

REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
HUNTINGTON DISTRICT, CORPS OF ENGINEERS  
502 EIGHTH STREET  
HUNTINGTON, WEST VIRGINIA 25701-2070

2 I certify that the following electronic file, consisting of 199 pages, 12 exhibits, and appendices is a true, correct and complete copy of the original document.

John Preston

Acting Chief, Environmental Analysis Section

Dated: 27 July 09

37 - Burnsville Lake Master Plan  
Final Draft + Little Kanawha River WV  
Design Memorandum No 11 Aug  
1989

BURNSVILLE LAKE  
LITTLE KANAWHA RIVER, WEST VIRGINIA

MASTER PLAN  
DESIGN MEMORANDUM NO. 11

FINAL DRAFT  
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Prepared by  
Department of the Army  
Huntington District, Corps of Engineers  
502 Eighth Street  
Huntington, West Virginia 25701-2070

Exhibits prepared by  
R.J. Ankrom Associates  
1107 Ninth Street, Suite N  
Vienna, West Virginia 26105

and

Booker Associates, Inc.  
343 Waller Avenue  
Lexington, Kentucky 40504

BURNSVILLE LAKE  
WEST VIRGINIA

MASTER PLAN

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**chapter 1**  
**introduction**

CHAPTER 1  
INTRODUCTION

1-01 PROJECT AUTHORIZATION

The Burnsville Lake project was authorized by the Flood Control Act of 1938 as a unit in the larger comprehensive flood control plan for the Ohio River, as discussed in the Flood Control Committee Document No. 1, 75th Congress, first session. Pursuant to Public Law 90-46 (90th Congress, 1st session) effective 4 July 1967, the name of the project has been changed from "Burnsville Dam and Reservoir" to Burnsville Lake."

1-02 PROJECT PURPOSES

The authorized purposes of the project are flood control, outdoor recreation, fish and wildlife conservation, and water quality control.

A. Flood Control. The lake is operated for the reduction of flood damages along the downstream areas of the Little Kanawha River and is a unit of the coordinated system for flood protection along the Ohio River valley.

B. Recreation. The project has federally constructed facilities for sightseeing, picnicking, camping, boating and fishing. There is also a privately constructed and managed marina area. Large land areas are available for other recreation uses.

C. Water Quality Improvement. Low flow water levels on the Little Kanawha River are augmented by releases from the dam to maintain a minimum flow of 20 cfs. The dam outlet works have three intakes at different elevations for water quality control.

D. Fish and Wildlife Management. (Multiple use area). The waters of the Lake and terrestrial habitats not used for operations or Corps managed recreation areas are managed by the State of West Virginia for the improvement of fishing, hunting, and forest resources.

E. Annual Benefits. The cost benefit ratio for the project at the time of construction was 1.02. The estimated annual costs and benefits are as follows:

<u>Annual Costs</u>	1,178,900	
<u>Annual Benefits</u>		<u>Percentage</u>
Flood Control	400,700	33%
Recreation	532,100	44%
Water Quality	127,300	11.5%
Area Redevelopment	<u>138,100</u>	11.5%
	1,198,100	

#### 1-03 PURPOSE OF THE MASTER PLAN

The purpose of the Master Plan Update, is to provide revised and current information relative to guiding the use and development of the project resources. It consolidates the original Master Plan and all other available related documents and information within a comprehensive planning format. The Master Plan establishes the policies, programs, and objectives for the development and management of all project area resources in accord with ER 1130-2-435, and other Corps regulations. The plan presents the resources and facilities available for public use and enjoyment and contains recommendations for enhancement of existing facilities and for the optimum location and design of future recreation facilities. A variety of elements have been taken into

consideration such as projected recreation demand, economic feasibility, the natural and cultural environment, and future operation and management capabilities.

1-04 PERTINENT PRIOR MEMORANDUMS

A number of reports concerning Burnsville Lake have been completed by the Corps of Engineers as listed in Table 1-01. In addition to prior design memoranda, numerous reports provided by state agencies and others regarding the project and surrounding areas have been considered in the preparation of the Master Plan.

TABLE 1-01

Previously Issued Design Memorandums  
Burnsville Lake

<u>Design Memorandum No.</u>	<u>Title</u>	<u>Approval Date</u>
1	Site Selection	March 1967
2	Hydrology (in Design Memorandum No. 3)	
3	General Design Memorandum Supplement 1, GDM Supplement 2, GDM, Project Formulation	October 1967 March 1968 January 1969
4A	Land Requirements Plan, Public Use Preliminary Master Plan	June 1970 May 1968
5	Access and Bypass Road (in DM No. 3)	
6	Real Estate - Dam Site and Bypass Road	July 68
6A	Real Estate - Reservoir Lands, Part II	September 1980
6B	Real Estate - Reservoir Lands, Weston and Gauley Bridge Turnpike	December 1974
6C	Real Estate - Reservoir Lands	August 1972



7	Relocation, Highway (included in DM No. 3)	
8	Geology and Soils (included in DM No. 10)	
9	Power, Telephone Relocations	January 1973
10	Dam, Spillway, and Outlet Works	July 1971
10A	Instrumentation	January 1970
11	Master Plan	February 1974
	Appendix A, Resource Management Plan	December 1981
	Appendix B, Forest Management Plan	June 1979
	Appendix C, Safety Management Plan	June 1979
	Appendix D, Fish & Wildlife Mgmt Plan	June 1979
	Appendix E, Fire Management Plan	June 1979
12	Concrete Aggregates	March 1973

#### 1-05 APPLICABLE PUBLIC LAWS

The following Federal Statutes govern the administration and development of Burnsville Lake.

A. SECTION 4, PUBLIC LAW 78-534, FLOOD CONTROL ACT OF 1944. This Act, as amended by the Flood Control Act, approved 24 July 1946, Public Law 526, 79th Congress, 2nd Session, H.R. 6597, provides for the development of reservoir areas under the control of the Department of the Army for recreational purposes. This law establishes the basic authority for the development of the Burnsville Lake project for recreation purposes.

B. PUBLIC LAW 85-624, FISH AND WILDLIFE COORDINATION ACT OF 1958. This Act states the general policy that fish and wildlife conservation shall receive equal consideration with other features of water resource development projects. Early and continuing coordination is encouraged to fulfill the spirit and intent of the law and administrative policy. This law establishes the basis for detailed consideration of fish and wildlife values in formulating future development plans for Burnsville Lake.

C. PUBLIC LAW 89-72, FEDERAL WATER PROJECT RECREATION ACT OF 1965.

This Act imposes requirements of non-Federal cooperation and cost-sharing participation in recreation financing and administration. These requirements have been applied administratively to projects authorized before 1965; therefore, all Corps of Engineers participation in recreation development at Burnsville Lake is subject to the requirements of P.L. 89-72. The cost share policy at the time of contract negotiation will prevail.

D. PUBLIC LAW 86-717 OF 1960. This Act provides for the protection of forest cover for reservoir areas under the jurisdiction of the Secretary of the Army and the Chief of Engineers. The Act requires that, where practicable, fee lands shall be developed and maintained so as to encourage, promote, and assure fully adequate and dependable future resources of readily available timber, through sustained yield programs, reforestation, and accepted conservation practices; and to increase the value of forest areas for conservation, recreation, and other beneficial uses.

E. PUBLIC LAW 89-65, NATIONAL HISTORIC PRESERVATION ACT OF 1966. The National Historic Preservation Act of 1966 (Public Law 89-65), established a national policy of historic preservation, directed the expansion of the National Register of Historic Places to include cultural resources of state and local, as well as national significance, and established certain procedures to be followed by Federal agencies in the event of a proposal that might have an effect on the National Register properties.

F. PUBLIC LAW 89-669, PROTECTION OF RARE AND ENDANGERED SPECIES ACT. This Act states the policy of Congress that the Secretaries of the Interior, Agriculture, and Defense shall seek to protect species of native fish and wildlife, including migratory birds that are threatened with extinction, and,

insofar as is practicable and consistent with the primary purposes of these agencies, shall preserve the habitats of such threatened species on lands under their jurisdiction.

G. PUBLIC LAW 91-190, NATIONAL ENVIRONMENT POLICY ACT OF 1969. This Act requires that an Environmental Impact Assessment shall be prepared to evaluate the impacts of any significant actions that may affect the environmental quality of Federally-owned land.

H. PUBLIC LAW 91-611, RIVER AND HARBOR AND FLOOD CONTROL ACTS OF 1970. Title II, Section 234, of this Act gives citation authority to designated Federal personnel for violations of those rules adopted by the Secretary of the Army related to the protection of Corps of Engineers projects resources.

I. PUBLIC LAW 93-291, PRESERVATION OF HISTORIC AND ARCHEOLOGICAL DATA ACT OF 1974. This Act provides for the preservation of significant scientific, prehistoric, historic, or archeological data that might be lost or destroyed as a result of various Federal actions.

J. PUBLIC LAW 99-662, WATER RESOURCES DEVELOPMENT ACT OF 1986. This law provides for the conservation and development of water and related resources and the improvement and rehabilitation of the Nation's water resources infrastructure. The Act discusses the new partnership relationships between Federal and non-Federal public entities as a result of increased cost-sharing in all stages of development and civil works projects.

K. PUBLIC LAW 81-152, FEDERAL PROPERTY ADMINISTRATION SERVICES ACT OF 1949. This act provides the Government an economical and efficient system for the disposal of surplus property.

L. PUBLIC LAW 93-205, ENDANGERED SPECIES ACT OF 1973. The purpose of this Act are to provide a means whereby the ecosystem upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the international treaties and conventions.

1-06 SCOPE OF THE MASTER PLAN.

In accordance with the Engineering Regulations (ER) 1120-2-400, 1130-2-435 (Draft), and ORDR 1105-2-2, the Master Plan describes how all project resources will be developed, used, and managed in the public interest. The Master Plan is focused primarily on those features contributing to the improvement of existing recreational facilities and multiple use areas. In recommending the development of new and upgraded facilities, a variety of elements have been considered, including the natural and cultural environment, current and projected recreation demand, operation and management capabilities, and facility costs. The goals of the Master Plan are to:

1. Develop a master plan that will provide for the best possible utilization of project resources.
2. Provide plans for improvements in outdoor recreation facilities and fish and wildlife resources.
3. Provide development concepts and criteria that will be in harmony with the character of the physical, historical, cultural, and biological environment of the area.

4. Assure sustained public utilization of project resources, up to a capacity which is consistent with aesthetic values and the natural environment.

5. Provide up-to-date information which will be the basis for future planning and coordination.

1-07 MASTER PLAN OBJECTIVES.

The following objectives represent specific tasks that will be addressed by the Master Plan. The objectives will guide the data collection, analysis, and the synthesis process throughout the plan. The objectives are to:

1. Evaluate the natural and cultural resources of the Burnsville Lake project and to identify the relationship between these resource characteristics and potential recreational use.
2. Investigate historical recreational use trends and to predict the type and quantity of recreational facilities that will be required to meet future facility demand.
3. Develop "Resource Use Objectives" which specify the attainable, publicly acceptable options for resource use based upon an analysis of resource capabilities and public needs.
4. Identify potential land and water use conflicts and to develop a land and water use plan that will minimize conflict and enhance multiple use of the area.

5. Develop conceptual development plans for existing and proposed recreational areas. These site plans will consider:
  - a. Potential consolidation or elimination of areas that are currently underutilized.
  - b. The need for repair and replacement of existing recreation facilities to protect the health and safety of the public and to prevent degradation of natural resources.
  - c. Identification of appropriate future facilities that will be required to meet future recreational demand and that will minimize long-term environmental damages and operational and maintenance costs.
  - d. The potential for cost-shared facility development.
6. To provide general plans for the development of appropriate facilities that are required to support or enhance the use of primary recreation sites.
7. To develop design criteria that can be used to guide the preparation of a physical plan of development and the preparation of more detailed facility plans.
8. To clarify long-term project management responsibilities and to identify minimum management planning programs.

9. Develop plans to improve forest, fish and wildlife utilization of the project.

10. To identify possible special problem areas that may require corrective action where appropriate.

1-08 MASTER PLAN FORMAT. The Master Plan has been divided into eleven chapters. Chapters 1 through 6 provide a review of the various natural and cultural resources that characterize Burnsville Lake, an analysis of existing and future recreational facility needs, and a summary of coordination efforts with other agencies. These chapters were developed utilizing a variety of existing data sources provided by local, state, and Federal agencies, information obtained from on-site investigations, coordination with various branches of the Corps of Engineers, and established planning and design procedures.

Chapter 7 presents facility recommendations that can be used to guide the future development of recreational areas. The general recommendations included in the Master Plan are designed to serve as a base for preparing detailed site plans as required in the future. Chapter 7 also includes the land and water use plan for the project. Chapter 8 presents facility loading and design criteria that were used to formulate development plans.

Chapter 9 presents broad management guidelines and policies which form the basis for preparing a detailed Operational Management Plan. These guidelines address the purpose and scope of the required plan as well as unique characteristics of Burnsville Lake as they relate to the preparation of the plan.

Chapter 10 presents cost estimates for the proposed recreation site developments and includes estimates for the rehabilitation of existing facilities. These cost estimates relate directly to the design criteria established in Chapter 8.

Chapter 11 presents a summary of the conclusions, recommendations, and special considerations developed and presented throughout the plan.



chapter 2  
project description

CHAPTER 2  
PROJECT DESCRIPTION

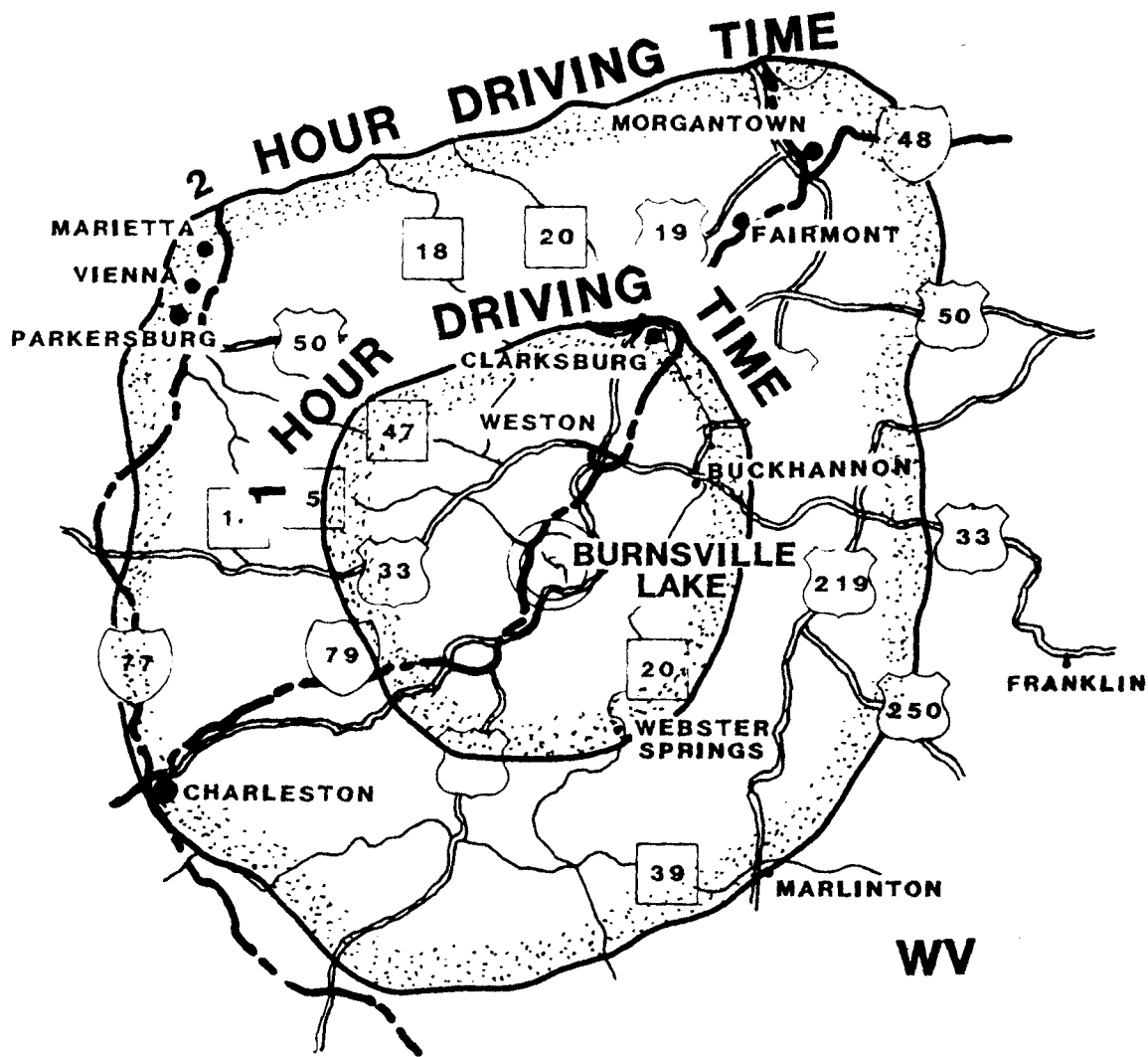
2-01 INTRODUCTION.

This chapter presents a brief description of the natural setting, development of the project, operational structures and management, and lake physical data. The description of the recreation facilities is presented in Chapter 5.

2-02 PROJECT LOCATION

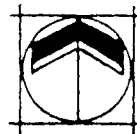
The planning area for Burnsville Lake consists of 13,312 acres of Federal land, located in the central part of West Virginia in northeast Braxton County. The dam is located 3 miles above the town of Burnsville on the Little Kanawha River, which drains into the Ohio River at Parkersburg, 124.2 miles below the dam. The project area is about 75 road miles northeast of Charleston, and 125 miles from Huntington. Clarksburg is located 36 miles to the northeast. Interstate 79 passes 3 miles to the west of the project, and exits are provided to State Route 5, which is the closest access to the dam. Access is also provided from the Interstate to U.S. 19 and State Route 4, both which cross the upper end of the project area. A location and driving distance map is presented as Exhibit 1.

2-03 GENERAL CHARACTER OF BURNSVILLE LAKE. The Lake is located in a mature plateau area with moderate to strong relief, and land use is largely forest with some open areas of former farm lands. The dam creates a 550 acre lake at minimum pool, 968 acres at the seasonal pool, and 1965 acres at the flood control pool. The lake is long and narrow, being 9.5 miles in length at the



location and driving distances

scale in miles



burnsville lake  
master plan  
update

exhibit

1

seasonal pool, and the width varies from 1000 to 1200 feet over most of the length, narrowing to about 200 feet near Bulltown about 6 miles upstream. Krawl Creek forms the largest branch of the lake and is located 3.4 miles from the dam on the right bank. Total length of the shoreline is 30 miles at the seasonal pool, and the mean depth of the lake at the minimum pool is 14.6 feet. A summary of lake data is presented in Table 2.01.

TABLE 2.01

Lake Data

Drainage area above dam	165.4 sq. miles
Maximum flow of record at dam site	9200 c.f.s.
Streambed elevation at dam	755 feet m.s.l.
Mean depth (minimum pool)	14.6 feet
Length at seasonal pool	9.5 miles
Top elevation of dam	839 feet m.s.l.
Mean breadth of lake	836 feet
Lake shoreline at seasonal pool	31 miles
Drawdown	13 feet

<u>Pool</u>	<u>Surface Elevation</u>	<u>Surface Area (Acres)</u>
Minimum	776	544
Seasonal	789	968
Flood Control		
Summer	825	1965
Winter	825	1965

Storage Capacity

	<u>Acre-Feet</u>		<u>Inches Runoff</u>	
	<u>Net</u>	<u>Gross</u>	<u>Net</u>	<u>Gross</u>
Minimum Pool	4077	4077	0.46	0.46
Seasonal Pool	10138	14215	1.15	1.61
Flood Control				
Summer	54,276	68,491	6.15	7.76
Winter	64,414	68,491	7.30	7.76

2-04 PROJECT DEVELOPMENT

A. GENERAL. The construction of the dam and access road was begun in June 1974 and was completed in January 1976. Construction is complete for all of the public use facilities at the project. These facilities include three boat launching ramps, campgrounds, picnic areas, a beach, playgrounds, hiking trails, parking areas, sewage treatment plants, and all associated utilities. Historical resources have been developed and restored at the Bulltown Area.

B. LAND ACQUISITION. The upper guide taking line for land acquisition was set at elevation 830. The taking line is based upon current real estate policy and includes all land required for construction designated public access areas, and public recreation use areas. The acquisition program was based upon fee acquisition of a 300-foot minimum horizontal guide line. Minimum requirements usually included all of the valuable bottom land and the lower hill slopes which included all improvements. The residual portions of these properties were relatively low value hill lands. The surface lands acquired in fee total 13,224 acres in about 280 tracts. All roads in the area were also within the minimum acquisition area. Entire properties were acquired in most cases to preclude demand for access or payment for severance. These circumstances led to a blocked out program that was consistent with the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (PL 91-646). Flowage easements of 98 acres were acquired to an elevation of 830 feet m.s.l. in some isolated upper reaches. Table 2.02 shows a general breakdown of land utilization.

TABLE 2.02

## Summary of Land Utilization

	<u>Acres</u>
Project Operations	80
Corps operated Public Use Areas	553.5
State Managed Lands	11,611
State Managed Lake Area (seasonal pool)	968
Leased to Private Concessions	<u>11.5</u>
Total Federal Land	13,224
Corps Flowage Easement	98

2-05 CORPS OPERATIONAL STRUCTURES

A. DAM. The dam is located 2.7 miles from the city limits of Burnsville and is a rockfill type embankment with impervious core. The dam has a maximum height of 89 feet, with a top elevation of 839 feet m.s.l., a top width of 24 feet, and a crest length of 1400 feet.

B. SPILLWAY. The concrete ogee spillway is controlled by three crest gates, 42' x 35 feet each at crest elevation of 792 feet, and has a total crest width of 142 feet<sup>9</sup>. The raceway and stilling basin is 240 feet long.

C. OUTLET WORKS. The outlet is located in the concrete spillway section for normal flows and has five 4'0" x 4'6" sluices with hydraulically operated slide gates. For water quality control, three 4' x 4' intake discharge through three 30" diameter conduits.

D. MAINTENANCE BUILDING. The building is located about 500 feet from the right dam abutment and is made up of 4 buildings. The largest, of 3700 square feet, is used as office space and for maintenance activities. The other buildings are of metal construction, varying from 96 to 3,200 square feet, and one used for storage or other maintenance activities.

E. VISITORS CENTER. The one acre site is on the right downstream end of the dam. The visitors center is also the operations office, and has restrooms, a display area, overlook, drinking fountains, and a 10 car visitors parking area.

2-06 STATE OF WEST VIRGINIA OPERATIONAL STRUCTURES.

The West Virginia Department of Natural Resources has constructed a operational and maintenance building located near the fish rearing sub-impoundments and the Falls Mill Scenic area.

2-07 RESERVOIR OPERATION

The resource pools consist of a minimum pool, seasonal pool and flood control pool. The minimum pool is maintained at elevation 776 feet above m.s.l. to increase flood control capacity, for sedimentation reserve, and to conserve the fishing resources. The seasonal pool is maintained at elevation 789 feet above m.s.l. for recreational use, fish and wildlife management, and to assure a minimum release of 20 cubic feet per second outflow. The maximum flood control pool is set at elevation 825 feet above m.s.l.

A. POOL LEVEL CHANGES. The pool will be maintained at an elevation of 789 feet above m.s.l. from 15 April to 30 September and at 776 feet from 1 December to 30 March. Drawdown of the pool below elevation 789 will occur when flow augmentation is needed to maintain water quality downstream. Releases from storage for flow augmentation purposes will be scheduled during the months of July through November in the amount necessary to maintain 330 c.f.s. at Elizabeth, West Virginia. A minimum release of 20 c.f.s. will be

maintained at all times. Filling of the lake for flood control generally is expected to take place in the winter and spring; summer flooding of lands above the seasonal pool is also possible.

B. OPERATION FOR FLOOD CONTROL. Burnsville Lake is considered a part of the integrated flood control system for the entire Ohio River Basin as well as the Little Kanawha River. The method of regulation must, therefore, be correlated with the operation of existing or any future reservoirs on other tributaries of the Little Kanawha and Ohio Rivers, if possible. Full consideration must also be given to local requirements. The plan of regulation is based on the assumption that an adequate flood forecasting and flood warning system would be in operation at all times. Control stages on the Little Kanawha River have been set low enough that only nominal damages would occur at downstream points, taking into consideration the safe and effective operation of the reservoir. It is desirable to empty the reservoir of flood storage as quickly as possible, in view of the possibility of a major flood occurring at a time when the reservoir is partly filled. Operation for Ohio River flood control is based on the maximum retention of flows which would add to crest stages in excess of 36 feet above normal pool on the Ohio River at Parkersburg, West Virginia.

C. EFFECTS OF LAKE OPERATION ON RECREATION. A rise or fall in the pool elevation at Burnsville Lake affects the lands surrounding the lake, recreation facilities, and project visitation. The recreation pool level is normally maintained at elevation 789 m.s.l. This is exceeded every year during the recreational pool season on average to elevation 795, and every 10 years to elevation 814. Effects associated with high water levels include the accumulation of driftwood and manmade trash, damage to vegetation, and



increased shoreline erosion. Lowering of the pool below elevation 789 during the recreation season does not occur as frequently as high water, and the effects would be minor. The winter drawdown does expose underwater hazards to boaters and makes the lake less pleasing because of the large area of exposed banks. The drawdown also concentrates areas of floating debris near the dam, and increases turbidity from erosion on the exposed bank areas. Table 2.03 shows the frequency and extent of reservoir filling and drawdown.

D. DEBRIS REMOVAL PLAN. Periodic use of the flood pool to prevent downstream flooding causes large amounts of timber, debris, and manmade trash to collect in various areas of the pool or bank areas. The debris removal plan selects areas of the lake pool where debris naturally accumulates and debris is removed from those areas where it would be hazardous to boaters, swimmers, or would affect project operations. This entails a large expenditure of time to remove silt, vegetative debris, and manmade trash, from launch ramps, parking lots, and lower lying camping areas. The Corps has the responsibility for keeping intense use areas clear of debris either by the use of their own equipment or contracting this work to private companies.

TABLE 2.03

Frequency of Pool Increases Based on Original  
Seasonal Pool 788 Feet Elevation

<u>Frequency (Years)</u>	<u>Elevation of Pool (feet)</u>
1	795
2	804
5	810.5
10	814
20	817
50	821
100	824
125	825

Frequency of Drawdown Based on  
Seasonal Pool of 788 Feet

<u>Frequency (Years)</u>	<u>Elevation of Pool (feet)</u>
1	June - No Change
4	June - 787.8
20	June - 787
1	July - No Change
2	July - 787.5
8	July - 786.0
20	July - 784.7
1	August - No Change
2	August - 786
10	August - 783.3
20	August - 781.5
1	September - No Change
2	September - 786
10	September - 786.6
20	September - 778.8

chapter 3  
environmental resources

CHAPTER 3  
ENVIRONMENTAL RESOURCES

3-01 PHYSICAL GEOGRAPHY

The Little Kanawha River Basin lies within the Kanawha section of the Appalachian Plateau physiographic province. This section is characterized as a mature plateau with moderate to strong relief. The ridge lines are sinuous, with moderately steep side slopes and narrow valleys. In the area of Burnsville Lake, the ridgetop elevations are from 1,300 to 1,550 feet, and the Little Kanawha flood plain varies from 750 to 800 feet in elevation giving a local relief of 500 to 750 feet. In the project area, the flood plain varies from 800 to 1,500 feet wide. Within the project area, 60-70 percent of the land is forest covered, the rest being more open land that was used for pasture or cultivation.

3-02 BASIN CLIMATE AND HYDROLOGY

The climate in the Little Kanawha drainage area is continental in nature, with wide variations in seasonal temperatures. Annual summer and winter temperatures average about 72°F and 35°F, respectively. Extremes of 105°F and -30°F have been recorded. Precipitation annually totals about 45 inches and is fairly well distributed throughout the year, with a slight increase in spring and early summer. Snowfall averages about 24 inches annually. Long periods of precipitation, which cause most of the flooding, occur most often in the winter and spring. Short, intensive storms occur in the summer months. The prevailing wind direction is from the southwest, which is frequently interrupted by storm fronts from the northwest, and less frequently from the east.

The Little Kanawha River flows in a northwesterly direction from its headwaters in the southern portion of Upshur County. The watershed has an area of 2,320 square miles, with the greatest length being 85 miles and width about 45 miles. The river follows a winding course 167 miles to its confluence with the Ohio River at Parkersburg. Hughes River, Leading Creek, Steer Creek, and West Fork are the major tributaries. The average gradient of the river is almost 9 feet per mile.

The drainage area above the dam site totals 165 square miles, is irregularly shaped, and is about 23 miles long by 10 miles wide. The basin displays high hills, steep slopes, and an absence of flat land. Only in the extreme lower reaches of the basin near the Ohio River are there any sizeable flood plain areas. Elevations of the streambed vary from 570 feet at the mouth of the Little Kanawha River to 2,050 feet at the headwaters. Stream slopes vary from 29.5 feet per mile in the 44-mile reach above the Town of Burnsville to 1.5 feet per mile near the mouth of the Little Kanawha River at Parkersburg.

The natural stream flow records for the Little Kanawha River near Burnsville for 1938 to 1966 show a maximum stage of 21.13 feet (13 feet is damage stage) above normal and a discharge of 9,200 cubic feet per second. A minimum is recorded at 0.01 cubic feet per second and an average or mean of 280 cubic feet per second (cfs).

The runoff from the Little Kanawha River Basin is flashy and tends to collect rapidly in the stream channels. Infiltration losses are generally low due to the relatively shallow depth of soil. Basin runoff is highest during the late winter and early spring. The runoff is lowest during the late summer and early fall. At Grantsville, 25 miles downstream, the Burnsville Dam reduces

the 100-year flood 2.8 feet, the 50-year flood 2.5 feet, and the 1-year flood 1 foot.

### 3-03 WATER QUALITY

A. GENERAL. The water quality program design for Burnsville Lake has been constructed to describe, either separately or in combination, the various factors which affect water quality. Results are used for project regulation activities, and to safeguard the integrity of project purposes. The following information summarizes water quality in 1981-1984.

B. SPECIAL PROBLEMS. Because of the chemical characteristics of the inflow basin, such as low buffering capacity, and low ionic strength, the water quality is delicately poised with respect to such adverse impacts as acid mine drainage. Also the Burnsville Lake watershed has high levels of iron and manganese in the hypolimnetic waters during periods of thermal stratification. When these metals precipitate from solution into receiving streams, they can cause coating of the bed, banks, and organisms, and create oxygen demand in the water.

C. SUMMARY. Water quality in general is deemed satisfactory for indigenous aquatic organisms. In terms of major ions and descriptive parameters, the water is characteristic of the predominantly non-calcareous nature of the watershed. Specific conductance, pH, alkalinity, and hardness are all very low. The water is classisied as soft.

Burnsville Lake becomes weakly thermally stratified in early summer. By mid-July, the lake temperatures show strong stratification. By the winter months, the temperatures are isothermal with transitional periods during the spring

and fall. Temperatures of releases are regulated to accommodate the downstream native fishery.

Dissolved oxygen concentrations remain fairly constant throughout the water column during the winter period, but decrease as a function of depth during the summer months. In the epilimnion dissolved oxygen concentrations remain greater than, or equal to 5.0 mg/l. As temperature decreases in the thermocline region, dissolved oxygen disappears rapidly, resulting in anoxic conditions near the bottom of the downstream section of the lake during late summer.

Total phosphorous increases with depth and dissolved phosphorous concentrations usually remain constant throughout the water column. Total concentrations greater than 50 ug/l develop in the hypolimnion during the summer. The total phosphorus for the lake station is 22 ug/l which is below the U.S. EPA recommended maximum at 50 ug/l.

Burnsville Lake is delicately poised with respect to pH. Because of the low buffering capacity of the non-calcareous watershed and acid drainage, the lake has a overall low pH value. Streams entering the project have a pH range of 5.2 to 8.4 with a mean of 7.1. In the pool pH decreases immediately below the thermocline during thermal stratification. Values in the epilimnion ranged from 7 to 7.5, pH in the unstratified period were around 6. At the outflow, pH ranges were 5.3 to 8 with a mean of 6.4, which within the range of the West Virginia State Standard.

Total iron at major inflow stations frequently exceeds the West Virginia Regulation maximum of 1.0 mg/l. Iron also occurs within the lake prior to

stratification, and total iron in excess of 2.0 mg/l is common throughout the water column.

High concentrations of manganese exist in the watershed. During thermal stratification in late summer manganese levels exceeded the State standards of 1.0 mg/l. The outflow will also contain unacceptable level unless constantly monitored. The water intake for the city of Burnsville is located below the dam outflow and therefore both iron and manganese are carefully regulated by the Corps.

D. BIOLOGICAL. The Little Kanawha River is a high quality aquatic habitat. It is one of the best overall fisheries in the State. The primary inflow stations on the Little Kanawha River, on Falls Mill, and Knawl Creek all indicate good water quality by the benthic macroinvertebrate analysis. The outflow had a moderate diversity of 2.25. Blue green algae, green algae and Flagellate Zooplankters comprise the majority of planktons analyzed from the lake. The lack of diversity of lake planktons indicate some stress probably due to acid drainage into the lake.

E. CONCLUSIONS. The most important water quality consideration at Burnsville Lake is the excessively high concentrations of iron and manganese which occur in the hypolimnion during periods of thermal stratification. Under present conditions, it is essential that releases of hypolimnetic waters be made during periods of thermal stratification only when made necessary by flooding or other significant conditions. To decrease as low as possible the retention time of the water which stands in the pool at lower levels ("dead-water") after spring rains and after low-level withdrawals are stopped, it is suggested that low-level withdrawals be made as late as practicable into the summer season to minimize buildup of iron and manganese in the hypolimnion.



Presence of acid drainage, together with associated salts of various metals, is a matter of great concern with respect to quality control of lake water from the outlet works during periods of thermal stratification. A temperature curve has been established in conjunction with State of West Virginia fisheries personnel. To meet temperature objectives, selective withdrawal capability is used to blend water from various lake depths near the face of the dam. During stratification periods, in the same manner as that which occurs in most natural lakes, a strong thermocline and anoxic hypolimnion are formed below a high-quality mass of epilimnetic water.

Under present and uncontaminated basin conditions, the project must be very carefully operated to compensate for hypolimnetic iron and manganese problems. The behavior of such elements is quite complex in a stratified and dynamic man-made lake system. Acid mine drainage would transport to the lake an increment of these and other metals in excess of that expected under uncontaminated basin conditions. Based increased levels of soluble forms of impoundment, such effects would impose (additional) environmental constraints in excess of those now in existence, therefore, it is recommended that any mining operation be carefully monitored.

### 3-04 GEOLOGY

The project area is underlain by sedimentary strata of Permian and Pennsylvanian age. Permian strata belong to the Dunkard series, and these strata cover the entire basin. The Dunkard series consists generally of micaceous, flaggy to massive sandstones, alternating with red and sandy shales and a few thin limestones and coals. Underlying Monongahela series of the Pennsylvanian age is generally similar to the Dunkard. It occurs high on the valley walls and ridge lines, and this series consists mainly of sandstone

beds with sandy shales, siltstones, thin limestones, and coals. The formations encountered in the basin area are relatively impervious. Outcropping siltstones and sandstones are slightly permeable along joints, fractures, and bedding contacts. The Conemaugh series in this region is characterized by many sandstones of irregular thickness and extent with several thin redbud sequences, and a few thin marine limestone horizons and coals. Redbeds of the Conemaugh series are quite susceptible to earth flows and rotational slides and slumps.

The geological phenomena affect design and construction of buildings, and must be taken into consideration in the development of access roads and recreational facilities. Saturation of the clay materials at the seasonal pool level may result in frequent slides which affect the location of shoreline developments.

A. WATERFALLS AND EXPOSED GEOLOGIC FORMATIONS.

(1) FALLS MILL. The falls and the associated land forms in the vicinity must be considered a major geologic, and scenic resource. The structure of the falls might also be called "unique," because of its orientation in the oxbow or horseshoe bend. The quiet, deep pool immediately upstream of the falls and the riffles downstream form a beautiful and unusual scenic area. The height of the falls is about 5 feet at seasonal pool level and is a major point of interest and importance to the project area.

