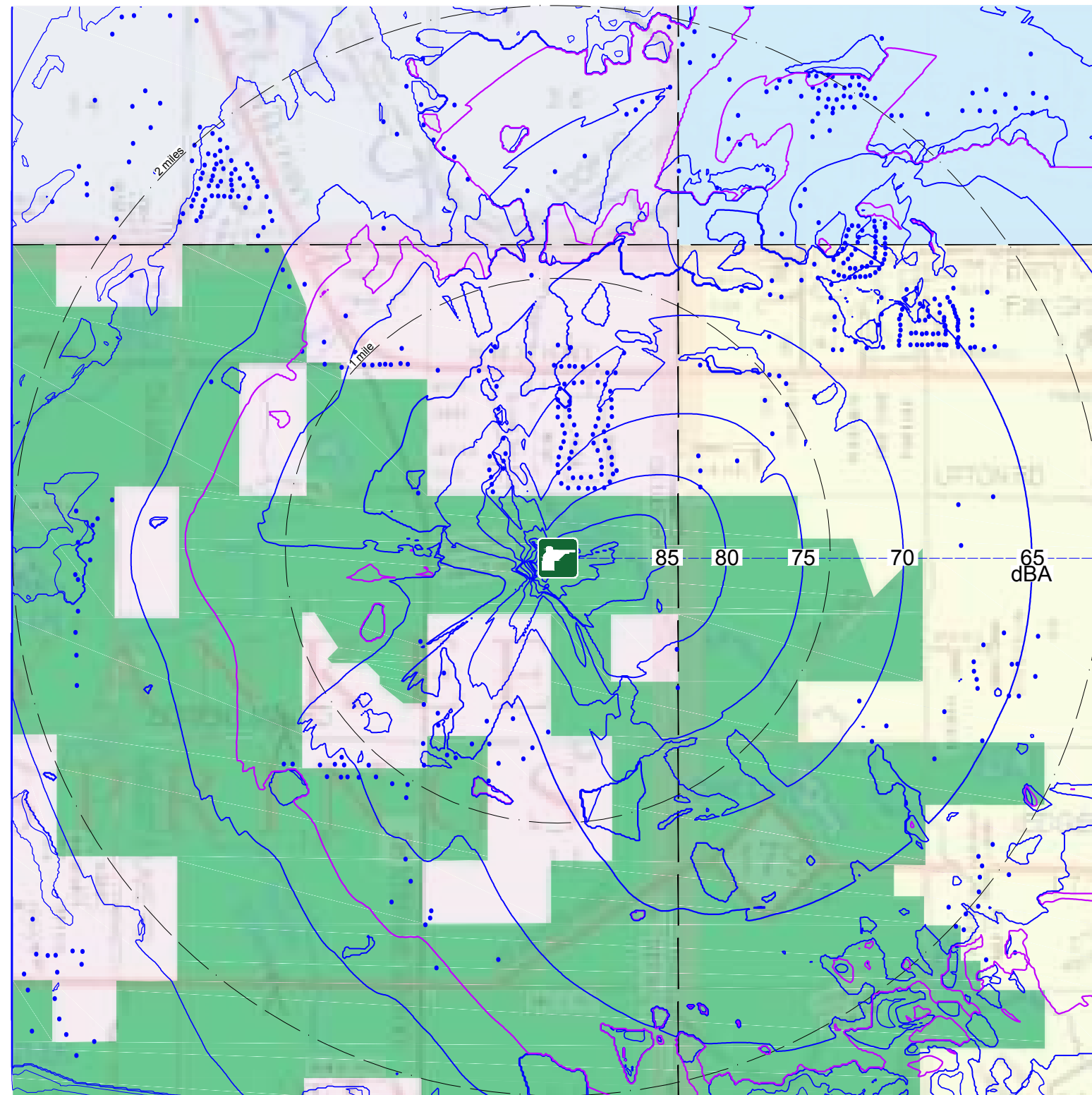
Wind: 1 to 11 mph downward

50°F and 50% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure H-3



Alternate Weather Conditions

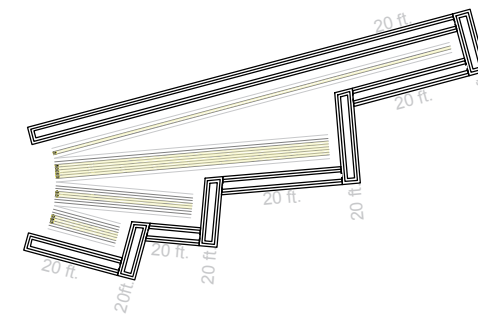
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. East

