

Existing Conditions

Fern Hollow Stream and Valley

Fern Hollow Creek originates in Homewood Cemetery and flows approximately 2.7 miles through Frick Park before joining Nine Mile Run near Beechwood Boulevard. Though classified as perennial, the creek behaves as a losing stream due to combined sewer infrastructure installed throughout the corridor during neighborhood development. Storm inlets capture approximately 65% of the contributing watershed, leaving most sections at or near zero flow between storm events. The perennial reach is now limited to approximately 0.3 miles, from the pond along Tranquil Trail to just south of the Biddle/Tranquil Trail intersection, below which flow diminishes over a 0.71-mile reach to the Nine Mile Run confluence. The mid-valley wetland complex—the corridor’s most ecologically significant habitat—depends on this diminished flow regime and is further compromised by trail infrastructure sitting within the floodplain, which restricts natural storage capacity. USACE hydraulic modeling confirms that removing trail fill from the floodplain would meaningfully increase wetland storage and reduce flood inundation extents. Ecological stress accumulates throughout the corridor. Chronic low flows degrade aquatic habitat and water quality. Unmanaged MS4 discharges from the Biddle parking lot and neighborhood streets erode banks, mobilize sediment, and raise stream temperatures. At the Nine Mile Run confluence, combined sewer overflow from the Fern Hollow culvert erodes banks, smothers downstream habitat, and renders Nine Mile Run unsafe for recreation during wet weather. Invasive species—Japanese knotweed, multiflora rose, and others—have colonized disturbed riparian areas throughout the corridor, suppressing native vegetation and accelerating erosion. Mature trees and canopy throughout the hollow represent significant ecological assets; all project designs have been developed to protect them.



Image Credits: Upstream Pittsburgh via Site Viewer 360 by Nodeology

Infrastructure Conditions

The valley’s infrastructure reflects a century of incremental decisions that have profoundly altered how water moves through the landscape. Combined sewer infrastructure is present throughout the corridor—not only running parallel to the stream beneath Tranquil Trail, but crossing the channel at multiple points as the sewer network follows the valley’s contours and tributary branches. A large-diameter, 60-inch circular brick combined sewer runs beneath Tranquil Trail for much of the corridor’s length, acting as a hydraulic barrier between upland groundwater and the stream channel. Smaller combined sewer laterals cross beneath Fern Hollow Creek at several locations, complicating any in-stream or near-channel work and creating a subsurface infrastructure network that is only partially mapped. Pittsburgh Water is presently completing a shotcrete lining rehabilitation of the reach of the 60-inch brick sewer below the Fern Hollow Bridge in 2025 to reduce inflow and infiltration (I&I), but the sewer system as a whole remains a source of significant I&I across the study area, with the shallow depth of many laterals and their age contributing to ongoing groundwater intrusion into the combined sewer.

The most consequential infrastructure condition for stream baseflow is the broken stone subdrain underlying the 96”x54” box culvert that conveys the main Fern Hollow combined sewer trunk. This subdrain was originally designed to relieve hydrostatic pressure around the exterior of the brick culvert by draining surrounding groundwater back into the sewer—a feature, not a defect. The practical effect, however, is that it functions as a continuous drain on the groundwater table along the stream corridor. The USACE Masterplan identifies this subdrain as a primary suspect in the dramatic loss of baseflow observed downstream of the Wetland and Confluence project areas: rather than sustaining stream flow, groundwater that might otherwise discharge to Fern Hollow Creek is instead intercepted by the subdrain and carried into the combined sewer. A geotechnical inspection of the junction manhole and the upstream end of the box culvert is recommended to locate the principal sources of stream loss and determine the feasibility of installing a natural or synthetic impermeable liner to partially decouple the subdrain from the surrounding groundwater system.

The park’s trail network introduces a third and more visible infrastructure condition affecting the study area. Tranquil Trail and Biddle Trail and its connecting trails are gravel-surfaced paths that run within or immediately adjacent to the floodplain for much of the corridor. Both these trails are subject to frequent flooding from the stream during moderate and larger storm events, and to persistent erosion from upland drainage that flows across the trail surface rather than through below it. Gravel and fine sediment mobilized during these events migrate downslope into the stream channel, contributing to the sediment loading that degrades habitat in the wetland and downstream reaches. The trail infrastructure itself sits on fill within the floodplain in the wetland zone, restricting the channel and limiting the wetland’s natural storage capacity—a condition the USACE hydraulic model confirms is directly correlated with elevated flood inundation extents in the area. Culverts along the trail network vary in size, material, age, and condition; several were surveyed by UpstreamPgh due to the absence of existing data. Addressing trail drainage, surface erosion, and the relationship between trail fill and floodplain function is a central objective of the Wetland project area design.



