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*Via Electronc Mail*

October 15, 2024

Dean Tagliaferro
EPA Project Coordinator
U.S. Environmental Protection Agency
c/o HDR, Inc.
75 South Church Street, Suite 403
Pittsfield, MA 01201

**Re: GE-Pittsfield/Housatonic River Site**
**Rest of River (GECD850)**
**Revised On-Site and Off-Site Transportation and Disposal Plan**

Dear Mr. Tagliaferro:

In accordance with the Revised Final Permit issued by EPA on September 16, 2020 for the Rest of River area and a letter issued by EPA on June 4, 2024, enclosed for EPA's review and approval is GE's *Revised On-Site and Off-Site Transportation and Disposal Plan*. In response to EPA's June 4, 2024 letter and GE's further evaluation of transport options, this document presents GE's revised plans for the transportation of materials removed from the Rest of River to the on-site Upland Disposal Facility and to off-site disposal facilities for disposal at those facilities.

Please let us know if you have any questions or would like to discuss this plan further.

Very truly yours,

Matt Calacone

Matthew Calacone
Senior Project Manager
Corporate Holdings, GE Aerospace

Enclosure

Cc: (via electronic mail)
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General Electric Company

# Revised On-Site and Off-Site Transportation and Disposal Plan

**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

October 2024 (originally submitted October 2023)

# Revised On-Site and Off-Site Transportation and Disposal Plan

**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

October 2024 (originally submitted October 2023)

**Prepared By:**
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# Abbreviations

| | |
|---|---|
| AADT | average annual daily traffic |
| ARAR | applicable or relevant and appropriate requirement |
| BMP | best management practice |
| BOL | bill of lading |
| CD | Consent Decree |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CMR | Code of Massachusetts Regulations |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalent |
| Confluence | confluence of the East and West Branches of the Housatonic River |
| cy | cubic yards |
| EA | Exposure Area |
| EPA | United States Environmental Protection Agency |
| Final Revised OSS | Final Revised Overall Strategy and Schedule for Implementation of Corrective Measures |
| Final Revised SOW | Final Revised Rest of River Statement of Work |
| GE | General Electric Company |
| GHG | greenhouse gas |
| HASP | health and safety plan |
| HRRC | Housatonic Railroad Company, Inc. |
| I-90 | Interstate 90 |
| MA-102 | Massachusetts Route 102 |
| MA-183 | Massachusetts Route 183 |
| MassDFG | Massachusetts Department of Fish and Game |
| MassDFW | Massachusetts Division of Fisheries and Wildlife |
| MassDOT | Massachusetts Department of Transportation |
| mg/kg | milligram per kilogram |
| MNHESP | Massachusetts Natural Heritage and Endangered Species Program |
| PCB | polychlorinated biphenyl |
| PDI | pre-design investigation |

| | |
|---|---|
| POP | Project Operations Plan |
| QOL | quality of life |
| QOL Compliance Plan | Quality of Life Compliance Plan |
| RCRA | Resource Conservation and Recovery Act |
| RD/RA | Remedial Design/Remedial Action |
| Reach 5A Conceptual Work Plan | Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A |
| Reach 6 Conceptual Work Plan | Conceptual Remedial Design/Remedial Action Work Plan for Reach 6 |
| RFI | RCRA Facility Investigation |
| Revised Final Permit | General Electric Company's Revised Final Resource Conservation and Recovery Act Corrective Action Permit |
| Revised T&D Plan | Revised On-Site and Off-Site Transportation and Disposal Plan |
| RFEI | Request for Expression of Interest |
| ROR | Rest of River |
| RU | remediation unit |
| SEFA | Spreadsheets for Environmental Footprint Analysis |
| SIP | Supplemental Information Package |
| SOW | Statement of Work |
| T&D Plan | Off-Site and On-Site Transportation and Disposal Plan |
| TBD | to be determined |
| TCLP | toxicity characteristic leaching procedure |
| TSCA | Toxic Substances Control Act |
| UDF | Upland Disposal Facility |
| UDF OMM Plan | UDF Operation, Monitoring, and Maintenance Plan |
| UHW Manifest | Uniform Hazardous Waste Manifest |
| US-7 | U.S. Route 7 |
| US-20 | U.S. Route 20 |
| U.S. DOT | United States Department of Transportation |
| WWTP | wastewater treatment plant |

# Executive Summary

As required by the U.S. Environmental Protection Agency (EPA), the General Electric Company (GE) has prepared this *Revised On-Site and Off-Site Transportation and Disposal Plan* to describe the proposed transport and disposal of sediments and soils removed from the Housatonic Rest of River (ROR) as part of a ROR Remedial Action specified by EPA in a final revised modification of GE's Resource Conservation and Recovery Act Corrective Action Permit (Revised Final Permit). For such transport and disposal, the Revised Final Permit selected a hybrid disposal approach involving construction and use of an on-site Upland Disposal Facility (UDF) for removed materials that meet specified acceptance criteria (which consist of most of the removed materials) and off-site transport and disposal of the remainder, with a further requirement that a minimum of 100,000 cubic yards (cy) of material must be sent off-site for disposal. In this plan, GE has evaluated three primary modes of transport both to the UDF and to off-site facilities – i.e., hydraulic pumping, truck transport, and rail combined with truck transport – based on currently estimated removal volumes from the ROR (which are preliminary estimates subject to modification during remedial design). There is no such thing as "all rail" transport for the ROR Remedial Action. Where rail transport is used, trucks will be necessary to take removed material from removal or staging areas to a rail loading area (other than the hydraulically transported sediment discussed in the next paragraph) and, in most cases (and all cases involving the UDF), from the railroad to the final disposal site.

Hydraulic dredges remove sediment as a slurry, which is then hydraulically transported to a dewatering area using large-diameter pipes and pumps and ultimately to a disposal site. As described in this plan, hydraulic dredging/transport is considered feasible and will be used for the sediments in Reaches 5C, 6, 7B, 7C, 7G, and 8 of the ROR (reaches are shown on Figure 1-1). As a result, approximately 79% of all of the material to be removed from the ROR will be transported hydraulically without the need for trucks, including approximately 74% directly from Reaches 5C, 6, 7B, and 7C to the UDF and another approximately 5% from Reaches 7G and 8 to a rail loading area for transport off-site by rail.

For the material to be removed from the ROR that cannot be hydraulically transported, GE has considered both trucking and rail combined with trucking (rail/truck). Use of trucks provides flexibility during implementation of remedial activities, as trucks are readily available and can easily access removal areas, staging areas, and the disposal facilities and can travel to the disposal facilities independently without relying on rail schedules. Truck transportation was the mode of transportation approved or selected by EPA for all of the materials removed from the Upper ½ Mile Reach of the Housatonic River and the 1½ Mile Reach of the River.

Rail is sometimes used as a mode of transportation for disposal of sediments and soils from remediation projects, typically when those materials will be transported over long distances for disposal. Consistent with this experience, the Revised Final Permit requires GE to "maximize the transport of . . . waste material to off-site facilities via rail, to the extent practicable." It does not mention or contain a similar requirement for on-site transport by rail to the UDF, but, consistent with EPA's instructions, GE has also considered the use of rail/truck to transport sediments and soil from the ROR to the UDF.

For the potential use of rail/truck, GE performed a preliminary screening evaluation of potential locations for the necessary rail loading and/or off-loading areas to support the rail/truck transport of removed materials. This preliminary screening evaluation included assessment of previously used rail spurs/sidings (e.g., near the Columbia Mill Dam adjacent to Reach 7B) as well as construction of new rail spurs/sidings (e.g., adjacent to Reach 5A, at/within the UDF). Based on the preliminary screening evaluation, GE has identified three locations in the ROR as the most practicable options for a rail loading or unloading area. Those locations are as follows:

- **Utility Drive**, located adjacent to Reach 5A in the City of Pittsfield, near the Pittsfield Wastewater Treatment Plant;
- **Woods Pond Spur**, located adjacent to Reach 6 in the Town of Lenox, at the Berkshire Scenic Railway Museum property, which could also be used as a rail unloading area for material being transported to the UDF; and
- **Rising Pond Property**, located adjacent to Reach 8 in the Town of Great Barrington.

In addition, GE has conducted a preliminary screening evaluation of rail/truck and determined that it is not suitable for transporting certain materials (notably, materials from Reaches 5B, 5C, 6, and 7E designated for on-site disposal, collectively comprising approximately 4% of the total removal volume) because the distance of truck travel on public roads to take those materials directly to the UDF is shorter than the distance to take them to and from a rail loading area, and thus truck trips would not be reduced. For these materials, trucking alone will be used under any scenario.

For the relatively small amount of remaining material, transport to a disposal facility will be by truck or rail/truck. GE has developed and evaluated four site-wide scenarios involving various combinations of hydraulic transport, truck transport, and rail/truck transport both to the UDF and out-of-state disposal facilities. For each scenario, GE has identified the roads that would be used for truck transport, taking into account the restrictions and prohibitions imposed by EPA on use of certain public roads. In this plan, GE has presented its evaluation of these scenarios based on several factors – truck trips, truck miles, greenhouse gas emissions, worker accident risks (in terms of injuries and fatalities), quality-of-life considerations, ecological considerations, logistical and implementability considerations, and schedule considerations for construction of supporting infrastructure.

Ultimately, as discussed in this plan, GE recommends the scenario that maximizes the use of hydraulic transport and has the greatest use of rail/truck and the fewest truck miles. That scenario, based on current volume estimates, includes the following components:

- Hydraulic transport of 839,500 cy (79% of removed material) without truck transport over local public roads, including hydraulic transport of 785,600 cy (74% of removed material) directly to the UDF and 53,900 cy (5% of removed material) directly to the Rising Pond rail loading area for subsequent rail transport to the selected out-of-state disposal facility(ies);
- Truck transport of 42,500 cy (4% of removed material) directly to the UDF;
- Construction of rail loading areas at Utility Drive and Rising Pond and a rail loading/off-loading area at Woods Pond Spur;
- Rail/truck transport of 136,800 cy (13% of removed material) to the UDF, including hydraulic transport of 6,600 cy of sediments from Reach 8 directly to the Rising Pond rail loading area (without truck transport over public roads) for subsequent rail transport to the Woods Pond Spur for off-loading and truck transport to the UDF; and
- Rail/truck transport of the remaining 46,100 cy (4% of removed material) off-site to the selected out-of-state disposal facility(ies), resulting in a total of 100,000 cy transported for off-site disposal.

In the event that, due to logistical and implementability issues, use of rail/truck would result in not meeting the ROR Remedial Action target production rates for sediment and soil removal, truck transport would be utilized as necessary to achieve those target production rates.

# 1 Introduction

On December 16, 2020, pursuant to the 2000 Consent Decree (CD) for the GE-Pittsfield/Housatonic River Site, the United States Environmental Protection Agency (EPA) issued to the General Electric Company (GE) a final revised modification of GE's Resource Conservation and Recovery Act (RCRA) Corrective Action Permit (Revised Final Permit) for the Housatonic Rest of River (ROR), which required GE to implement the ROR Remedial Action selected by EPA to address polychlorinated biphenyls (PCBs) in the ROR (EPA 2020d). The ROR is that portion of the Housatonic River and its backwaters and floodplain (excluding Actual/Potential Lawns as defined in the CD) located downstream of the confluence of the East and West Branches of the Housatonic River (the Confluence). The ROR Remedial Action specified in the Revised Final Permit was selected by EPA based on EPA's comparative analysis of several sediment and floodplain remediation and treatment or disposition alternatives (EPA's 2020 Comparative Analysis; EPA 2020b).

This *Revised On-Site and Off-Site Transportation and Disposal Plan* (Revised T&D Plan) addresses the transport and disposal of sediment and soil removed from the ROR as part of the ROR Remedial Action. In this regard, the Revised Final Permit selected a hybrid disposal approach involving construction and use of an on-site Upland Disposal Facility (UDF) for removed materials that meet specified acceptance criteria (which are most of the removed materials) and off-site transport and disposal of the remainder, with a further requirement that a minimum of 100,000 cubic yards (cy) of material must be sent off-site for disposal.

The Revised Final Permit requires EPA's subsequent approval of the methods and locations for off-site disposal and requires GE to "maximize the transport of…waste material to off-site facilities via rail, to the extent practicable" (Section II.B.6.b.(1)). There is no mention in either EPA's 2020 Comparative Analysis or the Revised Final Permit of the potential use of rail for on-site transport to and disposal at the UDF. The Revised Final Permit requires further that sediment from certain portions of the ROR be conveyed to the UDF hydraulically if feasible.

The Revised Final Permit required GE to develop and submit a Statement of Work (SOW) specifying the deliverables and activities that GE will conduct to design and implement the ROR Remedial Action. In accordance with that requirement, after receipt of EPA's comments on an earlier version of the SOW, GE submitted a *Final Revised Rest of River Statement of Work* on September 14, 2021 (Final Revised SOW; Anchor QEA et al. 2021), and EPA approved it on September 16, 2021. Although there was no mention in EPA's 2020 Comparative Analysis or the Revised Final Permit of the potential use of rail for on-site transport, the Final Revised SOW required that GE evaluate various transport modes, including truck and rail, for both on-site and off-site transport.

In addition, as required by the Revised Final Permit, GE submitted a *Final Revised Overall Strategy and Schedule for Implementation of the Corrective Measures* on July 5, 2022 (Final Revised OSS; Anchor QEA 2022a), and EPA approved it on July 6, 2022. As described in that document, the ROR has been segmented into six separate remediation units (RUs) to manage workflow and schedule for the ROR Remedial Action. Reach 5A is the first RU to be addressed because it is the most upstream reach in the ROR. The *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Reach 5A Conceptual Work Plan; Anchor QEA et al. 2023) was submitted to EPA on September 28, 2023 and is under EPA review. Reach 6 (containing Woods Pond) is the second RU to be addressed, and the *Conceptual Remedial Design/Remedial Action Work Plan for Reach 6* (Reach 6 Conceptual Work Plan) is scheduled to be submitted to EPA on October 31, 2024. The design work plans for the other RUs will be developed and submitted to EPA in a sequential manner, starting with Reach 5B and moving downstream, in subsequent years. In accordance with the Revised Final Permit, soil and sediment removed from the RUs will be subject to disposal at the UDF constructed on GE-owned property in Lee, Massachusetts, provided that the material meets certain acceptance criteria specified in Attachment E to the Revised Final Permit and provided that at least 100,000 cy of material are sent off-site for disposal.

With respect to transport of that material, Section 4.3.1.1 of the Final Revised SOW stated that GE would prepare two transportation and disposal plans – an off-site transportation and disposal plan and an on-site transportation and disposal plan. However, after consultation with EPA, GE combined these two plans into a single document to avoid unnecessary repetition of activities that apply to both and submitted the *Off-Site and On-Site Transportation and Disposal Plan* (T&D Plan) to EPA on October 31, 2023. On June 4, 2024, EPA provided partial disapproval/conditional approval of and comments on that submittal, directing GE to submit a revised plan. This present document constitutes that Revised T&D Plan.

This Revised T&D Plan details the procedures for transporting and disposing of sediment, soil, and debris (collectively "material") anticipated to be removed during the implementation of the ROR Remedial Action. In addition to addressing EPA's conditions in its June 4, 2024 letter, this Revised T&D Plan has considered communications from several local municipalities and the local community, as discussed in Section 1.4.

As mentioned above, the Reach 5A Conceptual Work Plan was previously submitted to EPA, the Reach 6 Conceptual Work Plan will be submitted to EPA by the end of October 2024, and the design work plans for the other RUs will be developed and submitted to EPA in a sequential manner in subsequent years. Additional details regarding transportation and disposal activities, including the information listed above, will be included in the Final Remedial Design/Remedial Action (RD/RA) Work Plan and/or the Supplemental Information Package (SIP) for each RU. In addition, as appropriate and in consultation with EPA, addenda to this Revised T&D Plan may be submitted to EPA periodically to summarize the RU-specific updates as they relate to transportation and disposal activities.

Determination of whether material removed from the ROR will be transported and disposed of on-site or off-site will be based primarily on the characterization of the material (using the criteria in Attachment E to the Revised Final Permit for disposal at the UDF), with a minimum of 100,000 cy of PCB-containing material to be sent for off-site disposal. While preliminary estimates regarding disposal locations were included in the Reach 5A Conceptual Work Plan (for Reach 5A material) and will be included in the Reach 6 Conceptual Work Plan (for Reach 6 material), the final determination of which material will be transported and disposed of on-site or off-site will be presented in the Final RD/RA Work Plans for the various RUs.

## 1.1 Purpose and Scope

This Revised T&D Plan evaluates the primary modes of transportation for use at the ROR – namely, hydraulic, truck, and rail combined with truck – and how they will apply to the site holistically, that is, for all RUs as a whole.[1] This evaluation allows for assessment of economies of scale and longer-term benefits of potential infrastructure required for implementation. However, as a conceptual design has been developed only for Reach 5A and is in development for Reach 6, this Revised T&D Plan is focused with most specificity on procedures to be used for transportation and disposal of material from those RUs. This plan includes more general information related to proposed transportation and disposal activities for Reaches 5B and 5C, and Reaches 7 and 8. For Reaches 7 and 8 in particular, because work in those RUs will not occur for 10 or more years after the start of work in Reaches 5 and 6, the final means and methods for implementing the remedial actions will be informed by experience with upstream Reaches 5 and 6, including any implementability or logistical problems encountered. As noted above, final details regarding transportation and disposal activities will be presented on an RU-specific basis in subsequent documents (i.e., the Final RD/RA Work Plans or SIPs for the various RUs and potentially addenda to

[1] There is thus no such thing as "all rail" transport for the ROR Remedial Action. Use of the railroad as a mode of transportation will necessarily require use of trucks to convey material from its removal location or a staging area to a rail loading facility and/or from the railroad to the final disposal site. This hybrid mode of transport is thus referred to herein as "rail/truck transport."

this Revised T&D Plan). The development of this Revised T&D Plan has considered several factors, including efficient modes of transportation and routes of travel, environmental and community impacts, professional judgement, experience on other similar projects, and community input.

Because the ROR Remedial Action is being performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the activities described in this Revised T&D Plan that will be conducted at the ROR are exempt from federal, state, and local permitting requirements and will be conducted in accordance with the substantive provisions of the applicable or relevant and appropriate requirements (ARARs) of federal and state laws and regulations.[2] In particular, on-site material management for the project and infrastructure construction required to such material management will be performed in accordance with the following EPA and Massachusetts regulations, to the extent pertinent to those activities and specified in Attachment C to the Revised Final Permit.

- Toxic Substances Control Act (TSCA) regulations (40 Code of Federal Regulations [CFR] Part 761), which generally cover materials with PCB concentrations greater than or equal to 50 milligrams per kilogram (mg/kg);
- RCRA regulations contained in 40 CFR Parts 258–268, to the extent applicable;[3]
- Hazardous Material Transportation Act regulations (49 CFR Parts 107, 171, 177);
- Regulations under Section 404 of the Clean Water Act (33 CFR Parts 320-323, 325, and 332 and 40 CFR Part 230);
- Regulations under the National Historic Preservation Act (36 CFR Part 800);
- Massachusetts solid water and hazardous waste facility siting and location regulations (310 Code of Massachusetts Regulations [CMR] 16.40 and 30), except as waived by EPA in Attachment C of the Revised Final Permit;
- Massachusetts Wetlands Protection Act regulations (310 CMR 10, including 10.53(q)); and
- Massachusetts Endangered Species Act regulations (321 CMR 10).

After the materials leave the site, the transportation and disposal activities will be subject to applicable federal, state, and local laws and regulations, compliance with which will be the responsibility of the transporters (during transport) and the disposal facility operator (for disposal).[4]

[2] The overall ARARs for the ROR Remedial Action were specified in Attachment C to the Revised Final Permit. The pertinent ARARs for each RU and the UDF will be listed in the Final RD/RA Work Plan and/or SIP for each RU and in the Revised Final Design Plan for the UDF.

[3] Although it is currently not anticipated that there will be any excavated/dredged ROR material that would be considered a hazardous waste under RCRA, this Revised T&D Plan includes, for the purposes of completeness, RCRA Subtitle C facilities as potential off-site disposal locations in the event that RCRA hazardous waste material is identified in the future.

[4] Although compliance with regulations is the responsibility of the transporters and the disposal facility operator, GE is not relieved of responsibility or liability it may have for the off-site transport or disposal of material removed from the ROR.

## 1.2 Site Description

The applicable ROR reaches where material will be removed and require transportation and disposal, as shown on Figure 1-1 and designated by EPA, are the following:

- **Reach 5**, from the Confluence downstream to Woods Pond (the first significant impoundment). Reach 5 also contains several backwater areas adjacent to the Housatonic River. This reach is further divided into the following subreaches:
  - Reach 5A, Confluence to the Pittsfield Wastewater Treatment Plant (WWTP) (located within the City of Pittsfield);
  - Reach 5B, Pittsfield WWTP to Roaring Brook (located within the Town of Lenox); and
  - Reach 5C, Roaring Brook to the start of Woods Pond (located within the Towns of Lenox and Lee).
- **Reach 6**, Woods Pond (located within the Towns of Lenox and Lee).
- **Reach 7**, Woods Pond Dam to Rising Pond. This reach is further divided into subreaches 7A through 7H, as illustrated on Figure 1-1, with active remediation anticipated in the following subreaches:
  - Reach 7B, Columbia Mill impoundment, north of Interstate 90 (I-90) (located within the Town of Lee);
  - Reach 7C, Former Eagle Mill impoundment, immediately downstream of Reach 7B and north of I-90 (located within the Town of Lee);
  - Reach 7E, Willow Mill impoundment, south of I-90 (located within the Town of Lee); and
  - Reach 7G, Glendale impoundment, south of I-90 (located within the Town of Stockbridge).
- **Reach 8**, Rising Pond (located within the Town of Great Barrington).

Within Reaches 5 and 6 of the ROR, which constitute the portion of the ROR between the Confluence and Woods Pond Dam, the CD defines the ROR site boundary as the floodplain area extending laterally to the 1 mg/kg PCB isopleth, which corresponds approximately to the 10-year floodplain.

## 1.3 Plan Organization

The remainder of this Revised T&D Plan is organized as follows:

- **Section 2 – Characterization of Materials for Disposal.** Summarizes the characterization, management, and testing of excavated/dredged materials for purposes of transportation to and disposal at the UDF or off-site disposal facilities.
- **Section 3 – Overview of Modes of Transportation.** Describes the three primary modes of transportation evaluated for use during the ROR Remedial Action for on-site and off-site disposal (i.e., hydraulic, truck, and rail/truck), and includes preliminary screening evaluations of potential rail loading/off-loading areas and rail/truck transport.
- **Section 4 – Transportation and Disposal Scenarios.** Presents a summary of the removal volumes anticipated for hydraulic and non-hydraulic transport and describes four different site-wide scenarios for on-site and off-site transport of removed materials to the UDF or to the authorized off-site disposal facility(ies).
- **Section 5 – Evaluation of Transportation and Disposal Scenarios.** Summarizes the comparative evaluation of the four site-wide scenarios described in Section 4, including evaluation of truck trips and miles,

greenhouse gas (GHG) emissions, accident-related injuries and fatalities, quality-of-life (QOL) considerations, ecological impacts, logistical and implementability considerations, and schedule considerations.

- **Section 6 – Transportation and Disposal Requirements.** Describes the material tracking process and recordkeeping from material removal/processing until final disposal.
- **Section 7 – On-Site Disposal or Treatment Coordination.** Describes the process for receipt of removed materials at the UDF and on-site transportation of generated liquids.
- **Section 8 – Off-Site Disposal Destination Screening and Selection.** Describes the process for selecting authorized off-site disposal facilities.
- **Section 9 – Community Assessment and Mitigation.** Summarizes the traffic assessment and traffic control and monitoring to be conducted during the ROR Remedial Action.
- **Section 10 – Health and Safety.** Summarizes the health and safety plans (HASPs) applicable to the transportation and disposal process.
- **Section 11 – Summary of Next Steps.** Discusses future transportation and disposal work to be conducted during the design process, including off-site disposal facility selection.
- **Section 12 – References.** Lists references of documents cited in this plan.

The discussions in this Revised T&D Plan are supported by various tables, figures, and appendices, as referenced herein.

## 1.4 Community Coordination and Access

As described above, the preparation of this Revised T&D Plan has considered input from several of the local municipalities. Specifically, GE presented preliminary information regarding transportation and disposal activities for the ROR Remedial Action at meetings held in July 2023 with the Town of Lee, the Town of Lenox, and the City of Pittsfield. In addition, GE participated in local public meetings in November 2023 to review and discuss the information presented in the October 2023 T&D Plan, and it reviewed EPA's February 2024 compilation of public input on that plan (EPA 2024). Comments received from the local municipalities and local communities were considered in the development of this revised plan.

In addition, subsequent to final design for each RU and prior to the start of the site work, GE will develop a summary of non-GE owned properties where temporary staging areas, rail loading facilities, and/or access roads will be constructed. Access agreements for properties owned by the Massachusetts Audubon Society and the Commonwealth of Massachusetts are addressed by separate provisions (Section IV.E of the 2020 Settlement Agreement for the Massachusetts Audubon Society and Paragraph 62.a of the CD for the Commonwealth). For the other properties included in the summary, GE will contact the property owners as needed to notify them of the anticipated work and request that they provide a signed Consent for Access form (based on the form included in the CD) allowing GE and the regulatory agencies, including EPA, access permission to perform and oversee the work. The CD requires GE to make best efforts to obtain access to implement response actions; however, if GE is unsuccessful in obtaining access, EPA will need to use its authorities to obtain access for GE. Section 5.12 of the Reach 5A Conceptual Work Plan provided further information regarding efforts to obtain the necessary access permission for work in Reach 5A, and the Reach 6 Conceptual Work Plan will contain a similar discussion of access for Reach 6. Similar efforts will be made to obtain access permission for work in other RUs.

# 2 Characterization of Materials for Disposal

This section provides a summary of the characterization of materials generated during the ROR Remedial Action, which will consist primarily of dewatered sediments and soils, for on-site or off-site disposal. As described in Sections II.B.5 and II.B.6 of the Revised Final Permit, the ROR Remedial Action will use a hybrid disposal approach that includes a combination of off-site disposal and on-site disposal at the UDF.

## 2.1 Determination of On-Site vs. Off-Site Disposal

Determination of whether material will be transported and disposed of at the UDF or will require transport to off-site disposal facilities will be based primarily on in-situ characterization of the material and application of the criteria in Attachment E to the Revised Final Permit for disposal at the UDF, with a minimum of 100,000 cy of PCB-containing material to be sent off-site.

The criteria set forth in Attachment E to the Revised Final Permit for disposal in the UDF include the following:

- *Sediments:* For sediments from each reach and subreach of the ROR (including backwaters) other than Reach 5B, sediments to be disposed of in the UDF must have a volume-weighted average PCB concentration of less than or equal to 25 mg/kg within a reach or subreach. If the volume-weighted average PCB concentration of sediments to be removed from such reach or subreach exceeds 25 mg/kg, sediments with the highest PCB concentrations will be segregated for off-site disposal until the average concentration of the remaining sediments to be removed decreases to less than 25 mg/kg for subsequent disposal at the UDF. In addition, for all such sediments (including in backwaters), any sediment represented by a three-dimensional polygon associated with a single vertical core that has an average PCB concentration greater than or equal to 100 mg/kg will be segregated for off-site disposal. For Reach 5B, based on the PCB concentrations of the sediments to be removed and as required by Attachment E to the Revised Final Permit, all removed sediments from that reach must be disposed of off-site and may not be disposed of in the UDF.
- *Floodplain Soils:* Floodplain soils to be disposed of in the UDF must have a volume-weighted average PCB concentration of less than 50 mg/kg for each Exposure Area (EA).[5] If the volume-weighted average PCB concentration in the soil to be removed from a given EA equals or exceeds 50 mg/kg, the soils with the highest PCB concentrations in the EA will be segregated for off-site disposal until the average concentration of the remainder of the soil to be removed in the EA decreases to less than 50 mg/kg for subsequent disposal at the UDF.
- *Riverbank Soils:*[6] For riverbank soils in Reach 5A, soils to be disposed of in the UDF must have a volume-weighted average PCB concentration of less than 50 mg/kg. If the volume-weighted average PCB concentration of riverbank soils to be removed from that reach equals or exceeds 50 mg/kg, soil with the highest PCB concentrations will be segregated for off-site disposal until the average concentration of the remaining soil to be removed decreases to less than 50 mg/kg for subsequent disposal at the UDF. For riverbanks soils in Reach 5B, as provided in Attachment E to the Revised Final Permit, those soils must be disposed of off-site except that any excavated soils with PCB concentrations less than 50 mg/kg may be disposed of in the UDF.

The UDF will be used only for disposal of sediments, soils, and debris that were generated as part of the ROR Remedial Action and only those sediments and soils that meet the acceptance criteria summarized above. Any

[5] EAs are as defined in the Revised Final Permit.

[6] The riverbanks subject to remediation are those in Reaches 5A and 5B.

debris or other material that is proposed to be disposed of in the UDF must comply with the Revised Final Permit criteria. The Revised Final Permit also prohibits the disposal of certain types of waste in the UDF, e.g., free liquids, free product, or materials that meet the federal criteria for RCRA hazardous waste.

In addition, no material from the ROR Remedial Action may be disposed of at any other location in Berkshire County (apart from the UDF), and no material from any portion of the GE-Pittsfield/Housatonic River Site (other than the ROR) or from other response actions under the CD may be disposed of at the UDF.

To determine whether sediments and soils from the ROR meet the above-described PCB criteria for disposal at the UDF, sediment and soil samples have been (for Reach 5A and Reach 6) or will be (for other RUs) collected and analyzed for PCBs during the pre-design investigation (PDI) of each RU and evaluated under the above criteria. Based on this in-situ delineation and the evaluation against the above PCB criteria, the sediments and soils from each RU will be designated for on-site or off-site disposal.

It will also be necessary to determine whether any of the material to be removed are subject to any of the above prohibitions on disposal in the UDF. In particular, Attachment E to the Revised Final Permit provides that, for the purposes of determining whether materials designated for the UDF constitute characteristic RCRA hazardous waste, GE may use existing relevant ROR data from GE's RCRA Facility Investigation (RFI) and apply the "20 times rule" (described below) and/or may use relevant data from the 1½-Mile Reach Removal Action. It states further that if existing data are not sufficient to demonstrate that material will not constitute RCRA hazardous waste, GE will propose additional sampling in appropriate work plans.

In accordance with that Attachment E to the Revised Final Permit, GE reviewed the existing data from the disposal characterization analysis performed for the Removal Action at the 1½-Mile Reach of the Housatonic River, which is located immediately upstream of the ROR (and at which a remediation action was completed by EPA in 2006). Over 90 sediment and soil samples collected by EPA and GE from the 1½-Mile Reach and adjacent floodplain were analyzed for hazardous waste characteristics by the toxicity characteristic leaching procedure (TCLP). None of the samples showed leachate levels in excess of the regulatory limits that would result in the material being classified as hazardous waste. It is expected that the sediments and soils in the ROR are similar to those in and adjacent to the 1½-Mile Reach and thus would likewise not constitute RCRA hazardous waste.

Since that time, GE has conducted screening of existing ROR sediment and floodplain soil data, including RFI data, for non-PCB constituents to evaluate whether sediments and soils designated for removal may be considered RCRA hazardous waste. This screening was performed using the "20 times rule." Under this rule, the results of the existing total constituent analysis were divided by 20 to convert the total results into the maximum leachable concentration. If this concentration is below the regulatory threshold, additional characterization of materials is typically not required using the TCLP. This evaluation of the ROR data indicated that characteristic RCRA hazardous waste is not expected in the ROR.

Further, as described in the Reach 5A Conceptual Work Plan, a subset of Reach 5A PDI in-river sediment samples collected in 2023 was subject to TCLP testing for disposal characterization; specifically, those sediment samples were analyzed for TCLP metals, volatile organic compounds, semi-volatile organic compounds, pesticides, and herbicides. The results indicated that none of the TCLP parameters was detected above the RCRA hazardous waste toxicity characteristic regulatory levels in 40 CFR § 261.24, which further confirms the conclusion stated above for Reach 5A. For the more downstream RUs, once removal areas are defined and determination of on-site vs. off-site disposal is made, existing ROR data for non-PCB constituents will again be reviewed (using the 20 times rule) to confirm that materials designated for disposal in the UDF do not contain RCRA hazardous waste. If appropriate GE will propose additional TCLP sampling in appropriate RU-specific work plans to further confirm that conclusion.

Based on the in-situ delineation and the evaluation against the above PCB and hazardous waste criteria, the sediments and soils from each RU will be designated for on-site or off-site disposal. Any debris encountered is planned to be classified in a manner consistent with the surrounding sediment and soil characterization. If large debris is removed that is potentially subject to TSCA or RCRA regulations for disposal or does not conform to the disposal characterization of the surrounding sediment or soil, that debris will be segregated, and additional characterization of the debris will be performed.

Section 4 of the Reach 5A Conceptual Work Plan provided details regarding the in-situ delineation and disposal evaluation conducted for Reach 5A, including for on-site and off-site segregation.[7] The Reach 6 Conceptual Work Plan will provide similar details regarding the sediments in Woods Pond and the Reach 6 floodplain soils. It is anticipated that a similar process will be followed for the remaining RUs.

Section 4 of the Reach 5A Conceptual Work Plan also presented preliminary removal volumes for Reach 5A. Table 2-1 specifies the conceptual Reach 5A removal volume estimates along with estimated volumes for off-site disposal and disposal in the UDF, as presented in the Reach 5A Conceptual Work Plan. These estimated volumes are subject to modification during the final design for the Reach 5A remediation. Table 2-1 likewise lists estimated removal volumes for Reach 6 based on PDI data reviewed to date; however, these estimated volumes are subject to modification during development of the design plans for the Reach 6 remediation.

Table 2-1 also includes removal volume estimates for the remaining RUs. Those volumes have been based on preliminary estimates developed based on historical data collected during the settlement process for the ROR remedy. The actual total removal volumes for those RUs and the volumes subject to on-site versus off-site disposal will be based on PDI sampling and design activities for each such RU.

*Table 2-1: Summary of Conceptual Estimated Removal Volumes*

| Reach | Estimated Removal Volume (cy)[a] | Estimated On-Site Disposal Volume (cy)[b] | Estimated Off-Site Disposal Volume (cy) |
|---|---|---|---|
| 5A | 138,700 | 130,200 | 8,500[c] |
| 5B | 21,000 | 19,000 | 2,000 |
| 5C | 261,000[d,e] | 235,000 | 26,000 |
| 6 | 537,200[e,f] | 531,600 | 5,600 |
| 7B | 18,000[e] | 18,000 | 0 |
| 7C | 20,000[e] | 20,000 | 0 |
| 7E | 4,500 | 4,500 | 0 |

[7] Supplemental data collection activities have been and will be performed to further delineate certain remediation areas and to refine the extent of removal in some areas that would be subject to off-site disposal. The final horizontal and vertical extents of remediation in Reach 5A will be determined during the final design process and will be presented in the Final RD/RA Work Plan for Reach 5A.

| Reach | Estimated Removal Volume (cy)[a] | Estimated On-Site Disposal Volume (cy)[b] | Estimated Off-Site Disposal Volume (cy) |
|---|---|---|---|
| 7G | 14,500 | 0 | 14,500[g] |
| 8 | 50,000 | 6,600 | 43,400[g] |
| **Total** | **1,064,900** | **964,900** | **100,000** |

**Notes:**

[a] All quantities are preliminary estimates, are rounded, and are subject to change during final design. All volumes are in-situ "neat-line" estimates in cy except that the estimated removal volume for Reach 5A includes an assumed 10% increase over the estimated "neat" volume for the main channel sediment removal to account for uncertainties.

[b] In addition to the material removed from remediation areas, other materials generated during implementation of the ROR Remedial Action, such as materials used to build temporary access roads and staging areas and/or debris from dam removal activities, may be disposed of in the UDF. Such materials are not included in the on-site disposal volumes given in this table.

[c] This volume assumes that all soils excavated as part of the vernal pool pilot study could be disposed of at an off-site facility; the actual disposition of such vernal pool pilot study soils in the UDF or off-site is dependent on a number of factors and will be determined later.

[d] The estimated removal volume for Reach 5C includes backwater sediments.

[e] As discussed further in this Revised T&D Plan, sediments from Reach 5C (including backwaters) and Reach 6 will be transported hydraulically directly to the UDF. In addition, GE anticipates that sediments from Reaches 7B and 7C will likewise be transported hydraulically directly to the UDF. See Section 3.1 for additional information regarding hydraulic conveyance and associated estimated disposal volumes. A small volume of Reach 6 floodplain material, less than the capacity of one dump truck, is anticipated to require removal for disposal in the UDF and an equivalently small volume of floodplain material is anticipated to require removal for disposal off-site. This volume of material is not accounted for in these rounded values.

[f] For completeness, this estimated remediation volume includes the estimated removal volume from the headwaters of Woods Pond in Reach 6, although the forthcoming Conceptual RD/RA Work Plan for Reach 6 will not cover that area, but will note that that area will be addressed in a later addendum.

[g] Based on the criteria in Attachment E to the Revised Final Permit for disposal at the UDF, it is anticipated that all material from Reaches 7G and 8 would meet the criteria for on-site disposal; however, this volume (totaling 58,500 cy) is expected to be transported and disposed of off-site to achieve the minimum of 100,000 cy of PCB-containing material to be sent for off-site disposal.

Once material has been designated for off-site disposal (using the criteria summarized in Section 2.1 and/or to achieve the minimum of 100,000 cy of PCB-containing material to be sent for off-site disposal), it will be further characterized as necessary to the extent required by the selected off-site facility(ies). Such material may fall into three categories: (1) material containing PCB concentrations at or above 50 mg/kg, the disposal of which is regulated under EPA's TSCA regulations; (2) material that is RCRA hazardous waste (if any); and (3) material whose disposal is not regulated under the TSCA regulations and which does not constitute RCRA hazardous waste (referred to herein as "non-TSCA/non-RCRA material"). The material in each category will be designated for transport to the appropriate off-site facilities authorized to receive such material, as discussed further in Section 8.2.

## 2.2 Material Handling and Staging

The selected locations for temporary material handling and staging areas (hereafter referred to as staging areas) and temporary roads to access those staging areas are to be identified in the RU-specific Final RD/RA Work Plans, along with the anticipated material handling and staging activities. The staging areas and access roads for Reach 5A were preliminarily identified in the Reach 5A Conceptual Work Plan, and those for the Woods Pond area will be preliminarily identified in the Reach 6 Conceptual Work Plan.

Site-related material handling activities will be performed in a manner consistent with the updated *Project Operations Plan* (POP) for the ROR Remedial Action, which is scheduled to be submitted to EPA by November 22, 2024. The conceptual approach for handling removed sediments, soils, and debris is being developed for each RU in consideration of (1) the nature and characteristics of the materials to be removed, (2) on-site processes needed to prepare the materials for temporary staging and subsequent disposition (e.g., dewatering of materials containing excessive water), and (3) the overall sequence and schedule of the removal activities. Based on these considerations, several handling-related activities will be performed after the sediments, soils, and debris are removed and before they are transported for final disposal at the UDF or an off-site disposal facility.

In general, removed sediment, soil, and debris will, to the extent practicable, be directly loaded into sealed vehicles for transport to the staging areas for temporary stockpiling and management (e.g., dewatering) prior to transport and disposal at the UDF or transport to an approved off-site disposal facility. The potential locations of temporary staging areas for material stockpiling and management for each RU, and associated temporary access roads, are presented on figures illustrating the transportation and disposal scenarios for non-hydraulic transport (see Section 4); these locations are subject to modification in the Final RD/RA Work Plans or SIPs for the various RUs. In certain circumstances, materials may be loaded and transported directly from the removal areas to the UDF or to the selected off-site disposal facility(ies).[8]

At the staging areas, removed sediment, soil, and debris, including concrete and other debris removed from the Columbia Mill Dam, will be segregated into appropriate stockpiles, with separate stockpiles for materials that will be subject to disposal at the UDF and those to be sent to an off-site disposal facility(ies). Additional segregation of materials to be sent to an off-site disposal facility will be performed, as appropriate, based on their designation for disposal under applicable regulations. Debris encountered during sediment and soil removal will be segregated for disposal based on the designation of the surrounding sediment or soil. As necessary, large debris items will be cut to size at the staging areas to facilitate transport and to meet the requirements of the disposal destination. If appropriate, some debris may be decontaminated and beneficially reused; for instance, boulders could be power washed and reused for bank stabilization or channel reconstruction.

Where excavated materials are transported to staging areas, they will be staged and managed there until they have been sufficiently dewatered by gravity to pass the Paint Filter Liquids Test (SW846 Test Method 9095B). If gravity dewatering does not initially yield material that will pass the Paint Filter Liquids Test, the piles will be reworked and repositioned, with consideration of the addition of similar but drier excavated materials (if available), to condition the material so that it is suitable for transport (i.e., contains no free liquids and passes the Paint Filter Liquids Test). In addition, for non-TSCA material designated for off-site disposal, if these dewatering procedures do not yield material that will pass the Paint Filter Liquids Test, drying agents (e.g., Portland cement, cement kiln dust, lime, fly ash, or other suitable and locally available material) may be mixed with the excavated material to allow it to pass that test. In any case, once the excavated materials are sufficiently dewatered to pass the Paint Filter Liquids Test, such drying agents may be used to further dry the materials to facilitate transport. The

[8] In some cases, as discussed further below, sediments pumped hydraulically to the UDF may be transported from there to off-site disposal facilities.

materials prepared for disposal will then be loaded into lined and covered over-the-road vehicles or other containers, if appropriate, for transport to the UDF or for off-site transport. As appropriate, bench-scale treatability testing will be performed prior to final design for each RU to evaluate the effectiveness of potential dewatering methods for sediment to be removed during the ROR Remedial Action.[9]

It is anticipated that for RUs that will not involve hydraulic dredging and transport (e.g., Reach 5A), water generated from removal area dewatering and material staging and processing, stormwater that accumulates in the staging area exclusion zone, backwash water generated during operation of water treatment systems, and water used for decontamination will be collected at the staging area and treated at a temporary wastewater treatment facility constructed at a nearby staging area to support remediation for that RU. For RUs that will involve hydraulic dredging and transport (e.g., Reach 6), water generated from the dewatering of hydraulically dredged sediment will be treated at a temporary water treatment facility constructed near the dewatering operation (e.g., at the UDF for sediments hydraulically dredged from Reach 6) (see also Section 7.2).

The potential for spills during on-site transportation will be addressed in the revised Contingency and Emergency Procedures Plan to be included in the upcoming revised POP, which is scheduled to be submitted to EPA by November 22, 2024.

Further details specific to Reach 5A material handling and staging were included in Section 5.9 of the Reach 5A Conceptual Work Plan, and such details relating to Woods Pond sediments and Reach 6 floodplain soils will be included in the Reach 6 Conceptual Work Plan. It is anticipated that similar procedures will be provided in subsequent RD/RA work plans for the remaining RUs.

As noted above, the preliminary layout of staging areas and primary temporary access roads for Reach 5A was presented in the Reach 5A Conceptual Work Plan, and the same for Woods Pond and the Reach 6 floodplain will be included in the Reach 6 Conceptual Work Plan. For the remaining RUs, the staging area layout will be spaced as needed along or within the subject reaches for access to the removal areas to be defined in forthcoming RU-specific work plans. The final locations of the staging areas will be based on (1) the final remediation areas, (2) the Remediation Contractor's preferred material removal method(s) and associated access requirements, and (3) GE's ability to obtain access agreements for the staging areas and temporary access roads. This information will be identified on an RU-specific basis in the Final RD/RA Work Plans or SIPs for the various RUs.

Transportation modes considered under this Revised T&D Plan start after the material is loaded into containers for shipment and end with delivery of the material at the receiving facility (i.e., the UDF or an off-site disposal facility).

[9] Section 4.3.3.1 of the Final Revised SOW stated that the Conceptual RD/RA Work Plan for each RU may include a Treatability Study Work Plan to describe any necessary treatability testing to support the final design. GE has determined that treatability studies will be necessary to support the remedial design for Reach 5A. A Treatability Study Work Plan for Reach 5A was provided in Appendix H to the Reach 5A Conceptual Work Plan.

# 3 Overview of Modes of Transportation

This section provides an overview of the three modes of transportation considered for material transport during the ROR Remedial Action: hydraulic transport; truck transport; and rail/truck transport.[10] GE's evaluation of rail/truck transport was supported by R.L. Banks & Associates, Inc., experts in rail construction, operations, and logistics who were consulted for the rail-related evaluation presented in this Revised T&D Plan.

Example photographs of the various equipment and methods to transport contaminated material are provided in Appendix A.

## 3.1 Hydraulic Transport

Hydraulic dredges remove sediment as a slurry by dislodging sediment (typically by use of a rotating cutter head) and sucking the sediment into a pipeline with a dredge pump. During the dredging process, a relatively large amount of water is sucked with the sediment to create a slurry, with typically 85% to 90% water (by weight). This slurry is hydraulically transported to a dewatering area using large-diameter pipes and pumps. Appendix A provides photographs of typical hydraulic transport equipment.

As noted in Section 2.1, the Revised Final Permit requires sediments from Reach 5C (including backwaters) and Reach 6 to be transported hydraulically directly to the UDF if feasible. In EPA's June 4, 2024 partial disapproval/conditional approval letter for the October 2023 T&D Plan, EPA directed GE to assume that material from Reaches 5C and 6 can and will be hydraulically transported to the UDF. In addition, EPA directed GE to evaluate, to the extent possible with existing data, the feasibility of hydraulic transport for Reaches 5A, 5B, 7B, 7C, 7E, 7G, and 8, including transport from those areas to either the UDF or a potential rail loading facility. For Reach 5A specifically, EPA stated that GE should also evaluate the feasibility of hydraulic transport directly to the UDF or from an intermediate staging area to the UDF. Appendix B presents GE's evaluation of the feasibility of hydraulic dredging and transport from each RU, including Reaches 5C and 6 (for completeness), to the UDF and/or to a potential rail loading area, and, for Reach 5A, from an intermediate staging area to the UDF. GE anticipates making a final confirmation of the feasibility of such transport during development of the Final RD/RA Work Plans and will present such confirmation therein for EPA review and approval.

For each RU, the evaluation of feasibility and implementability of hydraulic dredging and transport considered the following criteria:

- Sediment characteristics and pumpability;
- Water depth;
- Production rate and ability to meet schedule;
- Presence of debris;
- Constraints due to geomorphology;
- Constraints due to infrastructure;
- Quality-of-life (QOL) considerations;
- Operational considerations (e.g., potential for downtime, flexibility in operations);

[10] Although barges may be used to support the ROR Remedial Action (e.g., to transport mechanically dredged material to shore for handling), it is not considered a stand-alone transportation mode for evaluation in this Revised T&D Plan.

- Transport distance and elevation differential (topography);
- Associated truck and/or rail traffic;
- Available space for required infrastructure;
- Required additional material processing and handling; and
- Required additional capital improvements to support dewatering.

Based on available data, hydraulic dredging/transport is considered feasible and will be used for Reaches 5C, 6, 7B, 7C, 7G, and 8, but will not be considered further for Reaches 5A, 5B, and 7E for the reasons summarized below. The RUs for which hydraulic dredging/transport has been retained for use and those for which that approach has not been retained for consideration are summarized in Table 3-1 below and illustrated on Figure 3-1.

*Table 3-1: Summary of Site-Wide Hydraulic Dredging/Transport Evaluation Results*

| Reach | Hydraulic Dredge/Transport Retained for Use | Hydraulic Dredge/Transport Not Retained for Further Consideration |
|---|---|---|
| 5A | | ✓ |
| 5B | | ✓ |
| 5C | ✓ (with transport directly to the UDF for dewatering) | |
| 6 | ✓ (with transport directly to the UDF for dewatering) | |
| 7B | ✓ (with transport directly to the UDF for dewatering) | |
| 7C | ✓ (with transport directly to the UDF for dewatering) | |
| 7E | | ✓ |
| 7G | ✓ (with transport to Rising Pond for dewatering) | |
| 8 | ✓ (with transport to Rising Pond for dewatering) | |

For Reach 5A, hydraulic dredging may be feasible, but hydraulic transport is not considered suitable for sediment from that reach. Notably, the presence of large cobbles and coarse sands and gravel in Reach 5A results in a low pumpability rating regardless of the transport origin/destination, and the evaluation of the three transport options for Reach 5A indicates that hydraulic transport is not suitable for transporting Reach 5A sediments for the following additional reasons:

- The evaluation of pumping from Reach 5A directly to the UDF determined that the large number of miles of pipeline and quantity of pumps required to pump material from Reach 5A directly to the UDF may cause significant operational limitations (e.g., high potential for production downtime and schedule delays).
- The evaluation of pumping from Reach 5A to a potential rail loading area determined that significant additional infrastructure would be required for dewatering the slurried sediment and for a railroad loading area not otherwise anticipated (see Section 3.3.2 for the evaluation of rail loading areas).

- The evaluation of pumping from an intermediate staging area to the UDF determined that the same number of truck trips would be required on the same roads near residential areas to transport material to the intermediate staging area as would be required to transport material directly to the UDF and significantly more time and energy would be required for additional material processing and handling (i.e., to dewater for truck transport to the intermediate staging area and then slurry for hydraulic transport the remaining distance to the UDF).

For Reach 5B the evaluation indicates that hydraulic dredging is not suitable for addressing Reach 5B sediments primarily due to concerns regarding production rate and operational limitations due the relatively low volume (1,000 cy) spread out over a two-mile section of the river. Sediment removal in small, isolated pockets is impractical for hydraulic dredging.

Finally, for Reach 7E, hydraulic dredging may be feasible, but hydraulic transport is not considered suitable for transporting Reach 7E sediments for the following reasons:

- The evaluation of pumping from Reach 7E directly to the UDF determined that the large number of miles of pipeline and quantity of pumps required to pump material from Reach 7E directly to the UDF may cause significant operational limitations (e.g., high potential for operational downtime).
- The evaluation of pumping from Reach 7E to a potential rail loading area at Rising Pond (Reach 8) determined that the large number of miles of pipeline and quantity of pumps required to pump material from Reach 7E to Rising Pond may cause significant operational limitations (e.g., high potential for production downtime and schedule delays).

For the RUs for which hydraulic dredging/transport is retained (i.e., Reaches 5C, 6, 7B, 7C, 7G, and 8), Appendix B includes preliminary hydraulic design parameters considered during the evaluation, including the potential pipeline route(s) for hydraulic conveyance. The final determination of transport methods for each RU will be presented in the Final RD/RA Work Plan or SIP for that RU. However, GE anticipates that, regardless of the non-hydraulic mode(s) of transportation selected for each RU, ***sediment designated for on-site disposal from Reaches 5C, 6, 7B, and 7C will be hydraulically transported directly to the UDF and will not require any non-hydraulic transportation***.[11] Table 3-2 provides a summary of the estimated on-site disposal volumes to be transported hydraulically (and not require any truck or rail/truck transport) and the remaining volumes not transported hydraulically (i.e., requiring transportation by truck or rail/truck).

*Table 3-2: Summary of Estimated Volume Transported Hydraulically Directly to UDF if Feasible*

| Reach | Estimated Removal Volume (cy) [a] | Approximate On-Site Disposal Volume Transported Hydraulically Directly to UDF (cy) | Approximate Disposal Volume Further Evaluated for Appropriate Mode of Transport (cy) [b] | |
|---|---|---|---|---|
| | | | On-Site [c] | Off-Site |
| 5A | 138,700 | -- | 130,200 | 8,500 |
| 5B | 21,000 | -- | 19,000 | 2,000 |
| 5C | 261,000 | 216,000 | 19,000 | 26,000 |

[11] The concrete and other debris removed from the Columbia Mill Dam (Reach 7B) cannot be transported hydraulically to the UDF. GE anticipates transporting this small amount of dam material to the UDF via truck (see Section 3.3.2).

| Reach | Estimated Removal Volume (cy) [a] | Approximate On-Site Disposal Volume Transported Hydraulically Directly to UDF (cy) | Approximate Disposal Volume Further Evaluated for Appropriate Mode of Transport (cy) [b] | |
|---|---|---|---|---|
| | | | On-Site [c] | Off-Site |
| 6 | 537,200 | 531,600 | 0 | 5,600 |
| 7B | 18,000 | 18,000 | 0 | 0 |
| 7C | 20,000 | 20,000 | 0 | 0 |
| 7E | 4,500 | -- | 4,500 | 0 |
| 7G | 14,500 | -- | 0 | 14,500 |
| 8 | 50,000 | -- | 6,600 | 43,400 |
| **Total (% of total volume)** | **1,064,900 (100%)** | **785,600 (74%)** | **179,300 (17%)** | **100,000 (9%)** |

**Notes:**

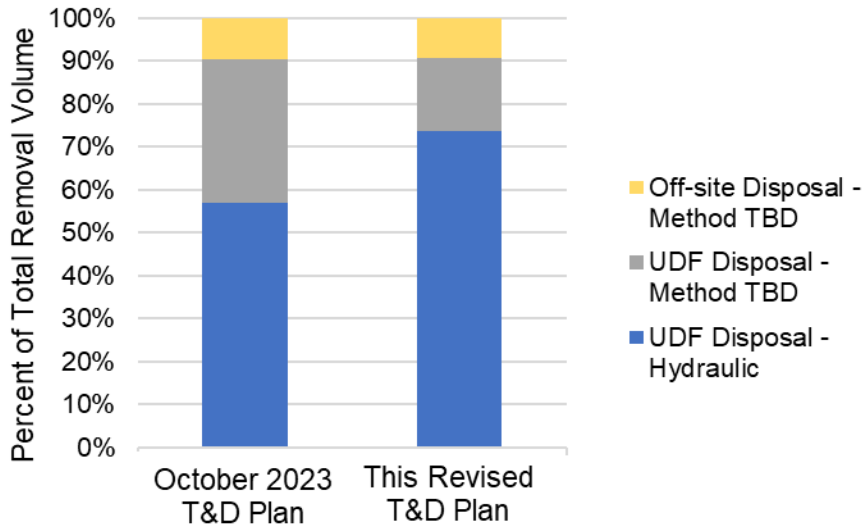
[a] Volumes from Table 2-1; see Table 2-1 for assumptions.

[b] Approximately 80,000 cy of the disposal volume evaluated for non-hydraulic transport (nearly 30%) is soil which cannot be hydraulically dredged.

[c] In addition to the material removed from remediation areas, other materials generated during implementation of the ROR Remedial Action, such as material used to build temporary access roads and staging areas and/or debris from dam removal activities, may also be disposed of in the UDF. Such materials are not included in the on-site disposal volumes given in this table.

-- = not applicable, based on conclusions presented in Table 3-1.

As shown in Table 3-2, if the proposed hydraulic transport approach can be implemented, nearly three-quarters of the estimated total remediation volume would be transported to the UDF without additional truck traffic. This represents a 17% increase in the total volume to be hydraulically transported to the UDF (without the need for truck or rail/truck transport) compared to the approach presented in the October 2023 T&D Plan. Overall, as illustrated in Figure 3-2, this would eliminate the need for approximately 73,700 round-trip truck trips to the UDF. Compared to the approach proposed in the October 2023 T&D Plan, this approach would eliminate an additional 19,000 local round-trip truck trips.




TBD = to be determined

*Figure 3-2: Illustration of Increase of Estimated Volume Transported Hydraulically Directly to UDF if Feasible (2023 vs. 2024)*

In addition, if a dewatering system to support hydraulic dredging and a rail loading area are both constructed at Rising Pond (see Sections 4.2 through 4.4), GE anticipates that sediment from Reaches 7G and 8 for off-site disposal will be hydraulically transported directly to Rising Pond for loading to rail and will not require any truck transport. This would further reduce the volume of material for off-site disposal requiring truck transport to only 46,100 cy and eliminate the need for approximately 4,000 additional round-trip truck trips to the off-site disposal facility(ies). If this additional hydraulic transport approach can be implemented for Reaches 7G and 8, ***79% of the estimated total remediation volume would be transported for disposal without additional truck traffic***.

Further, if rail/truck transport is used for on-site disposal (see Section 4.4), GE anticipates that sediment from Reach 8 for on-site disposal will be hydraulically transported directly to Rising Pond for loading to rail and will not require any truck transport. This would even further reduce the volume of material requiring truck transport to only 39,500 cy and eliminate the need for approximately 600 additional round-trip truck trips from Reach 8 to the UDF (although truck trips would still be required between Woods Pond Spur and the UDF – see Section 4.4). No sediment from Reach 7G is anticipated to be disposed of on-site, so there is no potential for further reduction in truck trips from that reach by utilizing rail/truck transport to convey material to the UDF.

## 3.2 Truck Transport from Excavation Locations to Disposal Site

Trucks are widely used as a mode of transportation for disposal of removed sediments and soils at many remediation projects and truck transport is a technically feasible method for transportation of materials to the UDF for on-site disposal or to the selected off-site disposal facility(ies) or to an on-site rail loading facility for subsequent rail transport to the UDF or off-site. It is the only mode of transport for disposal at the UDF other than hydraulic transport mentioned in either EPA's 2020 Comparative Analysis or the Revised Permit. For truck transport, it is anticipated that material will be loaded into lined trucks at the temporary staging areas (or removal areas if loaded there for direct transport). From there, material will be driven over temporary access roads and public roadways directly to the UDF or to the selected off-site disposal facility(ies) or to an on-site rail loading area. Figure 3-3 presents a process flow diagram for truck transport from the RU loading area to the off-site disposal facility(ies), and Figure 3-4 presents a process flow diagram for truck transport from the RU loading area to the UDF. Trucks will be covered and meet all applicable labeling and manifesting requirements (see Section 6). Appendix A provides photographs of typical truck transport equipment.

Use of trucks provides flexibility during implementation of remedial activities, as trucks are readily available and can easily access removal areas, staging areas, and the disposal facility(ies) and can travel to the disposal facility(ies) independently without relying on other entities to dictate schedule. Truck transportation was the mode of transportation selected by GE for all of the materials removed from the Upper ½ Mile Reach of the Housatonic River (approximately 19,000 cy removed and transported via truck over three years) and by EPA for all of the materials removed from the 1½ Mile Reach (approximately 92,000 cy removed and transported via truck over five years). Truck transport was also used by the Pittsfield Economic Development Authority for transport of soil (approximately 95,000 cy) during its recent site development activities at the former 19s Complex at the former GE plant site.

For each transportation and disposal scenario presented in Section 4, GE has identified the most likely anticipated routes for transportation of materials from the various RUs to the UDF or off-site disposal facility(ies) or, where applicable, to an on-site rail loading area. Regardless of the scenario, these routes have been located to prioritize major roads, avoid the designated restricted roads,[12] and avoid other local roads through developed areas to the extent practicable. The selection of these routes has also considered input received during discussions with the affected local municipalities and local community (see Section 1.4), as well as the requirements specified in EPA’s June 4, 2024 letter on the October 2023 T&D Plan. The identified routes take into account the following additional considerations:

- Travel will prioritize use of Roaring Brook Road and Woodland Road, along the eastern side of Reaches 5 and 6, which are rural roads with limited residential development.
- Use of Massachusetts Route 183 (MA-183) through the center of Lenox will be avoided as a potential transport route to the UDF; if needed, U.S. Route 7 (US-7) to Walker Street will be utilized to approach the UDF from the south via Willow Hill Road. If there are unanticipated or emergency situations, such as temporary road closures, GE may propose to EPA, for prior approval, the temporary use of MA-183 through the center of Lenox.
- The primary off-site truck route from RUs north of I-90 will use US-7 south to Massachusetts Route 102 (MA-102) east to I-90 west. The use of U.S. Route 20 (US-20) east through Lee will only be used as a secondary or alternate route to get to I-90 west.
- Use of MA-102 west through Stockbridge will be avoided as a potential transport route from Reaches 7E, 7G, and 8 to I-90 west. Instead, as needed, materials going off-site by truck from Reaches 7E, 7G and 8 will utilize MA-102 east to I-90 west. If there are unanticipated or emergency situations, such as temporary road closures, GE may propose to EPA, for prior approval, the temporary use of MA-102 through Stockbridge.

The truck routes for each transportation scenario are described in Section 4 and estimated numbers of truck trips and miles for transport from each RU to the selected disposal site for each scenario are discussed in Section 5.1.

[12] The restricted roads consist of those identified in Section II.H.11.c of the Revised Final Permit – namely, Brunswick, Kenilworth, Warwick, and Chester Streets; Noblehurst Avenue; Revilla Terrace; and Shetland, Clydesdale, Pinto, Palomino, Anita, Lucia, Quirico, Joseph, and Eric Drives.

For the local roads that are part of the proposed routes, an evaluation will be made of the need for and type of reconditioning and upgrading of the roads and associated infrastructure to make them suitable for truck traffic. This evaluation will also consider the habitat/ecological impacts of road reconditioning or upgrades. The results of that evaluation and a proposal for such reconditioning and upgrading, where warranted, including the specific roads/infrastructure involved and the type of reconditioning/upgrading to be performed, will be included in the Final RD/RA Work Plan and/or SIP for each RU. At a minimum, it is anticipated that Roaring Brook Road will need to be reconditioned and upgraded to support construction activities along Reaches 5 and 6, including transportation to the UDF or off-site disposal facility(ies). The proposal for such reconditioning and upgrading will be included in the Final RD/RA Work Plan for the first RU for which use of the road is anticipated (likely Reach 5A). The timeline for such reconditioning and upgrading is expected to fit within the schedule for general mobilization to initiate construction at Reach 5A and is not expected to extend or delay the construction schedule.

## 3.3 Rail/Truck Transport from Excavation Locations to Disposal Site

Rail is sometimes used as a mode of transportation for disposal of removed sediments and soils at remediation projects, typically when removed materials will require transport over long distances for disposal. Accordingly, the Revised Final Permit requires GE to maximize use of rail, to the extent practicable, for off-site disposal, but not on-site disposal. As noted previously, use of the railroad as a mode of transportation will necessarily include use of trucks to convey material to the railroad and/or from the railroad to the final disposal site and is therefore considered a rail/truck transport approach. In addition, as material cannot be loaded or unloaded directly to rail cars on the railroad mainline tracks due to worker safety concerns and the potential to impede mainline operations, use of the railroad as a mode of transportation will require construction of a railroad spur or siding branching off from the mainline tracks and an associated support area for transferring material to/from the railroad. A railroad spur is typically a dead-end track that branches off the mainline track, while a siding is typically parallel to the mainline track and may allow through-traffic (i.e., may connect to the mainline track in two places). There are currently no usable active railroad spurs or sidings available in or near the City of Pittsfield or the Towns of Lee, Lenox, Great Barrington, and Stockbridge.

The containers used for rail/truck transport are typically either gondola rail cars or intermodal containers, and each requires different material handling and loading/unloading procedures. Appendix A provides photographs of typical rail/truck transport equipment. Gondola rail cars are typically open-top cars (which can be fit with a top and sealed) from which material is loaded/unloaded while the gondola is on the railroad tracks, and each can hold approximately 100 tons of waste. Loading/unloading material into/from gondolas directly on the railroad tracks requires a large material staging area (multiple acres) and equipment for loading/unloading operating immediately adjacent to the railroad tracks, which limits the areas along the railroad tracks that can be used for loading and/or unloading. Unlike gondola rail cars, intermodal containers allow for use of multiple modes of transportation (e.g., truck, railroad) without handling of the material itself when changing modes and can hold approximately 15 to 20 tons of waste. The intermodal container is loaded once at the point of origin and unloaded once at the final destination, regardless of how many times the container is transferred from different modes of transportation. Six 20-foot intermodal containers fit on a typical railroad flat car (either three end to end and double-stacked or four end to end with double-stacking on the leading and trailing ends). The use of intermodal containers reduces the need for direct handling (i.e., loading/unloading) of material (since the container is handled instead) and allows freight to be transported faster. For the purposes of the ROR Remedial Action, it is anticipated that intermodal containers will be the primary container for rail transportation; however, equipment determination will be based on equipment availability and the preference of the selected contractor and/or disposal facility(ies). Final equipment determinations will be presented in the Final RD/RA Work Plans or SIPs for the various RUs or potentially addenda to this Revised T&D Plan.

The mainline railroad tracks near the ROR are serviced by the Housatonic Railroad Company, Inc. (HRRC). HRRC uses a right-of-way owned by the Massachusetts Department of Transportation (MassDOT), with the mainline track running down the center of the right-of-way. HRRC railroad tracks generally follow the Housatonic River and generally run the length of the ROR subject to Remedial Action (Figure 1-1). Under the rail/truck transport approach, transportation of rail cars loaded with project materials would be under the care and custody of the railroads and would be routed pursuant to railroad transportation agreements between the railroad company and GE and applicable laws and regulations.

The frequency of train movement would vary based on railroad scheduling, rate of loading, travel time required to and from the selected disposal facility, rate of off-loading, and other factors. As needed, rail cars could be staged and loaded based on the project sequence and schedule. However, use of the railroad would depend on the railroad's availability to move cars as needed to maintain the production rates for soil/sediment removal, any required maintenance of the tracks or railroad equipment, and other railroad traffic on the single main line route, all of which could dictate and delay construction sequencing and schedule. This could result in a stoppage of removal activities and/or operations at the RUs and the UDF based on the railroad's schedule.

For rail/truck transport, it is anticipated that material will be loaded into intermodal containers that will be fitted with a polyethylene liner at the temporary staging areas (or removal areas if loaded there for direct transport). From there, the container will be driven via truck over temporary access roads and public roadways to a rail loading area and transferred from a truck to rail (including a likely intermediate step to temporarily stage the container at the rail loading area until enough containers are available to fill a rail car). For off-site disposal by rail/truck transport, the transfer could take place at a new local rail loading area, or the material could be driven by truck to an existing off-site commercial rail loading facility – e.g., the CSX Corporation facility located in Albany, New York – for loading on trains.[13] From there, for off-site disposal, the rail car will transport the material directly to the selected off-site disposal facility(ies). For on-site disposal, the rail car will transport the material to a second rail loading facility near the UDF, where the container will be transferred from rail to a truck (including a likely intermediate step to temporarily staging the container until a truck is available) and then be driven directly to the UDF. Figure 3-3 presents a process flow diagram for rail/truck transport from the RU loading area to off-site disposal facility(ies), and Figure 3-4 presents a process flow diagram for rail/truck transport from the RU loading area to the UDF. Containers utilized for rail/truck transport will be covered and meet all applicable labeling and manifesting requirements (see Section 6).

To use rail/truck transport effectively and efficiently, a railroad spur or siding and associated support area will be required in proximity to the removal staging areas, and, for rail/truck transport for on-site disposal, a railroad spur or siding and associated support area would be required in proximity to the UDF. As noted above, there are currently no active railroad sidings available in or near the removal areas or the UDF and there are no previously used railroad sidings in those areas that could be used in their current condition for the ROR Remedial Action. Therefore, existing spurs/sidings will have to be reconditioned or new spurs/sidings constructed, and associated support areas will need to be constructed.

The size of property required for reconditioning or new spurs/sidings must accommodate the anticipated project-specific production rates for the ROR Remedial Action. A minimum of approximately 90 feet of operational railroad track is required to fit one railroad car (which fits a maximum of six containers, utilizing double-stacking),

[13] This would involve the same amount of local traffic and off-site traffic near the ROR site as the use of trucks to travel directly to the off-site disposal facilities (although the routes leaving the site on the interstate high-ways may be somewhat different), but it would involve use of railroad for the long-distance transport to the disposal facilities.

which can support transport of approximately 126 tons of removed material. Based on HRRC's current operational capacity, it is anticipated that project-related rail cars can be moved by HRRC on the mainline tracks once per day, which results in a removal rate from the rail loading area (or arrival rate at a rail off-loading area) of 126 tons per day. That is less than the minimum average production rate anticipated for the ROR Remedial Action. To match anticipated project production rates and mitigate the potential for rail loading and/or off-loading operations to require removal operations to slow, which would delay the overall project schedule, it is anticipated that: (a) a minimum of approximately 270 feet of operational track is required to support daily production rates anticipated for Reaches 5A and 5B; (b) a minimum of approximately 630 feet of operational track is required to support daily production rates anticipated for Reaches 5C and 6; (c) a minimum of approximately 360 feet of operational track is required to support daily production rates anticipated for Reach 7; and (d) a minimum of approximately 630 feet of operational track is required to support daily production rates anticipated for Reach 8. Additional track length will be required to connect the operational track to the railroad mainline tracks; this length will be determined on a location-by-location basis and is anticipated to range from 100 to 700 feet.

Finally, a minimum width of approximately 90 feet of land adjacent to the operational area of each rail spur/siding is needed for loading/off-loading operations, plus additional area for truck traffic/turning. In addition, it is anticipated that a minimum of approximately one acre of space, depending on the RU, is needed to accommodate anticipated truck traffic and equipment to load or off-load containers to/from rail cars.

The minimum total anticipated area required to support the various production rates in various RUs is summarized in Table 3-3.

*Table 3-3: Estimated Minimum Area Required for Rail Loading/Off-Loading for Various Remedial Units*

| Area | Estimated Minimum Area Required for Rail Loading/Off-Loading Area |
|---|---|
| Reaches 5A and 5B | 2.2 acres |
| Reaches 5C and 6 | 2.7 acres |
| Reach 7 | 2.2 acres |
| Reach 8 | 3.2 acres |

Section 3.3.1 evaluates and provides a preliminary screening of potential locations for rail loading and/or off-loading areas.