20 ft. End Berms  
 20 ft. Side Berms

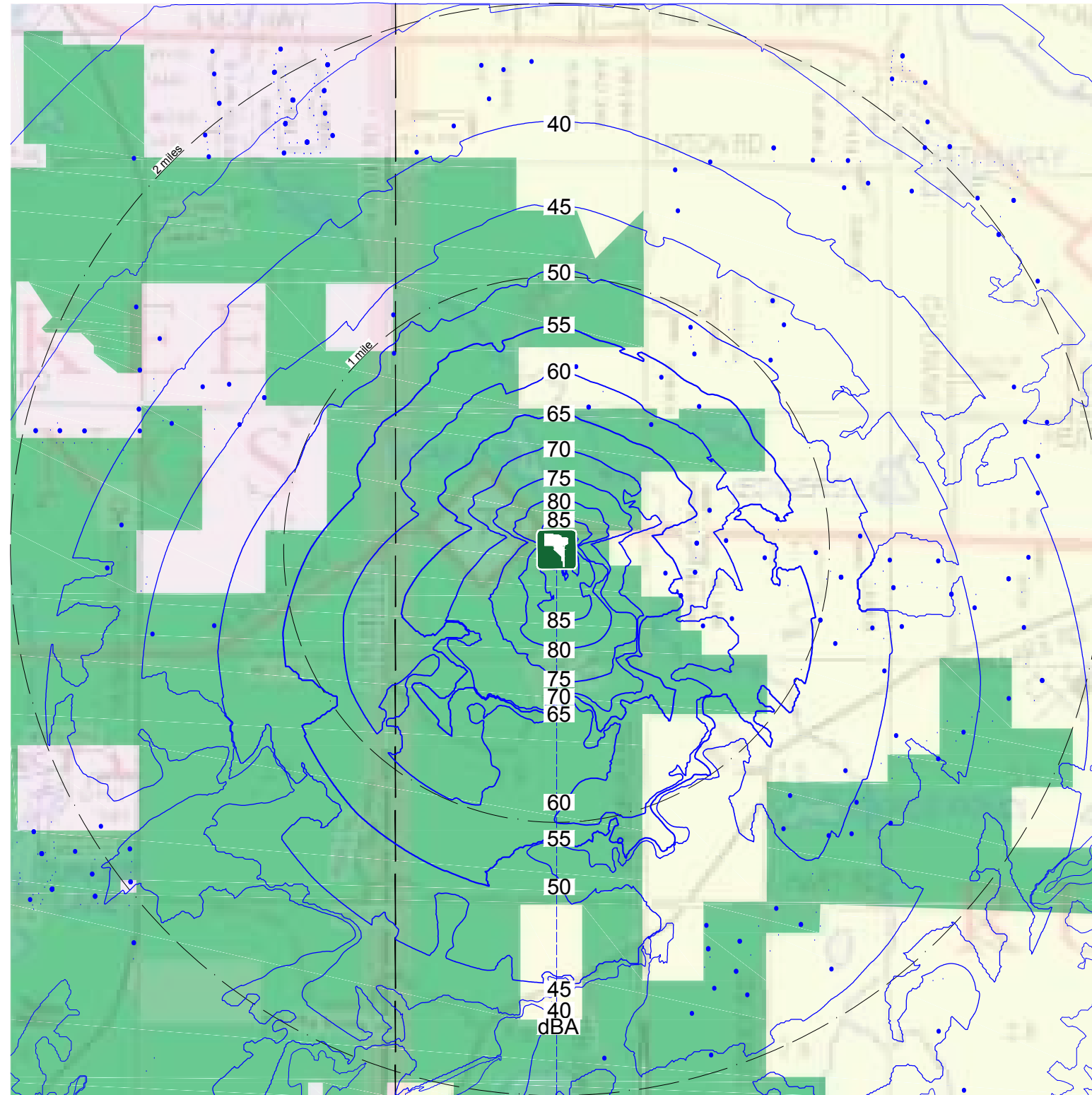
Wind: 1 to 11 mph downward

70°F and 50% R.H.



- STATE GAME AREA
  - THORNAPPLE TOWNSHIP  
No sound level limitations established
  - YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
  - IRVING TOWNSHIP  
Refer to Barry County Zoning Ordinance
  - RUTLAND TOWNSHIP  
No sound level limitations established
  - 57 dBA Residential Zones
  - 60 dBA Commercial
  - 65 dBA Industrial
- BARRY COUNTY ZONING ORDINANCE  
**Sound Level Limitations if site is zoned as Commercial**

Figure H-4



**CHIEF NOONDAY**  
 Alternate Weather Conditions

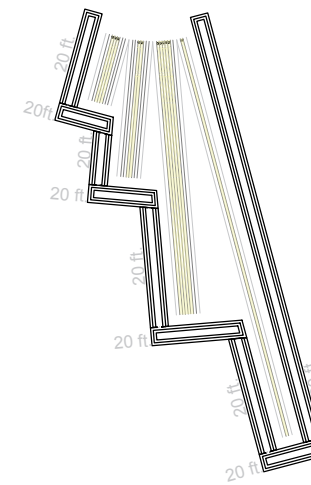
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. South