(2) MILLSTONE RUN. Along Millstone Run about one-half mile from its juncture with the Little Kanawha River is located a very scenic small waterfalls in a setting of azaleas, rhododendron and mountain laurel; also in the immediate vicinity of this waterfall occur some of the better rock out-

croppings noted in the project area. Although much of the Conemaugh series and some of the Monongahela series (at the higher elevations) of the Carboniferous (Pennsylvanian) rocks underlying the project area have been exposed through actions of man, there seem to be relatively few natural outcroppings, thus importance is attached to the above mentioned features. The Millstone Run area provides a nice complex of both falls and rocks.

(3) FOSSILS. Although the fossiliferous shales of the Conemaugh series (exposed in many places through man's actions), are quite rich in fossils (primarily marine invertebrates), there probably are no currently known fossil beds that should be preserved or protected after impoundment. It is possible, however, that a thorough search of the area, perhaps in conjunction with attempts to locate archeological sites, may reveal other fossil beds.

### 3-05 MINERAL RESOURCES

The mineral resources within the drainage area are mainly coal, oil, and gas. Some of the clays have been used for brick, and sandstone has been quarried for aggregate and facing stone. Commercial mineable coal seams do occur within the pool drainage area and some of the seams have been mined locally. Coal reserves have been estimated at about 1.6 billion tons in the pool drainage area (1917 source). The General Design Memorandum No. 3 indicates there is not evidence of past coal mining operations in the project area. Limited exploration data indicated no proven mineable coal reserves. At the time of acquisition there were 26 producing gas wells on the project area.

During acquisition, lands were generally acquired in fee, including minerals. Some lands were taken subject to seven producing gas wells remaining until their resources were depleted, after which they would be plugged. A tract of land acquired near the damsite provided the quarry rock needed for the dam and other fill purposes. At the present time there are no requests for mineral leasing, or state of ground water, and no coal mining is being done in the project.

### 3-06 SOILS

Of primary concern for recreational development are the terrace soils and colluvial soils along the shoreline of the lake, since most development occurs in this area. The Monongahela soils are typical of the terrace soils found on the gentle sloping areas. These soils are moderately deep to deep, moderately well drained, and developed from sandstone, siltstone, and shale materials. They are a yellowish-brown silt loam or clay loam. A fragipan occurs at about 20 inches. Water moves slowly through the fragipan, so there is a considerable buildup of water in the soil in prolonged wet periods. Under these conditions there will be slumpage of soils in shoreline areas. Vegetation should be preserved on shoreline areas or riprapped in cases of existing bank caving. Vandalia soils are typical of the colluvial soils which occur at the base and on the lower side slopes of the hillsides. This is a dark reddish-brown silt loam or a silty clay loam. Vandalia soils often erode into ravines where there is no vegetative protection.

### 3-07 VEGETATION

Forest covers about 60-70 percent of the project lands. These forests are primarily second or third growth. Forest land within the project area is made

up of three major tree communities. The beech-maple community may be found anywhere from the streams to the tops of the hills, but is most often found in the lowland areas where the soil is relatively deep and fertile. The oak-hickory community is found in the areas higher in elevation, and oak-pine community is found mainly on the ridge areas. Land not in forest is located mainly in the less-steep areas which were once used for pasture or crops. These areas are becoming brushy and will eventually become forest land. The combination of forested hills and open areas on the lesser slopes makes for a scenically-pleasing landscape. There are at least four especially scenic areas located at Falls Mill, Millstone Run, Bulltown Scenic Overlook, and the Weston and Gauley Bridge Turnpike route.

At the time of acquisition, it was estimated that 38 percent of the project area was covered by commercial hardwoods. Conifers cover about 1.2 percent of the area, 46 percent of the land was considered to be brushland, and 15 percent was agricultural. Since that time more agricultural land has become brushland, and some land is succeeding to timberland.

### 3-08 FISH AND WILDLIFE

A. AQUATIC LIFE. The Little Kanawha River and its major tributaries are considered among the best fishing streams in the western part of West Virginia, and are noted for the populations of Muskellunge, largemouth and smallmouth bass, white bass, channel catfish, and panfish. A list of the fishes found in the Little Kanawha River is presented in Appendix I. The West Virginia DNR stocks various species of gamefish in the lake waters from the subimpoundment ponds located at Falls Mill. Fishes considered to be rare or endangered in the Little Kanawha River includes the Ohio Lamprey, Ohio Brook

Lamprey, Paddlefish, Black Redhorse, River Redhouse, Tippecanoe Darter, Sharpnose Darter.

B. MAMMALS. Game mammals found within the project are whitetailed deer, Gray and Fox squirrels, Cottontail rabbit, Raccoon, Red and Grey fox, Woodchucks, and Bobcat. Species often trapped include Muskrats, Mink, Skunk, and Opossum. The variety of land farms and cover types within the project are favorable for nature observation and hunting. The efforts of WVDNR for providing food plots and habitat improvement has also enhanced conditions for wildlife. A list of mammals found in the project area, is presented in Appendix I.

C. BIRDS. Game birds found in the project include wild turkey, Ruffed grouse, Bobwhite quail, Mourning doves, various species of waterfowl, primarily Woodducks, Mallards, and Canada Geese. A list of birds found in the project area is presented in Appendix I.

chapter 4  
recreation and cultural resources

CHAPTER 4  
RECREATION AND CULTURAL RESOURCES

4-01 HISTORICAL RESOURCES

The Bulltown Historic Village and Civil War site centers around the Cunningham Farmstead. The farmstead consists of the main residence and several out-buildings three of which are now standing. The house was built in the early 19th century and housed Bulltown's post office and telephone switchboard. The house was occupied until the Corps acquired the property in 1976.

The Cunningham Farmstead and the Civil War site were listed on the National Register of Historic Places on March 21, 1984, as the Bulltown Multiple Resource Area.

An interpretive center was added which houses historic and prehistoric artifacts from the area as well as interpretive panels. During the summer recreation season the center is open to the public, including guided tours to school groups. The operation is contracted out on a yearly basis.

Bulltown was named for Captain Bull, the Chief of a Delaware Indian settlement of approximately five Delaware families around 1765-1768. Fish, game and natural salt licks were abundant in the area and attracted many early settlers.

As white settlers began to move into the area in the late 18th century, there were many incidents of violence between the whites and the Indians. In 19772, the family of Adam Stroud was murdered. The Delaware Indians were blamed for



the massacre and the entire Delaware settlement was wiped out by the white settlers avenging the murder of Stroud's family. Captain Bull was believed to have been away at the time of the murders and he was believed to have been killed in 1781 at Isaacs Creek, West Virginia.

During the 18th and 19th centuries as more settlers moved into the area, Bulltown grew into a thriving agricultural community. The average farm grew crops such as corn, wheat, buckwheat, potatoes, sorghum and fruit. Grains were raised to feed livestock that was used for home consumption or taken to market for sale or trade.

Early industry in Bulltown consisted of a salt works, a tannery and a grist mill. The Bulltown Salt Works was a significant factor in the county's economy. The salt works supplied much of the surrounding area with needed completion from other salt works in Kanawha County and Clarksburg and a lack of adequate transportation were factors which led to its demise.

Bulltown had a tannery in the mid-19th century. Tanning required large quantities of both water and salt. The exact location of the tannery is unclear; however, an 1845 deed description places it near the Bulltown Historic Area, near the salt works. The tannery is believed to have operated between at least 1846 and 1877.

The falls of the Little Kanawha River at Falls Mill provided a ready source of power. The first water-powered grist mill was built in 1810 and consisted of a small, round log structure powered by a tub wheel and grinding with buhrs from Millstone Run. This operated until 1833 when it was replaced by a larger mill which occupied the site until 1925.

Construction of the Weston-Gauley Bridge Turnpike was started in 1849 and was completed in 1854-1855. It was the first major thruway to connect central western Virginia with points north and south to provide early residents a means of transportation to trade farm produce for goods not available in Bulltown.

During the Civil War, having control of Bulltown meant having control of part of the Weston-Gauley Bridge Turnpike, including the nearby covered bridge that carried the turnpike across the Little Kanawha River. In a mountainous region where communication was such an enormous problem, control of this major north-south road was crucial to the control of central western Virginia and other parts of the state. Bulltown was therefore of far greater strategic significance than the 12-hour Battle of Bulltown might suggest.

The Battle of Bulltown began on the morning of October 13, 1963, when Colonel William L. Jackson and Major J. M. Kessler attacked the Union encampment located on the crest of the hill about 250 feet above the floodplain of the Little Kanawha River where Millstone Run enters the river. After 12 hours of fighting, however, Colonel Jackson was forced to break off the engagement and he retreated south to Sutton. Seven Confederates were killed in the battle and are buried nearby in a common grave. Had Colonel Jackson been able to capture Bulltown and cut Union lines of communication and transport between the Baltimore and Ohio Railroad and the Great Kanawha Valley, the history of the Civil War in Western Virginia would have been much different.

Archeological excavations in 1981 showed that the Union fortifications consisted of a set of trenches, or breastworks, which varied considerably in size, shape and manner of construction, suggesting they were not designed by

military engineers but by the soldiers who built and used them to defend the site. For the most part, the dirt that was removed to form and maintain the trenches was thrown down the slopes. On the gentle slope of the north-eastern side, however, where the encampment was more vulnerable to attack, the dirt was piled in front of the trench to form a parapet.

Several log structures with architectural significance from the Bulltown area were dismantled and reconstructed at the Bulltown Historic Village. The Johnson House was built around 1883 and its most unique architectural feature is the cat-and-clay chimney made of wooden slats daubed with mud. This particular style is not common in the area and its origins are unclear.

The Fleming House was built before 1900 in the "saddlebag" style common to central West Virginia. It is a 1-1/2 story log house and consists of two "pens" or "cribs". Most logs of the left pen are joined by half-dovetail notching; however, the logs of the right pen are joined by means of mortise and tenon construction. This construction is presumed to have been adopted because it eliminates the need for two internal walls--the right internal wall of the left pen serves as the dividing wall for both pens.

The McCauley Barn was built in the 19th century and has a loft and a gable roof.

St. Michael's Church was built in 1878 on Flesher's Run due to the growing number of Irish Catholics in the Bulltown area. The Corps reconstructed St. Michael's at the historic area in 1975 to appear much as it did in the late 1800's, including all of the original furnishings, which were donated by the church's congregation.

#### 4-02 ARCHEOLOGICAL RESOURCES

An archeological survey was conducted by the West Virginia Geological Survey in 1971. The collections from this survey were analyzed by the University of Pittsburgh in 1980.

There are 41 archeological sites recorded within the project boundaries, both historic and prehistoric. There are 19 prehistoric open habitations without mounds, 4 prehistoric hamlets, 1 historic farm/residence, 2 historic military sites and 15 sites of unknown use. A total of 41 temporal components have been identified, consisting of 6 Early Archaic components (8000 - 5000 BC), 3 Middle ARchaic (5000 - 2000 BC), 8 Late ARchaic (2000 - 800 BC), 2 Early Woodland (800 - 100 BC), 1 Middle Woodland (100 BC - AD 500), 5 Late Woodland (AD 500 - 1200), and 8 Late Prehistoric (AD 1200 - 1680). A total of 13 cultural components have been identified, consisting of 3 Late Archaic Buffalo components, 3 Late Archaic Brewerton components, 4 Late Woodland Buck Garden components, 2 Archaic Panhandle components and 1 Late Prehistoric Fort Ancient component.

#### 4-03 SOCIO-ECONOMIC PROFILE

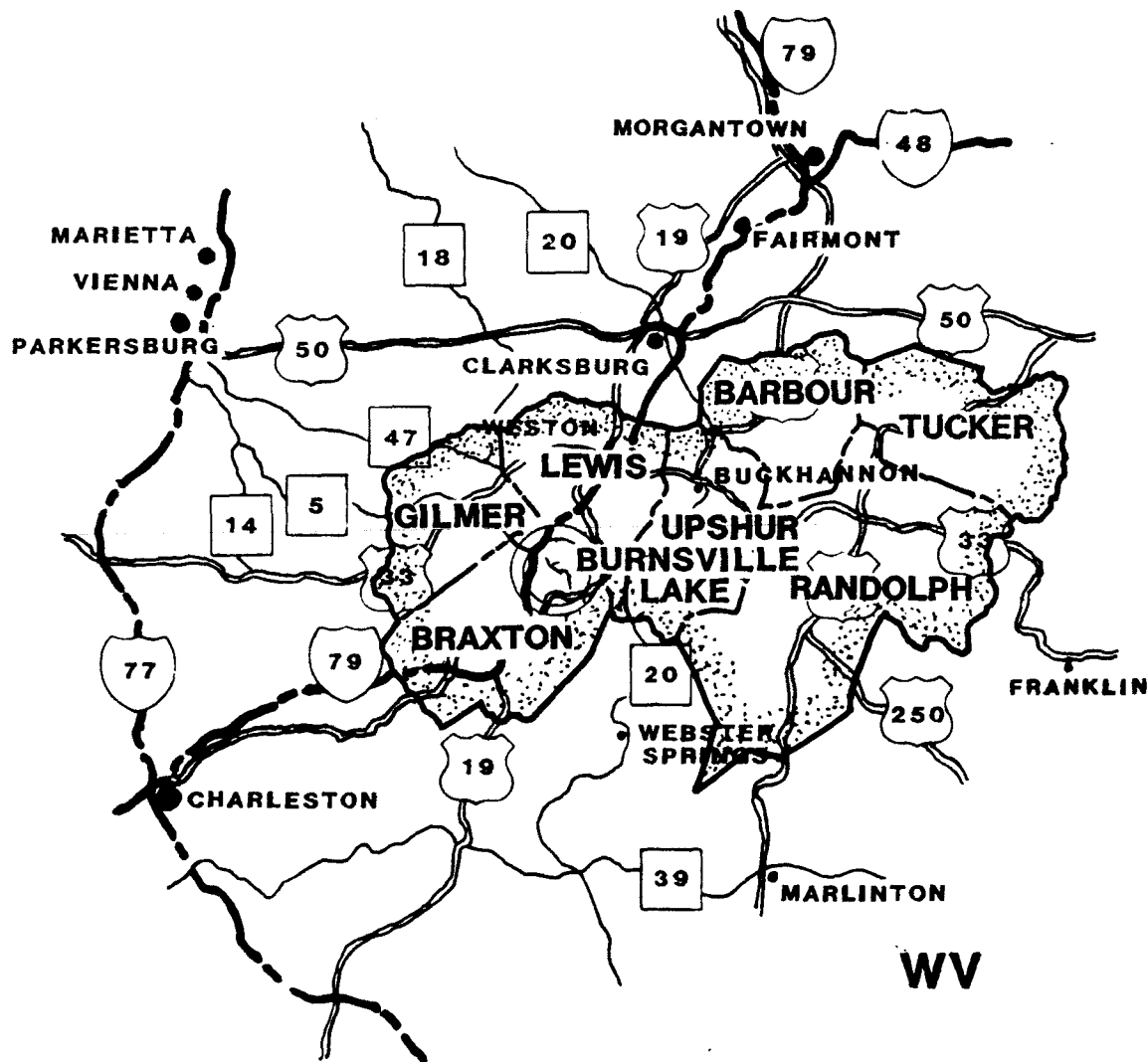
A. POPULATION. Braxton County had a 1980 population of 13,894, an increase of 9.4 percent from 1970. Seventy-six percent of the residents are considered rural non-farm, or live in small unincorporated villages. Four percent of the population are classified as farm resident. The county is sparsely populated with 27.1 persons per square mile compared to the state which has 81 persons per square mile. The population is 99.6 percent white, and .31 percent black. In the seven county SCORP region, the population was 118,516 in 1980, an average 14 percent increase from 1970.

B. EMPLOYMENT AND INCOME. Employment in the SCORP region is diversified. Twenty-two percent in 1980 were employed in professional or related services, 16 percent in agriculture, forestry, or mining, 15 percent in retail trade, 13.5 percent in manufacturing, 9.5 percent in construction trade, 4 percent in transportation, and 3 percent in communications or utilities.

In 1980, 13 percent of the households had incomes over \$25,000 per year, and 1.3 percent had income of over \$50,000 per year. Poverty level incomes amounted to 18 percent of the households.

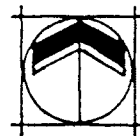
C. EDUCATION. The amount of education attained has been increasing each decade. In Braxton County, 45 percent of persons over 25 years old had 12 years of school. Eight percent had 16 years or more. In the SCORP region 50 percent had 12 years of school or more compared to the state which averaged 56 percent.

D. HOUSING. In the decade of 1970-80, the county and region was experiencing a housing shortage caused by the influx of more people to the area after 15 years of declining populations. There is often a shortage of building sites because of the steep terrain. The shortage of housing has been largely alleviated by new home building or mobile homes and the quality of housing has increased substantially. Twenty-three percent of the housing has been built since 1970.



**market area**

scale in miles



**burnsville lake  
master plan  
update**

**exhibit**

**2**

#### 4-04 REGIONAL RECREATIONAL FACILITIES

The area within a 50 mile air radius of Burnsville Lake includes a considerable number of recreational and historical points of interest. This area is especially well suited for outdoor recreation because of the variety of land uses consisting of farmland, large areas of forest, and some of best fishing and boating waters in West Virginia. The region extends close to the Ohio River and includes the higher mountain areas of the Monongahela National Forest. This region includes the large recreational resources available at Sutton Lake, Summersville Lake, and the recently completed Stonewall Jackson Lake. The recreation sites within 25 and 50 miles are shown in Table 4.01, and illustrated on exhibit 3.

TABLE 4.01

#### Recreation Areas Within 25 and 50 Miles of Burnsville Lake

##### WITHIN 25 MILES

Holly River State Park  
Sutton Lake  
Elk River Public Hunting Area  
Cedar Creek State Park  
Waters Smith Memorial State Park  
Stonecoal Lake  
French Creek Game Farm  
Jackson Lake

##### 25-50 MILES

Summersville Lake  
Carnifax Ferry Battlefield State Park  
North Bend State Park  
Conoway Lake  
Lewis Wetzel Public Hunting Area  
Tygart Lake State Park  
Audra State Park  
Teter Creek Lake  
Stuart Park Recreation Area  
Kumbrabow State Forest  
Cass Scenic Railroad  
Cranberry Glades and Wilderness Area

#### 4-05 SURROUNDING LAND USE

Land use in the project area at the time of land acquisition was 36 percent woodland, 29 percent pasture, 25 percent tilled land, 2.5 percent homesites, 0.2 percent commercial, and 7.2 percent streambank riparian habitat. Most areas outside the project have similar land use characteristics. Land use changes in the last few years include some areas being taken away from farming and reverting to brush and forest land. Commercial development and home building will take small amounts of the more level land as a result of population increases. Only a small percentage of the land is disturbed by strip mine or other mining activity.

#### 4-06 UTILITIES

A. SOLID WASTE. Solid waste is deposited in dumpsters located throughout the project. The waste is then picked up by a contractor who disposes of the material in county land fills.

B. ELECTRICAL POWER. The Monongahela Power Company operates all power facilities throughout the project area. Direct burial primary cables are installed along the roadways.

C. TELEPHONE. There are two telephone companies having facilities in the project area. The Chesapeake and Potomac Telephone Company of West Virginia serves the area originating from the Burnsville and Sutton exchanges. Telephone utilities of West Virginia Inc. has right-of-way in the project and serves the area through aerial and buried facilities originating at the Walkerville exchange.



D. WATER SUPPLY. All potable water to the project is supplied by the Burnsville city water system. A water treatment plant and storage tank is located at the Bulltown Camping area and serves this area.

E. WASTE WATER TREATMENT. One tertiary wastewater treatment plant is located at the Bulltown Camping and day use area.. The wastewater collection system in the area has both gravity and pressure sewers and discharges into either manholes or lift stations. Another package sewage treatment plant is located near the dam. Trailer waste disposal stations are located at Riffle Run and the Bulltown Camping area.

#### 4-07 TRANSPORTATION SYSTEM

Burnsville Lake is easily accessible to visitors from a large surrounding area because of the nearby location of Interstate 79. Federal Route 19 and State Route 4 are the other primary routes which provide access to the project. Most visitors to the project area would be from a 50 mile road radius of the lake, but a large number travel greater distances. The table below gives the distance to the major population centers in the region.

TABLE 4.02

<u>City</u>	<u>Miles</u>
Charleston, W. Va.	72
Clarksburg, W. Va.	36
Parkersburg, W. Va.	72
Fairmont, W. Va.	54
Beckley, W. Va.	84
Huntington, W. Va.	127
Morgantown, W. Va.	72
Wheeling, W. Va.	120
Pittsburgh, Pa.	132

A. PROJECT AREA ROADS. The road system within the Federal project area not part of the State or Federal road system is maintained by the Corps of Engineers or West Virginia DNR. Roads within the West Virginia DNR License area are usually built or maintained by the State. Most of the project roads are relatively new and in good condition. Interstate 79 passes the project 3 miles west of the dam area and State Route 5 provides good access to Burnsville and the dam area. The Bulltown area of the project is also accessible from Burnsville by taking route 5 south which connects with U.S. 19 north of the town of Flatwoods. U.S. 19 is a well maintained two lane road which provides the primary access to the Bulltown recreation area and Falls Mill scenic area. Route 19 ends about 2 miles east of Falls Mill.

Several road realignments were necessary when the project was built because of the flooding at some roads along the river. U.S. 19 has been relocated to higher ground in the Bulltown area and U.S. 19 to the Falls Mill Scenic Area takes a more direct route. The abandoned U.S. 19 along the river, and now a Corps road, provides access to the Falls Mill Fisherman Access area. The Corps has built a new road along Millstone Run to provide access to the Bulltown Camping area. A short distance beyond the Bulltown campground entrance this road connects with the State Route 19/12 which provides access to the Weston-Gauley Bridge Turnpike trail head. Fording of the Little Knawl Creek is necessary at the present time to reach the trail access parking area.



**chapter 5**  
**recreation use analysis**

CHAPTER 5  
RECREATION USE ANALYSIS

5-01 INTRODUCTION.

This chapter provides an analysis of the current and projected recreation use pattern at Burnsville Lake. Analysis of the impact that regional demand has on project demand and facility needs is also discussed. Through a careful analysis of existing conditions, as well as future visitation projections, potential recreational demand and facility needs can be identified. Determination of future facility levels involves the application of planning judgement and adherence to Corps criteria and standards. The results should be used as general guidelines for facility development plans. Final plans for recreation development must additionally consider budgetary constraints, agency goals, and other planning and management considerations.

5-02 EXISTING RECREATION AREAS

Information regarding existing recreation facilities is necessary in order to establish current and future facility needs for the Project. Existing recreational facilities cover a range of outdoor recreation activities and interests. The major activities are sightseeing, camping, picnicking, swimming, fishing, boating, hunting, and other natural area activities. Corps-operated public use sites presently total eight sites in the intensive use category, and the area totals 554 acres. A outgrant for the marina concession totals 11.5 acres. Low density recreation land managed by the Corps has a total of 131 acres. Wildlife management outgrants to the State of West Virginia have an area of 12,579 acres. The following listed intensive recreation sites progress from below the dam, upstream. Table 5.01 lists

complete facilities, and Exhibit 7 illustrates the location of facilities at the project.

A. TAILWATER DAY USE AREA. This area occupies about 30 acres mostly on the north side of the Little Kanawha River, along the spillway and outlet works. A fisherman's weir has been constructed about 2,150 feet below the toe of the spillway. There are parking spaces for 103 cars and the area has 2 picnic shelters, waterborne restrooms, playground, ballfield, horseshoe pit, benches and two shuffleboard courts.

B. VISITOR CENTER AND OVERLOOK. The 1-acre site is on the right downstream abutment of the dam. This is the site of the Visitors Center and has parking for 10 cars, restrooms, exhibition area, overlook, and is the operational headquarters for the project.

C. RIFFLE RUN. This 52 acre area is divided into three general land uses; a boat access area, picnic area, and campground. The facilities include a four lane launch ramp, 300 space parking, 12 picnic units, 2 picnic shelters, 2 playgrounds, 60 camping sites, and 3 waterborne restrooms, Also located here are handicapped fishing access; and amphitheatre. The concessionaire marina is located nearest the dam.

D. BULLTOWN DAY USE AREA. This 67 acre area has 12 picnic units, a four-lane launch ramp, 210 parking spaces, beach, and 2 waterborne restrooms.

E. BULLTOWN HISTORICAL AREAS. The area covers about 60 acres and is generally broken into two parts--the confederate historic area with an overlook and across the river are the union trenches with overlook, and historic building area. There is also a interpretative center, church, waterborne restroom, and parking.

F BULLTOWN CAMPING AREA. The 150-acre area has 204 camping units with 4 washhouses. The area also has a one-lane launch ramp, 38 visitor parking spaces, and a trailer dump station.

G. FALLS MILL AREA. The 36-acre area is divided into three land uses: a roadside overlook, a falls scenic area, and fisherman access area. The 25-acre fisherman's access area provides a 25-car parking lot and access to 7,000 feet of lake and river shore, along with vault toilets and drinking water.

H. WESTON AND GAULEY BRIDGE TURNPIKE. This hiking trail is now complete and uses the road bed of about 6.8 miles of the former Weston and Gauley Bridge Turnpike. This trail connects the Burnsville Lake and the Stonewall Jackson Lake.

5-03 REGIONAL RECREATION FACILITY NEEDS.

Regional demand for outdoor recreation activities is based on data provided in the West Virginia Statewide Comprehensive Outdoor Recreation Plan (SCORP), 1988-1992. The West Virginia SCORP identifies the recreation facility requirements of State planning regions.

Burnsville Lake is located within the SCORP Region VII, a seven county area in central West Virginia. The region is the same as the market area shown on exhibit 2. Surveys made in regions 7 by interviewing residents show the

highest participation frequency were for the activities of jogging, walking, fishing, sightseeing, picnicking, hunting, bicycling, outdoor pools, playgrounds, freshwater swimming, and league sports.

Residents also indicated high satisfaction for the number of facilities for hunting, sightseeing, hiking, jogging/walking, and 4 wheeling. The lowest satisfaction was expressed for the number of facilities for cross-country skiing, bicycling, dramas/concerts, sledding/skating, and tennis.

Activities for which inadequate facilities were most often mentioned as a reason for non-participation were: fairs/festivals, bicycling, freshwater swimming, downhill skiing, jogging/walking, dramas/concerts, volleyball, playgrounds, cross-country skiing, sledding/skating, tennis, and picnicking.

The SCORP concluded that for Region 7 the following activities had high priority for future development based on demand and the adequacy of existing facilities.

Jogging/Walking

Picnicking

Bicycling

Playgrounds

Freshwater swimming

League sports

Fishing

Developed camping

Fairs/festivals

Outdoor pools

Cross-country skiing

Tennis

Target shooting

Undeveloped camping



5-04 PROJECT VISITATION AND FACILITY NEEDS

A. GENERAL. An analysis of past visitation at Burnsville Lake may be used to determine future recreation needs and priorities. Visitation estimates have been obtained by periodically surveying recreation activity use and traffic entering the project area. These surveys are designed to account for seasonality, weekend and weekday use, and recreation area use.

B. PROCEDURES FOR DETERMINING VISITATION. The percentage of vehicles actually entering the facility for recreation purposes, and the average number of persons per vehicle are used to develop an estimate of the total number of visitors at Burnsville Lake. A further breakdown by activity is then applied to this number in order to arrive at an estimate of use for each activity. Visitor use estimates for 1982 through 1987 are shown in Table 5.02. Table 5.04 also shows projected visitation for years 1990, 2000, 2010, 2020, and 2030. This data was calculated as follows:

The base condition was determined by analysis of visitation for the years 1982 thru 1986. Since the recreation areas were complete in 1985 this year visitation was determined to be the most accurate base year.

For projected visitation, the calculated visitation for the average base condition (1985) was then increased in accordance with the rate of OBERS population projections for the seven county market area as shown on Table 5.03. This region corresponds with SCORP region 7.

A recreation day, which is a measure of recreation use consisting of a visit by one individual to a recreation site, area, or project for recreation purposes during all or any portion of a 24-hour day, may consist of more than one activity or activity day.

C. DESIGN LOAD AND FACILITY NEEDS. The design load is defined as the projected visitation which will occur on an average weekend day during the peak month of the recreation season. This is the estimate of maximum visitation for each activity and is the maximum use of available resources. To calculate the design load for a peak weekend day, the following methodology was used:

$$DL = \frac{D \times \%PM \times \%WE}{N}$$

Where: DL = Design Load

D = Demand (Projected Visitation from Table 5.04)

%PM = Percent of Annual Use Expected During Peak Month

%WE = Percent of Peak Month use Occurring on Weekends

N = Number of Peak (weekend) Days in a Month (9 Avg.)

The total number of facility units needed to meet projected demand can be calculated through a formula based on maximum one-day use, average group size, and turnover rates. Table 5-05 presents the criteria used to calculate the design load and facility needs.

The formula used to calculate facility needs for maximum one-day use is as follows:

$$FN = \frac{DL}{XG \times TR}$$

Where: FN = Facility Needs

DL = Demand Load (as calculated)

XG = Average Group Size (as shown in Table 5.05)

TR = Turnover Rates (as shown in Table 5.05)

The results of this formula, along with a list of existing facilities, are shown in Table 5.06. By subtracting the projected demand from the existing supply, the quantity of needs or surplus can be determined.

D. SUMMARY OF TABLE 5.06. The facility needs developed for Table 5.06 were compared with actual project conditions. Deficiencies in most cases correlated with those in Table 5.06.

Camping units are normally adequate at the project except for some weekends and holidays. There is a need for additional camping units, therefore 60 more units are proposed for development.

Picnic units are also not quite adequate at high use periods, therefore a new picnic area is proposed for the future to be located near the present Bulltown picnic area. As a temporary measure more picnic units can be added at the present picnic areas.

Boat launch lanes are considered to be adequate in the 0-12 year time frame since there are three launch ramps with a total of 9 lanes located in different areas of the project.

Boat/trailer parking is adequate at the present time and the future with a total of 240 spaces located at Riffle Run, Bulltown Day use area, and Bulltown camping area.

Parking space is sometimes not adequate at the Bulltown beach area since there are only 109 car parking spaces allocated to this use. Usually when this occurs the 100 car/trailer spaces in the same area are partially used to provide additional space.

Parking space for fishing and sightseeing is estimated to be adequate on Table 5.06 and on the project. Half of the car/trailer parking was allocated for fishing, and also some of the single car parking located at the tailwater, Riffle Run, Bulltown Day Use Area, and Falls Mill.

Hunting space is considered to be adequate since there is 11,790 acres available for hunting and 31,018 visits by hunters occurred in 1987.

TABLE 5.01

## SUMMARY OF EXISTING RECREATION FACILITIES FOR BURNSVILLE LAKE

FACILITIES	TAILWATER AREA	VISITORS CENTER	RIFFLE RUN	BULLTOWN DAY USE AREA	BULLTOWN CONFEDERATE OVERLOOK	BULLTOWN HISTORIC AREA	BULLTOWN CAMPGROUND	FALLS MILL	WESTON-GAULEY TURNPIKE	TOTAL
DEVELOPED ACRES	30	1	58	67	30	30	150	36	70	472
CAMPSITES (TENT/TRAILER)			60				204			264
GROUP CAMP AREA										
SHOWER STALLS			6	2			22			30
REST ROOMS	1 WB	1 WB	3 WB	2 WB		1 WB	4 WB	2 V,		14
WATER SUPPLY TANKS							1			1
SEWAGE TREATMENT PLANTS			1				1			2
PICNIC UNITS			12	12						24
PICNIC SHELTER	2		2	2						6
BEACHES				1						1
SWIMMING POOLS										
BOAT LAUNCH LANES			4	4				1		9
PARK OFFICE		1								1
OVERLOOK		1			2			2		5
PLAYGROUND	1		2	1			4			8
GAME PADS										
PARKING SPACES - CAR	103	16	200	159	10	26	38	55		607
PARKING SPACES - CAR/TRAILER			100	100			30			230
HORSESHOE COURTS										
MARINA SLIPS			125							125
MOORINGS							106			106
GOLF COURSE										
SHOOTING RANGE										
TRAILS - MILES				1	1	1	3	1	6.5	13.5
LODGE - ROOMS										
CABINS										
PUBLIC PIERS			1					1		2
MARINA			1							1
AMPHITHEATRE			1							1
TRAILER DUMP STATIONS			1				1			2
BALLFIELD	1									
PAVILION							1			

WB=WATERBORNE  
V=VAULT

TABLE 5.02

## ACTUAL VISITATION, 1982-1987 FOR BURNSVILLE LAKE

	No. Persons	Camp	Picnic	Boat	Fish	Hunt	SS	Water Ski	Swim	Other
<u>1982</u>	175,356	19,339	4,663	20,208	32,968	20,370	59,283	9,827	8,696	0
<u>1983</u>	408,558	21,597	18,447	46,184	99,036	33,778	126,926	19,948	41,158	1,472
Percent Use		5%	4%	11%	24%	8%	31%	4%	10%	10%
<u>1984</u>	420,160	6,965	20,088	44,339	107,913	40,919	131,415	17,583	48,996	1,954
Percent Use		2%	4%	10%	25%	9%	31%	4%	11%	10%
<u>1985</u>	455,735	51,744	17,382	42,619	103,837	20,788	159,933	16,755	41,606	1,075
Percent Use		11%	4%	9%	23%	5%	34%	4%	9%	1%
<u>1986</u>	363,891	7,145	17,747	35,116	108,838	24,923	116,263	11,413	41,048	1,408
Percent Use		1%	4%	9%	29%	6%	31%	3%	11%	0%
<u>1987</u>	363,184	47,083	11,723	28,507	72,733	31,018	131,635	11,416	25,377	2,860
Percent Use		12.9%	3.2%	7.8%	20%	8.5%	36.2%	3.1%	6.9%	0.8%

TABLE 5.03

## COUNTY POPULATION PROJECTIONS FOR SCORP REGION 7

COUNTIES	1980 Actual	1985	1990	2000	2010	2020	2030
SCORP Region 7	118,516	116,547	128,873	134,414	132,101	137,495	140,892
Braxton	13,894	13,835	15,151	15,649	15,358	15,975	16,369
Gilmer	8,334	7,848	8,578	8,714	8,460	8,732	8,902
Lewis	18,813	18,327	20,015	20,606	20,196	20,981	21,474
Upshur	23,427	22,976	25,658	27,006	26,590	27,706	28,403
Barbour	16,639	16,200	18,040	18,837	18,427	19,117	19,549
Tucker	8,675	8,510	9,351	9,712	9,545	9,936	10,184
Randolph	28,734	28,853	32,080	33,891	33,525	35,049	36,011

TABLE 5.04

## VISITATION PROJECTIONS FOR BURNSVILLE LAKE 1990-2030

Year	No. Persons	Camp	Picnic	Boat	Fish	Hunt	SS	Water Ski	Swim	Other
1990	503,587	55,394	20,143	45,322	115,825	25,179	171,219	20,143	45,322	5,035
2000	524,737	57,721	20,989	47,226	120,689	26,236	178,410	20,989	47,226	5,247
2010	515,817	56,739	20,632	46,423	118,637	25,790	175,377	20,632	46,423	5,158
2020	536,449	59,009	21,457	48,280	123,383	26,822	182,392	21,457	48,280	5,364
2030	549,323	60,425	21,972	49,439	126,344	27,466	186,769	21,972	49,439	5,493



TABLE 5.05

## DEMAND VARIABLES USED

ACTIVITY	%PM	%WE	AVERAGE GROUP SIZE	TURNOVER RATE
Camping	30	62	4	1
Picnicking	40	71	5	2
Boating	26	74	4	40 Launches (2 for parking)
Fishing	26	74	3	3
Hunting	45	64	0.1/acre	2
Sightseeing	17	62	4	3
Water Skiing	28	74	4	2
Swimming	43	69	4	2

TABLE 5.06

## SUMMARY OF MAJOR FACILITY NEEDS (FN) AT BURNSVILLE LAKE

Facility Type	Camping Units		Picnic Units		Boat Launch Lanes		Boat Parking		Swimming Parking		Fishing Parking		Sightseeing Parking		Hunting Acres	
Existing Supply	264		42		9		230		109 (1)		275 (2)		252 (3)		11,790	
Year	FN	(-)	FN	(-)	FN	(-)	FN	(-)	FN	(-)	FN	(-)	FN	(-)	FN	(-)
		(+)		(+)		(+)		(+)		(+)		(+)		(+)		(+)
1990	286	-22	63	-21	6.0	+3	121	+108	186	-77	275	0	167	+85	4028	+7762
2000	298	-34	66	-24	6.3	+2.7	126	+104	194	-85	286	11	174	+78	4197	+7593
2010	293	-29	65	-23	6.2	+2.8	124	+106	191	-82	281	-6	171	+81	4126	+7664
2020	304	-40	67	-25	6.4	+2.6	129	+101	198	-89	293	-18	178	+74	4291	+7499
2030	312	-48	69	-27	6.6	+2.4	132	+98	203	-94	300	-25	182	+70	4394	+7396

(1) Swimming parking was assumed to be all at Bulltown day use area.