### 3.3.1 Preliminary Screening Evaluation of Potential Rail Loading and/or Off-Loading Locations

This section provides a preliminary screening evaluation of potential locations for rail loading and/or off-loading areas to support the rail/truck transport of removed materials during the ROR Remedial Action. The preliminary screening evaluation includes the following potential locations, as illustrated on Figure 3-5:

- **Utility Drive**: Located adjacent to Reach 5A in the City of Pittsfield, near the Pittsfield WWTP, this location is evaluated as a potential loading area.
- **Woods Pond Spur**: Located adjacent to Reach 6 in the Town of Lenox, at the Berkshire Scenic Railway Museum property, this location is evaluated as a potential loading and/or unloading area.

- **At/Within the UDF**: Located on the eastern side of the Housatonic River, immediately south of Woods Pond in the Town of Lee, this location is evaluated as a potential loading and/or unloading area within the UDF Operational Area.
- **Adjacent to the UDF**: Located on the eastern side of the Housatonic River, immediately south of Woods Pond in the Town of Lee, this location is evaluated as a potential loading and/or unloading area immediately west of and adjacent to the UDF Operational Area.
- **Columbia Mill**: Located adjacent to Reach 7B in the Town of Lee, this location is evaluated as a potential loading area.
- **Willow Mill**: Located adjacent to Reach 7E in the Town of Lee, this location is evaluated as a potential loading area.
- **Rising Pond**: Located adjacent to Reach 8 in the Town of Great Barrington, this location is evaluated as a potential loading area.

As part of the evaluation of each rail loading and/or off-loading location, the available space for constructing required infrastructure has been considered. The ability to recondition an existing rail spur/siding or construct a new rail spur/siding is subject to obtaining access agreements for the adjacent property(ies).

Some additional, previously used railroad siding locations were identified in the October 2023 T&D Plan near the ROR site, including the following: Industrial Drive, Greylock Mill, Pleasant Street, Stockbridge Train Station, and Glendale. These locations have been determined not to be feasible options for the reasons given in Table 3-4. Thus, these previously used railroad siding locations were not retained for further evaluation in this Revised T&D Plan.

#### 3.3.1.1 Utility Drive

The proposed Utility Drive location is within a property owned by the Commonwealth of Massachusetts, specifically the Massachusetts Department of Fish and Game (MassDFG) or its Division of Fisheries and Wildlife (MassDFW), on a property between the existing railroad tracks and the river, outside the 1 mg/kg PCB isopleth (Figure 3-6). As noted by EPA in its June 4, 2024 letter, this property has significant available area that could be used for construction of the infrastructure required to support rail/truck transport, and it is anticipated that enough space is available to support a rail siding or spur long enough to support the expected soil and sediment removal rates for the ROR Remedial Action. This location would require use of the public road that services the Pittsfield WWTP and coordination with the City of Pittsfield regarding the increase in truck traffic to the rail loading area. In addition, this location is immediately adjacent to a residential neighborhood for which road use is restricted; and while use of those roads is not necessary to access the Utility Drive rail loading area, the proximity to those roads will be evaluated with regard to QOL impacts (see Section 5.4).

The proposed rail loading area at this location consists of an open upland field that appears to be mowed at least annually (and possibly more often). As illustrated on Figure 3-6, the entirety of this upland field is mapped by the Massachusetts Natural Heritage and Endangered Species Program (MNHESP) of MassDFW as Priority Habitat of state-listed threatened, special concern, or endangered species, and MNHESP has designated a Core Area 2 zone through roughly two-thirds of the eastern portion of the field (including an overlap with the rail loading layout in the southern part). Although the 2022 Species Habitat Maps provided by MNHESP to GE cover areas adjacent to the upland field, those maps do not extend to that field because they are limited to areas within the 1 mg/kg PCB isopleth. It is thus unknown whether the MNHESP's Species Habitat mapping includes this field. It is similarly unknown whether use of this location for a rail loading area would affect any state-listed species.

Additional evaluation of MNHESP's state-listed species data and potentially additional habitat assessment would be necessary to make those determinations. Finally, the Utility Drive property has wetlands identified in the National Wetland Inventory near the area identified for the rail loading area.

At EPA's request, GE evaluated, as a potential benefit to utilizing this location as a rail loading area, the potential for using additional internal temporary access roads between this location and the Reach 5A staging areas to minimize traffic on public roads. Based on information presented in the Reach 5A Conceptual Work Plan, access roads leading to public roads already connect three staging areas (numbers 6, 7, and 9) to Utility Drive, representing approximately 17% of the Reach 5A removal volume. River crossings could potentially be used to move material from three additional preliminary staging areas on the eastern side of the river (numbers 4, 5, and 8) in order to reduce traffic on public roads for moving material from the eastern side of the river to the potential rail loading area at Utility Drive (i.e., reduce traffic on East New Lenox Road, New Lenox Road, US-7, Holmes Road, and Utility Drive). However, construction of additional internal temporary access roads would increase disturbance of sensitive habitats between Utility Drive and the river. Additionally, it would be less efficient and require more resources and operations to use additional internal temporary access roads in this manner rather than using the temporary access road approach proposed in the Reach 5A Conceptual Work Plan. Although potentially possible, the negative impact to sensitive habitats and additional logistical issues offset the potential benefit of connecting the three preliminary staging areas on the eastern side of the river (numbers 4, 5, and 8) to Utility Drive with additional internal temporary access roads. Finally, the first three staging areas (numbers 1, 2, 3) are too far north from the Utility Drive location, with a residential neighborhood between, to extend internal temporary access roads between these areas and Utility Drive, and the last small staging area in Reach 5A (number 10) is on the eastern side of the river approximately a half-mile south of the next closest staging area, with significant elevation changes between the two, and internal temporary access roads are not implementable between this area and Utility Drive. Details related to the location of temporary access roads and staging areas will be included in the Final RD/RA Work Plan for Reach 5A.

GE's railroad consultant has determined that the Utility Drive location has suitable space to accommodate rail infrastructure and associated operational areas. Potential negative impacts identified by GE's railroad consultant include potential conflicts with the active operations which share the access road (i.e., Pittsfield WWTP traffic), as noted above. In addition, although the area is a relatively flat open field, GE's railroad consultant anticipates that significant grading could be required to build the required rail infrastructure and connect such infrastructure to the existing mainline track.

Utility Drive is considered a feasible option for a potential rail loading area and has been retained for consideration in the site-wide scenarios described in Section 4. Use of this location will require GE to obtain access and use agreements for the property with the City of Pittsfield and MassDFG or MassDFW, with enough room for transferring material between truck and rail and other supporting operations. Use of this location is also subject to the need to satisfactorily address the issues relating to Priority Habitat and wetlands in the area and those relating to potential conflicts with WWTP operations and traffic.

#### 3.3.1.2 Woods Pond Spur

The proposed Woods Pond Spur location is on the western side of the river, relatively close to the UDF, within a property owned by the Berkshire Scenic Railway Museum (Figure 3-7), immediately adjacent to the existing railroad and accessible from Willow Creek Road. The entire area of potential use for rail transport-related infrastructure has been previously developed for industrial/commercial uses. It is anticipated that enough space is available at this location to support a rail siding or spur long enough to support the expected soil and sediment removal rates for the ROR Remedial Action. Due to the space required to construct a rail loading/off-loading area and anticipated increase in truck traffic to the rail loading/off-loading area, use of this location would likely require a complete shutdown of the Berkshire Scenic Railway Museum's operations for the duration of use and temporary relocation of its historic rail cars and infrastructure currently on the property (which may require building additional railroad infrastructure elsewhere). Based on preliminary discussions with representatives of Berkshire Scenic Railway Museum, it is clear that use of this location as a potential rail loading/off-loading area will significantly impact the museum operations; however, the museum is willing to continue conversations regarding property use given the potential for long-term benefits to the museum operations from a new rail siding or spur.

The current MNHESP Priority Habitat mapping does not include the proposed rail layout area but is confined to the area to the east (encompassing the northern part of Woods Pond and its floodplain on the eastern side of the existing rail line). Additionally, no wetlands have been identified in the National Wetland Inventory near the area identified for the rail loading area. However, the conceptual layout and required minimum size of the operational area and rail spur overlaps with an area listed on the National Register of Historic Places (Figure 3-7).

GE's railroad consultant has determined that the Woods Pond Spur location is suitable for use as a rail loading and/or off-loading area. Advantages include previous use for railroad spurs/sidings (i.e., the area is already generally graded to support rail infrastructure) and sufficient room to accommodate rail infrastructure and associated operational areas. Negative impacts to the museum patron parking area during project duration may be outweighed by potential long-term benefits to the Berkshire Scenic Railway Museum, as will be further discussed with the Museum. In addition, accommodations may be required by HRRC to allow service at the Woods Pond Spur in such proximity to existing rail operations at the Casella facility immediately north of this location.[14]

Woods Pond Spur is considered a feasible option for a potential rail loading and/or off-loading area and has been retained for consideration in the site-wide scenarios described in Section 4. Use of this location is subject to GE's ability to obtain access and use agreements for the property with the Berkshire Scenic Railway Museum, with enough room for transferring material between truck and rail and other supporting operations. Additionally, consideration and coordination will be required during design related to potential use of and impacts to the area listed on the National Register of Historic Places. Truck transport routes from staging areas on the eastern side of the river to this potential rail loading location on the western side of the river and from this rail unloading location to the UDF on the eastern side of the river are discussed in Section 3.3.3.

#### 3.3.1.3 At or Within the UDF

It is technically infeasible to build a railroad loading and/or off-loading area within the footprint of the UDF Operational Area (Figure 3-8) due to the following restrictions:

- The full footprint of the UDF Operational Area is designated for UDF operations, including stormwater controls and support areas, and/or operations to dewater hydraulically dredged material and treat liquid generated by dewatering and through operation of the UDF (i.e., leachate), and there is insufficient space for the required minimum rail spur/siding length or supporting area.

[14] In an effort to reduce impact to the businesses operating between Willow Creek Road and the mainline tracks, GE also evaluated use of the land between the mainline tracks and the Housatonic River as a potential rail loading/off-loading area. However, as shown on Figure 3-7, this area is identified as Core Area 1 habitat, for which disturbance is to be avoided to the extent practicable during the ROR Remedial Action, as well as an MNHESP-designated Priority Habitat of state listed species and wetlands identified in the National Wetland Inventory. As defined in the Revised Final Permit, Core Area 1 habitat consists of areas identified by Mass DFG as areas with "the highest quality habitat for species that are most likely to be adversely impacted by PCB remediation activities," most of which species are plants because they are not mobile (Attachment B to the Revised Final Permit).

- The elevation of the UDF Operational Area is significantly higher than the mainline track, requiring that any rail spur/siding be constructed at a grade steeper than the allowable grade for railroad use.
- As the UDF receives material from the RUs, the UDF will continue to evolve and develop, which will require a dynamic landscape not conducive to installation of a fixed rail spur/siding and support area.

For these reasons, a location at/within the UDF has not been retained as a potential rail loading and/or off-loading area.

#### 3.3.1.4 Adjacent to the UDF

To build a rail loading and/or off-loading area on the eastern side of the river immediately south of Woods Pond and west of and adjacent to the UDF Operational Area, an extensive amount of railroad infrastructure would be required to create a new rail spur from the mainline track to the private property adjacent to and west of the UDF Operational Area (i.e., on land between the river and the UDF). The property is privately owned by Eurovia Atlantic Coast LLC (Eurovia). In 2020, HRRC conducted an evaluation of options to construct a railroad spur to and on Eurovia's property adjacent to the UDF Operational Area (see HRRC comments in EPA 2020c). The three options evaluated by HRRC approach the UDF from the south; they consist of the following:

- **Alternative 1:** Create an at-grade railroad crossing across Mill Street, travel next to residential properties, excavate through the existing vegetated hill between Mill Street and Willow Hill Road (construct retaining walls on both sides of the excavation), and construct a railroad bridge across Willow Hill Road to enter the Eurovia property.
- **Alternative 2:** Relocate Willow Hill Road and install a new retaining wall between the new rail spur and the newly aligned Willow Hill Road to enter the Eurovia property.
- **Alternative 3:** Construct a railroad bridge over the Housatonic River, north of the Mill Street Bridge, to enter the Eurovia property.

These three alternatives are illustrated on Figure 3-8. The alignments illustrated are conceptual and could be extended further towards the UDF Operational Area, or else the remaining distance to the UDF would be traveled by truck across Eurovia's property. No matter where the rail spur terminates adjacent to the UDF Operational Area, truck traffic would still be required on temporary access roads to transfer material from the railroad to the UDF for disposal.

GE's railroad consultant has determined that all three of these alternatives would require extensive earthwork to complete, that Alternatives 1 and 2 would require new retaining walls, that Alternatives 1 and 3 would require railroad bridges, and that Alternative 2 would require displacing Willow Hill Road. Further, Alternative 1 would involve additional safety concerns with construction and use of an at-grade crossing across Mill Street.

In addition, as noted by HRRC's engineer and confirmed by GE's railroad consultant, the horizontal curve that would be required north of the Mill Street Bridge for Alternative 2 is in the range of 16 degrees, a radius not acceptable for mainline tracks, although potentially allowable for the proposed spur line. Certain rail cars can navigate a 16-degree curve, but only at low speeds since there is a higher chance of rail cars derailing on these sharp curves. The Chief Engineer's approval for this geometry would need to be requested.

Finally, in order to have a rail loading and/or off-loading area adjacent to the UDF Operational Area, the railroad spur line and loading/off-loading area would be built entirely on private property, and thus approval of and access/use agreements with the property owner would be necessary to construct and operate that spur line/siding. Eurovia is an active facility with a high volume of existing truck traffic.

Given these complex challenges, it is infeasible to construct a railroad spur line/siding to and on the property adjacent to the UDF property. Accordingly, a location adjacent to the UDF has not been retained as a potential rail loading and/or off-loading area.

#### 3.3.1.5 Columbia Mill Property

The location evaluated for Columbia Mill is within a small privately owned property between the railroad mainline track and the Housatonic River (Figure 3-9). However, there is extensive existing infrastructure on the parcel, and GE's railroad consultant has determined that the property size is not sufficient for the minimum required length of rail spur, the required associated operational area for rail loading, and dewatering areas to prepare the removed sediment for transport. In addition, the bridge at the point of ingress and egress from the property would need further evaluation to confirm that it is sufficient to support truck operations to and from the rail loading area. In any case, as noted in Section 3.1, the sediment from Reach 7B (i.e., the Columbia Mill impoundment) is anticipated to be pumped directly to the UDF, eliminating the need for evaluation of a non-hydraulic transport option adjacent to the Reach 7B impoundment.

For these reasons, a location at Columbia Mill has not been retained as a potential rail loading area.

#### 3.3.1.6 Willow Mill Property

The location evaluated for Willow Mill is within a small privately owned property between the railroad mainline track and the Housatonic River (Figure 3-10). The entirety of the parcel has been designated by MNHESP as Priority Habitat of rare species, and the property also includes wetlands identified in the National Wetland Inventory. Based on the 2022 Species Habitat maps provided by MNHESP to GE, the published Priority Habitat mapping appears to correspond to the Species Habitat mapping of three state-listed species: wood turtle, creeper (a freshwater mussel), and longnose sucker (a fish). While the latter two species are entirely aquatic and would be restricted to in-river habitat, the wood turtle could use both riverine/riverbank and adjacent terrestrial and wetland habitats. In any case, GE's railroad consultant has determined that the property size is not sufficient for the minimum required length of rail spur, the required associated operational area for rail loading, and dewatering areas to prepare the removed sediment for transport.

For these reasons, a location at Willow Mill has not been retained as a potential rail loading area.

#### 3.3.1.7 Rising Pond Property

The proposed Rising Pond location is within a property currently owned by GE between the rail mainline track and the Housatonic River (Figure 3-11). Although GE is required to transfer this property to the Town of Great Barrington under the February 2020 Settlement Agreement, GE will retain sufficient easements to allow this property to be used in connection with the ROR Remedial Action, including for a rail loading area. Most of this site is in mature upland woodland. The MNHESP Priority Habitat mapping does not include the rail loading layout area, and no wetlands have been identified in the National Wetland Inventory in that area. This property has significant available area that GE's railroad consultant has determined could be used for construction of the infrastructure required to support rail/truck transport, including a rail siding or spur long enough to support the expected soil and sediment removal rates for the ROR Remedial Action and the associated supporting operational area.

For these reasons, the Rising Pond property is considered a feasible option for a potential rail loading area and has been retained for consideration in the site-wide scenarios described in Section 4.

#### 3.3.1.8 Summary

Based on the evaluation presented above, the location at Utility Drive (adjacent to Reach 5A) and the Rising Pond property (adjacent to Reach 8) are considered potential rail loading areas, and Woods Pond Spur location (adjacent to Reach 6) is considered a potential rail loading and/or off-loading area. These three locations are retained for consideration in the site-wide scenarios described in Section 4 and evaluated in Section 5.

### 3.3.2 Preliminary Screening Evaluation of Rail/Truck Transport

Although Section 5 provides a full evaluation of the site-wide transportation and disposal scenarios for the ROR Remedial Action, this section provides a preliminary screening evaluation of the use of rail/truck transport for on-site disposal of: (a) floodplain soils removed from Reaches 5B, 5C, and 6, which cannot be hydraulically transported (since soil cannot be hydraulically dredged); (b) sediment removed from Reach 7E, which will not be hydraulically dredged and transported (see Section 3.1); and (c) concrete and other debris removed from the Columbia Mill Dam (Reach 7B), which cannot be hydraulically transported (since concrete cannot be hydraulically dredged).

As determined in Section 3.3.1, the locations at Utility Drive (adjacent to Reach 5A) and at the Rising Pond property (adjacent to Reach 8) are considered potential rail loading areas, and the Woods Pond Spur (adjacent to Reach 6) is considered a potential rail loading and/or off-loading area. For Reaches 5B, 5C, and 6, it is anticipated that approximately 38,000 cy of floodplain soil will require removal and disposal in the UDF. For these RUs, the potential preliminary staging areas are anticipated to be located on or near Roaring Brook Road in the Town of Lenox. In this situation, the distance of truck travel on public roads to get from the staging areas to Utility Drive to load to rail cars and then to get from Woods Pond Spur to the UDF after off-loading from the rail is more than the distance on public roads to drive directly to the UDF.

Similarly, for Reach 7E, it is anticipated that approximately 4,500 cy of sediment will require removal and disposal in the UDF. For this location, the distance of truck travel on public roads to get to the Rising Pond property to load to rail cars and then to get from Woods Pond Spur to the UDF after off-loading from the rail is more than the distance on public roads to drive directly from Reach 7E to the UDF.

Finally, for the relatively small amount of concrete and other debris to be removed from Columbia Mill Dam in Reach 7B that cannot be transported hydraulically to the UDF (anticipated to be 2,600 cy), the closest rail loading area is also the location identified as the rail off-loading area, and therefore it is anticipated that trucks will travel the short distance directly to the UDF using Columbia Street to Mill Street to Willow Hill Road.

For these reasons, soil designated for on-site disposal from Reaches 5B, 5C, and 6, sediment designated for on-site disposal from Reach 7E, and the concrete and other debris to be removed from Columbia Mill Dam will be transported by truck to the UDF for all site-wide scenarios presented in Section 4. Thus, there is no scenario in which all material designated for on-site disposal would be transported by the rail/truck approach since, at a minimum, approximately 42,500 cy of removed material plus approximately 2,600 cy of debris from Columbia Mill Dam will be transported directly to the UDF by truck.[15]

[15] Additionally, as discussed further in Section 5.6, in the event that at any time during the ROR Remedial Action use of rail/truck transport cannot match target production rates for sediment and floodplain soil removal due to implementability and logistical issues (i.e., material is being removed and stockpiled faster than it can be transported for disposal, with the risk of running out of room), truck transport will be utilized to supplement rail/truck transport and convey removed materials for disposal.

### 3.3.3 Truck Transport between Woods Pond Spur and Eastern Side of Housatonic River

As described above, use of the railroad as a mode of transportation will necessarily include some use of truck transport to convey material to and/or from the railroad. Because Woods Ponds Spur is on the western side of the river and the UDF is on the eastern side of the river, as are some of the anticipated staging areas for Reaches 5C and 6 GE has evaluated truck traffic routes between the eastern and western sides of the river to minimize traffic on public roads, including two routes over existing roads and infrastructure and a third route utilizing construction of a temporary bridge near the location of the current pedestrian bridge by Woods Pond (Figure 3-12).

The two routes over existing roads are illustrated on Figure 3-12 and described below. For the purposes of the descriptions and illustration, the routes are presented between the UDF and Woods Pond Spur (moving east to west); however, these same routes may be applicable for transportation of material from staging areas on the eastern side of the river to this location for rail loading and/or for transportation of material off-loaded at Woods Pond Spur for transport to the UDF.

The two routes over existing roads, as illustrated on Figure 3-12, are as follows:

- **Northern Route**: Truck travel over local public roads, including travel along Woodland Road, Valley Street, Crystal Street, and Willow Creek Road. This alternative assumes travel along some private roads to get between Valley Street and Crystal Street, and the use of Schweitzer Bridge to cross the Housatonic River.
- **Southern Route**: Truck travel over local public roads through Lenox Dale, including travel along Woodland Road, Willow Hill Road, over the Mill Street Bridge, and continuing on Crystal Street and Willow Creek Road.

Use of a temporary bridge near the location of the current pedestrian bridge by Woods Pond would require truck traffic on the same public roads as described for the Northern Route alternative. Taking into account the required space needed for driving and turning over-the-road construction vehicles, existing topography on the east and west banks of the river, the existing spillway immediately east of the river, and the proximity to a residential property on the western side of the river near the pedestrian bridge, GE identified the narrow part of the river approximately halfway between the pedestrian bridge and the spillway as the most likely place to install a temporary bridge (Figure 3-12). It is anticipated that the construction of a temporary bridge would require use of floating platforms, which would be subject to potential use limitations due to water elevation fluctuations (e.g., floods). In addition, a new at-grade truck crossing would be required across the existing railroad tracks between Crystal Street and the river.

The Northern Route alternative requires coordination and access agreements with property owners along Valley Street as the road itself is owned by private entities. Current operations of local businesses along Valley Street require a significant amount of daily truck traffic, which may impede use of this route for additional routine daily truck traffic. In addition, the use of this route would require reconditioning of the seasonal-use portion of Valley Street and, depending on the weight rating of the existing culvert bridge over the spillway immediately east of the river, potential reconstruction of that bridge to support construction-related truck traffic.

The Southern Route alternative is along public roads and bridges sufficiently rated and with appropriate traffic controls to carry anticipated construction-related truck traffic.

The construction of and use of a temporary bridge across the river is technically feasible; however, potential safety issues with construction of the at-grade crossing across the railroad tracks, potential use limitations due to water elevation fluctuations, and limited reduction in truck traffic on public roads compared to the Northern Route and Southern Route alternatives make this alternative impractical. Consequently, the construction of a temporary bridge across the river near the pedestrian bridge is not included in the site-wide scenarios presented in Section 4 and evaluated in Section 5.

Both the Northern Route and Southern Route alternatives are considered feasible and implementable, subject to access agreements for the Northern Route. For the purposes of evaluating the site-wide scenarios presented in Section 4, it is assumed that the primary route for truck transport between Woods Pond Spur and the eastern side of the Housatonic River, if required, will be the Northern Route. However, if, at the time of implementation, this route is infeasible, the Southern Route will be utilized. In addition, even if the Northern Route is feasible at the time of implementation of the Remedial Action, the Southern Route will be considered as a secondary truck transport route for periods of higher-volume truck traffic along Valley Street or as needed to accommodate traffic from local businesses.

# 4 Transportation and Disposal Scenarios

As summarized in Section 3.1, GE anticipates that approximately 785,600 cy (74% of the total ROR Remedial Action removal volume) of sediment designated for on-site disposal from Reaches 5C, 6, 7B, and 7C will be hydraulically transported directly to the UDF, eliminating the need for approximately 73,700 round-trip truck trips to the UDF. In addition, approximately 42,500 cy (4% of the total ROR Remedial Action removal volume) of material from Reaches 5B, 5C, 6, and 7E will be transported directly to the UDF by truck (see Section 3.3.2). Figure 4-1 illustrates the estimated total removal volume presented in this Revised T&D Plan over time and by anticipated transport mode. To cover the remaining volume (236,800 cy, 22% of the total removal volume), various combinations of hydraulic transport, truck transport, and rail/truck transport have been evaluated, as appropriate, within the context of four site-wide scenarios described in this section, which collectively represent the feasible combinations of these transport modes for the ROR Remedial Action.

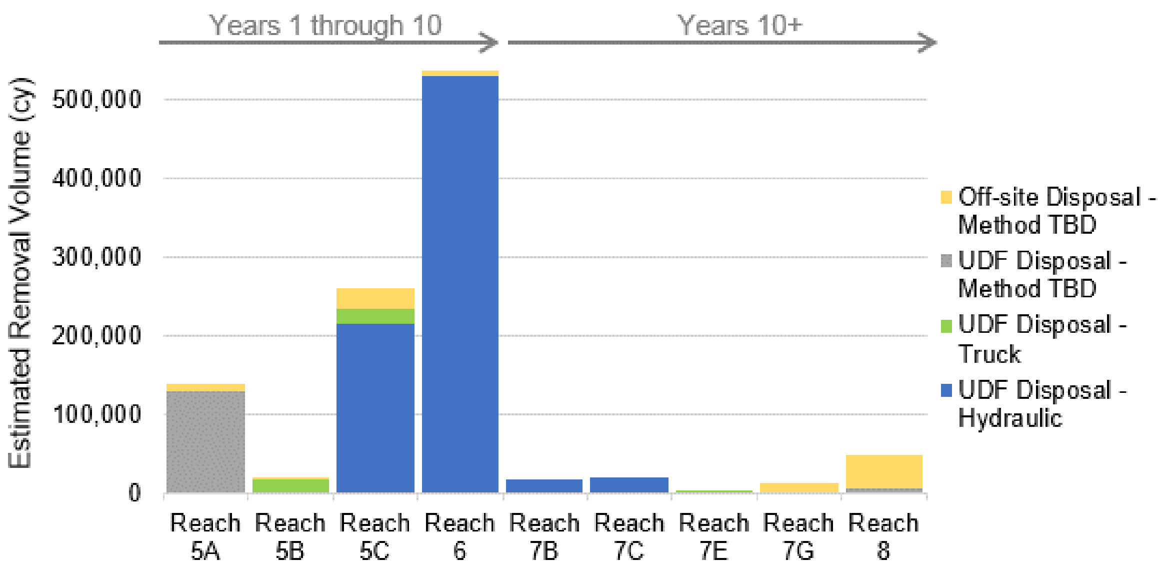



*Figure 4-1: Summary of Removal Volume over Time by Transportation Mode*

Finally, Figure 4-2 illustrates the approximate disposal volume further evaluated to determine the appropriate mode of transport for disposal.

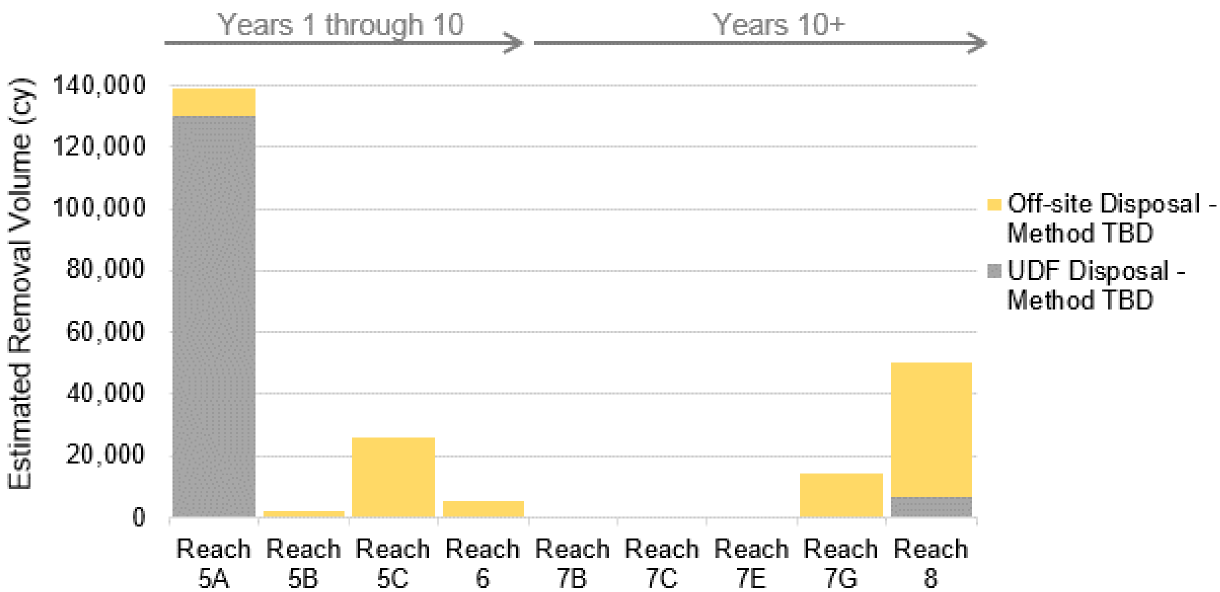



*Figure 4-2: Summary of Removal Volume over Time Requiring Further Evaluation of Transport Mode*

Based on the information presented above on modes of transportation and potential railroad spur locations, four site-wide scenarios have been identified for detailed evaluation, all of which include hydraulic transport to the UDF of the great majority of removed materials (74%) and truck transport to the UDF of 4% and thus differ only in the modes of transport of the remaining volume (22%). Those site-wide scenarios are as follows:[16]

- **Scenario 1 (Truck Transport to UDF and for Off-Site Disposal)** – Hydraulic transport of 74% of the removed material to the UDF; for the remainder, truck transport from the RUs to the UDF for on-site disposal and truck transport from the RUs for off-site disposal, with loading to rail at an existing commercial rail loading facility in Albany, New York, and rail transport the remaining distance to the selected off-site disposal facility(ies).
- **Scenario 2 (Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal)** – Hydraulic transport of 74% of the removed material to the UDF; for the remainder, truck transport from the RUs to the UDF for on-site disposal and rail/truck transport from the RUs for off-site disposal, including construction of three rail loading areas (Utility Drive, Woods Pond Spur, and Rising Pond). Rail/truck transport for off-site disposal from the RUs includes hydraulic transport of 53,900 cy of sediments from Reach 7G and 8 directly to the Rising Pond loading facility for loading to rail, thus reducing the volume of material for off-site disposal requiring truck transport to only 46,100 cy and eliminating the need for approximately 4,000 additional round-trip truck trips to an off-site disposal facility(ies). If this additional hydraulic transport approach can be implemented for Reaches 7G and 8, 79% of the estimated total remediation volume would be transported for disposal without additional truck traffic.
- **Scenario 3 (Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal)** – Hydraulic transport of 74% of the removed material to the UDF; for the remainder, truck transport from the RUs for on-site disposal, truck transport from Reaches 5A and 5B for off-site disposal with loading to rail at the existing commercial rail loading facility in Albany, New York, and rail transport the remaining distance to the selected

[16] Since all of these scenarios involve hydraulic transport of the great majority of removed materials to the UDF, their names used in this plan reflect the primary transport modes for the remaining materials.

off-site disposal facility(ies), and rail/truck transport from the other RUs for off-site disposal, including construction of two rail loading areas (Woods Pond Spur and Rising Pond).

- **Scenario 4 (Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal)** – Hydraulic transport of 74% of the removed material to the UDF; for the remainder, mostly rail/truck from the RUs for on-site disposal and rail/truck transport from the RUs for off-site disposal, including construction of two rail loading areas (Utility Drive and Rising Pond) and one rail loading/off-loading area (Woods Pond Spur). Rail/truck transport for off-site disposal from the RUs includes hydraulic transport of 53,900 cy of sediments from Reach 7G and 8 directly to the Rising Pond loading facility for loading to rail, thus reducing the volume of material for off-site disposal requiring truck transport to only 46,100 cy and eliminating the need for approximately 4,000 additional round-trip truck trips to an off-site disposal facility(ies). If this additional hydraulic transport approach can be implemented for Reaches 7G and 8, 79% of the estimated total remediation volume would be transported for disposal without additional truck traffic. Further, under this scenario, hydraulic transport of 6,600 cy of sediment from Reach 8 directly to the Rising Pond loading facility for loading to rail would eliminate the need for 600 round-trip truck trips from Reach 8 to the UDF (although truck trips would still be required between Woods Pond Spur and the UDF, as discussed in Section 4.4).

For the purposes of the evaluation in this Revised T&D Plan, it is assumed that truck transport between Woods Pond Spur and the eastern side of the Housatonic River, if required, will use the Northern Route described in Section 3.3.3. However, if, at the time of implementation, this route is infeasible, the Southern Route will be utilized, adding approximately 0.6 mile per truck trip.

# 4.1 Scenario 1 – Truck Transport

Scenario 1 would involve the following:

- Hydraulic transport of 785,600 cy (74% of removed material) directly to the UDF;
- Truck transport of the remaining material for on-site disposal (179,300 cy, 17% of removed material) directly to the UDF; and
- Truck transport of 100,000 cy (9% of removed material) off-site to an existing commercial rail loading facility located in Albany, New York, for loading on trains for transport of the material to the selected out-of-state disposal facility(ies).

Figure 4-3 illustrates the anticipated routes GE has identified for Scenario 1 for transportation of materials from the various RUs to the UDF or off-site for disposal.

It is anticipated that, for material removed from Reach 5A designated for on-site disposal, trucks would start from the staging areas (preliminarily identified in the Reach 5A Conceptual Work Plan) or removal areas if loaded there for direct transport and would travel south to the UDF. For staging areas on the western side of the river, trucks would travel on temporary access roads to Holmes Road, cross the river on New Lenox Road and then proceed to Roaring Brook Road. For staging areas on the eastern side of the river, trucks would travel on temporary access roads to East New Lenox Road and then proceed to Roaring Brook Road. From there, all traffic would continue down Roaring Brook Road and Woodland Road, rural roads with limited residential development, and enter the UDF on the eastern side of the UDF property. For material removed from Reach 5A designated for off-site disposal, trucks would start from the staging areas (preliminarily presented in the Reach 5A Conceptual Work Plan) or removal areas if loaded there for direct transport and would proceed generally west from Reach 5A to travel off-site to the west via US-20. Specifically, for staging areas on the western side of the river, trucks would travel either north or south on Holmes Road to connect with US-20 (northbound traffic will connect through

Pomeroy Avenue to Crofut Street), depending on location of the staging area. For staging areas on the eastern side of the river, trucks would travel on East New Lenox Road to New Lenox Road to connect with US-20. From US-20, trucks would enter the interstate system for travel west to the appropriate disposal facility(ies).

For materials removed from Reaches 5B, 5C, and 6 designated for on-site disposal, trucks would travel south to the UDF on a similar route to that used for Reach 5A. For staging areas on the western side of the river, trucks are anticipated to cross the river on New Lenox Road, turn right on Roaring Brook Road, and then proceed to the UDF. For staging areas on the eastern side of the river, trucks would travel down the eastern side of the river via Roaring Brook Road to Woodland Road. These routes mainly use rural roads with limited residential development. For materials designated for off-site disposal removed from Reaches 5B and 5C, trucks would predominantly travel to New Lenox Road to join US-20 east (and continue to US-7 south to MA-102 east to I-90 west), with some traffic traveling south on Roaring Brook Road to cross the river on Mill Street and travel on Walker Street to join US-20. For Reach 6, trucks would similarly travel from staging area(s) to US-20 via Walker Street to join US-7 south and the same remaining route off-site. For sediments from Reaches 5C and 6 that are transported hydraulically to the UDF but are ultimately designated for off-site disposal, trucks would similarly travel from the UDF to US-7 south via Walker Street.

Finally, for materials removed from Reaches 7 and 8 south of I-90 designated for on-site disposal, truck traffic to the UDF would likely use US-7 north to Walker Street and would approach the UDF from the south via Willow Hill Road. For materials from Reaches 7 and 8 south of I-90 designated for off-site disposal, truck traffic will likely travel east on MA-102 to join I-90 in Lee.

An evaluation of the four site-wide transportation scenarios, including Scenario 1, is presented in Section 5.

## 4.2 Scenario 2 – All Truck Transport for On-Site Disposal; All Rail/Truck Transport for Off-Site Disposal

Scenario 2 would involve the following:

- Hydraulic transport of 839,500 cy (79% of removed material) without truck transport over local public roads, including hydraulic transport of 785,600 cy (74% of removed material) directly to the UDF and 53,900 cy (5% of removed material) directly to the Rising Pond rail loading area for subsequent rail transport to the selected out-of-state disposal facility(ies);
- Truck transport of remaining material for on-site disposal (179,300 cy, 17% of removed material) directly to the UDF;
- Construction of three rail loading areas (Utility Drive, Woods Pond Spur, and Rising Pond); and
- Rail/truck transport of the remaining 46,100 cy (4% of removed material) off-site to the selected out-of-state disposal facility(ies), resulting in a total of 100,000 cy transported for off-site disposal.

Figure 4-4 illustrates the anticipated rail loading areas and truck traffic routes that GE has identified for Scenario 2 to transport materials from the various RUs to the UDF or for off-site for disposal.

It is anticipated for material removed from the RUs designated for on-site disposal, truck traffic to the UDF will be along the same routes as described in Section 4.1.

For Scenario 2, construction of three rail loading areas would be required for the rail/truck transport of material off-site for disposal – one each at Utility Drive (for materials removed from Reach 5A), Woods Pond Spur (for materials removed from Reaches 5B, 5C, and 6), and Rising Pond (for materials removed from Reaches 7G and

8). It is anticipated that each rail spur/siding and associated support area would take a total of about three months to construct, and that construction would be completed within the time required to mobilize for remediation in the associated RU(s) for which the rail loading area will be utilized. As a result, construction of the rail loading areas is not expected to impact the overall construction schedule. See Section 3.3 for a description of the specific requirements for each rail loading area. Truck routes described in the remainder of this section would be used to move material designated for off-site disposal from the RUs to the appropriate rail loading area. From there, the material would travel via rail west to the appropriate disposal facility(ies).

It is anticipated that, for material removed from Reach 5A designated for off-site disposal via rail/truck transport, trucks would start from the staging areas (preliminarily identified in the Reach 5A Conceptual Work Plan) or removal areas if loaded there for direct transport and would travel to the Utility Drive rail loading area. For staging areas on the western side of the river, trucks would travel on temporary access roads either directly to the loading area (i.e., staging areas 6, 7, and 9) or to Holmes Road to Utility Drive. For staging areas on the eastern side of the river, trucks would travel on temporary access roads to East New Lenox Road and then proceed to New Lenox Road to US-20 to connect to Holmes Road and Utility Drive. As noted in Section 3.3.1.1, for this Scenario 2, the use of internal temporary access roads would further reduce use of public roads to access the Utility Drive rail loading area.

For materials removed from Reaches 5B and 5C designated for off-site disposal via rail/truck transport, trucks would travel on New Lenox Road, as needed, and then proceed to Roaring Brook Road. From there, all traffic would continue down Roaring Brook Road and turn right onto Valley Street to cross the Housatonic River at Schweitzer Bridge (i.e., the Northern Route presented in 3.3.3). Trucks would then proceed north on Crystal Street to Willow Creek Road.[17] Similarly, for materials removed from Reach 6 and/or material dewatered at the UDF designated for off-site disposal via rail/truck transport, trucks would travel on Woodland Road to join Valley Street and proceed on the same route as described for materials from Reaches 5B and 5C. These routes are predominantly on rural roads with limited residential development.

Finally, for materials removed from Reaches 7 and 8 south of I-90 going off-site via rail/truck transport, truck traffic would be required only for conveyance of floodplain soils from Reach 7G (which cannot be hydraulically pumped) to the Rising Pond rail loading area. These trucks would travel on MA-183 south to Van Deusenville Road and proceed to the Rising Pond loading area.

An evaluation of Scenario 2 is included in Section 5.

## 4.3 Scenario 3 – All Truck Transport for On-Site Disposal; Mostly Rail/Truck Transport for Off-Site Disposal

Scenario 3 would involve the following:

- Hydraulic transport of 839,500 cy (79% of removed material) without truck transport over local public roads, including hydraulic transport of 785,600 cy (74% of removed material) directly to the UDF and 53,900 cy (5% of removed material) directly to the Rising Pond rail loading area for subsequent rail transport to the selected out-of-state disposal facility(ies);
- Truck transport of remaining material for on-site disposal (179,300 cy, 17% of removed material) directly to the UDF;

[17] Use of Schweitzer Bridge is subject to coordination and access agreements with multiple property owners.

- Truck transport of 10,500 cy (less than 1% of removed material) from Reaches 5A and 5B for off-site disposal, with transport to the existing commercial rail loading facility in Albany for loading on trains for transport to the selected out-of-state disposal facility(ies);
- Construction of two rail loading areas (Woods Pond Spur and Rising Pond); and
- Rail/truck transport of the remaining 35,600 cy (3% of removed material) off-site to the selected out-of-state disposal facility(ies), resulting in a total of 100,000 cy transported for off-site disposal.

Figure 4-5 illustrates the anticipated rail loading areas and truck traffic routes that GE has identified for Scenario 3 to transport materials from the various RUs to the UDF or for off-site for disposal.

It is anticipated for material removed from the RUs designated for on-site disposal, truck traffic to the UDF will be along the same routes as described in Section 4.1.

For Scenario 3, no rail loading area is planned in the City of Pittsfield. As such, material removed from Reach 5A designated for off-site disposal will travel off-site by truck, and truck traffic will be along the same routes as described in Section 4.1. For Reach 5B, given the anticipated “hot spot” removal of a relatively small volume of material designated for off-site disposal (approximately 2,000 cy) spread over two miles, and the reduced flexibility in production/schedule coordination with rail/truck transport, material removed from Reach 5B designated for off-site disposal will travel off-site by truck, and the truck traffic will be along the same routes as described in Section 4.1.

For Scenario 3, construction of two rail loading areas would be required for rail/truck transport of material off-site for disposal – one each at Woods Pond Spur (for materials removed from Reaches 5C and 6) and Rising Pond (for materials removed from Reaches 7G and 8). It is anticipated that each rail spur/siding and associated support area would take a total of about three months to construct, and that construction would be completed within the time required to mobilize for remediation in the associated RU(s), so that construction of the rail loading areas would not impact the overall construction schedule). See Section 3.3 for a description of the specific requirements for each rail loading area. For material going off-site by rail/truck transport (i.e., from Reaches 5C, 6, 7G, and 8, including material dewatered at the UDF designated for off-site disposal via rail/truck transport), the truck traffic would be along the same routes as described in Section 4.2. From there, the material would travel via rail west to the appropriate disposal facility(ies).

An evaluation of Scenario 3 is included in Section 5.

## 4.4 Scenario 4 – Mostly Rail/Truck Transport for On-Site Disposal; All Rail/Truck Transport for Off-Site Disposal

Scenario 4 would involve the following:

- Hydraulic transport of 839,500 cy (79% of removed material) without truck transport over local public roads, including hydraulic transport of 785,600 cy (74% of removed material) directly to the UDF and 53,900 cy (5% of removed material) directly to the Rising Pond rail loading area for subsequent rail transport to the selected out-of-state disposal facility(ies);
- Truck transport of 42,500 cy (4% of removed material), for which rail/truck transport does not make sense, directly to the UDF;[18]

[18] As described in Section 3.3.2, soil for on-site disposal from Reaches 5B, 5C, and 6, and sediment for on-site disposal from Reach 7E will be transported by truck to the UDF for all four site-wide scenarios presented in Section 4, including Scenario 4.

- Construction of two rail loading areas (Utility Drive and Rising Pond) and one rail loading/off-loading area (Woods Pond Spur);
- Rail/truck transport of 136,800 cy (13% of removed material) to the UDF, including hydraulic transport of 6,600 cy of sediments from Reach 8 directly to the Rising Pond rail loading area (without truck transport over public roads) for subsequent rail/truck transport to the Woods Pond for off-loading and truck transport to the UDF;
- Rail/truck transport of the remaining 46,100 cy (4% of removed material)to the selected out-of-state disposal facility(ies), resulting in a total of 100,000 cy transported for off-site disposal.

Figure 4-6 illustrates the anticipated rail loading and/or off-loading areas and truck traffic routes that GE has identified for Scenario 4 to transport materials from the various RUs to the UDF or for off-site for disposal.

It is anticipated that, for soil designated for on-site disposal from Reaches 5B, 5C, and 6 and sediment designated for on-site disposal from Reach 7E, truck traffic to the UDF will be along the same routes described in Section 4.1.

For Scenario 4, construction of two rail loading areas would be required for rail/truck transport of material designated for on-site or off-site for disposal, one each at Utility Drive (for materials removed from Reach 5A) and Rising Pond (for materials removed from Reaches 7G and 8). In addition, a rail loading/off-loading area would be required at Woods Pond Spur for loading material from Reaches 5B, 5C, and 6 for off-site disposal (including material dewatered at the UDF that requires off-site disposal) and for off-loading of material arriving by rail that is designated for disposal in the UDF. It is anticipated that each rail spur/siding and associated support area would take a total of about three months to construct, and that construction would be completed within the time required to mobilize for remediation in the associated RU(s) so that construction of the rail loading/off-loading area would not impact the overall construction schedule. See Section 3.3 for a description of the specific requirements for each rail loading and/or off-loading area. Truck routes described in the next paragraph would be used to move material removed from the RUs to the appropriate rail loading area. From there, material for on-site disposal would be transported by rail to the Woods Pond Spur for off-loading and material for off-site disposal would travel via rail west to the appropriate disposal facility(ies).

It is anticipated that, for material removed from Reach 5A, truck traffic to the Utility Drive rail loading area would be along the same routes described in Section 4.2 for transport to that area. Similarly, for material removed from Reaches 5B, 5C, and 6 designated for off-site disposal, including material dewatered at the UDF, trucks traveling between the RUs or UDF and the Woods Pond Spur loading/off-loading area would be along the same routes described in Section 4.2 for such transport. Finally, for soils removed from Reach 7G that cannot be hydraulically pumped truck traffic to the Rising Pond loading area would be along the same route described in Section 4.2.

An evaluation of Scenario 4 is included in Section 5.

# 5 Evaluation of Transportation and Disposal Scenarios

This section presents a detailed evaluation of the four site-wide transportation scenarios presented in Section 4, in terms of truck trips/miles, GHG emissions, worker accident risks (in terms of injuries and fatalities), QOL considerations, ecological considerations, logistical and implementability considerations, and schedule considerations for construction of supporting infrastructure.

## 5.1 Evaluation of Truck Trips and Miles

An evaluation has been conducted of the necessary truck trips for the four site-wide transportation scenarios presented in Section 4. The evaluation of truck trips has been made based on the assumption that hydraulic transport will be used to convey 785,600 cy of sediments from Reaches 5C, 6, 7B, and 7C directly to the UDF (for all four scenarios) and, for Scenarios 2, 3, and 4, to convey 53,900 cy of sediments from Reaches 7G and 8 designated for off-site disposal to Reach 8 such that they can be loaded to rail at the Rising Pond rail loading area without the need for truck traffic on public roads. Finally, for Scenario 4, it is assumed that an additional 6,600 cy of sediment from Reach 8 designated for on-site disposal will be hydraulically transported to the Rising Pond rail loading area without the need for truck traffic on public roads (although this 6,600 cy will still require truck transport over public roads between the Woods Pond off-loading area and the UDF). The estimated reduction in truck trips and miles for disposal from the removal or staging areas to the on- or off-site disposal facility(ies) due to this hydraulic conveyance are summarized in Table 5-1 (below) for each of the four scenarios.

For the purposes of comparing the four site-wide scenarios, truck trips assume the use of typical construction equipment, including a dump truck with a 16-ton capacity for on-site disposal by truck transport, a dump truck with a 20-ton capacity for off-site disposal by truck transport, and an intermodal container with 21-ton capacity for disposal by rail/truck transport. Calculation of truck miles assumes the Northern Route alternative utilizing Schweitzer Bridge (discussed in Section 3.3.3) between the eastern and western sides of the river near Woods Pond Spur. Truck miles are calculated only for the portion of the routes on public roads plus the short distance on private roads to utilize Schweitzer Bridge, where applicable. As noted in Section 4, if at any time during implementation this primary route across Schweitzer Bridge is infeasible, the secondary route, the Southern Route across the Mill Street Bridge, will be utilized, adding approximately 0.6 mile per truck trip. For material to be disposed of at the UDF, at the request of the local community and EPA to try to the reduce truck traffic on Willow Hill Road from trucks approaching the UDF from the south, GE is discussing with the property owner the potential for obtaining access to build an alternative entrance to the UDF closer to Mill Street (see Figure 3-12 for the two potential alternative entrances); however, for the purposes of calculating truck miles, the entrance to the UDF is assumed to be through the property owned by GE located on Woodland Road.

For material to be disposed at an off-site facility(ies), at the direction of EPA, the truck miles on public roads do not include mileage once trucks enter I-90 or, for US-20 west to New York, the truck mile calculation terminates at the City of Pittsfield line. Truck miles represent round-trip (i.e., two-way) travel.

*Table 5-1: Summary of Estimated Reduction in Truck Trips Due to Hydraulic Conveyance*

| Scenario | Disposal Destination | Estimated Disposal Volume Hydraulically Transported Without Associated Truck Transport (cy) | Estimated Reduction in Round-Trip Truck Trips | Estimated Reduction in Round-Trip Truck Miles [a] |
|---|---|---|---|---|
| 1 – Truck Transport to UDF and for Off-Site Disposal | On-site | 785,600 | 73,700 | 245,000 |
| | **Total** | **785,600** | **73,700** | **245,000** |
| 2 – Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | On-site | 785,600 | 73,700 | 245,000 |
| | Off-site | 53,900 | 4,000 | 79,100 |
| | **Total** | **839,500** | **77,700** | **324,100** |
| 3 – Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal | On-site | 785,600 | 73,700 | 245,000 |
| | Off-site | 53,900 | 4,000 | 79,100 |
| | **Total** | **839,500** | **77,700** | **324,100** |
| 4 – Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | On-site[b] | 785,600 | 73,800 | 261,000 |
| | Off-site | 53,900 | 4,000 | 79,100 |
| | **Total** | **839,500** | **77,800** | **340,100** |

**Notes:**

[a] Reduction in miles assumes truck transport would otherwise be used to convey the same volume of material.

[b] The on-site volume, truck trips, and truck miles take into account 6,600 cy of sediment for on-site disposal from Reach 8 that would be loaded to rail at Rising Pond for transport to Woods Pond Spur and truck transport of the intermodal containers from there to the UDF (rather than truck transport directly to the UDF). Therefore, the reduction in truck trips and miles takes into account the additional trips needed between the Woods Pond Spur and UDF if rail transport is utilized instead truck transport from Reach 8 directly to the UDF.

The evaluation also assumes that for each of the four scenarios, either truck transport or rail/truck transport will be selected as the mode of transport for all other materials to the UDF or for off-site disposal. As noted above, truck traffic is required for transport of material from the staging areas (or removal areas if loaded there for direct transport) to a rail loading area and, for on-site disposal, from the rail off-loading area to the UDF. The evaluation of the truck trips and miles for rail/truck transport depends on the locations for transferring material from truck to rail (for both on-site and off-site disposal destinations) and from rail back to truck to drive the material to the UDF (for on-site disposal). The truck trip and miles presented in the rest of this section evaluate truck trips and miles associated with truck transport directly to the UDF, truck transport directly off-site for disposal, and truck transport associated with rail/truck transport either to the UDF or off-site.

Under these assumptions, based on the conceptual estimated disposal volumes presented in Table 3-2 (above), the estimated numbers of on-site truck trips and miles from the removal or staging areas to the UDF or for off-site disposal are presented in Table 5-2 for each of the four site-wide disposal scenarios. Tables 5-3 through 5-6 present estimated truck trips and truck mileage for each RU for each scenario.

*Table 5-2: Summary of Estimated Truck Trips from Removal or Staging Areas to Appropriate Disposal Facility(ies)*

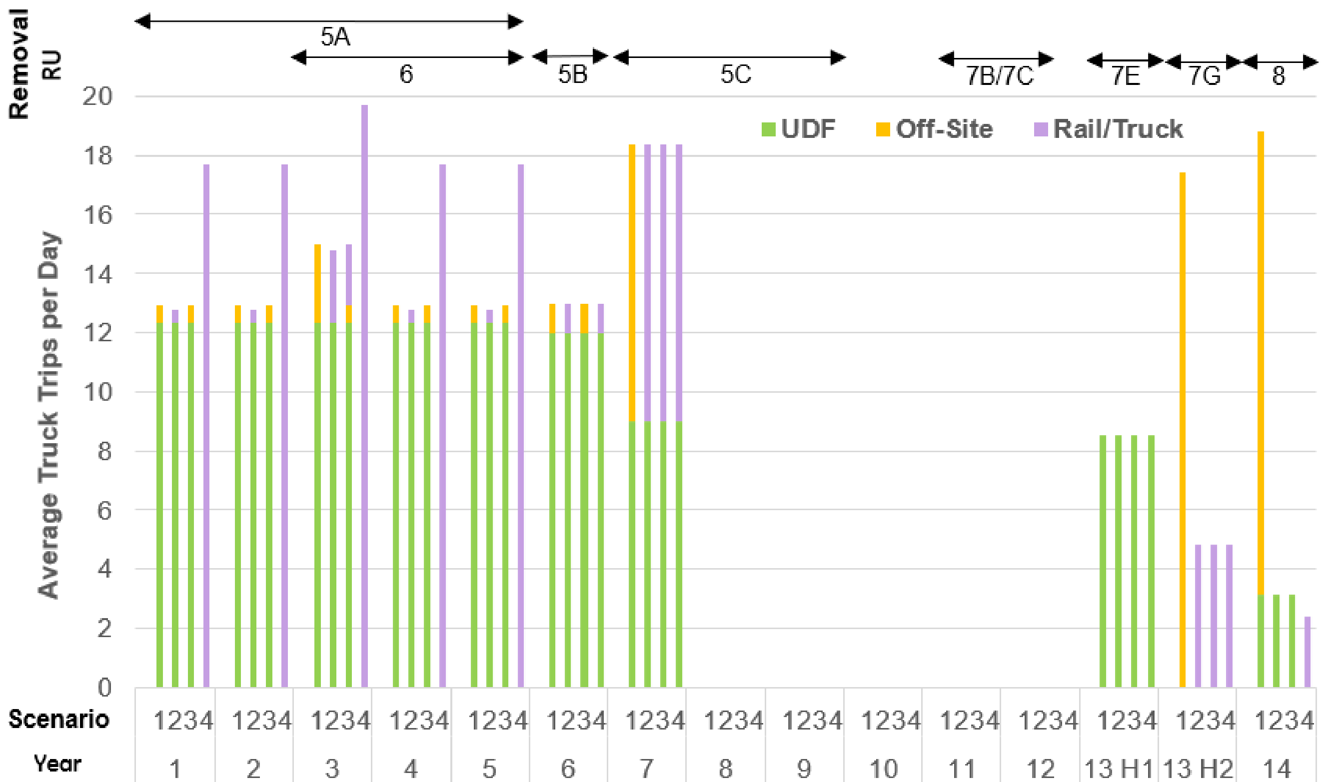
| Scenario | Disposal Destination (Mode) | Estimated Disposal Volume Transported by Truck (cy) | Estimated Round-Trip Truck Trips | Estimated Round-Trip Truck Miles |
|---|---|---|---|---|
| 1 – Truck Transport to UDF and for Off-Site Disposal | On-site (truck) | 179,300 | 16,800 | 229,600 |
| | Off-site (truck) | 100,000 | 7,200 | 152,600 |
| | **Total** | **279,300** | **23,900** | **382,200** |
| 2 – Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | On-site (truck) | 179,300 | 16,800 | 229,600 |
| | Off-site (rail/truck) | 100,000 | 3,100 | 15,400 |
| | **Total** | **279,300** | **19,900** | **245,000** |
| 3 – Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal | On-site (truck) | 179,300 | 16,800 | 229,600 |
| | Off-site (truck) | 10,500 | 800 | 14,000 |
| | Off-site (rail/truck) | 89,500 | 2,600 | 11,500 |
| | **Total** | **279,300** | **20,200** | **255,100** |
| 4 – Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | On-site (truck) | 97,200 | 4,000 | 37,400 |
| | On-site (rail/truck) | 82,100 | 17,500 | 90,000 |
| | Off-site (rail/truck) | 100,000 | 3,100 | 15,400 |
| | **Total** | **279,300** | **24,600** | **142,800** |

**Note:**

1. Total truck trips and miles are rounded to the nearest hundred.

As summarized in Table 5-2, truck trips for each scenario range from approximately 20,000 trips (Scenarios 2 and 3) to 24,600 trips (Scenario 4). However, because the distances between the RUs and the rail loading/off-loading areas are relatively short compared to the distances between the RUs and the on- or off-site disposal facilities, Scenario 4 has the fewest associated estimated truck miles (approximately 142,800 truck miles).

Figure 5-1 illustrates the estimated daily average truck trips for each of the four site-wide scenarios over time for truck transport directly to the UDF (“UDF”), truck transport directly off-site for disposal (“off-site”), and truck transport associated with rail/truck transport either to the UDF or off-site (“rail/truck”).




**Note:**

1. Daily averages assume 198 days per year, based on an assumed average of 22 working days per month and a nine-month construction season. The estimated duration for each RU is based on the Final Revised OSS and the approach provided in the Reach 5A Conceptual Work Plan. For the purposes of this illustration, it is assumed that the non-hydraulic transport of material from Reach 6 (approximately 5,600 cy sediment for off-site disposal) and Reach 5C (approximately 19,000 cy soil for on-site disposal and 26,000 cy soil/sediment for off-site disposal) occurs in the first year of remediation of those RUs – i.e., Year 3 for Reach 6 and Year 7 for Reach 5C – and the average truck trips per day for each reach are spread throughout that first year. Duration and volumes are subject to change as the remedial design activities progress; changes could affect the estimated number of truck trips.

H1 = first half of the year; H2 = second half of the year.

*Figure 5-1: Summary of Estimated Daily Average Truck Trips*

As illustrated on Figure 5-1, Scenarios 2 and 3 have nearly the same daily average truck trips for the duration of the ROR Remedial Action, and while Scenario 4 requires the most daily average truck trips during the first years of construction, those trips would be shorter than under the other scenarios. In general, the four site-wide scenarios have a generally similar number of daily average truck trips over the full duration of the ROR Remedial

Action; however, the roads impacted and the construction years during which such impacts occur vary based on the selected transportation scenario.

Table 5-7 below summarizes the typical traffic on portions of anticipated travel routes to provide perspective on the relative impact of truck traffic associated with on-site disposal on the surrounding communities. This table is based on data reported by MassDOT as average annual daily traffic (AADT), which equates to average vehicles per day, and it summarizes data available and/or interpolated (depending on station) for the past 10 years (MassDOT 2023). The data in the table are further separated into average total vehicles per day and the portion of that total that is composed of large trucks. The location of the stations evaluated are illustrated on Figure 5-2.

*Table 5-7: Summary of Typical Traffic on Portions of Anticipated Travel Routes*

| Route | Station Reference/Reaches Represented | Average Total Vehicles per Day[a] | Average Large Trucks per Day[a,b] |
|---|---|---|---|
| US-20 North of Holmes Road | **1175**: Representative of typical traffic for on-site and off-site routes proposed for work in Reach 5A (all scenarios) | 11,800 | 180 |
| US-20 South of New Lenox Road, North of US-7A | **40**: Representative of typical traffic for on-site and off-site routes proposed for work in Reach 5A (all scenarios) and off-site routes proposed for work in Reaches 5B and 5C (Scenarios 1 and 3) | 13,800 | 360 |
| US-7 South of Walker St, North of I-90 | **S16-052-283-02:** Representative of typical traffic for on-site routes proposed for work in Reaches 7E (all scenarios) and 7G and 8 (Scenarios 1 through 3) and off-site routes proposed for work in Reaches 5B (all scenarios) and 5C and 6 (Scenario 1) | 6,300 | 30 |

**Notes:**

Source: MassDOT 2023

[a] Average per day represents an average of one-way AADT traffic northbound and one-way AADT traffic southbound.

[b] The criteria for the “large truck” category are vehicles with a length >22 feet or a Federal Highway Administration class >3A. The selection of the criteria is dependent on the availability of the classification data provided by MassDOT (2023). The data for vehicles of length >22 feet are not available at Station 40 for the year 2020 and 2021; data included represent vehicles of length >35 feet.

Although the stations used in the above table are not located directly on the travel routes to be used during the ROR Remedial Action, they are the only such numbers available and thus can be used for comparison to the truck trips under the current transport scenarios.[19] In general, as shown by comparing the numbers illustrated in Figure 5-1 and the average of the numbers presented in Table 5-7, if trucks are used to transport removed materials to the UDF rather than rail/truck transport, the anticipated daily average truck traffic associated with such transport is expected to increase total traffic by less than 1%. When looking at only large truck traffic, estimated truck traffic due to the remediation work scheduled for the first 10 years (covering Reaches 5 and 6) may increase large truck traffic by less than 5% during work in Reaches 5A and 5B compared to the one-way large truck traffic typically observed on US-20, but no more than 1% for work in Reach 5C. For work in Reaches 7 and 8, which will occur more than 10 years from now, a similar evaluation of relative increase to truck traffic may be included in the forthcoming RU-specific work plans.

## 5.2 Evaluation of Greenhouse Gas Emissions

GHGs are gases that trap heat in the atmosphere. The most prominent GHGs contributing to this process are carbon dioxide ($CO_2$), methane, and nitrous oxide. $CO_2$ is the primary GHG emitted through human activities (approximately 80% of GHG emissions consist of $CO_2$). However, the carbon dioxide equivalent ($CO_2e$) consists of the calculated total GHG emissions taking into account the global warming potential of each of these components. Global warming potential is the heat absorbed by any GHG in the atmosphere as a multiple of the heat that would be absorbed by the same mass of $CO_2$. Transportation and disposal activities are anticipated to generate GHG emissions during the ROR Remedial Action. The potential sources of GHG emissions anticipated during transportation and disposal of material will include direct sources (e.g., on- and off-road vehicles and fuel combustion from equipment operation), indirect sources (electricity use), and upstream contributions (e.g., production of materials used for transportation and disposal).

### 5.2.1 Anticipated Greenhouse Gas Emissions

At EPA's direction, GE performed an evaluation of the potential GHG emissions related to and during the transport of materials from the removal areas (or staging area) for each RU to the selected and approved disposal facility(ies) using the different modes of transport. Specifically, GE performed a GHG assessment to provide a quantitative comparison of anticipated GHG emissions related to hydraulic transport, truck transport, and rail/truck transport in the context of their use in the four transportation scenarios described Section 4. As stated in Section 2.2, the transportation modes considered in this Revised T&D Plan start after the material is loaded into containers for shipment and end with delivery of the material at the receiving facility (i.e., UDF or off-site disposal facility). As such, GHG emissions have been evaluated for the period that begins with the loading of material into containers for shipment and ends with delivery of the material at the receiving facility.

In general, GHG emissions from truck transport and rail transport could vary greatly depending on factors including the type of fuel used, the efficiency of the vehicles, and the amount of material carried. In general, trains tend to be more energy efficient compared to trucks and produce fewer GHG emissions per ton of material transported; however, especially for short distances of transportation, GHG emissions associated with construction of the infrastructure required to support rail/truck transport can outweigh the energy efficiencies directly associated with transportation. GHG emissions from hydraulic conveyance are associated with power required from booster pumps required to move the material and vary depending on the distance material is conveyed hydraulically. However, in general, hydraulic transport should result in lower GHG emissions than truck or rail/truck transport over the same distance given fewer operational needs (e.g., less equipment) and lack of related infrastructure. As stated above, the GHG comparisons in this Revised T&D Plan are for the period from

[19] We note that the Reach 5A travel routes do use a portion of US-20 between Station 1175 and Station 40.

loading of the material into containers for shipment through delivery of the material at the receiving facility; and as such, they do not account for emissions associated with the material dredging or dewatering, which would be included as part of the RU-specific GHG emissions.

A quantitative GHG assessment has been performed for the purposes of comparing the four site-wide transportation scenarios presented in Section 4 and is based on assumed numbers and types of construction equipment and materials and proximities of the equipment, personnel, and materials to the ROR site during construction. Because many of the details associated with the ROR Remedial Action have yet to be established, the GHG assessment presented herein is preliminary for the purposes of a relative comparison among potential transportation and disposal options. The tool called Spreadsheets for Environmental Footprint Analysis (SEFA) (Version 3.0) was used to estimate GHG emissions from the ROR Remedial Action. SEFA is a Microsoft Excel-based tool developed by EPA and can be found on EPA's Contaminated Site Clean-Up Information website (EPA 2020a). This tool has been designed to help analyze the environmental footprint of a site cleanup project, including GHG emissions. Based on use of this tool, estimated GHG emissions associated with the four site-wide transportation scenarios are provided in Table 5-8 below. Methodology and calculations for the estimated GHG emissions are presented in Appendix C.

*Table 5-8: Summary of Estimated Greenhouse Gas Emissions (tons $CO_2e$)*

| Scenario | Hydraulic Transport [a] | Truck Transport [b] | Rail/Truck Transport [c] | TOTAL |
|---|---|---|---|---|
| 1 – Truck Transport to UDF and for Off-Site Disposal | 3,100 | 500 | 4,500[d] | **8,100** |
| 2 – Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 3,600 | 500 | 3,700 | **7,800** |
| 3 – Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal | 3,600 | 500 | 3,500[d] | **7,600** |
| 4 – Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 3,600 | 100 | 10,900 | **14,600** |

**Notes:**

[a] Hydraulic transport includes operations and labor associated with the booster pumps and creation and use of the associated pipeline (i.e., creation of a virgin material), which produce GHG emissions.

[b] Truck transport includes operations associated with movement of removed material by truck to the selected disposal facility(ies). Since no scenario includes truck traffic directly to an off-site disposal facility, GHG emissions associated with truck transport are for movement of material by truck to the UDF.

[c] Rail/truck transport includes construction of associated rail-specific infrastructure (e.g., rail spur/siding, support area) for Scenarios 2 through 4 using virgin materials, operations and labor associated with transfer of containers from truck to rail and/or from rail to truck (including transfer from truck to rail at the existing commercial rail loading facility in Albany, New York for Scenarios 1 and 3), movement of removed material by truck to a rail loading area (including the existing commercial rail loading facility in Albany), by truck from a rail off-loading area, and by rail to the appropriate disposal facility(ies) (including, for Scenarios 1 and 3, transport from the Albany rail loading facility to the off-site disposal facility[ies]).

[d] As noted above, GHG emissions associated with rail/truck transport under these scenarios include emissions from trucking to the Albany rail loading facility, loading of material on trains there, and rail transport to the off-site disposal facilities.

As shown in Table 5-8, total GHG emissions for the four scenarios range from 7,600 tons $CO_{2e}$ to 14,600 tons $CO_{2e}$. The GHG contribution of hydraulic transport is similar for all scenarios as the volume of material transported hydraulically is similar for all scenarios. Truck transport GHG emissions are generally proportional to truck transport miles to the UDF (not including truck miles associated with rail/truck transport), with Scenarios 1 through 3 anticipated to produce the most emissions and Scenario 4 anticipated to produce the least emissions. Finally, GHG emissions for rail/truck transport are comparable for Scenarios 2 and 3, slightly higher for Scenario 1 due mainly to the truck travel of all 100,000 cy of material for off-site disposal to Albany to load to rail, and the highest for Scenario 4 due to the greatest volume moved by rail/truck and the greatest amount of operations required to transfer the containers between truck and rail operations.

## 5.2.2 Minimization of Greenhouse Gas Emissions During Design

As described in the Sustainability and Climate Adaptation Plan (Anchor QEA 2022b), methods to minimize GHG emissions will be incorporated into the transportation and disposal process to the extent practicable. These measures will be evaluated by GHG category, including measures to address direct emissions, indirect emissions, and upstream emissions. Table 5-9 describes minimization measures and details regarding how those measures would reduce GHG emissions. Based on the planned minimization activities, a range of anticipated reductions in the potential $CO_2e$ produced during transportation and disposal activities will be developed and included in the final design.

Sustainable best management practices (BMPs) relating to transportation and disposal will be evaluated as part of Final RD/RA Work Plan for each RU and the Revised Final Design for the UDF and incorporated into the strategy for implementation of remedial activities to minimize GHGs.

