3.5 METEOROLOGY AND AIR QUALITY

3.5.1 Meteorology

The climate of the region may be broadly classified as humid continental. The Cumberland Mountains to the northwest help to shield the region from cold air masses that frequently penetrate far south over the plains and prairies in the central United States during the winter months. In summer, tropical air masses from the south provide warm and humid conditions that often produce thunderstorms. However, anticyclonic (clockwise) circulation around high-pressure systems centered in the western Gulf of Mexico can bring dry air from the southwestern United States into the region, leading to occasional periods of drought. Elevation affects the temperature and precipitation over the region; cooler temperatures and greater precipitation generally occur at the higher elevations of the Great Smoky Mountains. Severe storms are relatively rare because the region lies east of the tornado belt, south and east of most blizzard occurrences, and too far inland to be much affected by hurricanes (Gale Research Company 1985).

The nearest locations to Section 8B for which climatic data are available are Gatlinburg [elevation 443 m (1454 ft)], about 24 km (15 miles) to the west-southwest, and Newport [elevation 317 m (1040 ft)], about the same distance to the north-northeast. The elevation of the proposed parkway Section 8B varies from about 411 m (1350 ft) to about 747 m (2450 ft), averaging close to 579 m (1900 ft).

Average annual temperature in Gatlinburg is 13.2°C (55.7°F); in Newport it is 14.1°C (57.3°F). The coldest month is January, averaging 2.5°C (36.5°F) at both locations; the warmest month is July, averaging 23.0°C (73.4°F) at Gatlinburg and 24.8°C (76.6°F) at Newport (Gale Research Company 1985). The temperature falls below freezing on an average of 115 days per year at Gatlinburg and 98 days per year at Newport, with about 90% of those days occurring during November through March. Temperatures fall below −17.8°C (0°F) on an average of only one day per year at both locations. Daytime high temperatures rise above 32.2°C (90°F) on an average of 24 days per year at Gatlinburg and 42 days per year at Newport, mostly during June, July, and August (Gale Research Company 1985). Temperature summaries for Gatlinburg and Newport are given in Table 20. Up-to-date records of extreme temperatures are not readily available from those stations. The nearest stations with such records are Knoxville [McGhee-Tyson Airport, elevation 299 m (980 ft)], located about 58 km (36 miles) west of Webb Mountain, and Asheville, North Carolina [elevation 652 m (2140 ft)], about 72 km (45 miles) east-southeast of Webb Mountain. (Webb Mountain is a convenient reference point, being located about midway along the route of proposed parkway Section 8B.) The lowest temperature ever recorded in Knoxville was −31°C (−24°F), and the highest was 39°C (103°F). The lowest temperature ever recorded at Asheville was −27°C (−16°F), and the highest was 38°C (100°F).

Average precipitation in the GSMNP varies with elevation. The highest elevations, around Clingman's Dome, receive an average of over 204 cm (80 in.) of precipitation annually (NPS 1982). The annual average at Gatlinburg is 144.6 cm (57.9 in.); at Newport it is 114.0 cm (44.9 in.). Precipitation amounts of 0.25 cm (0.1 in.) or more occur on an average of 96 days per year at Gatlinburg and 88 days per year at Newport (Gale Research Company 1985). Average monthly precipitation amounts do not vary greatly over the course of the year, ranging from 7.95 cm (3.13 in.) in October to 15.37 cm (6.05 in.) in July at Gatlinburg, and from 6.53 cm

Table 20. Temperature data for Gatlinburg and Newport, Tennessee (°F)

	Mean monthly		Mean daily maximum		Mean daily minimum	
Month	Gatlinburg	Newport	Gatlinburg	Newport	Gatlinburg	Newport
January	36.5	36.5	48.2	47.2	24.7	25.9
February	39.1	39.3	51.9	51.1	26.2	27.5
March	47.2	47.6	61.0	60.4	33.3	34.8
April	56.5	57.9	71.5	71.8	41.5	44.0
May	63.7	65.8	78.0	79.0	49.2	52.6
June	70.1	73.1	83.5	85.5	56.7	60.6
July	73.4	76.6	86.3	88.6	60.6	64.5
August	72.8	75.9	85.5	88.1	60.0	63.6
September	67.6	70.3	80.8	83.0	54.4	57.5
October	56.2	57.9	70.8	71.7	41.6	44.0
November	46.2	47.2	60.0	59.9	32.4	34.5
December	39.2	39.1	51.7	50.4	26.7	27.7
Annual	55.7	57.3	69.1	69.7	42.3	44.8

*Climatic normals for 1951–1980. To convert °F to °C, subtract 32 and divide by 1.8.
Source: Gale Research Company 1985.

(2.57 in.) in October to 12.62 cm (4.97 in.) in March at Newport. The summer peak at Gatlinburg is the result of thunderstorm activity that is particularly evident in the mountainous areas. The driest months generally occur in the fall when anticyclonic (high-pressure) systems are most frequent. Average annual snowfall at Gatlinburg is 31 cm (12.2 in.) and 32 cm (12.6 in.) at Newport. Precipitation summaries for Gatlinburg and Newport are given in Table 21.

Information on thunderstorm days and precipitation extremes is available from Knoxville and Asheville. The average number of thunderstorm days per year is 47 at Knoxville and 46 at Asheville, with most thunderstorms coming during the summer months. Maximum precipitation during a single month was 29.82 cm (11.74 in.) at Knoxville and 28.65 cm (11.28 in.) at Asheville, and maximum precipitation during a 24-hour period was 12.90 cm (5.08 in.) at Knoxville and 13.03 cm (5.13 in.) at Asheville. More information on precipitation extremes is given in Table 22.

The nearest long-term records of relative humidity are for Knoxville. Relative humidity in Knoxville averages about 72%, which is about average for the eastern United States. In Asheville, the annual average relative humidity is about 76%. The relative humidity at Asheville is slightly higher because of its higher elevation and corresponding lower air pressure and temperature; the actual amount of water vapor per kilogram of air is about the same at both locations. In general, relative humidity is highest early in the morning, during the coolest hours, and lowest during the afternoon.

Table 21. Precipitation data for Gatlinburg and Newport, Tennessee (inches)[a]

	Mean monthly		Maximum monthly		Snow			
					Mean monthly		Maximum monthly	
Month	Gatlinburg	Newport	Gatlinburg	Newport	Gatlinburg	Newport	Gatlinburg	Newport
January	4.80	3.98	12.17	10.77	4.5	5.4	17.4	16.0
February	4.34	3.61	9.42	8.31	3.8	3.8	16.8	13.6
March	5.81	4.97	11.32	10.82	1.5	1.1	17.4	10.0
April	4.88	3.96	7.41	6.03	0.0	0.1	0.0	2.0
May	4.81	4.22	8.57	8.73	0.0	0.0	0.0	0.0
June	5.60	3.81	10.97	7.81	0.0	0.0	0.0	0.0
July	6.05	4.37	14.74	7.70	0.0	0.0	0.0	0.0
August	5.08	3.63	12.64	8.65	0.0	0.0	0.0	0.0
September	3.93	3.20	8.80	5.99	0.0	0.0	0.0	0.0
October	3.13	2.57	6.71	5.61	0.0	0.0	0.0	0.0
November	4.12	3.18	8.52	5.36	0.5	0.3	3.8	3.5
December	4.38	3.48	9.24	7.85	1.9	1.9	8.7	8.8
Annual	56.93	44.88	14.74	10.82	12.2	12.6	17.4	16.0

[a]Climatic normals for 1951–1980. One inch = 2.54 cm.
Source: Gale Research Company 1985.

Table 22. Expected precipitation extremes (inches of precipitation) in Sevier County, for selected lengths of time and return periods[a]

Return period (years)	Duration										
	Hours						Days				
	0.5	1	2	3	6	12	1	2	4	7	10
2	1.2	1.5	1.9	2.1	2.5	2.9	3.3	3.8	4.5	5.1	5.8
5	1.6	1.9	2.4	2.6	3.1	3.7	4.3	5.0	5.9	6.9	7.6
10	1.8	2.2	2.8	3.0	3.5	4.2	4.9	5.7	6.6	7.8	8.9
25	2.0	2.6	3.2	3.5	4.0	4.8	5.6	6.6	7.8	9.3	10.5
50	2.2	2.8	3.5	3.8	4.8	5.5	6.3	7.4	9.0	10.5	11.3
100	2.5	3.2	3.9	4.2	5.0	5.9	6.7	8.0	9.5	11.1	12.2

Recorded maximum precipitation

	24 hours	Monthly
Knoxville (52-year record)	5.08	11.74
Asheville (25-year record)	5.13	11.28

[a]Based on Hershfield (1961) and Miller (1964). 1 in. = 2.54 cm.

Air stagnation is relatively common in eastern Tennessee (about twice as common as in western Tennessee, for example). An average of about two multi-day air stagnation episodes occur annually in eastern Tennessee, to cover an average of about 8 days per year (Korshover 1976, p. 10). August, September, and October are the most likely months for air stagnation episodes (Table 23).

Table 23. Number of Korshover stagnation episodes, by month, during the 40-year period 1936–1975 (Korshover 1976, pp. 14–19)

Number by month											
Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
0	0	0	3	8	8	5	12	9	18	6	1
Cumulative number by month											
0	0	0	3	11	19	24	36	45	63	69	70

Near-surface winds in the region are greatly influenced by local terrain features. Prevailing winds near the surface are often parallel to the nearest ridge. Mountain-valley winds are upslope (moving upward along the valley floor and adjacent slopes) during the day and downslope (opposite of upslope) at night. In some cases, converging ridges can channel the near-surface wind, causing air to converge and leading to a "throttling" effect in which the winds speed up considerably. On rare occasions, such winds have been known to uproot trees in GSMNP.

Prevailing winds aloft are from the west, and these winds interact with the complex pattern of surface air flow to produce different wind patterns at different locations. Near-surface winds at any specific location may not be accurately described by data from a station as near as 5 km (3 miles) away. Therefore the wind patterns from nearby stations such as the Knoxville airport, or even from a single station located on the proposed route of Section 8B, would not indicate the varying wind patterns along the entire route. Further, no records of wind data are available from anywhere along the proposed route. Therefore it is not possible to present a documented summary of the wind patterns along the route of the proposed parkway section.

3.5.2 Air Quality and Visibility

National Ambient Air Quality Standards (NAAQS) exist for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), lead (Pb), and two sizes of particulate matter: particles less than 10 μm in diameter (PM-10) and particles less than 2.5 μm in diameter (PM-2.5). The NAAQS are expressed as concentrations of the above pollutants that are not to be exceeded in the ambient air—that is, in the outdoor air to which the general public has access [40 CFR 50.1(e)]. Primary NAAQS are designated to protect human health; secondary NAAQS are designated to protect human welfare by safeguarding environmental resources (e.g., soils, water, plants, and animals) and manufactured materials. Primary and secondary NAAQS are presented in Table 24.

Table 24. Air quality standards[a]

Pollutant	Averaging period	National ambient air quality standard		Allowable increment for prevention of significant deterioration	
		Primary	Secondary	Class I	Class II
Sulfur dioxide (SO_2)	3-hour[b]		1300	25	512
	24-hour[b]	365	—	5	91
	annual	80	—	2	20
Nitrogen dioxide (NO_2)	annual	100	100	2.5	25
Carbon monoxide (CO)	1-hour[b]	40,000	—	—	—
	8-hour[b]	10,000	—	—	—
Ozone (O_3)	1-hour[c]	245[d]	245[d]	—	—
	8-hour[e]	167[d]	167[d]	—	—
PM-10[f]	24-hour[g]	150	150	8	30
	annual[h]	50	50	4	17
PM-2.5[i]	24-hour[j]	65	65	—	—
	annual[h]	15	15	—	—
Lead (Pb)	3-month[k]	1.5	1.5	—	—
Additional state of Tennessee secondary standards for fluorides					
Fluorides (HF)[l]	30-day[b]	1.2			
	7-day[b]	1.6			
	24-hour[b]	2.9			
	12-hour[b]	3.7			
Additional state of North Carolina standards					
Total suspended particles (TSP)	annual	75[m]	—	—	—
	24-hour	150[b]	—	—	—

[a]All concentrations are in units of micrograms per cubic meter.
[b]Not to be exceeded more than once per year.
[c]Not to be exceeded more than 1 day per year on the average over 3 years.
[d]These figures include the allowance for rounding off the measured values, as per EPA (1979) and 40 CFR 50, Appendix I.
[e]The 8-hour standard will apply when sufficient data are available to determine attainment status; technically, the 1-hour standard is no longer applicable, as of June 5, 1998 (*Fed. Reg.* 63 31014).
[f]Particulate matter less than or equal to 10 μm in diameter.
[g]Within 3 years, the standard will apply to a 3-year average of annual 4th-highest daily values.
[h]A 3-year average of the annual means.
[i]Particulate matter less than or equal to 2.5 μm in diameter.
[j]The 3-year average of annual 8th-highest daily values.
[k]Calendar quarter.
[l]Gaseous fluorides expressed as HF.
[m]Geometric mean.

In addition to these standards, Tennessee has adopted secondary standards for gaseous fluorides expressed as hydrogen fluoride (HF), and North Carolina has general standards for total suspended particulate matter (TSP). These standards are also summarized in Table 24.

In addition to ambient air quality standards, which represent an upper bound on allowable pollutant concentrations, standards exist for the prevention of significant deterioration (PSD) of air quality. The PSD standards differ from the NAAQS in that the NAAQS provide maximum allowable *concentrations* of pollutants, while PSD requirements provide maximum allowable *increases in concentrations* of pollutants for areas already in compliance with the NAAQS. PSD standards are therefore expressed as allowable *increments* in the atmospheric concentrations of specific pollutants. Allowable PSD increments currently exist for three pollutants, NO_2, SO_2, and PM-10. PSD increments are particularly relevant when a major proposed action (involving a new source or a major modification to an existing source) may degrade air quality without exceeding the NAAQS, as would be the case, for example, in an area where the ambient air is very clean.

Allowable PSD increments are given in Table 24. One set of allowable increments exists for Class II areas, which cover most of the United States, and a much more stringent set of allowable increments exists for Class I areas, which are specifically designated areas where the degradation of ambient air quality is to be severely restricted. Class I areas include many national parks and monuments, wilderness areas, and other areas as specified in 40 CFR 51.166. The nearest Class I area is GSMNP. The northern boundary of GSMNP is almost adjacent to the proposed ROW just west of Rocky Grove.

Sevier and Cocke Counties are in attainment of all federal and state air quality standards (40 CFR 81:334 and 343). Surrounding counties in Tennessee and North Carolina are also in attainment of all state and national standards. Knox County was in marginal nonattainment of the ozone standard from January 6, 1992, until October 27, 1993 (40 CFR 81:343). That nonattainment classification was based on exceedances during 1988 at the Rutledge Pike monitoring station, located in the eastern part of Knoxville, about 56 km (35 miles) west-northwest of the midpoint of the proposed parkway section.

Existing air quality data from the GSMNP and surrounding stations are summarized in Table 25. Ozone is monitored in and near the Park; SO_2 and PM-10 are monitored near the Aluminum Company of America (Alcoa) Aluminum Plant (the nearest major source of these pollutants); CO is produced and monitored primarily in urban areas; and lead and NO_2 are only monitored at a few distant locations because of their low background levels in eastern Tennessee and western North Carolina.

Because of the reduction in the use of leaded gasolines, ambient air concentrations of lead have diminished markedly in recent years. The major sources of air pollutants near the proposed ROW are to the west. The Alcoa plant in the city of Alcoa is about 56 km (35 miles) from the midpoint of the proposed parkway section. McGhee-Tyson Airport is about 58 km (36 miles) distant in almost the same direction. Bull Run Steam Plant is roughly 80 km (50 miles) west-northwest of Section 8B. As noted above, the eastern part of Knoxville is about 56 km (35 miles) to the west-northwest of the midpoint of the ROW. Major pollutants from these sources that are most likely to adversely affect GSMNP include SO_2, oxides of nitrogen (NO_x) (the collective term for NO and

Table 25. Air quality monitoring data[a]

Pollutant	Monitoring location[b]	Year	Averaging period	Highest concentration	NAAQS	Highest concentration as a percentage of NAAQS
Sulfur dioxide (SO_2)	Alcoa, Tenn.	1992	3-hour	382	1300	29
		1993	3-hour	504	1300	39
		1994	3-hour	339	1300	26
		1995	3-hour	364	1300	28
		1996	3-hour	343	1300	26
		1992	24-hour	149	365	41
		1993	24-hour	178	365	49
		1994	24-hour	156	365	43
		1995	24-hour	140	365	38
		1996	24-hour	194	365	53
		1992	annual	25	80	31
		1993	annual	25	80	31
		1994	annual	25	80	31
		1995	annual	27	80	34
		1996	annual	24	80	30
Nitrogen dioxide (NO_2)	McMinn County, Tenn.	1992	annual	24	100	24
		1993	annual	28	100	28
		1994	annual	26	100	26
		1995	annual	24	100	24
		1996	annual	26	100	26
	Sullivan County, Tenn.	1992	annual	34	100	34
		1993	annual	32	100	32
		1994	annual	32	100	32
		1995	annual	34	100	34
		1996	annual	34	100	34
Carbon monoxide (CO)	Knoxville, Tenn.	1992	1-hour	10,350	40,000	26
		1993	1-hour	12,075	40,000	30
		1994	1-hour	8,280	40,000	21
		1995	1-hour	8,625	40,000	22
		1996	1-hour	6,210	40,000	16
		1992	8-hour	6,210	10,000	62
		1993	8-hour	6,095	10,000	61
		1994	8-hour	5,520	10,000	55
		1995	8-hour	5,060	10,000	51
		1996	8-hour	4,600	10,000	46
	Kingsport, Tenn.	1992	1-hour	7,820	40,000	20
		1993	1-hour	8,625	40,000	22
		1994	1-hour	6,785	40,000	17
		1995	1-hour	6,900	40,000	17
		1996	1-hour	6,210	40,000	16
		1992	8-hour	4,485	10,000	45
		1993	8-hour	8,165	10,000	82
		1994	8-hour	4,485	10,000	45
		1995	8-hour	3,910	10,000	39
		1996	8-hour	3,910	10,000	39

Table 25. continued

Pollutant	Monitoring location[b]	Year	Averaging period	Highest concentration	NAAQS	Highest concentration as a percentage of NAAQS
Ozone (O_3)	Look Rock GSMNP, Tenn. (Blount Co.)	1992	1-hour	192	245[c]	82
		1993	1-hour	210	245[c]	89
		1994	1-hour	227	245[c]	97
		1995	1-hour	241	245[c]	103
		1996	1-hour	208	245[c]	89
		—	8-hour[d]	—	167[c]	157
	Cove Mountain GSMNP, Tenn. (Sevier Co.)	1992	1-hour	174	245[c]	74
		1993	1-hour	221	245[c]	94
		1994	1-hour	235	245[c]	100
		1995	1-hour	231	245[c]	98
		1996	1-hour	218	245[c]	93
		1992	8-hour	165	167[c]	99[e]
		1993	8-hour	174	167[c]	104[e]
		1994	8-hour	172	167[c]	103
		1995	8-hour	182	167[c]	109
		1996	8-hour	180	167[c]	108
	Clingman's Dome, GSMNP	1993	1-hour	161	245[c]	69
		1994	1-hour	200	245[c]	85
		1995	1-hour	210	245[c]	89
		1996	1-hour	208	245[c]	89
		—	8-hour[d]	—	167[c]	—
Particulate matter (PM-10)[f]	Maryville, Tenn.	1992	24-hour	51	150	34
		1993	24-hour	63	150	42
		1994	24-hour	38	150	25
		1995	24-hour	51	150	34
		1996	24-hour	46	150	31
		1992	annual	25	50	50
		1993	annual	23	50	46
		1994	annual	22	50	44
		1995	annual	24	50	48
		1996	annual	22	40	44
	Asheville, N.C.	1992	24-hour	41	150	27
		1993	24-hour	56	150	37
		1994	24-hour	34	150	23
		1995	24-hour	41	150	27
		1996	24-hour	44	150	29
		1992	annual	23	50	46
		1993	annual	22	50	44
		1994	annual	19	50	38
		1995	annual	18	50	36
		1996	annual	19	50	38

Table 25. continued

Pollutant	Monitoring location[b]	Year	Averaging period	Highest concentration	NAAQS	Highest concentration as a percentage of NAAQS
Particulate matter (PM-2.5)[g]		—	24-hour	—	65	—
		—	annual	—	15	—
Total suspended particles (TSP)[h]	Asheville, N.C.	1992	24-hour	63	150	42
		1993	24-hour	85	150	57
		1994	24-hour	67	150	45
		1995	24-hour	58	150	39
		1996	24-hour	82	150	55
		1992	annual[i]	27	75	36
		1993	annual[i]	30	75	40
		1994	annual[i]	30	75	40
		1995	annual[i]	30	75	40
		1996	annual[i]	36	75	48
Lead (Pb)	Nashville, Tenn.	1992	3-month[j]	0.11	1.5	7
		1993	3-month[j]	0.10	1.5	7
		1994	3-month[j]	0.08	1.5	5
		1995	3-month[j]	0.08	1.5	5
		1996	3-month[j]	0.07	1.5	5

[a]Units are micrograms per cubic meter.

[b]For monitoring stations not located in GSMNP, approximate distances and directions from Webb Mountain (which is located about midway along the proposed parkway route) are as follows: Alcoa and Maryville, Tenn., 37 mi. W; McMinn Co., Tenn., 70 mi. SW; Kingsport, Tenn., 65 mi. NE; Knoxville, Tenn., 35 mi. WNW; Nashville, Tenn., 200 mi. W; Asheville, N.C., 45 mi. ESE.

[c]These figures include the allowance for rounding off the measured values, as per EPA (1979) and 40 CFR 50, Appendix I.

[d]The 8-hour standard will apply when sufficient data are available to determine attainment status; technically, the 1-hour standard is no longer applicable, as of June 5, 1998 (*Fed. Reg.* 63 31014).

[e]The EPA data completeness requirement for 3-year averages was not met.

[f]Particles less than or equal to 10 μm in diameter.

[g]Particles less than or equal to 2.5 μm in diameter. These standards were recently added to the NAAQS; sufficient monitoring data are not yet available for comparison of this size of particulate matter with standards.

[h]Regulated by North Carolina; standards are state standards (not NAAQS).

[i]Geometric mean.

[j]Calendar quarter.

NO_2), and hydrocarbons. SO_2 can oxidize to form sulfate particles, which impair visibility; SO_2 and NO_x are precursors of acid precipitation; NO_x and hydrocarbons are precursors of ozone.

3.5.3 Potential Effects of Pollutants on Resources at GSMNP

3.5.3.1 Visibility

Many pollutants contribute to visibility reductions, although SO_2 (which oxidizes to form sulfate particles) is the primary source of concern at GSMNP. Unfortunately, no consistent historical quantitative data base exists for visibility in GSMNP (Reisinger and Valente 1985). Estimates of background visual range since 1980 have been obtained from nephelometer measurements at Look

Rock, about 40 km (25 miles) west-southwest of Gatlinburg. These estimates were summarized on a seasonal basis through 1983 by Reisinger and Valente (1985), who found that *geometric* averages of visual range varied from about 19 km (12 miles) in summer to about 72 km (45 miles) in spring, with the annual (geometric) average being about 53 km (33 miles). More recently, Shaver, Tonnessen, and Maniero (1994) have indicated that the annual *median* is now closer to 39 km (24 miles), suggesting a decline from the earlier (early 1980s) value. However, the more recent figures suggest that the typical (median) summer visibility is still around 19 km (12 miles) (Shaver, Tonnessen, and Maniero 1994). Note that the statistics used to summarize visibility often vary from one study to the next (e.g., geometric mean is used one time and median the next, as above), so that the documentation and quantification of visibility trends remains difficult.

There are six integral vista observation points in GSMNP. These are relatively high elevation locations from which distant scenic objects can be viewed over a wide range of directions. These observation points and their distances from the proposed parkway section are listed in Table 26.

Table 26. Integral vista observation points of the Great Smoky Mountains National Park

Observation point	Approximate distance and direction from Webb Mountain[a]
Mount Cammerer Tower	18 km (11 miles) E
Mount Sterling Tower	23 km (14 miles) E
Newfound Gap	21 km (13 miles) SSE
Clingman's Dome Tower	29 km (18 miles) SSE
Cove Mountain Tower	26 km (16 miles) WSW
Look Rock Tower	56 km (35 miles) WSW

[a]Webb Mountain is a convenient reference point, located about midway along the route of proposed Section 8B.

3.5.3.2 Acid Precipitation

Acid precipitation is associated mainly with SO_2 and NO_x. The acidity of precipitation is measured on the pH scale, in which lower numbers indicate more acidic compounds. Natural precipitation has a pH of about 5.6. The pH of precipitation in GSMNP averages about 4.4, while the lowest in North America is about 4.15 in western New York and northwestern Pennsylvania. Acid precipitation has been associated with a reduction in frost-hardiness in high-elevation red spruce in the northeastern United States, and there is some evidence that the same phenomenon may be occurring in the southeastern United States (NAPAP 1991).

3.5.3.3 Ozone

Ozone is formed when an ordinary oxygen molecule (O_2) combines with a single oxygen atom (O). Single oxygen atoms are formed when ultraviolet radiation breaks the molecular bonds

between two oxygen atoms, which may be joined together simply (O_2) or associated with other elements (e.g., in NO_2). The separation of O_2 molecules takes place primarily in the stratosphere [the layer of the atmosphere from about 13 to 48 km (8 to 30 miles) above the earth's surface].

Most of the sun's radiation that penetrates below the stratosphere is in wave lengths that are too long to break the O_2 molecule into single atoms. However, the waves are still short enough to separate single oxygen atoms from NO_2, and these atoms subsequently combine with O_2 to form O_3. Formation of NO_2 in the troposphere (the layer of air between the earth's surface and the stratosphere) may be due to natural phenomena (e.g., lightning), or to human activities (e.g., burning fossil fuels). Natural processes and human activities also produce hydrocarbons, which can act to inhibit ozone destruction and to promote the formation of NO_2 from nitric oxide (NO). Thus, NO_x and hydrocarbons react (sometimes in complex ways) to account for most of the ozone produced in the troposphere.

An important mechanism for ozone destruction is deposition at the earth's surface (e.g., on plants, soil, and certain manufactured materials) where it reacts with other chemicals, often causing damage. Because a significant amount of ozone destruction occurs at the earth's surface, ozone concentrations tend to be lower in the air near the surface than in the overlying air unless mechanisms are present to replenish the ozone near the surface. Sunlight is an important mechanism to replenish near-surface ozone because it is a required catalyst in ozone formation and because it heats the earth's surface and the near-surface atmosphere. The warm air rises from the surface and cooler overlying air sinks to replace it, resulting in vertical mixing that brings ozone-rich air from aloft to near the surface. Most of this vertical mixing takes place in the lower troposphere, within about 2.4 km (1.5 miles) of the surface.

The troposphere receives ozone from the lower stratosphere, where ozone is abundant and is occasionally transported downward by vertical motions known as stratospheric intrusions and by further mixing in the troposphere. Those natural processes are augmented by another mechanism for ozone enrichment of the troposphere, in which vertical mixing transports ozone-rich air from aloft to urban areas with high levels of ozone production, where the air becomes even further enriched before rising again.

During the daylight hours, especially in urban areas, there is often a pronounced peak in ozone concentrations because of the transport of ozone-rich air from aloft into a region of ozone production where further ozone-enrichment takes place. At night, sunlight is not present to (1) act as a catalyst in ozone formation and (2) induce vertical mixing of the atmosphere by heating the earth's surface. Therefore, ozone deposited on surface materials at night is not replenished. The absence of vertical mixing at night may also cause substances originating at the surface to tend to remain there, so that substances with which ozone reacts (e.g., terpenes) sometimes accumulate in the near-surface air during the night, resulting in further depletion of atmospheric ozone. The result is a tendency for atmospheric ozone concentrations to be greatly reduced during the night and early morning hours at low-elevation sites.

The situation is different at exposed high-elevation sites, where ozone-rich air does not have to be transported downward to reach the surface. Exposed high-elevation sites tend to have high levels of surface-air ozone concentrations during all hours of the day and night. The result is that daily

and longer-term average ozone values are often higher at exposed locations within the GSMNP than at lower-elevation sites in the Tennessee Valley.

Several plant species in the park show varying degrees of evidence of ozone sensitivity. There appears to be a correlation between elevation, ozone concentration, and visible tree injury among certain species, notably black cherry (*Prunus serotina*), and sassafras (*Sassafras albidum*). Visible ozone injury on native plant species within the park has been reported by Chappelka, Renfro, and Somers (1994). More information about vegetation responses to air pollutants in GSMNP is provided in Sect. 4.4.1.5.

3.5.3.4 Regulated Pollutants of Lesser Concern at GSMNP

In addition to PM-10, SO_2, NO_2, and O_3, pollutants regulated by NAAQS or by Tennessee or North Carolina include lead, CO, fluorides, and TSP. No major sources of atmospheric lead have been identified close to the proposed parkway. The nearest sources of CO are Knoxville, about 56 km (35 miles) west-northwest of Webb Mountain; Maryville and Alcoa, about the same distance west of Webb Mountain; and the Sevierville-Gatlinburg strip of U.S. 441 that runs about 19 km (12 miles) west of Webb Mountain and intersects the proposed parkway about 11 km (7 miles) west of the western end of Section 8B. (Webb Mountain is a convenient reference point, being located about midway along the route of proposed parkway section.) Since 1989, CO concentrations in the metropolitan areas near GSMNP have not exceeded two-thirds of the NAAQS, and no resources within the park currently appear to be threatened by atmospheric CO.

The Tennessee secondary standards for fluorides arise primarily from work that was carried out at the Oak Ridge Gaseous Diffusion Plant (now the East Tennessee Technology Park), southwest of the city of Oak Ridge and about 97 km (60 miles) west of Webb Mountain. That plant ceased operation several years ago, and the stored supply of chlorofluorocarbon (CFC-114) has been transferred to other gaseous diffusion plants at Paducah, Kentucky, and Portsmouth, Ohio. As recently as 1993, more than 5000 cylinders containing uranium hexafluoride (UF_6) were stored at the East Tennessee Technology Park.

Concentrations of TSP in the area around GSMNP seldom exceed 50% of the North Carolina standards and are not considered a threat to vegetation. Visibility reductions arise primarily from particles less than about 2.5 μm in diameter. As noted above, sulfates are the particles of major concern regarding visibility in GSMNP.

3.6 EXISTING SOCIOECONOMIC CONDITIONS

3.6.1 Introduction

Socioeconomic impact analysis begins by defining the impact region—that area where project-related effects are expected to be most intense. For the proposed Foothills Parkway project, the impact region consists of the area where most inmoving construction workers would locate and where most operations-related traffic, land-use changes, economic impacts, and associated effects would occur.

Section 8B is located approximately 80 km (50 miles) southeast of Knoxville, Tennessee, and 400 km (250 miles) northeast of Atlanta, Georgia. During the construction period, when the socioeconomic impacts generated by a small work force are expected to be minor, the impact area would include most of Sevier and Cocke Counties—the two Tennessee counties in which Section 8B is located (Fig. 44). During the operations period, when increased tourist visits to the area could occur, impacts are likely to be more intense but are expected to be largely confined to southeastern Sevier County and the southwest corner of Cocke County. Specifically, Pittman Center—at or near the proposed western terminus of Section 8B—and, to a lesser extent, Cosby—at the eastern terminus of Section 8B—are likely to bear the largest share of any parkway-induced impacts (Fig. 45).

Existing conditions for each important socioeconomic subject area are discussed below. Each of the following sections will provide some information on Cocke and Sevier Counties as a whole and on the towns of Gatlinburg and Pigeon Forge, which are located near the western terminus of Foothills Parkway Section 8C—the section immediately to the west of Section 8B. However, this report will focus most closely on Pittman Center and Cosby because their small size, rural nature, and location at either end of Section 8B make them most susceptible to potential impacts. The towns of Newport (the county seat and largest municipality of Cocke County) and Sevierville (Sevier County's seat and largest municipality) are described briefly in the population section, but a further discussion of these towns is unnecessary because they are not likely to be affected to any significant extent by the parkway project.

3.6.2 Population

3.6.2.1 Current Population

The current populations of Sevier and Cocke Counties and their largest towns are presented in Table 27. While population growth in Cocke County was moderate between 1960 and 1980, the rate of population expansion decreased to almost zero between 1980 and 1990. Since 1990, however, this trend seems to have been reversed; population grew by almost 6% between 1990 and 1994. Cocke County's average 1994 population density was 69.5 persons per square mile. The population of Newport—Cocke County's largest city—actually declined during the 1980s; more recent data are not yet available to show whether this pattern has held since 1990. Cosby is an unincorporated town in southeastern Cocke County, whose approximate borders enclose an area south of Cosby Creek and west of the ridges traversed by Foothills Parkway Section 8A. This area, referred to by longtime residents as Lower Cosby, had a population of roughly 1200 in 1990. Although more recent population numbers are not available, local officials report that the Cosby area is the fastest growing part of Cocke County (J. Grooms, executive director of the Cocke County Economic Development Commission, personal communication with M. Schweitzer, ORNL, January 11 and May 9, 1995; F. James, Attendance Supervisor, Cocke County School System, personal communication with M. Schweitzer, ORNL, May 9 and 10, 1995).

Sevier County, which has experienced substantial tourism-related growth and development in recent decades, has grown at a significantly greater rate than Cocke County. Sevier County's most rapid population growth occurred between 1970 and 1980. The rate of increase slowed during the 1980s but has picked up again since 1990. The average 1994 population density in Sevier County was 97.3 persons per square mile. Gatlinburg and Pittman Center both grew substantially in the

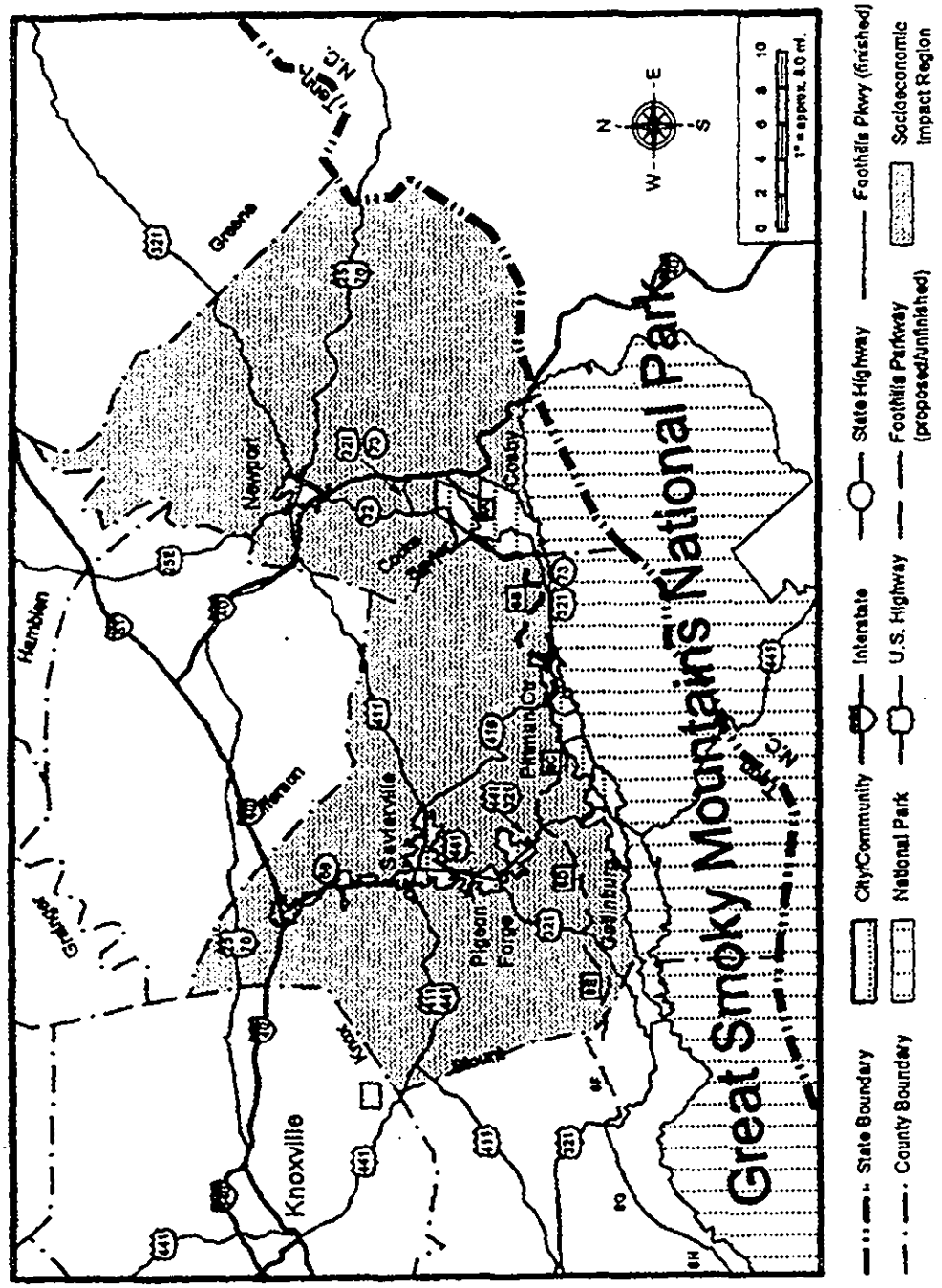


Fig. 44. Socioeconomic impact region, Foothills Parkway Section 8B.

