FOOTHILLS PARKWAY SECTION 8B
FINAL ENVIRONMENTAL REPORT

M. C. Wade[1] (Project Manager)

T. J. Blasing[1]
G. F. Cada[2]
M. Carter[3]
S. M. Chin[1]
J. A. Dickerman[2]
D. A. Etnier[3]
R. Gibson[3]
B. Hatcher[3]
M. Harvey[4]
D. Lietzske[4]
L. K. Mann[2]
P. J. Mulholland[2]
C. H. Petrich[1]
L. Pounds[4]
J. Ranney[6]
R. M. Reed[1]
P. F. Ryan[5]
M. Schweitzer[1]
D. Smith[3]
P. Thomason[4]

[1]Energy Division
[2]Environmental Sciences Division
[3]University of Tennessee
[4]Personal Consultant
[5]Science Applications International Corporation
[6]Joint Institute for Energy and Environment

Volume 1

Prepared for

The National Park Service
Denver Service Center and
The Great Smoky Mountains National Park

July 1999

Prepared by the
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831
managed by
LOCKHEED MARTIN ENERGY RESEARCH CORP.
for the
U.S. DEPARTMENT OF ENERGY
under Contract No. DE-AC05-96OR22464

CONTENTS

LIST OF FIGURES ix

LIST OF TABLES xiii

ACRONYMS xv

VOLUME 1 SUMMARY xix

1. INTRODUCTION 1-1
   1.1 PURPOSE AND NEED 1-1
   1.2 SCOPE AND APPROACH OF THE ENVIRONMENTAL REPORT 1-1
   1.3 BACKGROUND 1-4
      1.3.1 History 1-4
      1.3.2 Planning Background 1-4
   1.4 ISSUES IDENTIFIED IN SCOPING 1-5

2. OVERVIEW OF ALTERNATIVES CONSIDERED 2-1
   2.1 BUILD ALTERNATIVE 2-1
      2.1.1 Construct Section 8B with no Interchanges Option 2-1
      2.1.2 Western Terminus Options 2-2
      2.1.3 Webb Mountain Options 2-2
      2.1.4 Operational Timing Options 2-3
   2.2 NO-ACTION ALTERNATIVE (NO-BUILD) 2-3

3. AFFECTED ENVIRONMENT 3-1
   3.1 GEOLOGY AND SOILS 3-1
      3.1.1 Regional Geology and Soil Characteristics 3-1
      3.1.2 Objectives and Data Collection 3-3
      3.1.3 Local Geology Along Proposed Section 8B 3-4
      3.1.4 Description of Geology and Soils by Segment 3-6
         3.1.4.1 Little Pigeon River Terraces (segment 1) 3-6
         3.1.4.2 Webb Creek Ridge (segment 2) 3-9
         3.1.4.3 Webb Mountain (segment 3) 3-13
         3.1.4.4 Matthew Branch Ridge (segment 4) 3-13
         3.1.4.5 Rocky Flats (segment 5) 3-13
         3.1.4.6 Big Ridge (segment 6) 3-20
         3.1.4.7 Cosby Creek Terraces (segment 7) 3-20
   3.2 WATER RESOURCES 3-26
      3.2.1 General Description of Surface Waters 3-26
      3.2.2 Tennessee Stream Use Classification 3-28
      3.2.3 Water Quality 3-30
         3.2.3.1 Data Collection 3-30
         3.2.3.2 Existing Surface Water Quality 3-33
   3.3 AQUATIC ECOLOGY 3-52
      3.3.1 Approach 3-52
         3.3.1.1 Benthic Invertebrate Survey Approach 3-60
         3.3.1.2 Fish Survey Approach 3-60