*Table 5-9: Potential Greenhouse Gas Mitigation Measures for Transportation*

| Measure | Reduction | Emission Type | | |
|---|---|---|---|---|
| | | Direct | Indirect | Upstream |
| Incorporate vehicle and equipment BMPs | Measures including use of fuel-efficient on-road vehicles, use of bio-fuels, idling restrictions, electric or hybrid vehicles as that market continues to grow, and route planning would reduce fuel use and thereby reduce overall GHG emissions associated with fuel combustion and fuel transport. | ✓ | | ✓ |
| Employ local staff | Use of local staff to perform site work would limit long-distance commuting to the site. | ✓ | | ✓ |
| Use of local suppliers | Use of local suppliers for equipment and materials to perform site work would limit long-distance delivery routes to the site. | ✓ | | ✓ |

## 5.3 Evaluation of Work Site and Transport-Related Injuries and Fatalities

At EPA's direction, GE also performed an evaluation of the potential for worker accidents related to and during the transport of materials from the removal areas (or staging area) for each RU to the selected and approved disposal facility(ies) using the different modes of transport. Specifically, GE has developed quantitative estimates of short-term worker and transport accident risks in terms of injuries and fatalities for the four transportation scenarios described Section 4. The methodology and calculations for the evaluation of transport-related worker injuries and fatalities are presented in Appendix D.

Note that the quantitative comparison of worker injuries and fatalities does not include hydraulic conveyance, which is a transport technology used in all four transportation scenarios. Based on the methodology presented in Appendix D, it is generally anticipated that no traffic accident risks are associated with hydraulic conveyance. Although it is anticipated that there will be worker accident risks associated with the operators and laborers assigned to operate and maintain the hydraulic conveyance pipeline and booster pumps, those risks are estimated to be relatively similar for all four site-wide scenarios.

Table 5-10 summarizes the work site fatalities, non-fatal work site injuries, and number of fatalities and non-fatal injuries associated with traffic accidents for the truck transport and rail/truck transport components of the four transportation scenarios presented in Section 4. As noted in Section 2.2, the transportation modes for which injuries and fatalities have been evaluated start after the material has been loaded into containers for shipment and end with delivery of the material at the receiving facility (i.e., UDF or off-site disposal facility).

*Table 5-10: Summary of Estimated Work Site Fatalities, Non-Fatal Work Site Injuries, and Number of Fatalities and Non-Fatal Injuries Associated with Traffic Accidents*

| Scenario | Work Site Fatalities | Non-Fatal Work Site Injuries | Transportation-Related Fatalities | Transportation-Related Injuries |
|---|---|---|---|---|
| 1 – Truck Transport to UDF and for Off-Site Disposal | 0.000786 | 0.143 | 1.96 | 9.84 |
| 2 – Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 0.00196 | 0.391 | 2.26 | 10.9 |
| 3 – Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal | 0.00160 | 0.313 | 2.25 | 10.8 |
| 4 – Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 0.00666 | 1.22 | 2.28 | 10.9 |

**Note:**

1. Values are rounded to three significant figures.

As shown in Table 5-10, Scenario 1 is expected to result in the fewest work site fatalities and injuries, with Scenarios 2 and 3 having slightly more, and Scenario 4 having the most, due mainly to the greater amount of rail/truck transport and thus the greater amount of loading/off-loading of material to/from rail. Scenario 1 is expected to result in the fewest transportation-related injuries and fatalities, largely due to the fact that the average injury and fatality accident rates for rail are more than a factor of 10 times greater than the average injury and fatality accident rates for large trucks (see Appendix D). There is no significant difference among the other three site-wide scenarios in terms of expected transportation-related fatalities and injuries.

# 5.4 Quality-of-Life Impacts

This section provides a general qualitative evaluation of the advantages and disadvantages of the three modes of transportation presented in Section 3, with consideration for the potential QOL impacts of the four site-wide scenarios presented in Section 4. This qualitative evaluation considers various types of potential impacts to the community, including the following:

- Air quality impacts;
- Noise;
- Lighting;
- Operating hours;
- Impacts to infrastructure;
- Impacts on recreation during construction; and
- Impacts on recreation post-remediation (recreational enhancements).

General discussion of potential QOL impacts and mitigation measures for such impacts was included in the *Quality of Life Compliance Plan* (QOL Compliance Plan) submitted to EPA December 20, 2023 (Anchor QEA and Arcadis 2023). That plan is a site-wide plan that defines the standards and measures that will be applied throughout the ROR Remedial Action, including during transportation and disposal. EPA provided conditional approval of that plan on July 22, 2024. As required by EPA's conditional approval letter, a revised QOL Compliance Plan is scheduled to be submitted to EPA by November 22, 2024. See Section 9 for additional discussion regarding the QOL Compliance Plan and general community assessment and mitigation. The potential for QOL impacts due to the three modes of transportation presented in Section 3 are evaluated in the remainder of this section as they apply to the four site-wide scenarios presented in Section 4.

## 5.4.1 Air Quality Impacts

Air quality impacts from materials transport include the potential to generate dust, airborne PCBs, and/or odor.

Hydraulic transport is expected to have limited air quality impacts due to generated dust or airborne PCBs as the technology is dependent on large amounts of water to slurry and convey sediments. However, hydraulic transport will likely depend on diesel-powered booster pumps, so emissions from those pumps may result in some air quality impacts. Truck transport and rail/truck transport are expected to have a similar potential to have contribute to air quality impacts, as materials will be loaded into similar containers, which will be sealed and covered, for each method of transportation.

Thus, there would be no significant difference in air quality impacts among Scenarios 1 through 4.

### 5.4.2 Noise

The hydraulic booster pumps required for hydraulic transport will run full time while hydraulic dredging is being performed (i.e., for the full workday every day). As discussed in Appendix B, the booster pumps associated with hydraulic dredging of Reaches 5C, 6, 7B, 7C, 7G, and 8 will, to the extent feasible, be located in areas away from residences or businesses (e.g., in the river) to reduce the potential for QOL impacts.

Truck transport noise is created due to truck traffic on the road, and rail noise (specific to the rail technology available near the site) is created by steel wheels rolling on steel tracks, as well as required safety warning horns. In addition, noise will be generated as part of rail/truck transport during transfer of metal containers from truck to rail and/or from rail to truck, and loading and unloading of rail cars from the mainline tracks.

Table 5-11 below summarizes some common noise levels, including sound of equipment required for truck transport and rail/truck transport (highlighted in yellow). A decibel (dB) is the unit used to indicate the intensity of a sound wave. Sound (noise) is often measured in decibels using an A–weighted scale (dBA) because this method approximates the way humans hear sound.

*Table 5-11: Common Noise Levels*

| Sound Source | dBA |
|---|---|
| Military jet, air raid siren | 130 |
| Amplified rock music | 110 |
| Jet takeoff at 500 meters | 100 |
| Freight train at 30 meters | 95 |
| Train horn at 30 meters | 90 |
| Heavy truck at 15 meters | 80-90 |
| Busy traffic intersection | 70-80 |
| Highway traffic at 15 meters, train | 70 |
| Predominantly industrial area | 60 |
| Light car traffic at 15 meters, city or commercial areas, or residential areas close to industry | 50-60 |
| Background noise in an office | 50 |
| Suburban areas with medium-density transportation | 40-50 |
| Public library | 40 |
| Threshold of hearing | 0 |

**Notes:**

1. Research performed generally reported road traffic at 15 meters and train traffic at 30 meters; understandably, the shorter the distance to the source the louder the relative noise level.

2. Sources: Cowan 1994 and Egan 1988.

dBA = decibels using an A–weighted scale

Based on the information in Table 5-1, plus the anticipated noise to be generated from the on-site rail operations, rail/truck transport would generate more noise impacts than truck transport alone.

With hydraulic transport being a relatively similar component of each of the four site-wide scenarios, Scenario 1 would have the least QOL impact due to noise, as no additional noise would be generated due to loading/off-loading of the containers or movement of the site-specific rail cars to/from the mainline track. For the three scenarios with rail/truck transport, Scenario 3 would have slightly less noise impact than Scenarios 2 and 4 as the latter have a rail loading area near a residential neighborhood (i.e., Utility Drive).

### 5.4.3 Lighting

Hydraulic transport and truck transport are expected to have limited to no QOL impacts due to lighting in addition to the impacts expected due to activities in the remediation project area and/or at the UDF as the operations are expected only during typical work activities. However, for rail/truck transport, it is anticipated that the railroad's availability to move cars to/from the rail loading/unloading areas will only be at night. This will require special additional lighting overnight at each rail loading/off-loading area. The Rising Pond property location is relatively rural, and limited QOL impact is expected due to overnight lighting at this location; however, overnight lighting at Woods Pond Spur and/or Utility Drive could result in additional light pollution for nearby residents.

With hydraulic transport being a relatively similar component of each of the four site-wide scenarios, Scenario 1 would have the least QOL impact due to light, as there would be no need for the overnight use of rail loading/off-loading areas (and associated lights). For the three scenarios with rail/truck transport, Scenario 3 would have slightly less light impact than Scenarios 2 and 4 as the latter have a rail loading area near a residential neighborhood (i.e., Utility Drive).

### 5.4.4 Operating Hours

The anticipated QOL impacts due to operating hours are likely to be relatively similar to those described in Section 5.4.3 for lighting. Hydraulic transport and truck transport are expected to occur only during normal working hours for the remediation; however, the railroad's availability to move cars to/from the site rail loading/unloading areas will only be at night (outside of normal working hours).

Scenario 1 would have the least QOL impact due to operating hours, as there would be no need for the overnight use of rail loading/off-loading areas. For the three scenarios with rail/truck transport, Scenario 3 would have slightly less QOL impact than Scenarios 2 and 4 as the latter have a rail loading area near a residential neighborhood (i.e., Utility Drive).

### 5.4.5 Impacts to Infrastructure

Hydraulic transport is expected to have minimal impact on surrounding infrastructure, and such impact would occur only if the hydraulic transport pipeline were adjacent to existing infrastructure. However, in general, it is anticipated that the pipeline can be routed around any existing infrastructure with little to no impact to that infrastructure.

Truck transport has the potential to impact road conditions by adding stress on local roadway infrastructure. The QOL Compliance Plan describes methods to be implemented to reduce potential impacts of the remediation work on road condition and usage, including during truck transport (and the truck component of rail/truck transport). These methods will be equally applied to trucks traveling directly to the disposal facility(ies) or those traveling to or from rail loading/off-loading areas. Potential impacts to existing local infrastructure would likely be related to the number of truck trips over such roads, and as such would likely be proportional to the truck trips presented in Section 5.1, which shows generally similar numbers of truck trips for each scenario.

It is not expected that the rail component of rail/truck transport would have much impact on the existing rail infrastructure, as the addition of one car per day (on average) to the existing rail freight would not add substantial stress the mainline track. Additional consideration and coordination will be required during design of the Woods Pond Spur rail loading/unloading area related to potential use of and impacts to the area listed on the National Register of Historic Places, but it is anticipated that implementation of protection measures, as needed, will be sufficient to mitigate the potential for any adverse impact to this area.

In short, there is no significant difference among the four scenarios in terms of impacts on existing infrastructure.

### 5.4.6 Impacts on Recreation During Construction

Hydraulic transport and truck transport will likely have little to no impact on recreation during construction other than those impacts due to the remediation itself. For rail/truck transport, the construction of up to three rail loading/off-loading areas may impact recreation at the three impacted properties. Specifically, the use of Woods Pond Spur will significantly impact the operations of the Berkshire Scenic Railway Museum, possibly closing it completely to public use during the period when it is being used for rail loading/unloading.

Scenario 1 would have the least QOL impact on recreation during construction, as there would be no need for the use of current recreational property for the rail loading/off-loading areas. For the three scenarios with rail/truck transport, Scenario 3 would require less disturbance to existing recreational property due to one less rail loading area (i.e., Utility Drive) than Scenarios 2 and 4.

### 5.4.7 Impacts on Infrastructure/Recreation After Construction

This section evaluates the potential positive long-term effects due to reconditioning and upgrading Roaring Brook Road to support construction activities and options to work with municipalities to modify the end use of impacted areas as future recreational areas, such as parks or hiking and bike trails, and potential benefits to the community of improved or new permanent rail spurs/sidings.

All four site-wide scenarios are expected to have the same positive long-term impact to Roaring Brook Road, including the potential for new, properly sized culverts.

Regarding the potential to work with municipalities to modify the use of impacted areas as future recreational areas, as discussed in the QOL Compliance Plan, GE will work cooperatively with the City of Pittsfield (regarding the Utility Drive rail loading area), Town of Lenox (regarding the Woods Pond Spur rail loading/off-loading area), the Town of Stockbridge, the Commonwealth of Massachusetts, and/or the affected property owner(s) to facilitate their future enhancement of recreational activities. In addition, if new rail spurs/sidings are constructed, GE will coordinate with HRRC, MassDOT, and/or the Berkshire Scenic Railway Museum to understand potential benefits to the community due to these new rail spurs/sidings. Thus, Scenarios 2 through 4 all have a potential for future enhancement of recreational activities and potential benefits to the community from improved or new permanent rail spurs/sidings.

## 5.5 Ecological Impacts

This section provides a general qualitative evaluation of the potential ecological impacts of the three modes of transportation and their use in the four site-wide scenarios.

Hydraulic transport does not require additional infrastructure and is expected to require little to no ecological disturbance in addition to the ecological impacts of the remediation. Hydraulic transport may require some additional site clearing or excavation to create a route for the hydraulic pipeline; however, it is expected the hydraulic transport route will follow existing easement corridors (e.g., railroad, roadway) that do not contain ecologically sensitive areas (e.g., wetlands, Priority Habitat for state-listed species).

Truck transport does not require additional infrastructure and is expected to require no ecological disturbance in addition to the ecological impacts of the remediation.

Rail/truck transport requires additional infrastructure, so will require additional clearing of existing and established vegetation; this is especially true for the rail loading area at the Rising Pond property (anticipated to require clearing of a minimum of 3.2 acres [see Table 3-3]). As discussed in Section 3.3.1.1, the Utility Drive location, which would require a minimum of 2.2 acres for a rail loading area, is situated within MNHESP-designated Priority Habitat for state-listed species and has a portion of Core 2 habitat, although it is unknown whether the MNHESP's Species-Specific Habitat maps extend into that area. It also has nearby wetlands identified in the National Wetland Inventory. The Woods Pond Spur and Rising Pond locations are located outside of Priority Habitat and do not contain wetlands identified in the National Wetland Inventory.

Scenario 1 would have the least ecological impact, as no additional infrastructure would be required to support rail/truck transport. Scenarios 2 and 4 would have similar ecological impacts due to the construction of the rail loading and/or unloading areas, especially at Utility Drive. Scenario 3 would have lesser ecological impact since it would not require a rail loading area at Utility Drive.

## 5.6 Logistical and Implementability Considerations

This section provides a general qualitative evaluation of the impacts of the three modes of transportation and the four site-wide scenarios in terms of construction logistics and implementability. This qualitative evaluation considers flexibility of the method, the potential need for double-handling, space constraints, ability to transport sufficient material in a timely manner, potential impacts to schedule, and other logistical issues.

Hydraulic transport is widely used as a method for transporting sediments and, as summarized in Section 3.1, is a technically feasible method for the majority of the material being removed during the ROR Remedial Action. Hydraulic transport is relatively flexible; however, is subject to more seasonal restrictions (i.e., winter shutdown) as the high volume of liquid involved is susceptible to freezing temperatures. In addition, hydraulic transport generally requires a larger staging area to dewater the hydraulic slurry of material and then treat the liquid generated during dewatering. Hydraulic dredging can achieve high production rates in the appropriate application; however, given the linear nature of hydraulic transport, if one pump breaks or there is a problem anywhere in the pipeline, there is a high potential for all operations to cease and the overall schedule to be impacted. However, given the significant reduction in truck traffic, despite potential logistical concerns, all four site-wide scenarios utilize hydraulic dredging for the majority of the material being removed (72% or more of the total removal volume, depending on the scenario).

Truck transportation is widely used as a method for transporting sediments and soils and is a technically feasible method for transportation of materials for disposal. Truck transport provides greater flexibility during implementation of the remedial activities and is not hindered by potential delays with rail transport equipment, schedule, or other rail customers along the route. Truck transport requires no additional infrastructure, space, or handling in addition to construction and use of a standard staging area for material handling and dewatering, and in some cases removed material could be directly loaded to trucks for transportation for disposal without the need for any temporary on-site staging. Truck transport is utilized most heavily in Scenario 1 and is also an important component of the other three site-wide scenarios, moving 4% to 18% of the removed material, depending on the scenario.

Rail/truck transport is sometimes used as a mode of transportation for disposal of removed sediments and soils at remediation projects, typically when removed materials will require transport over long distances for disposal. Rail/truck transport requires construction of additional infrastructure to load and/or unload material from the rail, and the need for double-handling material to transfer from truck to rail and/or rail to truck. Use of an existing commercial rail facility would reduce logistical and implementability concerns given its current reliable use for transportation of materials across the country, and is included as a component of Scenarios 1 and 3. As noted in Section 3.3, use of the railroad would depend on the railroad’s availability to move cars as needed to maintain the production rates for soil/sediment removal, the railroad’s ability to maintain the tracks and its rail equipment, and coordination with other railroad traffic, all of which could dictate and delay construction sequencing and schedule. As needed, rail cars could be staged and loaded based on the project sequence and schedule; however, space constraints limit how many containers and/or rail cars could be staged. Of the three modes of transportation presented herein, rail/truck transport has the most amount of potential logistical and implementability issues, and the highest potential to cause a stoppage of removal activities and/or operations at the UDF based on the railroad’s schedule.

Finally, of the three potential rail loading and/or off-loading areas, Utility Drive presents the most logistical and implementability issues. For the Woods Pond Spur, the Berkshire Scenic Railway Museum is willing to continue conversations regarding property use given the potential for long-term benefits to the museum operations. The Rising Pond loading area is on property that is currently owned by GE and at which GE will retain the necessary easements after the property’s transfer to Great Barrington.

Scenario 1 would have the least potential for logistical and implementability problems, given that it would not be dependent on local rail transport. Scenarios 2 through 4 would have similar potential logistical and implementability impacts, with Scenario 3 having somewhat less because one fewer rail loading area would need to be constructed (i.e., no Utility Drive) and thus coordination with or impact to the Pittsfield WWTP could be avoided.

Overall, among the three modes of transport, rail/truck transport has the most potential logistical and implementability issues and the highest potential to cause a stoppage of removal activities and/or operations at the UDF based on the railroad’s schedule. As a result, for Scenarios 2 through 4, if at any time during the ROR Remedial Action use of rail/truck cannot match target production rates for sediment and soil removal (i.e., material is being removed and stockpiled faster than it can be transported for disposal, with the risk of running out of room), truck transport would be utilized to supplement rail/truck transport and convey removed materials for disposal.

## 5.7 Schedule Considerations for Construction of Supporting Infrastructure

All scenarios are expected to require some reconditioning and/or upgrades to existing seasonal roads (e.g., Roaring Brook Road), and Scenarios 2 through 4 would require construction of infrastructure to support rail/truck transport. However, as discussed in Section 3.2 (for roads) and Sections 4.2 through 4.4 (for rail infrastructure), it is anticipated that the construction required to recondition, upgrade, or build new supporting infrastructure would be completed within the time required to mobilize for remediation in the associated RU(s) and thus would not impact the overall construction schedule for any of the four scenarios. However, since reconditioning and/or upgrades to roads and the construction of rail spurs or other infrastructure to support rail/truck transport will require coordination with federal, state, or local governmental entities, the schedule for those activities will be affected by the time necessary for such coordination. In addition, the schedule for construction and operation of new railroad tracks, as part of the infrastructure to support rail/truck transport, may be dependent on coordination with the local railroad.

## 5.8 Conclusions

GE recommends Scenario 4 as the site-wide holistic approach to transporting and disposing of material removed in the course of the ROR Remedial Action. This recommendation gives substantial weight to the preference of some in the community for a reduction in local round-trip truck miles. Scenario 4 has by far the fewest round-trip truck miles of any of the scenarios evaluated (142,800 miles), with the next highest scenario (Scenario 2; 245,000 miles) involving over 70% more round-trip truck miles.

Scenario 1 is the most favorable scenario for many other evaluation criteria. However, that scenario includes the most local round-trip truck miles on local roads. Moreover, the Revised Final Permit requires measures to "maximize the transport of…waste material to off-site facilities via rail, to the extent practicable"; and as provided in the SOW, GE has included in this Revised T&D Plan an evaluation of practicability of utilizing both off-site and on-site rail/truck transport for the material not anticipated to be transported hydraulically.

For the three site-wide scenarios that include rail/truck transport (Scenarios 2 through 4), the differences among the scenarios in terms of several of the evaluation criteria (e.g., number of truck trips, transport-related injuries and fatalities, impacts to infrastructure and recreation, and schedule considerations for constructing supporting infrastructure) are not significant. However, Scenario 3 is slightly more favorable than the others in terms of logistical and implementability considerations, quality-of-life impacts, and ecological impacts as it is the only one of these three scenarios that does not require a rail loading area at Utility Drive, adjacent to a residential neighborhood and within designated Priority Habitat for state-listed species. Scenario 4 has the greatest GHG emissions and work site injury and fatality impacts of these three scenarios because it involves the most rail transportation, and transportation by rail is associated with higher GHG emissions and work site injuries and fatalities than transportation by truck alone.

As noted in Section 5.6 above, in the event that Scenario 4 is incapable of meeting ROR Remedial Action target production rates for sediment and soil removal, truck transport would be utilized to supplement rail/truck transport in conveying removed materials for disposal.

# 6 Transportation and Disposal Requirements

This section describes the on-site and off-site requirements applicable to truck and rail/truck transport. At a minimum, BMPs will be implemented during transportation to minimize potential traffic impacts, including potential accidents. Section 9 provides a list of preliminary BMPs and specifies which subsequent documents will describe additional details related to these BMPs.

## 6.1 On-Site Transportation Requirements

Over-the-road transport of excavated materials to the UDF or to an on-site rail loading area by truck is considered on-site transport and is subject to the on-site permit exemption specified in Section 121(e) of CERCLA and Paragraph 9.a of the CD for the GE-Pittsfield/Housatonic River Site. Material transport vehicles leaving the work area will be lined and covered to avoid spillage during transportation and will be placarded and documented in accordance with federal and state requirements using bills of lading (BOLs). For such on-site transport by truck to the UDF or to an on-site rail loading area, the Remediation Contractor and transporters (as applicable) will be required to implement the following procedures:

- Employ qualified personnel trained in accordance with United States Department of Transportation (U.S. DOT) requirements for handling and shipping hazardous materials, with such training to include general safety, emergency response, exposure protection, accident prevention, preparation of shipping papers, and securing loads;
- Employ drivers that have a Commercial Driver’s License with a Hazardous Materials Endorsement;
- Use trucks that are U.S. DOT-inspected and certified;
- Include in the HASP, POP, and Contingency Plan detailed provisions for responding to transportation emergencies such as accidents, spills, releases, or other incidents;
- Maintain records of the number of loads of materials sent to the UDF on a daily basis; and
- Confirm that the materials are suitable for transport (i.e., that they do not contain free liquids).

In addition, the on-site truck transportation of excavated materials to the UDF or to an on-site rail loading area will be conducted in accordance with the following guidelines:

- After a safety check of the truck, the truck bed will be lined with polyethylene sheeting.
- Excavated material will be placed in the truck, and the load will be covered.
- An appropriate materials BOL will be prepared in accordance with U.S. DOT requirements and signed by the truck driver; the BOL will have a 24-hour number, from which GE personnel will be contacted as soon as practicable in case of an accident so there can be a timely and proper response.
- After another safety check of the vehicle and placarding, the truck will leave the staging area and proceed to the UDF or to an on-site rail loading area, using the pre-approved route. If the material is transported onsite by rail, it will be off-loaded from the rail cars and loaded onto a truck for transport to the UDF for disposal following similar procedures.
- Upon arrival of the material at the UDF, receipt of the load will be documented, and the material will be off-loaded and placed as appropriate (see Section 7.1).

For the rail component of rail/truck transport, requirements for the Remediation Contractor and rail transporter (as applicable) for such transportation will include the following:

- Comply with all federal and state requirements using BOLs and/or other appropriate railroad shipping documents;
- Placard railroad cars in accordance with U.S. DOT and Federal Railroad Administration requirements;
- Employ qualified personnel trained in accordance with U.S. DOT requirements for handling and shipping hazardous materials, with such training to include general safety, emergency response, exposure protection, accident prevention, preparation of shipping papers, and securing loads;
- Transport material in U.S. DOT-approved shipping containers that are covered (e.g., intermodal boxes, gondolas);
- Have detailed provisions for responding to transportation emergencies such as accidents, spills, releases, or other incidents; and
- Maintain transportation and disposal records to include the number of loads of materials sent to the railroad off-loading area on a daily basis and copies of the final manifests, weight tickets, and certificates of disposal.

## 6.2 Off-Site Transportation Requirements

Over-the-road transport of materials to off-site disposal facilities by truck will be performed by licensed haulers in accordance with appropriate local, state, and federal regulations. Material transport vehicles leaving the work area will be lined and covered to avoid spillage during transportation and will be manifested and placarded in accordance with federal and state requirements using hazardous waste manifests or BOLs. Similar to the requirement for BOLs for on-site transport, the manifests or BOLs for off-site transport will have a 24-hour number, from which GE personnel will be contacted as soon as practicable in case of an accident so there can be a timely and proper response.

For the transport of excavated materials from the ROR by truck to the off-site disposal facility(ies) or to an off-site railroad loading area (i.e., in Albany) for further transport by rail, the Remediation Contractor and the transporters (as applicable) will be required to comply with all off-site transportation and disposal requirements and to implement the same transport procedures listed in Section 6.1 for on-site transport by truck.

In addition, the transport of excavated materials from the staging areas (or from the removal areas if material can be directly loaded) by truck to the appropriate off-site disposal facility(ies) or an off-site rail loading area will be conducted in accordance with the following guidelines:

- After a safety check of the truck, the truck bed will be lined with polyethylene sheeting.
- Excavated soil will then be placed in the truck and the load will be covered.
- An appropriate hazardous waste manifest or BOL will be prepared and completed by GE (or its authorized representative).
- After another safety check of the vehicle and placarding, the truck will leave the staging areas and proceed to the off-site disposal facility(ies) (or loading area) using the pre-approved route. All trucks leaving the staging areas and proceeding to the off-site disposal facility(ies) must meet MassDOT and U.S. DOT weight limits.

For the rail component of rail/truck transport, requirements for the Remediation Contractor and rail transporters (as applicable) for such transportation will be the same as those listed in Section 6.1 for on-site rail transport with the following modifications:

- The transporters will be required to comply with all comply with federal and state requirements for such transport using hazardous waste manifests or BOLs and other appropriate railroad shipping documents; and
- The Remediation Contractor and transporters, as applicable, must maintain transportation and disposal records, including the number of loads of materials sent to the disposal facilities on a daily basis and copies of the final manifests, weight tickets, and certificates of disposal.

# 6.3 Tracking and Recordkeeping

Tracking and recordkeeping of the material transported to and disposed of at the UDF or an off-site facility(ies) will be in accordance with applicable federal state, and local disposal management regulations (including, if applicable to the material being transported for disposal, EPA's TSCA regulations in 40 CFR Part 761).

## 6.3.1 Labeling and Placarding

Each waste container or transportation vehicle will adhere to applicable U.S. DOT regulations and utilize a U.S. DOT Hazard Class 9 placard, as referenced on the applicable BOL (or manifest for off-site transport and disposal). In addition, each container or transport vehicle used for on-site transport to the UDF will be marked as containing PCBs, with large PCB mark labels affixed to each side of the container or transport vehicle.

For containers or transport vehicles used for off-site transport that contain material with PCB concentrations of 50 mg/kg or greater or that contain greater than the Reportable Quantity of PCBs (1 pound), the container or transport vehicle will be marked as containing PCBs in accordance with EPA's TSCA regulations (40 CFR § 761.40) and applicable U.S. DOT regulations. Specifically, large PCB mark labels will be affixed to each such container or transport vehicle on all sides. If it is determined that the waste constitutes RCRA hazardous waste, applicable placarding would accompany the loads based on the predominant hazard identified during RCRA characterization. These marking, labeling, and placarding requirements are not applicable to transportation of material with PCB concentrations less than 50 mg/kg and containing less than 1 pound of PCB. For such material, in-transit material identification will be accomplished by use of a BOL. Packaging will not be marked, and transportation vessels will not be marked or placarded.

Rail cars (if used) will also be placarded in accordance with Federal Railroad Administration requirements.

## 6.3.2 Manifesting Requirements

As noted above, on-site transport to the UDF is subject to the on-site permit exemption specified in Section 121(e) of CERCLA and Paragraph 9.a of the CD for the GE-Pittsfield/Housatonic River Site. As such, on-site movement of material is exempt from manifesting requirements. However, transporters will need to follow U.S. DOT requirements including utilizing BOLs and appropriate placarding.

For off-site transport to off-site disposal facilities, manifests will be used to track shipments from the ROR to the selected disposal facilities. Non-hazardous waste manifests will be used for shipments of non-TSCA/non-RCRA waste to Subtitle D facilities, and the Uniform Hazardous Waste Manifest (UHW Manifest) form (EPA Form 8700-22 and, if necessary, continuation sheet Form 8700-22S) will be used for shipments of TSCA-regulated non-hazardous waste and/or RCRA hazardous waste (if any) to Subtitle C facilities.

Waste manifests will accompany the off-site transported material and be signed by the generator (GE) or its representative, the transportation vendor(s), and the final receiving facility. GE will send copies of the generator manifests to the Massachusetts Department of Environmental Protection. The disposal facility will be responsible for reporting to its respective overseeing agency in accordance with applicable state requirements.

Each individual acting as generator signatory on hazardous waste manifests for off-site transport and disposal is required by 49 CFR Part 172 to be trained in handling and shipping hazardous materials. Training requirements are outlined in 49 CFR Part 172, Subpart H. Training must be completed at least once every three years.

It is anticipated that one UHW Manifest form or non-hazardous waste manifest form, as appropriate, will be prepared and completed for each loaded truck for off-site transport or each loaded container transported off-site by rail. For rail shipments (if applicable), a listing of rail cars in each unit train will be prepared, noted on the manifest, and attached to the manifest. This listing will include rail car serial numbers and estimated loaded net weight for each car. For trucks, the listing will include the estimated loaded net weight for each truck.

The Remediation Contractor, on behalf of the generator (GE), will work with the relevant off-site disposal facility to prepare and print unique and appropriate shipping documents for each off-site truck load or rail load. The shipping documents will include all transporters used during transportation to the disposal facility. Each transporter will sign its section of the shipping document until it reaches the disposal facility. The disposal facility will return shipping documents to the Remediation Contractor to close out the process.

### 6.3.3 Documentation

The amount of material transported on-site to the UDF for disposal will be documented through the estimated volume of material in each truck unloading at the UDF and by counts of those trucks (including trucks transferring material from the rail off-loading area to the UDF if rail is used for a portion of the on-site transport) and by flow measurements for hydraulic transport. As a BMP, a tracking system will be established and updated routinely. The total volume of material disposed of in the UDF will be confirmed by comparing surveys of the UDF consolidation area before, during, and after construction/consolidation. See Section 7.1 for additional details related to receipt of material at the UDF. The following documents and information will be generated and retained to document disposal of waste on-site:

- On-site disposal tracking table; and
- Total disposal volume based on comparison of before, during, and after construction/consolidation surveys.

Documentation of material transported off-site for disposal will be through weight tickets provided by the receiving facility. As a BMP, a tracking system will be established to document generation of material, waste characterization and approvals, and off-site disposal for the ROR Remedial Action.

Tracking tables will be generated and updated routinely, and the selected disposal facility(ies) will be required to provide final waste manifests and scale tickets within a reasonable timeframe (to be established at a later date). The following documents and information will be generated and retained to document disposal of waste off-site:

- Off-site disposal tracking table;
- Final manifests and scale tickets;
- Waste characterization summary table (if appropriate);
- Waste approval letter(s); and
- Waste profile(s).

Transportation and disposal-related documents for on-site and off-site disposal will be provided with the report(s) documenting construction completion following remedy implementation.

# 7 On-Site Disposal or Treatment Coordination

This section describes the required coordination for on-site disposal of removed materials at the UDF and for on-site transport of generated liquid for disposal or treatment.

## 7.1 Receipt of Transported Materials at the Upland Disposal Facility

As of now, the only entrance anticipated to be available for land-based transport vehicles (i.e., trucks) to access the UDF is through the property owned by GE located on Woodland Road adjacent to the UDF. However, as discussed in Section 5.1, at the request of the local community and EPA to try to the reduce truck traffic on Willow Hill Road from trucks approaching the UDF from the south, GE is discussing with the property owner the potential for obtaining access permission to build an alternative entrance to the UDF. Two potential alternative entrances are illustrated on Figure 3-12.

Material delivered to the UDF by trucks will be routed directly to active cells within the UDF for disposal. Delivered material will be placed in designated cell areas where it will be graded and compacted in accordance with fill operation plans and requirements developed for the UDF.

It is currently anticipated that material delivered to the UDF by hydraulic transport will be routed to cell areas within the UDF Consolidation Area designated for dewatering operations (e.g., areas with geotextile filter bags where the material will undergo dewatering and consolidation or other appropriate methods). It is further anticipated that mechanically removed materials will initially be dewatered and processed at RU-specific temporary staging/support areas before being delivered directly into the UDF Consolidation Area for disposal. Liquid generated within the UDF cells during the dewatering and consolidation process will be collected for subsequent treatment and disposal (see Section 7.2). Figure 7-1 illustrates the locations where within the UDF Operational Area hydraulically and/or mechanically removed materials are anticipated to be consolidated. The locations shown are subject to modification based on material consolidation requirements.

Details related to the handling of material at the UDF were presented in the initial UDF Final Design Plan and UDF Operation, Monitoring, and Maintenance Plan (UDF OMM Plan), both submitted to EPA on February 28, 2024 (Arcadis 2024a, 2024b). Further details related to the construction and operation of the UDF, including information related to material delivery and placement at the UDF, will be included in the Revised UDF Final Design Plan, which is scheduled to be submitted to EPA on December 13, 2024 and/or the Revised UDF OMM Plan, which is scheduled to be submitted to EPA on December 20, 2024.

## 7.2 On-Site Transportation of Generated Liquids

Liquid generated within the UDF cells (i.e., decant liquid from dewatering operations within the UDF cells and leachate collected by the UDF leachate collection system) will be collected for subsequent treatment and disposal. This liquid will initially be transported to GE's Building 64G Groundwater Treatment Facility at its former Pittsfield plant site(Building 64G), or to a temporary water treatment area constructed for remediation of Reach 5A (see Section 2.2), or to an approved off-site facility for treatment. The potential routes for the transportation of leachate from the UDF to either GE's Building 64G to an approved off-site facility(ies) are illustrated on Figure 7-2.

Based on the current ROR construction schedule, it is anticipated that construction at Reach 6 will start approximately one year after initiation of construction at Reach 5A. As part of the Reach 6 construction efforts, an on-site wastewater treatment facility will be built at the UDF to support hydraulic dredging of Reach 6 and hydraulic conveyance to the UDF. Therefore, it is anticipated that there will be approximately one year of ROR construction (at Reach 5A), including associated generation of leachate at the UDF due to disposal of to Reach 5A soils and sediments therein, before a wastewater treatment facility is operational at the UDF. Once that facility is operational, transport of leachate material to GE's Building 64G or an approved off-site facility is expected to be largely discontinued. However. some intermittent use may be required even after the UDF wastewater treatment facility is operational (e.g., when necessary for planned or unplanned maintenance of the UDF treatment facility), as will be described in the forthcoming Revised UDF OMM Plan.

Based on the calculations presented in Appendix E5 of the February 2024 UDF Final Design Plan, approximately 9,600 gallons per day of leachate are anticipated to be generated from Cell 1, which is the only cell anticipated to be in use during the first year of UDF operation. Transport of that daily average volume of 9,600 gallons will require one to two 5,000-gallon truck trips per day and a total of approximately 700 truck trips for the year during which GE anticipates transporting leachate from the UDF to GE's Building 64G or an approved off-site facility.

# 8 Off-Site Disposal Destination Screening and Selection

Potential off-site disposal facilities have been identified based on the anticipated waste streams for the ROR Remedial Action, as presented in Section 2.1: (1) material containing PCB concentrations at or above 50 mg/kg, whose disposal is regulated under EPA's TSCA regulations; (2) material that constitutes RCRA hazardous waste (if any); and (3) non-TSCA/non-RCRA material. The material in each category will be designated for transport to the appropriate off-site facilities authorized to receive such material – either a RCRA Subtitle C facility for material in either or both categories 1 or 2, or a Subtitle C or Subtitle D facility for material in category 3.[20]

This section outlines the evaluation criteria that will be applied to select the appropriate off-site disposal facility(ies) and provides a summary of the preliminary evaluation performed for disposal of material in these three categories and information gathered from retained potential facilities.

## 8.1 Disposal Facility Evaluation Criteria

For development of the October 2023 T&D Plan, numerous Subtitle D and Subtitle C landfills outside of Massachusetts were identified and reviewed, using professional judgment and experience, for general facility information and capability. Following the initial review effort, additional information was requested from a subset of facilities through a Request for Expression of Interest (RFEI) letter. The information received in reply to each RFEI letter and gathered during development of this Revised T&D Plan was used to evaluate each facility's capability to meet the conceptual and preliminary needs of the ROR Remedial Action using the following criteria:

- CERCLA approval status;
- Waste acceptance criteria (sampling and analytical requirements);
- Facility capacity limitations (e.g., permitting restrictions, processing requirements, operation schedule, storage limits);
- Rail access; and
- Transportation distance, modes, and options.

## 8.2 Disposal Facility Preliminary Evaluation

This section discusses the candidate disposal facility(ies) that were retained after the preliminary screening based on the criteria described in Section 8.1. Table 8-1 identifies the five Subtitle C and five Subtitle D candidate off-site disposal facilities retained after the preliminary screening and indicates which facilities can accept material by rail. The locations of those retained facilities are illustrated on Figure 8-1. GE will continue to research and communicate with candidate disposal facilities, including and in addition to those summarized in Table 8-1, throughout the design process; final selection of the off-site disposal facility(ies) will be included in the Final RD/RA Work Plans and SIPs for the various RUs.

[20] Although TSCA/non-RCRA landfills exist, for simplicity GE evaluated Subtitle C facilities that accept both TSCA and RCRA-regulated materials.

### 8.2.1 Subtitle C Facilities (TSCA- and RCRA-Regulated Waste)

Bulk waste with a PCB concentration greater than or equal to 50 mg/kg will be disposed of in a TSCA chemical waste landfill or hazardous waste landfill permitted by EPA under Section 3004 of RCRA or by a state authorization under Section 3006 of RCRA. The retained Subtitle C disposal facilities listed in Table 8-1 constitute such landfills. These Subtitle C landfills are also potential disposal options for RCRA-regulated hazardous waste (if any) that is non-TSCA-regulated or waste that is both TSCA-regulated and RCRA-regulated. Due to the unlikelihood of encountering RCRA-regulated hazardous waste with PCB concentrations less than 50 mg/kg during the ROR Remedial Action, Subtitle C facilities that cannot accept waste with PCB concentrations greater than or equal to 50 mg/kg were not retained. All Subtitle C facilities indicated that they could receive waste by rail; however, some facilities may require additional truck transport between the closest railroad off-loading location and their facility.

### 8.2.2 Subtitle D Facilities (Solid Waste Disposal)

Non-TSCA/non-RCRA material will be considered acceptable for disposal at RCRA Subtitle D (solid waste) disposal facilities as long as the acceptance criteria of the individual facility permits are met. Based on the initial and preliminary screening, the Subtitle D landfills considered for the disposal of non-TSCA/non-RCRA waste are listed in Table 8-1, which also indicates whether the listed facilities can receive material by rail. These facilities have transportation and disposal experience with similar large-scale waste removal actions and are capable of managing the generated non-TSCA/non-RCRA materials from this project. Most of these facilities indicated that they cannot receive waste by rail; however, two facilities can.

# 9 Community Assessment and Mitigation

As described in Section 1.4, this Revised T&D Plan has considered communications from the local municipalities and community members regarding the transport and disposal of excavated/dredged materials to the UDF and to off-site disposal facilities. As a result of those discussions, changes have been made to potential travel routes (e.g., by avoiding or limiting use of certain roads), and additional efforts are still being made to coordinate with property owners and municipalities to further identify potential alternative travel routes.

A discussion of potential QOL impacts stemming from transportation and disposal activities is presented in Section 5 of this Revised T&D Plan. As noted there, such impacts and mitigation measures for them were discussed in GE’s initial QOL Compliance Plan, submitted to EPA on December 20, 2023, and conditionally approved on July 22, 2024, and will be discussed further in GE’s Revised QOL Compliance Plan, scheduled to be submitted on November 22, 2024. Among other things, that plan defines the QOL standards and measures that will be applied throughout the ROR Remedial Action, including during transportation and disposal, including GE’s proposed standards for air quality, noise, odor, and lighting. The EPA-approved QOL standards will be incorporated into the RU-specific remedial design and used to establish routine control measures, monitor the impacts of the remedial activities, and specify contingency response actions where necessary.

The Revised QOL Compliance plan will address concerns related to increased traffic in or near residential areas and stress on local roadways that could result in the need for increased road maintenance. That plan will describe methods to minimize and mitigate transportation-related impacts to neighborhoods, infrastructure (e.g., bridges and culverts), and the general public, including BMPs where appropriate, to minimize or eliminate accidents. The plan will also include a description of activities that will be performed to document the pre- and post-remediation conditions of municipal roads and associated infrastructure that may be used for the transportation of materials required for remediation. The Revised QOL Compliance Plan standards and mitigation measures will apply to all of the modes of transportation proposed in this Revised T&D Plan. Additionally, the Remediation Contractor will implement traffic control measures in the form of BMPs and temporary controls to minimize potential traffic impacts, including potential accidents. These measures will include the following:

- Dedicated transportation routes will be developed, tracked, and enforced.
- Truck and project vehicle drivers will comply with project-specific traffic control measures, speed limits, and other local, state, and federal traffic laws.
- Drivers of diesel trucks and other equipment will refrain from idling trucks on local streets to the extent practicable and refrain from overnight parking on city streets unless specific areas are designated and pre-approved.
- Tarps will be installed to cover material loaded onto trucks and trains, and liners will be used to avoid spillage.
- Traffic control signs will be posted (e.g., speed, parking areas) in the work areas, and where appropriate traffic control personnel (e.g., flaggers) will be utilized.
- Real-time communications (e.g., radios, phones) and tracking systems (e.g., global positioning system) will be developed for project vehicles and/or drivers, as necessary.

Additional details on anticipated BMPs and associated control measures and contingency response actions, if appropriate, will be included in RU-specific remedial designs.

During the ROR Remedial Action, project-related truck traffic will be monitored and managed by the Remediation Contractor and GE or their designated on-site representative will verify that traffic control measures are functioning as intended.

In addition, during the ROR Remedial Action, GE or its designated on-site representative will investigate community complaints regarding traffic and/or congestion to evaluate whether the traffic originated from the project. Where investigations find that the traffic and/or congestion was a result of the project, the Remediation Contractor will implement corrective actions as directed by GE. The forthcoming Revised Quality of Life Compliance Plan, like the prior version, will contain a community coordination plan, including a community education and notification program and a complaint management program.

# 10 Health and Safety

A revised site HASP (Arcadis 2023) has been submitted to EPA to establish health and safety procedures and requirements to protect workers during the ROR Remedial Action. The HASP includes general requirements specific to waste handling and transportation, including the following:

- Identification of the potential hazards;
- Personal protective equipment requirements;
- Emergency contacts and procedures;
- Roles and responsibilities; and
- Training and medical qualification criteria for site personnel.

The HASP will be reviewed by contractor and subcontractor managers, supervisors, and safety personnel. Project personnel performing field activities will receive a site-specific project orientation summarizing the content of the HASP.

The HASP was written to comply with the requirements of the Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response Standard (29 CFR § 1910.120). Activities covered by the HASP will be conducted in compliance with applicable federal, state, and local health and safety regulations, including 29 CFR § 1910.120 and, for railroad operations (if any), applicable Federal Railroad Administration safety regulations (49 CFR Part 214, Subpart C).

The Remediation Contractor will also be required to develop its own HASP to identify project-specific health and safety procedures, in accordance with 29 CFR Parts 1910 and 1926, for the activities that it will undertake. Contractor requirements will be specified in more detail in forthcoming RU-specific documents (i.e., technical specifications).

# 11 Summary of Next Steps

The Final Revised OSS presented flow charts (Figures 5-1 and 5-2 in that report) that detail the sequencing and precedents of deliverables and data collection activities that need to be conducted prior to the start of remediation activities in Reach 5A (the most upstream and first RU to be addressed). As discussed in Section 11 of the Reach 5A Conceptual Work Plan, many of those deliverables will need to be approved by EPA prior to submission of the Final RD/RA Work Plan for Reach 5A and implementation of construction. Pertinent updates related to transportation and disposal will be developed as the design proceeds and will be included in the Final RD/RA Work Plan or SIP for Reach 5A. A similar process will be followed for transportation and disposal activities for Reach 6 and the remaining RUs. As discussed in Section 1, such updates, to be included in the Final RD/RA Work Plans and SIPs for the various RUs, will include RU-specific information on the following:

- Final specific methods of transportation and the transportation routes to the UDF and the selected off-site disposal facility(ies);
- Selection of the off-site disposal facility(ies); and
- Evaluation of compliance with the disposal acceptance criteria of the off-site disposal facility(ies).

In addition, as necessary and in consultation with EPA, addenda to this Revised T&D Plan may be submitted to EPA periodically to summarize the RU-specific updates as they relate to transportation and disposal activities. Final routes and methods of transportation included in the EPA-approved Revised T&D Plan will not be modified without prior EPA approval in writing.

# 12 References

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# Tables

**Table 3-4**
**Evaluation of Other Railroad Sidings Presented in October 2023 T&D Plan**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Previously Used Railroad Siding Location | General Location | Reason Not Retained |
|---|---|---|
| Industrial Drive | City of Pittsfield, north of Reach 5A | - Use of access road would conflict with active businesses adjacent to tracks.<br>- Truck access is by use of a congested business area in the City of Pittsfield.<br>- Nearly the same truck routes and distances on local roads near Reach 5A to get to Industrial Drive as to get to out-of-state route or directly to UDF (and more trips near residential roads northwest of site). |
| Greylock Mill | Reach 7B | - Reach 7B sediments anticipated to be hydraulically conveyed directly to the UDF.<br>- Requires at-grade railroad crossing (safety issues).<br>- Limited space available due to existing infrastructure. |
| Pleasant Street | Adjacent to Reach 7D, off Massachusetts Route 102 | - Not adjacent to any areas identified for active removal.<br>- Track is currently used by local industry. |
| Stockbridge Train Station | Adjacent to Reach 7F, about halfway between Reaches 7E and 7G | - Not adjacent to any areas identified for active removal.<br>- Potential disruption to use of train station for passenger rail service. |
| Glendale | Reach 7G | - Previously used siding is on a narrow strip of land not easily accessible to the road and without room for loading operations.<br>- Area available for use is upstream from Reach 7G impoundment (active removal area), requiring local truck traffic between removal area and rail loading area.<br>- Rising Pond is within a couple miles of this location and more suitable to use. |

**Table 5-3**
**Summary of Estimated Truck Trips from Removal or Staging Areas to Appropriate Disposal Facility(ies) by RU - Scenario 1**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Reach | Estimated Round-Trip Truck Trips | | | | Estimated Truck Miles (Round-Trip) | | | |
|---|---|---|---|---|---|---|---|---|
| | On-Site | | Off-Site | | On-Site | | Off-Site | |
| | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport |
| 5A | 12,210 | N/A | 610 | N/A | 175,200 | N/A | 10,000 | N/A |
| 5B | 1,800 | N/A | 140 | N/A | 16,300 | N/A | 4,400 | N/A |
| 5C | 1,780 | N/A | 1,860 | N/A | 13,200 | N/A | 48,700 | N/A |
| 6 | 1 | N/A | 400 | N/A | 1 | N/A | 10,300 | N/A |
| 7B | 0 | N/A | 0 | N/A | 0 | N/A | 0 | N/A |
| 7C | 0 | N/A | 0 | N/A | 0 | N/A | 0 | N/A |
| 7E | 420 | N/A | 0 | N/A | 7,900 | N/A | 0 | N/A |
| 7G | 0 | N/A | 1,040 | N/A | 0 | N/A | 14,100 | N/A |
| 8 | 620 | N/A | 3,100 | N/A | 17,000 | N/A | 65,100 | N/A |
| **Total** | **16,800** | **N/A** | **7,200** | **N/A** | **229,600** | **N/A** | **152,600** | **N/A** |

**Note:**
N/A = not applicable

**Table 5-4**
**Summary of Estimated Truck Trips from Removal or Staging Areas to Appropriate Disposal Facility(ies) by RU - Scenario 2**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Reach | Estimated Round-Trip Truck Trips | | | | Estimated Truck Miles (Round-Trip) | | | |
|---|---|---|---|---|---|---|---|---|
| | On-Site | | Off-Site | | On-Site | | Off-Site | |
| | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport |
| 5A | 12,210 | N/A | N/A | 440 | 175,200 | N/A | N/A | 2,330 |
| 5B | 1,800 | N/A | N/A | 140 | 16,300 | N/A | N/A | 1,540 |
| 5C | 1,780 | N/A | N/A | 1,860 | 13,200 | N/A | N/A | 7,900 |
| 6 | 1 | N/A | N/A | 400 | 1 | N/A | N/A | 1,500 |
| 7B | 0 | N/A | N/A | 0 | 0 | N/A | N/A | 0 |
| 7C | 0 | N/A | N/A | 0 | 0 | N/A | N/A | 0 |
| 7E | 420 | N/A | N/A | 0 | 7,900 | N/A | N/A | 0 |
| 7G | 0 | N/A | N/A | 290 | 0 | N/A | N/A | 2,100 |
| 8 | 620 | N/A | N/A | 0 | 17,000 | N/A | N/A | 0 |
| **Total** | **16,800** | **N/A** | **N/A** | **3,100** | **229,600** | **N/A** | **N/A** | **15,400** |

**Note:**
N/A = not applicable

**Table 5-5**
**Summary of Estimated Truck Trips from Removal or Staging Areas to Appropriate Disposal Facility(ies) by RU - Scenario 3**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Reach | Estimated Round-Trip Truck Trips | | | | Estimated Truck Miles (Round-Trip) | | | |
|---|---|---|---|---|---|---|---|---|
| | On-Site | | Off-Site | | On-Site | | Off-Site | |
| | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport |
| 5A | 12,210 | N/A | 610 | 0 | 175,200 | N/A | 9,620 | 0 |
| 5B | 1,800 | N/A | 140 | 0 | 16,300 | N/A | 4,390 | 0 |
| 5C | 1,780 | N/A | 0 | 1,860 | 13,200 | N/A | 0 | 7,900 |
| 6 | 1 | N/A | 0 | 400 | 1 | N/A | 0 | 1,500 |
| 7B | 0 | N/A | 0 | 0 | 0 | N/A | 0 | 0 |
| 7C | 0 | N/A | 0 | 0 | 0 | N/A | 0 | 0 |
| 7E | 420 | N/A | 0 | 0 | 7,900 | N/A | 0 | 0 |
| 7G | 0 | N/A | 0 | 290 | 0 | N/A | 0 | 2,100 |
| 8 | 620 | N/A | 0 | 0 | 17,000 | N/A | 0 | 0 |
| **Total** | **16,800** | **N/A** | **800** | **2,600** | **229,600** | **N/A** | **14,000** | **11,500** |

**Note:**
N/A = not applicable

**Table 5-6**
**Summary of Estimated Truck Trips from Removal or Staging Areas to Appropriate Disposal Facility(ies) by RU - Scenario 4**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Reach | Estimated Round-Trip Truck Trips | | | | Estimated Truck Miles (Round-Trip) | | | |
|---|---|---|---|---|---|---|---|---|
| | On-Site | | Off-Site | | On-Site | | Off-Site | |
| | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport | Truck Transport | Rail/Truck Transport |
| 5A | 0 | 17,050 | N/A | 440 | 0 | 88,180 | N/A | 2,330 |
| 5B | 1,800 | 0 | N/A | 140 | 16,300 | 0 | N/A | 1,540 |
| 5C | 1,780 | 0 | N/A | 1,860 | 13,200 | 0 | N/A | 7,900 |
| 6 | 1 | 0 | N/A | 400 | 1 | 0 | N/A | 1,500 |
| 7B | 0 | 0 | N/A | 0 | 0 | 0 | N/A | 0 |
| 7C | 0 | 0 | N/A | 0 | 0 | 0 | N/A | 0 |
| 7E | 420 | 0 | N/A | 0 | 7,900 | 0 | N/A | 0 |
| 7G | 0 | 0 | N/A | 290 | 0 | 0 | N/A | 2,100 |
| 8 | 0 | 470 | N/A | 0 | 0 | 1,800 | N/A | 0 |
| **Total** | **4,000** | **17,500** | **N/A** | **3,100** | **37,400** | **90,000** | **N/A** | **15,400** |

**Note:**
N/A = not applicable

**Table 8-1**
**Off-Site Disposition – Preliminary Facility List**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

ARCADIS

| Number | Facility Information | | | | | |
|---|---|---|---|---|---|---|
| | **Operating Company** | **Facility Name** | **Facility Type** | **Facility Can Accept Material Transported by Rail** | **Facility ID** | **Facility Address** |
| 1 | Clean Harbors | Lone Mountain Landfill | Subtitle C | Yes | OKD065438376 | 40355 South County Road 236, Waynoka, OK 73860 |
| 2 | Clean Harbors | Grassy Mountain Landfill | Subtitle C | Yes | UTD991301748 | 7 miles north of Knolls, exit 41 off I-80, Grassy Mountain, UT 84029 |
| 3 | Heritage Environmental Services, Inc. | Roachdale Facility | Subtitle C | Yes | IND980503890 | 4370 West County Road 1275 North, Roachdale, IN 46172 |
| 4 | Republic Environmental Services | Wayne Disposal, Inc. Site #2 Landfill | Subtitle C | Yes | MID048090633 | 49350 North I-94 Service Drive Belleville, MI 48111 |
| 5 | Waste Management, Inc. | Emelle Landfill | Subtitle C | Yes | ALD000622464 | 36964 AL Hwy 17, Emelle, AL 35459 |
| 6 | Waste Management, Inc. | High Acres Landfill | Subtitle D | Yes | N/A | 425 Perinton Parkway Fairport, NY 14450 |
| 7 | Casella Waste Systems, Inc. | Hyland Landfill | Subtitle D | No | N/A | 6653 Herdman Road, Angelica, NY 14709 |
| 8 | Casella Waste Systems, Inc. | Ontario County Landfill | Subtitle D | No | N/A | 1879 Routes 5 & 20 Stanley, NY 14561 |
| 9 | Casella Waste Systems, Inc. | Clinton County Landfill | Subtitle D | No | N/A | 286 Sand Rd. Morrisonville, NY 12962 |
| 10 | Casella Waste Systems, Inc. | McKean County Landfill | Subtitle D | Yes | N/A | 19 Ness Lane Kane, PA 16735 |

**Notes:**

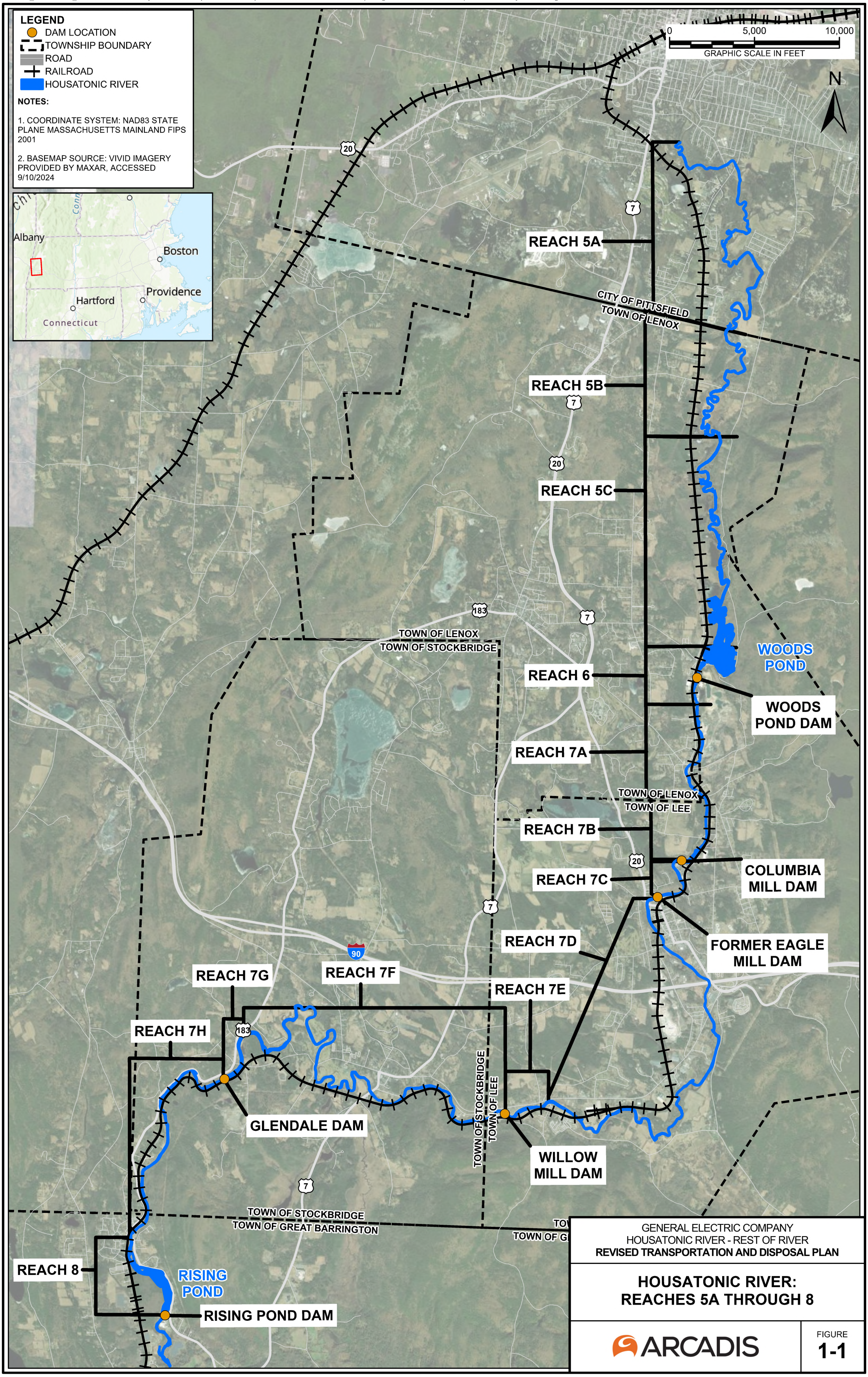
Retained after preliminary screening (Subtitle C)

Retained after preliminary screening (Subtitle D)

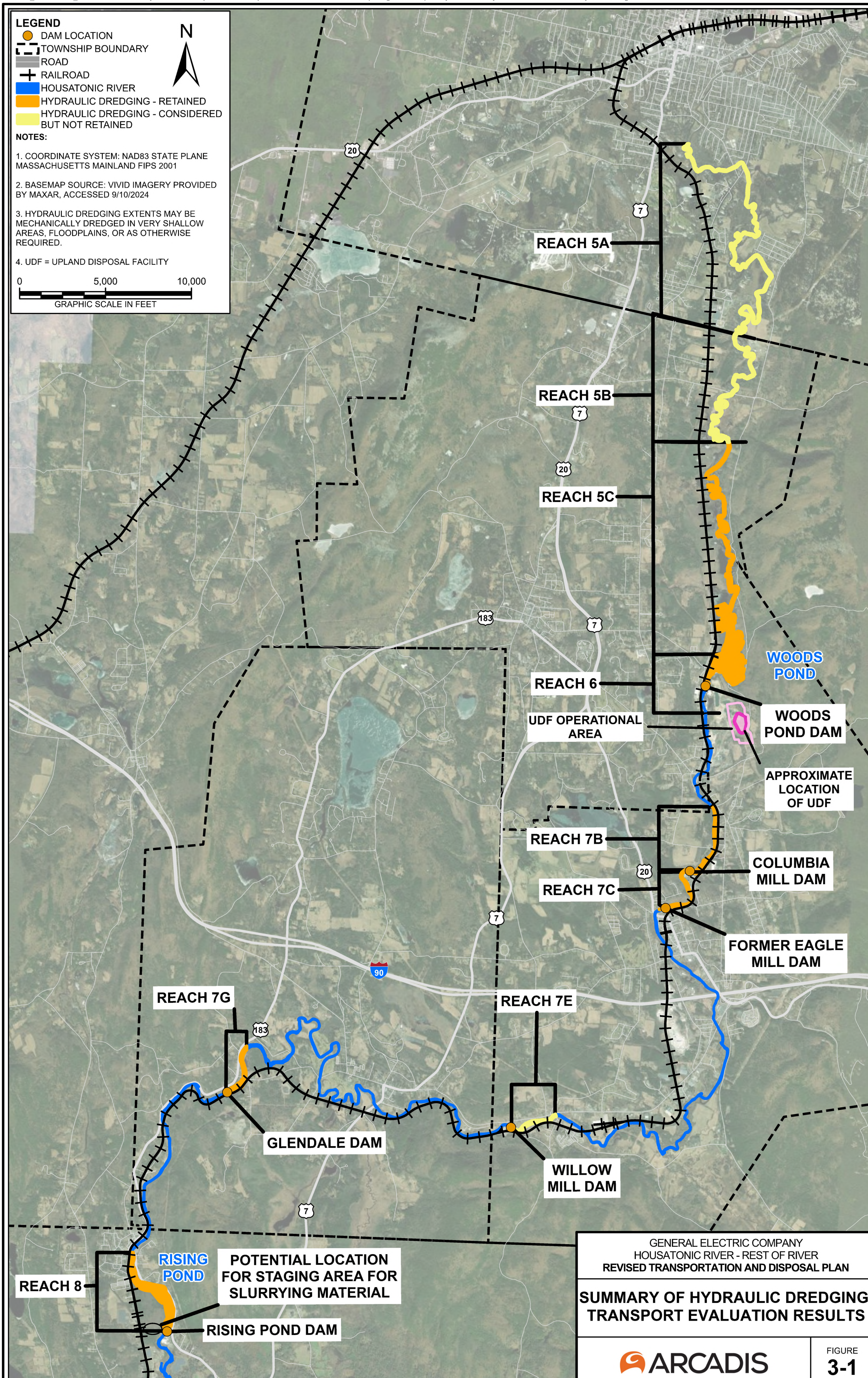
N/A = not available or not applicable

# Figures

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig1-1 Housatonic River Map Last Saved By: ksinsabaugh 9/10/2024



Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig3-1 Anticiapted Hydraulic Conveyance Routes Last Saved By: ksinsabaugh 9/10/2024

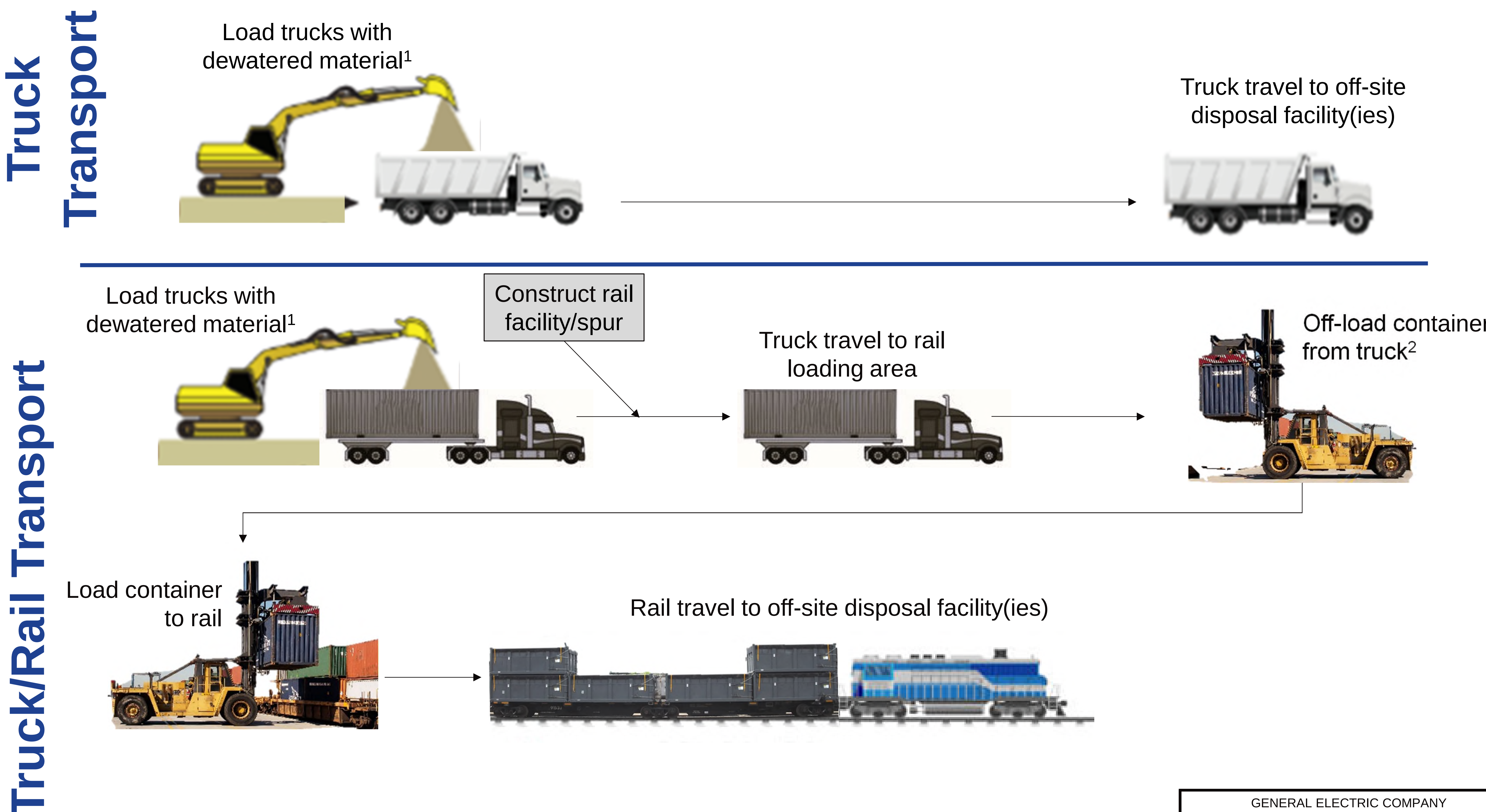



GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**SUMMARY OF HYDRAULIC DREDGING/ TRANSPORT EVALUATION RESULTS**

ARCADIS

FIGURE
**3-1**




GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER – REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

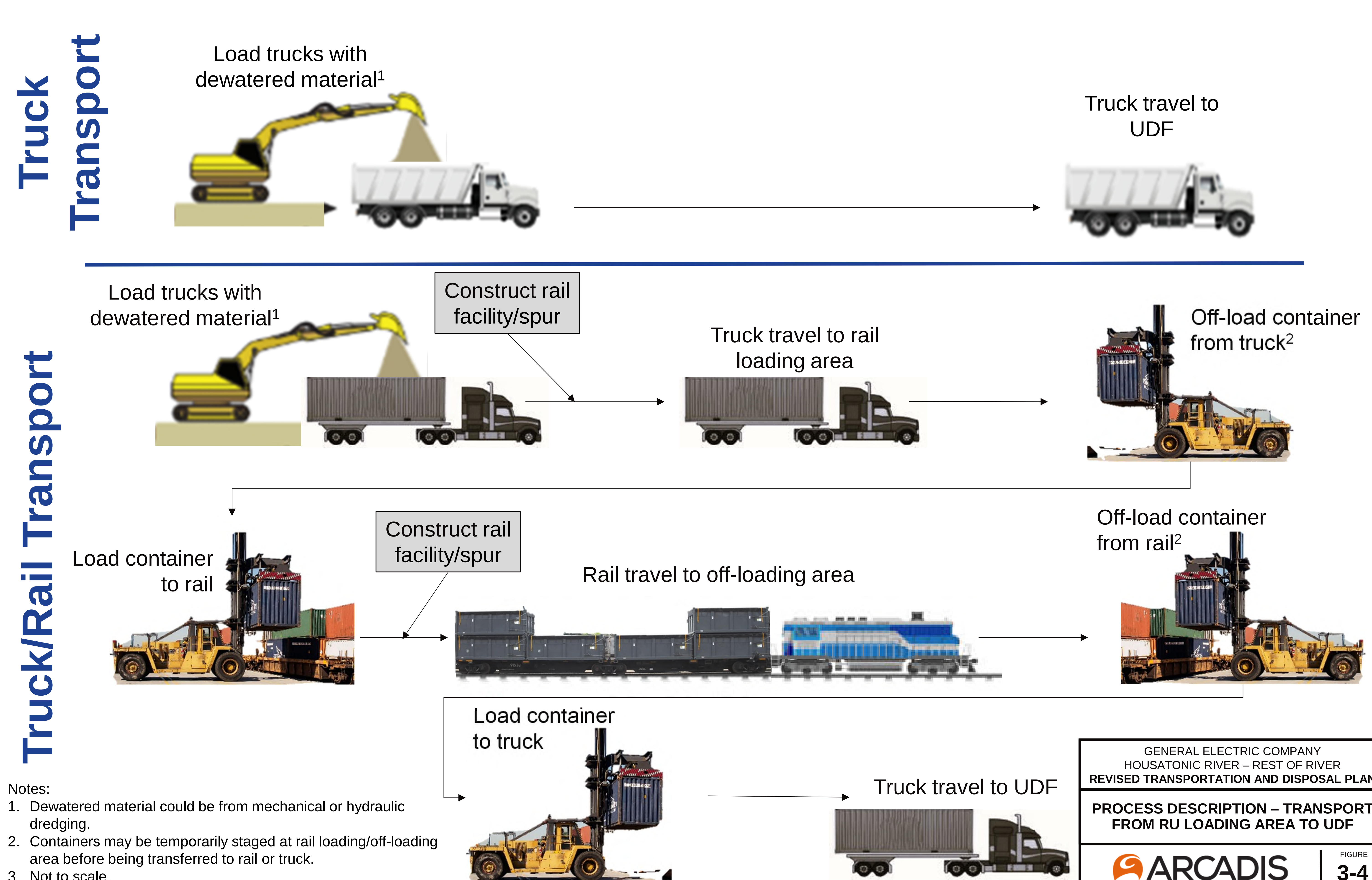
**PROCESS DESCRIPTION – TRANSPORT FROM RU LOADING AREA TO OFF-SITE DISPOSAL FACILITY(IES)**

ARCADIS

FIGURE
**3-3**

Notes:
1. Dewatered material could be from mechanical or hydraulic dredging.
2. Containers may be temporarily staged at rail loading area before being transferred to rail.
3. Not to scale.