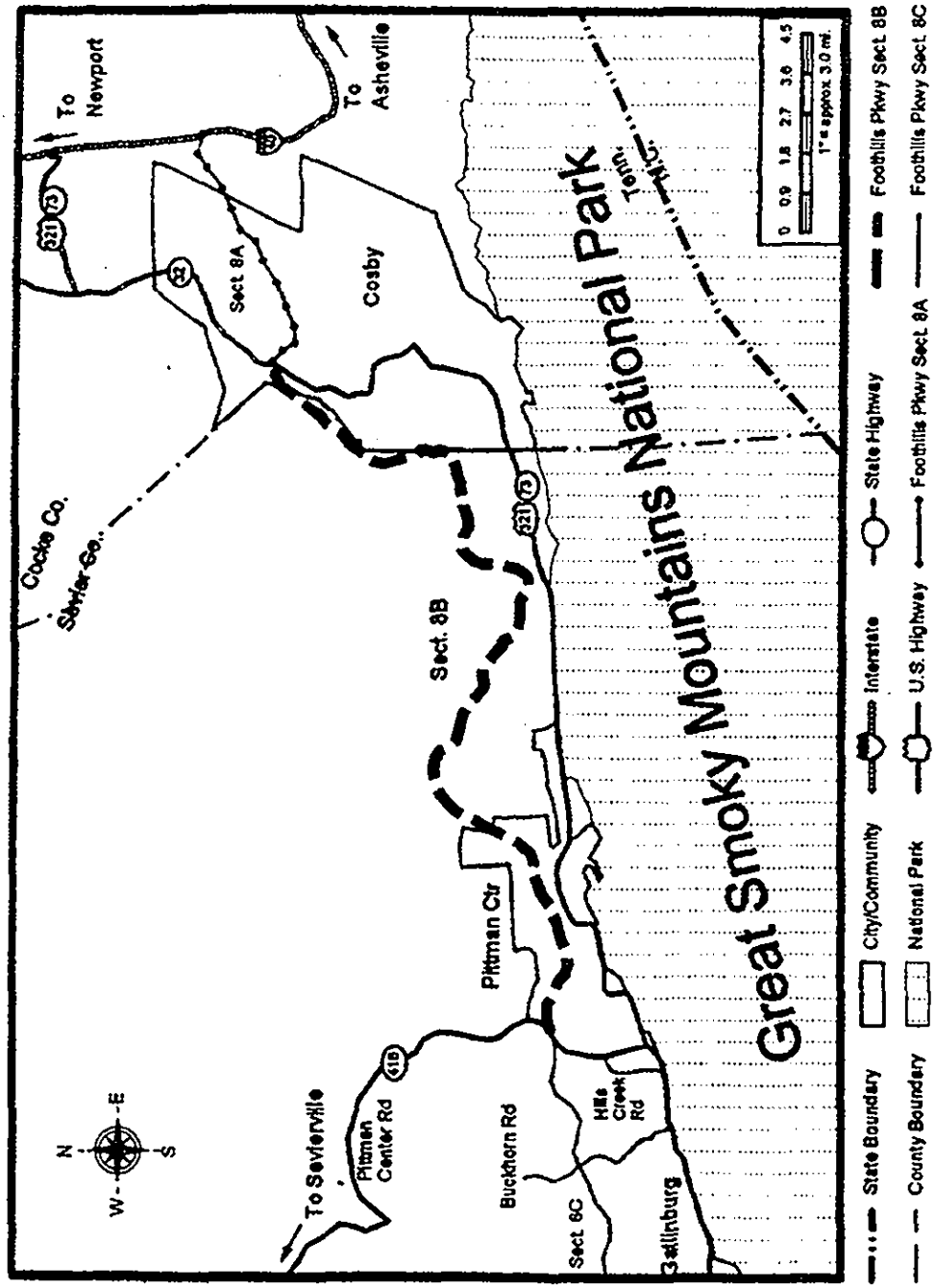


Fig. 45. Foothills Parkway Section 8B and immediate vicinity.

Table 27. Population in the area of Foothills Parkway Section 8B

	1960 population	1970 population	1980 population	1990 population	1994 population	Percent change 1960–70	Percent change 1970–80	Percent change 1980–90	Percent change 1990–94
Sevier County	24,251	28,241	41,418	51,043	58,184	16.5	46.7	23.2	14.0
Gatlinburg	1,764	2,329	3,500	3,417	NA	32.0	50.3	−2.4	NA
Pigeon Forge	NA	1,361	1,822	3,027	NA	NA	33.9	66.1	NA
Pittman Center	NA	315	488	478	NA	NA	54.9	−2.0	NA
Sevierville	2,890	2,661	5,444	7,178	NA	−7.9	104.6	31.9	NA
Cocke County	23,390	25,283	28,792	29,141	30,801	8.1	13.9	1.2	5.7
Cosby	NA	NA	NA	1,220	NA	NA	NA	NA	NA
Newport	6,448	7,328	7,580	7,123	NA	13.6	3.4	−6.0	NA

NA= not available

Source: Vickers (1993); U.S. Bureau of the Census 1991, 1995; *Land Use Plan: Pittman Center, Tennessee* (1987).

1970s but experienced slight population declines during the 1980s. Pigeon Forge and Sevierville also grew rapidly during the 1970s, and their growth continued in the 1980s. Sevierville, which more than doubled in population between 1970 and 1980, was the county's most rapidly growing municipality during that decade. Pigeon Forge led the county's population growth in the 1980s, increasing its number of residents by approximately two-thirds. Although updated population figures are not available for the county's municipalities, a recent count of new residences based on the 911 emergency system indicates that Sevierville and Pigeon Forge continue to grow rapidly and that Gatlinburg and Pittman Center have also shared in the county's most recent expansion (*The Mountain Press*, February 14, 1995).

In 1994, more than 300 new residences were built in Pigeon Forge and about 220 new dwelling units were added in Sevierville. In Gatlinburg, about 50 new residences were added and Pittman Center, despite its small size, was the site of nearly 40 new dwellings.

Both Sevier and Cocke Counties are much more racially homogeneous than the state as a whole. As shown in Table 28, 16% of the state's population is black, while blacks represent only 2.1% of Cocke County's and 0.4% of Sevier County's residents. In each county, the proportion of the population under 18 is sightly less than the statewide figure. And while the relative size of the under-18 population has declined throughout the state since 1980, it has fallen more rapidly in Cocke and Sevier Counties than in the state as a whole. In contrast, the proportion of the Sevier and Cocke County populations that is 65 or over is slightly greater than for the state as a whole; this population has increased faster in these two counties than it has statewide, probably partly because of the inmigration of retirees. Of all births in Sevier County, 17.2% involve mothers under 20 years of age, the same as for the state as a whole. In Cocke County, a much higher proportion of all births (23.0%) are to women under 20. The final column in Table 28 shows that about half of Cocke County's adult population has graduated from high school, compared with about two-thirds of the population statewide. The proportion of high school graduates in Sevier County is substantially higher than in Cocke County, but still slightly below the state figure.

Table 28. Key demographic features of Cocke County, Sevier County, and Tennessee

	Percentage white (1990)	Percentage black (1990)	Percentage under 18 (1990)	Percentage 65 and over (1994)	Percentage of births to mothers under 20 (1988)	Percentage of high school graduates[a] (1990)
Sevier County	98.9	0.4	24.0	12.9	17.2	63.0
Cocke County	97.5	2.1	23.9	13.3	23.0	50.4
Tennessee	83.0	16.0	24.9	12.6	17.2	67.1

[a]Percentage of the population aged 25 and over receiving at least an high school diploma.
Source: U.S. Bureau of the Census (1995); *County and City Data Book 1994* (1994).

3.6.2.2 Population Projections

Sevier County and its three largest towns can expect continued population growth as a result of ongoing tourism-related development and the continued inmigration of retirees. The population of

Sevier County in 2005—the projected completion date for Section 8B—is expected to be somewhere between 60,000 and 70,000. The U.S. Bureau of Economic Analysis projected in 1992 that the county's population would be 59,700 in 2005 (U.S. Department of Commerce 1992), an increase of only 17% over the number of residents in 1990. Based on the growth that has already occurred during the current decade, this projection appears to be very low. In contrast, state projections made at approximately the same time envisioned a 2005 population of 68,942 (Hastings 1992), representing a growth rate of 35% for the 15-year period beginning in 1990. The state figure was projected by considering age-specific population trends and adjusting these figures according to fertility and mortality rates. Pittman Center probably will not grow as rapidly as the county as a whole, because it is not at the center of recent tourism-related development and it plans to limit commercial growth in order to maintain its more traditional mountain character (see Sect. 3.6.5.2.).

True to past trends, Cocke County is expected to grow much more slowly than Sevier County. The U.S. Bureau of Economic Analysis projected that Cocke County would have 31,400 residents in 2005 (U.S. Department of Commerce 1992), an increase of less than 8% over its 1990 population. State projections were that the county's population would be 29,096 in 2005 (Hastings 1992), a loss of 45 residents over the 15-year period. Based on the observed rate of growth between 1990 and 1994, both of these projections seem unrealistically low. Population projections are not available for Cosby because the town is not incorporated and is not directly served by any planning agency. However, much of the county's recent growth has been concentrated in the Cosby area, and this trend is likely to continue because of the demand for homes in the vicinity of the GSMNP. A major attraction of this area seems to be its natural beauty and relatively undeveloped nature.

3.6.3 Housing

Housing in Sevier and Cocke Counties consists mainly of single-family, owner-occupied structures. General housing information is provided in Table 29. In Sevier County, the number of housing units increased by 45.5% from 1980 to 1990. Housing in Gatlinburg grew at about the same rate, while the number of units in Pigeon Forge increased more rapidly than the countywide average. Pittman Center had 291 housing units in 1990, approximately 80% of them single-family structures, but the historic growth rate for the town is unavailable. A small part of the residential/recreational development known as Cobbly Nob is located in Pittman Center, but most of that community—including nearly all its housing units—lies to the east of Pittman Center. In addition to its golf courses, Cobbly Nob contains both year-round residences and vacation rental units. This area contains nearly 100 condominium units in two separate complexes and approximately 570 lots. There currently are 245 houses in Cobbly Nob and another 75 lots have been set aside by the Cobbly Nob Property Owners Association as open space. This leaves about 280 undeveloped lots, a few of which are probably unsuitable for building due to slope or soil conditions (J. Dean, Executive Secretary, Cobbly Nob Property Owners Association, personal communication with M. Schweitzer, ORNL, July 23, 1997).

In contrast with the rapid growth in Sevier County, the number of housing units in Cocke County grew by only 8.9% during the 1980s. This is about half the statewide growth rate of 16.6% for the same period. Cosby had 576 housing units in 1990, about 70% of them single-family structures. Cosby's housing growth rate is unavailable.

Housing in Cocke County, with a 1990 median value of $44,878, is considerably less expensive than in Sevier County, where the 1990 median value was $72,183 (Table 29). Monthly rents are similar in the two counties, with Cocke County having a median rent of $320 compared with $347 in Sevier County (U.S. Bureau of the Census 1991). Multifamily rental complexes are relatively scarce and, as a result, rents are beginning to rise in Sevier County; rents of $400 to $500 a month are becoming increasingly common. Rental housing is especially hard to find for those families with low incomes and seasonal employment. Currently, Sevier County has about 15 apartment complexes, but vacancies typically do not last more than a week, and some complexes go years without a vacancy. Rent-subsidized housing also fails to meet the high demand, even though Ridgewood Village in Pigeon Forge recently made available 100 rent-subsidized apartments and a 50-unit senior housing complex was recently completed in Sevierville. Despite these new developments, there is still a shortage of apartments and low- to moderate-income housing in Sevier County (J. Wagner, City Planner, Sevierville, Tennessee, Planning Office, personal communication with M. Schweitzer, ORNL, October 9, 1996).

Table 30 lists the types and numbers of vacant housing units in Sevier and Cocke Counties. In Sevier County, approximately half the vacant units are held for seasonal, recreational, or occasional use. Cocke County also has a sizable number of housing units in this category (about one-fourth of all vacancies), but the largest number of vacant units in Cocke County fall into the "other" category, which includes abandoned and dilapidated units.

The demand for new houses is overwhelming home builders in Sevier County; as a result, they have to refer or turn away more business than in the past. Part of the county's rapid growth is a result of demand for overnight rentals. Many of these new homes are being built outside the cities of Gatlinburg, Pigeon Forge, and Sevierville. According to the Sevier County Electric System, 644 more housing units were added outside these cities than within their city limits in 1993 (*The Mountain Press*, July 21, 1994).

3.6.4 Public Services

3.6.4.1 Education

The Sevier County school system comprises 14 elementary/middle schools, three high schools, one vocational center, one special learning center, and an adult high school. All Sevier County public schools are accredited by the Southern Association of Colleges and Schools, a standard more rigorous than state standards (*Everything You Always Wanted to Know about Sevier County* 1994). The schools are not zoned, so students may attend their school of choice; but bus service is only provided to and from the school closest to a student's residence.

There are two public schools in the Pittman Center area: Gatlinburg-Pittman High School, which serves grades 9–12, and Pittman Center Elementary School, which serves grades K–8. Gatlinburg-Pittman has an enrollment of 673 students and Pittman Center Elementary enrolls 222 (D. Waskoviak, Sevier County School System, personal communication with M. Schweitzer, ORNL, May 9, 1995). Over the past 10 years, enrollment at both schools has increased by about 45% (C. Elder, Director of Vocational Education, Sevier County School System, personal communication with M. Schweitzer, ORNL, May 9, 1995). Current student-teacher ratios at Pittman Center Elementary are 20:1 for K–3, 21:1 for grades 4–6, and 28:1 for grades 7–8—all of

Table 29. Housing in the area of Foothills Parkway Section 8B

Place	Total units			Singe-family structures		Median values ($)	
	1980	1990	Percent change 1980–90	1980	1990	1980	1990
Sevier County	16,604	24,166	45.5	13,405	17,067	67,658	72,183
Gatlinburg	2,044	2,923	43.0	1,380	1,932	50,800	88,700
Pigeon Forge	807	1,371	69.9	NA	929	41,200	66,600
Pittman Center	NA	291	NA	NA	228	NA	80,000
Cocke County	11,277	12,282	8.9	8,264	8,274	46,523	44,878
Cosby	NA	576	NA	NA	501	NA	43,401

NA = not available.

Source: U.S. Bureau of the Census (1991).

Table 30. Housing vacancy in the area of Foothills Parkway Section 8B

Place	Total vacant units	For rent	For sale only	Rented or sold, not occupied	Seasonal, recreational, or occasional use	Other vacant
Sevier County	4,646	936	376	240	2,270	824
Gatlinburg	1,439	386	73	33	844	103
Pigeon Forge	176	22	16	19	73	46
Pittman Center	85	4	2	1	62	16
Cocke County	1,091	255	115	172	242	307
Cosby	NA	NA	NA	NA	NA	NA

NA = not available.
Source: U.S. Bureau of the Census (1991).

which are better than the ratios required by the state (C. Henry, Principal, Pittman Center Elementary School, personal communication with M. Schweitzer, ORNL, May 9, 1995). At Gatlinburg-Pittman, the ratio of students to teachers is 18:1, which is much better than the state standard for high schools (K. Cantrell, Guidance Counselor, Gatlinburg Pittman High School, personal communication with M. Schweitzer, ORNL, May 9, 1995). At Gatlinburg-Pittman, a free-standing building containing two classrooms was built during the 1994–95 academic year, and another such building—housing a band room and an art room—was completed during the 1995–96 school year. Construction of a school theater at the high school is tentatively scheduled to begin in spring 1998 (M. Harmon, Director of Maintenance, Sevier County School System, personal communication with M. Schweitzer, ORNL, May 10, 1995, October 9, 1996, and July 23, 1997). In late 1994, local officials in Pittman Center called for construction of a new elementary school in a different location, since the existing school is in a flood hazard area (*The Mountain Press*, January 1, 1995). Since then, the county has purchased a 15-acre parcel of land on the southeast side of Pittman Center Road (SR 416), immediately south of the Foothills Parkway ROW, as a site for a future elementary school (J. Coykendall, Chairman, Pittman Center Planning Commission, personal communication with M. Schweitzer, ORNL, July 22, 1997). Private schooling is available in Sevier County in the form of a day and boarding school for grades 6–12; a day school for pre-school age, kindergarten, and primary grade children; and two schools for day students in grades K–12. A state and federally funded adult high school is available for literacy training, general equivalency diploma training, and regular high school classes for adults (*Everything You Always Wanted to Know about Sevier County* 1994).

The Cocke County public school system has nine elementary schools, two high schools, and one vocational school. Cosby has two public schools. Cosby School is located in the northernmost portion of Cosby and serves grades K–12. It has an enrollment of 902 students and provides student bus service. Smoky Mountain Elementary School, located in the southern part of Cosby, serves grades K–8 and enrolls 142 students. Its bus service extends within an approximate 16-km (10-miles) radius of the intersection of U.S. 321 (SR 73) and SR 32. Both Cosby schools have special education programs for gifted children and those with learning disabilities. Combined enrollment at the two Cosby schools has remained constant since 1986, but the number of students has increased slightly at Cosby School and declined at Smoky Mountain Elementary. Recently, Cosby School added three portable buildings containing six classrooms; these additions were largely necessitated by the school's push to reduce student-teacher ratios. Currently, the ratio of students to teachers at both schools in the Cosby area is 17:1 for K–3 and approximately 25:1 for grades 4–8. At Cosby School, the ratio also is about 25:1 for grades 9–12. These ratios, especially for the early grades, are substantially better than those required by the state. The Cocke County School Board has recommended separating Cosby School's elementary and high school students and housing the two different age groups in separate schools, but the county commission has not yet appropriated the necessary funds for this (F. James, Attendant Supervisor, Cocke County School System, personal communication with M. Schweitzer, ORNL, May 9 and 10, 1995 and October 9, 1996).

3.6.4.2 Water

Water service in Sevier County is provided by four utility districts and the three largest cities—Gatlinburg, Pigeon Forge, and Sevierville. Each of the cities serves its own residents and, in some cases, customers located adjacent to its borders. Gatlinburg provides about 2900 water hookups,

primarily using water drawn from the west fork of the Little Pigeon River. The city's average daily water usage is about 0.0438 m^3/s [(1 million gallons per day (MGD)] in the winter and about 0.1 m^3/s (2.5 MGD) in the summer. The city's water treatment plant has a rated peak capacity of 0.09 m^3/s (2 MGD) and the city can buy up to another 0.0438 m^3/s (1 MGD) from Pigeon Forge, provided the water is available (D. McFalls, Assistant Superintendent of Public Works, Gatlinburg, Tennessee, personal communication with M. Schweitzer, ORNL, May 8, 1995). Pigeon Forge provides more than 2300 hookups, primarily using water from Waldens Creek, a tributary of the Little Pigeon River. The city's customers consume an average of approximately 0.07 m^3/s (1.5 MGD) in the winter and 0.1 m^3/s (2.5 MGD) in the summer. The peak demand, which generally is experienced in the height of the summer tourist season, is approximately 0.15 m^3/s (3.5 MGD). The city's treatment plant is rated at 0.11 m^3/s (2.6 MGD) and, in addition, up to 0.0438 m^3/s (1 MGD) is purchased, as needed and available, from Sevierville (R. King, Chief Water Plant Operator, Pigeon Forge, Tennessee, personal communication with M. Schweitzer, ORNL, May 9, 1995). Sevierville has approximately 5100 hookups, providing water from the Middle Prong of the Little Pigeon River (J. Bettis, Senior Accounting Clerk, Sevierville Water System, personal communication with M. Schweitzer, ORNL, October 9, 1996). Average daily use is roughly 0.07 m^3/s (1.6 MGD) in the winter and 0.11 m^3/s (2.6 MGD) during the summer months. Peak summer demand is approximately 0.13 m^3/s (3 MGD), including water sold to Pigeon Forge. While Sevierville's water treatment plant has a rated capacity of 0.18 m^3/s (4 MGD), the city is only allowed to pump 0.13 m^3/s (3 MGD) from the Little Pigeon River because of water quality concerns. Once this peak capacity of 0.13 m^3/s (3 MGD) is reached, Sevierville will have to start cutting back on the amount of water sold to Pigeon Forge during critical periods (T. McCarter, Operator, Sevierville Water Plant, personal communication with M. Schweitzer, ORNL, May 8, 1995).

During the peak tourist season, both Gatlinburg and Pigeon Forge have insufficient water processing capabilities, and Sevierville is rapidly approaching its capacity. As noted earlier, Gatlinburg buys water from Pigeon Forge during the summer months, and Pigeon Forge buys water from Sevierville. However, Sevierville faces the near-term possibility of being unable to provide all the water needed by its customers. To eliminate this water shortage, Pigeon Forge, Gatlinburg, Sevierville, and the Sevier County government—acting under the auspices of a countywide water board—undertook the construction of a pumping station and a raw water line from Douglas Lake to a treatment plant in Pigeon Forge, a distance of roughly 24 km (15 miles). From there, treated water will be distributed to the member governments. The largest financial contribution will be made by Pigeon Forge, followed closely by Gatlinburg. The shares contributed by Sevierville and the county will be much smaller. Voting strength on the board is directly proportional to the amount of money committed. Pittman Center will participate as a non-voting member (*The Mountain Press*, January 12, 1995). When completed, the raw water line from Douglas Lake is expected to supply approximately 0.26 m^3/s (6 MGD) (R. King, Chief Water Plant Operator, Pigeon Forge, Tennessee, personal communication with M. Schweitzer, ORNL, May 9, 1995). The pumping station at Douglas Lake and necessary expansions to the Pigeon Forge water treatment plant were completed in June 1997. The current target date for completing the raw waterline and beginning to draw water from the lake is the summer of 1998 (G. McGill, Project Manager, McGill Associates, personal communication with M. Schweitzer, ORNL, July 22, 1997). The city of Sevierville also has considered the possibility of buying 1 MGD from the Knoxville Utilities Board, but this option is not being actively pursued at the present time

(P. Layman, General Manager, Sevierville Water System, personal communication with M. Schweitzer, ORNL, October 9, 1996).

The Webb Creek Utility District provides water to virtually all structures in the Cobbly Nob area east of Pittman Center. The same utility district also serves a few parcels in Pittman Center, but most of the community gets water from private wells and—largely due to cost considerations—there are no plans for the Webb Creek Utility District to provide water to the rest of Pittman Center (J. Coykendall, personal communication with M. Schweitzer, ORNL, October 8, 1996). Recent testing indicated that about half of the wells in Pittman Center were contaminated with fecal e-coli bacteria coming from failed septic systems. Because of this, Pittman Center has expressed interest in trying to renegotiate an existing contract signed with Gatlinburg in 1978 that would pipe potable water to the town using state and matching Gatlinburg city funds. The proposed water line would extend from Gatlinburg across the Greenbriar Bridge on U.S. 321 to provide service to all of Pittman Center (T. Ledford, Acting City Administrator, Pittman Center, Tennessee, personal communication with P. L. Sau, ORNL, August 5, 1994). No recent effort has been made to pursue this option, largely due to Gatlinburg's current lack of surplus water during the peak tourist season (J. Coykendall, Chairman, Pittman Center Planning Commission, personal communication with M. Schweitzer, ORNL, July 22, 1997). Even if Pittman Center does not get water from Gatlinburg under the terms of the 1978 contract, it is very likely that the town will get piped water in the next 5 to 20 years as part of a countywide water system (J. Coykendall, Chairman, Pittman Center Planning Commission, personal communication with M. Schweitzer, ORNL, January 11, 1995).

In Cocke County, the Newport public water system serves the entire city and Cosby. The system provides 6500 hookups, 3000 of them inside the Newport city limits and the remainder in surrounding areas of Cocke County (L. Allen, Water Manager, Newport, Tennessee Utilities Board, personal communication with P. L. Sau, ORNL, August 12, 1994). Newport also supplies water for the Webb Creek Utility District. Water lines follow SR 32 south to Cosby, and then go east along U.S. 321 into the Cobbly Nob resort and to a few parcels on the eastern edge of Pittman Center (J. Valentine, Webb Creek Utility District, personal communication with P. L. Sau, ORNL, August 5, 1994). The average daily demand for city water is 0.17 m^3/s (3.9 MGD) and the peak demand is approximately 0.22 m^3/s (5 MGD); the rated capacity of the city's treatment facility is 0.25 m^3/s (5.8 MGD). The utilities board is considering upgrading the system and is attempting to get state funds for this purpose, but there are no firm plans to make improvements at this time (L. Atkins, Superintendent of Newport Water Plant, personal communication with M. Schweitzer, ORNL, May 8, 1995 and July 22, 1997).

3.6.4.3 Sewers

In addition to seeking public water service from Gatlinburg, Pittman Center is considering alternatives to its current dependence on individual septic systems for wastewater disposal. Most of the older septic systems in Pittman Center were built without adequate distances between water wells and septic tanks, and the predominant soil type is not suitable for effective septic field operation. This accounts for the high rate of septic system failure and well contamination described in Sect. 3.6.4.2. Because the problem is likely to get worse in the future (D. Morris, Pittman Center Alderman, personal communication with P. L. Sau, ORNL, August 5, 1994) and because any sewer line extension would be very expensive, the town is considering alternative

waste treatment ideas, including wetlands treatment coupled with spraying treated water on slopes, community pumped septic systems, and mound treatment (A. Anderson, East Tennessee Community Design Center, personal communication with T. R. Young, ORNL, August 13, and 15, 1994). However, no design or feasibility studies have been performed for any of these options (J. Coykendall, Chairman, Pittman Center Planning Commission, personal communication with M. Schweitzer, ORNL, July 22, 1997). Centralized sewer service, which would allow substantially greater density of urban development in the Pittman Center area, is not likely to be available in the foreseeable future (J. Coykendall, Chairman, Pittman Center Planning Commission, personal communication with M. Schweitzer, ORNL, January 11, 1995).

Gatlinburg currently treats an average of 0.105 m^3/s (2.4 MGD) of wastewater, but its peak demand during a recent 12-month period was 0.22 m^3/s (5 MGD). This was associated with flood conditions, and much of the volume was due to infiltration into the city's sewer lines. The city's wastewater treatment plant is capable of adequately treating 0.13 m^3/s (3 MGD). There are no current plans to increase that capacity, but ongoing improvements to the city's sewer lines will reduce infiltration and hence peak flow. Pigeon Forge presently treats 0.09 m^3/s (2 MGD) and has a peak capacity of 0.18 m^3/s (4 MGD). Like Gatlinburg, the peak volume reached by the city is approximately 0.22 m^3/s (5 MGD). The city has no current plans to increase its treatment plant capacity, but it will probably consider such improvements in the next few years (M. Cross, Project Manager, Professional Services Group, personal communication with M. Schweitzer, ORNL, May 8, 1995).

Newport has a wastewater treatment plant with a maximum capacity of 0.19 m^3/s (4.35 MGD). Current average daily use is only 0.105 m^3/s (2.4 MGD). The Cosby area does not have sewer service and relies on septic systems. Newport would be the most likely source of any future sewer service for Cosby (L. D. Brooks, Sewer Manager, Newport, Tennessee Utilities Board, personal communication with P. L. Sau, ORNL, August 12, 1994).

3.6.4.4 Solid Waste

Sevier County produces an average of 0.16 million kg (180 tons) of solid waste per day, which is deposited in a new 56-ha (140-acre) landfill that is expected to serve the county for 25 to 30 years. As a result of a new recycling program that received an achievement award from the Solid Waste Association of North America, the volume of waste deposited in the landfill has been reduced by 70%. This new program includes a co-composting plant adjacent to the Sevier County landfill that processes garbage and sewage and removes organic material. A demolition landfill accepts brush, tree stumps, and large blocks of concrete, and 11 oil recycling centers handle oil. Cardboard is baled, stored, and then shipped to Rock Ten Paper in Chattanooga, while scrap metal is sent to Ferris Metal to be recycled (*The Mountain Press*, July 20, 1994; *Everything You Always Wanted to Know about Sevier County* 1994).

Cocke County produces between 730 and 907 kg (75 and 100 tons) of solid waste per day, which it used to dump in a 10.4-ha (26-acre) landfill near Newport. However, that landfill was closed at the very beginning of 1997, and Cocke County's household wastes are now being hauled to a neighboring county while it attempts to develop a new landfill. The county recently acquired property adjacent to the old landfill to use for the disposal of dry wastes, which excludes household garbage. The county recently started recycling in all ten of its convenience centers, two

of which are in Cosby (C. McMann, Cocke County Landfill, personal communication with P. L. Sau, ORNL, August 12, 1994, and with M. Schweitzer, ORNL, October 9, 1996; D. Hensley, Cocke County Landfill, personal communication with M. Schweitzer, ORNL, January 24, 1997).

3.6.4.5 Police and Fire Protection

Sevier County is served by five local law enforcement agencies: the Sevier County Sheriff's Department, which primarily serves outside incorporated communities, and the police departments of each of the four towns. All five agencies participate in drug prevention programs and assist the Fourth Judicial District Task Force. The Pittman Center Police Department has two full-time officers. The Sheriff's Department helps patrol Pittman Center, and the Gatlinburg Police Department provides additional officers to help with major accidents. Fire protection in Sevier County is provided by one professional and eight volunteer fire departments (*Everything You Always Wanted to Know about Sevier County* 1994). The volunteer departments rely on funding from auctions, fund-raising events, donations, and monies from county and city commissions. The Pittman Center Volunteer Fire Department serves the Pittman Center area. The GSMNP has formal mutual aid agreements with Gatlinburg and the other largest municipalities adjacent to the Park. In addition, park personnel have assisted Pittman Center in the past in dealing with motor vehicle accidents and responding to fires that have forest fire potential. According to park personnel, this type of informal assistance will continue to be provided in the future (C. Schell, Resource Management Specialist, Great Smoky Mountains National Park, personal communication with M. Schweitzer, ORNL, May 9, 1995).

The Cocke County Sheriff's Department serves all of Cocke County with 16 full-time officers (T. Moore, Sheriff, Cocke County, Tennessee, personal communication with M. Schweitzer, ORNL, September 19, 1994). Newport has its own municipal police department. Cocke County has five volunteer fire departments and a professional fire department that serves all of Cocke County. In addition, Newport has its own municipal fire department (E. Ramsey, Fire Department, Cocke County, Tennessee, personal communication with M. Schweitzer, ORNL, September 19, 1994).

3.6.5 Land Use

3.6.5.1 Current Land Use

Cocke County covers 1152 km^2 (443 square miles). Sevier County is about one-third larger at 1555 km^2 (598 square miles). Figure 44 shows the relative size of these counties, as well as the location of key municipalities and roads. Table 31 shows the amount of each county that is devoted to various major land uses. Cocke County has a substantially larger portion of its total area in farms and other rural (non-federal) land uses than Sevier County. However, a much larger portion of Sevier County is federal land, due primarily to the presence of the GSMNP. Sevier County also is much more urbanized than Cocke County, due in large part to the tourism-related growth and development of recent decades. Cocke County has not developed land use plans or zoning ordinances for its unincorporated areas, but it enforces subdivision regulations where city ordinances are not in place. In Sevier County, a planning board was recently approved to develop regulations to govern the construction of private roads and the subdivision of land in

Table 31. Land use in Cocke and Sevier Counties

	Cocke County		Sevier County	
	Area ($mile^2$)	Percentage of county total	Area ($mile^2$)	Percentage of county total
Farmland	131	29.6	116	19.4
Other rural land (non-federal)	228	51.5	210	35.1
Federal land[a]	70	15.8	194	32.5
Urban land[b]	5	1.1	73	12.2
Water	9	2.0	5	0.8
Total	443	100.0	598	100.0

[a]Nearly all federal land in Sevier County is part of the GSMNP, while federal land in Cocke County is divided primarily between the GSMNP and the Pisgah National Forest.

[b]The Cocke County land is designated as "urban," while the Sevier County land is designated as "commercial/industrial/urban" and may therefore be more inclusive.

Source: Vickers, personal communication with M. Schweitzer, ORNL, September 12, 1994.

unincorporated parts of the county (*The Mountain Press*, April 18, 1995). The largest municipalities in both counties—Pigeon Forge, Gatlinburg, Sevierville, and Newport—all have land use plans as well as zoning ordinances and subdivision regulations, and these towns generally extend their influence over local land use a limited distance beyond their city limits (J. Bryant, Tennessee Local Planning Assistance Office, Knoxville, Tennessee, personal communication with T. R. Young, ORNL, July 30, 1994; M. Robinson, Community Development Office, Newport, Tennessee, personal communication with M. Schweitzer, ORNL, July 28, 1994).

Land use plans and controls are in place for Pittman Center but not for Cosby. The most recent comprehensive land use plan for Pittman Center (*Land Use Plan: Pittman Center, Tennessee*) was submitted to the planning commission for approval in 1987. An update to the plan is expected by the end of 1997 and will probably incorporate many of the key ideas generated during the recently-completed "Futurescapes" program (Sect. 3.6.5.2) undertaken by the town in conjunction with the East Tennessee Community Design Center and the Tennessee Valley Authority (J. Coykendall, personal communication with M. Schweitzer, ORNL, October 8, 1996). Pittman Center has zoning and subdivision regulations, including provisions for planned unit developments—an unusually sophisticated mechanism for a town this small. An interesting feature of Pittman Center's zoning ordinance is that no land is designated for industrial uses (*Zoning Ordinance: Pittman Center, Tennessee* 1993) because of the lack of available land and adequate urban services to support industrial development and the desire to preserve the area's rural mountain character.

Currently, the primary land use in the Pittman Center area is low-density, single-family residential (*Land Use Map: Pittman Center, Tennessee* 1994). In the vicinity of the proposed Foothills Parkway interchange at Pittman Center Road (SR 416), there is a sizeable amount of undeveloped

land as well as some private residences and a few vacation rental units. The Pittman Center City Hall and Elementary School, which are designated as civic/commercial land uses, also are located near the proposed interchange. Between 1960 and 1994, nearly 1500 lots were created in the Pittman Center area through the subdivision of large parcels of land. As shown in Table 32, most of this land subdivision took place in the late 1960s and early 1970s. Slightly more than one-fourth of the 433 lots created in the 1960s were associated with the development of a trailer park. The early 1970s saw a substantial increase in land development, with the creation of nearly 1000 residential lots. More than half of these lots were in the Cobbly Nob area, where vacation rental homes were developed along with condominiums and year-round residences. Commercial development in the Pittman Center area primarily consists of vacation rental units, craft shops, and commercial recreation facilities like golf courses and campgrounds. All of these commercial ventures are located along the town's major roadways. The single largest commercial area in town is a resort and condominium complex, along with associated golf courses, located at the eastern end of town along U.S. 321. Other commercial land uses include a grocery and general store on U.S. 321, a campground and vacation rental units along Pittman Center Road, and numerous small crafts shops on Buckhorn Road (the western boundary of the city). All key roads mentioned in this section are shown in Fig. 45.

Current land use in the Cosby area is mostly low-density, single-family residential; a few commercial establishments are located along key roadways. Cosby experienced substantial subdivision of land in the late 1970s, when more than 500 lots were created. Two-thirds of these lots are associated with a campground/trailer park development. There are a few commercial establishments at the intersection of U.S. 321 and SR 32. An inn, a realty office, and a few crafts stores line SR 32 northward to I-40 and Newport.

Currently, the most important physical factors limiting development around Pittman Center are the lack of water and sewerage services, coupled with a rugged topography and periodic flooding that limit the carrying capacity of the land. Cosby has water lines available, but development is limited by the area's rugged terrain and lack of sewer service. In addition, Cosby is somewhat isolated from other areas of tourism-related commercial development.