3.3.1.3 Non-Biotic Indicators of Stream Condition 3-61
3.3.1.4 Biotic Indicators of Stream Condition 3-61
3.3.2 Benthic Macroinvertebrates and Fish: Results and Discussion 3-63
3.3.2.1 Little Pigeon River/Copeland Creek/Lindsey Creek 3-65
3.3.2.2 Webb Mountain/Webb Creek Drainages 3-77
3.3.2.3 Rocky Flats Drainages 3-80
3.3.2.4 Big Ridge/Cosby Creek Drainages 3-81
3.3.2.5 Summary 3-83
3.4 TERRESTRIAL RESOURCES 3-87
3.4.1 Vegetation 3-89
3.4.2 Wildlife 3-92
3.4.3 Protected Rare Species 3-93
3.4.3.1 Vascular Plant Species 3-93
3.4.3.2 Bryophyte and Lichen Species 3-101
3.4.3.3 Animal Species 3-101
3.4.4 Additional Species of Interest to the NPS 3-104
3.4.5 Unique or Sensitive Habitats Including Wetlands 3-109
3.4.6 Summary 3-111
3.5 METEOROLOGY AND AIR QUALITY 3-112
3.5.1 Meteorology 3-112
3.5.2 Air Quality and Visibility 3-115
3.5.3 Potential Effects of Pollutants on Resources at GSMNP 3-120
3.5.3.1 Visibility 3-120
3.5.3.2 Acid Precipitation 3-121
3.5.3.3 Ozone 3-121
3.5.3.4 Regulated Pollutants of Lesser Concern at GSMNP 3-123
3.6 EXISTING SOCIOECONOMIC CONDITIONS 3-123
3.6.1 Introduction 3-123
3.6.2 Population 3-124
3.6.2.1 Current Population 3-124
3.6.2.2 Population Projections 3-128
3.6.3 Housing 3-129
3.6.4 Public Services 3-130
3.6.4.1 Education 3-130
3.6.4.2 Water 3-133
3.6.4.3 Sewers 3-135
3.6.4.4 Solid Waste 3-136
3.6.4.5 Police and Fire Protection 3-137
3.6.5 Land Use 3-137
3.6.5.1 Current Land Use 3-137
3.6.5.2 Land Use Projections 3-139
3.6.6 Taxes 3-141
3.6.7 Economic Structure 3-142
3.6.8 Social Structure 3-147
3.6.9 Summary 3-148
3.7 EXISTING TRAFFIC CONDITIONS 3-149
3.7.1 Existing Traffic Patterns and Movements 3-149
3.7.1.1 Capacity Analysis 3-149
3.7.1.2 Level of Service for Rural Two-Lane Highways 3-150

3.7.1.3 Level of Service for Rural Multilane Highways 3-150
3.7.1.4 Level of Service for Unsignalized Intersections 3-151
3.7.2 Traffic Data Collection and Acquisition 3-152
3.7.3 Traffic Noise Analysis 3-154
3.7.3.1 Noise Regulation and Factors Affecting Noise Levels 3-154
3.7.3.2 Ambient Noise Level Data Collection 3-164
3.7.3.3 Ambient Noise Levels Within the Study Area 3-164
3.8 AESTHETIC RESOURCES 3-164
3.8.1 Summary of Existing Conditions 3-164
3.8.1.1 Aesthetics of Cuts, Fills, and Associated Vegetation 3-172
3.8.2 Introduction 3-176
3.8.3 Approach to the Aesthetic Resource Evaluation 3-176
3.8.4 Description of Key Aesthetic Development Sites 3-180
3.8.5 Views of Section 8B 3-206
3.9 CULTURAL RESOURCES ASSESSMENT 3-210
3.9.1 Eligible National Register Properties 3-211
3.9.1.1 Cocke County 3-213
3.9.1.2 Sevier County 3-213
3.9.2 Cultural Landscapes 3-214
3.9.2.1 The Cosby Valley 3-214
3.9.2.2 Pittman Center 3-214
3.9.2.3 Rocky Flats 3-215