9/17/2024 9:53:08 AM




Notes:
1. Dewatered material could be from mechanical or hydraulic dredging.
2. Containers may be temporarily staged at rail loading/off-loading area before being transferred to rail or truck.
3. Not to scale.

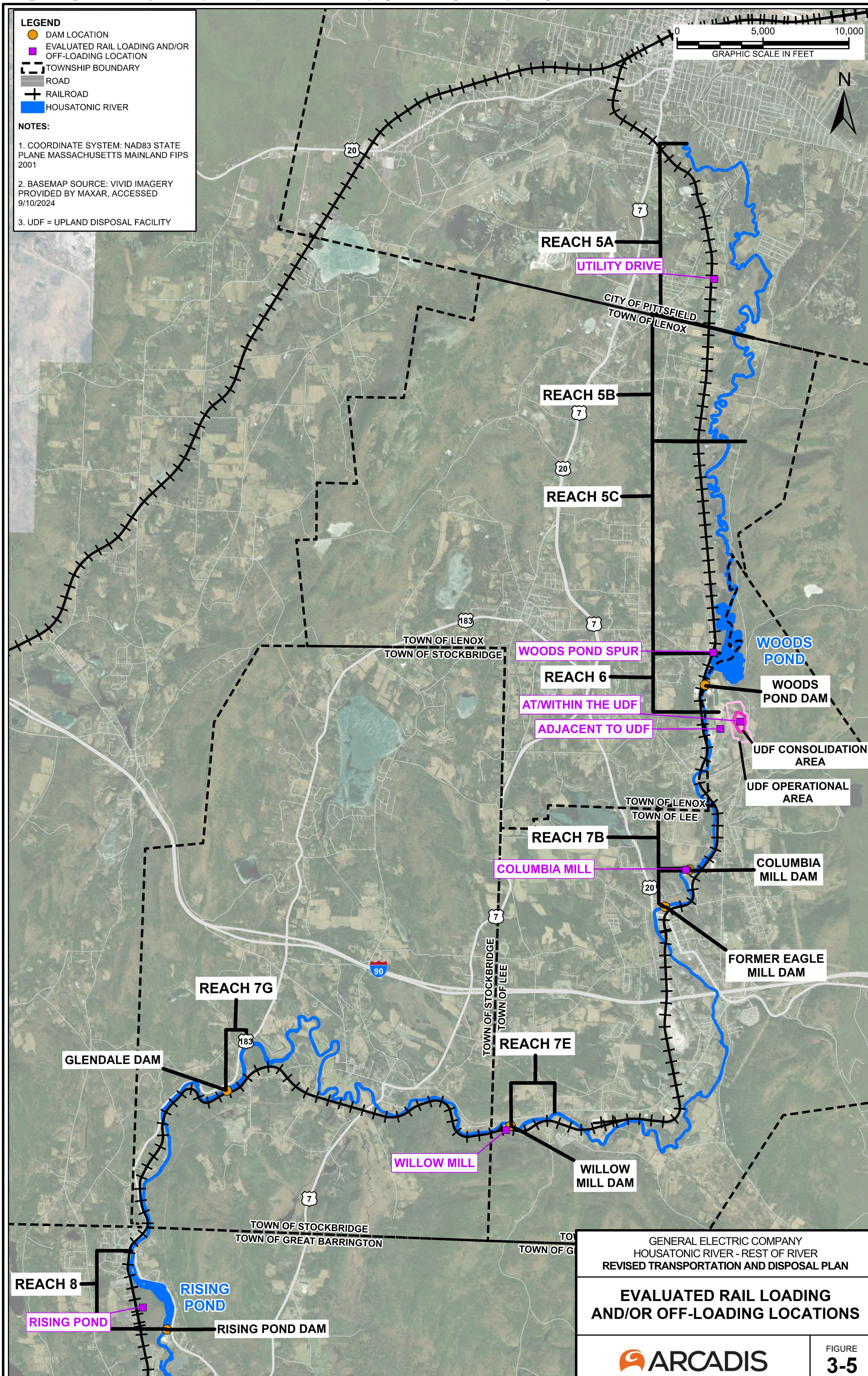
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER – REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**PROCESS DESCRIPTION – TRANSPORT FROM RU LOADING AREA TO UDF**

ARCADIS

FIGURE
**3-4**

9/17/2024 9:53:10 AM



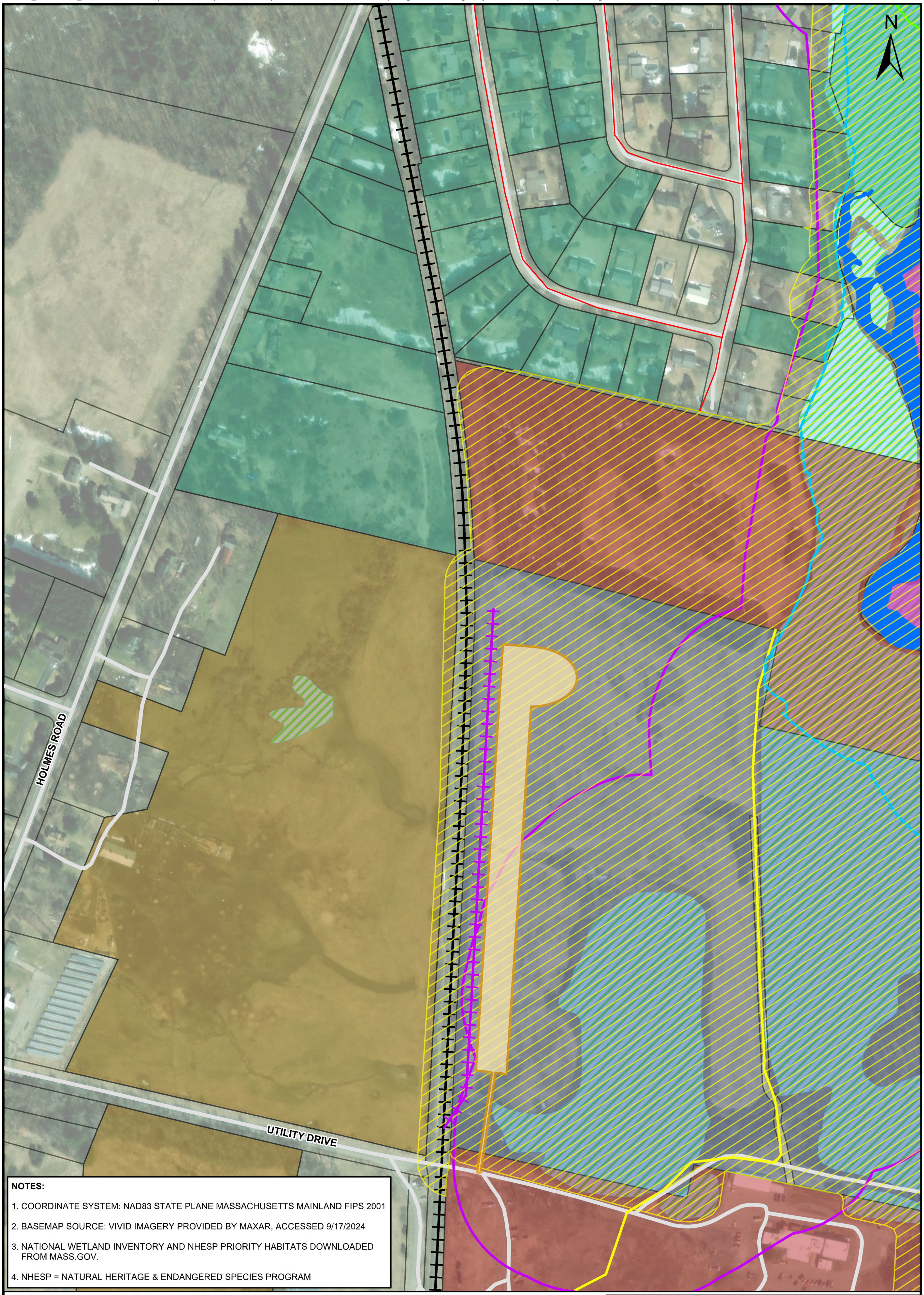

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**EVALUATED RAIL LOADING AND/OR OFF-LOADING LOCATIONS**

ARCADIS

FIGURE
**3-5**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig3-6 Rail Loading Utility Drive Last Saved By: ksinsabaugh 9/17/2024




**NOTES:**

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV.
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

**LEGEND**

- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- PRELIMINARY ACCESS ROAD TO PUBLIC ROAD
- HOUSATONIC RIVER
- GE PROPERTY
- PROPERTY BOUNDARY
- ROAD USE RESTRICTED
- POTENTIAL RAIL SPUR/SIDING
- POTENTIAL RAIL LOADING OPERATIONAL AREA
- NATIONAL WETLAND INVENTORY
- NHESP PRIORITY HABITAT OF RARE SPECIES
- CORE AREA 1
- CORE AREA 2
- CORE AREA 3

PARCELS WITHIN 500 FEET OF RAIL

- RESIDENTIAL
- AGRICULTURAL/ HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL
- COMMONWEALTH OF MASSACHUSETTS

0 250 500
GRAPHIC SCALE IN FEET

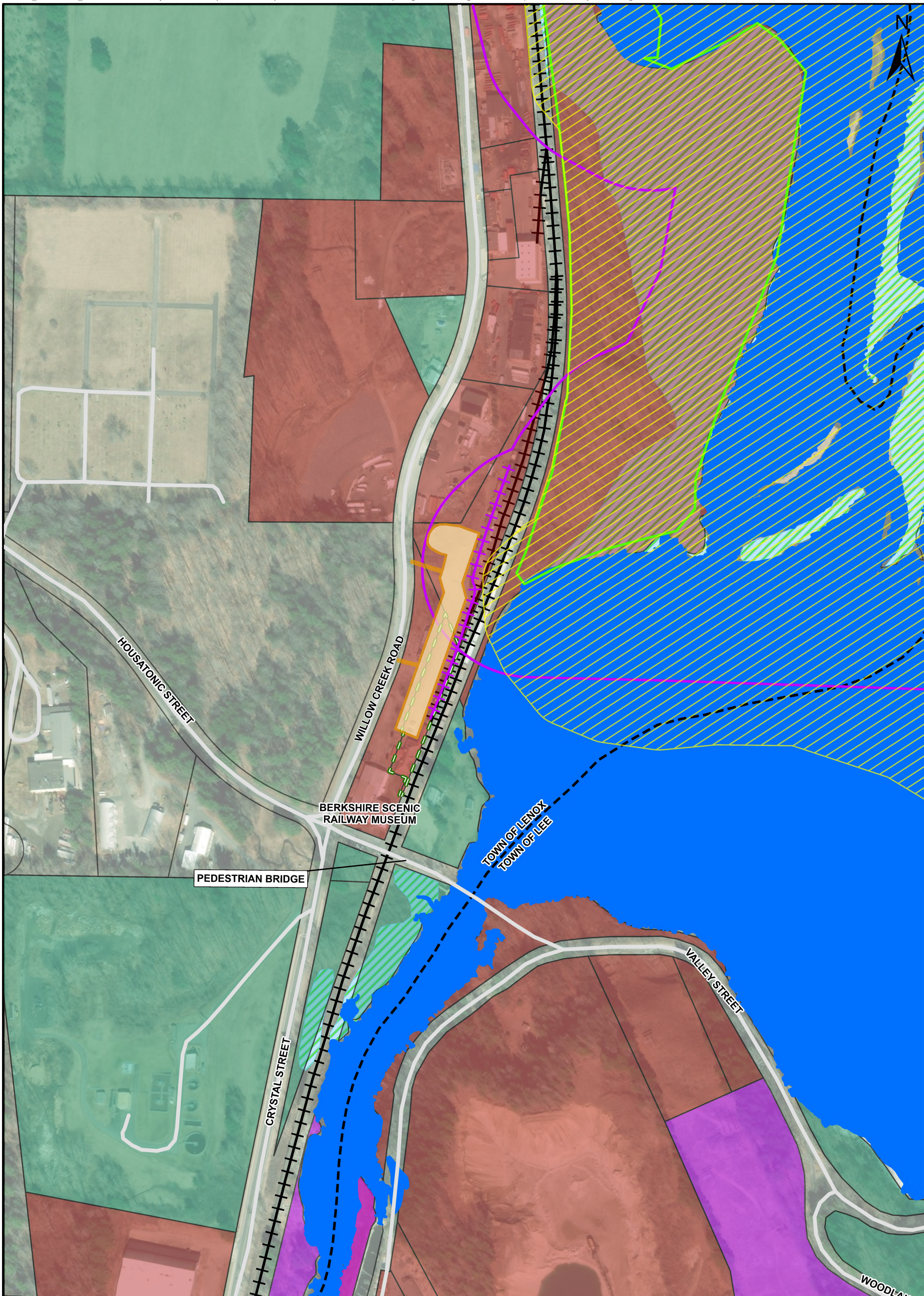
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**EVALUATED RAIL LOADING LOCATION - UTILITY DRIVE**

ARCADIS

FIGURE
**3-6**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig3-7 Rail Loading Woods Pond Spur Last Saved By: ksinsabaugh 10/14/2024




**LEGEND**

- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- HOUSATONIC RIVER
- GE PROPERTY
- PROPERTY BOUNDARY
- POTENTIAL RAIL SPUR/SIDING
- POTENTAIL RAIL LOADING/OFF-LOADING OPERATIONAL AREA
- NATIONAL WETLAND INVENTORY
- NHESP PRIORITY HABITAT OF RARE SPECIES
- CORE AREA 1
- CORE AREA 2
- AREA LISTED ON THE NATIONAL REGISTER OF HISTORIC PLACES

PARCELS WITHIN 500 FEET OF RAIL

- RESIDENTIAL
- INDUSTRIAL

**NOTES:**

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 10/14/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV.
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

0 250 500

GRAPHIC SCALE IN FEET

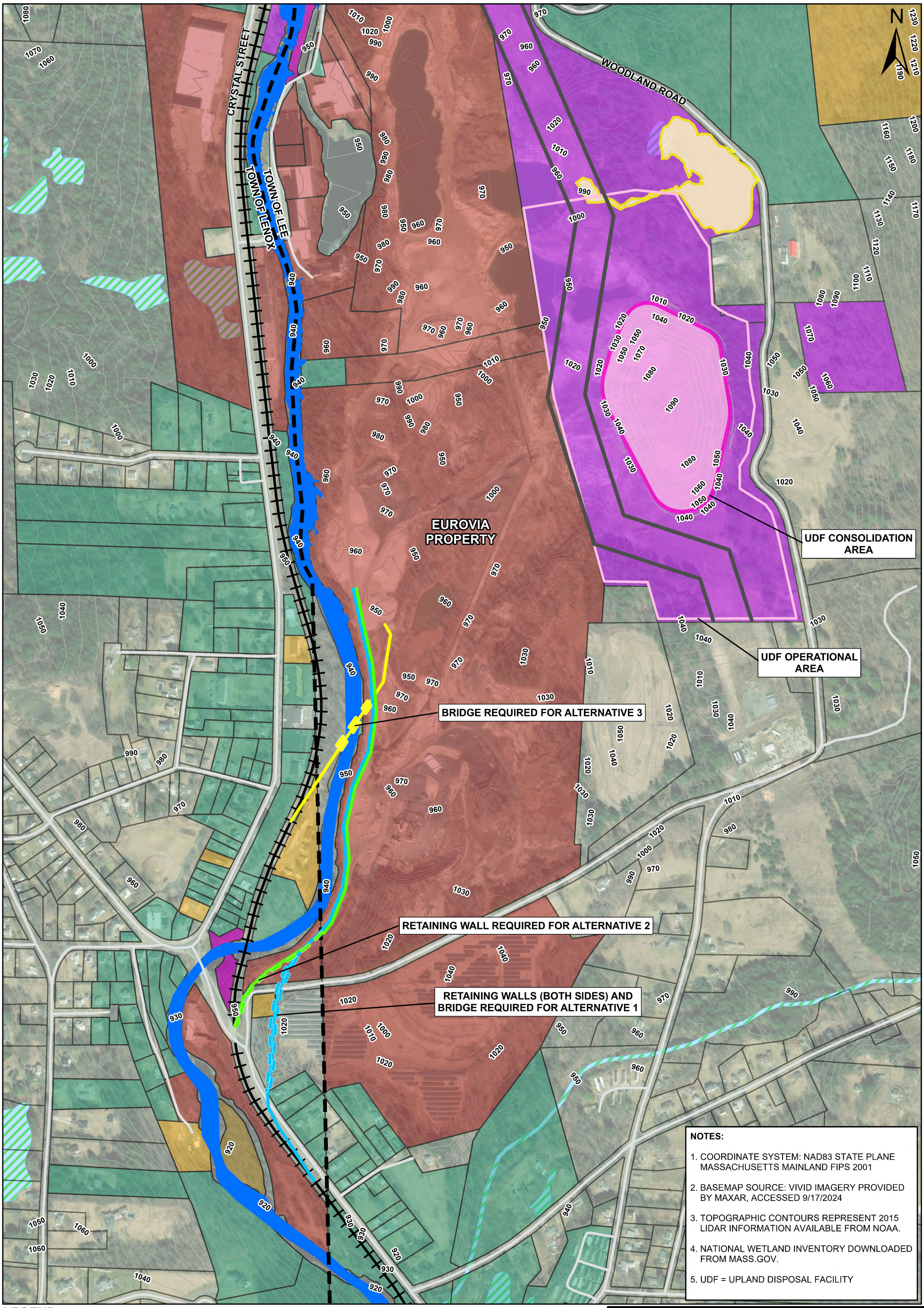
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**EVALUATED RAIL LOADING AND/OR OFF-LOADING LOCATION - WOODS POND SPUR**

ARCADIS

FIGURE
**3-7**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig3-8 Rail Loading UDF Area Last Saved By: ksinsabaugh 9/17/2024




**LEGEND**

- TOPOGRAPHIC CONTOURS (10-FOOT)
- HOUSATONIC RIVER
- RAILROAD
- TOWNSHIP BOUNDARY
- ALTERNATIVE 1 ALIGNMENT
- ALTERNATIVE 2 ALIGNMENT
- ALTERNATIVE 3 ALIGNMENT
- SURVEYED WETLAND
- EASEMENT
- GE PROPERTY
- PROPERTY BOUNDARY
- NATIONAL WETLAND INVENTORY

PARCELS WITHIN 500 FEET OF RIVER, UDF, OR RAIL

- RESIDENTIAL
- AGRICULTURAL/HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL

0 500 1,000
GRAPHIC SCALE IN FEET

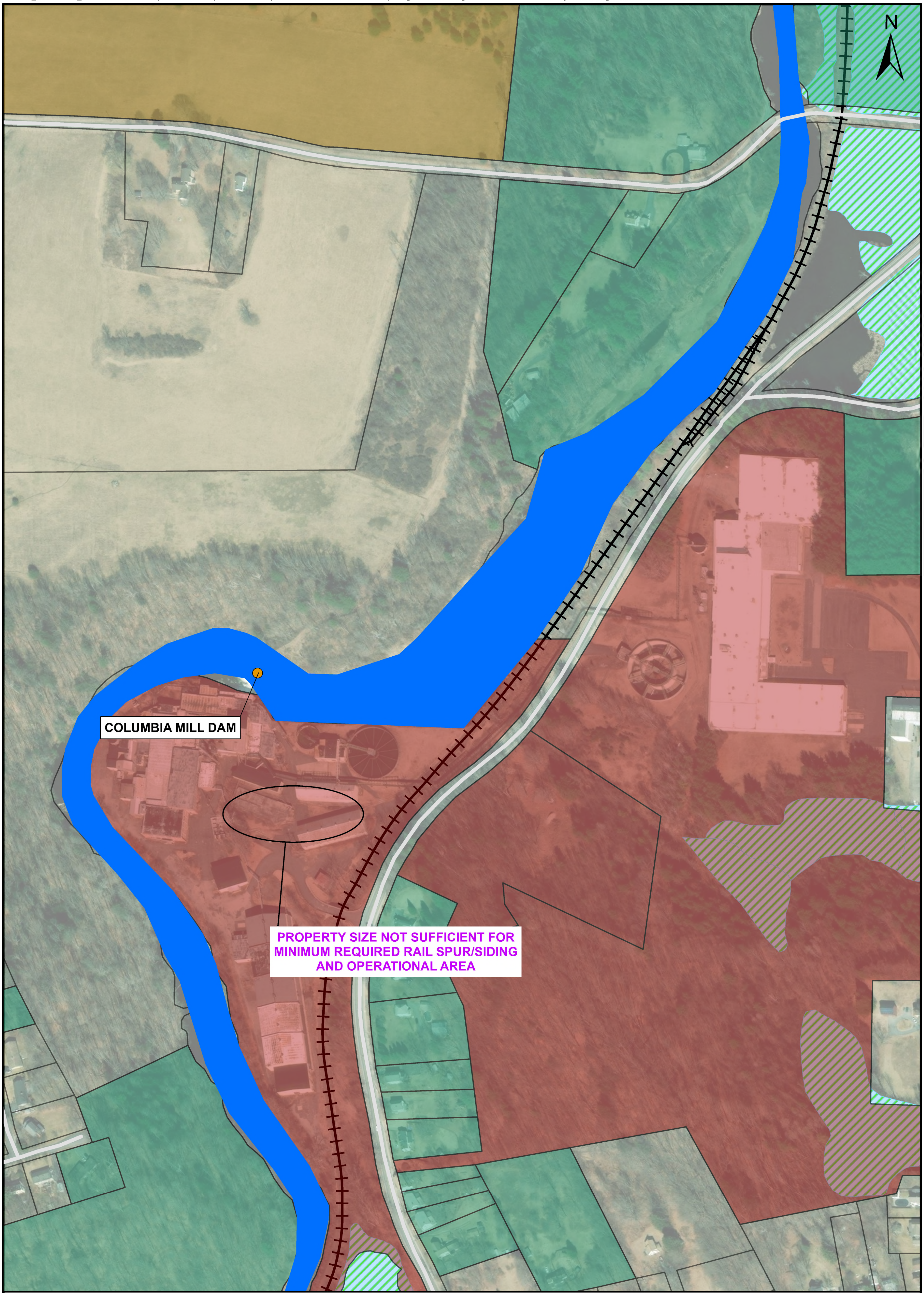
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**EVALUATED RAIL LOADING AND/OR OFF-LOADING LOCATIONS - AT/WITHIN OR ADJACENT TO THE UDF**

ARCADIS

FIGURE
**3-8**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig3-9 Rail Loading Columbia Mill   Last Saved By: ksinsabaugh  9/17/2024




**LEGEND**

- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- HOUSATONIC RIVER
- PROPERTY BOUNDARY
- NATIONAL WETLAND INVENTORY

PARCELS WITHIN 500 FEET OF RAIL

- RESIDENTIAL
- AGRICULTURAL/HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL

**NOTES:**

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY DOWNLOADED FROM MASS.GOV.

0 250 500

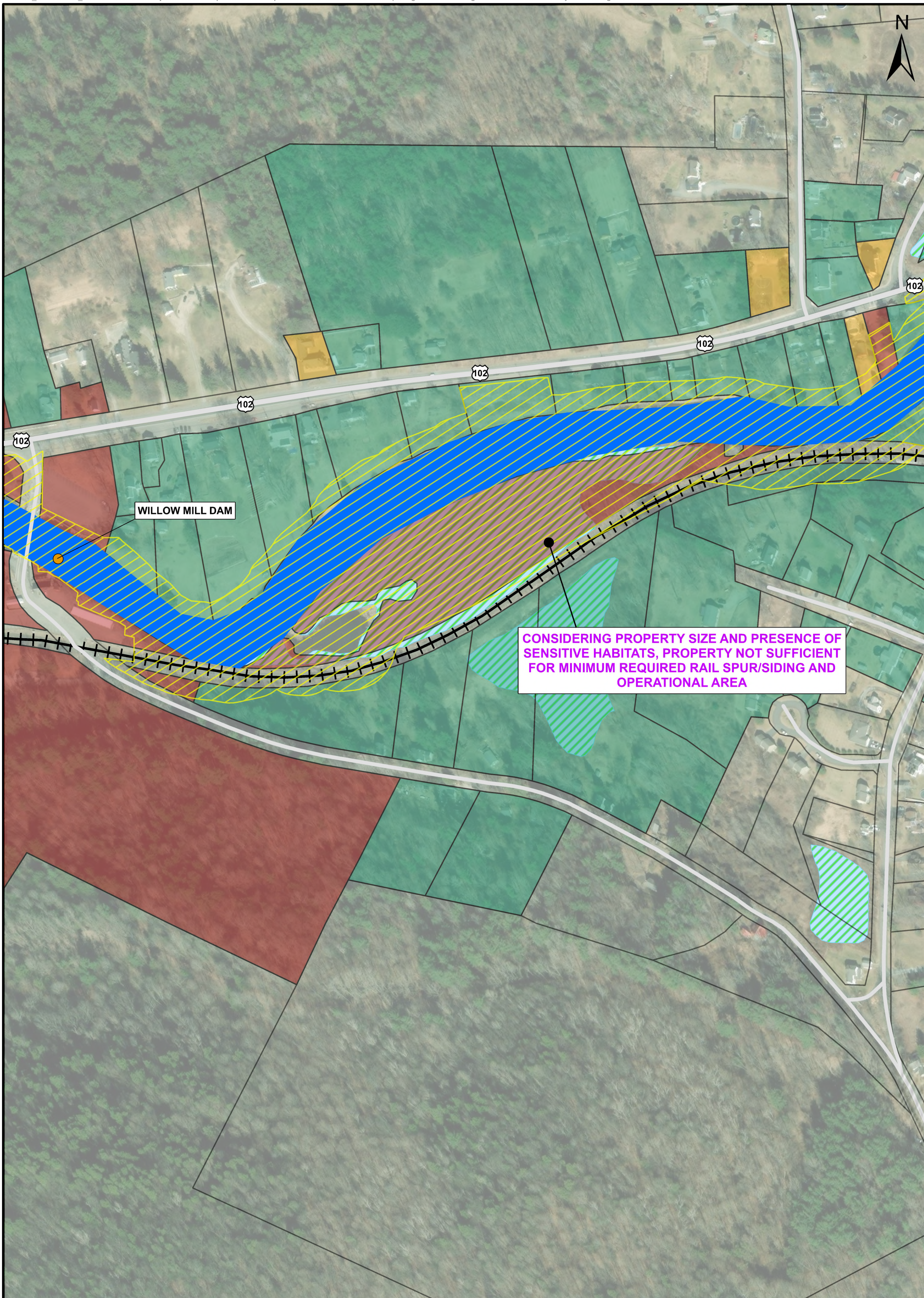
GRAPHIC SCALE IN FEET

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**EVALUATED RAIL LOADING LOCATION - COLUMBIA MILL**

ARCADIS

FIGURE
**3-9**




**LEGEND**

TOWNSHIP BOUNDARY
ROAD
RAILROAD
HOUSATONIC RIVER

PROPERTY BOUNDARY
NATIONAL WETLAND INVENTORY
NHESP PRIORITY HABITAT OF RARE SPECIES

PARCELS WITHIN 500 FEET OF RAIL
RESIDENTIAL
COMMERCIAL
INDUSTRIAL

**NOTES:**

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV.
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

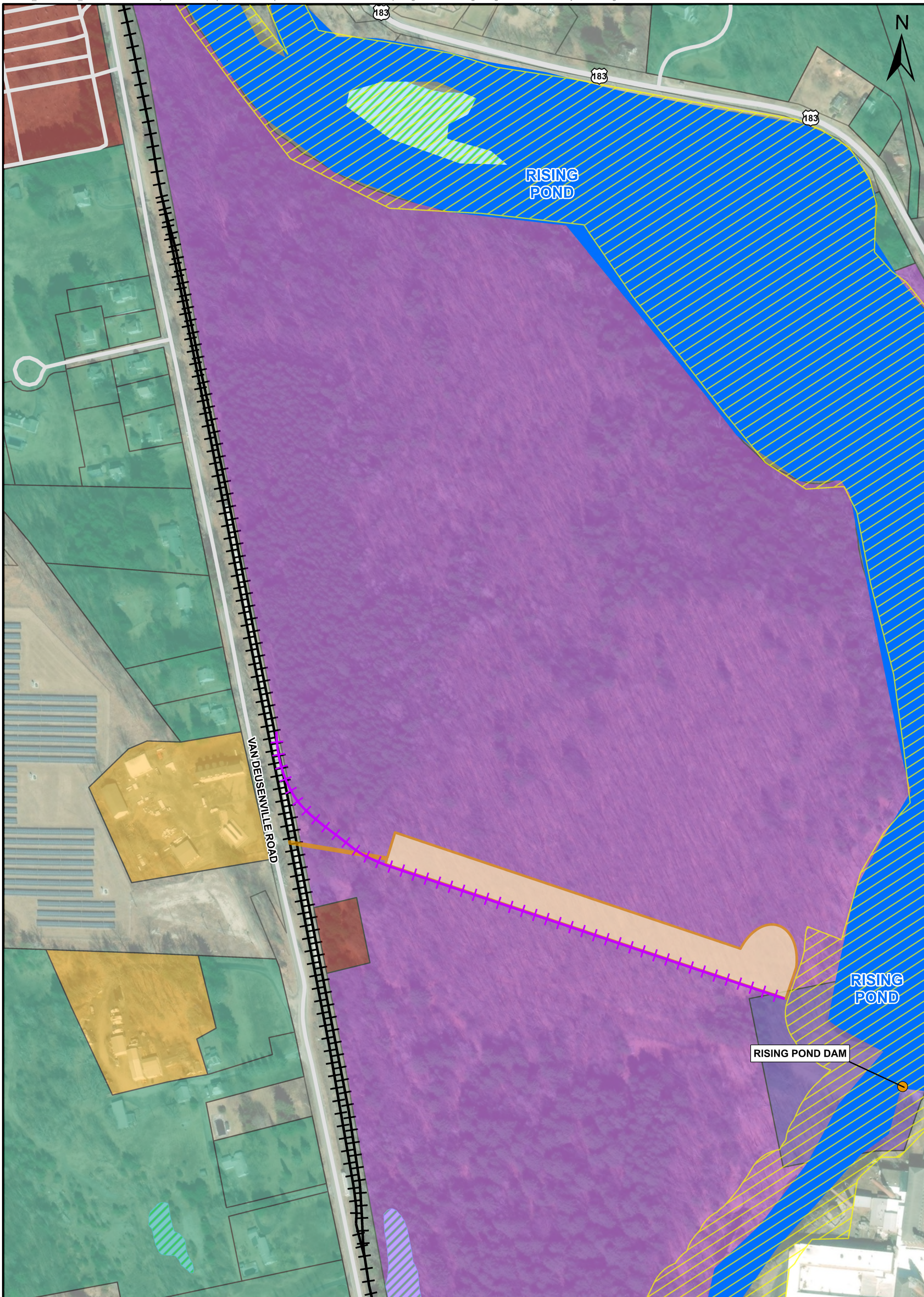
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**EVALUATED RAIL LOADING LOCATION - WILLOW MILL**

ARCADIS

FIGURE
**3-10**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig3-11 Rail Loading Rising Pond Last Saved By: ksinsabaugh 9/17/2024




**LEGEND**

TOWNSHIP BOUNDARY
ROAD
RAILROAD
HOUSATONIC RIVER
GE PROPERTY
PROPERTY BOUNDARY
POTENTIAL RAIL SPUR/SIDING
POTENTIAL RAIL LOADING OPERATIONAL AREA
NATIONAL WETLAND INVENTORY
NHESP PRIORITY HABITAT OF RARE SPECIES

PARCELS WITHIN 500 FEET OF RAIL
RESIDENTIAL
COMMERCIAL
INDUSTRIAL

**NOTES:**

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

0 250 500
GRAPHIC SCALE IN FEET

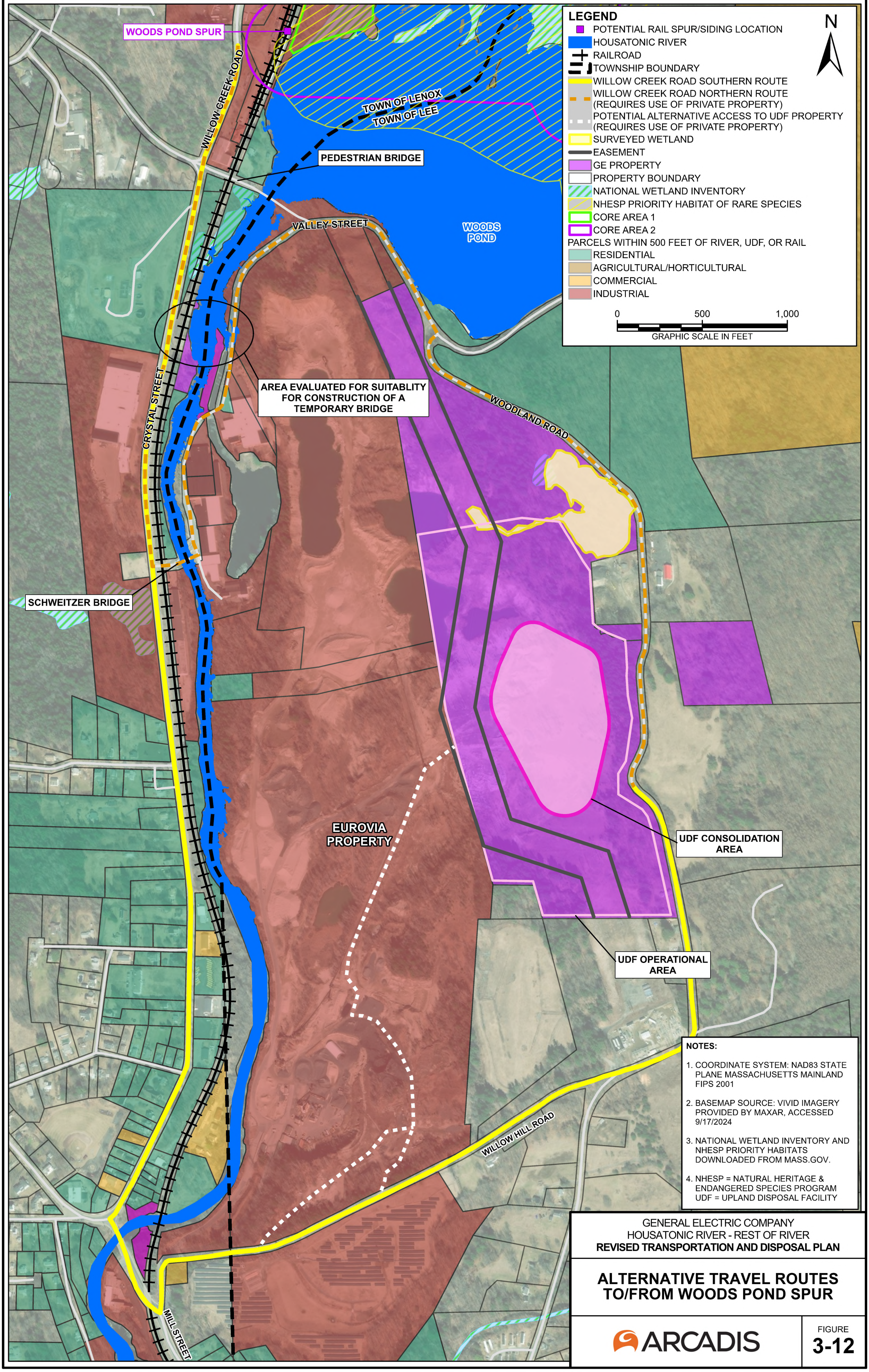
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**EVALUATED RAIL LOADING LOCATION - RISING POND**

ARCADIS

FIGURE
**3-11**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig3-12 Alt Woods Pond UDF Travel Route Last Saved By: ksinsabaugh 9/17/2024




NOTES:

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV.
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM
UDF = UPLAND DISPOSAL FACILITY

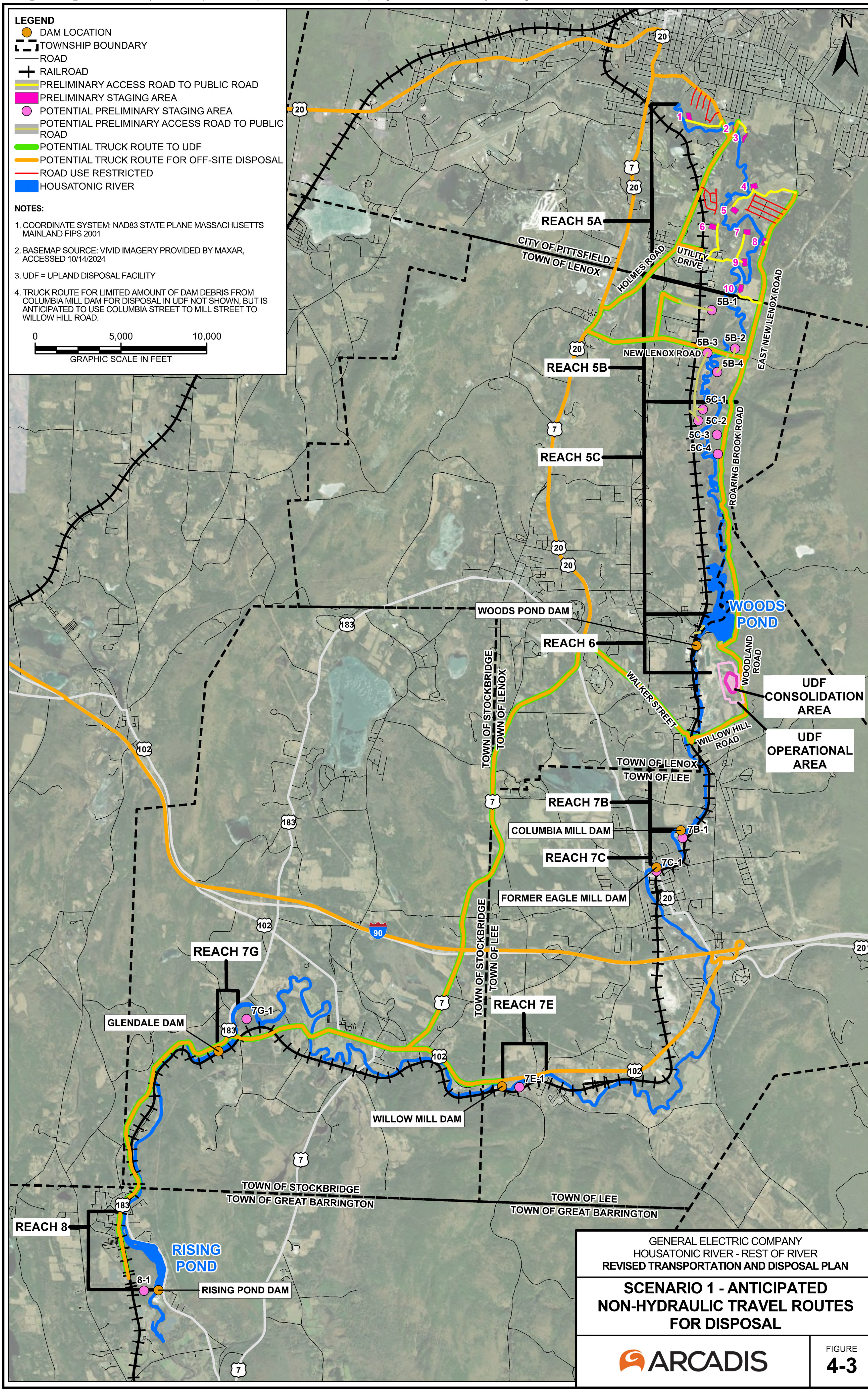
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**ALTERNATIVE TRAVEL ROUTES TO/FROM WOODS POND SPUR**

ARCADIS

FIGURE
**3-12**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig4-3 Scenario 1 Last Saved By: ksinsabaugh 10/14/2024



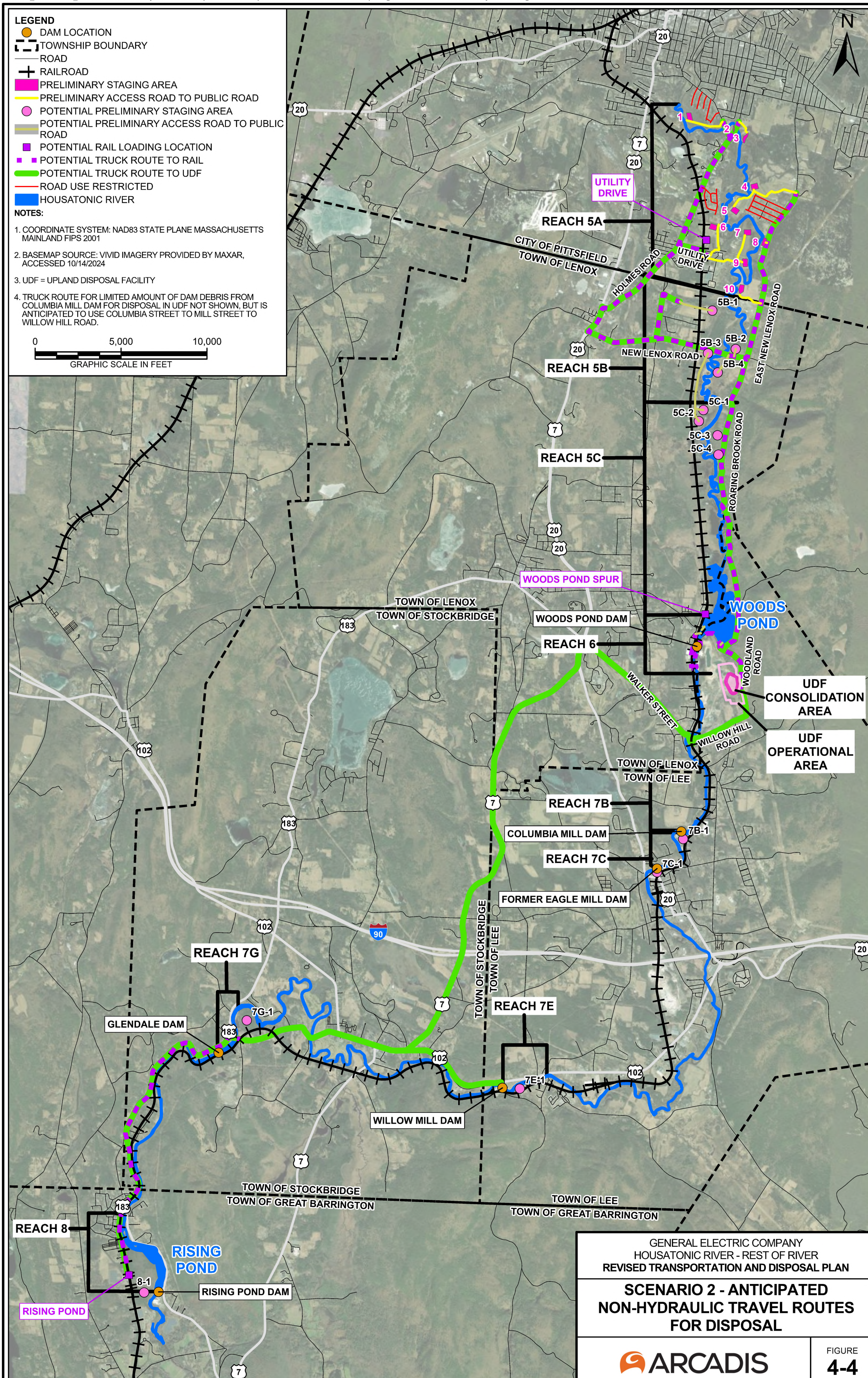

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**SCENARIO 1 - ANTICIPATED NON-HYDRAULIC TRAVEL ROUTES FOR DISPOSAL**

ARCADIS

FIGURE
**4-3**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig4-4 Scenario 2 Last Saved By: ksinsabaugh 10/14/2024



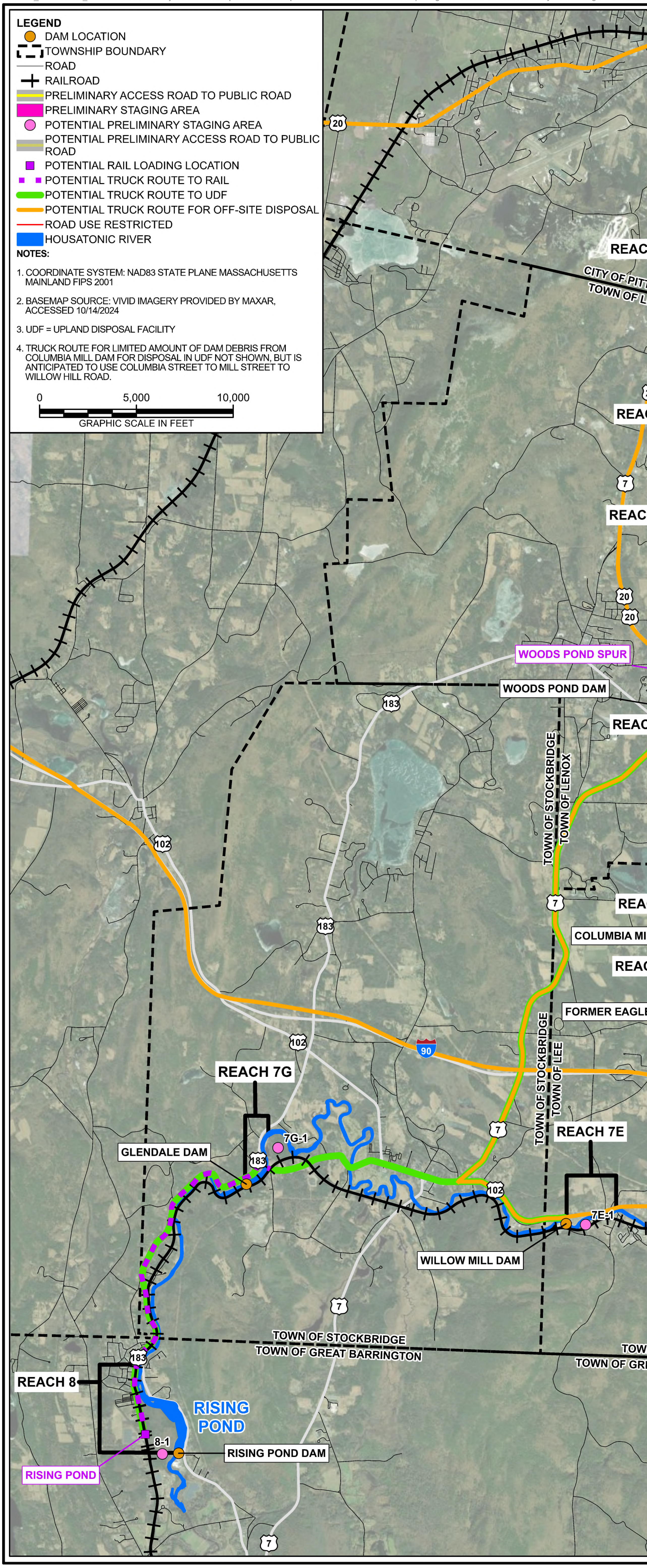

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**SCENARIO 2 - ANTICIPATED NON-HYDRAULIC TRAVEL ROUTES FOR DISPOSAL**

ARCADIS

FIGURE
**4-4**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig4-5 Scenario 3 Last Saved By: ksinsabaugh 10/14/2024



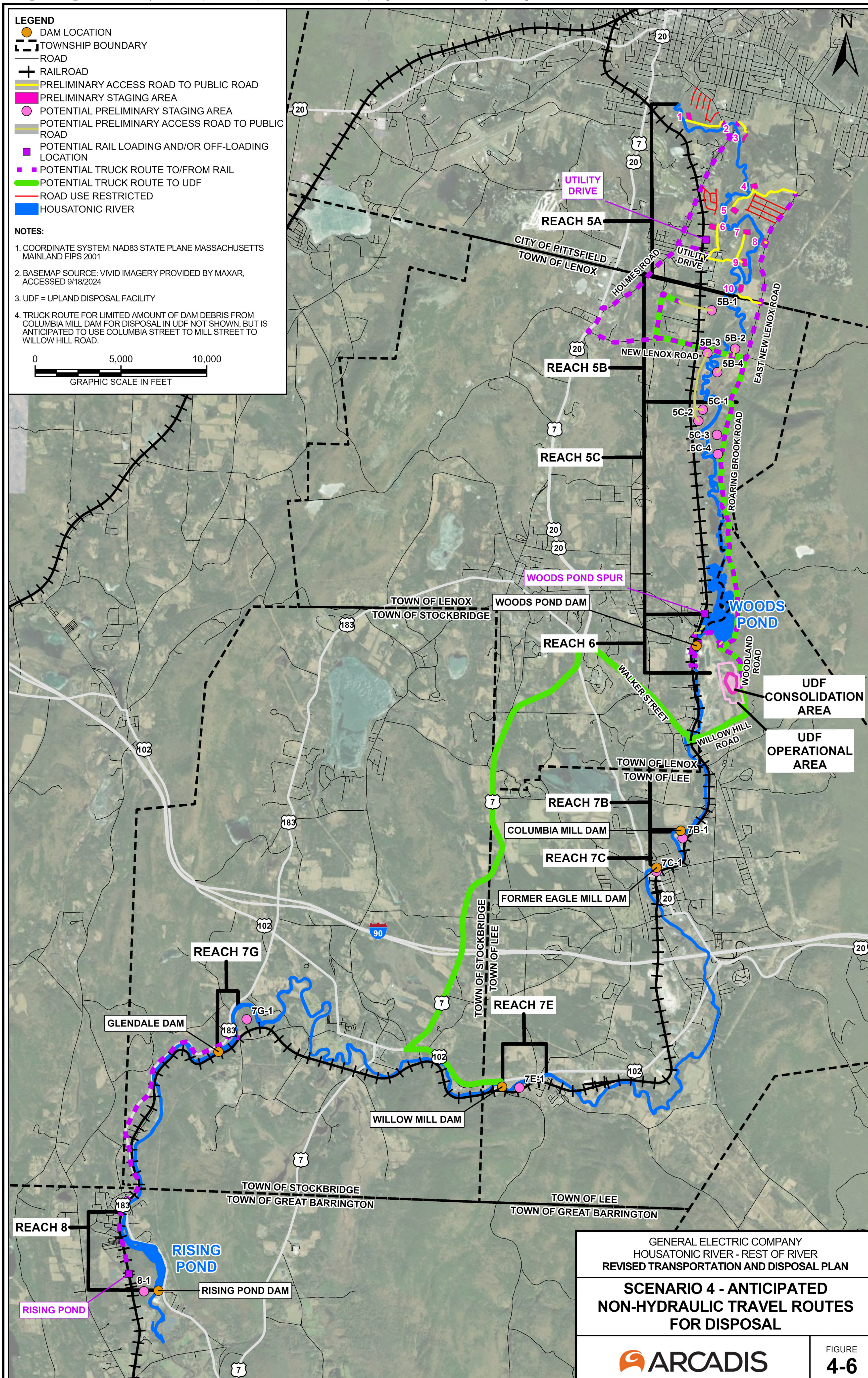

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**SCENARIO 3 - ANTICIPATED NON-HYDRAULIC TRAVEL ROUTES FOR DISPOSAL**

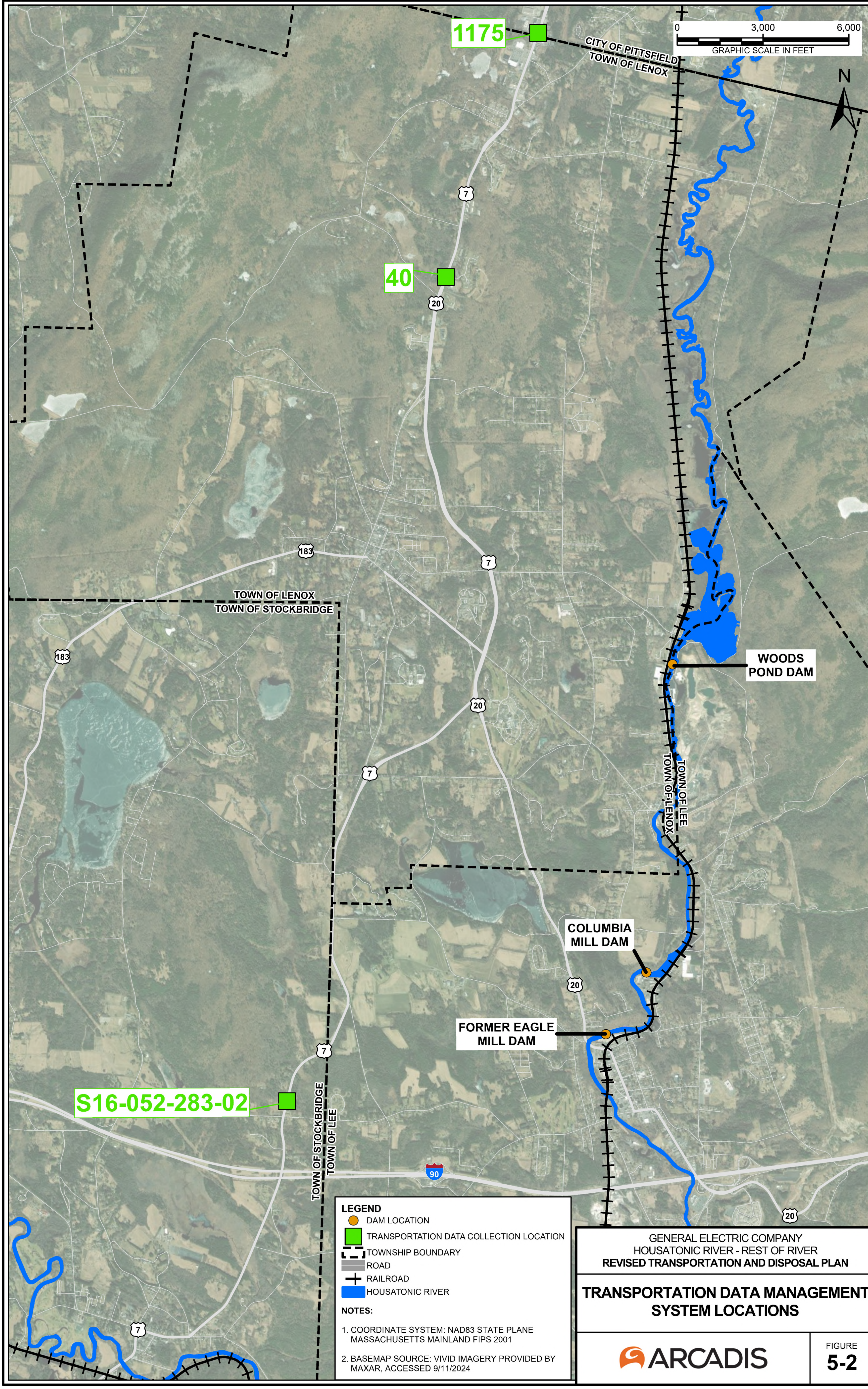
ARCADIS

FIGURE
**4-5**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig4-6 Scenario 4 Last Saved By: ksinsabaugh 9/18/2024



Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig5-2 Transportation Data Mgmt System Last Saved By: ksinsabaugh 9/11/2024



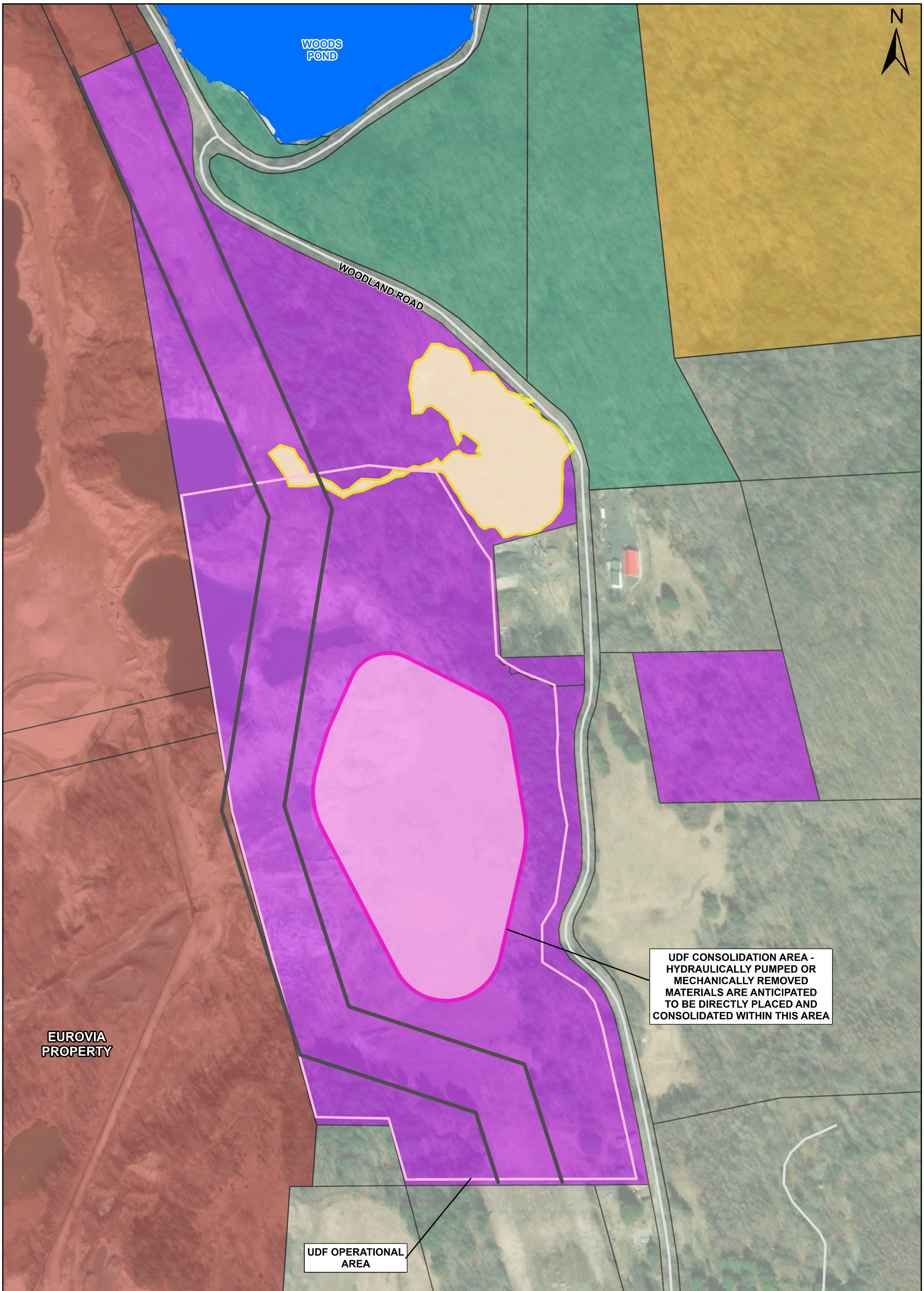

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**TRANSPORTATION DATA MANAGEMENT SYSTEM LOCATIONS**

ARCADIS

FIGURE
**5-2**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig7-1 Dewatering System Last Saved By: ksinsabaugh 9/11/2024




**LEGEND**

- HOUSATONIC RIVER
- TOWNSHIP BOUNDARY
- SURVEYED WETLAND
- GE PROPERTY
- PROPERTY BOUNDARY
- EASEMENT

PARCELS WITHIN 500 FEET OF RIVER OR UDF
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL

NOTES:

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/11/2024
3. UDF = UPLAND DISPOSAL FACILITY

0 300 600
GRAPHIC SCALE IN FEET

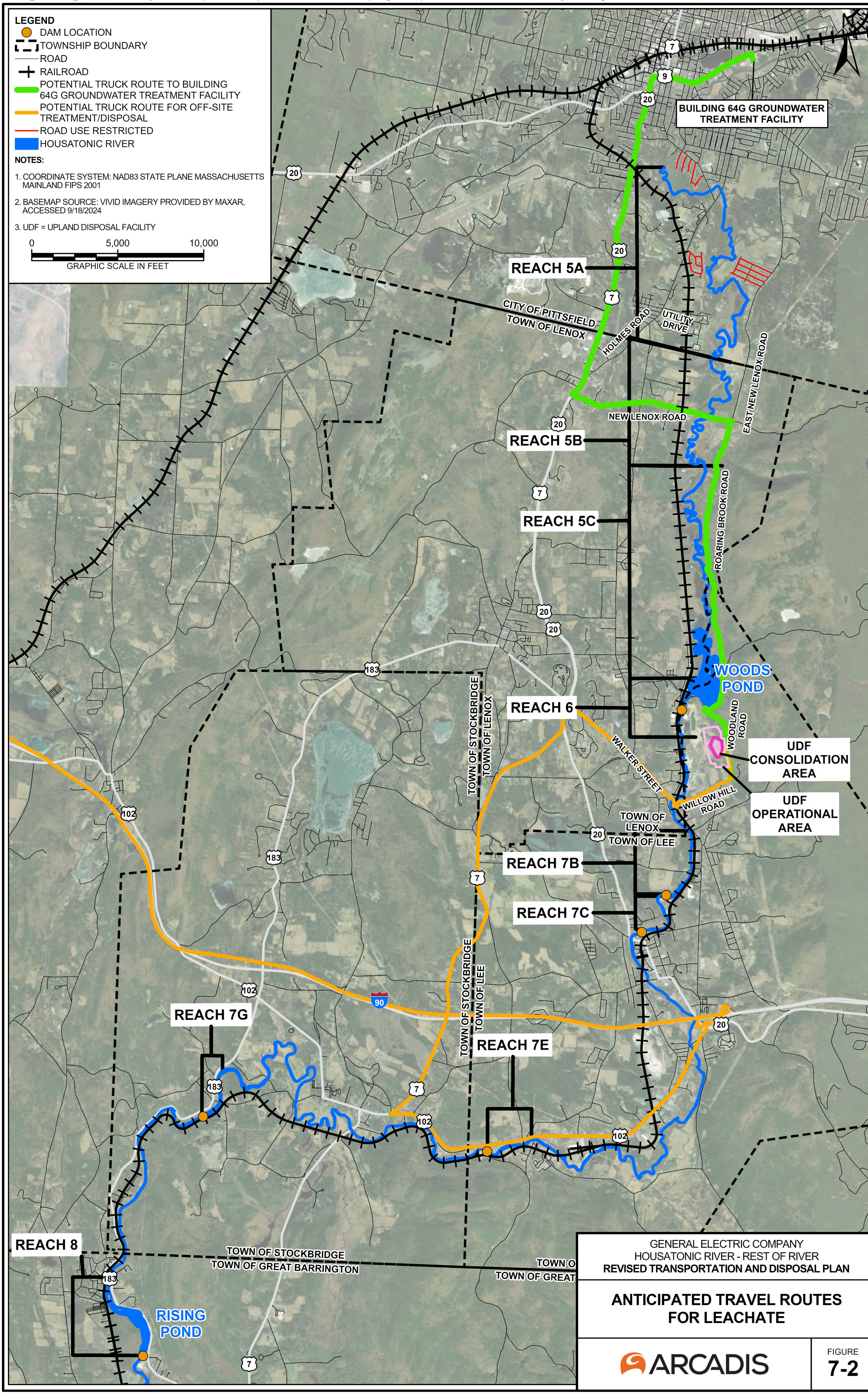
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**ANTICIPATED LOCATION OF DEWATERING SYSTEM AT UDF**

ARCADIS

FIGURE
**7-1**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\Revised T and D Plan.aprx\Fig7-2 Anticipated Travel Route Leachate Last Saved By: ksinsabaugh 9/18/2024

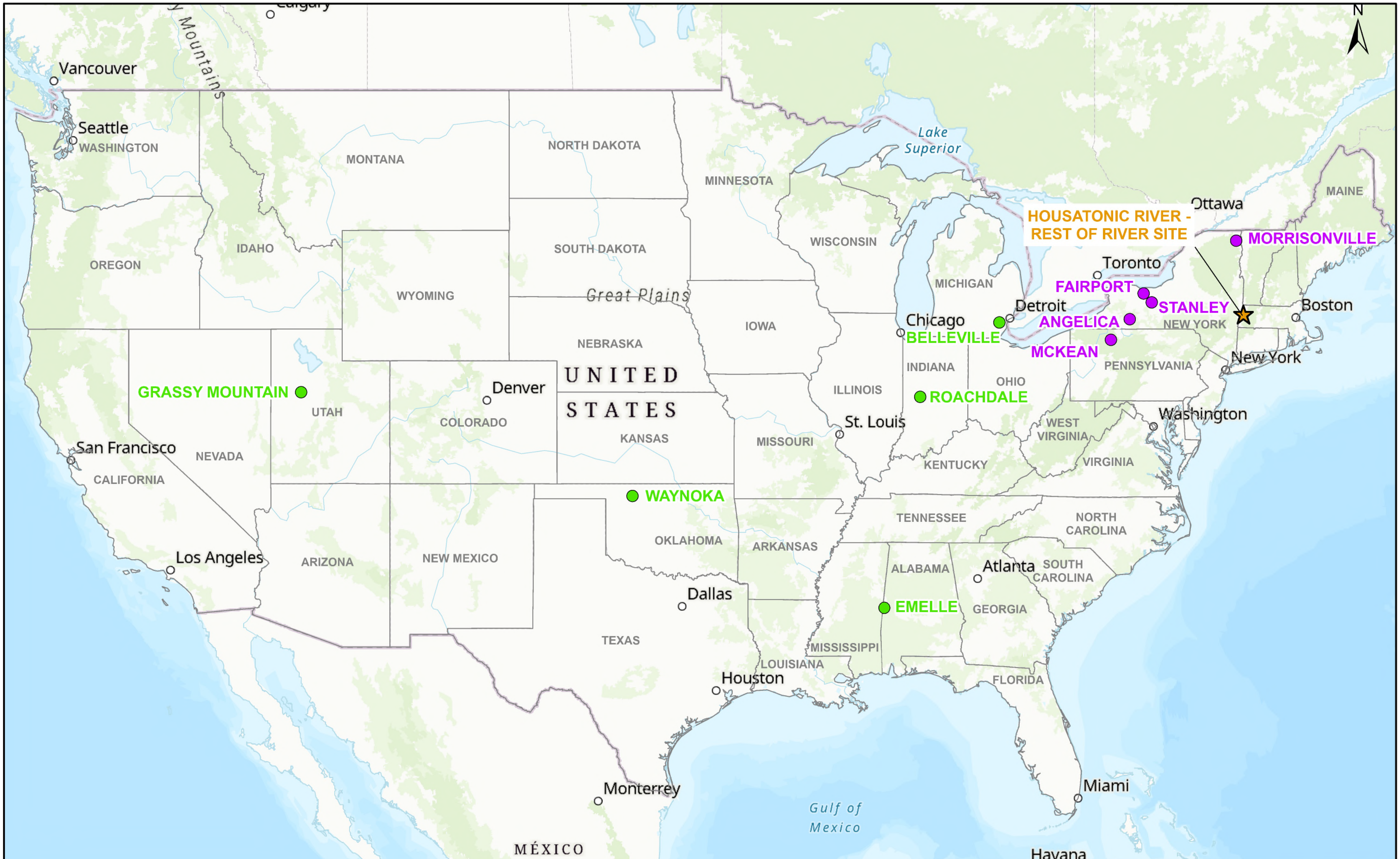



GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**ANTICIPATED TRAVEL ROUTES FOR LEACHATE**

ARCADIS

FIGURE 7-2




**LEGEND**

- CANDIDATE OFF-SITE DISPOSAL FACILITY - SUBTITLE C
- CANDIDATE OFF-SITE DISPOSAL FACILITY - SUBTITLE D

0 300 600
GRAPHIC SCALE IN MILES

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**CANDIDATE OFF-SITE DISPOSAL FACILITY LOCATIONS**

ARCADIS

FIGURE
**8-1**

# Appendix A

## Photograph Log of Typical Transport of Equipment

# Photograph Log

General Electric Company
Housatonic River – Rest of River
**Revised Transportation and Disposal Plan**

**Photograph:** 1

**Description:**
Typical Hydraulic Conveyance Equipment - Hydraulic Dredge


**Photograph:** 2

**Description:**
Typical Hydraulic Conveyance Equipment – Booster Pump

**Photograph:** 3

**Description:**
Typical Truck Transport Equipment – Loading Truck with Liners to protect surface from potential spills

**Photograph: 4**

**Description:**
Typical Truck Transport Equipment – Lined Truck ready for loading, on liner to protect surface from potential spills

# Photograph Log

General Electric Company
Housatonic River – Rest of River
**Revised Transportation and Disposal Plan**

**Photograph: 5**

**Description:**
Typical Truck Transport Equipment – Loaded Truck with cover liner in place

**Photograph: 6**

**Description:**
Typical Rail/Truck Transport Equipment – Gondola Loading

# Photograph Log

ARCADIS

General Electric Company
Housatonic River – Rest of River
**Revised Transportation and Disposal Plan**


**Photograph:** 7

**Description:**
Typical Rail/Truck Transport Equipment – Intermodal Loading


**Photograph:** 8

**Description:**
Typical Rail/Truck Transport Equipment – Truck Transport to Rail Loading Facility using Intermodal Container

# Photograph Log

General Electric Company
Housatonic River – Rest of River
**Revised Transportation and Disposal Plan**


**Photograph:** 9

**Description:**
Typical Rail/Truck Transport Equipment – Top Pick Loader with Intermodal Containers

**Photograph:** 10

**Description:**
Typical Rail/Truck Transport Equipment – Loaded Rail Car with Maximum of Six Intermodal Containers

# Appendix B

**Preliminary Site-Wide Hydraulic Dredging/Transport Evaluation**

General Electric Company

# Appendix B: Preliminary Site-Wide Hydraulic Dredging/Transport Evaluation

**Revised On-Site and Off-Site Transportation and Disposal Plan**

**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

October 2024

# Appendix B: Preliminary Site-Wide Hydraulic Dredging/Transport Evaluation

**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

October 2024

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Syracuse
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Fax: 315 449 0017

**Prepared For:**
General Electric Company
Pittsfield, Massachusetts

**Our Ref:**
ARC31156 (30177139)

# Table of Contents

# Tables



# Figures

# Abbreviations

| | |
|---|---|
| CCV | critical carrying velocity |
| Confluence | confluence of the East and West Branches of the Housatonic River |
| EPA | United States Environmental Protection Agency |
| GE | General Electric Company |
| I-90 | Interstate 90 |
| MNHESP | Massachusetts Natural Heritage and Endangered Species Program |
| Reach 6 Conceptual Work Plan | Conceptual Remedial Design/Remedial Action Work Plan for Reach 6 |
| Revised T&D Plan | Revised On-Site and Off-Site Transportation and Disposal Plan |
| ROR | Rest of River |
| RU | remediation unit |
| T&D Plan | On-Site and Off-Site Transportation and Disposal Plan |
| TBD | to be determined |
| UDF | Upland Disposal Facility |

# 1 Introduction

On October 31, 2023, the General Electric Company (GE) submitted to the United States Environmental Protection Agency (EPA) the *Off-Site and On-Site Transportation and Disposal Plan* (T&D Plan; Arcadis 2023) for the Housatonic Rest of River Remedial Action. The Rest of River (ROR) is that portion of the Housatonic River and its backwaters and floodplain (excluding Actual/Potential Lawns as defined in the 2000 Consent Decree) located downstream of the confluence of the East and West Branches of the Housatonic River (Confluence), in Pittsfield, Massachusetts. The ROR has been segmented into six separate remediation units (RUs) to manage workflow and schedule for the ROR Remedial Action. The applicable ROR RUs where material would be removed and require transportation and disposal, as designated by the EPA, are the following:

- **Reach 5**, from the Confluence downstream to Woods Pond (the first significant impoundment). Reach 5 also contains several backwater areas adjacent to the Housatonic River. This reach is further divided into the following subreaches:
  - Reach 5A, Confluence to the Pittsfield Wastewater Treatment Plant (located within the City of Pittsfield);
  - Reach 5B, Pittsfield Wastewater Treatment Plant to Roaring Brook (located within the Town of Lenox); and
  - Reach 5C, Roaring Brook to the start of Woods Pond (located within the Towns of Lenox and Lee).
- **Reach 6**, Woods Pond (located within the Towns of Lenox and Lee).
- **Reach 7**, Woods Pond Dam to Rising Pond. This reach is further divided into subreaches 7A through 7H, as illustrated on Figure B-1, with active remediation anticipated in the following subreaches:
  - Reach 7B, Columbia Mill impoundment, north of Interstate 90 (I-90) (located within the Town of Lee);
  - Reach 7C, Former Eagle Mill impoundment, immediately downstream of Reach 7B and north of I-90 (located within the Town of Lee);
  - Reach 7E, Willow Mill impoundment, south of I-90 (located within the Town of Lee); and
  - Reach 7G, Glendale impoundment, south of I-90 (located within the Town of Stockbridge).
- **Reach 8**, Rising Pond (located within the Town of Great Barrington).