3.6.5.2 Land Use Projections

In 1993, Pittman Center was chosen for a demonstration project on accommodating development in environmentally sensitive areas. Pittman Center competed with other towns in East Tennessee to receive the services of design teams from the East Tennessee Community Design Center and Tennessee Valley Authority. Through the program—known as the Futurescapes Project—Pittman Center defined a set of goals that include preserving the community's mountain heritage and maintaining its environmental assets, and identified ways in which Pittman Center can achieve its goals and realize its vision. The Futurescapes Project was completed in late 1995 and is documented in a final report published by the East Tennessee Community Design Center (1995).

The Futurescapes design teams developed a consensus map designating specific areas of town for various types of development over the next 20 years (*Consensus Map: Pittman Center, Tennessee* 1994). The consensus map calls for the Pittman Center area to remain primarily residential—mostly low-density—with large corridors of open space interspersed throughout the town. The map designates a public land use area for a new elementary school and a small playground just south

Table 32. Subdivision of land in and around Pittman Center and Cosby, 1960–1994

	Pittman Center area (including Cobbly Knob)		Cosby and southwestern Cocke County		
Year	Name of development	Number of lots	Year	Name of development	Number of lots
1962	Scenic Acres	97			
1966	The Holiday Out	121			
1968	Webb Creek #5	126			
1969	Li'l Bit O'Heaven	36			
1969	Venture Out Gatlinburg	53			
1960–69	**Subtotal**	**433**			
1970	Li'l Bit O'Heaven	66			
1971	Outdoor Resorts	396			
1972	Broken Pine	80			
1972	Timberidge	102			
1972	Chestnut Ridge	4			
1972	Old Smoky Hy-Top	54			
1972	Pine Cove	21	~1972	Earl Hogue Subdivision	39
1972	Pittman Center Heights	21	~1977	Laurel Springs	28
1973	Old Hickory	30	~1977	Kamp-Rite Acres of Gatlinburg	352
1973	Chestnut Ridge #2	35	~1978	Stonebrook Subdivision	49
1973	Foxwoods	86	~1977–85	Cosby Acres	32
1973	Chestnut Ridge	98			
1970–79	**Subtotal**	**993**			
1980	Frontier Log Village	17			
1980–89	**Subtotal**	**17**			
1991	Laurel Highlands	22			
1990–94	**Subtotal**	**22**			
1960–94	**Total**	**1465**	**1972–85**	**Total**	**500**

Source: Tax Maps, Cocke and Sevier Counties, Tennessee (1994).

and east of Pittman Center Road (SR 416), immediately adjacent to the proposed Foothills Parkway interchange. All other land in the vicinity of the proposed interchange is designated for residential use (mostly low density) or as open space. No commercial enterprises are envisioned for that area and, in fact, local officials have advocated that the Foothills Parkway interchange be located at U.S. 321 to avoid stimulating commercial development along Pittman Center Road (J. Coykendall, Chairman, Pittman Center Planning Commission, personal communication with M. Schweitzer, ORNL, January 11, 1995). According to the consensus map and subsequent refinements developed during Futurescapes land use workshops, commercial land use will continue to be limited to a few areas along the community's major roadways. Land in the vicinity of existing commercial areas will be developed more intensively in the future. In addition, one new 80-ha (200-acre) parcel located near the intersection of U.S. 321 and Hills Creek Road will be developed as the commercial center of town. Hill Creek Road runs parallel to, and slightly west of, Pittman Center Road. The "village center," known as the Hills Creek area, is considered ideal for mixed use development which could include a visitors center, public facilities, retail space, rental cabins, and clustered housing (*The Futurescape of Pittman Center* 1995; A. Anderson, East Tennessee Community Design Center, personal communication with M. Schweitzer, ORNL, January 9, 1995). It is likely that the proposal to limit commercial development in Pittman Center will be challenged by some landowners, but this has not yet occurred (J. Coykendall, Chairman, Pittman Center Planning Commission, personal communication with M. Schweitzer, ORNL, October 8, 1996).

In addition to limiting the *amount* of commercial development, Pittman Center also has taken steps to prohibit certain things which it considers inappropriate for the community. A recently-passed ordinance prohibits ferris wheels, merry-go-rounds, go-carts, and similar amusement rides within the city. It also is illegal to keep venomous reptiles and wild or exotic animals. Other recent ordinances prohibit loud music and unscreened waste disposal facilities (*The Mountain Press*, December 23, 1995). No future land use plan has been developed for Cosby, but it is unlikely that the character of the area will change substantially in the next 10 years. Some additional commercial establishments might be added along U.S. 321 and SR 32, and a few new residential subdivisions might be developed. However, the slow pace at which land conversion has occurred in the past and the interest of many residents in avoiding high-intensity commercial development indicate that a dramatic shift in local land use is extremely unlikely.

3.6.6 Taxes

Sevier County and its incorporated towns have some of the lowest property tax rates in the state. Cocke County's equalized property tax rate is more than double that of Sevier County, and Newport's equalized tax rate is roughly three times that of Sevier County's municipalities because the additional property taxes levied by towns in Sevier County are very low (Table 33). In contrast, sales tax rates for the two counties are nearly the same. In Sevier County, the sales tax rate is a uniform 8.5 cents per dollar; sales tax rates in Cocke County are 0.25 cents higher. Both counties keep less than one-third of the sales tax revenues they collect. The bulk of these revenues (6 cents per dollar) go to the state treasury.

As shown in Table 34, Sevier County's total operating revenues are nearly 2.5 times those of Cocke County, and Sevier County receives more funds than Cocke County in each of the revenue categories shown. The difference between the two counties' revenues is greatest in terms of sales

Table 33. Property tax rates in the area of Foothills Parkway, Section 8B, 1994

County *City*	Actual tax rate[a]	Appraisal ratio (%)	Equalized tax rate[b]
Cocke	2.52	100.00	2.52
Newport	4.71	100.00	4.71
Sevier	1.26	90.38	1.14
Gatlinburg	1.50	90.38	1.36
Pigeon Forge	1.43	90.38	1.29
Pittman Center	1.58	90.38	1.43
Sevierville	1.82	90.38	1.64

[a]Dollars per $100 of assessed value. For cities, property tax rate is *total* of city and county rates
[b]Equalized rate equals actual rate multiplied by the appraisal ratio.
Source: Vickers (1996).

tax, where Sevier County collects 6.5 times the amount that Cocke County does. Because of their substantial sales tax receipts—generated by the outlet malls, amusements, hotels, and other commercial facilities located within their boundaries—Sevier County and its major municipalities can afford to levy low property tax rates. However, the town of Pittman Center—which has very little commercial development—has much lower revenues, both in absolute terms and on a per capita basis, than both counties and all other towns listed in Table 34.

In 1992, the estimated value of all property in Sevier County was slightly less than $3 billion, nearly five times the value of all property in Cocke County. Approximately half the assessed value of Sevier County's property came from residential and farm land, with nearly the same value contributed by industrial and commercial property. In contrast, residential and agricultural land in Cocke County had more than twice the assessed value of its industrial and commercial properties. But within nearly all municipalities in both counties, industrial and commercial properties were worth more than residential and farm land. This was especially true in Pigeon Forge and Gatlinburg, where industrial and commercial properties accounted for approximately four-fifths and two-thirds, respectively, of the municipalities' total assessed property value. The major exception is Pittman Center, where there is little commercial activity and nearly three-fourths of the assessed property value was provided by residential and agricultural properties (Vickers 1996).

3.6.7 Economic Structure

Key economic indicators for Sevier and Cocke Counties and the state of Tennessee are shown in Table 35. In the winter months, unemployment in both counties tends to be substantially higher than the statewide average. During the summer, the Cocke County unemployment rate tends to remain higher than the state average, but unemployment in Sevier County drops to well below the state rate. Sevier County's per capita income is well above that of Cocke County, but both counties are below the average per capita income for the state as a whole. As of 1989, the latest year for which such figures are available, 25.3% of Cocke County residents had incomes below the poverty level, compared with 15.7% of Tennesseeans statewide and 13.2% of Sevier Countians.

Table 34. Summary of operating revenues, by source, in the area of Foothills Parkway, Section 8B, fiscal year 1994

County	City	Property tax		Sales tax		Other sources[a]		Total revenue	
		Revenue ($1000)	Percentage of total revenue	Revenue ($1000)	Percentage of total revenue	Revenue ($1000)	Percentage of total revenue	Revenue ($1000)	Percentage of total revenue
Cocke		4,470	18.0	2,293	9.2	18,102	72.8	24,865	100.0
	Newport	1,140	15.9	1,628	22.7	4,405	61.4	7,173	100.0
Sevier		11,545	19.7	14,911	25.4	32,232	54.9	58,688	100.0
	Gatlinburg	654	3.9	3,285	19.4	12,974	76.7	16,918	100.0
	Pigeon Forge	343	1.9	5,666	30.9	12,297	67.2	18,306	100.0
	Pittman Center	30	12.9	51	21.9	152	65.2	233	100.0
	Sevierville	714	9.8	3,634	49.7	2,958	40.5	7,306	100.0

[a]Other sources include state, federal, and other local contributions.
Source: Vickers (1996).

Table 35. Key economic indicators for Cocke County, Sevier County, and Tennessee

Place	Labor force (Jan. 1994)[a]	Unemployment rate (%)[a]		Per capita income (1992)	Percentage of persons with income below poverty level (1989)
		Jan. 1994	July 1994		
Cocke Co.	15,940	17.5	6.8	$13,412	25.3
Sevier Co.	33,380	17.1	2.7	$15,749	13.2
Tennessee	2,544,800	6.1	4.6	$17,674	15.7

[a]By place of residence. Not seasonally adjusted.

Source: Tennessee Department of Employment Security (1994b and 1994c); County and City Data Book: 1994 (1994).

Employment in Sevier County is dominated by the retail trade and service industries, which account for over two-thirds of the county's jobs (Table 36). In contrast, these two sectors are much less important in Cocke County, where nearly two-fifths of the jobs are in the manufacturing sector. The importance of tourism to the Sevier County economy—indicated by the large number of retail and service jobs—is illustrated even more clearly in Table 37, which shows that over half of the jobs in Sevier County can be characterized as travel-generated. The absolute number of travel-generated jobs and the magnitude of travel-related expenditures in Sevier County are the third largest in the state, behind Davidson County (where Nashville is located) and Shelby County (where Memphis is). And on a jobs-per-capita basis, the impact of tourism on Sevier County is much greater than in either of those counties. In contrast to Sevier County, travel-generated jobs in Cocke County represent less than 5% of total employment. On a per-worker basis, the number of travel-generated jobs in Tennessee as a whole is slightly greater than in Cocke County.

The unemployment rate in Sevier County is subject to substantial fluctuation because of the county's reliance on tourism; the number of available jobs is highest during the summer and lowest in the winter. State and county officials are trying to diversify the economy by attracting industrial facilities and other enterprises that do not rely on the seasonal tourist trade. The county's second industrial park was recently filled, and the county is currently in the process of recruiting tenants for a third park. In addition to its economic diversification efforts, the county also is taking steps to lengthen the tourist season. Examples of these efforts are the annual Winter Fest celebration held in the county's three largest municipalities from November until February, the Christmas concerts and other holiday events recently instituted at Dollywood, the establishment of year-round music theaters throughout the county, the newly instituted annual Romance Fest in Gatlinburg, and the off-season promotion of the county's many factory outlets (R. DeBusk, Executive Director, Sevier County Economic Development Council, personal communication with M. Schweitzer, ORNL, December 16, 1994). The latest unemployment figures indicate that these efforts are having the desired effect; jobless rates for December 1994 and January through March 1995 were all lower than in the preceding years (*The Mountain Press*, January 31, 1995; March 5, 1995; May 1, 1995).

Table 36. 1993 employment by sector (%)[a] in Cocke and Sevier Counties

	Cocke County	Sevier County
Retail trade	20.9	35.2
Services	15.2	32.0
Government	13.9	10.6
Manufacturing	39.1	10.0
Finance, insurance, and real estate	2.5	4.8
Construction	2.5	4.7
Other	6.0	2.7
Total	100.1[b]	100.0

[a]By place of work.
[b]Total does not equal 100.0% due to rounding error.
Source: Tennessee Department of Employment Security (1994a).

Table 37. Economic impact of tourism in the area of Foothills Parkway, Section 8B, 1993

Place	Total travel expenditures ($)	Number of travel-generated jobs	Travel-generated jobs as % of total covered employment[a]
Cocke County	22.48 million	390	4.9
Sevier County	598.05 million	12,470	51.9
Tennessee	6,779.15 million	132,000	5.8

[a]Covered employment is by place of work and refers to jobs with employers that are covered by unemployment insurance; this includes nearly all employment in the counties and state.
Source: U.S. Travel Data Center (1994). Tennessee Department of Employment Security (1994a).

Like Sevier County, Cocke County suffers from high seasonal unemployment. However, Cocke County also has a year-round unemployment rate that is higher than the statewide average. To improve its local economy, Cocke County has an economic development commission that has been active since the early 1980s in recruiting new industry and maintaining existing businesses. In the last 5 years, the county has recruited a number of new industries and is in the process of bringing additional tenants to its new industrial park. In late 1994, a tourism council was established with the goal of attracting more visitors to Cocke County. The Council's efforts include promoting river rafting and other outdoor recreational activities and working with the state to improve the highway connecting Newport to Cosby. Future economic development efforts in Cocke County are likely to

focus on recruiting industry and attracting more tourists to the immediate area (J. Grooms, Newport-Cocke County Economic Development Commission, personal communication with M. Schweitzer, ORNL, May 9, 1995 and October 9, 1996).

Sevier County is continuing its massive building boom. Several tourist attractions and new motels are planned or under construction along the Highway 66 corridor between the I-40 interchange and downtown Sevierville. In addition, land preparation for a large new commercial development known as Governor's Crossing (eventually containing theaters, restaurants, a hotel, an outlets mall, and a water park) recently started on a site in the Sevierville area. Also, the Dollywood theme park has undergone two expansions since late 1994, and about half a dozen new music theaters have been opened or approved for future construction during the same time period (R. DeBusk, Executive Director, Sevier County, Economic Development Council, personal communication with M. Schweitzer, ORNL, October 9, 1996). But commercial construction is not the only booming industry. As mentioned in Sect. 3.6.3, the pace of residential construction is increasing in the county, especially in the unincorporated areas outside the major towns.

A recent report produced for the Futurescapes project (Eblen 1994) explores the question of future economic growth for Pittman Center. It predicts that Pittman Center will eventually "be caught up in the growth of the tourism industry" in Sevier County, but notes that the policies adopted by the town will greatly influence when and how Pittman Center is affected. Future economic growth in Pittman Center that is consistent with the community's expressed wishes could come from providing bed and breakfast facilities, short-term rental housing, vacation dwellings, and commercial recreation facilities for visitors who desire a less heavily developed environment than the one provided by Sevier County's larger municipalities.

Future growth in the Cosby area also is likely to be linked closely to tourism and outdoor recreation. Local officials in Gatlinburg and Cocke County are trying to get the state to widen U.S. 321 between Cosby and Gatlinburg, which could increase tourism in the Cosby area. Currently, the widening of U.S. 321 from Glades Road, on the east side of Gatlinburg, to Pittman Center Road is under design. The city of Gatlinburg is paying for this project but will probably ask the state to fund the actual construction. There is no state funding at this time to design the widening of U.S. 321 east of Pittman Center Road (J. Moore, Project Manager, Scheduling Section, Tennessee Department of Transportation, personal communication with M. Schweitzer, ORNL, July 22, 1997).

A group of local business people is considering the establishment of a welcome center in Cosby (J. Grooms, Newport-Cocke County Economic Development Commission, personal communication with M. Schweitzer, ORNL, May 9, 1995 and October 9, 1996). At the same time, there seems to be substantial local interest in ensuring that future economic development in the Cosby area does not degrade the existing quality of the community. Ecotourism and cluster development of the type sought by Pittman Center seems to be consistent with this goal and amenable to many current residents (I. McMahan, Jr., Director, Tourism Council of Newport and Cocke County, personal communication with M. Schweitzer, ORNL, October 10, 1996).

3.6.8 Social Structure

Because of the nature of the communities in the vicinity of Section 8B of the Foothills Parkway and the key issues facing them, this section focuses on local attitudes toward growth and development and on the forces affecting the direction of that development.

Overall, the growth in population and commerce that has occurred in Sevier County in recent decades has been well received locally, with government and business officials in Sevierville, Pigeon Forge, and Gatlinburg showing particular enthusiasm for development. In the unincorporated portion of the county, there has been some conflict between newcomers and longer-term residents over continued growth and the need for land use planning. In 1994, public discussion of the need for countywide planning pitted newer, pro-planning residents in subdivisions in northern Sevier County, near the Knox County line, against longtime residents in the eastern part of the county (*The Mountain Press*, July 6, 1994). Since then, the Sevier County Commission has voted—despite vocal opposition from some area residents and several local developers—to establish a countywide planning board, as noted in Sect. 3.6.5.1.

In Pittman Center, the use of planning and zoning to control future growth and development is well established and seems to be widely accepted by community residents. The town, which historically was sparsely settled and isolated from the rest of the county, was incorporated in 1974 (*Land Use Plan: Pittman Center, Tennessee* 1987), giving it more direct control over its future development than if it remained unincorporated or eventually was annexed by Gatlinburg. According to Pittman Center's "Vision Statement," the town aspires "To create and perpetuate a quality living environment and to encourage quality development that supports that end. To encourage development that supports a tourist-oriented economic base that relates to and magnifies our unique relation to and with the Great Smoky Mountains" (Pittman Center Planning Commission n.d.). Specific community goals, developed by local residents during the Futurescapes project, include preserving the community's mountain heritage, maintaining its water quality and other environmental assets, and building an economy based on nature-oriented "eco-tourism" and related enterprises, such as bed and breakfast establishments, crafts shops, and low impact recreational opportunities. Most Pittman Center residents seem to want to maintain the existing character of the community and avoid intense commercial development (Anderson 1994).

An immediate concern of the people living in Pittman Center is the high incidence of well contamination, which is motivating the town's current search for water supply and sewage treatment alternatives. The decisions made on these subjects could have a substantial impact on what is probably the biggest issue facing Pittman Center today: the shape of future development in the community. Currently, there are large amounts of vacant land in the town, much of it owned by non-residents (Anderson 1994). The presence of water and sewer lines, should these be made available, would allow substantially denser development than is now possible and would likely increase the development pressures felt by local residents. It is very likely that piped water will be available in Pittman Center within the next 5 to 20 years (Sect. 3.6.4.2). However, centralized sewer service—which would allow much greater development density than would piped water by itself—is not likely to be available in the foreseeable future (Sect. 3.6.4.3).

Even without centralized water and sewer services, Pittman Center's current zoning ordinance would allow greater density of land development than has occurred to date (Anderson 1994). And

changes in existing zoning laws, which could allow still more growth and alter existing land use patterns, are always possible if the make-up of the board of aldermen changes or if current members change their positions on development-related issues.

Pittman Center residents have expressed concern about the proposed Foothills Parkway interchange at Pittman Center Road because of its potential for stimulating commercial development in the area from the interchange south to U.S. 321 (Coykendall 1995). The community's desire to prevent commercial development along Pittman Center Road is reflected in its consensus land use map. During scoping for the EIS, the mayor and planning commission chairman issued a position paper suggesting that the western terminus of Section 8B be located at U.S. 321 rather than at Pittman Center Road, and that the Parkway from that point east to Cosby be built along the existing U.S. 321 corridor, to prevent further commercial development and associated impacts to the area's scenic quality. This would allow the existing Foothills Parkway ROW to be kept in its natural state and used for recreational purposes (Perryman and Coykendall 1993). The proposed realignment of the Foothills Parkway subsequently was endorsed by local citizens at Futurescapes transportation workshops (Anderson 1994).

Cosby is a more loosely integrated community than Pittman Center. While it is clearly recognized as a distinct place by its residents and those living in the surrounding area, it has no government, no land use controls, and no formal boundaries. A few years ago, some local residents attempted to incorporate Cosby as a municipality, but this effort was not successful. Cosby does not currently face the intense development pressures that exist in much of Sevier County, but it is the fastest-growing part of Cocke County and is likely to experience continuing growth and development related to recreation, tourism, and the inmigration of permanent residents. The precise magnitude and shape of that potential development is unclear, and Cosby does not currently have a land use plan to guide and control its growth.

3.6.9 Summary

During the construction period, the socioeconomic impact area would include most of Sevier and Cocke Counties. During Parkway operations, the impact area would be limited to southeastern Sevier County and the southwest corner of Cocke County, with Pittman Center and—to a lesser extent—Cosby experiencing the largest share of any impacts. The latest available population figures for the impact area show that Sevier County (population 58,184) is nearly twice as populous as Cocke County (population 30,801). Pittman Center had 478 residents, while Cosby had 1,220. Population and the local housing stock have grown much more rapidly in recent decades in Sevier County than in Cocke County. During the last few years, water has been in short supply in Sevier County during the peak tourist season, but the county and its municipalities are addressing this problem by constructing a raw water line from nearby Douglas Lake and increasing local water treatment capacity. Pittman Center has neither centralized water nor sewer service at present, while Cosby gets piped water from the city of Newport. Sevier County is more urbanized than Cocke County, but the largest municipalities in both counties have land use plans, zoning ordinances, and subdivision regulations. Land use plans and controls also are in place in Pittman Center, but not in Cosby. Employment in Sevier County is dominated by the retail trade and service industries, reflecting the substantial importance of tourism to the local economy, while manufacturing is much more important in Cocke County. Most Pittman Center residents seem to want to avoid intense commercial development and to maintain the community's existing

character. Cosby, while not experiencing the same powerful development pressures that face much of Sevier County, is still likely to experience continuing growth and development related to recreation, tourism, and the influx of new permanent residents.

3.7 EXISTING TRAFFIC CONDITIONS

The first step in performing the traffic analysis was to establish the existing traffic conditions on roadways and at intersections in the study area. ORNL began by collecting traffic volume and turning movement counts on highways and at intersections in the study area. Data was both collected in the field and acquired from the Tennessee Department of Transportation (TDOT), the NPS, previous Foothills Parkway traffic studies, and other sources. Traffic volume and turning movement counts were taken at key locations in the study area during the height of the summer and fall peak seasons in order to capture peak traffic conditions.

ORNL then performed a capacity analysis to determine the traffic conditions along each roadway and at each intersection in the study area. Traffic conditions were described using a measure called level of service (LOS), which indicates the general presence or lack of congestion and delay. The results of the analysis are then displayed. The predicted future traffic conditions for the various build alternatives and options are presented in Sect. 4.7.

3.7.1 Existing Traffic Patterns and Movements

Much of the information in this section is based on the Highway Capacity Manual produced by the National Research Council in 1994.

3.7.1.1 Capacity Analysis

The concept of levels of service uses qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of such factors as speed and travel time, delay, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of traffic conditions. LOS A represents the highest quality of traffic service, with subsequent LOS categories representing incremental declines in such attributes as travel speed and maneuverability. LOS E corresponds to the maximum flow rate, or capacity, on the facility, while LOS F represents conditions where demand exceeds capacity (National Research Council 1994).

Although higher LOS conditions are more desirable, there is usually a trade-off between construction cost and LOS when designing highways. For most design or planning purposes, LOS C and D are typically used. However, acceptable and desirable LOS for highways is usually a decision made by political entities. In this study, we assume LOS A through C to be acceptable for GSMNP and Foothills Parkway roads. For roads outside the park, LOS A through D is considered acceptable.

Different highway facility types have differing operational goals and characteristics, and travelers have different expectations regarding traffic movement on them. Thus, the procedures for determining LOS for a highway facility, along with the qualitative characteristics of LOS, depend upon the type of facility being analyzed. Most of the roadways within the survey are currently rural two-lane highways, and some will soon be upgraded to rural multilane roads. Therefore, the capacity of each roadway, both for existing and future highway sections, is determined using the procedure appropriate for that facility type. All intersections in the study area are stop-sign controlled, and the corresponding capacity analysis procedures and LOS have been applied. The following paragraphs describe traffic conditions under the six LOS categories for the two types of highways analyzed in this study.

3.7.1.2 Level of Service for Rural Two-Lane Highways

LOS A. The highest quality of traffic service. Motorists are able to drive at their desired speed. Without strict enforcement, this can result in speeds approaching the maximum design speed and exceeding posted speed limits (which are usually lower). The passing frequency required to maintain desired speeds has not reached a demanding level, and almost no platoons* of three or more vehicles are observed. Drivers would be delayed (i.e., would not be able to travel at their desired speed) no more than 30 percent of the time by slow-moving vehicles.

LOS B. Passing demand needed to maintain desired speeds becomes significant and approximately equals the passing capacity at the lower boundary of LOS B. Drivers are delayed up to 45 percent of the time.

LOS C. Noticeable increases in platoon formation, platoon size, and frequency of passing impediments become noticeable. While traffic flow is stable, it is becoming susceptible to congestion due to turning and slow-moving traffic. Percent time delays can reach 60 percent.

LOS D. Passing becomes extremely difficult as passing demand becomes very high and passing capacity nears zero. Mean platoon sizes of 5 to 10 vehicles are common, and the percentage of time motorists are delayed reaches up to 75 percent.

LOS E. Percent delay time exceeds 75 percent. Passing is virtually impossible under LOS E, and platooning becomes intense when slower vehicles or other interruptions are encountered.

LOS F. This represents heavily congested flow with traffic demand exceeding capacity.

3.7.1.3 Level of Service for Rural Multilane Highways

LOS A. Traffic operates under free-flow conditions. Vehicle operation is virtually unaffected by the presence of other vehicles and is only affected by highway geometry and driver preferences. Maneuverability is good, and minor disruptions to flow are easily absorbed without a change in travel speed.

*Platoons are vehicles driving together on a highway section, either voluntarily or involuntarily due to signal control, geometrics, or other factors.

LOS B. This LOS is also indicative of free flow, although the presence of other vehicles begins to be noticeable. Average travel speeds are the same as for LOS A, but drivers have slightly less freedom to maneuver.

LOS C. The influence of traffic density becomes marked. The ability to maneuver within the traffic stream is now clearly affected by the presence of other vehicles, and average travel speeds begin to show some reduction for multilane highways with free-flow speeds over 50 mph. Minor disruptions may be expected to cause serious local deterioration in service, and queues* may form behind any significant traffic disruption.

LOS D. The ability to maneuver is severely restricted because of traffic congestion, and travel speed begins to be reduced by increasing volumes. For the majority of multilane highways with free-flow speeds between 45 and 60 mph, passenger car speeds at capacity generally range from 44 to 57 mph. Only minor disruptions can be absorbed without the formation of extensive queues and the deterioration to LOS E and F.

LOS E. This LOS represents near-capacity conditions and is quite unstable. Vehicles are operating with the minimum spacing at which uniform flow can be maintained. For the majority of multilane highways with free-flow speeds between 45 and 60 mph, passenger car speeds at capacity generally range from 42 to 55 mph but are highly variable and unpredictable within that range. As capacity is reached, disruptions cannot be damped or readily dissipated, and most disruptions will cause queues to form and service to deteriorate to LOS F.

LOS F. This represents forced or breakdown flow. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages. Average travel times with queues are generally less than 30 mph.

3.7.1.4 Level of Service for Unsignalized Intersections

Levels of service for movements at unsignalized intersections are determined by the average total delay experienced by vehicles making that movement at the intersection. Total delay, measured in seconds per vehicle, is defined as the total elapsed time from when a vehicle first stops at the end of a queue until the vehicle departs from the stop line. The delay ranges corresponding to each LOS are provided in Table 38. Note that LOS is not applicable to movements that have a continuous right of way since these vehicles are not required to stop at an intersection.

Physical layouts and information on traffic control schemes (e.g., stop sign and/or yield sign control) related to the roadway section and four stop-sign-controlled "T" intersections have been collected. Capacity analyses have been performed for present traffic conditions on these roadway sections and intersections. These analyses are based on procedures suggested in Highway Capacity Manual (National Research Council 1994). The results are presented in the Tables 39–46.

The rural two-lane highway sections within the study area in general operated at acceptable levels of service. The worst LOS for roadways within the study area is D (flow approaching unstable

*Queues are lines of vehicles that are moving very slowly or have stopped, typically at traffic signs or signals or due to some interruption in traffic flow.

Table 38. Level of service criteria for unsignalized intersections

Level of service	Average total delay (seconds per vehicle)
A	≤5
B	>5 and ≤10
C	>10 and ≤20
D	>20 and ≤30
E	>30 and ≤45
F	>45

flow conditions with moderate to heavy delays). However, traffic turning left from Foothills Parkway Section 8A onto U.S. 321 southbound is experiencing LOS E during the weekday peak periods and LOS F for weekend peak periods. The traffic demand on Section 8A is not high. The reason for the decrease in the capacity of the stop-sign-controlled Foothills Parkway approach is the high travel speed of the U.S. 321 traffic (about 45 mph). This increases the main traffic stream gap duration required for traffic from the Parkway to turn left onto U.S. 321.

Left-turn traffic from U.S. 321/SR 32 northbound to U.S. 321 currently experiences LOS E during the weekend peak periods.The two intersections along SR 416 (at U.S. 321 and at Webb Creek Road) currently operate under acceptable conditions at LOS D or better.

3.7.2 Traffic Data Collection and Acquisition

Traffic volume counts were collected at five locations in the Pittman Center and Cosby areas from June 29 to July 21, 1994 (Fig. 46). Traffic volume data for roads within and around the GSMNP were acquired from the NPS. The NPS data covered the period from June 1993 to June 1994 for four sites: (1) Sugarlands Visitor Center, (2) Oconaluftee, (3) Townsend Wye, and (4) Gatlinburg Spur. Volume data for Foothills Parkway Section 8A was also acquired from NPS.

Intersection traffic turning movement counts were taken at key intersections in the Cosby and Pittman Center areas during the peak color season in October 1994. These turning movement counts were taken during morning (11:00 A.M. to 12:00 P.M.) and afternoon (4:00 P.M. to 5:00 P.M.) peak hours during the weekday (10/25/94) and weekend (10/22/94, 10/29/94). Traffic turning movements were taken at four key sites (Fig. 46, sites 1–4).

Site 1. Intersection of U.S. 321/SR 32 with Foothills Parkway Section 8A in Cosby
Site 2. Intersection of U.S. 321 with U.S. 339/SR 32 in Cosby
Site 3. Intersection of U.S. 321 and SR 416 near Pittman Center
Site 4. Intersection of SR 416 with Webb Creek Road at Pittman Center

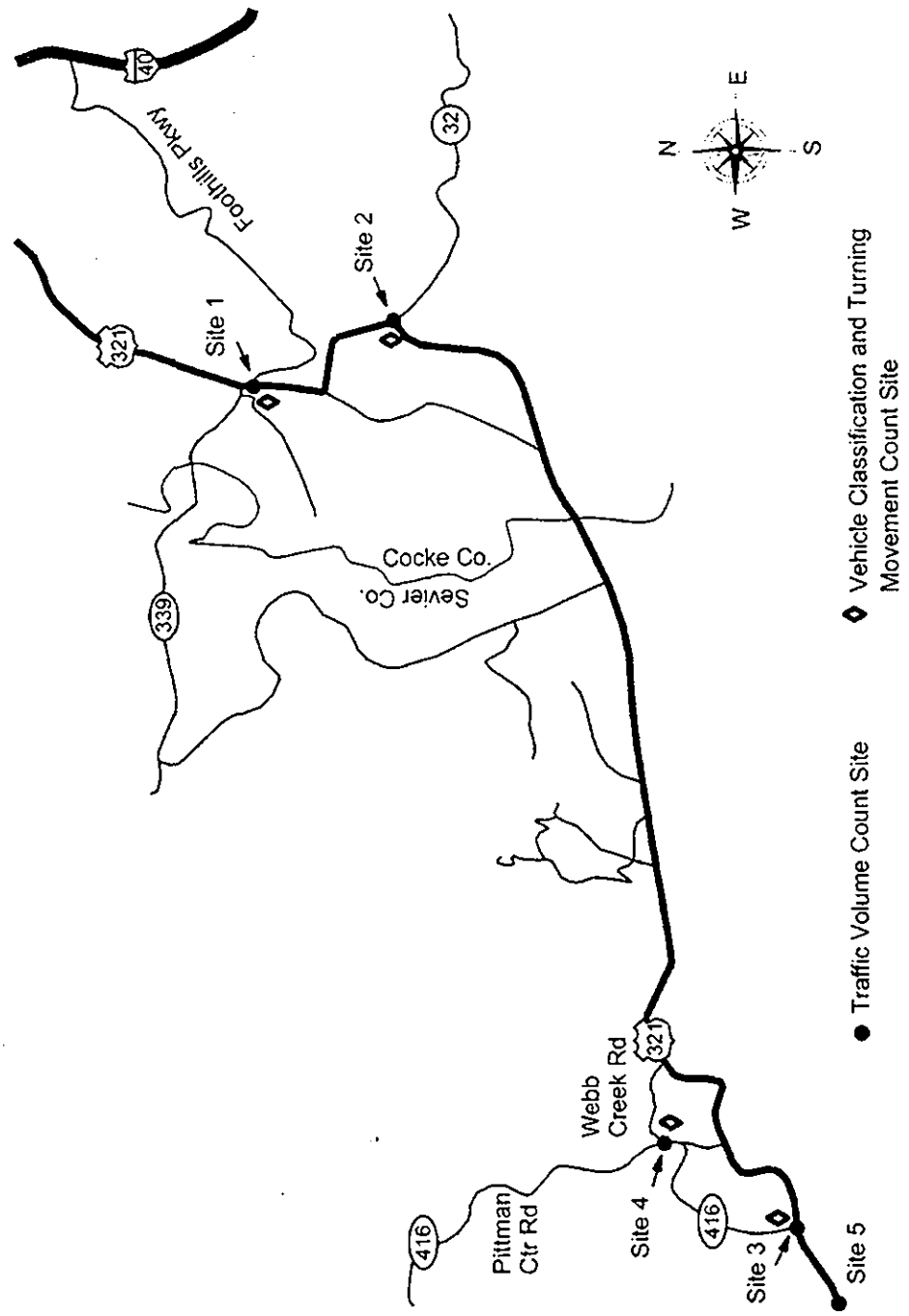


Fig. 46. Area map for traffic volume counts and vehicle classification and turning movement counts.

Based on these intersection traffic turning movement counts and the traffic volume data collected by the automatic traffic counters during the summer of 1994, the existing peak traffic conditions in the study area for both weekdays and weekends have been determined and are presented in Tables 39–46.

3.7.3 Traffic Noise Analysis

The first step in performing the traffic noise analysis was to establish the existing ambient noise levels at key receptor sites in the study area. This data was collected in the field and compared against noise level standards established by the Federal Highway Administration (FHWA). This section briefly discusses some of the properties of sound and factors that affect sound levels, describes metrics used to measure noise levels, presents the FHWA noise level standards, and discusses the results of the noise level collection effort in the context of those standards.

3.7.3.1 Noise Regulation and Factors Affecting Noise Levels

FHWA has established allowable noise levels for several land use categories (Table 47). The FHWA noise abatement criteria require that the L_{eq} noise level not exceed 67 dBA or that the L_{10} noise level not exceed 70 dBA for Activity Category B. This category includes picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, and hotels. These FHWA guidelines relate to community noise levels and are not necessarily the same standards that would be applied to more pristine locations within national parks. However, the FHWA guidelines will be a reference to Section 8B and surrounding areas. In addition to the guidelines related to community noise levels, FHWA requires that the predicted noise levels resulting from roadway improvement not substantially exceed the existing noise levels.

Factors influencing traffic noise levels. Sound reduction over a certain distance is influenced by the kind of surface that lies between the source and the receptor. In general, reduction in the sound level from a vehicular "line source" is about 3 dBA per double distance over "hard" surfaces (e.g., concrete, asphalt, bodies of water) and is about 4.5 dBA per double distance over "soft" surfaces (e.g., grass, crops).

Walls, buildings, embankments for depressed roadways, berms, hills, or other terrain features between the source and receiver can serve as noise barriers and consequently will reduce the noise level at the receiver's location. A 5.0-dBA reduction in sound level can be achieved by using a noise barrier to merely break the line of sight between the receiver and the source. It should be noted that berms are better noise barriers than other materials such as timbers or concrete. An additional 3.0 dBA in sound reduction can be achieved by a berm compared with other barrier walls of different materials. For Section 8B, terrain features and cut/fill sections that might break the line of sight between noise sources and receptors would function much like berms. Such earthen obstructions are usually modeled as berms in the traffic noise analysis process so that future traffic noise levels can be accurately predicted.

For cases in which there is no clear line of sight between the receiver and source, and the tree height extends at least 15 ft above the line of sight, the noise level reduction from the dense growth of woods and other vegetation is about 5.0 dBA per 100 ft of such plantings. However, no more than a 10.0-dBA reduction in noise can be expected.

