

Elkmont Wastewater Treatment Plant Upgrade



National Park Service

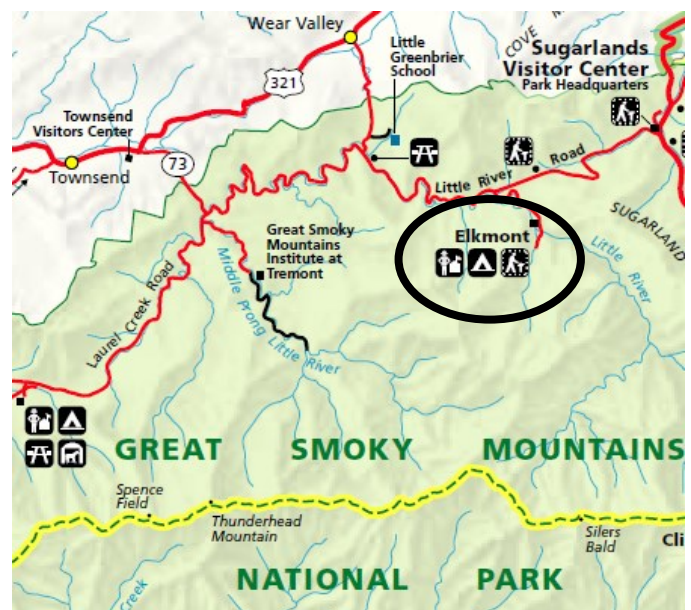
North Carolina, Tennessee

Project Description

Great Smoky Mountains National Park (Park) is announcing a public scoping period to solicit input on a proposed project to upgrade the Elkmont Wastewater Treatment Plant (WWTP), Sevier County, Tennessee. The WWTP serves the Elkmont Developed Area, which includes Elkmont Campground and other facilities nearby. Treated effluent is discharged to the Little River downstream of the campground as authorized by National Pollutant Discharge Elimination System (NPDES) permit number TN0022349 issued by the Tennessee Department of Environment and Conservation. The WWTP operates seasonally for about nine months from March through November based on the campground schedule. The permitted design flow is 35,000 gallons per day (gpd). Average daily flows range from about 2,200 to 8,300 gpd. The Elkmont WWTP effluent consistently complies with all NPDES permit limitations and the Little River meets water quality criteria for protection of its designated uses, which include propagation of fish and aquatic life, recreation, wildlife uses, and natural reproduction of trout (TDEC Rules Chapter 0400-40-04 *Use Classifications for Surface Waters*).

The purpose of the proposed action is to provide a modern, efficient, and sustainable wastewater treatment system for the Elkmont Developed Area, ensure continued NPDES permit compliance, and maintain or enhance water quality in the Little River. The action is needed because the existing WWTP, which was originally built in 1959 and modified in 1969 and 2008, has exceeded its expected service life. Specific objectives of the proposed action include:

- Comply with NPDES permit limits and maintain or enhance water quality in the Little River;
- Avoid and minimize impacts on park resources, visitors, and operations;
- Minimize chemical and energy consumption; and
- Minimize operational and maintenance demands.



Preliminary Alternatives

As part of the National Environmental Policy Act process, the Park is currently evaluating alternative approaches for treating wastewater at the Elkmont Developed Area and is requesting public input into alternative ways of achieving the project objectives. Currently, three preliminary alternatives have been identified for further consideration:

- Alternative A – The No Action Alternative provides a basis for comparing environmental impacts of the action alternatives.
- Alternative B – Upgrade WWTP and continue discharging to the Little River.
- Alternative C – Upgrade WWTP and install a land-based, subsurface effluent drip dispersal system.

Alternative C is being considered, in part, because the Little River within GRSM is designated as an Outstanding National Resource Water. No new discharges or expansions of existing discharges are permitted in Outstanding National Resource Waters unless such activity will not result in either measurable degradation or discernible effect (TDEC Rules Chapter 0400-40-03 *General Water Quality Criteria*). Although no new or expanded discharges to the Little River are proposed in GRSM, NPS is considering Alternative C to reduce the frequency and volume of discharges to surface water.