These ROR RUs are illustrated on Figure B-1.

The October 2023 T&D Plan was submitted in accordance with the requirements of the *Final Revised Rest of River Statement of Work* (Anchor QEA et al. 2021), submitted on September 14, 2021, and approved by EPA on September 16, 2021. On June 4, 2024, EPA provided partial disapproval/conditional approval of and comments on the T&D Plan, directing GE to submit a revised plan. This Preliminary Site-Wide Hydraulic Dredging/Transport Evaluation is an appendix to that Revised On-Site and Off-Site Transportation and Disposal Plan (Revised T&D Plan).

GE's Revised Final Resource Conservation and Recovery Act Corrective Action Permit (EPA 2020) requires sediments from Reach 5C (including backwaters) and Reach 6 to be hydraulically transported directly to an on-site Upland Disposal Facility (UDF) for disposal, if feasible. In the June 4, 2024 partial disapproval/conditional approval letter for the October 2023 T&D Plan, EPA directed GE to assume that material from Reaches 5C and 6 can and will be hydraulically transported to the UDF. In addition, EPA directed GE to evaluate, to the extent possible with existing data, the feasibility of hydraulic transport for Reaches 5A, 5B, 7B, 7C, 7E, 7G, and 8, including transport from those areas to either the UDF or a potential rail loading facility. For Reach 5A specifically, EPA stated that GE should also evaluate the feasibility of hydraulic transport directly to the UDF or from an intermediate staging area to the UDF. This appendix presents GE's preliminary evaluation of the feasibility of hydraulic dredging and transport from each RU, including Reaches 5C and 6 (for completeness), to the UDF and/or to a potential rail loading area, and, for Reach 5A, from an intermediate staging area to the UDF. GE anticipates making a final confirmation of the feasibility of such transport during development of the Final Remedial Design/Remedial Action Work Plan for each RU and will present such confirmation therein for EPA review and approval.

The remainder of this appendix is organized as follows:

- **Section 2 – Evaluation Scope and Screening Criteria**. Presents the scope and screening criteria considered in the preliminary evaluation.
- **Section 3 – Evaluation by Remediation Unit**. Presents the scenarios considered for each RU and associated preliminary evaluation performed for each.
- **Section 4 – Summary and Recommendations**. Presents a preliminary recommendation for which RUs hydraulic dredging and transport is proposed.
- **Section 5 – References**. Lists references of documents cited in this plan.

The discussions in this appendix are supported by various tables and figures, as referenced herein.

# 2 Evaluation Scope and Screening Criteria

This section discusses the evaluation scope and screening criteria considered for the preliminary site-wide hydraulic dredging and transport evaluation for each RU. The evaluation scope included the following:

- **Hydraulic Dredging Feasibility Evaluation**: This was a preliminary evaluation of hydraulic dredging as a viable method for sediment removal from each RU, considering factors including water depths, sediment characteristics, debris, infrastructure constraints, river geomorphology, quality of life, and the effects on production rate.
- **Transport Methods Evaluation**: For those RUs for which hydraulic dredging may be feasible, this was a preliminary evaluation of hydraulic transport, considering sediment dewatering/upland support and access area needs for each RU and recommended locations (i.e., siting evaluation), available data, the topography of the site, the distance from each RU to upland support areas identified as part of the siting evaluation, and waterfront access. This evaluation assessed, to the extent possible with existing data, the feasibility of hydraulic dredging and transport from each RU to the UDF and/or to a potential rail loading area, and, for Reach 5A, from an intermediate staging area to the UDF.

Reach 5A was the first RU to be addressed because it is the most upstream reach in the ROR. The *Conceptual Remedial Design/Remedial Action Work Plan for Reach 5A* (Anchor QEA et al. 2023) was submitted to EPA on September 28, 2023, and that work plan is under EPA review. Reach 6 (containing Woods Pond) was the second RU to be addressed, and the *Conceptual Remedial Design/Remedial Action Work Plan for Reach 6* (Reach 6 Conceptual Work Plan) is scheduled to be submitted to EPA on October 31, 2024. The design work plans for the other RUs will be developed and submitted to EPA in a sequential manner, starting with Reach 5B and moving downstream, in subsequent years. Because a conceptual design has been developed for Reach 5A and is in development for Reach 6, the evaluation presented in this appendix had the most specificity for those RUs. It included more general information related to hydraulic dredging and transport for Reaches 5B, 5C, 7, and 8. For Reaches 7 and 8 in particular, because work in those RUs will not occur for 10 or more years after the start of work in Reaches 5 and 6, the evaluation presented herein is preliminary and subject to further modification based on experience with upstream Reaches 5 and 6.

Details related to the handling of material at the UDF were presented in the initial UDF Final Design Plan and UDF Operation, Monitoring, and Maintenance Plan (UDF OMM Plan), both submitted to EPA on February 28, 2024 (Arcadis 2024a, 2024b). Further details related to the construction and operation of the UDF, including information related to material delivery and placement at the UDF, will be included in the Revised UDF Final Design Plan and/or the Revised UDF OMM Plan, both of which are scheduled to be submitted to EPA on December 20, 2024.

As part of the evaluation, hydraulic dredging and pipeline contractors were consulted to obtain their insights and ensure that the proposed solutions are grounded in industry best practices. In addition, potential data gaps associated with the hydraulic dredging and transport process were identified to inform supplemental data collection and development of treatability study work plans. The final determination of transport methods for each RU will be presented in the Final Remedial Design/Remedial Action Work Plan or Supplemental Information Package for that RU.

## 2.1 Description of Hydraulic Dredging and Transport

Hydraulic dredges remove sediment as a slurry by dislodging the sediment (typically by use of a rotating cutter head) and sucking it into a pipeline with a dredge pump. A swinging ladder cutter head is typically used for hydraulic dredging, allowing movement of the cutter head both vertically and horizontally as the ladder swings on a pivot on the dredge barge. Hydraulic dredges are typically either self-propelled, through use of spuds, or operated on cables anchored to shore, allowing relatively continuous dredging (Palermo et al. 2008).

During the dredging process, a relatively large amount of water is sucked into the pipeline with the sediment to create a slurry, with typically 85% to 90% of the slurry being water (by weight). This slurry is hydraulically transported to a sediment processing plant or disposal site using large pipes and pumps to overcome frictional losses. Work boats are typically used to manage the pipeline near the dredging operation, move personnel and supplies, and conduct monitoring. The pipeline can be anchored to the riverbed or floated or run overland, depending on site conditions and proposed means and methods.

## 2.2 Definition of Qualitative Ratings System

The United States Army Corps of Engineers' Technical Guidelines for Environmental Dredging of Contaminated Sediments (Palermo et al. 2008) and EPA's Contaminated Sediment Remediation Guidance for Hazardous Waste Sites (EPA 2005) are useful relevant guidance documents for dredging and transport technology screening. The United States Army Corps of Engineers guidance and the sections relevant to dredging in the EPA guidance reflect work performed by Palermo and others (Palermo et al. 2004). Qualitative ratings of hydraulic dredging and transport technologies were developed for the purposes of this preliminary evaluation based on these guidance documents and were adapted for site-specific characteristics.

The guidance documents (Palermo et al. 2008; EPA 2005) use qualitative high, medium, or low relative ratings of technology against evaluation criteria. The definitions of these rating levels as provided in the guidance documents are as follows:

- **High**. Indicates the given criterion is generally suitable or favorable for hydraulic dredging or hydraulic transport.
- **Medium**. Indicates the hydraulic dredging or hydraulic transport technology addresses the issue or concern but may not be preferred.

- **Low**. Indicates the hydraulic dredging or hydraulic transport technology may not be a suitable selection for addressing the issue or concern.
- **To Be Determined (TBD)**: Indicates additional information is required to be able to rate whether the hydraulic dredging or hydraulic transport technology may be a suitable selection for addressing the issue or concern.

## 2.3 Hydraulic Dredging Screening Criteria

The first step of the site-wide hydraulic dredging and transport evaluation was to evaluate the feasibility of hydraulic dredging for each RU using the qualitative rating system of high, medium, and low for the following criteria:

- **Water depth**. An evaluation was made of anticipated site conditions to ensure sufficient water depth for hydraulic dredging (e.g., generally at least three feet of depth); although dredging becomes more difficult at greater water depths, no areas within the ROR are anticipated to be too deep for hydraulic dredging.
- **Sediment Characteristics**. An evaluation was made of the grain-size distribution of sediments; hydraulic dredging performs best for silts and clays and is less ideal for sediments with high proportions of coarse sands, gravels, and small rocks.
- **Production rate and ability to meet schedule**. A determination was made of whether hydraulic dredging could meet target daily/yearly production rates and the overall project schedule. For the purposes of this evaluation, the target hydraulic dredging production rates assumed in GE’s Revised Corrective Measures Study Report (Arcadis et al. 2010) were considered (275 cubic yards per day per dredge). In addition to depending on the anticipated production rate of a single hydraulic dredge, the achievable dredge production rate will also depend on production rates of subsequent processes/technologies, such as sediment processing/dewatering and water treatment.
- **Presence of debris**. An evaluation was made of whether the quantity and size of debris may impact (reduce) production rates. Hydraulic dredges are rated “low” in the guidance documents (Palermo et al. 2008; EPA 2005) in terms of their ability to dredge sediments containing large debris. Hydraulic dredges are also subject to clogging by debris, which can reduce productivity.
- **Constraints due to geomorphology**. An evaluation was made of whether geomorphology (e.g., river width, river curvature, riverbank elevations, and slope stability) may limit access and/or the maneuverability required for typical hydraulic dredging equipment.
- **Constraints due to infrastructure**. An evaluation was made of whether existing infrastructure (e.g., bridges, utility crossings) may limit access and/or the maneuverability required for typical hydraulic dredging equipment. Hydraulic dredges are generally rated “medium” for working around structures because the cutter head swinging action and/or movement of the barge limits their ability to operate near infrastructure and within tightly restricted areas.
- **Quality of life**. An evaluation was made of the potential for hydraulic dredging to disturb the quality of life for surrounding communities.
- **Operational considerations**. An evaluation was made of operational considerations including sediment processing, downtime and reduced production rates, and flexibility in operations.

## 2.4 Hydraulic Transport Screening Criteria

The second step of the site-wide hydraulic dredging and transport evaluation was to evaluate, for those RUs where hydraulic dredging is feasible, the feasibility of transport of materials hydraulically dredged from each RU using the qualitative rating system of high, medium, and low for the following criteria:

- **Siting**. An evaluation was made of available space for new infrastructure including pipelines and support areas, considering existing infrastructure, property access, ecologically sensitive habitats, and wetlands.
- **Distance**. An evaluation was made of the distance from the removal area to the processing or disposal location and the associated required piping length and quantity of booster pumps.
- **Topography**. An evaluation was made of the elevation change anticipated along the planned pipeline profile.
- **Sediment pumpability**. An evaluation was made of the ability of pumps and pipelines to convey the sediment the anticipated distance and elevation, based on sediment characteristics (i.e., grain size).
- **Reduction in truck traffic**. An evaluation was made of the ability to minimize non-hydraulic transportation methods (i.e., truck transport) and associated traffic through residential areas.
- **Infrastructure constraints**. An evaluation was made of whether existing infrastructure (e.g., I-90 corridor) presents challenges for routing pipelines.
- **Additional handling**. An evaluation was made of the added sediment processing requirements to facilitate hydraulic transport.
- **Capital improvements**. An evaluation was made of the requirements for construction of new staging, dewatering, and water treatment facilities not otherwise planned as part of the implementation of the ROR Remedial Action.

In many situations, critical carrying velocity (CCV) is a controlling factor used to evaluate the feasibility of hydraulic transport. CCV is the minimum velocity of the slurry required to maintain sediment entrainment (i.e., suspension in the slurry mixture), which is necessary to prevent the deposition of sediment in the pipeline and pumps. Sediment deposition in the pipeline or pumps may reduce hydraulic system capacity or cause damage to the pumps. CCV can also be used to determine the required number of booster pump stations to transport material the full distance from the removal area to the processing or disposal location.

The hydraulic transport evaluations that consider pumping directly to the UDF from Reach 5A through Reach 6 assume that the hydraulic transport terminates at a shoreline support facility located on the southern shore of Woods Pond for subsequent pumping to the UDF. That facility is referred to herein as the “Woods Pond shoreline support facility.” Hydraulic transport from that location to the UDF will be described in the Reach 6 Conceptual Work Plan. The hydraulic transport evaluations that consider pumping directly to the UDF from Reach 7 assume that the hydraulic transport terminates somewhere within the UDF operational area; however, because work in those RUs will not occur for 10 or more years after the start of work in Reaches 5 and 6, the transport evaluation presented herein is preliminary and subject to further modification based on experience with and infrastructure built to support upstream Reaches 5 and 6.

# 3 Evaluation by Remediation Unit

This section summarizes the preliminary site-wide hydraulic dredging and transport evaluation(s) performed for each RU. Table B-1 summarizes the results of the preliminary hydraulic dredging evaluation for each RU, and Table B-2 presents the results of the preliminary hydraulic transport evaluation for each RU. For those RUs for which hydraulic dredging is retained, Table B-3 presents a preliminary hydraulic transport design, including pipeline lengths, elevation changes, and number and power of booster pumps, to support the evaluation of whether hydraulic transport should be retained. Table B-4 summarizes the recommendations of both evaluations and indicates whether hydraulic dredging and transport will be included in the design for each RU.

## 3.1 Reach 5A Evaluation

This section summarizes the evaluation for Reach 5A, which extends from the Confluence to the Pittsfield Wastewater Treatment Plant (Figure B-2).

### 3.1.1 Hydraulic Dredging Feasibility Evaluation

The preliminary evaluation of hydraulic dredging of Reach 5A sediments indicated that hydraulic dredging may be feasible in some areas of Reach 5A (Table B-1). Reach 5A has "high" ratings for the following screening criteria:

- **Constraints due to geomorphology**. Reach 5A is anticipated to have an acceptable river width and alignment to accommodate hydraulic dredging.
- **Constraints due to infrastructure**. No known infrastructure constraints are present in Reach 5A.
- **Quality of life**. In general, hydraulic dredging requires fewer support vessels (e.g., barges, trucks) and therefore creates less traffic and odor and fewer emissions than other technologies.

"Medium" ratings are assigned to the following screening criteria:

- **Water depth**. Reach 5A water depths are expected to be less than three feet in most areas during seasonal low flows and slightly higher than three feet during high flows, based on HEC-RAC modeling. In general, a water depth of at least three feet is necessary to perform hydraulic dredging. To allow sufficient water depth in all of Reach 5A to support hydraulic dredging, portions of the reach would need to be damned and flooded, which has the potential to create a higher risk for flooding conditions in the area surrounding and upstream of Reach 5A.
- **Sediment characteristics**. In addition to the large cobles and rocks present in Reach 5A (which are not included in grain-size analysis testing), the Reach 5A main channel sediment consists of 8.7% gravel, 84% sand, and 6.5% fines, as discussed in the Conceptual RD/RA Work Plan for Reach 5A. Although it may be feasible to dredge such sediment, additional equipment would be required for transport in order to overcome pressure losses associated with larger material that does not readily suspend in a slurry.
- **Presence of debris**. Based on existing data, a significant number of large rocks, fallen trees, and buried logs/debris are expected in Reach 5A, which could require significant time for pre-clearing and/or cause clogging of hydraulic dredging equipment, both of which could reduce project productivity and delay the overall project schedule.

"Low" ratings are assigned to the following screening criteria:

- **Production rate and ability to meet schedule**. It is likely hydraulic dredging would not meet target daily/yearly production rates and the overall project schedule because low pumpability is anticipated due to the observed sediment characteristics, the potential need to manually control water depths, and the need to address large debris.
- **Operational considerations**. Damning and flooding the river to create deeper water depths and/or pre-clearing debris to mitigate the potential downtime and reduced production rates would result in additional logistical and operational considerations.

Regardless of "low" ratings for some screening criteria, hydraulic dredging may be feasible in some areas of Reach 5A, and hydraulic transport was also evaluated (Section 3.1.2).

## 3.1.2 Hydraulic Transport Evaluation

Because hydraulic dredging may be feasible for Reach 5A, a preliminary evaluation of hydraulic transport was also performed. For Reach 5A, this evaluation assessed, to the extent possible with existing data, the feasibility of hydraulic transport directly to the UDF (i.e., to the Woods Pond shoreline support facility), directly to a potential rail loading area, and from an intermediate staging area to the UDF. For the last of these evaluations, the former DeVos property, owned by GE and located between the river and the corner of New Lenox Road and Roaring Brook Road, was selected as a potential area for an intermediate staging area.

### 3.1.2.1 Pump Directly to the Woods Pond Shoreline Support Facility

As part of the hydraulic transport evaluation, a preliminary design of the sediment transport pipeline was developed to understand the feasibility of various pumping scenarios. The preliminary hydraulic transport design parameters considered for Reach 5A are summarized in Table B-3, and the preliminary hydraulic transport alignment evaluated to convey material directly to the Woods Pond shoreline support facility is illustrated on Figure B-2.

To convey material directly from Reach 5A to the Woods Pond shoreline support facility, approximately seven miles of pipeline would likely be required. Based on the CCV assumed for Reach 5A sediments and approximately 40 feet of expected elevation decrease, approximately 18 booster pump stations, spaced at roughly 2,000-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). As illustrated on Figure B-2, the preliminary hydraulic transport alignment parallels Roaring Brook Road to mitigate potential impact to areas identified by the Massachusetts Natural Heritage and Endangered Species Program (MNHESO) as Priority Habitat of state-listed threatened, endangered, or special concern species (hereafter "rare species") protected under the Massachusetts Endangered Species Act, and/or to wetlands identified in the National Wetland Inventory between Reach 5A and the UDF. Based on available information, this routing may include a 90-foot increase (and decrease) in elevation if the pipe is to remain installed at the ground surface elevation along the road.

The long distance from any part of Reach 5A to the Woods Pond shoreline support facility would increase the chances that if a pump failed during operation, the entire system would lose all transport capabilities. In addition, as discussed above, regardless of the destination, Reach 5A sediment is expected to have low pumpability based on the prevalence of coarse sands and gravel, and hydraulic transport may be challenging.

Given the excessive distance, number of booster pumps required, and associated operational limitations (e.g., high potential for production downtime and schedule delays), hydraulic transport would not be suitable for transporting Reach 5A sediments directly to the Woods Pond shoreline support facility, and thus this transport scenario was not retained for inclusion in design (Table B-2).

#### 3.1.2.2 Pump Directly to a Rail Facility

As discussed in Section 3.2 of the Revised T&D Plan, a potential rail loading area has been identified in an area on Utility Drive near the Pittsfield Wastewater Treatment Plant (Figure B-2). To use the railroad for transport, hydraulically dredged sediment from Reach 5A would need to be pumped to the rail loading area, dewatered, staged, and then loaded on rail cars for transport to the Woods Pond shoreline support facility or an off-site disposal facility. However, as noted in the Revised T&D Plan, the Utility Drive location is within an area designated as Priority Habitat of rare species and has wetlands identified in the National Wetland Inventory. In addition, the infrastructure required for dewatering hydraulically dredged material would require significantly more capital development, materials handling, and disturbance to the parcel identified for the Utility Drive loading area than the rail infrastructure alone and would include construction of a large dewatering facility and area for collection and treatment of the liquid generated during dewatering. In addition, as discussed above, regardless of the destination, the Reach 5A sediment is expected to have low pumpability based on the prevalence of coarse sands and gravel, and hydraulic transport may be challenging.

Hydraulic transport directly to a rail facility was not retained (Table B-2) for inclusion in the design for Reach 5A based on siting (risk of ecological impacts and lack of space), low sediment pumpability, need for significant additional capital improvements for the rail loading facility (if not built for other reasons), and the need for an additional facility in Reach 5A for dewatering hydraulically dredged sediments.

#### 3.1.2.3 Pump from an Intermediate Staging Area to Woods Pond Shoreline Support Facility

At the request of EPA, for Reach 5A, GE has also evaluated the feasibility of hydraulic transport from an intermediate staging area (i.e., the former DeVos property) to the Woods Pond shoreline support facility (Figure B-2). For this scenario, the material would first need to be transported to the intermediate staging area. This would likely involve dewatering dredged sediment at temporary staging areas in Reach 5A for over-the-road truck transport to the intermediate staging area and/or could include placing mechanically dredged sediment directly into a slurry pump.[1] The former option would generally include truck transport on the same local roads near residential areas adjacent to Reach 5A as trucking directly to the Woods Pond shoreline support facility or for off-site disposal (Figure B-2). To place mechanically dredged sediment directly into a slurry pump, dredged sediment would initially be placed into small dredge scows, which would then transport the sediment a short distance to be transloaded into the slurry pump at the intermediate staging area. Such a transloading operation would likely be accomplished using mechanical equipment that feeds into a screening hopper, equipment to slurry the sediment, and a pumping system that could operate at a steady rate to consistently achieve the desired screened solids concentration for pumping to the Woods Pond shoreline support facility. Several miles of pipeline and many booster pumps would be needed.

Pumping Reach 5A sediment from an intermediate staging area to the Woods Pond shoreline support facility or a rail facility was not retained for consideration during design of transport scenarios for Reach 5A because it requires significantly more time and energy for additional material processing and handling (i.e., dewatering for truck or barge transport to the intermediate staging area and then re-slurring for hydraulic transport the remaining distance to the UDF), additional capital investment in a staging and slurrying facility, and, if barge

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[1] At the ongoing dredging project at the New Bedford Harbor Superfund Site in Massachusetts, mechanical dredges place dredged material directly into slurry pumps for pipeline transport.

transport to the intermediate staging area is not feasible, the same number of truck trips on the same roads near residential areas adjacent to Reach 5A to transport material to the intermediate staging area as would be required to transport material directly to the Woods Pond shoreline support facility.

### 3.1.3 Conclusion

Based on available data, hydraulic dredging and transport are impractical for Reach 5A. Although it may be technically feasible to dredge the sediment from some portions of Reach 5A, hydraulic dredging is impractical due to shallow water depth in some areas and potential operational considerations (e.g., potential downtime and reduced production rates). In addition, hydraulic transport of the sediment has many limitations as discussed above and is likewise impractical. Regardless of the starting/ending place for hydraulic transport, Reach 5A sediment is expected to have low pumpability based on the prevalence of coarse sands and gravel. Pumping directly to the Woods Pond shoreline support facility was not retained due to the excessive number of booster pumps and relatively high level of risk to project shutdown and/or schedule delays associated with that scenario. Pumping directly to a rail facility was also not retained due to the additional handling required and lack available space for construction of a dewatering and staging facility. Pumping from an intermediate area was also not retained due to the additional handling required and the likely need for a similar amount of truck traffic on local public roads near residential areas adjacent to Reach 5A as would be required for non-hydraulic transport of the same material.

## 3.2 Reach 5B Evaluation

This section summarizes the hydraulic dredging evaluation for Reach 5B, which extends from the Pittsfield Wastewater Treatment Plant to Roaring Brook (Figure B-1).

Approximately 1,000 cubic yards of sediment are expected to be removed from non-contiguous small “hot spots” that extend over the two-mile length of Reach 5B. Sediment removal in such small, isolated pockets is impractical for hydraulic dredging and transport given that the technology relies on continuous flow of the slurry to maintain sediment entrainment (i.e., suspension of the slurry mixture), which is necessary to prevent the deposition of sediment in the pipeline and pumps. Due to the non-contiguous removal areas and relatively small total removal volume and the likely inability to maintain consistent production rates, both the operational considerations and production rate and ability to meet schedule screening criteria received a “low” rating, and thus hydraulic dredging was not retained as a suitable option for Reach 5B sediments (Table B-1).

Because hydraulic dredging was not retained as a suitable removal technology, hydraulic transport was not separately evaluated. Similar to hydraulic transport from Reach 5A, transport of sediment from Reach 5B would require significant pipeline lengths and operation of numerous pumps, resulting in operational limitations (e.g., high potential for production downtime and schedule delays) that lead to the conclusion that hydraulic dredging and transport is not suitable for Reach 5B.

## 3.3 Reach 5C Evaluation

This section summarizes the hydraulic dredging evaluation for Reach 5C, which extends from Roaring Brook to the start of Woods Pond (Figure B-3).

## 3.3.1 Hydraulic Dredging Feasibility Evaluation

The preliminary evaluation of hydraulic dredging of Reach 5C sediments indicated that hydraulic dredging is likely feasible in Reach 5C (Table B-1), and therefore hydraulic dredging of Reach 5C sediments was retained for inclusion in design. Reach 5C has “high” ratings for the following screening criteria:

- **Water depth**. Reach 5C water depths are expected to be, on average, 5 to 10 feet, which is suitable for operation of hydraulic dredging equipment.
- **Constraints due to geomorphology**. Reach 5C is anticipated to have acceptable river width and alignment to accommodate hydraulic dredging.
- **Constraints due to infrastructure**. No known infrastructure constraints are present in Reach 5C.
- **Quality of life**. In general, hydraulic dredging requires fewer support vessels (e.g., barges, trucks) and therefore creates less traffic and odor and fewer emissions than other technologies.

“Medium” ratings are assigned to the following screening criteria:

- **Presence of debris**. Assuming that Reach 5C is similar to Reach 5A, a number of large rocks, fallen trees, and buried logs/debris are expected in Reach 5C, which could cause clogging of hydraulic dredging equipment and reduce project productivity and delay the overall project schedule. Debris would either be removed concurrently with hydraulic dredging or before initiating hydraulic dredging.
- **Operational considerations**. Pre-clearing debris to mitigate the potential for downtime and reducing the production rates would result in additional logistical and operational considerations.

Sediment characteristics are largely unknown for Reach 5C; therefore, further sampling is required to evaluate whether the grain-size distribution of sediments in Reach 5C is suitable for hydraulic dredging. Similarly, without fully understanding sediment pumpability, the production rate and the ability to meet the schedule are unknown. However, it is anticipated that hydraulic dredging of Reach 5C sediments would meet target daily/yearly production rates and the overall project schedule. Because hydraulic dredging is likely feasible for Reach 5C, hydraulic transport was also evaluated (Section 3.3.2).

## 3.3.2 Hydraulic Transport Evaluation

Because hydraulic dredging is likely feasible for Reach 5C, a preliminary evaluation of hydraulic transport was also performed. For Reach 5C, this evaluation assessed, to the extent possible with existing data, the feasibility of hydraulic transport to the UDF (i.e., to the Woods Pond shoreline support facility) and directly to a potential rail loading area.

### 3.3.2.1 Pump Directly to the Woods Pond Shoreline Support Facility

As part of the hydraulic transport evaluation, a preliminary design of the sediment transport pipeline was developed to understand the feasibility of various pumping scenarios. The preliminary hydraulic transport design parameters considered for Reach 5C are summarized in Table B-3, and the preliminary hydraulic transport alignment evaluated to convey material directly to the Woods Pond shoreline support facility is illustrated on Figure B-3.

The routing for the transport pipeline from Reach 5C to the Woods Pond shoreline support facility would likely require approximately four miles of pipeline. Based on the CCV assumed for Reach 6 (since sediment characteristics are largely unknown for Reach 5C) sediments and approximately net 25 feet of expected elevation decrease, approximately eight booster pump stations, spaced at roughly 2,000-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). As illustrated on Figure B-3, the preliminary hydraulic transport alignment parallels Roaring Brook Road to mitigate potential impact to areas identified as Priority Habitat of rare species and/or wetlands identified in the National Wetland Inventory between Reach 5A and the UDF. Based on available information, this routing may include a 90-foot increase (and decrease) in elevation if the pipe is to remain installed at the ground surface elevation along the road. The preliminary proposed pipeline route would not pass through any dense residential areas.

The hydraulic transport screening criteria for Reach 5C were rated as “high” with the exception of sediment pumpability, which is yet to be determined due to the unknown sediment characteristics mentioned previously (Table B-2). Sufficient space would be available for siting the pipeline, booster stations, and support areas along public roads to get to the Woods Pond shoreline support facility. The distance and piping length to the Woods Pond shoreline support facility would be relatively short (approximately four miles). However, consideration will need to be taken during design to identify a pipeline route to mitigate the potential for steep inclines or large elevation changes potentially present along Roaring Brook Road. There would be no expected infrastructure constraints in the form of large interstate corridors or rail crossings. Truck traffic would be minimized by piping slurry instead of trucking the material. This option involves no additional handling or significant capital improvements because sediment would be pumped directly from the reach to the Woods Pond shoreline support facility and from there directly to the UDF sediment processing facility.

### 3.3.2.2 Pump Directly to a Rail Facility

As discussed in Section 3.2 of the Revised T&D Plan, a potential rail loading area has been identified at Utility Drive near the Pittsfield Wastewater Treatment Plant in Reach 5A (Figure B-2), and a potential rail loading/off-loading area has been identified at Woods Pond Spur immediately northwest of Woods Pond (Figure B-3). To use the railroad for transport, hydraulically dredged sediment from Reach 5C would need to be pumped to the rail loading area, dewatered, staged, and then loaded on rail cars for transport to the UDF or an off-site disposal facility.

The Utility Drive location is unfavorable for receiving, handling, and loading hydraulically dredged materials from Reach 5C, as discussed in Section 3.1.2.2. In addition, the distance from the downstream half of Reach 5C to the Utility Drive location would require a significant length of pipeline and associated booster pumps to provide adequate head conditions to the slurry pumping system (i.e., similar to the inverse of the system discussed in Section 3.1.2.2). The Woods Pond Spur location is also unfavorable for receiving, handling, and loading hydraulically dredged materials because there is no space available for the infrastructure required for dewatering hydraulically dredged material. In addition, this option would require more local truck traffic than pumping directly to the UDF (Section 3.3.2.1) because the percentage of material from Reach 5C designated for disposal in the UDF is greater than the percentage of material from Reach 5C designated for disposal off site (i.e., the number of truck trips from the UDF to Woods Pond Spur for off-site disposal would be less than the number of truck trips from Woods Pond Spur to the UDF for on-site disposal).

Due to unfavorable siting (no space available) and the need for significant capital improvements for an additional facility at either rail loading location for dewatering hydraulically dredged sediments, and, for the Woods Pond Spur location, the lack of reduction in truck traffic close to Woods Pond, this option was not retained for inclusion in the design of transport scenarios for Reach 5C.

### 3.3.3 Conclusion

Hydraulic dredging with transport by pumping directly to the UDF was retained for inclusion in the Reach 5C remedial design; however, further investigation into sediment characteristics and sediment pumpability may be needed to make a final determination.

## 3.4 Reach 6 Evaluation

This section summarizes the evaluation for Reach 6, including Woods Pond (Figure B-4).

### 3.4.1 Hydraulic Dredging Feasibility Evaluation

The preliminary evaluation of hydraulic dredging of Reach 6 sediments indicated that hydraulic dredging is likely feasible for Reach 6 (Table B-1), and hydraulic dredging of Reach 6 sediments was retained for inclusion design. Reach 6 has “high” ratings for all screening criteria, as follows:

- **Water depth**. The majority of Reach 6 is conducive to hydraulic dredging. The main channels and the southeastern side of the pond have water depths ranging from three to 15 feet. Although the shoreline areas, non-channel areas, and transition zones in Woods Pond have water depths of less than three feet during typical flows, it is anticipated that traditional hydraulic dredging equipment can be used in most of these areas due to the ability to float barges in deeper water and extend the dredge head into shallower water. Modified hydraulic dredging equipment and/or limited mechanical dredging may be used in some areas to supplement traditional hydraulic dredging equipment.
- **Sediment characteristics**. Data indicate the presence of fine-grained sediments such as silt and clay that are well-suited for hydraulic dredging. Reach 6 sediment data indicate that the sediment consists of less than 0.5% gravel, 54% sand, and 45.8% fines.
- **Production rate and ability to meet schedule**. Hydraulic dredging in Reach 6 is expected to meet target daily/yearly production rates and the overall project schedule.
- **Presence of debris**. Large rocks, fallen trees, buried logs, and other debris are expected to be minimal and can either be removed concurrently with hydraulic dredging or before initiating hydraulic dredging, if needed.
- **Constraints due to geomorphology**. River (impoundment) width and alignment in Reach 6 are anticipated to optimally accommodate hydraulic dredging.
- **Constraints due to infrastructure**. The only notable infrastructure is the Woods Pond Dam, which can be dredged around and is not expected to be a constraint.
- **Quality of life**. In general, hydraulic dredging requires fewer support vessels (e.g., barges, trucks) and therefore creates less traffic and odor and fewer emissions than other technologies.
- **Operational considerations**. The expected high production rate and limited infrastructure constraints or large debris indicate few operational challenges.

It should be noted that, in some shoreline areas in Reach 6, sediment removal may require mechanical removal. It should also be noted that, although it is anticipated that hydraulic dredging will likewise be used for Valley Mill Pond, situated just downstream of Woods Pond Dam, additional evaluation of the sediment dredging and transport approach for Valley Mill Pond will be conducted after additional data are collected on the sediments in that pond.

Because hydraulic dredging is considered to be generally feasible for Reach 6, hydraulic transport was also evaluated (Section 3.4.2).

### 3.4.2 Hydraulic Transport Evaluation

Because hydraulic dredging is considered feasible for Reach 6, a preliminary evaluation of hydraulic transport was also performed. For Reach 6, this evaluation focuses on the feasibility of pumping to the UDF (i.e., to the Woods Pond shoreline support facility) and directly to a potential rail loading facility.

#### 3.4.2.1 Pump Directly to the Woods Pond Shoreline Support Facility

As part of the hydraulic transport evaluation, a preliminary design of the sediment transport pipeline was developed to understand the feasibility of various pumping scenarios. The preliminary hydraulic transport design parameters considered for Reach 6 are summarized in Table B-3, and the preliminary hydraulic transport alignment evaluated to convey material directly to the Woods Pond shoreline support facility is illustrated on Figure B-4.

The routing for the transport pipeline from Reach 6 to the Woods Pond shoreline support facility would likely require approximately 0.5 mile of pipeline. Based on the CCV assumed for Reach 6 sediments and approximately 15 feet of expected elevation decrease, approximately two booster pump stations, spaced at roughly 1,500-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). The preliminary pipeline route would not pass through any dense residential areas.

All of the hydraulic transport screening criteria for Reach 6 were rated as “high” (Table B-2). Sufficient space would be available for siting for new infrastructure including pipelines and support areas for the Woods Pond shoreline support facility. The distance and piping length to the Woods Pond shoreline support facility would be very short, and the pipeline route topography would be favorable due to lack of steep inclines or large elevation gains. Sediment pumpability is expected to be high due to the prevalence of fine-grained materials. There would be no expected infrastructure constraints in the form of large interstate corridors or rail crossings. Truck traffic would be minimized by piping slurry instead of trucking the material. This option would not involve additional handling or significant capital improvements because sediment would be pumped directly from the reach to the Woods Pond shoreline support facility and from there directly to the UDF sediment processing facility.

#### 3.4.2.2 Pump Directly to a Rail Facility

As discussed in Section 3.2 of the Revised T&D Plan, a potential rail loading/off-loading area has been identified at Woods Pond Spur immediately northwest of Woods Pond (Figure B-4). To use the railroad for transport, hydraulically dredged sediment from Reach 6 would need to be pumped to the rail loading area, dewatered, staged, and then loaded on rail cars for transport to the UDF or an off-site disposal facility.

The Woods Pond Spur location is unfavorable for receiving, handling, and loading hydraulically dredged materials because there is no space available for the infrastructure required for dewatering hydraulically dredged material. In addition, this option would require more local truck traffic than pumping directly to the UDF (Section 3.4.2.1) because the percentage of material from Reach 6 designated for disposal in the UDF is greater than the percentage of material from Reach 6 designated for disposal off site (i.e., the number of truck trips from the UDF to Woods Pond Spur for off-site disposal would be less than the number of truck trips from Woods Pond Spur to the UDF for on-site disposal).

Due to unfavorable siting (no space available) and the need for significant capital improvements for an additional facility at the rail loading location for dewatering hydraulically dredged sediments and the lack of reduction in truck traffic close to Woods Pond, this option was not retained for inclusion in the design of transport scenarios for Reach 6.

### 3.4.3 Conclusion

Hydraulic dredging with transport by pumping directly to the Woods Pond shoreline support facility and then the UDF was retained for inclusion in the Reach 6 remedial design and will be discussed further in the forthcoming Reach 6 Conceptual RD/RA Work Plan.

## 3.5 Reaches 7B and 7C Evaluation

This section summarizes the evaluation for Reach 7B, which encompasses the Columbia Mill impoundment, and Reach 7C, which encompasses the Former Eagle Mill impoundment (Figure B-5). Because work in these RUs will not occur for 10 or more years after the start of work in Reaches 5 and 6, the evaluation includes more general information related to hydraulic dredging and transport. Additionally, because of their proximity to each other, the likelihood of hydraulic dredging and transport in Reaches 7B and 7C is similar and related, and therefore the evaluation of both reaches is discussed together in this section.

### 3.5.1 Hydraulic Dredging Feasibility Evaluation

The preliminary evaluation of hydraulic dredging of Reaches 7B and 7C sediments indicated that hydraulic dredging is likely feasible in these RUs (Table B-1), and hydraulic dredging of Reaches 7B and 7C was thus retained for inclusion in design. Reaches 7B and 7C have “high” ratings for the following screening criteria:

- **Water depth**. Recent bathymetry data for Reaches 7B and 7C are not available. However, because sediment removal in Reaches 7B and 7C is expected to be limited to the impoundment, it is anticipated that water depths would be suitable for operation of hydraulic dredging equipment.
- **Constraints due to geomorphology**. River (impoundment) width and alignment in Reaches 7B and 7C are anticipated to accommodate hydraulic dredging.
- **Constraints due to infrastructure**. The only notable infrastructure is the Columbia Mill Dam, which can be dredged around and is not expected to be a constraint.
- **Quality of life**. In general, hydraulic dredging requires fewer support vessels (e.g., barges, trucks) and therefore creates less traffic and odor and fewer emissions than other technologies.

A “medium” rating is assigned to the following screening criteria:

- **Operational considerations**. Pre-clearing debris to mitigate the potential for downtime and reducing production rates would both result in additional logistical and operational considerations.

Sediment characteristics are largely unknown for Reaches 7B and 7C; therefore, further sampling may be required to evaluate whether the grain-size distributions of sediments in Reaches 7B and 7C are suitable for hydraulic dredging. Presence of debris is also unknown, and a debris survey will be required prior to commencement of dredging. Debris can either be removed concurrently with hydraulic dredging or before initiating hydraulic dredging. Similarly, without fully understanding sediment pumpability, the production rate and the ability to meet schedule is unknown. However, it is anticipated that hydraulic dredging of Reaches 7B and 7C sediments would meet target daily/yearly production rates and the overall project schedule. Because hydraulic dredging is considered likely feasible for Reaches 7B and 7C, hydraulic transport was also evaluated (Section 3.5.2).

### 3.5.2 Hydraulic Transport Evaluation

Because hydraulic dredging is likely feasible for Reaches 7B and 7C, a preliminary evaluation of hydraulic transport was also performed. For Reaches 7B and 7C, this evaluation assessed, to the extent possible with existing data, the feasibility of hydraulic transport directly to the UDF operational area. As discussed in Section 2, for the purposes of this hydraulic transport evaluation, pumping directly to the UDF assumes that the evaluation terminates somewhere within the UDF operational area. If hydraulic transport infrastructure from Reach 7B were installed, hydraulic transport from Reach 7C would tie into the pipeline system constructed for Reach 7B and vice versa; however, each can also operate as a stand-alone system, as discussed in the remainder of this section. Because a potential rail loading area was not identified near Reaches 7B and 7C (see Section 3.2 of the Revised T&D Plan), this evaluation did not consider the potential to pump directly to a potential rail loading area.

#### 3.5.2.1 Pump Directly to the UDF Operational Area – Reach 7B Only

As part of the hydraulic transport evaluation, a preliminary design of the sediment transport pipeline was developed to understand the feasibility of various pumping scenarios. The preliminary hydraulic transport design parameters considered for Reach 7B are summarized in Table B-3, and the preliminary hydraulic transport alignment evaluated to convey material directly to the UDF operational area is illustrated on Figure B-5. Because the existing railroad easement is relatively straight and flat (to support the railroad), the preliminary hydraulic transport alignment parallels the tracks.

The routing for the transport pipeline from Reach 7B to the UDF operational area would likely require approximately 2.4 miles of pipeline. Based on the CCV assumed for Reach 7B sediment and approximately 25 feet of expected elevation increase, approximately six booster pump stations, spaced at roughly 2,000-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). Routing to avoid drastic changes in elevation would need to be considered during design. The preliminary pipeline route would pass through residential communities of the Town of Lee, and booster pump stations (and associated noise) would likely be required close to residential areas.

Most of the hydraulic transport screening criteria for Reach 7B are rated as “high” except for sediment pumpability, which is yet to be determined due to the unknown sediment characteristics, and distance/piping length and infrastructure constraints (due to a railroad crossing), which are rated as “medium” (Table B-2). Sufficient space would be available for siting a pipeline, booster stations, and support areas. The pipeline route topography would be favorable due to a lack of steep inclines or large elevation gains. Truck traffic would be minimized by piping instead of trucking the sediment. This option would not involve additional handling or significant capital improvements because sediment would be pumped directly from the reach to the UDF sediment processing facility.

#### 3.5.2.2 Pump Directly to the UDF Operational Area – Reach 7C Only

As part of the hydraulic transport evaluation, a preliminary design of the sediment transport pipeline was developed to understand the feasibility of various pumping scenarios. The preliminary hydraulic transport design parameters considered for Reach 7C are summarized in Table B-3, and the preliminary hydraulic transport alignment evaluated to convey material directly to the UDF operational area is illustrated on Figure B-

5. Because the existing railroad easement is relatively straight and flat (to support the railroad), the preliminary hydraulic transport alignment parallels the tracks.

The routing for the transport pipeline from Reach 7C to the UDF operational area would likely require approximately 2.9 miles of pipeline. Based on the CCV assumed for Reach 7C sediment and approximately 30 feet of expected elevation increase, approximately seven booster pump stations, spaced at roughly 2,000-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). Routing to avoid drastic changes in elevation would be considered during design. The preliminary pipeline route passes through residential communities of the Town of Lee, and booster pump stations (and associated noise) would likely be required close to residential areas.

Most of the hydraulic transport screening criteria for Reach 7C are rated as “high” except for sediment pumpability, which is yet to be determined due to the unknown sediment characteristics, and distance/piping length and infrastructure constraints (due to a railroad crossing), which are rated as “medium” (Table B-2). Sufficient space would be available for siting a pipeline, booster stations, and support areas. The pipeline route topography would be favorable due to a lack of steep inclines or large elevation gains. Truck traffic would be minimized by piping instead of trucking the sediment. This option would not involve additional handling or significant capital improvements because sediment would be pumped directly from the reach to the UDF sediment processing facility.

#### 3.5.2.3 Pump Directly to the UDF Operational Area – Reaches 7B and 7C Combined System

The screening criteria ratings presented above for Reaches 7B and 7C individually also apply to a combined system. The routing for the transport pipeline from Reach 7C, if the Reach 7B system is already constructed, will require approximately 0.5 mile of additional pipeline and one additional booster pump station would be necessary to provide adequate head conditions to the slurry pumping system and overcome the approximately five feet of additional elevation head expected from Reach 7C to the Reach 7B pipeline (Table B-3).

### 3.5.3 Conclusion

Hydraulic dredging with transport by pumping directly to the UDF was retained for inclusion in the remedial design for Reaches 7B and 7C remedial design; however, further investigation into sediment characteristics and sediment pumpability may be needed to make a final determination of the feasibility of such an approach.

## 3.6 Reach 7E Evaluation

This section summarizes the evaluation for Reach 7E, which encompasses the Willow Mill impoundment (Figure B-6).

### 3.6.1 Hydraulic Dredging Feasibility Evaluation

The preliminary evaluation of hydraulic dredging of Reach 7E sediments indicated that hydraulic dredging is likely feasible (Table B-1), and hydraulic dredging of Reach 7E was thus retained for inclusion in design. Reach 7E has “high” ratings for the following screening criteria:

- **Water depth**. Recent bathymetry data for the Reach 7E are not available. However, because sediment removal in Reach 7E is expected to be limited to the impoundment, it is anticipated that water depths would be suitable for operation of hydraulic dredging equipment.
- **Constraints due to geomorphology**. River (impoundment) width and alignment in Reach 7E are anticipated to accommodate hydraulic dredging.
- **Constraints due to infrastructure**. The only notable infrastructure is the Willow Mill Dam, which can be dredged around and is not expected to be a constraint.
- **Quality of life**. In general, hydraulic dredging requires fewer support vessels (e.g., barges, trucks) and therefore creates less traffic and odor and fewer emissions than other technologies.

A “medium” rating is assigned to the following screening criteria:

- **Operational considerations**. Pre-clearing debris to mitigate the potential for downtime and reducing production rates would result in additional logistical and operational considerations.

Sediment characteristics are largely unknown for Reach 7E; therefore, further sampling may be required to evaluate whether the grain-size distribution of sediments in Reach 7E is suitable for hydraulic dredging. Similarly, without fully understanding sediment pumpability, the production rate and the ability to meet schedule is unknown. However, it is anticipated hydraulic dredging of Reach 7E sediments would meet target daily/yearly production rates and the overall project schedule. Presence of debris is also unknown, and a debris survey will be required prior to commencement of dredging. Debris can either be removed concurrently with hydraulic dredging or before initiating hydraulic dredging. Because hydraulic dredging is considered likely feasible for Reach 7E, hydraulic transport was also evaluated (Section 3.6.2).

## 3.6.2 Hydraulic Transport Evaluation

Because hydraulic dredging may be feasible for Reach 7E, a preliminary evaluation of hydraulic transport was also performed. For Reach 7E, this evaluation assessed, to the extent possible with existing data, the feasibility of hydraulic transport directly to the UDF or directly to a potential rail loading area.

### 3.6.2.1 Pump Directly to the UDF Operational Area

As part of the hydraulic transport evaluation, a preliminary design of the sediment transport pipeline was developed to understand the feasibility of various pumping scenarios. The preliminary hydraulic transport design parameters considered for Reach 7E for this evaluation are summarized in Table B-3, and the preliminary hydraulic transport alignment evaluated to convey material directly to the UDF operational area is illustrated on Figure B-6. Because the existing railroad easement is relatively straight and flat (to support the railroad), and in an effort to mitigate potential impact to areas identified as Priority Habitat of rare species and/or wetlands identified in the National Wetland Inventory between Reach 7E and the UDF, the preliminary hydraulic transport alignment evaluated parallels the tracks.

To convey material directly from Reach 7E to the UDF more than eight miles of pipeline would be required. Based on the CCV assumed for Reach 7E sediments and approximately 200 feet of expected elevation increase, approximately 21 booster pump stations, spaced at roughly 2,000-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). The long distance from any part of Reach 7E to the UDF would increase the chances that if a pump failed during operation, the entire system would lose all transport capabilities. In addition, the pipeline would need to cross the I-90 corridor to reach the UDF, which would be difficult. Finally, the infrastructure required to support hydraulic transport would negatively impact the Priority Habitat of rare species and wetlands identified near Reach 7E and within the corridor most likely to be used for the potential hydraulic transport alignment (Figure B-6).

Given the excessive distance, number of booster pumps required, associated operational limitations (e.g., high potential for production downtime and schedule delays), and potential impact to sensitive habitats, hydraulic transport would not be suitable for transporting Reach 7E sediments directly to the UDF, and thus this transport scenario was not retained for inclusion in design (Table B-2).

#### 3.6.2.2 Pump Directly to a Rail Facility

As discussed in Section 3.2 of the Revised T&D Plan, the closest potential rail loading area identified near Reach 7E is on property near Rising Pond (Figures B-6 and B-7). Because the existing railroad easement is relatively straight and flat, and in an effort to mitigate potential impact to areas identified as Priority Habitat of rare species and/or wetlands identified in the National Wetland Inventory between Reach 7E and Rising Pond, the preliminary hydraulic transport alignment evaluated parallels the tracks for much of the distance to Rising Pond.

To convey material directly from Reach 7E to Rising Pond, more than eight miles of pipeline would be required. The net elevation decrease would be 90 feet. Based on the CCV assumed for Reach 7E sediments, approximately 17 booster pump stations, spaced at roughly 2,000-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). The long distance from any part of Reach 7E to Rising Pond would increase the chances that if a pump failed during operation, the entire system would lose all transport capabilities. In addition, the infrastructure required to support hydraulic transport would negatively impact the Priority Habitat of rare species and wetlands identified near Reach 7E and within the corridor most likely to be used for the potential hydraulic transport alignment (Figure B-6).

Given the excessive distance, number of booster pumps required, associated operational limitations (e.g., high potential for production downtime and schedule delays), and potential impact to sensitive habitats, hydraulic transport would not be suitable for transporting Reach 7E sediments to a potential rail loading area at Rising Pond, and thus this transport scenario was not retained for inclusion in design (Table B-2).

### 3.6.3 Conclusion

Based on available data, hydraulic dredging and transport are not recommended for Reach 7E. Although it may be feasible to dredge the sediment from Reach 7E, hydraulic transport of the sediment has many limitations and is not practical. The options to pump directly to the UDF or to a potential rail loading area were not retained due to the excessive number of booster pumps and relatively high level of risk to project shutdown and/or schedule delays. In addition, the infrastructure required to support hydraulic dredging and transport would likely significantly impact Priority Habitat of rare species.

## 3.7 Reach 7G Evaluation

This section summarizes the evaluation for Reach 7G, which encompasses the Glendale impoundment (Figure B-7).

### 3.7.1 Hydraulic Dredging Feasibility Evaluation

The preliminary evaluation of hydraulic dredging of Reach 7G sediments indicated that hydraulic dredging is likely feasible (Table B-1), and hydraulic dredging of Reach 7G was thus retained for inclusion in design. Reach 7G has "high" ratings for the following screening criteria:

- **Water depth**. Recent bathymetry data for the Reach 7G are not available. However, because sediment removal in Reach 7G is expected to be limited to the impoundment, it is anticipated that water depths would be suitable for operation of hydraulic dredging equipment.
- **Constraints due to geomorphology**. River (impoundment) width and alignment in Reach 7G are anticipated to accommodate hydraulic dredging.
- **Constraints due to infrastructure**. The only notable infrastructure is the Glendale Dam, which can be dredged around and is not expected to be a constraint.
- **Quality of life**. In general, hydraulic dredging requires fewer support vessels (e.g., barges, trucks) and therefore creates less traffic and odor and fewer emissions than other technologies.

A "medium" rating is assigned to the following screening criteria:

- **Operational considerations**. Pre-clearing debris to mitigate the potential for downtime and reducing production rates would both result in additional logistical and operational considerations.

Sediment characteristics are largely unknown for Reach 7G; therefore, further sampling may be required to evaluate whether the grain-size distribution of sediments in Reach 7G is suitable for hydraulic dredging. Similarly, without fully understanding sediment pumpability, the production rate and the ability to meet schedule is unknown. However, it is anticipated that hydraulic dredging of Reach 7G sediments would meet target daily/yearly production rates and the overall project schedule. Presence of debris is also unknown, and a debris survey will be required prior to commencement of dredging. Debris can either be removed concurrently with hydraulic dredging or before initiating hydraulic dredging. Because hydraulic dredging is considered likely feasible for Reach 7G, hydraulic transport was also evaluated (Section 3.7.2).

### 3.7.2 Hydraulic Transport Evaluation

Because hydraulic dredging is likely feasible for Reach 7G, a preliminary evaluation of hydraulic transport was also performed. For Reach 7G, this evaluation assessed, to the extent possible with existing data, the feasibility of hydraulic transport directly to a potential rail loading area. As discussed in Section 3.2 of the Revised T&D Plan, the closest potential rail loading area identified near Reach 7G is at Rising Pond (Figure B-7). To use the railroad for transport, hydraulically dredged sediment from Reach 7G would need to be pumped to the rail loading area, dewatered, staged, and then loaded on rail cars for transport to the UDF or an off-site disposal facility.

As part of the hydraulic transport evaluation, a preliminary design of the sediment transport pipeline was developed to understand the feasibility of various pumping scenarios. The preliminary hydraulic transport design parameters considered for Reach 7G are summarized in Table B-3, and the preliminary hydraulic transport alignment evaluated to convey material to the Rising Pond rail loading area is illustrated on Figure B-7.

The routing for the transport pipeline from Reach 7G to Rising Pond would likely require approximately 3.8 miles of pipeline. Based on the CCV assumed for Reach 7G sediments and approximately 80 feet of expected elevation decrease, approximately eight booster pump stations, spaced at roughly 2,000-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). Routing to avoid drastic changes in elevation would be considered during design. The preliminary proposed pipeline route would be along (within) the river channel. Although the pipeline would pass through areas identified as Priority Habitat of rare species and/or wetlands identified in the National Wetland Inventory between Reach 7G and Rising Pond, floating the pipeline within the channel is not expected to disturb ecologically sensitive areas beyond impacts due to dredging operations. In addition, routing through the channel would increase the distance between the pipeline route and the dense residential areas that parallel the river.

The hydraulic transport screening criteria for Reach 7G are rated as “high” with the exception of sediment pumpability, which is yet to be determined due to the unknown sediment characteristics mentioned previously, and capital improvements (due to the need for an additional dewatering facility for hydraulically dredged sediments other than the one planned near the UDF) and additional handling, which are rated as “medium” (Table B-2). Sufficient space would be available for siting the pipeline, booster stations, and support areas along the river, the railroad corridor, or public roads to get to Rising Pond. The distance and piping length to the Rising Pond rail loading area would be relatively short, and the pipeline route topography would be favorable due to a lack of steep inclines or large elevation gains. There would be no expected infrastructure constraints in the form of large interstate corridors. Truck traffic would be minimized by piping slurry to the Rising Pond rail loading area instead of trucking the material.

### 3.7.3 Conclusion

Hydraulic dredging with transport by pumping directly to the Rising Pond rail loading facility was retained for inclusion in the Reach 7G remedial design; however, further investigation into sediment characteristics and sediment pumpability may be needed to make a final determination of the feasibility of this approach.

## 3.8 Reach 8 Evaluation

This section summarizes the evaluation for Reach 8, specifically, the Rising Pond impoundment (Figure B-7).

### 3.8.1 Hydraulic Dredging Feasibility Evaluation

The preliminary evaluation of hydraulic dredging of Reach 8 sediments indicated that hydraulic dredging is likely feasible (Table B-1), and hydraulic dredging of Reach 8 was thus retained for inclusion in design. Reach 8 has “high” ratings for the following screening criteria:

- **Water depth**. Based on a 1998 bathymetric survey of the area, water depths in Rising Pond are expected to range from one to 15 feet. Although the bathymetric survey indicates that shoreline areas, non-channel areas, and transition zones in Rising Pond have water depths of less than three feet, it is anticipated that traditional hydraulic dredging equipment can be used in most areas due to the ability to float barges in deeper water and extend the dredge head into shallower water. Modified hydraulic dredging equipment and/or limited mechanical dredging may be used in some areas to supplement traditional hydraulic dredging equipment.
- **Constraints due to geomorphology**. River (impoundment) width and alignment in Reach 8 are anticipated to accommodate hydraulic dredging.
- **Constraints due to infrastructure**. The only notable infrastructure is the Rising Pond Dam, which can be dredged around and is not expected to be a constraint.

- **Quality of life**. In general, hydraulic dredging requires fewer support vessels (e.g., barges, trucks) and therefore creates less traffic and odor and fewer emissions than other technologies.
- **Operational considerations**. The expected high production rate and limited infrastructure constraints or large debris indicate few operational challenges.

Sediment characteristics are largely unknown for Reach 8; therefore, further sampling may be required to evaluate whether the grain-size distribution of sediments in Reach 8 is suitable for hydraulic dredging. Similarly, without fully understanding sediment pumpability, the production rate and the ability to meet schedule is unknown. However, it is anticipated that hydraulic dredging of Reach 8 sediments will meet target daily/yearly production rates and the overall project schedule. Presence of debris is also unknown, and a debris survey will be required prior to commencement of dredging. Debris can either be removed concurrently with hydraulic dredging or before initiating hydraulic dredging. Because hydraulic dredging is considered likely feasible for Reach 8, hydraulic transport was also evaluated (Section 3.8.2).

### 3.8.2 Hydraulic Transport Evaluation

Because hydraulic dredging is likely feasible for Reach 8, a preliminary evaluation of hydraulic transport was also performed. For Reach 8, this evaluation assessed, to the extent possible with existing data, the feasibility of hydraulic transport directly to a potential rail loading area. As discussed in Section 3.2 of the Revised T&D Plan, a potential rail loading area was identified in an area near Rising Pond (Figure B-7). To use the railroad for transport, hydraulically dredged sediment from Reach 8 would need to be pumped to the rail loading area, dewatered, staged, and then loaded on rail cars for transport to the UDF or an off-site disposal facility.

As part of the hydraulic transport evaluation, a preliminary design of the sediment transport pipeline was developed to understand the feasibility of various pumping scenarios. The preliminary hydraulic transport design parameters considered for Reach 8 are summarized in Table B-3, and the preliminary hydraulic transport alignment evaluated to convey material to the Rising Pond rail loading area is illustrated on Figure B-7.

The routing for the transport pipeline from Reach 8 to Rising Pond would likely require approximately one mile of pipeline. Based on the CCV assumed for Reach 8 sediments and approximately 20 feet of expected elevation decrease, approximately three booster pump stations, spaced at roughly 2,000-foot intervals, would be necessary to provide adequate head conditions to the slurry pumping system (Table B-3). Routing to avoid drastic changes in elevation would be considered during design. The preliminary proposed pipeline route would be directly from the river channel through vacant property used to support construction to the rail loading area on the same property.

The hydraulic transport screening criteria for Reach 8 are rated as “high” with the exception of sediment pumpability, which is yet to be determined due to the unknown sediment characteristics mentioned previously, capital improvements (due to the need for an additional dewatering facility for hydraulically dredged sediments other than the one planned near the UDF) and additional handling, which are rated as “medium” (Table B-2). Sufficient space would be available for siting the pipeline, booster stations, and support areas along the river. The distance and piping length to Rising Pond rail loading area would be relatively short, and the pipeline route topography would be favorable due to a lack of steep inclines or large elevation gains. There would be no expected infrastructure constraints in the form of large interstate corridors or rail crossings. Truck traffic would be minimized by piping slurry to the Rising Pond rail loading area instead of trucking the material.

### 3.8.3 Conclusion

Hydraulic dredging with transport by pumping directly to the Rising Pond rail loading facility was retained for inclusion in the Reach 8 remedial design; however, further investigation into sediment characteristics and sediment pumpability may be needed to make a final determination of the feasibility of this approach.

# 4 Summary and Recommendations

This section summarizes, based on available data, the preliminary recommendation for each RU regarding whether hydraulic dredging can be performed, and if so, the recommendation for hydraulic transport of material.

Based on available data, hydraulic dredging and hydraulic transport appear to be likely feasible for Reaches 5C, 6, 7B, 7C, 7G, and 8 and thus have been retained for inclusion in the remedial design for those reaches. For several of these reaches, particularly those downstream of Woods Pond, further investigation into sediment characteristics and water depths will be needed to make a final determination of feasibility. Hydraulic dredging and transport were not retained for inclusion in the remedial designs for Reaches 5A, 5B, and 7E due to factors including dredging efficiency, sediment characteristics, distances to the UDF or to a rail loading facility, and the presence of Priority Habitat of rare species and wetlands, limiting construction of new infrastructure.

The summarized results of the evaluation are presented in Table B-4, below.

**Table B-4 Summary of Preliminary Hydraulic Dredging and Transport Evaluation**

| Evaluation | Reach | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5A | 5B | 5C | 6 | 7B | 7C | 7E | 7G | 8 |
| Hydraulic dredging | retained | not retained | retained | retained | retained | retained | retained | retained | retained |
| Hydraulic transport: | | | | | | | | | |
| Pump directly to UDF | not retained | not applicable/not evaluated | retained | retained | retained | retained | not retained | not applicable/not evaluated | not applicable/not evaluated |
| Pump directly to rail facility | not retained | not applicable/not evaluated | not retained | not retained | not retained | not retained | not retained | retained | retained |
| Pump to UDF from intermediate staging area | not retained | not applicable/not evaluated | not applicable/not evaluated | not applicable/not evaluated | not applicable/not evaluated | not applicable/not evaluated | not applicable/not evaluated | not applicable/not evaluated | not applicable/not evaluated |

**Legend:**

= retained
= not retained
= not applicable/not evaluated

For those RUs that will include hydraulic dredging and transport to the UDF, sediments designated for off-site disposal (if any) will be fully segregated from sediments for on-site disposal during dredging and transport to the UDF and once at the UDF property for dewatering. The material designated for off-site disposal will likely be pumped to the same location as other sediments for on-site disposal in the UDF (whether it be transported directly to the UDF or a temporary staging facility), segregated, dewatered, and transported for off-site disposal. If the material designated for off-site disposal is mechanically dredged separately, the material will be placed in or transported to a temporary staging area or container, dewatered, and then transported for off-site disposal. The handling and management of hydraulically pumped sediments at the UDF will be described further in the forthcoming Revied Final Design Plan for the UDF.