Table 39. Existing weekday morning traffic conditions and levels of service at key intersections[a]

Intersection location	Approach	Total vehicles per hour	Directional information: Turning movement	Directional information: Percent	Directional information: Counts	Level of service	Traffic composition[b]: Motorcycle	Traffic composition[b]: Single-unit truck	Traffic composition[b]: Combination truck
U.S. 321 intersection w/Foothills Pkwy 8A (Site 1)	FH Pkwy 8A WB	169	Left turn	86.36%	146	E	0.00%	0.00%	0.00%
			Right turn	13.64%	23	A			
	U.S. 321 SB	445	Through	90.24%	402		0.00%	4.88%	4.27%
			Left turn	9.76%	43	A			
	U.S. 321 NB	596	Through	81.64%	487		0.00%	6.28%	3.38%
			Right turn	18.36%	109				
U.S. 321 convergence w/ SR 32 (Site 2)	U.S. 321 EB	351	Left turn	86.19%	303	C	0.00%	4.42%	4.42%
			Right turn	13.81%	48	A			
	U.S. 321 SB	211	Through	27.01%	57		0.00%	4.60%	4.02%
			Right turn	72.99%	154				
	SR 32 NB	68	Through	69.57%	47		0.00%	8.70%	1.45%
			Left turn	30.43%	21	A			
U.S. 321 intersection w/SR 416 (Site 3)	SR 416 SB	74	Left turn	23.81%	18	D	0.00%	4.76%	9.52%
			Right turn	76.19%	56	A			
	U.S. 321 WB	570	Through	98.00%	559		0.00%	3.60%	0.80%
			Right turn	2.00%	11				
	U.S. 321 EB	325	Through	87.00%	283		0.00%	2.50%	2.50%
			Left turn	13.00%	42	A			
SR 416 intersection w/Webb Creek Rd. (Site 4)	Webb Cr Rd WB	29	Left turn	65.22%	19	A	0.00%	0.00%	0.00%
			Right turn	34.78%	10	A			
	SR 416 SB	22	Through	66.67%	15		0.00%	6.67%	0.00%
			Left turn	33.33%	7	A			
	SR 416 NB	24	Through	54.17%	13		0.00%	0.00%	0.00%
			Right turn	45.83%	11				

[a]Note that LOS is not calculated for through and right-turn movements at non-controlled approaches (i.e., those without traffic signs or signals) since these vehicles have the right of way at all times.

[b]Traffic composition of vehicles other than passenger cars, pickup trucks, vans, and SUVs.

Table 40. Existing weekday evening traffic conditions and levels of services at key intersections[a]

Intersection location	Approach	Total vehicles per hour	Directional information			Level of service	Traffic composition[b]		
			Turning movement	Percent	Counts		Motorcycle	Single-unit truck	Combination truck
U.S. 321 intersection w/Foothills Pkwy 8A (Site 1)	FH Pkwy 8A WB	125	Left turn	83.08%	104	E	0.00%	1.54%	1.54%
			Right turn	16.92%	21	A			
	U.S. 321 SB	461	Through	97.02%	447		0.00%	2.98%	0.60%
			Left turn	2.98%	14	A			
	U.S. 321 NB	614	Through	88.12%	541		0.00%	2.90%	0.58%
			Right turn	11.88%	73				
U.S. 321 convergence w/ SR 32 (Site 2)	U.S. 321 EB	465	Left turn	85.97%	400	C	0.00%	3.58%	0.90%
			Right turn	14.03%	65	A			
	U.S. 321 SB	211	Through	26.67%	56		0.00%	4.10%	1.03%
			Right turn	73.33%	155				
	SR 32 NB	48	Through	66.67%	32		0.00%	2.38%	2.38%
			Left turn	33.33%	16	A			
U.S. 321 intersection w/SR 416 (Site 3)	SR 416 SB	48	Left turn	21.05%	10	C	0.00%	0.00%	5.26%
			Right turn	78.95%	38	A			
	U.S. 321 WB	552	Through	95.65%	528		0.48%	4.83%	0.48%
			Right turn	4.35%	24				
	U.S. 321 EB	268	Through	91.53%	245		0.71%	3.53%	0.71%
			Left turn	8.47%	23	A			
SR 416 intersection w/Webb Creek Rd. (Site 4)	Webb Cr Rd WB	38	Left turn	52.78%	20	A	0.00%	0.00%	0.00%
			Right turn	47.22%	18	A			
	SR 416 SB	22	Through	85.71%	19		0.00%	0.00%	0.00%
			Left turn	14.29%	3	A			
	SR 416 NB	31	Through	58.33%	18		0.00%	2.08%	0.00%
			Right turn	41.67%	13				

[a]Note that LOS is not calculated for through and right-turn movements at non-controlled approaches (i.e., those without traffic signs or signals) since these vehicles have the right of way at all times.

[b]Traffic composition of vehicles other than passenger cars, pickup trucks, vans, and SUVs.

Table 41. Existing weekend morning traffic conditions and levels of service for key intersections[a]

			Directional information				Traffic composition[b]		
Intersection location	Approach	Total vehicles per hour	Turning movement	Percent	Counts	Level of service	Motorcycle	Single-unit truck	Combin-ation truck
U.S. 321 intersection w/Foothills Pkwy 8A (Site 1)	FH Pkwy 8A WB	286	Left turn	86.36%	247	F	0.00%	0.72%	0.72%
			Right turn	13.64%	39	B			
	U.S. 321 SB	490	Through	90.24%	442		0.00%	1.78%	2.37%
			Left turn	9.76%	48	A			
	U.S. 321 NB	734	Through	81.64%	599		0.00%	4.47%	1.63%
			Right turn	18.36%	135				
U.S. 321 convergence w/SR 32 (Site 2)	U.S. 321 EB	481	Left turn	86.19%	415	E	0.47%	7.04%	1.88%
			Right turn	13.81%	66	A			
	U.S. 321 SB	480	Through	27.01%	130		0.00%	1.50%	2.01%
			Right turn	72.99%	350				
	SR 32 NB	93	Through	69.57%	65		2.11%	0.00%	1.05%
			Left turn	30.43%	28	A			
U.S. 321 intersection w/SR 416 (Site 3)	SR 416 SB	80	Left turn	23.81%	19	D	0.00%	1.47%	0.00%
			Right turn	76.19%	61	B			
	U.S. 321 WB	692	Through	98.00%	678		0.19%	0.97%	0.58%
			Right turn	2.00%	14				
	U.S. 321 EB	413	Through	87.00%	359		1.94%	1.94%	0.00%
			Left turn	13.00%	54	A			
SR 416 intersection w/Webb Creek Rd. (Site 4)	Webb Cr Rd WB	18	Left turn	65.22%	12	A	0.00%	0.00%	0.00%
			Right turn	34.78%	6	A			
	SR 416 SB	17	Through	66.67%	11		0.00%	0.00%	0.00%
			Left turn	33.33%	6	A			
	SR 416 NB	20	Through	54.17%	11		0.00%	6.25%	0.00%
			Right turn	45.83%	9				

[a]Note that LOS is not calculated for through and right-turn movements at non-controlled approaches (i.e., those without traffic signs or signals) since these vehicles have the right of way at all times.

[b]Traffic composition of vehicles other than passenger cars, pickup trucks, vans, and SUVs.

Table 42. Existing weekend evening traffic conditions and levels of service for key intersections[a]

Intersection location	Approach	Total vehicles per hour	Directional information: Turning movement	Percent	Counts	Level of service	Traffic composition[b]: Motorcycle	Single-unit truck	Combination truck
U.S. 321 intersection w/Foothills Pkwy 8A (Site 1)	FH Pkwy 8A WB	175	Left turn	83.08%	145	F	1.58%	0.00%	0.00%
			Right turn	16.92%	30	A			
	U.S. 321 SB	540	Through	97.02%	524		0.45%	1.35%	0.90%
			Left turn	2.98%	16	A			
	U.S. 321 NB	702	Through	88.12%	619		0.00%	0.26%	0.26%
			Right turn	11.88%	83				
U.S. 321 convergence w/ SR 32 (Site 2)	U.S. 321 EB	560	Left turn	85.97%	481	E	0.00%	1.68%	0.00%
			Right turn	14.03%	79	A			
	U.S. 321 SB	400	Through	26.67%	107		0.37%	1.10%	0.73%
			Right turn	73.33%	293				
	SR 32 NB	62	Through	66.67%	41		0.00%	1.02%	2.04%
			Left turn	33.33%	21	A			
U.S. 321 intersection w/SR 416 (Site 3)	SR 416 SB	93	Left turn	21.05%	20	D	0.00%	2.63%	0.00%
			Right turn	78.95%	73	B			
	U.S. 321 WB	738	Through	95.65%	706		0.00%	1.69%	0.28%
			Right turn	4.35%	32				
	U.S. 321 EB	381	Through	91.53%	349		0.00%	0.40%	0.40%
			Left turn	8.47%	32	A			
SR 416 intersection w/Webb Creek Rd. (Site 4)	Webb Cr Rd WB	29	Left turn	52.78%	15	A	0.00%	0.00%	0.00%
			Right turn	47.22%	14	A			
	SR 416 SB	30	Through	85.71%	26		0.00%	7.69%	0.00%
			Left turn	14.29%	4	A			
	SR 416 NB	31	Through	58.33%	18		0.00%	0.00%	0.00%
			Right turn	41.67%	13				

[a]Note that LOS is not calculated for through and right-turn movements at non-controlled approaches (i.e., those without traffic signs or signals) since these vehicles have the right of way at all times.

[b]Traffic composition of vehicles other than passenger cars, pickup trucks, vans, and SUVs.

Table 43. Existing two-lane rural highway weekday morning traffic conditions and levels of service

Road section name	Range	Traffic volume	Directional split		Percentage of trucks	Level of service
U.S. 321 (Site 1)	From intersection with Foothills Parkway Section 8A to convergence with SR 32	737	NB	66%	9%	C
			SB	34%		
U.S. 321 (Site 2)	From U.S. 321 convergence with SR 32 to intersection with SR 416	694	EB	62%	7%	C
			WB	38%		
SR 416 (Site 3)	From intersection with U.S. 321 to intersection with Webb Creek Road	87	NB	33%	7%	A
			SB	67%		
U.S. 321 (Site 4)	From intersection with SR 416 to outside of Gatlinburg	983	EB	46%	5%	D
			WB	54%		

Table 44. Existing two-lane rural highway weekday evening traffic conditions and levels of service

Road section name	Range	Traffic volume	Directional split		Percentage of trucks	Level of service
U.S. 321 (Site 1)	From intersection with Foothills Parkway Section 8A to convergence with SR 32	807	NB	70%	4%	D
			SB	30%		
U.S. 321 (Site 2)	From U.S. 321 convergence with SR 32 to intersection with SR 416	722	EB	70%	5%	C
			WB	30%		
SR 416 (Site 3)	From intersection with U.S. 321 to intersection with Webb Creek Road	70	NB	32%	4%	A
			SB	68%		
U.S. 321 (Site 4)	From intersection with SR 416 to outside of Gatlinburg	1,111	EB	52%	4%	D
			WB	48%		

Table 45. Existing two-lane rural highway weekend morning traffic conditions and levels of service

Road section name	Range	Traffic volume	Directional split		Percentage of trucks	Level of service
U.S. 321 (Site 1)	From intersection with Foothills Parkway Section 8A to convergence with SR 32	1,215	NB	60%	5%	D
			SB	40%		
U.S. 321 (Site 2)	From U.S. 321 convergence with SR 32 to intersection with SR 416	909	EB	62%	5%	D
			WB	38%		
SR 416 (Site 3)	From intersection with U.S. 321 to intersection with Webb Creek Road	74	NB	32%	4%	A
			SB	68%		
U.S. 321 (Site 4)	From intersection with SR 416 to outside of Gatlinburg	1,196	EB	44%	2%	D
			WB	56%		

Table 46. Existing two-lane rural highway weekend evening traffic conditions and levels of service

Road section name	Range	Traffic volume	Directional split		Percentage of trucks	Level of service
U.S. 321 (Site 1)	From intersection with Foothills Parkway Section 8A to convergence with SR 32	1,161	NB	63%	1%	D
			SB	37%		
U.S. 321 (Site 2)	From U.S. 321 convergence with SR 32 to intersection with SR 416	960	EB	65%	2%	D
			WB	35%		
SR 416 (Site 3)	From intersection with U.S. 321 to intersection with Webb Creek Road	117	NB	35%	1%	A
			SB	65%		
U.S. 321 (Site 4)	From intersection with SR 416 to outside of Gatlinburg	1,217	EB	47%	1%	D
			WB	53%		

Table 47. Federal Highway Administration noise standards

Land use category	Design noise level (L_{eq})	Design noise level (L_{10})	Description of land use category
A	57 dBA (exterior)	60 dBA (exterior)	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces that are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 dBA (exterior)	70 dBA (exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks.
C	72 dBA (exterior)	75 dBA (exterior)	Developed lands, properties, or activities not included in categories A and B.
D	----	----	For requirements on undeveloped lands, see FHPM 7-7-3(3).
E	52 dBA (interior)	55 dBA (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Atmospheric effects such as precipitation, wind fluctuations, wind gradients with altitude, temperature, temperature gradients with altitude, and relative humidity also affect sound transmission. These factors can result in as much as a 10-dBA difference in sound level.

L_{10} and L_{eq} noise level measurements. Two noise level measures are commonly used in traffic-related noise studies: L_{10} and L_{eq}. L_{10} is the 10th percentage point or the 90th percentile of the sound pressure level probability distribution function. In other words, L_{10} is the noise level that is exceeded 10 percent of the time at a specific location. The equivalent noise level, L_{eq}, is the average noise level expressed in decibels. In field data collection, L_{eq} may be approximated as the logarithmic sum of a series of discrete noise level samples. In general, the L_{eq} noise level reading is about 3 dBA lower than the L_{10} reading for the same sound source over a period of time.

The L_{10} noise level is not additive. The L_{eq} noise level is additive, but it is not linearly proportional to the traffic volume. In general, doubling the traffic volume will only add 3 dBA to the original L_{eq} noise level. For combining two L_{eq} sound levels, the "decibel addition" rules given in Table 48 can be used for noise levels known or desired to an accuracy of ± 1 dBA. Based on the addition rules, if the difference between the measured ambient noise level and the projected future traffic noise is between 4 and 9 dBA, only 1 dBA needs to be added to the projected future traffic noise. If the difference is 10 dBA or more, the currently measured ambient noise can be ignored.

Table 48. Decibel addition rules

When two decibel values differ by	Add the following amount to the higher value
0 or 1 dBA	3 dBA
2 or 3 dBA	2 dBA
4 to 9 dBA	1 dBA
10 dBA or More	0 dBA

Effects of noise on people. Because noise and increases in noise are bothersome to people, it is necessary that this study address some of the effects of noise on people. For the purposes of this study, highway noise effects can be categorized into three groups: (1) activity interference, (2) general annoyance, and (3) hearing loss. The most obvious and direct activity interference produced by noise is the effect on verbal communication. Tables 49 and 50 show some of the resulting activity interference produced by various noise levels.

Table 49. A-scale noise levels that will permit acceptable speech communication or voice levels and listener distances

	Voice level[a], dBA			
Distance (ft)[b]	Low	Normal	Raised	Very loud
1.0	66	72	78	84
2.0	60	66	72	78
3.3	56	62	68	74
3.9	54	60	66	72
4.9	52	58	64	70
5.9	50	56	62	68
11.8	44	50	56	62

[a]Based on men's voices, standing face-to-face outdoors.

[b]Distances in reference information are given in meters, but have been changed to feet in this table to be more readily understood.

Table 50. Quality of telephone usage in the presence of steady-state interfering noise

Noise level (dBA)	Telephone usage
30–50	Satisfactory
50–65	Slightly difficult
65–75	Difficult
Above 75	Unsatisfactory

General annoyance, a primarily subjective measurement, varies among individuals and is difficult to measure or predict. In terms of the time characteristics of noise, a smooth continuous flow of noise is generally more acceptable than abrupt or intermittent noise, although all of these noises may be unwanted. Related to traffic noise, this suggests that a steady flow of traffic and a steady-state continuous noise level are less objectionable to people than intermittent flow with time-varying noise levels.

The possibility of hearing damage is another concern people associate with increased noise levels. However, in the case of noise produced by highway traffic, this is an unwarranted concern. The Walsh-Healy Public Contracts Act of 1969 and the Occupational Safety and Health Act of 1970 (OSHA) have established a set of maximum permissible noise exposures for persons working in high noise environments. These maximum permissible noise exposures are given in Table 51.

Table 51. Maximum permissible noise exposures for persons working in high noise environments

Duration (hours/day)	Sound level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25 or less	115

Some may misinterpret this table to indicate that any noise level above 90 dBA will cause loss of hearing, regardless of exposure time. However, this table is intended to apply to industrial areas and workers, and it is intended to protect the hearing of people exposed on a daily basis to these noise levels and durations over a lifetime of employment. To experience continuous 90-dBA noise levels from highway traffic, one would have to stand approximately 3–6 m, or about 10–20 ft, from a highway lane carrying approximately 1,000 trucks per hour. To approach the OSHA exposure limits, one must then remain there beside the highway for 8 hours per day on a daily basis for many years. This is a rather unrealistic situation. There is a strong possibility that the OSHA table of values will be reduced by 5 dBA in future legislation in order to provide greater hearing protection for people exposed to noise. Even with this reduction, it is unlikely that residents near a highway are receiving hearing damage due to traffic noise.

3.7.3.2 Ambient Noise Level Data Collection

Ambient noise level measurements were taken in the areas around Pittman Center and Cosby. Key receptor sites were identified using aerial photographs and topographic maps containing the Section 8B ROW. Identified key receptors included residences, rental properties, churches, schools, and other locations. A total of 41 sites were identified and confirmed as key receptors. A list of these sites and their measured ambient noise levels is provided in Appendix L. Maps illustrating the locations of key receptor sites are presented in Sect. 4.7.4 (Figs. 86–90).

3.7.3.3 Ambient Noise Levels Within the Study Area

All of the measured sites within the study area, except for site 6 along U.S. 321, experienced ambient noise level measurements below the FHWA standard for residential areas (Leq of 67 dBA). In fact, about 71 percent of the sites experienced noise levels below 50 dBA. Along U.S. 321 and SR 416, highway traffic seemed to be the primary source of noise—although commercial/industrial activities appeared to be a contributing factor at one site. At most other locations, natural sound sources, such as running streams, insects, and birds, seemed to dominate noise levels.

3.8 AESTHETIC RESOURCES

3.8.1 Summary of Existing Conditions

The aesthetic resources affected by the proposed Foothills Parkway Section 8B involve viewing opportunities of the GSMNP, specific local viewsheds, scenery to the north, and interpretive opportunities (Fig. 47). Factors such as season, time of day, vegetation condition, and traffic affect the value of the potential viewing experience. Views of the GSMNP from this section on Webb Mountain would be better than other completed sections. This is due to the directness of the viewing opportunities, especially to the central ridge of the park to the south (Fig. 48) and of the foothills to the north from Webb Mountain. Even better are additional unobstructed views up and down a valley adjacent to the park which present a long series of succeeding side ridges (Fig. 48). Since the ridge generally runs east-west, early morning and late afternoon lighting enhances the appearance of ridge lines.

In general, Section 8B of the Foothills Parkway is completely wooded, topographically complex, and includes low ridges and mid-slopes of the Webb Mountain area paralleling the main spine of the GSMNP in an east-west direction (seen in Fig. 48). This area between Pittman Center and Cosby is principally wooded in thick deciduous forest broken up by occasional pine trees or pine stands. Some small valleys are the only cleared areas. These offer cultural and environmental interpretative opportunities along the parkway at Cosby, Rocky Flats, and Pittman Center.

The winding parkway would offer frequent but often short views of the GSMNP's high ridges 3 to 8 kilometers (2 to 5 miles) distant (Fig. 49). Foreground forests block most potential views. In addition, vegetation on roadside slopes would need to be maintained 50 meters (165 feet) or more away from the road to enable views of the park over tree tops. Without maintenance, all views eventually become blocked as a result of new vegetation growth.

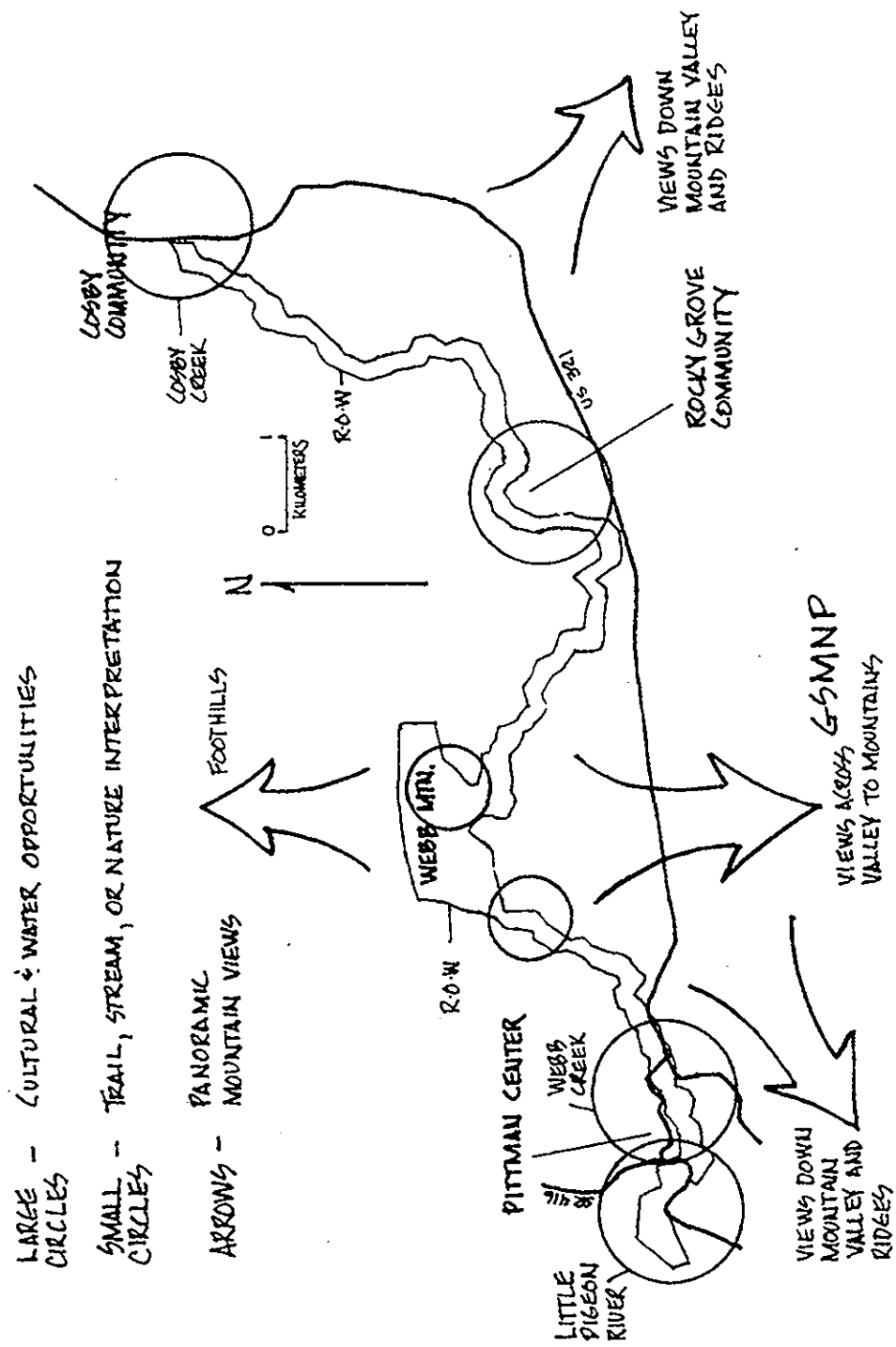


Fig. 47. The principle aesthetic resources along the proposed parkway are views south (arrows) across a valley to the GSMNP and views east and west along the valley. Atop Webb Mountain, a view north reveals a broad panorama of foothills. Additional opportunities for human settlement history and nature interpretation exist at several locations (circles).

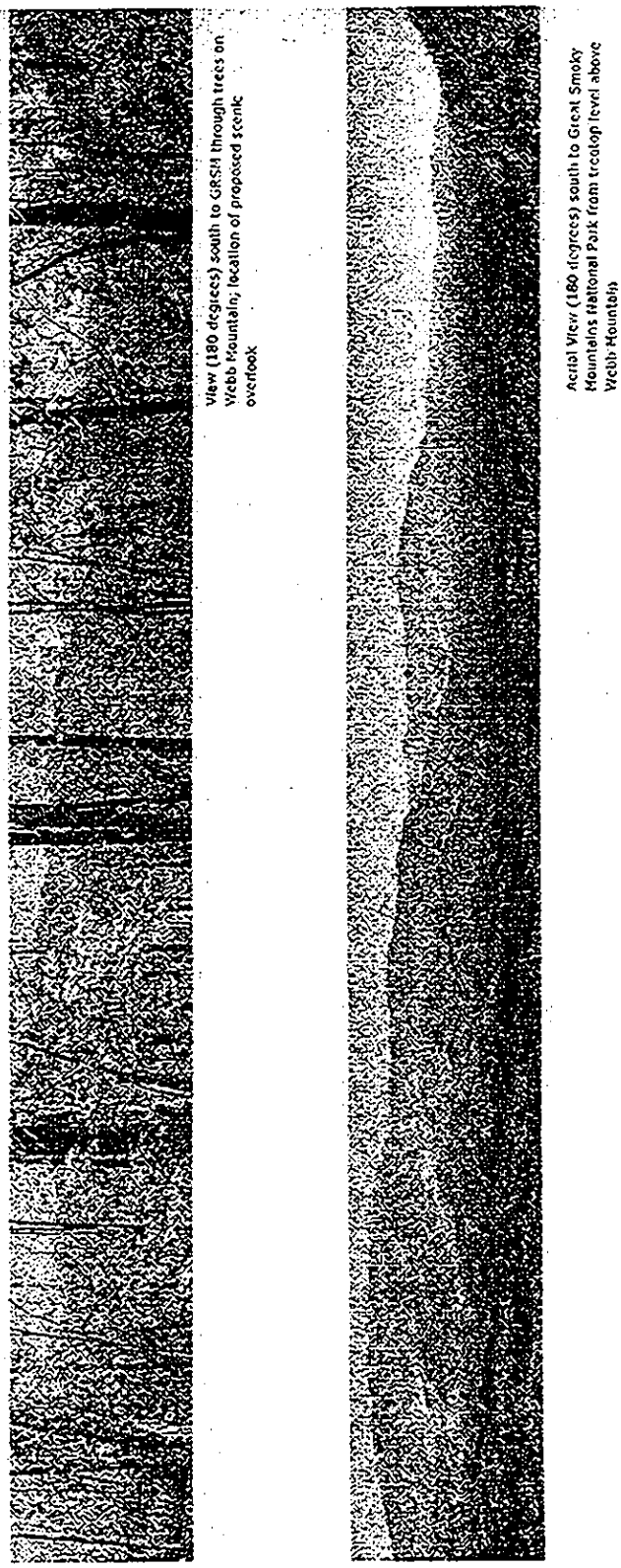


Fig. 48. A 180 degree view of the GSMNP as seen from atop Webb Mountain where a scenic overlook could be developed.

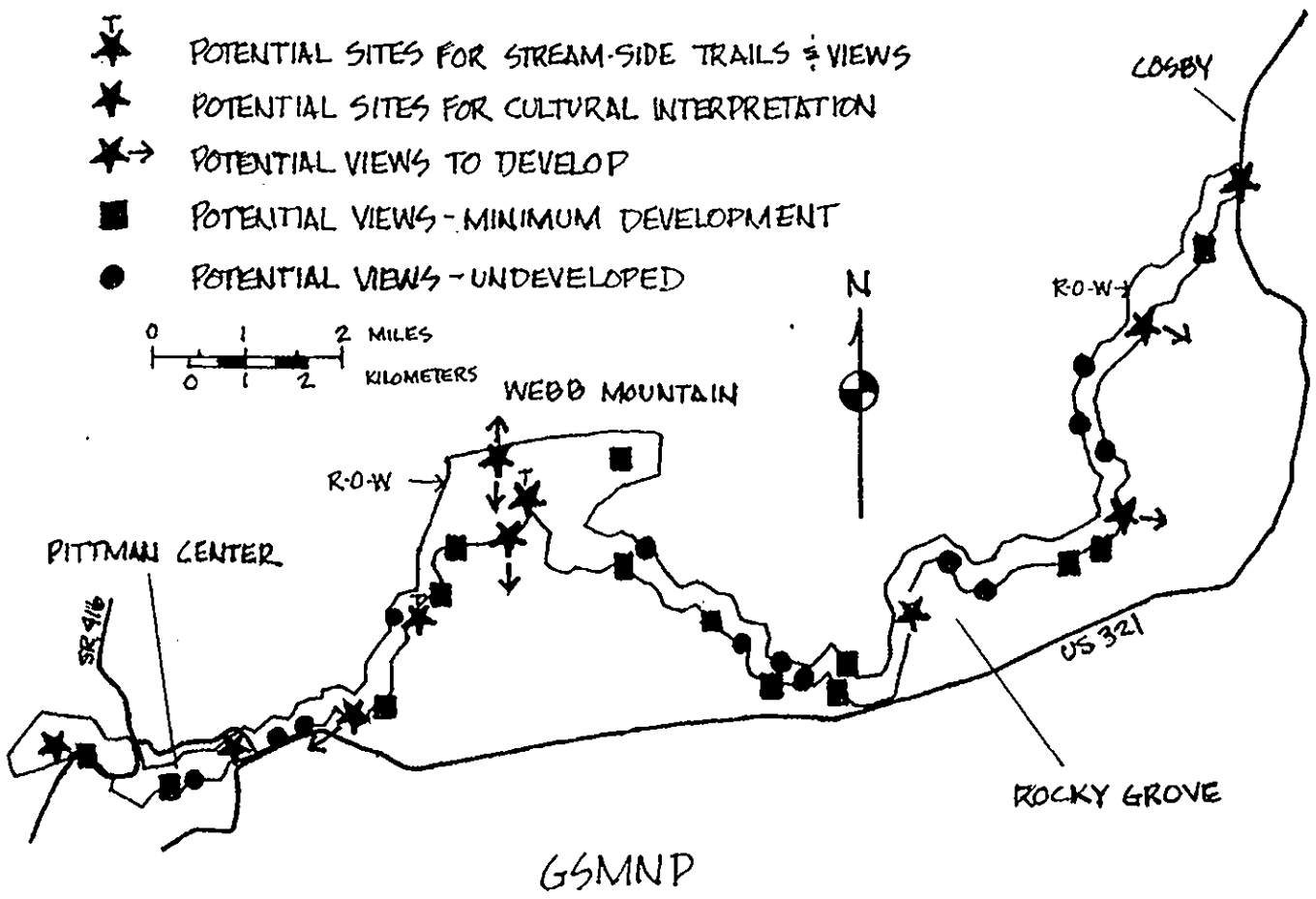


Fig. 49. Initial inventory of potential views and development sites along the proposed parkway. Thirty-eight sites were reduced to the best eleven (stars on map) to assess potential development effects.

Thirty-eight potential views of varying quality and focus were inventoried along the proposed alignment of the parkway (these sites are identified as dots, squares, and stars as shown on Fig. 49). These were subjected to review, aesthetic analysis (described in Sects. 3.8.4 and 4.8), and suitability for development/maintenance. Thirteen, identified as round dots, were eliminated from consideration as being too insignificant to develop. Fourteen, identified as squares, show some viewing opportunities for passive viewing without significant development. The remaining eleven sites, identified as stars, show the best development potential. "Star" sites were identified as those requiring the least amount of land grading while offering the best viewing opportunities. Two of these sites contain opportunities for quiet trail development, nature interpretation, or viewing. Three or four contain resources for human settlement interpretation. Five sites offer special opportunities for pull-over parking and scenic views. These eleven sites (stars) are treated in detail later in the text. The fourteen sites with some viewing opportunity (squares) will be mentioned from time to time as a potential resource to develop later. The remaining low potential sites (dots) will not be reviewed except as they relate to describing methodologies for aesthetic analyses and to acknowledge their initial consideration.

Besides the quality of scenic or interpretative viewing, site selection was also based on considerations of vegetation maintenance. This includes vegetation on cuts, fills, and where forests would need to be cleared to open views. Figure 50 provides an example of a developed viewing site to illustrate vegetation maintenance considerations. Figures 51A and 51B (pictures) show how conditions may appear.

Under good viewing conditions (i.e., limited or no haze), high ridges behind the nearest peaks can be seen from the ROW. These greatly enhance some views. However, the best views tend to look up or down the valley (easterly or westerly) between the ROW and the GSMNP. These views offer panoramas of many succeeding ridges that bring out the exceptional beauty of the area.

Most views of GSMNP are looking up from lower and mid elevations. Only the observation areas atop Webb Mountain would give a feeling of looking top-to-top at the Great Smoky Mountains. This is the most distant and panoramic view of the GSMNP from Section 8B. It is complemented by views to the north away from the park of rolling agricultural low lands mixed with wooded foothills in the far distance. Webb Mountain would offer the most dramatic view of any section of the parkway.

The western edge of the Section 8B ROW is in the area of Pittman Center, a small rural mountain community. Here, the aesthetic resources are small streams and the Little Pigeon River; small, fenced, bottomland pastures surrounded by forested low ridges; quiet paved roads; scattered houses of diverse ages and qualities; and the quaint, small, and historic Pittman Center (see Appendix N for more detail) nestled tightly in a narrow wooded valley. Rhododendron, mountain laurel, and dense hardwood forests provide the backdrop to this community. Ascending the initial slopes along the parkway, open areas including buildings and houses give way to completely forested settings. These open areas are not seen again until Rocky Grove (Fig. 52) and the town of Cosby at the easterly end of Section 8B. As one winds along the ROW, the forests change from bottomland hardwoods to upland hardwoods and, on steep exposed slopes, mixed stands of pines or hardwoods. Views of water and streams (all quite small) are scarce or hidden. This scenery would be interrupted by road cuts and fills that occasionally enable views of the Great Smoky Mountains, views of the intervening valley, and wooded foreground and midground slopes below the parkway.