20 ft. End Berms  
 20 ft. Side Berms

Wind: 1 to 11 mph downward

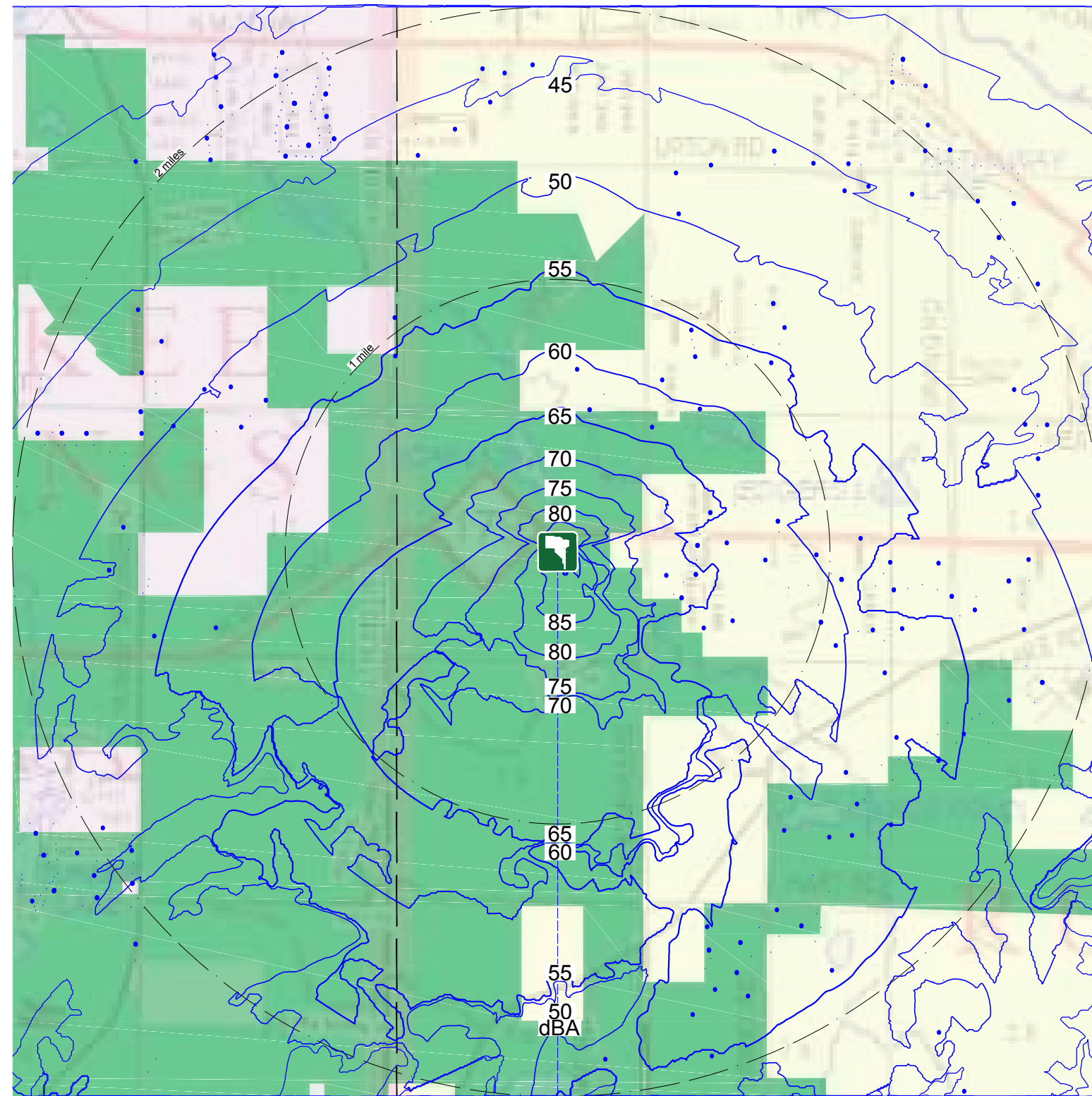
00°F and 50% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure H-5





**CHIEF NOONDAY**  
 Alternate Weather Conditions

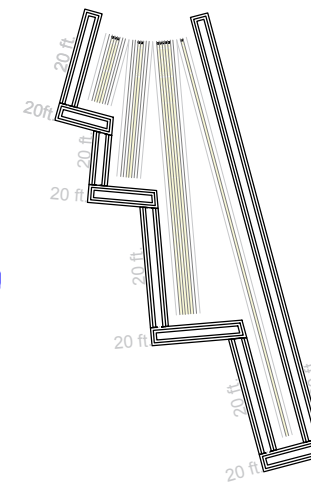
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. South