- LEGEND
- Steep Slope Overlay
 - Landslide Prone Areas
 - Fern Hollow Stream

Existing Conditions Map

Design Considerations

Site Selection & Project Scope

The five project areas were selected from a broader field of potential interventions identified through the Fern Hollow Vision Plan and refined through the USACE Water Resources Masterplan, which modeled five distinct restoration alternatives for the corridor. Project areas were evaluated against consistent criteria: hydraulic connection to Fern Hollow Creek; measurable potential to restore flow, reduce erosion, or improve ecological function; constructability within the constraints of a functioning park; and near-term permitting and funding feasibility.

Two alternatives at the northern end of the study area were evaluated and tabled for future development. Alternative 3—a culvert installation intended to reconnect the upper headwaters—and Alternative 4—a right-of-way GSI system along South Homewood Avenue—both run into a common problem: the absence of a well-defined stream channel along Tranquil Trail between Homewood Cemetery and Fern Hollow Bridge. Water currently drains overland through that section, often across the trail surface rather than in a defined channel. Without comprehensive channel reconstruction and likely trail realignment, adding stormwater to this portion of the valley would worsen existing conflicts among

surface drainage, trail infrastructure, and the shallow sewer system beneath. The South Homewood Avenue GSI would also require a lined underground detention facility and coordination with multiple adjacent property owners, significantly increasing both cost and complexity. These upper watershed projects are recommended for a future design phase, developed as a comprehensive solution from Homewood Cemetery to Fern Hollow Bridge.

The remaining USACE alternative—a single right-of-way GSI system along the Regent Square neighborhood edge—was split into two discrete projects: Henrietta Street GSI and Overton Street GSI. Though geographically adjacent, these two areas drain to separate and distinct points of reconnection to the stream, and treating them as independent projects allows each to be designed, permitted, funded, and constructed on its own timeline without interdependency. The Biddle Parking Lot GSI was added as a new project not in the original USACE alternatives. Relative to the other sites, Biddle avoids in-stream regulatory work and right-of-way permitting complications, making it a strong candidate for early implementation and a tangible early demonstration of the project's goals.

Environmental Constraints and Standards

Steep and landslide-prone terrain flanks the valley on both sides throughout the study area. The City of Pittsburgh's steep slope overlay (grades $\geq 25\%$) and landslide-prone area designation affect portions of every project area. These overlays trigger Zoning and Development Review for all five sites, constrain construction methods, prohibit subsurface infiltration where slopes and soil conditions introduce saturation risk, and require geotechnical investigation before grading, foundation design, or stormwater conveyance work can be finalized. At Biddle and Overton, the proximity of steep and landslide-prone slopes to proposed detention facilities makes geotechnical assessment a specific prerequisite. These constraints are real and shape the design approach at every site, but they are not prohibitive—they define the envelope within which each design has been developed.

The Henrietta Street and Overton Street GSI projects require coordination with the City's Department of Mobility and Infrastructure (DOMI) for right-of-way work, and with the Department of Public Works (DPW) for the MS4 outfall connections that redirect drainage currently entering the combined sewer system. Pittsburgh Water coordinates on combined sewer catchbasin relocation and reconnection. All projects involving 10,000 square feet or greater of earth disturbance are subject to the City of Pittsburgh Stormwater Code and Stormwater Design Manual, governing BMP selection, volume reduction, peak rate control, and water quality treatment.

Work in or adjacent to streams, wetlands, and floodplains requires PA DEP review under Chapter 105 (Dam Safety and Waterway Management). Projects with substantial encroachment require an Individual Permit, processed jointly with the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. The Confluence stream restoration and Wetland projects are expected to require joint DEP/ACOE Individual Permits; some trail improvement and stream maintenance work at the Wetland may qualify for a Chapter 105 General Permit (GP-7, Minor Road Crossing). The three GSI projects may require Chapter 105 review for their MS4 outfall connections, with the permit pathway—general or individual—determined by final design.