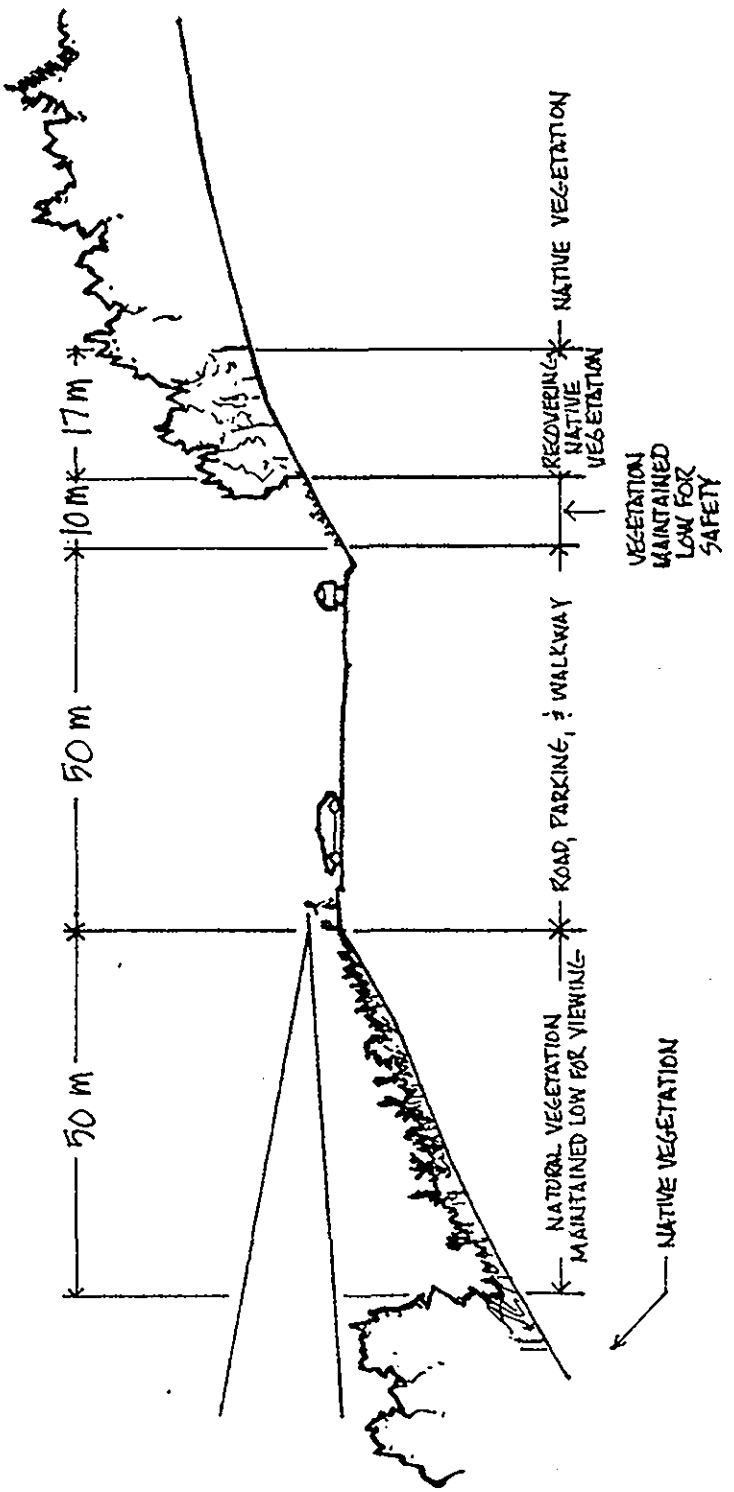
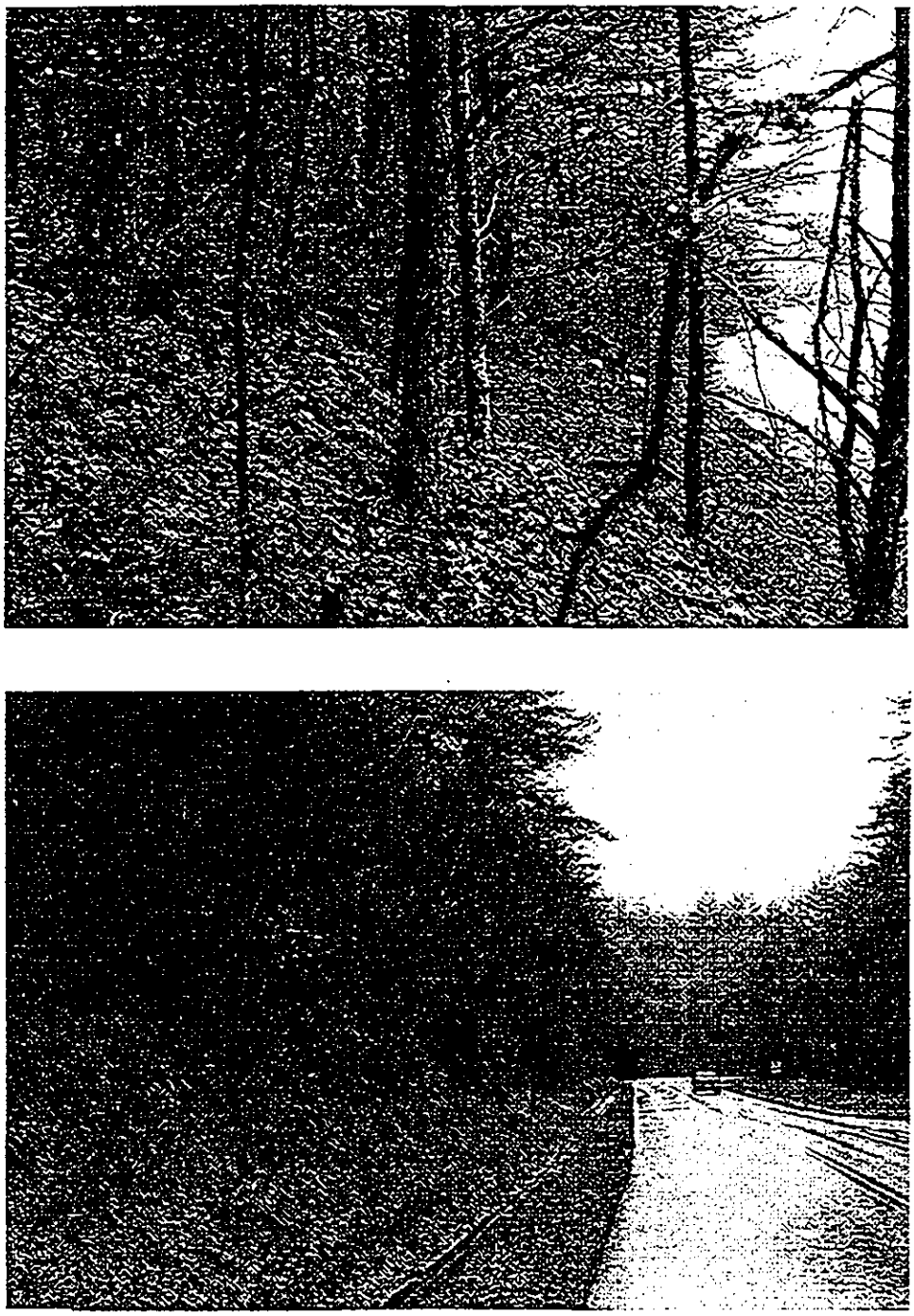


Fig. 50. Simplified profile of a scenic pull-over illustrating the vegetation maintenance needed to maintain views and safety.



Figs. 51A and 51B. Photographs show how a pull-over actually looks along another section of the parkway. Maintenance can be both costly and provide large patches of scrubby looking vegetation if clearings must be large for viewing.

Oblique Aerial View east of Sevier & Cocke Counties and east end of Great Smoky Mountains NP, from just above Webb Mountain

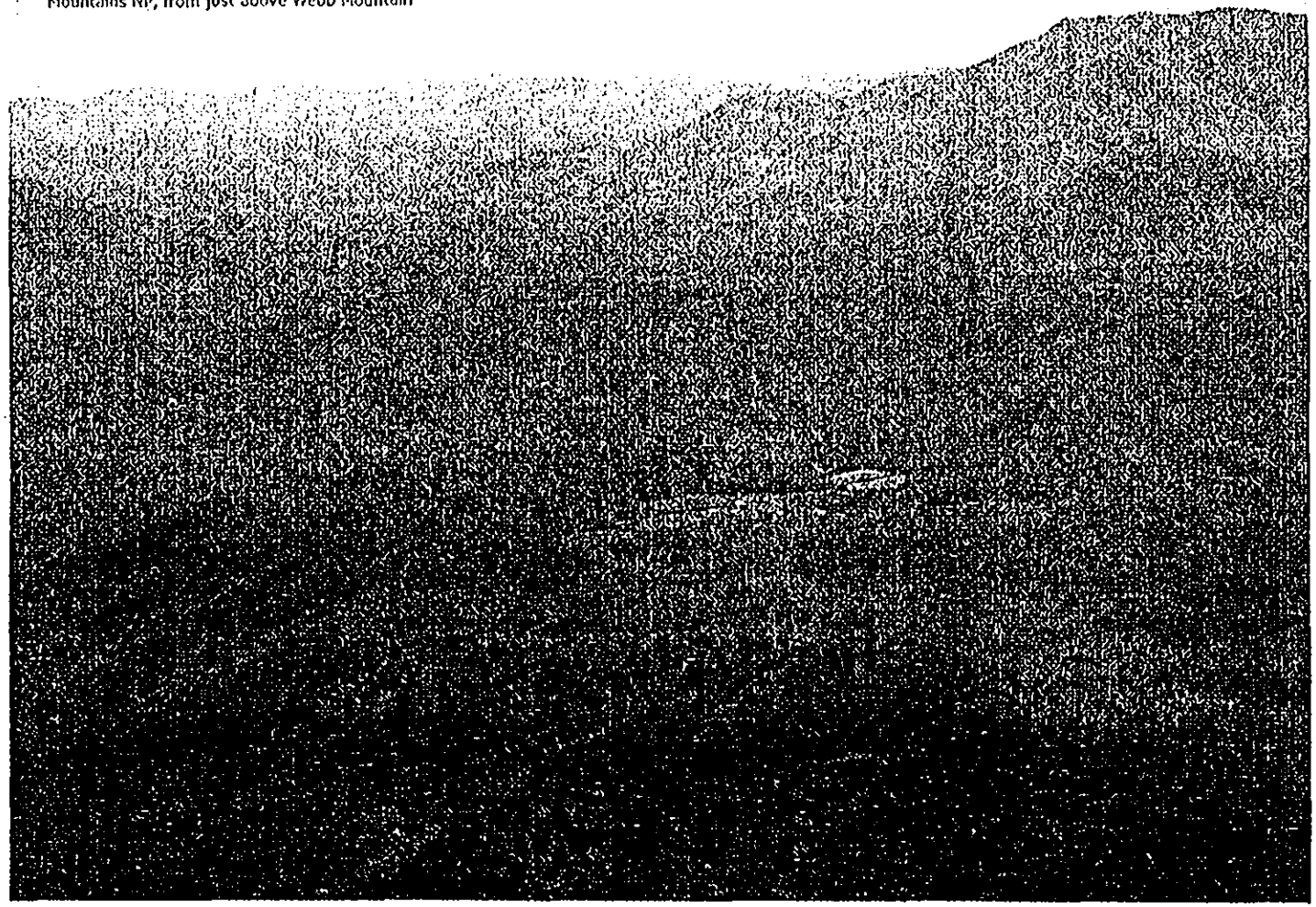


Fig. 52. Isolated fields in the Rocky Grove area lie between Webb Mountain in the foreground and the main crest of the GSMNP in the upper right to upper left. These fields, accompanying stone walls, and other structures offer interpretative opportunities to travelers of the proposed parkway.

At Cosby, the parkway connects with U.S. 321 and crosses Cosby Creek. This setting is rural although more open and developed than Pittman Center. Rural cultural resources are again present but less apparent in a much broader valley and slightly more commercial setting. Water resources (i.e., streams and rivers) play their largest aesthetic roles at the east and west ends of Section 8B. Although, there are a few areas along the ROW where close views of streams could be developed.

The intervening valley between the ROW and GSMNP contains U.S. 321, a relatively busy, straight, 2-lane highway, which is mostly hidden from view by trees from the ROW (Fig. 53). This is the motor viewing alternative to the ROW. The valley contains a golf course, camping parks, recreation homes, commercial businesses, and private homes, most generally close to the road and in a rural, forested setting. There are several locations where proposed cuts and fills on the parkway ROW would be seen from U.S. 321 and existing developments. Most of the mountain and parkway ROW viewing from U.S. 321 is blocked by trees along U.S. 321. There are no assurances these trees would remain as tourism develops.

Seasonal variation in vegetation is a significant aesthetic resource. Spring (April) brings abundant forest floor wildflowers and the greening of pastures and trees. As spring turns into summer, mountain laurel, rhododendron, and other flowering shrubs bring color to deeply shaded woods. By midsummer, people are attracted to the slightly cooler temperatures and cleaner smelling air of the mountains. The fall color (and cooler temperatures), however, is perhaps the main seasonal aesthetic event of the year. Along with the brilliant red and yellow colors of maples, sourwood, yellow poplar, and northern red oak, fall brings in many social and craft events.

Sections of the existing built parkway ROW may be seen from a few limited vantage points along foot trails in the GSMNP. Generally, this viewing is from 5 to 8 km or (3 to 5 miles). On clearer days, the parkway may be seen as the only road in a mountainous wooded view.

3.8.1.1 Aesthetics of Cuts, Fills, and Associated Vegetation

Cuts and fills of the proposed parkway are an essential component of the aesthetic experience. All along Section 8B the color of exposed rock would vary between light brown, dark brown, gray, and patches of white. The gray would dominate only in segment 3 and be nearly absent in other segments. Exposed freshly cut gray rocks (slates and shales) provide the least negative contrast to native vegetation. These are also the hardest to revegetate. Contrast is increasingly greater with dark brown, light brown, and white rocks.

Typical fill slopes would be on a 1:2 (vertical:horizontal) incline. Cuts would typically be a 1:1 slope. Before stabilized with vegetation, both cut and fill slopes would provide negative aesthetic impact due to their contrasting color and texture to surrounding native vegetation. As these features age, natural regrowth of vegetation would occur. Less steep slopes revegetate faster and become natural looking more quickly. In 10 years, most cuts would be visually dominated by grasses, perennial herbs, and somewhat inconspicuous tree seedlings. By 20 years, sufficient native vegetation would take hold to begin visually blending with wooded surroundings. In 30 years, typical cuts and fills would be well vegetated with hardwoods and pines that blend with native surroundings (Fig. 54A and 54B). Steeper cuts would contain more pines and less hardwoods (Fig. 55). Beyond a 4:3 slope, bare rock is increasingly seen and pines become more scattered and stunted. Road cuts of shales and slates are the most aesthetically problematic and are likely to

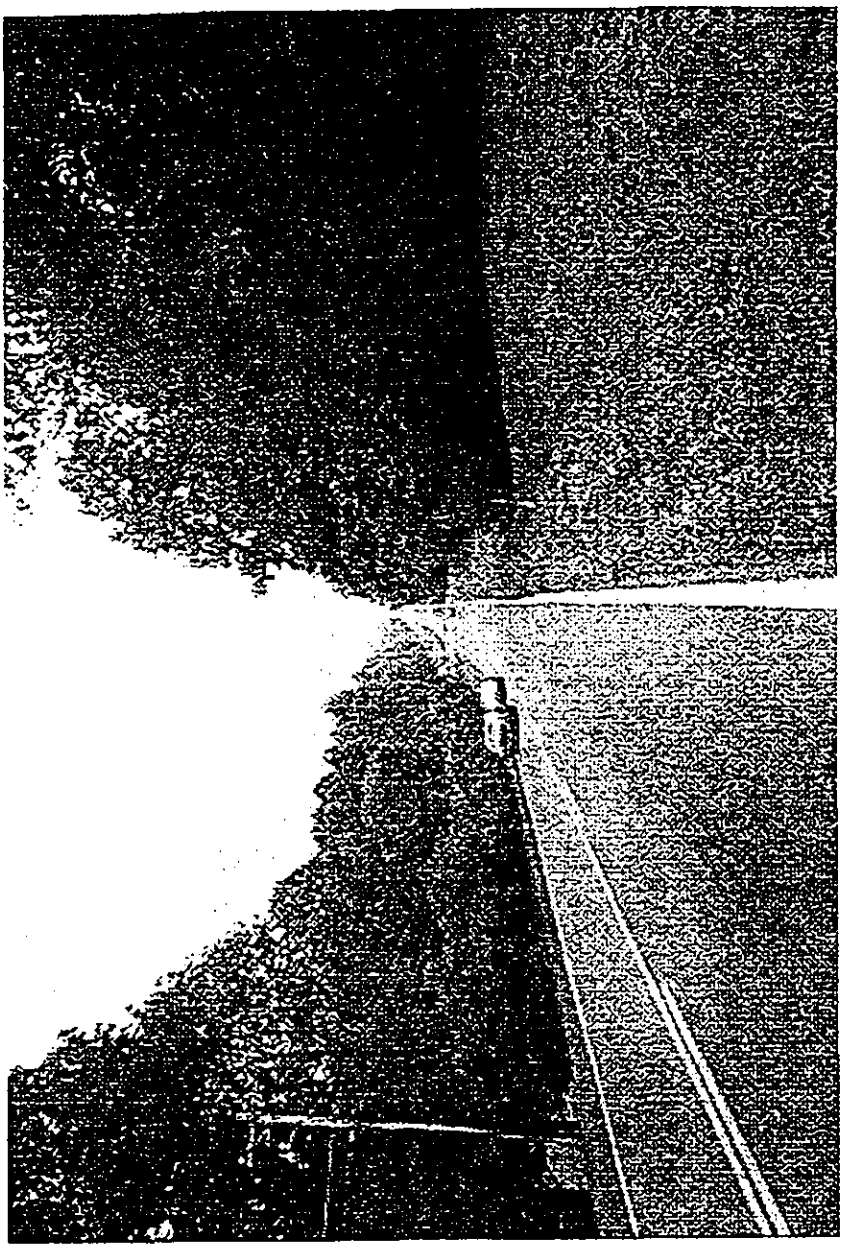


Fig. 53. View of U.S. 321 near Cobbly Nob. Trees along this route block most views of both the GSMNP and the parkway ROW. Future development could alter this situation. Existing development includes resorts, camping, homes, and roadside services.

Figs. 54A and 54B. Photographs of a road cut along an existing stretch of parkway shows how vegetation may appear in 30 years. Vegetation came back by natural seeding.

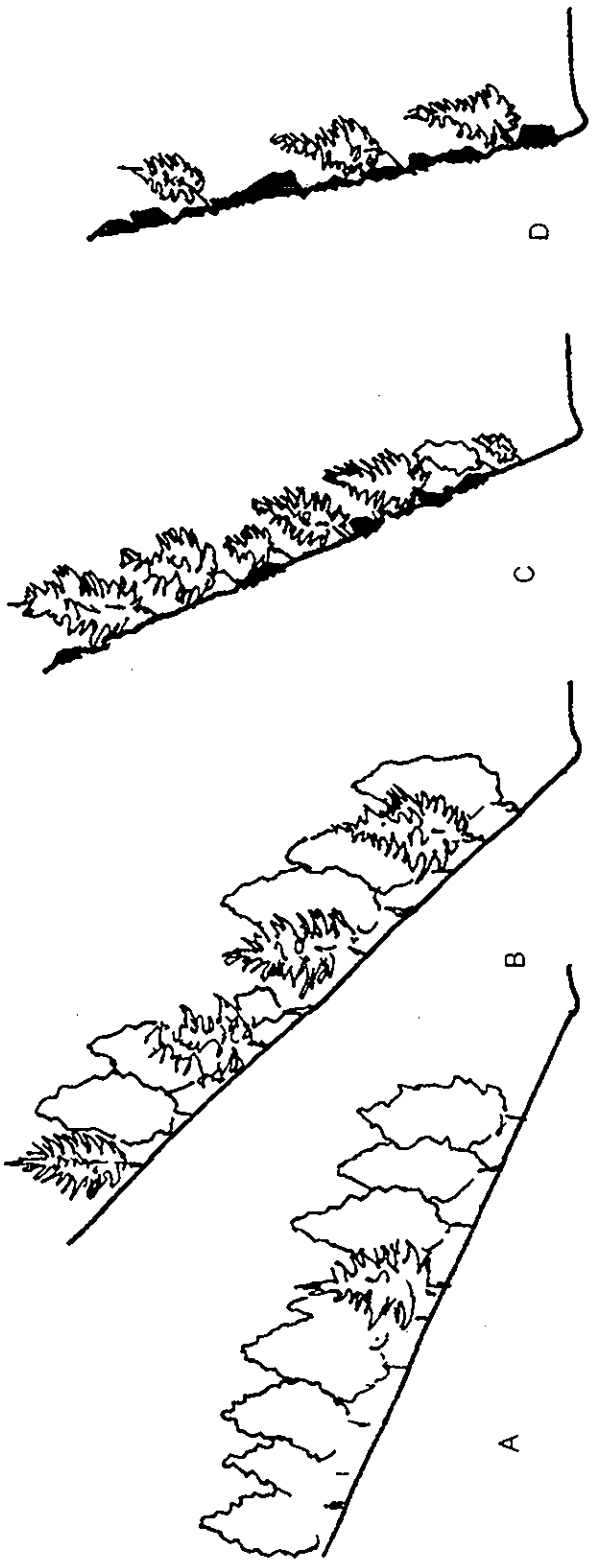


Fig. 55. Based on similar sections of the parkway already constructed, the type of vegetation returning to cuts and fills will vary by steepness of slope. Steeper slopes will be occupied more by native pines as opposed to hardwoods. This figure illustrates what might occur after 20 to 30 years.

occur occasionally on the higher parts of Section 8B. This bedrock is difficult to stabilize and revegetate even on more gentle slopes, often remains bare indefinitely and rarely is attractive to view. On road fills and slopes where vegetation is constantly cut back for panoramic viewing, conditions would contrast with natural vegetation when viewed from a distance. The frequently cut vegetation would appear smoother in texture and lighter green in color. Close up, however, the cleared areas may look weedy and scrubby.

The development of vegetation on cuts and fills between initial parkway construction and 30 years later is of significant concern. In the first few years, cover would be grasses, native mixes of perennials, and seedlings of a few native trees. These would increasingly be replaced by shrubs, small trees, briars, and patches of grasses and perennials. Exotic pest plants such as honeysuckle, multiflora rose, johnsongrass, privet, and thistle may require control. Within 15 to 20 years, a few larger native trees would be present. On better soil and gentler slopes, an even canopy of trees would be growing. At this time, some cuts and fills would be blending into the scenery quite well but they would still be identifiable by the casual observer (Fig. 56). The vegetation recovery process can be accelerated by planting aggressive, native, pioneer species such as Virginia pine and maple.

3.8.2 Introduction

The Foothills Parkway provides the recreation- and leisure-oriented motorist opportunities to discover the beauty and charm of the Smoky Mountains and the rural Tennessee landscape. Scenic mountain vistas, seasonal foliage displays, woodlands, sparkling streams, quiet pastoral scenes, fences and rock walls, and colorful wildflowers are part of this landscape. The objectives are similar to those of the Blue Ridge Parkway designed and built over an approximate 50-year period from the 1930s to the 1980s.

3.8.3 Approach to the Aesthetic Resource Evaluation

Because the experience of driving a scenic parkway consists of sequentially perceived views of varying aesthetic quality, the existing Section 8B environment was evaluated for its potential to provide opportunities for scenic viewing, either from the future roadway or from its scenic turnouts. Studies of the southern portion of the Blue Ridge Parkway provided guidance for assessing preferences for potential scenic views from Section 8B (see Appendix M). Scenes with water elements are likely to be most preferred, followed by views that offer multiple, receding mountain ridges, and third, scenes focused on rural valleys. The least likely preferred vistas are ones obstructed in part by trees and other vegetation and also scenes whose field of view is dominated by largely low, single-ridged mountains.

Parkway designers would combine these views (along with other resource opportunities and constraints) to structure the overall alignment of Section 8B. Designers would consider the relative aesthetic quality of the potential views from this section within the broader context of views from other parkway sections to create varied and rhythmic scenic experiences that—ideally—*in toto* reveal the essential aesthetic character of the Great Smoky Mountains and the rural Tennessee landscape.

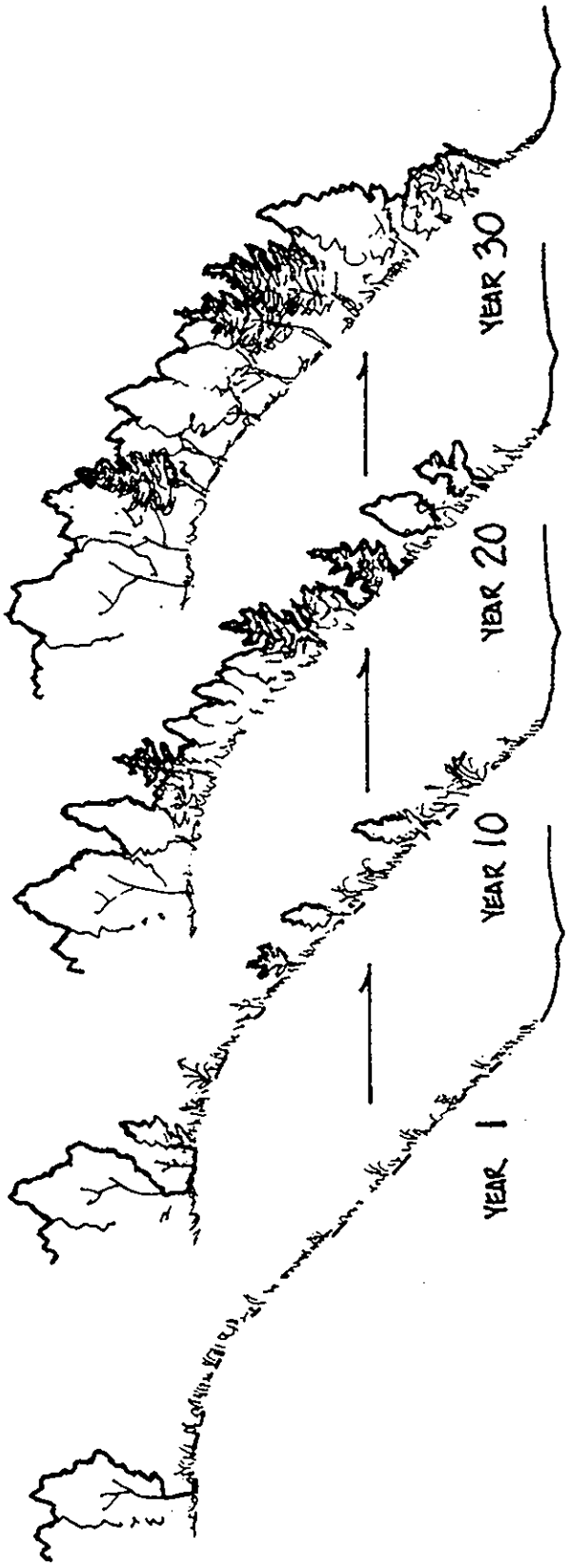


Fig. 56. Illustration of road cut vegetation recovery on a 1:1 slope over time on Webb Mountain. The first 10 years is dominated by a grassy stage which gradually evolves into a full forest stage by about 30 years. Rate of recovery will vary by steepness of slope, aspect, soil condition, and elevation.

A worksheet was created specifically for application on Section 8B of the proposed Foothills Parkway (see Fig. 57). It utilizes Hammit's findings under the heading "quality of view" in slightly modified form for worksheet purposes (Hammit 1988). The findings of others (Noe 1988; Wellman et al. 1988) regarding the conditions of viewing, as opposed to the view itself, are also presented on the worksheet. The basis for the quality of viewing conditions is segregated into critical components on the worksheet [i.e., presentation of the view (i.e., focus) and special experience opportunities at each viewing location such as sounds, lighting, and temperature]. These components together form some immediate conditions around the viewer (foreground conditions) which help shape the aesthetic experience. This experience is tempered strongly by the opportunity to view. Time for viewing, the openness of the view, and the ability to stop and take good pictures all influence the opportunity to view.

On the worksheet, evaluation boxes to the left carry the least weight and those to the right, the most. In each box a response is chosen (working from left to right), and the outcome is then integrated into the next box in the evaluation process. The result at the right is an estimated aesthetic experience rating of 1 to 5, with 1 being outstanding and 5 being boring or negative. These ratings help compare the different views along Section 8B in a systematic way. They also help when considering the sequence of views and aesthetic experiences traveling in either direction on the proposed parkway. This helps to prioritize and manage the different viewing opportunities for specific purposes and values.

The limitations with such worksheets are that the unique combination of circumstances surrounding a viewing experience is not always easily categorized. Classifying special experience opportunities best exemplifies this limitation. Aspects of several different ratings in this box can apply at a single viewing site. In such a case, one must estimate a rating. This leaves room for different opinions. Any aesthetic evaluation would have such limitations even though extensive effort is taken to systematize the procedure. Consequently, results should be considered estimates. The benefit of this approach is that the rules of evaluation are defined and referenced.

The evaluations are based on conceptual road plans developed by the FHWA and the NPS, topographic maps, field (on-site) examinations, and use of worksheets developed specifically for this evaluation. Worksheets were employed later in the process to address the quality of views from points along the proposed parkway alignment which offer some significant view. A slightly different methodology is used to assess groups of views of the proposed parkway. The difference is that views from the parkway estimate the level of positive experience in viewing, while views of the parkway estimate levels of negative experience in terms of undesirable contrasts between the construction effects and the surrounding landscape.

Aesthetic Experience Worksheet
Foothills Parkway Section 8B
*** Views From the Parkway Section ***
View 'A', Little Pigeon River, 1-400 to 1-680

Quality of View (pick one)

Very Best – Water scenes with long views of series of receding mountain ridges and valleys
Best – Long views of receding mountain ridges or water scenes but not both; close views of wooded mountain streams
Better* – Long but partially blocked views of mountain ridges or water scenes; more midground ridges than long view
Good – Midground views of opposing ridges; rustic valleys, little to no long views
Fair – Midground to foreground views of opposing ridges, close views of roads, traffic; development may be present

Presentation of View (pick one)

Best – View along outside of moderate road curve with long line of sight on road; view for 6+ seconds at speed limit
Better* – View along outside of moderate/sharp road curve with *moderate line of sight on road, view 4–6 seconds* at speed limit
Good – View along straight roadside with long to moderate line of sight on road; view 3–4 seconds at speed limit
Fair – Along tight curves and short lines of sight on road; view less than 3 seconds at speed limit

Aesthetic Experience (pick one)

Viewing Condition	Very Best	Best	*Better*	Good	Fair
vg	1	1	2*	3	3
g	1	1	2	3	4
m	2	2	3	4	5
f	3	3	4	4	5
p	3	3	4	5	5

Quality of View

1 = outstanding; 2 = very good; 3 = positive; 4 = somewhat neutral; 5 = negative

Foreground Condition (pick one)

Special Experience Opportunity	Best	*Better*	Good	Fair
I	1	1	1	2
II	1	2*	2	2
III	2	3	3	3
IV	3	3	3	4
V	4	4	4	4

Presentation of View

Special Experience Opportunity (pick one)

I. Fall color; spring blooms; water sounds; cool in summer; very special lighting effects
*II.** Morning or evening back/side lighting; mists; winter ice/frosts; deep woods; cool wet smells
III. Wildlife viewing (birds, deer, etc.); special geology; cool woods smell; big trees; unusual vegetation; noticeable ecological processes
IV. *Mostly normal mountain* vegetation; little unusual lighting effects or sensory experiences expected
V. Blinding sun; heavy fog; bad smells; bad traffic situation; noisy; strong winds; dead and dying vegetation; hot in summer; trash in view

Opportunity of View (pick one)

*A.** Horizontal view angle >180°; vertical view angle >20°; pull over present
B. Horizontal view angle 90–180°; vertical view angle 15–20°; pull over present
C. Horizontal view angle 45–90°; vertical angle 10–15°; pull over available; larger viewing angles with no pull over available
D. Horizontal view angle 30–45°; no pull over available
E. Horizontal view angle <30°; no pull over

Viewing Condition (pick one)

Opportunity to View	1	2	3	4
A	vg	vg*	m	f
B	vg	g	f	f
C	g	m	f	p
D	g	m	f	p
E	m	f	p	p

Foreground Condition

vg = very good; g = good; m = moderate; p = poor

Choices are marked with an asterisk.

Fig. 57. Sample aesthetic evaluation worksheet.

Foreground, midground, and farground*, as defined by Orr are useful terms in describing views (Orr 1973). This is because the expression of form, line, color, and texture in scenes changes with distance. These are the basic building blocks in scenic analysis. Consider, for example, how one might describe a tree 50 m away versus a clump of trees 2 km distant. Textures and forms change dramatically. When something new is introduced into a scene, such as a new road, it is seen differently at various distances in terms of contrasts (e.g., color, texture, line, form). It is therefore important to describe the distance terms and how perception generally changes with them.

3.8.4 Description of Key Aesthetic Development Sites

The description of affected aesthetic resources can be conveniently divided into the same segments of the ROW as in other parts of this report. Figure 58 shows 38 individual aesthetic sites along the parkway and which of 7 segments they fall into.

Segment 1 is the furthest west and includes cleared fields, barns, houses, the Little Pigeon River at close view, and scant views of the GSMNP (Fig. 58). Segment 2 contains the transition from lowland to upland conditions with opportunity for both lowland, near water views, and low-to-mid elevation views of the GSMNP to the south and southwest. The third segment contains views of the GSMNP from higher elevations as well as opportunities for quiet walkways and environmental interpretation. Segment 4 involves a winding slow descent along the top of a subridge to Webb Mountain. Many views along this segment are difficult to develop because of the winding parkway ROW and forests blocking views. Few interpretive opportunities, beyond environmental topics, are available for interpretation along this segment. Segment 5 provides the descent into, and climb out of, the Rocky Flats valley with few panoramic views but interesting views of old stone walls and farmsteads. Segment 6, along a low ridge, offers views of the GSMNP to the southeast where many succeeding ridges provide excellent panoramas. Most views are difficult to develop because of steep and complex topography. Segment 7 descends into Cosby Creek valley where there are opportunities for historical, stream-side, and environmental interpretation.

Thirty-eight aesthetic resource sites are identified on the map of Fig. 58. According to the methodology described early, most sites were evaluated for aesthetic qualities. Thirteen sites with a rating of 4 or 5 (low aesthetic quality) are identified with dots and were eliminated from further consideration. The final eleven sites were retained for detailed analysis and description. These are identified with stars in Fig. 58. Fourteen other sites have some potential for limited development but are considered lower priority (squares in Fig. 58). All sites are listed in Table 52.

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*Foreground extends from the eye of the viewer to approximately 0.8 km (about 0.5 miles) away. It is often strongly defined by the texture of tree trunks, road surfaces, rock surfaces, forest floor, building siding, and tree leaves. It is also often affected by line and color. Form may be defined by such elements as houses (angular form), boulders (rounded to angular forms), and large tree trunks.

Midground extends from 0.8 km to about 3 km (about 2 miles). The details of leaf shapes, tree trunk textures, and rock surface textures are lost and taken over by the texture of tree crowns, geologic forms (ridge tops), and differences between stands of trees (e.g., clumps of conifers in hardwood forests) and perceived by differences in colors and general textures of forests. The fine texture of young forest canopies can be differentiated from the rougher looking, large rounded crowns of trees in older forests.

Farground extends beyond 3 km. The texture of tree stands fades into wooded and non-wooded differences. Colors became muted by the haze of distance unless special back lighting occurs. Forms or shapes of mountain ridges and valleys dominate the view.

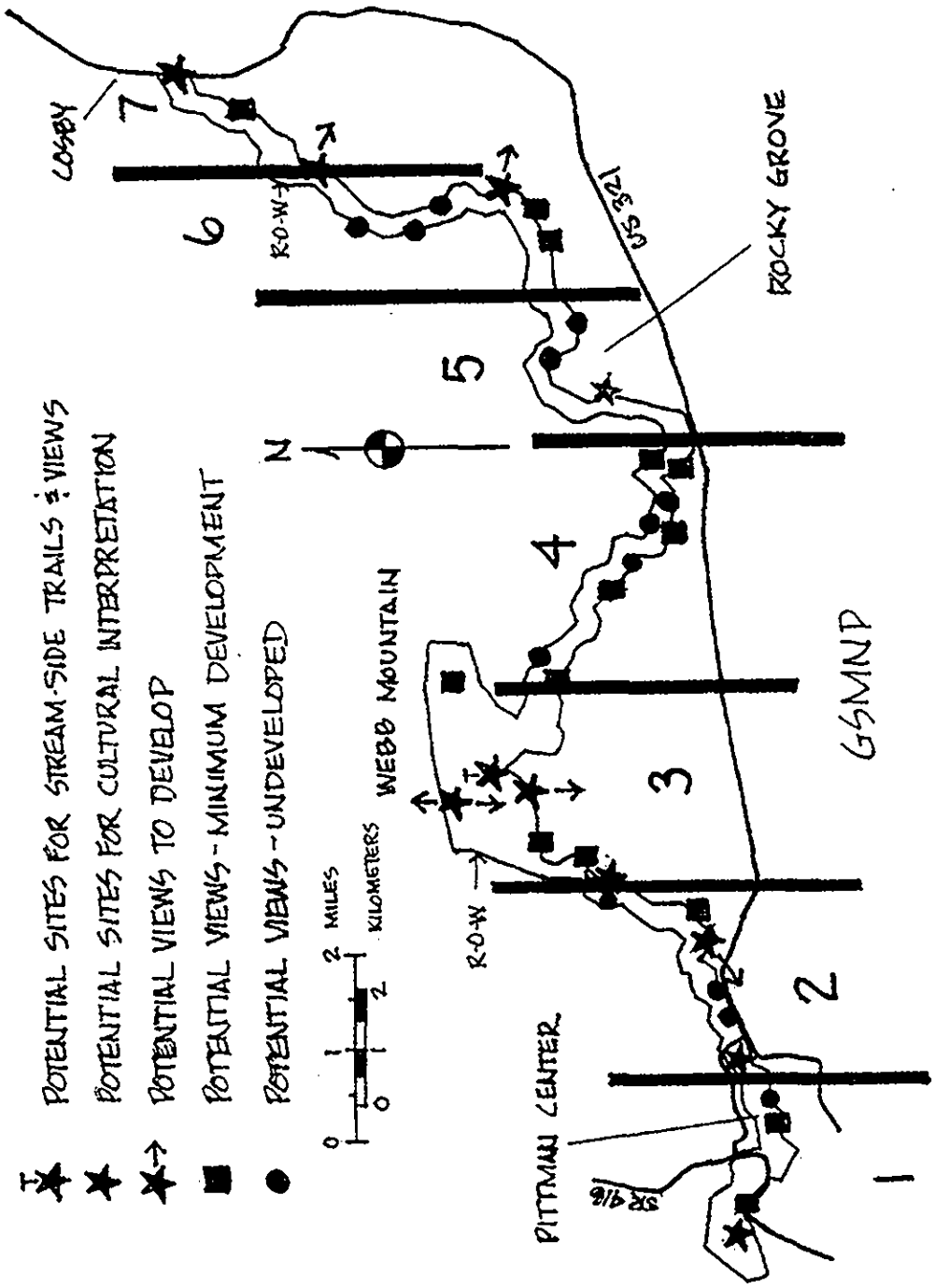

Fig. 58. The aesthetic resources of Section 8B are divided into these 7 segments.