(2) Half of boat parking was assumed to be for fishing plus half in tailwater, Riffle Run, and Falls Mill.

(3) Sightseers were assumed to park at least once.

chapter 6  
coordination with other agencies

## CHAPTER 6 COORDINATION

### 6-01 SUMMARY OF COORDINATION

The Master Plan process requires the active participation of most element of the Corps of Engineers, the major outgrant holders especially the West Virginia Department of Natural Resources, as well as all interested private organizations and individuals. Coordination with public and private agencies will be conducted throughout the planning process.

It is important that the project area, which is a part of the Public Domain, be developed and managed to provide public benefits. This requires contributions from many sources throughout the planning process to ensure that solution to water resource problems satisfies the needs of the people to the maximum degree possible.

A goal of the Master Plan is to maintain the channels of communication established in the development of the project and to ensure optimum utilization of project resources through these channels. This final draft Master Plan will be reviewed by various branches of the Corps District and outside governmental agencies. All suggestions and comments will be used in preparation of the final Master Plan.

chapter 7  
physical plan of development

CHAPTER 7  
PHYSICAL PLAN OF DEVELOPMENT

7.01 INTRODUCTION.

The master planning process requires an orderly sequence of data inventory and analysis. This chapter draws upon the data base presented in previous chapters to formulate appropriate future development plans for Burnsville Lake.

This chapter presents the current cost sharing policy and a series of resource use objectives to guide the overall planning process. Land and water use allocations are presented to guide the management and use of project resources. Site analysis is performed for each existing recreation site and recommendations are made for future improvements. The development areas are mapped and conceptual site plans are presented.

7.02 FUNDING AND COST SHARING POLICY.

Cost sharing policy has gone through several changes since passage of the Federal Water Project Recreation Act of 1965, Public Law 89-72. This policy was further refined by Public Law 99-662, Water Resources Development Act of 1986.

A. FACILITIES TO BE PROVIDED BY THE CORPS. Section 3(a) of P.L. 89-72 provides that, in the absence of a non-Federal public sponsor, no facilities or project modifications which furnish recreation or fish and wildlife enhancement benefits shall be provided unless (1) such facilities or modifications serve other project purposes and are justified hereby without regard to such incidental recreation or fish and wildlife enhancement benefits as they

may have or (2) they are minimum facilities which are required for the public health and safety and are located at access points provided by roads existing at the time of project construction or constructed for the administration and management of the project. (Minimum facilities for public health and safety are defined as vault toilets (unless a higher grade of facility is required by mandatory state or Federal standards), guardrails, barricades, and turnarounds at road ends existing at the time of construction or provided for project construction or maintenance. Not included are parking, picnicking, swimming, camping areas or facilities, or more elaborate sanitary facilities. The Corps can provide visitor centers and ~~boat ramps~~<sup>operational</sup>.) Without a local sponsor for recreation development, it is the clear intent of Congress and the policy of the Corps that costs to provide such facilities for public health and safety be kept at a minimum while complying with legal requirements.

A / B. FACILITIES TO BE FUNDED BY OTHERS. If the recreation facility is of the type usually provided by private enterprise, or is vendable, then the facility should be provided by others. The Corps should encourage development by others when it is not detrimental to the multipurpose nature of the project or when it does not conflict with Federal interests. When facilities can stand alone at the location without the water resource project and not lose any of its utility, the Corps should not participate in their development.

D / C. FACILITIES TO BE COST SHARED. When proposed facilities do not fit the two categories already described and when the structural enhancements acquire much of their value from their relationship to the Federal water and land resources they should be cost shared 50/50, with other governmental sponsors. Non-federal sponsors must agree to ~~operate~~<sup>maintain</sup>, maintain, and replace the facilities after construction.

D. SPECIAL RECREATION USER FEES, (SRUF) REVENUES. The Chief of Engineers is authorized under the Land and Water Conservation Act of 1965 as amended (16 U.S.C. 1401) (Public Law 93-303) to charge certain use fees at public park and recreation facilities provided at Federal expense at water resource development projects operated and maintained by the Department of the Army. The charges consist of camping fees where the following facilities are provided: designated tent and/or trailer spaces, drinking water, access roads, refuse containers, fireplaces, visitor protection and toilets.

The revenues collected under this act are credited into a special account in the Treasury of the United States to be administered in conjunction with, but separate from, revenues in the Land and Water Conservation Fund. Revenues in the special account are available to the Corps of Engineers only be direct appropriation. These appropriated funds are allocated back to the projects at which fees are collected in proportion to the revenues collection. Guidance on administering the use fee program is found in ER 1130-2-404. Further guidance for the use of funds is contained in OCE Letter of 4 October 1984, Corps Policy on Utilization of Special Recreation User Fee (SRUF) Revenues.

#### 7.03 RESOURCE USE OBJECTIVES.

Resource use objectives have been developed for Burnsville Lake in accordance with ER 1105-2-167. The objectives should specify the attainable publicly acceptable options for resource use determined from study and analysis of available resources and public needs. The objectives address three major areas of resource use--recreational development; operations and maintenance; and fish, wildlife and forest resources.

The initial recreational and operational facilities constructed at Burnsville



Lake are generally adequate to meet current needs, although site improvements to existing areas may be required. Additional recreation sites may be proposed as a result of the site analysis and recommendations.

A. RECREATIONAL DEVELOPMENT AND OPERATIONS OBJECTIVES.

Objective 1. Provide well-designed, high-quality, outdoor recreation facilities to meet current and projected demand.

Objective 2. Maintain a hiking trail system capable of serving the needs of a variety of users.

Objective 3. Maintain and improve the visual qualities of the project sites by incorporating landscaping and erosion control elements.

Objective 4. Upgrade existing facilities to the current design standards.

Objective 5. Preserve and develop the historical resources of the project.

Objective 6. Provide for the safety and security of all persons using the project for recreation and operations purposes. Identify safety hazards and modify facilities and regulations to reduce hazard.

Objective 7. Enhance the recreational experience by protection of forest, wildlife, and fish habitat.

Objective 8. Plan new developments and existing facility improvements to minimize costs for roads, utilities, operations and maintenance.

B. FISH, WILDLIFE AND FOREST MANAGEMENT OBJECTIVES.

Objective 9. Provide access and appropriate facilities for fishermen, hunters, and natural area users; and to protect and manage the natural environment.

Objective 10. Identify and protect critical wildlife habitats, unique vegetation communities, scenic areas, and threatened or endangered species.

Objective 11. Develop and implement plans to protect, and manage the forest resources of the project area.

Objective 12. Enforce the state and Federal regulations pertaining to fishing, boating, and hunting.

7.04 PROJECT LAND USE ALLOCATIONS.

The land use allocations plan for Burnsville Lake provides the basic framework that will guide the development, management, and operation of all project resources and facilities. The land use categories for the project were established to clarify the differing land uses based on the purposes and objectives defined earlier and the management responsibilities of the controlling agencies. Exhibit 9 illustrates the land use plan and Table 7.01 shows the land use allocations that were developed in the Master Planning process.

A. CORPS PROJECT OPERATIONS. Land in this category is used for the safe, efficient operation of the project for authorized purposes, primarily for flood control, and water quality. This land category overlaps somewhat with recreational uses. At Burnsville Lake this land is used for operational

structures including the dam and spillway, maintenance and storage facilities, administrative offices, wastewater treatment, and other functions.

B. WVDNR PROJECT OPERATIONS. This operations building and storage area is located near the subimpoundment at Falls Mill.

C. INTENSIVE RECREATION. These areas are used for the greatest concentrations of visitors using the recreational facilities for both active and passive purposes. These include campgrounds, major boat launching areas, picnic areas, visitor center, overlooks, and swimming beaches. Intensive use areas experience the greatest use and are the most highly developed.

Eight intensive use areas which meet the above criteria are located in the project area. The areas cover a total of about 554 acres and facilities have been developed at each site. The recreation areas are listed below.

1. Tailwater day use area
2. Dam visitor center and overlook
3. Riffle Run boat access area, picnic area, and campground
4. Bulltown day use area
5. Bulltown historical sites
6. Bulltown camping area
7. Falls Mill area
8. Weston and Gauley Bridge Turnpike trail

D. LOW DENSITY RECREATION. Land in this category is used for hiking trail alignments, land reserved for future expansion, nature study, wildlife management, and forest management. These areas are excess land for recreation, and not included in the intensive recreation or fish and wildlife areas. This land is used to preserve or enhance desirable spatial or aesthetic characteristics in support of the long range plans for recreation of higher density. The following areas are currently in this category and total 131 acres.

1. Land surrounding the intensive use areas near the dam.
2. Land surrounding the intensive use areas at Falls Mill.

E. MULTIPLE RESOURCE MANAGEMENT AREAS. Land and water areas in this category is managed to protect and improve wildlife habitat and forest resources. These areas are also used for hiking, nature observation, hunting and fishing. Some land in this category is used for intensive wildlife improvement activities such as cultivation of row crops for wildlife food, planting of shrubs and hedge rows and clearing of low quality habitat. These areas are available for future high density recreation development if site characteristics are suitable. Most of the wildlife lands are too steep or remote for possible future development. At Burnsville Lake, land in this category amounts to 12,578 acres and is leased to the West Virginia Department of Natural Resources to be managed for the above purposes. Each year WVDNR submits a management plan which is approved by the Corps of Engineers.

At the present time there are five right-of-way outgrants on 89 acres for an indefinite time. Other outgrants include one lease for oil and gas production and one garden lease.

TABLE 7.01  
LAND USE ALLOCATIONS

	<u>Acres</u>
<u>Federally-owned and Managed Land</u>	
Project Operations	30
Intensive Recreation	472
Low Density Recreation	<u>131.5</u>
<u>Subtotal</u>	633.5
<u>Federal Land Licensed to State</u>	
Project Operations - Wildlife Management	5
Wildlife and Forest Management (Multiple Use Area) (includes lake area)	<u>12,579</u>
<u>Subtotal</u>	12,579
<u>Federal Land Leased to Marina Concession</u>	11.5
Total Federal Land	13,224
Federal Easement	<u>98</u>

7.05 WATER USE PLAN.

Water areas of the project include the minimum, seasonal, and flood control pools and the tailwaters. The pool areas are leased to the WVDNR for fish and wildlife management and law enforcement. The flood control pool periodically inundates for short periods land in all use categories and must be managed with this in mind for the low lying areas. The water use plan describes how these waters are regulated. There is no limit on boat horsepower which makes necessary strict enforcement of restrictions on water use.

The water use plan is designed to protect the boating public, minimize conflicts between water and land use activities, and to protect environmental resources. Exhibit 9 illustrates the water use plan which is based on the seasonal pool area. All restricted areas of the lake are designated with buoys. Other types of buoys indicate channel areas, underwater hazards, and diving areas.

A. UNRESTRICTED AREA (Unlimited Speed Zone). The water areas within this category are available for all water-related recreation activities. This is the largest zone and located mostly in the wider, deeper parts of the lake where there is a minimum chance for conflicts with other water users.

B. CONTROLLED AREA (No Wake Zone). Water craft using this zone must limit speeds to prevent creation of waves which may cause disturbances to other boaters, shoreline uses, or aquatic ecosystems. More specifically the water areas are described as follows:

1. Water areas in proximity to boat launch ramps, marinas, or other facilities which may be damaged by waves or would be a safety hazard to other boaters.

2. Water areas which due to shallowness, narrow width, or submerged obstacles, would present dangers to users of boats traveling at higher speeds.

3. Water areas which are best used for fishing, hunting, canoeing, conservation of aquatic habitat, or other uses which are incompatible with high boat speeds.

C. BOAT EXCLUSION AREA. This category applies to water areas which usually have buoys prohibiting watercraft from a certain area such as near

dams, swimming beaches, diving areas, or other areas where boats are incompatible with public safety. At Burnsville Lake these areas are located near the dam, and surrounding the beach area at Bulltown.

D. HAZARD AREAS. These are areas which may have underwater obstructions at minimum pool and require caution from boaters.

TABLE 7.02  
WATER USE ALLOCATIONS

<u>Areas</u>	<u>Acres</u>
Unrestricted Area (Unlimited Speed)	634
Controlled Area (No Wake Zone)	329
Restricted Area (no boating)	5

#### 7.06 EVALUATION OF RECREATION FACILITIES.

This section presents detailed descriptions of existing facilities, site analysis for each, and defines problem areas with final recommendations. Since most of the operational and intensive recreational sites are completed, most of the proposed changes in facilities will be improvements to existing sites.

##### A. BELOW DAM DAY USE AREA.

1. EXISTING FACILITIES. This area covers about 30 acres mostly on the north side of the Little Kanawha River below the spillway and stilling basin. A fisherman's weir has been constructed about 2,150 feet below the toe

of the spillway, and a low-water type weir bridge provides access for fishermen to the south side of the river. A stream gauging station is located on the lower end of the area, and the project entrance sign is also located near here. A softball field is located immediately downstream of the dam.

Developments include parking space for 103 cars, two picnic shelters, waterborne restroom, playground, horseshoe area, two shuffleboard courts, and two drinking fountains. Sidewalks, and fisherman walkways are provided. Facilities are provided to make the area accessible and usable by handicapped persons.

2. SITE ANALYSIS.

a. POSITIVE SITE FEATURES. This is a spacious, well designed area, with an impressive view of the dam and visitor center. Trees are planted in the open areas and some original trees have been preserved.

b. NEGATIVE SITE FEATURES. There is a need for additional shade in the summer since most of the trees are small.

3. EVALUATION. The parking and recreation facilities are adequate to meet demand and are underused at times.

4. PROPOSED DEVELOPMENT. None

5. FUTURE PLANS. None

B. VISITORS CENTER AND OVERLOOK.

1. EXISTING FACILITIES. This one-acre site is on the right downstream end of the dam. This is the site of the combined Visitors Center and Operations Office. There is a 10-car parking area for visitors and employees.



The Visitors Center has restrooms, a drinking fountain, and features displays on the locality. A deck along the lake side provides a panoramic view of the area.

2. SITE ANALYSIS.

a. POSITIVE SITE FEATURES. This attractive building provides interior space for exhibits and slide shows featuring the project area. The overlooks provide good views of both the upstream and tailwater sides of the dam.

b. NEGATIVE SITE FEATURES. None.

3. EVALUATION. This recreational and operational building is considered adequate at present.

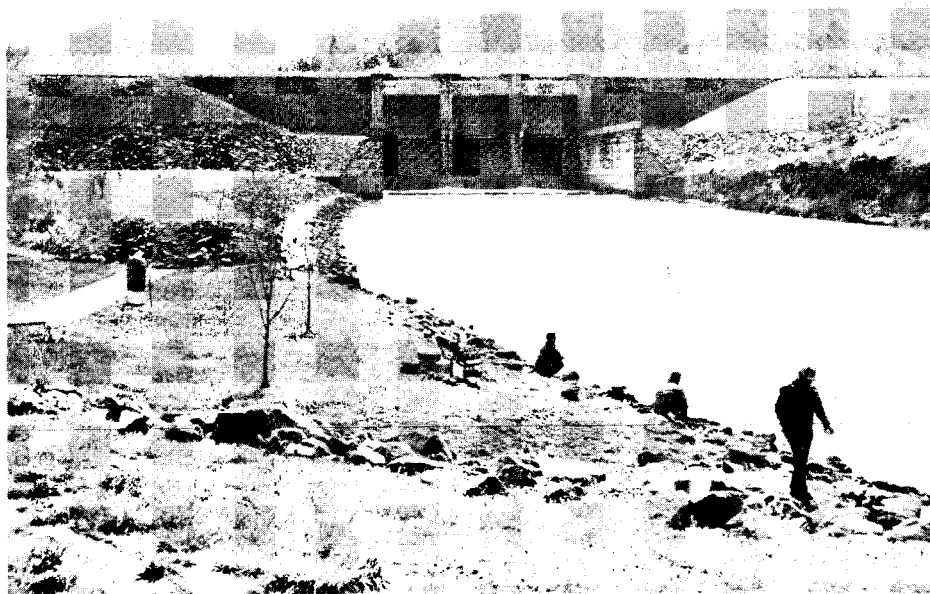
4. PROPOSED DEVELOPMENT. None

5. FUTURE PLANS. None

C. RIFFLE RUN AREA.

1. EXISTING FACILITIES. This 58 acre land area consists of three land uses which includes the boat access area, picnic area, and campground.

The boat access area consists of approximately 10 land acres with the marina, waterborne restroom, water fountains, and 150 car parking located nearest the dam, and further up Riffle Run the four lane launch ramp is located adjacent to the 100 car/trailer parking lot. The marina concession occupies a 11.5 acre land and water lease area which consists of 125 boat slips, a store with boaters and fisherman supplies, and a snack bar. A handicap access fishing pier is located at this location. The marina operator lives in a mobile home on high ground out of view of the public use area.



Photograph 7.01

Tailwater Fisherman Access Area

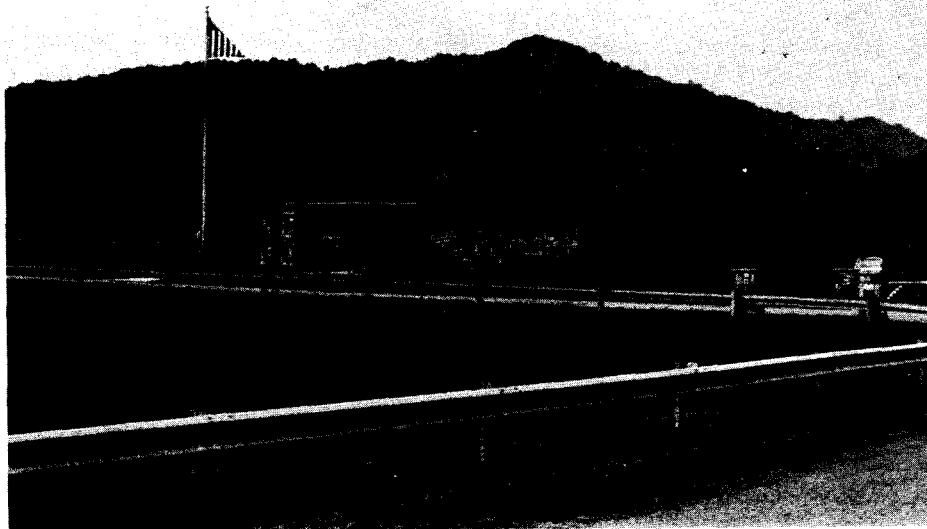


Photograph 7.02

Below Dam Day Use Area

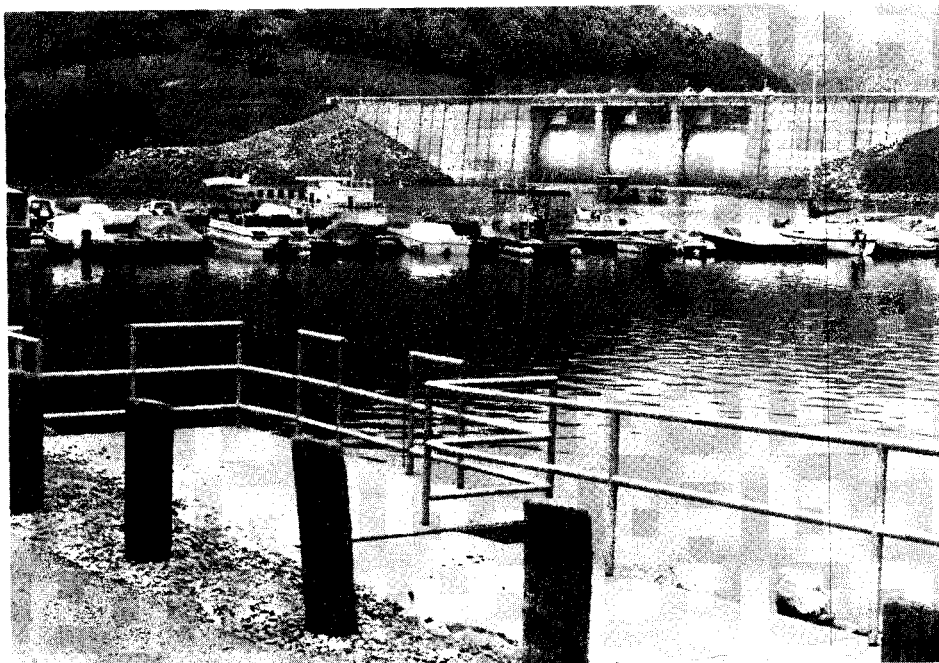
The picnic area contains about 10 acres and is located up a side valley. It consists of two picnic shelters, 12 picnic units, a 50 car parking area, totlot, waterborne restroom and water fountains. A free campground area with 6 sites has recently been constructed in the open area at the end of the road.

Riffle Run Campground is a 38-acre area located farther up Riffle Run which has 54 campsites, amphitheatre, washhouse restroom, playground, and drinking fountains. A gas well, enclosed with a rustic fence, is used to fire the water heater at the washhouse. A trailer waste station and a traffic control entrance station have been built.



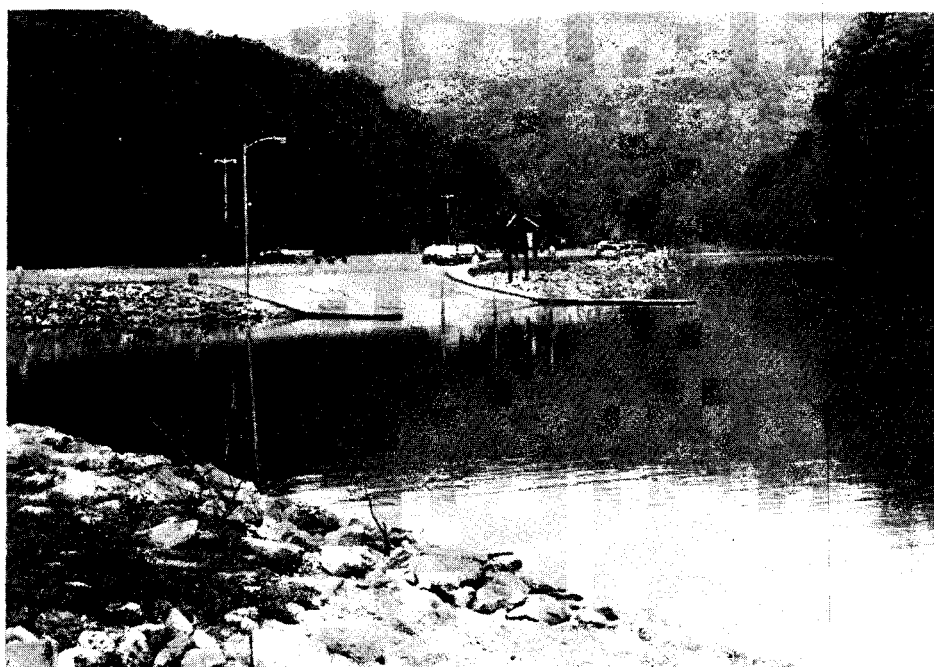
Photograph 7.03

Visitor Center



Photograph 7.04

Handicap Access Fishing Pier at Dam



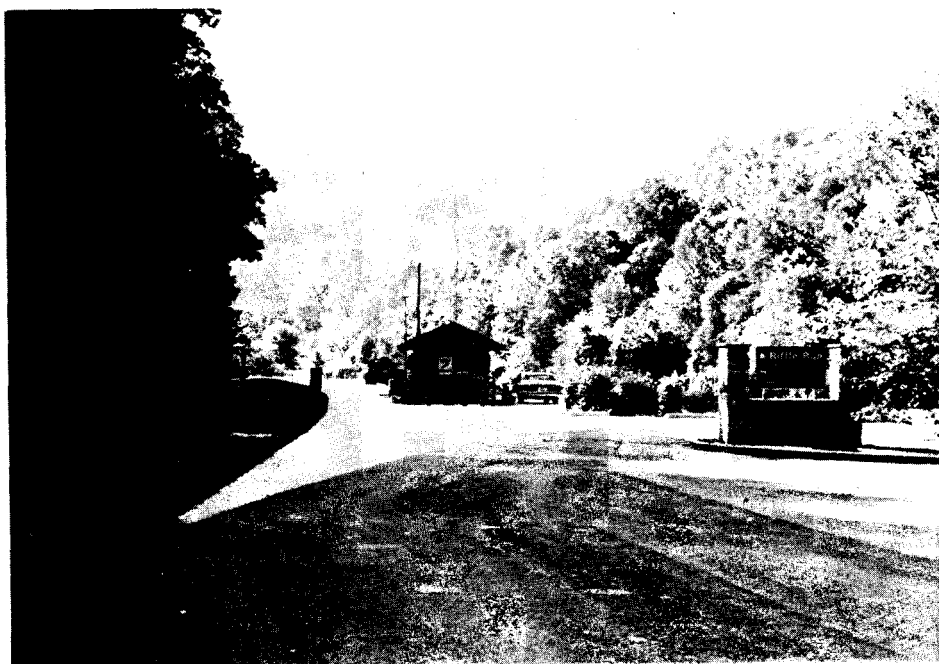
Photograph 7.05

Launch Ramp at Riffle Run



Photograph 7.06

Picnic Area at Riffle Run



Photograph 7.07

Campground entrance at Riffle Run



Photograph 7.08

Typical campsite at Riffle Run



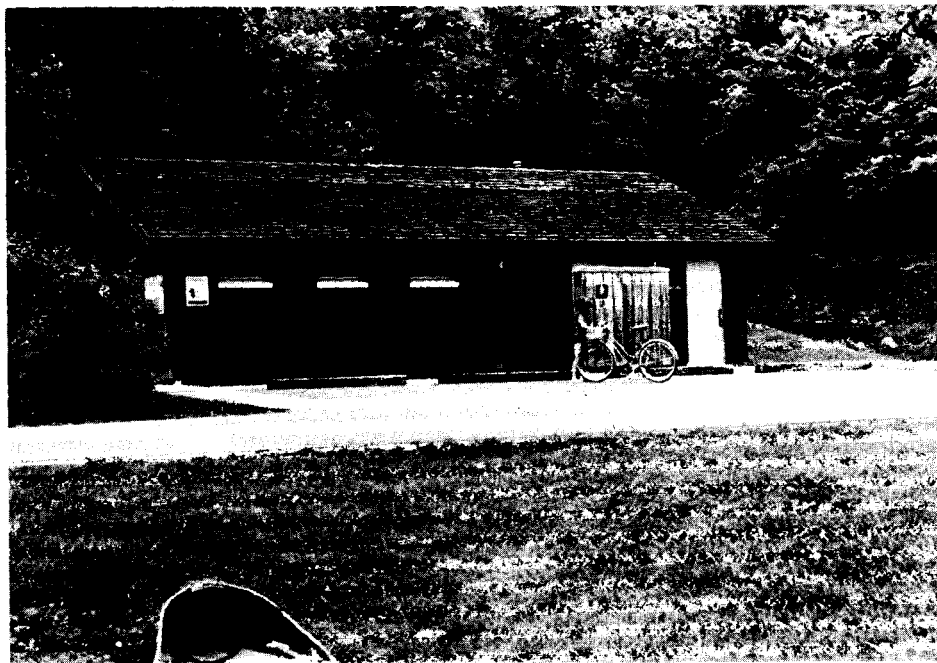
Photograph 7.09

Playground at Riffle Run Campground



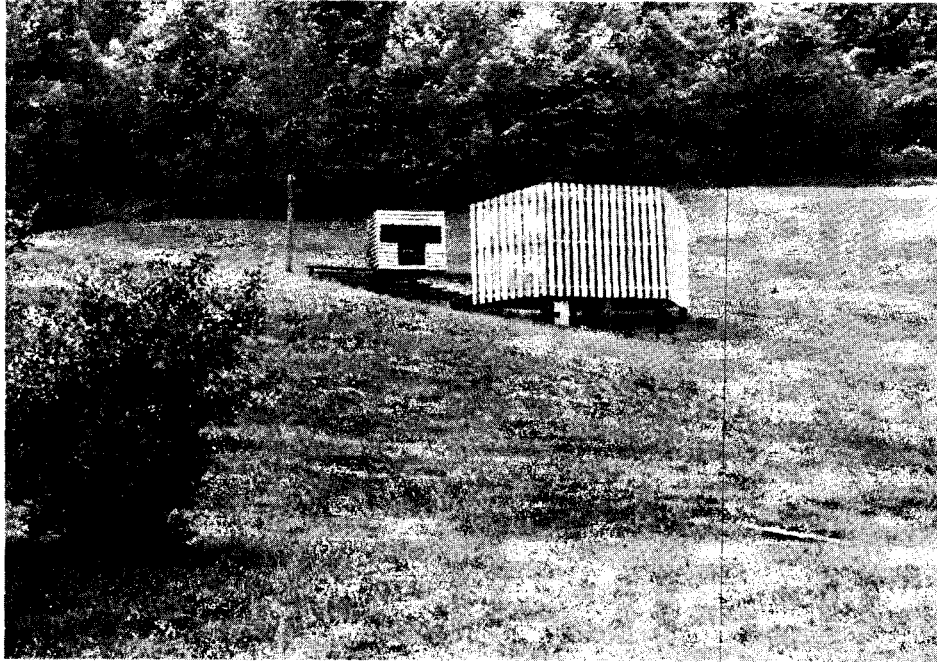
Photograph 7.10

Access road at Riffle Run Campground



Photograph 7.11

Restroom-washhouse at Riffle Run Campground



Photograph 7.12

Amphitheatre at Riffle Run Campground



Photograph 7.13

Free camping sites located near Riffle Run Picnic Area



2. SITE ANALYSIS.

a. POSITIVE SITE FEATURES. The natural setting for the area is very attractive because of the proximity to the Lake, Riffle Run, scenic views of the dam and marina area, and the wooded hills surrounding. Benches have been provided along Riffle Run for passive recreation and fishing. The area has been landscaped to provide additional trees in the open areas.

b. NEGATIVE SITE FEATURES. The launch ramp parking area and restroom are located on low elevations and flood occasionally during high water stages.

3. EVALUATION. This area has diversified recreation facilities, is essentially complete, and has adequate landscaping elements.

4. PROPOSED DEVELOPMENT. Provide game pad near the Riffle Run campground.

5. FUTURE PLANS. None

D. BULLTOWN DAY USE AREA.

1. EXISTING FACILITIES. This 67 acre area offers three types of recreational activities, picnicking, scenic viewing, and water-related activities.

The picnic area has 56-car parking spaces, 28 picnic units, two picnic shelters, a waterborne restroom, drinking fountains, and playground.

The boat-launch area provides 100 car and trailer parking spaces, a four-lane launching ramp, and courtesy dock. Further along the lake is a waterborne restroom, and a 300 foot beach with parking for 109 cars.

2. SITE ANALYSIS.

a. POSITIVE SITE FEATURES. This is a large well-designed area which makes use of interesting natural terrain features. The picnic area is located partially on a wooded hill and large trees have been preserved to provide shade. This is a quiet area separated from the more active recreation at the launch and swimming areas. The boat launch and swimming area are located down the hill in a scenic cove area of the lake. The historic overlook is close by.

b. NEGATIVE SITE FEATURES. The launch ramp is located opposite the Bulltown Campground and the no wake zone extends a mile to reach the open areas of the lake. This area is low-lying therefore flooding occurs periodically.

3. EVALUATION. This is a popular diversified recreation area which has maximum usage of the beach during hot months.

4. PROPOSED DEVELOPMENT. Expand the beach about 100 feet upstream.

5. FUTURE PLAN. A future 20 acre picnic area has been designated west of the present picnic grounds. This will be developed at a later time, if demand increases.

E. BULLTOWN HISTORICAL SITES.

1. EXISTING FACILITIES. The historical sites consist of two 30 acre areas separated by the upper end of the lake.

The Confederate Historic Area is located across the road from the Bulltown picnic area, and has a ten-car parking lot, a overlook area, and a cemetery with the remains of seven Confederate soldiers. Old trenches are still evident around the overlook. Across the lake on an opposing hill is where the Union trenches are located. This area has a covered overlook structure. This area is connected to the main historic area by a hiking trail which passes near a reconstructed log Catholic Church. At the main site there is a 26-car parking lot, restroom, interpretive center and signs. Two log dwellings have been moved into the general area and the original Cunningham house and outbuildings have been preserved.

2. SITE ANALYSIS.

a. POSITIVE SITE FEATURES. The Confederate area has open fields with good scenic views, and provides a short circuylar hike to the overlook. This is a quiet area separated from the day use area. The parking spaces are usually adequate.

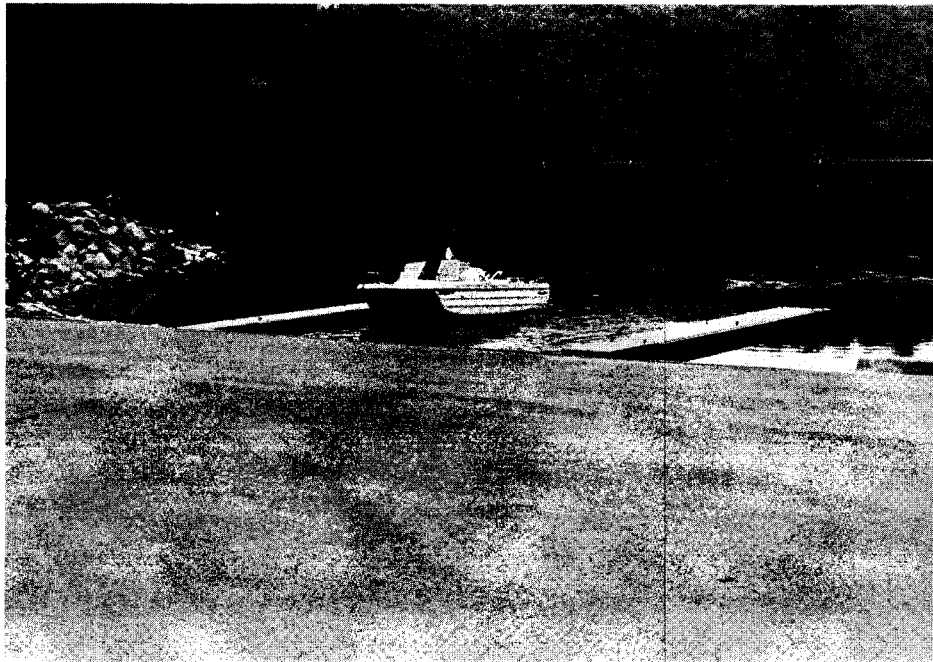
b. NEGATIVE SITE FEATURES. None.

3. EVALUATION. These areas are now nearly complete and provide an unusual and interesting historical element to the recreation facilities at the project.



