FINAL SAFETY ANALYSIS REPORT

CHAPTER 2

SITE CHARACTERISTICS

2.0 SITE CHARACTERISTICS

{This Chapter of the U.S. EPR FSAR is incorporated by reference with the following departures and/or supplements.

Chapter 2 describes the geological, seismological, hydrological, and meteorological characteristics of the Calvert Cliffs Nuclear Power Plant (CCNPP) site and vicinity. The site characteristics are described in conjunction with present and projected population distribution, land use, and site activities and controls. The CCNPP site characteristics were developed in accordance with the relevant requirements of Title 10 CFR Part 20, Subpart D (CFR, 2007a); Title 10 CFR Part 50 (CFR, 2007b); Title 10 CFR Part 100 (CFR, 2007c); and Regulatory Guide 1.206 (NRC, 2007).}

GN-11-0054

The U.S. EPR FSAR includes the following COL Item in Section 2.0:

GN-11-0167

> A COL applicant that references the U.S. EPR design certification will compare the characteristics of its proposed site to the site parameters in Table 2.1-1. If the characteristics of the site fall within the assumed site parameters in Table 2.1-1, then the U.S. EPR standard design is bounding for the site. For site-specific characteristics that are outside the bounds of the assumptions presented in Table 2.1-1, the COL applicant will demonstrate that the U.S. EPR design acceptably meets the regulatory requirements, given the site specific characteristic. In such an instance, the COL applicant will also demonstrate that the design commitments and acceptance criteria described in the FSAR do not need to be changed, or will propose new design commitments or acceptance criteria, or both.

This COL Item is addressed as follows:

CC3-10-0266, CC3-11-0023

{The CCNPP Unit 3 site-specific characteristics have been reviewed and compared to determine if they are within the bounds of the assumed parameters for a U.S. EPR. This comparison is provided in Table 2.0-1. For the CCNPP Unit 3 site-specific characteristics that are outside the bounds of the conservative limiting assumptions presented in Table 2.0-1, justification of the acceptability of these conditions is provided in the associated section as specified in the table.}

Table 2.0-1 — {U.S. EPR Site Design Envelope Comparison}

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Item	U.S. EPR FSAR Design Parameter Value	CCNPP Unit 3 Site Characteristic Value
Precipitation		
CC3-11-0023 Rainfall rate	≤19.4 in/hr	18.5 in/hr (42 cm/hr) (See Section 2.4.3)
CC3-11-0168 Sum of normal winter precipitation event and extreme frozen winter precipitation event ground load.	≤143 psf (note e)	54.2 psf (264.6 kg/m^2)
Seismology		
CC3-13-0108 CC3-10-0266, CC3-11-0168 Horizontal SSE Acceleration	0.3g PGA for EUR and 0.21g PGA for HF (CSDRS shapes – See Section 3.7.)	0.115g GMRS, 0.15g Site SSE A site SSE has been established as the envelope of the U.S. EPR FSAR European Utility Requirements (EUR) Soft Soil Spectrum anchored at 0.15g and the FIRS for the NI common basemat structure. The Site SSE exceeds the CSDRS in the low frequency range. See note m for discussion of the SSE departure (See Sections 2.5.2 and 3.7)
CC3-13-0108 CC3-10-0266, CC3-11-0168 Vertical SSE Acceleration)	0.3g PGA for EUR and 0.18g PGA for HF (CSDRS shapes – See Section 3.7.)	0.115g GMRS, 0.15g Site SSE A site SSE has been established as the envelope of the U.S. EPR FSAR European Utility Requirements (EUR) Soft Soil Spectrum anchored at 0.15g and the FIRS for the NI common basemat structure. The Site SSE exceeds the CSDRS in the low frequency range See note m for discussion of the SSE departure (See Sections 2.5.2 and 3.7)
Fault Displacement Potential	No fault displacement is considered for safety-related SSCs in U.S. EPR design certification.	No fault displacement potential (See Section 2.5.3)

Table 2.0-1 — {U.S. EPR Site Design Envelope Comparison}

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Item	U.S. EPR FSAR Design Parameter Value	CCNPP Unit 3 Site Characteristic Value
	Soil	
Minimum Static Bearing Capacity	Maximum static bearing demand is 23,100 lbs/ft^2 at the bottom of the Seismic Category I structure basemats. The ultimate static bearing capacity divided by 3.0 is greater than or equal to the maximum static bearing demand.	Allowable static bearing capacity is 23,500 lbs/ft^2 at the bottom of the NI basemat with a factor of safety (FOS) of 3.0. Allowable static bearing capacity is 34,100 lbs/ft^2 at the bottom of the EPGB basemat with a factor of safety (FOS) of 3.0. Allowable static bearing capacity is 31,000 lbs/ft^2 at the bottom of the ESWB basemat with a factor of safety (FOS) of 3.0. (See Section 2.5.4, Table 2.5-67 for bearing capacities)
Minimum Dynamic Bearing Capacity	The maximum dynamic bearing demand (combination of safe shutdown earthquake and static loads) at the corner of any Seismic Category I Structure basemat is: 38,000 lbs/ft^2 (for soft soil) (note o) 48,000 lbs/ft^2 (for medium soil) (note o) 60,000 lbs/ft^2 (for hard soil) (note o) For a site with shear wave velocity between soft and medium soil conditions or between medium and hard soil conditions, the maximum dynamic bearing demand is the larger of the two values. For sites not meeting the soil property requirements, a site-specific analysis is required. The ultimate dynamic bearing capacity divided by 2.0 is greater than or equal to the maximum dynamic bearing demand.	CCNPP Unit 3 is a soft soil site Allowable dynamic bearing capacity is 35.2 ksf across the NI basemat with a factor of safety (FOS) of 2.0. See note n for discussion of the soil properties departure Maximum dynamic bearing capacity is 51,100 lbs/ft^2 across the EPGB basemat with a factor of safety (FOS) of 2.0. Maximum dynamic bearing capacity is 41,300 lbs/ft^2 across the ESWB basemat with a factor of safety (FOS) of 2.0. (See Section 2.5.4, Table 2.5-67)
Minimum Shear Wave Velocity (Low strain best estimate average value at bottom of basemat)	1000 fps	Shear wave velocity profile values for the structural fill material for the CCNPP Unit 3 Seismic Category I and II structures, and the FP Building and FP Tanks, are greater than or equal to 1,000 fps at depths of 41.5 ft or greater; greater than or equal to 1,000 fps at depths between 22 ft and 41.5 ft; greater than or equal to 840 fps at depths between 6 ft and 22 ft; and greater than or equal to 650 fps at depths less than 6 ft. See note h for departure information.
Liquefaction	None	None (See section 2.5.4)

Table 2.0-1 — {U.S. EPR Site Design Envelope Comparison}

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Item	U.S. EPR FSAR Design Parameter Value	CCNPP Unit 3 Site Characteristic Value
Slope Failure Potential	No slope failure potential is considered in the design of safety-related SSCs for U.S. EPR design certification.	No slope failure potential that would adversely affect the safety of the proposed CCNPP Unit 3 (See Section 2.5.5)
Maximum Settlement (across the basemat)		
1. Differential Settlement	Figure 3.8-124 through Figure 3.8-136	See section 3.8.5.5.1 for NI, Section 3.8.5.5.2 for the EPGB, and Section 3.8.5.5.3 for ESWB
2. Tilt Settlement	½ inch in 50 feet in any direction	Less than ½ inch in 50 feet in any direction of NI Common Basemat. See Section 2.5.4.10.2
Angle of Internal Friction (in situ and backfill)	26.6 degrees (minimum) 30 degrees (maximum)	The angle of internal friction of the backfill is 40 degrees The angle of internal friction of Chesapeake Cemented sand (L1) is 33.5 degrees See note n for discussion of the soil properties departure See section 2.5.4, Table 2.5-56
Soil Density (γ) (in situ and backfill)	110 lb/ft^3 ≤ γ ≤ 134 lb/ft^3	145 lb/ft^3 for backfill 120 lb/ft^3 for Chesapeake Cemented Sand See note n for discussion of the soil properties departure See section 2.5.4, Table 2.5-61
Maximum Ground Water Level	3.3 ft below grade	Approximately 30 feet below grade (See Section 2.4.12.5)
Minimum Coefficient of Static Friction for Category I Structures (representative of all interfaces between basemat and soil)	0.5 (note b)	0.47 beneath the NI common basemat structures 0.47 beneath the EPGB 0.47 beneath the ESWB See note n for discussion of the soil properties departure See section 3.8.5.5, Table 3.8-1
NAB Coefficients of Friction	0.5 ≤ u ≤ 0.7 (note b)	0.47 under the NAB See note n for discussion of the soil properties departure (See Section 3.8.5.5, Table 3.8-1)
EPGB Coefficient of Side Wall Friction	μ ≥ 0.36	μ = 0.47 (see Section 3.7.2.14.2)

Table 2.0-1 — {U.S. EPR Site Design Envelope Comparison}

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Item	U.S. EPR FSAR Design Parameter Value	CCNPP Unit 3 Site Characteristic Value
Inventory of Radionuclides Which Could Potentially Seep Into the Groundwater (Refer to Section 11.2)		
Flood Level		
Maximum Flood (or Tsunami)	1 ft below grade	Approximately 3 ft below grade, except for the Forebay and UHS Makeup Water Intake Structure which are designed to function under flood conditions (See Sections 2.4.1 and 2.4.2, 2.4.10, 3.4.2, 3.4.3.10, 3.8.4.1.11, 3.8.4.3, and 9.2.5)
Wind		
ASCE 7-05 Basic Wind Speed (3-second gust)	145 mph (Based on 3-sec gust at 33 ft above ground level and factored for 50-yr mean recurrence interval.)	95 mph (parameter referred to as Wind Gust in this FSAR) (Based on 3-sec gust at 33 ft above ground level and factored for 50-yr mean recurrence interval.) (See Section 2.3.1)
Importance Factor	1.15 (Safety-related structures for 100-year mean recurrence interval.)	1.15 (used to adjust the velocity pressure from a 50-year to 100-year mean recurrence interval for safety- and quality- related structures.) (See Section 2.3.1)
Tornado		
Maximum Pressure and Rate of Drop	1.2 psi at 0.5 psi/sec	0.9 psi at 0.4 psi/sec (See Section 2.3.1)
Maximum Rotational Speed	184 mph	160 mph (See Section 2.3.1)
Maximum Translational Speed	46 mph	40 mph (See Section 2.3.1)
Maximum Wind Speed	230 mph	200 mph (See Section 2.3.1)
Radius of Maximum Rotational Speed	150 ft	150 feet (See Section 2.3.1)

Table 2.0-1 — {U.S. EPR Site Design Envelope Comparison}

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Item	U.S. EPR FSAR Design Parameter Value			CCNPP Unit 3 Site Characteristic Value
Missile Spectra	6 in Schedule 40 pipe, 6.625 in diameter x 15 ft long, 287 lb, 34.5 in^2 impact area, impact velocity of 135 ft/sec horizontal and 90 ft/sec vertical.			Design values are enveloped (See Section 2.2 and 3.5)
	Automobile, 16.4 ft x 6.6 ft x 4.3 ft, 4000 lb, 4086.7 in^2 impact area, impact velocity of 135 ft/sec horizontal & 90 ft/sec vertical. (Automobile missile is considered at elevations up to 30.0 ft above grade elevation.)			Design values are enveloped (See Section 2.2 and 3.5)
	Solid steel sphere, 1 in diameter, 0.147 lb, 0.79 in^2 impact area, impact velocity of 26 ft/sec horizontal & 17 ft/sec vertical.			Design values are enveloped (See Section 2.2 and 3.5)
Hurricane				
Maximum Wind Speed	230 mph			200 mph (See Section 2.3.1)
Missile Spectra	6 in Schedule 40 pipe, 6.625 in diameter x 15 ft long, 287 lb, 34.5 in^2 impact area, impact velocity of 176 ft/sec horizontal and 85 ft/sec vertical.			Design values are enveloped (See Section 2.2 and 3.5)
	Automobile, 16.4 ft x 6.6 ft x 4.3 ft, 4000 lb, 4086.7 in^2 impact area, impact velocity of 222 ft/sec horizontal & 85 ft/sec vertical. (Automobile missile is considered at elevations up to 30.0 ft above grade elevation.)			Design values are enveloped (See Section 2.2 and 3.5)
	Solid steel sphere, 1 in diameter, 0.147 lb, 0.79 in^2 impact area, impact velocity of 155 ft/sec horizontal & 85 ft/sec vertical.			Design values are enveloped (See Section 2.2 and 3.5)
Temperature				
Air	0% Exceedance Values (note j)	Maximum	115°F Dry Bulb / 80°F Wet Bulb mean (coincident)	102°F Dry Bulb /80°F Wet Bulb (coincident) (See Section 9.2.5.3.3) (note a)
		Minimum	-40°F	0°F (See Section 2.3.1)
	1% Exceedance Values (seasonal basis) (note k)	Maximum	100°F Dry Bulb / 77°F Wet Bulb mean (coincident)	93°F dry bulb/ 76.8°F wet bulb (coincident)
			80°F Wet Bulb (non-coincident)	80°F wet bulb (non-coincident)
		Minimum	-10°F	14°F

Table 2.0-1 — {U.S. EPR Site Design Envelope Comparison}

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Item	U.S. EPR FSAR Design Parameter Value	CCNPP Unit 3 Site Characteristic Value
Atmospheric Dispersion and Deposition Factors (χ/Q)(D/Q)		
Maximum Annual Average (limiting sector)	≤ 4.973E-6 sec/m^3 (χ/Q) ≤ 5.0E-08 m^{-2}(D/Q)	5.039E-06 sec/m^3 (note c) (See Section 2.3.5)
Accident		
0-2 hr (EAB)	≤1E-3 sec/m^3	6.914E-04 sec/m^3 (See Section 2.3.4)
0-2 hr (LPZ)	≤1.75E-4 sec/m^3	2.151E-04 sec/m3 (note d) (See Section 2.3.4)
2-8 hr (LPZ)	≤1.35E-4 sec/m^3	1.176E-04 sec/m^3 (See Section 2.3.4)
8-24 hr (LPZ)	≤1.00E-4 sec/m^3	6.865E-05 sec/m^3 (See Section 2.3.4)
1-4 day (LPZ)	≤ 5.40E-5 sec/m^3	3.005E-05 sec/m^3 (See Section 2.3.4)
4-30 day (LPZ)	≤ 2.20E-5 sec/m^3	9.179E-06 sec/m^3 (See Section 2.3.4)

Main Control Room and Technical Support Center Intake Atmospheric Dispersion Factors for Onsite Accident Dose Analysis (χ/Q)[f, g]

Time Period	Vent Stack Base	Releases via Safeguard Building Canopy	Equipment Hatch Releases via Material Lock (note i)		Main Steam Relief Train Silencer
0-2 hours (s/m^3)	1.93E-03 / 1.81E-03	6.52E-03 / 5.88E-03			4.30E-03 / 3.90E-03
2-8 hours (s/m^3)	1.73E-03 / 1.55E-03	5.68E-03 / 4.99E-03			3.71E-03 / 3.41E-03
8-24 hours (s/m^3)	6.74E-04 / 5.60E-04	2.34E-03 / 1.95E-03			1.46E-03 / 1.23E-03
1-4 days (s/m^3)	5.12E-04 / 4.95E-04	1.63E-03 / 1.60E-03			1.12E-03 / 1.07E-03
4-30 days (s/m^3)	4.72E-04 / 3.87E-04	1.50E-03 / 1.23E-03			1.03E-03 / 8.39E-04

Table 2.0-1 — {U.S. EPR Site Design Envelope Comparison}

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CC3-10-0266, CC3-13-0108

Item	U.S. EPR FSAR Design Parameter Value			CCNPP Unit 3 Site Characteristic Value	
Main Control Room and Technical Support Center Unfiltered Inleakage Atmostpheric Dispersion Factors for Onsite Accident Dose Analysis (χ/Q)[f, g]					
CC3-14-0058 **Time Period**	**Vent Stack Base**	**Releases via Safeguard Building Canopy**	**Equipment Hatch Releases via Material Lock (note i)**		**Main Steam Relief Train Silencer**
CC3-11-0168, CC3-14-0058 0-2 hours (s/m^3)	4.30E-03 / 4.30E-03	1.67E-02 / 1.67E-02			1.76E-02 / 1.76E-02
2-8 hours (s/m^3)	3.71E-03 / 3.71E-03	1.47E-02 / 1.47E-02			1.48E-02 / 1.48E-02
8-24 hours (s/m^3)	1.46E-03 / 1.46E-03	5.96E-03 / 5.96E-03			5.88E-03 / 5.88E-03
1-4 days (s/m^3)	1.12E-03 / 1.12E-03	4.28E-03 / 4.28E-03			4.55E-03 / 4.55E-03
4-30 days (s/m^3)	1.03E-03 / 1.03E-03	3.89E-03 / 3.89E-03			4.16E-03 / 4.16E-03

Table 2.0-1 — {U.S. EPR Site Design Envelope Comparison}

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CC3-10-0266, CC3-13-0108

Item	U.S. EPR FSAR Design Parameter Value	CCNPP Unit 3 Site Characteristic Value

Notes:

CC3-12-0039, CC3-13-0136 a. FSAR Section 9.2.5.3.3 describes that the cooling tower plume interference and recirculation was calculated to be an increase of less than 2.4°F wet-bulb for the UHS tower and less than approximately 2.2°F wet-bulb interference increase for the safety related HVAC intakes.

CC3-11-0023, CC3-12-0217 b. The U.S. EPR FSAR equates a minimum friction angle of 26.6 degrees with a friction coefficient greater than or equal to 0.5 (see U.S. EPR FSAR Tier 2 Section 2.5.4.2).

c. Value is a departure from a design parameter and is listed in Part 7 of the COL Application. Justification is provided in Section 2.3.5.

d. Value is a departure listed in Part 7 of the COL Application. Justification is provided in Chapter 15.

CC3-11-0168 e. The effect of the extreme liquid winter precipitation event on roof loads is negligible due to the lack of parapets.

CC3-11-0023 f. First value is U.S. EPR Design Parameter/Second value is CCNPP3 Site Specific Characteristic value.

g. The same meteorological data are used to calculate unfiltered χ/Q values. Since the site-specific control room χ/Q values were demonstrated to be bounded by the U.S. EPR χ/Q values, the calculation of the site-specific atmosphere dispersion factors for unfiltered inleakage was not necessary. CCNPP Unit 3 incorporates by reference the doses for the main control room presented in the U.S. EPR FSAR.

h. Since some of these values are less than 1,000 fps, this constitutes a departure from a design parameter and is listed in Part 7 of the COL Application. Justification is provided by the analysis in Section 3.7

CC3-11-0168, CC3-14-0058 i. The atmospheric dispersion parameters for the equipment hatch are bounded by the parameters for the release via the Safeguards Building canopy.

CC3-11-0023 j. By definition, zero percent exceedence temperature values exclude peaks of temperatures less that two hours in duration. The zero percent exceedence temperature values are based on conservative estimates of 100-year return period values and historic extreme values, whichever is bounding.

CC3-11-0023 k. For maximum values, data from the summer months of June, July, and August are used. For minimum values, data from the winter months of December, January, and February are used.

CC3-11-0023 l. COL applicant to determine wet bulb temperature correction factor to account for potential interference and recirculation effects. (Refer to COL Item 2.0-1 in Table 1.8-2 - FSAR Sections that Address COL Items).

CC3-13-0108 m. The Site SSE exceeds the CSDRS at low frequencies. This departure is discussed in Section 2.5.2.6 and Part 7 of the COLA application.

n. Several site specific soil properties do not meet established design parameters. This departure is discussed in Section 2.5.2.6 and Part 7 of the COLA application.

CC3-14-0004 o. The shear wave velocities (strain compatible best estimate average values directly beneath the foundation basemat) of soft, medium, and hard soils are 1000 ft/sec, 1640 ft/sec, and greater than or equal to 6601 ft/sec, respectively.