4. ENVIRONMENTAL CONSEQUENCES 4-1
4.1 GEOLOGY AND SOILS 4-1
4.1.1 Summary 4-4
4.2 WATER RESOURCES 4-5
4.2.1 Construction of Parkway with no Interchanges 4-5
4.2.1.1 Hydrology 4-5
4.2.1.2 Water Quality 4-6
4.2.2 Western Terminus Options 4-8
4.2.2.1 Hydrology 4-8
4.2.2.2 Water Quality 4-9
4.2.3 Webb Mountain Options 4-9
4.2.3.1 Hydrology 4-9
4.2.3.2 Water Quality 4-10
4.2.4 Operational Timing Options 4-10
4.2.4.1 Hydrology 4-10
4.2.4.2 Water Quality 4-10
4.2.5 No-action Alternative 4-11
4.2.6 Cumulative Impacts 4-11
4.2.7 Summary 4-11
4.3 AQUATIC ECOLOGY 4-12
4.3.1 General Description of Highway Construction Impacts on Aquatic Communities 4-12
4.3.2 Impacts to Aquatic Communities of Constructing Section 8B with no Interchanges 4-13
4.3.3 Impacts of Western Terminus Options on Aquatic Communities 4-15
4.3.4 Impacts of Webb Mountain Options on Aquatic Communities 4-15
4.3.5 Impacts of Operational Timing Options on Aquatic Communities 4-15

4.3.6 Impacts of No-Action Alternative on Aquatic Communities 4-16
4.3.7 Cumulative Impacts on Aquatic Communities 4-16
4.3.8 Summary of Impacts to Aquatic Communities 4-16
4.4 TERRESTRIAL RESOURCES 4-17
4.4.1 Construction Options 4-17
4.4.1.1 Vegetation 4-17
4.4.1.2 Wildlife 4-17
4.4.1.3 Protected Rare Species 4-20
4.4.1.4 Additional Species of Interest to NPS 4-22
4.4.1.5 Unique or Sensitive Habitats Including Wetlands 4-27
4.4.1.6 Cumulative Impacts 4-29
4.4.1.7 Summary of Cumulative Impacts to Terrestrial Resources 4-31
4.4.2 Impacts of the No Action Alternative 4-31
4.5 METEOROLOGY AND AIR QUALITY 4-31
4.5.1 Effects of Road Construction on Air Quality 4-31
4.5.2 Effects of Road Construction on Visibility 4-34
4.5.3 Effects of Road Use on Air Quality 4-36
4.5.3.1 Carbon Monoxide 4-37
4.5.3.2 Ozone (O_3) 4-41
4.5.3.3 Nitrogen Oxides (NO_2) 4-44
4.5.3.4 Particulate Matter 4-46
4.5.3.5 Prevention of Significant Deterioration 4-49
4.5.3.5.1 Class II PSD Areas 4-50
4.5.3.5.2 Class I PSD Areas 4-50
4.5.4 Effects of Road Use on Visibility 4-51
4.5.5 Cumulative Impacts 4-52
4.5.6 Summary of Air Quality and Visibility Conclusions 4-52
4.5.6.1 Construction 4-52
4.5.6.2 Operation 4-53
4.5.6.2.1 Pollutant Concentrations 4-53
4.5.6.2.2 Visibility 4-55
4.5.6.2.3 Conservation of the Analysis 4-55
4.6 SOCIOECONOMICS 4-55
4.6.1 Population 4-56
4.6.2 Housing 4-57
4.6.3 Public Services 4-58
4.6.3.1 Education 4-58
4.6.3.2 Water 4-58
4.6.3.3 Sewer 4-59
4.6.3.4 Solid Waste 4-59
4.6.3.5 Police and Fire Protection 4-60
4.6.4 Land Use 4-60
4.6.5 Taxes 4-61
4.6.6 Economic Structure 4-62
4.6.7 Social Structure 4-63
4.6.8 Environmental Justice 4-64
4.6.9 Cumulative Impacts 4-64
4.6.10 Summary of Findings 4-64