# 5 References

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# Tables

**Table B-1**
**Results of Preliminary Hydraulic Dredging Evaluation**
**Preliminary Site-Wide Hydraulic Dredging/Transport Evaluation**
**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

ARCADIS

| **Criteria** | **Reach** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **5A** | **5B** | **5C** | **6** | **7B** | **7C** | **7E** | **7G** | **8** |
| Water depth | | | | | | | | | |
| Sediment characteristics | | | | | | | | | |
| Production rate | | | | | | | | | |
| Presence of debris | | | | | | | | | |
| Geomorphology constraints | | | | | | | | | |
| Infrastructure constraints | | | | | | | | | |
| Quality of life | | | | | | | | | |
| Operational considerations | | | | | | | | | |
| Result | Possibly feasible in some areas | Not retained | Likely feasible | Likely feasible | Likely feasible | Likely feasible | Likely feasible | Likely feasible | Likely feasible |

**Legend:**

| | |
|---|---|
| High | |
| Medium | |
| Low | |
| To Be Determined | |

**Table B-2**
**Results of Preliminary Hydraulic Transport Criteria Evaluation**
**Preliminary Site-Wide Hydraulic Dredging/Transport Evaluation**
**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

| Criteria | Reach | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5A | | | 5B | 5C | | 6 | | 7B | 7C | 7E | | 7G | 8 |
| | Pump Directly to UDF | Pump to UDF from Intermediate Staging Area | Pump Directly to Rail Facility | | Pump Directly to UDF | Pump Directly to Rail Facility | Pump Directly to UDF | Pump Directly to Rail Facility | Pump Directly to UDF | Pump Directly to UDF | Pump Directly to UDF | Pump Directly to Rail Facility | Pump Directly to Rail Facility | Pump Directly to Rail Facility |
| Siting | High | High | Low | Not applicable (not retained for hydraulic dredging) | High | Low | High | Low | High | High | Low | Low | High | High |
| Distance/piping length | Low | Medium | High | | High | High | High | High | Medium | Medium | Low | Low | High | High |
| Topography | High | High | High | | High | High | High | High | High | High | High | High | High | High |
| Sediment pumpability | Low | Low | Low | | To Be Determined | Medium | High | High | To Be Determined | To Be Determined | To Be Determined | To Be Determined | To Be Determined | To Be Determined |
| Reduction in truck/rail traffic | High | Low | Medium | | High | Medium | High | Medium | High | High | High | Medium | High | High |
| Infrastructure constraints | Medium | Medium | High | | High | High | High | High | Medium | Medium | Medium | High | High | High |
| Additional handling | High | Low | Low | | High | Low | High | Low | High | High | High | Medium | Medium | Medium |
| Additional capital improvements | Medium | Low | Low | | High | Low | High | Low | High | High | High | Low | Medium | Medium |
| Result | Not retained | | | | Likely feasible | Not retained | Likely feasible | Not retained | Likely feasible | Likely feasible | Not retained | Not retained | Likely feasible | Likely feasible |

**Legend:**

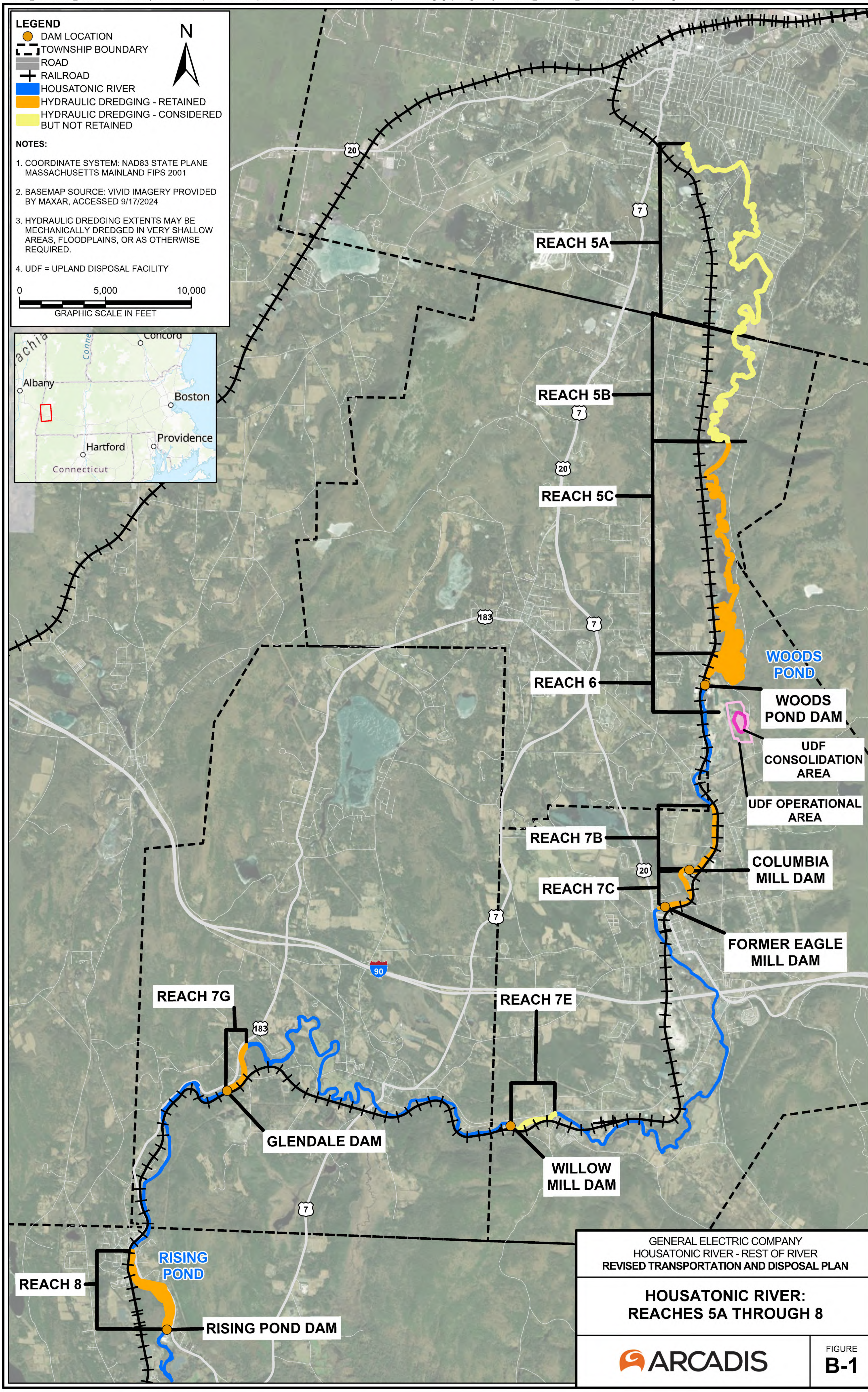
- High
- Medium
- Low
- To Be Determined

**Table B-3**
**Summary of Preliminary Hydraulic Transport Design**
**Preliminary Site-Wide Hydraulic Dredging/Transport Evaluation**
**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

| Reach | Pipeline Length (miles) | Net Elevation Change (feet) | Booster Pump Stations |
|---|---|---|---|
| 5A | 7.0 | -40 | 18 |
| 5C | 4.0 | -25 | 8 |
| 6 | 0.5 | -15 | 2 |
| 7B (stand-alone) | 2.4 | +25 | 6 |
| 7C (stand-alone) | 2.9 | +30 | 7 |
| 7C (combined with Reach 7B) | 0.5 | +5 | 1 |
| 7E (to Upland Disposal Facility) | 7.2 | +200 | 21 |
| 7E (to Rising Pond) | 8.5 | -90 | 17 |
| 7G (stand-alone) | 3.8 | -80 | 8 |
| 8 | 1.0 | -20 | 3 |

**Note:**
Approximately 110 horsepower per pump was assumed for this preliminary design; however, power requirements will largely depend on flow characteristics and equipment specification.

# Figures



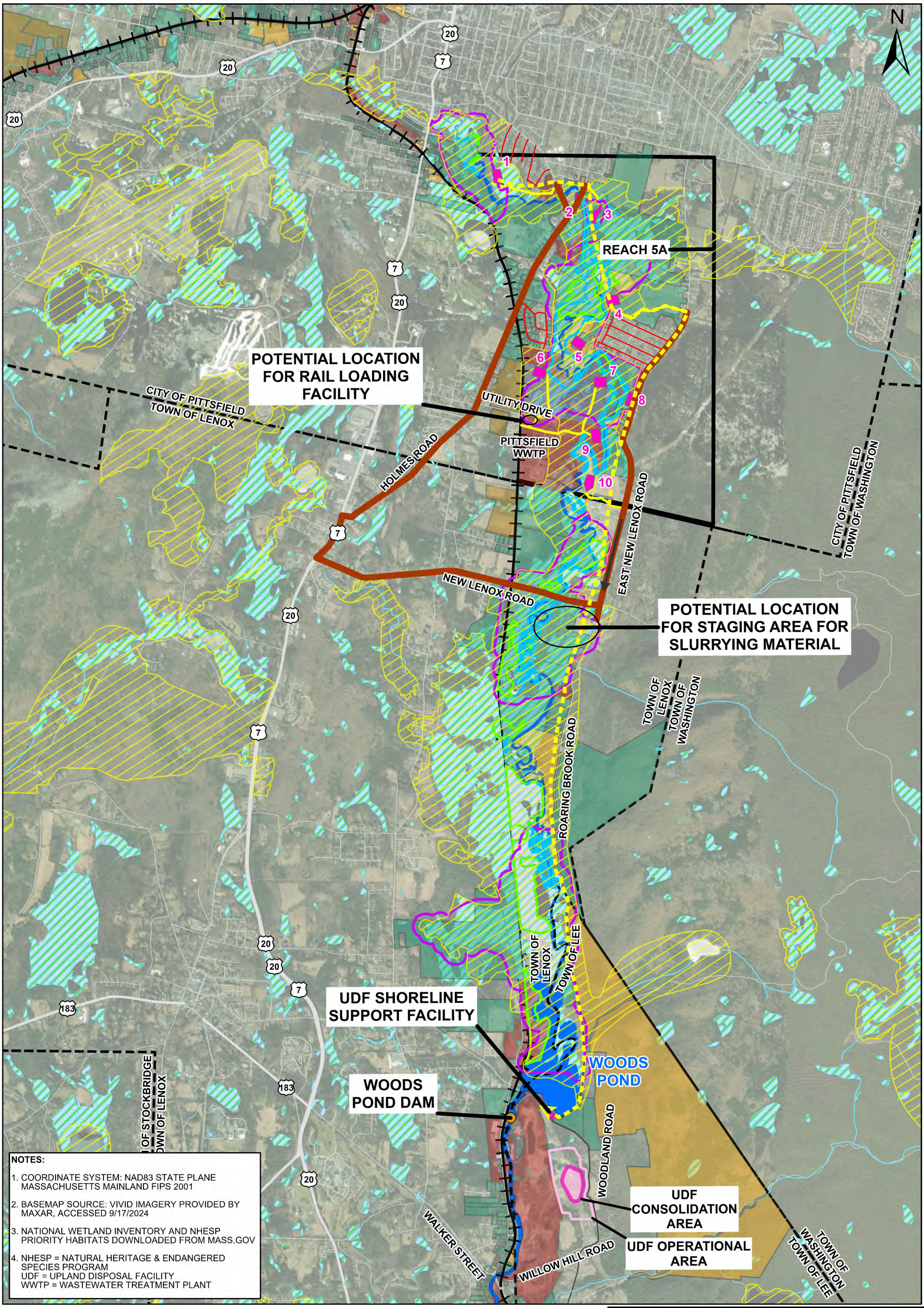

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**HOUSATONIC RIVER: REACHES 5A THROUGH 8**

ARCADIS

FIGURE
**B-1**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\T and D Plan - SiteWideEval Hydraulic Dredging.aprx\FigB-2 Hydraulic Eval_Reach 5A   Last Saved By: ksinsabaugh  9/17/2024




NOTES:

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM
UDF = UPLAND DISPOSAL FACILITY
WWTP = WASTEWATER TREATMENT PLANT

**LEGEND**

- DAM LOCATION
- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- PRELIMINARY ACCESS ROAD TO PUBLIC ROAD
- PRELIMINARY STAGING AREA
- ROAD USE RESTRICTED
- HOUSATONIC RIVER
- POTENTIAL TRUCK ROUTE TO STAGING AREA FOR SLURRYING
- POTENTIAL PIPING ROUTE
- GENERAL TRAVEL DIRECTION TO DISPOSAL
- NHESP PRIORITY HABITAT OF RARE SPECIES
- CORE AREA 1
- CORE AREA 2
- CORE AREA 3
- NATIONAL WETLAND INVENTORY

PARCELS WITHIN 500 FEET OF RAILROAD

- RESIDENTIAL
- AGRICULTURAL/HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL
- RECREATIONAL
- COMMONWEALTH OF MASSACHUSETTS

0 3,000 6,000
GRAPHIC SCALE IN FEET

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**HYDRAULIC DREDGING & TRANSPORT EVALUATION - REACH 5A**

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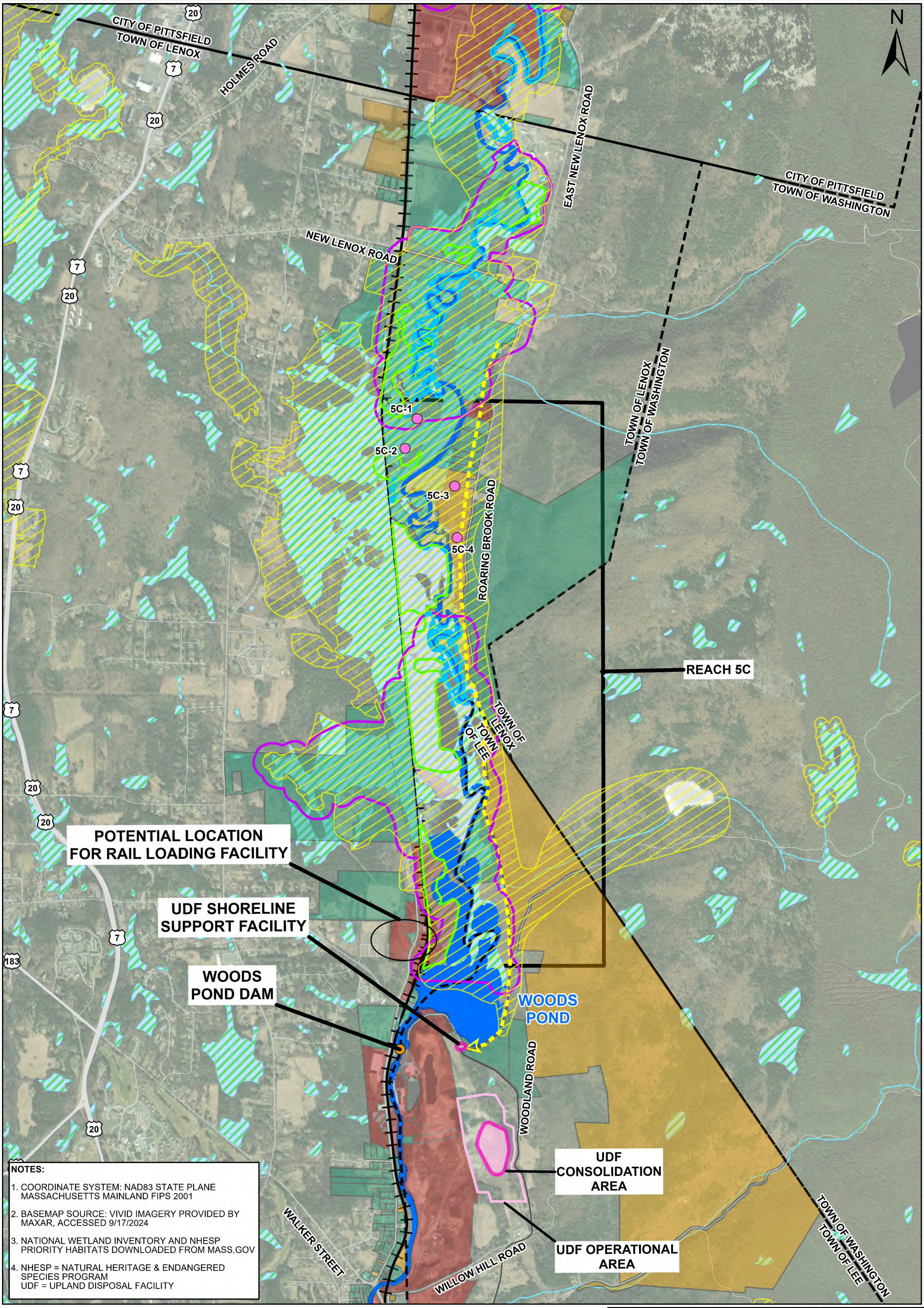
FIGURE
**B-2**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\T and D Plan - SiteWideEval Hydraulic Dredging.aprx\FigB-3 Hydraulic Eval _Reach 5C Last Saved By: ksinsabaugh 9/17/2024




**NOTES:**

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM
   UDF = UPLAND DISPOSAL FACILITY

**LEGEND**

- DAM LOCATION
- POTENTIAL PRELIMINARY STAGING AREA
- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- HOUSATONIC RIVER
- POTENTIAL PIPING ROUTE
- NHESP PRIORITY HABITAT OF RARE SPECIES
- CORE AREA 1
- CORE AREA 2
- CORE AREA 3
- NATIONAL WETLAND INVENTORY

PARCELS WITHIN 500 FEET OF RAILROAD

- RESIDENTIAL
- AGRICULTURAL/HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL
- MULTIPLE-USE
- RECREATIONAL
- COMMONWEALTH OF MASSACHUSETTS

0 2,000 4,000
GRAPHIC SCALE IN FEET

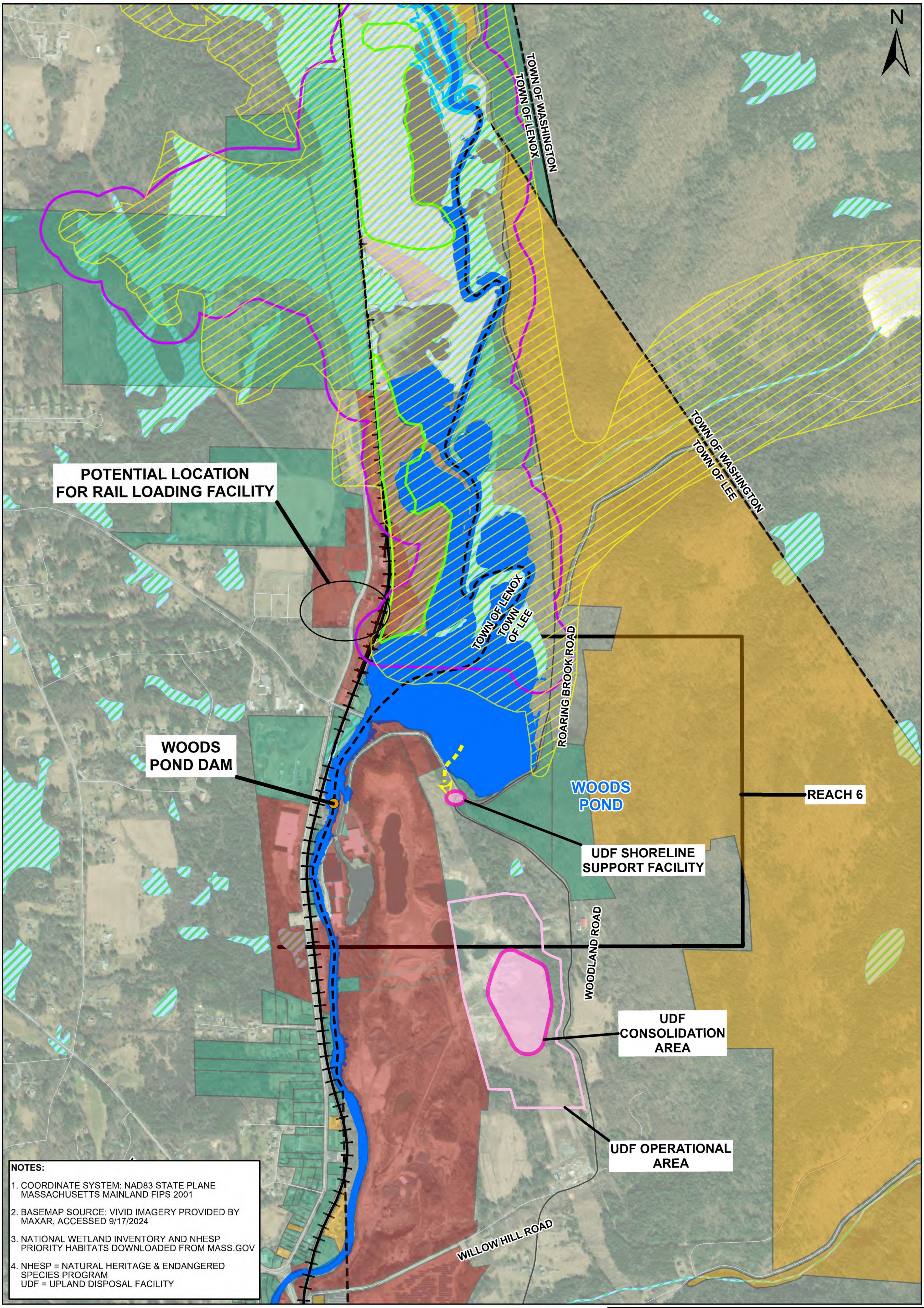
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**HYDRAULIC DREDGING & TRANSPORT EVALUATION - REACH 5C**

ARCADIS

FIGURE
**B-3**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\T and D Plan - SiteWideEval Hydraulic Dredging.aprx\FigB-4 Hydraulic Eval _Reach 6   Last Saved By: ksinsabaugh  9/17/2024




**LEGEND**

- DAM LOCATION
- POTENTIAL PRELIMINARY STAGING AREA
- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- HOUSATONIC RIVER
- POTENTIAL PIPING ROUTE
- NHESP PRIORITY HABITAT OF RARE SPECIES
- CORE AREA 1
- CORE AREA 3
- CORE AREA 2
- NATIONAL WETLAND INVENTORY

PARCELS WITHIN 500 FEET OF RAILROAD
- RESIDENTIAL
- AGRICULTURAL/HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL
- MULTIPLE-USE
- RECREATIONAL
- COMMONWEALTH OF MASSACHUSETTS

0 1,000 2,000
GRAPHIC SCALE IN FEET

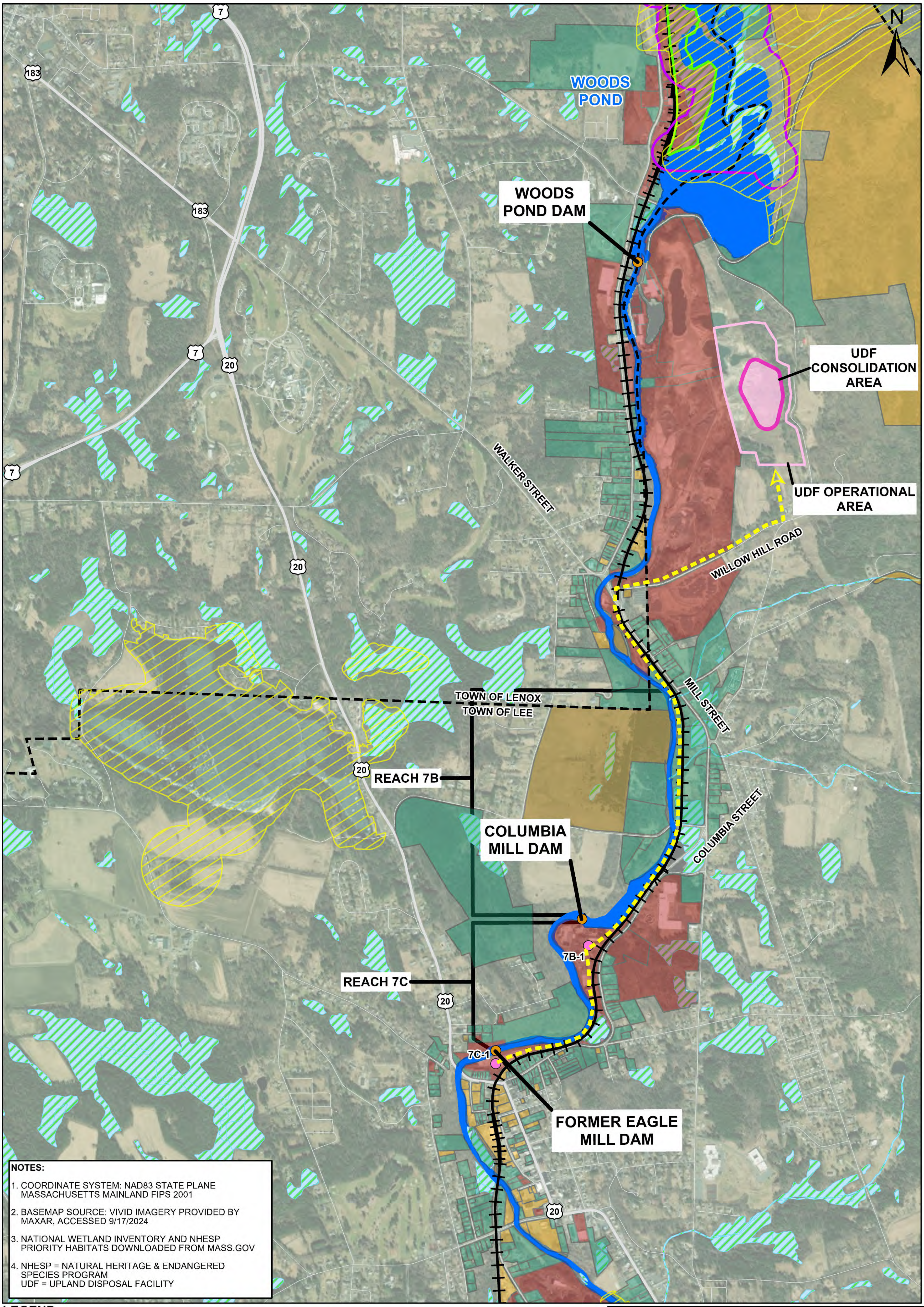
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**HYDRAULIC DREDGING & TRANSPORT EVALUATION - REACH 6**

ARCADIS

FIGURE
**B-4**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\T and D Plan - SiteWideEval Hydraulic Dredging.aprx\FigB-5 Hydraulic Eval _Reach 7B 7C Last Saved By: ksinsabaugh 9/17/2024




NOTES:

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM
UDF = UPLAND DISPOSAL FACILITY

**LEGEND**

- DAM LOCATION
- POTENTIAL PRELIMINARY STAGING AREA
- POTENTIAL PIPING ROUTE
- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- HOUSATONIC RIVER
- NHESP PRIORITY HABITAT OF RARE SPECIES
- CORE AREA 1
- CORE AREA 2
- NATIONAL WETLAND INVENTORY

PARCELS WITHIN 500 FEET OF RAILROAD

- RESIDENTIAL
- AGRICULTURAL/HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL
- MULTIPLE-USE
- RECREATIONAL
- COMMONWEALTH OF MASSACHUSETTS

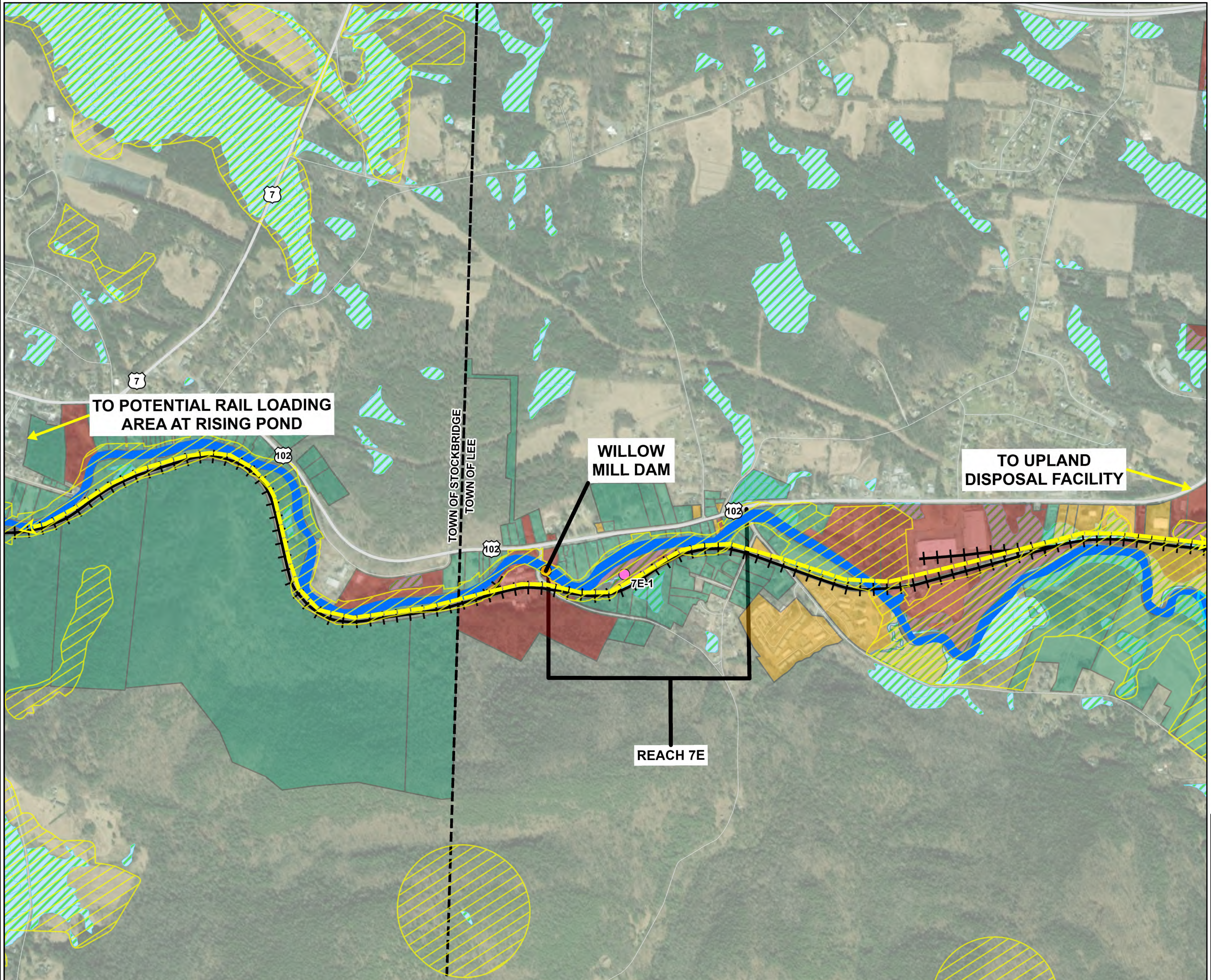
0 1,500 3,000
GRAPHIC SCALE IN FEET

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**HYDRAULIC DREDGING & TRANSPORT EVALUATION - REACHES 7B AND 7C**

ARCADIS

FIGURE
**B-5**




**LEGEND**

- DAM LOCATION
- POTENTIAL PRELIMINARY STAGING AREA
- POTENTIAL PIPING ROUTE
- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- HOUSATONIC RIVER
- NATIONAL WETLAND INVENTORY
- CORE AREA 3
- NHESP PRIORITY HABITAT OF RARE SPECIES

PARCELS WITHIN 500 FEET OF RAILROAD

- RESIDENTIAL
- AGRICULTURAL/HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL
- MULTIPLE-USE
- RECREATIONAL
- COMMONWEALTH OF MASSACHUSETTS

**NOTES:**

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/17/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

0 1,250 2,500
GRAPHIC SCALE IN FEET

N

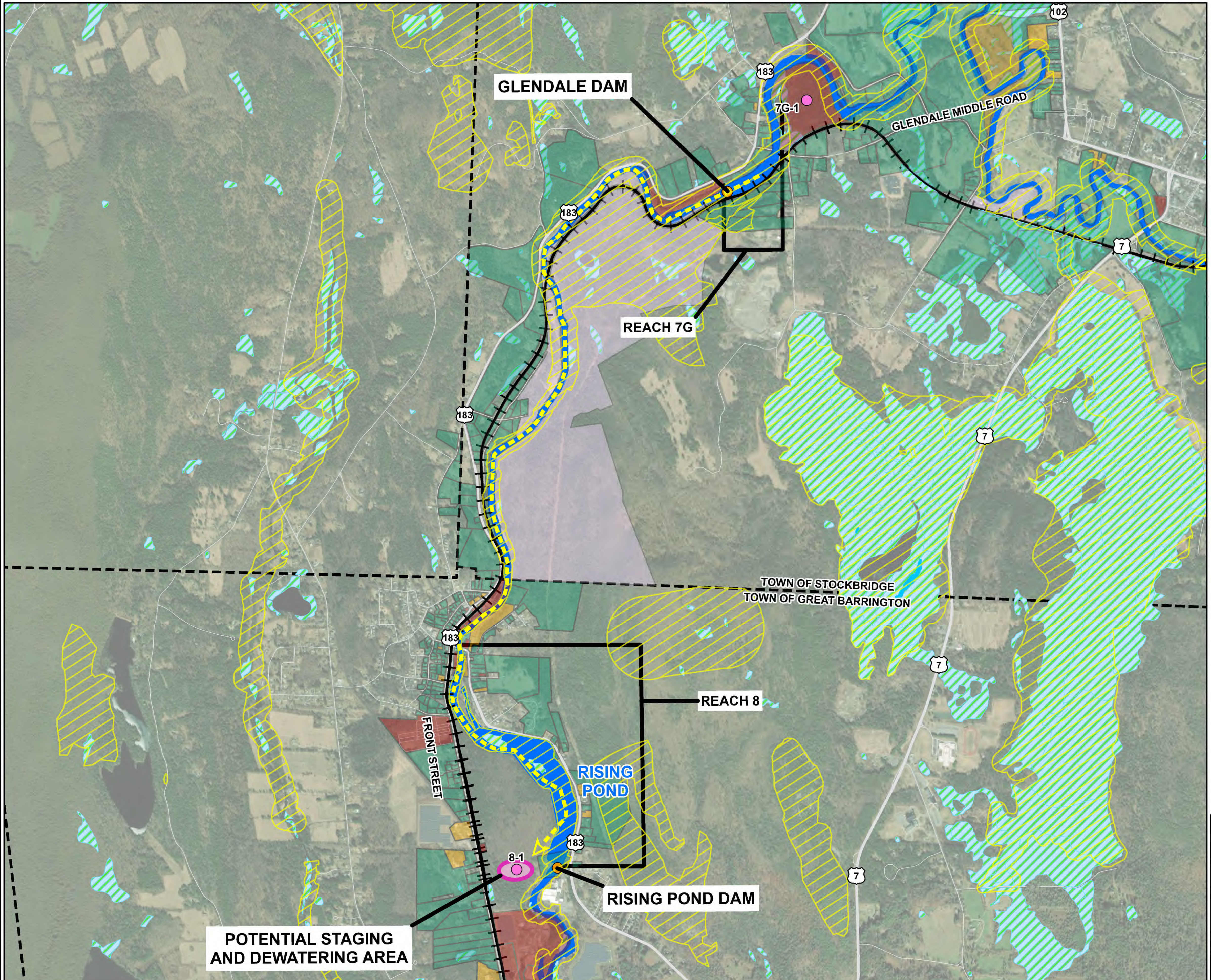
GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**HYDRAULIC DREDGING & TRANSPORT EVALUATION - REACH 7E**

ARCADIS

FIGURE
**B-6**

Path: T:_ENV\GE\GE_Housatonic\ArcPro Projects\ROR\Transportation and Disposal Plan\T and D Plan - SiteWideEval Hydraulic Dredging.aprx\FigB-6 Hydraulic Eval _Reach 7E Last Saved By: ksinsabaugh 9/17/2024




**LEGEND**

- DAM LOCATION
- POTENTIAL PRELIMINARY STAGING AREA
- POTENTIAL PIPING ROUTE
- TOWNSHIP BOUNDARY
- ROAD
- RAILROAD
- HOUSATONIC RIVER
- NHESP PRIORITY HABITAT OF RARE SPECIES
- CORE AREA 3
- NATIONAL WETLAND INVENTORY

PARCELS WITHIN 500 FEET OF RAILROAD

- RESIDENTIAL
- AGRICULTURAL/HORTICULTURAL
- COMMERCIAL
- INDUSTRIAL
- RECREATIONAL

**NOTES:**

1. COORDINATE SYSTEM: NAD83 STATE PLANE MASSACHUSETTS MAINLAND FIPS 2001
2. BASEMAP SOURCE: VIVID IMAGERY PROVIDED BY MAXAR, ACCESSED 9/18/2024
3. NATIONAL WETLAND INVENTORY AND NHESP PRIORITY HABITATS DOWNLOADED FROM MASS.GOV
4. NHESP = NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

0 2,000 4,000

GRAPHIC SCALE IN FEET

N

GENERAL ELECTRIC COMPANY
HOUSATONIC RIVER - REST OF RIVER
**REVISED TRANSPORTATION AND DISPOSAL PLAN**

**HYDRAULIC DREDGING & TRANSPORT EVALUATION - REACHES 7G AND 8**

ARCADIS

FIGURE
**B-7**

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www.arcadis.com

# Appendix C

## Greenhouse Gas Evaluation

General Electric Company

# Appendix C: Greenhouse Gas Evaluation

## Revised On-Site and Off-Site Transportation and Disposal Plan

## Housatonic River – Rest of River
## Pittsfield, Massachusetts

October 2024

# Appendix C: Greenhouse Gas Evaluation

**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

October 2024

**Prepared By:**
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**Prepared For:**
General Electric Company
Pittsfield, Massachusetts

**Our Ref:**
ARC31156 (30177139)

# Table of Contents



# Tables (in text)



# Attachments

# Abbreviations

| | |
|---|---|
| EPA | United States Environmental Protection Agency |
| GHG | greenhouse gas |
| $CH_4$ | methane |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalent |
| $N_2O$ | nitrous oxide |
| Revised T&D Plan | Revised On-Site and Off-Site Transportation and Disposal Plan |
| ROR | Rest of River |
| RU | remediation unit |
| SEFA | Spreadsheets for Environmental Footprint Analysis |
| T&D Plan | On-Site and Off-Site Transportation and Disposal Plan |
| TSCA | Toxic Substances Control Act |
| UDF | Upland Disposal Facility |

# 1 Introduction

The Revised On-Site and Off-Site Transportation and Disposal Plan (Revised T&D Plan), to which this document is an appendix, describes and evaluates various methods and scenarios for transporting sediments and floodplain soils containing polychlorinated biphenyls and removed from different remediation units (RUs) of the Housatonic River and adjacent floodplain to an on-site Upland Disposal Facility (UDF) or to off-site commercial disposal facilities. This transport of materials will occur during performance of a Remedial Action selected by the United States Environmental Protection Agency (EPA) for the Housatonic Rest of River (ROR) site. The transport methods include hydraulic transport, truck transport, and rail combined with truck transport (rail/truck transport).[1]

As directed by EPA, potential impacts of the various transportation methods and scenarios on nearby communities, workers, and the environment during the implementation of the Remedial Action have been evaluated. These impacts include potential greenhouse gas (GHG) emissions associated with the transport of materials from the removal areas (or staging areas) to the UDF or off-site disposal facilities. This appendix provides an assessment of anticipated GHG emissions related to the use of hydraulic transport, truck transport, and rail/truck transport in the four site-wide transportation scenarios described Section 4 of the Revised T&D Plan.

The hydraulic transport, truck transport, and rail/truck transport components of the four site-wide transportation scenarios evaluated are described in detail in Section 4 of the Revised T&D Plan and can be summarized as follows:

- **Scenario 1 (Truck Transport to UDF and for Off-Site Disposal)** – Hydraulic transport of the majority of the removed material to the UDF. For the remainder, truck transport from the RUs to the UDF for on-site disposal and truck transport from the RUs for off-site disposal, with loading to rail at an existing commercial rail loading facility in Albany, New York, and rail transport the remaining distance to the selected off-site disposal facility(ies).
- **Scenario 2 (Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal)** – Hydraulic transport of the majority of the removed material to the UDF. For the remainder, truck transport from the RUs to the UDF for on-site disposal and rail/truck transport from the RUs for off-site disposal. This scenario includes construction of three rail loading areas (at Utility Drive, Woods Pond Spur, and Rising Pond). Rail/truck transport for off-site disposal includes hydraulic transport of sediments from Reach 7G and 8 directly to the Rising Pond loading facility for loading to rail.
- **Scenario 3 (Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal)** – Hydraulic transport of the majority of the removed material to the UDF. For the remainder, truck transport from the RUs to the UDF for on-site disposal, truck transport from Reaches 5A and 5B for off-site disposal with loading to rail at the existing commercial rail loading facility in Albany and rail transport the remaining distance, and rail/truck transport from the other RUs for off-site disposal. This scenario includes construction of two rail loading areas (at Woods Pond Spur and Rising Pond). Rail/truck transport for off-site disposal includes hydraulic transport of sediments from Reach 7G and 8 directly to the Rising Pond loading facility for loading to rail.
- **Scenario 4 (Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal)** – Hydraulic transport of the majority of the removed material to the UDF. For the remainder, mostly rail/truck from the RUs to the UDF for on-site disposal and rail/truck transport from the RUs for off-site disposal. This scenario includes construction of two rail loading areas (at Utility Drive and Rising Pond) and one rail loading/off-loading area (at Woods Pond Spur). Rail/truck transport for on- and off-site disposal includes hydraulic transport of sediments from Reach 7G and 8 directly to the Rising Pond loading facility for loading to rail.

[1] Use of the railroad as a mode of transportation will necessarily include use of trucks to convey material to the railroad and/or from the railroad to the final disposal site and is therefore referred to as a rail/truck transport approach.

This appendix quantifies and evaluates the GHG emissions associated with these four transportation scenarios. The GHGs that are emitted are gases that trap heat in the atmosphere. The most prominent GHGs contributing to the heating of the atmosphere in general are carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$), with $CO_2$ being the primary GHG emitted through human activities (comprising approximately 80% of GHG emissions). In order to take into account the contributions of all of these components to the heating of the atmosphere, the carbon dioxide equivalent ($CO_2e$) is used to calculate total GHG emissions based on the global warming potential of each component. Global warming potential is the heat absorbed by any GHG in the atmosphere as a multiple of the heat that would be absorbed by the same mass of $CO_2$. The potential sources of GHG emissions anticipated from transportation and disposal of material during implementation of the ROR Remedial Action will include direct sources (e.g., on- and off-road vehicles and fuel combustion from equipment operation), indirect sources (e.g., electricity use), and upstream contributions (e.g., production of materials used for transportation and disposal.

The remainder of this appendix presents the methodology and assumptions for the evaluation of GHG emissions and summarizes the results of the evaluation.

# 2 Greenhouse Gas Emissions Methodology and Evaluation

A quantitative GHG assessment was performed for the purposes of comparing the four site-wide transportation scenarios presented above and was based on assumed numbers and types of construction equipment and materials and proximities of the equipment, personnel, and materials to the ROR site during construction. Because many of the details associated with the ROR Remedial Action have yet to be established, the GHG assessment presented herein is preliminary and intended to provide a relative comparison among potential transportation and disposal options. The tool called Spreadsheets for Environmental Footprint Analysis (SEFA) (Version 3.0) was used to estimate GHG emissions from the ROR Remedial Action. SEFA is a Microsoft Excel-based tool developed by EPA and can be found on EPA's Contaminated Site Clean-Up Information website (EPA 2020). This tool has been designed to help analyze the environmental footprint of a site cleanup project, including GHG emissions.

SEFA was developed using industry-standard guidance and assumptions; the remedial scenarios were scoped using fundamental engineering practices and design assumptions with support from product and manufacturer documentation, when available. SEFA documents emissions of GHGs, including CO2, CH4, and N2O in the form of tons of CO2e. The tool uses industry standards to quantify this metric following EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 2012). In accordance with the World Resources Institute Greenhouse Gas Protocol (World Resources Institute/World Business Council for Sustainable Development. 2001), emissions are separated into three scopes:

- **Scope 1 (Direct)** – These GHG emissions occur within the site boundaries and are derived from equipment owned by the General Electric Company or its on-site contractors. In this analysis, Scope 1 emissions will include emissions associated with fuel combusted onsite in heavy equipment for construction of rail spurs/siding and/or transferring material between rail and truck.
- **Scope 2 (Electricity**) – These emissions result from off-site generation of electricity used by the project (such emissions are not anticipated for any of the four site-wide transportation scenarios).
- **Scope 3 (Indirect)** – These emissions result from remedy-related emissions not covered by the Scope 1 or Scope 2 categories. For this analysis, Scope 3 emissions are further subdivided as follows:

- Transportation (Scope 3a) – These emissions are associated with transportation of personnel, equipment, and material to/from the site for use or disposal, including transportation of the removed soil/sediment to the appropriate disposal facility[2].
- Other Indirect (Scope 3b) – These emissions are associated with off-site activities such as materials manufacturing, off-site services (e.g., laboratory analysis), transmission of electricity through the electricity grid, and resource extraction for fuels used in electricity generation.

As stated in the Revised T&D Plan, transportation in the modes being considered starts after the material is loaded into containers for shipment and ends with delivery of the material at the receiving facility (i.e., UDF or off-site disposal facility). As such, GHG emissions were evaluated for the period that begins with the loading of material into containers for shipment and ends with delivery of the material at the receiving facility. Activities evaluated in the four site-wide transportation scenarios include the following for each scenario, as applicable, and general assumptions for each are outlined in the remainder of this section:

- Hydraulic transport operations;
- Construction of rail spurs;
- Truck transport operations; and
- Rail/truck transport operations, including operations to transfer material from trucks to rail and/or from rail to truck.

In the evaluation of hydraulic transport operations, for the purposes of this GHG evaluation, the process of “loading of material into containers for shipment” implies that the transport of hydraulically dredged material starts within the hydraulic transport pipeline. As such, hydraulic dredging operations themselves are not included as part of the transportation activities. Similarly, hydraulic operation emissions were calculated based on projected booster pump and pipe use and did not include emissions associated with the receiving facility (e.g., the dewatering system) or any other downstream processes.

Construction activities associated with the rail spurs were assumed to occur for eight hours per day, five days per week, for approximately three months, with some minor variation in duration due to existing site conditions at each of the three locations identified as potential rail spur locations in the Revised T&D Plan. Specifically, at the Utility Drive location, construction is expected to require approximately 11 weeks because it is a cleared, relatively flat field without large trees. For the Woods Pond Spur location, some grading has already been performed to support existing rail infrastructure; therefore, less site preparation is anticipated, and construction is expected to require approximately 10 weeks. Finally, the Rising Pond location is expected to require approximately 12 weeks for construction due to dense vegetation and large trees and shrubs. It is anticipated that both the Utility Drive and Rising Pond locations will be restored following project completion, with the time for restoration dependent on the nature and scope of the restoration plan, determined in coordination with the property owner. However, given the anticipated future use of the Woods Pond Spur for use by the Berkshire Scenic Railway Museum, no additional site restoration is anticipated for that location after the project is complete.

Finally, truck transport operations include transport of removed materials by truck to the selected disposal facility(ies), and rail/truck transport operations include transport of removed materials by truck to a rail loading area, by truck from a rail off-loading area, and/or by rail to the selected disposal facility(ies). Rail/truck transport operations also include the operations for transferring material from trucks to rail and/or from rail to truck and are

[2] For the purposes of estimating miles of transport for the GHG calculations, an off-site disposal facility in Emelle, Alabama, was assumed for materials regulated under the Toxic Substances Control Act (TSCA) and an off-site facility in Fairport, New York, was assumed for material not regulated under TSCA (i.e., non-TSCA material). The UDF is the selected on-site disposal facility. The estimated miles include the round-trip distance traveled. Total truck miles traveled is per truck, and total train miles is the number of miles traveled by each rail car (which includes six containers).

based on applicable construction hours for each scenario, which are eight hours per day, five days per week, and nine months per year (198 days per year). Off-loading from either rail and truck at the selected off-site or on-site disposal facility is not included in the GHG evaluation presented herein.

## 2.1 Scenario 1

As described above, the following activities are applicable to the GHG emissions evaluation for Scenario 1:

- Hydraulic transport of the majority of the removed material to the UDF;
- Truck transport of the remaining material for on-site disposal from the RUs to the UDF; and
- Truck transport of the remaining material for off-site disposal from the RUs to an existing commercial rail loading facility in Albany, New York, for transfer from truck to rail, and then rail transport for the remaining distance to the selected off-site disposal facility(ies).

In this scenario, construction of new project-specific rail loading areas is not included.

Table C-1 presents GHG emissions for Scenario 1 broken down by scope and activity, as calculated using SEFA.

*Table C-1: Scenario 1 GHG Emissions (tons CO2e)*

| Scope | Hydraulic Transport Operations | Construction of Rail Loading/Off-Loading Area | Truck Transport Operations | Rail/Truck Transport Operations[a] | Total |
|---|---|---|---|---|---|
| **1** | 2,538 | 0 | 0 | 523 | **3,061** |
| **2** | 0 | 0 | 0 | 0 | **0** |
| **3a** | 40 | 0 | 430 | 1,825 | **2,295** |
| **3b** | 531 | 0 | 58 | 2,190 | **2,779** |
| **Total** | **3,109** | **0** | **488** | **4,538** | **8,135** |

**Note:**
[a] For the purposes of calculating GHG, even though the rail transport begins off-site, in Albany, New York, transport of removed materials by truck to a rail loading area and operations for transferring material from trucks to rail are accounted for under “rail/truck transport operations,” along with transport by rail to the selected disposal facility(ies).

Tables summarizing the input assumptions and SEFA calculations for Scenario 1 are provided in Attachment C-1.

## 2.2 Scenario 2

As described above, the following activities are applicable to the GHG emissions evaluation for Scenario 2:

- Hydraulic transport of the majority of the removed material to the UDF;
- Construction of three rail loading areas (Utility Drive, Woods Pond Spur, and Rising Pond);
- Truck transport of the remaining material for on-site disposal from the RUs to the UDF; and
- Rail/truck transport of the remaining material for off-site disposal from the RUs to the selected off-site disposal facility(ies).

Table C-2 presents GHG emissions for Scenario 2 broken down by scope and activity, as calculated using SEFA.

*Table C-2: Scenario 2 GHG Emissions (tons CO2e)*

| Scope | Hydraulic Transport Operations | Construction of Rail Loading/Off-Loading Area | Truck Transport Operations | Rail/Truck Transport Operations | Total |
|---|---|---|---|---|---|
| **1** | 2,935 | 778 | 0 | 523 | **4,236** |
| **2** | 0 | 0 | 0 | 0 | **0** |
| **3a** | 46 | 61 | 430 | 68 | **605** |
| **3b** | 585 | 299 | 58 | 1,955 | **2,896** |
| **Total** | **3,566** | **1,138** | **488** | **2,545** | **7,737** |

Tables summarizing the input assumptions and SEFA calculations for Scenario 2 are provided in Attachment C-1.

## 2.3 Scenario 3

As described above, the following activities are applicable to the GHG emissions evaluation for Scenario 3:

- Hydraulic transport of the majority of the removed material to the UDF;
- Construction of two rail loading areas (Woods Pond Spur and Rising Pond);
- Truck transport of the remaining material for on-site disposal from the RUs to the UDF;
- Truck transport of material from Reaches 5A and 5B for off-site disposal from the RUs to an existing commercial rail loading facility in Albany, New York, for transfer from truck to rail, and then rail transport for the remaining distance to the selected off-site disposal facility(ies); and
- Rail/truck transport of the remaining material for off-site disposal from the RUs to the selected off-site disposal facility(ies).

Table C-3 presents GHG emissions for Scenario 3 broken down by scope and activity, as calculated using SEFA.

*Table C-3: Scenario 3 GHG Emissions (tons CO2e)*

| Scope | Hydraulic Transport Operations | Construction of Rail Loading/Off-Loading Area | Truck Transport Operations | Rail/Truck Transport Operations[a] | Total |
|---|---|---|---|---|---|
| **1** | 2,935 | 505 | 0 | 523 | **3,962** |
| **2** | 0 | 0 | 0 | 0 | **0** |
| **3a** | 46 | 41 | 430 | 221 | **738** |
| **3b** | 585 | 202 | 58 | 1,975 | **2,820** |
| **Total** | **3,566** | **748** | **488** | **2,719** | **7,521** |

**Note:**
[a] For the purposes of calculating GHG, even though a portion of the rail transport begins off-site, in Albany, New York, transport of removed materials by truck to a rail loading area and operations for transferring material from trucks to rail are accounted for under "rail/truck transport operations," along with transport by rail to the selected disposal facility(ies).

Tables summarizing the input assumptions and SEFA calculations for Scenario 3 are provided in Attachment C-1.

## 2.4 Scenario 4

As described above, the following activities are applicable to the GHG emissions evaluation for Scenario 4:

- Hydraulic transport of the majority of the removed material to the UDF;
- Construction of three rail loading areas (Utility Drive, Woods Pond Spur, and Rising Pond);
- Truck transport of soil from Reaches 5B, 5C, and 6 and sediment from Reach 7E for on-site disposal from the RUs to the UDF;
- Rail/truck transport of the remaining material for on-site disposal from the RUs to the UDF; and
- Rail/truck transport of the remaining material for off-site disposal from the RUs to the selected off-site disposal facility(ies).

Table C-4 presents GHG emissions for Scenario 4 broken down by scope and activity, as calculated using SEFA.

*Table C-4: Scenario 4 GHG Emissions (tons CO2e)*

| Scope | Hydraulic Transport Operations | Construction of Rail Loading/Off-Loading Area | Truck Transport Operations | Rail/Truck Transport Operations | Total |
|---|---|---|---|---|---|
| **1** | 2,935 | 778 | 0 | 2,748 | **6,461** |
| **2** | 0 | 0 | 0 | 0 | **0** |
| **3a** | 46 | 61 | 70 | 371 | **547** |
| **3b** | 585 | 299 | 9 | 6,678 | **7,572** |
| **Total** | **3,566** | **1,138** | **80** | **9,797** | **14,580** |

Tables summarizing the input assumptions and SEFA calculations for Scenario 4 are provided in Attachment C-1.

# 3 Results

Table C-5 provides a comparison of GHG emissions for the evaluated transportation scenarios.

*Table C-5: Comparison of GHG Emissions by Scenario and Activity (tons CO2e)*

| Scenario | Hydraulic Transport Operations | Construction of Rail Loading/Off-Loading Area | Truck Transport Operations | Rail/Truck Transport Operations[a] | Total |
|---|---|---|---|---|---|
| **1** | 3,110 | 0 | 490 | 4,540 | **8,100** |
| **2** | 3,570 | 1,140 | 490 | 2,550 | **7,800** |
| **3** | 3,570 | 750 | 490 | 2,720 | **7,600** |
| **4** | 3,570 | 1,140 | 80 | 9,800 | **14,600** |

**Note:**

[a] For the purposes of calculating GHG, even though a portion of the rail transport in Scenarios 1 and 3 begins off-site in Albany, New York, transport of removed materials by truck to a rail loading area and operations for transferring material from trucks to rail are accounted for under "rail/truck transport operations," along with transport by rail to the selected disposal facility(ies).

The GHG contribution of hydraulic transport operation is similar for all four site-wide transportation scenarios, with emissions for hydraulic operations for Scenario 1 being slightly lower because sediments from Reaches 7G and 8 would not be conveyed hydraulically in this scenario and therefore fewer pumps would be used. For the construction of the rail spurs, GHG emissions are dependent on the number of rail spurs to be built (none in Scenario 1, three for Scenarios 2 and 4, and two for Scenario 3). GHG emissions associated with truck operations and rail operations activities are generally proportional to the miles traveled by the respective vehicle type, with emissions equaling approximately 0.05 pound of $CO_2e$ per short-ton rail mile and approximately 0.4 pound of $CO_2e$ per short-ton truck mile (EPA 2024). Rail/truck transport operations are also dependent on the amount of volume loaded to rail and/or off-loaded from rail, with Scenario 4 having the largest volume transported by rail.

As shown in Table C-5, Scenario 4 is expected to result in the most GHG emissions, largely due to due to the greatest volume moved by rail/truck and the greatest amount of operations required to transfer the containers between truck and rail operations. Although Scenario 1 does not involve the construction of rail spurs and requires a slightly lower generator use for hydraulic operations, the emissions resulting from all material traveling off-site by truck, loading to rail in Albany, and rail from Albany the remainder of the distance for disposal resulted in the next highest emissions. Scenarios 2 and 4 both involve the construction of two rail spurs per scenario and the same operational requirements related to hydraulic operations. Additionally, although Scenario 3 has more trucking in the rail/truck transport operations, Scenario 2 has higher construction emissions, which results in overall GHG emissions for these two scenarios being only 200 tons of $CO_2e$ apart.

# 4 References

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World Resources Institute/World Business Council for Sustainable Development. 2001. GHG Protocol Corporate Accounting and Reporting Standard. September.

# Attachment C-1

**Tables Summarizing Input Assumptions and SEFA Calculations for Scenarios 1 through 4**

# Scenario 1

# Hydraulic Transport Operations

## Input Worksheet for Input Hydraulic Operations

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 2 | Hydraulic Operations |
|---|---|---|

*General Scope*

Hydraulic operations includes the operators for booster pumps associated with the dredging process.

*Example Items Eliminated through Screening Process*

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Mechanical Operator - for all reaches | 1327 | 50 | Car | Gasoline | 66350 | 25 | | 2654 | |
| Mechanical Operator - extra for reach 5C & 7G | 594 | 50 | Car | Gasoline | 29700 | 25 | | 1188 | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 10613 | 43777.8 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster pump |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 10613 | 43777.8 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster pump |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5861 | 24175.8 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster pump |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5861 | 24175.8 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster pump |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5861 | 24175.8 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster pump |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5861 | 24175.8 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster pump |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5275 | 21758.22 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster pump |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 4752 | 19602.0 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster pump |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| None | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| None | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-Site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HDPE | lb | 190080 | 95.04 | Refined | Virgin | Yes | 500 | 25 | 3 | Yes | 150 | Truck (mpg) | Diesel | 6 | | 25.000 | Assume 9 lbs per linear foot for 10" HDPE |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| <u>*On-Site*</u> | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| <u>*Transportation*</u> | | **Units** | **Quantity** | **Notes** |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
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| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

***Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

***Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***

***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Hydraulic Operations - On-Site Footprint (Scope 1)

| | | | **Energy** | | **GHG** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 225619 | 0.139 | 31361.04 | 22.5 | 5076428 | 0.17 | 38355.23 | 0.0054 | 1218.343 | 0.0034 | 767.1047 | 5.2E-06 | 1.173219 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **31,361** | | **5,076,428** | | **38,355** | | **1,218** | | **767** | | **1** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **31,361.04** | | **5,076,428** | | **38,355** | | **1,218** | | **767** | | **1** |

## Hydraulic Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 158.6 | 0.139 | 22.0454 | 22.5 | 3568.5 | 0.17 | 26.962 | 0.0054 | 0.85644 | 0.0034 | 0.53924 | 5.2E-06 | 0.000825 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3842 | 0.124 | 476.408 | 19.77 | 75956.34 | 0.027 | 103.734 | 0.00036 | 1.38312 | 0.003 | 11.526 | 0.0067 | 25.7414 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **498** | | **79,525** | | **131** | | **2** | | **12** | | **26** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | mpg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **498** | | **79525** | | **131** | | **2** | | **12** | | **26** |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 190080 | 0.0332 | 6310.656 | 1.94 | 368755.2 | 0.00325 | 617.76 | 0.00409 | 777.4272 | 0.000439 | 83.44512 | 6.41E-05 | 12.18413 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 225777.6 | 0.017 | 3838.22 | 3.02 | 681848.4 | 0.0051 | 1151.466 | 0.0062 | 1399.821 | 0.0017 | 383.822 | 0.0011 | 248.3554 |
| Gasoline produced | gal | 3842 | 0.033 | 126.786 | 2.8 | 10757.6 | 0.0046 | 17.6732 | 0.005 | 19.21 | 0.0015 | 5.763 | 0.001 | 3.842 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **3965.006** | | **692606** | | **1169.139** | | **1419.031** | | **389.585** | | **252.1974** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **10275.66** | | **1061361** | | **1786.899** | | **2196.458** | | **473.0301** | | **264.3815** |

## Hydraulic Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3842 | 0.124 | 476.408 | 19.77 | 75956.34 | 0.027 | 103.734 | 0.00036 | 1.38312 | 0.003 | 11.526 | 0.0067 | 25.7414 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 3842 | 0.033 | 126.786 | 2.8 | 10757.6 | 0.0046 | 17.6732 | 0.005 | 19.21 | 0.0015 | 5.763 | 0.001 | 3.842 |
| **Total Gasoline Footprint** | | **3842** | | **603.194** | | **86713.94** | | **121.4072** | | **20.59312** | | **17.289** | | **29.5834** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 225619 | 0.139 | 31361.04 | 22.5 | 5076428 | 0.17 | 38355.23 | 0.0054 | 1218.343 | 0.0034 | 767.1047 | 5.2E-06 | 1.173219 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 158.6 | 0.139 | 22.0454 | 22.5 | 3568.5 | 0.17 | 26.962 | 0.0054 | 0.85644 | 0.0034 | 0.53924 | 5.2E-06 | 0.000825 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 225777.6 | 0.017 | 3838.22 | 3.02 | 681848.4 | 0.0051 | 1151.466 | 0.0062 | 1399.821 | 0.0017 | 383.822 | 0.0011 | 248.3554 |
| **Total Diesel Footprint** | | **225777.6** | | **35221.31** | | **5761845** | | **39533.66** | | **2619.02** | | **1151.466** | | **249.5294** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

## Hydraulic Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **31,361** | **5,076,428** | **38,355** | **1,218** | **767** | **40,341** | **1** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **498** | **79,525** | **131** | **2** | **12** | **145** | **26** |
| **Other Off-Site (Scope 3b)** | **10,276** | **1,061,361** | **1,787** | **2,196** | **473** | **4,456** | **264** |
| **Remedy Totals** | **42,135** | **6,217,314** | **40,273** | **3,417** | **1,252** | **44,942** | **291** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

Construction of Rail Loading/Off-Loading Area

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*
*GE - ROR Remedial Action*

## Input Worksheet for Input Construction - Rail Spurs

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 1 | Construction of Rail Spurs |
|---|---|---|

*General Scope*

Construction of rail spurs associated with using rail as a mode of trasnportation to removal waste materials from the site. 2-3 rail spurs and loading areas will need to be constructed depending on the scenario (2&4 or 3).

*Example Items Eliminated through Screening Process*

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
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** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dozer - large (200 HP) | 400 | 75% | Diesel | 15 | 0 | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| Skid-steer - small (60 HP) | 46 | 75% | Diesel | 1.725 | 0 | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| Excavator - large (250 HP) | 350 | 75% | Diesel | 13.125 | 0 | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| Loader (200 HP) | 250 | 75% | Diesel | 9.375 | 0 | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| Roller (100 HP) | 200 | 75% | Diesel | 7.5 | 0 | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

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*GE - ROR Remedial Action*

**Input Worksheet for Input Construction - Rail Spurs**

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation*** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | 12" of aggregate |
| | | | 0 | | | | | | | | | | | | | | 4" ballast under & between rails |
| | | | 0 | | | | | | | | | | | | | | Rails |
| | | | 0 | | | | | | | | | | | | | | Geotextile Liner |
| | | | 0 | | | | | | | | | | | | | | Timber Ties, assuming weight of 70lb/tie |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

**Input Worksheet for Input Construction - Rail Spurs**

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
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| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*
*GE - ROR Remedial Action*

## Input Worksheet for Input Construction - Rail Spurs

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| *On-Site* | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| *Transportation* | | Units | Quantity | Notes |
| User-defined conventional energy transportation #1 | *User-Defined | TBD | | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

***** Enter units and conversion factors on "User Defined Factors" tab*
***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage*
***See the "Detailed Notes and Explanations" tab for use of this table.***

*Other Voluntary Renewable Energy Use*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

***** Enter units and conversion factors on "User Defined Factors" tab*
***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.*
***See the "Detailed Notes and Explanations" tab for use of this table***

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
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| | | |
| | | |
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| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Totals | 0 | |

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Construction of Rail Spurs - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **0.00** | | **0** | | **0** | | **0** | | **0** | | **0** |

## Construction of Rail Spurs - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 0 | 0.139 | 0 | 22.500 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | mpg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 0 | 0.017 | 0 | 3.02 | 0 | 0.0051 | 0 | 0.0062 | 0 | 0.0017 | 0 | 0.0011 | 0 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy Conv. Factor | Energy MMBtus | Greenhouse Gas Conv. Factor | Greenhouse Gas lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |

## Construction of Rail Spurs - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| **Total Gasoline Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 0 | 0.017 | 0 | 3.02 | 0 | 0.0051 | 0 | 0.0062 | 0 | 0.0017 | 0 | 0.0011 | 0 |
| **Total Diesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Construction of Rail Spurs - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0.000** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Other Off-Site (Scope 3b)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Remedy Totals** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity | |
|---|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** | |
| On-site biodiesel use | MMBtu | **0** | |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** | |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** | *(This value is the sum of the three rows above)* |
| Voluntary purchase of renewable electricity | MWh | **0** | |
| Voluntary purchase of RECs | MWh | **0** | |

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

# Truck Transport Operations

## Input Worksheet for Input Truck Operations

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 3 | Truck Operations |
|---|---|---|

*General Scope*

Truck operations focuses on the transportation of waste material from the site to variuos landfill locations, or to a rail loading area where waste would then be transported via train.

*Example Items Eliminated through Screening Process*

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NONE | | Diesel | | | | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 3 | Truck Operations |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| NONE | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-Site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation* ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

**Remedy Component that this Input worksheet is part of:** **Component 3** | **Truck Operations**

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recycled/reused off-site | tons | 268960.5 | 268960.5 | 50 | 1 | 114782 | Yes | 229564 | Truck (mpg) | Diesel | 6 | | 38260.7 | assume 1.5 tons/CY, landfilling emissions accounted for in UDF |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

**Remedy Component that this Input worksheet is part of:** **Component 3** | **Truck Operations**

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| On-Site | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| Transportation | | **Units** | **Quantity** | **Notes** |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
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| | | |
| | | |

| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | 10 | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***

***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Truck Operations - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **0.00** | | **0** | | **0** | | **0** | | **0** | | **0** |

## Truck Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Transportation Footprint (Scope 3a)

| Category | Units | Usage | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 38260.7 | 0.139 | 5318.237 | 22.5 | 860865.8 | 0.17 | 6504.319 | 0.0054 | 206.6078 | 0.0034 | 130.0864 | 5.2E-06 | 0.198956 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **5,318** | | **860,866** | | **6,504** | | **207** | | **130** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | mpg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **5318** | | **860866** | | **6504** | | **207** | | **130** | | **0** |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 38260.7 | 0.017 | 650.4319 | 3.02 | 115547.3 | 0.0051 | 195.1296 | 0.0062 | 237.2163 | 0.0017 | 65.04319 | 0.0011 | 42.08677 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **650.4319** | | **115547.3** | | **195.1296** | | **237.2163** | | **65.04319** | | **42.08677** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **650.4319** | | **115547.3** | | **195.1296** | | **237.2163** | | **65.04319** | | **42.08677** |

## Truck Operations - Intermediate Totals

| Category | Units | Usage | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| **Total Gasoline Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 38260.7 | 0.139 | 5318.237 | 22.5 | 860865.8 | 0.17 | 6504.319 | 0.0054 | 206.6078 | 0.0034 | 130.0864 | 5.2E-06 | 0.198956 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 38260.7 | 0.017 | 650.4319 | 3.02 | 115547.3 | 0.0051 | 195.1296 | 0.0062 | 237.2163 | 0.0017 | 65.04319 | 0.0011 | 42.08677 |
| **Total Diesel Footprint** | | **38260.7** | | **5968.669** | | **976413.1** | | **6699.449** | | **443.8241** | | **195.1296** | | **42.28573** |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |

Notes:

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Truck Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **5,318** | **860,866** | **6,504** | **207** | **130** | **6,841** | **0** |
| **Other Off-Site (Scope 3b)** | **650** | **115,547** | **195** | **237** | **65** | **497** | **42** |
| **Remedy Totals** | **5,969** | **976,413** | **6,699** | **444** | **195** | **7,338** | **42** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

# Rail/Truck Transport Operations

## Input Worksheet for Input Rail Operations

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 4 | Rail Operations |
|---|---|---|

*General Scope*

Rail operations includes labrorers associated with loading waste materials from trucks to train as well as miles from the site to various landfill locations.

*Example Items Eliminated through Screening Process*

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Contractor/Foreman - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | |
| General Equipment Operator (1) - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | |
| General Laborer (1) - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavator - medium (175 HP) | 350 | 75% | Diesel | 13.125 | 3540.0 | 46462.5 | 50 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Intermodal Top Pick, used to load intermodal contains onto rail |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 4 | Rail Operations |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| NONE | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation* ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

**Remedy Component that this Input worksheet is part of:** | **Component 4** | **Rail Operations**

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recycled/reused off-site | tons | 150010.5 | 150010.5 | 50 | 1 | 478584 | Yes | 957168 | Truck (mpg) | Diesel | 6 | | 159528.0 | Off-site facility, material transferred to rail |
| Off-site non-hazardous waste landfill | tons | 150010.5 | 150010.5 | 25 | 1 | 836460 | Yes | 1672920 | Train (gptm) | Diesel | 0.002150075 | | 322.5 | To Albany, includes landfilling emissions |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

**Remedy Component that this Input worksheet is part of:** | **Component 4** | **Rail Operations**

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| <u>On-Site</u> | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| <u>Transportation</u> | | **Units** | **Quantity** | **Notes** |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
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|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | 10 | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

***Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the “Detailed Notes and Explanations” tab for use of this table.***

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

***Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right.  No footprint reductions are associated with the voluntary purchases.***

***See the “Detailed Notes and Explanations” tab for use of this table***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

# Rail Operations - On-Site Footprint (Scope 1)

| Contributors to Footprints | Units | Usage | Energy Conv. Factor | Energy MMBtus | GHG Conv. Factor | GHG lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 46462.5 | 0.139 | 6458.288 | 22.5 | 1045406 | 0.17 | 7898.625 | 0.0054 | 250.8975 | 0.0034 | 157.9725 | 5.2E-06 | 0.241605 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **6,458** | | **1,045,406** | | **7,899** | | **251** | | **158** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **6,458.29** | | **1,045,406** | | **7,899** | | **251** | | **158** | | **0** |

## Rail Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Transportation Footprint (Scope 3a)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 159867.2 | 0.139 | 22221.54 | 22.5 | 3597012 | 0.17 | 27177.42 | 0.0054 | 863.2829 | 0.0034 | 543.5485 | 5.2E-06 | 0.831309 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 2652 | 0.124 | 328.848 | 19.77 | 52430.04 | 0.027 | 71.604 | 0.00036 | 0.95472 | 0.003 | 7.956 | 0.0067 | 17.7684 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **22,550** | | **3,649,442** | | **27,249** | | **864** | | **552** | | **19** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | npg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **22550** | | **3649442** | | **27249** | | **864** | | **552** | | **19** |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 206329.7 | 0.017 | 3507.605 | 3.02 | 623115.7 | 0.0051 | 1052.281 | 0.0062 | 1279.244 | 0.0017 | 350.7605 | 0.0011 | 226.9627 |
| Gasoline produced | gal | 2652 | 0.033 | 87.516 | 2.8 | 7425.6 | 0.0046 | 12.1992 | 0.005 | 13.26 | 0.0015 | 3.978 | 0.001 | 2.652 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **3595.121** | | **630541.3** | | **1064.481** | | **1292.504** | | **354.7385** | | **229.6147** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 150010.5 | 0.16 | 24001.68 | 25 | 3750263 | 0.14 | 21001.47 | 0.075 | 11250.79 | 0.4 | 60004.2 | 0.0014 | 210.0147 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **27596.8** | | **4380804** | | **22065.95** | | **12543.29** | | **60358.94** | | **439.6294** |

## Rail Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 2652 | 0.124 | 328.848 | 19.77 | 52430.04 | 0.027 | 71.604 | 0.00036 | 0.95472 | 0.003 | 7.956 | 0.0067 | 17.7684 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 2652 | 0.033 | 87.516 | 2.8 | 7425.6 | 0.0046 | 12.1992 | 0.005 | 13.26 | 0.0015 | 3.978 | 0.001 | 2.652 |
| **Total Gasoline Footprint** | | **2652** | | **416.364** | | **59855.64** | | **83.8032** | | **14.21472** | | **11.934** | | **20.4204** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 46462.5 | 0.139 | 6458.288 | 22.5 | 1045406 | 0.17 | 7898.625 | 0.0054 | 250.8975 | 0.0034 | 157.9725 | 5.2E-06 | 0.241605 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 159867.2 | 0.139 | 22221.54 | 22.5 | 3597012 | 0.17 | 27177.42 | 0.0054 | 863.2829 | 0.0034 | 543.5485 | 5.2E-06 | 0.831309 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 206329.7 | 0.017 | 3507.605 | 3.02 | 623115.7 | 0.0051 | 1052.281 | 0.0062 | 1279.244 | 0.0017 | 350.7605 | 0.0011 | 226.9627 |
| **Total Diesel Footprint** | | **206329.7** | | **32187.43** | | **5265534** | | **36128.33** | | **2393.425** | | **1052.281** | | **228.0356** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Rail Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **6,458** | **1,045,406** | **7,899** | **251** | **158** | **8,307** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **22,550** | **3,649,442** | **27,249** | **864** | **552** | **28,665** | **19** |
| **Other Off-Site (Scope 3b)** | **27,597** | **4,380,804** | **22,066** | **12,543** | **60,359** | **94,968** | **440** |
| **Remedy Totals** | **56,605** | **9,075,652** | **57,214** | **13,658** | **61,068** | **131,940** | **458** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity | |
|---|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** | |
| On-site biodiesel use | MMBtu | **0** | |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** | |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** | *(This value is the sum of the three rows above)* |
| Voluntary purchase of renewable electricity | MWh | **0** | |
| Voluntary purchase of RECs | MWh | **0** | |

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx*

# Scenario 2

# Hydraulic Transport Operations

**Input Worksheet for Input Hydraulic Operations**

| **Please specify which Remedy Component this Input worksheet is part of:** (Select "Off" to exclude this Input worksheet from calculations and results) | **Component 2** | **Hydraulic Operations** |
|---|---|---|

*General Scope*

Hydraulic operations includes the operators for booster pumps associated with the dredging process.