2.1 GEOGRAPHY AND DEMOGRAPHY

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

The U.S. EPR FSAR includes the following COL Item in Section 2.1:

> A COL applicant that references the U.S. EPR design certification will provide site-specific information related to site location and description, exclusion area authority and control, and population distribution. This COL Item is addressed as follows:

{Site specific information related to site location and description is addressed in Section 2.1.1. Exclusion area authority and control is addressed in Section 2.1.2, and population distribution is addressed in Section 2.1.3.}

2.1.1 Site Location and Description

{Sections 2.1.1.1 through 2.1.1.3 are added as a supplement to the U. S. EPR FSAR.

2.1.1.1 Specification of Location

A site area map for the CCNPP site is provided in Figure 2.1-1. The coordinates of the center of the containment building for CCNPP Unit 3 are provided in Table 2.1-1 for both the Geodetic Latitude/Longitude and the Universal Transverse Mercator (UTM) coordinate systems.

CCNPP site and the surrounding area within 50 mi (80 km) and 10 mi (16 km), respectively. The CCNPP site occupies 2070 acres (838 hectares) of which CCNPP Unit 3 will occupy approximately 460 acres (186 hectares) of the site. With the exception of CCNPP Units 1 and 2, no commercial, industrial, institutional, recreational, or residential structures are located within the CCNPP site. Camp Conoy, a former recreational summer camp used for various recreational purposes is now abandoned, with no plans for re-establishment.

The CCNPP site is located within Calvert County, Maryland. Calvert County is a peninsula bounded by the Chesapeake Bay on the east and the Patuxent River on the west. The CCNPP site is in the southeastern sector of Calvert County on the west bank of the Chesapeake Bay. The prominent natural features of the CCNPP site region include the Chesapeake Bay, the Patuxent River, and a generally wooded countryside. From the Chesapeake Bay, the wooded shoreline features 100 ft (30 m) cliffs with widely spaced small housing developments and marinas. The distance across the Chesapeake Bay in the vicinity of CCNPP site is approximately 6 mi (10 km). Located approximately 3 mi (5 km) offshore from the CCNPP site is a major shipping channel to the Port of Baltimore.

Calvert County includes two incorporated towns, North Beach and Chesapeake Beach, and seven town centers, Dunkirk, Owings, Huntingtown, Prince Frederick, St. Leonard, Lusby, and Solomons. St. Leonard, Lusby, and Solomons are located within 10 mi (16 km) of the CCNPP site. The county seat, Prince Frederick, Maryland, is approximately 10.5 mi (17 km) northwest of the site. Additional communities located near the CCNPP site include: Calvert Beach and Long Beach, approximately 3 mi (5 km) to the northwest; Cove Point, approximately 4.5 mi (7 km) to the southeast; and Chesapeake Ranch Estates, approximately 6 mi (10 km) to the south.

Calvert County has one main four-lane road, Maryland State Highway MD 2/4, bisecting the county north to south with smaller roads running from the main road to the water on each side. Very few of the smaller roads off MD 2/4 connect with each other; therefore, this highway services the bulk of the traffic for the length of the county. MD 2/4 runs adjacent to the CCNPP

site and provides the main access to the site. Access to the site is via Calvert Cliffs Parkway and Road B from MD 2/4.

As described in section 2.2.2.6, there are no railroads within 5 miles (8 km) of the CCNPP site.

The Patuxent River Naval Air Station, a military installation, is location approximately 10 mi (16 km) to the south of the CCNPP site. The Dominion Cove Point Liquefied Natural Gas terminal, the only major industry other than CCNPP Units 1 and 2, is located about 3.6 mi (5.8 km) south of the CCNPP site. These facilities are depicted on Figure 2.1-3.

The metropolitan centers closest to the CCNPP site are Annapolis, MD, approximately 35 mi (56 km) to the north; Washington, D.C., approximately 45 mi (72 km) to the northwest; Baltimore, MD, approximately 60 mi (97 km) to the north; Richmond, VA, approximately 80 mi (129 km) to the southwest; and Norfolk, VA, approximately 110 mi (177 km) to the south.

2.1.1.2 Site Area Map

A site area map for the CCNPP site is provided in Figure 2.1-1. This map shows the following attributes:

- Plant property (site boundary) lines. The area of the plant property is 2070 acres (838 hectares).
- Exclusion Area Boundary (EAB). Figure 2.1-4 provides an enlarged site area map that provides a scaled plot plan of the exclusion area in 22 ½ degree segments centered on the 16 cardinal compass points.
- Location and orientation of principal plant structures within the site area. Figure 2.1-5 shows an enlarged view of CCNPP Unit 3.
- Location of CCNPP Units 1 and 2 which are the only other commercial structures within the site. There are no industrial, military, transportation facilities, institutional, recreational, or residential areas on the CCNPP site.
- True North and Plant North.
- Highways, railways, and waterways that traverse or are adjacent to the site.
- Prominent natural and man-made features in the site area.

2.1.1.3 Boundary for Establishing Effluent Release Limits

The exclusion area is considered the restricted area. The exclusion area boundary (EAB) for CCNPP Unit 3 is a circle with a radius of 3,324 ft (1,013 m) or approximately 0.6 mi (1.0 km) as depicted on Figure 2.1-1. The EAB establishes a radius of at least 0.5 mi (0.8 km) from the potential release points. In accordance with 10 CFR 50.34(a)(1)(ii)(D)(1), an individual assumed to be located at any point on the EAB will not receive a radiation dose in excess of 25 rem TEDE over any two hour period following a postulated fission product release into the containment (CFR, 2007b). The EAB is established in accordance with 10 CFR 100.21(a) and 10 CFR 100.3 (CFR, 2007c).

GN-10-0029 This area will be conspicuously posted and administrative procedures, including security patrols will be imposed to control access to the area. Section 2.1.2.1 provides additional discussion regarding the control of access to the EAB.

2.1.2 Exclusion Area Authority and Control

Sections 2.1.2.1 through 2.1.2.4 are added as a supplement to the U. S. EPR FSAR.

2.1.2.1 Authority

CC3-11-0038 The CCNPP site was originally comprised of a number of parcels which were recombined and subdivided into a north parcel and a south parcel. The owner of the north parcel, which includes the CCNPP Units 1 and 2, is Calvert Cliffs Nuclear Power Plant, LLC (a Constellation Energy Nuclear Group, LLC company). The owners of the south parcel, which includes CCNPP Unit 3, are Calvert Cliffs 3 Nuclear Project, LLC, and other UniStar Nuclear Energy, LLC subsidiaries. This division is shown on Figure 2.1-6. Calvert Cliffs 3 Nuclear Project, LLC, UniStar Nuclear Energy, LLC subsidiaries, and Calvert Cliffs Nuclear Power Plant, LLC, for their respective parceled areas within the CCNPP Unit 3 EAB, own the land, including mineral rights. These areas exclude the portion that extends into the Chesapeake Bay. Calvert Cliffs 3 Nuclear Project, LLC, UniStar Nuclear Energy, LLC, and Calvert Cliffs Nuclear Power Plant, LLC, for their respective parceled areas within the CCNPP Unit 3 EAB, possess the authority to determine all activities including the exclusion and removal of personnel and property. Calvert Cliffs 3 Nuclear Project, LLC, UniStar Nuclear Energy, LLC, and Calvert Cliffs Nuclear Power Plant, LLC, for their respective parceled areas within the CCNPP Unit 3 EAB, will exercise dominion and control in the event of an emergency to afford protection of public health and safety. Control of access to the CCNPP Unit 3 EAB within the CCNPP site boundary is provided by posting the boundary and performing security patrols.

Access to the portion of the CCNPP Unit 3 EAB that extends into the Chesapeake Bay will be controlled through the use of buoys with postings that define the restrictions for the area. The United States Coast Guard (USCG) installs and maintains these buoys for the CCNPP site. The access restrictions for the portion of the CCNPP Unit 3 EAB that extends into the Chesapeake Bay are enforced by the USCG and the Maryland Department of Natural Resources police.

2.1.2.2 Control of Activities Unrelated to Plant Operations

CC3-10-0010 No activities unrelated to plant operation are planned within the CCNPP Unit 3 EAB. No person or entity can reside, build, or conduct other activities without approval from Calvert Cliffs 3 Nuclear Project, LLC, UniStar Nuclear Operating Services, LLC, and Calvert Cliffs Nuclear Power Plant, LLC for their respective parceled areas within the CCNPP Unit 3 EAB. However, in the event that an activity unrelated to plant operation is conducted within the CCNPP Unit 3 EAB, plant security will be notified prior to commencement of the activity to ensure that all individuals engaged in the activity may be evacuated in the event of an emergency.

2.1.2.3 Arrangements for Traffic Control

No state or county roads or railways traverse the CCNPP Unit 3 EAB. The waters of the Chesapeake Bay are the only public thoroughfare that traverses the EAB. The USCG and the Maryland Department of Natural Resources police enforce the access restrictions for the portion of the CCNPP Unit 3 EAB that extends into the Chesapeake Bay. The major shipping lane of the Chesapeake Bay lies outside of the CCNPP Unit 3 EAB.

2.1.2.4 Abandonment or Relocation of Roads

There are no public roads traversing the CCNPP Unit 3 EAB that will have to be abandoned or relocated because of their location.

2.1.3 Population Distribution

The population surrounding the site, up to a 50 mi (80 km) radius, was estimated based on the most recent U.S. Census Bureau decennial census data (USCB, 2000a). The population distribution was estimated in 10 concentric bands at 0 to 1 mi (0 to 1.6 km), 1 to 2 mi (1.6 to 3.2 km), 2 to 3 mi (3.2 to 4.8 km), 3 to 4 mi (4.8 to 6.4 km), 4 to 5 mi (6.4 to 8.0 km), 5 to 10 mi (8.0 to 16 km), 10 to 20 mi (16 to 32 km), 20 to 30 mi (32 to 48 km), 30 to 40 mi (48 to 64 km), and 40 to 50 mi (64 to 80 km) from the site, and 16 directional sectors, each direction consisting of 22 ½ degrees. The populations for years 2010 through 2060 by decade have been projected by calculating a growth rate using state population projections (by county) as the base.

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In addition, the same population information was generated for the year of initial plant operation, and the end of plant life. This information is used for comparison against NRC population density criteria. The COLA has been developed with an assumed commercial operation date in 2015. This estimated date is provided for illustrative purposes only. The exact construction and startup schedules have yet to be finalized, and many potential scenarios are under evaluation. UniStar will provide construction and starup schedules after issuance of the COL once UniStar has made a final decision on the details of the construction of the plant. The license would expire 40 years after initial operation and, for the purposes of this evaluation, the year 2055 is the end of plant operations. These populations are included with the decade populations that follow and are addressed in detail in Section 2.1.3.6.

Sections 2.1.3.1 through 2.1.3.6 are added as a supplement to the U. S. EPR FSAR.

2.1.3.1 Population Within 10 mi (16 km)

Figure 2.1-7 shows places of significant population grouping, such as cities and towns, and other features within 10 mi (16 km) of the site. The map includes concentric circles drawn with the existing CCNPP Units 1 and 2 at the center point, at distances of 1, 2, 3, 4, 5, and 10 mi (1.6, 3.2, 4.8, 6.4, 8.0, and 16 km). The map is divided into 22 ½ degree segments with each segment centered on one of the 16 compass points. According to the 2000 census, Chesapeake Ranch Estates, with a population of 11,503, is the largest community within 10 mi (16 km) of the site. Other towns within the 10 mi (16 km) radius include California (population of 9,307), Calvert Beach - Long Beach (population of 2,487), Lusby (population of 1,666), and Prince Frederick (population of 1,432) (USCB, 2000a). Calvert Beach – Long Beach, Lusby and portions of Chesapeake Ranch Estates lie within 5 mi (8 km) of the CCNPP site.

The resident population distribution within 10 mi (16 km) of the CCNPP site was computed by overlaying the 2000 census block points data (the smallest unit of census data) on the grid shown on Figure 2.1-8, and summing the population of the census block points within each sector. SECPOP 2000, a code developed for the NRC by Sandia National Laboratories, was utilized to calculate the resident population by emergency planning zone sectors (NRC, 2003). SECPOP uses 2000 block data from the USCB and overlays it into the sectors in the annuli prescribed by the user. The population projections for each county within 50 mi (80 km) of the CCNPP site were obtained from the Delaware Economic Development Office (DEDO, 2000), the Maryland Department of Planning (MDP, 2005), the USCB (USCB, 2005), and the Virginia Employment Commission (VEC 2006) and used to calculate an exponential growth rate for each county within the 50 mi (80 km) radius and Washington D.C. Each county growth rate was then

used to project future populations (within each sector, taking into account the percent of each sector in a particular county).

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The population distributions (including transient population) and related information were tabulated for all distances and in all sixteen directions. Figure 2.1-8 through Figure 2.1-14 show the cumulative population (i.e., resident plus transient population) for the year 2000, and projected populations (by decade) through the year 2060. Tables on each map are keyed to the detailed populations within each radius interval-sector segment. The tables show ring population (one radius interval summed through all sectors) and cumulative population (population within each radius). See Section 2.1.3.6 and Figure 2.1-24 and Figure 2.1-25 for similar maps for the year of initial operation and the year of plant shutdown. Each figure also shows totals by direction and by radius. For sectors with no land (and therefore no population), a population number is not shown. Since little information is available on future growth rates for transient populations, the anticipated growth rate for resident populations was also used for transient populations. The SECPOP 2000 results (with transient population added) were used to produce the 10 mi (16 km) radius population for the year 2000 and the population projections described above were used in development of population estimates for 2010 through 2060 (by decade) the year of initial operation for CCNPP Unit 3 (2015, projected), and the year of plant shutdown (2055). It is required that projected changes in population growth "within about 5 years" after initial site approval be evaluated. Initial site approval would occur in the 2010 to 2011 time frame. Plant construction is estimated to begin in 2011. Therefore, the 2010 decade population and the 2015 population for initial operation are suitable for this evaluation. The detail provided in Figure 2.1-8 through Figure 2.1-14 is summarized in Table 2.1-2. The COLA has been developed with an assumed commercial operation date in 2015. This estimated date is provided for illustrative purposes only. The exact construction and startup schedules have yet to be finalized, and many potential scenarios are under evaluation. UniStar will provide construction and startup schedules after issuance of the COL once UniStar has made a final decision on the details of the construction of the plant.

2.1.3.2 Population Between 10 and 50 mi (16 and 80 km)

The 50 mi (80 km) radius centered at the CCNPP site includes all or parts of 2 counties in Delaware, 14 counties in Maryland, 16 counties in Virginia, and the District of Columbia as detailed in Figure 2.1-15. Figure 2.1-16 identifies places of significant population grouping, such as cities and towns, and include concentric circles drawn with the existing CCNPP Units 1 and 2 at the center point at 10 mi (16 km) increments (between 10 and 50 mi (16 and 80 km)). The map is divided into 22 ½ degree segments with each segment centered on one of the 16 compass points. Estimates of the year 2000 resident population between 10 and 50 mi (16 and 80 km) from the site were computed using the same methodology used to develop the 10 mi (16 km) population distribution.

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The population grid from 10 to 50 mi (16 to 80 km) is shown on Figure 2.1-16. Transient population was not quantitatively determined for the 10 to 50 mi (16 to 80 km) radii as discussed in Section 2.1.3.3.2. The 50 mi (80 km) population distributions for the years 2000 through 2060 (by decade) and the estimated years of initial operation and plant shutdown for CCNPP Unit 3 are shown on Figure 2.1-16 through Figure 2.1-22. Totals populations for each year, including the estimated years of initial operation and plant shutdown are summarized in Table 2.1-3.

2.1.3.3 Transient Population

2.1.3.3.1 Transient Population Within 10 Mi (16 km)

Major land uses surrounding the CCNPP site include residential and agricultural. The waters in the vicinity of the CCNPP site are used for commercial fishing, especially for shellfish such as clams, oysters, and crabs, and offer a popular summer boating retreat.

Recreational use is considered the primary contributor to the transient population in the area. Several parks and museums lie within the 10 mi (16 km) radius. Nineteen marinas lie within 10 mi (16 km) radius.

Table 2.1-4, Table 2.1-5, and Table 2.1-6 list major employers, major recreational areas and attractions, and marinas, respectively, in the 10 mi (16 km) radius (CCNPP, 2002). The tables include the distance and direction from the CCNPP site. Seasonal and daily variations in transient population result from these land uses. Day/night employer populations vary substantially, from 1,812 during the day to 73 during the night. Recreational areas and attractions as well as marinas would likewise display a substantial drop at night. Winter populations would likely be lower at recreational areas and attractions, and at marinas.

Accounting for major employers (other than CCNPP Units 1, 2, and 3), overnight accommodations, major recreation areas, and marinas within the 10 mi (16 km) radius, a total transient population of 8,010 is estimated to be present within the 10 mi (16 km) radius. The 10 mi (16 km) transient population was added to the resident distribution and projected for future years as denoted in Figure 2.1-8 through Figure 2.1-14, Figure 2.1-24, and Figure 2.1-25. The baseline (2000) transient population distribution for the 10 mi (16 km) radius is summarized in Table 2.1-7.

2.1.3.3.2 Transient Population Between 10 and 50 Mi (16 and 80 km)

A general discussion of transient population for the 10 to 50 mi (16 to 80 km) radius is provided below. A quantitative estimate of the transient population for the 10 to 50 mi (16 to 80 km) radius is not provided for the following reasons:

1. There are no significant centers of transient populations between 10 and 30 mi (16 to 80 km) from the CCNPP site;

2. Annapolis (35 mi (56 km) from the CCNPP site) and Washington D.C. (45 mi (72 km) from the CCNPP site), despite being significant centers of transient populations (tourists, commuters, and other business travelers), are also resident population centers that dilute the proportion of transients. The CCNPP site is not located in an area where significant population increases due to transient land use, such as recreational or industrial, are expected; the areas nearest to the CCNPP site (including areas within Calvert County and St. Mary's County) experience a daytime net loss of more than 20,900 residents, primarily due to commuters traveling toward the Washington D.C. area and denoted in Table 2.1-8 (USCB, 2000b).

For the 30 to 50 mi (48 to 80 km) radius, significant transient population is expected given the economic influence and recreational opportunities of the Washington D.C. metropolitan area, located approximately 45 mi (72 km) from the CCNPP site. In 2004, Washington D.C. hosted 17.7 million domestic visitors. Of those 17.7 million domestic visitors, 67% were on leisure travel, 13% traveled for business, 16% were attending a convention or seminar, and 4% traveled for a combination of business and pleasure.

Four of Maryland's top ten 2004 destinations are in the 30 to 50 mi (48 to 80 km) radius. Annapolis (35 mi (56 km) from the CCNPP site) was Maryland's third top destination in 2004, with 1.1 million visitors. In close proximity to Washington D.C., Silver Spring and Bethesda, Maryland, both located approximately 50 mi (80 km) from the CCNPP site, were the sixth and tenth top destinations in 2004, respectively. Salisbury, Maryland in Wicomico County, located approximately 45 mi (72 km) from the CCNPP site, was the ninth top destination (MDOT, 2006). Eight-one percent of visitors to Maryland traveled for pleasure; 19% traveled for business.

In Virginia, Fairfax and Arlington counties (both in the Washington D.C. area) were the top two counties for travel expenditures in 2004 (leisure and business travelers). A portion of Prince William County is located 40 to 50 mi (64 to 80 km) radius, approximately 45 mi (72 km) from the CCNPP site. Prince William County ranked tenth in total travel expenditures (TIA, 2005).

A small portion of southern Delaware lies in the 50 mi (80 km) radius, and includes the town of Seaford located approximately 45 mi (72 km) from the CCNPP site, home to several museums, festivals, and outdoor recreational opportunities.

Seasonal agricultural workers make up a portion of the transient population in the 10 to 50 mi (16 to 80 km) radius. Farms in the following Maryland counties that fall wholly or partially in the 50 mi (80 km) radius employ migrant labor (number of farms in parentheses): Caroline (8), Charles (1), Dorchester (8), Kent County (8), Montgomery (32) (only a small portion lies in the 50 mi (80 km) radius), Prince Georges (7), Queen Annes (20), Somerset (3), Talbot (4), and Wicomico (12) (USDA, 2004a). Virginia counties within 50 mi (80 km) with farms employing migrant labor include: Accomack (10), Caroline (1), Essex (2), King and Queen (4), Lancaster (1), Middlesex (2), Northumberland (1), Prince William (1), Richmond (2), and Westmoreland (10) (USDA, 2004b). Kent and Sussex counties in Delaware contain 38 and 27 farms, respectively, that employ migrant labor (USDA, 2004c).