4.7 TRAFFIC AND NOISE 4-65
4.7.1 Traffic Study Area 4-66
4.7.1.1 Data Collection and Acquisition 4-66
4.7.1.2 Traffic Study Alternatives 4-67
4.7.2 Future Traffic Projections 4-70
4.7.2.1 Applied Methodology 4-70
4.7.2.2 Future Infrastructure Changes 4-72
4.7.2.3 Projecting Future Traffic Production and Attraction Growth 4-72
4.7.2.4 Determining Traffic Diversion to the Foothills Parkway 4-74
4.7.3 Traffic Study Results 4-78
4.7.3.1 Construct Sections 8B and 8C with no Interchanges 4-78
4.7.3.2 Western Terminus Options 4-79
4.7.3.3 Operational Timing Options 4-81
4.7.3.4 Traffic Impacts Due to Construction 4-82
4.7.3.5 Cumulative Effects of All Sections Open to Traffic 4-83
4.7.3.6 No-Build Alternative 4-83
4.7.3.7 Bicycle Traffic 4-84
4.7.3.8 Summary 4-85
4.7.4 Future Noise Projections 4-86
4.7.4.1 Applied Methodology 4-86
4.7.4.2 Traffic Noise 4-88
4.7.4.3 Construction Noise 4-95
4.7.4.4 Traffic Noise Summary 4-96
4.8 AESTHETIC RESOURCES 4-98
4.8.1 Introduction 4-98
4.8.2 Views From the Parkway 4-98
4.8.2.1 Safety 4-100
4.8.2.2 Cuts and Fills 4-100
4.8.3 Aesthetic Quality 4-101
4.8.4 General Analysis for Views of Section 8B 4-101
4.8.5 Aesthetic Impacts of No Action 4-103
4.8.6 Summary of Aesthetically Preferred Build Options 4-105
4.8.7 Overall Analyses Summary 4-106
4.8.7.1 Positives 4-106
4.8.7.2 Negatives 4-107
4.9 CULTURAL RESOURCES 4-107
4.9.1 National Register Properties 4-107
4.9.2 National Register Eligible Properties 4-108
4.9.3 Cultural Landscapes 4-108
4.10 SUMMARY OF IMPACTS 4-108

5. RECOMMENDED MITIGATION MEASURES 5-1
5.1 GEOLOGY AND SOILS 5-1
5.2 WATER RESOURCES 5-2
5.2.1 Construction of the Parkway with no Interchanges 5-2
5.2.2 Western Terminus Options 5-3
5.2.3 Webb Mountain Options 5-3
5.2.4 Operational Timing Options 5-4
5.2.5 No-action Alternative 5-4

5.3 AQUATIC ECOLOGY 5-4
5.4 TERRESTRIAL RESOURCES 5-5
5.4.1 Vegetation and Wildlife 5-5
5.4.2 Protected Species 5-5
5.4.3 Additional Species of Interest to NPS 5-7
5.4.4 Summary 5-7
5.5 MITIGATION MEASURES FOR METEOROLOGY AND AIR QUALITY 5-8
5.5.1 Construction 5-8
5.5.2 Operation 5-9
5.6 SOCIOECONOMICS 5-9
5.7 MITIGATION MEASURES FOR PARKWAY TRAFFIC AND TRAFFIC NOISE 5-10
5.7.1 Parkway Traffic Mitigation 5-10
5.7.2 Parkway Traffic Noise Mitigation 5-10
5.7.3 Parkway Construction Noise Mitigation 5-10
5.8 AESTHETIC RESOURCES 5-11
5.8.1 Road Cuts and Fills 5-11
5.8.2 Proposed Parkway Alignment 5-12
5.8.3 Development of Pull-Overs and Vegetation Clearing for Views 5-12
5.8.4 Potential for Interpretive Resources 5-13
5.8.5 Potential for Views of Streams, Valleys, and Distant Views Not Evaluated 5-13
5.9 CULTURAL RESOURCES 5-14