Alternative A – No Action Alternative

Should Alternative A be selected, the National Park Service would respond to future needs and conditions associated with the Park's objectives without major actions or changes from the present course. Routine maintenance and repairs would continue to be performed to the extent possible with available funds. The WWTP would continue to meet NDPEs permit limits, but the risk of component failure and non-compliance would increase over time as the system continues to age. Failure of the system could result in closure of facilities in the Elkmont Developed Area, including the campground.

Alternative B – Upgrade WWTP and Continue Discharging to the Little River

Under Alternative B, the Elkmont WWTP would be upgraded to include new treatment processes and controls. The plant would be modernized and the effluent would continue to comply with NPDES permit limits. Wastewater would receive pretreatment, secondary biological treatment, tertiary treatment, and disinfection. Effluent quality would be similar to that of the existing WWTP. Portions of the existing plant would be rehabilitated and new systems would be constructed or installed, as appropriate, within or adjacent to the existing WWTP site. Specific treatment processes would be defined in the project design phase.

Alternative C – Upgrade WWTP and Install a Land-based, Subsurface Effluent Dispersal System

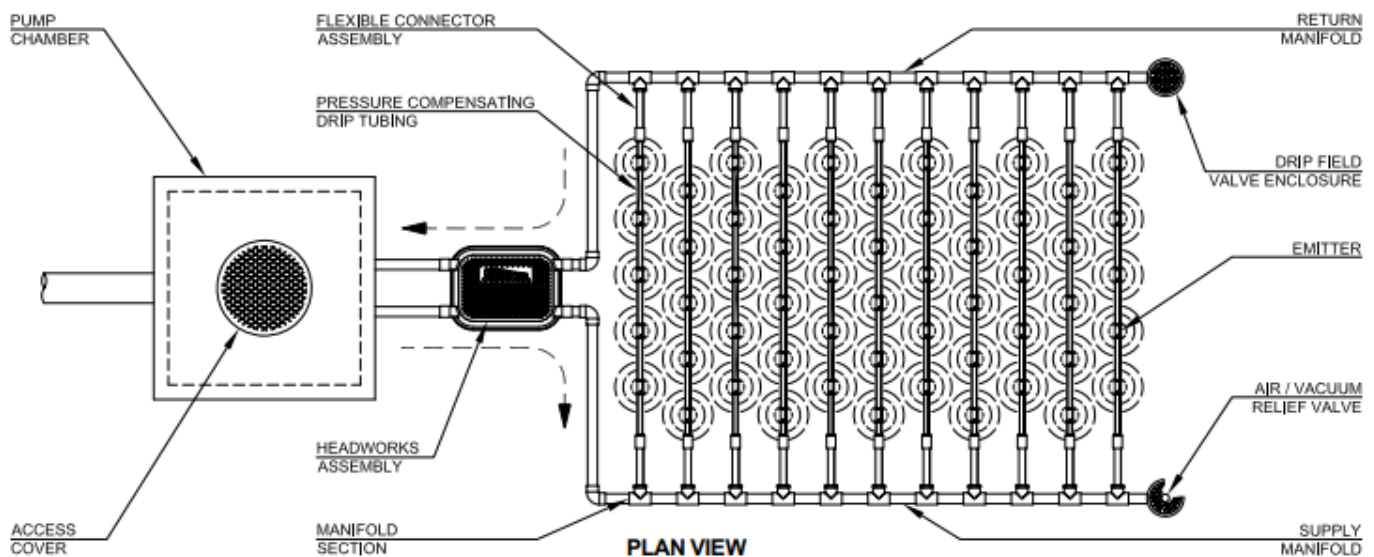
Under Alternative C, the Elkmont WWTP would be upgraded to include new treatment processes and controls; a land-based, subsurface effluent drip dispersal system; and a force main to supply the drip dispersal system. The effluent dispersal system would be installed on up to 5 acres of forested land near the WWTP and would allow for elimination of discharges to the Little River during typical wastewater flows.