2.1.3.4 Low Population Zone

The Low Population Zone (LPZ) for CCNPP Unit 3 is a 1.5 mile (2.4 km) radius area centered on CCNPP Unit 3. It is completely contained within the LPZ for CCNPP Units 1 and 2 which consist of the area falling within a 2 mi (3.2 km) radius of CCNPP Units 1 and 2. For conservatism, the CCNPP Unit 3 LPZ will be defined as the entire area of the CCNPP Units 1 and 2 LPZ. Figure 2.1-23 shows both the CCNPP Units 1 and 2 LPZ and the CCNPP Unit 3 LPZ. The communities of Lusby and Calvert Beach - Long Beach lie within the LPZ, as well as a portion of the Chesapeake Bay. Portions of Calvert Cliffs State Park and Bay Breeze Youth Campground, along with the majority of Flag Ponds Park also fall within the LPZ. No nursing homes, hospitals, prisons, or major employers (other than the existing CCNPP Units 1 and 2) are known to exist within the LPZ. One school, the Southern Middle School in Lusby, is located within the LPZ approximately 1.9 mi (3.0 km) south. This school had a combined student and faculty population of 771.

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The resident and transient population distributions within the existing LPZ for each decade from 2000 through 2060 is denoted as the 2 mi (3.2 km) cumulative population on Figure 2.1-8 through Figure 2.1-14. The population within the LPZ including years 2015 and 2055, the estimated year of initial operation and the expected year of license expiration for CCNPP Unit 3 are summarized in Table 2.1-9.

There is considerable variation in peak daily and seasonal transient population within the LPZ. Winter daytime population with its one large school (771 students and staff) sees the highest population. This occupancy is minimal at night. Residents in the LPZ would have the highest

population at night as many workers commute to points beyond the LPZ during the day. LPZ population would be lowest in the summer, when school is not in session.

In accordance with 10 CFR 50.34(a)(1)(ii)(D)(2), an individual located on the outer radius of the LPZ for the course of the postulated accident (assumed to be 30 days) would not receive a radiation dose in excess of 25 rem TEDE (CFR, 2007b). For CCNPP Units 1 and 2, this distance was 2 mi (3.2 km). It has been determined that the CCNPP Unit 3 could achieve the 25 rem TEDE within 1.5 miles. Onsite emergency preparedness personnel have developed an Emergency Planning Zone that extends well beyond the CCNPP site boundary and its Radioactive Emergency Plan establishes evacuation routes both onsite and offsite. Under these plans, emergency preparedness personnel would have ample time to take appropriate protective measures to all affected individuals within and beyond the existing LPZ.

Facilities and institutions in and beyond the LPZ that may require special consideration when evaluating emergency plans are defined out to a distance of 10 mi (16 km). This 10 mi (16 km) radius includes the LPZ and approximates the CCNPP Emergency Planning Zone. There are no prisons or hospitals in the 10 mi (16 km) radius. Schools and nursing homes in the Emergency Planning Zone are listed in Table 2.1-10 and Table 2.1-11, respectively. Recreational areas (parks and beaches) and marinas are listed in Table 2.1-5 and Table 2.1-6, respectively.

2.1.3.5 Population Center

St. Charles, Maryland is the closest population center that meets the definition contained in 10 CFR 100.3, (i.e., it has a population of greater than 25,000) (CFR, 2007c). St. Charles' population was 33,379 per the census data provided for the year 2000 (USCB, 2000a). The nearest political boundary of St. Charles, Maryland, corresponding with the nearest boundary of the population center, is approximately 26 mi (42 km) west-northwest of the CCNPP site as denoted in Figure 2.1-15. The distance between St. Charles and the site is approximately 13 times the radius of the existing LPZ. Therefore, it meets the requirement that the population center distance be at least one and one-third times the distance from the reactor to the outer boundary of the LPZ (10 CFR 100.11(a)(3)). Transient populations were not used to establish the nearest population center. The closest center of significant employment is the Patuxent River Naval Air Station, approximately 9 mi (14 km) south of the CCNPP site, which employed approximately 20,200 persons in 2005 (SMCDEC, 2006).

As shown in Figure 2.1-15, St. Charles is in the west-northwest (WNW) sector beginning in the 20 to 30 mi (32 to 48 km) radius interval. This population grouping is approximately 20 mi (32 km) from Washington D.C., but is still surrounded by farmland. The population of the WNW sector 20 to 30 mi (32 to 48 km) radius interval in 2015 would be 78,206 with a land area of 98.1 mi^2 (254 km^2) equating to a population density of 796 persons/mi^2 (307 persons/km^2). Over the project life of CCNPP Unit 3, the population is expected to grow approximately 2.4% per year.

2.1.3.6 Population Density

This section describes populations and resulting population densities in the years of initial operation and the end of operations. For the purposes of this study, it is assumed that initial operation of CCNPP Unit 3 begins in 2015. It is also assumed that the end of operations is upon license expiration which is currently projected to be the year 2055, 40 years thereafter.

Figure 2.1-24 and Figure 2.1-25 provide the same detailed population data for 2015 and 2055 in the 10 mi (16 km) vicinity that were provided by Figure 2.1-8 through Figure 2.1-14 for the

decades of 2000 through 2060, respectively. Figure 2.1-26 and Figure 2.1-27 provide the 50 mi (80 km) region population data for 2015 and 2055.

Figure 2.1-28 shows the cumulative population in year 2000 within 30 mi (48 km) of the CCNPP site and projected cumulative populations in years 2015 (assumed year of initial operations) and 2055 (assumed year for end of operations). On the same figure, spanning the same radial distances, population curves are calculated for hypothetical densities of 500 persons/mi^2 (200 persons/km^2) and 1,000 persons/mi^2 (400 persons/km^2) to demonstrate that the population density does not exceed 500 persons/mi^2 (200 persons/km^2) at the time of the projected COL approval and within 5 years thereafter consistent with guidance provided in Regulatory Guide 4.7, Position C.4 (NRC, 1998) and Regulatory Guide 1.206 (NRC, 2007). Areas located exclusively over water were excluded in calculating population densities.

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For all radial distances (1, 2, 3, 4, 5, 10, 20, and 30 mi (1.6, 3.2, 4.8, 6.4, 8.0, 16, 32, and 48 km)), the population for the estimated startup date (2015) is below a population density of 500 persons/mi^2 (200 persons/km^2). The highest population density at startup was at the 5 mi (8 km) radius. Using a land area for the 5 mi (8 km) radius of 38.7 mi^2 (100.2 km^2), the population for the 5 mi (8 km) radius would be 484 persons/mi^2 (187 persons/km^2) at startup.

Figure 2.1-28 also presents the total population at the end of operations date (2055) compared with the total population for the hypothetical density of 1,000 persons per square mile. For all radial distances (1, 2, 3, 4, 5, 10, 20, and 30 mi (1.6, 3.2, 4.8, 6.4, 8.0, 16, 32, and 48 km)), the population is below the 1000 persons/mi^2 (400 persons/km^2) density criterion. The highest population in 2055 at the 10 mi (16 km) radius is 132,360 while the total population for the 1,000 persons/mi^2 (400 persons/km^2) population density is 139,175. The end of operations (2055) total population equates to a density of 951 persons/mi^2 (367 persons/km^2) using a land area of 139.2 square miles.

The densities at expected COL approval in the year 2010 would be less than the 500 per square mile but the maximum density would grow slightly, at approximately 1.5 percent per year, from 450 persons/mi^2 (174 persons/km^2) in 2010 to 484 persons/mi^2 (187 persons/km^2) in 2015.}

2.1.4 References

{This section is added as a supplement to the U. S. EPR FSAR.

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Table 2.1-1 — {CCNPP Unit 3 Specific Location}

Latitude/Longitude (NAD 27) (Degrees)	Latitude/Longitude (NAD 83) (Degrees)	UTM, Zone 18N (78W to 72W) (NAD 27) (Meters)	UTM, Zone 18N (78W to 72W) (NAD 83) (Meters)
N 38 25 40.85225	N 38 25 41.29323	North/South 4254079.23	North/South 4254298.77
W 76 26 19.26254	W 76 26 17.39253	East/West 374418.85	East/West 374467.58

Table 2.1-2 — {Population Within 10 mi (16 km) Radius (2000 – 2060)}

Year	10 mi (16 km) Radius Population
2000	40,745
2010	46,272
2015	49,031
2020	51,126
2030	55,256
2040	61,716
2050	66,723
2055	69,214
2060	71,781

Table 2.1-3 — {Population Within 50 mi (80 km) Radius (2000 – 2060)}

Year	50 mi (80 km) Radius Population
2000	3,202,260
2010	3,637,765
2015	3,853,907
2020	4,015,954
2030	4,342,312
2040	4,847,354
2050	5,244,602
2055	5,441,431
2060	5,640,366

Table 2.1-4 — {Transient Population Facilities - Population Facilities - Major Employers Within the 10 mi (16 km) Zone)}

Name of Facility	County	Compass Direction/ Distance – mi (km)	Daytime Population	Nighttime Population
Dominion Cove Point LNG	Calvert	SSE / 3-4 (4.8-6.4)	35	20
Solomons Strip Malls	Calvert	S / 6-7 (9.7-11.3)	367	-
Chesapeake Biological Laboratory	Calvert	S / 8-9 (12.9-14.5)	150	-
St. Mary's Industrial Park	St. Mary's	SW / 9-10 (14.5-16)		
PRB Associates			230	-
Mechanical Products Inc. (Minitec)			60	0
Merkle Mailing Services.			150	50
Wildewood Technology Park	St. Mary's	SSW / 10-11 (16-18)		
Tracor			500	0
Congressional Information Service			70	3
Wildewood Mall	St. Mary's	SSW / 10-11 (16-18)	250	-

Table 2.1-5 — {Transient Population Facilities - Major Recreational Areas and Attractions Within the 10 mi (16 km) Zone}

Name of Facility	County	Compass Direction / mi (km)	Population
Flag Ponds Nature Park	Calvert	NW / 1-2 (1.6-3.2)	263
Calvert Cliffs State Park Day Use Area & Park Beach	Calvert	S / 2-3 (3.2-4.8) SE / 2-3 (3.2-4.8)	217 108
Cove Point Recreation Park	Calvert	SSE / 3-4 (4.8-6.4)	500
Calvert County Marine Museum	Calvert	S / 7-8 (11.3-12.9)	378
Battle Creek Cypress Swamp Nature Area & Visitor Center	Calvert	WNW / 9-10 (14.5-16)	378
Jefferson Patterson Park & Museum	Calvert	WSW / 4-5 (6.4-8.0)	360

Table 2.1-6 — {Transient Population Facilities - Marinas Within the 10 mi (16 km) Zone}

Name of Facility	County	Compass Direction/ mi (km)	Number of Slips	Population
Mill Creek	Calvert	S / 6-7 (9.7-11.3)	100	90
Hospitality Harbor	Calvert	S / 6-7 (9.7-11.3)	75	68
Town Center Marina	Calvert	S / 7-8 (11.3-12.9)	104	93
Harbor Island	Calvert	S / 7-8 (11.3-12.9)	115	104
Spring Cove Marina	Calvert	S / 7-8 (11.3-12.9)	246	221
Comfort Inn / Beacon Marina	Calvert	S / 7-8 (11.3-12.9)	186	168
Zahnizer's	Calvert	S / 7-8 (11.3-12.9)	300	270
Bunky's	Calvert	S / 7-8 (11.3-12.9)	10	9
Solomons Yacht Club	Calvert	S / 7-8 (11.3-12.9)	32	30
Calvert Marina	Calvert	S / 7-8 (11.3-12.9)	450	405
White Sands	Calvert	WSW / 2-3 (3.2-4.8)	100	90
Broome's Island Marina	Calvert	WSW / 5-6 (8.0-9.7)	20	18
Bill's	Calvert	WSW / 6-7 (9.7-11.3)	15	15
Flag Harbor	Calvert	NW / 2-3 (3.2-4.8)	168	151
Blackstone	St. Mary's	SSW / 7-8 (11.3-12.9)	60	54
Reliable Marina	St. Mary's	SSW / 8-9 (12.9-14.5)	26	24
Weeks Marine Railway	St. Mary's	SW / 7-8 (11.3-12.9)	50	45
Cape St. Mary's	St. Mary's	W / 9-10 (14.5-16)	150	135
Boatel California	St. Mary's	SSW / 8-9 (12.9-14.5)	58	53

Table 2.1-7 — {Transient Population Distribution for the 10 mi (16 km) Radius (2000)}

Radius mi (km)	Direction	Number of Transients
1-2 (1.6-3.2)	NW	263
2-3 (3.2-4.8)	SE	283
2-3 (3.2-4.8)	S	217
2-3 (3.2-4.8)	WSW	90
2-3 (3.2-4.8)	NW	151
3-4 (4.8-6.4)	SSE	535
4-5 (6.4-8.0)	WSW	360
4-5 (6.4-8.0)	NW	32
5-10 (8.0-16)	ENE	408
5-10 (8.0-16)	S	3,163
5-10 (8.0-16)	SSW	1,477
5-10 (8.0-16)	SW	485
5-10 (8.0-16)	WSW	33
5-10 (8.0-16)	W	135
5-10 (8.0-16)	WNW	378
	TOTAL	**8,010**

Table 2.1-8 — {Commuting Patterns To and From the Calvert County and St. Mary's County Area (2000)}

Parameter	County	Charles County	Prince George's County	Anne Arundel County	District of Columbia	Other	Total
Worker Inflow to the Two County Area	Calvert	640	641	1,118	59	678	3,136
	St. Mary's	2,197	378	262	126	1,357	4,320
	Total	2,837	1,019	1,380	185	2,035	7,456
Worker Outflow from the Two County Area	Calvert	1,178	8,243	1,739	3,967	3,909	19,036
	St. Mary's	3,313	2,244	80	1,828	1,886	9,351
	Total	4,491	10,487	1,819	5,795	5,795	28,387
Net Worker Outflow from the Two County Area	Calvert	538	7,602	621	3,908	3,231	15,900
	St. Mary's	1,116	1,866	(182)	1,702	529	5,031
	Total	1,654	9,468	439	5,610	3,760	20,931

Table 2.1-9 — {Population Within the LPZ (2000 – 2060)}

Year	LPZ Population
2000	2,508
2010	2,884
2015	3,102
2020	3,336
2030	3,827
2040	4,414
2050	5,092
2055	5,455
2060	5,844

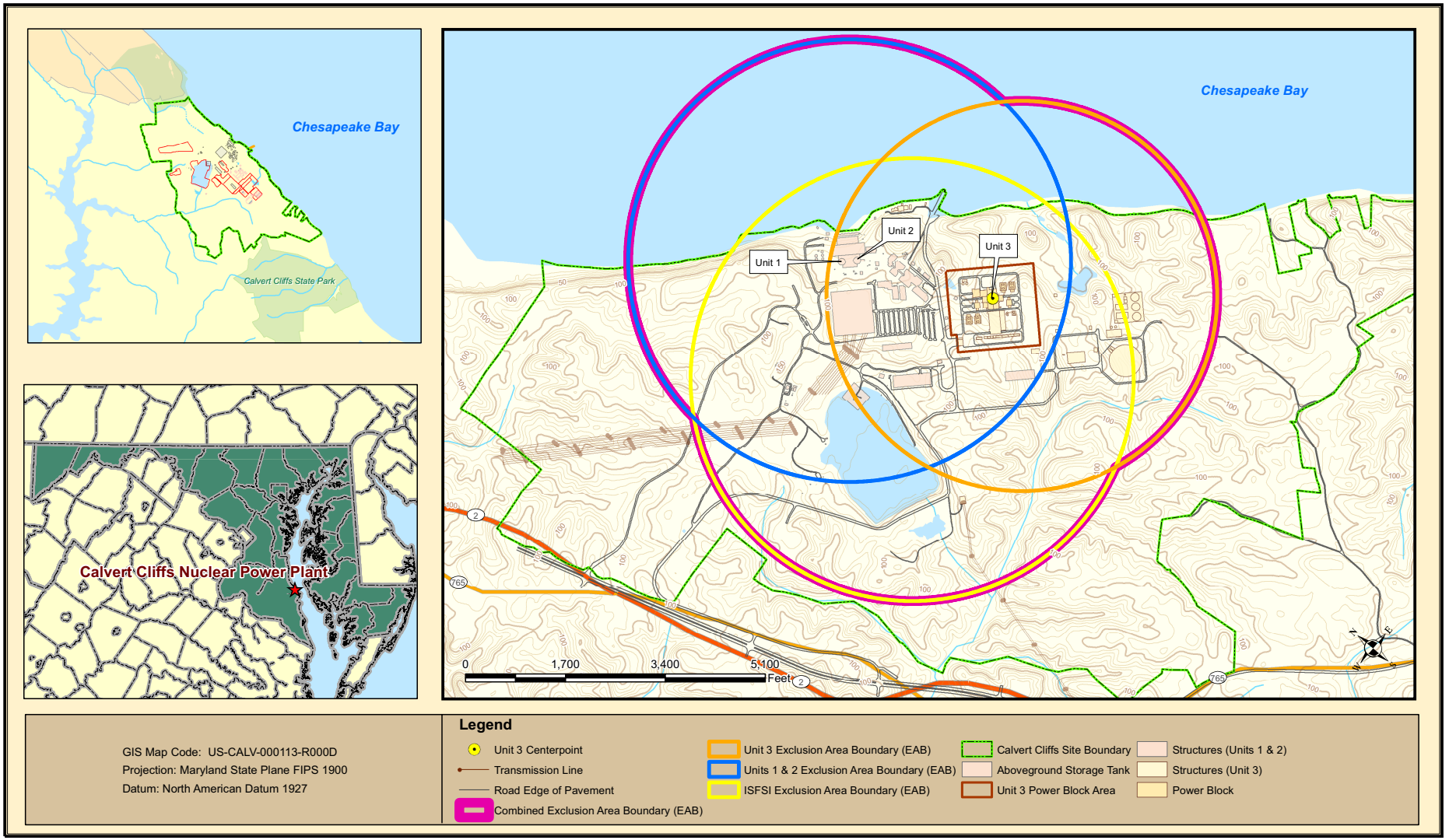
Table 2.1-10 — {Special Facilities – Schools Within the 10 mi (16 km) Zone}

Name of Facility	County	Compass Direction / mi (km)	Student Enrollment	Staff	Total Population
Southern Middle School	Calvert	S / 1-2 (1.6-3.2)	694	77	771
Patuxent Elementary School	Calvert	S / 3-4 (4.8-6.4)	434	59	493
Appeal Elementary School	Calvert	S / 4-5 (6.4-8.0)	488	55	543
Mutual Elementary School	Calvert	WNW / 5-6 (8.0-9.7)	542	72	614
Our Lady Star of the Sea School	Calvert	S / 7-8 (11.3-12.9)	199	15	214
Community College	Calvert	NW / 6-7 (9.7-11.3)	350	20	370
St. Leonard Elementary	Calvert	WNW / 3-4 (4.8-6.4)	701	67	768
Mill Creek Middle School	Calvert	S / 5-6 (8.0-9.7)	636	67	703
Patuxent High School	Calvert	S / 5-6 (8.0-9.7)	1747	121	1868
Dowell Elementary School	Calvert	S / 5-6 (8.0-9.7)	727	71	798
Town Creek Elementary School	St. Mary's	SSW / 9-10 (14.5-16)	332	32	364
Esperanza Middle School	St. Mary's	SSW / 10-11 (16-18)	923	83	1006
St. Johns Elementary School	St. Mary's	SW / 9-10 (14.5-16)	235	21	256
Hollywood Elementary School	St. Mary's	SW / 9-10 (14.5-16)	632	57	689
Green Holly Elementary School	St. Mary's	SSW / 10-11 (16-18)	732	97	829

Table 2.1-11 — {Special Facilities - Nursing Homes Within the 10 mi (16 km) Zone}