6. REFERENCES 6-1

LIST OF FIGURES

Fig. 1A. General location map for the area of the Foothills Parkway 1-2
Fig. 1B. General map of Foothills Parkway Section 8B 1-3
Fig. 2. Regional geologic map of the western Blue Ridge in the vicinity of the Great Smoky Mountains of Tennessee and western North Carolina showing distribution of rock units between the Great Smoky and Hayesville faults 3-2
Fig. 3. Simplified geologic map of the Webb Mountain area 3-5
Fig. 4. Rock units of the Foothills Parkway and their engineering and other properties that would affect environmental impacts 3-7
Fig. 5. Map of right-of-way showing the seven segments into which it was divided for presentation of geology and soils characterization 3-8
Fig. 6. Parent materials of Segment 1 (Little Pigeon River Terraces) 3-10
Fig. 7. Slopes of Segment 1 (Little Pigeon River Terraces) 3-11
Fig. 8. Parent materials of Segment 2 (Webb Creek Ridge) 3-12
Fig. 9. Slopes of Segment 2 (Webb Creek Ridge) 3-14
Fig. 10. Parent materials of Segment 3 (Webb Mountain) 3-15
Fig. 11. Slopes of Segment 3 (Webb Mountain) 3-16
Fig. 12. Parent materials of Segment 4 (Matthew Branch Ridge) 3-17
Fig. 13. Slopes of Segment 4 (Matthew Branch Ridge) 3-18
Fig. 14. Parent materials of Segment 5 (Rocky Flats) 3-19
Fig. 15. Slopes of Segment 5 (Rocky Flats) 3-21
Fig. 16. Parent materials of Segment 6 (Big Ridge) 3-22
Fig. 17. Slopes of Segment 6 (Big Ridge) 3-23
Fig. 18. Parent materials of Segment 7 (Cosby Creek Terraces) 3-24
Fig. 19. Slopes of Segment 7 (Cosby Creek Terraces) 3-25
Fig. 20. Map showing the location of all perennial streams and the stream sampling stations for the water quality and aquatic biota studies for Section 8B 3-27
Fig. 21. Map showing the location of stream sampling stations for the Webb Mountain water quality survey conducted on March 20, 1995 3-32
Fig. 22. Variation in the concentrations of selected physical and chemical parameters across sampling stations in the water quality studies 3-42
Fig. 23. Seasonal variation in the concentrations of selected physical and chemical parameters for five streams 3-44
Fig. 24. Variation in the concentrations of selected chemical parameters for streams sampled during the March Webb Mountain survey 3-46
Fig. 25. Concentrations of selected parameters during a storm in January 1995 in Webb Creek (station 8) 3-48
Fig. 26. Concentrations of selected parameters during a storm in January 1995 in Warden Branch (station 11) 3-49
Fig. 27. Concentrations of selected parameters during a storm in February 1995 in Matthews Creek (station 13) 3-50
Fig. 28. Concentrations of selected parameters during a storm in February 1995 in Carson Branch (station 21) 3-51
Fig. 29. Concentrations of selected parameters during a storm in May 1995 in Webb Creek (station 8) 3-53

Fig. 30. Concentrations of selected parameters during a storm in May 1995 in Warden Branch (station 11) 3-54
Fig. 31. Concentrations of selected parameters during a storm in May 1995 in Matthew Creek (station 13) 3-55
Fig. 32. Concentrations of selected parameters during a storm in May 1995 in Carson Branch (station 21) 3-56
Fig. 33. Total number of taxa for benthic macroinvertebrates and fish at the stream biological survey sites for Section 8B of the Foothills Parkway 3-70
Fig. 34. Ratio of EPT taxa to total benthic macroinvertebrate taxa at the stream biological survey sites for Section 8B of the Foothills Parkway 3-71
Fig. 35. Ratio of Orthocladiinae taxa to total Chironomidae taxa at the stream biological survey sites for Section 8B of the Foothills Parkway 3-72
Fig. 36. Number of Ephemeroptera, Plecoptera, and Tricoptera (EPT) taxa and non-EPT taxa at the stream biological survey sites for Section 8B of the Foothills Parkway 3-73
Fig. 37. Relative contribution of Ephemeroptera, Plecoptera, and Tricoptera (EPT) to the EPT total taxa at the stream biological survey sites for Section 8B of the Foothills Parkway 3-74
Fig. 38. Numbers of Orthocladiinae and non-Orthocladiinae taxa at the stream biological survey sites for Section 8B of the Foothills Parkway 3-75
Fig. 39. Total benthic invertebrates, EPTs, orthoclads, and fish taxa versus mean stream width at the stream biological survey sites for Section 8B of the Foothills Parkway 3-84
Fig. 40. Benthic invertebrate ratios of EPT taxa to total taxa and orthoclad taxa to chironomid taxa versus mean stream width at the stream biological survey sites for Section 8B of the Foothills Parkway 3-85
Fig. 41. Total benthic macroinvertebrates taxa by stream width at unaffected and affected stream sites in the stream biological survey sites at Section 8B of the Foothills Parkway 3-86
Fig. 42. Benthic invertebrate ratios versus mean stream width at sites with and without more than one pollution indicating species in the stream biological survey sites for Section 8B of the Foothills Parkway 3-88
Fig. 43. Landcover in the approximately 130 mi^2 (335 km^2) region surrounding the ROW 3-90
Fig. 44. Socioeconomic impact region, Foothills Parkway Section 8B 3-125
Fig. 45. Foothills Parkway Section 8B and immediate vicinity 3-126
Fig. 46. Area map for traffic volume counts and vehicle classification and turning movement counts 3-153
Fig. 47. The principle aesthetic resources along the proposed parkway are views south 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 3-165
Fig. 48. A 180 degree view of the GSMNP as seen from atop Webb Mountain where a scenic overlook could be developed 3-166
Fig. 49. Initial inventory of potential views and development sites along the proposed parkway 3-167
Fig. 50. Simplified profile of a scenic pull-over illustrating the vegetation maintenance needed to maintain views and safety 3-169