*Example Items Eliminated through Screening Process*

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Mechanical Operator - for all reaches | 1584 | 50 | Car | Gasoline | 79200 | 25 | | 3168 | |
| Mechanical Operator - extra for reach 5C & 7G | 654 | 50 | Car | Gasoline | 32700 | 25 | | 1308 | |
| | | | | | | | | | |
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| | | | | | | | | | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 12672 | 52272 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 12672 | 52272 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 7920 | 32670 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5750 | 23718.42 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5227 | 21562.2 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| **Remedy Component that this Input worksheet is part of:** | **Component 2** | **Hydraulic Operations** |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| **Estimated Total Electricity Usage Based on Above** | | | | | | 0 | |
| **Renewable Electricity Generated On-Site*** | | | | | | | |
| **Total Electricity Usage Based on Personnel Transportation** | | | | | | 0 | |
| **Total Grid Electricity Used** | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| None | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | **Totals** | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| None | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | **Total** | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-Site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation* ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HDPE | lb | 190080 | 95.04 | Refined | Virgin | Yes | 500 | 25 | 3 | Yes | 150 | Truck (mpg) | Diesel | 6 | | 25.000 | Assume 9 lbs per linear foot for 10" HDPE |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
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| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| On-Site | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| Transportation | | Units | Quantity | Notes |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
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| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

*** Enter units and conversion factors on "User Defined Factors" tab***
***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***
***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| Totals | 0 | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

*** Enter units and conversion factors on "User Defined Factors" tab***
***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***
***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Hydraulic Operations - On-Site Footprint (Scope 1)

| | | | **Energy** | | **GHG** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 260902.6 | 0.139 | 36265.46 | 22.5 | 5870308.95 | 0.17 | 44353.45 | 0.0054 | 1408.874 | 0.0034 | 887.0689 | 5.2E-06 | 1.356694 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **36,265** | | **5,870,309** | | **44,353** | | **1,409** | | **887** | | **1** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **36,265.46** | | **5,870,309** | | **44,353** | | **1,409** | | **887** | | **1** |

## Hydraulic Operations - Electricity Generation Footprint (Scope 2)

| Contributors to Footprints | Units | Usage | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 158.6 | 0.139 | 22.0454 | 22.5 | 3568.5 | 0.17 | 26.962 | 0.0054 | 0.85644 | 0.0034 | 0.53924 | 5.2E-06 | 0.000825 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 4476 | 0.124 | 555.024 | 19.77 | 88490.52 | 0.027 | 120.852 | 0.00036 | 1.61136 | 0.003 | 13.428 | 0.0067 | 29.9892 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **577** | | **92,059** | | **148** | | **2** | | **14** | | **30** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | npg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **577** | | **92059** | | **148** | | **2** | | **14** | | **30** |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 190080 | 0.0332 | 6310.656 | 1.94 | 368755.2 | 0.00325 | 617.76 | 0.00409 | 777.4272 | 0.000439 | 83.44512 | 6.41E-05 | 12.18413 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 261061.2 | 0.017 | 4438.041 | 3.02 | 788404.8844 | 0.0051 | 1331.412 | 0.0062 | 1618.58 | 0.0017 | 443.8041 | 0.0011 | 287.1673 |
| Gasoline produced | gal | 4476 | 0.033 | 147.708 | 2.8 | 12532.8 | 0.0046 | 20.5896 | 0.005 | 22.38 | 0.0015 | 6.714 | 0.001 | 4.476 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **4585.749** | | **800937.6844** | | **1352.002** | | **1640.96** | | **450.5181** | | **291.6433** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **10896.4** | | **1169692.884** | | **1969.762** | | **2418.387** | | **533.9632** | | **303.8275** |

## Hydraulic Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **<u>Total Grid Electricity Footprint</u>** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *<u>Electricity Generation</u>* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *<u>Resource Extraction for Electricity</u>* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *<u>Electricity Transmission</u>* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **<u>Total Fuel Footprints</u>** | | | | | | | | | | | | | | |
| <u>Total Gasoline Footprint</u> | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 4476 | 0.124 | 555.024 | 19.77 | 88490.52 | 0.027 | 120.852 | 0.00036 | 1.61136 | 0.003 | 13.428 | 0.0067 | 29.9892 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 4476 | 0.033 | 147.708 | 2.8 | 12532.8 | 0.0046 | 20.5896 | 0.005 | 22.38 | 0.0015 | 6.714 | 0.001 | 4.476 |
| **Total Gasoline Footprint** | | **4476** | | **702.732** | | **101023.32** | | **141.4416** | | **23.99136** | | **20.142** | | **34.4652** |
| | | | | | | | | | | | | | | |
| <u>Total Diesel Footprint</u> | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 260902.6 | 0.139 | 36265.46 | 22.5 | 5870308.95 | 0.17 | 44353.45 | 0.0054 | 1408.874 | 0.0034 | 887.0689 | 5.2E-06 | 1.356694 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 158.6 | 0.139 | 22.0454 | 22.5 | 3568.5 | 0.17 | 26.962 | 0.0054 | 0.85644 | 0.0034 | 0.53924 | 5.2E-06 | 0.000825 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 261061.2 | 0.017 | 4438.041 | 3.02 | 788404.8844 | 0.0051 | 1331.412 | 0.0062 | 1618.58 | 0.0017 | 443.8041 | 0.0011 | 287.1673 |
| **Total Diesel Footprint** | | **261061.2** | | **40725.55** | | **6662282.334** | | **45711.82** | | **3028.31** | | **1331.412** | | **288.5249** |
| | | | | | | | | | | | | | | |
| <u>Total Biodiesel Footprint</u> | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| <u>Total Natural Gas Footprint</u> | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| <u>Total Liquified Petroleum Gas Footprint</u> | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| <u>Total Compressed Gas Footprint</u> | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Hydraulic Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **36,265** | **5,870,309** | **44,353** | **1,409** | **887** | **46,649** | **1** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **577** | **92,059** | **148** | **2** | **14** | **164** | **30** |
| **Other Off-Site (Scope 3b)** | **10,896** | **1,169,693** | **1,970** | **2,418** | **534** | **4,922** | **304** |
| **Remedy Totals** | **47,739** | **7,132,061** | **46,471** | **3,830** | **1,435** | **51,736** | **335** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx*

Construction of Rail Loading/Off-Loading Area

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*
*GE - ROR Remedial Action*

## Input Worksheet for Input Construction - Rail Spurs

| Please specify which Remedy Component this Input worksheet is part of:<br>(Select "Off" to exclude this Input worksheet from calculations and results) | Component 1 | Construction of Rail Spurs |
|---|---|---|

| *General Scope* | *Example Items Eliminated through Screening Process* |
|---|---|
| Construction of rail spurs associated with using rail as a mode of trasnportation to removal waste materials from the site. 2-3 rail spurs and loading areas will need to be constructed depending on the scenario (2&4 or 3). | |

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Contractors/Foreman | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | |
| | | | | | | | | | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dozer - large (200 HP) | 400 | 75% | Diesel | 15 | 1480 | 22200 | 50 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Skid-steer - small (60 HP) | 46 | 75% | Diesel | 1.725 | 1480 | 2553 | 2 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Excavator - large (250 HP) | 350 | 75% | Diesel | 13.125 | 1480 | 19425 | 42 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Loader (200 HP) | 250 | 75% | Diesel | 9.375 | 1480 | 13875 | 25 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Roller (100 HP) | 200 | 75% | Diesel | 7.5 | 1480 | 11100 | 9 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*
*GE - ROR Remedial Action*

## Input Worksheet for Input Construction - Rail Spurs

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation*** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gravel/sand/clay | lb | 10475817.4 | 5237.908715 | Unrefined | Virgin | Yes | 25 | 25 | 172 | Yes | 8600 | Truck (mpg) | Diesel | 6 | | 1433.333 | 12" of aggregate |
| Gravel/sand/clay | lb | 3786571.51 | 1893.285755 | Unrefined | Virgin | Yes | 25 | 25 | 62 | Yes | 3100 | Truck (mpg) | Diesel | 6 | | 516.667 | 4" ballast under & between rails |
| Steel | lb | 218050 | 109.025 | Refined | Virgin | Yes | 500 | 25 | 1 | Yes | 50 | Train (gptm) | Diesel | 0.002150075 | | 5.860 | Rails |
| Other refined construction materials | lb | 24740 | 12.37 | Refined | Virgin | Yes | 500 | 25 | 2 | Yes | 100 | Truck (mpg) | Diesel | 6 | | 16.667 | Geotextile Liner |
| Other refined construction materials | lb | 15264 | 7.632 | Refined | Virgin | Yes | 500 | 25 | 1 | Yes | 50 | Train (gptm) | Diesel | 0.002150075 | | 0.410 | Timber Ties, assuming weight of 70lb/tie |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*
*GE - ROR Remedial Action*

## Input Worksheet for Input Construction - Rail Spurs

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

***** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

***** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*

*GE - ROR Remedial Action*

**Input Worksheet for Input Construction - Rail Spurs**

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

***Other Energy Use and Air Emissions***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| *On-Site* | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| *Transportation* | | Units | Quantity | Notes |
| User-defined conventional energy transportation #1 | *User-Defined | TBD | | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***
***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***
***See the "Detailed Notes and Explanations" tab for use of this table.***

***Off-Site Laboratory Analysis***

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Totals | 0 | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***
***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***
***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Construction of Rail Spurs - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 69153 | 0.139 | 9612.267 | 22.5 | 1555943 | 0.17 | 11756.01 | 0.0054 | 373.4262 | 0.0034 | 235.1202 | 5.2E-06 | 0.359596 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **9,612** | | **1,555,943** | | **11,756** | | **373** | | **235** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **9,612.27** | | **1,555,943** | | **11,756** | | **373** | | **235** | | **0** |

## Construction of Rail Spurs - Electricity Generation Footprint (Scope 2)

| Contributors to Footprints | Units | Usage | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |

Notes:

## Construction of Rail Spurs - Transportation Footprint (Scope 3a)

| Category | Units | Usage | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 2139.437 | 0.139 | 297.3817 | 22.500 | 48137.33 | 0.17 | 363.7043 | 0.0054 | 11.55296 | 0.0034 | 7.274086 | 5.2E-06 | 0.011125 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3700 | 0.124 | 458.8 | 19.77 | 73149 | 0.027 | 99.9 | 0.00036 | 1.332 | 0.003 | 11.1 | 0.0067 | 24.79 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **756** | | **121,286** | | **464** | | **13** | | **18** | | **25** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | mpg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **756** | | **121286** | | **464** | | **13** | | **18** | | **25** |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 14262389 | 0.000028 | 399.3469 | 0.00335 | 47779 | 1.65E-05 | 235.3294 | 0.000015 | 213.9358 | 0.000002 | 28.52478 | 2.05E-10 | 0.002924 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 218050 | 0.0044 | 959.42 | 1.1 | 239855 | 0.0014 | 305.27 | 0.0017 | 370.685 | 0.00056 | 122.108 | 0.000067 | 14.60935 |
| Other refined construction materials | lb | 40004 | 0.01885 | 754.0754 | 2.115 | 84608.46 | 0.004038 | 161.5162 | 0.005133 | 205.3205 | 0.001443 | 57.71577 | 0.000163 | 6.50165 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 71292.44 | 0.017 | 1211.971 | 3.02 | 215303.2 | 0.0051 | 363.5914 | 0.0062 | 442.0131 | 0.0017 | 121.1971 | 0.0011 | 78.42168 |
| Gasoline produced | gal | 3700 | 0.033 | 122.1 | 2.8 | 10360 | 0.0046 | 17.02 | 0.005 | 18.5 | 0.0015 | 5.55 | 0.001 | 3.7 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **1334.071** | | **225663.2** | | **380.6114** | | **460.5131** | | **126.7471** | | **82.12168** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **3446.914** | | **597905.6** | | **1082.727** | | **1250.454** | | **335.0957** | | **103.2356** |

## Construction of Rail Spurs - Intermediate Totals

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3700 | 0.124 | 458.8 | 19.77 | 73149 | 0.027 | 99.9 | 0.00036 | 1.332 | 0.003 | 11.1 | 0.0067 | 24.79 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 3700 | 0.033 | 122.1 | 2.8 | 10360 | 0.0046 | 17.02 | 0.005 | 18.5 | 0.0015 | 5.55 | 0.001 | 3.7 |
| **Total Gasoline Footprint** | | **3700** | | **580.9** | | **83509** | | **116.92** | | **19.832** | | **16.65** | | **28.49** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 69153 | 0.139 | 9612.267 | 22.5 | 1555943 | 0.17 | 11756.01 | 0.0054 | 373.4262 | 0.0034 | 235.1202 | 5.2E-06 | 0.359596 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 2139.437 | 0.139 | 297.3817 | 22.5 | 48137.33 | 0.17 | 363.7043 | 0.0054 | 11.55296 | 0.0034 | 7.274086 | 5.2E-06 | 0.011125 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 71292.44 | 0.017 | 1211.971 | 3.02 | 215303.2 | 0.0051 | 363.5914 | 0.0062 | 442.0131 | 0.0017 | 121.1971 | 0.0011 | 78.42168 |
| **Total Diesel Footprint** | | **71292.44** | | **11121.62** | | **1819383** | | **12483.31** | | **826.9923** | | **363.5914** | | **78.7924** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

## Construction of Rail Spurs - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **9,612** | **1,555,943** | **11,756** | **373** | **235** | **12,365** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0.000** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **756** | **121,286** | **464** | **13** | **18** | **495** | **25** |
| **Other Off-Site (Scope 3b)** | **3,447** | **597,906** | **1,083** | **1,250** | **335** | **2,668** | **103** |
| **Remedy Totals** | **13,815** | **2,275,134** | **13,302** | **1,637** | **589** | **15,528** | **128** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

# Truck Transport Operations

## Input Worksheet for Input Truck Operations

| **Please specify which Remedy Component this Input worksheet is part of:** (Select "Off" to exclude this Input worksheet from calculations and results) | Component 3 | Truck Operations |
|---|---|---|

***General Scope***

Truck operations focuses on the transportation of waste material from the site to variuos landfill locations, or to a rail loading area where waste would then be transported via train.

***Example Items Eliminated through Screening Process***

***Other Notes and References***

***Personnel Transportation***

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | |
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****** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.***

***** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).***

***On-Site Equipment Use and Transportation***

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NONE | | Diesel | | | | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

****** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.***

***** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.***

******* Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.***

| **Remedy Component that this Input worksheet is part of:** | Component 3 | Truck Operations |
|---|---|---|

***On-Site Electricity Use***

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| NONE | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

****** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).***

***On-Site Natural Gas Use***

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

***Landfill Gas Combusted On-Site for Energy Use***

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

***Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-Site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.***

***Materials Use and Transportation***

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation* ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 3 | Truck Operations |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recycled/reused off-site | tons | 268960.5 | 268960.5 | 50 | 1 | 114782 | Yes | 229564 | Truck (mpg) | Diesel | 6 | | 38260.7 | assume 1.5 tons/CY, landfilling emissions included in UDF |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

| Remedy Component that this Input worksheet is part of: | Component 3 | Truck Operations |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| On-Site | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| Transportation | | Units | Quantity | Notes |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | 10 | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***

***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Truck Operations - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **0.00** | | **0** | | **0** | | **0** | | **0** | | **0** |

## Truck Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 38260.7 | 0.139 | 5318.237 | 22.5 | 860865.8 | 0.17 | 6504.319 | 0.0054 | 206.6078 | 0.0034 | 130.0864 | 5.2E-06 | 0.198956 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **5,318** | | **860,866** | | **6,504** | | **207** | | **130** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | mpg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **5318** | | **860866** | | **6504** | | **207** | | **130** | | **0** |

## Truck Operations - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy Conv. Factor | Energy MMBtus | Greenhouse Gas Conv. Factor | Greenhouse Gas lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 38260.7 | 0.017 | 650.4319 | 3.02 | 115547.3 | 0.0051 | 195.1296 | 0.0062 | 237.2163 | 0.0017 | 65.04319 | 0.0011 | 42.08677 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **650.4319** | | **115547.3** | | **195.1296** | | **237.2163** | | **65.04319** | | **42.08677** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | Units | Usage | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **650.4319** | | **115547.3** | | **195.1296** | | **237.2163** | | **65.04319** | | **42.08677** |

## Truck Operations - Intermediate Totals

| Category | Units | Usage | Energy Conv. Factor | Energy MMBtus | Greenhouse Gas Conv. Factor | Greenhouse Gas lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| **Total Gasoline Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 38260.7 | 0.139 | 5318.237 | 22.5 | 860865.8 | 0.17 | 6504.319 | 0.0054 | 206.6078 | 0.0034 | 130.0864 | 5.2E-06 | 0.198956 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 38260.7 | 0.017 | 650.4319 | 3.02 | 115547.3 | 0.0051 | 195.1296 | 0.0062 | 237.2163 | 0.0017 | 65.04319 | 0.0011 | 42.08677 |
| **Total Diesel Footprint** | | **38260.7** | | **5968.669** | | **976413.1** | | **6699.449** | | **443.8241** | | **195.1296** | | **42.28573** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Truck Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| On-site (Scope 1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grid Electricity Generation (Scope 2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Transportation (Scope 3a) | 5,318 | 860,866 | 6,504 | 207 | 130 | 6,841 | 0 |
| Other Off-Site (Scope 3b) | 650 | 115,547 | 195 | 237 | 65 | 497 | 42 |
| Remedy Totals | 5,969 | 976,413 | 6,699 | 444 | 195 | 7,338 | 42 |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | 0 |
| On-site biodiesel use | MMBtu | 0 |
| Biodiesel and other renewable resource use for transportation | MMBtu | 0 |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | 0 |
| Voluntary purchase of renewable electricity | MWh | 0 |
| Voluntary purchase of RECs | MWh | 0 |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx*

# Rail/Truck Transport Operations

## Input Worksheet for Input Rail Operations

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 4 | Rail Operations |
|---|---|---|

***General Scope***

Rail operations includes labrorers associated with loading waste materials from trucks to train as well as miles from the site to various landfill locations.

***Example Items Eliminated through Screening Process***

***Other Notes and References***

***Personnel Transportation***

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Contractor/Foreman - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | |
| General Equipment Operator (1) - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | |
| General Laborer (1) - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | |
| General Laborer (1) - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

**** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.***

***** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).***

***On-Site Equipment Use and Transportation***

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavator - medium (175 HP) | 350 | 75% | Diesel | 13.125 | 3540.0 | 46462.5 | 50 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Intermodal Top Pick, used to load intermodal contains onto rail |
| | | 75% | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | 75% | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | 75% | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | 75% | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | 75% | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | 75% | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | 75% | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | 75% | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | 75% | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

**** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.***

***** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.***

****** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.***

| Remedy Component that this Input worksheet is part of: | Component 4 | Rail Operations |
|---|---|---|

***On-Site Electricity Use***

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| NONE | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

**** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).***

***On-Site Natural Gas Use***

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

***Landfill Gas Combusted On-Site for Energy Use***

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

***Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.***

***Materials Use and Transportation***

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation* ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

**Remedy Component that this Input worksheet is part of:** | **Component 4** | **Rail Operations**

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recycled/reused off-site | tons | 150010.5 | 150010.5 | 50 | 1 | 7683 | Yes | 15366 | Truck (mpg) | Diesel | 6 | | 2561.0 | assume 1.5 ton/cy , material transferred to rail |
| Off-site non-hazardous waste landfill | tons | 150010.5 | 150010.5 | 25 | 1 | 971492 | Yes | 1942984 | Train (gptm) | Diesel | 0.002150075 | | 322.5 | assume 1.5 ton/cy , includes landfilling emissions |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

**Remedy Component that this Input worksheet is part of:** | **Component 4** | **Rail Operations**

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| On-Site | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| Transportation | | **Units** | **Quantity** | **Notes** |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
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| | | |
| | | |
| | | |

| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | 10 | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

*** Enter units and conversion factors on "User Defined Factors" tab***
***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***
***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| Totals | 0 | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

*** Enter units and conversion factors on "User Defined Factors" tab***
***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***
***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

# Rail Operations - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 46462.5 | 0.139 | 6458.288 | 22.5 | 1045406 | 0.17 | 7898.625 | 0.0054 | 250.8975 | 0.0034 | 157.9725 | 5.2E-06 | 0.241605 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **6,458** | | **1,045,406** | | **7,899** | | **251** | | **158** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **6,458.29** | | **1,045,406** | | **7,899** | | **251** | | **158** | | **0** |

## Rail Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Transportation Footprint (Scope 3a)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 2900.2 | 0.139 | 403.1278 | 22.5 | 65254.5 | 0.17 | 493.034 | 0.0054 | 15.66108 | 0.0034 | 9.86068 | 5.2E-06 | 0.015081 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3536 | 0.124 | 438.464 | 19.77 | 69906.72 | 0.027 | 95.472 | 0.00036 | 1.27296 | 0.003 | 10.608 | 0.0067 | 23.6912 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **842** | | **135,161** | | **589** | | **17** | | **20** | | **24** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | npg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **842** | | **135161** | | **589** | | **17** | | **20** | | **24** |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 49362.7 | 0.017 | 839.1659 | 3.02 | 149075.4 | 0.0051 | 251.7498 | 0.0062 | 306.0487 | 0.0017 | 83.91659 | 0.0011 | 54.29897 |
| Gasoline produced | gal | 3536 | 0.033 | 116.688 | 2.8 | 9900.8 | 0.0046 | 16.2656 | 0.005 | 17.68 | 0.0015 | 5.304 | 0.001 | 3.536 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **955.8539** | | **158976.2** | | **268.0154** | | **323.7287** | | **89.22059** | | **57.83497** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 150010.5 | 0.16 | 24001.68 | 25 | 3750263 | 0.14 | 21001.47 | 0.075 | 11250.79 | 0.4 | 60004.2 | 0.0014 | 210.0147 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | Units | Usage | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **24957.53** | | **3909239** | | **21269.49** | | **11574.52** | | **60093.42** | | **267.8497** |

## Rail Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3536 | 0.124 | 438.464 | 19.77 | 69906.72 | 0.027 | 95.472 | 0.00036 | 1.27296 | 0.003 | 10.608 | 0.0067 | 23.6912 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 3536 | 0.033 | 116.688 | 2.8 | 9900.8 | 0.0046 | 16.2656 | 0.005 | 17.68 | 0.0015 | 5.304 | 0.001 | 3.536 |
| **Total Gasoline Footprint** | | **3536** | | **555.152** | | **79807.52** | | **111.7376** | | **18.95296** | | **15.912** | | **27.2272** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 46462.5 | 0.139 | 6458.288 | 22.5 | 1045406 | 0.17 | 7898.625 | 0.0054 | 250.8975 | 0.0034 | 157.9725 | 5.2E-06 | 0.241605 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 2900.2 | 0.139 | 403.1278 | 22.5 | 65254.5 | 0.17 | 493.034 | 0.0054 | 15.66108 | 0.0034 | 9.86068 | 5.2E-06 | 0.015081 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 49362.7 | 0.017 | 839.1659 | 3.02 | 149075.4 | 0.0051 | 251.7498 | 0.0062 | 306.0487 | 0.0017 | 83.91659 | 0.0011 | 54.29897 |
| **Total Diesel Footprint** | | **49362.7** | | **7700.581** | | **1259736** | | **8643.409** | | **572.6073** | | **251.7498** | | **54.55566** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Rail Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **6,458** | **1,045,406** | **7,899** | **251** | **158** | **8,307** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **842** | **135,161** | **589** | **17** | **20** | **626** | **24** |
| **Other Off-Site (Scope 3b)** | **24,958** | **3,909,239** | **21,269** | **11,575** | **60,093** | **92,937** | **268** |
| **Remedy Totals** | **32,257** | **5,089,806** | **29,757** | **11,842** | **60,272** | **101,871** | **292** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity | |
|---|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** | |
| On-site biodiesel use | MMBtu | **0** | |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** | |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** | *(This value is the sum of the three rows above)* |
| Voluntary purchase of renewable electricity | MWh | **0** | |
| Voluntary purchase of RECs | MWh | **0** | |

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

# Scenario 3

# Hydraulic Transport Operations

## Input Worksheet for Input Hydraulic Operations

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 2 | Hydraulic Operations |
|---|---|---|

***General Scope***

Hydraulic operations includes the operators for booster pumps associated with the dredging process.

***Example Items Eliminated through Screening Process***

***Other Notes and References***

***Personnel Transportation***

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Mechanical Operator - for all reaches | 1584 | 50 | Car | Gasoline | 79200 | 25 | | 3168 | |
| Mechanical Operator - extra for reach 5C & 7G | 654 | 50 | Car | Gasoline | 32700 | 25 | | 1308 | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

***On-Site Equipment Use and Transportation***

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 12672 | 52272 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 12672 | 52272 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 7920 | 32670 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5750 | 23718.42 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5227 | 21562.2 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

***On-Site Electricity Use***

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

***On-Site Natural Gas Use***

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| None | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

***Landfill Gas Combusted On-Site for Energy Use***

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| None | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

***Materials Use and Transportation***

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation* ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HDPE | lb | 190080 | 95.04 | Refined | Virgin | Yes | 500 | 25 | 3 | Yes | 150 | Truck (mpg) | Diesel | 6 | | 25.000 | Assume 9 lbs per linear foot for 10" HDPE |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| On-Site | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| Transportation | | Units | Quantity | Notes |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***

***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Hydraulic Operations - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 260902.6 | 0.139 | 36265.46 | 22.5 | 5870309 | 0.17 | 44353.45 | 0.0054 | 1408.874 | 0.0034 | 887.0689 | 5.2E-06 | 1.356694 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **36,265** | | **5,870,309** | | **44,353** | | **1,409** | | **887** | | **1** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **36,265.46** | | **5,870,309** | | **44,353** | | **1,409** | | **887** | | **1** |

## Hydraulic Operations - Electricity Generation Footprint (Scope 2)

| Contributors to Footprints | Units | Usage | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Transportation Footprint (Scope 3a)

| Category | Units | Usage | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 158.6 | 0.139 | 22.0454 | 22.5 | 3568.5 | 0.17 | 26.962 | 0.0054 | 0.85644 | 0.0034 | 0.53924 | 5.2E-06 | 0.000825 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 4476 | 0.124 | 555.024 | 19.77 | 88490.52 | 0.027 | 120.852 | 0.00036 | 1.61136 | 0.003 | 13.428 | 0.0067 | 29.9892 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **577** | | **92,059** | | **148** | | **2** | | **14** | | **30** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | mpg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **577** | | **92059** | | **148** | | **2** | | **14** | | **30** |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 190080 | 0.0332 | 6310.656 | 1.94 | 368755.2 | 0.00325 | 617.76 | 0.00409 | 777.4272 | 0.000439 | 83.44512 | 6.41E-05 | 12.18413 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 261061.2 | 0.017 | 4438.041 | 3.02 | 788404.9 | 0.0051 | 1331.412 | 0.0062 | 1618.58 | 0.0017 | 443.8041 | 0.0011 | 287.1673 |
| Gasoline produced | gal | 4476 | 0.033 | 147.708 | 2.8 | 12532.8 | 0.0046 | 20.5896 | 0.005 | 22.38 | 0.0015 | 6.714 | 0.001 | 4.476 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **4585.749** | | **800937.7** | | **1352.002** | | **1640.96** | | **450.5181** | | **291.6433** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Dx(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **10896.4** | | **1169693** | | **1969.762** | | **2418.387** | | **533.9632** | | **303.8275** |

## Hydraulic Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 4476 | 0.124 | 555.024 | 19.77 | 88490.52 | 0.027 | 120.852 | 0.00036 | 1.61136 | 0.003 | 13.428 | 0.0067 | 29.9892 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 4476 | 0.033 | 147.708 | 2.8 | 12532.8 | 0.0046 | 20.5896 | 0.005 | 22.38 | 0.0015 | 6.714 | 0.001 | 4.476 |
| **Total Gasoline Footprint** | | **4476** | | **702.732** | | **101023.3** | | **141.4416** | | **23.99136** | | **20.142** | | **34.4652** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 260902.6 | 0.139 | 36265.46 | 22.5 | 5870309 | 0.17 | 44353.45 | 0.0054 | 1408.874 | 0.0034 | 887.0689 | 5.2E-06 | 1.356694 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 158.6 | 0.139 | 22.0454 | 22.5 | 3568.5 | 0.17 | 26.962 | 0.0054 | 0.85644 | 0.0034 | 0.53924 | 5.2E-06 | 0.000825 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 261061.2 | 0.017 | 4438.041 | 3.02 | 788404.9 | 0.0051 | 1331.412 | 0.0062 | 1618.58 | 0.0017 | 443.8041 | 0.0011 | 287.1673 |
| **Total Diesel Footprint** | | **261061.2** | | **40725.55** | | **6662282** | | **45711.82** | | **3028.31** | | **1331.412** | | **288.5249** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

## Hydraulic Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **36,265** | **5,870,309** | **44,353** | **1,409** | **887** | **46,649** | **1** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **577** | **92,059** | **148** | **2** | **14** | **164** | **30** |
| **Other Off-Site (Scope 3b)** | **10,896** | **1,169,693** | **1,970** | **2,418** | **534** | **4,922** | **304** |
| **Remedy Totals** | **47,739** | **7,132,061** | **46,471** | **3,830** | **1,435** | **51,736** | **335** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

Construction of Rail Loading/Off-Loading Area

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*
*GE - ROR Remedial Action*

## Input Worksheet for Input Construction - Rail Spurs

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 1 | Construction of Rail Spurs |
|---|---|---|

| *General Scope* | *Example Items Eliminated through Screening Process* |
|---|---|
| Construction of rail spurs associated with using rail as a mode of trasnportation to removal waste materials from the site. 2-3 rail spurs and loading areas will need to be constructed depending on the scenario (2&4 or 3). | |

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Contractors/Foreman | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 120 | 50 | Car | Gasoline | 6000 | 25 | | 240 | |
| | | | | | | | | | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dozer - large (200 HP) | 400 | 75% | Diesel | 15 | 960 | 14400 | 50 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Skid-steer - small (60 HP) | 46 | 75% | Diesel | 1.725 | 960 | 1656 | 2 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Excavator - large (250 HP) | 350 | 75% | Diesel | 13.125 | 960 | 12600 | 42 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Loader (200 HP) | 250 | 75% | Diesel | 9.375 | 960 | 9000 | 25 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Roller (100 HP) | 200 | 75% | Diesel | 7.5 | 960 | 7200 | 9 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

# Input Worksheet for Input Construction - Rail Spurs

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation*** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gravel/sand/clay | lb | 7498026.8 | 3749.0134 | Unrefined | Virgin | Yes | 25 | 25 | 119 | Yes | 5950 | Truck (mpg) | Diesel | 6 | | 991.667 | 12" of aggregate |
| Gravel/sand/clay | lb | 2710224.27 | 1355.112135 | Unrefined | Virgin | Yes | 25 | 25 | 43 | Yes | 2150 | Truck (mpg) | Diesel | 6 | | 358.333 | 4" ballast under & between rails |
| Steel | lb | 150450 | 75.225 | Refined | Virgin | Yes | 500 | 25 | 1 | Yes | 50 | Train (gptm) | Diesel | 0.002150075 | | 4.043 | Rails |
| Other refined construction materials | lb | 16652 | 8.326 | Refined | Virgin | Yes | 500 | 25 | 2 | Yes | 100 | Truck (mpg) | Diesel | 6 | | 16.667 | Geotextile Liner |
| Other refined construction materials | lb | 10532 | 5.266 | Refined | Virgin | Yes | 500 | 25 | 1 | Yes | 50 | Train (gptm) | Diesel | 0.002150075 | | 0.283 | Timber Ties, assuming weight of 70lb/tie |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

## Input Worksheet for Input Construction - Rail Spurs

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

***** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.***

***** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.***

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
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| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

***** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.***

***Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.***

**Input Worksheet for Input Construction - Rail Spurs**

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

***Other Energy Use and Air Emissions***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| *On-Site* | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| *Transportation* | | Units | Quantity | Notes |
| User-defined conventional energy transportation #1 | *User-Defined | TBD | | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***
***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***
***See the "Detailed Notes and Explanations" tab for use of this table.***

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***
***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***
***See the "Detailed Notes and Explanations" tab for use of this table***

***Off-Site Laboratory Analysis***

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| **Totals** | **0** | |

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Construction of Rail Spurs - On-Site Footprint (Scope 1)

| Contributors to Footprints | Units | Usage | Energy Conv. Factor | Energy MMBtus | GHG Conv. Factor | GHG lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 44856 | 0.139 | 6234.984 | 22.5 | 1009260 | 0.17 | 7625.52 | 0.0054 | 242.2224 | 0.0034 | 152.5104 | 5.2E-06 | 0.233251 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **6,235** | | **1,009,260** | | **7,626** | | **242** | | **153** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **6,234.98** | | **1,009,260** | | **7,626** | | **242** | | **153** | | **0** |

## Construction of Rail Spurs - Electricity Generation Footprint (Scope 2)

| Contributors to Footprints | Units | Usage | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |

Notes:

## Construction of Rail Spurs - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 1537.493 | 0.139 | 213.7115 | 22.500 | 34593.59 | 0.17 | 261.3738 | 0.0054 | 8.302462 | 0.0034 | 5.227476 | 5.2E-06 | 0.007995 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 2400 | 0.124 | 297.6 | 19.77 | 47448 | 0.027 | 64.8 | 0.00036 | 0.864 | 0.003 | 7.2 | 0.0067 | 16.08 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **511** | | **82,042** | | **326** | | **9** | | **12** | | **16** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | npg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **511** | | **82042** | | **326** | | **9** | | **12** | | **16** |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 10208251 | 0.000028 | 285.831 | 0.00335 | 34197.64 | 1.65E-05 | 168.4361 | 0.000015 | 153.1238 | 0.000002 | 20.4165 | 2.05E-10 | 0.002093 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 150450 | 0.0044 | 661.98 | 1.1 | 165495 | 0.0014 | 210.63 | 0.0017 | 255.765 | 0.00056 | 84.252 | 0.000067 | 10.08015 |
| Other refined construction materials | lb | 27184 | 0.01885 | 512.4184 | 2.115 | 57494.16 | 0.004038 | 109.7554 | 0.005133 | 139.5219 | 0.001443 | 39.21972 | 0.000163 | 4.41808 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 46393.49 | 0.017 | 788.6894 | 3.02 | 140108.3 | 0.0051 | 236.6068 | 0.0062 | 287.6397 | 0.0017 | 78.86894 | 0.0011 | 51.03284 |
| Gasoline produced | gal | 2400 | 0.033 | 79.2 | 2.8 | 6720 | 0.0046 | 11.04 | 0.005 | 12 | 0.0015 | 3.6 | 0.001 | 2.4 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **867.8894** | | **146828.3** | | **247.6468** | | **299.6397** | | **82.46894** | | **53.43284** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **2328.119** | | **404015.1** | | **736.4684** | | **848.0503** | | **226.3572** | | **67.93316** |

## Construction of Rail Spurs - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 2400 | 0.124 | 297.6 | 19.77 | 47448 | 0.027 | 64.8 | 0.00036 | 0.864 | 0.003 | 7.2 | 0.0067 | 16.08 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 2400 | 0.033 | 79.2 | 2.8 | 6720 | 0.0046 | 11.04 | 0.005 | 12 | 0.0015 | 3.6 | 0.001 | 2.4 |
| **Total Gasoline Footprint** | | **2400** | | **376.8** | | **54168** | | **75.84** | | **12.864** | | **10.8** | | **18.48** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 44856 | 0.139 | 6234.984 | 22.5 | 1009260 | 0.17 | 7625.52 | 0.0054 | 242.2224 | 0.0034 | 152.5104 | 5.2E-06 | 0.233251 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 1537.493 | 0.139 | 213.7115 | 22.5 | 34593.59 | 0.17 | 261.3738 | 0.0054 | 8.302462 | 0.0034 | 5.227476 | 5.2E-06 | 0.007995 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 46393.49 | 0.017 | 788.6894 | 3.02 | 140108.3 | 0.0051 | 236.6068 | 0.0062 | 287.6397 | 0.0017 | 78.86894 | 0.0011 | 51.03284 |
| **Total Diesel Footprint** | | **46393.49** | | **7237.385** | | **1183962** | | **8123.501** | | **538.1645** | | **236.6068** | | **51.27409** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

## Construction of Rail Spurs - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **6,235** | **1,009,260** | **7,626** | **242** | **153** | **8,020** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0.000** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **511** | **82,042** | **326** | **9** | **12** | **348** | **16** |
| **Other Off-Site (Scope 3b)** | **2,328** | **404,015** | **736** | **848** | **226** | **1,811** | **68** |
| **Remedy Totals** | **9,074** | **1,495,317** | **8,688** | **1,099** | **391** | **10,179** | **84** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

# Truck Transport Operations

## Input Worksheet for Input Truck Operations

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 3 | Truck Operations |
|---|---|---|

| *General Scope* | *Example Items Eliminated through Screening Process* | *Other Notes and References* |
|---|---|---|
| Truck operations focuses on the transportation of waste material from the site to variuos landfill locations, or to a rail loading area where waste would then be transported via train. | | |

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NONE | | Diesel | | | | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 3 | Truck Operations |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| NONE | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation* ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

**** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.***

***** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.***

****** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.***

| Remedy Component that this Input worksheet is part of: | Component 3 | Truck Operations |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recycled/reused off-site | tons | 268960.5 | 268960.5 | 50 | 1 | 114782 | Yes | 229564 | Truck (mpg) | Diesel | 6 | | 38260.7 | assume 1.5 tons/CY, landfilling emissions accounted for in UDF |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

**** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.***

***** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.***

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

**** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.***

***Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.***

| Remedy Component that this Input worksheet is part of: | Component 3 | Truck Operations |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| *On-Site* | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| *Transportation* | | **Units** | **Quantity** | **Notes** |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
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| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | 10 | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

** Enter units and conversion factors on "User Defined Factors" tab*

*** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage*

*See the "Detailed Notes and Explanations" tab for use of this table.*

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

*Other Voluntary Renewable Energy Use*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

** Enter units and conversion factors on "User Defined Factors" tab*

*** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.*

*See the "Detailed Notes and Explanations" tab for use of this table*

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Truck Operations - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **0.00** | | **0** | | **0** | | **0** | | **0** | | **0** |

## Truck Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 38260.7 | 0.139 | 5318.237 | 22.5 | 860865.8 | 0.17 | 6504.319 | 0.0054 | 206.6078 | 0.0034 | 130.0864 | 5.2E-06 | 0.198956 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **5,318** | | **860,866** | | **6,504** | | **207** | | **130** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | npg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **5318** | | **860866** | | **6504** | | **207** | | **130** | | **0** |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 38260.7 | 0.017 | 650.4319 | 3.02 | 115547.3 | 0.0051 | 195.1296 | 0.0062 | 237.2163 | 0.0017 | 65.04319 | 0.0011 | 42.08677 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **650.4319** | | **115547.3** | | **195.1296** | | **237.2163** | | **65.04319** | | **42.08677** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **650.4319** | | **115547.3** | | **195.1296** | | **237.2163** | | **65.04319** | | **42.08677** |

## Truck Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| **Total Gasoline Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 38260.7 | 0.139 | 5318.237 | 22.5 | 860865.8 | 0.17 | 6504.319 | 0.0054 | 206.6078 | 0.0034 | 130.0864 | 5.2E-06 | 0.198956 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 38260.7 | 0.017 | 650.4319 | 3.02 | 115547.3 | 0.0051 | 195.1296 | 0.0062 | 237.2163 | 0.0017 | 65.04319 | 0.0011 | 42.08677 |
| **Total Diesel Footprint** | | **38260.7** | | **5968.669** | | **976413.1** | | **6699.449** | | **443.8241** | | **195.1296** | | **42.28573** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |

Notes:

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Truck Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **5,318** | **860,866** | **6,504** | **207** | **130** | **6,841** | **0** |
| **Other Off-Site (Scope 3b)** | **650** | **115,547** | **195** | **237** | **65** | **497** | **42** |
| **Remedy Totals** | **5,969** | **976,413** | **6,699** | **444** | **195** | **7,338** | **42** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

Rail/Truck Transport Operations

## Input Worksheet for Input Rail Operations

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 4 | Rail Operations |
|---|---|---|

| *General Scope* | *Example Items Eliminated through Screening Process* | *Other Notes and References* |
|---|---|---|
| Rail operations includes labrorers associated with loading waste materials from trucks to train as well as miles from the site to various landfill locations. | | |

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Contractor/Foreman - at loading area | 368 | 50 | Car | Gasoline | 18400 | 25 | | 736 | |
| Contractor/Foreman - at loading area (Albany) | 75 | 50 | Car | Gasoline | 3750 | 25 | | 150 | |
| General Equipment Operator (1) - at loading area | 368 | 50 | Car | Gasoline | 18400 | 25 | | 736 | |
| General Equipment Operator (1) - at loading area (Albany) | 75 | 50 | Car | Gasoline | 3750 | 25 | | 150 | |
| General Laborer (1) - at loading area | 368 | 50 | Car | Gasoline | 18400 | 25 | | 736 | |
| General Laborer (1) - at loading area | 368 | 50 | Car | Gasoline | 18400 | 25 | | 736 | |
| General Laborer (1) - at loading area (Albany) | 75 | 50 | Car | Gasoline | 3750 | 25 | | 150 | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

**** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.***

***** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).***

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavator - medium (175 HP) | 350 | 75% | Diesel | 13.125 | 2941.0 | 38600.6 | 50 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Intermodal Top Pick, used to load intermodal contains onto rail |
| Excavator - medium (175 HP) | 350 | 75% | Diesel | 13.125 | 599.0 | 7861.9 | 50 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Intermodal Top Pick, used to load intermodal contains onto rail |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | |

**** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.***

***** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.***

****** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.***

| Remedy Component that this Input worksheet is part of: | Component 4 | Rail Operations |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| NONE | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

**** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).***

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

***Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.***

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation*** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 4 | Rail Operations |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recycled/reused off-site | tons | 134260.5 | 134260.5 | 50 | 1 | 5746 | Yes | 11492 | Truck (mpg) | Diesel | 6 | | 1915.3 | assume 1.5 ton/cy , landfilling emissions accounted for in UDF |
| Off-site non-hazardous waste landfill | tons | 134260.5 | 134260.5 | 25 | 1 | 794835 | Yes | 1589670 | Train (gptm) | Diesel | 0.002150075 | | 288.7 | assume 1.5 ton/cy , includes landfilling emissions |
| Recycled/reused off-site | tons | 15750 | 15750 | 50 | 1 | 169926 | Yes | 339852 | Train (gptm) | Diesel | 0.002150075 | | 33.9 | assume 1.5 ton/cy , landfilling emissions accounted for in UDF |
| Off-site non-hazardous waste landfill | tons | 15750 | 15750 | 25 | 1 | 43116 | Yes | 86232 | Truck (mpg) | Diesel | 6 | | 14372.0 | assume 1.5 ton/cy , includes landfilling emissions |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
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| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

| Remedy Component that this Input worksheet is part of: | Component 4 | Rail Operations |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| On-Site | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| Transportation | | Units | Quantity | Notes |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | 10 | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

*** Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| **Item** | | **Units** | **Quantity** | **Notes** |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

*** Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right.  No footprint reductions are associated with the voluntary purchases.***

***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Rail Operations - On-Site Footprint (Scope 1)

| Contributors to Footprints | Units | Usage | Energy Conv. Factor | Energy MMBtus | GHG Conv. Factor | GHG lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 46462.5 | 0.139 | 6458.288 | 22.5 | 1045406 | 0.17 | 7898.625 | 0.0054 | 250.8975 | 0.0034 | 157.9725 | 5.2E-06 | 0.241605 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **6,458** | | **1,045,406** | | **7,899** | | **251** | | **158** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **6,458.29** | | **1,045,406** | | **7,899** | | **251** | | **158** | | **0** |

## Rail Operations - Electricity Generation Footprint (Scope 2)

| Contributors to Footprints | Units | Usage | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 16643.3 | 0.139 | 2313.419 | 22.5 | 374474.3 | 0.17 | 2829.361 | 0.0054 | 89.87382 | 0.0034 | 56.58722 | 5.2E-06 | 0.086545 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3394 | 0.124 | 420.856 | 19.77 | 67099.38 | 0.027 | 91.638 | 0.00036 | 1.22184 | 0.003 | 10.182 | 0.0067 | 22.7398 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **2,734** | | **441,574** | | **2,921** | | **91** | | **67** | | **23** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | npg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **2734** | | **441574** | | **2921** | | **91** | | **67** | | **23** |

## Rail Operations - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy Conv. Factor | Energy MMBtus | Greenhouse Gas Conv. Factor | Greenhouse Gas lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 63105.8 | 0.017 | 1072.799 | 3.02 | 190579.5 | 0.0051 | 321.8396 | 0.0062 | 391.256 | 0.0017 | 107.2799 | 0.0011 | 69.41638 |
| Gasoline produced | gal | 3394 | 0.033 | 112.002 | 2.8 | 9503.2 | 0.0046 | 15.6124 | 0.005 | 16.97 | 0.0015 | 5.091 | 0.001 | 3.394 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **1184.801** | | **200082.7** | | **337.452** | | **408.226** | | **112.3709** | | **72.81038** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 150010.5 | 0.16 | 24001.68 | 25 | 3750263 | 0.14 | 21001.47 | 0.075 | 11250.79 | 0.4 | 60004.2 | 0.0014 | 210.0147 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy Conv. Factor | Energy MMBtus | Greenhouse Gas Conv. Factor | Greenhouse Gas lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **25186.48** | | **3950345** | | **21338.92** | | **11659.01** | | **60116.57** | | **282.8251** |

## Rail Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3394 | 0.124 | 420.856 | 19.77 | 67099.38 | 0.027 | 91.638 | 0.00036 | 1.22184 | 0.003 | 10.182 | 0.0067 | 22.7398 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 3394 | 0.033 | 112.002 | 2.8 | 9503.2 | 0.0046 | 15.6124 | 0.005 | 16.97 | 0.0015 | 5.091 | 0.001 | 3.394 |
| **Total Gasoline Footprint** | | **3394** | | **532.858** | | **76602.58** | | **107.2504** | | **18.19184** | | **15.273** | | **26.1338** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 46462.5 | 0.139 | 6458.288 | 22.5 | 1045406 | 0.17 | 7898.625 | 0.0054 | 250.8975 | 0.0034 | 157.9725 | 5.2E-06 | 0.241605 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 16643.3 | 0.139 | 2313.419 | 22.5 | 374474.3 | 0.17 | 2829.361 | 0.0054 | 89.87382 | 0.0034 | 56.58722 | 5.2E-06 | 0.086545 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 63105.8 | 0.017 | 1072.799 | 3.02 | 190579.5 | 0.0051 | 321.8396 | 0.0062 | 391.256 | 0.0017 | 107.2799 | 0.0011 | 69.41638 |
| **Total Diesel Footprint** | | **63105.8** | | **9844.505** | | **1610460** | | **11049.83** | | **732.0273** | | **321.8396** | | **69.74453** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Rail Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **6,458** | **1,045,406** | **7,899** | **251** | **158** | **8,307** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **2,734** | **441,574** | **2,921** | **91** | **67** | **3,079** | **23** |
| **Other Off-Site (Scope 3b)** | **25,186** | **3,950,345** | **21,339** | **11,659** | **60,117** | **93,115** | **283** |
| **Remedy Totals** | **34,379** | **5,437,325** | **32,159** | **12,001** | **60,341** | **104,501** | **306** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity | |
|---|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** | |
| On-site biodiesel use | MMBtu | **0** | |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** | |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** | *(This value is the sum of the three rows above)* |
| Voluntary purchase of renewable electricity | MWh | **0** | |
| Voluntary purchase of RECs | MWh | **0** | |

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

# Scenario 4

# Hydraulic Transport Operations

# Input Worksheet for Input Hydraulic Operations

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 2 | Hydraulic Operations |
|---|---|---|

*General Scope*

Hydraulic operations includes the operators for booster pumps associated with the dredging process.

*Example Items Eliminated through Screening Process*

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Mechanical Operator - for all reaches | 1584 | 50 | Car | Gasoline | 79200 | 25 | | 3168 | |
| Mechanical Operator - extra for reach 5C & 7G | 654 | 50 | Car | Gasoline | 32700 | 25 | | 1308 | |

** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 12672 | 52272 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 12672 | 52272 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 7920 | 32670 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 6336 | 26136 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5750 | 23718.42 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |
| Generator - HP varies | 110 | 75% | Diesel | 4.125 | 5227 | 21562.2 | 8 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Booster Pumps |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| None | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| None | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HDPE | lb | 190080 | 95.04 | Refined | Virgin | Yes | 500 | 25 | 3 | Yes | 150 | Truck (mpg) | Diesel | 6 | | 25.000 | Assume 9 lbs per linear foot for 10" HDPE |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

| Remedy Component that this Input worksheet is part of: | Component 2 | Hydraulic Operations |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| *On-Site* | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| *Transportation* | | **Units** | **Quantity** | **Notes** |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
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| | | |

| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***

***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Hydraulic Operations - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 260902.6 | 0.139 | 36265.46 | 22.5 | 5870308.95 | 0.17 | 44353.45 | 0.0054 | 1408.874 | 0.0034 | 887.0689 | 5.2E-06 | 1.356694 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **36,265** | | **5,870,309** | | **44,353** | | **1,409** | | **887** | | **1** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **36,265.46** | | **5,870,309** | | **44,353** | | **1,409** | | **887** | | **1** |

## Hydraulic Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 158.6 | 0.139 | 22.0454 | 22.5 | 3568.5 | 0.17 | 26.962 | 0.0054 | 0.85644 | 0.0034 | 0.53924 | 5.2E-06 | 0.000825 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 4476 | 0.124 | 555.024 | 19.77 | 88490.52 | 0.027 | 120.852 | 0.00036 | 1.61136 | 0.003 | 13.428 | 0.0067 | 29.9892 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **577** | | **92,059** | | **148** | | **2** | | **14** | | **30** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | npg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **577** | | **92059** | | **148** | | **2** | | **14** | | **30** |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 190080 | 0.0332 | 6310.656 | 1.94 | 368755.2 | 0.00325 | 617.76 | 0.00409 | 777.4272 | 0.000439 | 83.44512 | 6.41E-05 | 12.18413 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 261061.2 | 0.017 | 4438.041 | 3.02 | 788404.8844 | 0.0051 | 1331.412 | 0.0062 | 1618.58 | 0.0017 | 443.8041 | 0.0011 | 287.1673 |
| Gasoline produced | gal | 4476 | 0.033 | 147.708 | 2.8 | 12532.8 | 0.0046 | 20.5896 | 0.005 | 22.38 | 0.0015 | 6.714 | 0.001 | 4.476 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **4585.749** | | **800937.6844** | | **1352.002** | | **1640.96** | | **450.5181** | | **291.6433** |
| Notes: | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Hydraulic Operations - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Dx(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **10896.4** | | **1169692.884** | | **1969.762** | | **2418.387** | | **533.9632** | | **303.8275** |

## Hydraulic Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 4476 | 0.124 | 555.024 | 19.77 | 88490.52 | 0.027 | 120.852 | 0.00036 | 1.61136 | 0.003 | 13.428 | 0.0067 | 29.9892 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 4476 | 0.033 | 147.708 | 2.8 | 12532.8 | 0.0046 | 20.5896 | 0.005 | 22.38 | 0.0015 | 6.714 | 0.001 | 4.476 |
| **Total Gasoline Footprint** | | **4476** | | **702.732** | | **101023.32** | | **141.4416** | | **23.99136** | | **20.142** | | **34.4652** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 260902.6 | 0.139 | 36265.46 | 22.5 | 5870308.95 | 0.17 | 44353.45 | 0.0054 | 1408.874 | 0.0034 | 887.0689 | 5.2E-06 | 1.356694 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 158.6 | 0.139 | 22.0454 | 22.5 | 3568.5 | 0.17 | 26.962 | 0.0054 | 0.85644 | 0.0034 | 0.53924 | 5.2E-06 | 0.000825 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 261061.2 | 0.017 | 4438.041 | 3.02 | 788404.8844 | 0.0051 | 1331.412 | 0.0062 | 1618.58 | 0.0017 | 443.8041 | 0.0011 | 287.1673 |
| **Total Diesel Footprint** | | **261061.2** | | **40725.55** | | **6662282.334** | | **45711.82** | | **3028.31** | | **1331.412** | | **288.5249** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

## Hydraulic Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **36,265** | **5,870,309** | **44,353** | **1,409** | **887** | **46,649** | **1** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **577** | **92,059** | **148** | **2** | **14** | **164** | **30** |
| **Other Off-Site (Scope 3b)** | **10,896** | **1,169,693** | **1,970** | **2,418** | **534** | **4,922** | **304** |
| **Remedy Totals** | **47,739** | **7,132,061** | **46,471** | **3,830** | **1,435** | **51,736** | **335** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

Construction of Rail Loading/Off-Loading Area

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*

*GE - ROR Remedial Action*

# Input Worksheet for Input Construction - Rail Spurs

| Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results) | Component 1 | Construction of Rail Spurs |
|---|---|---|

***General Scope***

Construction of rail spurs associated with using rail as a mode of trasnportation to removal waste materials from the site. 2-3 rail spurs and loading areas will need to be constructed depending on the scenario (2&4 or 3).

***Example Items Eliminated through Screening Process***

***Other Notes and References***

***Personnel Transportation***

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Contractors/Foreman | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Equipment Operator | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |
| General Laborer | 185 | 50 | Car | Gasoline | 9250 | 25 | | 370 | Round trips based on crew returning home each night, 3 months of |

****** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.***

***** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).***

***On-Site Equipment Use and Transportation***

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dozer - large (200 HP) | 400 | 75% | Diesel | 15 | 1480 | 22200 | 50 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Skid-steer - small (60 HP) | 46 | 75% | Diesel | 1.725 | 1480 | 2553 | 2 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Excavator - large (250 HP) | 350 | 75% | Diesel | 13.125 | 1480 | 19425 | 42 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Loader (200 HP) | 250 | 75% | Diesel | 9.375 | 1480 | 13875 | 25 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| Roller (100 HP) | 200 | 75% | Diesel | 7.5 | 1480 | 11100 | 9 | 2 | 100 | 200 | Truck (mpg) | Diesel | 6 | | 33.3 | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

****** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.***

***** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.***

******* Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.***

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*
*GE - ROR Remedial Action*

## Input Worksheet for Input Construction - Rail Spurs

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| None | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation*** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gravel/sand/clay | lb | 10475817.4 | 5237.908715 | Unrefined | Virgin | Yes | 25 | 25 | 172 | Yes | 8600 | Truck (mpg) | Diesel | 6 | | 1433.333 | 12" of aggregate |
| Gravel/sand/clay | lb | 3786571.51 | 1893.285755 | Unrefined | Virgin | Yes | 25 | 25 | 62 | Yes | 3100 | Truck (mpg) | Diesel | 6 | | 516.667 | 4" ballast under & between rails |
| Steel | lb | 218050 | 109.025 | Refined | Virgin | Yes | 500 | 25 | 1 | Yes | 50 | Train (gptm) | Diesel | 0.002150075 | | 5.860 | Rails |
| Other refined construction materials | lb | 24740 | 12.37 | Refined | Virgin | Yes | 500 | 25 | 2 | Yes | 100 | Truck (mpg) | Diesel | 6 | | 16.667 | Geotextile Liner |
| Other refined construction materials | lb | 15264 | 7.632 | Refined | Virgin | Yes | 500 | 25 | 1 | Yes | 50 | Train (gptm) | Diesel | 0.002150075 | | 0.410 | Timber Ties, assuming weight of 70lb/tie |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

**Input Worksheet for Input Construction - Rail Spurs**

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

*Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019*
*GE - ROR Remedial Action*

**Input Worksheet for Input Construction - Rail Spurs**

| Remedy Component that this Input worksheet is part of: | Component 1 | Construction of Rail Spurs |
|---|---|---|

***Other Energy Use and Air Emissions***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| *On-Site* | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| *Transportation* | | **Units** | **Quantity** | **Notes** |
| User-defined conventional energy transportation #1 | *User-Defined | TBD | | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***
***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***
***See the "Detailed Notes and Explanations" tab for use of this table.***

***Off-Site Laboratory Analysis***

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***
***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***
***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Construction of Rail Spurs - On-Site Footprint (Scope 1)

| | | | **Energy** | | **GHG** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 69153 | 0.139 | 9612.267 | 22.5 | 1555943 | 0.17 | 11756.01 | 0.0054 | 373.4262 | 0.0034 | 235.1202 | 5.2E-06 | 0.359596 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **9,612** | | **1,555,943** | | **11,756** | | **373** | | **235** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **9,612.27** | | **1,555,943** | | **11,756** | | **373** | | **235** | | **0** |

## Construction of Rail Spurs - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Transportation Footprint (Scope 3a)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 2139.437 | 0.139 | 297.3817 | 22.500 | 48137.33 | 0.17 | 363.7043 | 0.0054 | 11.55296 | 0.0034 | 7.274086 | 5.2E-06 | 0.011125 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3700 | 0.124 | 458.8 | 19.77 | 73149 | 0.027 | 99.9 | 0.00036 | 1.332 | 0.003 | 11.1 | 0.0067 | 24.79 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **756** | | **121,286** | | **464** | | **13** | | **18** | | **25** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | mpg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **756** | | **121286** | | **464** | | **13** | | **18** | | **25** |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 14262389 | 0.000028 | 399.3469 | 0.00335 | 47779 | 1.65E-05 | 235.3294 | 0.000015 | 213.9358 | 0.000002 | 28.52478 | 2.05E-10 | 0.002924 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 218050 | 0.0044 | 959.42 | 1.1 | 239855 | 0.0014 | 305.27 | 0.0017 | 370.685 | 0.00056 | 122.108 | 0.000067 | 14.60935 |
| Other refined construction materials | lb | 40004 | 0.01885 | 754.0754 | 2.115 | 84608.46 | 0.004038 | 161.5162 | 0.005133 | 205.3205 | 0.001443 | 57.71577 | 0.000163 | 6.50165 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 71292.44 | 0.017 | 1211.971 | 3.02 | 215303.2 | 0.0051 | 363.5914 | 0.0062 | 442.0131 | 0.0017 | 121.1971 | 0.0011 | 78.42168 |
| Gasoline produced | gal | 3700 | 0.033 | 122.1 | 2.8 | 10360 | 0.0046 | 17.02 | 0.005 | 18.5 | 0.0015 | 5.55 | 0.001 | 3.7 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **1334.071** | | **225663.2** | | **380.6114** | | **460.5131** | | **126.7471** | | **82.12168** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Construction of Rail Spurs - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **3446.914** | | **597905.6** | | **1082.727** | | **1250.454** | | **335.0957** | | **103.2356** |

## Construction of Rail Spurs - Intermediate Totals

| Category | Units | Usage | Energy Conv. Factor | Energy MMBtus | Greenhouse Gas Conv. Factor | Greenhouse Gas lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 3700 | 0.124 | 458.8 | 19.77 | 73149 | 0.027 | 99.9 | 0.00036 | 1.332 | 0.003 | 11.1 | 0.0067 | 24.79 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 3700 | 0.033 | 122.1 | 2.8 | 10360 | 0.0046 | 17.02 | 0.005 | 18.5 | 0.0015 | 5.55 | 0.001 | 3.7 |
| **Total Gasoline Footprint** | | **3700** | | **580.9** | | **83509** | | **116.92** | | **19.832** | | **16.65** | | **28.49** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 69153 | 0.139 | 9612.267 | 22.5 | 1555943 | 0.17 | 11756.01 | 0.0054 | 373.4262 | 0.0034 | 235.1202 | 5.2E-06 | 0.359596 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 2139.437 | 0.139 | 297.3817 | 22.5 | 48137.33 | 0.17 | 363.7043 | 0.0054 | 11.55296 | 0.0034 | 7.274086 | 5.2E-06 | 0.011125 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 71292.44 | 0.017 | 1211.971 | 3.02 | 215303.2 | 0.0051 | 363.5914 | 0.0062 | 442.0131 | 0.0017 | 121.1971 | 0.0011 | 78.42168 |
| **Total Diesel Footprint** | | **71292.44** | | **11121.62** | | **1819383** | | **12483.31** | | **826.9923** | | **363.5914** | | **78.7924** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |

Notes:

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

## Construction of Rail Spurs - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **9,612** | **1,555,943** | **11,756** | **373** | **235** | **12,365** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0.000** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **756** | **121,286** | **464** | **13** | **18** | **495** | **25** |
| **Other Off-Site (Scope 3b)** | **3,447** | **597,906** | **1,083** | **1,250** | **335** | **2,668** | **103** |
| **Remedy Totals** | **13,815** | **2,275,134** | **13,302** | **1,637** | **589** | **15,528** | **128** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity | |
|---|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** | |
| On-site biodiesel use | MMBtu | **0** | |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** | |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** | *(This value is the sum of the three rows above)* |
| Voluntary purchase of renewable electricity | MWh | **0** | |
| Voluntary purchase of RECs | MWh | **0** | |

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx*

# Truck Transport Operations

## Input Worksheet for Input Truck Operations

| **Please specify which Remedy Component this Input worksheet is part of:** (Select "Off" to exclude this Input worksheet from calculations and results) | Component 3 | Truck Operations |
|---|---|---|

*General Scope*

Truck operations focuses on the transportation of waste material from the site to variuos landfill locations, or to a rail loading area where waste would then be transported via train.

*Example Items Eliminated through Screening Process*

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | |
| | | | | | | | | | |
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** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.*

*** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).*

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NONE | | Diesel | | | | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | | | Truck (mpg) | Diesel | 6 | | | |

** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.*

*** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| **Remedy Component that this Input worksheet is part of:** | Component 3 | Truck Operations |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| NONE | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).*

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

*Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.*

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation*** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | Yes | | Truck (mpg) | Diesel | 6 | | | |
| | | | 0 | | | | | | | Yes | | Truck (mpg) | Diesel | 6 | | | |
| | | | 0 | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

| Remedy Component that this Input worksheet is part of: | Component 3 | Truck Operations |
|---|---|---|

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recycled/reused off-site | tons | 63760.5 | 63760.5 | 50 | 1 | 18706 | Yes | 37412 | Truck (mpg) | Diesel | 6 | | 6235.3 | assume 1.5 tons/CY, landfilling emissions accounted for in UDF |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

| Remedy Component that this Input worksheet is part of: | Component 3 | Truck Operations |
|---|---|---|

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| On-Site | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |
| | | | | |
| Transportation | | Units | Quantity | Notes |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
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| | | |

| | | | | |
|---|---|---|---|---|
| User-defined conventional energy transportation #1 | *User-Defined | TBD | 10 | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***

***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Truck Operations - On-Site Footprint (Scope 1)

| Contributors to Footprints | Units | Usage | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. Factor | MMBtus | Conv. Factor | lbs CO2e | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs | Conv. Factor | lbs |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **0.00** | | **0** | | **0** | | **0** | | **0** | | **0** |

## Truck Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 6235.3 | 0.139 | 866.7067 | 22.5 | 140294.3 | 0.17 | 1060.001 | 0.0054 | 33.67062 | 0.0034 | 21.20002 | 5.2E-06 | 0.032424 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **867** | | **140,294** | | **1,060** | | **34** | | **21** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | mpg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **867** | | **140294** | | **1060** | | **34** | | **21** | | **0** |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 6235.3 | 0.017 | 106.0001 | 3.02 | 18830.61 | 0.0051 | 31.80003 | 0.0062 | 38.65886 | 0.0017 | 10.60001 | 0.0011 | 6.85883 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| Liquefied Petroleum Gas Produced | gal | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| Natural Gas - Compressed Produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **106.0001** | | **18830.61** | | **31.80003** | | **38.65886** | | **10.60001** | | **6.85883** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 0 | 0.058071 | 0 | 6.853438 | 0 | 0.131402 | 0 | 0.303876 | 0 | 0.04557 | 0 | 0.033017 | 0 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Truck Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **106.0001** | | **18830.61** | | **31.80003** | | **38.65886** | | **10.60001** | | **6.85883** |

## Truck Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | | Conv. | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| **Total Gasoline Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.101 | 0 | 0.00013 | 0 | 0.009 | 0 | 0.00004 | 0 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 6235.3 | 0.139 | 866.7067 | 22.5 | 140294.3 | 0.17 | 1060.001 | 0.0054 | 33.67062 | 0.0034 | 21.20002 | 5.2E-06 | 0.032424 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 6235.3 | 0.017 | 106.0001 | 3.02 | 18830.61 | 0.0051 | 31.80003 | 0.0062 | 38.65886 | 0.0017 | 10.60001 | 0.0011 | 6.85883 |
| **Total Diesel Footprint** | | **6235.3** | | **972.7068** | | **159124.9** | | **1091.801** | | **72.32948** | | **31.80003** | | **6.891254** |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 0 | 0.088 | 0 | 1.47 | 0 | 0.0016 | 0 | 0.0024 | 0 | 0.0007 | 0 | 0.0003 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 0 | 19.983 | 0 | 343.92 | 0 | 0.4732 | 0 | 2.1651 | 0 | 0.1846 | 0 | 0.2895 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

# Truck Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **867** | **140,294** | **1,060** | **34** | **21** | **1,115** | **0** |
| **Other Off-Site (Scope 3b)** | **106** | **18,831** | **32** | **39** | **11** | **81** | **7** |
| **Remedy Totals** | **973** | **159,125** | **1,092** | **72** | **32** | **1,196** | **7** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity |
|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** |
| On-site biodiesel use | MMBtu | **0** |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** |
| Voluntary purchase of renewable electricity | MWh | **0** |
| Voluntary purchase of RECs | MWh | **0** |

*(This value is the sum of the three rows above)*

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx*

# Rail/Truck Transport Operations

## Input Worksheet for Input Rail Operations

| **Please specify which Remedy Component this Input worksheet is part of:** (Select "Off" to exclude this Input worksheet from calculations and results) | Component 4 | Rail Operations |
|---|---|---|

*General Scope*

Rail operations includes labrorers associated with loading waste materials from trucks to train as well as miles from the site to various landfill locations.

