

## ***VTM Engineering, PLC***

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May 2, 2024

Ms. Valerie Capels  
Bristol Town Administrator  
1 South Street  
PO Box 249  
Bristol, Vermont 05443

RE: Bristol Landfill – 2024 Annual Inspection  
Solid Waste Identification Number AD080  
ANR Project Identification Number RU95-0205

Dear Ms. Capels:

VTM Engineering, PLC is pleased to provide this report summarizing the annual inspection of the former Bristol Landfill including recommendations for post closure care.

If you have any questions, please feel free to contact me.

Respectfully,  
**VTM ENGINEERING, PLC**

Steven L. Palmer, P.E.  
President

Copy: Jeff Bourdeau - VTDEC, Waste Management and Prevention Division

Attachments:  
Bristol Landfill – 2024 Annual Inspection Report

**BRISTOL LANDFILL  
2024 ANNUAL INSPECTION REPORT**

**Prepared for:  
Town of Bristol, Vermont**

**Prepared By:  
VTM Engineering**

**May 2, 2024**

# **BRISTOL LANDFILL**

## **2024 ANNUAL INSPECTION REPORT**

### **BACKGROUND**

VTM Engineering, PLC was contracted by the Town of Bristol, Vermont to conduct an annual inspection of the former municipal landfill located at 80 Pine Street in Bristol, Vermont. In preparing for the annual inspection, VTM reviewed the 2023 Annual Inspection Report, the approved Landfill Post Closure Permit for the facility (Permit) dated January, 30, 2017 as well as an associated Permit Amendment dated September 7, 2021. The 2021 amendment was specific to a solar array that was constructed on top of the former landfill in 2020/2021. Finally, VTM reviewed the approved Post Closure Plan for the facility dated September 30, 2016 prepared by LE Environmental.

It should be noted that there is a separate Stormwater Discharge Permit (Permit #9252-9050) issued through the Vermont Department of Environmental Conservation specific to the access road and surrounding area on the east side of the landfill. This permit was required due to the permitting and construction of the solar array project and has its own (separate) annual inspection and reporting requirements.

### **1.0 APPLICABLE PERMITS AND PERMIT REQUIREMENTS**

#### **1.1 Landfill Post Closure Permit and Permit Amendment**

A Post Closure Permit was issued by the Vermont Agency of Natural Resources in 2017. The permit includes the following annual inspection requirements: *“On or before June 15<sup>th</sup> each certification year, the Permittee shall submit an annual evaluation of the Facility. This inspection shall be performed by a registered engineer or other qualified professional. The engineer or qualified professional shall evaluate at a minimum the integrity of the final cover system and vegetative cover, the drainage systems and surface water runoff, and the gas ventilations system. The inspection shall be performed during the month of May of each certification year.”*

An Amendment to the Post Closure Permit pertaining to the solar arrays was issued in 2021. The Amendment added the following annual inspection requirement: *“Commencing upon installation of the solar array, the annual evaluation required under Condition 10 (of the original permit) shall also incorporate, any notable differential settlement and lateral foundation movement, ballast integrity, and solar system components.”*

#### **1.2 Landfill Post Closure Plan**

In addition to the permit and permit Amendment, a landfill Post Closure Plan was prepared and submitted as part of the original 2017 Permit application. The Post Closure Plan was made part of the Permit by reference. The Post Closure Plan contains the following language pertaining to annual maintenance *“A majority of the maintenance efforts will be on an "as-needed" basis. They include annual mowing of the vegetated cover for aesthetics, woody growth control, weed control to promote growth of the desired species, and regrading and re-vegetation should vegetative growth fail and/or soil erosion occurs. Drainage control features will be periodically inspected to ensure that erosion, differential settlement and sediment build-up have not*

*occurred that may jeopardize the original design intent. These occurrences should be promptly corrected. Burrowing animals should be removed from the landfill, to avoid the creation of large holes in the cap. The gate and warning sign should be maintained, and the gate kept locked to prevent future dumping, to minimize vandalism and to protect the public.”*

## **2.0 2023 SITE INSPECTION AND ASSOCIATED FINDINGS**

Mr. Steven Palmer, P.E of VTM Engineering, PLC (VTM) conducted the annual inspection of the former Bristol landfill on May 1, 2024. The following represent observations and recommendations based on this inspection.

### **2.1 Entry Gate**

The former landfill entry gate was open during the inspection, however Town Highway Department personnel were working in the vicinity at the time. No garbage or debris from dumping was noted in or around the former landfill.