Wastewater would receive pretreatment, secondary biological treatment, and disinfection prior to being discharged to a 40,000 gallon holding tank. Effluent from the holding tank would be disposed of through the drip dispersal system under almost all wastewater flow conditions.

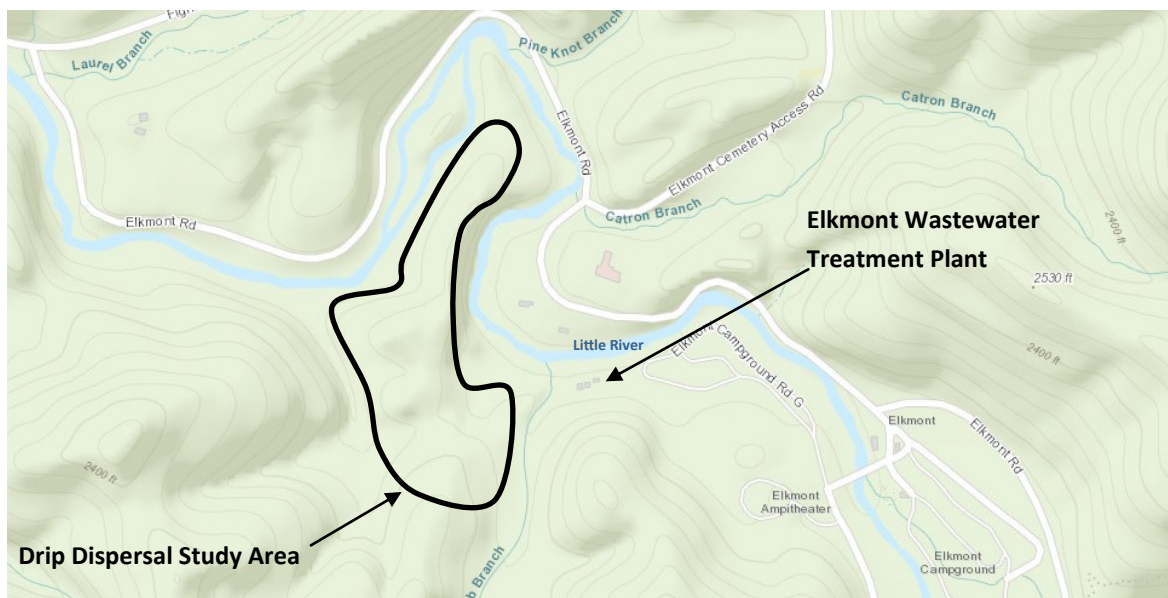
Alternative C (continued)

After multiple days of unusually high wastewater flows, the capacity of the drip dispersal system could be exceeded and discharge to the Little River may be necessary. Holding tank effluent would be treated further using a granular activated carbon filter to achieve additional pollutant removal prior to discharging to the river.

Drip systems consist of a network of small-diameter (approximately 0.5-inch) tubing and emitters installed 6 to 10 inches beneath the soil surface. These systems are designed to uniformly disperse treated wastewater over a large area. A small volume of wastewater is dosed at predetermined time intervals throughout the day to the soil through a pressurized piping network. The objective is to minimize or preclude soil saturation while still achieving equal distribution. This optimizes wastewater dispersal through the soil, plant uptake of the wastewater through their root systems, and attenuation of any remaining pollutants.



Example layout of a subsurface effluent drip dispersal system. Source: Norweco, Inc.



The general location being considered for the drip dispersal system is an approximate 15-acre forested area west and south-west of the Elkmont WWTP. The drip dispersal system would occupy up to 5 acres within the 15-acre forested area.

Alternative C (continued)

Specific locations for drip dispersal zones would be identified during the project design phase. These areas would be selected to minimize impacts on park resources and facilitate efficient installation and maintenance of the system. Topographic, soil, and vegetation surveys would be conducted as part of the design process to develop a drip system layout that minimizes vegetation clearing, tree damage, and soil erosion. The goal would be to select less steep areas with relatively sparse understory and scattered large trees. Nonetheless, some level of understory vegetation clearing and selective large tree removal would be necessary based on existing conditions



Representative photographs of vegetation in the drip dispersal study area.