Table 52. The location and identification of views and interpretative sites along Section 8B of the proposed Foothills Parkway. These sites were identified after consideration of development constraints, opportunities, and maintenance requirements.

Symbol as appears on Fig. 58	Segment number	Roadway station	Rating and view identification		Description
Star	1	1-400 to 1-680	1-2	1A	West terminus at Little Pigeon River
Square	1	1-400	2	1A1	North ramp alternative assumed; combine with 1A
Square	1	2-170	3	1B	View of tunnel assumed, steep cuts avoided
Dot	1	2-170	4	1C	Tunis Branch lateral views of small valley, small cleared fields, thinned forests
Star	2	2-380 to 2-970	2	2A	Webb Creek valley view of water, hayfields, and some rural houses
Dot	2	2-870	4	2A1	Alternative terminus access not assumed
Dot	2	3-400	4	2B	View south at alternative terminus site
Star	2	4-580 to 4-700	3	2C	Good westerly view of GSMNP with tree clearing
Square	2	4-940 to 5-200	2	2D	Narrow view south toward Timothy Creek, clearing at issue
Dot	2	6-000	5	2E	Close view of wooded valley to southwest
Square	3	6-300 to 6-400	2	3A	Narrow view south on curve toward Lower Mill Dam Creek
Star	3	6-500 to 7-200		3A1	Stream-side interpretative trail opportunity
Square	3	7-810	3	3B	Short view down Warden Branch (southeast) to GSMNP
Star	3	8-120 to 9-170	1	3C	Composite views south from lower parking lot and Parkway
Star	3	8-700	2	3C1	Trail to scenic view south of GSMNP
Star	3	Upper parking	1	3D	Upper Webb Mountain parking panorama
Square	3	Parking access road	2	3E	North view to English Mountain on sharp curve
Square	4	10-450	3	4A	South view from Blackgum Gap, 2+ ha of tree clearing
Dot	4	10-450	4	4B	North view from Blackgum Gap, limited sight distance

Table 52. Continued

Symbol as appears on Fig. 58	Segment number	Roadway station	Rating and view identification		Description
Square	4	11-500 to 11-950	1	4C	Southwest view from Table Ridge, 1+ ha of tree clearing
Dot	4	12-370	4	4D	Branam Hollow view east, very narrow
Dot	4	12-670	4	4E	Pine Cove view northeast, close view only
Square	4	12-670	3	4F	View south up Texas Creek to GSMNP, clearing needed
Dot	4	12-760	4	4G	Close view north of evergreens, very plain scenery
Square	4	13-250 to 13-450	3	4H	2nd best of squares, view south-southeast with pull-over space
Square	4	13-700	2	4I	View southeast, pull-over, extensive forest clearing required
Star	5	15-050 to 15-600	3	5A	Valley alternative for aesthetics, stream, old stone walls, small fields, and several houses
Dot	5	16-400	4	5B	Shults Grove Church, very closed in but stream near
Dot	5	17-000	4	5C	Rocky Grove view south but closed in by near ridge
Square	6	17-860	3	6A	View south to GSMNP but very near development
Square	6	18-300	3	6B	View southeast toward Buckeye Creek, too steep for pull-over development
Star	6	18-800	4	6C	View east spectacular if developed, but narrow view
Dot	6	19-410	4	6D	View northeast out Sandy Hollow, view quality marginal
Dot	6	19-900	4	6E	West view down valley into near opposing ridge
Dot	6	20-500	5	6F	View down Chavis Creek, short view to opposing ridge
Star	7	21-200	3	7A	East-southeast view up GSMNP ridge w/pull-over at Camp Creek
Square	7	22-570 to 23-160	3	7B	East view from low elevation near terminus

Table 52. Continued

Symbol as appears on Fig. 58	Segment number	Roadway station	Rating and view identification		Description
Star	7	23-800	3	7C	View of stream and rural development along Cosby Creek and community

Figure 59 identifies only those areas selected for potential aesthetic development along the proposed parkway.

Table 52 demonstrates that significant visual resources exist along the proposed route of the parkway. It also indicates that some of these resources would exist without the development of pull-overs or parking lots. However, maintenance of some vegetation to keep views clear would be needed to retain these visual resources.

Eleven sites would offer especially improved aesthetic experiences if developed. These sites include several with close views, opportunities for interpretive development of culture or environment, or quiet walkways along streams or to panoramic viewing points. Some of the close viewing opportunities include flood plains, wetlands, houses, old rock walls, and archaeology. Table 53 lists only the sites selected for potential development and detailed analysis.

Site 1A

Site 1A is at the west terminus of Section 8B and lies within the floodplain of the Little Pigeon River. Small hay fields, cabins, and SR 416 occupy the location. Low wooded hills surround the valley and do not permit views of the GSMNP. Here, the parkway would emerge from a small gap onto a high bridge spanning one of the fields, Copeland Creek (a very small stream), and the Little Pigeon River. SR 416 would pass under the bridge (see Fig. 60). This picturesque location would require vegetation management along the Little Pigeon River to allow it to be visible to viewers. Since the area would be at a possible exit/entrance point for the parkway, more viewing may occur due to slower traffic. Enhancing the visibility of the river, cabins, and fields would be important.

Figure 60 illustrates the emergence of the parkway into the Little Pigeon River floodplain. The figure shows how important trees would be in screening road cuts where the parkway would emerge from the hills onto the overpass. Without these trees, the parkway would impress an engineered (non-natural) component in the view.

The area would be somewhat congested with the two bridges over the river and two existing roads as well as two intersections being somewhat close to one another at both ends of the short exit ramp (Fig. 61). Pull-over parking development on the parkway would not be safe on an overpass or near the intersection with the exit ramp. The only opportunity for stopping and interpretative development would be to locate a small parking area to the southwest of the intersection of the exit ramp and parkway. From such parking, trail development and small picnic facilities would be possible toward the parkway bridge (not the exit ramp) where it passes over the Little Pigeon River. About 0.5 to 0.75 hectares (1 to 2 acres) could be cleared or thinned to improve aesthetics in the area.

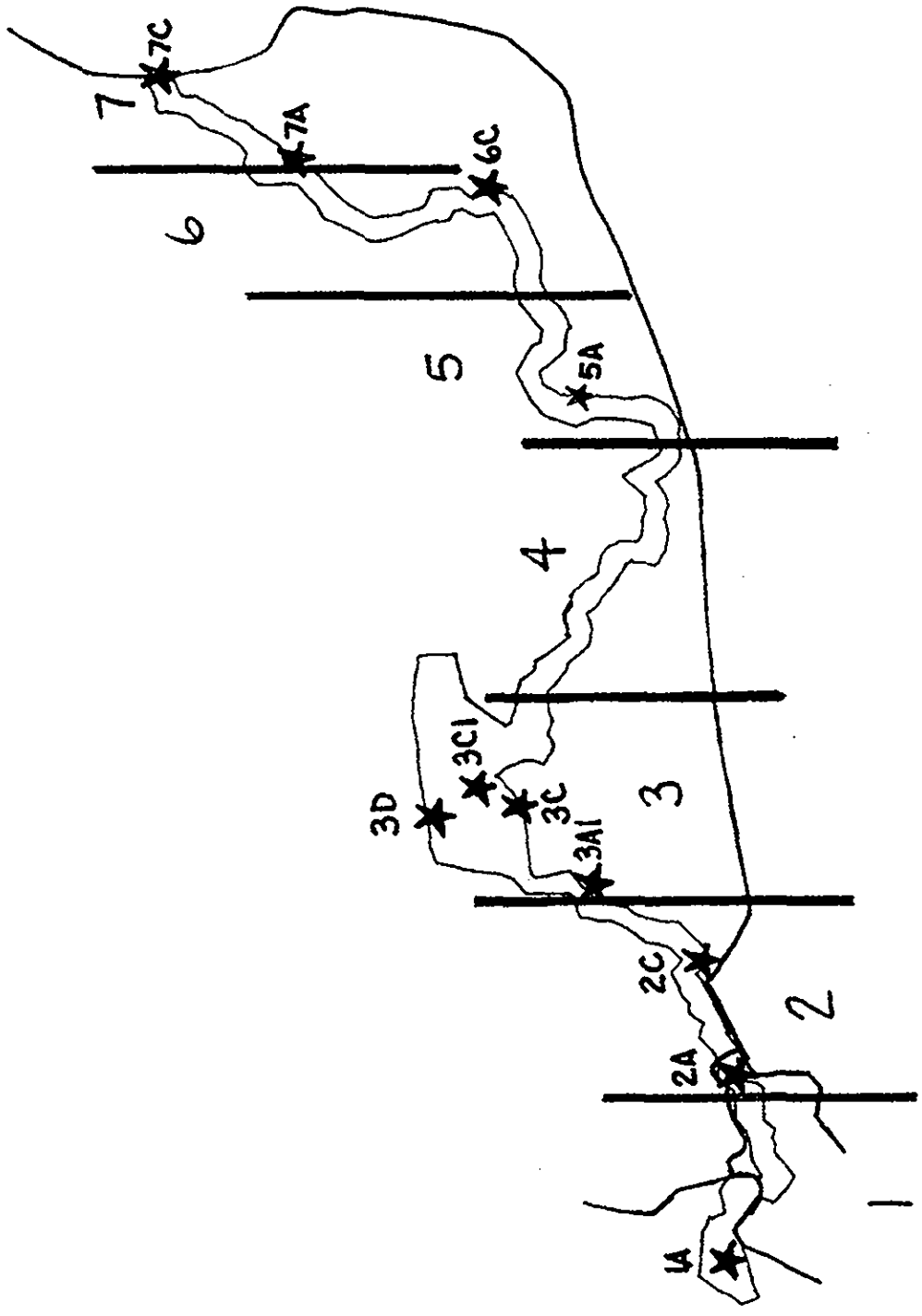

Fig. 59. The location and segment of sites for potential aesthetic development within the ROW of Section 8B.

Table 53. Sites selected for potential development along Section 8B of the Foothills Parkway

Symbol as appears on Fig. 58	Segment number	Roadway station	Rating and view identification		Description
Star	1	1-400 to 1-680	1-2	1A	West terminus at Little Pigeon River
Star	2	2-380 to 2-970	2	2A	Webb Creek valley view of water, and Pittman Center features
Star	2	4-580 to 4-700	3	2C	Good westerly view of GSMNP with tree clearing
Star	3	6-500 to 7-200		3A1	Stream-side trail with interpretative opportunity
Star	3	8-700	2	3C1	Trail to scenic view south of GSMNP, stream nearby
Star	3	8-120 to 9-170	1	3C	Composite views south from lower parking lot and parkway
Star	3	Upper parking	1	3D	Upper Webb Mountain parking panorama
Star	5	15-050 to 15-600	3	5A	Valley alternative for aesthetics, stream, old farming features
Star	6	18-800	4	6C	View east spectacular if developed, but narrow view
Star	7	21-200	3	7A	East-southeast view up GSMNP ridge w/pull-over at Camp Creek
Star	7	23-800	3	7C	View of stream, Cosby Creek, and community

Part of the aesthetic package at this location is the view from the parkway looking west as one travels west onto the overpass to view the Little Pigeon River floodplain.

Coming into the area just under tree-top level would not enable long distance viewing. However, this would focus greater attention to river and valley landscapes.

Some travelers who would access the parkway from U.S. 321 would have a slow, short drive along a narrow winding road that, along one stretch, is only feet from Webb Creek. Close-up viewing of this shaded, cool, damp, mountain stream is an excellent aesthetic experience. This short access road also passes through a portion of Pittman Center, an historic cultural center for the area.

Site 2A

At the location of site 2A, the parkway would cut across the small floodplain of Webb Creek. The parkway would run for some distance along the edge of a field with Webb Creek on the opposite

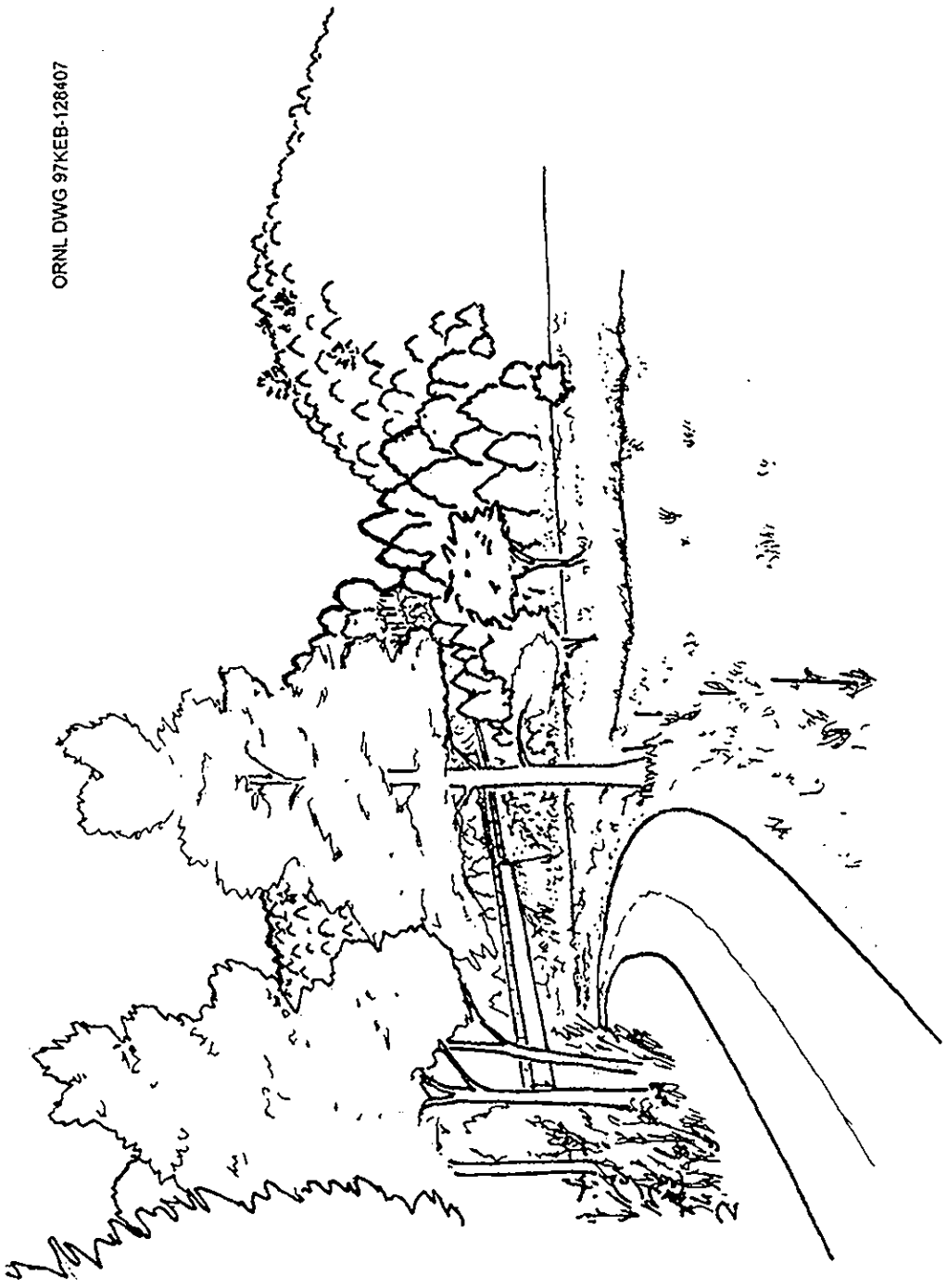

Fig. 60. This sketch shows how the parkway might emerge from low mountains into the open floodplain of the Little Pigeon River. The view is from state route 416 looking east, near site 1A.

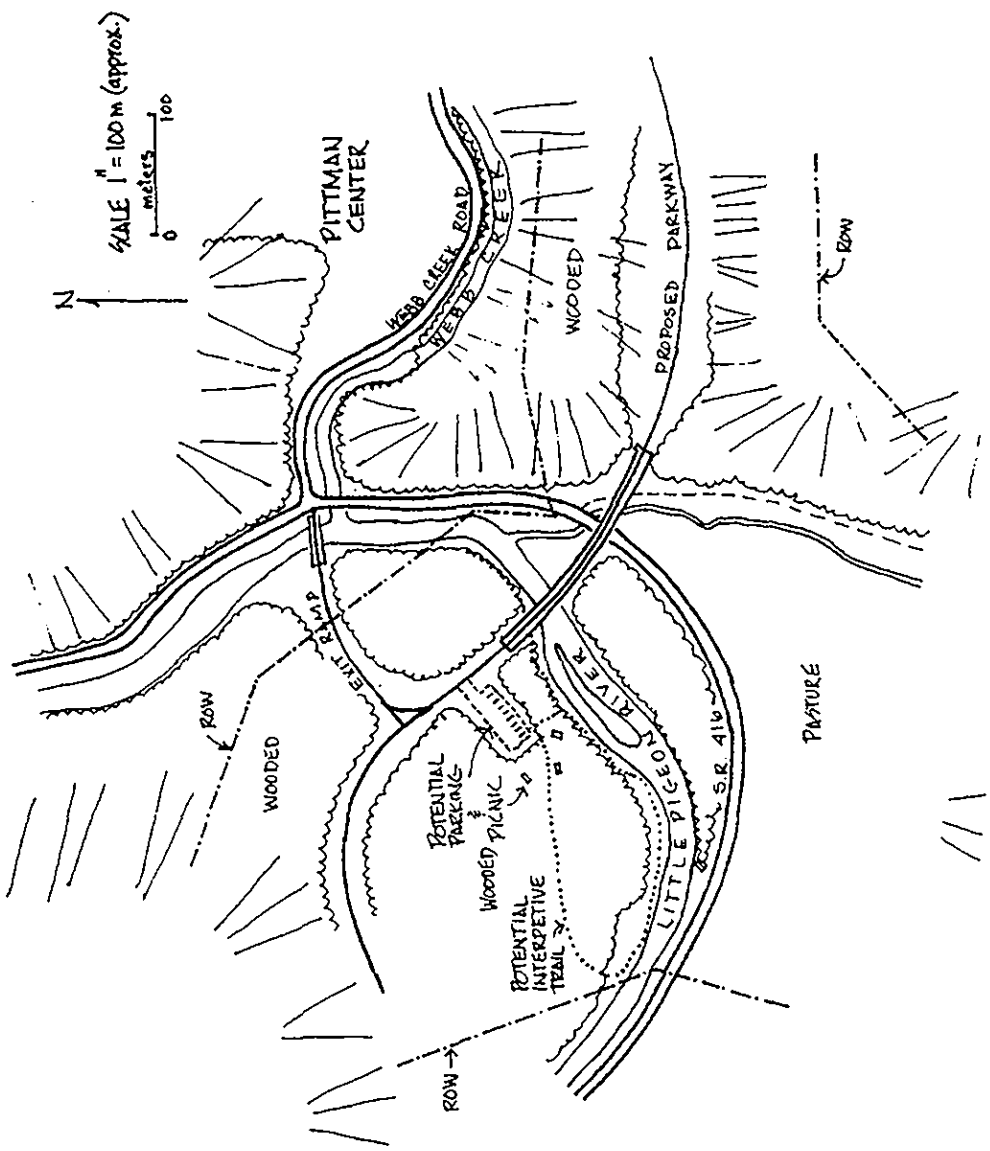

Fig. 61. Sketch of the western terminus of Section 8B at site 1A where aesthetic developments would offer interpretive opportunity. Parking, picnic, trail, and interpretive opportunities could be located as shown. Some maintenance of wooded vegetation would be needed to improve views of the Little Pigeon River.

side of the field (Figs. 62 and 63). Small open fields and the element of water would be important aesthetic elements to develop. Maintenance of stream-side vegetation to allow stream viewing would be necessary to improve the viewing experience. As with site 1A, the floodplain is surrounded by low wooded ridges which prevent viewing of the GSMNP. Pull-over opportunities exist in the floodplain and next to the fields for interpretive cultural stops on early 19th century settlement of the area and the history of nearby Pittman Center.

Where the parkway would descend into the Webb Creek floodplain from the east, a highly visible road cut on a steep slope would be imposed. The need would exist for retaining walls to minimize the exposure of these cuts along such a natural valley and stream. parkway travelers headed east across Webb Creek valley would be subjected to direct close views of the road cuts just mentioned. Plans would include retaining walls. Gray stone would be the most aesthetically desired material.

Site 2C

This site occurs at about 500 to 510 meters elevation in complex, steep terrain (winding parkway). It occurs between road station 4-580 and 4-700 on a short straight stretch of parkway between two turns curving in opposite directions. The section would probably be seen from U.S. 321 headed east. Approaching curves to the viewing stretch along the parkway make stopping for pull-overs somewhat hazardous so pull-over development is not recommended.

Enhancing the viewing opportunity to the west (an outstanding view) would require the clearing of trees. This could be as much as 75 meters out along a low ridge extending west from the parkway and about 50 meters wide (about 0.4 hectares or 1 acre). Along the rest of the stretch of this view, only nearby vegetation on road fills would need control. At the two ends of this stretch, additional trees could be removed to extend the length of view (see Fig. 64).

Only one parkway fill area would be seen from site 2C (see Fig. 64). Others to the west would be hidden from view by forest vegetation on ridges near the parkway. U.S. 321 may possibly be seen from site 2C, depending on the extent of vegetation clearing to view the GSMNP and the location of the viewer along the parkway.

Site 3A1

The site does not offer panoramic viewing of the GSMNP but is included for development to provide an interesting interpretive trail to a small, well shaded mountain stream (Sheep Pen Branch) (see Fig. 65). A lightly used hiking trail also passes across the site. Pull-over parking for 5 cars on an extended shoulder is possible near road station 7-100. The site could be developed as a quiet walkway involving nature interpretation and proximity to water.

Site 3C

Except for the panoramic view atop Webb Mountain (site 3D), site 3C offers the best viewing opportunity of the GSMNP. This site is the location of a proposed parking lot and would involve maintenance of vegetation to provide excellent viewing directly south. Figure 66 illustrates the view which includes a series of succeeding ridges most of which are visible even on hazy days. Views to the east are restricted by a nearby side ridge. Views to the west are less restricted and provide the best views.

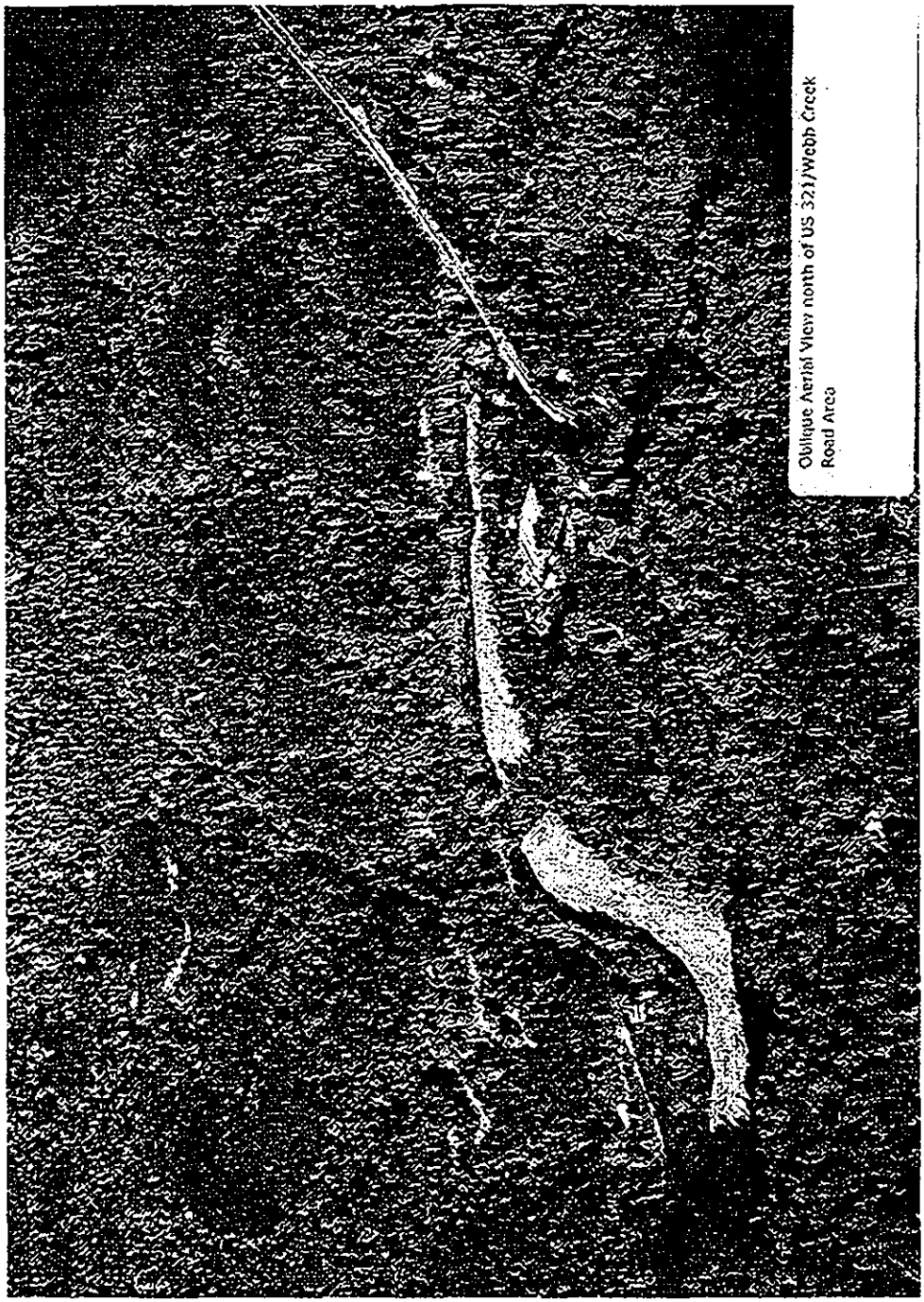

Fig. 62. An oblique aerial photograph of the site 2A area. Webb Creek appears in the center of the photo while U.S. 321 appears to the right.

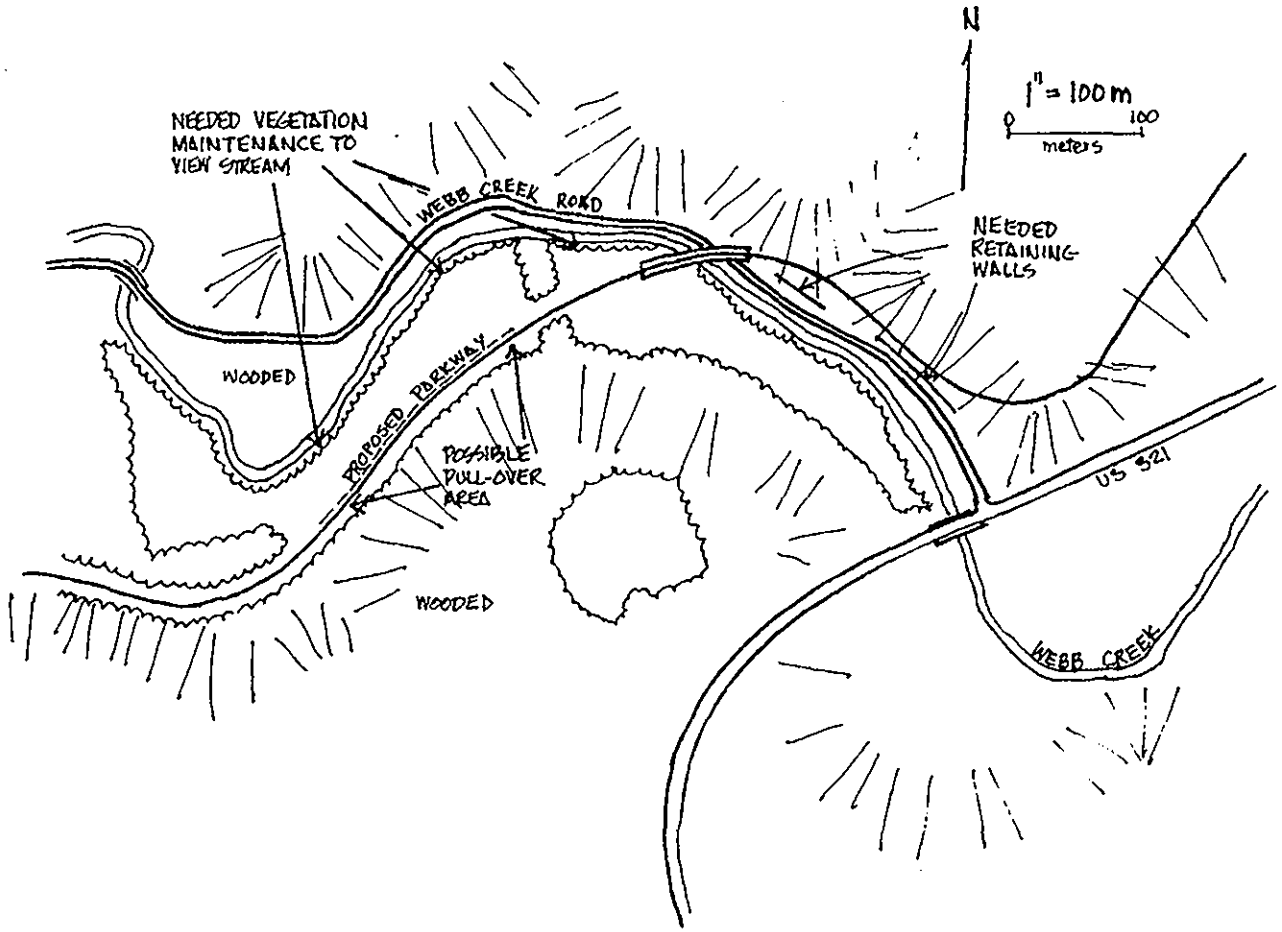

Fig. 63. Sketch of the proposed parkway passing through Webb Creek valley near U.S. 321 at site 2A. The main aesthetic features are the open fields, stream, and surrounding hillsides. Possible actions to improve aesthetics include retaining walls near U.S. 321, development of a pull-over, and some vegetation clearing and maintenance along parts of Webb Creek.

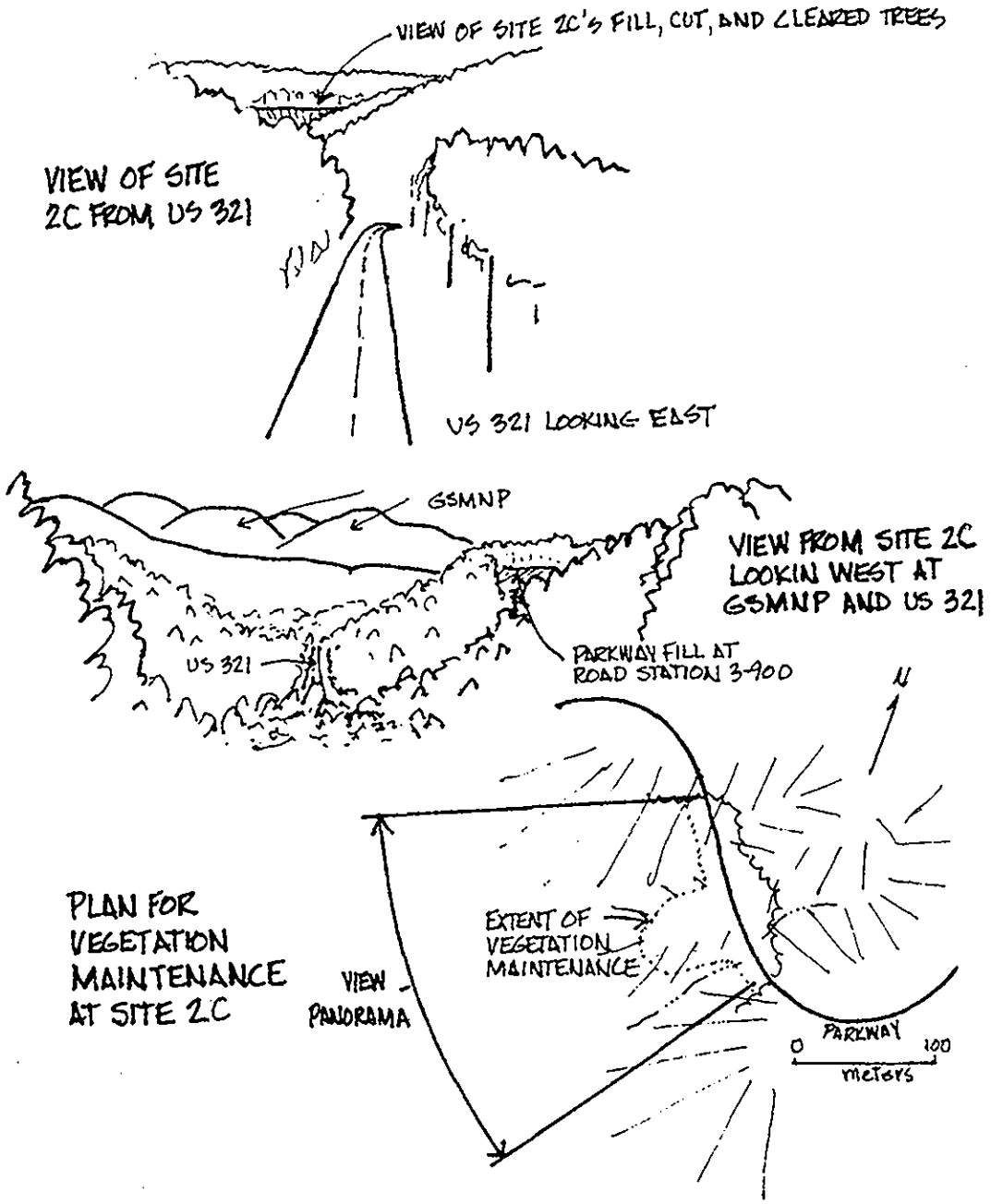

Fig. 64. Sketches of various aspects of site 2C.