Photograph 7.14

Picnic shelter at Bulltown Picnic Area



Photograph 7.15

Launch ramp at Bulltown Day Use Area



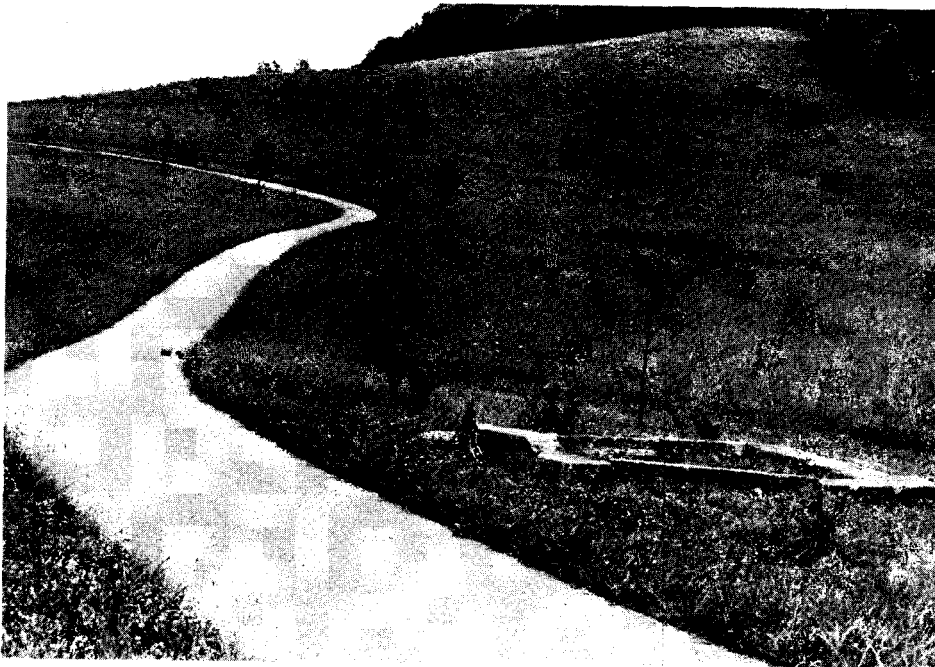
Photograph 7.16

Restroom and parking near Bulltown beach area



Photograph 7.17

Beach at Bulltown day use area



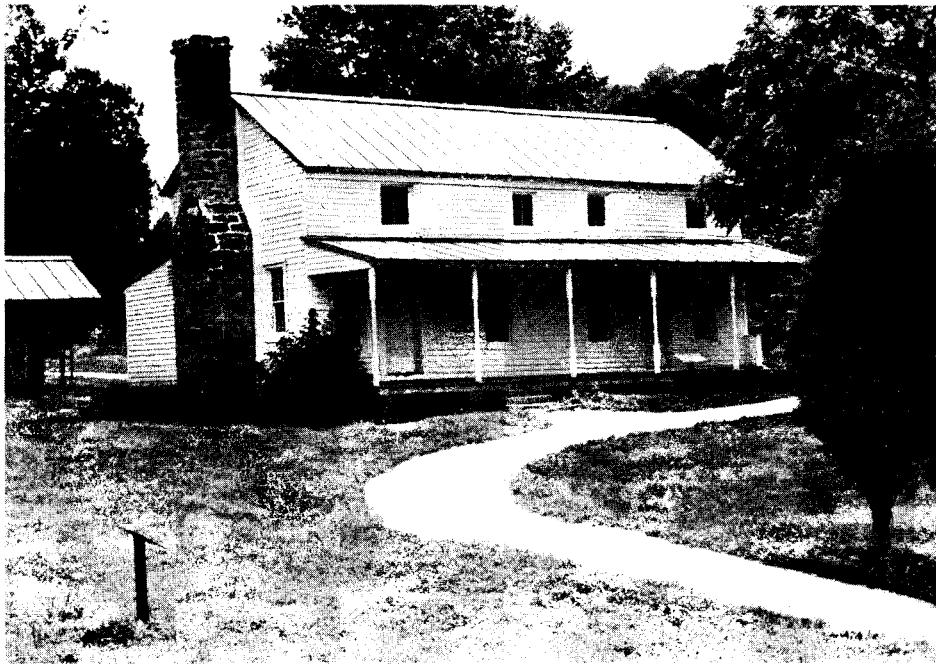
Photograph 7.18

Confederate historic area at Bulltown



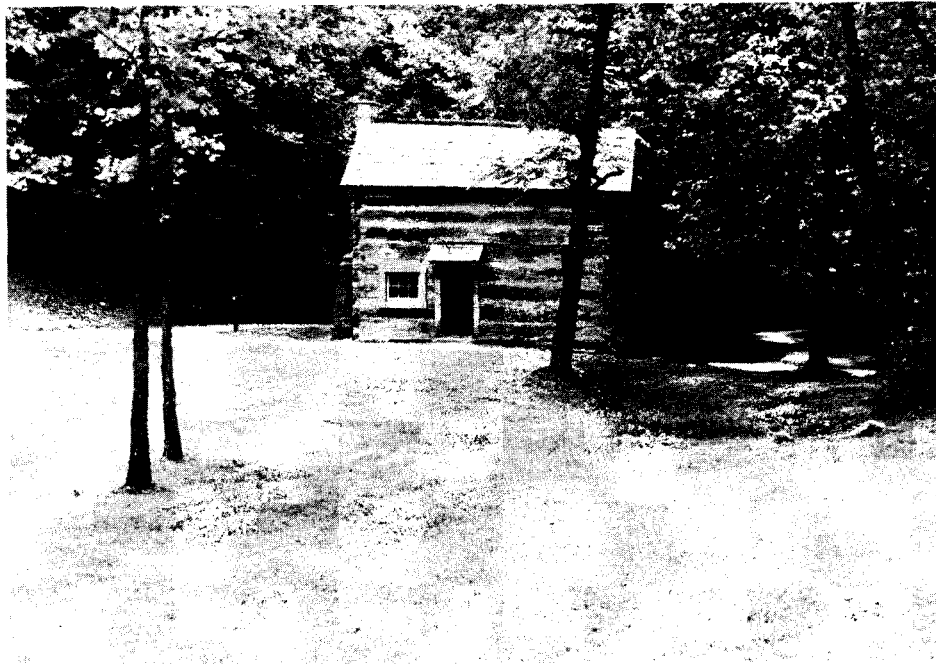
Photograph 7.19

Union overlook at Bulltown



Photograph 7.20

Cunningham house at Bulltown Historic Area



Photograph 7.21

Log cabin at Bulltown Historic Area



Photograph 7.22

Catholic church at Bulltown Historic Area



Photograph 7.23

Bulltown Campground entrance station and parking



4. PROPOSED DEVELOPMENT. None

5. FUTURE PLANS. None

F. BULLTOWN CAMPING AREA.

1. EXISTING FACILITIES. The 150-acre Bulltown Camping Area is controlled by fee collections near the historical area parking lot by contract attendants who are provided a nearby trailer site with hookups. A trailer dump station is located nearby. The access road to the campgrounds passes through meadow and woodland to eventually go down the hillside to the former riverbottom. Seven designated fee camping areas, A through F plus the hill loop are located along this road in the wooded areas and on the bottom next to the lake. A total of 196 sites were constructed in the initial phase and 8 fee sites have been added between B and C loops for a total of 204. Washhouses are located at four restroom sites. A one lane launch ramp with a 26 car-trailer parking lot are located near Campground F. One tot-lot is located in area A-B, and 3 in the other camping areas.

2. SITE ANALYSIS.

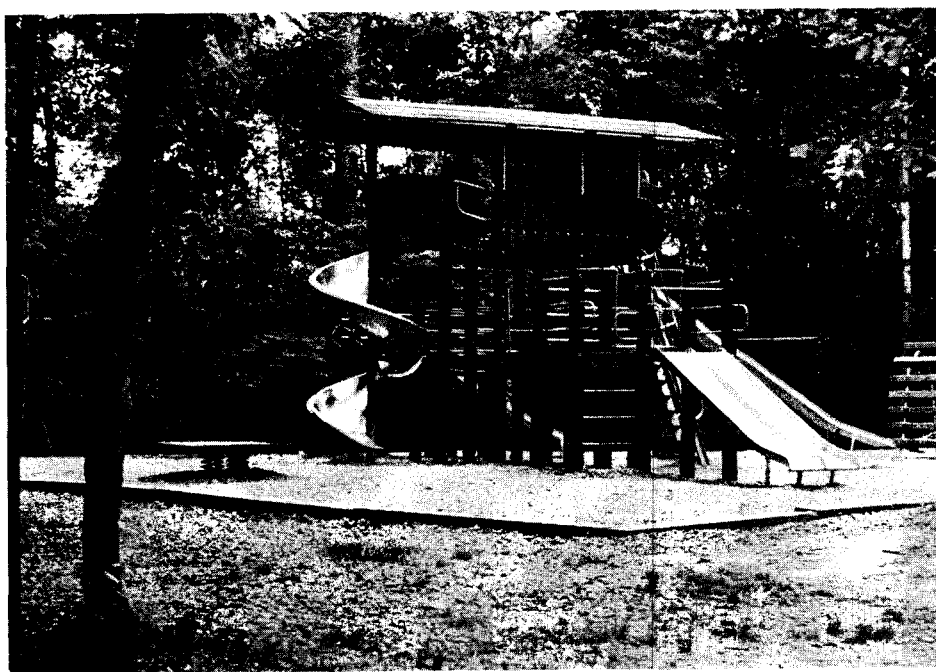
a. POSITIVE SITE FEATURES. Camping areas C through F are located near the lake, and sites near the water have boat mooring posts. All of the sites are well maintained and attractive. Numerous trees have been planted to provide shade. Areas A and B have the original trees preserved to provide shade and privacy.

b. NEGATIVE SITE FEATURES. There is not enough shade in the C through F areas at present. Some camp sites flood occasionally during high water.



Photograph 7.24

Wooded campsite at Bulltown Camping Area B



Photograph 7.25

Tot-Lot at Bulltown Camping Area B



Photograph 7.26

Hilltop campground at Bulltown



Photograph 7.27

Lake area campsites at Bulltown

3. EVALUATION. There are a variety of site features to satisfy the needs of campers. All camping areas are fairly new and well maintained. At heavy use periods such as holidays there are not sufficient campsites to fulfill the demand.

4. PROPOSED DEVELOPMENT. An additional camping area with 60 fee camp sites will be located between areas B and C. These sites will be on higher ground than the C - F areas. Three game pads and a all purpose pavillion should be provided in the C - F areas. The pavillion has been approved and will be located between the C and D loops.

5. FUTURE PLANS. None.

G. FALLS MILL AREA.

1. EXISTING FACILITIES. The Falls Mill Area comprises 36 acres and is divided into three areas relating to their individual usages.

a. A one-acre Roadside Overlook has been built which affords a panoramic view of the falls itself and the attending geologic formations which create the falls. A ten-car blacktopped parking area has been fenced for protection of the viewers. An interpretive panel will be installed at a later date which will tell the origin of the falls and past usage as a mill site.

b. The Falls areas contains ten acres and is composed of developed areas above the below the falls. The area above the falls has a 20-car parking lot, a vault restroom, and interpretive panel. This area is connected to another viewing area below the pool at the base of the falls by a footpath. This site has a sitting area with four benches and a guardrail for

pedestrian safety. Between the two areas is a rather unusual rock dome which overlooks the falls. A recent addition to the area below the falls is a handicap access fishing pier.

c. Further downstream along the river is located the Fisherman Access Area. This 25-acre area provides a 25-car parking lot and a vault-type restroom. This area includes approximately 7,000 feet of lake which lies beside the access road which was U.S. Route 19 before abandonment and acquisition by the Corps.

## 2. SITE ANALYSIS.

a. POSITIVE SITE FEATURES. This is primarily a natural area with scenic views of the falls and also the flooded timber area downstream which provides good fishing habitat. All facilities are quite new and well designed. The rustic fence in the roadside overlook adds to the scenic qualities of the site. Parking space is considered adequate. The road to the fisherman access area is a scenic drive. The vault restroom here blends in well with natural environment.

b. NEGATIVE SITE FEATURES. None.

3. EVALUATION. This is a quiet retreat area and should be protected to prevent overuse. This area is within the scenic reserve.

4. PROPOSED DEVELOPMENT. None.

5. FUTURE PLANS. None

## H. WESTON AND GAULEY BRIDGE TURNPIKE.

1. EXISTING FACILITIES. This trail passes through the Bulltown historic area but the trail head for hikers is accessible by driving the S.R. 19/12 (Millstone Road) and S.R. 4/4 for 4 miles beyond the Bulltown camping area entrance. The 7-mile trail is complete for hikers and connects Burnsville Lake and Stonewall Jackson Lake. The "Turnpike" was a major artery for both armies during the Civil War. Facilities include a 20-car gravel parking area, and a barrier gate to keep vehicles out. The Route 4/4 has been improved to the U.S. Government project boundary.

2. SITE ANALYSIS.

a. POSITIVE SITE FEATURES. The trail is essentially complete, and will be a scenic, historic, hiking trail which should be very popular for hikers from both Burnsville Lake and Stonewall Jackson Lake. S.R. 19/12 which provides access has been improved with a stone surface for most of the length. WVDNR has provided trail signs.

b. NEGATIVE SITE FEATURES. The access road needs resurfacing for a few hundred yards to the government property line. A bridge is needed over Little Knawl Creek.

3. EVALUATION. This trail will be one of the most interesting trail systems in West Virginia. Part of the trail is within the WVDNR license area, although the Corps of Engineers has primary responsibility for most of the trail length.

4. PROPOSED DEVELOPMENT. The upper reach of Millstone Road (Route 19/12) should be improved with stone surface to make trail head more accessible for vehicles. A vehicle bridge is needed over Little Knawl Creek.

I. OTHER PROJECT TRAILS. There are numerous old roads and trails throughout the project area. Several that are accessible from the Corps recreation areas are the Quarry Run trail which runs north from the dam area; Wolf Pen trail which traverses the area south of the dam; Whitetail trail which is accessible from the Bulltown Campground; Little Krawl trail branches off from the Weston-Gauley Bridge trail and provides access to Little Krawl embayment area of the lake. Abandoned U.S. 19 provides a hard surface trail north of the Falls Mill Fisherman access and provides good access for fishing the upper reaches of the seasonal pool. Nearly 80 miles of trails are part of the project area and are included in a handout brochure available to the public.

RECOMMENDATIONS. These trails are all within the WVDNR license area. They should be maintained, signs provided, and be made available for hikers.

J. SEWAGE TREATMENT FACILITIES. These facilities are located in two areas, one package plant located along S.R. 5 to the dam, and the other plant near the access road in Bulltown Campground across the road from Camping Area E. The plant near the dam is within a fenced storage area which is needed for secure parking of vehicles, and other equipment. This area is along the main access road to the recreation areas near the dam and would benefit from vegetative screening to make it more acceptable to viewers. The plant located at Bulltown is within a cove area and is not conspicuous. These facilities are shown in Photographs 7.34 and 7.35.

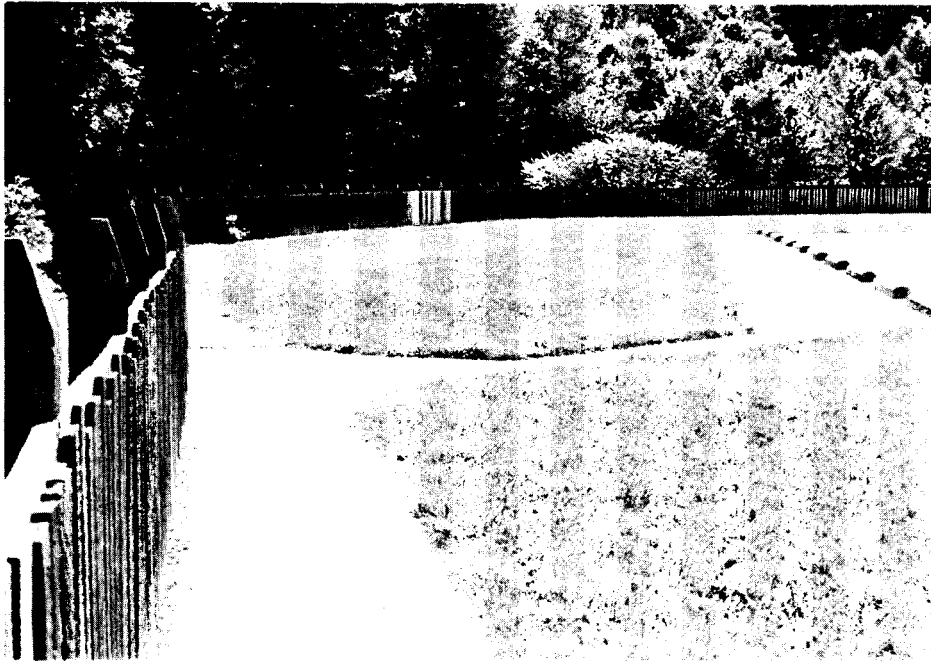
RECOMMENDATIONS. Screen the fenced storage area with trees.

K. MAINTENANCE AREAS. These facilities consist of the Corps maintenance complex located near the dam, and the West Virginia DNR operations and maintenance building with storage area located at Falls Mill. The Corps buildings are located on a side road off of S.R. 5 and is not normally visible from the recreation areas. This fenced area provides adequate facilities for Corps maintenance activities. The WVDNR maintenance and operations area is also within a fenced area near the fish rearing subimpoundments at Falls Mill. The building is about 2 years old and is adequate at present.

7.07 WILDLIFE MANAGEMENT AREAS.

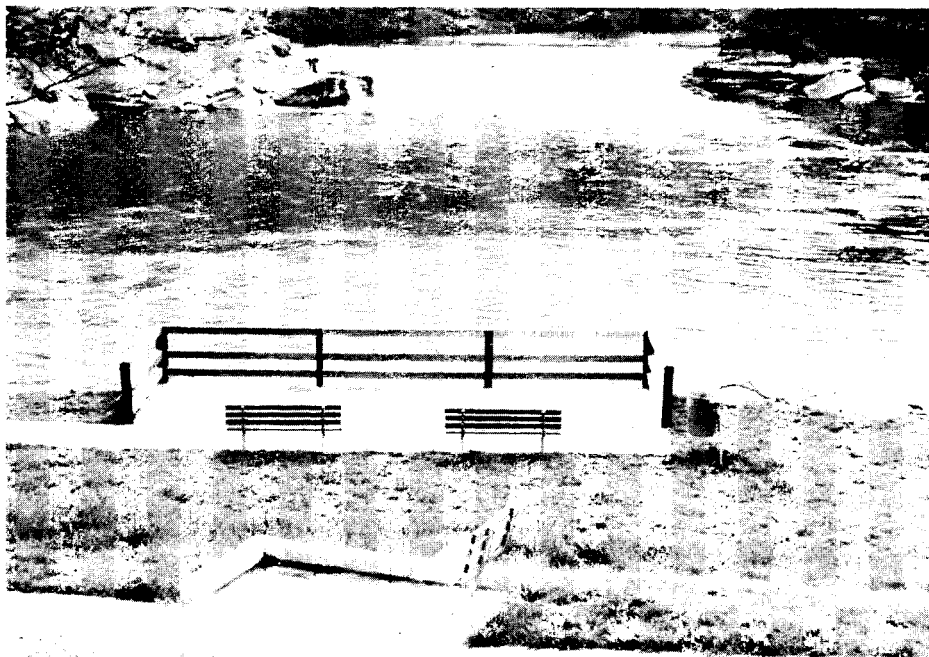
A. GENERAL DESCRIPTION. The West Virginia Department of Natural Resources has entered into a forest, fish and wildlife management license for most of the project area not used for the Corps operation and recreational sites. The license area totals 12,579 acres including the 968 acre seasonal pool area and is 95% of the project area. Management of these areas is according to the annual wildlife management plan prepared by the State and approved by the Corps. The Corps does not manage land specifically for wildlife but 132 acres in low density recreation is managed to preserve these resources. Hunting is not permitted on Corps managed areas at Burnsville Lake. Hunting is permitted on all the DNR land not restricted by other uses. Fishing is permitted on all water areas except the intake area of the dam, and at the beach.





Photograph 7.28

Scenic overlook at Falls Mill



Photograph 7.29

Handicap access fishing pier at Falls Mill



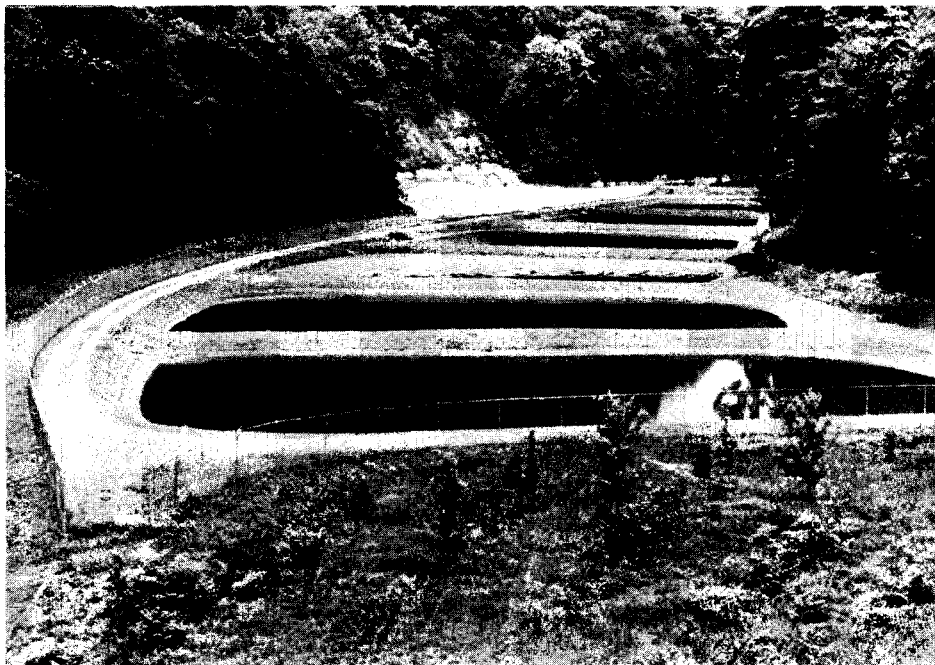
Photograph 7.30

Falls Mill Fisherman Access Area



Photograph 7.31

Vault restroom and parking at Falls Mill Fisherman Access area



Photograph 7.32

Fish rearing subimpoundments at Falls Mill



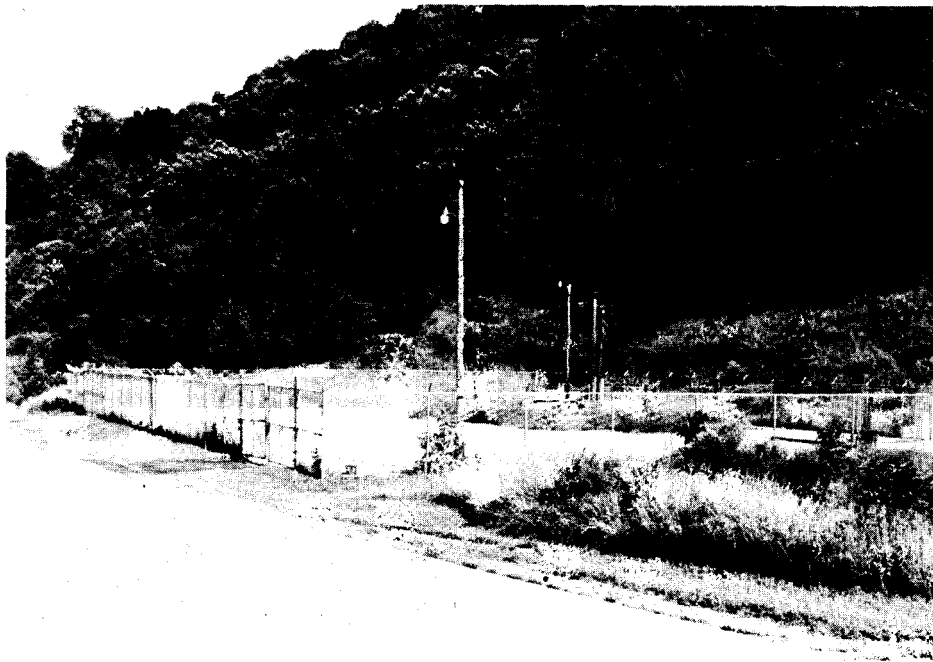
Photograph 7.33

Parking area for access to Weston-Gauley Bridge Turnpike Trail

West Virginia DNR activities for management of fish and wildlife resources includes fish stocking in the lake, planting of trees and shrubs, vegetation control, maintaining nesting boxes and platforms, share-cropping for food plots, trapping and transplanting of deer and other animals, and research.

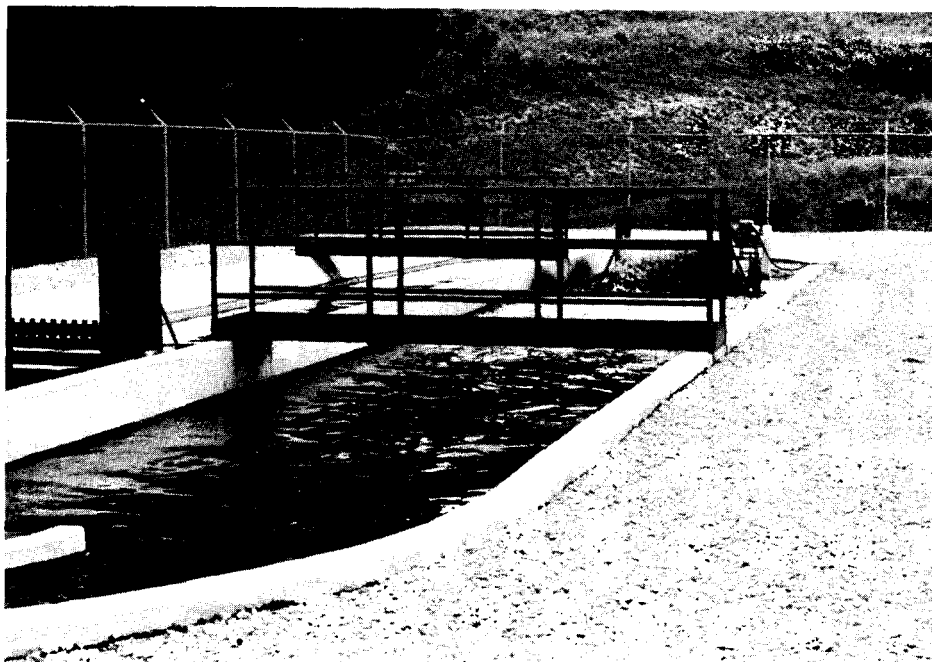
Other activities are construction and maintenance of roads, bridges, trails, parking lots, signs; and game law enforcement.

A recent accomplishment by DNR has been the repair and modification of a 3.5 acre pond on Triplets Run for the purpose of providing duck breeding and migration habitat. This was a cooperative project with Ducks Unlimited and the Soil Conservation Service.



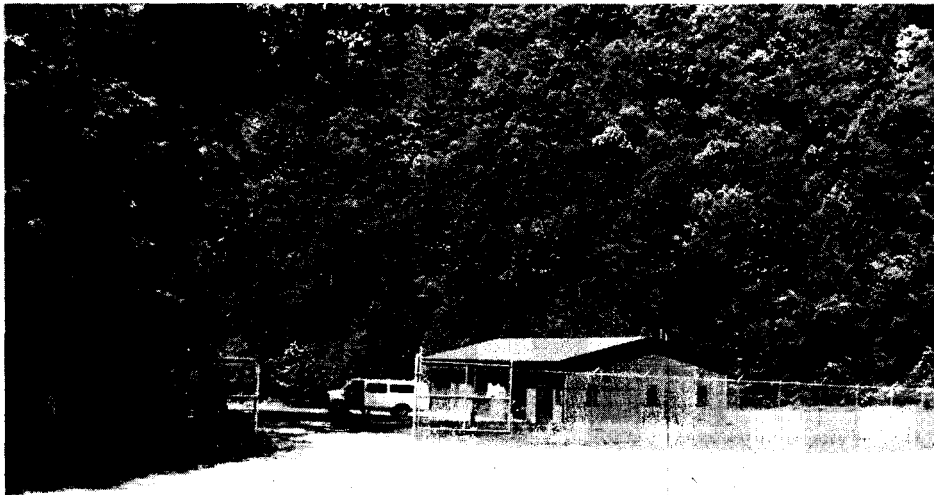
Photograph 7.34

Location of sewage treatment plant, and storage area at Dam



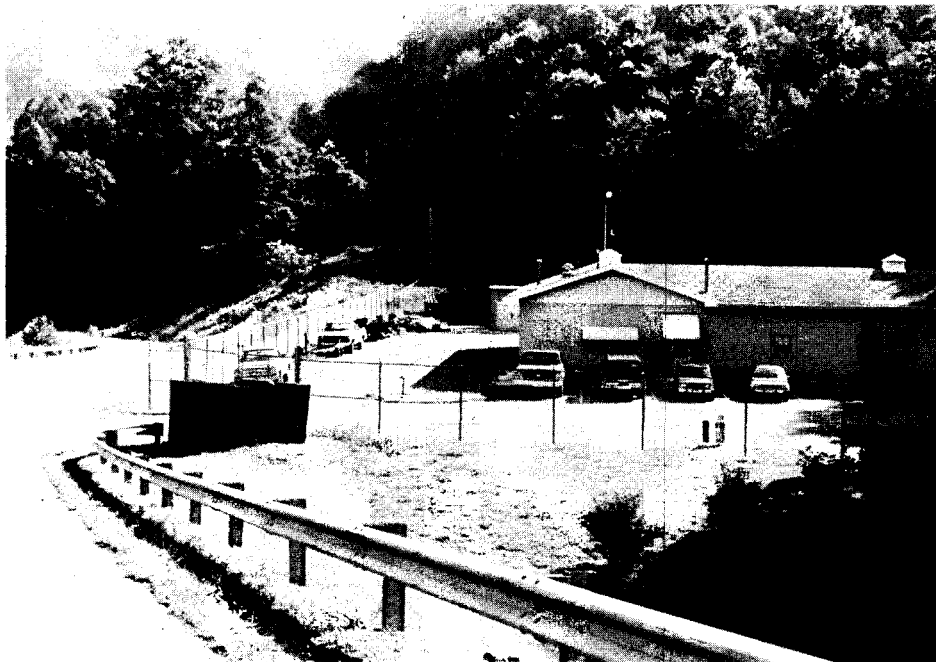
Photograph 7.35

Tertiary treatment plant at Bulltown Campground



Photograph 7.36

West Virginia DNR operations area at Falls Mill



Photograph 7.37

COE maintenance area at Dam

chapter 8  
facility design criteria

CHAPTER 8  
FACILITY DESIGN CRITERIA

8.01 INTRODUCTION.

General policies and procedures for the planning, design, operation and maintenance of recreation facilities at Corps of Engineers Civil Works projects are established in the Engineer Manuals, Engineer Regulations and Technical Reports referenced below:

EM 1110-2-400, Recreation Planning and Design Criteria.

ER 1110-2-400, Design of Recreation Sites, Areas and Facilities.

ER 1110-2-102, Design Features to Make Buildings and Facilities Usable  
by the Physically Handicapped.

EM 1110-2-103, Design for the Physically Handicapped.

EM 1110-2-410, Design of Recreation Areas and Facilities.

EM 1110-2-4201, Water Supply

EM 1120-2-400, Recreation Resources Planning.

EM 1130-2-400, Recreation - Resource Management of Civil Works Water  
Resource Project.

EM 1165-2-400, Recreational Planning, Development and Management  
Policies.

EP 310-1-6 Graphics Standards Manual

CERL Technical Report D-63, Design Guidelines for Recreational Roads.

These guidelines, along with State of West Virginia public health and sanitation requirements, and state building codes, form a basis for the detailed design and construction phases of the project. Design principles and criteria appropriate to the Burnsville Lake project are discussed in this



chapter. Sections 8.02 through 8.22 address the general standards necessary for expanding existing areas and developing new facilities.

## 8.02 SITING.

A. GENERAL. There are a number of site characteristics that influence the site selection for proposed facilities. Topography, area size, access potential, relative location and site attractiveness are all major considerations which dictate site selection for recreation facilities. The likelihood and impact of flooding, wind and wave action and operations and maintenance requirements are also important.

Only the most adaptable topography should be used for siting facilities. Forced siting should be avoided unless the efficient use of the area requires modification of existing land forms. Major cuts and fills should be used only when a satisfactory alternative site is unavailable, and then only for the siting of a specific facility. Existing clearings should be used whenever possible. Similarly, existing disturbed areas and roads or road beds should be used whenever possible.

Final design and construction supervision should play a key role in the successful implementation of the proposals presented in the Master Plan. The layout of roads and facilities must be considered as preliminary in order to provide the project designer and field supervisor the latitude necessary to adapt the construction plans to the site.

## B. ELEVATION CONSIDERATIONS.

1. Habitable buildings, washhouses and restrooms, sanitary sewage and water systems (except "closed systems") and other facilities subject to substantial damage from inundation should be sited at levels above the flood control pool level of 825 feet. Due to the long horizontal and vertical distance from the lake edge at summer pool to the flood control pool and the desirability of placing facilities near the lake, these facilities may need to be located below this. In these cases the structures should be designed to withstand inundation. Circulation roads, parking, picnic sites and campsites may extend to the five year flood pool level of 810.5 feet.

2. Boat launching ramps should be constructed to extend at least to elevation 771 feet or 5 feet below the normal minimum pool at elevation 776 feet to accomodate launching and removal of boats during dry seasons. Basins for marinas and boat service facilities will be dredged to at least elevation 770 feet.

3. Boat mooring posts should be located within four horizontal feet above the seasonal pool level of 789 feet.

4. The top of combination walls/docks should be set at elevation 791 feet to accommodate docking and loading of boats when the lake is at the seasonal pool elevations of 789 feet.

### 8.03 SITE PREPARATION.

Site preparation (including excavation, clearing and grubbing) for the various buildings, camping areas and day-use areas should vary according to individual site conditions such as slope, vegetation, surrounding land use and soil

characteristics. All grading and earthwork should be done in accordance with established erosion control measures and shall meet all state and local regulations. During all site construction operations, particular emphasis should be placed on the protection of vegetation and other site features and on blending necessary cuts and fills uniformly with the existing contours. Excavation and land disturbances that are one-quarter acres or greater in size will necessitate the submittal to the WVDNR Division of Water Resources a sediment control plan for the area to be disturbed. The plan should be approved prior to initiation of work.

#### 8.04 LANDSCAPE PLANTING.

The major objectives for providing landscape planting within recreation areas include: screening undesirable features; reducing wind and noise; providing shade; providing privacy; the enhancement of structures; the definition of recreational use areas; reforestation; erosion control and the enhancement of wildlife habitats. Planting in all areas should strive to imitate the character of the site through naturalistic planting concepts and the use of plant materials which are native to the area. All plant materials selected should be indigenous, maintenance free and functional.

#### 8.05 ROADS.

The road system within the project boundary plays a significant role in providing a quality recreational experience for the visiting public. The following guidelines will be considered in locating and designing proposed access and circulation roads.

A. ALIGNMENT. Curvilinear alignment is preferred over long tangents. Roads will be designed to complement the existing terrain and to optimize scenic views. In addition, consideration will be given to the creation and maintenance of irregular right-of-way borders to enhance the visual characteristics of the roadway.

B. PROFILE. Deep cuts and high fills are to be avoided to reduce environmental impacts. When suitable, borrow material is available, consideration should be given to building the roadbed slightly above the natural ground level. Positive effects of this method of road construction relate to improved drainage, minimal environmental disturbance, reduced cost, and control of vehicular traffic in undesignated areas.

C. DRAINAGE. Swales and interceptor ditches will be constructed as necessary. The use of culverts will be kept to a minimum. One-way circulation roads will be cross-sloped where possible to minimize ditching.

D. MATERIALS. All access and circulation roads will be paved. The thickness of these sections will be based on soil studies conducted during the final Feature Design Memorandum stage. Service roads may be a gravel surface. The cost estimates for roads include materials, labor, and grading.

Major design standards for the development of various types of roads are included in CERL Technical Report D-63 and EM 1110-2-400.

Existing paved roads which are not necessary should be removed and replaced with natural landscape features.

1. DESIGN STANDARDS AND TYPICAL ROAD SECTIONS. Table 8.01 includes the major design standards associated with the various types of roads that should serve the proposed recreational and operational areas within the project boundaries. A typical section of each road type is shown on Figures 8.01 through 8.04.