Name of Facility	County	Compass Direction / mi (km)	Number of Residents Independent / Assisted	Staff Day / Night	Total Population Day / Night
Southern Pines	Calvert	S / 3-4 (4.8-6.4)	100 / NA	2 / 0	100 / 100
Asbury at Solomon's Island	Calvert	S / 6-7 (9.7-11.3)	300 / 66	80 / 25	446 / 391
Solomon's Nursing Center	Calvert	S / 6-7 (9.7-11.3)	NA / 127	60 / 12	187 / 139

Figure 2.1-1 — {Site Area Map}



Note: See Figure 1.1-3 and 1.2-1 for Site and Powerblock layout

Figure 2.1-2 — {50 mi (80 km) Surrounding Area}

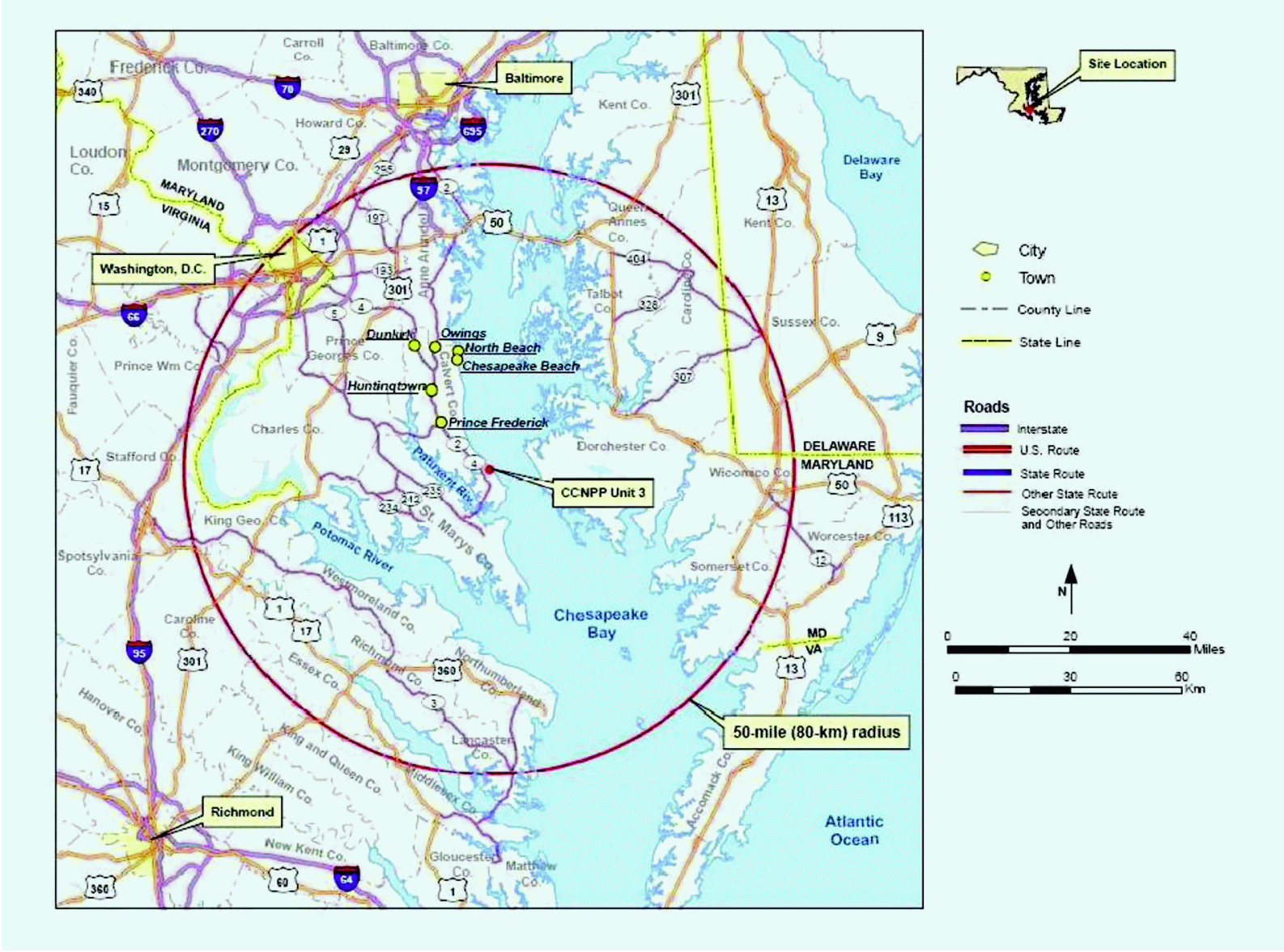


Figure 2.1-3 — {10 mi (16 km) Surrounding Area}

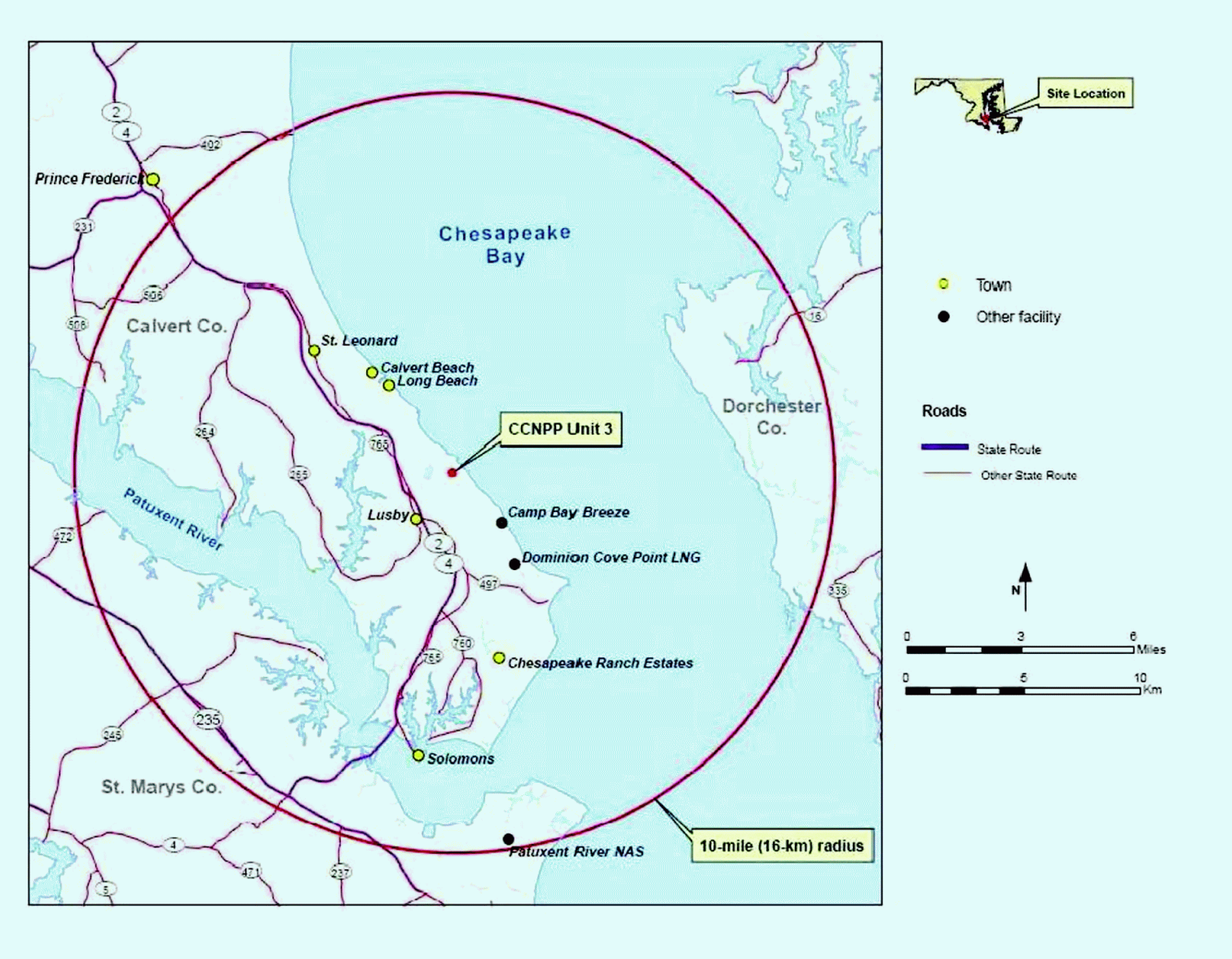


Figure 2.1-4 — {Enlarged Site Map}

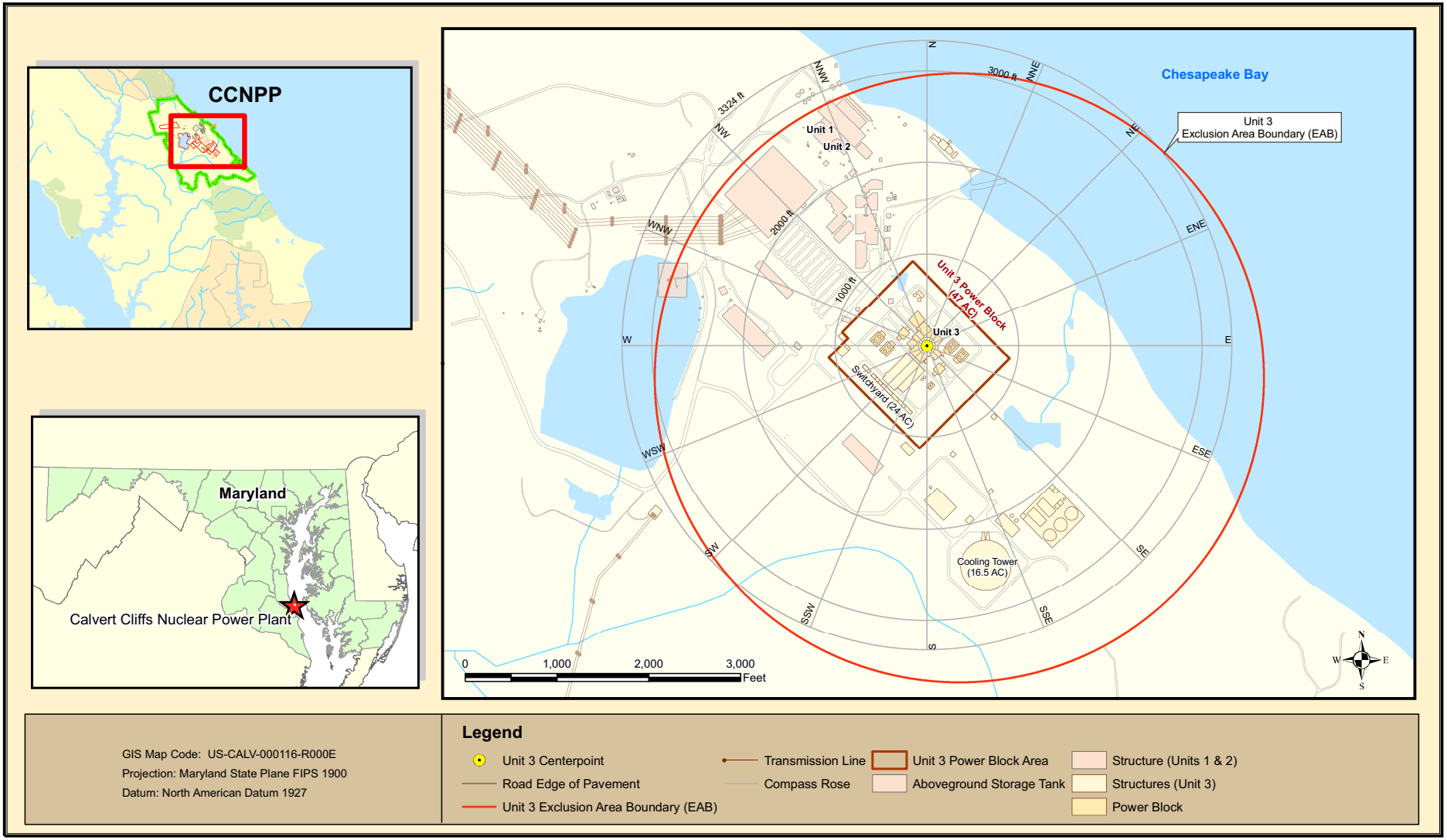


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Figure 2.1-5 — {CCNPP Unit 3 Enlargement}