Fig. 51. Photographs show how a pull-over actually looks along another section of the parkway 3-170
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 3-171
Fig. 53. View of U.S. 321 near Cobbly Nob 3-173
Fig. 54. Photographs of a road cut along an existing stretch of parkway shows how vegetation may appear in 30 years 3-174
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 3-175
Fig. 56. Illustration of road cut vegetation recovery on a 1:1 slope over time on Webb Mountain 3-177
Fig. 57. Sample aesthetic evaluation worksheet 3-179
Fig. 58. The aesthetic resources of Section 8B are divided into these 7 segments 3-181
Fig. 59. The location and segment of sites for potential aesthetic development within the ROW of Section 8B 3-185
Fig. 60. This sketch shows how the parkway might emerge from low mountains into the open floodplain of the Little Pigeon River 3-187
Fig. 61. Sketch of the western terminus of Section 8B at site 1A where aesthetic developments would offer interpretive opportunity 3-188
Fig. 62. An oblique aerial photograph of the site 2A area 3-190
Fig. 63. Sketch of the proposed parkway passing through Webb Creek valley near U.S. 321 at site 2A 3-191
Fig. 64. Sketches of various aspects of site 2C 3-192
Fig. 65. This quiet mountain stream walkway would provide interesting interpretive information about nature and some variation in activity for certain parkway travelers 3-193
Fig. 66. This sketch from the parking lot of site 3C shows the panoramic view of succeedingly more distant ridges of the GSMNP 3-194
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) 3-196
Fig. 68. The most westerly portion of 3C may be seen from this housing development as illustrated 3-197
Fig. 69. A sketch of the expected view from 3C1 atop a ridge near the lower parking lot on Webb Mountain 3-198
Fig. 70. Illustrations of the kinds of views to the east, south, and west of the GSMNP 3-199
Fig. 71. Plan sketch of the upper parking lot atop Webb Mountain 3-200
Fig. 72. Foothills Parkway Section 8B right-of-way in relation to the Great Smoky Mountains National Park trails and other features 3-201
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 3-203
Fig. 74. Sketch of possible development of site 6C 3-204
Fig. 75. A sketch of what the view to the east of the GSMNP would look like from site 6C 3-205
Fig. 76. A plan sketch of site 7A showing vegetation clearing, parking arrangements, and direction of views 3-207

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 3-208
Fig. 78. Architectural, historic, and cultural resources of Section 8B 3-212
Fig. 79. Simplified bedrock geologic map of the Webb Mountain area 4-3
Fig. 80. Habitat map in the approximately 130 mi^2 (335 km^2) region surrounding the right-of-way 4-25
Fig. 81. Location of traffic data counts 4-68
Fig. 82. Annual average daily traffic—1994 4-69
Fig. 83. Great Smoky Mountains National Park Historic and projected recreational visitation 4-73
Fig. 84. Historical traffic trends: 1987 to 1994 4-75
Fig. 85. Traffic growth projections: 1991 to 2026 in five-year intervals 4-76
Fig. 86. Area map for ambient noise level measurement sites 4-89
Fig. 87. Area map for ambient noise level measurement sites, Pittman Center area 4-90
Fig. 88. Area map for ambient noise level measurement sites, Cobbly Nob area 4-91
Fig. 89. Area map for ambient noise level measurement sites, Rocky Grove area 4-92
Fig. 90. Area map for ambient noise level measurement sites, Cocke County area 4-93