TABLE 8.01

ROADWAY DESIGN STANDARDS

<u>Road Type</u>	<u>Road Width (ft.)</u>	<u>Shoulder Width (ft.)</u>	<u>Maximum Gradient (%)</u>	<u>Maximum Design Speed (mph)</u>	<u>Minimum Radius (ft.)</u>
Major Access	20-25	2-4	10	40	270
Two-Way Circulation	18-24	2-4	10	30	150
One-way Circulation	12-14	2	10	30	100
Service	10	1.5	12	40	50

8.06 PARKING.

A. GENERAL. Additional parking facilities at Burnsville Lake should be provided as an integral part of the circulation system. The parking facilities should be sited so that their physical impact on the natural environment is minimized. Various techniques should be utilized to screen parking areas from recreational facility areas including mounding, landscape screening and recessing lots. The visual character of all parking areas should be enhanced by providing planting islands and/or landscaped aisles wherever possible, as

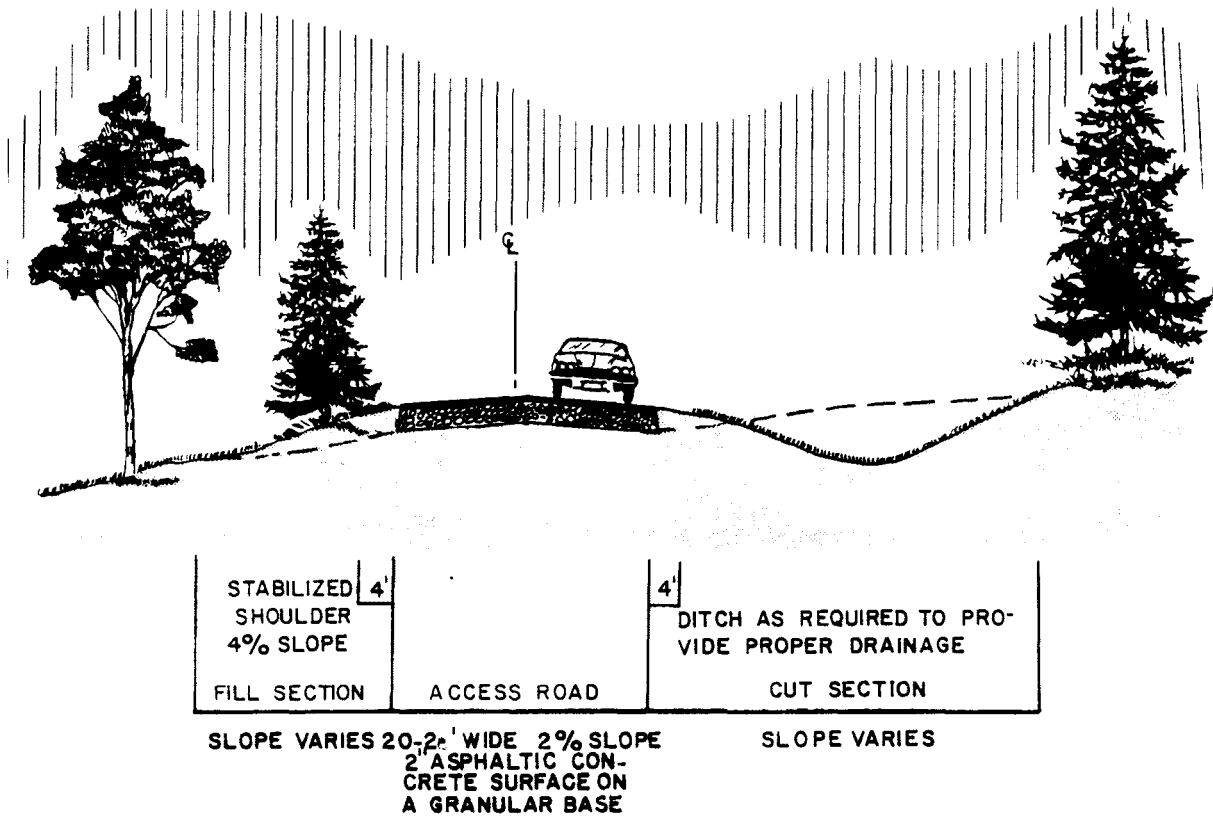


Figure 8-01  
Typical Major Access Road

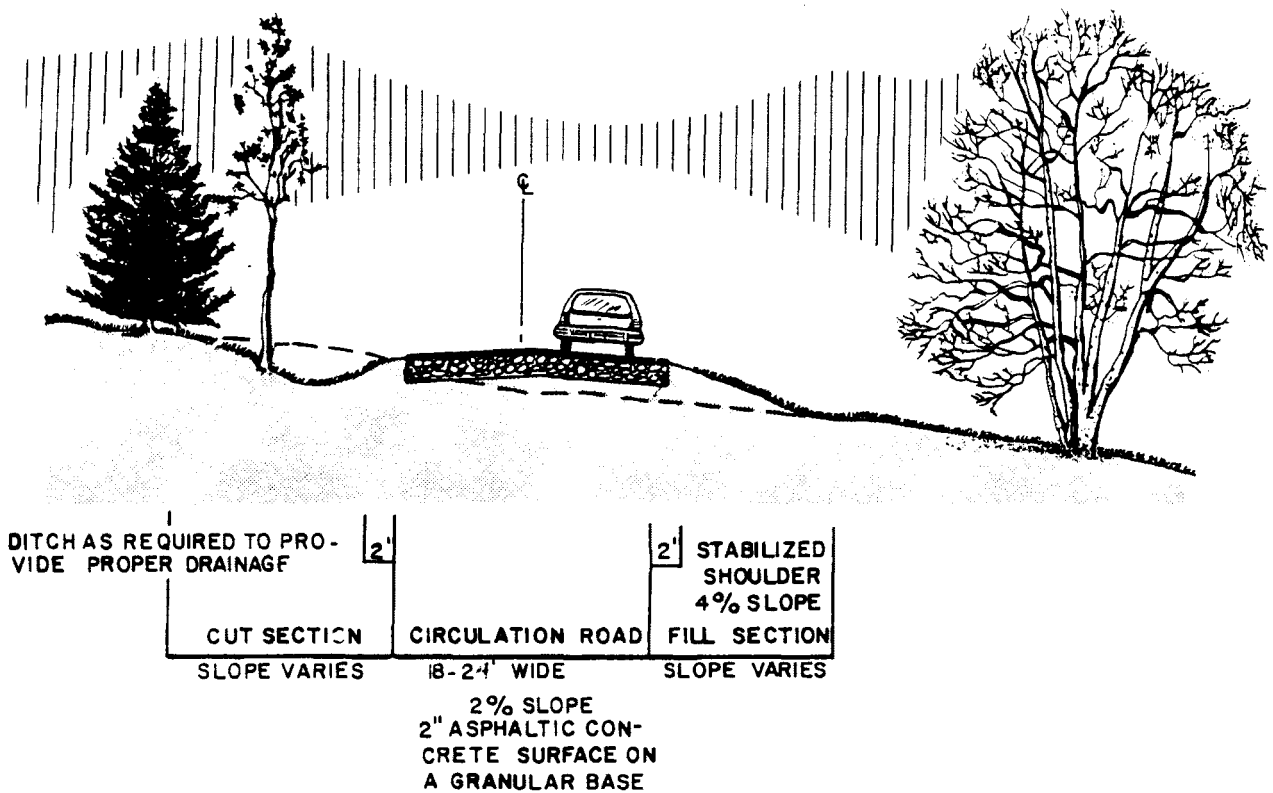


Figure 8-02  
Typical Two-Way Circulation Road

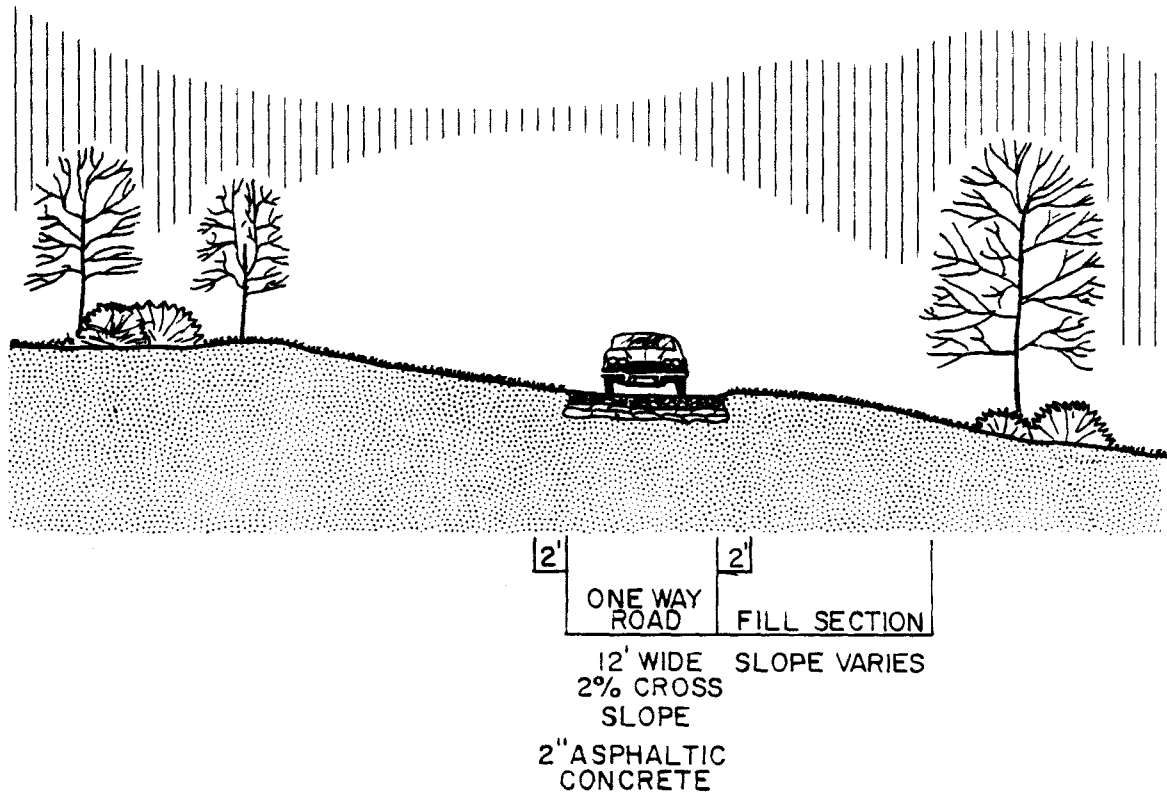


FIGURE 8-03  
TYPICAL ONE-WAY CIRCULATION ROAD

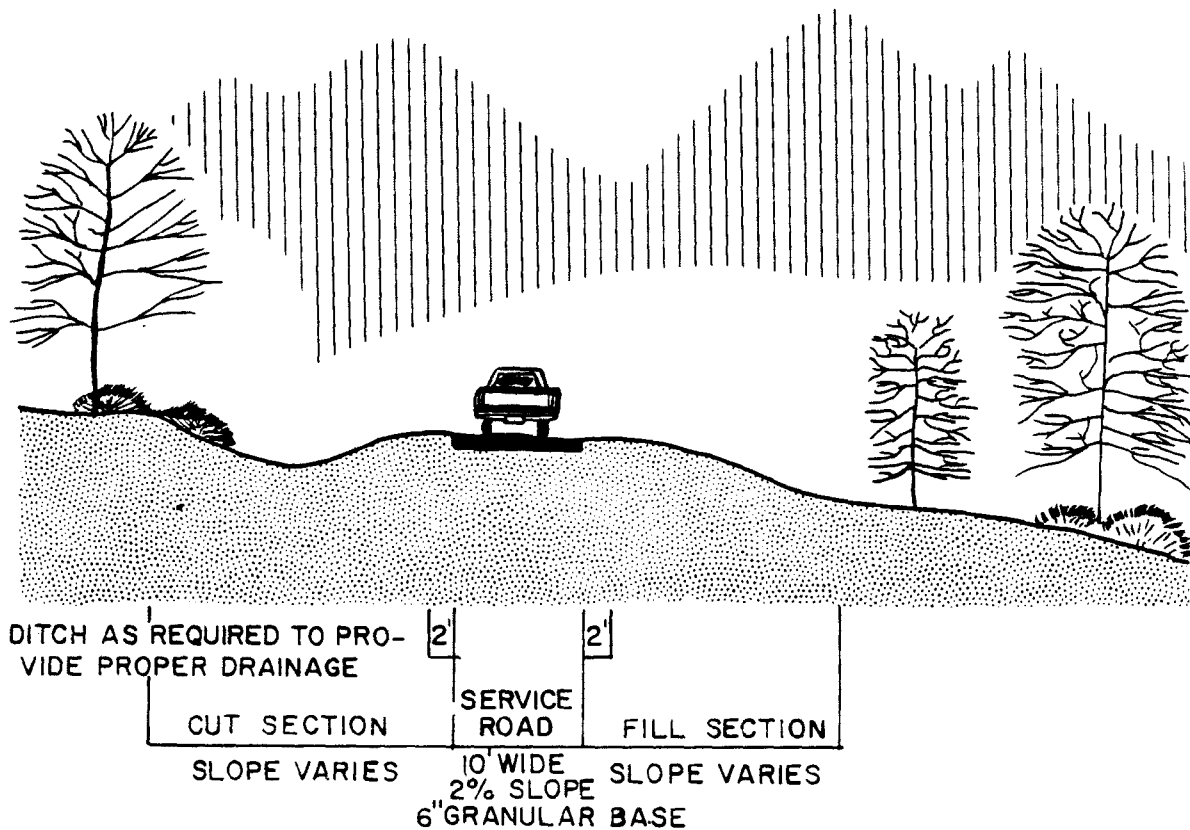


FIGURE 8-04  
TYPICAL SERVICE ROAD

shown in Figure 8-05. In some cases, two or more small lots may be easier to site than a large lot with uniform grading. All proposed parking lots should be physically separated from the major access roads to minimize circulation conflicts. Pedestrian circulation should also be considered in the layout of parking lots.

B. DESIGN CRITERIA.

1. MATERIALS. All pertinent parking areas will be paved and overflow parking areas will have a gravel surface. Design of parking areas and thickness of sections will be determined during the Feature Design Memorandum stage. Installation of gravel or porous paving rather than nonporous materials should be considered as a means of reducing large expanses of normally unused paved parking. Cost estimates for parking areas include paving materials, site preparation, grading and labor.

2. SIZE. Car-trailer spaces will be a minimum 10 feet by 40 feet and car parking spaces will be 10 feet by 20 feet. Approximately two percent of the total number of spaces in each use area will be specifically designed and reserved for the use of the handicapped persons. These spaces will be 13 feet wide and conveniently located to walkways, buildings, site impact areas, etc.

3. LAYOUT. Parking lots should be designed to allow for efficient movement of vehicles through the lot. Parking areas may be in separate lots off of the circulation or access roads or may have spaces which are at 90 degrees to a circulation road. Lots for cars with trailers will provide pull-through spaces where possible or pull-in and back-out spaces in areas where



space is limited by slopes, vegetation or other constraints. Car with trailer spaces will be at a 45 degree angle to the aisle when possible.

4. OTHER FEATURES. All parking spaces, except pull-throughs, will be provided with wheel stops. Curbing and catch basins will be minimized; storm run-off will be surface drained whenever possible.

#### 8.07 BOAT LAUNCHING RAMPS.

All ramps shall have a slope between 12 and 16 percent. The lower limit of each all season ramp should be elevation 771 feet, five feet below the minimum pool at elevation 776 feet. The upper limit should be elevation 789 feet, six feet above the summer seasonal pool. A vehicular turnaround will be provided at each multiple launch area. At least one courtesy dock should be provided at each boat access launch ramp.

#### 8.08 DOCKS AND MARINA FACILITIES.

A. COURTESY DOCKS. A minimum of one concrete courtesy dock should be provided at each boat launch ramp to facilitate safe and convenient boat loading, launching, and retrieval. Docks should be accessible from both sides so that boats can be moved from the launch area before loading. Basic criteria for the design of courtesy docks include:

1. LIVE LOADS. Fifty psf uniform live load on dock and bridge, or 400 pounds concentrated load applied over an area of 12 by 12 inches.

2. WIND LOADS. Uniform load of 17 psf (80 mph) on all projected surfaces assuming 100 percent boat occupancy.

3. WAVE AND CURRENT LOADINGS. Will be considered on a site by site basis.

4. FREEBOARD. Dead load freeboard of all floating dock units shall be 18 by 24 inches. Freeboard under dead load and 30 psf live load shall not be less than 10 inches.

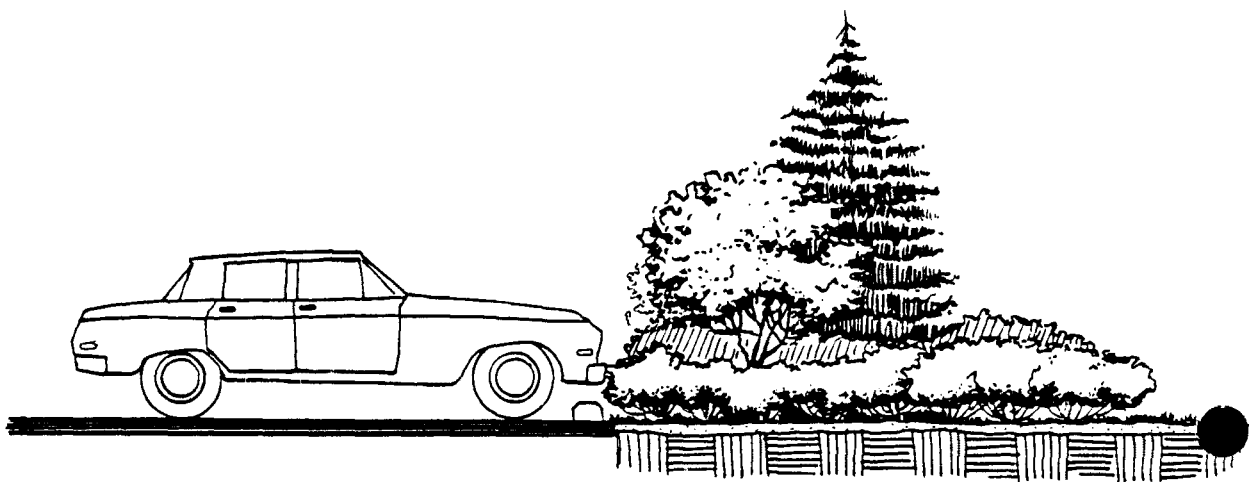
B. MOORING POSTS. The wood posts should be spaced 20 feet apart and should be located within four horizontal feet above the seasonal pool level of 789 feet. A typical mooring post facility is shown in Figure 8.06.

C. FISHING ACCESS. ORDR 1130-2-18 provides authority for the construction of access to lake waters near dam areas. Steps can be provided, also filling of voids in riprap with small stones to provide a construction of fishing platforms. An access berm above the seasonal pool can be a part of the design stage of new projects. A typical access design is shown in Figure 8.07.

D. HANDICAP FISHING ACCESS. Design of these facilities can be of several types to fit the terrain situation at each site. Handicap access should be provided at each major recreation site. These facilities are illustrated in Photographs 8.01 through 8.03.

#### 8.09 BEACHES.

Beaches will be surfaced with sand at a slope of three to five percent. Slopes greater than 5 percent are not feasible as the sand will shift during drawdown even when the area is stabilized with retaining walls or curbs. A turf sunning area will extend above the sand area. This turf area will be



**Figure 8-05**  
**Typical Parking Area Screening**

surrounded by a diversion berm to minimize maintenance problems resulting from large quantities of surface runoff moving over the beach area. Large turf areas may be provided with intermittent plantings to provide partial shade and protection from strong winds. Beaches and sunbathing areas should be separated from parking areas with a vegetation buffer strip.

Swimming areas will be outlined with buoys, international orange in color, with cable passing through each buoy. The buoys should be visible to a swimmer at a distance of not less than 100 feet. Additionally, warning buoys to boaters should be provided at 200-foot intervals, or a minimum of two per area. The warning buoys should be parallel to and 300 feet (100 feet minimum) beyond the buoyed safety line defining the swimming area.

Supporting facilities will include a changehouse and comfort station. These structures should be located as high as possible without being inconvenient to the swimmer and should be constructed to withstand flooding.

#### 8.10 CAMPING AREAS.

A. GENERAL. Camping areas should be designed to blend with the natural landscape. Therefore, deep cuts and fills will be avoided; individual sites will be located in the field giving particular emphasis to individual site characteristics such as terrain, vegetation, and views. All campsites should be located as close to the lakeshore as possible, above the five year flood level of 810.5 feet elevation to minimize flood damage to facilities.

B. CAMPGROUND LAYOUT. Circulation roads in campgrounds should be one way when possible to minimize construction costs and traffic conflicts. Spurs should be designed as pull-throughs and back-ins to increase diversity.

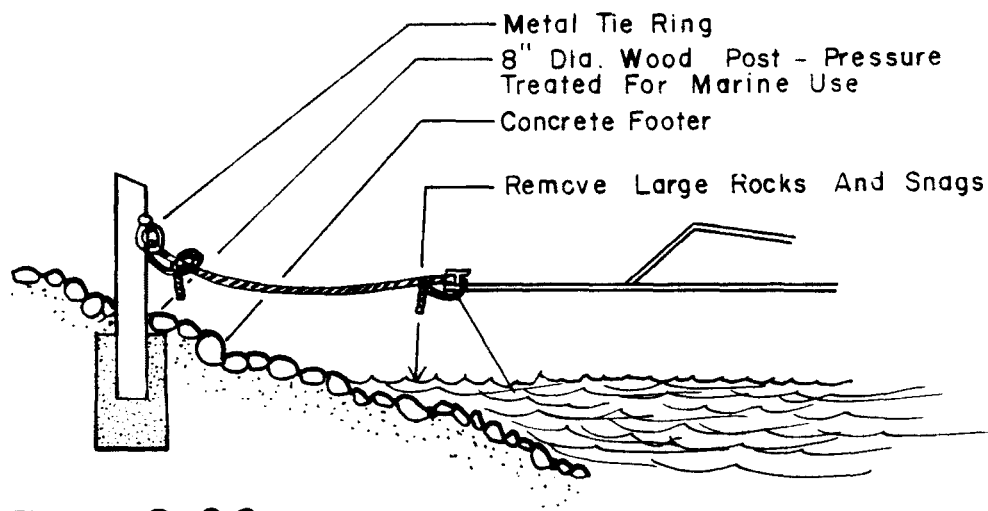


Figure 8-06  
Typical Boat Mooring Post

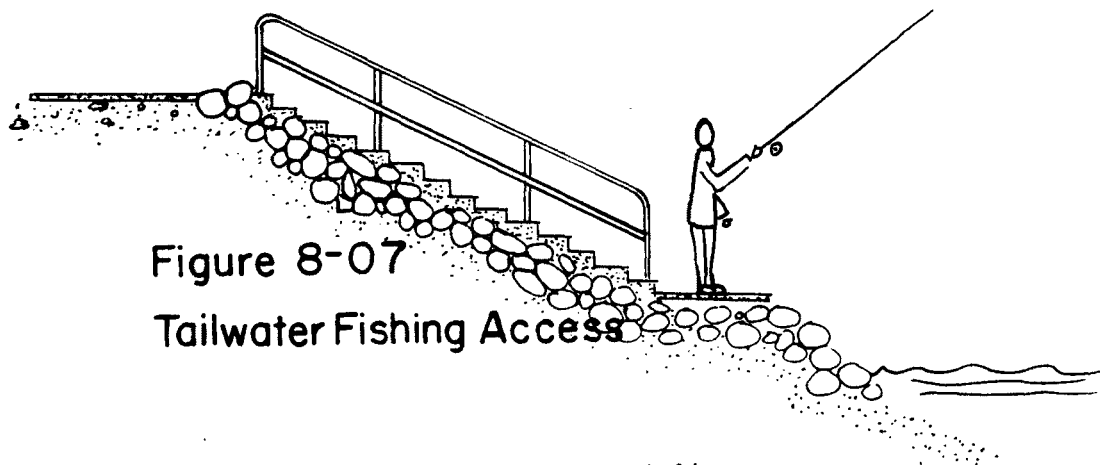
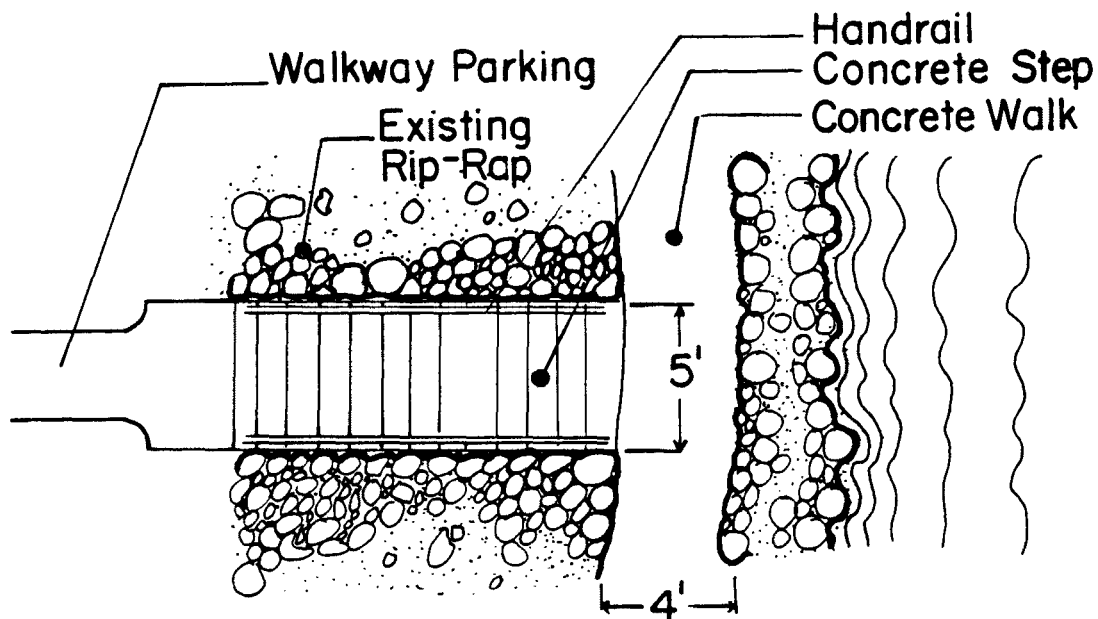


Figure 8-07  
Tailwater Fishing Access

Tables, grills, and impact areas should be opposite camper trailer doors which are generally located on the right side of the trailer. Pull-through and roadside spurs should only be used on the right side of roadways. Back-in spurs should be angled 30 to 60 degrees. If 90 degree angle spurs are necessitated by terrain, spur entrances should be flared to provide adequate width. Due to visibility problems with backing a trailer into a spur, 90 degree angle spurs should only be placed on the left side of roads.

C. SPACING AND LANDSCAPING. Sites will be spaced to allow an average of 60 feet between sites and a density of approximately five sites per acre. Dense landscape planting providing both canopy and understory vegetation will be developed and maintained within camping areas whenever possible to provide each camping group with a sense of privacy.

D. TRASH COLLECTION. Centralized trash collection facilities may be provided to minimize operational expenses. A centralized trash collection facility will be located within 60 feet of each camp unit, or trash receptacles may be provided at each site.

E. CAMP UNIT DESIGN. Each camp unit will be provided with a gravel or paved car/trailer parking spur (10 feet by 45 feet) with a maximum slope of two percent on the rear half of the spur. Also to be included are one lantern post, one picnic table, a fire ring or grill, an enclosed gravel impact area (approximately 15 feet by 30 feet), a site identification marker, and electrical hookups. These items and site preparation and grading are included in the cost of each unit. Impact areas and spurs should be integrated where possible so that the site may be used by a tent camper, pop-up camper, van, trailers, or any other type of recreational vehicle. Figure 8.08 illustrates the basic components of a camp unit.

F. PRIMITIVE CAMPSITES. Provide 8-12 camp spaces, fire circle, and 1 trash receptacle for each group of 4 spaces. Provide a pit toilet or porta-john to serve each 8 spaces.

G. SITES FOR THE HANDICAPPED. Approximately four percent of the camp units should be designed for use by the handicapped, preferably the sites nearest the washhouse. Design considerations for these sites include paving impact areas, providing a wide spur for wheelchair movement around the vehicle, providing paved pathways to the site, providing a picnic table which can accommodate wheelchairs, and providing curbs around the area. These sites should be on a level surface.

H. SANITARY FACILITIES AND UTILITIES. All areas will be provided with waterborne sanitary facilities. All camp units will be located within 300 feet of a restroom or washhouse, and not more than 600 feet from a washhouse. Facilities located in these areas will be distributed as described in EM 1110-2-400 with a restroom for each 50 camp units and a washhouse for each 50 to 100 units in addition to the comfort station. One water hydrant/fountain will be provided for each 8 camp units or 1 hand pump for 25 spaces.

I. PLAY AREAS. Two or three acres of relatively open, flat land should be provided as play areas for each 50 space campground. Facilities in these areas can consist of ballfields, tot-lots, horseshoe pits, volleyball courts or other appropriate facilities.

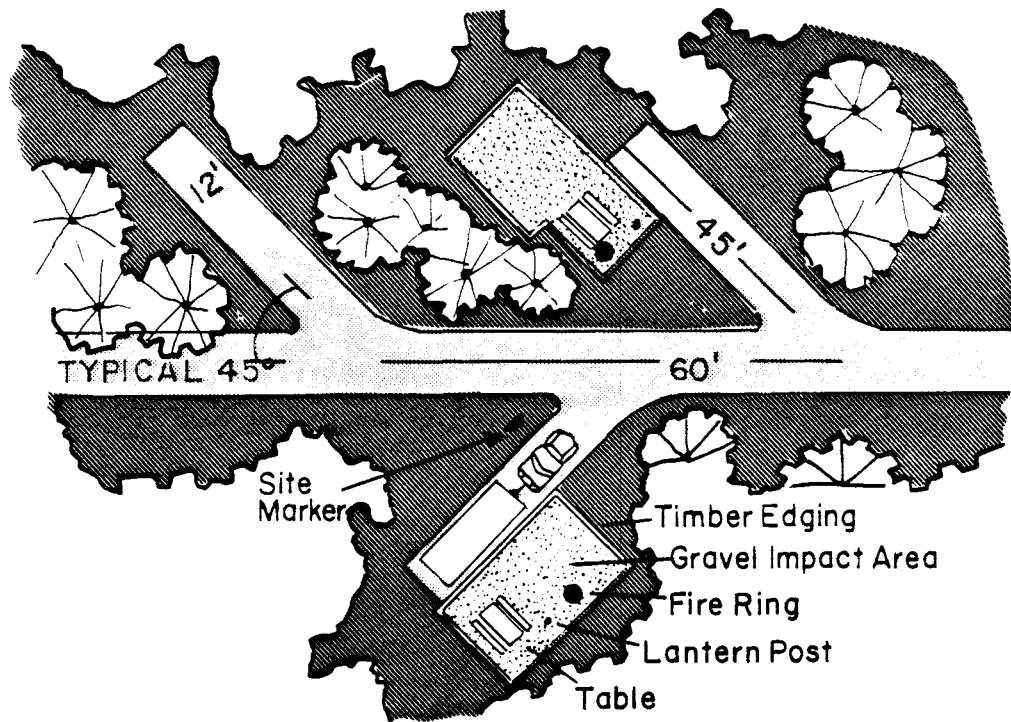


Figure 8-08  
Typical Campsite

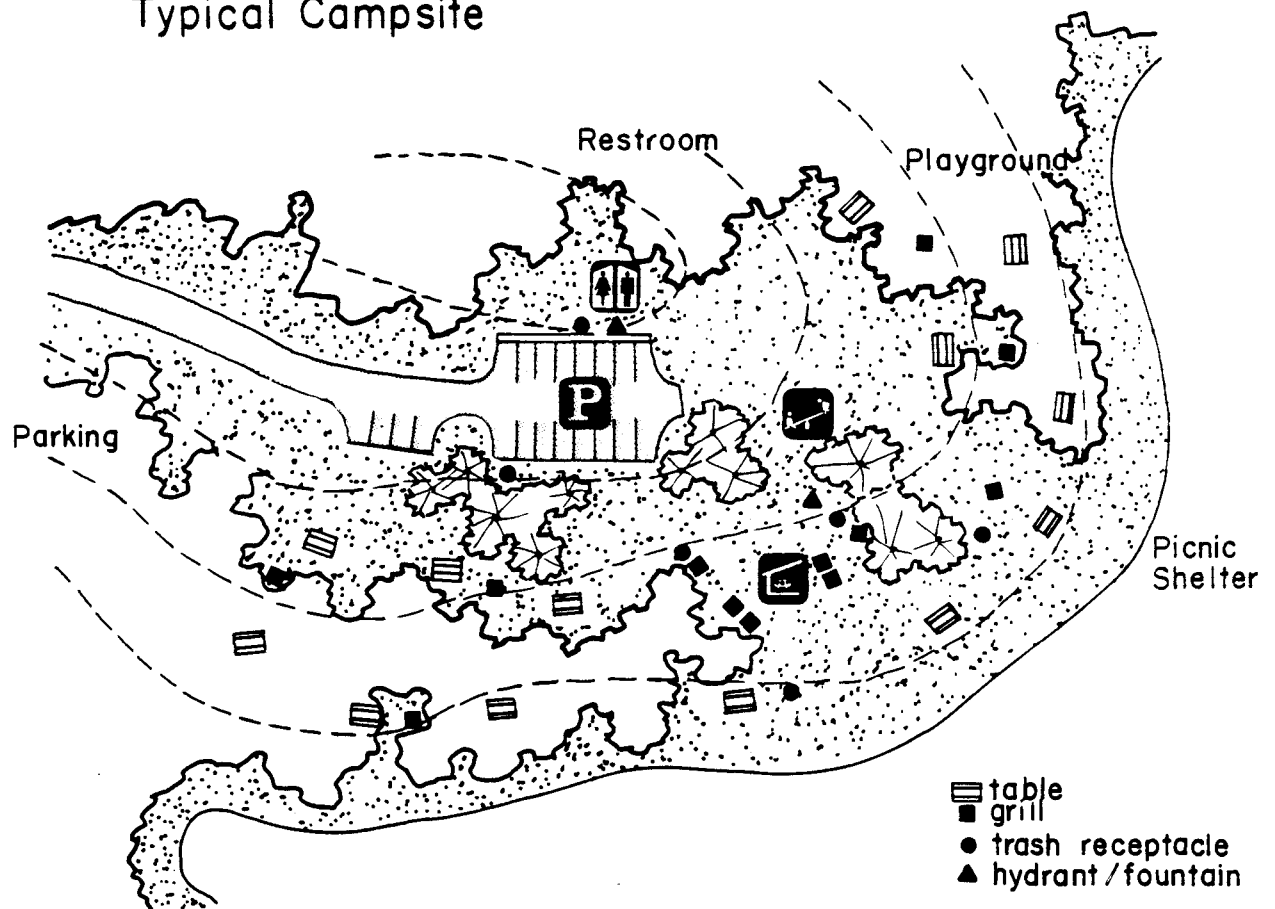


Figure 8-09  
Typical Picnic Area



J. AMPHITHEATERS. Can be provided where there is enough demand for use such as in group camps, campgrounds, and large day use areas. An amphitheatre should have sufficient parking space nearby either in a campground or day use area. A typical amphitheater is shown in photograph 8.04.

#### 8.11 PICNIC AREAS.

A. AREA DEVELOPMENT. Picnic areas will be water oriented when possible and will consist of picnic units, picnic shelters, playgrounds, water and sanitary facilities, game fields and game courts, circulation roads and parking areas. An example of a typical picnic area is shown in Figure 8.09.

The maximum cross slope in a picnic area will not exceed 15 percent or be less than 2 percent. Each picnic area will include at least 10 units with a maximum density of 12 units per acre. One car parking space will be provided for each picnic table. One grill will be provided for each two tables and conveniently located centralized trash collection facilities will be located in the area. One hydrant/fountain is to be provided for each ten tables. The cost estimate for picnic areas include these items. Picnic tables will be spaced a minimum of 60 feet apart. Table locations should be changed occasionally to minimize wear on the grass surface. Road and parking areas should be designed to limit access of vehicles to paved areas only. Ditching along the side of paved areas, curbs, or cast concrete or wood wheel stops may be used to control impact areas.

B. SANITARY FACILITIES. Restrooms should be located a minimum of 100 feet and a maximum of 600 feet from the picnic tables they serve. In areas that do not have sufficient use to justify waterborne facilities, vault toilets should be used. One restroom or vault toilet with facilities for both

men and women, should be constructed for each 25 picnic tables in high use areas.

C. PICNIC SHELTERS. Picnic shelters should be placed where demand warrants their construction and maintenance. The style of picnic shelters should match those already constructed in the area because of their high quality and good appearance. Each shelter will be designed to accommodate at least six tables. Additional support facilities should include three grills, a trash dumpster and potable water. Fees can be charged for group use.