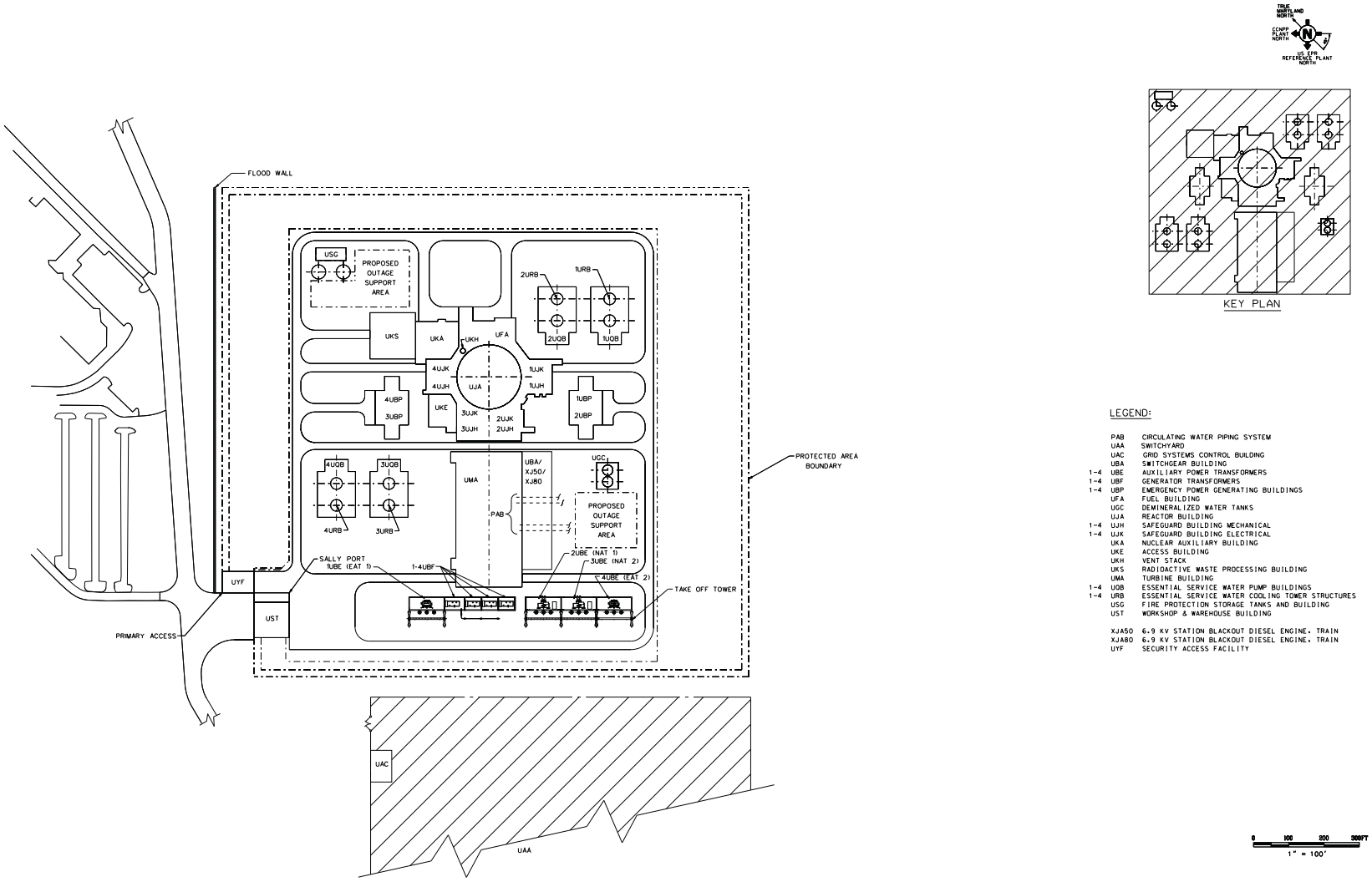

Figure 2.1-6 — {Division of Site Parcels}

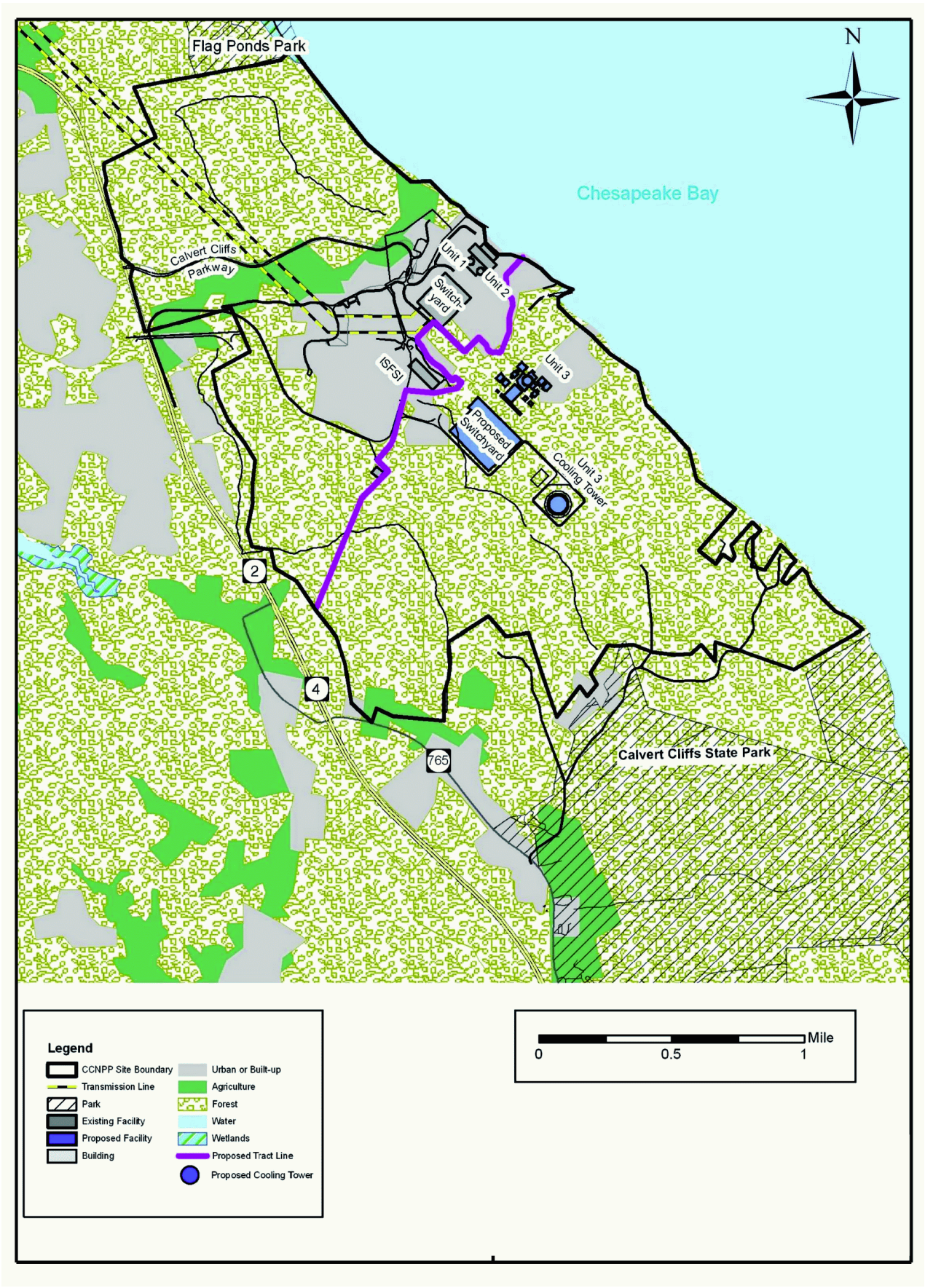

Figure 2.1-7 — {10 mi (16 km) Radius Map}

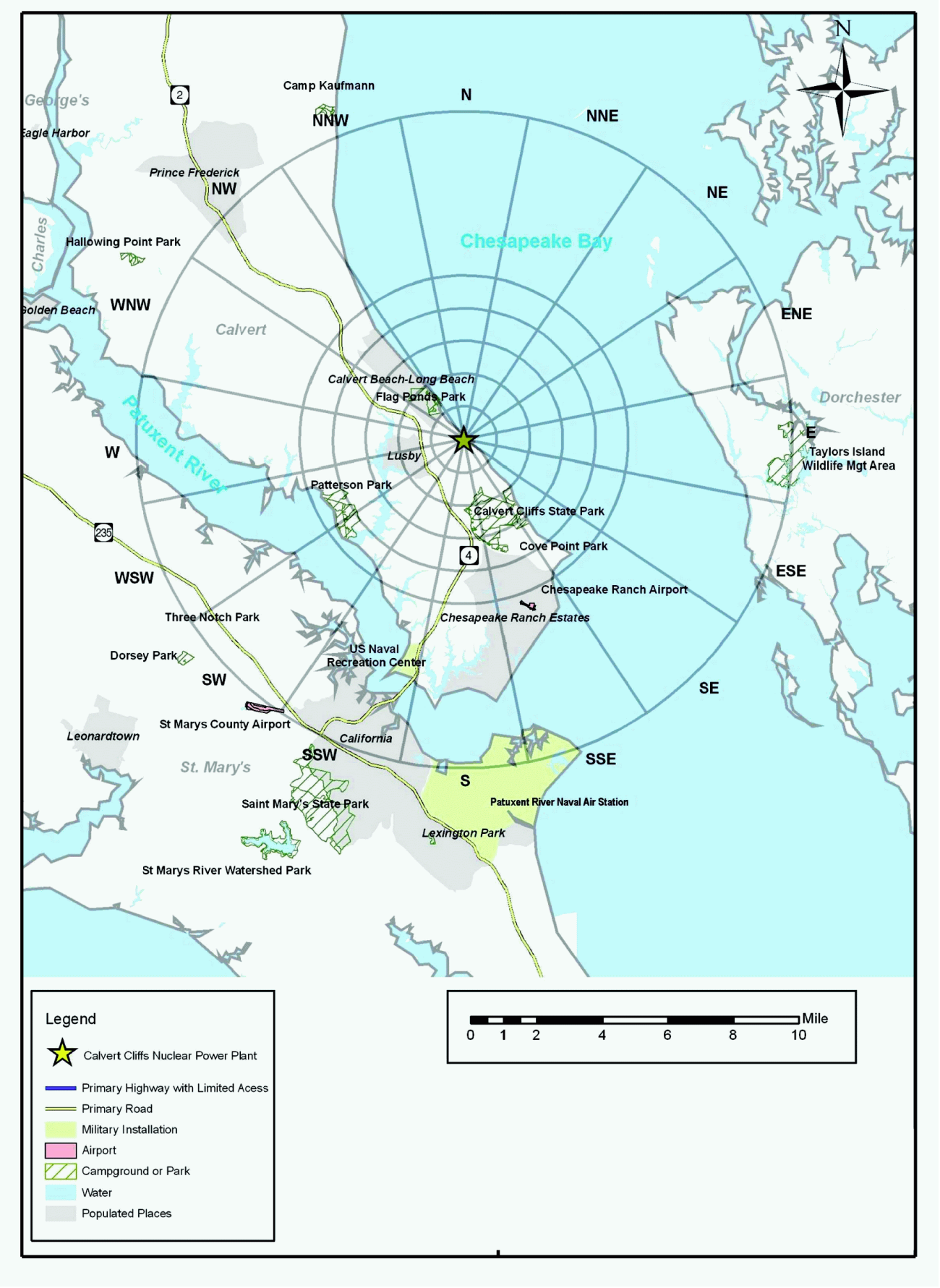

Figure 2.1-8 — {10 mi (16 km) 2000 Population Distribution}

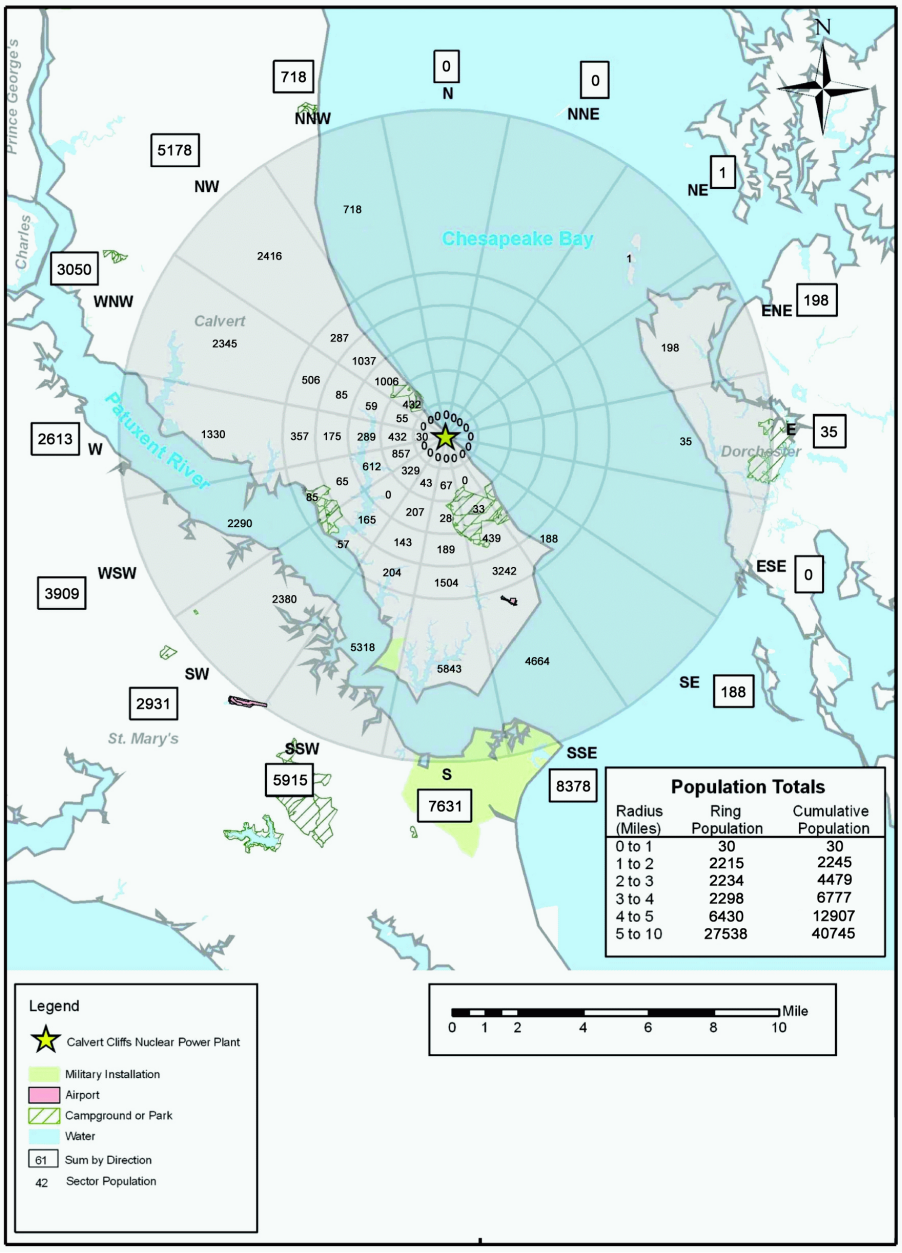

Figure 2.1-9 — {10 m (16 km) 2010 Population Distribution}

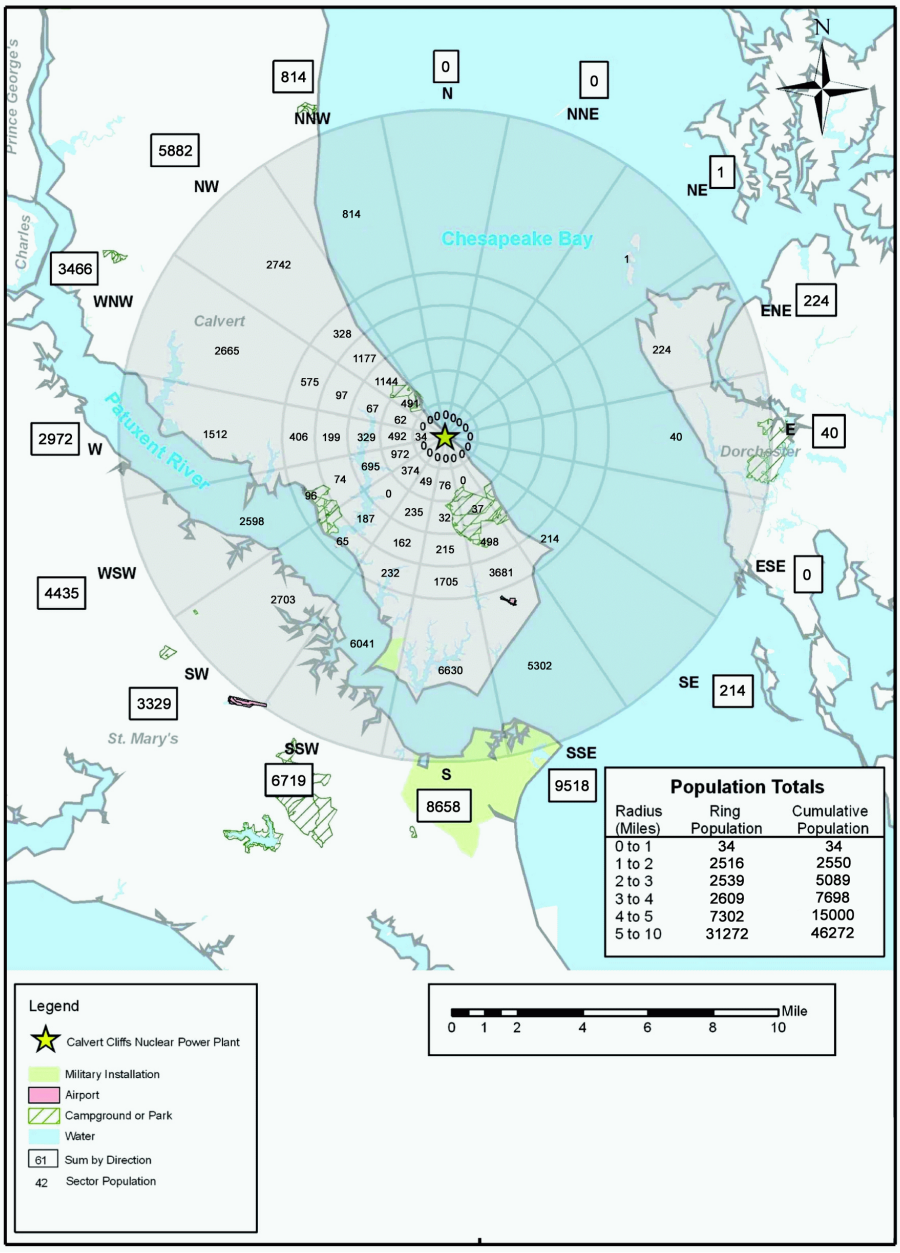

Figure 2.1-10 — {10 mi (16 km) 2020 Population Distribution}

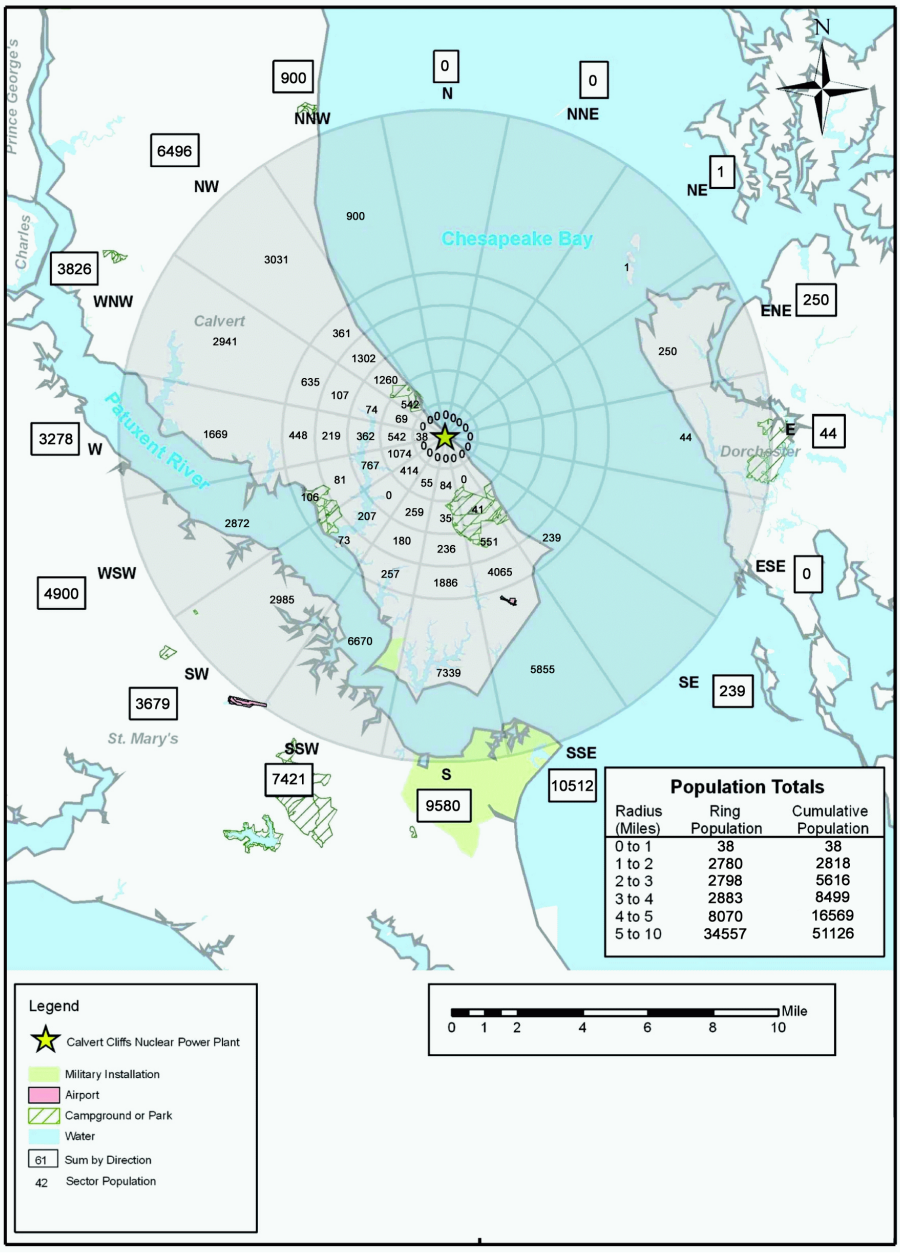

Figure 2.1-11 — {10 mi (16 km) 2030 Population Distribution}

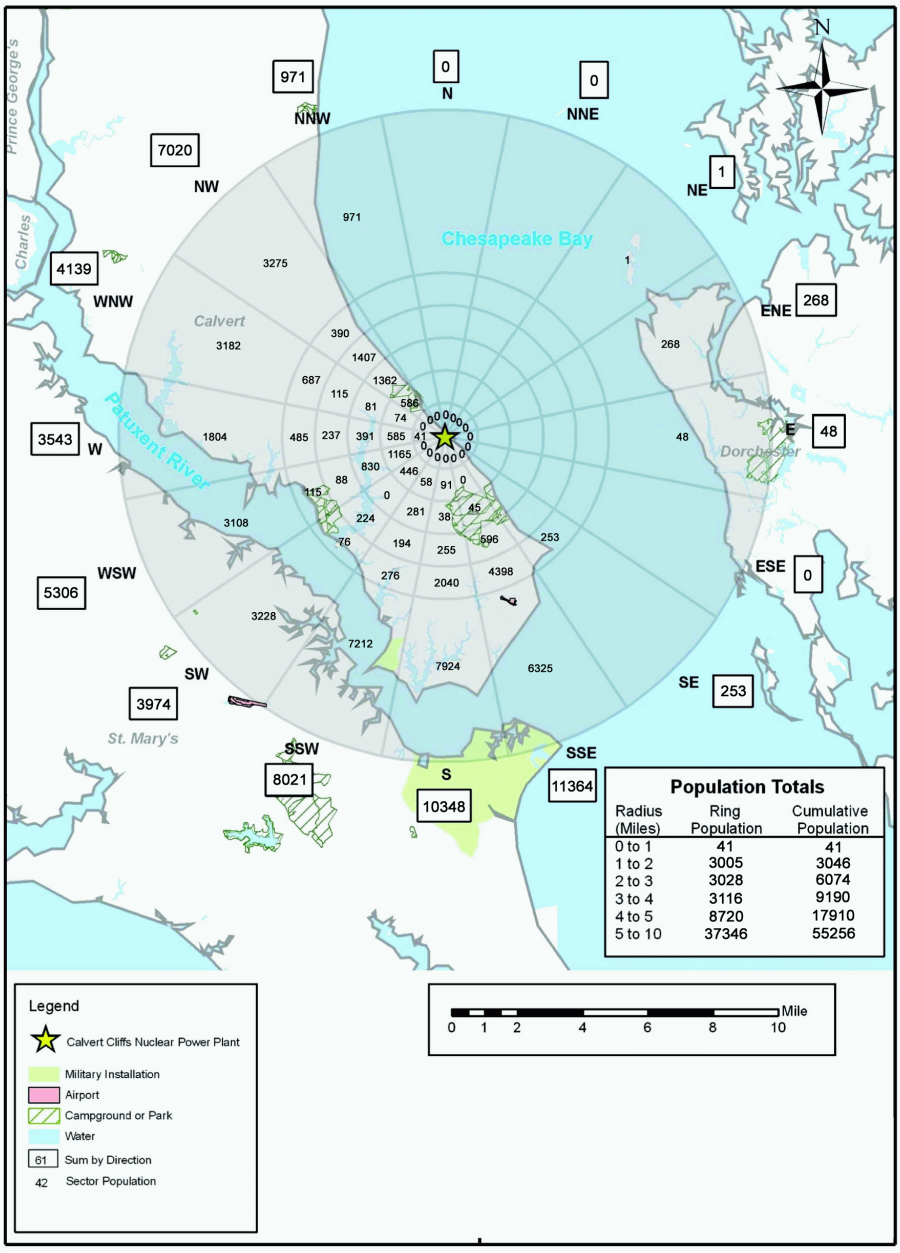

Figure 2.1-12 — {10 mi (16 km) 2040 Population Distribution}

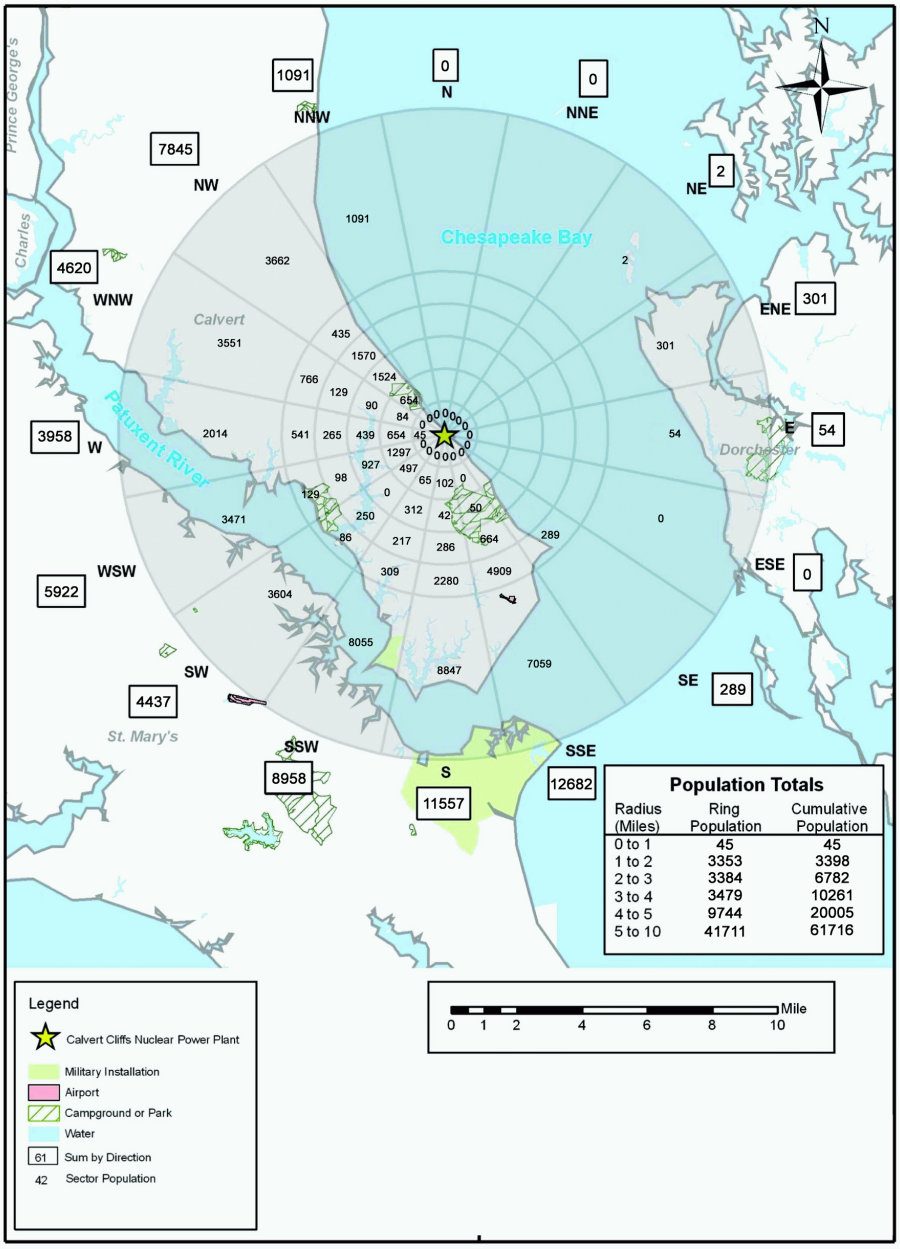

Figure 2.1-13 — {10 mi (16 km) 2050 Population Distribution}

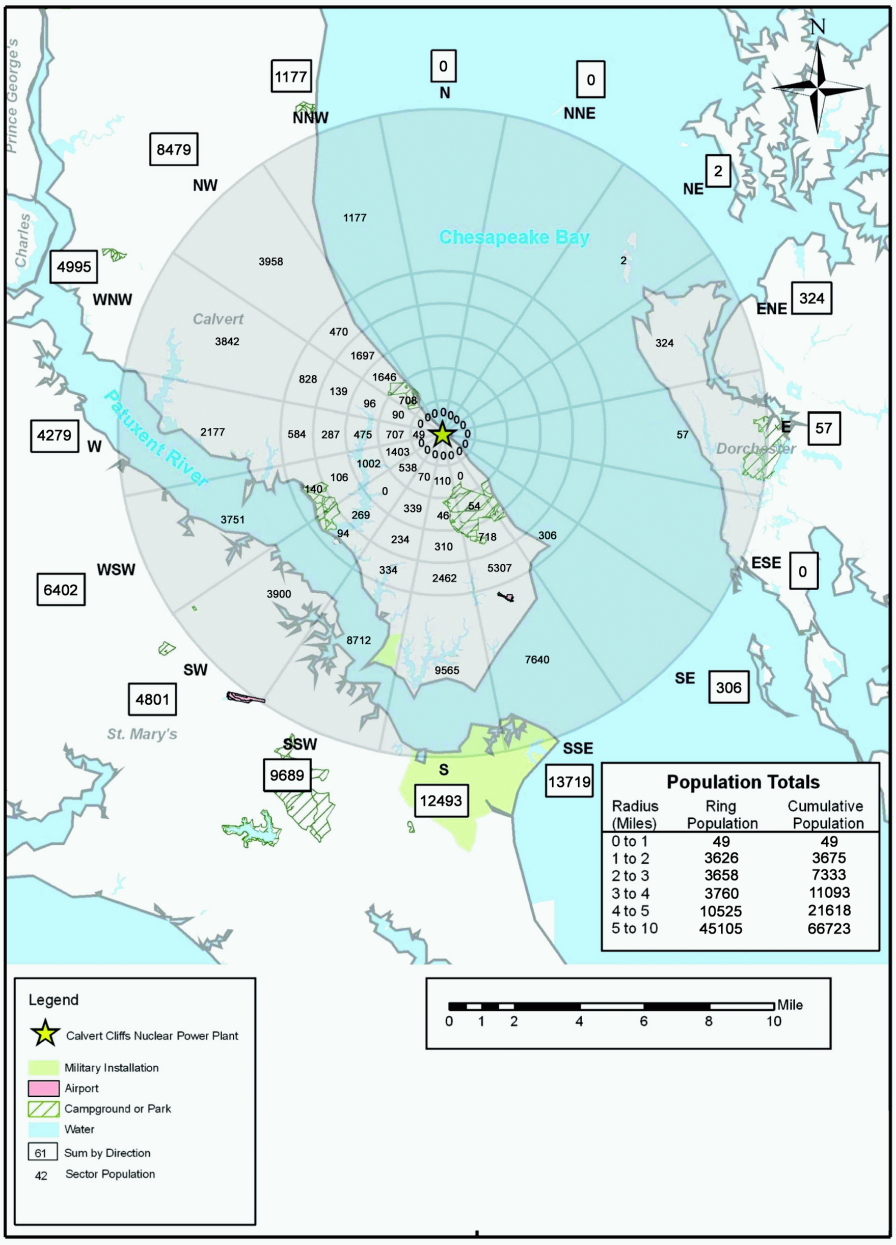

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Figure 2.1-14 — {10 mi (16 km) 2060 Population Distribution}