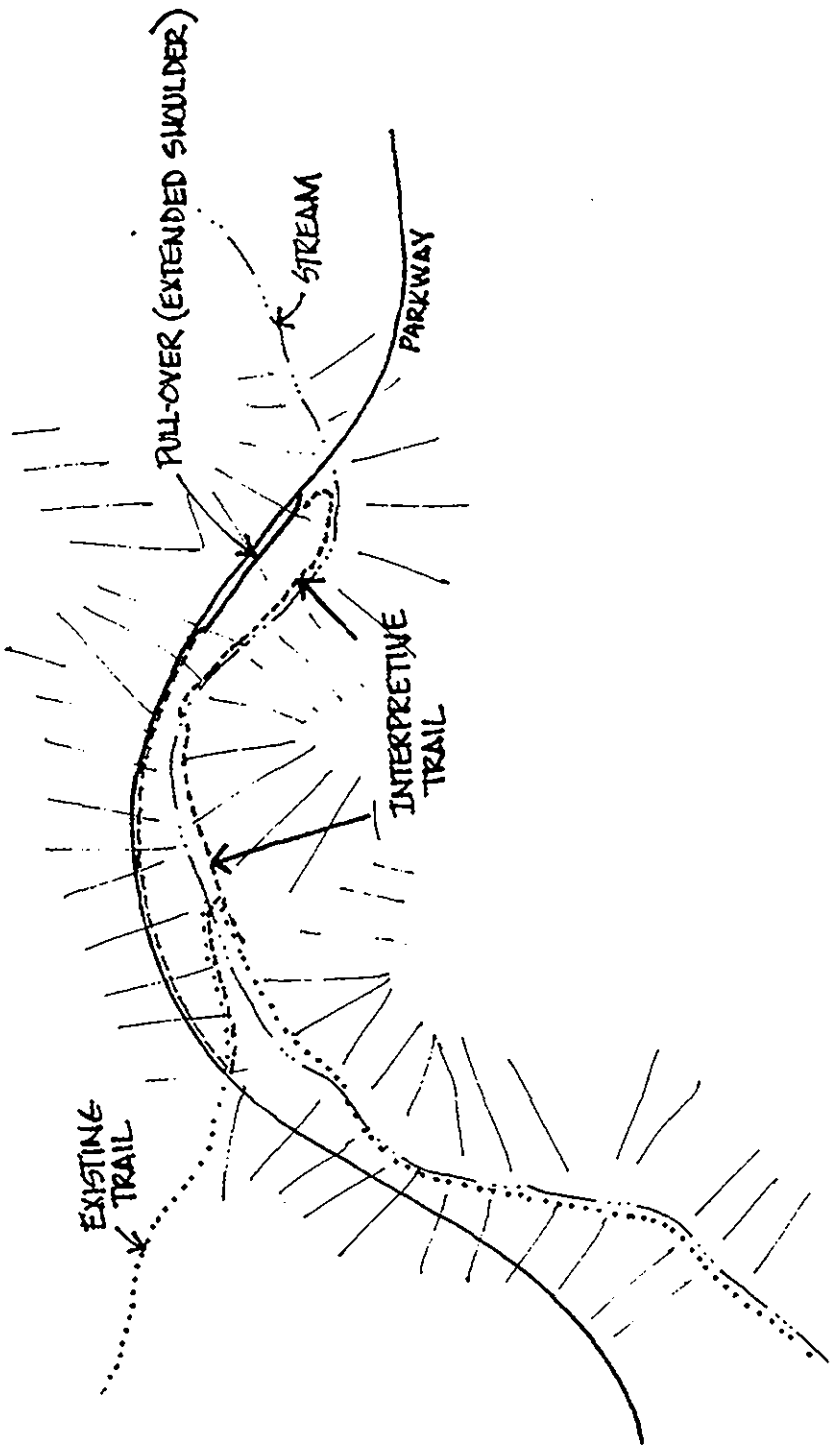

Fig. 65. This quiet mountain stream walkway would provide interesting interpretive information about nature and some variation in activity for certain parkway travelers. *This site, site 3A1, may also act as a trail head for more ambitious hikers.*

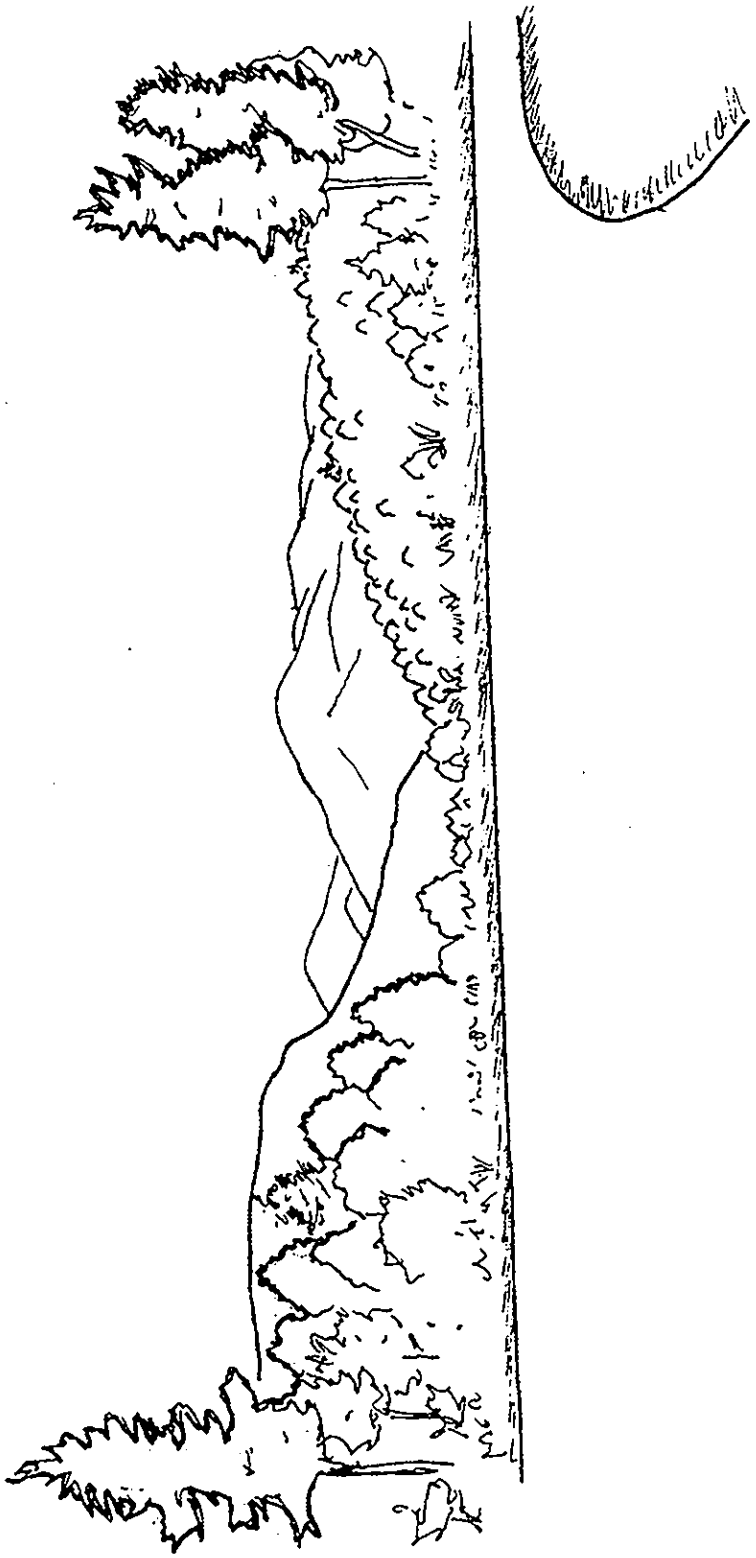

Fig. 66. This sketch from the parking lot of site 3C shows the panoramic view of succeedingly more distant ridges of the GSMNP.

In the vicinity of site 3C, there is a series of significant road cuts and fills that offer viewing opportunities to the east and west. Maintenance of vegetation at nearly every major cut along this site would be required. Approximately 2 to 2.5 hectares (5 to 6 acres) of vegetation would need to be maintained (see Fig. 67).

Site 3C is in the proximity of Cobbly Nob, a planned community of resort homes. Very little of the parkway would be seen from this housing development (Fig. 68) since topography and housing orientation focuses south, away from the parkway and toward the GSMNP.

Site 3C1

Site 3C1 is on a small ridge top to the east of the parking lot identified in site 3C. Investigation showed that an improved view of the GSMNP could be gained by climbing this ridge, a relatively easy, short climb. Figure 67 shows the location of this trail and the vegetation that would need to be periodically maintained for the best viewing. Since this view would be from a trail, only about half the trees in the identified zone for vegetation maintenance would have to be cut. Figure 69 illustrates the view from this location which is principally to the southwest. One can see the parking lot of site 3C in the lower right corner of the sketch.

Site 3D

This is the proposed site of the upper parking on top of Webb Mountain. It would offer panoramic views unmatched by any others of the parkway. Figure 70 illustrates the kinds of views to the east (top sketch), south (middle sketch), and west (bottom sketch), all of the GSMNP. In addition to this view is a spectacular view to the north of English Mountain, other foothills, and the developed valleys beyond. About 210 degrees of viewing is possible at this 850 meter (2800 ft) elevation. As much as 270 degrees of viewing is possible from the trail at the very peak of the mountain. Only to the west is the view blocked by vegetation.

The view in different directions would require moving around a loop parking lot just below the very peak of Webb Mountain. A short trail to the top would offer some excellent viewing to the west. Figure 71 illustrates a possible layout of the upper parking lot and areas where vegetation would need to be maintained for viewing. Retaining walls would reduce the extent of fill toe slopes, and would not affect the extent of maintained vegetation and the visibility of the mountain top from surrounding locations.

As Fig. 71 illustrates, the major variable in viewing is the extent to which trees are cleared and maintained so as not to obstruct views. In Fig. 71, there are several locations where vegetation is maintained out to 75 meters (250 ft) from the loop with most distances are closer to 50 meters (165 ft). Trees were assumed to be no more than 25 meters (82 ft) tall. Most trees are shorter, requiring less clearing than Fig. 71 shows. The worst case scenario would involve clearing and maintaining almost 4 hectares (nearly 10 acres) of vegetation.

The cleared area atop Webb Mountain as viewed from other locations such as U.S. 321, trails in the GSMNP, and Cobbly Nob would sometimes be visible, especially on clear days. Little should be seen from the Cobbly Nob development. There would be minimum exposure to U.S. 321 viewing. However, the cleared area atop Webb Mountain, along with the upper reaches of the parkway would be seen from selected trails in the GSMNP at a distance of 5 to 8 km (3 to 5 miles) or more on clear days (Fig. 72).

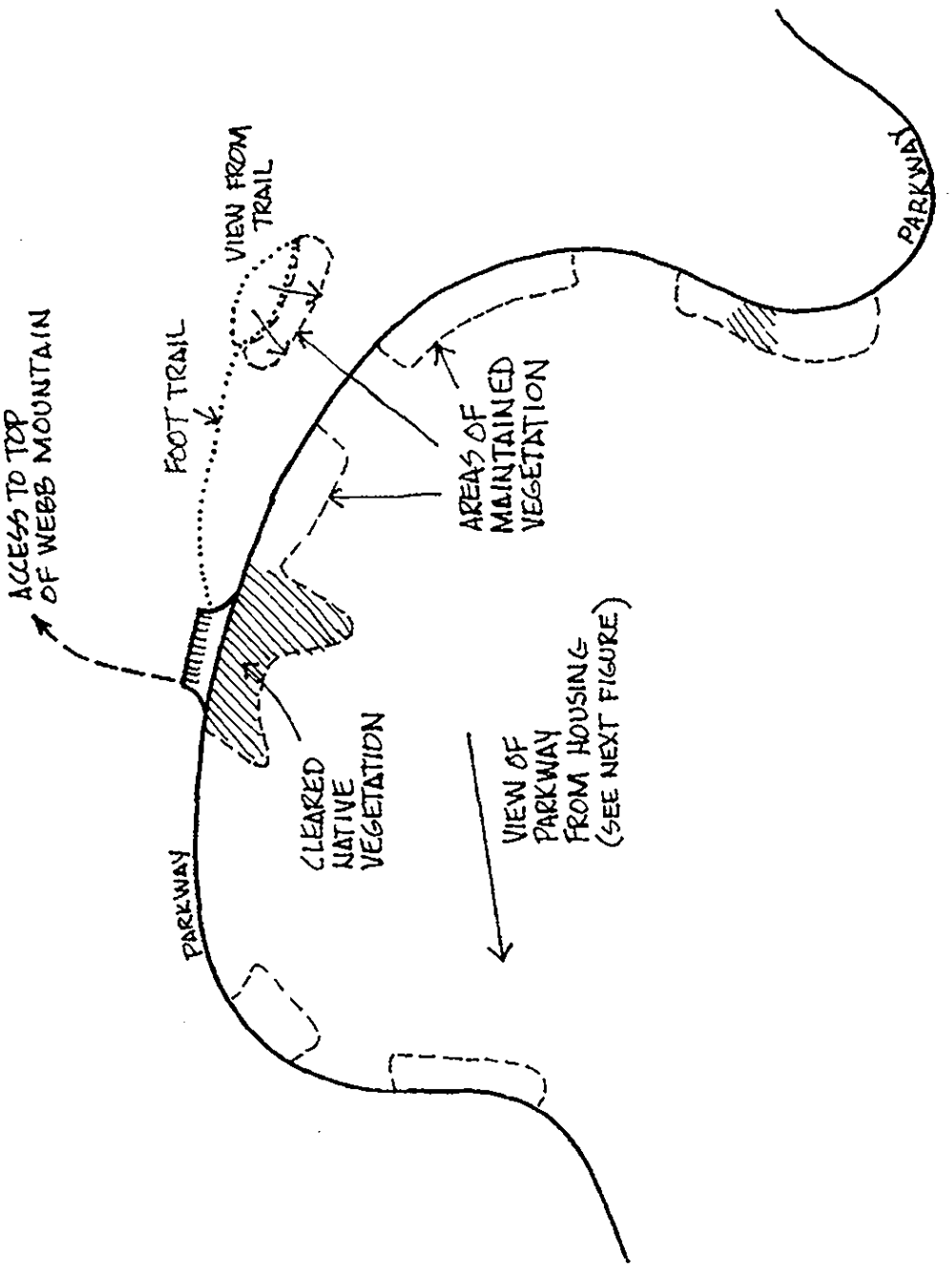

Fig. 67. This sketch shows the extent of vegetation that will need to be maintained to capture the viewing resources of site 3C. Most clearing will extend no more than 30 meters (98 feet).

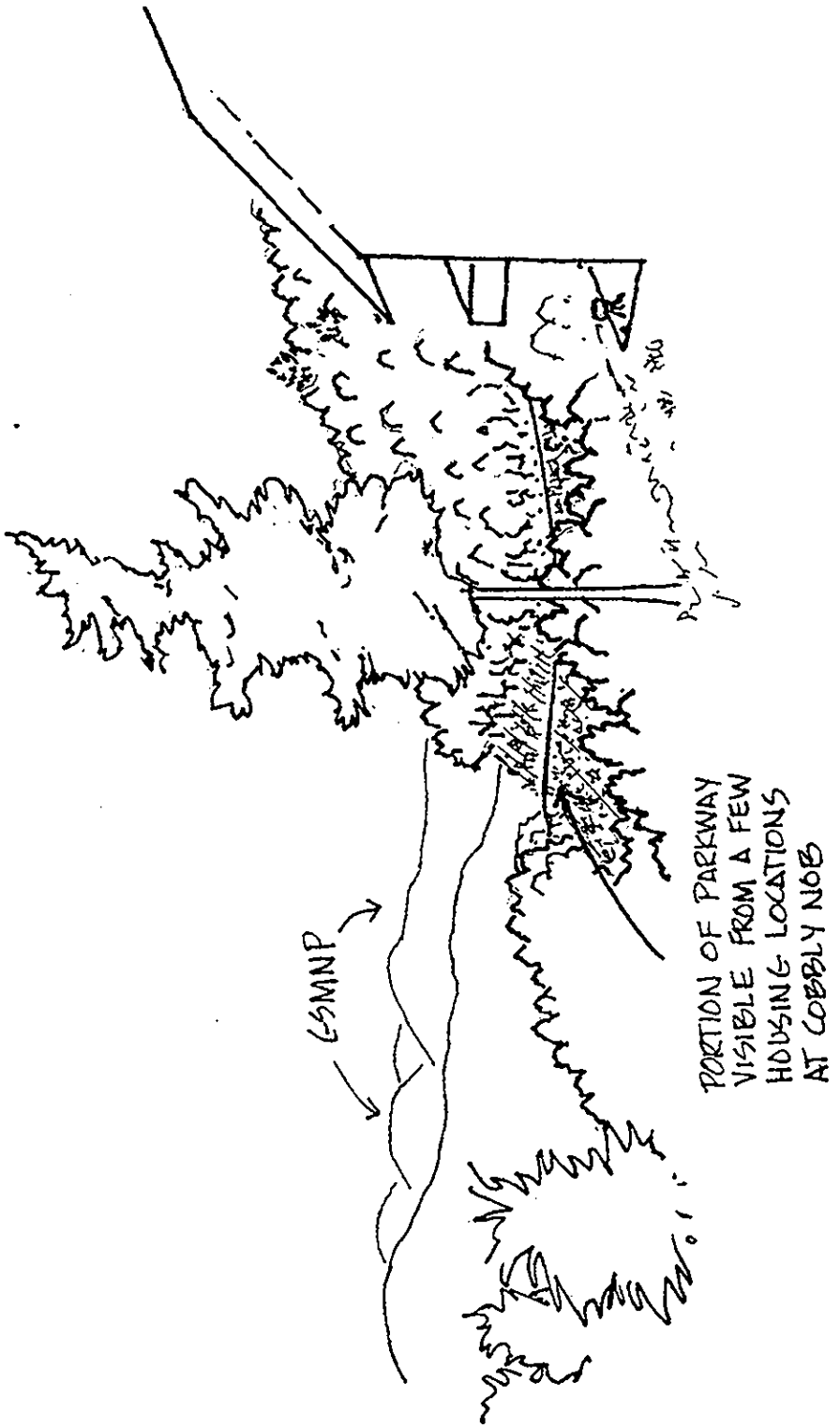

Fig. 68. The most westerly portion of 3C may be seen from this housing development as illustrated.

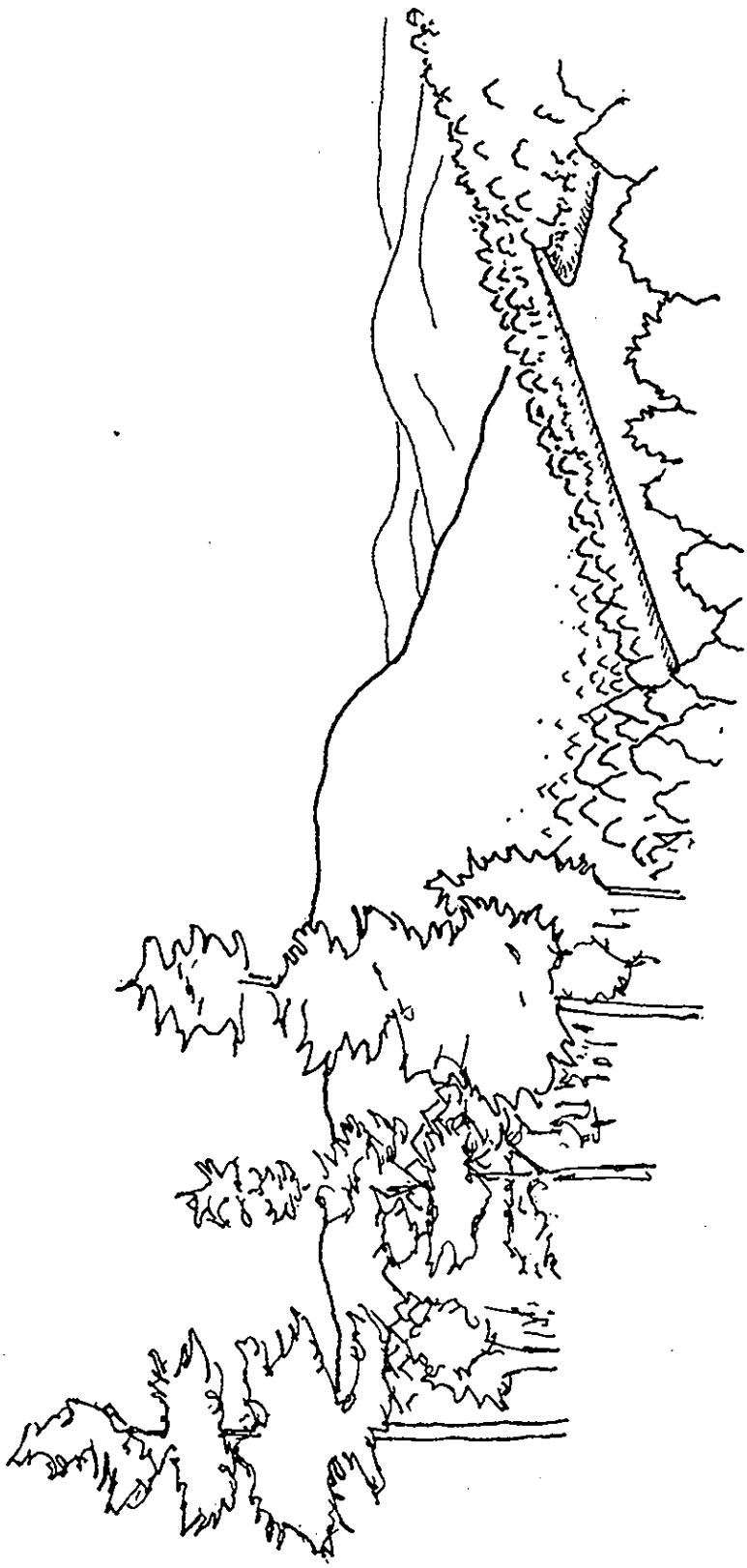

Fig. 69. A sketch of the expected view from 3C1 atop a ridge near the lower parking lot on Webb Mountain. This view could be accessed by trail and would require clearing of some trees.

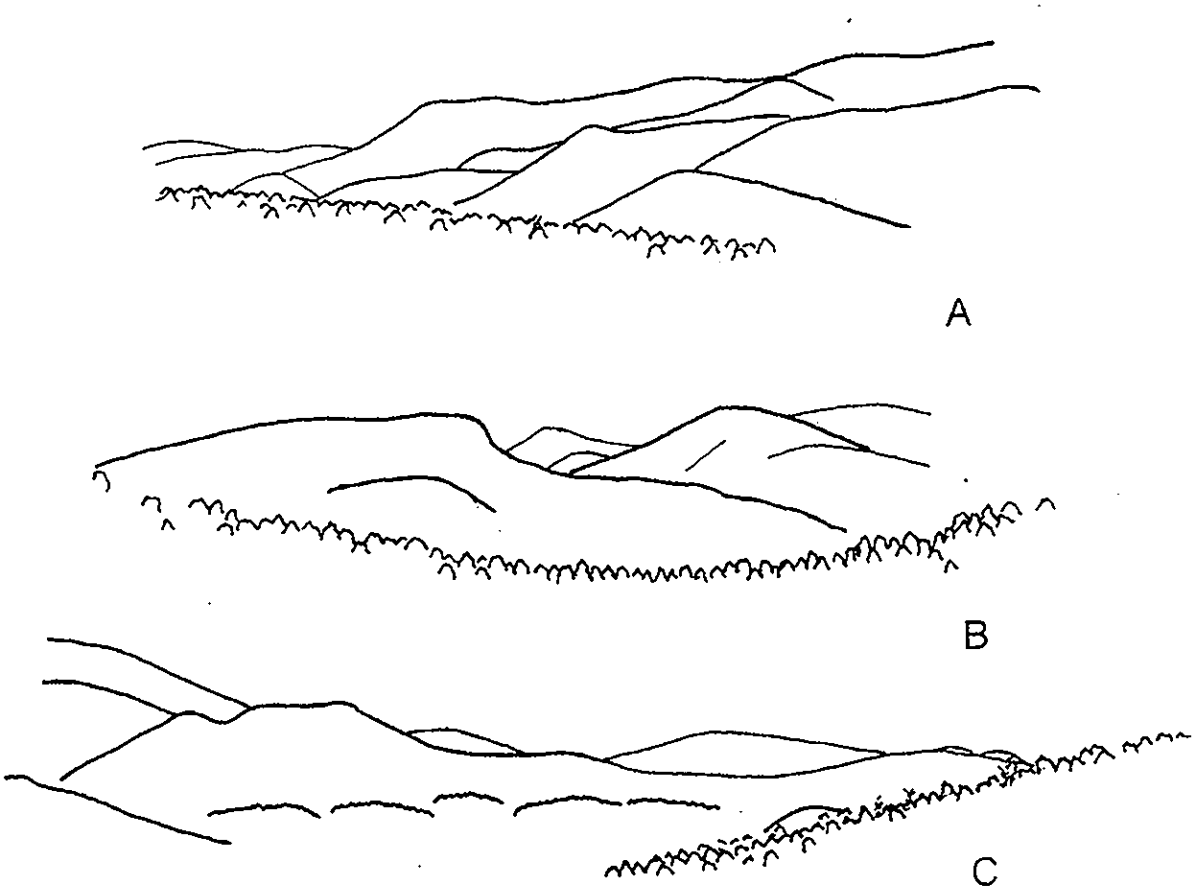

Fig. 70. Illustrations of the kinds of views to the east (top sketch), south (middle sketch), and west (bottom sketch) of the GSMNP.

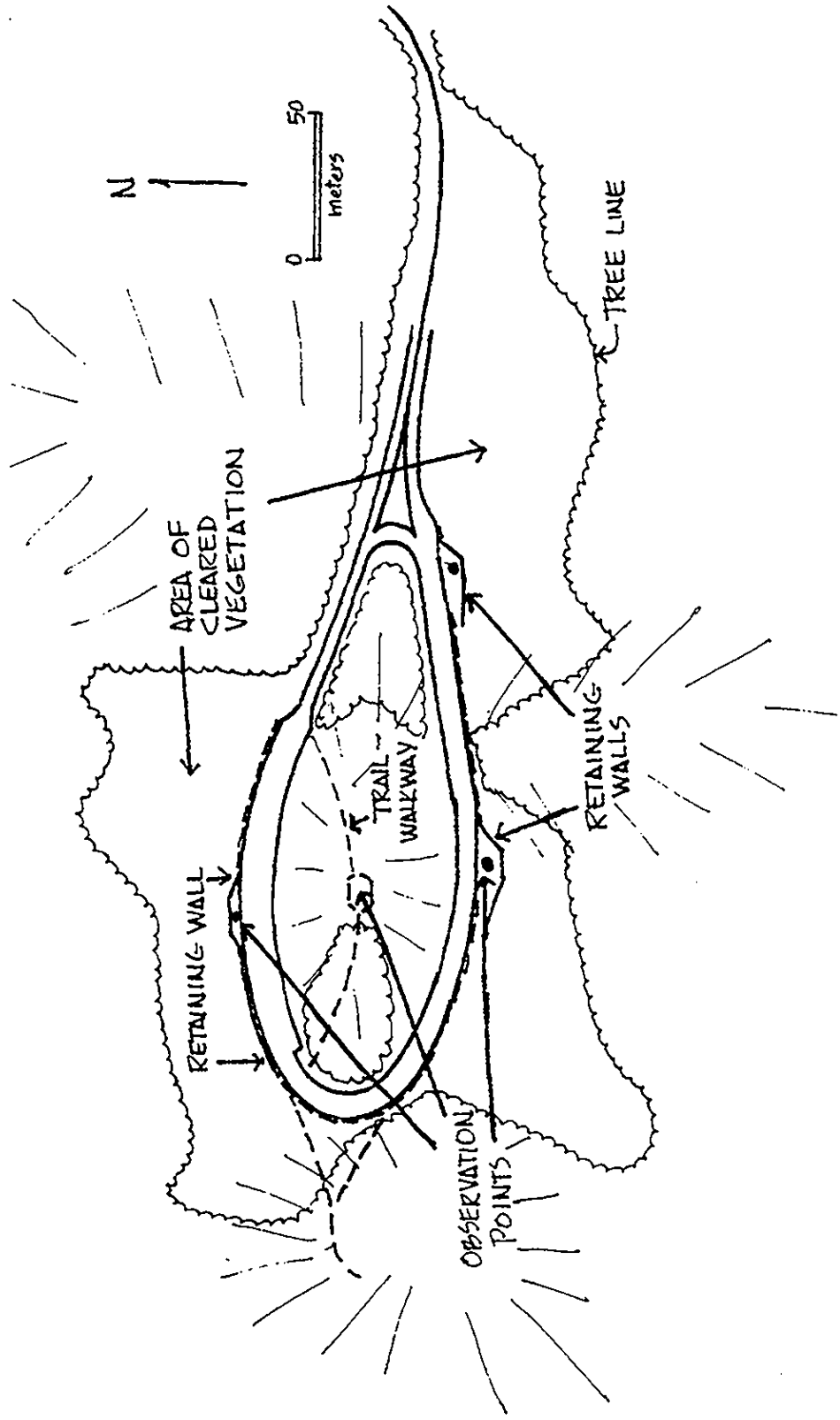

Fig. 71. Plan sketch of the upper parking lot atop Webb Mountain. The illustration shows the possible extent of vegetation clearing to maintain panoramic views.

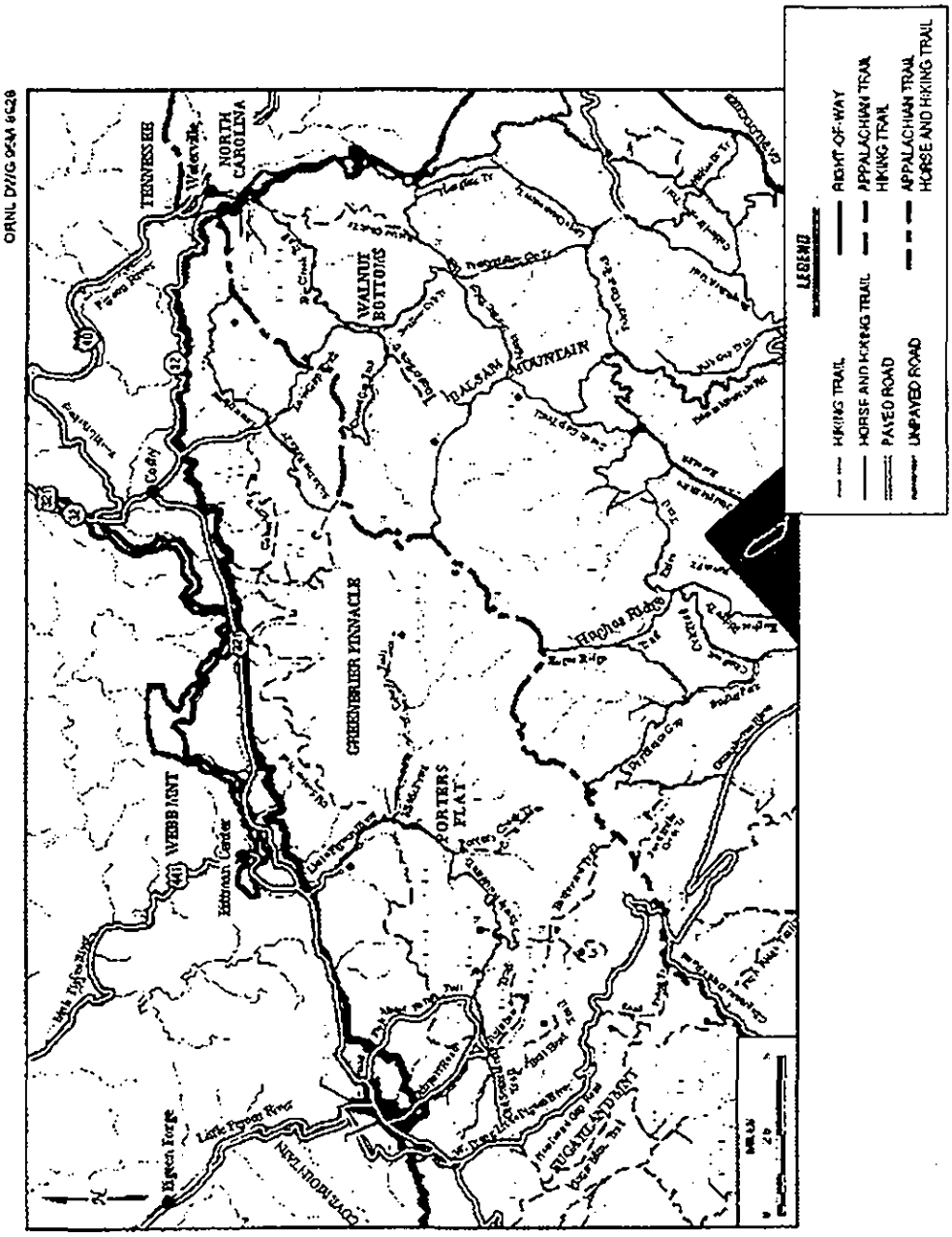

Fig. 72. Foothills Parkway Section 8B right-of-way in relation to the Great Smoky Mountains National Park trails and other features.

Site 5A
Site 5A is where the parkway descends into the valley of Rocky Flats. Of two alternative alignments, the valley floor alternative paralleling a stream is preferred due to the extensive unsightly road cuts necessary for the hillside alternative.

This site does not offer panoramic viewing but has good opportunity for development of interpretive resources. Proximity to a stream, a valley with historical development, and interesting rock fences comprise this mostly wooded valley. This short, relatively straight, level stretch of parkway would easily accommodate pull-over parking. Potential impacts to wetlands and slope stability may occur and should be considered prior to development (see Sects. 4.2, 4.3, and 4.4 for additional details). Trails are not suggested for this site. Rather, interpretive signs recognizing the historical significance of the area are suggested. Figure 73 depicts the general kind of development assumed for this site. About 0.25 hectares (0.6 acres) of additional forest clearing would be necessary for the pull-overs.

If site 5A is not conducive to such development upon closer inspection, site 5B may offer a suitable alternative with similar development objectives. It is located on the opposite side of Rocky Flats.

Site 6C
Site 6C occurs where the parkway, heading east, sharply turns north following the top of an intermediate ridge with an elevation of over 600 meters (1,970 ft). Wooded side ridges block most panoramic views.

This site spans a slight gap with a steep side slope and large road fill to the east. Being at the headwaters of Indian Creek, side ridges confine the panorama of the view, especially to the northeast. However, the focus of the view is a long easterly view of succeeding side ridges along the spine of the GSMNP and beyond. Because the view is so good and because the site is conducive to pull-over parking, it is identified as a developable site. A road and some private home development occurs downslope but would not be seen from the parkway.

Vegetation maintenance is again an issue. Most of the road fill would have to be maintained in short vegetation. This would extend downslope from the parkway as much as 50 meters (165 ft). On the south side of the road fill, additional vegetation would need to be cleared and maintained for about another 50 meters (165 ft). This clearing is important because some of it would be in the foreground view, directly ahead at eye level as opposed to being downslope. Figure 74 illustrates the location of the road fill, vegetation maintenance, and pull-over. Figure 75 is a sketch of what the view may look like. The total area of vegetation to be kept cleared and maintained is about 0.5 hectares (less than 1.5 acres).

Site 7A
Site 7A would offer spacious parking, a view to the south-southeast (toward Mt. Cammerer), and would be located along a fairly level and less winding portion of the parkway. The panorama of the view is limited to the east by another ridge. This site would be easier to develop than 6C and captures almost as much scenery of the GSMNP, including a series of succeeding ridges, but at closer range. The parking area could be separated from the parkway by a parking island and

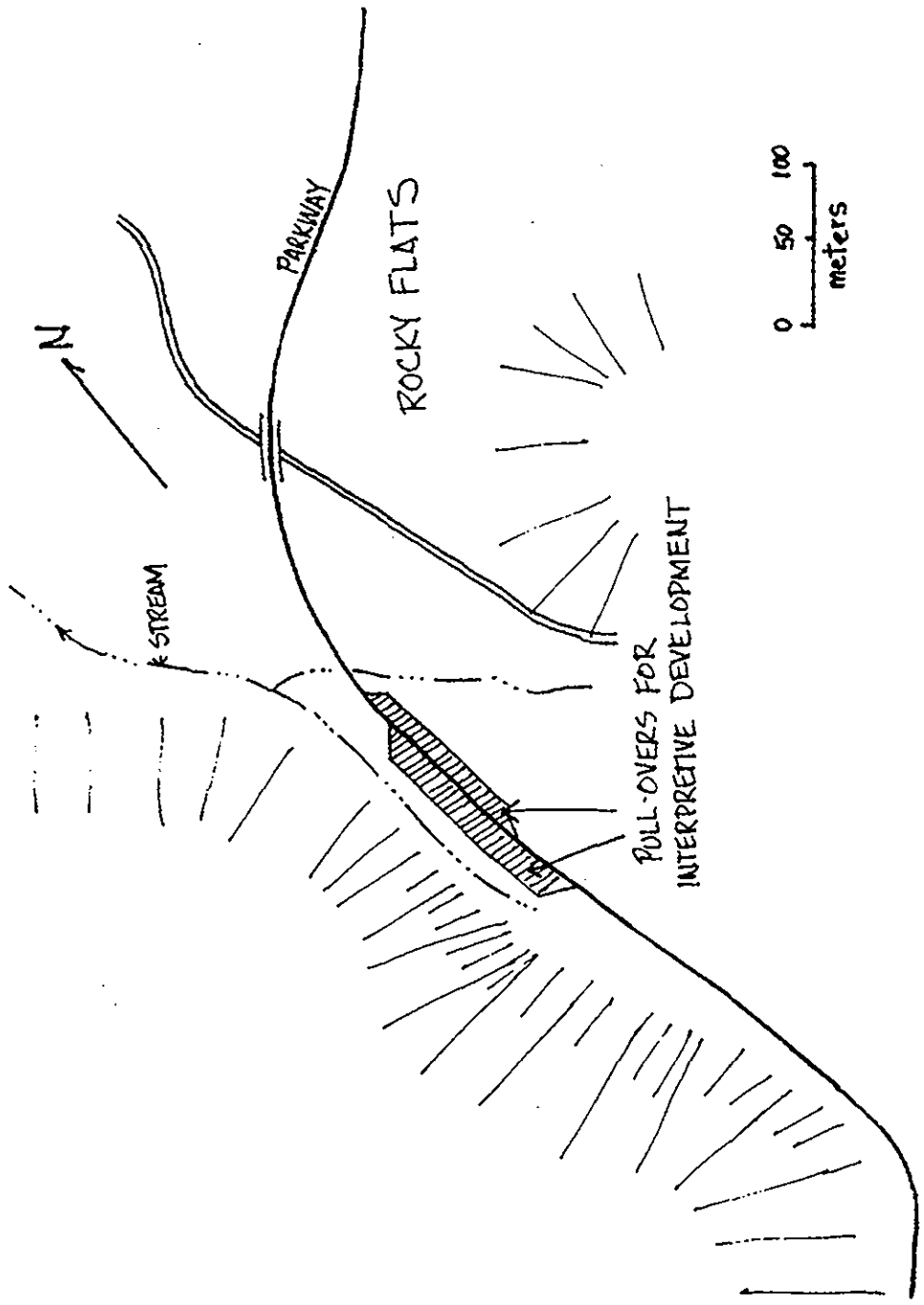

Fig. 73. Sketch of site 5A at Rocky Flats (Rocky Grove) showing the location of pull-overs for interpretive development of cultural and environmental resources.