D. PLAYGROUNDS. One playground or tot-lot should be provided at each area with 30 or more picnic tables. Playgrounds are discussed in Section 8.12.

E. OPEN PLAY AREA. Open play areas of approximately one acre in size will be provided at picnic areas with 50 or more tables.

#### 8.12 PLAYGROUNDS.

A. GENERAL. A minimum of one playground should be provided in each recreation area. Natural materials should be utilized and the play area layout should be designed to fit into the natural setting with consideration given to preservation of trees and other vegetation. Equipment which promotes a creative kind of play is recommended; such as wood climbers, playwalls, sculptured earth mounds, swings, sand areas and benches.

Appropriate surface materials include sand, bark chips, turf, and smooth pea gravel. Small play areas with one or two climbing structures should be added to some existing areas where no play structure exist. A large playground is shown as Figure 8-10.

B. DESIGN CRITERIA. The following general guidelines apply to all playground development:

1. The location should be near the major use areas within each site in a manner that does not conflict with pedestrian or vehicular traffic patterns.

2. Playgrounds should be landscaped to provide partial shade if the site does not provide it already.

3. Open turf areas should be preserved adjacent to playgrounds whenever possible to provide opportunities for field games and free play activities.

4. One playground will be provided for each camp area or picnic area.

#### 8.13 TRAILS.

A. GENERAL. Trails should be used where they enhance public enjoyment of the environment and utilization of fish and wildlife resources. Important factors to consider when designing a trail include alignment, terrain, topography, vegetation, aesthetic values, points of interest, road crossings or other potential dangers, and final destinations. Zoning of trails for various types of use intended is also necessary. The trail type to be provided at Burnsville will be hiking and horseback riding. Hiking trails should provide secondary benefits by providing access for hunting, fire control, etc.

B. DESIGN CRITERIA (GENERAL). The following general guidelines are applicable to all trail development.

1. Vegetation or native rock materials should be placed where necessary to prevent erosion.

2. Trails should be routed around large trees where practical to avoid unnecessary tree removal.

3. Trails should be inspected periodically to check trail conditions and markings.

4. Pedestrian trails should be used for travel only, except where access roads will be used by both pedestrians and maintenance vehicles. Trails which are designated for pedestrian use only should be closed off with logs, zig-zag barriers, or stairways to discourage non-pedestrian users.

5. If it is necessary to develop trails utilizing side-hill construction techniques, the cut slopes may be as steep as the soil material will tolerate without serious erosion. Most soils will tolerate a 1/2:1 or 3/4:1 cut slope. Care should be taken to ensure that an angle of repose is used that will maintain a stable condition indefinitely and will permit vegetation to grow.

6. All trail construction should be planned to produce the least disturbance to the natural environment, consistent with the intended use.

7. Trails should provide a variety of experiences, taking advantage of panoramic and focal views, traversing ridges and valleys, open spaces and forested areas, and traveling along water bodies whenever possible.

8. Curbs and/or handrails should be provided where appropriate.

9. Inter-site walkways should be considered to link major recreational facilities.

10. Abrupt changes of direction or grade should be avoided. The linear foot unit cost estimate for each trail type includes the construction of the trail, surface materials, stairs, curbs, handrails, signage, and grading.

C. SIGNAGE. Adequate signage is essential at trail heads, intersections, points of interest, and at locations on the trail where the direction is not readily discernible. Trail signs should include mileages to various points of interest along the way, along with the total trail mileage. Frequent mileage markers along the trail are helpful to the hiker and useful in the operations and maintenance of the area.

D. SURFACING. Surfacing is a costly item in trail construction. Therefore, natural materials will be used wherever feasible. Asphaltic concrete material will only be used on trails for the handicapped, bicycle trails, and on trails with concentrated use. Wood chips, chaff, or other natural surfacing materials will be used for most hiking trails that are not designed for use by the handicapped.

E. TYPICALS. Typical hiking trail and paved walkway sections are shown on Figures 8.11 and 8.12. These typicals show minimum and maximum grades for the trail types, surface materials, trail width and other pertinent information.

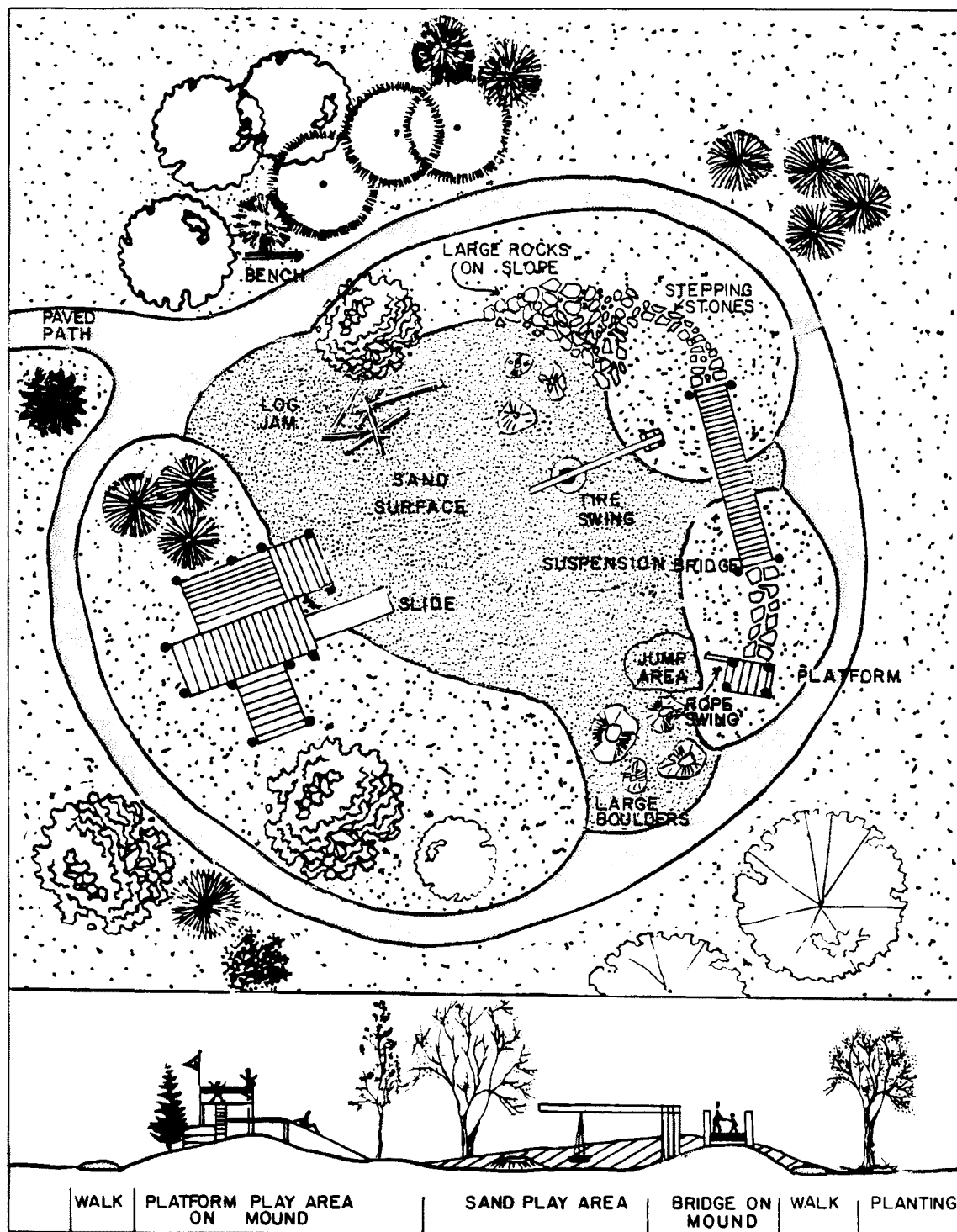


Figure 8-10  
Typical Large Playground

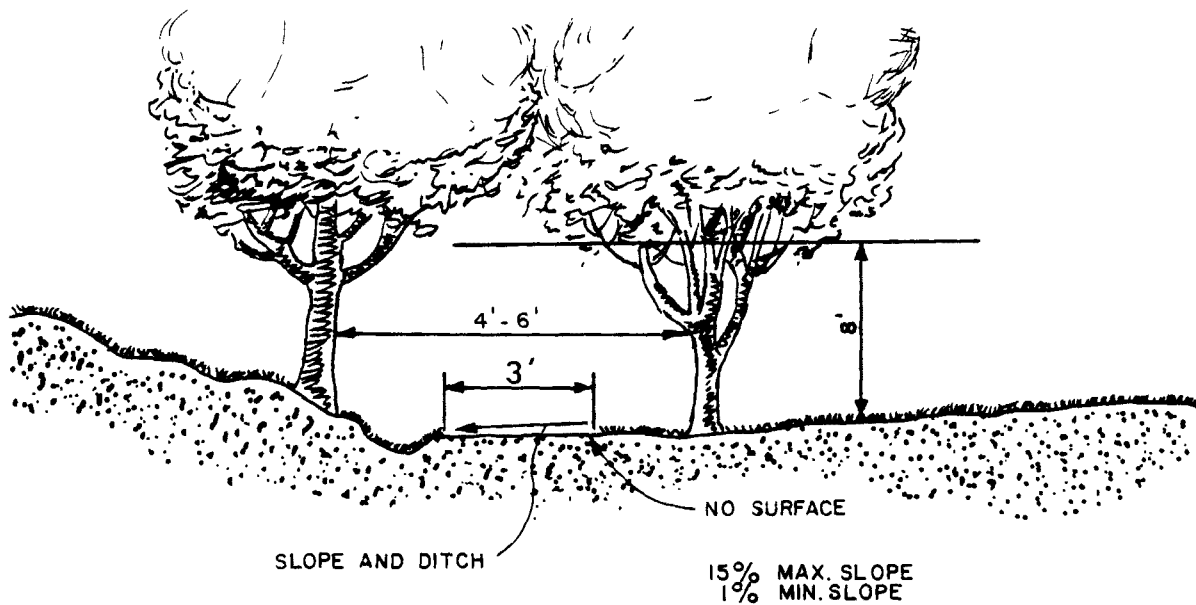


Figure 8-11  
Typical Hiking Trail

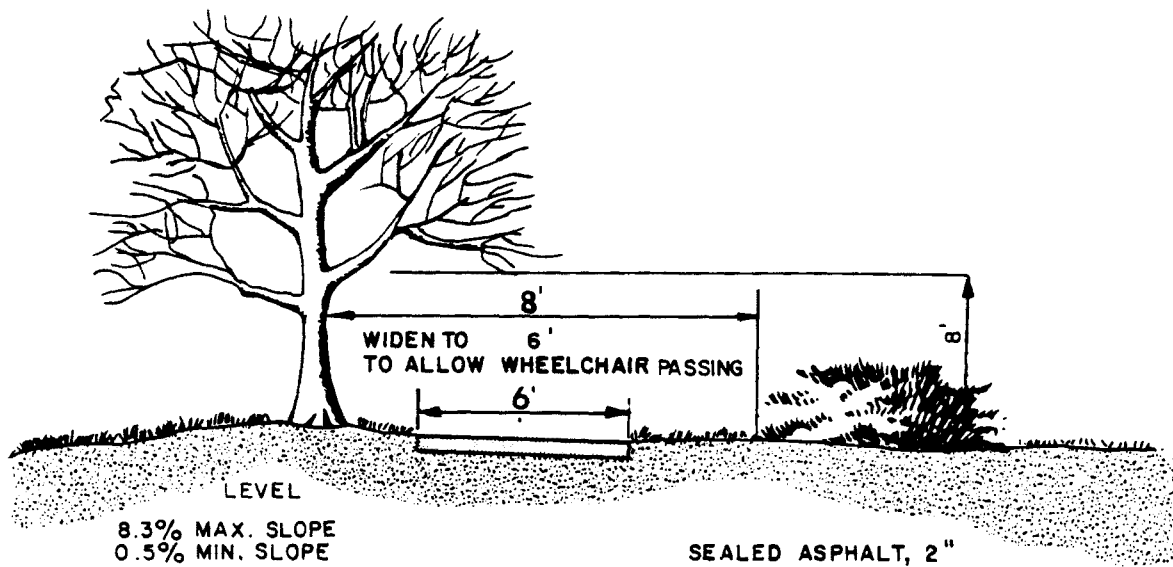


Figure 8-12  
Typical Paved Walkway Trail

F. FOOTBRIDGES. Footbridges should be used to span drainage ways when they are encountered on foot paths. Bridges should be built as shown on Park Practice Program Design, Index B-3139 which is illustrated on Figure 8.13. This design or a similar style should be used because of its strength, rustic appearance, and flexibility of span lengths.

G. OVERLOOKS. At scenic points along the trail where desirable views need to be enhanced, an overlook should be developed. A typical overlook is shown in Figure 8.14.

H. SPECIAL CONSIDERATIONS.

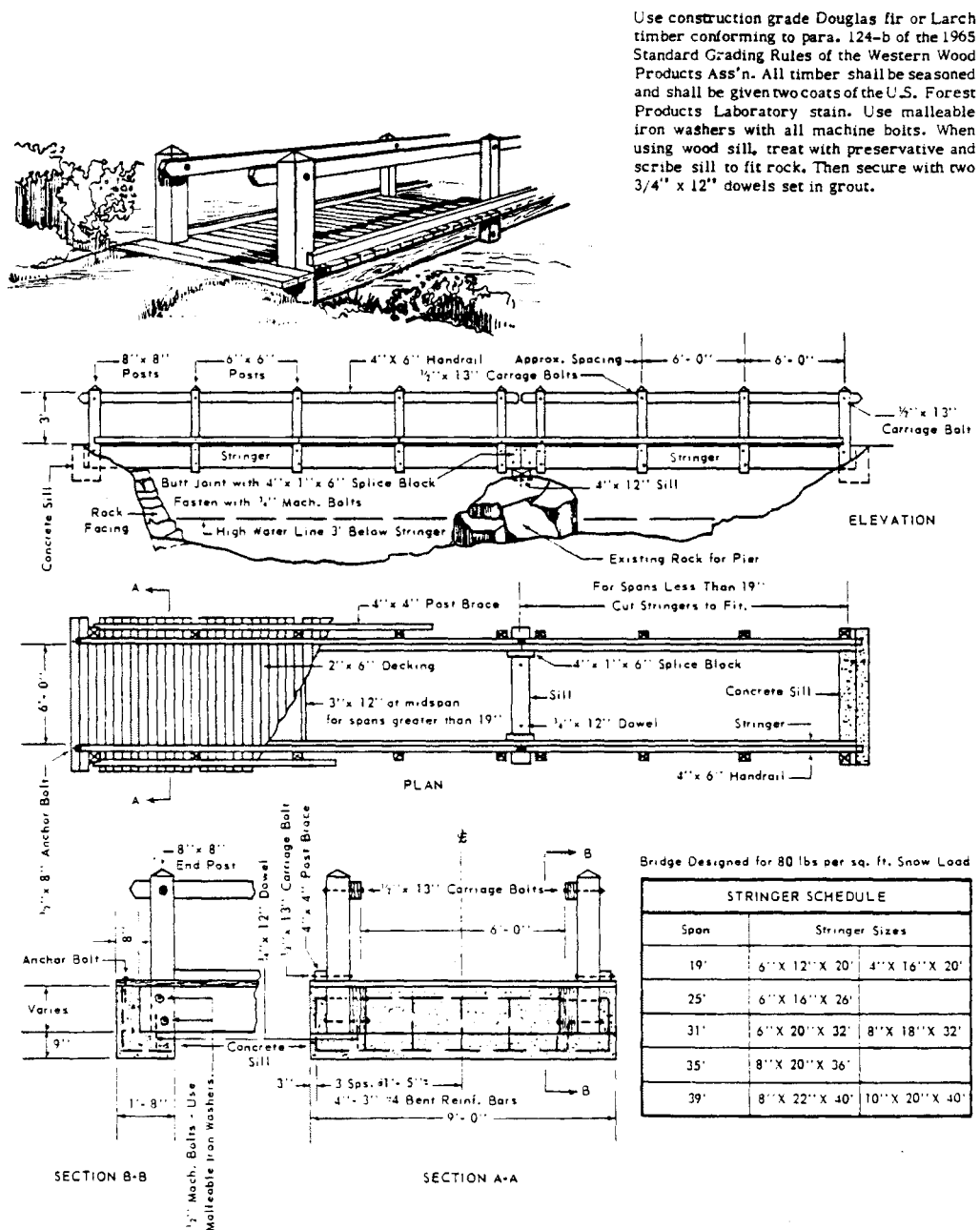
1. TRAILS FOR THE HANDICAPPED. Trails to be utilized by the handicapped should conform to established design criteria. The following criteria should be used to provide the handicapped person with maximum mobility with a minimum of assistance and effort.

a. Non-slip bituminous asphalt level surface (avoid high crowns and minimize expansion joints).

b. Paved trails should have a minimum width of 6 feet to allow for passage of wheel chairs.

c. On long grades of three to eight percent, level 6 x 6 foot platforms should be provided no more than 30 feet apart and at all changes in direction. Bench and rest areas may be combined with passing areas and/or platforms.





**Figure 8-13**  
**Typical Footbridge**

United States Department of the Interior, National Park Service		FOOTBRIDGE	
<b>THE PARK PRACTICE PROGRAM</b>		Contributed by FOREST SERVICE U.S. Dept. of Agriculture	
National Conference on State Parks • National Recreation & Park Association			
DATE	June 1972	PLATE	824 L
INDEX	B-3139	CONTROL	F-1290-R

Mounded Planting Area

Wood Benches

Natural Surface

Protective Fence

Rock Cliffs

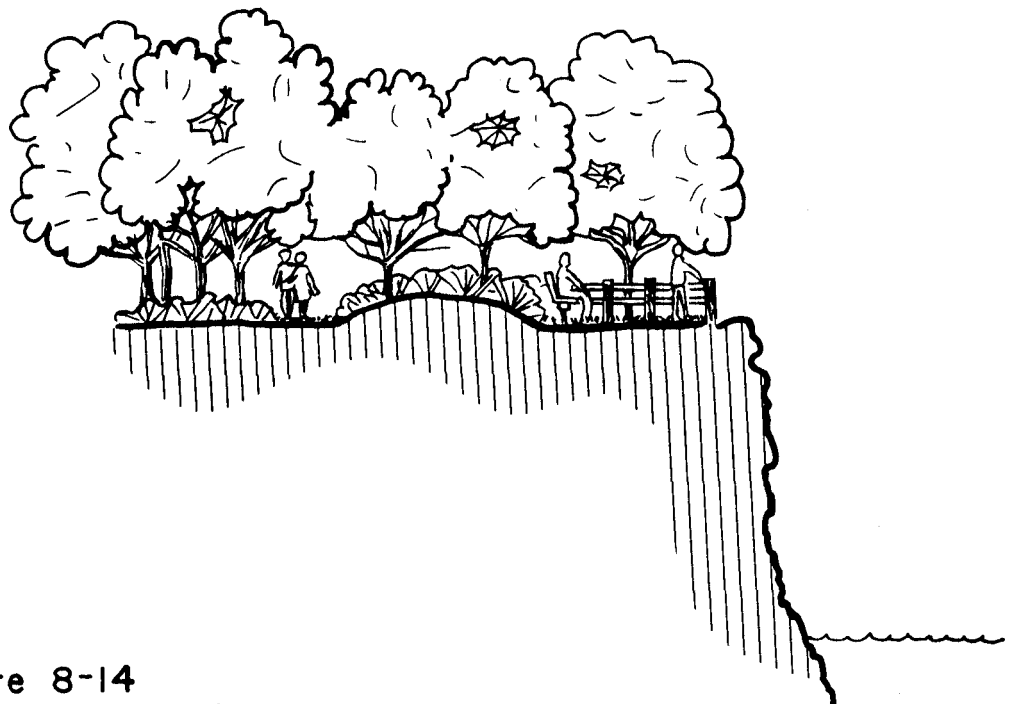
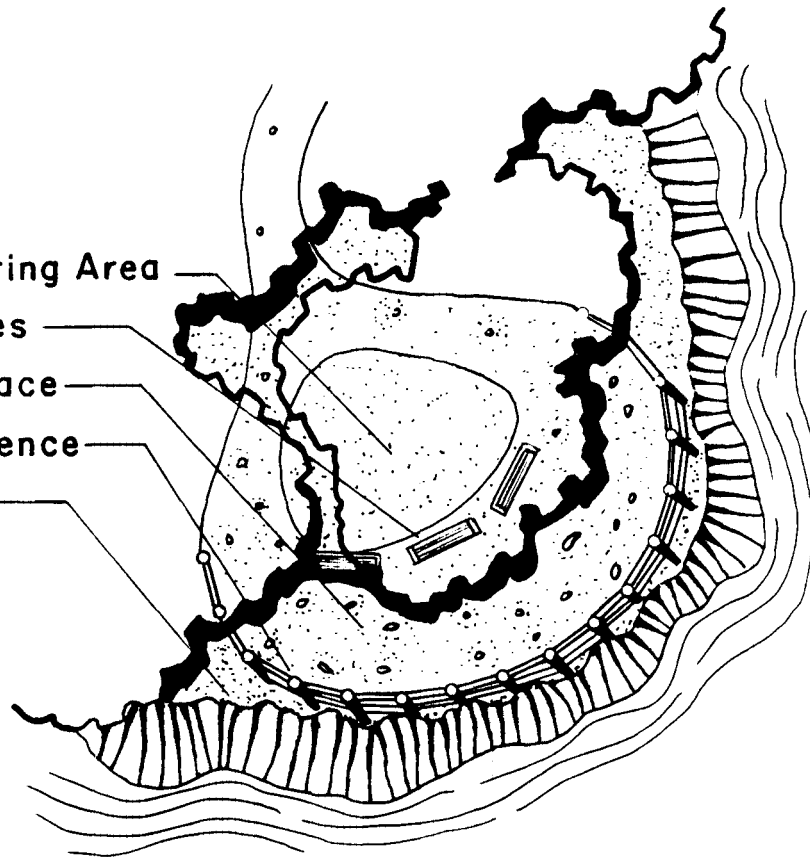


Figure 8-14  
Typical Scenic Overlook

d. Contrasting shoulder material (in texture and color) should be provided.

e. Hand rails or curbs may be necessary if there is a steep cross slope to the trail.

#### 8.14 SIGNS.

A. POLICY. It is the responsibility of the Corps of Engineers to provide appropriate signs and markers at each project to guide, inform, and protect visitors and employees. The effective use of signs is an integral part of project management. Both Corps policy and individual project requirements must be satisfied.

B. SIGNAGE GUIDELINES. Signs should conform to the sign guidelines contained in the Sign Standards Manual, Chapter 4 of EP 310-1-6, Graphics Standards Manual. All other regulations are superseded by this manual. State of West Virginia managed areas will use signage to conform with State standards, although in new license agreement the Corps sign standards should be made part of license documents. Corps project personnel should work with licensees in implementing the sign program.

C. TYPES OF COE SIGNS.

1. IDENTIFICATION SIGNS. All U.S. Army Corps of Engineers projects and facilities are identified with a standard identification sign. The graphic format has been standardized for use at all locations. The standard identification sign is intended for use along public access routes and incorporates the COE signature on the sign panel. At location where under the terms of the lease, a different managing agency has placed their own identification sign, a Corps Participation Credit sign is used. Examples of standard identification signs are shown in Figure 8.15.

A secondard identification sign is available for use within a Corps project. It is placed along project roadways to identify individual facilities within the project. The Corps Signature is not used on the panel. Once a sign is located within a project boundary, the Mark is no longer appropriate. No District or Division identification will be placed on signs.

2. DIRECTIONAL SIGNS. Well planned and properly designed directional signs are important visitor aids. They lead visitors to a Corps project, direct them to various recreation areas, and then guide them to facilities within each area. Directional signs are highly visable and seen by recreation users and people traveling in the vicinity of Corps projects. A sign should be provided at all intersections where change of direction is necessary. Signs directing potential users to a Corps project may be located several miles from the project. Within a recreation area, symbols can be used for directional signs instead of words.

3. RECREATION AREA SIGNS. These signs represent the majority of the signs which will be used on a Corps lake project. This group of signs has a variety of purposes and applications. They outline fees charged, hours of operation, services available, and procedures to be followed. The legends used on these signs have been carefully developed, reviewed, and approved for nationwide use.

4. RECREATION SYMBOL SIGNS. A group of recreation area symbols has been created as part of the Corps Sign Standards System. Most of the symbols were adapted from the National Park Service (NPS) system and refined for greater legibility and clarity of meaning. A number of new symbols have been added to address specific communication needs.

5. TRAFFIC SIGNS. The Manual on Uniform Traffic Control Devices for Streets and Highways has been adopted as the standard for all regulatory and warning signs used on Corps project roadways for vehicular traffic.

6. SAFETY SIGNS. The industrial safety sign system shown in this section has been developed for both public and restricted areas of Corps projects and facilities. The functions of the signs are: to alert or warn people about hazards, to restrict access, and instruct people of safety requirements. Each of the Corps safety signs is designed for a specific intended purpose. There are five basic types of signs in this group: Danger, Caution, Safety, Notice, and Directional Signs. Danger signs are red, Caution are yellow, Safety signs are green, Notice or Control signs are blue. Directional signs are black which point out the way to extinguishing equipment, escapes or exits, and for emergency procedures.

7. REGULATORY SIGNS. The basic regulation that governs all Corps projects is Title 36 (Chapter III, Part 327) of the U.S. Code. A full copy of the code should be placed where it can be easily viewed. All other federal, state, and local laws should be displayed where they are applicable to the project.

8. NAVIGATION SIGNS. These signs provide information and warn of hazards in the water areas of the project. They are intended for boaters primarily.

9. INTERPRETIVE SIGNS. Informative and educational signs describing man-made, ecological, and historical points of interest to visitors.

Typical existing Corps of Engineers signs are shown in Photographs 8.01 through 8.04. A current state wildlife area sign is shown in Photograph 8.05.

#### 8.15 NAVIGATION AIDS.

Small boat navigation aids at Burnsville Lake should include warning, directional, caution, and control buoys which conform to the Uniform State Waterway Marking System and to Coast Guard regulations. Boat launching ramps and marinas should provide adequate lighting to guide evening fishermen and other boaters back to shore. Potential shallows created by drawdowns should be identified as danger areas and buoyed accordingly. Other potential hazard areas should also be identified. The Corps is responsible for providing these navigational aids in the water management areas.

Boating courtesy and safety rules should be posted at all launching ramps and marinas to promote safe and enjoyable boating experiences.

a) Standard identification sign with full name of the project.



a)

b) Standard identification sign with the area name as the primary legend and the project identification placed as the secondary legend.



b)

c) Identification sign with area name as primary legend and cooperating sponsor identified in the secondary legend.

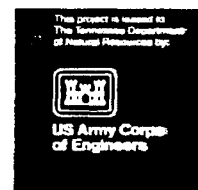


c)

d) Identification sign of operating agency with second sign identifying Corps participation in the project.



d)



e) Secondary identification sign placed within a project or area at the entrance to a specific facility.



e)

Figure 8.15  
Typical Identification Signs  
From Sign Standards Manual



Photograph 8.01

Project entrance sign will be replaced by 1995



Photograph 8.02

Recreation area entrance sign





Photograph 8.03

Symbol Signs



Photograph 8.04

Project Directional Sign



Photograph 8.05

Typical Wildlife Area sign at Big Run

#### 8.16 RECREATION AREA STRUCTURES.

The development of detailed design documents for all of the proposed recreational structures should be based on the following design criteria:

1. All major buildings must present a positive image to the public.
2. The functional areas of the building must be discernible to provide for efficient usage.
3. Facilities should be designed for minimum maintenance and operational expense, and should be as vandal-proof as possible.
4. The design of all structures should reflect the environment which is characteristic of the Burnsville Lake area. Natural materials that are attractive, visually unobtrusive, and that withstand weather and age should be utilized.
5. Natural lighting and ventilation should be optimized to reduce operational costs and to enhance the personal use of structures.
6. The same architectural style and materials should be used throughout the project to provide continuity.
7. Any structures to be located in probable flood zones should be constructed to withstand the effects of flooding.

#### 8.17 WASTEWATER COLLECTION AND TREATMENT.

The type and extent of the system should be designed after thorough investigation of the specific site and discussion with health officials. Some of the type plants and facilities for disposal of wastes are listed below.

A. CONNECTION TO EXISTING PLANT. Connection with existing treatment plant system or participation with a new treatment plant is a logical choice. Under Section 107 of the Water Resources Development Act of 1974 (PL 93-251; 88 Stat. 12) federal participation with local government entities for sewage treatment installation is permitted.

B. TYPES OF SEWAGE TREATMENT SYSTEMS.

1. Central Treatment Plant.

2. Package Units. This type of treatment should be considered for individual facilities.

3. Land Treatment.

4. Stabilization Ponds.

5. Septic Tanks with Tile Fields.

6. Vault and Pit Toilets.

7. Chemical Toilets.

8. Sanitary Waste Stations.

8.18 SOLID WASTE DISPOSAL.

For solid waste disposal, feasible solutions are contracting with off-project sanitary collection, using a land fill on project lands in isolated areas, or incineration. The plan of disposal should be coordinated with local health officials. Dumpsters used on the project should be enclosed by wooden fences.

#### 8.19 ELECTRICAL AND TELEPHONE SERVICE.

These facilities will be located in such a manner as to preserve the landscape and enhance the quality of the environment to the maximum extent. This can be accomplished through the placement of these facilities underground wherever practicable especially with recreation sites. Where public telephones are required, these facilities can be provided within basic structures or especially within park-adapted structures.

#### 8.20 SITE LIGHTING.

Low level night lighting should be provided around camping areas, control stations and sanitary facilities. Security lighting to discourage vandalism and provide lighting for emergency work should be provided at administrative, maintenance, and operational structures. A high intensity light should be provided at boat launch ramps for night identification and night-time launchings. All lighting and electrical service should be designed in accordance with the criteria and standards contained in Appendix A of EM 1110-2-400.

#### 8.21 WATER SUPPLY SYSTEM.

Potable water facilities should be designed in accordance with EM 1110-2-4201. Wells and storage tanks should be screened from public view.

#### 8.22 FACILITIES FOR THE ELDERLY AND THE HANDICAPPED.

To extend practical, existing and future public use, facilities should incorporate measures to accommodate the elderly and the handicapped. Facilities design will take into account the special needs of the elderly and the handi-

capped and will be built according to latest standards. Considerations include:

1. Trails and walks designed with appropriate slope, surfacing and related design features to facilitate easy access and use by all visitors.
2. Building entrance ramps with non-slip surfaces for wheelchair access.
3. Water closets for use by the handicapped in each restroom and a minimum of one accessible restroom in each major recreation area.
4. Special parking spaces to accommodate wheelchair unloading and that allow safe and convenient access to related facility areas.
5. Play equipment, picnic tables, drinking fountains, and other site furniture that allow use by the handicapped.

#### 8.23 SITE REHABILITATION DESIGN CRITERIA.

A. GENERAL. Since Feature Design Memorandums might not be prepared prior to implementing facility rehabilitation projects, general design criteria have been included herein. Rehabilitation efforts of Burnsville Lake will be aimed at upgrading existing facilities to the general standards and criteria provided in the earlier portions of this chapter. The authority for the rehabilitation program is provided by the 1979 Command Goals and Objectives of the U.S. Army Corps of Engineers.

B. ROADS. Existing gravel or paved roads that are in poor condition, or that are inadequate for current use levels, should be repaired and surfaced to meet the standards for new roads.

C. PARKING AREAS. Existing parking areas which show signs of excessive wear, and unsurfaced areas which are used for parking, should be upgraded with a paved or gravel surface, depending on the amount of use. Existing parking areas may need to be made more functional and circulation patterns improved by redesign and/or placement of planting islands. Wheel stops should be placed in lots where they are not existing and mounds or vegetation screen should be provided where they are necessary.

D. CAMPING AREAS. The campground are relatively new and generally meets the design standards. Items which need to be studied further in the rehabilitation of camping areas include:

1. Repaving where necessary.
2. Creation of gravel impact areas.
3. Surfacing or paving paths worn by pedestrian traffic to control and direct campers to use these paths and to reduce the amount of site disturbance.
4. Provide additional landscaping to provide a buffer between sites and to increase the aesthetic quality of the area.
5. Provide areas for basketball or volleyball and horseshoes to enhance visitor use of the area.

Figure 8.16 shows the appropriate measures taken to rehabilitate each site. These measures include paving the parking spur if not already done, adding a lantern post to avoid damage to trees, adding a gravel impact area at all sites to avoid site disturbance and provide a place for tents, and replacement of deteriorated wood site number posts with a new one.

E. PLAYGROUNDS. In the design and rehabilitation of playgrounds, one of the most important factors to be considered is the safety of the children who will use the area. Existing play structures which are worn or broken should be replaced with new structures which meet current standards. The surfaces of playgrounds become worn with time and need to be replenished with additional sand, shredded bark, pea gravel or turf, depending on the existing material. Playgrounds which receive more use than originally anticipated should be made larger and provided with additional play structures.

F. TRAILS. Pedestrian trails should be sited to direct the traffic of users and to try to limit the area of site disturbance caused by constant foot traffic over an area. In locations where pedestrian use had compacted the soil and eliminated ground cover, efforts should be made to aerate and revegetate. Paths and steps will be provided to minimize site disturbance. Trails should be cleared of tree branches and vegetation that represent a potential safety hazard to trail users. Culverts and ditching should be provided where necessary to minimize trail erosion. Steps or ramps should be provided where steeper trail areas are eroding. Steps or switch backs and new trails may be specified for areas where the slopes of existing trails are too steep. Further study for an area may determine areas where existing trails should be made accessible to handicapped persons, in which case the materials and criteria discussed in Section 8.22 will be followed. Trail markers and signs should also be replaced and added as needed.



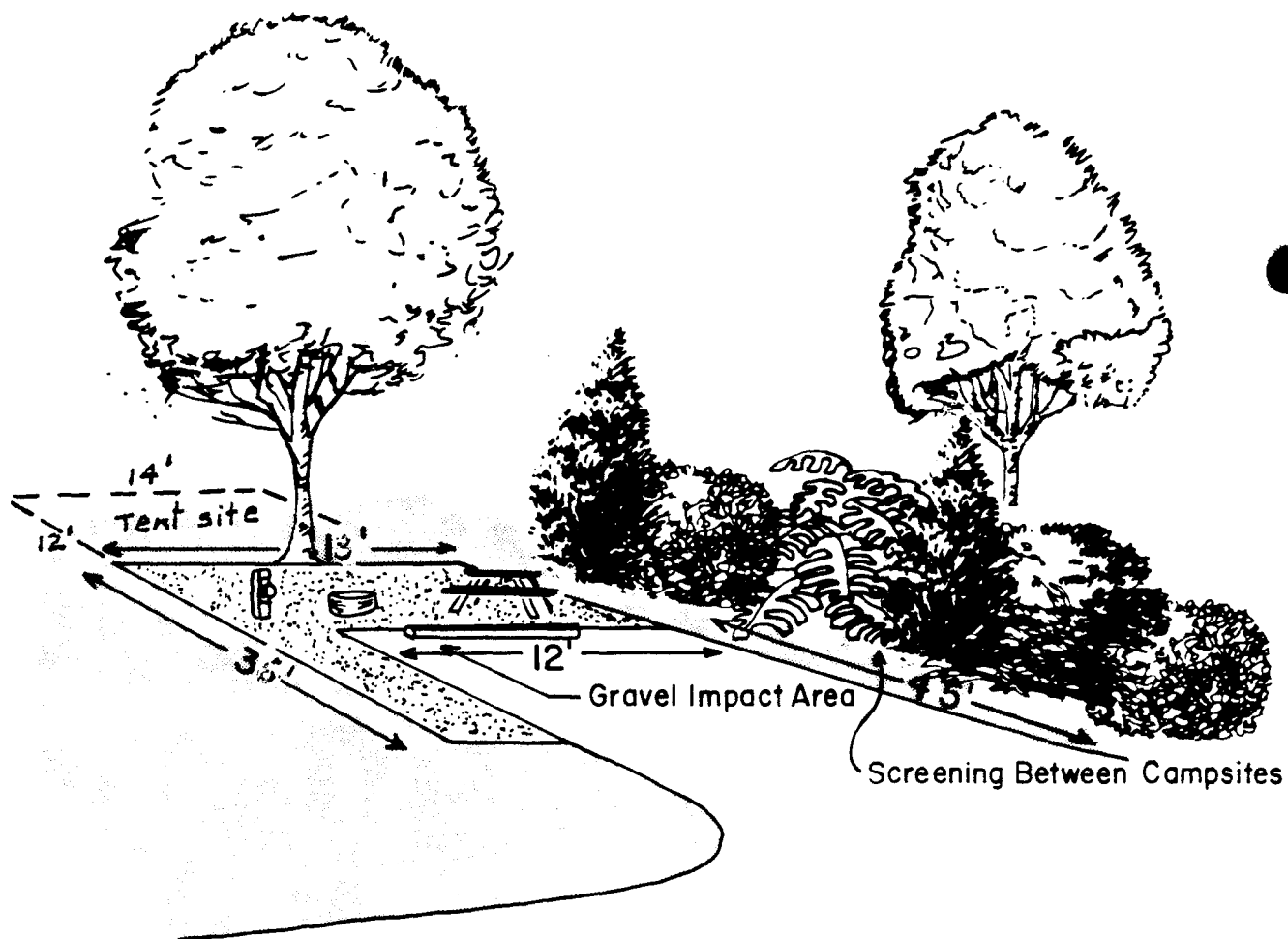


Figure 8.16  
Typical Upgraded Campsite

#### G. RECREATIONAL AREA STRUCTURES.

1. GENERAL. The criteria in this chapter for new structures has been established to provide for aesthetically pleasing and functional structures throughout the project. These criteria also serve to establish unity between sites through the use of similar architectural types and materials. Consideration will be given (during planned rehabilitation efforts) to make existing structures conform to these standards and add to the unity of the project. Rehabilitation efforts will include, but are not limited to the following:

- o Modifying appropriate sites, buildings, and interiors to be accessible to the handicapped.
- o Providing doors and windows which are resistant to vandalism.
- o Provide landscaping to add to the visual appeal of the structure.
- o Enlarge structures as determined to be necessary.
- o Repair or replace any plumbing, electrical, interior finishes and fixtures as required.