LIST OF TABLES

Table 1. Soil mapping units and parent materials 3-9
Table 2. Tennessee water quality criteria for domestic water supply (DOM) and fish and aquatic wildlife (FISH) use classifications 3-29
Table 3. Water quality sampling stations and sampling frequency (generally listed from west to east 3-31
Table 4. Average physical and bulk chemical characteristics from July 1994 to June 1995 3-34
Table 5. Average chemical concentrations from July 1994 to June 1995 3-36
Table 6. Average trace metal concentrations (mg/L) from July 1994 to June 1995 3-38
Table 7. Sampling sites for the aquatic ecological resources of proposed Section 8B of the Foothills Parkway 3-57
Table 8. Indications of anthropogenic effects on the streams in the proposed Section 8B of the Foothills Parkway: abiotic indicators of stream condition . . . 3-62
Table 9. Indications of anthropogenic effects on the streams in the proposed Section 8B of the Foothills Parkway: biotic indicators of stream condition 3-64
Table 10. Stream width and depth and total numbers of benthic macroinvertebrates and fish taxa collected from the stream sampling sites along the proposed Section 8B of the Foothills Parkway 3-66
Table 11. Benthic macroinvertebrate survey taxa and specimen comparisons of various stress-sensitive and stress-tolerant taxonomic groupings from the stream sampling sites along the proposed Section 8B of the Foothills Parkway 3-68
Table 12. Important vegetation types for delineating habitats of plant and animal species of concern along Section 8B 3-91
Table 13. Birds of the right-of-way 3-94
Table 14. Protected vascular plant species growing on the right-of-way 3-97
Table 15. Vascular plant distribution, traversing Section 8B of the right-of-way from southwest to northeast, of state and previous federal candidate species and species new or rare in Great Smoky Mountains National Park (excluding exotic species) 3-98
Table 16. Mammals captured on the Section 8B of the right-of-way that were listed as "In Need of Management" by the state of Tennessee 3-103
Table 17. Vascular plants found during surveys on Section 8B of the right-of-way which were either new or considered rare in GSMNP, other than state and federally listed species in Table 14 3-105
Table 18. Songbirds identified by the Southeast Management Working Group for Partners in Flight as preliminary priorities in need of increased conservation attention in the Southeastern United States and Blue Ridge Physiographic Province which were observed on or near the right-of-way 3-107
Table 19. Non-native (exotic) species growing on or near Section 8B of the right-of-way 3-109
Table 20. Temperature data for Gatlinburg and Newport, Tennessee 3-113
Table 21. Precipitation data for Gatlinburg and Newport, Tennessee 3-114
Table 22. Expected precipitation extremes in Sevier County, for selected lengths of time and return periods 3-114
Table 23. Number of Korshover stagnation episodes, by month, during the 40-year period 1936–1975 3-115