The type of equipment used to install the drip system would vary based on terrain and vegetation. For example, conventional machinery such as a trencher or tractor equipped with a vibratory plow could be used in less steep, relatively open areas. Smaller equipment such as a walk-behind vibratory plow or trencher could be used in steeper, more densely vegetated areas.

In accordance with Tennessee Department of Environment and Conservation requirements, the drip dispersal area would be closed to public entry. A long-term vegetation management program would also be developed and implemented to maintain early successional vegetation in the drip zones.



Example of drip tubing installation with a vibratory plow.

Issues

The National Park Service has identified potential issues that warrant further analysis based on internal scoping and is requesting public input about these or other important issues that should be considered.

Issues Associated with Both Action Alternatives (Alternatives B and C)

- **Recreational Resources** – An early closing and late opening of the Elkmont Campground might be necessary to accommodate the construction schedule for both action alternatives. Treated effluent would continue to be discharged to the Little River, which is used for fishing and swimming, but discharges would be infrequent under Alternative C.
- **Archeological Resources** – Ground disturbances could affect archeological resources, if present.
- **Floodplains** – The existing WWTP and proposed modifications to the main plant would be in the 100-year floodplain. The effluent dispersal area would be outside the floodplain.
- **Ecological processes** - Natural processes such as nutrient cycling, decomposition, and primary and secondary production in aquatic (Alternatives A and B) and terrestrial (Alternative C) systems could be altered by effluent discharges.

Issues Associated with Alternative B

- **Water Quality** – All treated effluent would continue to be discharged to the Little River. Effluent discharges would meet NPDES permit limits, but some risks to water quality would continue to exist, including WWTP upsets, discharge of nutrients (nitrogen and phosphorus), and discharge of unregulated constituents of emerging concern such as pharmaceuticals, personal care products, and endocrine disrupting compounds.
- **Park Operations** — WWTP operational and maintenance demands would be higher compared to Alternative C.

Issues Associated with Alternative C

- **Water Quality** - Discharges to the Little River would be eliminated, except under the highest wastewater flow conditions.
- **Vegetation** – Up to 5 acres of forest would be affected by understory clearing, tree removal, ground disturbance, long-term maintenance, and altered water and nutrient regimes.
- **Nonnative or exotic species** – Vegetation clearing and ground disturbance would create favorable conditions for establishment of additional nonnative invasive plants.
- **Wildlife** – Vegetation clearing and ground disturbance would affect wildlife and wildlife habitat during construction.
- **Soils** - Vegetation clearing and ground disturbance would affect soils and increase the potential for erosion, especially in steeper areas. Effluent dispersal could affect soil chemistry and microbes.
- **Land Use and Recreational Resources** – Up to 5 acres of forested land that is currently open to public use would be converted to an effluent dispersal area that would be closed to public entry. No designated trails or backcountry campsites exist within or near the proposed dispersal area, but some abandoned roads in the area are used for hiking.
- **Wetlands** – Installation of a force main sewer line for the effluent dispersal area would require crossing Slick Limb Branch, a tributary to the Little River.
- **Wilderness Character** - The dispersal area would be adjacent to areas that have been recommended for designation as wilderness.

Join the Conversation

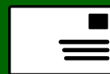
As an integral part of the National Environmental Policy Act and National Historic Preservation Act compliance processes, the National Park Service is asking for your input. Public scoping is an early step in the process, where the public is asked to identify opportunities, concerns, and alternatives to help the Park focus its analysis on important issues. The National Park Service will identify the appropriate environmental planning and compliance pathway and establish a schedule after considering scoping comments. The information below describes how you can get involved in scoping and provide input.

How to Comment—Public Scoping Period Open through December 10, 2017



Submit comments electronically
(preferred method)

National Park Service
Planning, Environment, and Public Comment
Website: <http://parkplanning.nps.gov/grsm>



Submit by mail

Great Smoky Mountains National Park
ATTN: Environmental Planning and Compliance
107 Park Headquarters Road
Gatlinburg, Tennessee 37738

Please enter your comments online or have them postmarked by December 10, 2016 to ensure consideration by the National Park Service.