H. SHORELINE AND DRAINAGEWAY STABILIZATION. Erosion protection is needed in some areas of the shoreline at Burnsville Lake. Protection is especially needed where the shore is highly visible and/or where the water has already severely eroded the bank. Increasing the grades at the shoreline results in less surface area for erosion to take place and provides a more constant, stable, and attractive bank. Examples of good shoreline

stabilization techniques include placing interlocking rip-rap on the bank, placing gabions as a wall to retain soil and resists wave action along the bank, or constructing walls along the shore where wave action takes place. Planting a water tolerant ground cover with extensive root systems to hold the soil in place will successfully prevent erosion in less critical areas. It is recommended that a more comprehensive study of shoreline erosion be done and that a plan for shoreline stabilization be adopted.

## I. EROSION CONTROL.

1. GENERAL DESCRIPTION. Erosion problems are caused by a number of factors including highly porous soils, wave action, lack of vegetation, pool drawdowns, and surface water runoff.

Further investigation is required to analyze and recommend specific solutions for erosion that may occur at locations throughout the project, particularly along the lake shoreline. The following is only a broad discussion of problem areas and alternative solutions. It should be noted that although the site solutions listed below appear to be simple, specific erosion control procedures should be developed and monitored by experienced site designers.

The following is a list of erosion problems found at Burnsville Lake and their causes:

a. Surface Water Erosion - caused by inadequate storm water drainage facilities and lack of vegetation.

b. Drawdown Erosion - caused by lake drawdowns, normally on slopes of over seven percent. Erosion of this type occurs in several locations but does not impact recreational facilities.

c. Severe Shoreline Erosion - caused by wave action, drawdowns and lack of vegetation on steep slopes over seven percent.

## 2. RECOMMENDATIONS

a. Inventory and evaluate all erosion areas and develop site specific recommendations. Appropriate erosion control techniques may include:

(1) Installation of rip-rap or concrete flairs at culvert outlets.

(2) Excavation of drainage ditches with wide flat bottoms and 4:1 side slopes. Reseed and install netting or hydro-mulch to enhance grass development. In severe cases, it may be necessary to place stone protection in the center of the ditch.

(3) Install rip-rap or construct gabion walls or concrete retaining walls to protect critical use areas. Materials and design will depend on the function of the area.

**chapter 9**  
**resource management guideline**

## CHAPTER NINE

### RESOURCE MANAGEMENT GUIDELINES

#### 9.01 INTRODUCTION.

In conformance with ER 1130-2-400, the District's Operations and Readiness Division will prepare an Operational Management Plan (OMP) for Burnsville Lake. The plan will include two parts. Part I Natural Resource Management; Part II Park Management. Included in Part I is resource protection, forest, fish and wildlife management. Part II will delineate outdoor recreation management and project safety. The Division's responsibilities will include the coordination of this plan with non-Federal entities actively involved in the operation and maintenance of public access sites associated with the project. The Operational Management Plan will be subject to approval by the Division Engineer and will appear under separate cover.

This section of the Master Plan establishes broad management guidelines and policies which form the basis for preparing a detailed OMP. Therefore, this chapter does not provide specific administrative or operational procedures for Burnsville Lake. However, recommendations are included to guide the development of effective policy pertaining to the management of project resources. It is particularly important that the Master Plan provides for the early identification of management relationships and responsibilities in order to minimize conflicts, inefficient management activities, or duplicated efforts.

9.02 NATURAL RESOURCES MANAGEMENT. (Part I)

A. OBJECTIVES. The objective of the Natural Resource Management program is to assure that project lands and waters are protected from damage or degradation and will provide a full diversity of native fish, wildlife and forest resources on a sustained basis in a manner that is compatible with outdoor recreation.

Forest, fish and wildlife management objectives and activities will be addressed in the Annual Management Plans prepared by the West Virginia Department of Natural Resources. The annual management plans establish specific objectives for the integration of fish, wildlife, and forest resource management and conservation.

1. FOREST MANAGEMENT.

a. General. The forest management program at Burnsville Lake emphasizes protection, management and improvement of the forest resources including timber, wildlife habitat, watershed capacity and aesthetics. Recreational opportunities also result from proper management of these resources.

b. Forest Management Plan. In accordance with Public Law 86-717 and ER 1130-2-400, the Corps of Engineers completed a draft Forest Management Plan for the Burnsville Lake project area. This plan was developed in order to initiate a program of forest management for the improvement of aesthetics, recreation, timber, watershed, and fish and wildlife resources.

It included a reconnaissance and description of the area forest resources along with recommendations for forest improvement. The plan included a comprehensive classification of the forest stands that are within project area lands by age, cover type, and slope aspect. It also included a forest cover type map and a cataloging of timber quantity and quality.

Future planning efforts will:

- o Improve measures to protect resource from fire, insects, and disease.

- o Identify forested areas that may be suitable for sustained yield forest management as required by PL 86-717.

- o Identify specific reforestation and landscaping activities that will be undertaken to improve the overall visual character of the project, especially in areas with substantial recreational use opportunities.

- o Identify areas with erosion problems and implement corrective practices; establish guidelines regarding all phases of project management and operations to assure watershed protection.

c. Forest Management of Various Land Use Areas. The development of detailed policies and procedures, and the recommendation of forest management techniques, is beyond the scope of this report. However, general guidelines for the management of the forest in various land allocation categories are suggested as described below:



- o Intensive Recreation Lands - The potential for adverse impacts resulting from public use is relatively high in these areas. Forested areas within intensive recreation lands should be managed to reduce hazards to visitors, to reduce impacts to the forest from those visitors, to provide maximum aesthetic enjoyment, and to provide for utilitarian needs such as screening and shade.

- o Multiple Resource Management Land - Management of the forest in the multiple resource area should improve timber quality and create diverse habitats that can support a variety of game and non-game wildlife species. Management of these lands should be accomplished under the guidance of a professional forester and a wildlife biologist. Species composition, the location and shape of openings, and edge treatment should be designed to create an environment that is beneficial to wildlife and aesthetically pleasing to users.

- o Monitoring Program and Plan Review - A forest resource monitoring program should be designed and implemented to record the impact of various land use activities on plant communities. The results of this monitoring program would be helpful in making planning and management decisions in the future and in detecting areas endangered by overutilization.

## 2. FISH AND WILDLIFE MANAGEMENT.

a. General. Burnsville Lake provides an environment which is capable of sustaining diverse fish and wildlife populations. It is important that these resources be protected so that the public may derive benefits associated with such activities as fishing, hunting, nature study and photography.

The fish and wildlife management program must be coordinated with other management plans including forest management, public use area development and maintenance, and interpretive programs. The program should consider the species being managed, habitat needs, condition of existing habitat, habitat maintenance, staff requirements, and planned coordination between the Corps of Engineers and the West Virginia Department of Natural Resources.

Major objectives of the updated management program are to:

- o Preserve and maintain suitable habitat conditions necessary for fish and wildlife propagation while maintaining an appropriate ecological balance.

- o Provide recreational opportunities through both consumptive and nonconsumptive uses of fish and wildlife resources.

- o Protect native fish and wildlife populations from exploitation and environmental degradation.

- o Manage the fish and wildlife resources to obtain benefits commensurate with the lake's primary function of flood protection, water quality control, and recreation.

- o Coordinate of the fish and wildlife program with other activities such as forest management, recreation area development, and interpretive programs.

b. Existing Plans. The West Virginia Department of Natural Resources is primarily engaged in management activities for game species under its existing Annual Management Plan. This involves mainly the establishment of wildlife food plots to attract a wide variety of game.

Other habitat techniques are employed such as edge cover protection, vegetation manipulation, and a stocking and release program in remote areas.

The state closely monitors the deer herd populations in the areas and periodically is engaged in a stocking program. Other game species found in the area and receiving management considerations are Wild Turkeys, Cottontail rabbit, Mourning dove, Raccoon, and Grouse.

3. FIRE PROTECTION. A fire protection program has been developed by the Corps of Engineers to establish a policy with regard to the control and suppression of fires. This program includes guidelines related to equipment needs, training of personnel, visitor education and awareness, fire response procedures, cooperative agreements with local community fire departments, and procedures for communication with these groups.

The West Virginia DNR and the Corps of Engineers cooperate with regard to fire suppression activities. The Resource Manager is responsible for initiating action regarding fire protection at Burnsville Lake. Fire hazard rating information may be obtained by the Resource Manager from the West Virginia Forestry Division which also has primary responsibility for surveillance.

9.03 PARK MANAGEMENT. (Part II)

A. OBJECTIVES. The objective of the recreation program is to provide safe and healthful recreational opportunities which feature enjoyment of the land and water resources of the project. Examples of featured activities include hunting, fishing, hiking, boating, camping and picnicking.

B. SCOPE. The recreation management program will include all aspects of outdoor recreation. The program will be outlined in detail in Part II "Park Management" of the OMP which will also contain the project safety program for employees, contractors and the visiting public.

Part II of the OMP will provide guidance concerning security, visitor

assistance, lakeshore management, outgrant management, maintenance, recreation, use fees, interpretation, cultural resources, special programs and inter-agency cooperation.

Detailed guidance concerning preparation of the OMP is contained within ER 1130-2-400.

C. WVDNR LICENSE FOR FOREST, FISH AND WILDLIFE MANAGEMENT.

1. INTRODUCTION. The Corps of Engineers is responsible for operation of the project for its primary purposes and for defining administrative policy for management of its land and water resources. The management of land and water areas by the West Virginia DNR will continue to be accomplished under a license agreement for forest, fish, and wildlife management.

2. SCOPE. The West Virginia DNR will be principally responsible for implementation of the natural resource management program outlined in Part I of the OMP. Part I will set forth the natural resource management objectives as previously presented in section 9.02 paragraph A OBJECTIVES of this master plan. In addition, it will provide an administrative structure which will require continuous coordination between the Corps Resource Manager and the WVDNR staff assigned to Burnsville Lake.

Part I must reflect both the requirements and the limitations imposed by the existing license. Management initiatives contained within the OMP, must be jointly developed by the Resource Manager and the WVDNR staff. As mentioned previously, detailed guidance concerning preparation of the OMP is contained within ER 1130-2-400.

3. COORDINATION MEETINGS. The OMP Part I should provide for periodic meetings between Corps staff and WVDNR staff. Problems should be discussed and the OMP reviewed to assure currentness. Proposed revisions should be jointly formulated.

4. MANAGEMENT AND OPERATIONAL RESPONSIBILITIES. The Huntington District, Corps of Engineers, will assume primary responsibility for the coordination of planning, management and operations activities. The West Virginia DNR will assume a major role in matters regarding natural resource management and public fishing and hunting. In compliance with the license agreement between the state and the Department of the Army, the Corps of Engineers will be responsible for monitoring and approving activities initiated on all federally-owned land.

5. CORPS OF ENGINEERS. The Corps of Engineers, in cooperation with the West Virginia DNR will:

a. Monitor all types of public recreation use and available recreation technology so as to ensure efficient management.

b. Prepare and periodically review an Operational Management Plan.

c. Monitor changes in environmental quality (terrestrial and aquatic) that may occur as a result of certain use activities on or near project lands.

d. Keep records on water quality and volume of water discharged from the dam.

e. Establish and maintain seasonal water levels that are most compatible with the project's authorized purposes. The Corps of Engineers will provide the State with a written copy of the water management plan so that they can coordinate their activities with anticipated pool fluctuations.

f. Review and approve all subleases, licenses, concession contracts, management plans, and development plans proposed by the State.

g. Periodically review the need to acquire or lease additional lands, and establish and maintain boundary monuments.

h. Periodically evaluate the Master Plan and make revisions to reflect current conditions and public needs. The Master Plan should be revised on a continuous basis, if possible to avoid costly future updates.

i. Monitor and resolve all cases of unauthorized use of project lands and waters including visual and physical encroachments.

j. Encourage local governments to adopt and enforce appropriate regulations to control private development adjacent to the project, thereby avoiding the resultant problems of water pollution, visual pollution, solid waste disposal on public lands, or use of project roads to provide access to private property.

k. Establish a permanent program to identify areas of significant environmental problems or degradation, and remedy these situations through established conservation techniques.

6. STATE OF WEST VIRGINIA. The West Virginia DNR, in cooperation with the Corps of Engineers will:

a. Implement a comprehensive resource management program in accordance with the license requirements. The Corps of Engineers has ultimate responsibility for all land use on the project.

b. Participate in the coordination and review of the Master Plan for Burnsville Lake.



c. Coordinate with the Corps of Engineers during the detailed planning and construction stages of all cost-shared facilities and improvements.

d. Perform all cleanup activities on areas licensed to the State.

e. Maintain all facilities including buildings, roads, barricades, etc., on State licensed areas.

f. Provide planning and design documents required to develop any 100 percent state-funded facilities beyond the general guidelines provided in the Master Plan and coordinate this planning and development with the Corps of Engineers.

g. Enforce all laws and regulations within the purview of WVDNR.

h. Patrol leased area boundary line for unauthorized use and encroachment.

7. OPERATION AND MAINTENANCE FACILITIES. The Corps of Engineers maintains an office and maintenance building at the dam site. These buildings provide office space for Corps of Engineers personnel, maintenance and storage areas required to maintain the dam and adjacent recreation areas.

8. LAW ENFORCEMENT. A specific law enforcement policy should be developed within the OMP. The jurisdictional boundaries of the various law enforcement agencies should be identified.

Several law enforcement agencies patrol the project lands and waters. In acquiring lands necessary for the project, the Federal Government did not seek or obtain exclusive jurisdiction on fee-owned lands. Consequently, all state laws continue to apply, and State and local law enforcement agencies continue to have jurisdiction and enforcement responsibilities.

9. FEE SYSTEMS AND COLLECTION.

a. Corps of Engineers. Entrance or admission fees may not be charged by the Corps of Engineers on project lands that are managed by the Corps of Engineers. However, user fees may be collected at Corps of Engineers facility areas that have been designated by the Secretary of the Army in accordance with applicable law. The Corps collects fees for reserving picnic shelters, use of campsites, and for Special Event Permits.

b. State of West Virginia. The State DNR does not collect fees for use of the licensed land and water areas.

10. UPDATE SCHEDULING. The Resource Manager will prepare an annual work plan to implement the work required to fulfill the Corps of Engineers management procedures described in the OMP. This work plan will include such items as equipment and material needs, manpower requirements, budgetary requirements, schedules for starting and completing each task, and other data that will be required to implement the plan. All planning will be done within a five-year time frame and the entire OMP is to be updated when considered necessary.

**chapter 10**  
**cost estimates**

CHAPTER 10  
COST ESTIMATES

10.01 INTRODUCTION

The cost estimates in the following tables show the costs for the proposed facilities as described in Chapter Seven. Proposed facilities are given a time frame for implementation of 0-3 years, or 3-6 years based on estimated need. Future plans have a time frame of roughly 6-12 years and were not estimated as these costs would occur at a later time. If these facilities are needed, detailed cost estimates will be prepared based on current price levels. Review of this Master Plan will reveal other facility needs which will be incorporated into the final plan. Costs estimated in the tables are based on August 1988 price levels.

TABLE 10.01

Summary of Estimated Costs (Proposed 0-6 Years)

Riffle Run Campground	6,000
Bulltown Day Use Area	27,000
Bulltown Campground	<u>409,000</u>
Total Construction Costs	\$442,000

TABLE 10.02  
Riffle Run Campground

Description	Development Period	Unit	Unit Cost	Quantity	Cost
Game Pad	0-3	EA	5,000	1	<u>5,000</u>
			Subtotal		5,000
			Contingencies		<u>1,000</u>
			Total Construction Cost		6,000

TABLE 10.3  
Bull Town Day Use Area

Description	Development Period	Unit	Unit Cost	Quantity	Cost
Beach Extension	0-3	TON	22.50	875	19,250
Buoy Posts (2) and Line w/floats (22 lf)		JOB		1	<u>2,100</u>
			Subtotal		21,350
			Contingencies		<u>5,650</u>
			Total Construction Cost		27,000

Note: These assumptions were made for beach area:

- (1) Beach is 130' long x 100' wide x 12" thick (sand, this gives 481 Cubic yards of approx. 975 Tons.
- (2) Buoy Posts and Line needed for swimmers' safety should be added to existing posts and line.

TABLE 10.04  
Bull Town Campground

Description	Development Period	Unit	Unit Cost	Quantity	Cost
Campsites	3-6	EA	1,300	60	78,000
12-ft Paved Road	3-6	SY	12.80	1,600	20,480
Signs	3-6	EA	200	6	1,200
Game Pads	0-3	EA	5,000	3	15,000
Group Shelter	0-3	EA	25,000	1	25,000
<u>SEE NOTES BELOW FOR EXPLANATION OF THESE ITEMS</u>					
Washhouse Type A	3-6	JOB		1	120,000
2-inch water line	3-6	LF	10.00	1,600	16,000
Lift Station 2 HP 32 GPM	3-6	JOB		1	18,000
3-inch force main	3-6	LF	14.00	2,400	<u>33,600</u>
Subtotal					327,280
Contingencies					<u>81,720</u>
Total Construction Cost					\$409,000

Note: These assumptions were made for campground:

- (1) Campsite consists of:
  - a. 12' x 45' paved area; 2.5" paving and 6" aggregate
  - b. 14' x 45' aggregate camp site; 4" thick
  - c. Outdoor grill
  - d. Lot number sign
  - e. Parking block
  - f. One trash can per 2 campsites
- (2) 12-ft road has 1" surface, 1.5" intermediate and 8" aggregate base.
- (3) Type A washhouse should be used, similar to previous Burnsville Recreation work. (Walking distance to other facilities is too far; +/- 800 ft.)
- (4) Water service and sewage facilities will be needed for campers and washhouse.





CHAPTER 11  
CONCLUSION AND RECOMMENDATIONS

11.01 CONCLUSIONS

The major task of the Master Plan was to present the existing environmental and cultural resources of the project area, to inventory the operational and recreational facilities at the project, and develop plans to facilitate long range improvements that would be in harmony with projected conditions.

Burnsville Lake has been in existence since 1978, and excellent initial planning has provided for most of the needed recreational and operational facilities. The primary purpose of this master plan is to update the project information and provide for the improvement of existing facilities or in some cases add new facility areas to meet demand.

The West Virginia Statewide Comprehensive Recreation Plan for 1988-1992 concluded that there was a need in this region for more high density recreation areas with specific increases in picnic sites, playgrounds, swimming beaches and outdoor pools, developed and primitive campsites, tennis courts, facilities for fairs and festivals, and league sports. There is also a need for more jogging and walking trails, bicycling trails, fishing access sites, cross-country skiing trails, and target shooting ranges.

Population projections for SCORP Region 7 show a growth to 141,000 persons by the year 2030, a 19 percent increase from the 1980 population of 118,500.

This is a fairly small increase compared to other states, and regions within West Virginia. Major facility needs for the project consist of at least 60 more camping sites, about 50 more picnic units, and an expansion of the swimming facilities which includes a larger beach area and more parking during heavy use periods. There is also a need for more recreational facilities within the campgrounds. Plans have been presented for future expansion of these facilities at the project.

In order to properly design and improve recreational development, specific design criteria have been revised and summarized in Chapter 8. Criteria in effect for Corps of Engineers projects and other accepted criteria were incorporated into a single source that can be used to guide facility design at the project.

#### 11.02 RECOMMENDATIONS.

A. PHYSICAL DEVELOPMENT RECOMMENDATIONS. It is recommended that the plans and criteria pertaining to the physical development of the project presented in this Master Plan be accepted and used to guide the present and future development and use of the Burnsville Lake project.

#### B. MANAGEMENT RECOMMENDATIONS

1. It is recommended that the Corps of Engineers and the West Virginia Department of Natural Resources continue formulation of programs and policies that address the issues and management responsibilities summarized in

Chapter 9 of the Master Plan in the formulation of an OMP. This plan will include specific recommendations for Natural Resources Management and Park Management. It will replace the former Master Plan Appendices A (Project Resource Management), B (Forest Management), C (Forest Fire Control), D (Fish and Wildlife Management), and E (Project Safety Plan).

2. It is recommended that all management plans and activities be closely monitored, coordinated between the Corps of Engineers and the State of West Virginia, and periodically reviewed.



APPENDIX I  
LIST OF FISHES, MAMMALS AND BIRDS  
OF THE PROJECT AREA

TABLE 1

## LIST OF FISHES OF THE LITTLE KANAWHA RIVER

(Jenkins, Lachner and Schwartz, 1972, (Miller, 1972))

	<u>Common Name</u>
Ohio Lamprey	Black bullhead
Allegheny brook lamprey	Yellow bullhead
Least brook lamprey	Channel catfish
	Flathead catfish
Paddlefish	Brindled madtom
	Stonecat
Longnose gar	
American eel	Trout-perch
Brook trout (introduced)	White bass
Muskellunge	Rockbass
	Green sunfish
	Orange spotted sunfish
Stoneroller minnow	Bluegill
Carp (introduced)	Longear sunfish
Redside dace	Smallmouth bass
Silverjaw minnow	Spotted bass
Bigeye chub	Largemouth bass
Streamline chub	White crappie
Silver chub	
River chub	Eastern sand darter
Common shiner	Greenside darter
Bigmouth shiner	Rainbow darter
Silver shiner	Bluebreast darter
Rosyface shiner	Fantail darter
Spotfin shiner	Johnny darter
Sand shiner	Tippecanoe darter
Mimic shiner	Variegate darter
Bluntnose minnow	Banded darter
Fathead minnow (introduced)	Logperch
Creek chub	Blackside darter
	Sharpnose darter
Quillback	Slenderhead darter
Common sucker	
Hog sucker	Mottled sculpin
Spotted sucker	
River redhorse	Small-mouth buffalo
Black redhorse	Emerald shiner
Golden redhorse	
Shorthead redhorse	

TABLE 2

## MAMMALS POSSIBLY FOUND IN LITTLE KANAWHA RIVER BASIN

	<u>Common Name</u>	
Hairy-tailed Mole	Eastern Fox Squirrel	Eastern Cottontail
Short-tailed Shrew	Northern Flying Squirrel	Mearns Cottontail
Masked Shrew	S. Flying Squirrel	White-Tailed Deer
Long-tailed Shrew	Beaver	Little Brown Bat or Myotis
Smoky Shrew	Eastern Harvest Mouse or (Short-Eared Harvest Mouse)	Small-footed Myotis (Least Brown Bat)
Water Shrew	Merriam Harvest Mouse	Keen's Myotis or (Trouessart's Bat)
Least Shrew	Northern Whitefooted Deer Mouse	Indiana Bat or Myotis (Rare in West Virginia)
Raccoon	Deer Mice	Silver-Haired Bat
Long-tailed weasel	Eastern Woodrat	Eastern Pipistrelle
Least weasel	Southern Bog Lemming (Lemming mouse)	Hoary Bat
Mountain mink	(Boreal) Carolina or Gapper's Red Backed Mouse or Vole	Red Bat
Brown mink	Yellownose or Smoky Mtn. Rock Vole	Big Brown Bat
Stripped skunk	Pine Mouse	Rafinesque's or Big-eared Bat
Spotted skunk	Common Muskrat	Virginia or Townsend's Big- eared Bat
Grey fox	Norway Rat	Western Big-Eared Bat
Red Fox	House Mouse	Eastern Big-Eared Bat
Bobcat	Woodland Jumping Mouse	
Black Bear	Roan Mountain Jumping Mouse (Critical)	
Woodchuck (Groundhog)	Meadow Jumping Mouse	
Eastern Chipmunk		
Eastern Red Squirrel		
Eastern Gray Squirrel		

TABLE 3

## BIRDS PROBABLY FOUND IN LITTLE KANAWHA RIVER BASIN

	<u>Common Name</u>	
Pied-billed Grebe	Rock Dove	Least Flycatcher
Green Heron	Yellow-billed Cuckoo	Eastern Wood Pewee
Black-crowned Night Heron	Black-billed Cuckoo	Prairie Horned Lark
Least Bittern	Barn Owl	Rough-winged Swallow
Mallard	Screech Owl	Barn Swallow
Black Duck	Great Horned Owl	Purple Martin
Blue-winged Teal	Barred Owl	Blue Jay
Wood Duck	Whip-poor-will	Common Crow
Hooded Merganser	Chimney Swift	Carolina Chickadee
Turkey Vulture	Ruby-throated Hummingbird	Tufted Titmouse
Broad-winged Hawk	Belted Kingfisher	White-Breasted Nuthatch
Sparrow Hawk	Yellow-shafted Flicker	House Wren
Bobwhite	Pileated Woodpecker	Carolina Wren
Turkey	Red-bellied Woodpecker	Mockingbird
King Rail	Red-headed Woodpecker	Catbird
Virginia Rail	Hairy Woodpecker	Brown Thrasher
Sora Rail	Downy Woodpecker	Robin
American Coot	Eastern Kingbird	Wood Thrush
Killdeer	Great-crested Flycatcher	Eastern Bluebird
American Woodcock	Eastern Phoebe	Blue Gray Gnatcatcher
Spotted Sandpiper	Acadian Flycatcher	Cedar Waxwing
White-rumped Sandpiper	Traill's (Alder) Flycatcher	Starling



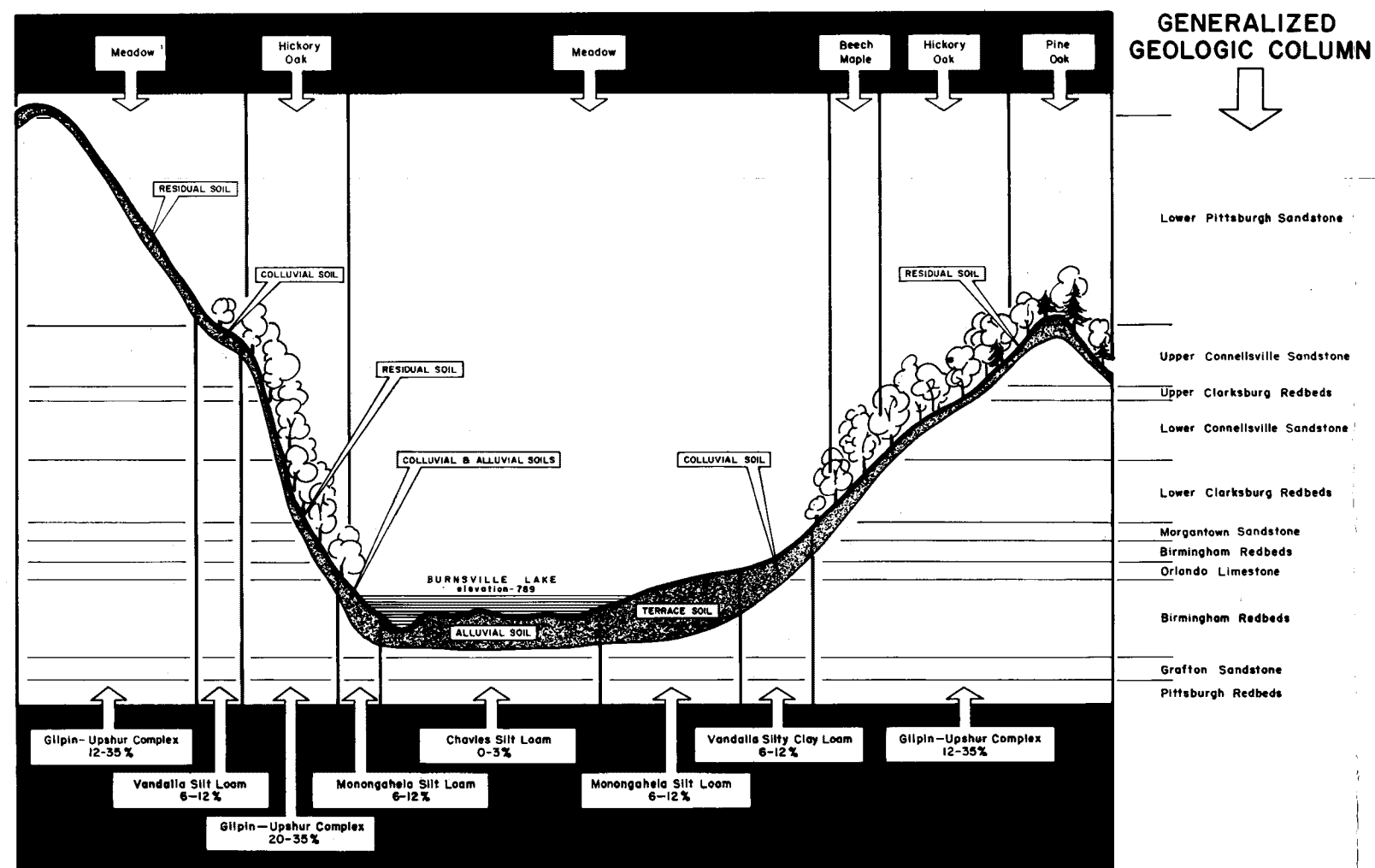
TABLE 3 (Cont'd)

<u>Common Name</u>		
White-eyed Vireo	Sycamore (Yellow Throated Warbler)	Blue Grosbeak
Red-eyed Vireo	Pine Warbler	Indigo Bunting
Yellow-throated Vireo	Prairie Warbler	American Goldfinch
Common Crow	Ovenbird	Rufous-sided Towhee
Carolina Chickadee	Louisiana Waterthrush	Grasshopper Sparrow
Tufted Titmouse	Kentucky Warbler	House (English) Sparrow
White-Breasted Nuthatch	Mourning Warbler	Eastern Meadowlark
House Wren	Yellowthroat	Red-winged Blackbird
Carolina Wren	Yellow-breasted Chat	Orchard Oriole
Mockingbird	Hooded Warbler	Baltimore Oriole
Catbird	Canada Warbler	Common Grackle
Brown Thrasher	American Redstart	Brown-headed Cowbird
Warbling Vireo	Eastern Henslow's Sparrow	
Black & White Warbler	Vesper Sparrow	
Prothonotary Warbler	Lark Sparrow	
Worm-eating Warbler	Chipping Sparrow	
Golden-winged Warbler	Field Sparrow	
Blue-winged Warbler	Eastern Song Sparrow	
Parula Warbler	Scarlet Tanager	
Yellow Warbler	Summer Tanager	
Black-throated Green Warbler	Cardinal	
Cerulean Warbler		

