

Thunder Valley Regenerative Community Sustainable Wastewater Infrastructure Assessment

Pine Ridge Indian Reservation, Porcupine, South Dakota



Tribal youth-focused regenerative housing and economic development project seeks to incorporate sustainable wastewater treatment and reuse into a holistic plan for restoration and water conservation.



Straw bale house designed and built by students

infrastructure for treatment and reuse into the planned mixed-use development site.

Thunder Valley, comprised of 34 acres, contains 86 multi-family units, 31 single family units, commercial space, a gym and a youth center. Driven by a need for more housing, business opportunities and services on the Reservation, the goal of this Lakota-led project is to create a community with sustainability, interconnectedness, and healthy and supportive environments for youth, the elderly, and families at the center. The project seeks to build on traditional Lakota values while promoting innovative,

homegrown Native solutions. A triple bottom line intent has been adopted by the Thunder Valley Community Development Corporation to ensure the project considers **social needs** (People), **environmental responsibility** (Planet), and **economic vitality** (Prosperity).

Biohabitats explored multiple on-site wastewater treatment, reuse and discharge options, keeping in mind not only cost and space requirements, but also environmental and aesthetic benefits to the community. The client desired a wastewater treatment and reuse system that was affordable, simple to operate and maintain, energy and space efficient, and capable of providing reuse- and surface-water discharge quality effluent on a consistent basis, even in the cold winters of South

Dakota. Sludge generation and electricity consumption were of concern due to not only their ecological impacts, but to their associated long-term and ongoing operational costs.

The technologies were evaluated based upon USDA criteria for seeking funding that included water quality, environmental impacts, footprint, budgetary costs, O&M costs, and sludge production. Biohabitats took the evaluation a few steps further, however, to outline options for water reuse, irrigation and effluent discharge that reduced water demand while supporting both prairie and riparian restoration efforts on the site.

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