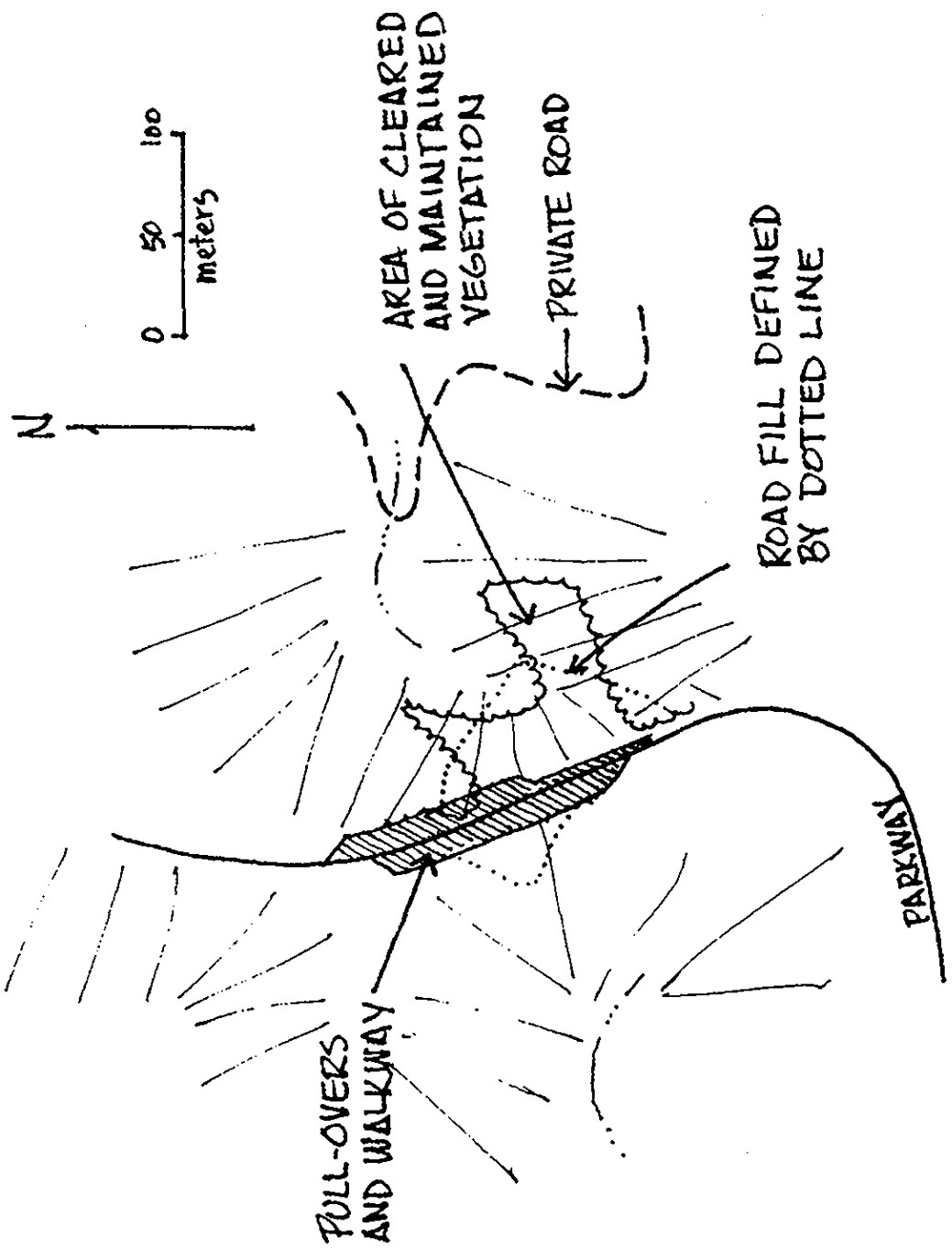

Fig. 74. Sketch of possible development of site 6C.

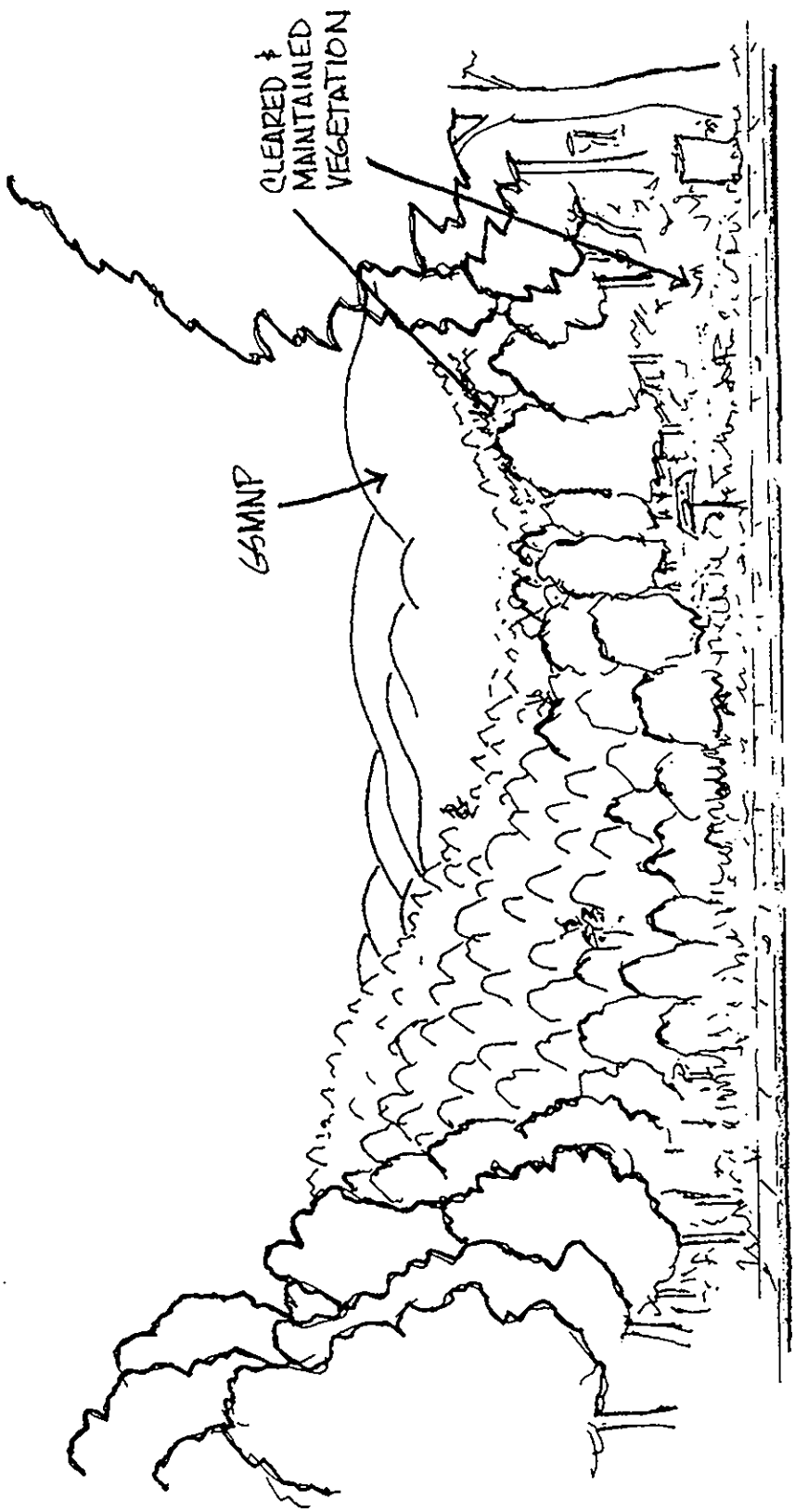

Fig. 75. A sketch of what the view to the east of the GSMNP would look like from site 6C. Note the foreground and midground vegetation clearing to the right of the sketch. Also note the long series of succeeding ridges in the center background.

involve pull in parking (Fig. 76). The amount of cleared vegetation to be maintained would be just over 1 hectare (about 2.6 acres).

Site 7C

Site 7C is the eastern terminus of parkway Section 8B. Here, 8B would connect with the completed Section A. This is in the Cosby Creek Valley bottom of Cosby which has historical churches, signs of agricultural settlement in the early 1800's, and Cosby Creek. Much of the surrounding area is in open fields and widely scattered development from early and mid twentieth century development. There are two alternatives for the exit ramp from the parkway to State Route 32. The southern alternative is shown in Fig. 77. The northern alternative would be to the northeast of the parkway bridge.

Potential aesthetic development of the site involves parking lot construction, trail development, and interpretative improvements to address local history. A map of the parkway highlighting stops, topography, and geology could also be included. The purpose of the siting of the parking lot and trail was to avoid future conflict with a possible realignment of the exit ramp and SR 32 (Fig. 77). Interpretive development to the north of the parkway would place activities too close to the nearby intersection.

The developed area would capture the cool, shaded condition along Cosby Creek. The valley view would be captured from the parkway at, and to the east of, the bridge crossing Cosby Creek. For this to be effective, trees may need to be thinned in the location of the hatched area on Fig. 77. Total forest affected may be about 0.8 hectares (about 2 acres).

3.8.5 Views of Section 8B

There is a major difference in the evaluation of views *from* the parkway and of views *of* the parkway. Generally, views from the parkway toward the GSMNP capture landscapes in their natural or existing element. Therefore, evaluations assessed the degree of positive experiences in the views. The methodology for doing so was presented earlier. Composite features (e.g., ridges, water, lighting effects, breadth of view) were used to define experiences based on surveys. In contrast, views of the parkway were assumed to be primarily negative. The methodology for assessing the degree of negative effects and possible actions for mitigation was devised by the United States Department of Agriculture Forest Service two decades ago. The methodology is based on identifying the degree of contrast introduced into a landscape by an action such as a road. In this methodology, distance (foreground, midground, and farground) and fundamental elements of a scene or characteristic landscape (form, line, color, and texture) are used to describe negative contrasts. This is the basis for evaluations of views of the proposed parkway. Views of the parkway were investigated from many positions. Resort housing sites were visited, commercial locations were checked, roadways (paved and unpaved) were inspected for views, and topographic maps were used to locate additional sites to check. Many sites were evaluated for the surrounding conditions of views in order to judge the degree of contrast imposed by the proposed pat is evaluated on a scale of 1 to 5, with 5 being the worst. This scale is explained in a footnote to the table.

There are several views of the proposed parkway extension that could be of concern. These views were evaluated using negative contrast. The locations are

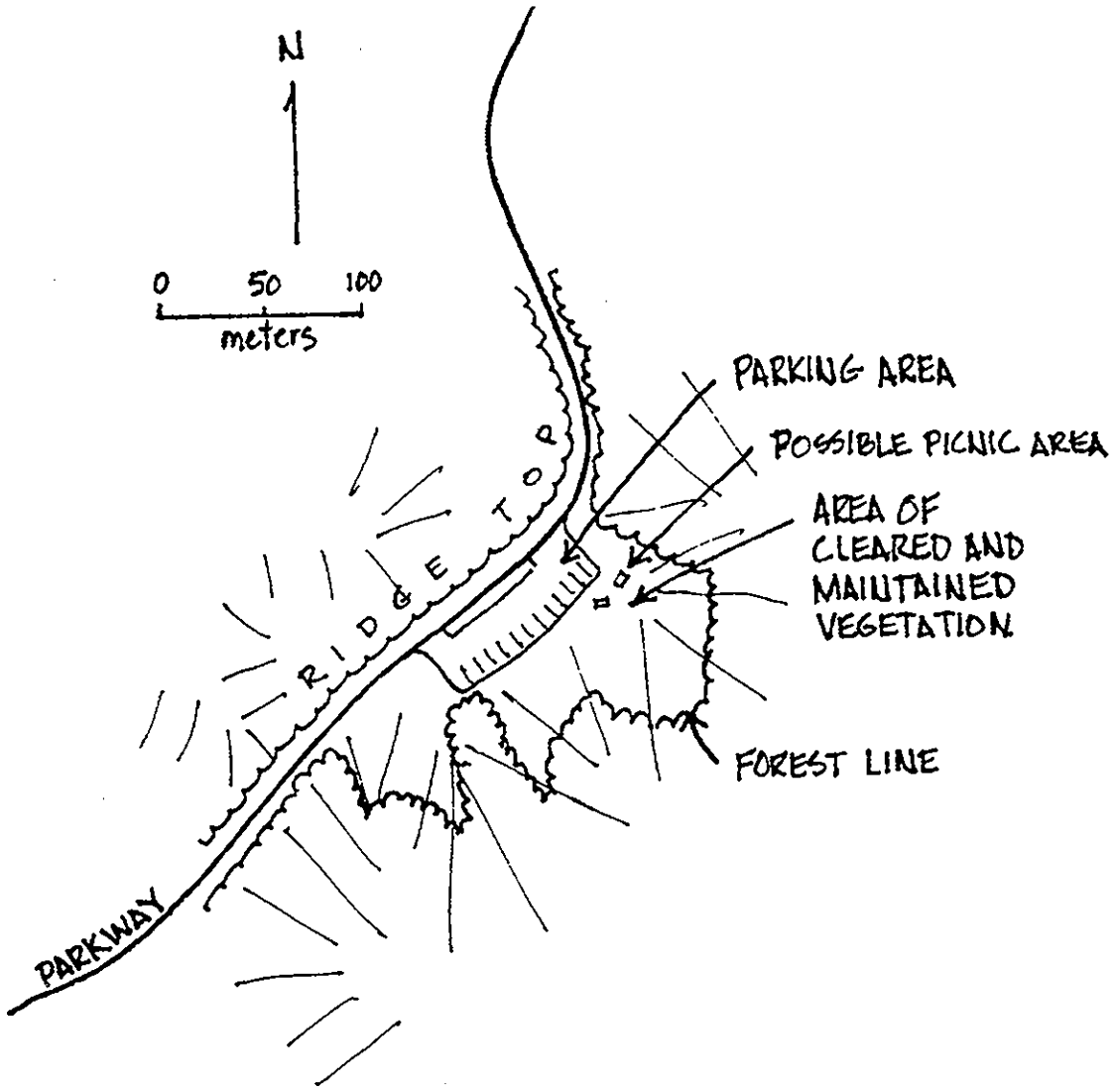

Fig. 76. A plan sketch of site 7A showing vegetation clearing, parking arrangements, and direction of views.

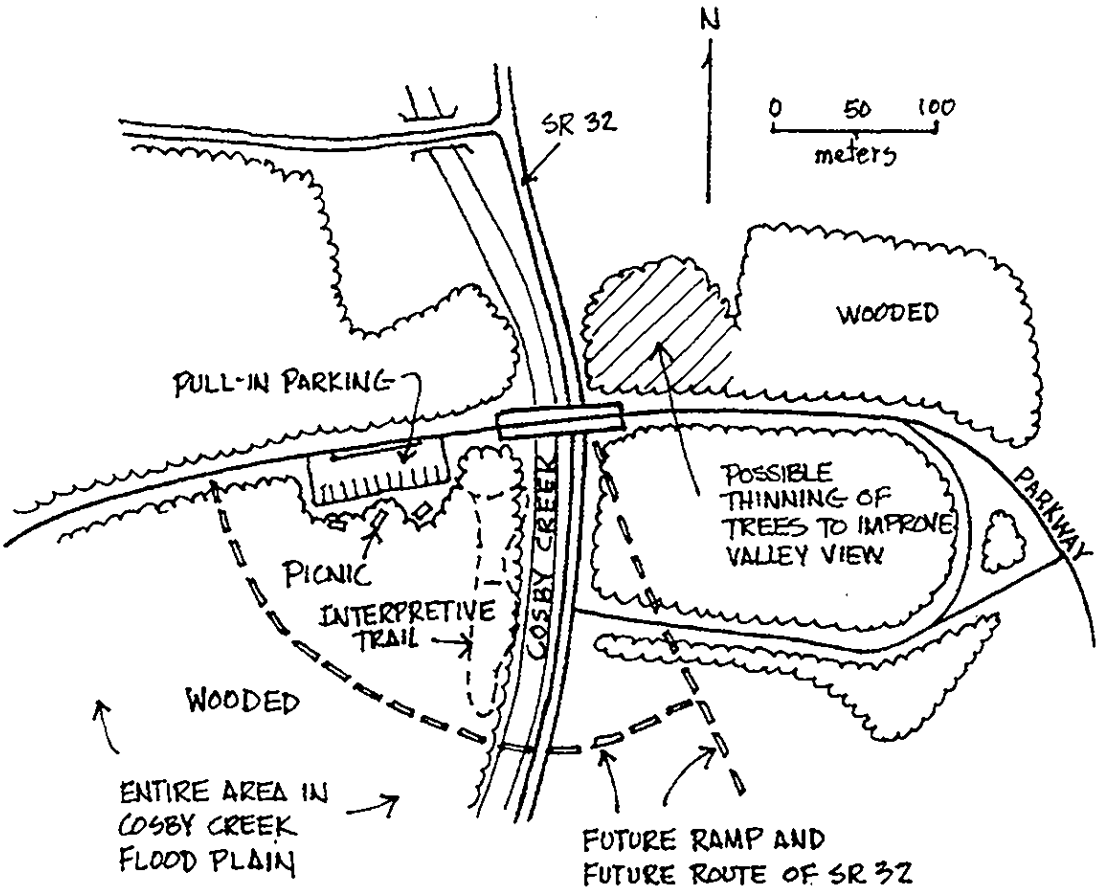

Fig. 77. A plan sketch of the eastern terminus of Parkway Section 8B at Cosby Creek shows the potential of parking and interpretive development in the area.

- Near Timothy Creek along U.S. 321, viewing the parkway at kilometer 4.8 (segment 2 near site 2C)
- Along U.S. 321 near Darky Branch and golf course, viewing segment 3 of the parkway
- A few houses in Deer Ridge Mountain Resort, viewing segment 3
- Along U.S. 321 near Texas Creek, viewing 12–100 to 13–300 (segment 4)
- Along U.S. 321 near Rocky Grove Church, viewing 14–500, and 14–800 (segment 5)
- Along U.S. 321 just west of the Sevier/Cocke County line, viewing around 17–000 (at the boundary between segment 5 and 6)
- At several locations along trails in the GSMNP (segment 3)

The most significant issue among these would be the view of the parkway cutting across near the top of Webb Mountain (segment 3). This area must receive special attention in minimizing some of the larger vertical exposures of cuts and fills. The next most important area is near Timothy Creek (segment 2). Retaining walls would be needed to minimize the exposure of larger fills in this area. The remaining areas would be of moderate concern, less from visitors traveling U.S. 321 than from local landowners having their views directly affected by road cuts and fills placed directly in and dominating their views. Some concerns about views of the proposed parkway are presented along with views from the parkway in Sect. 4.1.8.

In effect, there are three important kinds of views of the proposed parkway. The differences have to do with the distance from which one views the parkway: foreground, midground, and farground views. Each of these would occur in a somewhat different landscape setting for the viewer. These settings would affect the degree of undesirable contrast imposed by the proposed parkway cuts and fills.

The foreground views occur along some sections of U.S. 321, especially near the west end of Section 8B and along a short section of U.S. 321 near Rocky Grove. Some additional foreground views from residences would occur. In the foreground situations, other roads exist within the view, houses may be present, power lines are usually visible, and traffic noises are present. The degree of forest cover and amount of human disturbance/development is quite different as seen from some residences and compared to U.S. 321. Two subcategories in the foreground views are necessary for proper evaluation.

The midground views of the proposed parkway, besides those from the proposed parkway itself, are quite limited. Some glimpses from U.S. 321 and more direct views from residences occur. It is difficult to ascertain how the clearing of forests and grading of terrain for development would change views of Webb Mountain in the future. Although views would be opened by forest clearing, construction of buildings would again close views. Traffic along U.S. 321, as well as views of the GSMNP, tend to draw viewing away from Webb Mountain. A few recreational/tourist developments on the south side of U.S. 321 tend to have focused views toward Webb Mountain as a midground view. The contrasts of road cuts and fills against the forest cover of Webb Mountain would make the proposed parkway quite visible along segment 3. These views would be framed by foreground roads, traffic, and development.

Farground views are all from trails in the GSMNP. From these locations, the cuts and fills would be more distant but would provide a higher level of contrast by being in what appears to be a completely wooded and pristine view. Although images of the effect of the Robbinsville highway

cutting across a mountain slope some years ago may come to mind, the proposed parkway design standards are such that the actual visual impact should not be as great. This does not mean that the perceived impact would be any less.

Actions taken in the construction of the parkway (segment 3) to reduce visual contrasts would play a dominant role in the midground and fargound acceptability of views of the parkway.

From within the GSMNP, the Webb Mountain portions of the parkway would be visible during defoliate seasons from numerous places along the 518- to 762-m (1700- to 2500-ft) elevations of the Old Settlers Trail (Minnigh 1995; Great Smoky Mountains Natural History Association 1994). Slightly above where the trail crosses Darky Branch, one can see Pittman Center to the west; here the parkway would likely be visible. Most of the trails in the vicinity of Greenbrier Pinnacle are on the far side of the Pinnacle from the ROW and would therefore have no visual orientation or access toward the ROW (G. Minnigh, GSMNP/NPS, personal communication with C. Petrich, May 3, 1995). Portions of Section 8B would likely be visible some time during the year from at least 6 trails inside the GSMNP (Fig. 72).

Maddron Bald, atop the Maddron Bald Trail, also would offer clear views of Webb Mountain, SR 32, and toward the Rocky Flats area where the ROW descends from Big Ridge and then climbs toward Webb Mountain.

From Maddron Bald and from other high-elevation promontories in the western and northern end of the GSMNP, 360° views abound on clear days. The Deerfield Inn, near the Cobbly Nob residential development and just south of the ROW, is strikingly visible in profile, as are severe scars from construction of several nearby residences. One overlook is just south of Inadu Knob on the Appalachian Trail on the north flank of Mt. Guyot, the second highest peak in the Smokies. Again, 360° views allow the observer to see "everything," including much of the development in and around Gatlinburg and Pigeon Forge as well as the ROW.

The ROW would also be visible from numerous locations along U.S. 321, but exact viewpoints would depend on final alignments. Defoliate seasons would undoubtedly reveal much more of the final parkway, but again, final alignment would have to be known. At both termini of Section 8B, the ROW would be most visible, either along SR 416 or SR 32. On SR 416 and the associated interchange area, the parkway would be most visible near the Emerts Cove area of Pittman Center. The ROW also crosses Branham Road, but the vegetation there is quite dense and would likely screen much of the roadway from most viewing points. The ROW crosses Rocky Flats and Rocky Flats Road, where the ROW would be readily visible, but again the vegetation is dense. Where the ROW is located close to U.S. 321, the visibility would depend strongly on engineering and design implementation because of the steep topography and the dense vegetation that allows for ready screening. The Webb Mountain portions would likely be visible from numerous areas along U.S. 321.

3.9 CULTURAL RESOURCES ASSESSMENT

The cultural resource assessment of the Foothills Parkway Section 8B ROW completed by Thomason and Associates documented the architectural, historical, and cultural resources located

within the project area (Fig. 78; see Appendix N). The purpose of this effort was to identify all properties that may have architectural, historical, or cultural significance within the project area, in accordance with federal guidelines and regulations. The study identified those properties presently listed, or eligible for listing, on the National Register of Historic Places. The area traversed by Section 8B is composed of mostly mountainous terrain with three major exceptions: the community of Cosby in Cocke County, the area known as Rocky Flats in Sevier County, and the community of Pittman Center in Sevier County. These areas contain a variety of architectural, historical, and cultural resources that were the subject of this study.

The project area for the Section 8B ROW is approximately 305 m (1000 ft) wide except where it is enlarged for special uses. Given the potential visual, audible, and atmospheric impacts of this project, all properties located within 1.6 km (1 mile) of the ROW centerline were inventoried. Additional properties in the Cosby area were also inventoried where the potential visual impacts could possibly exceed 1.6 km (1 mile).

The file search and cultural resources inventory did not identify any properties actually within the Section 8B ROW of the Foothills Parkway as listed on the National Register of Historic Places. Neither were any properties within the Section 8B ROW identified as meeting National Register eligibility requirements. The file search and cultural resources inventory identified only one property within the project area presently listed on the National Register. The Tyson McCarter Place in Sevier County was listed on the National Register on March 16, 1976. This farmstead is composed of three outbuildings from the 19th century and is within the boundary of the GSMNP.

In 1994 the Southeast Archeological Center finished archeological investigations at three locations on the Foothills Parkway Section 8B (Leabo et al. 1996). One site is located in Cosby along Cosby Creek. This site was not believed to be eligible for inclusion on the National Register of Historic Places and no additional archeological testing was recommended. The second site is at Copeland Creek, south of Pittman Center. This site was considered potentially eligible for inclusion on the National Register of Historic Places. Given the variety of archeological components and the presence of undisturbed cultural deposits, additional archeological testing was recommended at the Copeland Creek site. This site provides an opportunity to examine cultural change over a large period of time. Further investigations can provide information concerning aboriginal occupants of the Tennessee and North Carolina area. The third site is located just southeast of Pittman Center along the Little Pigeon River. Some additional testing was recommended due to the likelihood of examining intact cultural deposits and the fact that multiple occupations took place at this site. Since the Little Pigeon River separates the Copeland Creek site from the Pittman Center site, further archeological investigations could determine whether the two sites were inhabited concurrently during one of apparently many prehistoric occupations.

3.9.1 Eligible National Register Properties

The following properties documented in the project area appear to meet eligibility requirements for listing on the National Register of Historic Places.

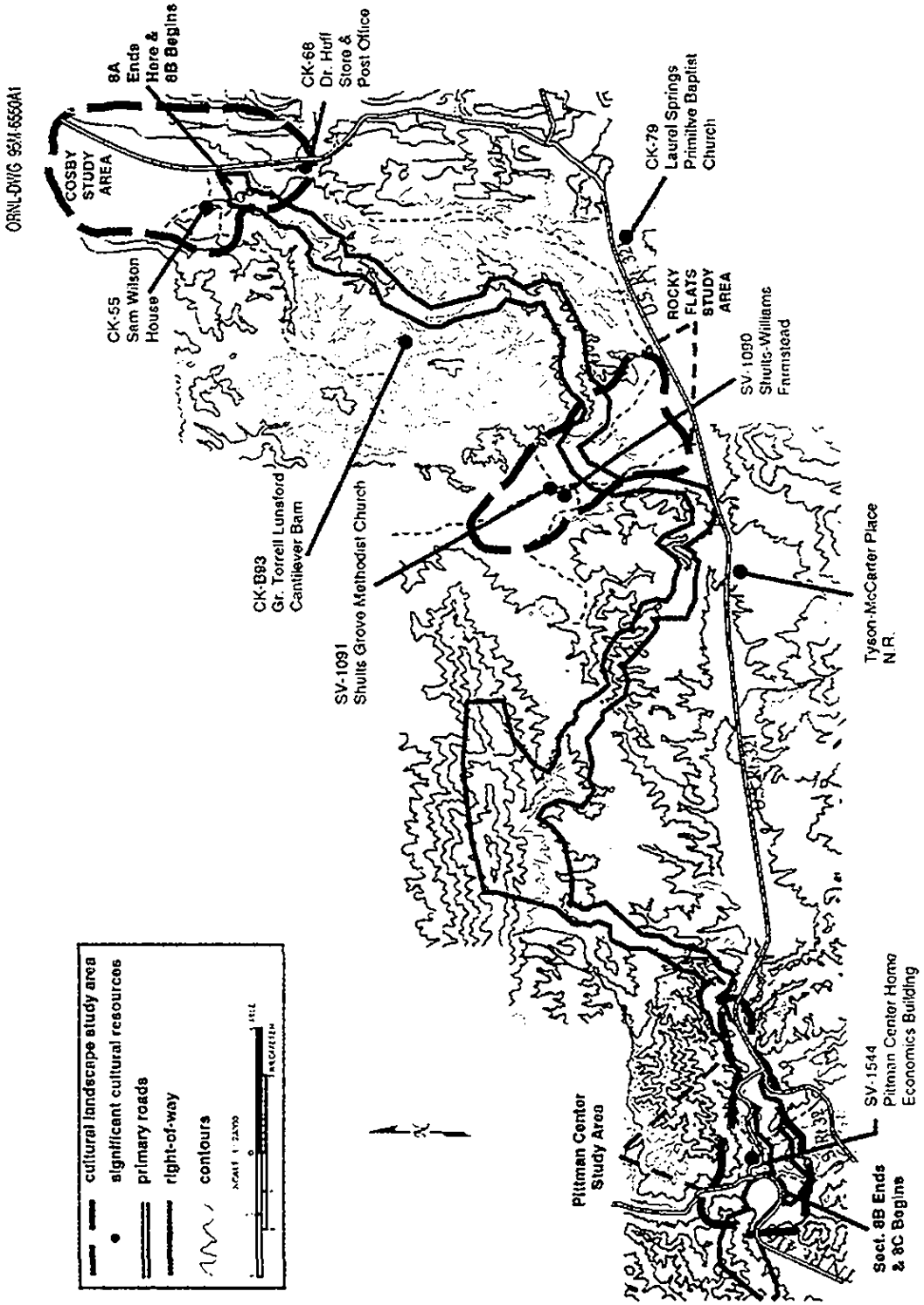

Fig. 78. Architectural, historic, and cultural resources of Section 8B.

3.9.1.1 Cocke County

CK-55—Sam Wilson House, Cosby vicinity: The Sam Wilson House is eligible for the National Register of Historic Places under Criterion C for architecture. The dwelling is representative of the I-house form common throughout the nineteenth and early twentieth centuries in rural East Tennessee. The Sam Wilson House is the largest and most elaborately detailed dwelling documented in Section 8B of the Foothills Parkway.

CK-79—Laurel Springs Primitive Baptist Church, Cosby vicinity: The Laurel Springs Primitive Baptist Church is eligible for the National Register of Historic Places under Criterion C for architecture. The well-preserved church is an example of the modest church buildings constructed in the rural, often isolated, areas of the mountainous regions of East Tennessee.

CK-68—Dr. John Huff store and post office, Cosby vicinity: The Dr. John Huff store and post office was a large general mercantile store that housed the only post office and Odd Fellows Hall in the upper Cosby area between ca. 1915 and ca. 1935 and is eligible for the National Register of Historic Places under Criterion C for architecture. Although abandoned and unused since the 1930s, the building is intact and retains almost all original features and integrity. The building is an example of an early twentieth century multi-use commercial facility of a type common in rural areas throughout the South.

CK-B93—G. Torrell Lunsford cantilever barn, Cosby vicinity: The G. Torrell Lunsford cantilever barn is eligible for the National Register of Historic Places under Criterion C for architecture. The well-maintained barn is a fine example of a type indigenous to the East Tennessee area, primarily Sevier, Blount, and Cocke Counties.

3.9.1.2 Sevier County

SV-1090 & SV B1090—Shults-Williams farmstead, Rocky Flats vicinity: The Shults-Williams farmstead is eligible for the National Register of Historic places under Criterion C for architecture. The farmstead is an example of the small yeoman farm in the foothills region in the late nineteenth and early twentieth centuries. This particular farm retains a wide variety of well-preserved outbuildings that are rare and indigenous to the foothills region of East Tennessee.

SV-C1091—Shults Grove Methodist Church, Rocky Flats vicinity: The Shults Grove Methodist Church is eligible for the National Register of Historic Places under criterion C for architecture. The well-maintained country church with modest Gothic Revival detailing is an excellent representative example of a type found throughout the foothills region of East Tennessee. Unaltered in appearance, the church is the best-preserved example of this style located in Sevier County.

SV-1544—Pittman Center Home Economics Building, Pittman Center vicinity: The Pittman Center Home Economics Building is eligible for the National Register of Historic Places under Criterion C for architecture and under Criterion A for social history. The restored structure is the only building remaining from the original Pittman Community Center that was established in 1921 by the Methodist Mission Board of New York. The facility had a great influence on the living conditions of the impoverished yeoman farmers of the mountainous region of Sevier County. The

Pittman Center Economics Building is the last remaining original structure of a once-vibrant village that was instrumental in the development of the foothills section of Sevier County. The building is an excellent example of the Craftsman-style educational facilities that were common from the early twentieth century, and since its restoration, has been well maintained in near original condition.

The consultant also identified seven sites along the Section 8B ROW consisting of the remnants of dwellings and farmsteads. None of these sites appears to possess sufficient architectural or archaeological significance to meet National Register criteria.

3.9.2 Cultural Landscapes

The Section 8B ROW descends and/or ascends through three valleys as it crosses Big Ridge and Webb Mountain: the Cosby area, Rocky Flats, and the valley at Pittman Center. These three valleys were extensively settled in the early nineteenth century by Anglo-Europeans who cleared the land and altered the original forested landscape. The existing rural landscapes are the physical and visual documentation of this history. As part of this project, these valleys were analyzed for their ability to convey a sense of time and place from this historical occupation. This analysis was conducted using guidelines issued by the National Park Service in its publication *National Register Bulletin 30, Guidelines for Evaluating and Documenting Rural Historic Landscapes.*

3.9.2.1 The Cosby Valley

The Cosby Valley contains the community of Cosby and agricultural lands. Traditional crops in the valley include wheat, corn, and tobacco. Although much of the valley remains under cultivation, there have been extensive changes to the area in recent decades. In Cosby there are prominent non-contributing features, including dozens of post-1945 buildings, post-1945 chicken houses and associated buildings, widened roads, and a new bridge. Large transmission lines bisect the valley and extend for over a mile. Stone walls have been lost throughout much of the agricultural areas, probably because of larger field size and larger scale farming operations. As a result of the extent of these non-contributing features, the Cosby Valley does not contain significant natural or man-made features that collectively meet the criteria of a historic rural landscape.

3.9.2.2 Pittman Center

Pittman Center is located in a small valley at the confluence of the Little Pigeon River and Webb Creek. This community was formed in the 1920s when it was settled as a Methodist mission, which constructed dozens of buildings along Webb Creek. To the west of the town center is a small valley adjacent to the Little Pigeon River that traditionally has been used for grain cultivation or livestock grazing. During the 1930s, Pittman Center was characterized by more than 20 school buildings and dwellings along the narrow valley of Webb Creek. The valleys to the west, south, and east contained small farmsteads with cultivated fields and pasture. Over the past several decades, almost all of the original mission buildings at Pittman Center have been razed. There no longer exists a significant collection of buildings and physical features retaining historic spatial relationships or organization at Pittman Center. The valleys adjacent to the town center do not contain any significant landscape features and have a mixture of pre- and post-1945 dwellings.

Because of the loss of original buildings and associated features, it is the consultant's opinion that Pittman Center does not contain significant natural or man-made features that collectively meet the criteria of a historic rural landscape.

3.9.2.3 Rocky Flats

Rocky Flats is the name given to a small valley separating Big Ridge and Webb Mountain between Cosby and Pittman Center. Several streams run through this valley, including Ogle Spring Branch and Matthew Creek. The area was settled in the nineteenth century and contained a series of small farmsteads at the turn of the century. Of the three study areas, Rocky Flats contains the largest number of historic properties and landscape features. A total of 13 properties were surveyed in Rocky Flats; physical features include cultivated fields and historic roadbeds. Rocky Flats also contains a network of stone walls that originally formed property and field boundaries. Despite the presence of these resources, it is the consultant's opinion that Rocky Flats no longer retains integrity to meet National Register criteria as a rural historic landscape. In addition to the historic properties, several dozen post-1945 buildings were noted in the valley. The present character of Rocky Flats is that of a erratic pattern of new housing development, older fields and pastures, and reclaimed woodlands. Although the stone walls offer glimpses of historic crop and field patterns, the overall appearance of the valley does not reflect a sense of time and place. None of the stone walls identified at Rocky Flats and other scattered locations within the project area was identified as possessing individual architectural or historical significance to meet National Register criteria.