Table 24. Air quality standards 3-116
Table 25. Air quality monitoring data 3-118
Table 26. Integral vista observation points of the Great Smoky Mountains National Park 3-121
Table 27. Population in the area of Foothills Parkway Section 8B 3-127
Table 28. Key demographic features of Cocke County, Sevier County, and Tennessee . . . 3-128
Table 29. Housing in the area of Foothills Parkway Section 8B 3-131
Table 30. Housing vacancy in the area of Foothills Parkway Section 8B 3-132
Table 31. Land use in Cocke and Sevier Counties 3-138
Table 32. Subdivision of land in and around Pittman Center and Cosby, 1960–1994 3-140
Table 33. Property tax rates in the area of Foothills Parkway, Section 8B, 1994 3-142
Table 34. Summary of operating revenues, by source, in the area of Foothills Parkway, Section 8B, fiscal year 1994 3-143
Table 35. Key economic indicators for Cocke County, Sevier County, and Tennessee 3-144
Table 36. 1993 employment by sector (%) in Cocke and Sevier Counties 3-145
Table 37. Economic impact of tourism in the area of Foothills Parkway, Section 8B, 1993 3-145
Table 38. Level of service criteria for unsignalized intersections 3-152
Table 39. Existing weekday morning traffic conditions and levels of service at key intersections 3-155
Table 40. Existing weekday evening traffic conditions and levels of services at key intersections 3-156
Table 41. Existing weekend morning traffic conditions and levels of service for key intersections 3-157
Table 42. Existing weekend evening traffic conditions and levels of service for key intersections 3-158
Table 43. Existing two-lane rural highway weekday morning traffic conditions and levels of service 3-159
Table 44. Existing two-lane rural highway weekday evening traffic conditions and levels of service 3-159
Table 45. Existing two-lane rural highway weekend morning traffic conditions and levels of service 3-160
Table 46. Existing two-lane rural highway weekend evening traffic conditions and levels of service 3-160
Table 47. Federal Highway Administration Noise Standards 3-161
Table 48. Decibel addition rules 3-162
Table 49. A-scale noise levels that will permit acceptable speech communication or voice levels and listener distances 3-162
Table 50. Quality of telephone usage in the presence of steady-state interfering noise 3-162
Table 51. Maximum permissible noise exposures for persons working in high noise environments 3-163
Table 52. The location and identification of views along Section 8B of the proposed Foothills Parkway 3-182
Table 53. Sites selected for potential development along Section 8B of the Foothills Parkway 3-186
Table 54. Comparison of conceptual alternatives 4-1
Table 55. Comparison of cleared areas for construction options 4-18
Table 56. Landcover and potential habitat for area sensitive forest songbird species within the right-of-way (ROW) and in the surrounding region 4-24
Table 57. Exotic species on or near the right-of-way of concern in GSMNP 4-26

Table 58. Simulated ambient air concentrations of pollutants resulting from traffic on the proposed parkway Section 8B, compared with National Ambient Air Quality Standards 4-38
Table 59. Simulated maximum possible increases in ambient air concentrations of pollutants resulting from traffic on the proposed parkway Section 8B, compared to allowable Prevention of Significant Deterioration increments for Class II and Class I areas 4-49
Table 60. Intersection traffic volume data locations and sources 4-67
Table 61. Roadways parallel to the Foothills Parkway 4-77
Table 62. Diversion factors for various origins and destinations 4-77
Table 63. Construction noise levels for typical equipment types at various distances 4-97
Table 64. Sites identified for scenic, aesthetic, and interpretive development along 23.8 kilometers of proposed parkway 4-99
Table 65. Aesthetic quality rating summation 4-101
Table 66. General impacts from views of the proposed parkway 4-102
Table 67. Specific views of Section 8B 4-104
Table 68. Summary of potential environmental impacts 4-109
Table 69. Mitigation measures for each build option 5-1

ACRONYMS

AADT	annual average daily traffic
Alcoa	Aluminum Company of America
BBS	Breeding Bird Survey
CALINE	California Line Source
CO	carbon monoxide
CDOT	California Department of Transportation
DOM	domestic
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ER	environmental report
FHWA	Federal Highway Administration
FISH	fish and aquatic life
GSMNP	Great Smoky Mountains National Park
HF	hydrogen fluoride
I-40	Interstate 40
IND	industrial
IRR	irrigation
ISC3	Industrial Source Complex
ISCST	Industrial Source Complex Short-Term
LOS	level of service
LW&W	livestock watering and wildlife
MGD	million gallons per day
NAAQS	National Ambient Air Quality Standards
NO	nitric oxide
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NPS	National Park Service
NWI	National Wetlands Inventory
O	oxygen atom
O_2	oxygen molecule
O_3	ozone
OEPA	Ohio Environmental Protection Agency
ONRWs	Outstanding National Resource Waters
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Act of 1970
PM-10	particulate matter
PSD	prevention of significant deterioration
REC	recreation
ROW	right-of-way
RPM	reactive plume model
RTDM	Rough Terrain Dispersion Model
SO_2	sulfur dioxide
SR	State Route
TDOT	Tennessee Department of Transportation
TOS	Tennessee Ornithological Society
TSP	total suspended particulate matter

TSS	total suspended solids
UF_6	uranium hexafluoride
USGS	U.S. Geological Survey
VISCREEN	visibility screening