### **2.2 Final Cover System & Vegetative Cover**

During the inspection, no areas of the former landfill were noted to contain significant differential settlement or erosion that would impact the integrity of the underlying cover. Small bushes/trees were noted to be growing within certain areas of the landfill cover limits. There was in general, more vegetive cover (grass) noted during the 2024 inspection than the year previous. Town officials indicated that re-seeding efforts had been undertaken following the 2022 and 2023 annual inspections. Although some areas are still lacking in terms of 100% vegetative cover, the efforts undertaken in 2022 and 2023 to re-establish vegetative cover following the installation of the solar array project appear to have been largely successful. The areas still lacking adequate vegetative cover were primarily located in and around the new solar arrays as well as one area along the north side of the former landfill. No areas of significant erosion were noted even in the areas still lacking 100% vegetative cover.

It was noted that the mowing of the grass within the formal landfill area does not appear to have been mowed in 2023. Annual mowing is a condition of the approved Post Closure Plan (and therefor by reference the Permit). A plan for annual mowing should be developed and implemented.

### **2.2 Drainage Systems and Surface Water Runoff**

In general, the stone drainage ditches surrounding the site appear to be in good condition. No settlement or other similar damage was noted which would impede their operation. One section of the stone lined ditch on the southeast side of the former landfill appears to have been filled with stone to make an access road rendering the ditch essentially inoperable (see attached photo's).

During the inspection, small trees were noted to be growing in one of the stone lined ditches along the north side of the former landfill (see attached photo's). The ditch still appears to be fully functional, however (see attached photo's). The trees and brush should be removed before the root systems have an opportunity to impact the underlying clay cover.

### **2.3 Gas Ventilation Systems**

Each of the four (4) existing passive gas vents were observed during the inspection. No settlement or other visible issues were noted, and the gas vents visually appear to be functional (see attached photo's).

### **2.4 Solar Array**

In 2021, a solar array was constructed on top of the former landfill. The solar array is a completely free-standing design with no buried foundations, wiring or other components that may have directly impacted the final cover integrity during construction. The foundations for each array are designed to spread out the weight of each array and limit the potential for differential settlement. During the 2024 annual inspection, no areas with notable erosion, differential settlement, lateral foundation movement, or ballast concerns were noted in or around the solar arrays. The solar arrays appear to all be in excellent condition and functioning as designed (see attached photo's).

It was noted that there were still areas lacking vegetive cover in and around the new solar arrays. (see attached photo's).

## **3.0 RECOMENDATIONS**

The following recommendations are based upon specific items identified during the May 2, 2024, field inspection:

- A. All areas should be mowed at a minimum of once per year. Preferably mowing should be done in late May or early June to allow the vegetive cover time (within the growing season) to propagate. Mowing (or trimming) should include the perimeter ditches to ensure that small trees and brush are not allowed to re-establish themselves in these areas. Mowing has an impact on the density of the vegetive cover layer as well as ensuring that shrubs and trees do not take root and damage the clay liner. The Town should develop a plan to ensure that annual mowing is conducted.
- B. Several areas were noted where vegetive cover is sparse. Re-seeding and re-establishment of vegetive cover should be conducted where necessary. If any areas of erosion are noted during re-seeding activities, areas should be filled and smoothed prior to re-seeding. Mulch and watering of newly seeded areas is recommended. Monitoring and additional maintenance of all newly seeded areas should be performed as needed. In and around the solar arrays, grass seed that is designed for shady areas should be utilized.
- C. Brush and small trees noted to be growing anywhere on or within the landfill cap area should be removed to prevent future root damage to the underlying final cover system.
- D. All brush and small tree growth within the existing stone perimeter drainage ditch on the northeast side of the site should be removed.
- E. The portion of the stone lined ditch that was filled to provide access around the southeast end of the site should be addressed. A culvert should be installed across the access road to facilitate drainage across the roadway and limit the potential for future erosion. Care

should be taken to ensure that there are no adverse impacts to the existing final cover system during the work.

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## Photographs



Photo #1 – Landfill Overview



Photo #2 – Area in Need of Vegetative Cover





Photo #3 – Area in Need of Vegetative Cover



Photo #4 – Typical Drainage Swale





Photo #5 – Drainage Swale In Need of Tree Removal



Photo #6 – Typical Gas Well



Photo #8 – Filled Stone Drainage Ditch In Need of Culvert