*Example Items Eliminated through Screening Process*

*Other Notes and References*

*Personnel Transportation*

| Participant | Number of Roundtrips to Site | Roundtrip Distance to Site (miles) | Mode of Transportation* | Transport Fuel Type* | Total Distance Transported (miles) | Default Fuel Usage Rate** | Fuel Usage Rate Override** | Fuel Used for Personnel Transport** | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|
| Contractor/Foreman - at loading area | 995 | 50 | Car | Gasoline | 49750 | 25 | | 1990 | Contractor/Foreman - at loading area (on-site duration) |
| Contractor/Foreman - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | Contractor/Foreman - at loading area (off-site duration) |
| Contractor/Foreman - at unloading area | 995 | 50 | Car | Gasoline | 49750 | 25 | | 1990 | Contractor/Foreman - at unloading area |
| General Equipment Operator (1) - at loading area | 995 | 50 | Car | Gasoline | 49750 | 25 | | 1990 | General Equipment Operator (1) - at loading area (on-site duration) |
| General Equipment Operator (1) - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | General Equipment Operator (1) - at loading area (off-site duration) |
| General Equipment Operator (1) - at unloading area | 995 | 50 | Car | Gasoline | 49750 | 25 | | 1990 | General Equipment Operator (1) - at unloading area |
| General Laborer (1) - at loading area | 995 | 50 | Car | Gasoline | 49750 | 25 | | 1990 | General Laborer (1) - at loading area (on-site duration) |
| General Laborer (1) - at loading area | 995 | 50 | Car | Gasoline | 49750 | 25 | | 1990 | General Laborer (1) - at loading area (on-site duration) |
| General Laborer (1) - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | General Laborer (1) - at loading area (off-site duration) |
| General Laborer (1) - at loading area | 442 | 50 | Car | Gasoline | 22100 | 25 | | 884 | General Laborer (1) - at loading area (off-site duration) |
| General Laborer (1) - at unloading area | 995 | 50 | Car | Gasoline | 49750 | 25 | | 1990 | General Laborer (1) - at unloading area |
| General Laborer (1) - at unloading area | 995 | 50 | Car | Gasoline | 49750 | 25 | | 1990 | General Laborer (1) - at unloading area |

***** See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options.***

***** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).***

*On-Site Equipment Use and Transportation*

| Equipment Type* | HP* | Load Factor (%)* | Equipment Fuel Type** | Equipment Fuel Usage Rate | Equipment Hours Operated | Fuel Used for On-site Equipment | Equipment weight (tons) | Number of Equipment Roundtrips to Site | Roundtrip Distance to Site (miles) | Total Distance Transported (miles) | Mode of Transportation | Transport Fuel Type*** | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Equipment Transport (gallons) | Activity or Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavator - medium (175 HP) | 350 | 75% | Diesel | 13.125 | 11183.0 | 146776.9 | 50 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Intermodal Top Pick, used to load intermodal contains onto rail |
| Excavator - medium (175 HP) | 350 | 75% | Diesel | 13.125 | 7644.0 | 100327.5 | 50 | 1 | 100 | 100 | Truck (mpg) | Diesel | 6 | | 16.7 | Intermodal Top Pick, used to load intermodal contains onto rail |
| | | | Diesel | 0 | | 0 | | | 100 | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | 100 | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | 100 | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | 100 | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0 | | | 50 | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | 100 | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | 100 | | Truck (mpg) | Diesel | 6 | | | |
| | | | Diesel | 0 | | 0.0 | | | 100 | | Truck (mpg) | Diesel | 6 | | | |

***** HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.***

***** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.***

****** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.***

| **Remedy Component that this Input worksheet is part of:** | Component 4 | Rail Operations |
|---|---|---|

*On-Site Electricity Use*

| Equipment Type | HP | Load Factor (%) | Efficiency (%) | Electrical Rating (kW) | Hours Used | Energy Used (kWh) | Notes |
|---|---|---|---|---|---|---|---|
| NONE | | | | | | | |
| Estimated Total Electricity Usage Based on Above | | | | | | 0 | |
| Renewable Electricity Generated On-Site* | | | | | | | |
| Total Electricity Usage Based on Personnel Transportation | | | | | | 0 | |
| Total Grid Electricity Used | | | | | | 0 | |

***** Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).***

*On-Site Natural Gas Use*

| Equipment Type | Power Rating (Btu/hr) | Efficiency (%) | Hours Used | Energy Required (Btu) | Natural Gas Used (ccf) | Notes |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | 0 | |
| | | | | 0 | | |
| | | Totals | 0 | 0 | 0 | |

*Landfill Gas Combusted On-Site for Energy Use*

| Equipment Type | Landfill Gas (ccf) | % Methane by volume | Used for electricity? | Landfill Gas Methane Used (ccf) | Notes |
|---|---|---|---|---|---|
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | Total | 0 | |

***Please see the "Detailed Notes and Explanations" tab for instructions on using the two tables above ("On-site Natural Gas Use" and "Landfill Gas Combusted On-Site for Energy Use"). In the two tables above, ccf = hundreds of cubic feet.***

*Materials Use and Transportation*

| Material Type* | Unit | Quantity | Tons | Is the Material Refined or Unrefined?** | Material Source: Virgin, Recycled, or Reused?** | Calculate Item Footprint?** | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Materials Transport (gallons) | Notes and Description of Materials |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
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| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | | | | |

** Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined Materials" in the dropdown menu.*

*** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the "Detailed Notes and Explanations" tab for further information.*

**** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

**Remedy Component that this Input worksheet is part of:** | **Component 4** | **Rail Operations**

*Waste Disposal and Transportation*

| Waste Destination* | Unit | Quantity | Tons | Default One-way Distance to Site (miles) | One-way Distance to Site Override (miles) | Number of One-way Trips to Site | Include Return Trip in Calculations? | Total Distance Transported (miles) | Mode of Transportation ** | Transport Fuel Type | Default Transport Fuel Usage Rate (gptm or mpg) | Transport Fuel Usage Rate Override (gptm or mpg) | Fuel Used for Waste Transport (gallons) | Notes and Description of Waste |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recycled/reused off-site | tons | 205200 | 205200 | 50 | 1 | 26419 | Yes | 52838 | Truck (mpg) | Diesel | 6 | | 8806.3 | assume 1.5 ton/cy, onsite, landfilling emissions accounted for in UDF |
| Recycled/reused off-site | tons | 205200 | 205200 | 50 | 1 | 7366 | Yes | 14732 | Train (gptm) | Diesel | 0.002150075 | | 441.2 | assume 1.5 ton/cy, onsite, landfilling emissions accounted for in UDF |
| Recycled/reused off-site | tons | 205200 | 205200 | 50 | 1 | 18566 | Yes | 37132 | Truck (mpg) | Diesel | 6 | | 6188.7 | assume 1.5 ton/cy, onsite, landfilling emissions accounted for in UDF |
| Recycled/reused off-site | tons | 150010.5 | 150010.5 | 50 | 1 | 7683 | Yes | 15366 | Truck (mpg) | Diesel | 6 | | 2561.0 | assume 1.5 ton/cy, offsite, material transferred to rail |
| Off-site non-hazardous waste landfill | tons | 150010.5 | 150010.5 | 25 | 1 | 971492 | Yes | 1942984 | Train (gptm) | Diesel | 0.002150075 | | 322.5 | assume 1.5 ton/cy, offsite, includes landfilling emissions |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |
| | | | 0 | | | | | | | | | | | |

** No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the "Detailed Notes and Explanations" tab for instructions on specifying "User-Defined" selections in the dropdown menu.*

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.*

*Type of Water Used*

| Source of Water Used* | Unit | Quantity | Tons | Source Location/Aquifer (optional) | Quality of Water Used (optional) | Water Uses (optional) | Fate of Used Water (optional) |
|---|---|---|---|---|---|---|---|
| | | NONE | NONE | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |
| | | | 0 | | | | |

** Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.*

*Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.*

**Remedy Component that this Input worksheet is part of:** | **Component 4** | **Rail Operations**

*Other Energy Use and Air Emissions*

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| *On-Site* | | | | |
| User-defined on-site conventional energy use #1 | *User-Defined | TBD | | |
| User-defined on-site conventional energy use #2 | *User-Defined | TBD | | |
| On-site HAP process emissions** | | lbs | | |
| On-site GHG emissions** | | lbs CO2e | | |
| On-site carbon storage** | | lbs CO2e | | |
| Landfill gas flared on-site | | ccf CH4 | | |
| Other on-site NOx emissions or reductions** | | lbs | | |
| Other on-site SOx emissions or reductions** | | lbs | | |
| Other on-site PM emissions or reductions** | | lbs | | |

*Off-Site Laboratory Analysis*

| Parameter and Notes | Number of Samples | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | | | |
|---|---|---|---|---|
| *Transportation* | | Units | Quantity | Notes |
| User-defined conventional energy transportation #1 | *User-Defined | TBD | 10 | |
| User-defined conventional energy transportation #2 | *User-Defined | TBD | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage***

***See the "Detailed Notes and Explanations" tab for use of this table.***

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| **Totals** | **0** | |

***Other Voluntary Renewable Energy Use***

| Item | | Units | Quantity | Notes |
|---|---|---|---|---|
| User-defined on-site renewable energy use #1 | *User-Defined | TBD | | |
| User-defined on-site renewable energy use #2 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #1 | *User-Defined | TBD | | |
| User-defined renewable energy transportation #2 | *User-Defined | TBD | | |
| Voluntary purchase of renewable electricity** | | MWh | | |
| Voluntary purchase of RECs** | | MWh | | |

**** Enter units and conversion factors on "User Defined Factors" tab***

***** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.***

***See the "Detailed Notes and Explanations" tab for use of this table***

| | | |
|---|---|---|
| Description of purchased renewable electricity (green pricing product or green marketing product) | Provider: | |
| | Type of product: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| Description of purchased RECs | Provider: | |
| | Type of renewable energy source: | |
| | Date of renewable system installation: | |
| | Location of renewable system installation: | |

## Rail Operations - On-Site Footprint (Scope 1)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| **On-Site** | | | | | | | | | | | | | | |
| *On-site Renewable Energy* | | | | | | | | | | | | | | |
| Renewable electricity generated on-site | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| Landfill gas combusted on-site for energy use | ccf CH4 | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined on-site renewable energy use #1 | gal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined on-site renewable energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| *On-site Conventional Energy* | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| On-site diesel use - Other | Gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | Gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | Gal | 247104.4 | 0.139 | 34347.51 | 22.24 | 5495601 | 0.101 | 24957.54 | 0.00013 | 32.12357 | 0.009 | 2223.939 | 0.00004 | 9.884175 |
| On-site diesel use >750 hp | Gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| On-site gasoline use - Other | Gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | Gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | Gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| On-site compressed natural gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed natural gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site liquified petroleum gas use - Other | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | gal | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other forms of on-site conventional energy use #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **On-site Conventional Energy Subtotals** | | | | **34,348** | | **5,495,601** | | **24,958** | | **32** | | **2,224** | | **10** |
| Notes: | | | | | | | | | | | | | | |
| *Other On-site Emissions* | | | | | | | | | | | | | | |
| On-site HAP process emissions | lbs | 0 | | | | | | | | | | | 1 | 0 |
| On-site GHG emissions | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| On-site carbon storage | lbs CO2e | 0 | | | 1 | 0 | | | | | | | | |
| GHG avoided by flaring on-site landfill methane | Lbs | 0 | | | -262 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Other on-site NOx emissions or reductions | lbs | 0 | | | | | 1 | 0 | | | | | | |
| Other on-site SOx emissions or reductions | lbs | 0 | | | | | | | 1 | 0 | | | | |
| Other on-site PM emissions or reductions | lbs | 0 | | | | | | | | | 1 | 0 | | |
| User-defined recycled/reused on-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused on-site #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **On-site Totals** | | | | **34,347.51** | | **5,495,601** | | **24,958** | | **32** | | **2,224** | | **10** |

## Rail Operations - Electricity Generation Footprint (Scope 2)

| | | | Energy | | GHG | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contributors to Footprints** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| | | | | | | | | | | | | | | |
| Voluntary purchase of renewable electricity | MWh | 0 | | | | | | | | | | | | |
| Voluntary purchase of RECs | MWh | 0 | | | | | | | | | | | | |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Transportation Footprint (Scope 3a)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Conventional Energy* | | | | | | | | | | | | | | |
| Transportation diesel use | gal | 33.4 | 0.139 | 4.6426 | 22.5 | 751.5 | 0.17 | 5.678 | 0.0054 | 0.18036 | 0.0034 | 0.11356 | 5.2E-06 | 0.000174 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Transportation gasoline use | gal | 18319.7 | 0.124 | 2271.643 | 19.6 | 359066.1 | 0.11 | 2015.167 | 0.0045 | 82.43865 | 0.00054 | 9.892638 | 0.000039 | 0.714468 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 19456 | 0.124 | 2412.544 | 19.6 | 381337.6 | 0.11 | 2140.16 | 0.0045 | 87.552 | 0.00054 | 10.50624 | 0.000039 | 0.758784 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| User-defined conventional energy transportation #1 | TBD | 19456 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined conventional energy transportation #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Conventional Energy Subtotals** | | | | **4,689** | | **741,155** | | **4,161** | | **170** | | **21** | | **1** |
| Notes: | | | | | | | | | | | | | | |
| *Renewable Energy* | | | | | | | | | | | | | | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| User-defined renewable energy transportation #1 | TBD | 0 | Biodiesel | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Ref. | |
| User-defined renewable energy transportation #2 | TBD | 0 | npg or pmp | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Renewable Energy Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| **Transportation Totals** | | | | **4689** | | **741155** | | **4161** | | **170** | | **21** | | **1** |

## Rail Operations - Off-Site Footprint (Scope 3b)

| Category | Units | Usage | Energy Conv. Factor | Energy MMBtus | Greenhouse Gas Conv. Factor | Greenhouse Gas lbs CO2e | NOx Conv. Factor | NOx lbs | SOx Conv. Factor | SOx lbs | PM Conv. Factor | PM lbs | HAPs Conv. Factor | HAPs lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| *Construction Materials* | | | | | | | | | | | | | | |
| Aluminum, Rolled Sheet | lb | 0 | 0.0633 | 0 | 9.15 | 0 | 0.0148 | 0 | 0.0283 | 0 | 0.0088 | 0 | 0.00102 | 0 |
| Asphalt, mastic | lb | 0 | 0.0412 | 0 | 0.85 | 0 | 0.00271 | 0 | 0.00798 | 0 | 0.000766 | 0 | 0.00107 | 0 |
| Asphalt, paving-grade | lb | 0 | 0.5 | 0 | 8.58 | 0 | 0.0299 | 0 | 0.0969 | 0 | 0.0091 | 0 | 0.0133 | 0 |
| Ethanol, Corn, 95% | lb | 0 | 0.0318 | 0 | -0.0199 | 0 | 0.00425 | 0 | 0.00303 | 0 | 0.000469 | 0 | 8.46E-05 | 0 |
| Ethanol, Corn, 99.7% | lb | 0 | 0.0324 | 0 | 0.0591 | 0 | 0.00431 | 0 | 0.0031 | 0 | 0.000472 | 0 | 0.000087 | 0 |
| Ethanol, Petroleum, 99.7% | lb | 0 | 0.0205 | 0 | 1.25 | 0 | 0.00199 | 0 | 0.00214 | 0 | 0.000277 | 0 | 5.89E-05 | 0 |
| Gravel/Sand Mix, 65% Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Gravel/sand/clay | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |
| HDPE | lb | 0 | 0.0332 | 0 | 1.94 | 0 | 0.00325 | 0 | 0.00409 | 0 | 0.000439 | 0 | 6.41E-05 | 0 |
| Photovoltaic system (installed) | W | 0 | 0.0336 | 0 | 4.47 | 0 | 0.015 | 0 | 0.032 | 0 | 0.00063 | 0 | 2.9E-06 | 0 |
| PVC | lb | 0 | 0.0262 | 0 | 2.02 | 0 | 0.004 | 0 | 0.00274 | 0 | 0.000372 | 0 | 0.000375 | 0 |
| Portland cement, US average | lb | 0 | 0.0139 | 0 | 1.34 | 0 | 0.00654 | 0 | 0.0104 | 0 | 0.00378 | 0 | 0.00097 | 0 |
| Ready-mixed concrete, 20 MPa | ft3 | 0 | 0.217 | 0 | 19.5 | 0 | 0.0975 | 0 | 0.154 | 0 | 0.057 | 0 | 0.0141 | 0 |
| Round Gravel | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Sand | lb | 0 | 2.48E-05 | 0 | 0.0024 | 0 | 0.000018 | 0 | 4.52E-06 | 0 | 2.61E-06 | 0 | 3.08E-07 | 0 |
| Stainless Steel | lb | 0 | 0.0116 | 0 | 3.4 | 0 | 0.0075 | 0 | 0.012 | 0 | 0.0044 | 0 | 0.000144 | 0 |
| Steel | lb | 0 | 0.0044 | 0 | 1.1 | 0 | 0.0014 | 0 | 0.0017 | 0 | 0.00056 | 0 | 0.000067 | 0 |
| Other refined construction materials | lb | 0 | 0.01885 | 0 | 2.115 | 0 | 0.004038 | 0 | 0.005133 | 0 | 0.001443 | 0 | 0.000163 | 0 |
| Other unrefined construction materials | lb | 0 | 0.000028 | 0 | 0.00335 | 0 | 1.65E-05 | 0 | 0.000015 | 0 | 0.000002 | 0 | 2.05E-10 | 0 |

Notes:

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| *Treatment Materials & Chemicals* | | | | | | | | | | | | | | |
| Cheese Whey | lbs | 0 | 0.0025 | 0 | 0.031 | 0 | 0.000062 | 0 | 0.000033 | 0 | 0.000002 | 0 | NP | |
| Emulsified vegetable oil | lbs | 0 | 0.0077 | 0 | 3.44 | 0 | 0.0066 | 0 | 0.0019 | 0 | 0.000033 | 0 | NP | |
| Granular activated carbon, primary | lbs | 0 | 0.0356 | 0 | 4.82 | 0 | 0.0793 | 0 | 0.128 | 0 | 0.000987 | 0 | 0.000657 | 0 |
| Granular activated carbon, regenerated | lbs | 0 | 0.00873 | 0 | 1.7 | 0 | 0.00733 | 0 | 0.0129 | 0 | 0.000886 | 0 | 0.000671 | 0 |
| Hydrogen Peroxide, 50% in H2O | lbs | 0 | 0.00979 | 0 | 1.19 | 0 | 0.00142 | 0 | 0.0024 | 0 | 0.000308 | 0 | 6.29E-05 | 0 |
| Iron (II) Sulfate | lbs | 0 | 0.00147 | 0 | 0.167 | 0 | 0.000316 | 0 | 0.000589 | 0 | 0.000103 | 0 | 0.000023 | 0 |
| Lime, Hydrated, Packed | lbs | 0 | 0.00206 | 0 | 0.762 | 0 | 0.000513 | 0 | 0.000358 | 0 | 0.00013 | 0 | 6.57E-06 | 0 |
| Molasses | lbs | 0 | 0.0044 | 0 | 0.48 | 0 | 0.0011 | 0 | 0.00024 | 0 | 4.1E-06 | 0 | NP | |
| Phosphoric Acid, 70% in H2O | lbs | 0 | 0.0067 | 0 | 0.882 | 0 | 0.00282 | 0 | 0.0294 | 0 | 0.00171 | 0 | 0.000163 | 0 |
| Potassium Permanganate | lbs | 0 | 0.00981 | 0 | 1.16 | 0 | 0.00234 | 0 | 0.0032 | 0 | 0.000422 | 0 | 0.000122 | 0 |
| Sodium Hydroxide, 50% in H2O | lbs | 0 | 0.00977 | 0 | 1.09 | 0 | 0.00194 | 0 | 0.00352 | 0 | 0.000403 | 0 | 0.000129 | 0 |
| Other Treatment Chemicals & Materials | lbs | 0 | 0.015 | 0 | 1.67 | 0 | 0.003 | 0 | 0.0065 | 0 | 0.00061 | 0 | 0.000016 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Fuel Processing* | | | | | | | | | | | | | | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| Diesel produced | gal | 0 | 0.017 | 0 | 3.02 | 0 | 0.0051 | 0 | 0.0062 | 0 | 0.0017 | 0 | 0.0011 | 0 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| Liquefied Petroleum Gas Produced | gal | 265457.5 | 0.088 | 23360.26 | 1.47 | 390222.5 | 0.0016 | 424.732 | 0.0024 | 637.0979 | 0.0007 | 185.8202 | 0.0003 | 79.63724 |
| Natural Gas - Compressed Produced | ccf | 19456 | 19.983 | 388789.2 | 343.92 | 6691308 | 0.4732 | 9206.579 | 2.1651 | 42124.19 | 0.1846 | 3591.578 | 0.2895 | 5632.512 |
| Natural Gas Produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Fuel Processing Subtotals** | | | | **412149.5** | | **7081530** | | **9631.311** | | **42761.28** | | **3777.398** | | **5712.149** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Public water* | gal x 1000 | 0 | 0.0092 | 0 | 5 | 0 | 0.0097 | 0 | 0.0059 | 0 | 0.016 | 0 | 0.000015 | 0 |
| *User-defined water resource #1* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *User-defined water resource #2* | gal x 1000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | | **Conv.** | |
| **Category** | **Units** | **Usage** | **Factor** | **MMBtus** | **Factor** | **lbs CO2e** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** | **Factor** | **lbs** |
| *Off-Site Services* | | | | | | | | | | | | | | |
| Hazardous waste incineration | lb | 0 | 0.00609 | 0 | 2.43 | 0 | 0.0016 | 0 | 0.00167 | 0 | 0.000209 | 0 | 0.000087 | 0 |
| Off-site waste water treatment (POTW) | gal x 1000 | 0 | 0.015 | 0 | 4.4 | 0 | 0.016 | 0 | 0.015 | 0 | NP | | NP | |
| Off-site non-hazardous waste landfill | ton | 0 | 0.16 | 0 | 25 | 0 | 0.14 | 0 | 0.075 | 0 | 0.4 | 0 | 0.0014 | 0 |
| Off-site hazardous waste landfill | ton | 0 | 0.18 | 0 | 27.5 | 0 | 0.154 | 0 | 0.0825 | 0 | 0.44 | 0 | 0.00154 | 0 |
| Off-site Laboratory Analysis - Other | sample | 915621 | 0.058071 | 53171.05 | 6.853438 | 6275152 | 0.131402 | 120314.4 | 0.303876 | 278235 | 0.04557 | 41724.69 | 0.033017 | 30230.63 |
| Off-site Laboratory Analysis - Metals | sample | 0 | 0.212 | 0 | 27.4693 | 0 | 0.6423 | 0 | 1.5072 | 0 | 0.2264 | 0 | 0.1643 | 0 |
| Off-site Laboratory Analysis - Mercury | sample | 0 | 0.073171 | 0 | 9.325458 | 0 | 0.212744 | 0 | 0.49824 | 0 | 0.074736 | 0 | 0.054233 | 0 |
| Off-site Laboratory Analysis - Inorganic Anions | sample | 0 | 0.007402 | 0 | 0.645948 | 0 | 0.006768 | 0 | 0.014793 | 0 | 0.002202 | 0 | 0.001554 | 0 |
| Off-site Laboratory Analysis - Alkalinity | sample | 0 | 0.01744 | 0 | 1.338192 | 0 | 0.007011 | 0 | 0.01325 | 0 | 0.00194 | 0 | 0.001283 | 0 |
| Off-site Laboratory Analysis - Perchlorate | sample | 0 | 0.023885 | 0 | 1.871705 | 0 | 0.007981 | 0 | 0.014154 | 0 | 0.002055 | 0 | 0.001287 | 0 |
| Off-site Laboratory Analysis - Nitrogen/Nitrate | sample | 0 | 0.033648 | 0 | 4.29897 | 0 | 0.095459 | 0 | 0.222665 | 0 | 0.03351 | 0 | 0.024251 | 0 |
| Off-site Laboratory Analysis - Sulfate | sample | 0 | 0.014122 | 0 | 1.472673 | 0 | 0.007981 | 0 | 0.013602 | 0 | 0.00198 | 0 | 0.001202 | 0 |
| Off-site Laboratory Analysis - PCBs | sample | 0 | 0.051277 | 0 | 5.224902 | 0 | 0.083334 | 0 | 0.190477 | 0 | 0.028439 | 0 | 0.021208 | 0 |
| Off-site Laboratory Analysis - VOCs | sample | 0 | 0.076204 | 0 | 9.016814 | 0 | 0.104498 | 0 | 0.227074 | 0 | 0.033951 | 0 | 0.023589 | 0 |
| Off-site Laboratory Analysis - SVOCs | sample | 0 | 0.07156 | 0 | 7.870422 | 0 | 0.145945 | 0 | 0.337304 | 0 | 0.050485 | 0 | 0.037258 | 0 |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Resource Extraction Subtotals** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| Notes: | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| Notes: | | | | | | | | | | | | | | |

## Rail Operations - Off-Site Footprint (Scope 3b)

| | | | **Energy** | | **Greenhouse Gas** | | **NOx** | | **SOx** | | **PM** | | **HAPs** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| *User-defined Materials* | | | | | | | | | | | | | | |
| User-defined material #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #4 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #5 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #6 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #7 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #8 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #9 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #10 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #11 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #12 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #13 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #14 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #15 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #16 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #17 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #18 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #19 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined material #20 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| *User-defined Waste Destinations* | | | | | | | | | | | | | | |
| User-defined recycled/reused off-site #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined recycled/reused off-site #3 | TBD | 0 | y(MMBtu/u | | (lbs CO2e/u | | Ox(lbs/unit) | | Ox(lbs/unit) | | M(lbs/unit) | | APs(lbs/unit | |
| User-defined non-hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined non-hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #1 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #2 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| User-defined hazardous waste destination #3 | TBD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Notes: | | | | | | | | | | | | | | |
| **Off-site Totals** | | | | **465320.6** | | **13356682** | | **129945.7** | | **320996.3** | | **45502.09** | | **35942.78** |

## Rail Operations - Intermediate Totals

| | | | Energy | | Greenhouse Gas | | NOx | | SOx | | PM | | HAPs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Units** | **Usage** | **Conv. Factor** | **MMBtus** | **Conv. Factor** | **lbs CO2e** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** | **Conv. Factor** | **lbs** |
| | | | | | | | | | | | | | | |
| **Total Grid Electricity Footprint** | | | | | | | | | | | | | | |
| On-site grid electricity | MWh | 0 | 3.413 | 0 | | | | | | | | | | |
| *Electricity Generation* | | | | | | | | | | | | | | |
| Grid electricity | MWh | 0 | 6.929 | 0 | 733.2188 | 0 | 0.7054 | 0 | 0.130202 | 0 | 0.048556 | 0 | 0.016343 | 0 |
| *Resource Extraction for Electricity* | | | | | | | | | | | | | | |
| Coal extraction and processing | MWh | 0 | 3.1 | 0 | 180.0 | 0 | 0.8 | 0 | 0.2 | 0 | 0.0 | 0 | NP | |
| Natural gas extraction and processing | MWh | 0 | 1.6 | 0 | 270.0 | 0 | 0.2 | 0 | 13.0 | 0 | 0.0 | 0 | NP | |
| Nuclear fuel extraction and processing | MWh | 0 | 0.2 | 0 | 25.0 | 0 | 0.2 | 0 | 0.5 | 0 | 0.0 | 0 | NP | |
| Oil extraction and processing | MWh | 0 | 2.3 | 0 | 270.0 | 0 | 1.7 | 0 | 0.1 | 0 | 0.0 | 0 | NP | |
| Other fuel extraction and processing | MWh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| *Electricity Transmission* | | | | | | | | | | | | | | |
| Transmission and distribution losses | MWh | 0 | 1.0342 | 0 | 73.32188 | 0 | 0.07054 | 0 | 0.01302 | 0 | 0.004856 | 0 | 0.001634 | 0 |
| **Total Grid Electricity Footprint** | | | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| **Total Fuel Footprints** | | | | | | | | | | | | | | |
| Total Gasoline Footprint | | | | | | | | | | | | | | |
| On-site gasoline use - Other | gal | 0 | 0.124 | 0 | 19.6 | 0 | 0.11 | 0 | 0.0045 | 0 | 0.00054 | 0 | 0.000039 | 0 |
| On-site gasoline use <25 hp | gal | 0 | 0.124 | 0 | 17.48 | 0 | 0.037 | 0 | 0.00025 | 0 | 0.165 | 0 | 0.00008 | 0 |
| On-site gasoline use >25 hp | gal | 0 | 0.124 | 0 | 19.93 | 0 | 0.032 | 0 | 0.00029 | 0 | 0.002 | 0 | 0.00009 | 0 |
| Transportation gasoline use | gal | 18319.7 | 0.124 | 2271.643 | 19.6 | 359066.1 | 0.11 | 2015.167 | 0.0045 | 82.43865 | 0.00054 | 9.892638 | 0.000039 | 0.714468 |
| Transportation gasoline use - car | gal | 0 | 0.124 | 0 | 19.77 | 0 | 0.027 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.0067 | 0 |
| Transportation gasoline use - passenger truck | gal | 0 | 0.124 | 0 | 19.79 | 0 | 0.035 | 0 | 0.00036 | 0 | 0.003 | 0 | 0.00661 | 0 |
| Transportation gasoline use - User Defined | gal | 19456 | 0.124 | 2412.544 | 19.6 | 381337.6 | 0.11 | 2140.16 | 0.0045 | 87.552 | 0.00054 | 10.50624 | 0.000039 | 0.758784 |
| Gasoline produced | gal | 0 | 0.033 | 0 | 2.8 | 0 | 0.0046 | 0 | 0.005 | 0 | 0.0015 | 0 | 0.001 | 0 |
| **Total Gasoline Footprint** | | **37775.7** | | **4684.187** | | **740403.7** | | **4155.327** | | **169.9907** | | **20.39888** | | **1.473252** |
| | | | | | | | | | | | | | | |
| Total Diesel Footprint | | | | | | | | | | | | | | |
| On-site diesel use - Other | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| On-site diesel use <75 hp | gal | 0 | 0.139 | 0 | 22.21 | 0 | 0.1565 | 0 | 0.000145 | 0 | 0.0145 | 0 | 0.00004 | 0 |
| On-site diesel use 75<hp<750 | gal | 247104.4 | 0.139 | 34347.51 | 22.24 | 5495601 | 0.101 | 24957.54 | 0.00013 | 32.12357 | 0.009 | 2223.939 | 0.00004 | 9.884175 |
| On-site diesel use >750 hp | gal | 0 | 0.139 | 0 | 22.24 | 0 | 0.149 | 0 | 0.00013 | 0 | 0.006 | 0 | 0.00004 | 0 |
| Transportation diesel use | gal | 33.4 | 0.139 | 4.6426 | 22.5 | 751.5 | 0.17 | 5.678 | 0.0054 | 0.18036 | 0.0034 | 0.11356 | 5.2E-06 | 0.000174 |
| Transportation diesel use - car | gal | 0 | 0.139 | 0 | 22.57 | 0 | 0.015 | 0 | 0.0002 | 0 | 0.003 | 0 | 0.00252 | 0 |
| Transportation diesel use - passenger truck | gal | 0 | 0.139 | 0 | 22.545 | 0 | 0.0585 | 0 | 0.0002 | 0 | 0.007 | 0 | 0.002605 | 0 |
| Transportation diesel use - User Defined | gal | 0 | 0.139 | 0 | 22.5 | 0 | 0.17 | 0 | 0.0054 | 0 | 0.0034 | 0 | 5.2E-06 | 0 |
| Diesel produced | gal | 0 | 0.017 | 0 | 3.02 | 0 | 0.0051 | 0 | 0.0062 | 0 | 0.0017 | 0 | 0.0011 | 0 |
| **Total Diesel Footprint** | | **247137.8** | | **34352.15** | | **5496353** | | **24963.22** | | **32.30393** | | **2224.053** | | **9.884349** |
| | | | | | | | | | | | | | | |
| Total Biodiesel Footprint | | | | | | | | | | | | | | |
| On-site biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| On-site biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Transportation biodiesel use - User Defined | gal | 0 | 0.127 | 0 | 22.3 | 0 | 0.2 | 0 | 0 | 0 | 0.00099 | 0 | NP | |
| Biodiesel produced | gal | 0 | 0.029 | 0 | -16.8 | 0 | 0.018 | 0 | 0.033 | 0 | 0.00082 | 0 | NP | |
| **Total Biodiesel Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Natural Gas Footprint | | | | | | | | | | | | | | |
| On-site natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Transportation natural gas use - User Defined | ccf | 0 | 0.103 | 0 | 13.1 | 0 | 0.01 | 0 | 6.3E-06 | 0 | 0.00076 | 0 | 8.4E-06 | 0 |
| Natural gas produced | ccf | 0 | 0.0052 | 0 | 2.2 | 0 | 0.0037 | 0 | 0.0046 | 0 | 0.000072 | 0 | 6.1E-06 | 0 |
| **Total Natural Gas Footprint** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** | | **0** |
| | | | | | | | | | | | | | | |
| Total Liquified Petroleum Gas Footprint | | | | | | | | | | | | | | |
| On-site liquified petroleum gas use - Other | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| On-site liquified petroleum gas use | ccf | 0 | NP | | 12.69 | 0 | 0.021 | 0 | 0.00013 | 0 | 0.001 | 0 | 0 | 0 |
| Liquified petroleum gas produced | ccf | 265457.5 | 0.088 | 23360.26 | 1.47 | 390222.5 | 0.0016 | 424.732 | 0.0024 | 637.0979 | 0.0007 | 185.8202 | 0.0003 | 79.63724 |
| **Total Natural Gas Footprint** | | **0** | | **23360.26** | | **390222.5** | | **424.732** | | **637.0979** | | **185.8202** | | **79.63724** |
| | | | | | | | | | | | | | | |
| Total Compressed Gas Footprint | | | | | | | | | | | | | | |
| On-site compressed gas use - Other | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| On-site compressed gas use | ccf | 0 | NP | | 1957.835 | 0 | 16.0325 | 0 | 0.023045 | 0 | 0.2775 | 0 | 0 | 0 |
| Compressed gas produced | ccf | 19456 | 19.983 | 388789.2 | 343.92 | 6691308 | 0.4732 | 9206.579 | 2.1651 | 42124.19 | 0.1846 | 3591.578 | 0.2895 | 5632.512 |
| **Total Natural Gas Footprint** | | **0** | | **388789.2** | | **6691308** | | **9206.579** | | **42124.19** | | **3591.578** | | **5632.512** |
| Notes: | | | | | | | | | | | | | | |

***Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.***

Space below available for notes and calculations:

## Rail Operations - Energy & Air Compiled Results

| Category | Total Energy | GHG | NOx | SOx | PM | NOx + SOx + PM | HAPs |
|---|---|---|---|---|---|---|---|
| | MMbtus | lbs CO2e | lbs | lbs | lbs | lbs | lbs |
| | | | | | | | |
| **On-site (Scope 1)** | **34,348** | **5,495,601** | **24,958** | **32** | **2,224** | **27,214** | **10** |
| **Grid Electricity Generation (Scope 2)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Transportation (Scope 3a)** | **4,689** | **741,155** | **4,161** | **170** | **21** | **4,352** | **1** |
| **Other Off-Site (Scope 3b)** | **465,321** | **13,356,682** | **129,946** | **320,996** | **45,502** | **496,444** | **35,943** |
| **Remedy Totals** | **504,357** | **19,593,439** | **159,064** | **321,199** | **47,747** | **528,009** | **35,954** |

*Values that are forwarded to the "Summary" tab are indicated in orange.*

| Voluntary Renewable Energy Use | Unit | Quantity | |
|---|---|---|---|
| On-site renewable energy generation or use | MMBtu | **0** | |
| On-site biodiesel use | MMBtu | **0** | |
| Biodiesel and other renewable resource use for transportation | MMBtu | **0** | |
| On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation | MMBtu | **0** | *(This value is the sum of the three rows above)* |
| Voluntary purchase of renewable electricity | MWh | **0** | |
| Voluntary purchase of RECs | MWh | **0** | |

*This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:*
*SEFA_calculations_(121718).xlsx*

# Appendix D

## Work Site and Transportation-Related Injuries and Fatalities Evaluation

General Electric Company

# Appendix D: Work Site and Transportation-Related Injuries and Fatalities Evaluation

**Revised On-Site and Off-Site Transportation and Disposal Plan**

**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

October 2024

# Appendix D: Work Site and Transportation-Related Injuries and Fatalities Evaluation

**Housatonic River – Rest of River**
**Pittsfield, Massachusetts**

October 2024

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# Table of Contents



# Tables

# Abbreviations

| | |
|---|---|
| BLS | Bureau of Labor Statistics |
| EPA | United States Environmental Protection Agency |
| FRA | Federal Railroad Administration |
| NAICS | North American Industry Classification System |
| NHTSA | National Highway Traffic Safety Administration |
| Revised T&D Plan | Revised On-Site and Off-Site Transportation and Disposal Plan |
| ROR | Rest of River |
| RU | remediation unit |
| SOS | Standard Occupational Classification |
| T&D Plan | On-Site and Off-Site Transportation and Disposal Plan |
| TSCA | Toxic Substances Control Act |
| UDF | Upland Disposal Facility |
| VMT | vehicle mile traveled |

# 1 Introduction

The Revised On-Site and Off-Site Transportation and Disposal Plan (Revised T&D Plan) describes and evaluates various methods and scenarios for transporting sediments and floodplain soils containing polychlorinated biphenyls and removed from different remediation units (RUs) of the Housatonic River and adjacent floodplain to an on-site Upland Disposal Facility (UDF) or to off-site commercial disposal facilities. This transport of materials will occur during performance of a Remedial Action selected by the United States Environmental Protection Agency for the Housatonic Rest of River (ROR) site. The transport methods include hydraulic transport, truck transport, and rail combined with truck transport (rail/truck transport).[1]

As directed by EPA, potential impacts of the various transportation methods and scenarios on nearby communities, workers, and the environment during the implementation of the Remedial Action have been evaluated. These impacts include potential worker accidents associated with the transport of materials from the removal areas to the UDF or off-site disposal facilities, including both work site accidents related to transport infrastructure and accidents occurring during transport. This document provides an estimation of anticipated injuries/fatalities associated with truck transport and rail/truck transport in the four site-wide transportation scenarios described Section 4 of the Revised T&D Plan. This quantitative comparison among the scenarios does not include hydraulic conveyance, which will be used similarly in all four transportation scenarios.

The four site-wide transportation scenarios evaluated are described in detail in Section 4 of the Revised T&D Plan. The truck and rail/truck transport components of those scenario are as follows:

- **Scenario 1 (Truck Transport to UDF and for Off-Site Disposal)** – Truck transport from the RUs to the UDF for on-site disposal and truck transport from the RUs for off-site disposal, with loading to rail at an existing commercial rail loading facility in Albany, New York, and rail transport the remaining distance to the selected off-site disposal facility(ies).
- **Scenario 2 (Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal)** – Truck transport from the RUs to the UDF for on-site disposal and rail/truck transport from the RUs for off-site disposal, including construction of three rail loading areas (at Utility Drive, Woods Pond Spur, and Rising Pond).
- **Scenario 3 (Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal)** – Truck transport from the RUs to the UDF for on-site disposal, truck transport from Reaches 5A and 5B for off-site disposal with loading to rail at the existing commercial rail loading facility in Albany and rail transport the remaining distance, and rail/truck transport from the other RUs for off-site disposal, including construction of two rail loading areas (at Woods Pond Spur and Rising Pond).
- **Scenario 4 (Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal)** – Mostly rail/truck from the RUs to the UDF for on-site disposal and rail/truck transport from the RUs for off-site disposal, including construction of two rail loading areas (at Utility Drive and Rising Pond) and one rail loading/off-loading area at (Woods Pond Spur).

The work site and transportation accidents risks associated with the four site-wide transportation scenarios include the following:

- Possible worker fatalities and non-fatal injuries during construction of infrastructure required to support rail/truck transport (i.e., construction of a railroad spur);

[1] Use of the railroad as a mode of transportation will necessarily include use of trucks to convey material to the railroad and/or from the railroad to the final disposal site and is therefore referred to as a rail/truck transport approach.

- Possible worker fatalities and non-fatal injuries during operations required to transfer containers of removed material from truck to rail and/or from rail to truck; and
- Potential injuries and/or fatalities that result from traffic accidents transporting removed sediments and soils from the site on public roads (involving trucks) and/or public railroad tracks (involving trains).

The components of each scenario included in the evaluation are summarized in Table D-1. The differences among the four scenarios are related to how much volume is moved via which mode of transportation and the number of rail spurs constructed.

*Table D-1: Summary of Components Included in Risk Evaluation for Each Scenario*

| Scenario | Work Site Operations for Construction of Rail Loading/Off-Loading Area | Work Site Operations to Transfer Containers between Truck/Rail | Accidents Related to Truck Traffic | Accidents Related to Rail Traffic |
|---|---|---|---|---|
| 1 | | ✓[a] | ✓ | ✓ |
| 2 | ✓ | ✓ | ✓ | ✓ |
| 3 | ✓ | ✓[a] | ✓ | ✓ |
| 4 | ✓ | ✓ | ✓ | ✓ |

**Note:**

[a] For Scenarios 1 and 3, the operations to transfer containers between truck and rail include operations to transfer containers from truck to rail at the existing commercial rail loading facility in Albany, New York.

The remainder of this appendix presents the methodology and assumptions for the evaluation of work site and transportation accident risks of fatality or non-fatal injury and summarizes the results of the evaluation.

# 2 Methodology for Estimating Accident Risks

The risk of a fatality or non-fatal injury due to work site accidents can be quantified by integrating fatal or non-fatal injury rate estimates from work site operations associated with the projected number of hours worked for constructing the rail spurs and for transferring containers of removed material from truck to rail and/or from rail to truck. The transportation risk of traffic accident occurrence from transporting materials can be determined by aggregating fatality or non-fatal injury accident rate estimates with the vehicle miles traveled by the different modes of transportation in each transportation scenario.

As stated in the Revised T&D Plan, transportation in the modes being considered in the Revised T&D Plan starts after the material is loaded into containers for shipment and ends with delivery of the material at the receiving facility (i.e., UDF or off-site disposal facility). As such, accident risks were evaluated for the period that begins with the loading of material into containers for shipment and ends with delivery of the material at the receiving facility. In the context of estimating work site and transportation risks, the activities considered for each transportation scenario are as follows:

- **Scenario 1 (Truck Transport to UDF and for Off-Site Disposal):**
  - Traffic accidents related to truck transport for on-site disposal from the RUs to the UDF;
  - Traffic accidents related to truck transport for off-site disposal from the RUs to an existing commercial rail loading facility in Albany, New York;

  - Work site operations to transfer containers from truck to rail; and
  - Traffic accidents related to rail transport for off-site disposal from the rail loading area to the selected off-site disposal facility(ies).

- **Scenario 2 (Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal):**
  - Work site operations related to construction of three rail loading areas (Utility Drive, Woods Pond Spur, and Rising Pond);
  - Traffic accidents related to truck transport for on-site disposal from the RUs to the UDF;
  - Traffic accidents related to truck transport for off-site disposal from the RUs to a rail loading area;
  - Work site operations to transfer containers from truck to rail; and
  - Traffic accidents related to rail transport for off-site disposal from the rail loading area to the selected off-site disposal facility(ies).

- **Scenario 3 (Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal):**
  - Work site operations related to construction of two rail loading areas (Woods Pond Spur and Rising Pond);
  - Traffic accidents related to truck transport for on-site disposal from the RUs to the UDF;
  - Traffic accidents related truck transport for off-site disposal from certain RUs to an existing commercial rail loading facility in Albany, New York, and for other RUs to either the Woods Pond Spur or Rising Pond loading areas;
  - Work site operations to transfer containers from truck to rail;
  - Traffic accidents related to rail transport for off-site disposal from the rail loading area to the selected off-site disposal facility(ies).

- **Scenario 4 (Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal):**
  - Work site operations related to construction of three rail loading areas (Utility Drive, Woods Pond Spur, and Rising Pond);
  - Traffic accidents related to truck transport for on-site disposal from certain RUs to the UDF and for other RUs to either the Utility Drive or Rising Pond loading areas;
  - Traffic accidents related to truck transport for off-site disposal from the RUs to a rail loading area;
  - Work site operations to transfer containers from truck to rail;
  - Traffic accidents related to rail transport for off-site disposal for the remaining distance to the selected off-site disposal facility(ies);
  - Traffic accidents related to rail transport for on-site disposal to Woods Pond Spur;
  - Work site operations to transfer containers from rail to truck; and
  - Traffic accidents related to truck transport for on-site disposal the remaining distance to the UDF.

As noted in Section 1, the evaluation of risks presented in this appendix does not include hydraulic conveyance, which will be used in all four transportation scenarios for the majority of the removal volume.

The risk estimation methods used for the four site-wide transportation scenarios for operational and traffic accidents are further described in the following subsections.

## 2.1 Estimating Work Site Accident Risks

There is a risk component involved when performing work site-related activities. As a result, the likelihood of a work site fatality or non-fatal injury has been evaluated for each scenario in terms of construction of rail loading/off-loading facilities and work site activities to transfer containers between truck and rail and/or rail and truck for further transport. Risk was computed by applying an assessment methodology similar to the one developed by Hoskin et al. (1994), which requires fatal or non-fatal injury work site accident rate statistics as well as site-specific information on the work hours for the different activities completed during each scenario being evaluated.

In their research project, Hoskin et al. evaluated occupational fatality risks for various hazardous waste remediation scenarios. The first step in their research involved the determination of fatality rates for relevant activities on the basis of tasks involved in each scenario. This was followed by the estimation of work hours required to complete an activity. A weighted fatality rate was then derived for each scenario by multiplying the fatality rates with the percentage of total work hours for each activity. Finally, a scenario's fatality rate was predicted by applying the weighted fatality rate to the total person-years worked.

Attached Tables D-2 through D-5 provide the total work hours by labor category and work site activity for each of the four scenarios, and Table D-6, below, summarizes the total labor hours for all work site activities in each scenario.

*Table D-6: Work Site Total Labor Hours for Each Scenario*

| Scenario | Total Labor Hours |
|---|---|
| Scenario 1: Truck Transport to UDF and for Off-Site Disposal | 10,600 hours |
| Scenario 2: Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 14,200 hours |
| Scenario 3: Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal | 13,600 hours |
| Scenario 4: Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 44,800 hours |

### 2.1.1 Work Site Accidents Resulting in Fatality

The risk estimation procedure used for this estimate is mathematically equivalent to the one applied by Hoskin et al. (1994); however, there are some minor differences in the calculation order. Firstly, the number of work site fatalities by labor category during the implementation of each scenario was predicted using Equation D-1 as follows:

$$\mu_{LC} = H \times F_R \qquad \text{Equation D-1}$$

where $\mu_{LC}$ is the estimated number of fatalities for a given labor category, $H$ is the estimated number of work hours within a given labor category, and $F_R$ is the calculated hourly fatality rate for a given labor category.

Consequently, the overall number of fatal work site accidents associated with a given scenario was calculated by summing the predicted fatalities for each individual labor category in a scenario.

The process followed for developing fatal accident rates for the different labor categories in each scenario includes these steps:

- **Step 1:** Acquire fatal accidents information for the most recent consecutive five years, 2018 to 2022, from the U.S. Department of Labor, Bureau of Labor Statistics (BLS) database (BLS 2024) for the Standard Occupational Classification (SOC) occupations that are correlated to the labor categories in this project. The SOC occupations used to represent the labor categories are listed in Table D-7, below.
- **Step 2:** Access the U.S. Census Bureau and BLS Current Population Survey database (U.S. Census Bureau and BLS 2018, 2019, 2020, 2021, 2022) to download information pertaining to the total number of workers in each SOC occupation.
- **Step 3:** Estimate the average annual rate of fatal accidents for each labor category. This is calculated by dividing the sum of work site fatalities by the sum of estimated workers in each labor category for all years used in the risk estimation analysis, i.e., 2018 through 2022.
- **Step 4:** Compute the hourly fatal accident rate for each labor category, also summarized in Table D-7, by assuming that laborers work 1,584 hours per year (considering that workers on this site are assumed to work 198 days per year and eight hours each day) and then dividing the average annual fatal accident rate by the work-hours value.

*Table D-7: Remediation Labor Categories, Associated SOC Occupations, and Average Hourly Fatality Rates Summary*

| Labor Category | SOC Occupation | Hourly Fatal Accident Rate |
|---|---|---|
| Contractor/foreman | First-line supervisors of construction trades and extraction workers (Code 471011) | $1.09 \times 10^{-7}$ |
| General operator | Excavating and loading machine and dragline operators (Code 537032) | $2.78 \times 10^{-8}$ |
| General laborer | Construction laborers (Code 472061) | $8.51 \times 10^{-8}$ |

The probability of at least one fatal accident to occur at a work site during the implementation of each disposal and rail construction scenario was also calculated by using a Poisson distribution function, as described by Hoskin et al. (1994). The application of a Poisson distribution is effective in capturing the occurrence of rare or independent events, such as fatalities, over a period under one crucial condition: the occurrence of one fatal event should not influence the possibility of subsequent events. Within the context of work site accidents, fatality events are assumed to meet these conditions. The following steps can be used to determine the risk of one fatal occurring at a work site:

- **Step 1:** Quantify the probability, or risk, of fatalities to occur at a work site using the quantitative method described in Equation D-2 (Snedecor et al. 1980), below.

$$P\ (x) = \frac{(e^{-\mu} \times \mu^{x})}{x!} \qquad \text{Equation D-2}$$

  where $x$ is the number of fatalities occurring and $\mu$ is the mean of the Poisson distribution, which is equivalent to the estimated number of fatalities during implementation of a scenario.

- **Step 2:** Apply Equation D-3, below, to calculate the probability of at least one work site fatality.

$$P(\geq 1) = 1 - P(0) \qquad \text{Equation D-3}$$

where $P(\geq 1)$ is the probability of at least one fatality occurring and $P(0)$ is the estimated probability of no fatalities occurring, where $x$ in Equation D-2 is substituted with zero.

### 2.1.2 Work Site Accidents Resulting in Non-Fatal Injury

There is an association between injuries and the non-fatal injury and illness data from the BLS. However, one limitation of the BLS database is that it does not provide the non-fatal injury and illness rates specific to the labor categories used in the fatal accident risk estimation analysis. Instead, the non-fatal injury rate data are available at the industry level, as categorized by the North American Industry Classification System (NAICS). Therefore, it was necessary to match the labor categories with an appropriate NAICS industry, outlined in Table D-8, below.

These steps were followed to assess the risk of non-fatal injury accidents during site remediation:

- **Step 1:** Obtain non-fatal injury rates for each year in the analysis from the BLS database (BLS 2024) based on the assigned NAICS industry categories. The overall rate of non-fatal injuries or illnesses in each labor category is then computed by averaging the non-fatal injury rates for the years 2018 through 2022.
- **Step 2:** Determine the hourly non-fatal injury rate for each labor category by applying the technique discussed in Section 2.1.1 for fatal accidents. The rates are summarized in Table D-8.
- **Step 3:** Calculate the predicted number of non-fatal injuries for each labor category using Equation D-1, which combines the rates from Step 1 with the estimated labor hour data for each alternative.
- **Step 4:** Estimate the total number of non-fatal injuries anticipated for a given scenario by summing the results from Step 2 for each labor category.

*Table D-8: Remediation Labor Categories, Associated NAICS Industries and Average Hourly Non-Fatal Injury Rates*

| Labor Category | NAICS Industry | Average Hourly Non-Fatal Injury Rate |
|---|---|---|
| Contractor/Foreman | Heavy and civil engineering construction | $1.35 \times 10^{-5}$ |
| General Operator | Heavy and civil engineering construction | $1.35 \times 10^{-5}$ |
| General Laborer | Heavy and civil engineering construction | $1.35 \times 10^{-5}$ |

The probability of at least one non-fatal injury occurring during implementation of a transportation scenario can be computed by applying the same technique considered when estimating the probability of at least one fatality, which is specified in Equations D-2 and D-3, above.

## 2.2 Estimating Traffic Accident Risks

All transport scenarios require transportation of removed soils and sediments from the site via trucks and/or rail to the selected disposal facility(ies), though different volumes for each mode of transportation and/or different locations are used in the four site-wide transportation scenarios. Fundamentally, there is a risk of transportation-related accidents occurring during the transit process, which might result in fatalities or injuries to workers and/or the public.

The estimated number of transportation accidents that can potentially lead to a fatality or non-fatal injury have been quantified for each scenario by linking scenario-specific information to accident rates obtained from publicly available data sources. The assessment of accident risks was based on the transportation activities mentioned in Section 2.

### 2.2.1 Transportation Accidents Resulting in Fatality

The risk of fatal accidents occurring on public roads from the transportation of removed materials for on-site and off-site disposal using trucks and rail can be calculated by applying Equation D-4, below. This methodology accounts for the predicted rate of fatal traffic accidents per distance traveled by a mode of transportation and the estimated miles traveled by each mode of transportation (i.e., either vehicle mile traveled [VMT] for truck transport or train miles for train transport) in each transportation scenario.

$$A = VMT\ or\ Tain\ Miles\ \times\ A_R \qquad \text{Equation D-4}$$

where $A_R$ is the estimated number of fatalities occurring on public roads/railroads from the transportation of removed material using trucks and rail, $VMT\ or\ Train\ Miles$ is the round-trip vehicle miles traveled by trucks or the round-trip train miles, and $A_R$ is the fatal or non-fatal injury accident rate per VMT or train mile.

The following steps were used to estimate VMT/train miles in Equation D-4:

- **Step 1:** Estimate the number of truck and rail trips that will be required for on-site and off-site disposal. These are based on the volume of material that needs to be transported and the type of transportation mode being used.
- **Step 2:** Assume the distance traveled by the different types of transportation modes in each scenario to determine the round-trip distances. For the purposes of calculating distance, an off-site disposal facility in Emelle, Alabama, was assumed for material regulated under the Toxic Substances Control Act (TSCA) and an off-site facility in Fairport, New York, was assumed for material not regulated under the TSCA (i.e., non-TSCA material).
- **Step 3:** Calculate total VMT/train miles for each transportation-related activity in a scenario as shown in Equation D-5, below.

  $$VMT\ or\ Tain\ Miles = D\ \times N \qquad \text{Equation D-5}$$

  where $VMT$ is the total truck miles traveled and train miles is the total number of miles traveled by each rail car (which includes six containers), $D$ is the assumed round-trip distance traveled, and $N$ is the number of vehicle trips on the designated routes.

Attached Tables D-9 through D-12 provide the total VMT/train miles by transportation activity for each of the four scenarios, and Table D-13, below, presents total VMT/train miles for each transportation activity across all scenarios. Miles consider round-trip travel.

*Table D-13: Total VMT/Train Miles by Transportation Activity for All Scenarios (miles)*

| Transportation Activity | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 |
|---|---|---|---|---|
| Truck transport | 230,000 | 230,000 | 230,000 | 37,400 |
| Truck transport (for train/rail transport) | 957,000 | 15,000 | 97,700 | 105,000 |
| Rail transport (for train/rail transport) | 1,670,000 | 1,940,000 | 1,930,000 | 1,960,000 |

The rate of fatal traffic accidents for trucks and rail can be computed using the steps described below:

- **Step 1:** Access the National Highway Traffic Safety Administration (NHTSA) traffic safety facts publication managed by the U.S. Department of Transportation to obtain the frequency of fatalities and injuries from large truck-related accidents in the U.S. between 2018 and 2022 (NHTSA 2024). (As defined by the Federal Motor Carrier Safety Administration, a large truck has a gross vehicle weight rating greater than 10,000 pounds.) Also obtain the total vehicle miles traveled by year from NHTSA's publication (NHTSA 2024) to calculate the average accident rate.
- **Step 2:** Acquire national statistics on the number of fatalities and injuries due to Class 1 railroad accidents from the U.S. Department of Transportation Federal Railroad Administration (FRA) Office of Safety Analysis between 2018 and 2022 (FRA 2024). (Class 1 railroads account for the majority of rail traffic in North America, which focuses on transporting freight containers and cargo.) Also obtain the train miles for this railroad class from FRA's safety data and reporting system (FRA 2024) to calculate the average accident rate.
- **Step 3:** Calculate annual fatal accident rates for trucks and rail, respectively, by dividing the accident frequencies by the VMT or train miles for each analysis year. Then determine the five-years average fatal accident rates as shown in Table D-14.

*Table D-14: Five-Years Average Fatal Accident Rates for Large Trucks and Rail*

| Transportation Mode | Average Fatal Accident Rate |
|---|---|
| Large trucks | $1.71 \times 10^{-8}$ |
| Rail | $1.16 \times 10^{-6}$ |

### 2.2.2 Transportation Accidents Resulting in Non-Fatal Injury

The risk of an accident resulting in a non-fatal injury from transportation-related activities is estimated using the same methodology outlined in Section 2.2.1. The average non-fatal injury accident rates by the different modes of transportation used to move waste material are provided in Table D-15.

*Table D-15: Five-Years Average Non-Fatal Injury Accident Rates for Large Trucks and Rail*

| Transportation Mode | Average Non-Fatal Injury Accident Rate |
|---|---|
| Large trucks | $4.92 \times 10^{-7}$ |
| Rail | $5.53 \times 10^{-6}$ |

### 2.2.3 Transportation Fatal or Non-Fatal Injury Accident Probability

The probability of at least one fatality or non-fatal injury occurring on public roads while transporting materials using truck and/or rail for each transportation scenario can be estimated by applying the Poisson distribution methodology defined in Section 2.1.1.

# 3 Estimated Risk Results and Discussion

The findings from the risk assessment are presented and discussed in this section. The estimated total number of work site fatalities and injuries for all activities in each scenario is summarized in Table D-16. A breakdown of fatal and non-fatal injury risk estimates by the various work site activities and labor categories in each of the four scenarios are included in Tables D-2 through D-5, respectively.

*Table D-16: Estimated Total Worker Fatalities and Non-Fatal Injuries for All Scenarios*

| Scenario | Total Work Site Fatalities | Total Work Site Non-Fatal Injuries |
|---|---|---|
| Scenario 1: Truck Transport to UDF and for Off-Site Disposal | 0.000786 | 0.143 |
| Scenario 2: Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 0.00196 | 0.391 |
| Scenario 3: Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal | 0.00160 | 0.313 |
| Scenario 4: Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 0.00666 | 1.22 |

Because the labor categories are similar for each scenario, the total work site fatalities and non-fatal injuries are largely proportional to the number of labor hours per scenario (Table D-6). Scenario 1 generates the lowest fatality and non-fatal injury estimates from the proposed work site activities. This is primarily because Scenario 1 only accounts for loading activities at the commercial rail facility in Albany, New York, in comparison to the other three scenarios, which involve a combination of work site activities including loading and/or off-loading material and construction of rail loading/off-loading areas. Scenarios 2 and 3 have slightly more fatalities and non-fatal injuries, and Scenario 4 has the most, due mainly to the greater amount of rail/truck transport and associated loading/off-loading of material to/from rail.

The estimated total number of fatalities and injuries for all the transportation-related activities in each scenario are presented in Table D-17. A breakdown of fatal and non-fatal injury risk estimates by the various transportation activities in each of the four scenarios are included in Tables D-9 through D-12, respectively.

*Table D-17: Estimated Fatalities and Injuries from Transportation Activities for All Scenarios*

| Scenario | Total Transportation-Related Fatalities | Total Transportation-Related Injuries |
|---|---|---|
| Scenario 1: Truck Transport to UDF and for Off-Site Disposal | 1.96 | 9.84 |
| Scenario 2: Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 2.26 | 10.9 |
| Scenario 3: Truck Transport to UDF; Mostly Rail/Truck Transport for Off-Site Disposal | 2.25 | 10.8 |
| Scenario 4: Mostly Rail/Truck Transport to UDF; Rail/Truck Transport for Off-Site Disposal | 2.28 | 10.9 |

The fewest fatalities and non-fatal injuries were estimated for Scenario 1. This is largely due to the accident rates for rail being more than a factor of 10 times greater than the accident rates for large trucks (see Tables D-14 and D-15) as well as the different ratios of truck transport and rail transport for each scenario. There is not a significant difference among the other three site-wide scenarios in terms of expected transportation-related fatalities and injuries.

# 4 References


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# Tables

**Table D-2**
**Scenario 1 Total Work Hours and Estimated Fatalities and Injuries by Labor Category and Work Site Activity**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| | Labor Category | Total Work Hours by Activity | | |
|---|---|---|---|---|
| | | Loading | Off-loading | Construction |
| **Total Work Hours** | Contractor/Foreman | 3,540 | 0 | 0 |
| | General Operator | 3,540 | 0 | 0 |
| | General Laborer | 3,540 | 0 | 0 |
| | **Total** | **10,600** | **0** | **0** |
| **Estimated Fatalities** | | 3.86E-04 | 0 | 0 |
| | | 9.83E-05 | 0 | 0 |
| | | 3.01E-04 | 0 | 0 |
| | **Total Estimated Fatalities** | **7.86E-04** | **0** | **0** |
| | **Probability of At Least One Fatality** | **7.85E-04** | **0** | **0** |
| **Estimated Non-Fatal Injuries** | | 0.048 | 0.000 | 0.000 |
| | | 0.048 | 0.000 | 0.000 |
| | | 0.048 | 0.000 | 0.000 |
| | **Total Estimated Non-Fatal Injuries** | **0.143** | **0.000** | **0.000** |
| | **Probability of At Least One Non-Fatal Injury** | **0.134** | **0.000** | **0.000** |

**Note:**
Values rounded to three significant figures.

**Table D-3**
**Scenario 2 Total Work Hours and Estimated Fatalities and Injuries by Labor Category and Work Site Activity**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| | Labor Category | Activity | | |
|---|---|---|---|---|
| | | Loading | Off-loading | Construction |
| **Total Work Hours** | Contractor/Foreman | 3,540 | 0 | 1,480 |
| | General Operator | 3,540 | 0 | 7,400 |
| | General Laborer | 7,080 | 0 | 5,920 |
| | **Total** | **14,200** | **0** | **14,800** |
| **Estimated Fatalities** | Contractor/Foreman | 3.86E-04 | 0 | 1.61E-04 |
| | General Operator | 9.83E-05 | 0 | 2.06E-04 |
| | General Laborer | 6.03E-04 | 0 | 5.04E-04 |
| | **Total Estimated Fatalities** | **1.09E-03** | **0** | **8.71E-04** |
| | **Probability of At Least One Fatality** | **1.09E-03** | **0** | **8.71E-04** |
| **Estimated Non-Fatal Injuries** | Contractor/Foreman | 4.78E-02 | 0 | 2.00E-02 |
| | General Operator | 4.78E-02 | 0 | 1.00E-01 |
| | General Laborer | 9.57E-02 | 0 | 8.00E-02 |
| | **Total Estimated Non-Fatal Injuries** | **1.91E-01** | **0** | **2.00E-01** |
| | **Probability of At Least One Non-Fatal Injury** | **1.74E-01** | **0** | **1.81E-01** |

**Note:**
Values rounded to three significant figures.

**Table D-4**
**Scenario 3 Total Work Hours and Estimated Fatalities and Injuries by Labor Category and Work Site Activity**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| | Labor Category | Activity | | |
|---|---|---|---|---|
| | | Loading | Off-loading | Construction |
| **Total Work Hours** | Contractor/Foreman | 3,540 | 0 | 960 |
| | General Operator | 3,540 | 0 | 4,800 |
| | General Laborer | 6,480 | 0 | 3,840 |
| | **Total** | **13,600** | **0** | **9,600** |
| **Estimated Fatalities** | Contractor/Foreman | 3.86E-04 | 0 | 1.05E-04 |
| | General Operator | 9.83E-05 | 0 | 1.33E-04 |
| | General Laborer | 5.52E-04 | 0 | 3.27E-04 |
| | **Total Estimated Fatalities** | **1.04E-03** | **0** | **5.65E-04** |
| | **Probability of At Least One Fatality** | **1.04E-03** | **0** | **5.65E-04** |
| **Estimated Non-Fatal Injuries** | Contractor/Foreman | 4.78E-02 | 0 | 1.30E-02 |
| | General Operator | 4.78E-02 | 0 | 6.48E-02 |
| | General Laborer | 8.75E-02 | 0 | 5.19E-02 |
| | **Total Estimated Non-Fatal Injuries** | **1.83E-01** | **0** | **1.30E-01** |
| | **Probability of At Least One Non-Fatal Injury** | **1.83E-01** | **0** | **1.30E-01** |

**Note:**
Values rounded to three significant figures.

**Table D-5**
**Scenario 4 Total Work Hours and Estimated Fatalities and Injuries by Labor Category and Work Site Activity**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| | Labor Category | Activity: Loading | Activity: Off-loading | Activity: Construction |
|---|---|---|---|---|
| **Total Work Hours** | Contractor/Foreman | 11,200 | 7,640 | 1,480 |
| | General Operator | 11,200 | 7,640 | 7,400 |
| | General Laborer | 22,400 | 15,300 | 5,920 |
| | **Total** | **44,800** | **30,600** | **14,800** |
| **Estimated Fatalities** | Contractor/Foreman | 1.22E-03 | 8.33E-04 | 1.61E-04 |
| | General Operator | 3.11E-04 | 2.12E-04 | 2.06E-04 |
| | General Laborer | 1.91E-03 | 1.30E-03 | 5.04E-04 |
| | **Total Estimated Fatalities** | **3.44E-03** | **2.35E-03** | **8.71E-04** |
| | **Probability of At Least One Fatality** | **3.43E-03** | **2.35E-03** | **8.71E-04** |
| **Estimated Non-Fatal Injuries** | Contractor/Foreman | 1.51E-01 | 1.03E-01 | 2.00E-02 |
| | General Operator | 1.51E-01 | 1.03E-01 | 1.00E-01 |
| | General Laborer | 3.03E-01 | 2.07E-01 | 8.00E-02 |
| | **Total Estimated Non-Fatal Injuries** | **6.05E-01** | **4.13E-01** | **2.00E-01** |
| | **Probability of At Least One Non-Fatal Injury** | **4.54E-01** | **3.38E-01** | **1.81E-01** |

**Note:**
Values rounded to three significant figures.

**Table D-9**
**Scenario 1 Total Travel Miles and Estimated Fatalities and Injuries by Transportation Activity**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Category | Activity | | |
|---|---|---|---|
| | Truck Transport | Truck Transport (for Train/Rail Approach) | Rail Transport |
| Total VMT or Train Miles | 230,000 | 957,000 | 1,670,000 |
| Fatal Accident Rate | 1.71E-08 | 1.71E-08 | 1.16E-06 |
| **Fatality Estimate** | **0.00393** | **0.0164** | **1.94** |
| **P (≥1) Fatality** | **0.00393** | **0.0163** | **0.857** |
| Injury Accident Rate | 4.92E-07 | 4.92E-07 | 5.53E-06 |
| **Injury Estimate** | **0.113** | **0.471** | **9.26** |
| **P (≥1) Injury** | **0.107** | **0.375** | **1.00** |

**Notes:**
1. Miles consider round-trip travel.
2. Values rounded to three significant figures.

**Table D-10**
**Scenario 2 Total Travel Miles and Estimated Fatalities and Injuries by Transportation Activity**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Category | Activity | | |
|---|---|---|---|
| | **Truck Transport** | **Truck Transport (for Train/Rail Approach)** | **Rail Transport** |
| Total VMT or Train Miles | 230,000 | 15,000 | 1,940,000 |
| Fatal Accident Rate | 1.71E-08 | 1.71E-08 | 1.16E-06 |
| **Fatality Estimate** | **0.00393** | **0.000263** | **2.26** |
| **P (≥1) Fatality** | **0.00393** | **0.000263** | **0.895** |
| Injury Accident Rate | 4.92E-07 | 4.92E-07 | 5.53E-06 |
| **Injury Estimate** | **0.113** | **0.00756** | **10.8** |
| **P (≥1) Injury** | **0.107** | **0.00753** | **1.00** |

**Notes:**
1. Miles consider round-trip travel.
2. Values rounded to three significant figures.

**Table D-11**
**Scenario 3 Total Travel Miles and Estimated Fatalities and Injuries by Transportation Activity**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Category | Activity | | |
|---|---|---|---|
| | **Truck Transport** | **Truck Transport (for Train/Rail Approach)** | **Rail Transport** |
| Total VMT or Train Miles | 230,000 | 97,700 | 1,930,000 |
| Fatal Accident Rate | 1.71E-08 | 1.71E-08 | 1.16E-06 |
| **Fatality Estimate** | **0.0039** | **0.001674** | **2.24** |
| **P (≥1) Fatality** | **0.0039** | **0.001673** | **0.894** |
| Injury Accident Rate | 4.92E-07 | 4.92E-07 | 5.53E-06 |
| **Injury Estimate** | **0.113** | **0.04806** | **10.7** |
| **P (≥1) Injury** | **0.107** | **0.04692** | **1.00** |

**Notes:**
1. Miles consider round-trip travel.
2. Values rounded to three significant figures.

**Table D-12**
**Scenario 4 Total Travel Miles and Estimated Fatalities and Injuries by Transportation Activity**
**Revised On-Site and Off-Site Transportation and Disposal Plan**
**Housatonic River – Rest of River**

| Category | Activity | | |
|---|---|---|---|
| | **Truck Transport** | **Truck Transport (for Train/Rail Approach)** | **Rail Transport** |
| Total VMT or Train Miles | 37,400 | 105,000 | 1,960,000 |
| Fatal Accident Rate | 1.71E-08 | 1.71E-08 | 1.16E-06 |
| **Fatality Estimate** | **0.000641** | **0.001805** | **2.27** |
| **P (≥1) Fatality** | **0.000641** | **0.00180** | **0.897** |
| Injury Accident Rate | 4.92E-07 | 4.92E-07 | 5.53E-06 |
| **Injury Estimate** | **0.0184** | **0.0518** | **10.8** |
| **P (≥1) Injury** | **0.0182** | **0.0505** | **1.00** |

**Notes:**
1. Miles consider round-trip travel.
2. Values rounded to three significant figures.

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