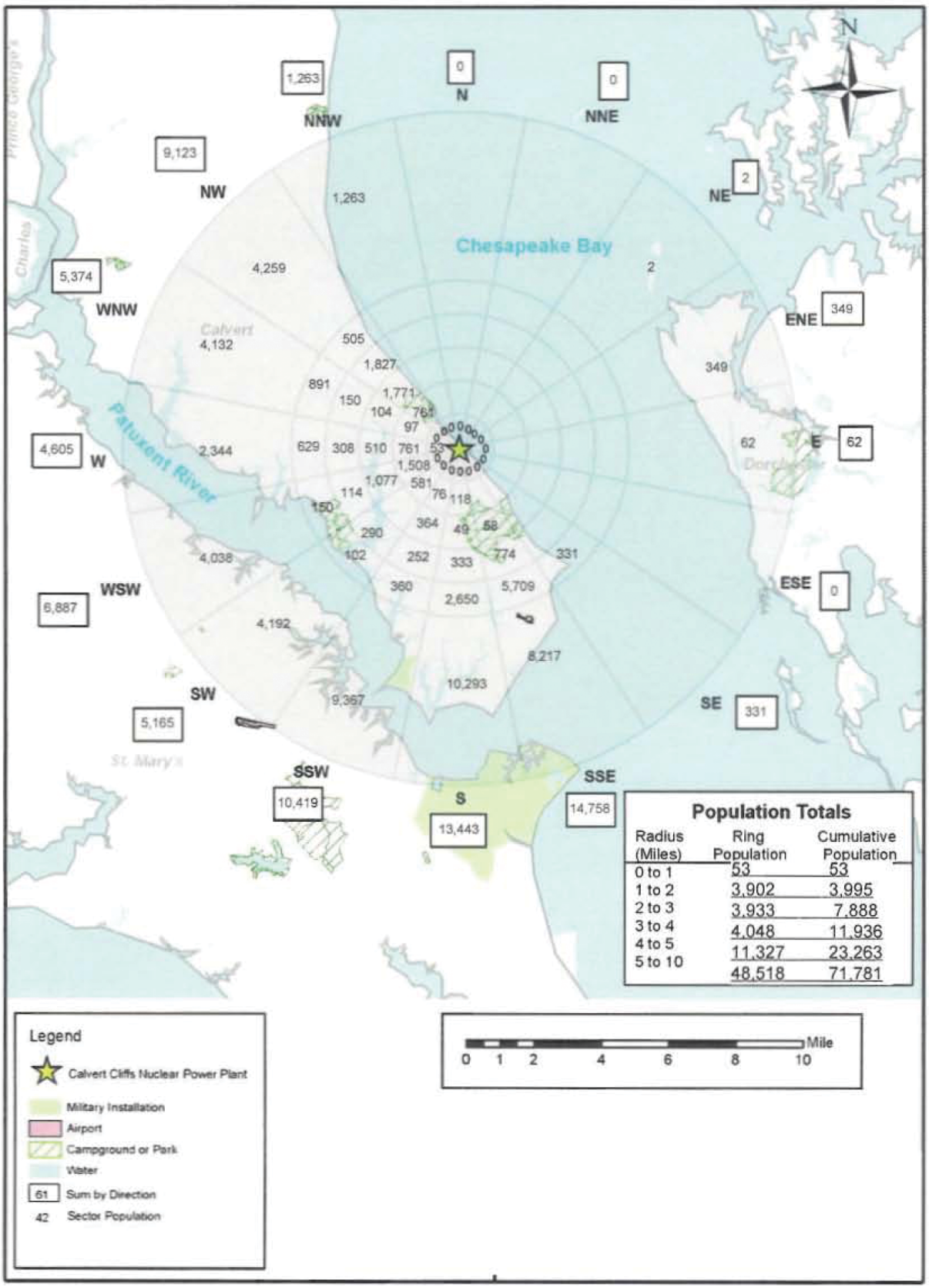

Figure 2.1-15 — {50 mi (80 km) Vicinity}

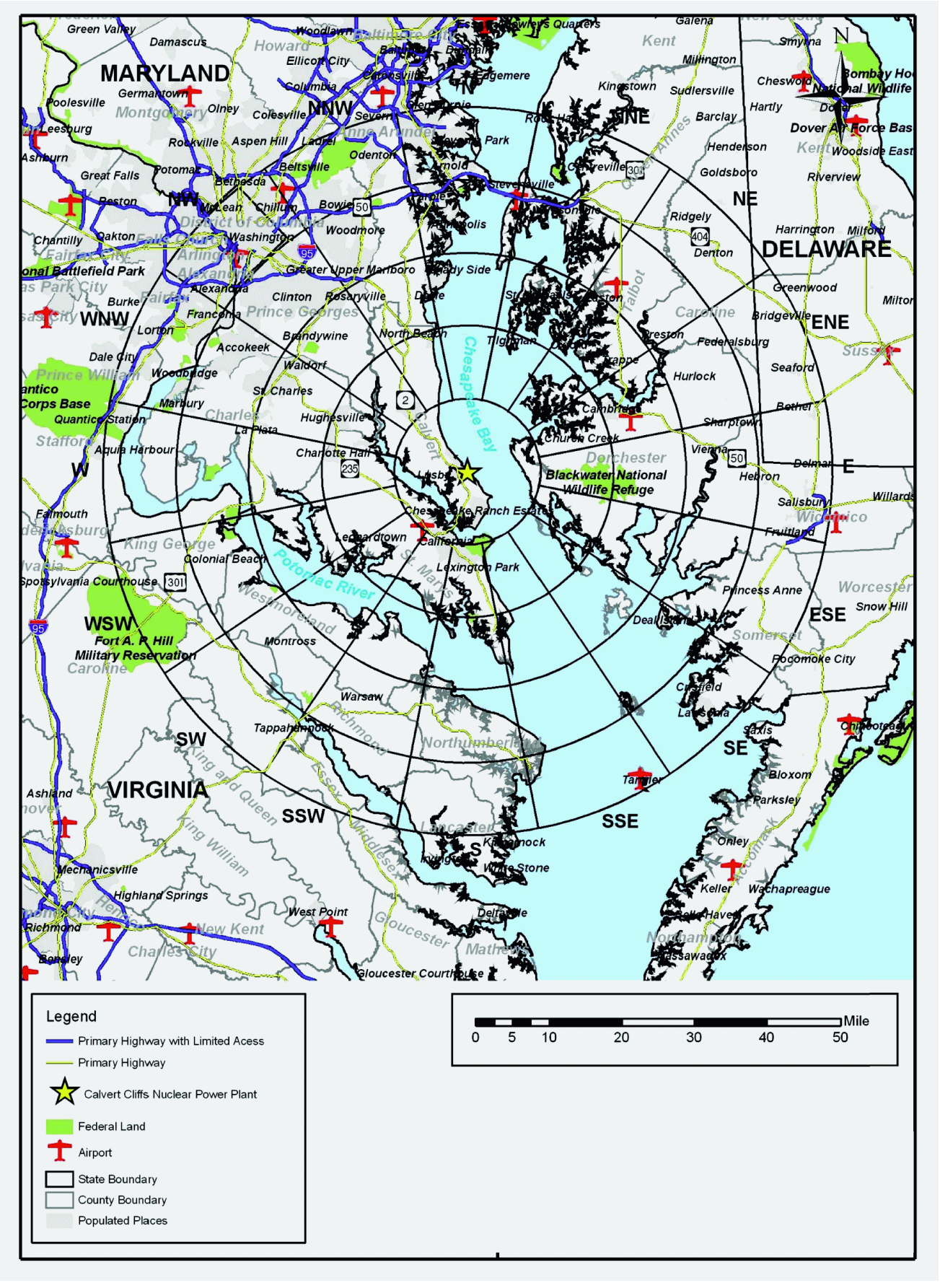

Figure 2.1-16 — {50 mi (80 km) 2000 Population Distribution}

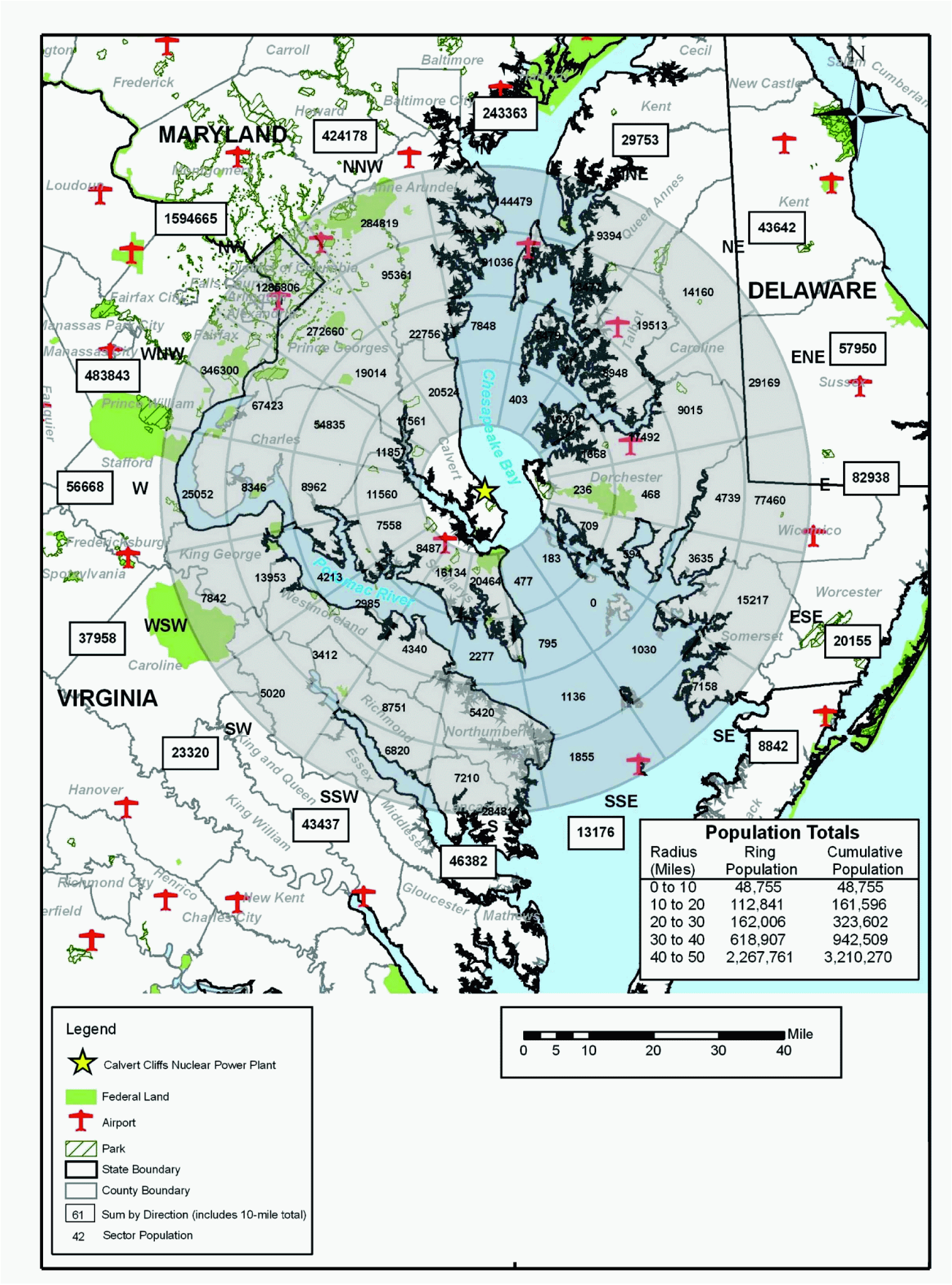

Figure 2.1-17 — {50 mi (80 km) 2010 Population Distribution}

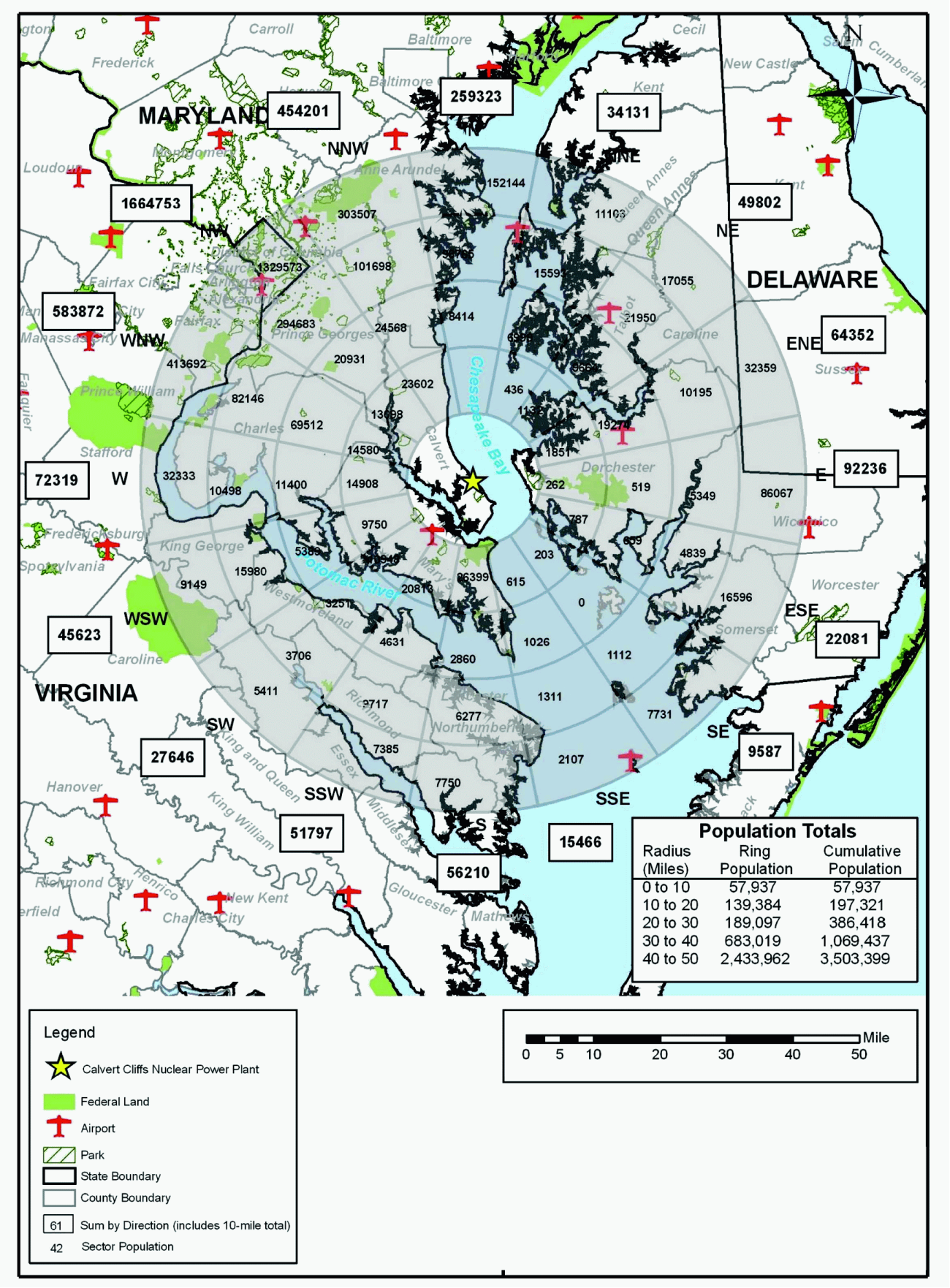

Figure 2.1-18 — {50 mi (80 km) 2020 Population Distribution}

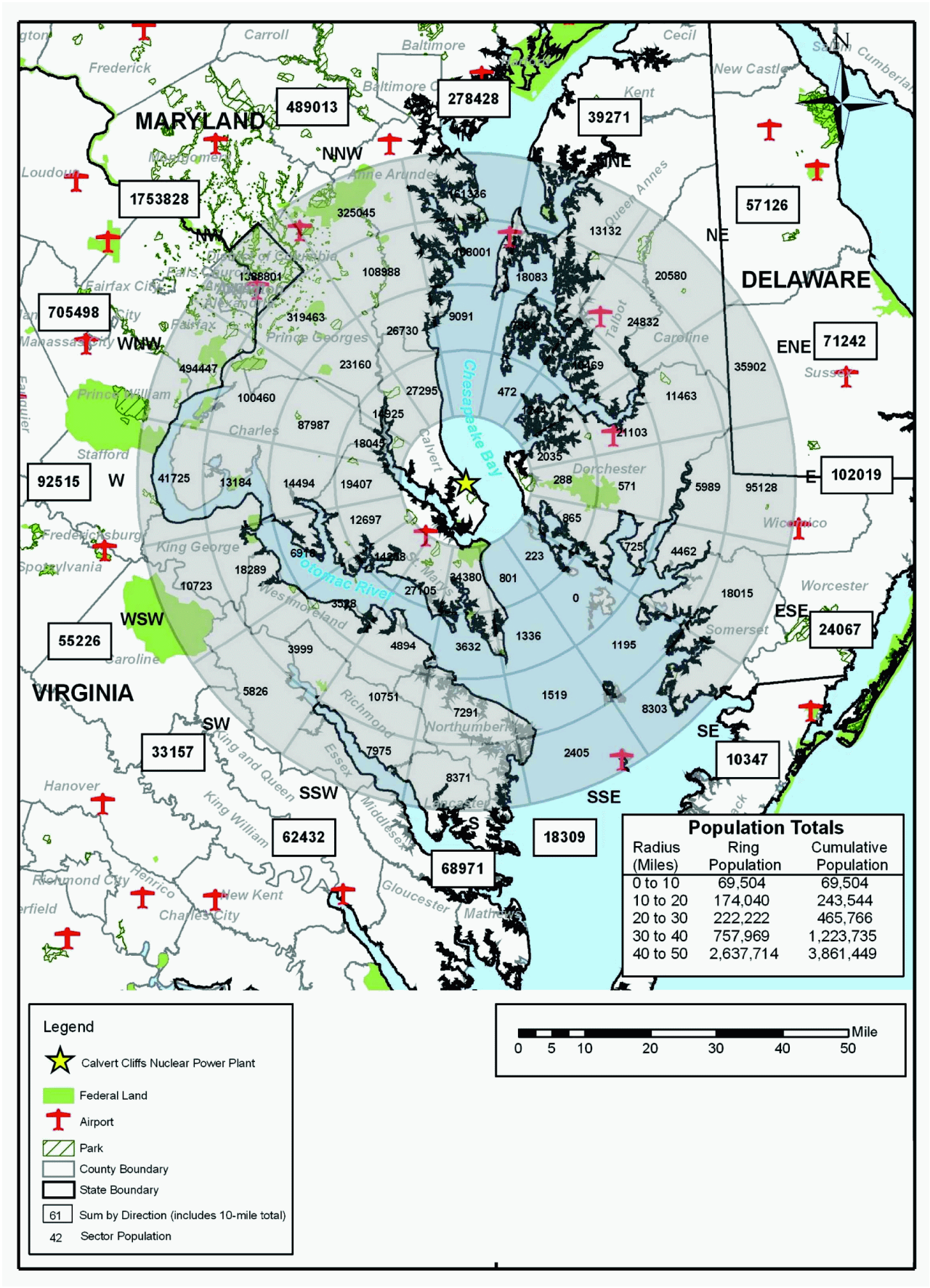

Figure 2.1-19 — {50 mi (80 km) 2030 Population Distribution}