APPENDIX II

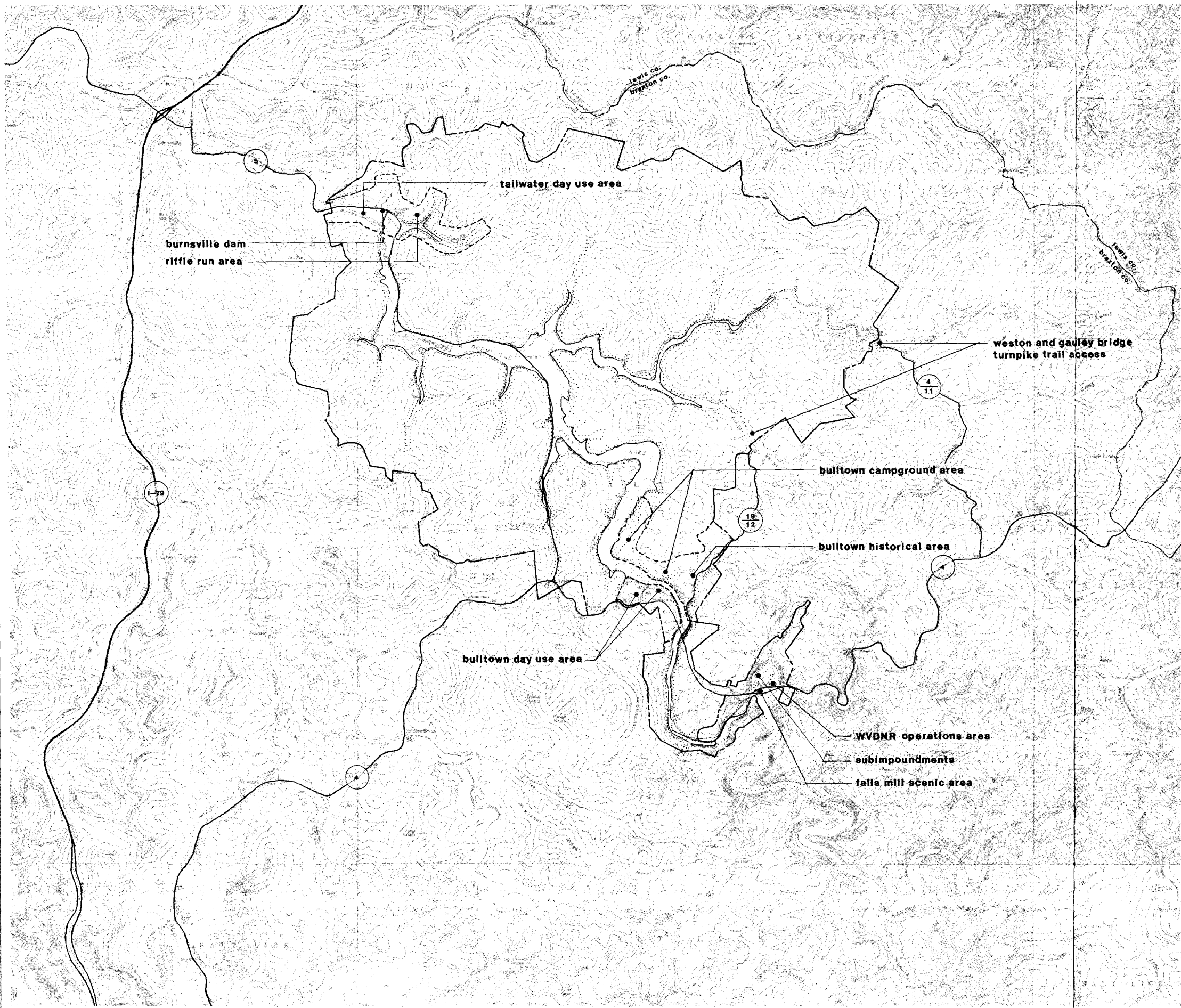
EXHIBITS 4-12

# typical soil, vegetation & geologic profile



project area  
topography

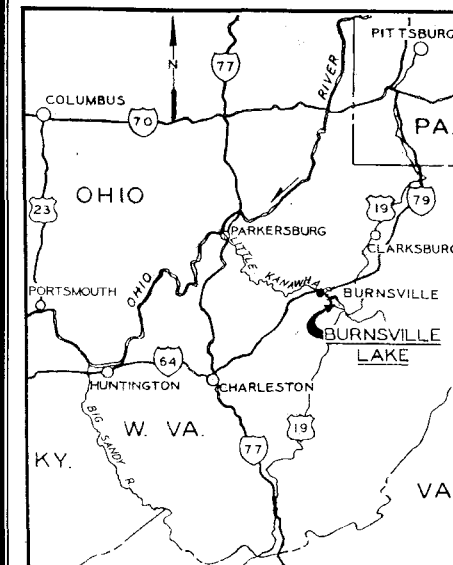
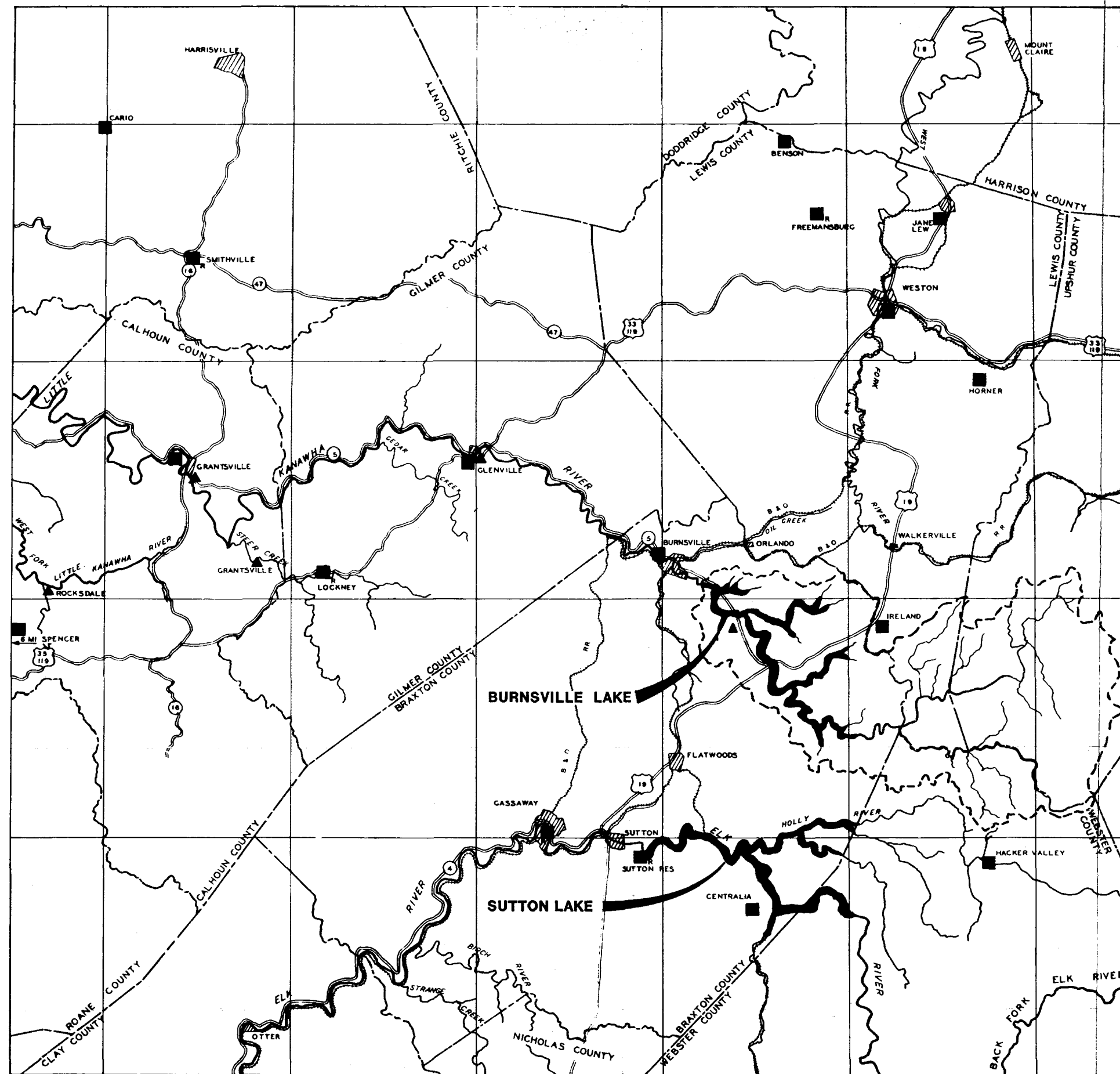
- LEGEND
- project boundary
  - WVDNR license boundary
  - 789.0 seasonal pool
  - 825.0 maximum flood control pool



little kanawha river basin  
west virginia  
burnsville lake  
master plan update  
u. s. army engineer district  
huntington  
corps of engineers  
exhibit 5



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VICINITY MAP

20 10 0 20 40  
SCALE IN MILES

## burnsville lake drainage basin

### LEGEND

- drainage area boundary
- county boundary
- u.s. highway
- state highway
- railroad
- recording stream gage
- towns or communities
- towns or communities

little kanawha river basin  
west virginia


## burnsville lake master plan update

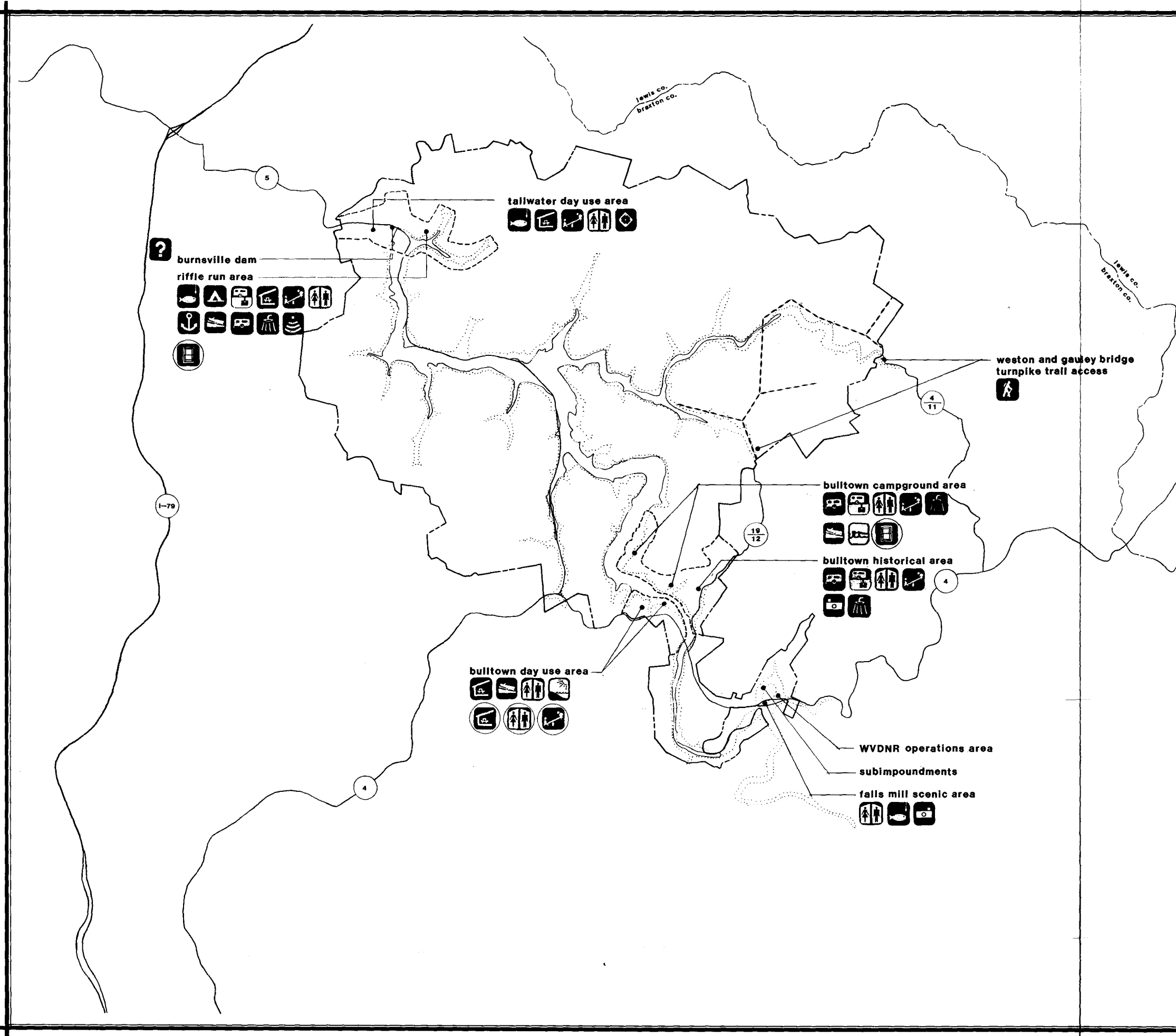
u. s. army engineer district  
huntington  
corps of engineers  
exhibit 6

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# recreation facility distribution map

## LEGEND

-  project boundary
-  WVDNR license boundary
-  789.0 seasonal pool
-  825.0 maximum flood control pool
-  visitor/park headquarters
-  camping area
-  trailer waste station
-  picnic area
-  picnic shelter
-  washhouse
-  restrooms
-  boat launch ramp
-  marina
-  mooring stanchions
-  beach area
-  fishing/handicap fishing
-  playground/tot lot
-  softball field
-  game court
-  amphitheatre
-  scenic overlook
-  hiking trail
-  proposed recreation facility



little kanawha river basin  
west virginia

burnsville lake  
master plan update

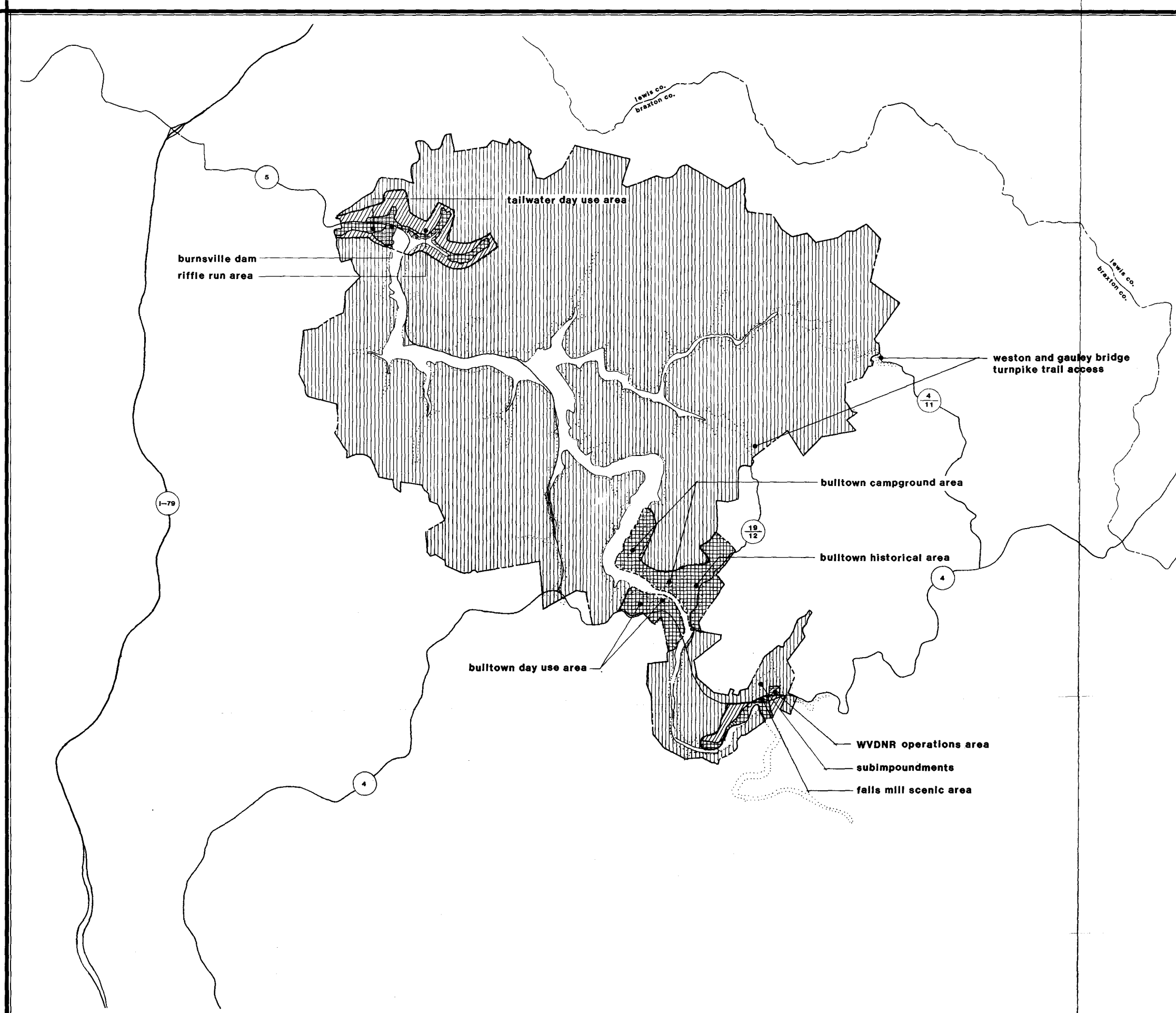
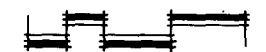
u. s. army engineer district  
huntington  
corps of engineers  
exhibit 7

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# land use plan

## LEGEND

-----	project boundary	
-----	WVDNR license boundary	
789.0	seasonal pool	
825.0	maximum flood control pool	
<b>FEDERALLY OWNED AND MANAGED LAND</b>		<b>acres</b>
[diagonal lines]	operations	30
[cross-hatch]	intensive recreation	472
[diagonal lines]	low density recreation	131.5
	<b>subtotal</b>	<b>633.5</b>
<b>FEDERAL LAND LICENSED TO WEST VIRGINIA DNR</b>		
[diagonal lines]	WVDNR operations area	5
[cross-hatch]	multiple use area	11606
[white]	lake area (seasonal pool)	968
	<b>subtotal</b>	<b>12579</b>
<b>FEDERAL LAND LICENSED TO MARINA CONCESSION</b>		
[cross-hatch]	marina	11.5
	<b>total federal land</b>	<b>13224</b>
	<b>federal land-weston gauley bridge trail (outside project)</b>	<b>70</b>
	<b>federal flood easement</b>	<b>98</b>



# water use plan

LEGEND

project boundary

WVDNR license boundary

789.0

seasonal pool

825.0

maximum flood control pool

SEASONAL POOL

acres

boat exclusion area (dam and beach)

2

controlled area no wake zone

424

unrestricted area

542

hazard zone at minimum pool - submerged road, bridge

little kanawha river basin

west virginia

burnsville lake

master plan update

u. s. army engineer district

huntington

corps of engineers

exhibit 9

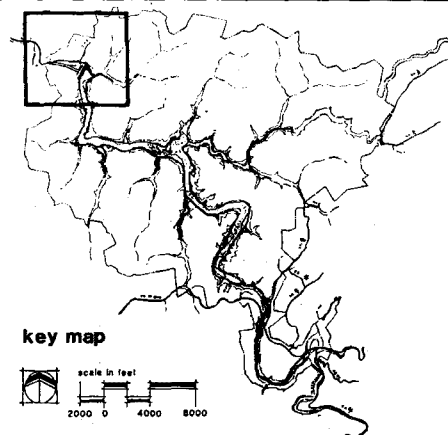
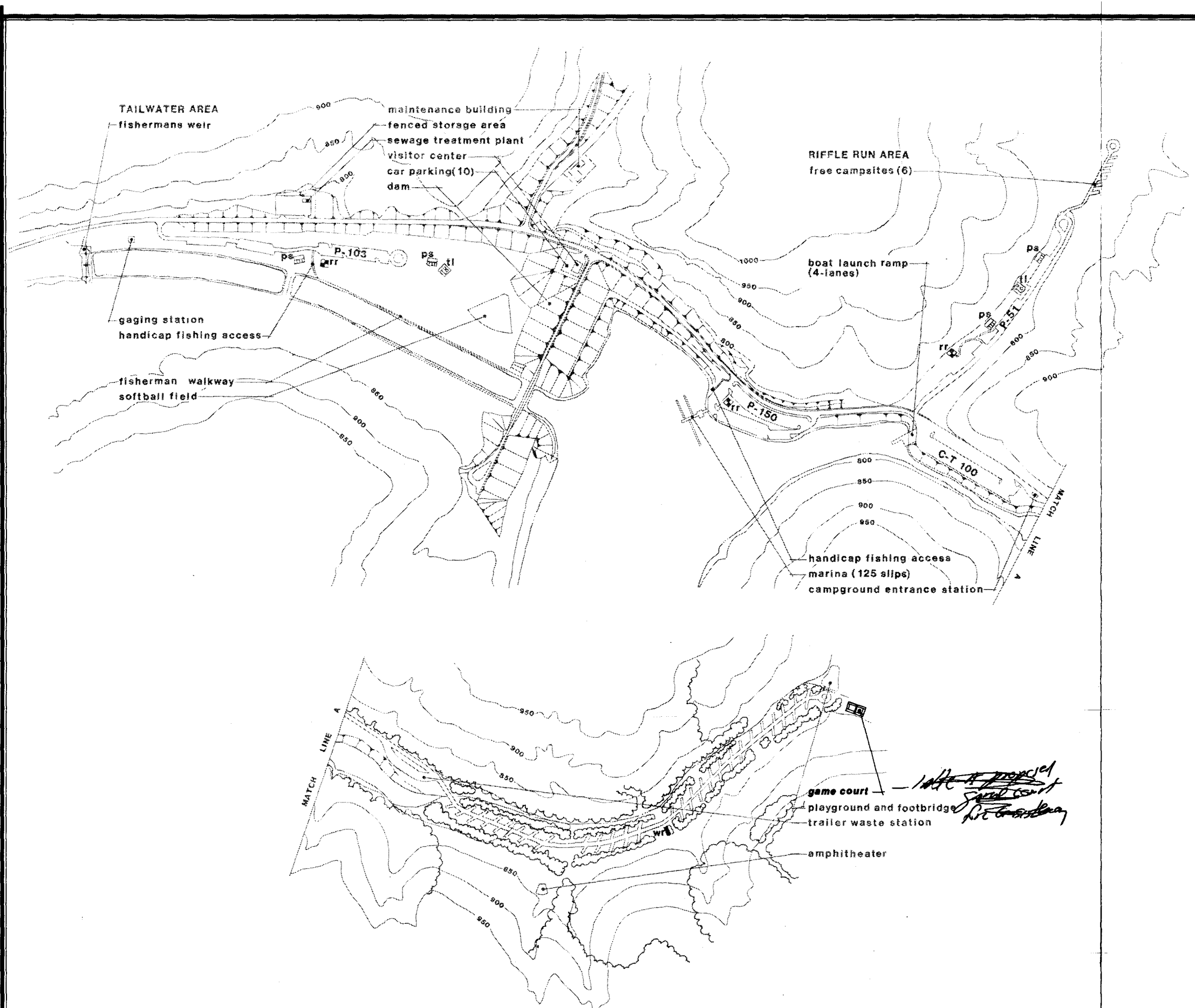
R/Ankrom Associates

Landscape Architecture & Land Planning

The map illustrates the Burnsville Lake area, showing the project boundary, WVDNR license boundary, and various water use zones. Key features include:

- Project Boundary:** Indicated by a solid line.
- WVDNR License Boundary:** Indicated by a dashed line.
- Seasonal Pool:** Indicated by a dotted line at 789.0 feet.
- Maximum Flood Control Pool:** Indicated by a dotted line at 825.0 feet.
- Boat Exclusion Area (Dam and Beach):** Indicated by a cross-hatched pattern, covering 2 acres.
- Controlled Area (No Wake Zone):** Indicated by a horizontal line pattern, covering 424 acres.
- Unrestricted Area:** Indicated by a white area, covering 542 acres.
- Hazard Zone at Minimum Pool:** Indicated by a dashed line, representing submerged roads and bridges.
- Geographical Features:**
  - Burnsville Dam:** Located on the left side of the lake.
  - Riffle Run Area:** Located near the dam.
  - Tailwater Day Use Area:** Located near the dam.
  - Bulltown Day Use Area:** Located in the lower central part of the lake.
  - Bulltown Campground Area:** Located in the lower central part of the lake.
  - Bulltown Historical Area:** Located in the lower central part of the lake.
  - Weston and Gauley Bridge Turnpike Trail Access:** Located on the right side of the lake.
  - WVDNR Operations Area:** Located in the lower right part of the lake.
  - Subimpoundments:** Located in the lower right part of the lake.
  - Falls Mill Scenic Area:** Located in the lower right part of the lake.
- Other Labels:**
  - Lewis Co. Braxton Co.:** Located at the top of the lake.
  - Lewis Co. Braxton Co.:** Located on the right side of the lake.
  - 1-79:** Located on the left side of the lake.
  - 4:** Located in the lower left part of the lake.
  - 19/12:** Located in the lower central part of the lake.
  - 4/11:** Located on the right side of the lake.





## dam area & riffle run

### LEGEND

- project boundary
- 780.0 seasonal pool
- 825.0 maximum flood control pool
- existing vegetation

### EXISTING FACILITIES

- P-5 road and car parking
- C-T 5 car and trailer parking
- WR washhouse / restroom
- rr restroom-waterborne
- ps picnic shelter
- tl tot lot
- walkway

### FUTURE FACILITIES

- game court

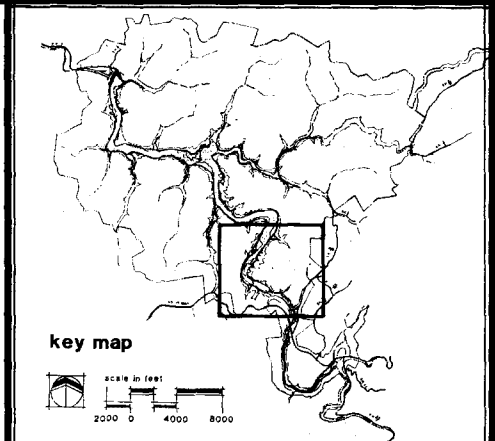
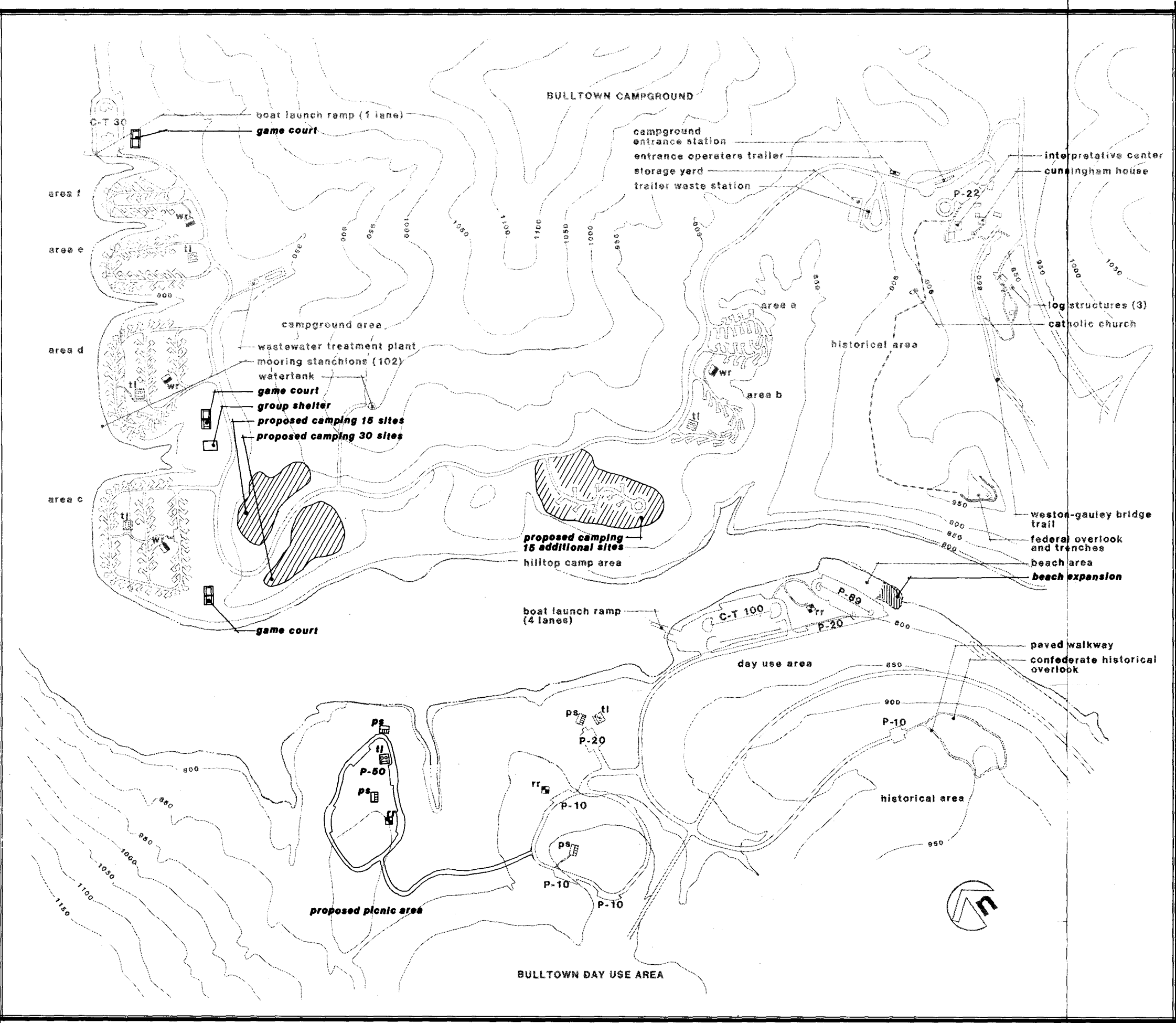
little kanawha river basin  
west virginia

**burnsville lake**  
**master plan update**

u. s. army engineer district  
huntington  
corps of engineers  
exhibit 10



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# bulltown, day use, campground, & historical areas

## LEGEND

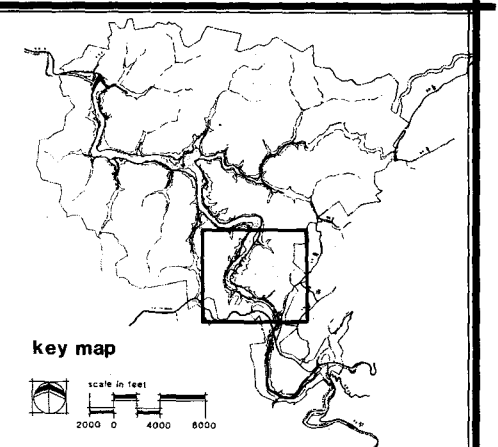
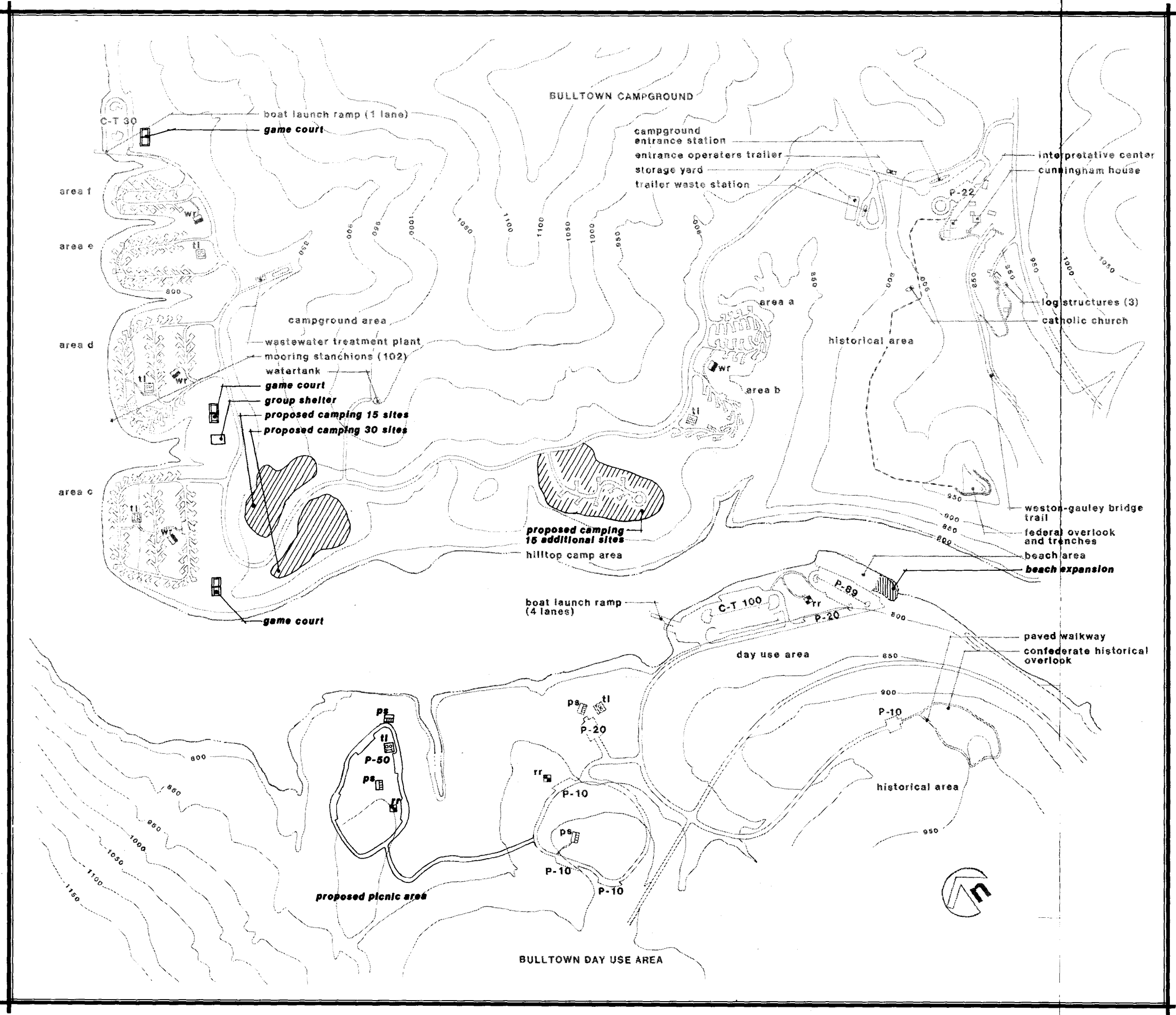
- project boundary
- 789.0 seasonal pool
- 825.0 maximum flood control pool
- existing vegetation

## EXISTING FACILITIES

- P-5 road and car parking
- C-T 5 car and trailer parking
- WT washhouse / restroom
- rr restroom-waterborne
- ps picnic shelter
- tl tot lot
- walkway

## FUTURE FACILITIES

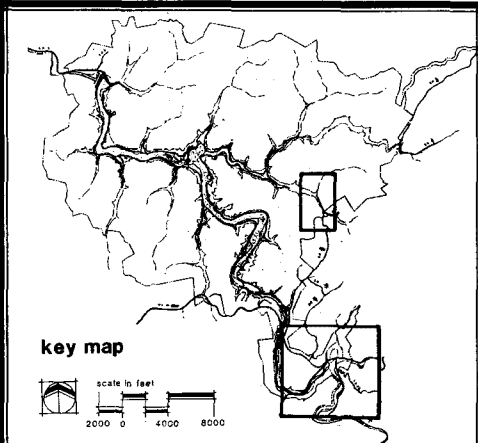
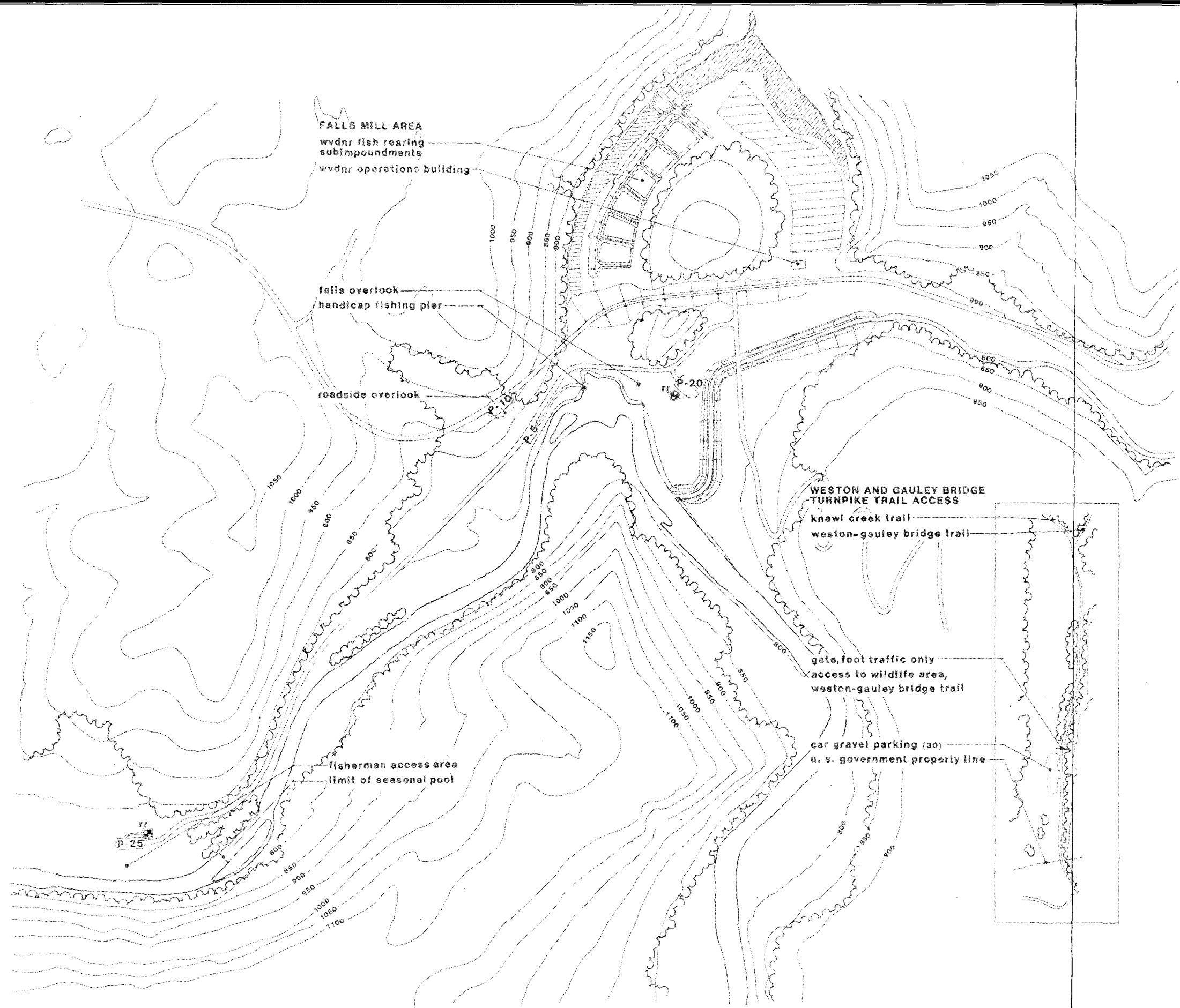
- game court
- group shelter
- picnic shelter
- restroom-waterborne
- tot lot
- P-6 road and car parking



# bulltown, day use, campground, & historical areas

## LEGEND

- project boundary
- 789.0 seasonal pool
- 825.0 maximum flood control pool
- existing vegetation
- EXISTING FACILITIES**
  - P-5 road and car parking
  - C-T 5 car and trailer parking
  - wr washhouse / restroom
  - rr restroom-waterborne
  - ps picnic shelter
  - tl tot lot
  - walkway
- FUTURE FACILITIES**
  - game court
  - group shelter
  - picnic shelter
  - restroom-waterborne
  - tot lot
  - road and car parking



# falls mill scenic area, subimpound- ments, western and gauley bridge turnpike trail access

- LEGEND**
- project boundary
  - 789.0 seasonal pool
  - 825.0 maximum flood control pool
  - existing vegetation
- EXISTING FACILITIES**
- P-5 road and car parking
  - walkway
  - restroom - vault
  - property line