20 ft. End Berms  
 20 ft. Side Berms

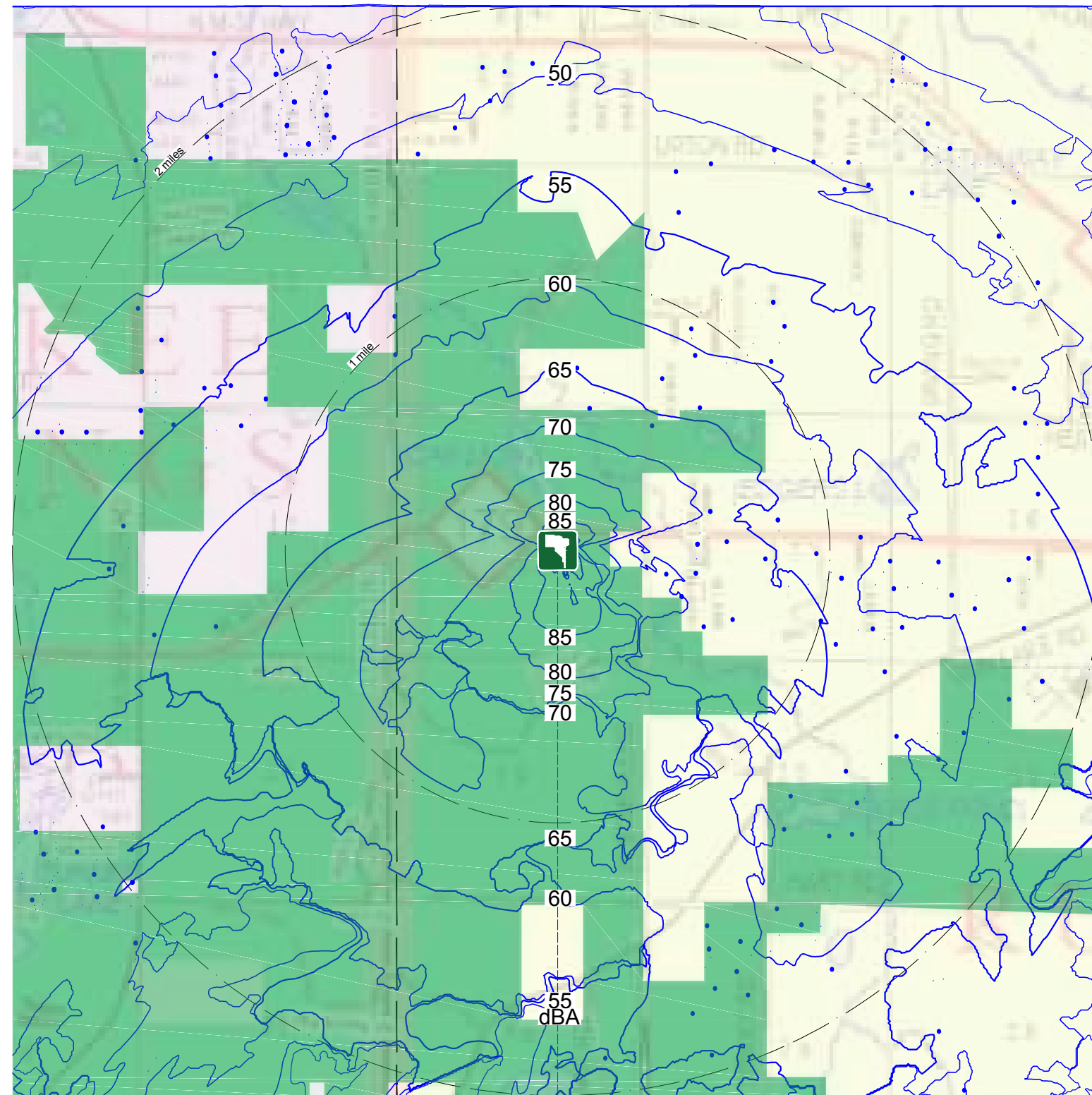
Wind: 1 to 11 mph downward

30°F and 50% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure H-6



**CHIEF NOONDAY**  
 Alternate Weather Conditions

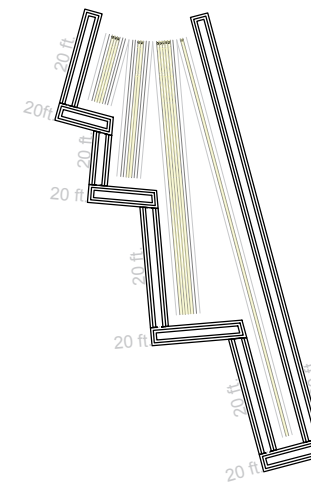
Shooters within 1 second:  
 6 Rifles  
 2 Shotguns  
 3 Handguns

D.O.F. South

20 ft. End Berms  
 20 ft. Side Berms

Wind: 1 to 11 mph downward

50°F and 50% R.H.



- STATE GAME AREA
- YANKEE SPRINGS TOWNSHIP  
No sound level limitations established
- RUTLAND TOWNSHIP  
No sound level limitations established

Figure H-7