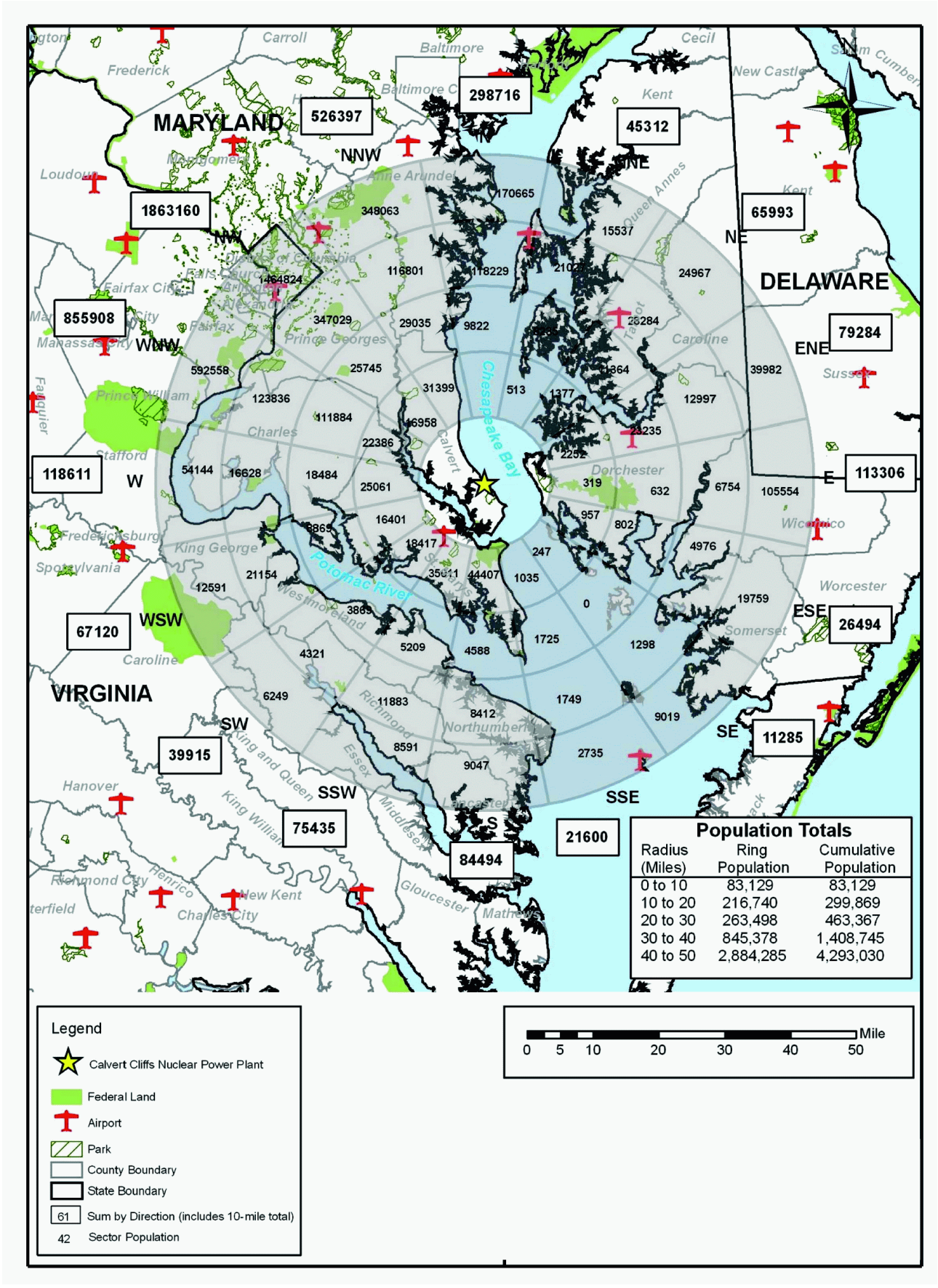

Figure 2.1-20 — {50 mi (80 km) 2040 Population Distribution}

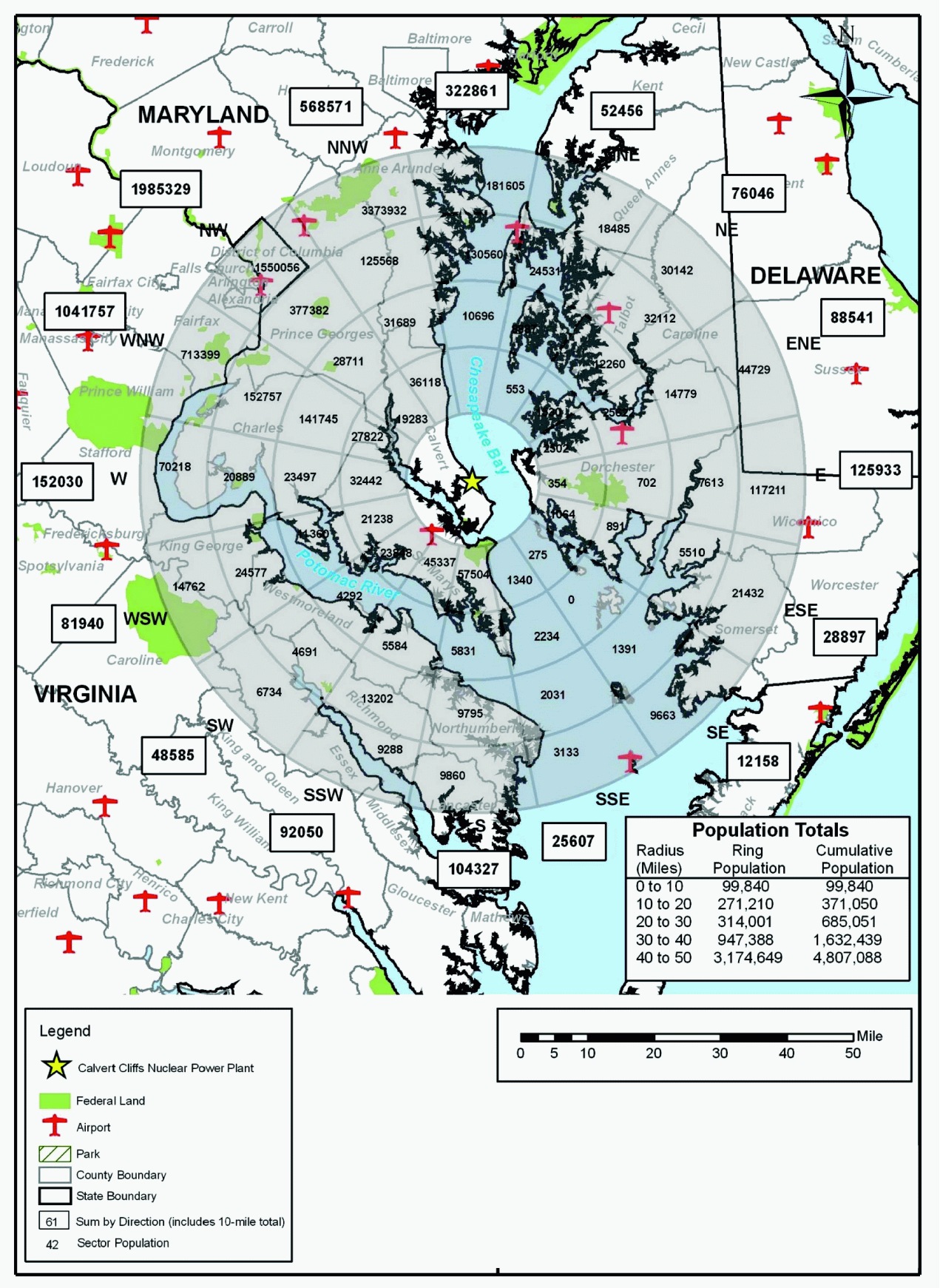

Figure 2.1-21 — {50 mi (80 km) 2050 Population Distribution}

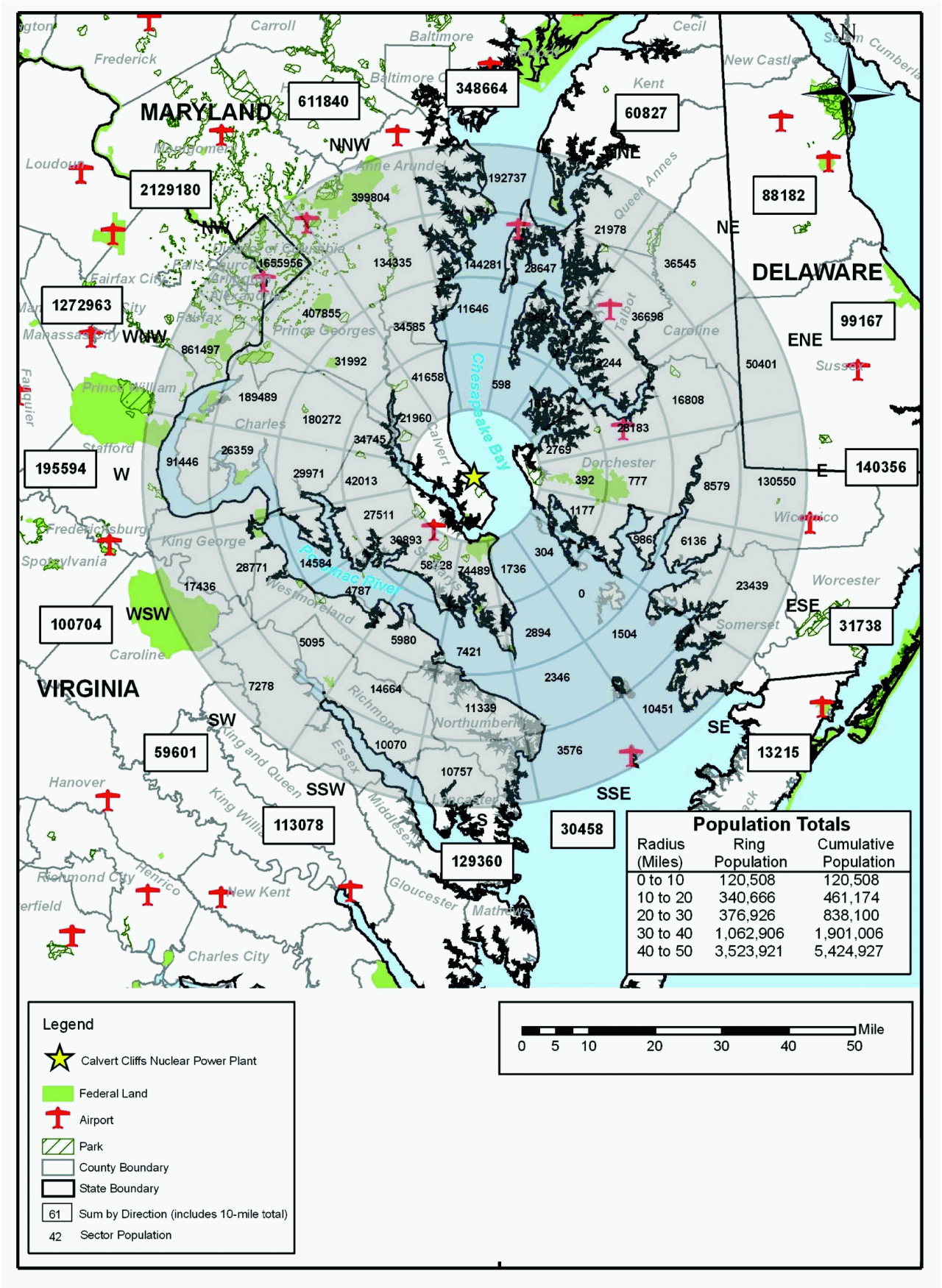

Figure 2.1-22 — {50 mi (80 km) 2060 Population Distribution}

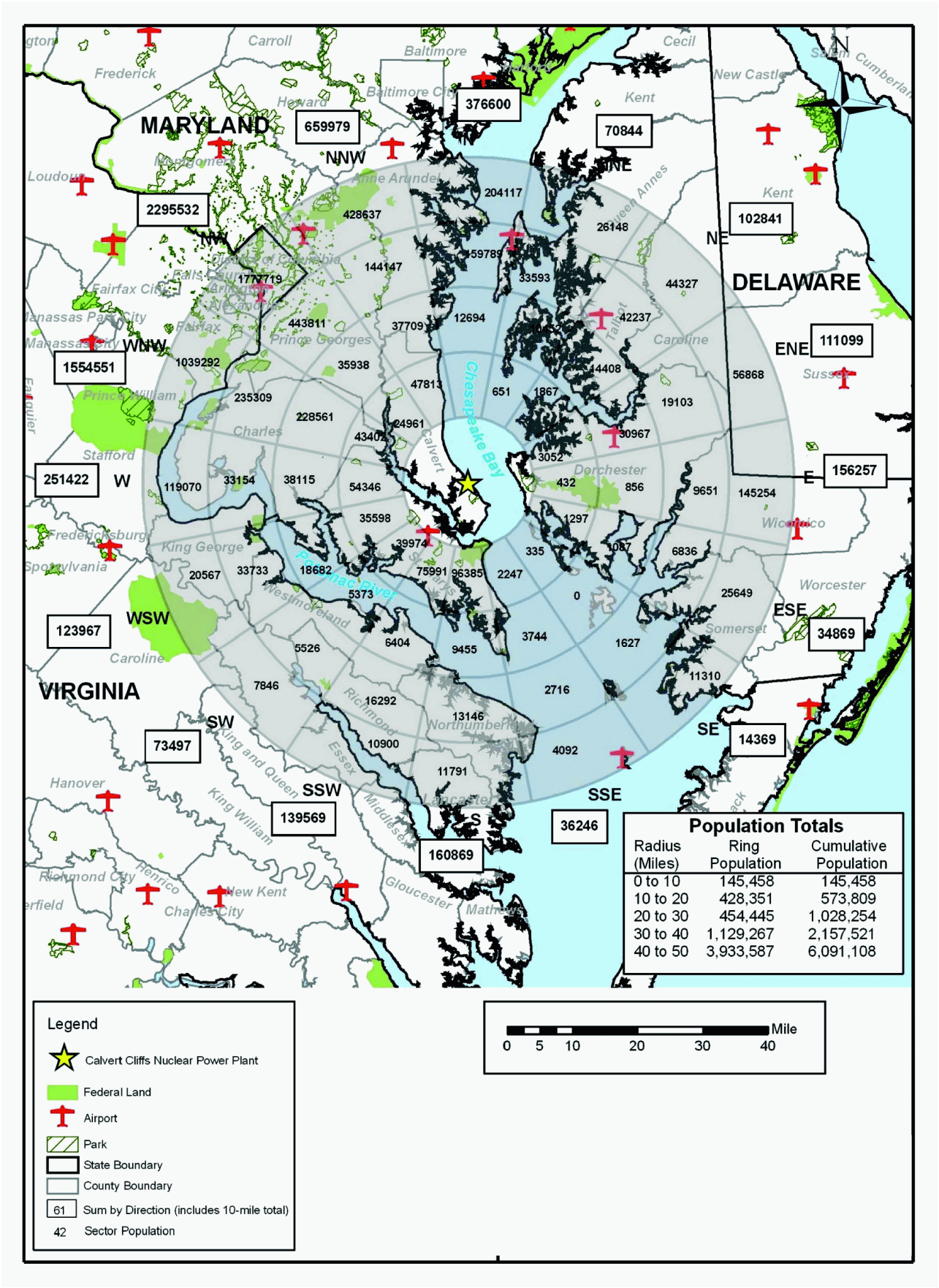

Figure 2.1-23 — {CCNPP Units 1, 2, and 3 Low Population Zone}

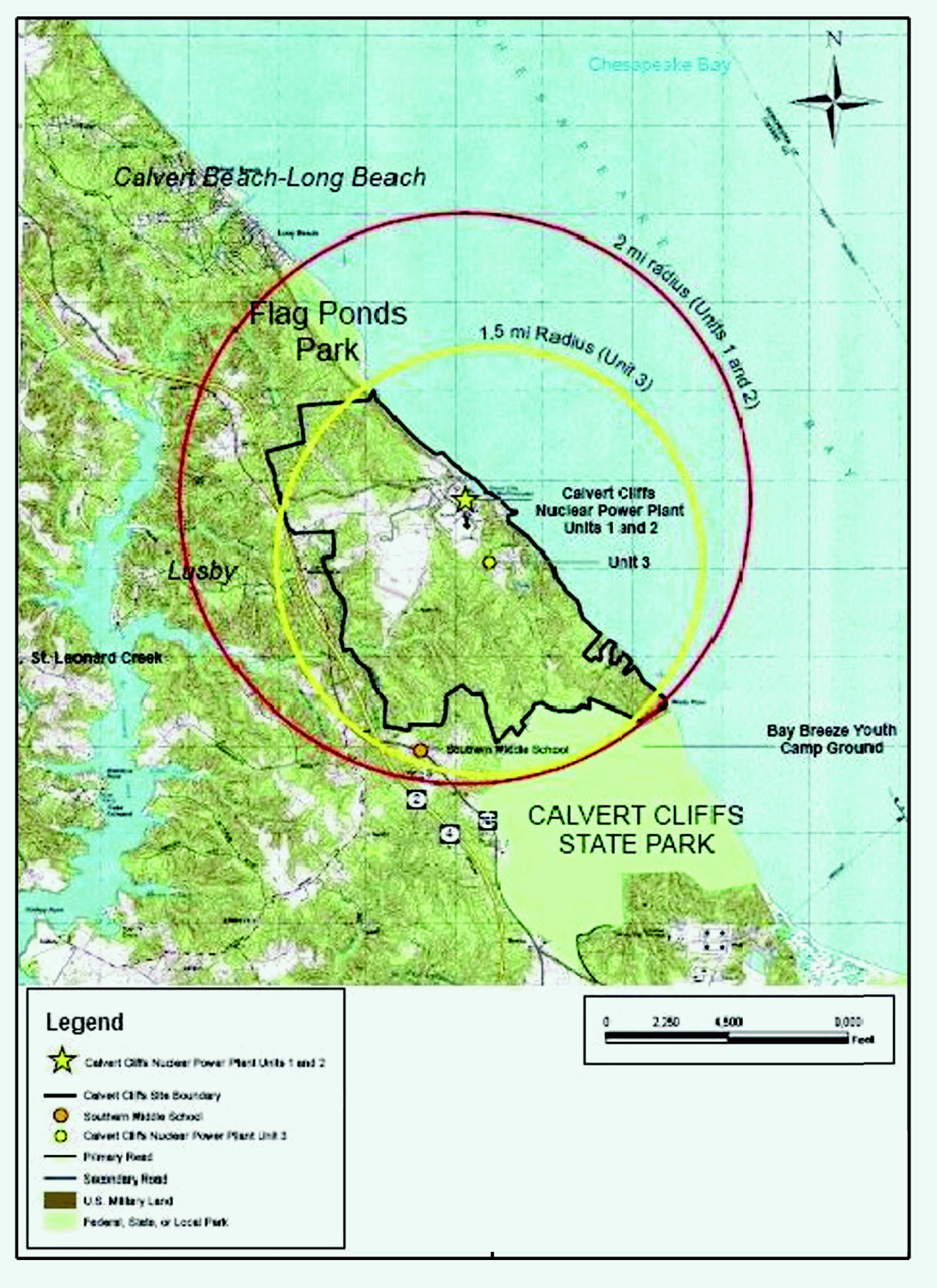