- LEGEND
- Ex. Sewer Infrastructure
 - Fern Hollow Creek
 - Overland Flow Paths

Sewer Infrastructure and Flow Paths



Existing Conditions Photo Log



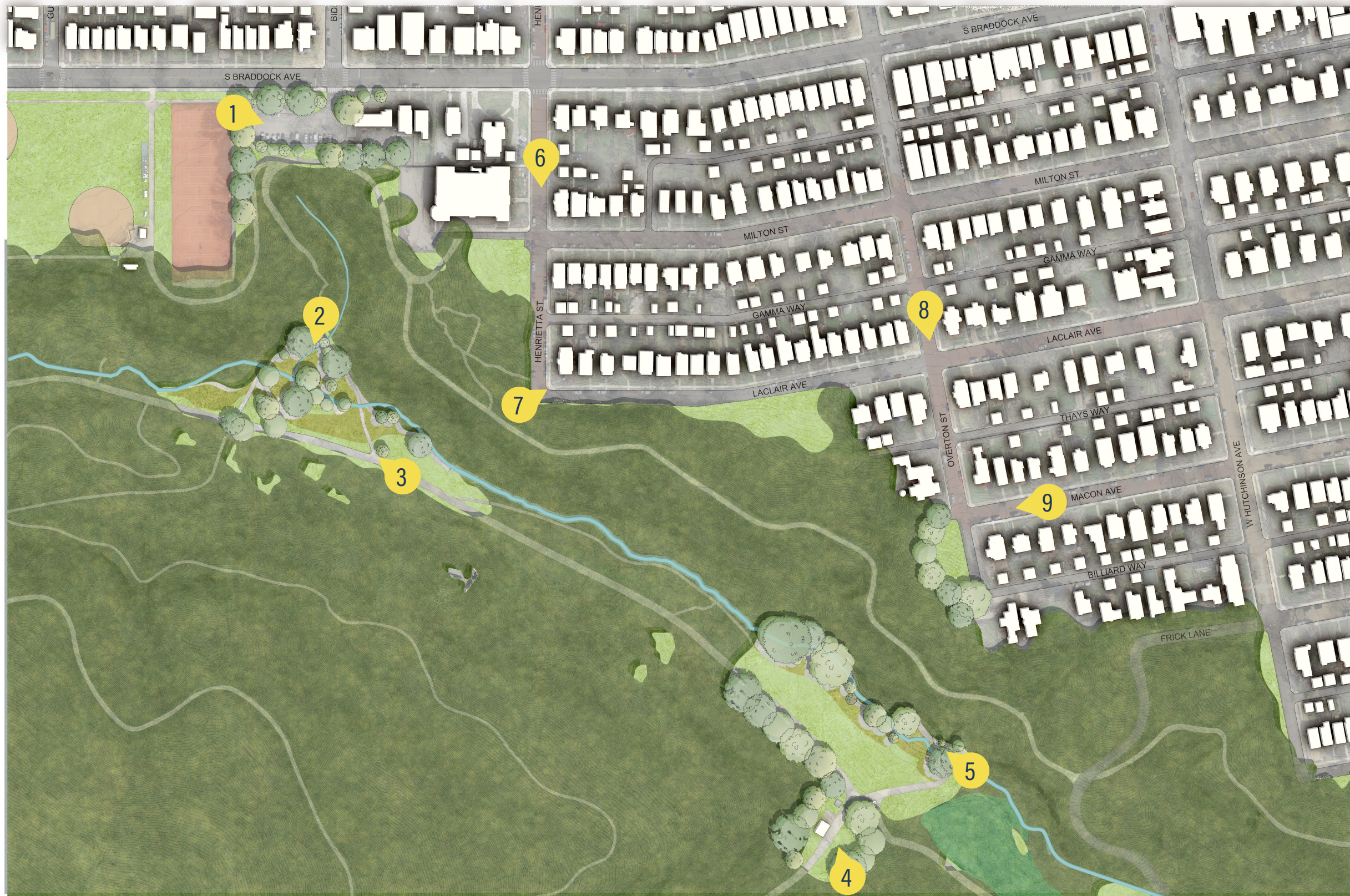


PHOTO NOTES

- 1 View of Biddle Avenue Parking Lot
- 2 View from Biddle Trail Stairs Overlooking Wetland Area
- 3 View from Tranquil Trail Culvert at Wetland Area Showing Lower Channel & Trail Erosion
- 4 View Looking Across Falls Ravine Trail towards defunct Pavilion and Bathroom Area
- 5 View Looking Upstream Fern Hollow Creek from Bridge at Bottom of Wooden Stairs
- 6 View Looking at Henrietta St & Milton St Intersection in Front of the ECS Intermediate School
- 7 View Looking at Henrietta St & LaClair Ave Corner
- 8 View Looking Downhill at Overton St & LaClair Ave Intersection
- 9 View Looking at Lawn Space at the Corner of Overton St & Macon Ave

Existing Conditions Photo Log