Figure 2.1-24 — {10 mi (16 km) 2015 Population Distribution}

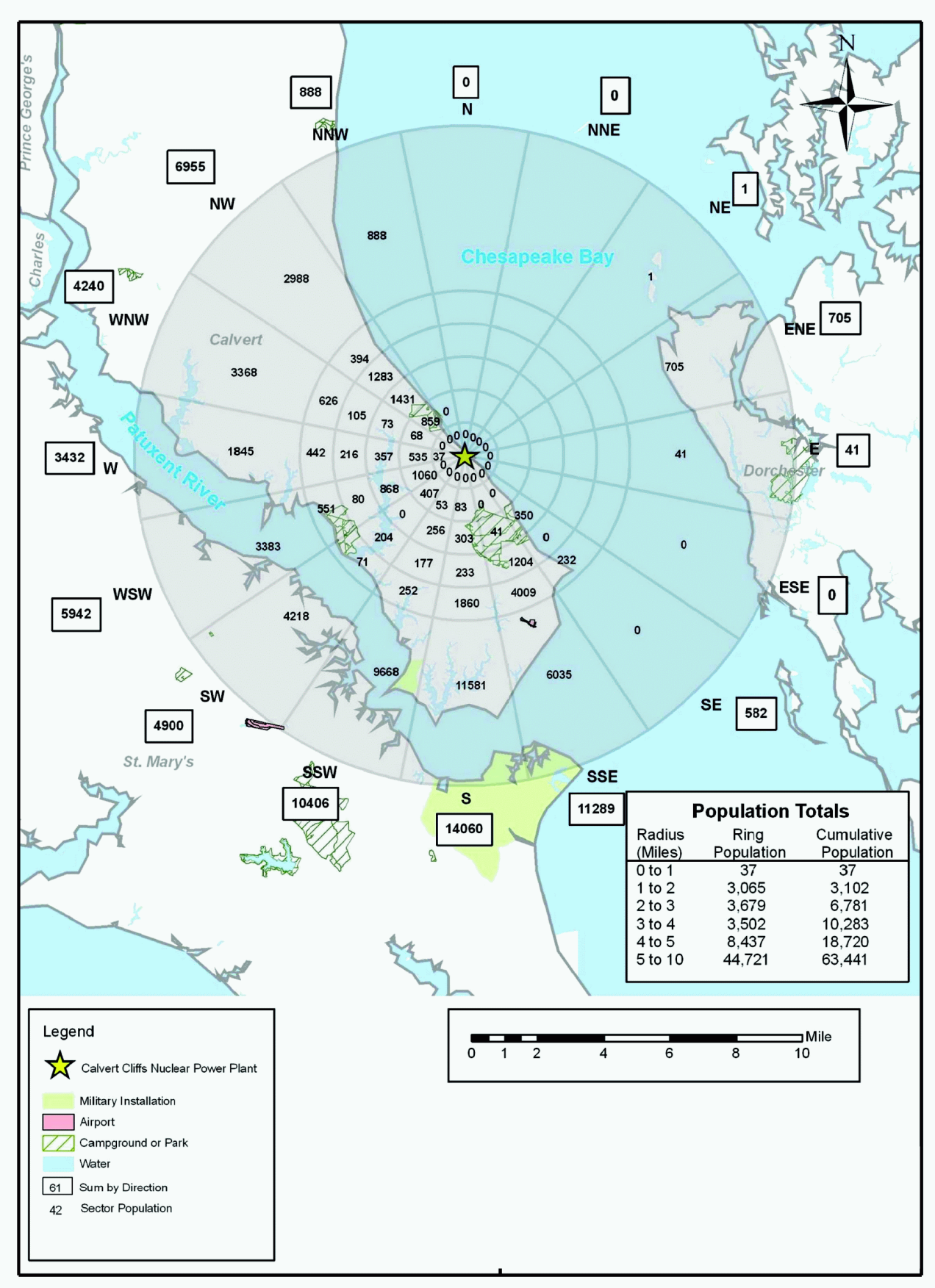

Figure 2.1-25 — {10 mi (16 km) 2055 Population Distribution}

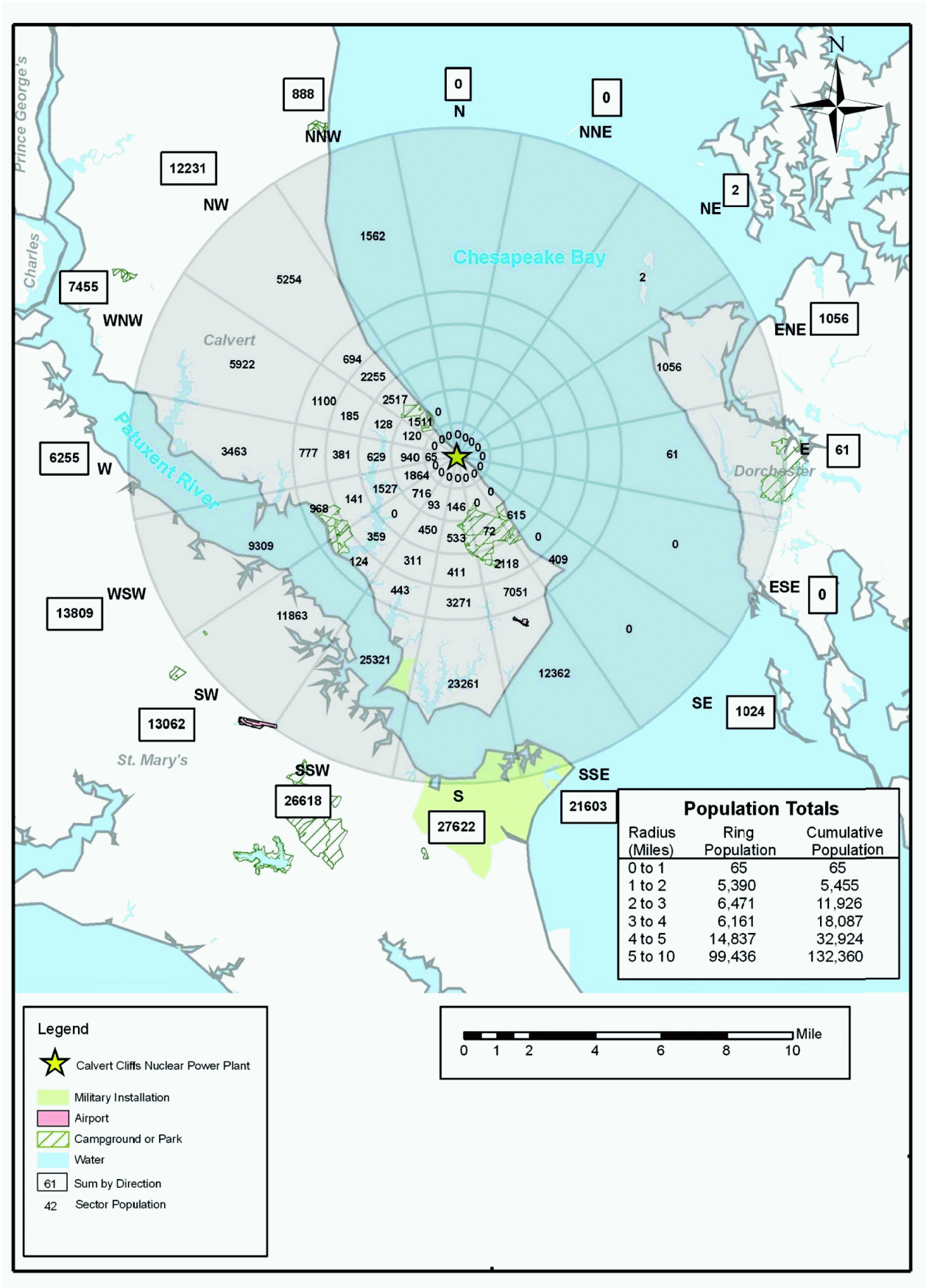

Figure 2.1-26 — {50 mi (80 km) 2015 Population Distribution}

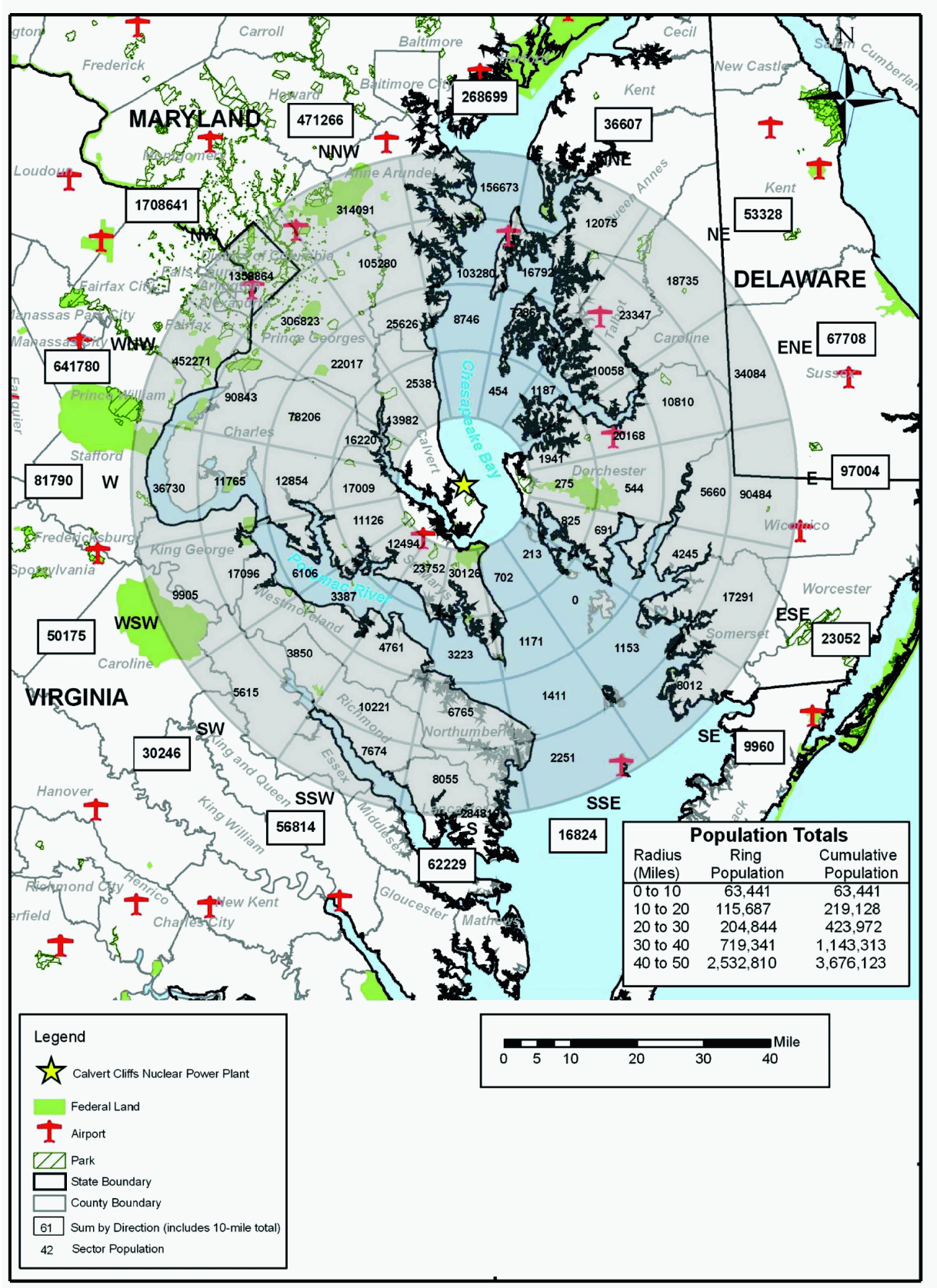

Figure 2.1-27 — {50 mi (80 km) 2055 Population Distribution}

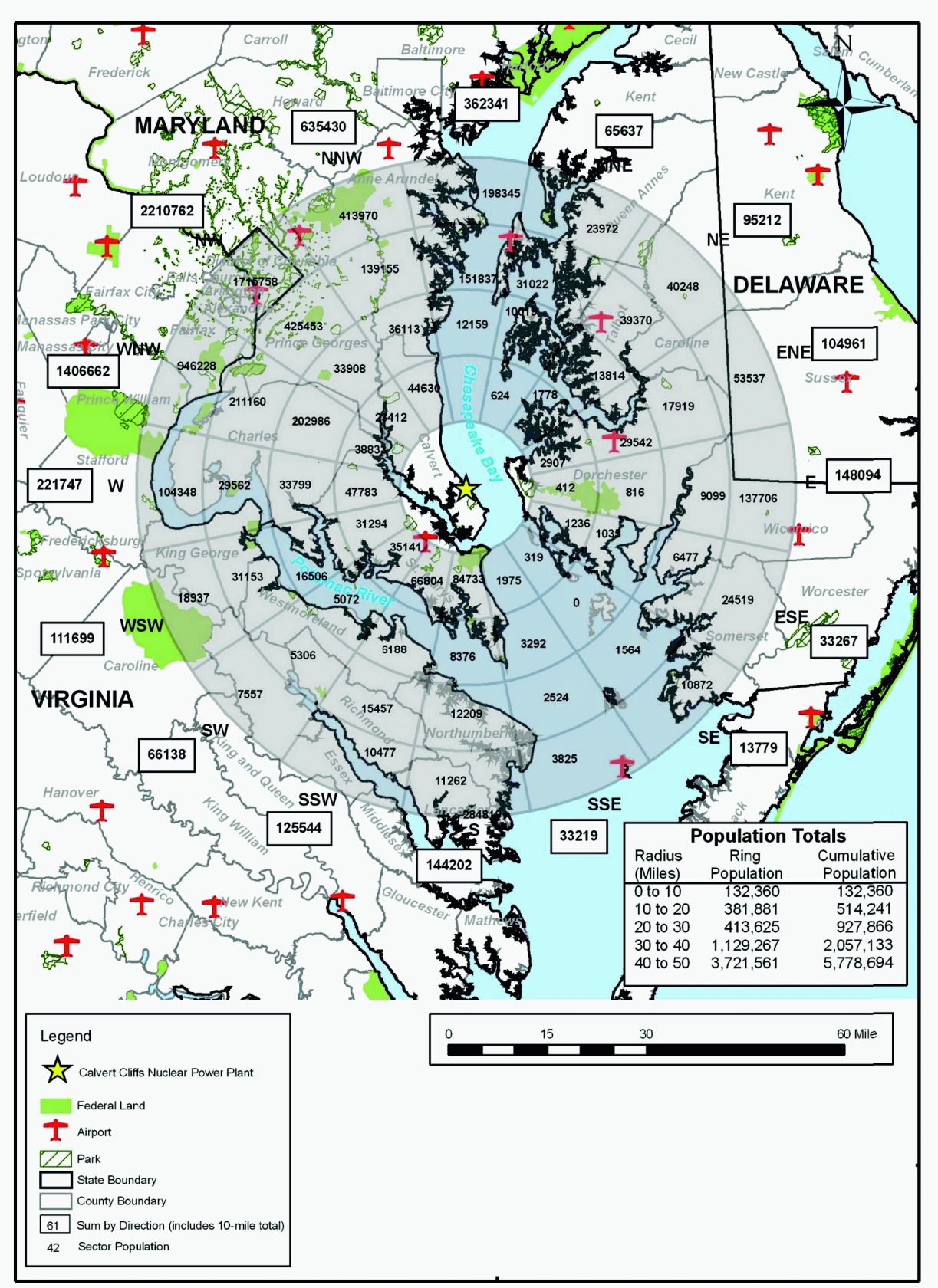

Figure 2.1-28 — {Population Compared to NRC Siting Criteria}